

THE AUTOCAR

A Journal published in the interests of the mechanically propelled road carriage.

EDITED BY H. WALTER STANER.

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Notes.

Instruction Books.

If there is one thing appreciated more than another by the owner of a car, it is a good instruction book. Quite a number of makers now issue these books, and some of them are very good, but there is a tendency to make them too general in character, and instructions are given which might well be part of a book dealing with cars generally, and not with one car in particular. In the majority of cases, these general instructions

might well be omitted and the reader referred to some such book as "Hints and Tips" or the "Dictionary of Motoring." What the owner of a car wants is the fullest possible details of the mechanism of his car and instructions as to how the particular part should be dealt with if it is necessary to take it down, and the exact way to proceed about it. For instance, if it should be necessary to take down the carburetter, with the interior of which the owner is not acquainted, it is of the greatest possible assistance to him to have very plain drawings of its interior parts and equally plain instructions as to how to get at them.

Some makers argue that there is no need for these instruction books, because the average owner is quite incapable of making any intricate adjustment or locating any fault which is at all difficult to find, and that, therefore, it is unnecessary to have carefully prepared drawings of the car, which, sooner or later, will require adjustment or other attention. It is argued that these matters will be dealt with by the repairer. It is forgotten, however, that there are plenty of competent repairers who would appreciate the instruction book as much as the owner, because the most skilled repairer who has not minutely studied the details of any particular car cannot see what is inside every part of it by merely examining the exterior, and he would often be greatly assisted with a good drawing or two, and any saving of his time means a saving for the owner.

It is also well to recollect that harm is often done in taking cars to pieces through not knowing exactly how they are constructed. This is frequently the case with very careful repairers. As to the careless ones, nothing will stop them from doing harm, for the simple reason that they are clumsy and are not interested in their work, and they probably will not take the trouble to master the intricacies of a repair job before starting upon it. Such people ought never to have been engaged in any mechanical pursuit. There are, however, people with mechanical instincts among both owners and repairers, and it is to these that well-defined instructions as to repairs and management especially appeal.

Intelligent Road Mending.

We have heard a good deal about the alleged damage done to roads by motor cars. We would be the last to deny that cars do some damage to the roads. Wear and tear damage everything, and although a motor car does far less harm to a road than does a horsed carriage it still causes some wear, and the wear that it causes is of a different sort from that caused by a horsed carriage or cart. Further than that, it is only the very largest and fastest cars which make any noticeable impression upon the roads. The real cause of the damage which people from time to time allege is done by the motor car is due to another cause entirely—that is to say, to the bad system of road repair which is prevalent in so many districts. Quite recently the surveyor of a certain road over which a more than average number of large fast cars passed daily showed us what he was pleased

to assert was the damage done by motor car traffic. In his company we examined the road carefully, and as we happened to have known it very well for many years we could only tell him that we had seen precisely similar indications of wear in the same road before a motor car had ever passed over it.

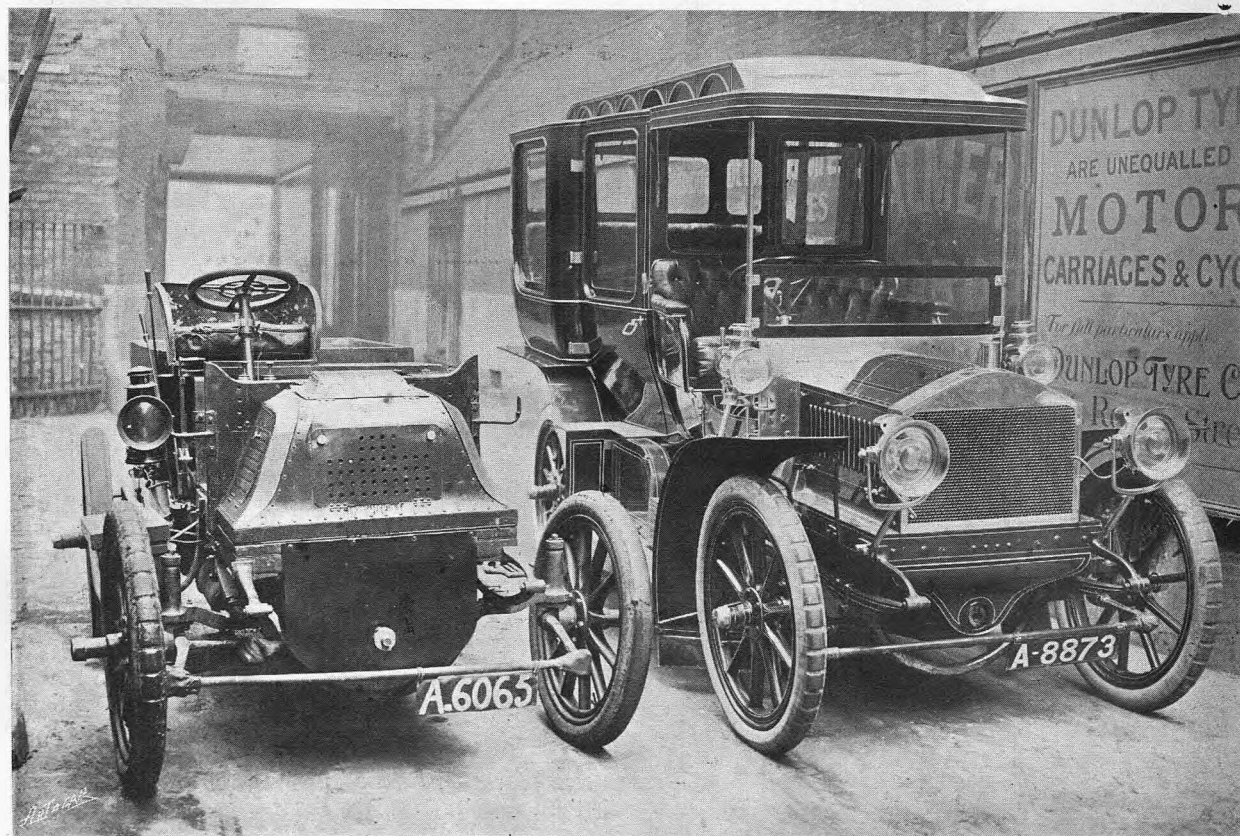
Now, the damage which the surveyor showed us consisted of holes which ran in parallel lines in the wheel tracks. It appeared as though at intervals of four or five feet holes about 9in. wide and double that length had been made in the surface. They were simply oblong saucer-like depressions, which, whenever the weather was wet, became a series of puddles. As everyone knows, the average driver, whether of a horse or motor, keeps to the middle of the road when there is nothing in his way, and all these holes can easily be dodged by driving about a foot away from the middle of the road. The surveyor was positive the damage was done by motor cars. We were equally positive it was not, but we pointed out to him that even if it were it was not so bad as the damage which would have been done by horse carriages, inasmuch as, instead of being a series of holes, there would have been one long depression or rut, so that, even accepting his assertion, the cars were not doing so much harm as horse vehicles would have done, as motor cars only made holes instead of continuous troughs.

We then asked him how the road could be repaired. He at once said there was no remedy for it except to put down tons of new metal. We never like to interfere with a man's profession or business, but we could not refrain from telling this road engineer that the method he proposed was absolutely and unnecessarily extravagant. The road, as a whole, was perfectly

sound, and there was nothing wrong with it except the depressions mentioned, and we hinted to him in the most delicate manner of which we were capable that the way to repair that road was simply this—to send a man with a barrow load of small stones, no dirt, grit, or gravel, but small stones only. This man should be armed with a little hand pick, a small shovel, and a hand rammer, and his duty would be to carefully fill up the holes one by one, after loosening the surface with the hand pick, and ram the stones home by hand.

When a road is really worn down it must be repaired all over, but to put stones all across a road when only a few holes need filling up is folly. The half-and-half measure which is too often adopted of sending a cart-load of stones down a road and putting a shovelful into every depression is equally foolish, because the stones are always too large, and are kicked all over the road. The average county and district council seems vastly more willing to spend money upon material than upon labour. Why, we do not know.

We cannot believe, with so many people out of work, that it is impossible, particularly near the larger towns, to obtain men who could intelligently, after very short instruction, repair the holes and inequalities in the way we have suggested. Each man should be given a certain section to be kept in repair, and if it were really well looked after and the system carefully and intelligently carried out we are convinced that the roads would not only be better, but would cost less to keep in good trim than by the present wasteful methods adopted. But nothing can be done so long as road authorities labour under the delusion that only the most unintelligent labour can be employed for roadmaking.



An evidence of the advance in motor car construction. The first Napier car built in 1900 and one of the same make early in the present year.

SOME COSTS OF RUNNING.

A COLLECTION OF UNINVITED STATISTICS CONTRIBUTED BY READERS.

A Medical Man's Expenditure.

We are always interested to have particulars of the actual cost of running a car. The figures given below have been compiled by a medical motorist in the Melton Mowbray district. We are not at liberty to give his name, but we may say that his car is a Little Star, which he purchased in October, 1904. The figures speak for themselves, but it will be interesting to add that the first 2,505 miles were performed on a consumption of exactly 100 gallons, this giving an average of twenty-five miles to the gallon, and it is significant to know that the first 1,200 miles gave an average of only twenty-two miles to the gallon, but the rest of the 2,500 miles gave an average of twenty-nine miles to the gallon, so that it shows how a little skill in driving affects these matters, because when the owner started, he was more or less of a novice. It is, perhaps, well to mention that the Little Star has a twin-cylinder engine, $3\frac{1}{2}$ in. by $4\frac{1}{2}$ in., and considering that the particular machine referred to had a glass screen and Cape hood, and was used in all weathers, through snow and over heavy winter roads, we think the consumption of fuel is most reasonable. Last, but not least, it is well to add that the owner kept two horses before he had his car; he has now dispensed entirely with horseflesh.

Car with hood and glass screen (all extras), one spare outer cover, two spare inner tubes, extra large tyres (85 mm.), apron, hamper, three lamps and a Polkey headlight, jack, volt-meter, extra twenty ampere accumulator, bucket back seat	£222	19	7
Petrol for 2,505 miles = 100 gallons	5	0	0
Lubricating oil and grease	1	5	6
Paraffin		11	8
New water pump	2	0	0
Sparking plugs		7	0
Repairs to tyres, mechanic's time for overhauling car, etc., etc.; also for fitting new water pump	5	10	0
Sundries (cloths, waste, patches, etc.)		8	7
	£238	2	4

Miles run—2,505.

2.284 Pence per Mile.

Mr. W. Pickard, of Mansfield, the owner of a 12 h.p. 1904 model De Dion car, writes:

"I have run my car during the past twelve months and have kept a careful record of the miles run and also of the cost, which I have pleasure in tabulating below. I may say the car has given me great pleasure and satisfaction in every way. We have had no stops of more than five minutes' duration excepting for tyre trouble, and even now we are still running one of the original tyres, which has never had a puncture, never been off the wheel, and only been blown up twice during the year."

Car brought home April 29th, 1904.

Repairs	£	s.	d.
Oil (a 28 lbs. tin still in stock)	5	13	2
Petrol (461 gallons)	4	10	3
New accumulators	23	9	0
Recharging accumulators	2	2	0
Tyres		14	0
		35	4
Total	£71	13	2

Miles run—7,528 = 2.284d. per mile.

11,260 Miles in 2½ Years.

The following facts may interest owners of light cars. The expenses and mileage have been very carefully recorded. In August, 1902, I bought a $4\frac{1}{2}$ h.p. Oldsmobile car for £200, with hood and back seat. Clothes, accessories, insurance, etc., added £64 to the first cost, making £264 in all. Since then I have run the car 11,260 miles. It has required two thorough overhauls and two partial overhauls. The car was fitted with 1904 Crypto gear, 1904 carburetter, 1904 cylinder (owing to a crack near lower cylinder head bolt), a new rear axle complete, solid tyres to back wheels, new Continentals to front wheels, have broken in dash twice, snapped rear axle once, crumpled up near front wheel once (side-slip), had car revarnished once, and repainted once. Have been to Strathpeffer from Eastbourne and back, to Ireland round 1903 Gordon-Bennett course, and used car almost daily in Portsmouth for two years. I find that the total amount of money I have spent on the car, including wages at £1 a week for eighteen months, and 30s. a week for the last year, comes to £758.

Total money spent	£	758
Initial outlay		264
Cost to run		494
Sold for		50
		444 = 9½d. per mile.
	+	264
		708 = 1s. 3d. per mile.
Less wages		116
		592 = 1s. 0½d. per mile.
Less initial outlay		264
		£328 = 7d. per mile.

I leave readers to draw their own conclusions, but I consider the fun, enjoyment, and use I have had out of the car have been worth the expense, and one must also take into consideration the probable cost of trains, cabs, and the expense of other amusements which would have taken the motor's place in the two and a half years it was in my possession. Also that 1905 cars, to do the same work, should not cost anything like as much, in consequence of the improvements in design and durability which have taken place during the past three years. R. K. ARBUTHNOT.

First Year's Costs.

Dr. T. J. Dowse, of Wexford, in a short account of his first year's experience of motoring says: "During that time I have travelled 3,236 miles with only one involuntary stop, which was quite easily remedied, as it was occasioned by the wearing through of the high-tension wire where it fastens on to the sparking plug. The only repairs I required were the upper leaf of both front and back springs, left side, broken in consequence of the bad condition of some of our roads. In all, my repairs came to 24s. for the year, petrol and lubricating oil to £8, altogether, including every little item, exactly £10 os. 4d. I have been fortunate in not having had a single puncture, and altogether no car of any make could possibly have given greater satisfaction. I may say that I have not found it necessary

to tighten a bolt in it since I got it. In explanation of the low figure for running expenses and upkeep, I have always driven the car myself, and do not keep a professional chauffeur; my indoor servant has kept the machine oiled and cleaned."

[Two Years' Costs.

I beg to enclose running expenses, etc., of my 12 h.p. Clément-Talbot for two years. The accounts and the mileage have been carefully kept. I am still driving the car about 200 miles a week, and it has never been running better than at present. I also enclose a few particulars of my 24 h.p. Léon Bollée which may be of interest:

12 H.P. FOUR-CYLINDER CLEMENT-TALBOT.

First year's total running expenses, ending July 31st, 1904:

New and repair tyres	£46	15	0
588 gallons of petrol	36	6	0
Oil, grease, leathers, sponges, cloths, charging accumulators	5	8	3
Repairs	1	14	3
Sparking plugs	1	12	0
Insurance	13	2	6
Damage to car in collision	2	10	0
Registration and licenses	3	12	0
	£111	0	0

Distance run, 9,600 miles = 2½d. per mile.

Second year's total running expenses, ending July 31st, 1905:

New and repair tyres	£87	2	6
760 gallons of petrol	35	10	0
Oil, grease, leathers, sponges, cloths, charging accumulators	4	10	6
Overhauling and renewals	44	15	0
Sparking plugs	2	4	0
Insurance	10	0	0
Licenses	2	12	0
Two Parsons chains, and repairing	9	6	0
	£196	0	0

Distance run, 11,123 miles = 4½d. per mile.

Total expenses, two years, £307.

20,723 miles = 3½d. per mile.

Car was used 454 days.

Car began the third year with one old cover and three practically new covers.

Car overhauled December, 1904, having run 14,500 miles.

Original pair of Michelin covers on driving wheels did 4,300 miles, unpunctured; taken off for retreading.

Original pair of Michelin covers on front wheels did—near side, 12,920 miles, including one retread, no puncture, but one burst to finish with; off side, 12,120 miles, including one retread, one puncture, and one burst to finish with.

The second pair of Michelins on driving wheels did 5,400 and 5,200 miles before being removed for retreading.

Another Michelin did 5,400 miles on driving wheels with no puncture; taken off for retreading, and did another 1,200 miles.

Using Parsons chains for 150 miles, a Palmer tyre was done for at 1,200 miles; and using the Parsons chain for ninety miles, another Palmer was finished at 1,600 miles. I say "finished," as the estimate for repairing it was more than the price of a new Michelin.

I have driven the car from Ascot up to Ross-shire and back twice, and drive to my business in London four days a week in summer and three days a week in winter, and I have not been in a train this year. The two sets of Dinin accumulators supplied with the car have never had any repair of any kind, and are still in use.

As regards petrol consumption, under ordinary touring conditions the car did eighteen miles to the gallon on my trip to Ross-shire and back—1,300 miles in August, 1903; but in August, 1904, my man fitted a hand throttle, controlling the butterfly valve with a Bowden wire, and we did twenty-two miles to the gallon for the journey of 1,300 miles.

Since June 1st I have also been driving a 24 h.p. Léon Bollée, and so far have done 4,000 miles, including a tour in Scotland of 1,800 miles, going up to John-o'-Groat's, etc. Beyond the petrol, oil, and grease required, this car has not cost me a penny since delivery in June, and I have not used a single spare part—not even a sparking plug. I have not had a puncture, and the Michelins supplied with the car have not been removed. The car has a large and comfortable body to seat seven, with a removable brougham top, and weighs 28 cwt. without the top. I drove back from Ross-shire to Ascot (630 miles) without adding a drop of water to the radiator, although I took five days to do the journey, being out for pleasure, in no hurry, and most anxious to escape the attention of "hedgehogs." I went up the Great North Road and returned by the North-west Road, and, thanks to many friendly warnings, successfully negotiated the numerous police traps.

LEYCESTER BARWELL.

The Cheapest Method of Locomotion.

At Easter last I purchased an 8 h.p. Darracq with detachable tonneau. I have run the car now about 6,750 miles, mostly over hilly country, including a tour round England, and the crossing from Wharfedale to Wensleydale in Yorkshire, one of the hilliest and roughest roads in the country. I can run from thirty to thirty-three miles on a gallon of petrol, and my bills so far this season, including petrol, oil, plugs, one new tyre only and one retreaded, charging accumulators, repairs, etc., amount to about £31. I always drive myself, and, although not a mechanic, have only been stranded once. If the tyre question can be satisfactorily solved, motoring will, I am sure, very soon hold undoubted sway as the best and cheapest method of locomotion.

HARRY D. LEATHER.

(To be continued.)



TOURING IN AMERICA.—A glen near Mount Washington.

GENERALITIES. By Rutulan.

The Life of Tyres.

Being a lazy individual and a hater of trouble in any form, I believe I detest tyre annoyances more than anything else in connection with a car. Consequently, I have just had a new set of covers fitted rather than take risks of future intervals by the way-side. Two of the covers were still in fairly good condition, but beginning to show signs of wear. Now I find that, amongst potential motorists, there is always a haunting fear that the tyre bill is going to be something enormous; therefore, it may interest those who tremble to know that the old set lasted me very nearly six thousand miles. This on a car weighing a little short of half a ton gives one a fair criterion of what the cost of tyres will work out to on a small car. Of course, a life such as this means careful driving. If you are going to indulge in plentiful brakework and frequent skidding you may easily wear out a set of tyres in a thousand miles. But I give this figure as food for thought to those who are driven to believe that tyre expenditure is an ever-recurring expense that will weigh down the pocket of the man of moderate means, to whom the small car more peculiarly appeals.

The Cost of a Small Car.

The cost of upkeep of a small car is a matter of almost more importance than original outlay to most buyers, for the man who buys a small car is presumably one who has to earn all he spends, and, therefore, to spend carefully. Last year I kept a careful record of what it cost me to keep a pony and trap, and, against that, what I spent on car maintenance, and it may come as a surprise to some to know that, leaving all matters of mileage out of the question, the relative costs were almost identical. The car cost a few pounds more per annum, but not sufficiently more to make a material difference, while it covered quite three times the mileage. Had the car mileage been brought down to that of the trap, and the consumption and wear and tear relatively reduced, the car would have come out the lower of the two. And in this I placed car depreciation at three years' purchase, which cannot be said to be over-favourable to the car.

A Comparison with a Pony-cart.

The pony and trap afford really the best comparison with the small car, because the man who keeps the one is the man who is going to keep the other in the future. The pony and trap cost, in round figures, £70 a year; the car, including depreciation and on a total run of five thousand miles, costs just under £90. Allow £10 depreciation for the pony and trap, and also allow that a small car would be saleable at some price at the end of three years, if only as scrap, and you will see that there is very little difference between the two. But while the car covered 5,000 miles, the pony's total was only 1,600 miles. I have been told that, in this comparison, I ought to have made some allowance for the services of the stableboy in the house. But the stableboy's housework is merely a filling-up of his time. He saves no other expense in labour; he could well be done without. In a large establishment the stableboy may save another servant's keep and wages, but it is not to those who maintain large establishments that such questions as these appeal. On the other hand, it is imperative that, if one would keep a small car at such a cost, the greater part of the work must be done one's self; but by this I do not mean such work as washing the car and

general cleaning-up. It is easy enough to hire a man to come two or three times a week for that. But it has been my experience that there is practically no difference between the cost of maintenance of a small car and that of a pony and trap, while the former will do from three to four times the work of the latter, or more if asked, besides being so much better fun.

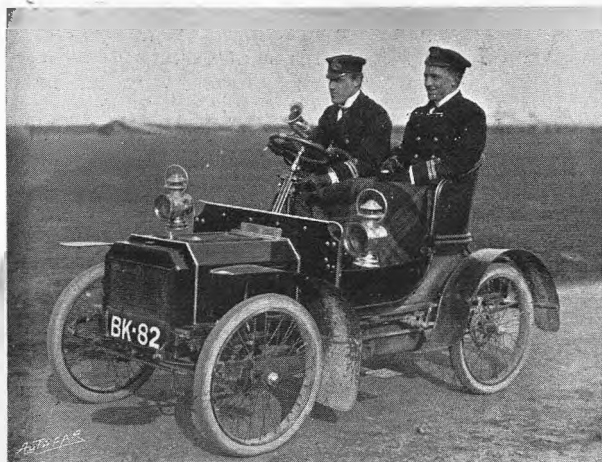
The Idiocy of Ignorance.

The longer one sits at the steering wheel the more thoroughly must one become convinced that the British public, in the mass, is, with all due respect, "mostly fools." Every motorist could relate dozens of instances as evidence of this from his own experience; here is an actual relation of what I endured no further back than last Saturday afternoon. At the foot of one of the hills just south of Elstree, *en route* to Edgware and London, stood a party of country folk. There was a wet patch where they stood, which suggested possibilities of side-slip, therefore I edged as far as possible to the other side, although I was still bound to be within a yard of them. The side-slip happened, and the car lurched over towards them, just brushing past an old woman, amidst yells of execration from the crowd, who seemed to regard this as a form of motoring amusement. Yet they could just as easily have stood on the footpath, instead of half-way across the road. A few miles further, approaching London, I came out from behind an electric tram, intending to pass it, to find myself faced by a dear old man who was driving the old grey mare dreamily home. He was on his wrong side, and had I not pulled up rapidly, I suppose the unfortunate motorist would have been to blame for running into a horse whose driver did not think it worth while to look where he was going, and wandered down the wrong side of a busy road. Finally, driving down the Edgware Road, towards Marble Arch, I came upon two men who had apparently drawn their week's wages some hours earlier, and were now engaged in a drunken fight in the middle of the road. They were just midway between a street refuge and the footpath, and as they treated the sound of the horn with contemptuous indifference, I had no alternative but to pull up. A cabby who had been trotting along behind me had some difficulty in keeping his horse off the back of the car, and addressed the wranglers in appropriate fashion, and within a few seconds there was a long string of traffic held up by a couple of drunken brawlers. Locked in each other's arms, they refused to get out of the way, while some of the on-lookers shouted to me to drive on and over the precious pair. I felt strongly tempted to do it, but fortunately two stalwart policemen relieved the situation by taking the pair off to a place where they would have time to think it over. If you are not a motorist, you may think this a remarkable relation; but if you belong to the elect, you will know that it is practically an everyday kind of happening. The more I see of things, the greater grows my surprise that the utter idiocy and ignorance of the British public does not lead to an infinitely larger number of "motor accidents" than we have recorded.

We hear that Messrs. J. W. Brooke and Co., Ltd., will float their business in the course of the next few months. The capitalisation will be extremely moderate though a dividend has been paid from the first.

MOTORS IN THE NAVY.

When the motor torpedo boat comes into being—an event that is within measurable distance—there will be no lack of handymen able to manage it. Motoring has caught on with the Navy. One of the first things a naval officer who has a shore billet does is to buy himself a car. Some of these officers, in fact, carry their cars afloat with them. Lord Charles Beresford set the fashion in this. He takes a motor car in his flagship, and never misses an opportunity of going ashore for a spin.



Two naval officers in a 6 h.p. Humberette.

Another famous officer who is an enthusiastic chauffeur is Admiral Percy Scott, of gun fame. As was to be expected of so resourceful a man, Admiral Scott soon devised other uses for his car than mere pleasuring. He mounted a Maxim in the driver's seat, and drove triumphantly into action at manœuvres, with

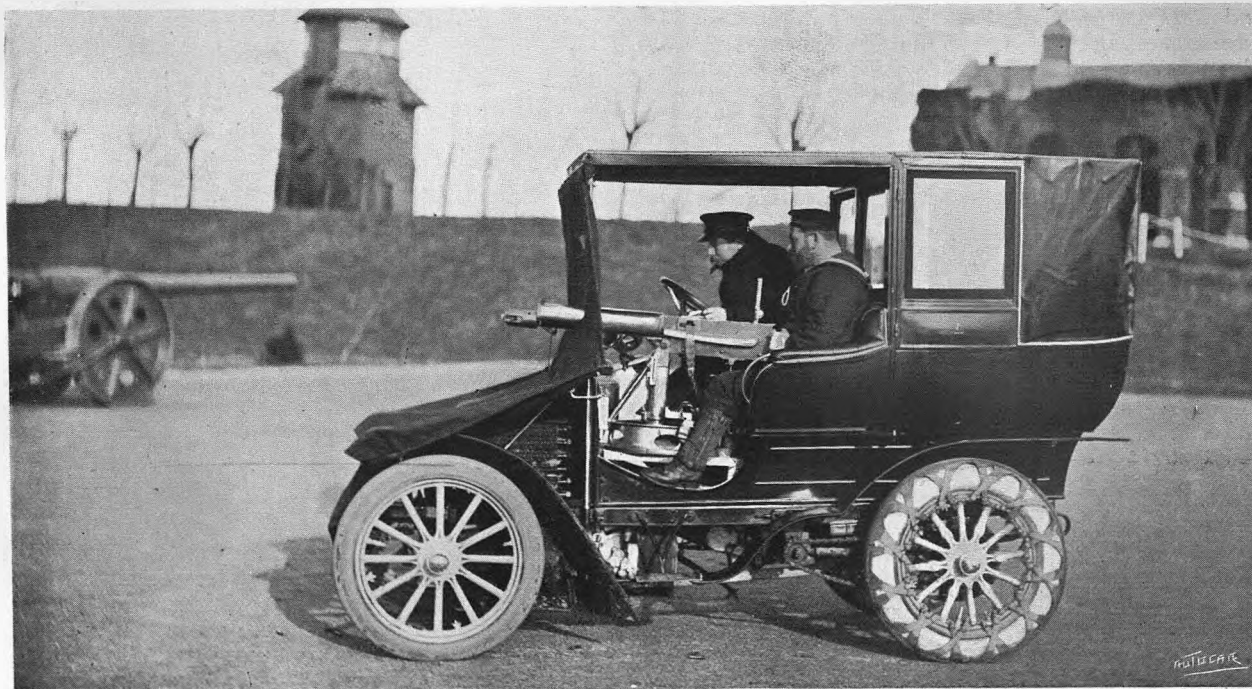
the gun peppering away at its hardest, much to the amusement of His Majesty the King, who witnessed the incident. There was something more in this than mere novelty, for Admiral Scott showed the utility of the motor machine guncarriage, and the great possibilities which lie before such a vehicle in warfare carried on in a country where there are decent roads. We give an illustration showing Admiral Percy Scott's car, with the Maxim firing from the front of it.

Amongst the officers of Admiral Scott's staff at the Whale Island Gunnery School are several enthusiastic motorists. One of these is Lieutenant F. C. Halahan, who has driven his 50 h.p. Wolseley for 12,000 miles during the past year, and the car is running as well as ever. Lieutenant Halahan finds it a good hill-climber, very comfortable for travelling, and in fifteen months all the repairs the car has required have been new sprockets and side chains and two new inlet valves.

Lieutenant the Hon. Ian L. Carnegie has also taken to motoring very strongly, and is an expert driver. Our picture shows him in his Humberette, accompanied by Lieutenant Crawford.

Jack makes an excellent chauffeur. Being a skilled mechanic and an electrician, he soon gets a knowledge of the intricacies of the motor car, and is able either to drive or overhaul it, as the case may be. Time was when cycling was the popular naval pastime, but Jack now prefers, instead of pedalling himself, letting petrol do that work for him, and the motor bicycle is consequently high in his favour.

The petrol motor has so much to recommend it that it is certain to be very largely adopted for naval uses. *Napier Minor* taught the Admiralty a lesson, and it is practically certain that before very long we shall have torpedo boats propelled by the same agency. Lord Charles Beresford was much impressed by the performance of Mr. Edge's speedy boat.



Admiral Scott's Wolseley car fitted with a Maxim gun.

A "TYRESOME" TRIP.

Ever since the demise of our old friend the steam car I had been labouring under the delusion that "incidents" on a modern motor trip were practically non-existent. The other day I received a shock—a rude and unpleasant shock—the memory of which will live with me for some time to come.

The Panhard and I arranged to go down for a week-end to stay in camp with the Devonshire Regiment on Salisbury Plain. That was the beginning of it. A guileless friend of mine, who was also asked, expressed the desire to accompany me on the car. As things turned out it was as well for me that he did so. Of the two new covers which had been despatched to have Samson treads put on them, only one arrived in time to be requisitioned for the trip, the result being that an elderly and decrepit tyre with all the studs out of it disgraced one back wheel, while the other flaunted the new cover, whose aggressive yellow hue was positively noisy. Two spare tubes and a childlike trust in providence were included in the outfit. Both were severely taxed!

The run down to Perham Down was accomplished with no mishap, the engine's steady purr, coupled with the distinctive whine of the Panhard gears, inducing an attitude in the passenger of such extreme comatosity that my intelligent remarks upon the beauty of the view and the intense heat of the afternoon had to be in each case driven home with well-directed blows from my elbow. His piteous pleadings to be allowed to slumber in peace had no effect on me, and I reminded him that my advice had been all against the second—and entirely unnecessary—bottle of Pilsener for lunch.

Innocents and Motor Cars.

As we sat and drifted pleasantly through the summer afternoon, a good car beneath and a warm welcome ahead, I felt inclined to sing aloud for the mere pleasure of it all. I think I *should* have sung right out loud but for the fact that I always prefer an accompaniment, and the passenger's snores (for he had escaped my vigilance for a moment) were not in the right key. Instead of making music I directed a well-aimed blow, which checked the snores and made him peevish. He demanded tea. Ye gods, tea! And after all that—well! I humoured him. We tea'd in Andover, and finally made our way, as the sun began to sink, over the rolling downs and a mile of newly-metalled road to the colony of white tents which marked our journey's end.

There is no need to dilate upon the kind of greeting accorded by a regimental mess to a visitor. It is the perfection of hospitality coupled with the minimum of reserve, and is valued by all accordingly. On the following afternoon the car was pressed into a new rôle, namely, grandstand on the polo ground. The protection from the sun afforded by the hood was appreciated by many, whose ribald remarks when, in the course of adjusting a front wheel bearing, my hands became—well, slightly soiled, were most unseemly. Those poor innocents little know what it is like to be *really* dirty, say after dismantling a gear box.

Well, I do not seem to be getting on with my story. That evening we concocted a plan for the following day. The colonel was lured—he needed some luring, too—into entrusting his precious life to my driving. The rest of the party consisted of my brother, another officer, my friend, and myself. The steady drip of rain on my nose next morning woke me to the fact that life under canvas is not always a bed of roses, as might be

supposed from the hilarious levity of the riverside camper. Slacking off tent ropes in heavy rain, with bare feet and prickly grass, does not appeal to me. However, by ten o'clock the weather had cleared, and we were able to make a start. Stonehenge was visited first. Having viewed the pyramids without experiencing a sense of disappointment, I hoped to have it in me to appreciate the monoliths at what (I am informed) is their true value. It could not be done at the price (1s.) which I paid for admission before discovering that the others had reached practically the same spot, by making a *détour* round the barbed-wire fence, for nothing. On we went to Salisbury, right across the plain—so-called because it is in no place flat. Lunch at the White Hart over, we embarked again for Romsey. On this stretch my brother proceeded to drive, what time his colonel showed traces of exceeding agitation, mentally vowing, I doubt not, to seek an early opportunity of court-martialling him for the anxiety caused. We had been invited to tea at Horsebridge, and were within a mile of that place, when—bang! Inspection showed a burst in the off front tyre. Over an hour afterwards a party, chastened by disaster and weary of inventing new combinations of words to express their sentiments, reached Horsebridge and tea. The extreme loveliness of our refuge, the garden, one mass of flowers, being formed out of an island set amidst the sparkling water of the Test, soothed our heated tempers and made us late for dinner, through disinclination to tear ourselves away from such a piece of fairyland.

Eventually we reached camp, to find the junior officers calculating the "steps" which would accrue from the decease of the motorists. When they saw us, I must say they disguised their disappointment manfully.

The Real Troubles.

Next day (here, in fact, begins the dolorous tale) the passenger and I started home. I say, advisedly, "started," for to say "went home" would not convey my meaning properly. It would give the impression that we got back under ordinary conditions. We did not. We started off at ten o'clock. We had fifty miles to go. We *arrived* at 6.30 p.m.! To take things in their proper order, five miles on the far side of Andover we burst the decrepit back cover. Hopeless. Five miles on the rim after extracting the inner tube. Bought new cover. The passenger at last useful, as he had a blank cheque. When the bill (by no means heavy for what we had) was made out the "blankness" was transferred to my visage. Proceeded without incident to Hartley Wintney. Suspicious swerve. New back tyre flat. Two mortal hours and a half did we spend by the roadside, a source of pleasurable interest to the simple villagers. The two spare tubes had been used for the two bursts, and one of the burst tubes had to be repaired. Intense heat not conducive to patches sticking. After putting on and taking off the cover four times we at last persuaded a large patch to do its duty, and proceeded. While waiting for patches to dry we had a hearty lunch of chocolate, solution, and French chalk. Within half a mile of home that patch came off, and we arrived in some style, the passenger standing on the near side step, doing his best to pull the car's weight off the damaged tyre, and myself leaning out the same side and steering as best I could. Oh, no! Motoring, after all, is not as dull as I thought. Oh, dear, no!

H. C. L.

THE SHOW AT OLYMPIA.

Compared with the Paris Show.

THE Society of Motor Manufacturers and Traders particularly and the automobile industry generally have no sort of reason to feel ashamed of the shows their united efforts have put on under the big iron sweep of Olympia's cleansed and re-glazed roof. The huge covered space at West Kensington can never make comparison with the Grand Palais de l'Industrie in the Champs Elysées, but, after all, it is not the building, but what it covers, which monopolises the interest. Great as is the reputation of the French Salon, it has not in the past, nor will it this year, surpass the Addison Road exhibition in variety, excellence, and international interest. Such improvements as were possible to be made to Olympia to fit it for exhibition purposes have been effected, the most marked being the cleansing or re-glazing of that part of the glass roof which was left blackened after the removal of the huge curtain last year.

The attendances in the early part of the week were most satisfactory, and, the boding prophecies of no buyers notwithstanding, good business has already been done on all sides.

Improvements in Detail.

Although no startling departures are anywhere noticeable, yet the manifold improvements in detail, which are particularly evident to those who keep a keen eye upon automobile development, are more than enough to repay a careful and painstaking tour of the show.

Cylinders.

The following points, amongst others, will be found to impress themselves upon the visitor as he makes his inspection. It will be noted that the practice of casting the four cylinders of a four-cylinder engine solid, first attempted and since continued by an English firm, has been followed by another English firm more lately arrived and two of the oldest leading French houses. The practice has much to be said for it on the score of machining, and the extra foundry and waster cost will be disregarded by those who ever strive for the best possible results. Referring to the other extreme, that of casting cylinders singly, no matter their number, this, by the evidence of Olympia at all events, does not appear to have become so general as it was expected to do a year or more ago. In the matter of four-cylinder engines there are signs on all sides of a continued leaning towards casting the cylinders in pairs and setting all the valve chambers on one side, so that, with m.o. valves one half-time-shaft serves.

Carburetters.

With regard to carburetters, it may, we think, be said with truth that independent, suction-actuated automatic valves are now general, but in addition thereto there is a distinct tendency so to arrange these automatic valves with regard to the throttle as to permit the entry of full charges of pure cold air to the cylinders whenever the throttle is fully closed. From the points of view of cleansing, cooling, and engine braking this is excellent practice, although the possibility of temporarily upsetting the mixture proportions upon dethrottling must force itself upon the mind.

In many cases we found the throttle valve suitably connected to the clutch striking gear, so that upon declutching the engine is promptly throttled, and held

throttled so long as the clutch is out. As this leaves the driver entirely hand free and obviates the necessity of governor complication it is to be recommended. Again, in very many cases the throttle is found to be controlled in duplicate—that is to say, it is connected up both to a throttle lever on the steering wheel and a small pedal. As this also makes for hand freedom it is quite advisable.

Before quitting carburetters the tendency to give control of the petrol supply to the jet from the dashboard or steering wheel must be noted. The capability of adjusting the service of petrol while running must make for cooler engines, greater efficiency, and more interest in driving.

Water Circulation.

While more water circulating pumps are being lifted to frame level and gear driven, there are signs of more than a few firms abandoning the pump altogether and pinning their faith to thermo-syphon cooling. In making provision for this system it will be noticed that pipes of large and increasing diameters set with proper falls and additional water space by inward overhang of the upper part of the radiator are provided. Also the flywheels are in many cases cast with vane arms to create a draught and eliminate the usual belt-driven fan. It looks as if the pump would ultimately go altogether. Push forward in lieu of piano type pedals are now almost universal.

Gate Quadrants.

The Mercedes form of gate quadrant for changing speed finds in a greater or less degree more imitators every year, but on certain of the vehicles care has been taken to make it impossible for a driver to accidentally or inadvertently change into his reverse. There are also one or two instances where the reversing striking mechanism is connected up to a ratchet and pawl sprag in such a way that when the gear striking lever is moved to the reverse position the pawl is lifted if down, and cannot be returned to the ratchet wheel until the reverse is once more disengaged.

Protection of Underframes.

Metal aprons protecting the crank chamber and gear box are very general, and there is an evident increase in the frame examples where the frame flanges of stamped steel frames are flared to form these protective screens and to make bed-plate supports for engine and gear box. The secondary or underframe is apparently passing away. Outside clutch springs, more or less on Turcat-Méry lines, are found here and there. Beyond particular accessibility we do not know that they have overmuch to recommend them.

Control Devices.

One or two cars have a deceleration pedal fitted to the dashboard for traffic driving, and there are several instances where the control of the induction valve inlet is depended upon and recommended for use in cities and towns in place of the throttle.

Magneto ignition of the high-tension or synchronised description is largely on the increase, while the low-tension magneto has, if anything, lost some of its support.

In chain-driven cars there is more than a tendency to separate the countershaft and differential gear case from the gear box with a view to shortening chains and affording wider side entrances.

Bearings.

The use of ball bearings is largely on the increase, and we are pleased to note that those of English manufacture are held in high favour. In two or three instances we find them fitted to crankshafts, but as a whole constructors seem very chary of going to this length. On gearshafts, propeller-shafts, back axles, and road wheels they are almost universal at Olympia.

Pressed Steel Frames.

Another point in constructional detail which cannot fail to attract attention of those who look below the surface is the increasing adoption of pressed steel frames. Some beautiful examples of these are to be found, and faith in this frame must be great other-

wise the firms who specialise on its production would not have risked laying down the expensive plant required to press the various sections out from the plate.

Brakes.

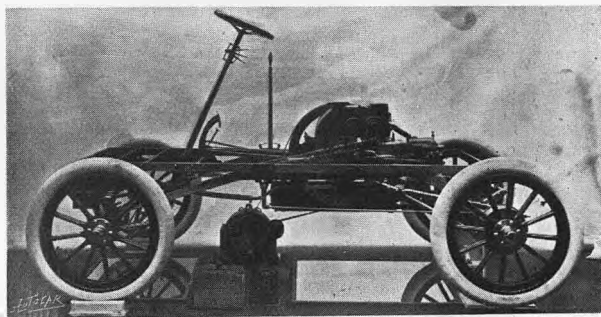
Brakes show all-round improvement, as many are designed to run unaffected by oil, and there is a tendency to follow locomotive practice for pedal brakes, and in some instances side brakes, too.

The Illustrations.

With very few exceptions, the photographs from which the illustrations appearing in our review of the show are made are the work of Mr. Argent Archer, of High Street, Kensington, who has devoted much study to the photographing of autocars since their first appearance in this country as practical vehicles.

PETROL CARS.

THE ADAMS MFG. CO., LTD. Queen Victoria Street, E.C. (71).—10 h.p. Adams-Hewett cars, carrying bodies of various designs, are staged here, but the attention of the interested automobilist will be drawn to the chassis which is found in the centre of the stand, and for its better comprehension is mounted over sheets of looking glass. Primarily it will be noticed that the single-cylinder horizontal engine, which has the breach of its cylinder towards the rear of the car, is carried on its own frame, which is on the long longitudinal

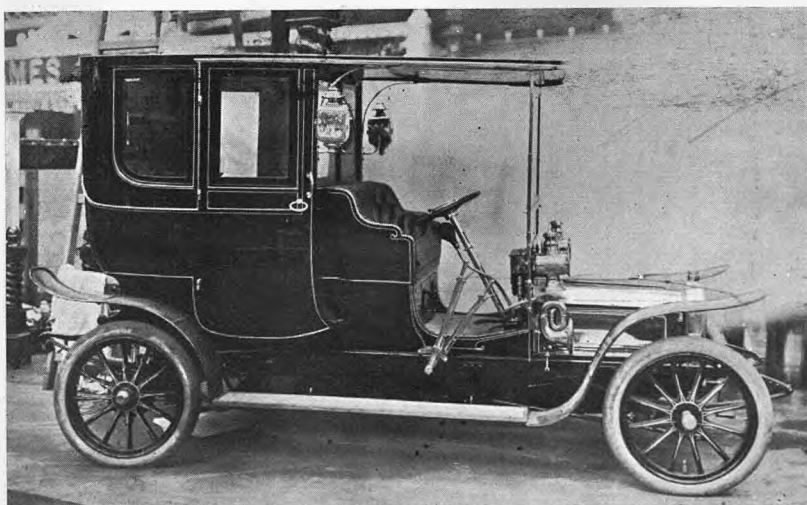


Chassis of the 10 h.p. Adams-Hewett car.

springs running from back to front axle, and in the manner known to English automobilists as the Lanchester style. The engine is 4½ in. bore by 6 in. stroke, and on the right-hand side of the crank chamber is mounted a heavy flywheel, 22½ in. in diameter. The chain sprocket is mounted on a crankshaft immediately to the right of the flywheel; beyond this, again, are the improved patterns of epicyclic gears, having no internally cut teeth. These gears afford two forward speeds and reverse, and are operated by foot pedals, either of which throw out the gear previously engaged. As will be noticed, this drive is direct from the crankshaft to a sprocket wheel surrounding the differential gear on the live axle. Both induction and exhaust valves are mechanically actuated, and are set side by side in a horizontal valve chamber. A very interesting form of carburetter is employed on this engine. A permanent air port is provided, with a balanced shutter opening to the jet chamber; the shutter always operates in sympathy with the engine suction. It is difficult to describe this simple apparatus without diagrammatic illustration, but this we hope to produce in a later issue in company with other diagrams of this particularly ingenious car. Above the crank chamber and part of the crank chamber casing, is formed the oil tank, from which the oil is drawn by an interesting and simple form of pump, and delivered through various leads to all parts of the engine and gears. The oil pump starts operation as soon as the cur-

rent is switched on. Both low-tension magneto and high-tension accumulator fed ignition is fitted. This chassis is shown carrying three bodies of various types: one a two-seated Victoria of elegant form, tastefully upholstered, and fitted with good hood and dickey seat behind; another with two-seated body, waterproof canvas hood, wind shield above dashboard, and auxiliary seat in rear; the third chassis carries a landaulette body of good design, well and comfortably upholstered and finished.

THE ALBANY MFG. CO., LTD., Willesden Junction, N.W. (80).—The title of this stand as it appears in the catalogue is as above, but the sign bears the words, Talbot cars. The only uncovered chassis shown here is the well-known 12-16 h.p. Clément-Talbot, which, we understand, is entirely the production of the works at Ladbroke Grove, with the exception of the engine. The bore and stroke of the four-cylinder engine is 85 mm. by 120 mm. The frame is of stamped cambered steel, upswept over the back axle, the engine and gear case being carried on a longitudinal underframe, and supported by cross members. The new features are not numerous in this chassis, but we understand that push pedals are to be fitted in future. A petrol filter is now placed between the petrol tank and the carburetter. The back wheel expanding brakes are compensated by means of a centrally actuated crosshead linked to two lever arms on the brake spindle. Auxiliary accumulator fed ignition is now fitted, in addition to the high-tension magneto ignition, on the standard cars. In doing this we think Clément-Talbot, Ltd., are well advised. The foot accelerator is to be dispensed with, and throttle valve control fitted on the steering wheel. In the 1906 models the gear box socket is flanged and bolted to the gear box itself, and is a much stronger arrangement than has hitherto been employed. A dissected steering is shown, by which the neat and effective arrangement of the worm and wheel steering can be examined. The gear box is

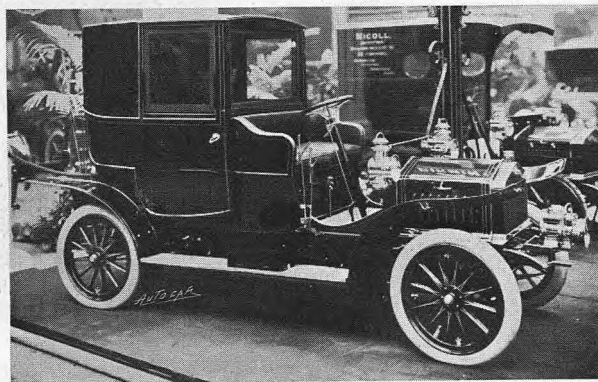


A British built four-cylinder Talbot of 12 h.p., with a landaulet body.

Show Report—Petrol Cars.

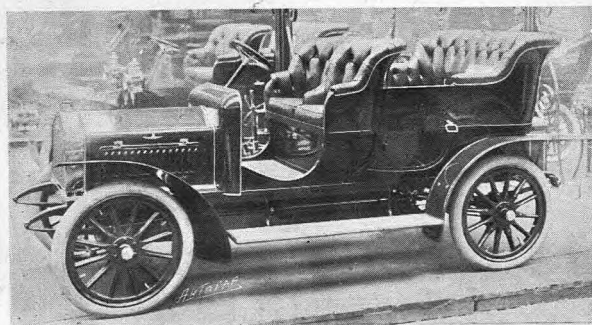
also exposed on the stand, apart from the chassis, and these parts show the excellent work put into the Talbot cars, and can be thoroughly inspected. A fine example of the 1906 20-24 h.p. engine, with 100 mm. bore and 120 mm. stroke, is shown, carrying a very handsome landaulet body with canopy over front seat, and wind shield above dashboard. In this type ball bearings are fitted to the gear shafts, the transmission shaft, and the live axle, and in this type also the hollow swaged live axle is used. It will be remembered that we described and illustrated this back axle, together with a photographic section of the swaged live axle, in a late issue of *The Autocar*. It should also be noted that this type is fitted with a plate clutch on Hele-Shaw lines, but made by the Talbot Co. themselves. With the higher-powered engines, of course, this clutch is advisable, owing to its peculiar sweetness of drive and pick up. A 12-16 h.p. Clément-Talbot is shown with a handsome double phaeton body, roll up, buttoned, and pleated upholstery, bucket seats, side entrance, and finished in dark red with coaching yellow chassis, black margins. Another 12-16 h.p. carries a very handsome landaulet body, with ample side-entrance doors, most luxuriously finished within and without. A very smart little 8-10 h.p. two-cylinder car occupies the centre of the stand, finished in green with black mouldings, lined crimson, and smooth red leather upholstery, divided seats, and tonneau body. At its price this car is most excellent value for money, and as we know from experience these two-cylinder cars have given the utmost satisfaction to many owners for years past. Another 12-16 h.p. four-cylinder car is fitted with a fine side-entrance double phaeton body, and equipped with well-made Cape cart hood. This car is shown with the alternative magneto high-tension or accumulator-fed ignition, it being possible to switch over from magneto to accumulators or *vice versa* by the actuation of a draw bar passing through the dashboard.

ALLDAYS AND ONIONS PNEUMATIC ENG. CO., LTD., Birmingham (66).—Three powers of Alldays cars are shown here. The 8 h.p. has a single cylinder, and is on standard lines throughout.



A smart little 10 h.p. brougham-bodied car, built by Messrs. Alldays and Onions.

The gear box affords a direct drive on top speed, the second motion shaft being absolutely stationary when on the direct drive. A ratchet and pawl sprag operated from the seat in a very simple manner is a feature not found on cars of this size



The new 16 h.p. four-cylinder Alldays car.

or price. The two-cylinder car of 10 h.p. is also on standard lines, and similar to the single-cylinder car except that it is

provided with a carburetter having a single float chamber and twin spray chambers. Each of these spray chambers contains a jet, and has its own automatic air intake.

ANGLO-AMERICAN MOTOR CAR CO., LTD., Regent Street, W. (43).—In the centre of this stand is found an 8½-10 h.p. Cadillac car, from which the mechanical economies of this car can be studied. The frame is of stamped steel channel



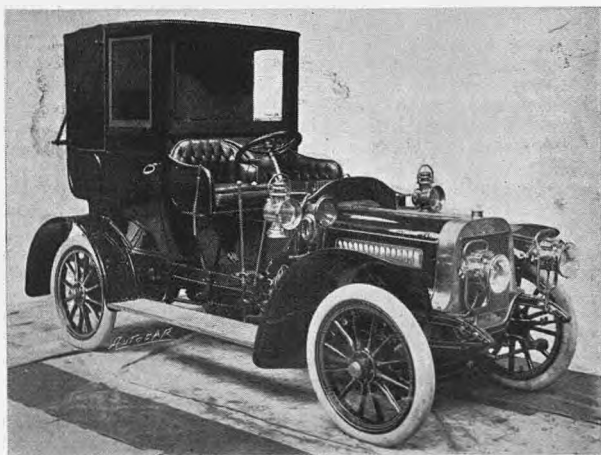
A handsome landaulet body fitted to a Cadillac chassis.

section, both longitudinal members parallel throughout, stayed by cross members of various sections where necessary for stiffness, and in order to carry the driving mechanism. The single-cylinder horizontal engine is set nearly midway between the axles, the crank chamber and engine being supported by two cross members of T section. The drive on top speed is by chain from the crankshaft direct, both crankshaft and rear axle being parallel. The low speed and reverse are obtained by epicyclic gear carried on an extension of the crankshaft itself. The whole of this mechanism is covered by the body, which is nevertheless easily removable by the withdrawal of four bolts only. The Cadillac carburetter is now provided with an extra air inlet, the air being delivered under a bell-topped pipe into the mixing chamber of the carburetter. Both valves are mechanically operated, and the engine is controlled by the variations of the lifting time of the induction valve. The brake drums are placed immediately on each side of the driving sprocket wheel, surrounding the differential gear box, and are mounted on the ends of the live axle, so that the braking effect is conveyed to each wheel, and does not pass through the differential gear. These brakes, which are compensated, are applied by push pedal, which is fitted with ratchet and pawl, so that the brakes can remain in action without fatigue to the foot. The standard Model F Cadillac is shown with an interesting and detachable British-made top, which can be supplied when specially desired, and which is capable of being easily placed in position, endowing the car with a most comfortably enclosed rear seat, which is most convenient for theatre and night work. This body is handsomely finished in dark green, lined white, with primrose underframe and wheels, and is most comfortably and tastefully upholstered. Another chassis carries a Model F body finished in standard colours, green, with primrose underframe, and body lined green, comfortably and tastefully upholstered in dark green leather. The body of a two-seated doctor's car is shown, very neat in appearance, and provided with a glass screen at the dashboard, and a waterproof drill hood meeting the screen and affording effectual protection against the weather. This is a small car, to which we particularly commend the attention of our medical readers. On this stand we find a most interesting car in the shape of a Harper motor car, illustrated on page 685. A Cadillac engine is used, but is set in the frame the reverse to the usual Cadillac practice, and well forward under the footboard and front seat. The drive passes by chain from the engineshaft to countershaft, carried in bearings in the differential gear box, and on this shaft is carried a pinion gearing with a spur ring set round the differential gear box. This taking looking vehicle, the design of which provides for ample accommodation in the covered body, is provided with Harper's patent control, in which the engine is manipulated through the agency of four pedals, one applying the reverse, another applying the brake, another marked slow throwing in the low speed, and another marked fast controlling the high speed. Three of

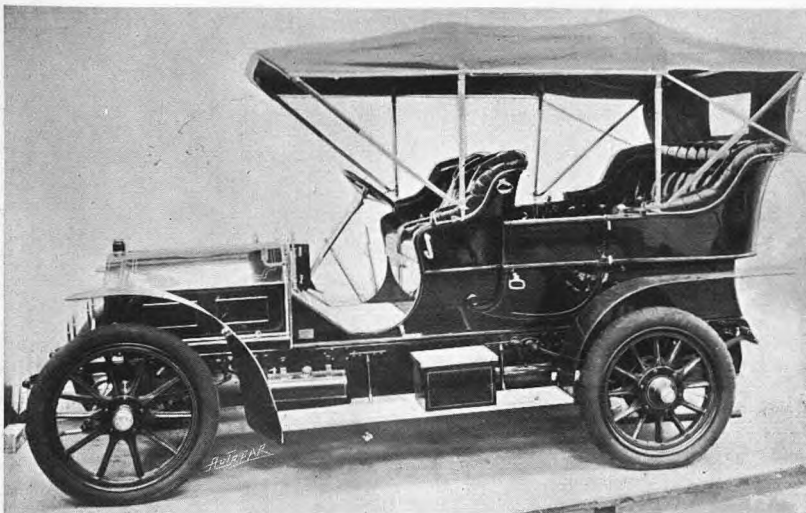
these pedals are on the left, and one on the right of the footboard. The ignition lever and throttle lever are set on the steering standard within the steering wheel, as usual. The vehicle is very handsomely finished and tastefully upholstered in drab cord. A very ample sized boot is provided for luggage at the rear of the car.

THE ARIEL MOTOR CO., LTD., Long Acre, W.C. (41).—The centre of this stand is occupied by two most interesting chassis, one a 35 h.p. four-cylinder and the other a 30-35 h.p. six-cylinder. With regard to both these chassis, the cylinders are as last year all cast in one piece, the heads only being separate. The departures introduced in the 1906 model are a pressure feed to the petrol, Eisemann high tension ignition, and gear driven water pump. The ignition distributor is brought on to the rear face of the dashboard. Some slight alterations have been made in the carburetter in the direction of pedal control and in cutting off all air for ease of starting. Three sets of brakes are fitted, the extra being of the internally expanding type within the driving wheel hubs and applied by a throttle connected pedal on the dashboard. The propeller-shaft now runs in a long extension of the differential gear case, which extension comes forward to the brake drum on the end of the gearshaft. Within this case the propeller-shaft runs in ball bearings. The driving bevel pinion is extended rearward, and is carried in a tail ball bearing. The six-cylinder chassis exhibits practically the same features as that above described, with the exception that the cylinders have slightly less bore and stroke, viz., 4 $\frac{1}{2}$ in. by 4 $\frac{1}{2}$ in. In this case also the cylinders are all in one casting with separate heads. Both these chassis exhibit the closest possible attention to detail in their design, and best possible style of workmanship, such as we have long been led to expect from the Ariel Motor Co. On the centre of the stand is a table with samples of the pistons of each power of Ariel engine made, from the 30 h.p. down to the 2 h.p. motor cycle engine. That most expensive production, a six-cylinder crankshaft, is also shown, and this is flanked by a 20 h.p. camshaft, all of them most interesting parts to examine. Two 20-25 h.p. four-cylinder chassis carry very handsome double landaulette bodies variously finished, while a 30 h.p. chassis is fitted with a Roi des Belges double phaeton body with canopy and handsomely fitted glass wind shields. The body is painted in scarlet and black, and makes a very effective appearance. Another 25 h.p. chassis carries a side entrance body with well fitted double Cape hood. We illustrate this very handsome car.

ARGYLL MOTORS, LTD., Bridgeton, Glasgow (87).—The Argyll stand is a testimonial to the good policy of making a sound article in few patterns and large quantities.

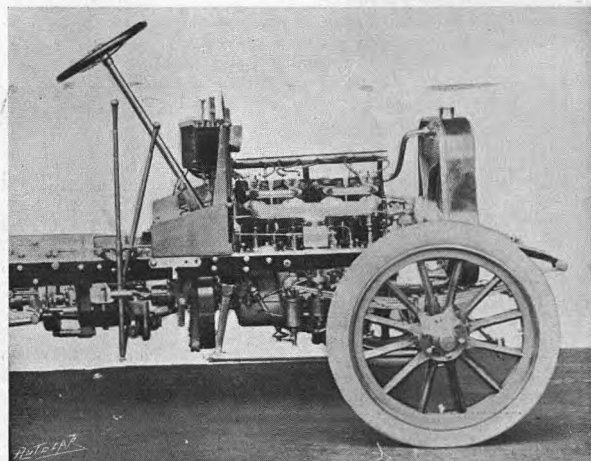


A 14 h.p. Argyll landaulette.



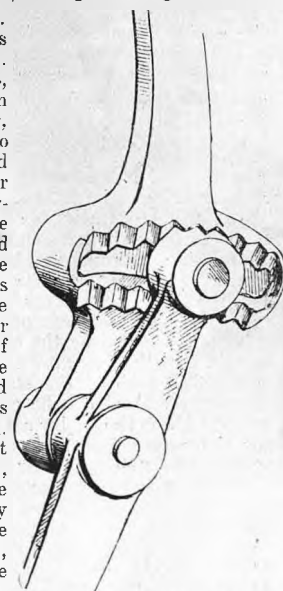
The four-cylinder 25 h.p. Ariel-Simplex car.

The sign, with its ivory white pillars, surmounted by a scale model of the new offices, is in keeping with this policy and



Front end of the 14 h.p. Argyll chassis, showing the driving mechanism.

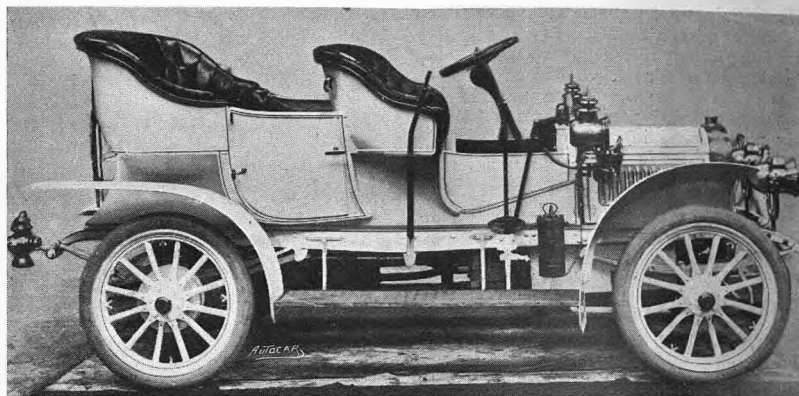
the exhibits on the stand itself. The principal item is a chassis of the medium power—14-16 h.p. The cylinders are all separate, with the valves arranged on either side. All the gearing, both for the camshaft and also for the pump, is enclosed, and an easily detachable apron or baseplate covers in the underside of the engine. The frame is of the company's inverted U pressed steel, with the open side downwards. This gives a very neat finish to the various attachments. Rear springs are clipped to parts of the live axle casing, which are made of spherical form to avoid binding. The live axle itself is well designed and constructed, as one is easily able to see, not only from outward inspection, but by examining the separate parts, which are conveniently displayed for the purpose. The governor acts on the throttle, and the usual control levers are provided on the steering wheel. The lubricating oil is pressure-



The Argyll pedal adjustment.

Show Report—Petrol Cars.

fed to the more important bearings, and the oiling of the spring joints has received careful attention. The Hele-Shaw type of clutch is employed, together with the company's well known gearing and shafting mechanism, in which springs are introduced to ensure the engagement of the wheels as they come into suitable positions. All the wheels are run on ball bearings. Another specimen of this class is shown complete with two-seated landaulet body, while a four-seated landaulet body is fitted to one of the 16-20 h.p. cars, which is constructed with a four-cylinder Aster engine. The smallest type, too—the 10-12 h.p.—has a motor by the same makers, and is fitted with a side-entrance body. Altogether, the exhibit goes to demonstrate the commercialised condition of the motor industry.



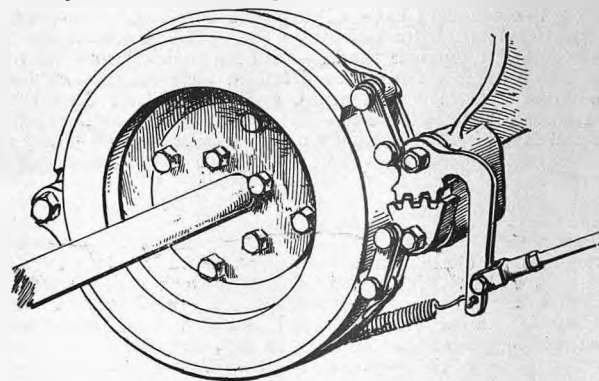
A 20 h.p. Argyl tonneau car, with roomy side entrance body.

SIR G. W. ARMSTRONG-WHITWORTH AND CO., LTD., Newcastle-on-Tyne (81).—This company manufacture under the Wilson and Pilcher patents, and all their cars are the same, in so far as they are of 12 to 16 h.p., and fitted with the popular landaulet bodies. The four-cylinder horizontal engine and the four-speed gear have not been materially altered since last year, but a new synchronised ignition is adopted. In this the current is obtained from an accumulator, and the various primary circuits are made and broken by an internal wipe contact breaker, as usual, and the high tension current is led to the plugs and earthed for the return, but a separate coil is used for each cylinder. The objection to this practice has consisted in the practical difficulty of adjusting all the tremblers equally, and this difficulty is got over by wiring all the coils to one trembler. A second trembler is fitted, but it is only used when the other is switched off, that is to say, should any trembler difficulty arise, the driver simply switches over on to the other one. Spark gaps are arranged in the coil box, and are numbered according to the cylinders, so that the condition of the individual primary circuits can be immediately ascertained by opening a door of the coil case. Another speciality which will appeal more to manufacturers consists in stampings and forgings of various motor car parts. The company are well equipped for this class of work.

THE BEAUFORT MOTOR CO., Baker Street, W. (92).—With regard to the 18-22 h.p. Beaufort chassis, which is an attractive feature on this stand, we find that the magnets in front have their spindles now set across the front of the crank chamber, and are driven off the left-hand half-time shaft by worm gearing. The whole of the half-time gear is as usual enclosed in a separate gear case, which can be detached from the crank chamber proper. The magneto is easily detachable, the connection between the driving and driven spindle being by a form of double disc dogs. A new underframe is now employed. The engine is suspended from the main members of the frames by brackets forming part of the crank chamber casting. The reciprocating levers actuating the make and brake tappets have a universal movement by means of a ball and socket bearing. High-tension ignition is also fitted, the sparking plugs for the latter being placed immediately above the induction valves. The low tension sparking plugs pass into the valve chamber from the side, and are also immediately above the induction valves. The carburettor is fitted with a unique longitudinal piston valve operating in the jet chamber, by which air is admitted from the left-hand side to and around the jet. While the engine is running slowly, the piston keeps a constant opening, but when the speed of the engine increases a further opening takes place, air passing into the mixture pipe but without passing round the jet. This piston valve is controlled by the governor as well as from the steering wheels. In the present engine, very short induction pipes are used. The rake of the steering stem is adjustable, and the steering standard can be set to accommodate a driver of any height. From the engine rearwards no change has been effected, for the reason that it has been found impossible to improve upon the clutch and gear box as used heretofore. The propeller-shaft is encased most effectively against ingress of dust and mud. A foot brake of the internal type operates on a drum forming part of the universal joint in rear of the gear box. Two 24 h.p. chassis are shown with bodies mounted throughout. One is a side entrance double phaeton with bucket seats in front, and well-executed Cape cart hood; the other a limousine

with forward canopy, storm glass screen over dashboard and storm curtains, and luggage provision on the roof. The side entrance door is of ample width, and the body is tastefully upholstered within, and well finished without. Side doors are fitted to the footboards of both these cars.

BELL BROS., Raventhorpe, Yorkshire (98).—The new 24-30 h.p. Bell car is a fine looking vehicle which bears evidence of practical design throughout. The chassis shown is the first made, and although certain minor alterations are yet to be made it is well worthy of inspection. The four cylinders are cast in pairs, with a bore of 4½ in. and a stroke of 5½ in. The ports and passages are all large, and good provision is made both for lubrication and inspection. The change-speed gear is so designed that when the top speed is in operation the layshaft is idle. The gear box is rigidly carried on four

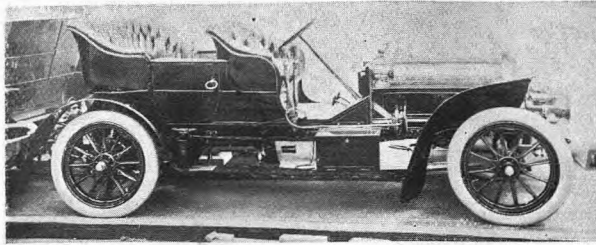


Drum brake on the Bell car.

brackets bolted to the crossbars of the frame, and is connected to the clutch by a double universal joint. The radius rods are practically universally jointed, and by this means strain is taken off the forward end of the rod when turning corners. The petrol tank, which is of the corrugated type, has an ingenious filling arrangement which projects behind the car, the cap being so arranged that it can be inverted and used as a funnel. This is all effected without possibility of grit getting into the arrangement, that is to say, it can be opened up and petrol poured in without any need for the parts being cleaned. Compression release is effected by a convenient knob on the dashboard. This can not only be used for ease in starting, but to reduce the engine to absolute silence when running in towns. Altogether the Bell car shows signs of careful design, and is worthy of inspection.

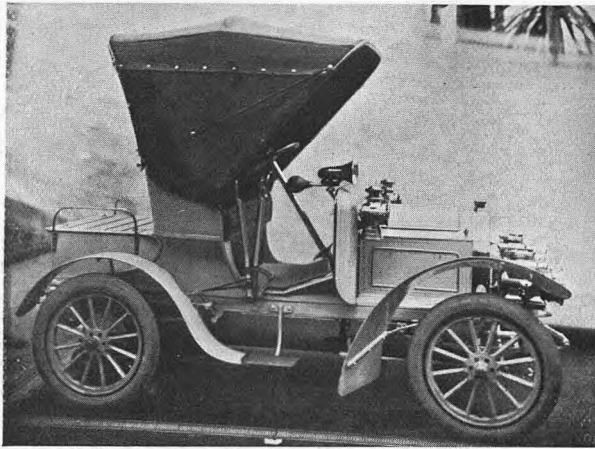
THE BELSIZE MOTOR CAR AND ENG. CO., LTD., Manchester (83).—A good range of cars is shown on this stand, and the motors are of two, three, four, and six cylinders. There are two patterns of four cylinders, one of them being on the same lines as the three, and the other on the lines of the two and six. The differences, however, are more in dimensions than in anything else. In all cases, both the inlet and the exhaust valves are operated by rockers, through tension rods, and bell cranks. The valves themselves are arranged in the tops of the cylinder heads, and are readily detachable, as are their seatings. No governors are fitted, the pedal brakes being coupled up to the throttles, and spark timing is also con-

trollable by levers on the steering wheel. The accumulator ignition comprises a single trembler coil, the company having used this method for quite a number of years. The pump,



The six-cylinder Belsize side entrance car.

an even more troublesome member than the governor, is also dispensed with. Natural circulation is employed, together with double inlet and outlet pipes. The tank is compounded with the honeycomb radiator, the whole being of quite ordinary dimensions. On the larger cars a positively driven lubri-



A two-cylinder 12 h.p. Belsize car fitted with a Cape hood.

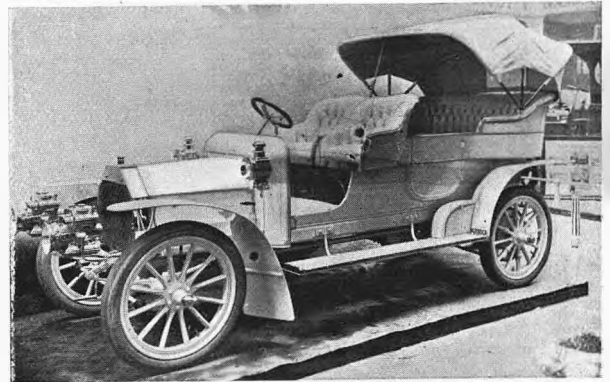
cator is employed, and, of course, feeds at a speed corresponding to that of the engine. Both the inlet and exhaust valves of the engine have variable lifts to facilitate starting, and slow driving. The bodies include the usual popular types, and we are not at all surprised to hear that these sterling cars are being turned out in large numbers.

THE BRITISH AUTOMOBILE COMMERCIAL SYNDICATE, LTD., Long Acre, W. (112).—The new Spyker is one of the novelties of the show. The engine and mechanism generally are entirely protected by a complete under casing. This casing is pressed out of one sheet of steel with the frame complete. In outline it is so formed that the lowest part is just below the fly-wheel. The casing then tapers upward each way, and the result is that the correct form is given to the under side of the car to ensure that the least possible amount of dust shall be raised. The dustless Spyker of the Maidenhead trials is already famed. We have no doubt its cleanliness will be greatly exceeded by the new type. The back of the frame is pointed somewhat like the bows of a boat, this form lending itself well to the transverse springing always adopted upon this make of car. The engine is fixed to the main frame by strong tubular struts, which are adjustable; the gear box is carried in the same way, so that if the car should meet with an accident and the frame be bent the engine and gear could be lined up in a very few minutes. The ball joint steering and universal joints of the propeller-shaft should be examined. The latter are particularly free in their action; this is proved by the fact that despite exceedingly easy springing, which causes a lot of motion up and down of the back axle, the jointing is so flexible that the bevel gear and its bearings show scarcely a sign of wear after many thousands of miles use. The pedals are unique. They form parts of the footboard, and are a foot long and six inches wide, rubber covered, and sloped exactly in accordance with the angle of the footboard. They should be most comfortable to use, as they can be utilised as footrests till they are actually wanted, and we should say that it is highly probable that

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their introduction will result in larger pedals being used in future if it is found they are as comfortable as we expect they will prove to be.

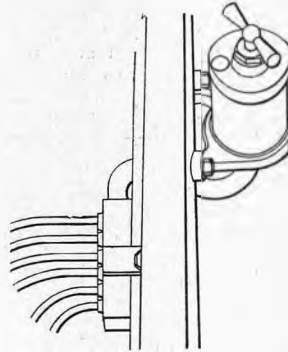
BROOKE AND CO., LTD., Lowestoft (52).—Two patterns of Brooke car are shown on this stand. These are 15-20 and 35 h.p., the two patterns which have been made during the last season, and which have consequently been thoroughly



A most striking and handsome car is that illustrated above and manufactured by J. W. Brooke and Co., Ltd. It is of 35 h.p., and seats five persons comfortably.

tested. It has not been found necessary to alter them except in detail, so that we merely enumerate their main features. Dealing first with the 15-20 h.p., the engine is a four-cylinder one, fitted with a low-tension magneto ignition and the usual double-jet suction operated carburetter, which we described some little time ago. The clutch is of the ordinary leather to metal cone type, but the gear box differs from the standard in having chain gear instead of spur gearing for the forward speeds. This has been a feature of the Brooke cars up to now.

Transmission from the gear box is by side chains to the back axle. The frame has been lengthened and the detail work been improved. The larger car is also fitted with low tension magneto and the firm's carburetter. An improvement on this car is a half-compression device, which is put into operation by the insertion of the starting handle, and automatically thrown out when the engine is started. The clutch and transmission is on the same lines as that of the smaller car, except as regards the gear box. In this spur gearing is used for all speeds. The gears and the gear box are noticeable for their ample dimensions, as is the case with all parts subjected to strains of either transmission or road shock. Petrol is pressure fed, being carried in a tank just behind the back axle. The pump for primarily starting the pressure is arranged very neatly on the steering pillar, so that the handle comes easily to the hand. Both cars have been provided with a curved overhanging dashboard.



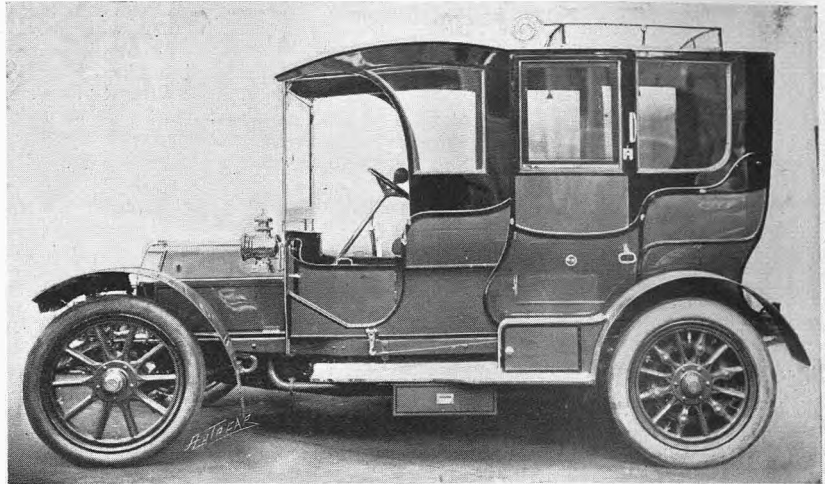
The Brooke grease distributor.

BROTHERHOOD-CROCKER MOTORS, LTD., Hanover Square, W. (28).—One of the most attractive features of the exhibition is the 20 h.p. Brotherhood chassis found on the Brotherhood-Crocker Motors' stand nearest the entrance. The sensation made by the Brotherhood cars at the last show will still be fresh in the minds of our readers, and we may say in the opening that so far as the engine goes no alteration has been found necessary during this year—that is to say, no vital alteration. An improvement has been effected in places. The ignition switches are immediately over the top of the sparking plugs in lieu of being placed in side pockets. A Fuller coil with Bradley patent electro magnet attachment is now fitted. This coil is said to give most extraordinary results, and to obviate all the trouble arising from the use of only one trembler. For this coil is claimed a perfect synchronisation of ignition, reduction in current consumption, and a prevention of the burning of the platinum contacts, with absolute quietude in working. A new feature with regard to the radiator is the substitution of vertical tubes for horizontal tubes, as before. The universal joint connecting clutch sleeve and the

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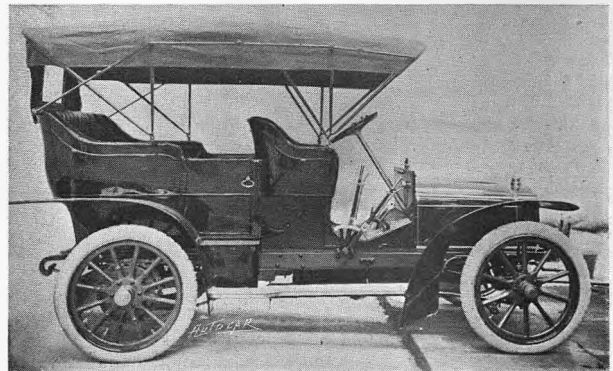
primary gearshaft have been improved in detail, and Hoffmann ball bearings are now fitted throughout the gear box. An undoubted improvement has been effected in the design of the radius rods. At the forward ends, these now entirely encircle the sprocket bearing sleeve outside the frame, and also encircle the back axle between the wheel and the spring hanger. The radius rod, which is of tapered girder section, is produced at the rear of the back axle sufficiently far to carry the brake pivot pins thereon mounted. The rear wheel band brake segments are operated on the sprocket drum between the sprocket and the spokes. The petrol tank is still formed in corrugated copper sheeting, but is made of larger dimensions than before. A very neat sprag operating on a ratchet within the sprocket ring is thrown into action by a small lever pivoted at the end of the brake sector. When the gear lever is placed in the reverse position, it automatically releases the sprag. To those who missed the Brotherhood-Crocker cars last year, this opportunity of inspecting one of the most carefully-designed and conscientiously-executed examples of automobile mechanism should be seized. In the 40 h.p. Brotherhood-Crocker chassis, which is practically a larger sister of that described above, the half-time gear is entirely enclosed, and a compression release is fitted. A Bradley clutch is fitted to this chassis. This is a plate clutch something on the Hele-Shaw lines. The change-speed lever sector is brought further back, and the lever itself set at the forward angle, more on Mercedes lines. All brakes are on the back wheels, the brake pedal on the dashboard applying an internally-expanding brake within the sprocket ring, and the side lever gripping band brakes referred to in the lower-powered chassis, but otherwise this car resembles the smaller one in detail throughout. A most attractive item on the stand is the 12-16 h.p. chassis, with Leicester phaeton body of detachable type, most tastefully finished in coaching yellow and black, upholstered in green cloth. This car is built to the order of the Right Hon. Earl Fitzwilliam, and has been finished in his lordship's own colours.

THE BROUHOT MOTOR CO. OF GREAT BRITAIN, LTD, 22, Mortimer Street, W. (128).—16 h.p., 20 h.p., and 24 h.p. cars are exhibited by this company. The first and second are ordinary touring cars, the third is that which won the President's Cup in the Pyrenees hill-climbing competition. This is an ordinary touring car fitted up in racing trim, and with a very much higher gear than would be fitted to an ordinary car. The smaller-powered car is fitted with a nice tulip body; the 20 h.p. with side entrance body with detachable brougham and canopy top, thus making a very handsome and serviceable car. As to the mechanical details, the principal feature is the metal to metal expanding clutch. This engages



A 20 h.p. Brotherhood-Crocker double phaeton car with brougham top, built to the order of Earl Fitzwilliam.

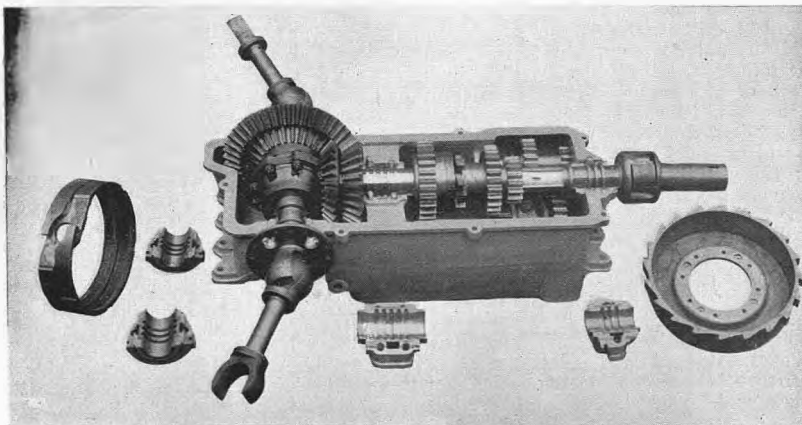
gradually, and when in firm contact drives, it is claimed, without any slipping whatsoever. The engine is fitted with the ordinary high tension ignition by accumulator and coil; the former being kept in a fully charged condition by means of a small dynamo which is run from the engine at suitable



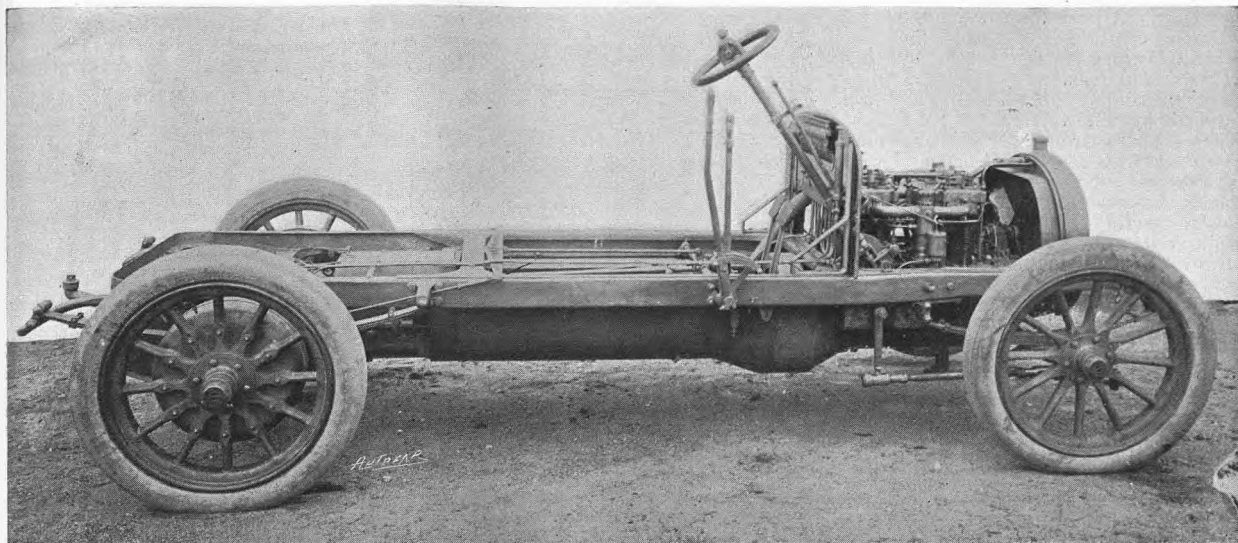
A 20 h.p. four-cylinder Brouhot car

speeds. The engine is controlled not on the throttle, but by a variable lift to the inlet valves. The carburetter is of the automatic type, and is so designed as to enable it to be readily dismounted and reassembled should occasion require. Magneto ignition is fitted to the higher powered car.

W. H. M. BURGESS, Piccadilly Circus, W. (12).—A very interesting exhibit is found on this stand in the shape of a Pilain chassis which at once attracts attention by its claim for direct drive on third and top speeds. The engine is carried on the main frame, which is of stamped cambered channel steel, inswept forward of the dashboard. The cylinders are cast in pairs with valve chambers on both sides. Two camshafts are fitted. The engine is provided with an interesting carburetter in which the automatic air valve is set in the base of the jet chamber. The throttle, which is placed in the centre of the induction pipe, is so constructed that when entirely closed denying feed to the engine, cold air ports are opened and a copious supply of pure air admitted to the cylinders for scavenging and braking purposes. The cylinders are fired by low tension ignition, the advance and retard being effected in a particularly ingenious manner by varying the lift of the make and break tappets. The lubrication has had the most thorough attention. It is pressure



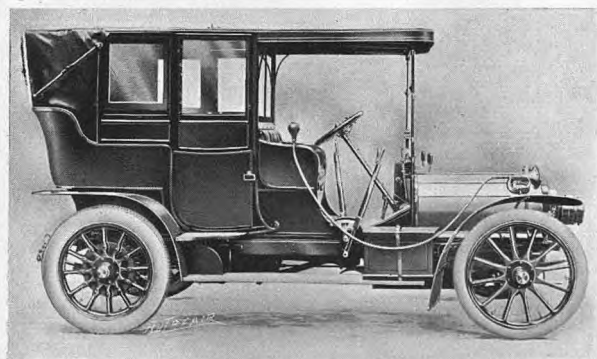
The Pilain change speed gear, brake band, and brake drum.



The 20 h.p. Pilain chassis which made its first appearance in England at the stand of Mr. W. H. M. Burgess.

fed to every bearing of the car, the lubricating tank being placed between the flywheel and the gear box. The latter is set very far back, the drive to the road wheels being off the countershaft in the gear box, which is connected by short cardan shafts to other pinions meshing with internally toothed spur wheels forming part of the road wheel naves. This drive from the gear box is somewhat similar to, though, of course, on a much larger scale than, the cardan shaft drive of the small De Dion car. The internally toothed drive resembles that which we have frequently described in connection with the well-known Chenard-Walcker car. The whole of the driving mechanism is enclosed and protected by a sheet steel apron running from the rear of the radiator to the rear of the gear box. The brakes fitted to the road wheels are perfectly compensated through a balance bar with central pull. An exhaust cut-out is operated by a handle on dashboard. A carburetter tickling rod is operated from the dashboard, and the throttle lever acting upon the throttle valve already referred to is fitted in the centre of the steering wheel. Altogether this is a most interesting chassis, presenting as many novel points as anything of the kind in the show.

THE CANNSTATT AUTOMOBILE SUPPLY ASSOCIATION, Shaftesbury Avenue, W. (124).—A chassis of the new 40 h.p. Leon Bollée, and an 18 h.p. Mercedes fitted with limousine body by Messrs. Hooper, Ltd., were the sole occupants of the stand at the time of our visit. With regard to the Leon Bollée



A fine example of Leon Bollée vehicle, exhibited by the Cannstatt Automobile Supply Association.

chassis, the principal departure is the use of ball bearings entirely throughout the car, this not including the engine crankshaft bearings. The carburetter is the usual type fitted with two jets, these being controlled by a lever set upon the steering wheel. The lubrication of the bearings throughout the car is effected by pressure feed and sight-feed lubricators, pres-

sure being obtained by means of a hand pump permanently set upon the dashboard. The clutch, which is of the usual conical type, is set upon a universal joint, so that it adapts itself to the female portion of the cone under all circumstances. The change-speed gear actuating mechanism is entirely enclosed, and is thus efficiently protected from dust and dirt. The usual brakes are fitted, the side brakes being interconnected with the clutch, the operation of which is carried out in a very simple and effective method. It may be said that the clutch spring is mounted in brackets on the right-hand side of the frame, where it is easily accessible for tensioning purposes. Simms-Bosch ignition is employed, this being driven from the pump spindle shaft by means of an internal gear.

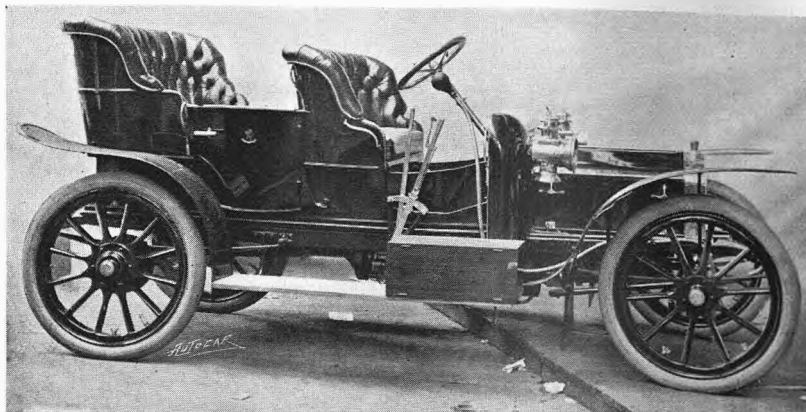
CHENARD AND WALCKER (W. Gutmann), Long Acre, W.C. (65).—We so recently dealt somewhat fully with the Chenard and Walcker cars, which are shown by Mr. W. Gutmann, their agent in this country, that it is unnecessary to plunge once more into a long description of the distinctive features which serve to mark this car out from the ruck, but we would recommend our readers not to omit to remark the special provisions for effective thermo-syphon circulation, the neat, most effective, and reliable system of ignition the force feed lubrication with its tell-tale gauge on the dashboard, the effective coned ring brake, and the special internal toothed wheel drive, whereby the driving axle drives only, and a fixed axle carries the wheels and the weight. A most closely considered and soundly built car, one to be examined with attention and enlightenment.

CLIMAX MOTORS, LTD., Coventry (18).—In *The Autocar* of November 11th we referred at some length to the new Climax cars, two examples of which are found on this stand. In the 22 h.p. chassis a four-cylinder Aster engine is mounted directly upon the main stamped steel cambered frame and drives through a metal to metal clutch of special design running in oil. A simple form of connection is provided between the clutchshaft and gear box in order that the former can be dismantled without interfering with the latter. A gear box of Mercedes type is carried upon the two longitudinal members of an underframe, this having two sliding sleeves operated through a gate sector in the usual way. A powerful internally expanding brake is fitted to the forward portion of the universal joint, the brake drum also carrying a ratchet wheel in which a pawl engages at will when it is desired to stop upon hills. Ball bearings are fitted to the steering movement, gearshafts, propeller-shaft, and live axle. The road wheels rotate on ball bearings set upon the productions of the axle sleeves, so that the live axle proper has merely to perform the duty of rotating the wheels. A radiator of neat design with perpendicular flanged tubes of considerable length closes in the front of the bonnet. Springs of ample length are provided, the rear pair being set outside the frame. The arrangement on the dashboard is particularly neat and convenient. It is of the well known Daimler type provided with convenient side cnpboards, the coil box and four sight

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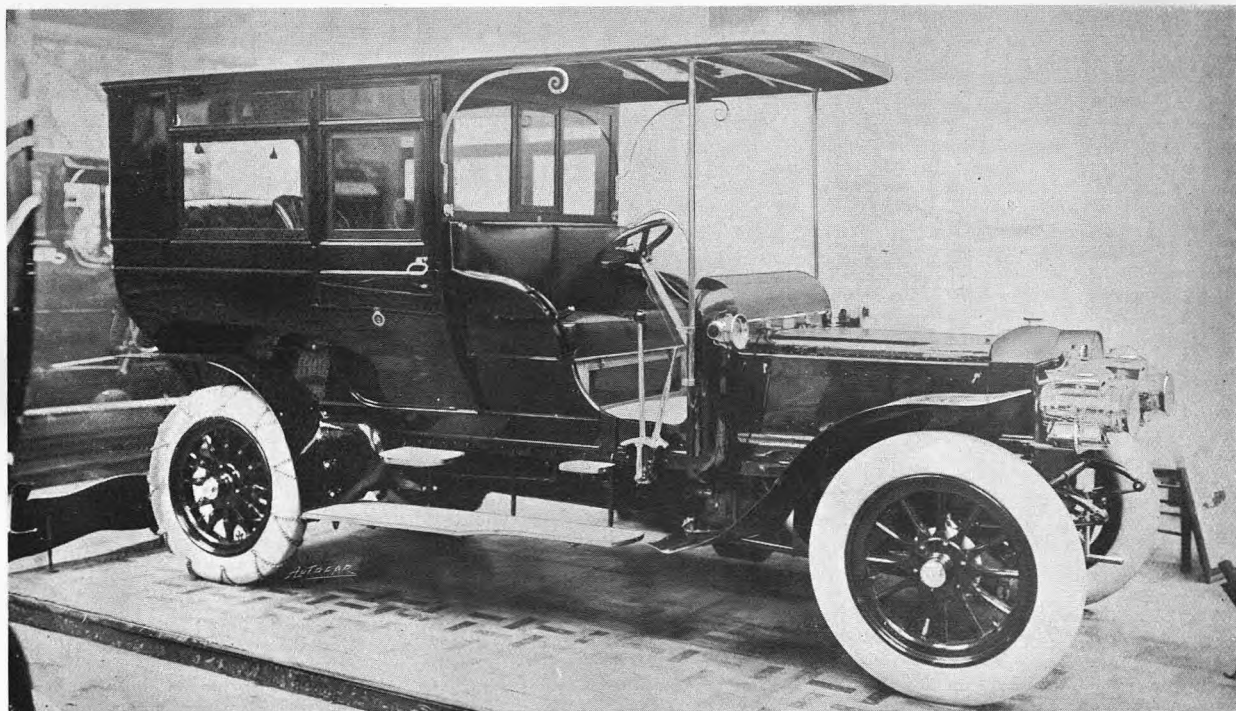
feed lubricators being set beneath the overturn. A neat form of ignition and throttle control is placed across the steering wheel. The whole of this chassis is a remarkably creditable production, and one which should be studied by all visitors to the show. The 14 h.p. four-cylinder Climax which is shown with a well finished and well upholstered double phaeton side entrance body is practically of the same design as the chassis already referred to, save that the gear gives three changes in lieu of four; otherwise the design and finish are similar in every respect. Its particularly neat design of clutch was illustrated and described in the issue of *The Autocar* referred to above. We hope before long to try this car and to report upon its running.

CLEMENT-TALBOT, LTD., Ladbroke Grove, N. (2).—The chassis of the 35-45 h.p. chain-driven French Talbot-shown here is interesting as affording means of contrasting the French with the English Talbot practice. Simms-Bosch magneto ignition is fitted, and the carburetter, which differs somewhat in design from those on the Albany stand, has its throttle valve connected to the clutch pedal, and can be controlled from a lever on the steering wheel. In this model the clutch spring takes the form of a spiral spring attached to a lever on the clutch striking spindle, and passing back through a lug on the crown of the gear box. It is easily adjustable by means of a nut in a very simple manner. The gear-striking lever is fitted with a gate change, and the drive passes from the gear box through a short propeller shaft to the differential gear case mounted on the countershaft, from the ends of which the road wheels are rotated by means of chains. The frame of this car is stamped and pressed out with webbed plates to carry the crank chamber and gear box, these inward extensions of the webs taking the place of an underframe. On this stand is also shown a 10-12 h.p. two-cylinder French Talbot vehicle. This particular car differs very slightly from the examples shown on the stand in the open part of the hall. It is handsomely finished in sage green with black margins, and most comfortably upholstered in red buttoned leather.



The 14 h.p. four-cylinder Climax car with side entrance body.

CRAWSHAY WILLIAMS, LTD., Ashted, Surrey (24).—We would draw attention to the 14 h.p. four-cylinder chassis here shown. The frame is of stamped steel with an underframe supported by the crossbars carrying the engine and gear box on three-point suspension from two cross members in the centre of the car. The engine is of very neat appearance, with cylinders cast in pairs, and valve chambers on the left-hand side, one camshaft only being used. The bore and stroke are 90 mm. by 100 mm. High tension accumulator ignition is provided and the contact maker is placed in a particularly accessible position in front of the engine, and is driven off the end of the half-time shaft by bevel gear within the crank chamber. The half-time gearing is wholly enclosed within an independent case in front of the crank chamber. The engine is lubricated by means of a small force pump in an oil case, and belt driven off the end of the half-time shaft. The drive passes to the gear box through a Hele-Shaw clutch, and a transmission shaft provided with universal joints at each end. The gear box is, as we have said, three-point suspension from cross members of the frame. The bolts by which the lower half of the gear box is suspended from the cross members are screwed through blocks set between the flanges of the girders. The gear gives three-speeds forward and reverse, Mercedes form



Photograph by

The new 35 h.p. Daimler car for King Edward VII., exhibited by permission of His Majesty. The Continental tyres are the largest fitted to any car in the show, being 920 by 150 mm. Parsons non-skids are fixed on the driving wheels.

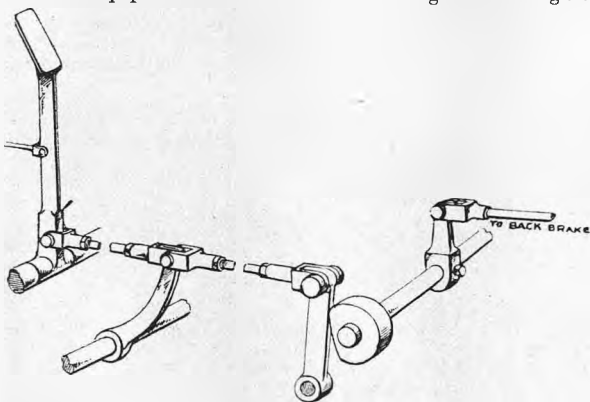
Argent Archer, Kensington, W.

of change with gate sector being adopted. All gear shafts run in ball bearings, which are bolted to the lower portion of the gear box, the upper portion merely forming an oil-tight dustproof lid which can be removed when inspection is desired. The countershaft is connected to the sprocket spindle on one side by a driving dog and on the other by a double jointed short cardan shaft. The drive is conveyed to the road wheels, which run on ball bearings, by chains in the usual way. Push pedals are fitted, the clutch being withdrawn by means of an eccentric on the clutch spindle. The powerful band brake on the countershaft is pedal applied, and internal brakes expanding in drums forming part of the road wheel hubs are applied by a side lever in the usual way. These brakes are effectually enclosed against the inroads of dust and dirt. The 20 h.p. car is similar in every way with the exception that the engine cylinders are 110 bore by 120 stroke, the water circulation pump being gear driven. The speed gear gives four speeds forward and reverse. This chassis carries a good-looking Roi des Belges side entrance body to seat seven.

CUPELLE MOTORS, LTD., Knightsbridge, S.W. (23).—Three cars—an 8 h.p. single-cylinder, 12 h.p. two-cylinder, and a 16 h.p. four-cylinder Cupelle, the latter with a Roi des Belges detachable brougham type body—are staged here. The latter body is ingeniously arranged to be lifted from the dash and tilted back on a rear hinge, while the hood is removable at will. The 8 and the 12 h.p. are both well designed and nicely-finished vehicles, the latter with a vertical well-finished side-entrance double phaeton body.

THE DAIMLER MOTOR CO. (1904), LTD., Coventry (62).—The Daimler Motor Company's stand is a centre of great interest owing to the presence of His Majesty's new car. The models shown are the 28 h.p., 30 h.p., and 35 h.p., these being shown in chassis form and with bodies of different styles made in the company's works. The mechanism of these cars is well known, but we should like to call attention to the inclined valves, single steering wheel control, synchronised ignition, and ample dimensions with simplicity of design. The models have been altered in detail only since last year. The frame has been rendered stiffer by a new L-shaped hitch plate and a tubular cross member. The speed lever is now fitted with a safety device preventing engagement of the reverse and a forward speed at the same time. A shaft is now carried along on the right-hand side of the engine to operate the magneto when used.

A. DARRACQ AND Co., LTD., Oxford Street, W. (125).—An entirely new model shown at Olympia for the first time is the 20 h.p. Darracq car. This is fortunately shown in the chassis form, and enables the visitor to appreciate its many points. The engine has four cylinders cast in pairs of 112 mm. bore and 120 mm. stroke. The valves are all set on one side, and are mechanically operated by one camshaft, which also drives the magneto and water-circulating pump. This latter, it may be noted, is now brought high up forward on the engine, and in a much more accessible position than in the earlier types of the Darracq productions. There are two ignitions—magneto



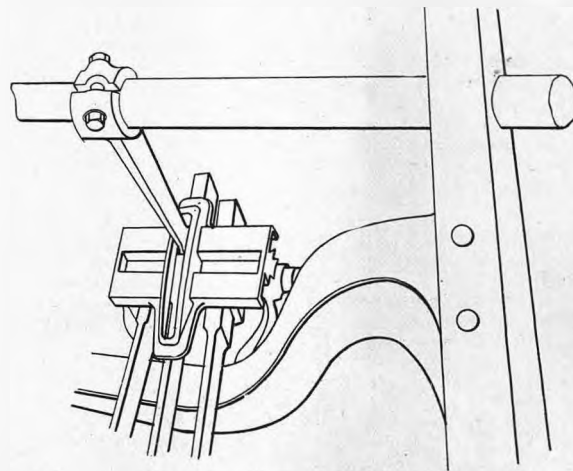
The Darracq brake motion, showing the cam to disengage the clutch.

and high tension. The high tension plugs are set in the centre of the cylinders, and the magneto plugs immediately over the inlet valves. The clutch is the ordinary leather-faced conical type, having beneath it a series of spring-actuated buffers, which ensure easy engagement of the clutch. The new car is fitted with three-speed gear, the top speed being, of course, direct. A change-speed lever is mounted beneath the steering wheel on the right-hand side. Power is transmitted from the change-speed gear to the rear live axle by means of the usual

Show Report—Petrol Cars.

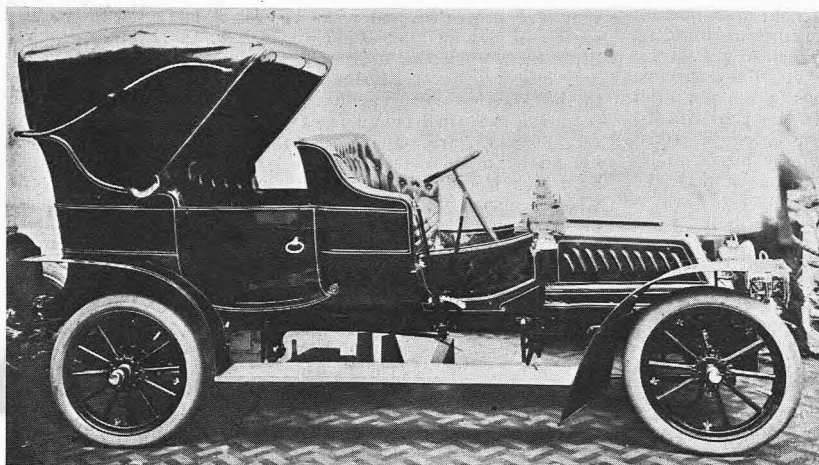
universally jointed propeller-shaft. The universal joints are very well protected, and when the car is loaded, the propeller-shaft assumes an almost horizontal line, so that there is very little wear upon the universal joints. It may be noted that ball bearings are used throughout this car, thus conforming to the practice now generally adopted. The brakes, of which there are the usual complement of countershaft brake and rear wheel brakes, are actuated as to the first by a pedal and the second by a side lever. There is a simple cam arrangement by which the clutch may be set to disconnect from the drive when the road wheel brakes are applied. The clutch pedal is also connected to the throttle valve, so that the operation of withdrawing the clutch also throttles down the engine, thus preventing racing. A slight alteration has been made in the throttle valve itself, this being of the mushroom type working in an upright position, and operated by a hand lever set on a sector on the steering wheel by the clutch pedal and by the governor, each independently. The 20 h.p. chassis should be made a point of special attention by all who are interested in Darracq productions. Another which is exhibited is that of the 15 h.p. car. This is in all essential respects a replica of the chassis we have already dealt with, with the exception of the magneto ignition gear, which in this instance is set upon the right-hand side of the engine, and opposite to the valve mechanism. Two finished cars are shown—one a single-cylinder 8 h.p., now so well known, and the other a 10 h.p. two-cylinder engine vertical. Both of these are fitted with four-seated bodies, and are specimens of the standard Darracq productions.

H. H. P. DEASY AND Co., LTD., Brompton Road, S.W. (29).—It is needless, considering the present reputation enjoyed by the Martini cars in this country, to carefully detail the whole of their mechanical design. We propose, therefore, merely to touch upon the additional features and alterations which we find in both the 24 h.p. and 40 h.p. chassis. A new carburettor provided with an ingenious syn-



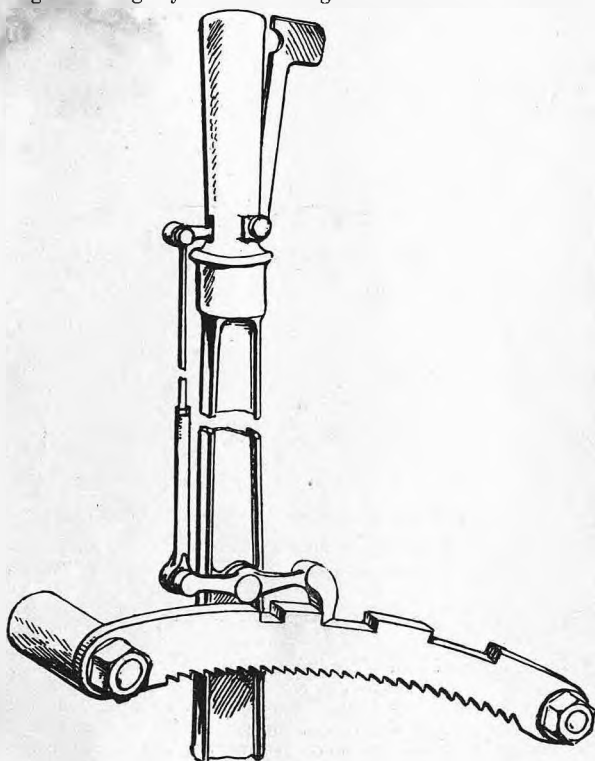
The Martini change-speed mechanism.

chronised petrol and air governing arrangement is fitted. It is somewhat difficult to describe this without a diagram, but we are promised by Capt. Deasy means to make the detail public at an early date. All the gearshafts now run in ball bearings, in which no springs are used, and the drive is direct on the top speed. The internally applied band brakes are made in two segments, and are very powerful in action. The countershaft brake has been strengthened, and is now made with an oil cavity which precludes the possibility of any oil gaining access thereto. A new metal to metal segmental clutch is fitted. This is of particularly ingenious design, very easily operated, and will be described in detail in an early issue. The clutch and throttle are now interconnected, so that the withdrawal of the clutch shuts down the engine. A decelerator pedal is now provided which makes for most comfortable and easy driving in traffic, it being possible to slow the car right down by its use, leaving the driver freedom of both his hands. A very handsome double phaeton body with Cape hood is set upon a 24 h.p. chassis, this body being finished in white, upholstered in pleated and buttoned red leather, while the wheels are scarlet lined with black. As we have already suggested, the Martini chassis are worthy of the closest attention.

Show Report—Petrol Cars.

A 15 h.p. De Dion side-entrance car with leather hood over the rear seats.

DE DION-BOUTON, LTD., Great Marlborough Street, W. (68).—On the De Dion-Bouton stand are to be found some new models. A new pattern 8 h.p. is being shown, this differing very slightly from the old 8 h.p., chiefly in length, it being made slightly shorter and lighter than before. The next



The De Dion change-speed lever and quadrant.

model is the new 9 h.p. single-cylinder car. The dimensions of this engine are 110 by 130 mm. The car is fitted with a plate clutch and a three-speed and reverse sliding gear. A sectional model of this very ingenious clutch, which was described in *The Autocar* on its introduction, is exhibited, and affords the intending purchaser an opportunity of becoming acquainted with this important part of a car's mechanism. The brakes on this pattern are of the internal metal to metal expanding type. The 15 h.p. four-cylinder car is similar in detail to that exhibited last year, but is completely altered in appearance. The well-known De Dion bonnet is replaced by a honeycomb radiator fitted in the usual place and a corresponding bonnet. The speed quadrant is novel, and its points will be appreciated from a perusal of the sketch which we give. It is provided with three notches, the first being of the same width as the catch, and

corresponding to the reverse gear. The next one is slightly longer and double the length of the reverse notch, and when the lever is at the back of this notch the gear is in the neutral; sliding it to the front end of the notch gives the first speed, then the catch has to be raised by the usual trigger to allow it to jump the space between that notch and the next. This is also a long notch, and at the back gives the second speed, and front the third. Thus it is rarely necessary to use the catch for changing. The 24 h.p. car is an enlarged model of the 15 h.p. The 12 h.p. two-cylinder, the 15 h.p., and the 9 h.p. engines are fitted with pressed steel frames. The 12 h.p. car has been altered slightly and is shown in its modified form. The lubrication has been altered and a magneto-shaft fitted. A detail worth inspection on this car is the facility of removal of the contact breaker cover. On all cars except the 6 h.p. and 8 h.p. sliding gear is used, but on these two the well known De Dion expanding

clutch gear is retained.

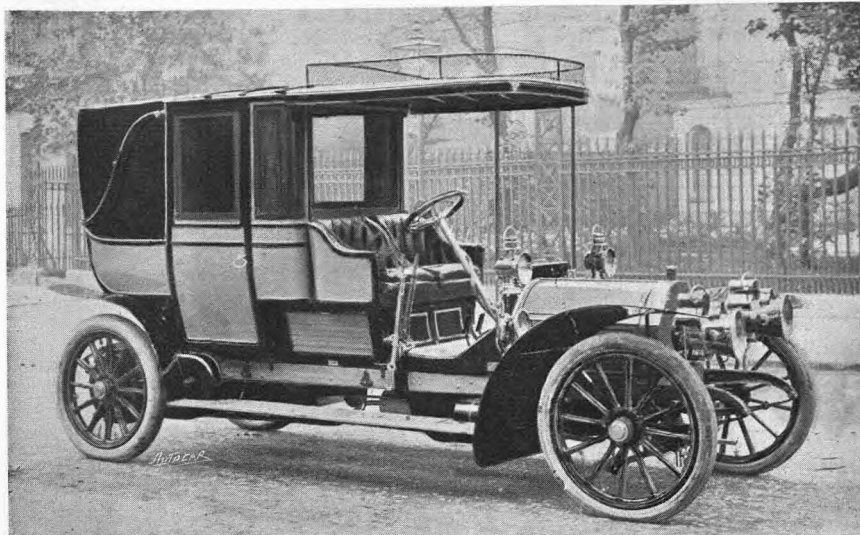
DELAUNAY-BELLEVILLE, Oxford Street, W. (58).—Three different powers of Delaunay-Belleville cars are being shown, including a stripped chassis. These cars do not differ from one another to any great extent, except in the dimensions of the engine and transmission, etc. The three powers are 16, 28, and 40, all being four-cylinder cars. The first is a live axle car, whilst the last two are driven by side chains from a countershaft, otherwise the following description is standard. The valves are arranged on opposite sides; the ignition is by low-tension magneto with simple insulated cut-out plugs. Lubrication is by a reciprocating eccentric operated force pump arranged within the crank chamber. The bottom of the crank chamber slopes towards the back, at which end is the force pump, forcing oil through the crankshaft and up the connecting rods. The engine is supported by arms from the main frame. Behind the dashboard at suitable distances are transverse frame members, to which are attached longitudinal members, forming a secondary frame. This secondary frame carries the gear box, which in all cases provides four speeds and reverse, operated by a single speed lever. This works in a straight-forward quadrant, which differs from the ordinary quadrant in not being provided with notches, and consequently there is no trigger on the speed lever. In the gear box is a sliding notched bar, with which engages a spring plunger. A dust screen is carried from the front of the engine to well behind the gear box, and the propeller shaft is provided with a single dustproof universal joint. All moving parts are well protected against dust. The clutch is the ordinary leather to metal cone type, and is provided with the details shown last February at Olympia, when this make of car created such a good impression.



The 8 h.p. De Dion car with victoria body and wind shield.

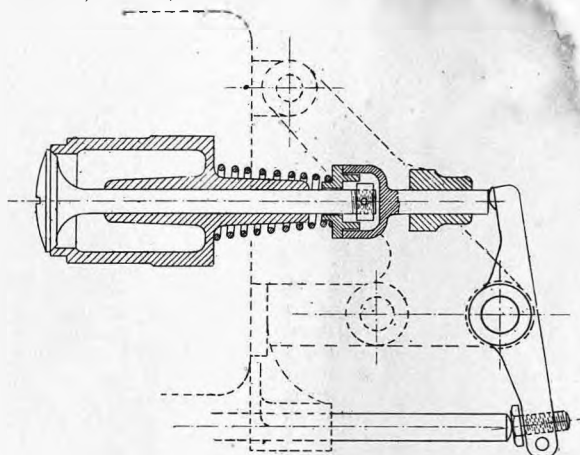
DUCROS MERCEDES, LTD., Long Acre, W.C. (42).—On this stand one naturally makes one's way to the 30-35 h.p. 1906 chassis, in which the following variations from the previous type are noticeable. The half-time gear is now placed in a separate gear case in front of the crank chamber and immediately behind the radiator, the cover of this gear case being detachable from the front. The air inlet to the carburetter is now adjustable from the dashboard—a facility which did not hitherto obtain in connection with these cars. In lieu of the lubrication being effected by pressure, a small force pump driven off an extension of the water pump spindle is employed for this purpose. The oil is forced by air pressure in the lubricating tank to the pump itself, and is then driven by the latter to the various bearings it serves. A copper jacket is now fitted round the flanged exhaust pipe, and an adjustable cold air intake arranged on the hot air lead to the carburetter. It is possible to supply either all cold or all hot air, or a mixture of the two if desired, by these means. The change-speed gear is now fitted with direct drive on top speed, and a ratchet and pawl sprag, actuated from the dashboard, is fitted to the exterior end of the secondary gearshaft. A neat and easily accessible means of adjustment is now provided to both band brakes. The springs are now secured to the axle by a surrounding clip, which is made with a bolt passing through the centre of the axle itself, and there secured by a castled nut. The 20-25 h.p. chassis carries a very handsome side-entrance double phaeton body with divided seats in front, and wide side-entrance body. The body is finished in Panhard red, black margins, lined gold, and upholstered in red leather to match. Another 20-25 h.p. chassis carries a side-entrance body, tastefully finished in French grey and red, with double extension Cape hood fitted with brass extension rods. A further 20-25 h.p. carries a coupe landaulet body, finished in dark green, black margin, and lined red, and most luxuriously upholstered in light fawn buttoned cloth. The interior of the body will comfortably accommodate four passengers, while at a pinch three can occupy the front seat. All the examples of body work on this stand are of the highest possible finish, and reflect great credit upon those responsible for them.

THE DURYEA MOTOR Co., Coventry (37).—Two 15 h.p. British-built Duryea cars are shown, and one 12 h.p. phaeton. We need hardly remind our readers that the Duryea is quite unique in its outline, and is thus a distinctive car. There are no great departures in the mechanical features of the cars beyond the adoption of Mr. R. E. Phillips's inlet valve, which is so designed that the valve spring is depressed so that the



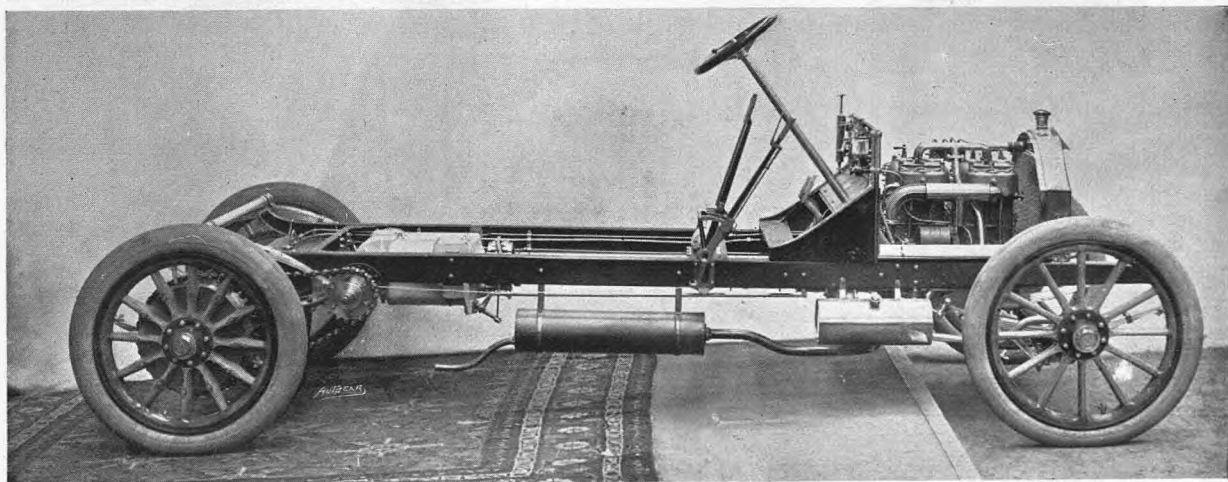
A 20 h.p. Mercedes coupé landaulet exhibited by Du Cros Mercedes, Ltd.

valve itself opens atmospherically without having any other work to do than to move the weight of the valve; the spring, of course, returns, and holds the valve in its seat. On the



The Phillips valve motion fitted to the Duryea engine.

trial car which the company are running there is fitted a modified type of gear, in which the noise is reduced to a



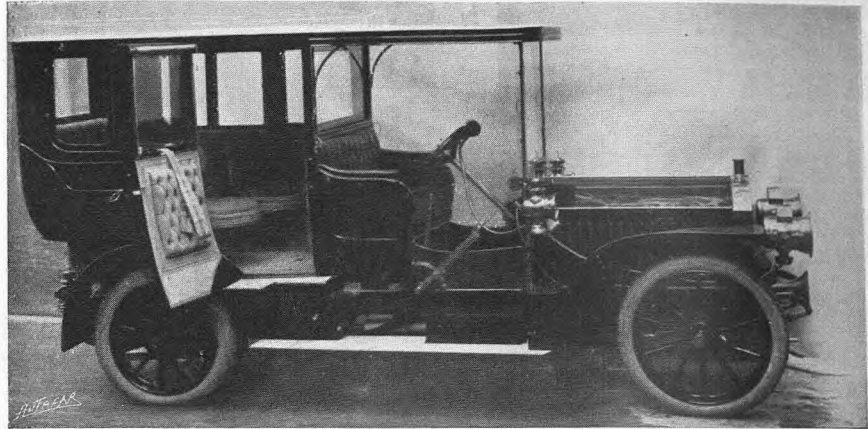
A 25 h.p. Mercedes chassis suitable for a landaulet body.

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minimum. A 7 h.p. Clyde car is also exhibited upon this stand. There is one departure in this car in the fitting of a three-speed gear. Hitherto two speeds and reverse have been the sum total of the change speeds available, but by an ingenious arrangement of the change-speed gear mechanism a third speed has been made possible. It may be well to remind our readers that in this case the change-speed gear is carried in a box affixed to the casing of the rear axle, and that the drive from the engine is conveyed to the countershaft by means of a Renold chain. The clutch is not part of the engine, but it is fitted within the chain wheel on the first shaft of the change-speed gear. The body fitted to the car shown has four seats, the left hand front seat being of the folding type, so that ready access to the rear seats is possible.

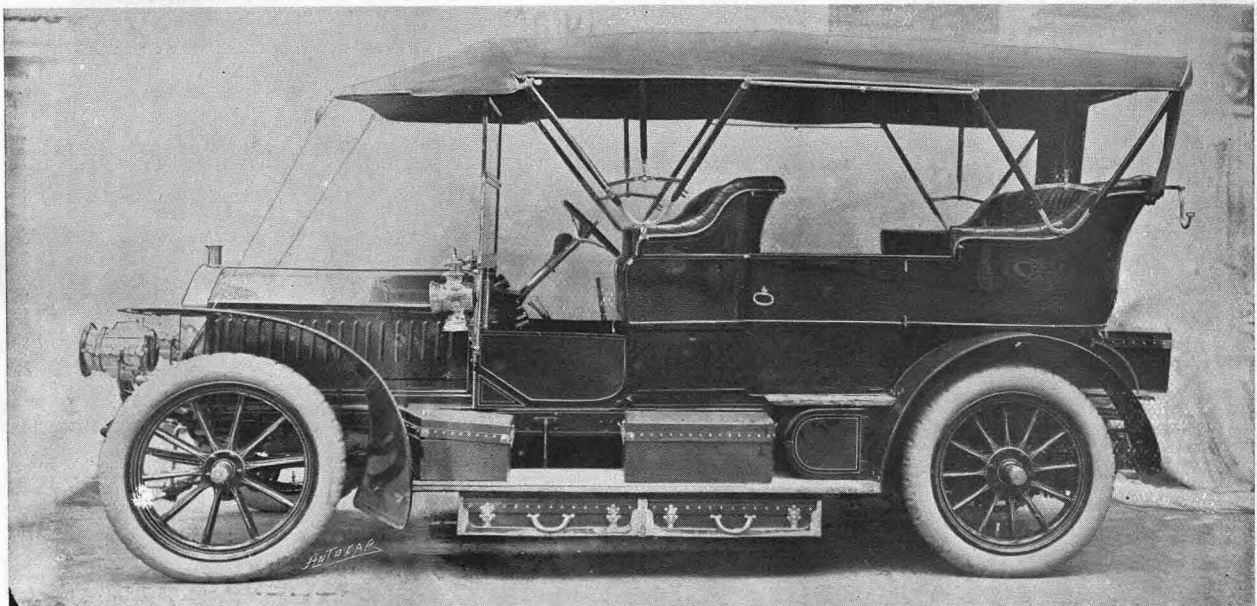
THE ECLIPSE MACHINE CO., LTD., Oldham (1).—The 24 h.p. Rothwell double phaeton car now shown for the first time is an interesting vehicle, particularly by reason of the fact that it is of British manufacture throughout, all being turned out by the Eclipse Machine Co. The radiator possesses novel features, inasmuch as it is formed of 200 lengths of coiled copper tube, each coil being about ten feet in length. The thermo-syphon system of cooling is adopted, the pipes from and to the radiator being of exceptionally large diameter with adequate rises. The four-cylinder engine has its cylinders cast in pairs, 4 in. by 5 in. bore and stroke. The valves are mechanically operated off a half-time shaft on the left-hand side of the engine, the induction valves being worked by rocking overhead tappets. The induction valves have a variable lift afforded by a simple means of varying the lift of the tappet rods. A cone friction clutch is provided, but is made with pallets or entering studs which engage with the flywheel web slightly in advance of the clutch proper, thus taking up the drive very sweetly. The gear box of ordinary design gives three speeds forward and reverse, the shaft carrying the sliding sleeve being formed with four feathers in lieu of being squared. Both gear box and back axle run on ball bearings, the road wheels being carried on extensions of the axle sleeve, so that the live axle performs the duty of rotating the road wheels alone, and is preserved from all road shock. The brakes, pedal and band applied at the rear of the gear box and to the road wheels respectively, are of the internally expanding type, and very powerful in application. The chassis

carries a very tasteful phaeton body finished in coaching yellow, lined red, and upholstered to match. The road wheels are by Mulliner, and are of the staggered spoke variety. The excellence of the work put into this car can be gauged by an examination of the engine and the various parts shown separately.



A striking six-cylinder Napier with four-seated landaulet body.

S. F. EDGE, LTD., New Burlington Street, W. (61).—One of the most interesting exhibits in the show are the two six-cylinder chassis shown here, and the remaining two carrying most handsome, luxurious, and perfectly-appointed bodies. There is no finer show finish to be found at Olympia than that of these two Napier chassis. The engine, and, indeed, the whole mechanical economy of the car, are now so well known, and have been so lately referred to in our columns, that we do not propose to enter into detail in this report, but no visitor should fail to make himself acquainted with the Napier system as exemplified in these fine examples of mechanical output. It will be noted that in the 60 h.p. four-cylinder the valve chambers are all set on the left-hand side of the cylinders. Both exhaust and induction valves are operated by one camshaft. The contrast between the 40 h.p. and the 60 h.p. will enable visitors to perceive the practice adopted with regard to the 40 h.p. and 60 h.p. chassis. Forced feed lubrication is provided to the whole engine. A circulating pump is set beneath the crank chamber, and the oil forced from a sump therein through the crankshaft to the various bearings, returning thence to the pressure oil tank carried on the side of the frame. A similar pump driving off the forward end of the gearshaft

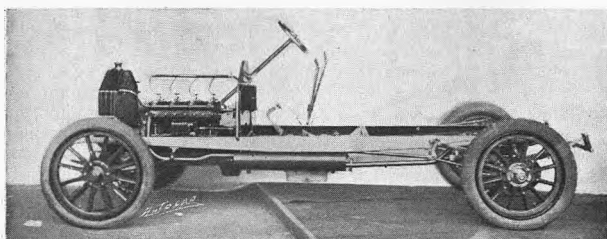


A handsome six-cylinder engined Napier touring car.

supplies oil in an equally certain manner to the gearshaft bearings. A 40 h.p. chassis carries a most magnificently finished double phaeton body with side entrance, bucket seats, side doors to footboard, and painted in the standard Napier colours, and fitted with trunk carrying drawers beneath the footboards, as well as tool boxes fitted upon the boards themselves. A long, flat, and elegant hood, which is brought forward as far as the centre of the long bonnet, is fitted with the wind screen above dashboard, and drop screen behind the front seat, also with roll-up side blinds, and affords splendid protection to the occupants of the car, even in the worst of weather. The other 40 h.p. chassis carries a double limousine body, also finished in Napier standard style, and handsomely glazed on all sides, accommodating five passengers inside. A working model of the celebrated Napier synchronised ignition, together with carburetter and hydraulic control, is found upon the centre table.

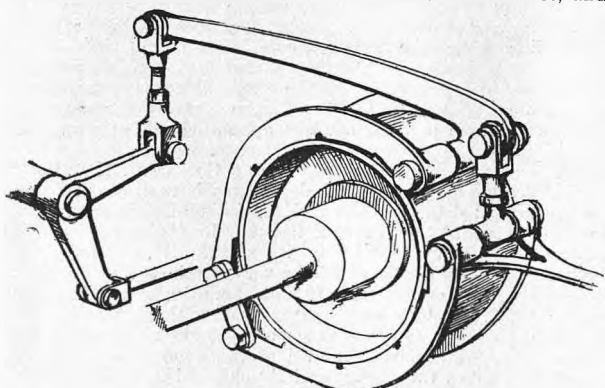
THE ELECTROMOBILE CO., LTD., Curzon Street, W. (67).—Covered petrol cars on the lines of electric cars are exhibited by the Electromobile Co. These are provided with 18 h.p. four-cylinder engines, and are chiefly on standard petrol car lines, with the exception that the transmission from the countershaft to the back axle is by side chains carried within the frame. Great attention is paid to the spring suspension, and a feature is made of a lengthy body for the relatively short wheelbase. The cars are made to turn on a very small radius so as to be particularly adapted to town work, whilst they are sufficiently fast for use in the open.

THE ENFIELD AUTOCAR CO., Redditch (17).—Attention will first be drawn on this stand to the new 30 h.p. Royal Enfield chassis, which with the exception of the tyres and springs, is the entire output of the Royal Enfield Works at Redditch. The frame is of cambered channel steel, both ends of the



The new 30 h.p. Model Y Enfield chassis.

longitudinal members being formed to take the spring hangers. The engine is carried on an inner frame sunk slightly below the level of the main frame, this underframe also supporting the gear box. The cylinders are cast separately, and are 127 mm. bore and 127 mm. stroke. High tension magneto ignition is fitted, the Nilmelior system being adopted on this car. A handsomely shaped well-made tubular radiator closes in the front of the bonnet, and



The Enfield countershaft brake.

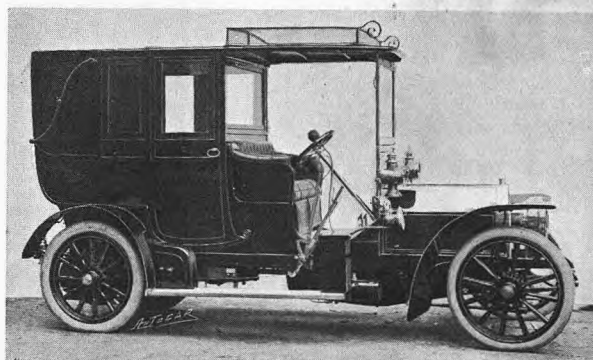
a slow running gear pump serves to drive the water from the radiator through the cylinders and return. A very neat and easily detachable dumb-bell form of connection conveys the drive from the friction clutch to the gear box, which gives three speeds forward and a reverse, and is of small size with short stiff shafts. Ball bearings are fitted to these shafts, as also to the crankshaft and back axle. An

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immensely powerful foot brake of the band form takes effect upon a wide drum in rear of the gear box. Locomotive type brakes—that is, two gripping brake blocks—are fitted to each of the rear wheel brake drums. Another feature is the arrangement of the steering spindle and gear. The steering spindle passes from the dashboard to the steering gear box which is carried upon and above the level of the frame, halfway between the dashboard and the radiator. This box contains two worms geared together by gear wheels, each operating worm nuts which in their turn produce a semi-rotary effect on the steering lever spindle. It is difficult to describe this ingeniously devised apparatus without diagrams, but this we hope to do at an early date. From every point of view this chassis deserves the closest attention. The other exhibit on this stand is a 15-20 h.p. car carrying a very handsome double phaeton side-entrance body, most comfortably and luxuriously upholstered. The mechanical detail of the chassis carrying this body is similar in all respects to the chassis above described, with the exception of the stroke and bore of the engine. We hope to give a full detailed and illustrated description of these remarkable cars from drawings kindly promised to us by Mr. Albert Eadie.

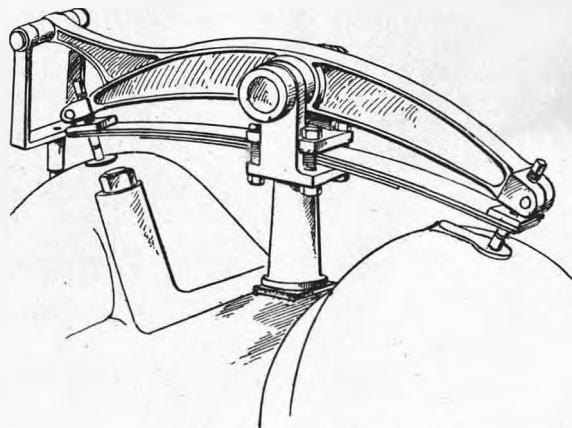
THE FARMAN AUTOMOBILE CO., Long Acre, W.C. (113).—A chassis new to the motor interest is the 20 h.p. Mascot, which this firm are now offering at a very reasonable price. The stamped steel cambered frame carries a four-cylinder Aster engine, fitted with a somewhat novel form of carburetter, in which a loose perforated thimble with pointed base lies loose on the chamber over the jet, and against the serrated base of which the petrol impinges and atomises. Over the jet chamber is an adjustable automatic valve. Eisemann ignition is provided. A leathered cone clutch conveys the drive to a three-speed gear, thence by solid propeller-shaft to the live axle. A ratchet and pawl sprag takes effect upon the pedal-applied band brake drum. The honeycomb radiator is of graceful design, and is fan-cooled.

FIAT MOTORS, LTD., Long Acre, W.C. (113).—The new pattern Fiat is shown nominally of 16 h.p. The chassis is



A 24 h.p. F.I.A.T. landaulet, with detachable extension top.

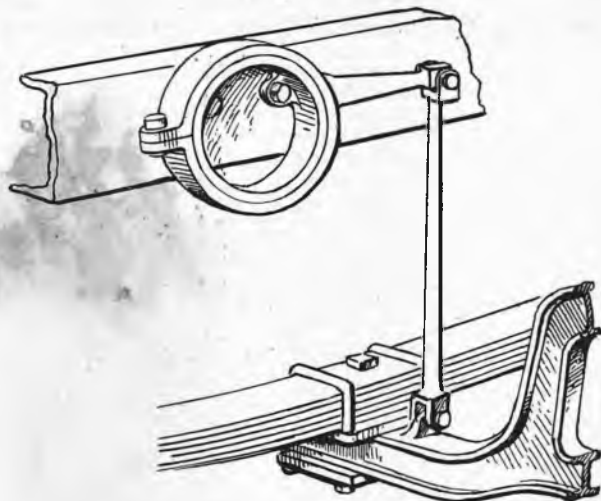
mainly designed for town work, but with a suitable body the car would make a very nice type of moderate powered touring vehicle. All the Fiat features are retained, these



The Fiat valve tappet and springs.

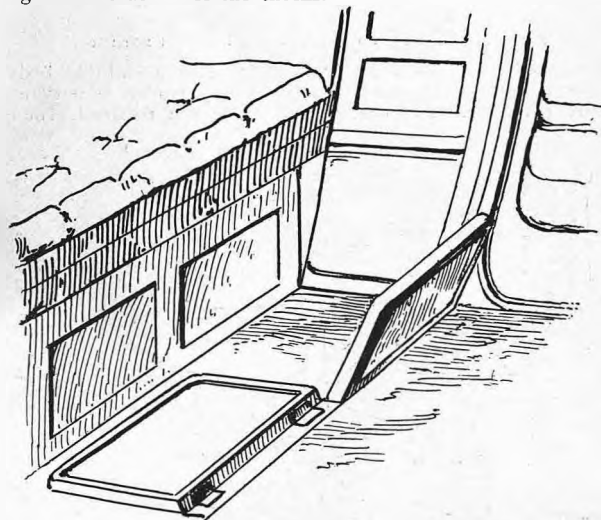
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remarks applying to the higher powers as well. A notable feature on the 16 h.p. chassis is the arrangement of the steering. Owing to the slope of the steering column the horizontal rod would be too short, so that the motion is taken back to a rocking lever and is then transmitted by a long straight rod to the front wheels. This arrangement reduces shock upon the worm and sector to a minimum. Great interest is taken in one of the celebrated racers, which is a sister to the one upon which Lancia distinguished himself so greatly both in Europe and America this year. It is a magnificent specimen of a racing car, and should be carefully studied throughout. From the sketch it will be seen that only one valve rod is used for each cylinder. This rod operates a rocking lever, which in its turn pushes open the exhaust and inlet valves alternately. The valve springs are of the laminated type—very small *fac similes* of the ordinary semi-elliptical carriage springs. The spring checks, to prevent undue bumping of the car on rough ground, take the form



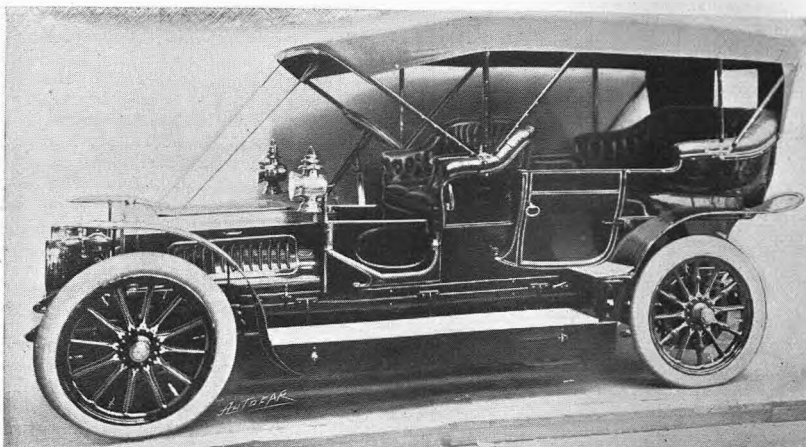
The Fiat spring check.

of bands encircling a drum, the drum being fixed to the frame. The bands can be tightened as occasion requires to regulate the action of the checks.



Rear seat footrests on the Peugeot landaulet.

FRISWELL, LTD, Albany Street, N.W. (104).—The Peugeot for 1906 is not materially altered from this year's pattern, as this has proved itself so satisfactory in practice that it has

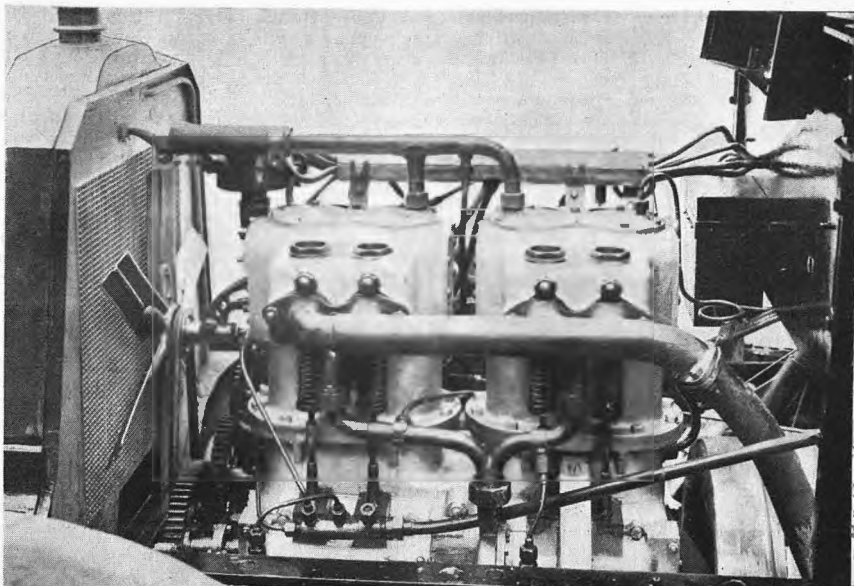


30-40 h.p. Peugeot car with Truffault suspension, exhibited on the stand of Friswell, Ltd.

been wisely decided to leave well alone. On both the 18-24 h.p. and the 30-40 h.p. cars, ignition improvement is embodied. The low-tension magneto ignition is as usual, and is one of the most accessible and well-constructed low-tension devices made. High-tension battery ignition is provided as a stand-by, but the improvement consists in a device for enabling the wipe contact-maker to be put out of action at any time. As the wipe contact is the part which is most subject to wear, and consequently to failure, this is a distinctly good idea, because it never need be used a single mile when it is not required. It is only necessary to open the side door of the bonnet, push over a small lever, and the contact-maker is out of action. The engine and mechanism are entirely protected by a stamped metal casing, which is bolted on to the main frame. The bodywork in both cars should be examined. It can only be described as luxurious in the extreme. On one car five back seats are provided in a rather unique manner. There is ample room for three upon the wide back seat, and, in addition to this, there are two hinged seats with backs. When these are out of use, they fall flat against the sides of the car, but they can be opened out, turned in any position, and placed almost anywhere in the back part of the car. At the same time, they remain just where they are put, and are quite stable and comfortable. They, like the rest of the seats, are beautifully upholstered. A luxury which must be tried to be appreciated is a folding footrest, which is more comfortable than a footstool, as it is set at a convenient angle, and at the same time can be instantly folded back out of the way when not wanted. Long footboards are made to serve as lids to most capacious tool boxes on one car and drawers on another. These are felt-lined, and provided with locks. They are large enough to carry practically all the tools and spares that would be wanted for a long tour. A metal luggage rack, which slides under the floor and completely out of sight when not required, is also another most useful fitting. It is part of the car, and yet never in the way till actually required. Taking them all round, the two Peugeot cars are among the most comfortable and luxuriously appointed of any in the exhibition.

THE GOBRON-BRILLIE BRITISH MOTOR CO., LTD., New Bond Street, W. (130).—No radical departures have been made in the mechanical details of the 35 h.p. Gobron-Brillie cars, with the exception that the governor has now been dispensed with; an accelerator pedal is used in its stead. Of the two cars shown, one of them is fitted with a very fine body by Benzelin. This as shown is an exceedingly handsome limousine, but this can be changed into a side entrance car with rear and front screens and canopy top by the removal of the side top panels of the body. Again, the removal of the canopy top and the back screen gives the car an entirely changed appearance, and presents it as an ordinary side entrance car. There is also staged a 60 h.p. car chassis. Here a change-speed gear of the Mercedes type replaces the previous gear. The Gobron-Brillie system, we might remind our readers, is that of having the explosive effort of the engine occurring between two pistons in a vertical position, the upper piston being connected to the crankshaft by means of a top brace and double connecting rods; the lower rod being connected to a centre crank pin at 180° to the outer pair. By this means vibration is very much reduced, and economy in fuel consumption is effected.

THE GLADIATOR Co., Long Acre, W.C. (63).—The lowest power Gladiator car shown is the 14-18 h.p. In this car a new departure is made as regards this company in the fitting of a live axle and propeller-shaft. This engine is very similar to last year's pattern, having mechanically-operated valves on opposite sides, and being provided with double ignition. A new automatic carburetter is fitted, and the car is brought up to date in the fitting of a Mercedes type of bonnet and push forward pedals. A fine chassis of the 18-28 h.p. car enables the visitor to see all the features. This is a new type of car, and presents many points of interest. The valves are on opposite sides, and two ignitions are provided, as with the smaller car. The magneto is driven by chain from the crankshaft, whilst a high tension distributor is carried at the top of a vertical shaft, thus rendering it extremely accessible. The air vents to the crank chamber are carried high up, and are provided with removable caps, enabling the crank chamber to be easily washed out with paraffin

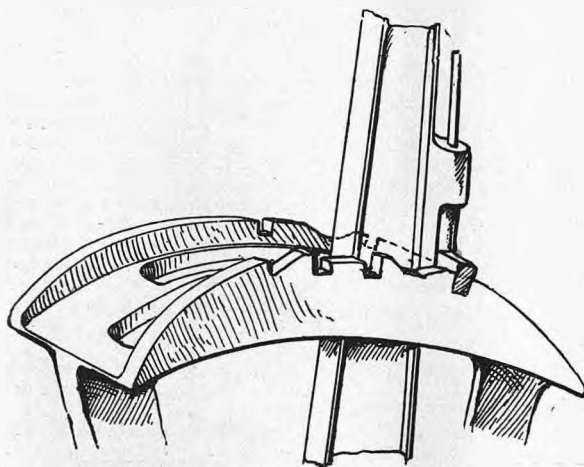


The Gladiator engine viewed from the exhaust side

H. E. HALL AND Co., Tonbridge (31), shows four 1906 Darracq cars, an 8 h.p., 10 h.p., 15 h.p., and 20 h.p., three with phaeton side entrance and one with a tonneau body. All are very smart examples of automobiles, but as the Darracq is dealt with elsewhere in this review we do not enter into its mechanical details to any further extent.

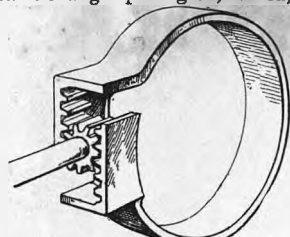
THE HITCHON GEAR AND AUTOMOBILE Co., LTD., Church, near Accrington (106).—The Hitchon change-speed gear, which, as our readers know, is absolutely foolproof (we use the word advisedly), is now made in various sizes to take all powers up to 100 h.p. It will be remembered that this gear is so constructed that there is no possibility of damage in changing. It has always been a surprise to us that it has not been adopted upon many makes of private cars, but we are convinced that it will be widely used sooner or later.

It seems more than probable that its good points will be first recognised by the omnibus manufacturers, as they suffer

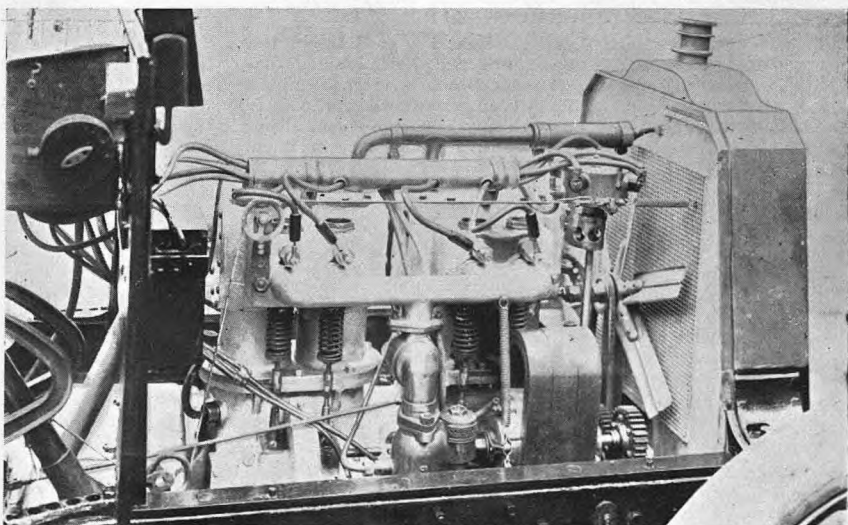


The Gladiator change speed quadrant,

or lubricated if necessary. The oil is circulated by a reciprocating pump worked by an eccentric off the exhaust valve camshaft. The exhaust valves are fitted with a half compression device to facilitate starting. The clutch is of the metal to metal type, and the gear box is supported on a secondary frame which is carried by transverse members. The engine, however, is carried direct from the main frame. The change speed lever works in a double-sided gate quadrant, having notches. The quadrant and change speed lever operate exactly similarly to that on the Clément cars of this year. Half the speeds are obtained with the lever in one half of the quadrant and half in the other. A neutral is provided between each speed. The countershaft is carried as far back as possible from the main frame, so that the chain centres are kept short, enabling a side entrance body to be fitted. Ball bearings are fitted throughout. The workmanship and finish are all that could be desired.



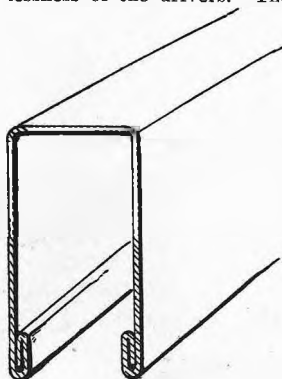
The Hitchon brake band.



Right-hand side view of the new Gladiator engine. High ten-on magneto and ordinary high tension ignition are provided, both acting through the same set of plugs.

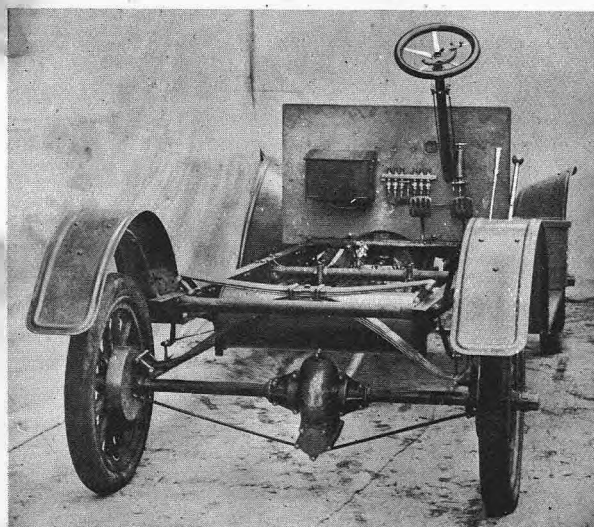
Show Report—Petrol Cars.

more than any other motor builders from the effects of carelessness of the drivers. The Globe cars are in two patterns, one with a single-cylinder engine, and the other with four-cylinder motor. The single-cylinder has a variable lift to the inlet valve, obtained by a very simple and strong method, whereby the fulcrum of the rocking lever, which actuates the inlet valve, is moved up or down as occasion requires. The final drive is by worm and worm wheel on to a ball bearing axle, the road wheels running on extensions of the axle sleeves, also on ball bearings, so that the driving axles proper transmit driving effort alone, and are not called upon to bear any share in carrying weight. It goes without saying that both these cars are fitted with the Hitchon gear. Particularly noticeable features are the three points of suspension. In addition to the transverse back spring, the centre of this spring, instead of being bolted to the rigid frame, is fixed to a second cross spring. This arrangement should give extreme comfort to the occupants of the back



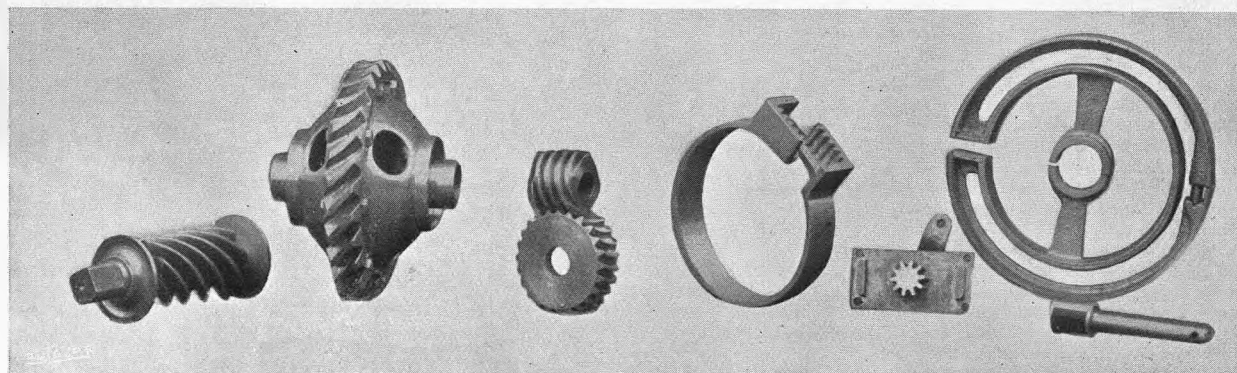
The Hitchon frame section.

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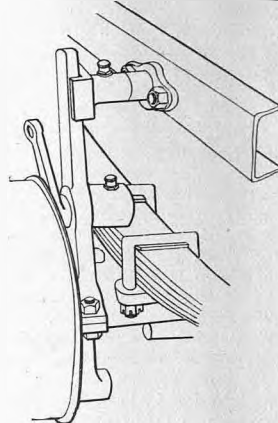
Rear view of the Globe car, built by the Hitchon Gear and Automobile Co. The method of rear springing is particularly worthy of note.

seats. A new section of pressed frame is a good thing, and is exceedingly strong. The sketch appended shows exactly what the section is. It should certainly prove to be one of the strongest sections which have yet been introduced, particularly in frames which are designed with any bends in them, either for dumb irons or for setting in to give a wide steering lock.

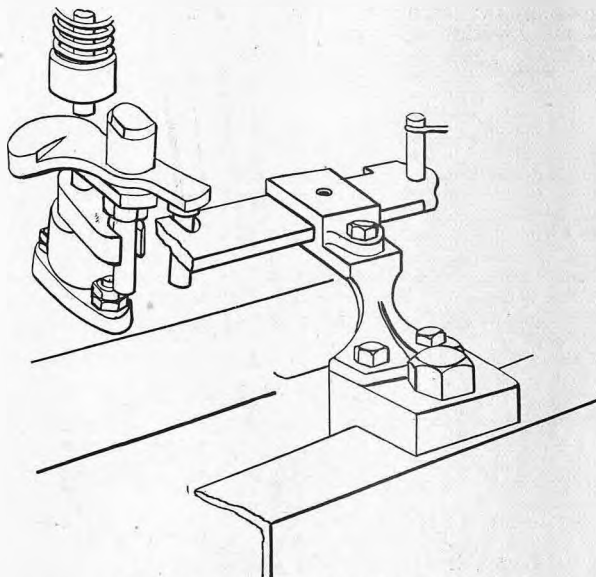


Various parts of the Globe car, including worm drive, irreversible steering by worm and worm wheel, pedal and side brakes.

HORSFALL AND BICKHAM, Manchester (30).—An interesting car on this stand is the 10-12 h.p. three-cylinder Horbick, driven by a three-cylinder White and Poppe engine, 80 by 90. A cone type friction clutch of ample dimensions, connects to a sliding sleeve arrangement of gear, giving three speeds forward and reverse, and propeller-shaft driven live axle. A Longuemare carburetter is fitted. This chassis carries a swinging front, side-entrance body, nicely upholstered in dark green leather, and finished in red, lined yellow, with black margins. The 15-20 h.p. and 20-24 h.p. chassis may be taken together, with the exception that the cylinders of the former are 90 by 105, and those of the latter 108 by 116 mm. The frames are of stamped channel steel, an underframe serving to carry the engine and gear box. The cylinders are cast in pairs, with water-jacket covers, the valve boxes being put on the right-hand side, so that only one camshaft is used. A special feature of this engine is the ingenious form of variable valve



Brake stay on the Horbick car.

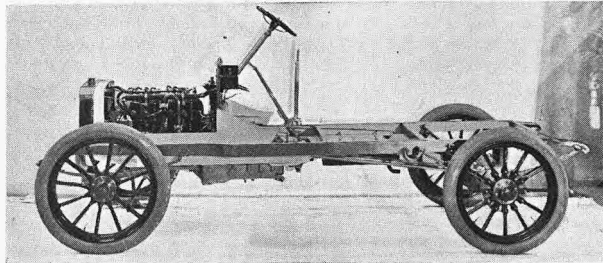


The variable inlet valve motion on the Horbick car.

lift, the arrangement of which is easily comprehended by means of the accompanying sketch. It practically takes the form of the swivelling of a wedged lip beneath the cam tappet and valve spindle. The radiator fan spindle now runs back to the rear of the engine over the top of the cylinders,

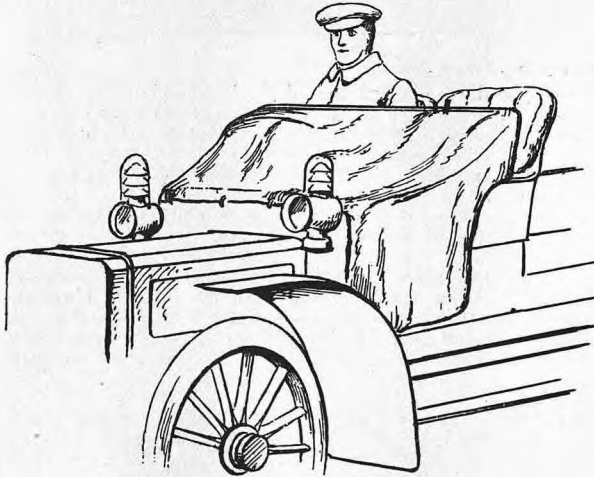
and is there driven off the rear end of the crankshaft by means of a spring spiral belt. The circulating pump is fitted to the top of the underframe, and driven by friction wheel off the flywheel. The gate sector is still fitted to the change-speed lever, but a neat safety arm prevents any possibility of unwittingly changing into the reverse gear. The gear-striking mechanism is specially designed. The arrangement of the interlocking links, which are set on the gear-striking spindle, and which prevent the engagement of any other gear than that intended, is very neatly and simply carried out. The method of transmitting the pull of the road wheel brakes on to the side members of the main frame can be discerned by means of the opposite diagram. This feature occurred in last year's car, but we have referred to it here diagrammatically on account of its interest and ingenuity.

H. M. HOBSON, LTD., of 87, King's Road, Chelsea (6).—The chief feature of this stand is the 16-20 h.p. Decauville chassis with its new four-cylinder motor, the cylinders cast in pairs and fitted with high tension magneto and accumulator



16-20 n.p. Decauville chassis, shown by Messrs. Hobson, Ltd.

fed ignition with independent sparking plugs. The Nilmelior high tension magneto is fitted, and on this car the radiator, which is of the same construction as heretofore, has been improved in design. The exhaust valve chambers are now on the right of the engine, the carburetter being shifted to the same side as the magneto. The induction pipe from the jet chamber delivers centrally to the two pairs of cylinders, and is of greater length than hitherto. The clutch has the same excellent and light striking apparatus, while the gear box is somewhat larger. The engine and gear box are, of course,



The Brewer driving apron exhibited by H. M. Hobson, Ltd.

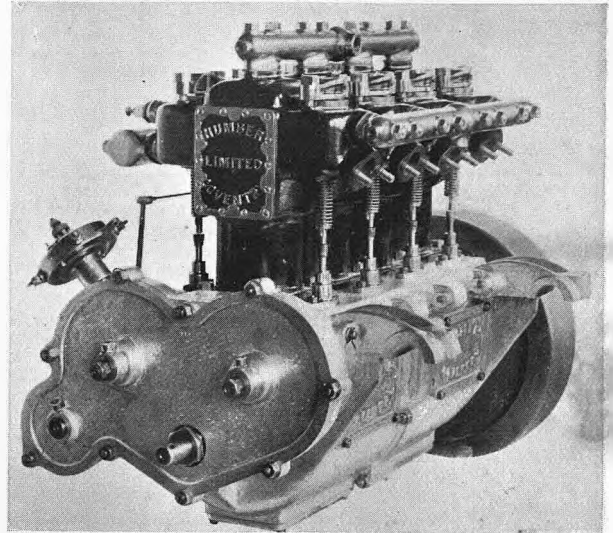
mounted on the well known Decauville bed plate. In the rear of the band brake behind the gear box is a heavy ratchet wheel and a pawl in lieu of the ordinary sprag. All brakes fitted are of extremely powerful description, those to the rear wheels being of the internally expanding order. The road wheels, of course, run on extensions of the axle sleeves in conformity with the original Decauville design. As is well known the Decauville people were the first to introduce this arrangement of driving wheel carriage. A 12-16 h.p. landaulet and a 26-28 h.p. double phaeton body, both thoroughly well finished and upholstered, are also shown.

E. H. JIORA, LTD., Peckham Road, S.E. (10).—A good show of the well-known Hurtu cars are staged here, including a comfortable doctor's coupé on an 8 h.p. chassis fitted with a De Dion engine, and a very commodious side-entrance body on

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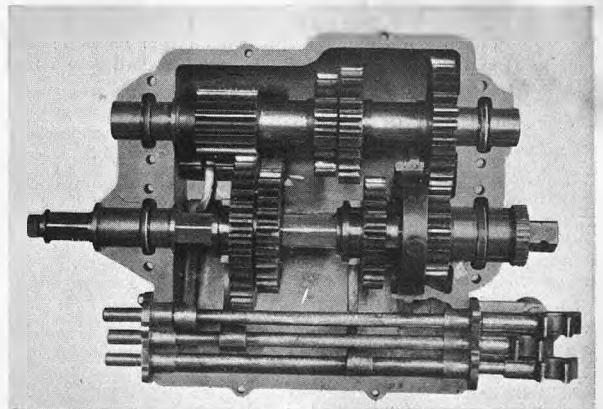
a 10-12 h.p. two-cylinder chassis, with an extending Cape hood. The latest type of 16-20 h.p. four-cylinder side-entrance double phaeton car, finished in dark blue, is a smart and attractive-looking vehicle.

HUMBER, LTD., Beeston, Notts (8).—10-12 h.p. Coventry Humber light car and 16-20 h.p. Beeston Humber touring car form the exhibit at this stand. The best way to deal with the 10-12 h.p. is to point out in what particular features it



The engine of the latest type 10 h.p. Coventry Humber.

exceeds or improves upon the well-known 8-10 h.p. In the first place the cylinders have a bore of $3\frac{1}{2}$ in. and stroke $3\frac{3}{4}$ in. The road wheels are 810 by 90 mm.—very ample dimensions for a car of this character. The gear box has been improved in detail, and an oil retaining case now surrounds and protects the universal joint in rear of the gear box. The bevel driving spindle is now provided with a plain tail bearing, while the live axle, which is on the Decauville principle of being saddled with the duty of rotating the road wheels alone, sustains no road shocks, and runs on ball bearings, three to

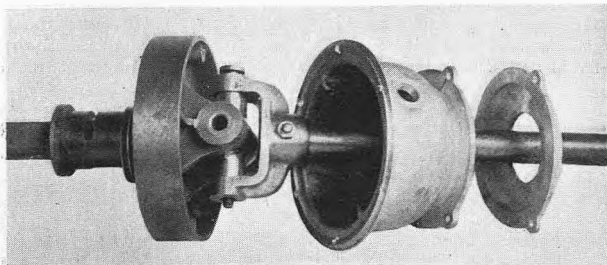


The crane-speed gear on the Bees on Humber cars.

each half of the rotating axle. The road wheel bearings are carried on extensions of the axle sleeve. The springs are made considerably longer than in the 8-10 h.p., and all round the car is considerably improved. The ignition and throttle levers are now placed in a very handy position on the top of the steering wheel. The long wheelbase car, 8 ft., has wheels of the dimensions already mentioned, and the short wheelbase, 7 ft. 1 in., has wheels 760 by 90 mm., heavy Dunlop tyres being fitted. The car shown is the short base type, and is excellently finished and upholstered. In the very handsome example of the 16-20 four-cylinder Beeston Humber touring car, we find a few novel features. The carburetter is now made semi-automatic and with the air valve controlled from the steering wheel. The commutator of the accumulator fed

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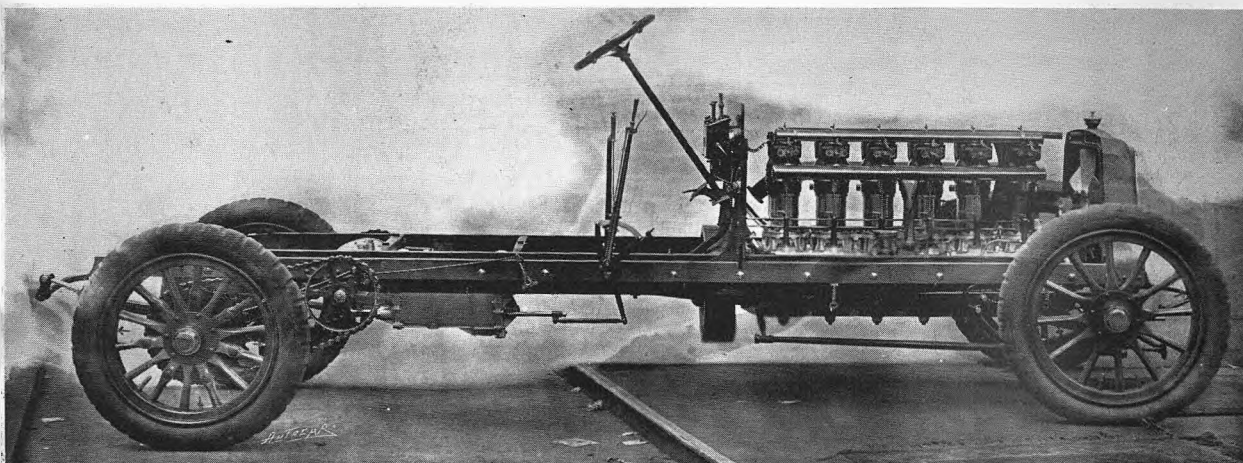
ignition is now synchronised with the magneto ignition. The universal joint in rear of the gear box is now protected by a light oil-tight dustproof case. Beyond these points it has been found unnecessary to vary the detail of this excellent



The universal joint of the Coventry Humber cars with aluminium cover. car in any other particular. The example staged carries a double phaeton body, beautifully finished in Panhard red, with black mouldings lined buff, and also has ample enamelled sheet steel mudguards and running footboard. The car body

child, and a 24 h.p. four-cylinder Panhard chassis, now reduced in price. Purchasers on the look out for automobiles de luxe should tarry at this stand, for not only is some of the best engineering work in the show to be found here, but also much that is of the best, most tasteful, and most luxurious from the point of view of those whose desire it is to purchase a reliable car for all-the-year-round work. The coach-building work exhibited is of a degree of workmanship not excelled by that of the engineers' contribution to the car's production.

IDEN MOTOR CAR Co., LTD., Coventry (27).—The name of Iden is quite sufficient to attract special attention to the very ingenious and simply designed chassis which we find occupying the centre of this stand. The engine is carried by means of its own brackets on the main frame, which is of the usual stamped steel type. The cylinders are cast singly with valve chambers on the left side only, the inlet valves being made with variable lift obtained through a lateral movement of the camshaft controllable from the steering wheel. The variable lift of the valves is governed by the tapered shape of the cams, and by this system of control the spark can be left at its most advanced position, and the pace of the car controlled in traffic to any desired degree. The chassis shown is fitted for accumulator fed ignition, but provision is made for

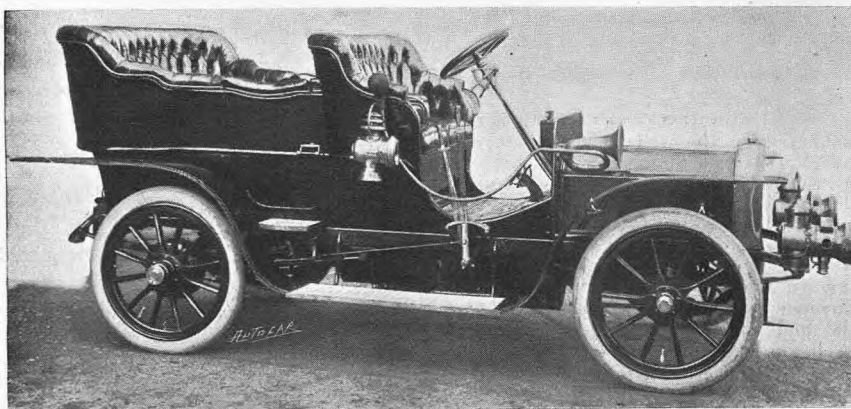


The chassis of the six-cylinder 50 h.p. Panhard.

is fitted with a handsome canopy, with glass wind screen swinging up to roof, and luggage rail on rear portion; altogether a handsome and tasteful car, which for all round touring purposes is difficult to beat.

J. E. HUTTON AND Co., LTD., Shaftesbury Avenue, W. (20).—An attractive 50 h.p. six-cylinder Panhard, the engine of which was reproduced in *The Autocar* of the 11th inst., forms the *pièce de résistance* of the exhibits by this well-known company. The cylinders, as our readers know, are separately cast, and bolted by projecting flanges to the crank chamber. The engine is fitted with Eisemann high-tension ignition. On the top speed the drive is direct. A new feature is the push pedals fitted to this car. A multiple disc clutch is provided, but otherwise the details are of Panhard design throughout, of course made in conformity with the extra stress thrown upon them by the increased power of the engine. The latter is a particularly clean job, every part being peculiarly accessible and very easy to detach. A handsome three-cylinder landau is shown, the price of which has now been greatly reduced. It is beautifully upholstered in fawn cloth, and most conveniently fitted. A 28-30 h.p. Mercedes chassis is also staged, carrying a very handsome Mercedes double phaeton side entrance body with beautifully designed divided seats in front, and tastefully upholstered in red folded and pleated leather. A 28-32 h.p. Mercedes chassis carries a very handsome brougham body with forward canopy, by J. Roths-

child, and the easy addition of magneto if desired. The clutch on the Iden car is fitted with a copper band over the usual leather covering. The change speed gives three speeds forward and reverse, and is of the sliding sleeve type, the gear wheels being of nickel steel hardened in oil. The toggle-applied band brake in rear of the gear box is extremely powerful, and yet sweet in application. Throughout the car the aim of the designer has been to reduce the number of parts, and to obtain the greatest simplicity, and this we think such of our readers who have examined the Iden car will agree with us has been well attained. On a similar chassis we find mounted a handsome side entrance phaeton body finished in cream and gold, and upholstered in red leather.



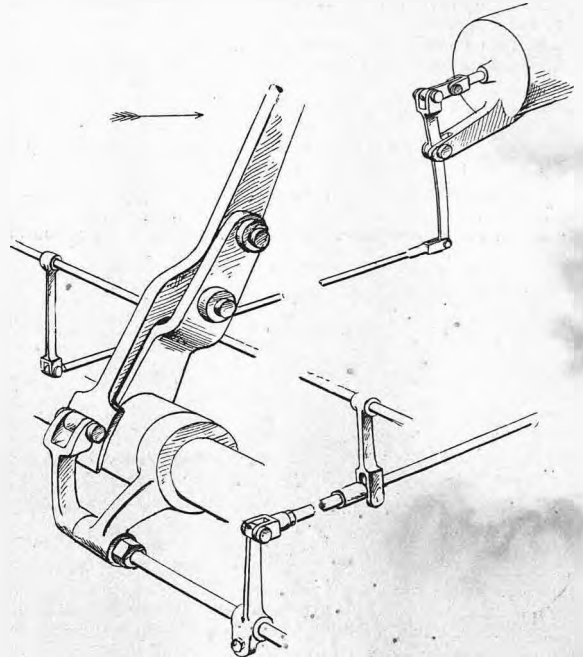
A 12 h.p. four-cylinder Iden phaeton. A similar car of 18 h.p. is also built.

THE IVANHOE MOTOR Co., Cricklewood, N.W. (99).—Of the large 24 h.p. car, with stamped frame and general up-to-date outfit, too specimens are shown, one with side entrance body and Cape cart hood, and the other of the landaulet type. No special features are claimed for these cars, but the working parts are all of large dimensions so as to provide for long wear. The Dougill car, for which the firm are agents, has a friction drive giving an infinitely variable gear from zero to the maximum. It consists of a driving and a driven disc. These are at right angles to each other, and the speed of the car, or rather the ratio of the gearing, is afforded by moving the driven disc across the face of the driving disc.

JAMES AND BROWNE, LTD., Hammersmith (88).—This firm is one of the few who distinctly score in these days of side entrance bodies, in the fact that their motor and gearing being below the level of the frame, allows of the coachwork being carried right forward, and great length in construction is thus avoided. Two chassis are exhibited, both embodying the principles which have distinguished this firm's manufactures for several years past, viz., four horizontal cylinders and the expanding clutch. In the pattern with the central gear wheel, the crankcase has been modified to allow of the ready detachment of the crankshaft, and the exhaust shaft is now arranged across the car, being driven by a skew gearing. For the new chassis the first pair of gear wheels is arranged at the side of the car, but the variable gear still provides four forward speeds and reverse. The gear and engine are mounted *en bloc* on the frame, which is now of pressed steel. Either high tension or low tension magneto ignition is fitted as desired. Lubrication is ensured by the suction of the pistons in the crankcase, and the waste oil is discharged through relief valves. The copper-plated water jackets present a handsome appearance, though probably in ordinary manufacture they would be left dull instead of being polished as shown. The powers range from 14 to 30 h.p. in three stages, and in addition to these there is an 8 h.p. two-cylinder car for those who require a vehicle for two passengers only. Among the larger bodies is a very handsome imperial landaulet to carry four, while others have single landaulets of more ordinary dimensions, but still very finely finished. All the landaulets are fitted with self-starting handles by which the car can be put in motion while the driver is keeping his seat, and in this particular, if in no other, we feel that the exhibitors are nearly filling a demand which is bound to become general in the course of a few years.

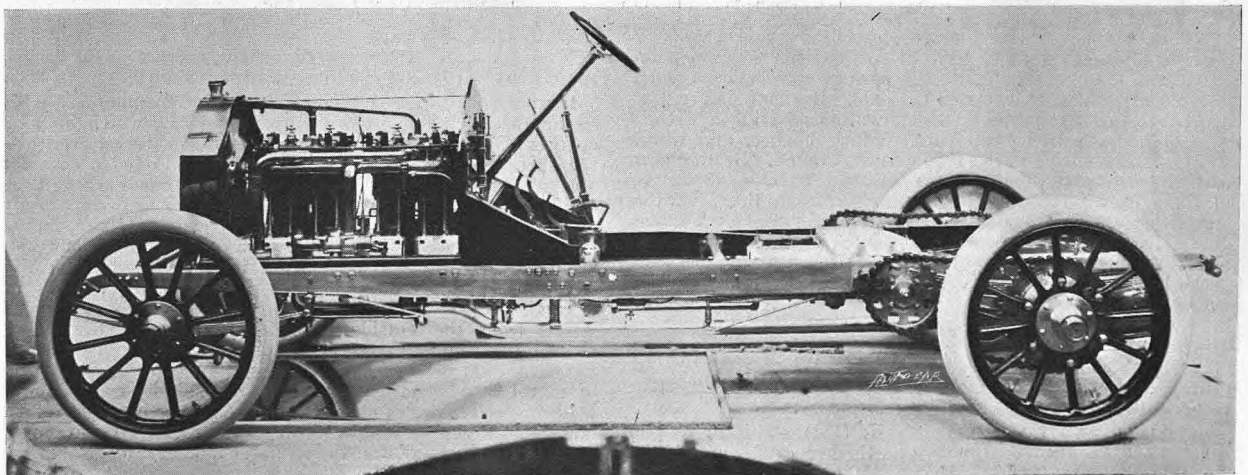
CHARLES JARROTT AND LETTS, LTD., Great Marlborough Street, W. (89).—Two new types of the famous De Dietrich cars are exhibited by Messrs. Jarrott and Letts. The first is a 40 h.p., of which a very handsomely finished chassis is exhibited. Dealing with the points of difference between this car and its prototypes, we find that the engine is now devoid of the overhead tappet motion to the valves, and in their place the valves are now ranged on the left-hand side of the engine, both inlet and exhaust being operated from the same camshaft. The bore and stroke of this engine, we may say, is 130 by 140 mm. respectively. Lubrication to the engine is effected by means of a force feed pump actuated by an eccentric mounted on the rear end of the valve camshaft, this pump delivering oil to a sight-feed lubricator, so that the driver may always be certain that the engine is receiving its proper

quantity of lubricant. The water circulating pump is placed in a very convenient position on the left-hand side of the engine forward, and is driven by a chain from the crankshaft. The draught-inducing fan behind the radiator is mounted upon a bracket placed on a pillar, around which is a spring. This has a tendency to lift the fan bracket upwards, and so keeps the fan belt at constant driving tension. The carburetter has been simplified in design, and the throttle valve is actuated by a lever mounted upon the steering wheel. The clutch pedal is also connected to the throttle valve, the act of withdrawing the clutch throttling down the engine. The method of inter-connecting the clutch to the governor is clearly illustrated in the sketch which we give herewith. Ignition is by low tension magneto, the ignition plates being also made to serve



The De Dietrich pedal connection to the throttle valve.

the purpose of caps to the exhaust valves. A large diameter flywheel is fitted with vane-shaped arms. The metal cone of the clutch is very light, and has also vane arms. The drive is carried through a steel driving bar mounted on the clutch-shaft, so that the power is taken direct from the leather clutch surface through the said steel bar to the clutch shaft. Petrol is fed to the carburetter by pressure supplied by a hand pump, the petrol tank being carried at the back of the frame, where a large quantity of spirit may be carried with perfect safety. The change-speed gear affords four speeds and a reverse, the desired gear being brought into operation by means of side lever working over a gate form of



The 1906 type of 40 h.p. De Dietrich chassis to be seen at the stand of Messrs. Jarrott and Letts.

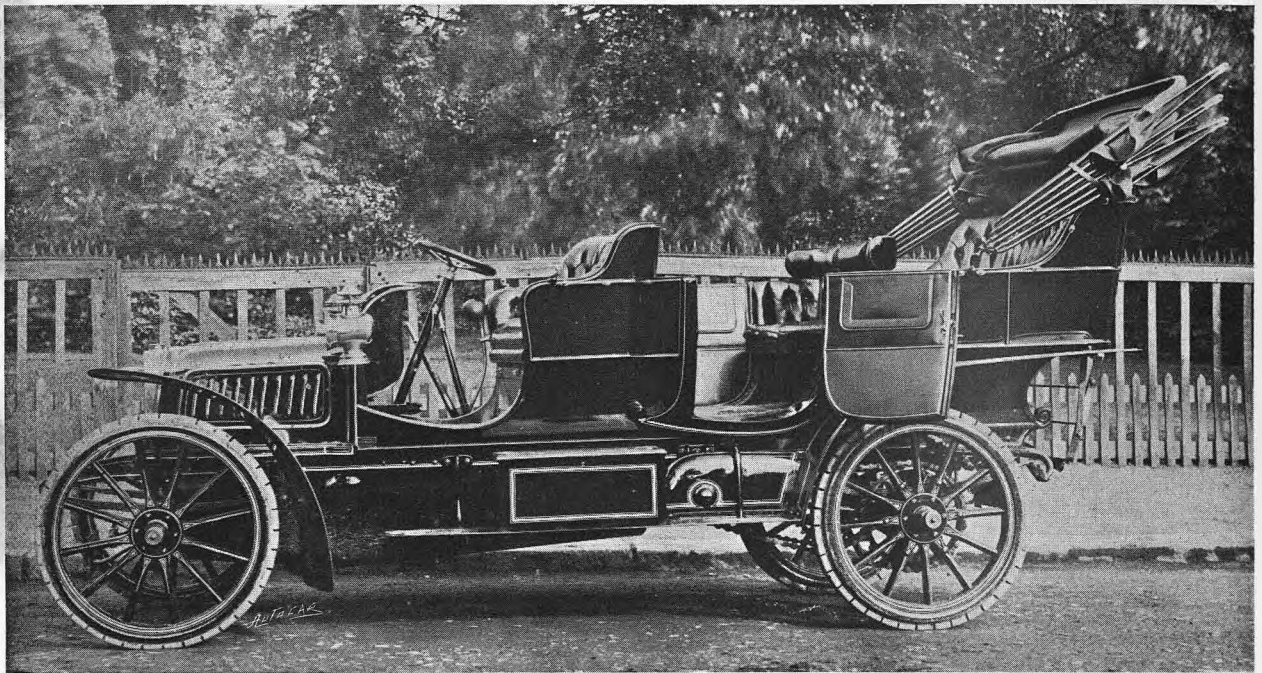
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quadrant. The bevel gear and differential are enclosed in an oil bath, the drive to the sprockets being carried out through universal joints. A foot-applied brake of ample dimensions is fitted to the right-hand half of the countershaft. The rear brakes are of the internal expanding type, being operated by a side lever through a series of steel rods in tension, the wire rope having been dispensed with. There is also a magnificent specimen of the new 12 h.p. light model chassis staged. This is to all intents and purposes a smaller edition of the chassis briefly described above. There are a few points of difference in detail; for instance, the lubrication is effected through ordinary pressure feed. The change-speed quadrant is of the ordinary sector type, and the clutch pedal is not interconnected with the governor. On the other hand, the ignition in this type shows a departure from the larger car, inasmuch as it is the Simms-Bosch high tension system. These two chassis are magnificent examples of a magnificent car, and a point should be made of inspecting this if an opportunity presents. In finished cars there are three types of the 1905 type, a 16 h.p., 24 h.p., and 14 h.p. The latter is fitted with a handsome limousine body, the 24 h.p. with a large and roomy side entrance Roi des Belges, and the 16 h.p. with a neat landaulet.

CHARLES JARROTT AND LETTS, LTD., Regent Street, W. (103).—Three different models of Oldsmobile cars, the smallest of 6 h.p., are shown here. The 7 h.p. has been improved since

seated landaulet. The Darracq exhibited is the latest two-cylinder 10 h.p. with side entrance body; a roomy and comfortable vehicle.

THE LACRE MOTOR CAR CO., LTD., Poland Street, W. (82).—This stand is principally devoted to the exhibition of the 16 h.p. Albion car, which, it will be remembered, is constructed in Glasgow, and for which the exhibitors are the London agents. The motor has two cylinders, and is mounted upon a channel steel frame. The governor acts upon the throttle, the mixture, and the timing of the spark. Low tension magneto ignition is employed, and the pressure for feeding the lubricators is obtained by a plunger pump rotated by a disc driven by the engine. An important feature in the driving gear, which is by side chains, consists in the introduction of a flexible connection between the clutch and variable gear. Various bodies are fitted, including a side entrance phaeton, and a landaulet. In addition to the above is shown the new 24 h.p. car, which is intended to meet the demand for a high speed vehicle. It is constructed on similar lines to the 16 h.p. car, but differs in one or two details. Two lubricators on the dashboard communicate with the countershaft bearings and the chains, which are encased. A simple hand adjustment is provided for the rear brakes. The whole is finished off by a handsome Roi des Belges body and canopy by the Lacre Co., whose carriage work is justly celebrated for its elegance and quality. As to the new 24 h.p. Albion



A side-seated Lacre shooting brake fitted to a 16 h.p. Albion chassis with De Nevers solid tyres.

last year. It now has an automatic carburettor and a stronger roller chain, and the tanks have been enlarged. The chief improvement is in the springing, the springs now having sliding freedom in inclined brackets on the axle. Radius rods are now fitted. A touring model is also shown, this having a French type of body, with bucket seats, dummy bonnet, and wheel steering. The engine in this case is turned round. Dealing now with the new pattern, this has vertical cylinders—a departure in these cars. The car is more on European lines, with a four-cylinder engine mounted on pressed steel frame. The engine drives by means of a friction clutch to three speeds and reverse sliding gear, which in turn drives by propeller-shaft on to the back axle. The inlet valves are automatic, and arranged over the exhaust valves on the left-hand side. The contact breaker is mounted on the top of the shaft carried to the rear of the engine. The change lever works in a gate type of quadrant, with safety reverse catch. Wheel steering and other European details make this car correspond in main respects to standard practice of this country.

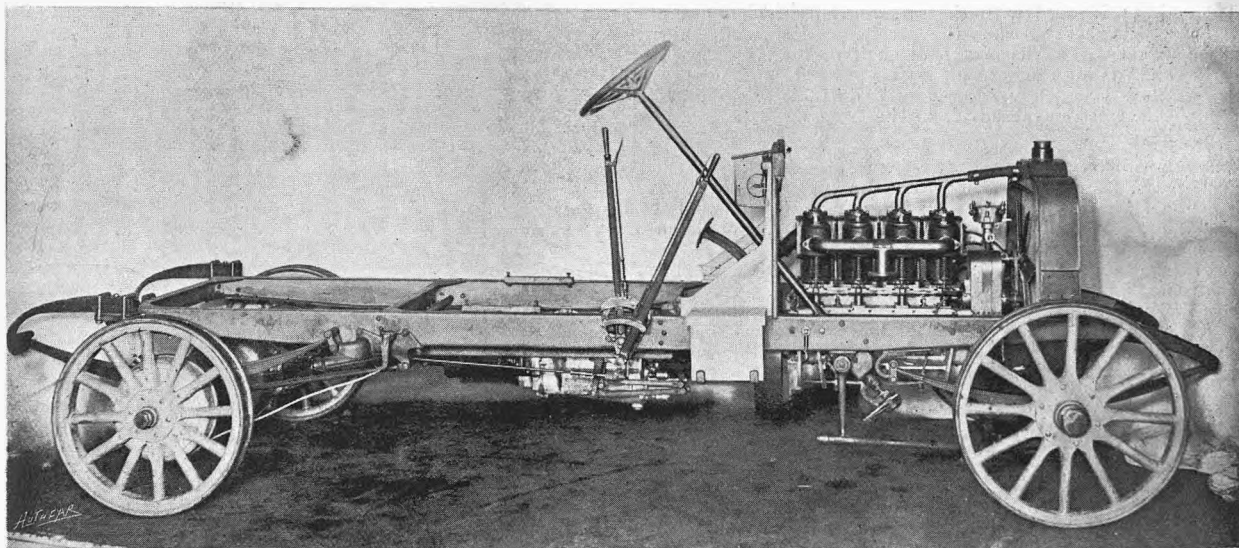
J. KERLE AND CO., Highgate, N. (131).—This firm, who are London agents for Darracq and Spyker cars, are exhibiting two standard types of the latter car—one a very nice side entrance 12 h.p., and the other a 20 h.p. four-

car, to which we have just referred, we can only say that if it stands hard work as well as the 16 h.p. type it will be a most satisfactory and reliable automobile.

LAMB BROS. AND GARNETT, Shaftesbury Avenue, W. (169).—The three-cylinder 18-22 h.p. National car, which is found on this stand, exhibits several interesting features, even over the chassis shown last year, which then attracted a considerable amount of attention, both from automobile engineers and the public. The cylinders, which are cast separately, are 4½ in. bore by 5½ in. stroke, and certain of these engines have given by electrical test 26½ b.h.p. Two additions have been made to the carburettor, one in the shape of an easily-adjustable automatic valve, in which the controlling spring is carried in a tower round the spindle, which can be adjusted from the outside. The jet is fitted with a cone-shaped controlling valve, actuated at will by a lever set in the centre of the steering wheel, and by which the delivery of petrol can be adjusted as the driver desires. Spring-clip held inspection holes are now provided to the sides of the crank chamber, and a small lever, governing the two-way wash out plug, allows the crank chamber to be entirely emptied of oil, or to be filled to its proper level. The self-adjusting radiator fan belt drive is still fitted, and we find

the bevel-driven enclosed commutator spindle and commutator in the same accessible position as last year. The triple spring clutch is as in last year's car, and the gear box is of the same design, but it is in the fitting and disposition of the road wheel brakes that a most interesting departure has been made. The pedal-applied brake takes effect upon the outer periphery of the brake drum, while the lever hand-applied brakes are of the internally expanding type, operating within the same drums. Both are easily adjusted and protected against mud and dust. The gearshafts are automatically oiled by a special device, and the universal joint at the rear end of the propeller shaft is enclosed in an aluminium oil-tight and dustproof casing. The bevel driving gear is cut to suit a nineteen or twenty-two tooth pinion, and this pinion can be easily removed by detaching an independent vertically-shaped lid, bolted to the right-hand forward side of the differential gear box. The chassis shown on this stand is the standard pattern, and as turned out by the firm and sold to the public. It has so many interesting and ingenious features that we suggest no one interested in automobile engineering should pass it by.

E. H. LANCASTER (Automobiles Clément), Leicester Street, W. (59).—E. H. Lancaster is showing Clément cars, for which he is agent in this country. Four patterns are shown, and we deal with these in turn. The 10 h.p. is a two-cylinder car, almost the same as last year's car, except that it has been improved in detail to keep it up to date. The chief



The chassis of the four-cylinder 18 h.p. Clément, exhibited by Mr. E. H. Lancaster.

feature of interest on this car is the metal plate clutch which is fitted to the larger patterns. The steering wheel control has been altered from the rotating reels fitted last year to the quadrant and lever commonly employed. This change has been made on the larger patterns. The next car is the four-cylinder 14 h.p. This has cylinders cast in pairs and is fitted with high tension magneto in combination with a distributor. Chief interest centres in the new 18 h.p. four-cylinder car. Of this there is a chassis shown with a looking glass arrangement beneath to facilitate inspection. The four cylinders are cast separately and have their valves on opposite sides. The same magneto and distributor are used as are fitted to the 14 h.p. car. A new automatic carburettor is arranged on the right hand side, on which side are the inlet valves. The oil pump is of the reciprocating type, and is actuated by an eccentric at the rear of the crank chamber. The engine is carried by arms direct from the main pressed steel frame. Just behind the clutch, and at the front scrolls of the back springs, are arranged cross members. Between these cross members are longitudinal members forming a secondary frame from which the gear box is carried. The clutch is of the plate type arranged in the hub of the flywheel. The gear box provides four speeds and reverse, actuated by a single lever. The speed lever and quadrant are worthy of attention. The quadrant is of the gate type, each side having notches, and a neutral is provided between each gear. Starting at the back of the right hand side of the quadrant, the reverse is

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engaged; starting forward the first speed is thrown in; next comes the neutral; next the second speed; then the lever is at the end of the right hand side of the quadrant. Coming back and crossing through the gate on to the other side, the third speed is at the back of the quadrant; then comes the neutral and the fourth speed at the front of the quadrant. The brakes are of the double acting expanding type, and the back axle is of the same kind that has been employed during last season. The highest power car staged at the time of our visit was a 24 h.p. four-cylinder. It is practically the same as the 18 h.p. just described, but enlarged and strengthened throughout. A six-cylinder 30 h.p. car was expected, but was not staged on the opening day.

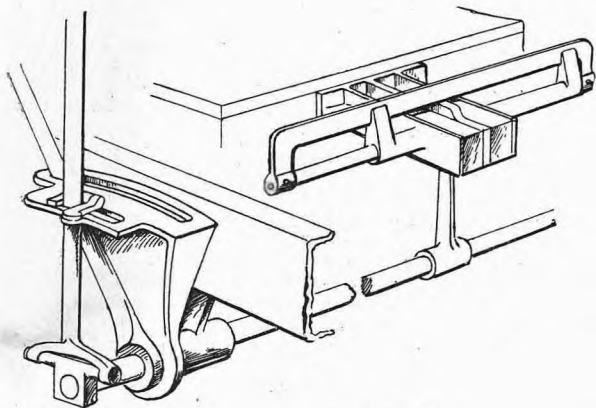
THE LANCHESTER ENGINE CO., LTD. Birmingham (19).—General attention is necessarily drawn to the latest introduction by this well-known firm, which is the 20 h.p. chassis shown on the stand parallel to the cross gangway. In this chassis we find a four-cylinder vertical engine set in the centre of the footboard and between the front passengers, as in the example shown last year, but the resemblance between the car of last year and this ends here. In the present case the cylinders are cast separately, and bolted to the upper part of the crank chamber, which carries the bearings in which the crankshaft rotates, a bearing being provided between each cylinder, so that the crankshaft is run in five bearings. The front bearing, which takes the weight of the flywheel, is of the roller pattern of considerable length. No alteration has

been made in the ingenious valve gear, which has been fully described in past show issues. The thermo-syphon system of cooling is retained, and to this engine is now fitted the well-known type of Lanchester ignition, which has proved of remarkable efficiency. Lanchester users will be glad to learn that the friction blocks in this case are now made of steel in lieu of cast-iron as heretofore, with the result that little or no adjustment is now necessary. The plate clutch, which is of the multiple disc type, is still fitted to this chassis. A special feature, however, is the design of the back axle and casing, which is now of such a character that the well-known Lanchester worm drive runs in oil instead of grease. The whole of this back axle casing can be taken down and the drive examined without interference with any other part of the mechanism or their adjustments. In all other points this chassis exhibits the widely-known and famous devices of the Lanchester cars. Two 20 h.p. chassis are also shown, one carrying a grandly finished and upholstered double landaulet body, and finished in dark blue and white, and the other a double phaeton side entrance body most tastefully finished in red with black margins, and upholstered in fawn leather. These two carriages are quite perfect in finish and design, and both possess extremely wide side entrances—probably the widest side entrance cars on the market. There is no possibility of ladies soiling their dresses in entering these cars.

LAURIE AND MARNER, LTD., Oxford Street, W. (175).—A 24 h.p. Mathieu chassis is staged. This has a four-cylinder engine fed by an automatic carburettor, the adjustinent

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being on the jet and not on the air intake. The contact breaker is particularly worthy of notice, it being completely removable from its operating shaft without the use of any tools. The speed gearing is controlled by a rocking and sliding speed lever, and provides three speeds forward and a reverse.

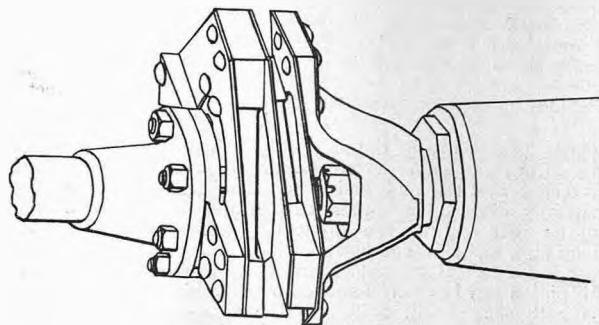


The Mathieu change-speed mechanism.

The quadrant is fitted with the safety catch which prevents the lever being moved when the car is standing, and which can be locked by means of a padlock if necessary. This is clearly shown in the accompanying sketch. The propeller-shaft is completely encased in a dustproof sleeve, and an ample dust screen extends from the front of the engine to behind the gear box.

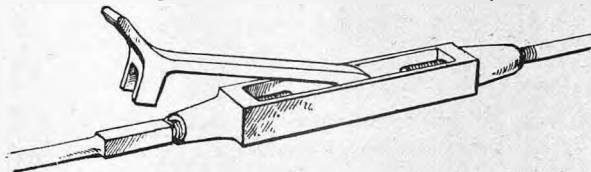
LEADER MOTORS, LTD., Nottingham (5).—A very taking vehicle is the 12 h.p. four-cylinder Leader with tonneau body. The engine, which is carried on an inner frame level with the main frame, has its four cylinders cast separately, but placed very closely together. The bore and stroke are 3½ in. The special feature in connection with the engine is the neatly designed carburetter, with its independent automatic valve set above the induction pipe. The throttle valve is placed between the jet chamber and the automatic valve chamber, so that when the throttle valve is closed altogether and the engine receives no mixture, the cylinders are taking full charges of pure air, and thus being completely scavenged when doing no work. Ordinary high-tension ignition is fitted, and the car is controlled by accelerator pedal from the footboard and ignition lever beneath the steering wheel. The gear box, also carried on the inner lever frame, gives three speeds forward and reverse, with direct drive on top speed. The car has a very taking appearance, is very nicely finished, and well upholstered. The accumulators are carried in a box on the dash-board.

LEGROS AND KNOWLES, LTD., Willesden Junction (78).—In view of the illustrated description which appeared in *The Autocar* of 11th Nov., page 574, in which the 25-30 h.p. Iris was very fully described and illustrated, we do not propose to recapitulate here all that was then said of this most interesting car. We would, however, remind our readers to pay special attention to the mounting of the engine, the carburetter, the specially designed clutch, the ingenious and most effective universal joint, the strong live back axle, and other features. A 35-40 h.p. chassis carries a handsome body with double extension Cape cart hood having a folding plate-glass wind screen on the dashboard beyond which the hood extends, so that the occupants of the front seat have equal protection with those in rear. A 25-30 h.p. chassis is fitted with an attractive limousine brougham carriage body, with amply wide side entrance doors, wind screen over dashboard, and canopy carried forward over the driver's head. Both these cars are excellently finished and upholstered, and with their distinctive design of motor bonnet and radiator attract considerable attention from the numerous visitors to the show.



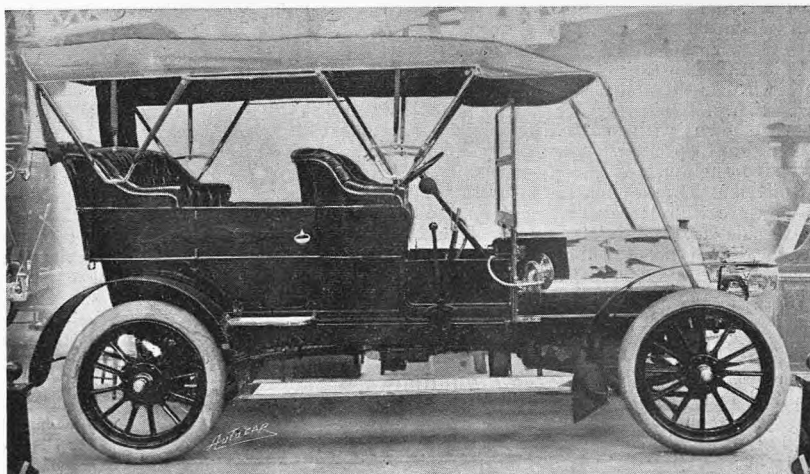
The Iris universal joint.

THE LONDON AND PARISIAN MOTOR CO., South Molton Street, W. (127).—A fine chassis of the latest type 35 h.p. Hotchkiss car figures prominently upon Captain da Corbet's stand. There are one or two detailed improvements since the chassis was exhibited at the beginning of the year. The principal alteration is found in the gear box, which is now of the Mercedes type, giving four speeds forward, with direct drive on top gear. As to the engine, the ignition is now by high-tension magneto, though provision is made for the fitting of a coil and accumulator system as an additional ignition, should it be desired. The same oiling arrangement is retained. This consists of a small plunger pump actuated by an eccentric mounted upon the rear end of the camshaft. This gives a positive delivery of oil to the sight-feed lubricator, which in turn distributes the oil to the various bearings, the engine, the gears, etc. As to the carburetter, that seen



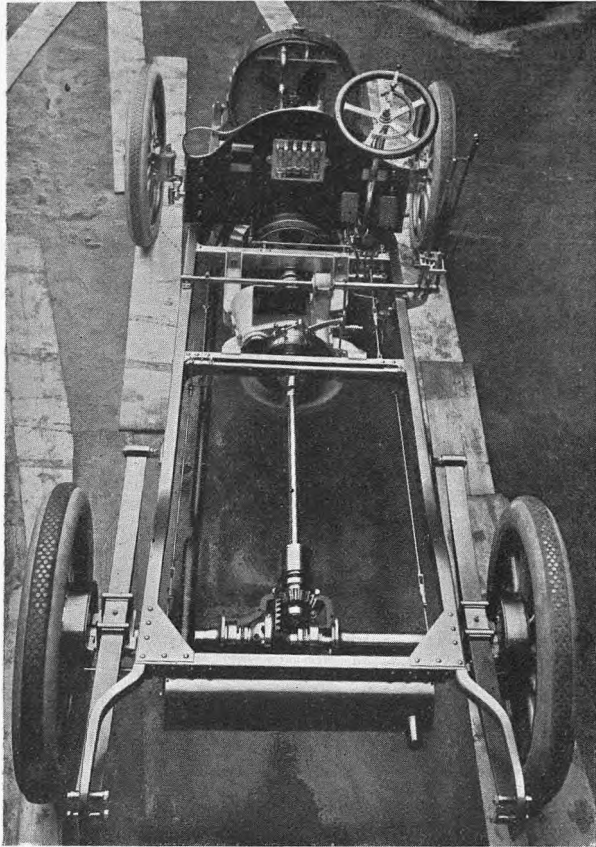
The brake adjustment on the Hotchkiss cars.

upon the stand is of the same type as in the preceding patterns, but the test car which is being run for purposes of demonstration is fitted with another carburetter, in which an adjustable inlet valve for the petrol jet enables the amount of petrol delivered to the engine to be regulated with great nicety. The earlier type of carburetter was so satisfactory that it has not, even at the moment of writing, been decided which type will become the standard on the new car. With regard to details, it is hardly necessary, seeing the chassis bears the name of Hotchkiss, to say that these are well carried out. One point which struck us in particular is a very neat turnbuckle for the adjustment of the brakes. This we illustrate with a small sketch herewith. It will be seen that the turnbuckle carries at its centre a lever, which when pressed down to lie level with the turnbuckle forms a lock by reason of a square slot in the end of the lever engaging with a



A handsome Iris car exhibited by Messrs. Legros and Knowles.

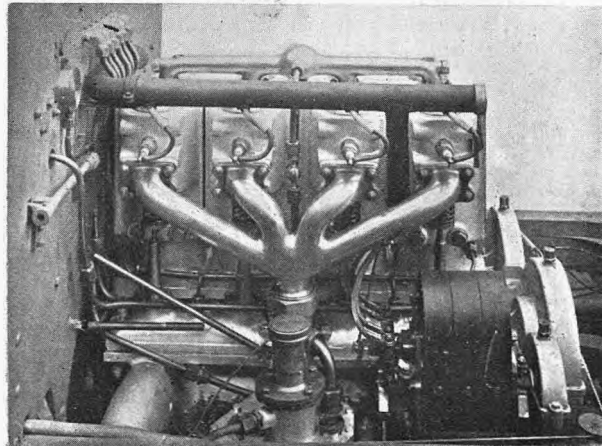
squared-out portion of one of the brake rods. Reverting to the change-speed gear, it should be noted that special provisions have been made to prevent the fouling of any of the gears by an inexperienced driver. There is a safety catch which can be put into operation when the car is not being driven, thus preventing the gear lever being put into gear without the



Plan view of the Hotchkiss chassis exhibited by the London and Parisian Motor Co.

knowledge of those in charge of the car. There is also a safety lock which has to be released by the heel before the reverse gear can be brought into operation. While examining this chassis, notice should be taken that the original tempering colour on the gears and springs is left on the metal. A finished car with landaulet body by Hooper is also staged.

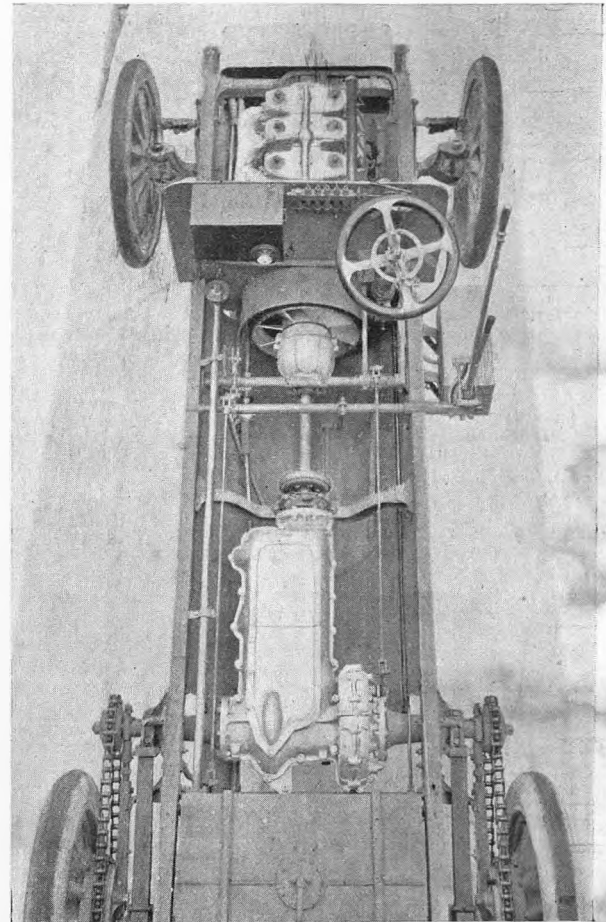
THE LONDON MOTOR GARAGE CO., LTD., Wardour Street, W. (49).—This stand was hardly complete at the time of our visit, but there is plenty to engage one's attention, neverthe-



Right-hand side view of the 24 h.p. C.G.V. engine.

less. First, we notice a very fine chassis of the 50 h.p. Pipe car. This has a four-cylinder motor, in which both the inlet and exhaust valves are operated mechanically through rockers, and are so disposed as to avoid any pockets in the cylinder

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Plan view showing the principal features of the 24 h.p. C.G.V. chassis.

head. The springs are fitted with the Truffault shock-absorbers, and the carburettor is water-heated. The governor act upon the throttle, which, as also the timing, can be positively regulated from the levers upon the steering wheel. Both high-tension magneto and high-tension accumulator systems of ignition are provided. The cooling water is circulated through the honeycomb radiator by a pump, no fan



Left-hand side view of the 24 h.p. C.G.V. engine.

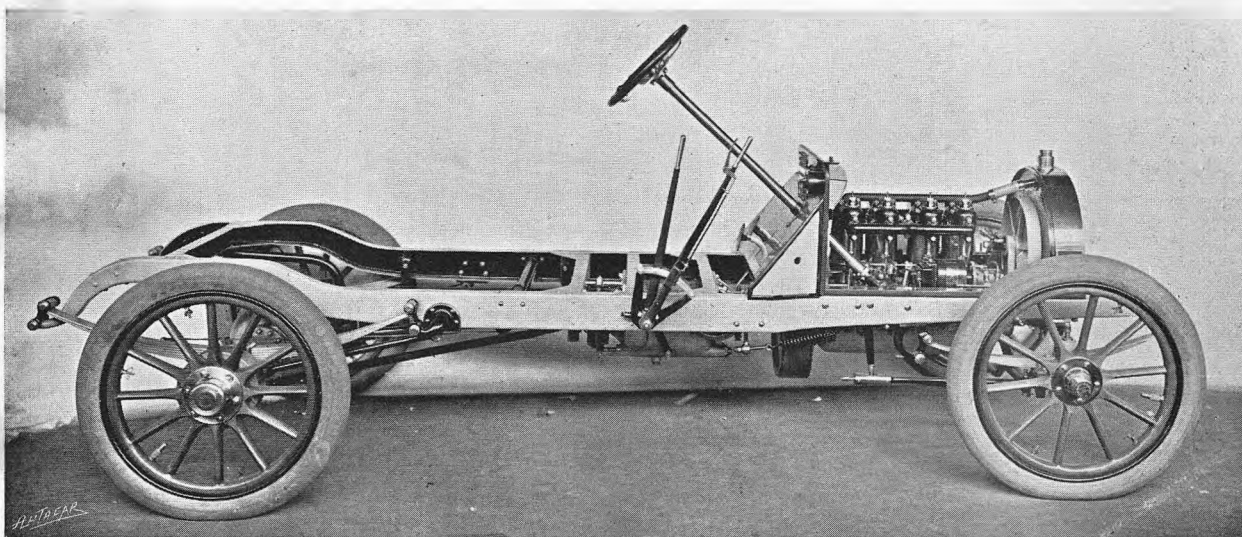
Show Report—Petrol Cars.

being found necessary. The gear provides four forward speeds and a reverse, and is coupled up to the motor by means of a Jenatzy magnetic clutch. Ball bearings are fitted throughout, except, of course, to the engine. Next is a 20 h.p. C.G.V., with a particularly fine limousine body by Messrs. Hooper. The principles of this car are well illustrated in the neighbouring chassis, which, however, is of 14-18 h.p., and has cardan drive instead of side chains. The motor is one of the neatest we have ever seen, all four cylinders being cast in one piece, with a rectangular water-jacket. The valves are all on one side of the head, and on the other is an enclosed gearing driving the water and lubricating oil pumps. The frame is of the square section usual to these cars, and the rear portion is suspended on C and transverse springs. The brake drum on the driving gear is cooled by radiating ribs. This particular car is arranged for left-hand driving in France, but the English models will, of course, be arranged in the usual way.

CAPT. THEO MASUI, Hanover Street, W. (21).—One of the tit-bits of the exhibition is undoubtedly the 16-22 h.p. Germain, a new introduction which from all points of view is a pleasure to examine. The frame is of stamped cambered channel steel inswept in front of the dashboard, and upswept over the back axle. The engine, which is carried on the main frame by stiff brackets forming part of the crank chamber, is a really beautiful type. The valves are mechanically operated, the inductions being on the right and the

having no further duty to perform. Powerful internally expanding brakes are fitted, and these are applied by the side brake lever already referred to. A radius rod to the differential gear case is of the crutch variety, and is carried as to its head in a spring plunger case attached to a cross member of the frame. Throttle ignition and variable valve control levers are set in a sector above the steering wheel, the latter not turning with the steering standard. An exhaust cut-out is fitted, operated from the footboard. A very smart appearance is given to this chassis by the small oval formed radiator. With regard to lubrication, oil is fed under pressure from a tank in front of the dashboard through drip feeds to the cylinders, crank chamber, gear box, and differential gear case. The 16-22 h.p. Germain chassis is fitted with a very handsome landaulet body tastefully upholstered in fawn cloth, finished outside in dark green and black, with red lines. A chassis similar to that described in our opening remarks carries a very neat double phaeton body upholstered in dark red leather, finished dark red and black, with neat single hood over rear seat. This car serves to show the remarkably smart appearance made by the new chassis when fitted with a body of this description.

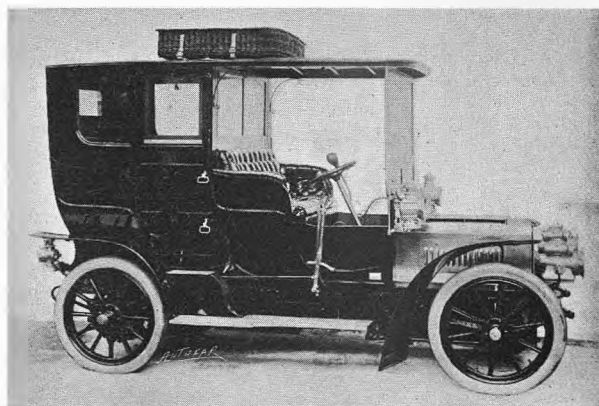
THE MAUDSLAY MOTOR CO., LTD., Coventry (45).—On this stand the examination of the 30-40 h.p. chassis will reveal several improvements for this year. A circular radiator, built on a principle patented by the firm, gives a very imposing appearance to the head of the car. The method upon which



The 16-22 h.p. Germain four-cylindered chassis.

exhausts on the left of the cylinders. The circulating pump is placed in a particularly accessible position, and is driven off the near side of the camshaft by toothed gearing, all of which is enclosed in a separate gear case. Eisemann high tension magneto is fitted, and this is driven in a manner similar to the circulating pump. The Germain cars have always been remarkable for their variable valve lift, but in this particular car, although this feature is retained, it is now much more neatly applied by the fact that the lifting worm is fitted within the valve tappet guides. The valves, of course, are operated by a sector lever upon the steering wheel. The clutch and throttle pedal are so situated that both can be depressed together if desired, and the engine deprived of feed when the drive is taken off the clutch. An ordinary form of friction clutch is used, but the clutch spring is fitted outside the flywheel, and exerts its effect on the clip by means of a lever keyed to the clutch striking spindle. The gear box gives three speeds forward and reverse. A powerful hand brake is fitted to the forward portion of the propeller-shaft universal joint. The operation of the side brake lever withdraws the clutch, as also does pressure upon the foot pedal lever. The back axle design is worthy of notice. The back axle sleeve itself is formed in four parts, two being the horizontal halves of the differential gear box, flanged and bolted together, and the remaining two the sleeves of the live axle, flanged and bolted to the differential gear box, and extended to take the bearings of the road wheels, which are rotated by the live axle within, the latter

this radiator is constructed gives a very large cooling surface by reason of the fact that round tubes are pressed over flat descending tubes, and form the radiating gills thereto. Simms-Bosch high-tension magneto is now added to the accumulator fed ignition. Ball bearings are fitted everywhere with the exception of the engineshaft, and both front and back axles



An example of the 20 h.p. Maudslay brougham.

are of H section. A new and well-designed gear box is used, in which direct drive is given on the third speed, and a geared fourth speed is added. Changing speed is effected by means of a gate control. A very interesting innovation in this model is the fitting of internally expanding brakes to the sprocket spindles between the sprockets and the frame. These brakes are compensated and are applied by a pedal, while internally expanding brakes applied by side lever in the usual way are fitted to the road wheels. Both brakes are effectually protected from mud and dust. The front of this car is two inches lower and the road clearance two inches higher than was the case last year. Altogether, it is a considerably improved model, upon which we have every reason to congratulate the firm responsible for it. Another interesting car on the stand is the four-cylinder 20-30 h.p. Tourist Trophy type, with standard engine and gear, the chassis weighing but a little over 14 cwt. and the car complete 17 cwt. The mechanical arrangement of this vehicle was dealt with in *The Autocar* previous to the Tourist Trophy Race. The 16-20 h.p. all-round car, which was a feature of this stand in last year's exhibition, is again staged, and by reason of the manifold uses it serves, and the fact that it must make a valuable adjunct to the conveniences of a country house, attracts a great deal of notice. A 30-40 h.p., as previously described, carries a well-designed and beautifully-finished private 'bus body. We have previously suggested that the circular radiator lent importance to the head of the car, and this statement is borne out by the appearance of the motor bonnet in this example.

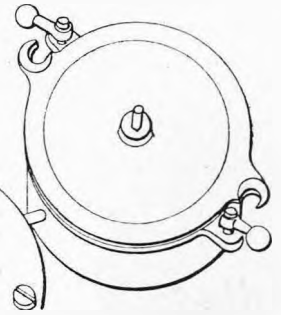
THE METROPOLITAN ENG. AND GENERAL MOTOR CAR CO., LTD., Mitcham (86).—This stand commences with a very handsome and roomy landaulet car driven by a four-cylinder Buchet motor mounted on a pressed steel frame with a wheel-base some 11ft. 6in. in length. Throttle and spark control from the steering wheel dispense with the necessity for a governor. Double ignition is fitted, an accumulator with distributor and Simplex magneto plugs with a separate distributor. The change speed gearing provides four forward speeds and reverse, and the wheels are shod with large Palmer cord tyres. The body is finished in crimson lake with copper fittings. The front wings are curved in two directions so as to shield the bonnet as well as the long steps, etc. A small dynamo is employed for keeping the batteries charged, and providing the lighting. A simpler car is fitted with a two-cylinder motor and three-speed gear. A strong feature is made of a parcel post van, the gearing of which is shown after running some three thousand miles. It looks no worse for the very hard service to which it has been put. On this stand is also shown a sample of the little Reyrol car by the Motor Supply Co., Ltd. It is driven by 4½ h.p. De Dion water-cooled motor, and gives two speeds and a reverse, but it is proposed to fit a 6 h.p. Buchet engine in future without increasing the very moderate price.

MINERVA MOTORS, LTD., Holborn Viaduct, E.C. (39).—Both the 22 and the 16 h.p. Minerva chassis on this stand will be found to vary considerably in detail from those to which the public were introduced last year. In the 22 h.p. chassis the

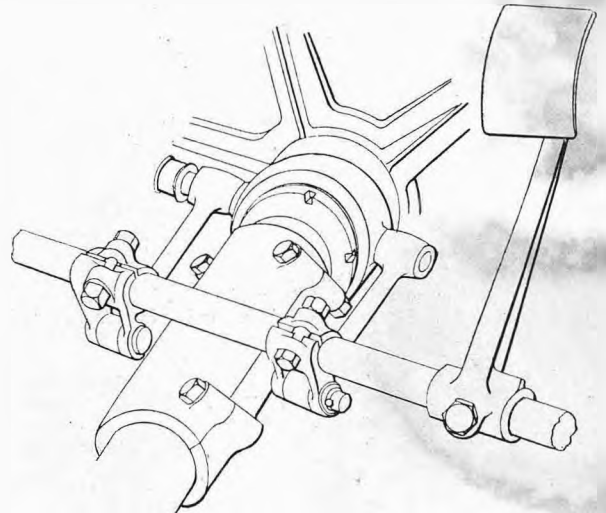
frame is of stamped steel, inswept forward from the dashboard, the engine being carried on the frame sides by means of the lengthy brackets of the crank chambers.

The cylinders are cast in pairs, with valve chambers on each side, the exhaust on the left, and the induction on the right. Nilmelior magneto and accumulator fed ignitions are fitted, controlled through a switch on the dashboard. The circulating water pump has now been dispensed with, thermo-syphon cooling, with large, properly graded delivery and ascension pipes, being fitted. We would draw particular attention to the neat design of the bridge, by which the valve caps are secured over the valves.

A new type of radiator with vertical tubes sunk below the frame and rearward of the tank is used in this car. The half-time gear is entirely enclosed in an independent gear case, the outer cover of which is easily detachable. An automatic carburetter made under Longuemare license is used. The gear box is car-

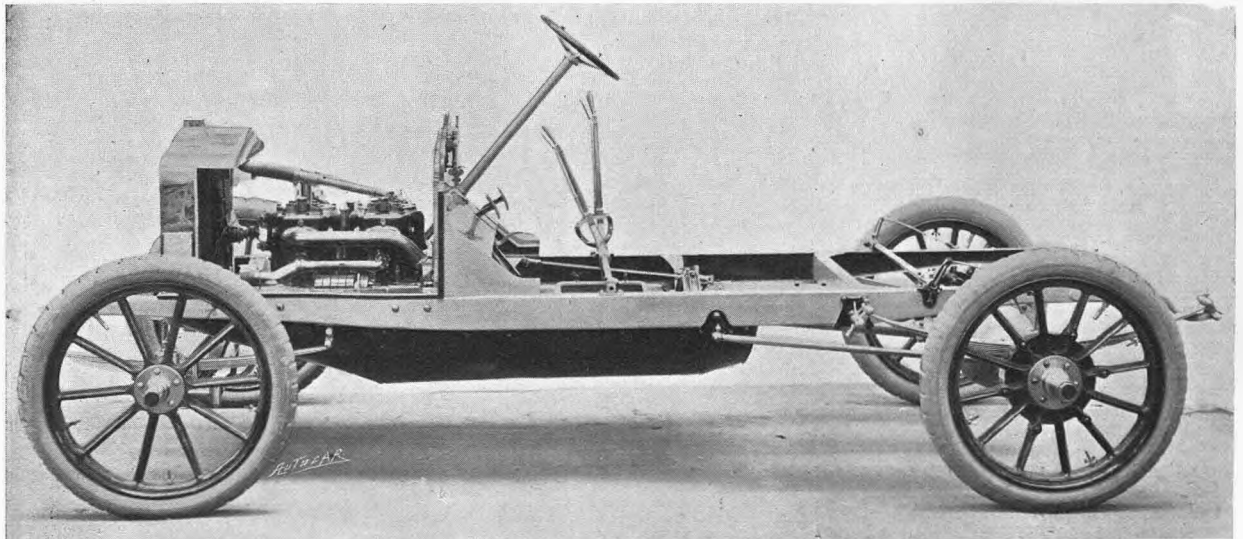


Minerva detachable carburetter lid.



The Minerva clutch pedal and operating mechanism.

ried on a secondary underframe, the transverse members being curved downwards to take the metal apron which runs from the radiator to the rear of the gear box. Ball bearings are fitted to the gearshaft. The road wheels run on the axle sleeve, the ends of the live axle being squared into the tapered axle boxes,



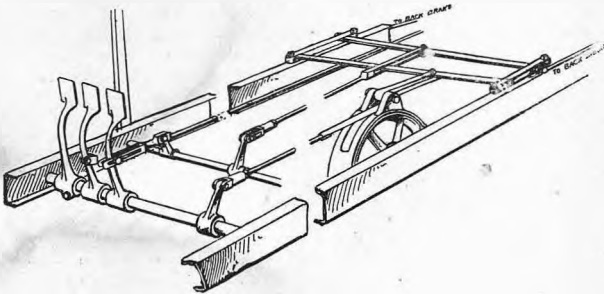
The new 22 h.p. Minerva chassis.

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and there secured by nuts in a very simple manner. Forced lubrication is provided from a small lubricating tank set in front of the dashboard beneath the bonnet, to and from which the oil is pumped by means of an oil pump driven off the right-hand side half-time shaft. The oil passes in the required quantities to the connected bearings through five visible oil drips set upon the dashboard. The whole chassis is a remarkably fine job, and one which merits the attention of all who visit the show. The 22 h.p. chassis as just described carries a well-finished landaulet body; and a 16 h.p. is mounted with a particularly neat and well-designed side entrance double phaeton by Morgan, of Bond Street and Loughborough.

MORGAN AND CO., LTD., Old Bond Street, W. (108).—As only a fortnight has elapsed since we dealt somewhat fully with the new Morgan car and its many original features, there is no need for repetition, but we may remark that the landaulet exhibited is fitted with the new pattern folding wind screen of Major Samuels' invention, which we also recently illustrated. This screen is hinged centrally; the lower half slopes backward quite close to the occupants of the front seat. The upper half is vertical, and can be folded forward on to the lower half when desired. In the folded form it possesses all the advantages of a high dashboard, but without its objections, and when opened up it completely protects the faces of the occupants of the front seat. Coming so close to them, it may almost be described as a transparent rug. It appeals to us as being one of the best—if, indeed, it is not the best screen which has yet been invented.

MORS, LTD., Shaftesbury Avenue, W. (117).—The new 45 h.p. Mors car is shown in chassis form, enabling the enquirer to appreciate the many points which are exhibited by this car. As to the engine, the cylinders are cast in pairs, and the crankshaft is set out of the vertical centre line so that a direct thrust is obtained on the working stroke. This practice was first adopted by the Mors Co. on their 40 h.p. cars of last year. The lubrication is effected by means of a gear pump actuated from one of the valve spindles by a link motion. Oil is fed by gravity from the reservoir to the oil pump, and is thence delivered to a sight-feed lubricator set on the dashboard. Behind this lubricator is placed a polished



The Mors brake lever arrangement.

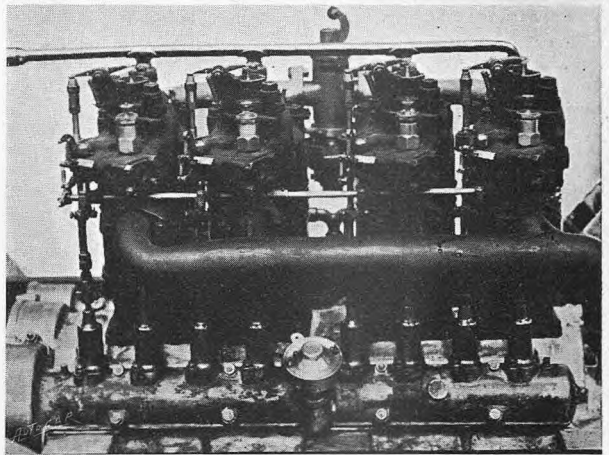
metal reflector in order that the rate of feed may be easily discerned. An interesting form of clutch is to be found on this car. Attached to the face of the flywheel is a light rim, surrounding which is a metal band having attached to it a number of steel segments which provide a clutch which may be slipped to such an extent as to enable the car to be started under somewhat more than ordinary conditions on the top speed. The application of the clutch is effected in a simple manner. There are two levers which contract the band for engagement, and these are operated by a cone behind which is placed the clutch spring. The brakes on this car are of considerable interest, and there are no less than five. There is the ordinary countershaft foot-actuated brake; there is another brake also mounted on the countershaft, which is applied by a second foot lever. The movement of this lever first causes the band to be applied to the brake drum, and a further movement causes the brakes on the rear wheel hubs to come into operation. It is claimed that this method of braking prevents side-slip to a very great degree, because the car is first checked through the gearing, and then the final application of brake power is made direct on to the road wheels. In addition to these two brakes are side-lever operated ones. These are actually the same set of brakes as are applied by the second countershaft clutch pedal. The fact of operating the rear brakes by means of the side lever releases the second countershaft brake, but this, if desired, may be applied by putting its lever over as far forward as possible. The whole of the bearings are of the now almost

universally adopted ball type. The control of the car is very nicely arranged. The fact of withdrawing the clutch automatically throttles the engine, as also does the application of the side brakes. For driving in traffic there is a variable inlet gear. For starting purposes the smaller inlet valve cams are brought into operation, and there is a small trigger beside the radiator which on being pulled opens the throttle to the greatest extent to facilitate starting. Two cars of 24 and 17 h.p. are exhibited, with some very fine limousine bodies by Messrs. Thrupp and Maberly.

THE MOTOR MFG. CO., Wardour Street, W. (119).—A 20 h.p. gear-driven car is exhibited by this firm. There are no radical alterations in this car from its predecessors, its chief point of interest lying more especially in the price, which is extremely moderate.

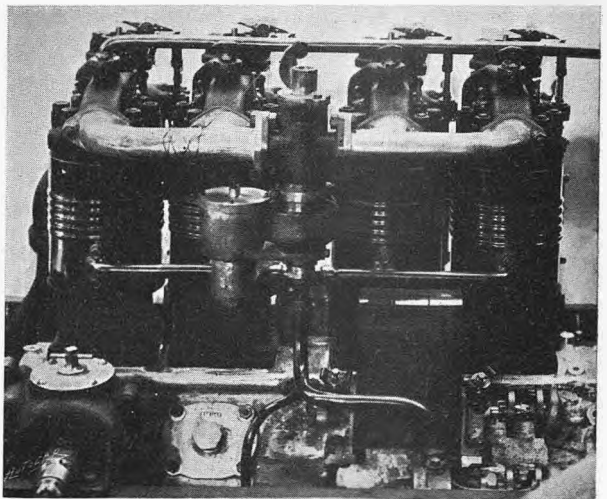
THE MOTOR CAR CO., LTD., Shaftesbury Avenue, W.C. (116a).—A single car occupies this stand, which on examination proves to be one of the little two-seated 10 h.p. four-cylinder Leader cars.

THE NEW ARROL-JOHNSTON MOTOR CAR CO., LTD., Paisley, Scotland (40).—On a particularly and quaintly-designed stand we find centrally mounted the renowned Arrol-Johnston car, which prevailed so effectually in the late Tourist Trophy Race. We do not at the present moment propose to go



The new Arrol-Johnston four-cylinder vertical engine, exhaust side.

into the mechanical details of this vehicle, as it was described so thoroughly in our columns recently, the 12-15 h.p., which is the practical outcome of this vehicle, being illustrated and described in our last issue. A 12-15 h.p. chassis, as now offered to the public, is shown on the lower part of the stand. The feature which is totally novel with regard to this show is the 24-30 h.p. chassis, suitable for a side-entrance body, in which the design of the Arrol-Johnston

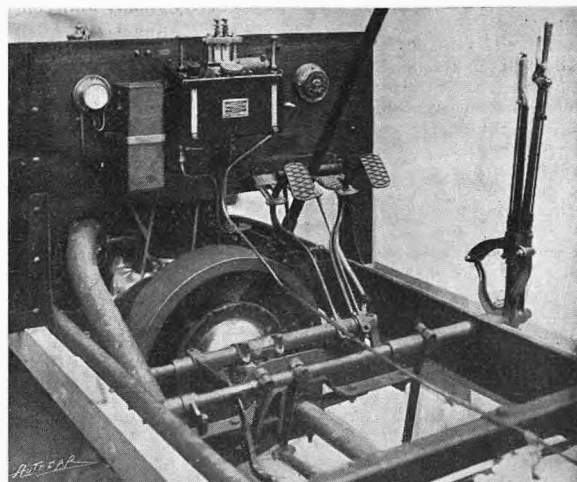


The new Arrol-Johnston vertical engine, inlet side.

engine as it has hitherto obtained has been dropped, and a vertical engine adopted. The cylinders are cast separately, and mounted with fluted copper water-jacket on an aluminium crank chamber. They have mechanically operated valves from one camshaft on the left-hand side of the engine, the inlet valves being operated by rocking levers, which receive their motion from tappet rods passing upwards between the valve chambers. This engine is fitted with magneto ignition, the make and break device being similar to that employed on the lower-powered car, and carried in an ignition chamber of a somewhat similar description. The bore of these cylinders is $4\frac{1}{2}$ in., and the stroke 5 in. The engine is entirely enclosed by bonnet and lower apron, the air being drawn through the enclosed radiator stack by the vaned arms of the flywheel. A Hele-Shaw clutch, specially designed for this company, is fitted, and the drive passes thence through a gear box, giving four speeds forward and reverse. The universal joint in rear of the gear box is enclosed in a dust-proof aluminium case, and the drive passes to the bevel driving wheel on the live axle through an ingenious and carefully-designed spring drive, which preserves the whole of the forward mechanism from driving shock. Upon this spring drive also is placed the pedal-applied drum brake, expanding brakes being fitted to the hubs of the rear road wheels, which are applied by side lever in the usual way. The steering gear is also interesting, and is practically the same as described in our notice of the 12-15 h.p. car in *The Autocar* of last week. Wear and backlash can be taken up to almost any desired degree. This car is one of the novel features of the show, and together with the famous Tourist Trophy winner should not be passed over by any visitor. The 12-15 h.p. chassis carries an attractive side-entrance body, while a 24-30 h.p. is fitted with a landaulet with detachable hood, thoroughly well finished, and most comfortably upholstered.

ORLEANS MOTOR CO., LTD., Twickenham, Middlesex (101).—The new model is a 22 h.p. car with four cylinders separately cast—100 mm. bore and 116 mm. stroke. The crankshaft runs on three long bearings. The valves are mechanically operated, this being somewhat of an innovation for Orleans practice. The carburetter is the well-tried Longuemare, with automatic additional air valve. The hand control on the wheel is inter-connected with the accelerator pedal, so that the advantages of delicate hand adjustment with those of foot control when gear changing or speed slackening are attained. The back axle runs entirely on ball bearings with the road wheels on the stationary sleeve, thus relieving the driving axle proper of any other than driving stresses. The front axle is of H section, and the frame is of stamped steel. The first chassis was only ready for exhibition in a partly finished state on Tuesday. Outside the show one of the new six-cylinder cars was running for trial trips, but no specimen was exhibited on the stand. The carriage work, which is entirely constructed in the Orleans factory, is worthy of note, especially a neat little 15 h.p. brougham. We must say that the Orleans Co. have been to the fore so far as really smart and tasty carriage work is concerned with cars other than those of the most luxurious types. They were among the first, if indeed they were not the first, to design and construct really comfortable and handsome bodies for cars of moderate power.

PANHARD AND LEVASSOR, Regent Street, S.W. (60).—Of Panhard cars an 8-11 h.p. three-cylinder is shown, this being the lowest power car now made, and being unaltered since last year. Next comes the 15 h.p. four-cylinder, with cast iron water jackets. The new feature of this car is an hydraulic-operated governor incorporated with the carburetter, which is an automatic one on the Krebs principle. This has been improved by rendering the automatic mechanism more dustproof. The rear wheels are arranged on ball bearings, and the back dumb horns are formed by halves of semi-elliptic springs. Dealing next with the 24 h.p., this is a four-cylinder car, and many of the details are in common with those of the 15 h.p. The steering pivots are on ball bearings, as also are the rear road wheels. The engine is provided with cast iron water jackets, and mechanically-operated valves on opposite sides. The ignition is by high-tension magneto, arranged to rock around the armature for advance and retardation. A half-compression device is fitted, this being operated by a knob coming through to the front of the car. The clutch on this car is of the metal to metal plate type, operated by a push forward pedal. The gear box differs from previous Panhard practice in having a direct drive on the top speed. The chief interest centres in the 50 h.p. six-cylinder car, of which a fine chassis is shown.



* The dashboard of the new 24 h.p. Panhard, with the manometer, single coil, lubricator, and two-way switch.

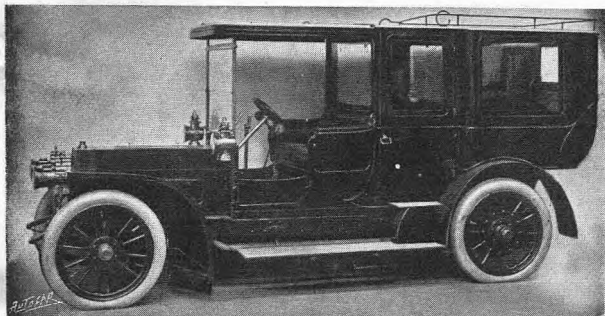
The cylinders are cast separately, and have the brazed copper water-jackets peculiar to high-powered Panhards of recent years. The clutch, magneto, carburetter, and governor are on the same principle as those just described, but the gear box is slightly altered in detail. Though we can hardly point out any special features not referred to in connection with the lower powered cars we are sure that this chassis will be examined with interest.

THE F.W. PECKHAM MOTOR SYNDICATE (9).—Three examples of the two-cylinder Maxwell cars are found upon this stand, and as they differ somewhat in detail from the usual run of automobiles they will be undoubtedly examined with considerable interest. The two-cylinder 8 h.p. is, without doubt, a cheap car. This engine has double opposed cylinders 4×4 , running at from 150 to 1,500 revolutions. The engine is carried on an armoured oak frame, and has a Crypto gear immediately in rear of the crank chamber, the drive being thence by propeller-shaft to the rear axle in the usual way. The gear affords two speeds forward and reverse. Means are provided for easily adjusting the change-speed gear. Force feed lubrication is fitted, the deliveries being direct to the bearings, the engine, and the transmission gear. The engine is controlled by a foot lever, and this is inter-connected with the spark control levers placed upon the steering wheel. It should be noted that the combined crank and gear box are three-point suspended, and the cases being in combination, the alignment of crankshaft and gearshafts is necessarily maintained. There is no pump fitted, thermo-syphon circulation being depended upon. A multiple disc clutch is used with steel driving plates for the high speed, and bronze clutches for the low and reverse speeds, all running in oil. Powerful band brakes are fitted to the back wheel, and extra braking is, of course, afforded by applying the reverse of the gear. Both cars are excellently fitted and upholstered, and are attractive-looking and well-provided vehicles. By a simple arrangement of the differential gear box it is possible to withdraw the driving bevel wheel and its spindle without interference from the back axle or propeller-shaft. The valves of this engine are remarkably get-at-able, all mechanism being found beneath the bonnet.

PERMAN AND CO., LTD., Charing Cross Road, W.C. (22), show the new 1906 18-22 h.p. Rochet-Schneider chassis, in which we find considerable detail improvement and simplification with regard to the engine. The ignition is operated from the steering wheel, there is a neat form of metal clutch, the gear has direct drive on the third speed, and a ratchet and pawl sprag is fitted. The chassis is carried at the rear on a transverse semi-elliptical spring, which in its turn is supported by semi-elliptical springs of the usual form. Ball bearings are fitted to the gearshafts, back axle, and road wheels. There is more than an indication of a successful attempt at simplification throughout this well-known car. For instance, the dashboard carries three sight-feed drips and a pressure tank petrol gauge only. Low-tension magneto ignition is still adhered to, and mica insulation is now substituted for porcelain in every particular. A 30 h.p. Rochet-Schneider chassis carries a threequarter landaulet body accom-

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modating eight passengers. It is particularly roomy and comfortable, well finished and upholstered throughout, and may be described as a most thoroughly adaptable family carriage. An 18-22 h.p. Rochet-Schneider Florentia car has a single landaulette body, the carriage work by Messrs. Thrupp and Maberly—a fine substantial car, eminently comfortable, and recommendable particularly as a town carriage. A 40 h.p. Rochet-Schneider chassis carries a grand double limousine body by Mulliner, of Northampton, splendidly finished both as to coachwork and upholstery, and is a fine example of a luxurious touring car. On this stand also we find shown for the first time in this country a 35 h.p. Delahaye, which is built with stamped steel frame, inswept forward from the dashboard, and upswept above the back axle. The cylinders, which are separately cast with valve chambers on each side, are 110 bore and 135 stroke, developing 30 h.p. at 1,000 revolutions per minute. Simms-Bosch high-tension magneto and accumulator-fed ignition, with non-trembler coil, are fitted, only one contact-breaker being used for the ignition of



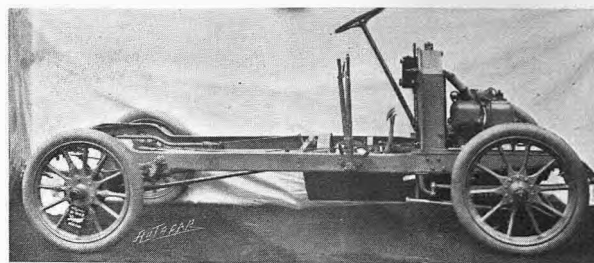
A luxurious 30 h.p. Rochet-Schneider car exhibited by Messrs. Perman

all four cylinders. The engine has a half-time shaft on each side, running in separate cases; easily dismountable. The ordinary form of leather covered clutch is used, but the leather is so mounted that by unscrewing four nuts it can be withdrawn for treatment or renewal. A Mercedes type of gear box is fitted, with four speeds and reverse. The differential and change-speed gear are carried in separate castings, the drive being conveyed to the bevel wheel by a connecting shaft. The drive is chain, as usual. The control is by throttle valve, operated either by lever on the steering wheel or by a pedal to the right of the brake pedal. The chassis carries a handsome double phaeton body, divided front seats, finished dark green with red and black wheels, and beautifully upholstered, the work being by Lamplugh and Co., of Paris. The ignition can be changed from magneto to accumulators while running by a draw rod on the dashboard, and a small half compression pedal is actuable by the driver. The Delahaye was one of the earliest cars from the other side to make its appearance in this country, and it is with considerable interest that we welcome the latest type at Olympia this week.

THE PUTNEY MOTOR CO., LTD., Putney, S.W. (114).—A feature of the 20 h.p. Bayley car is a worm drive so designed that the driving axles bear no portion of the weight but take the driving stress only. The engine, a 20 h.p. Brouhot, is fitted with a supplementary petrol tank. This is a small tank in the bonnet close against the carburetter. All the petrol from the main tank runs through this supplementary tank. As this small tank is so close to the carburetter a good supply of petrol is always assured for hill-climbing, even when the supply in the main tank is falling low.

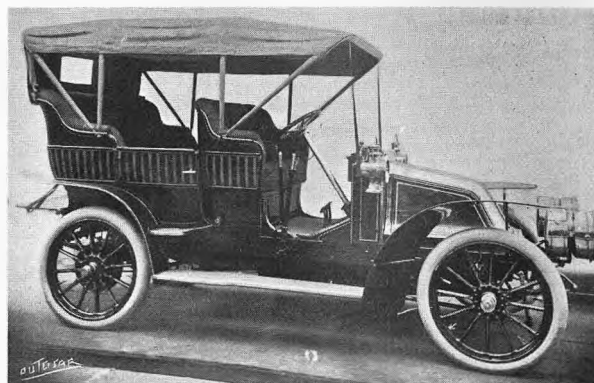
RENAULT FRERES, LTD., Newman Street, W. (72).—The 10-14 h.p. four-cylinder 1906 chassis will probably attract the major portion of attention on this stand. The four cylinders are all in one casting, the bodies of the cylinders being separated, though united in one piece, which is bolted to the crank chamber. The valve chambers are on the left-hand side of the engine with automatic inlets above the exhaust. The frame is of stamped cambered steel, inswept before the dashboard and upswept at the rear over the back axle. The engine is carried on two cross members, and the gear box in a similar manner. A sliding throttle is mounted on, and forms part of, the cylinder casting. The induction pipe comes from a simple carburetter, in which are but one jet and exit holes at various intervals, placed in a convenient position to the crank chamber flange. Simms-Bosch high tension magneto ignition is fitted, the magneto being set

across the engine in front and driven by helical gearing off the half-time shaft. The engine is enclosed within the bonnet and apron, and air is drawn through the radiator, which is set immediately in front of the dashboard by means of vanes on the periphery of the flywheel. The pedal applied brake



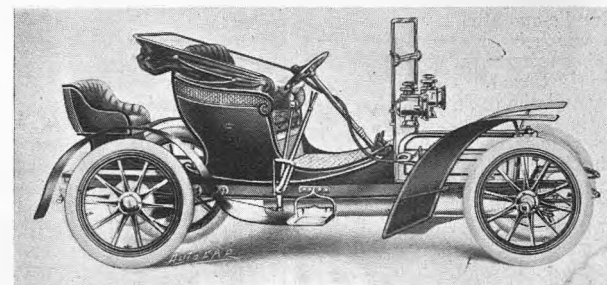
A four-cylinder 10-14 h.p. Renault chassis

drum in which an internally expanding brake operates is formed with serrations on the outer periphery for the radiating of heat which may accrue when working. No governor is fitted to this engine, the sliding piston throttle before referred to being operated by a foot pedal on the right-hand side of the brake pedal. In addition to this control by pedal, the throttle can be locked in any position by means of lever and sector set upon the dashboard. Engine, gear box, and differential gear are all lubricated by forced lubrication from a lubricator fixed upon the dashboard, from which a force pump is worked, and is driven by worm gear off the crankshaft. The brakes fitted to the road wheels are of the internally expanding type. In the centre of the stand is mounted a 90 h.p. motor boat engine, which will interest motorists as being a replica of the motor fitted to the Renault car which did so well in the Vanderbilt Cup Race. A 14 h.p.



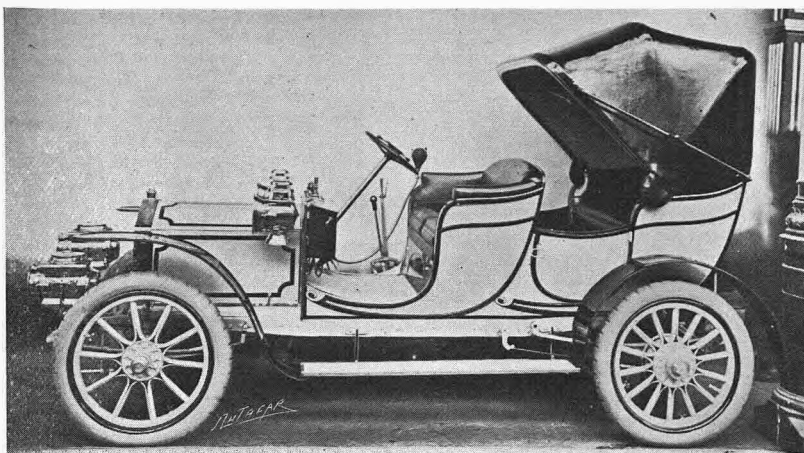
A four-cylinder 10-14 h.p. Renault, with double phaeton body.

chassis carries a beautifully finished double phaeton body with double Cape hood, the body being finished in bright red, black margins, lined white. A 20 h.p. chassis is fitted with an exceedingly comfortable well designed double limousine body with forward canopy.



A car that attracts great attention at the show is the Rolls-Royce "Legalimit" car, illustrated above. It has eight cylinders, and, as our readers are doubtless aware, is designed to travel on a varying road at a speed not exceeding 20 m.p.h. without changing gear.

C. S. ROLLS AND CO., Conduit Street, W. (97).—We have so recently described the great Rolls-Royce novelty that we need say little more than that an eight-cylinder landaulet is exhibited, and in addition to the landaulet a rather novel form of two-seated car is shown, in which the eight-cylinder engine is placed under a very low wide bonnet. The effect is unusual, and, we must confess, much more pleasant than we should have imagined. This is the Legalimit car, which can be set at will to maintain but not exceed the legal limit of speed. A six-cylinder chassis shows fully all the R.R. points, and also exhibits the Hallé spring wheel, while the four-cylinder car is an example of the famous Tourist Trophy machine which secured second place in the race in September, and which has been bought by our colleague. A particularly interesting feature of the six-cylinder chassis is the change-speed gear, as this has the direct drive on the third speed and the indirect drive on the fourth. As some people have experienced great difficulty in understanding how this—to them—impossible arrangement has been effected, we should advise them to examine it, as it will be seen that it is really a very simple matter indeed.

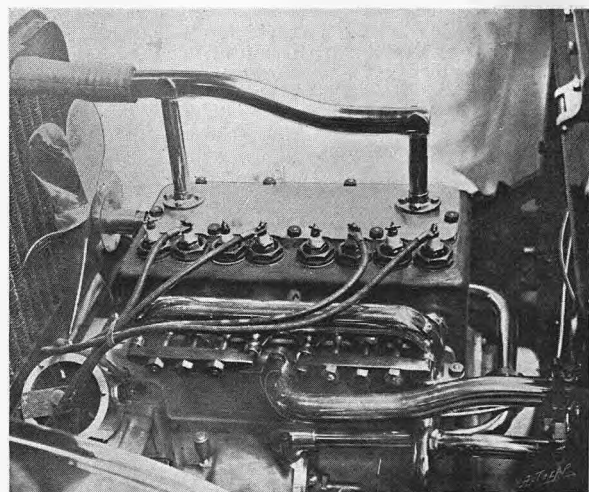


The Rolls-Royce Tourist Trophy car which has been purchased by Mr. Harry J. Swindley.

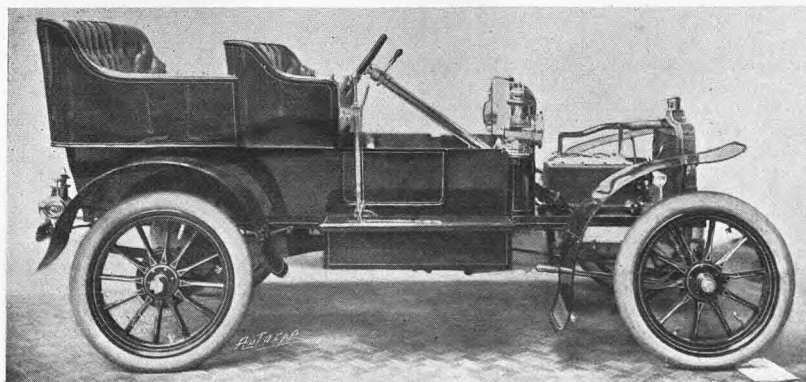
THE ROVER CYCLE CO., LTD., Coventry (64).—The 6 h.p. Rover car is shown in two patterns, the original one selling at 100 guineas, the other being slightly higher priced. This latter has certain improvements over the cheaper pattern, chiefly in finish and in the fitting of larger tyres. The 8 h.p. single-cylinder car is unaltered this year. Next in power comes the 10-12 h.p. four-cylinder car, which, as regards its engine, is one of the novelties of the show. It will simplify matters to state that the chassis, etc., apart from the engine, is on standard Rover lines, except as mentioned. Dealing with the engine, all four cylinders, their jackets, and the top half of the crank chamber are cast integral, the whole being rectangular in each direction. Big waterways in the casting are provided, which is made to overhang the valves. Over the valves fits an easily removable cover plate, so that the camshaft, valves, and their springs are all protected from dust by this side plate. The camshaft is lubricated, and hence the valves and their springs, by the oil splashed through by the cranks. To the side of the crank chamber there is also a cover plate, which when removed enables the pistons and connecting rods to be withdrawn. On this car is fitted a high-tension distributor co-operating with a single coil. The 16-20 h.p. four-cylinder Tourist Trophy type of car is represented. The features of this car are very similar to those of the single-cylinder cars, but they have, of course, four cylinders. Each one of the cars has a distinct style of its own, and we think it may be fairly said that the 8 and 16 h.p. types have shown by their public performances that they are among the proved successes of the year. This is no small achievement when it is remembered that it is not two years since the Rover was an unknown name in the automobile world.

SEYMOURS, LTD., Brompton Road, S.W. (26).—A 30-35 h.p. Metallurgique car is afforded space on this stand. The four-

cylinder engine, the cylinders of which are cast in pairs, is carried directly on a stamped steel frame by its own crank chamber brackets. The cylinders are 108 by 140 mm. The valve chambers are on the left-hand side, and both inlet

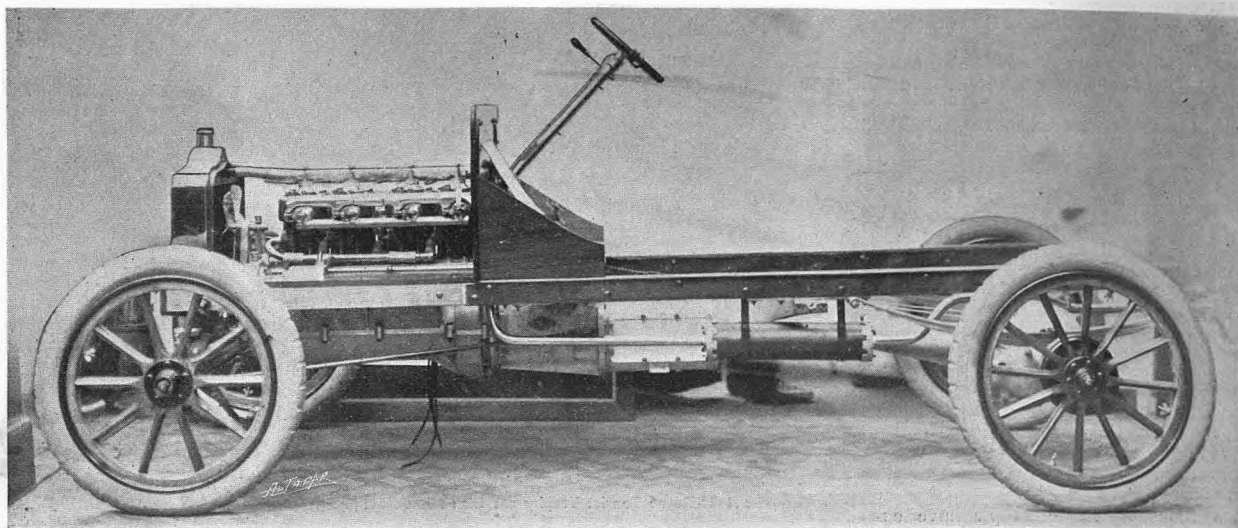


The four-cylinder engine of the 10-12 h.p. Rover car. Note the duplicate ignition plugs.



The new 10-12 h.p. four-cylinder Rover with engine bonnet removed.

and exhaust valves are operated by one camshaft. The inlet valves have a variable lift fitted, operating from the steering wheel. The Sthenos carburetter is fitted. The throttle valve, set in the induction pipe above the mixing chamber, is connected with the clutch, and operated only in the act of declutching. The car is entirely driven on the variable valve lift. Ignition is by Simms-Bosch and accumulator fed high tension current, with independent plugs for each system of ignition. The half-time shaft is produced on the front of the radiator, and the circulating pump is driven off the toothed wheel mounted thereon. A very large flywheel is mounted on the rear end of the crankshaft, and within its boss is fitted an internally expanding segmental clutch. A Mercedes type of gear is employed, giving four speeds forward and reverse, with direct drive on the top speed. The driving wheels are mounted on the live axle, and run in D.W.F. ball bearings. These bearings are also fitted to the road wheels and gearshafts, with the exception of the crankshaft, where the bearings are plain. This is the first time that this particular machine has

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Side view of the 16 h.p. four-cylinder Tourist Trophy Rover chassis.

been exhibited in this country, and visitors to the stand will regard it as a fine example of automobile construction. It carries a big comfortable double phaeton side-entrance body. We should have pointed out that this car has a spring drive in rear of the gear box. The chassis of the 18-24 h.p. four-cylinder Vulpes is shown here. This is a very smart-looking chassis, with a well-designed four-cylinder engine. The cylinders are cast in pairs, with valve chambers on each side. Simms-Bosch high-tension magneto ignition and forced lubrication by means of a pump, steel belt driven off the half-time shaft. The oval-shaped radiator gives a very smart appearance in front. The frame, which is of the usual stamped steel type, is inswept forward to the dashboard, allowing plenty of lock to the steering wheels. A friction cone clutch conveys the drive by means of a universally-jointed shaft to the gear box, which gives four speeds forward and reverse. The chassis shown has chain drive to the rear wheels. The live axle drive can be provided if required. This is the car that was successful in the Gaillon Hill-climb on October 15th this year, and was also placed in the Hors de Concours at Liège Exhibition in October. Although not appearing in the catalogue, an attractive feature on this stand is the 16-22 h.p. Dixi chassis, in which new features appear over and above the car described in *The Autocar* some months ago. The cambered pressed steel frame is now inswept forward of the dashboard. The engine is carried on the main frame, the cylinder

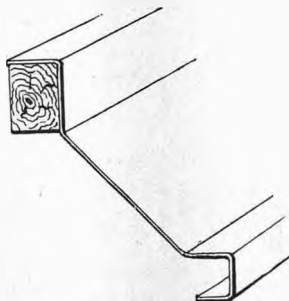
being set in pairs, 100 stroke by 110 bore. Both inlet and exhaust valve boxes are on the left-hand side, one half-time shaft serving to operate all the valves. The carburetter is now fitted with a hot-air intake from round the exhaust pipe, and a throttle valve operated round the jet. An automatic inlet valve admits air independently of the throttle valve, so that when the engine is throttled down cold air is passing to the cylinder for scavenging purposes. The circulating water pump has been lifted to the level of the top of the frame, and is carried on the right-hand rear crank chamber bracket, and is run by friction wheel off the flywheel. The gear gives three speeds forward and reverse. A neat form of ingenious dismountable commutator is fitted to the motor. This commutator can be detached for cleaning purposes, without upsetting any of the leads, in a couple of seconds.

THE SIMMS MFG. CO., LTD., Kilburn, N.W. (69), have two new exhibits in their 20-24 h.p. and 26-30 h.p. cars. Both of these are for the most part alike, differing only in size of engines and dimensions of parts. The chief point of interest is the pressed steel frame. The side members are pressed integrally with a sheet which extends down, and is bent over channelwise to form the underframe. Thus the underframe is connected to the main frame by what forms a dust-screen, and a very substantial support for the underframe. This carries the engine and gear-box. The engine does not call for particular description, it being on this company's usual lines, with the exception of the carburetter, which is a new automatic one

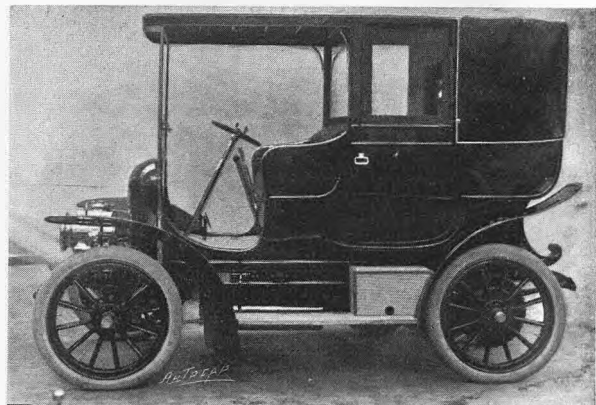


A 20-24 h.p. Simms-Welbeck car with Roi des Belges body and pneumatic buffers.

of the firm's own make. The gear-box provides a direct drive on top, and is so constructed that the layshaft is stationary on top speed. On all these cars the dashboard is fitted with a lever, which controls the petrol tap, a refinement which doubtless is appreciated. On the dash is also mounted a controller by which the magneto leads to any one cylinder can be cut out. The gear box brake is of the block locomotive type, and looks extremely powerful. A departure for this firm is the fitting of a honeycomb radiator, which in this case is attached to the frame by two bolts only, so as to be easily removable. The steering is provided with ball bearings, both in the gear and in the pivots. The 12-15 h.p. car has been improved by the addition of a new automatic carburetter. The clutch dashpot is retained on all the cars, and in all cases the road wheels are carried by the outer stationary axle sleeve. Our attention was drawn to the bodywork on two of the cars, the *Roi des Belges tonneau*, and a *landaulet*, both of which are certainly worthy of inspection.

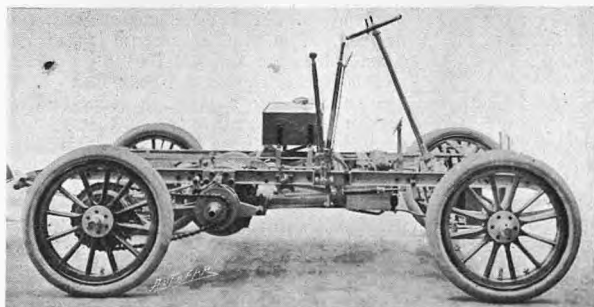


Section of the Simms frame.



The 12-14 h.p. Singer landaulet.

in the succeeding year's patterns, yet that is the case here, and it is all the more remarkable, seeing that the cars are constructed on such unconventional lines; nevertheless, the design employed by this firm, in conjunction with Messrs. Lea and Francis, is eminently practical and satisfactory. The horizontal motor with its long connecting rods, and the double Crypto gear giving direct drives on the second and third speeds, and other features, are all as introduced in the early part of this year. The cars are shown in two powers, namely, 12 to 14 h.p. and 8 to 10 h.p., and are fitted with a variety of bodies including two, three, and five seats, landau-



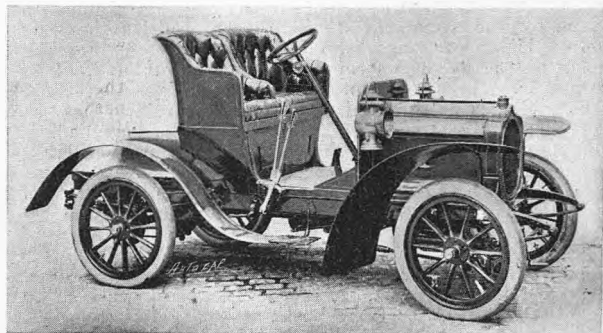
The 12-14 h.p. Singer chassis.

let, and small omnibus. In addition, there is the excellent little 6 h.p. tri-car which acquitted itself so well in the recent trials. The gear has been modified to provide three forward

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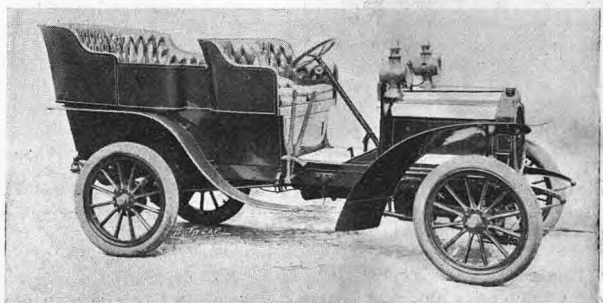
speeds and a reverse, and the back of the frame as well as the front is now sprung. For an exhibit of the smaller class of vehicles this one will be hard, if indeed possible, to beat in the show.

THE SPEEDWELL MOTOR AND ENG. CO., LTD., 151, Knightsbridge, S.W. (100).—Among notable features on the four-cylinder Speedwell car is the reservoir, which is formed in the main induction pipe as it passes along all four cylinders close



The two-seated '6 h.p. Speedwell car.

to the induction valves. This gives a reserve of explosive mixture close to the engine, so that any slight fluctuations of the carburetter have no effect on the smooth running of the engine. The crank case is so constructed that the bottom portion of it can be taken right away without affecting the main bearings, and it is possible to tighten the big ends, or, for the matter of that, to remove the connecting rods and pistons without dismounting anything else. The commutator is gear driven, and occupies a horizontal position, so that no oil can leak from it to the detriment of the wires. High-tension magneto and accumulator ignition are fitted. The change-speed gear, which gives three speeds, is so constructed that on the top speed the secondary-shaft is not revolving, so that the highest possible efficiency in the drive is obtained. A



A 12 h.p. Speedwell four-seated car.

single-cylinder Speedwell of 6 h.p. is also worth attention. It has a De Dion engine, three speeds, direct drive on the top, pressed steel frame, ample tyres, and a very nice looking and comfortably upholstered two-seated body.

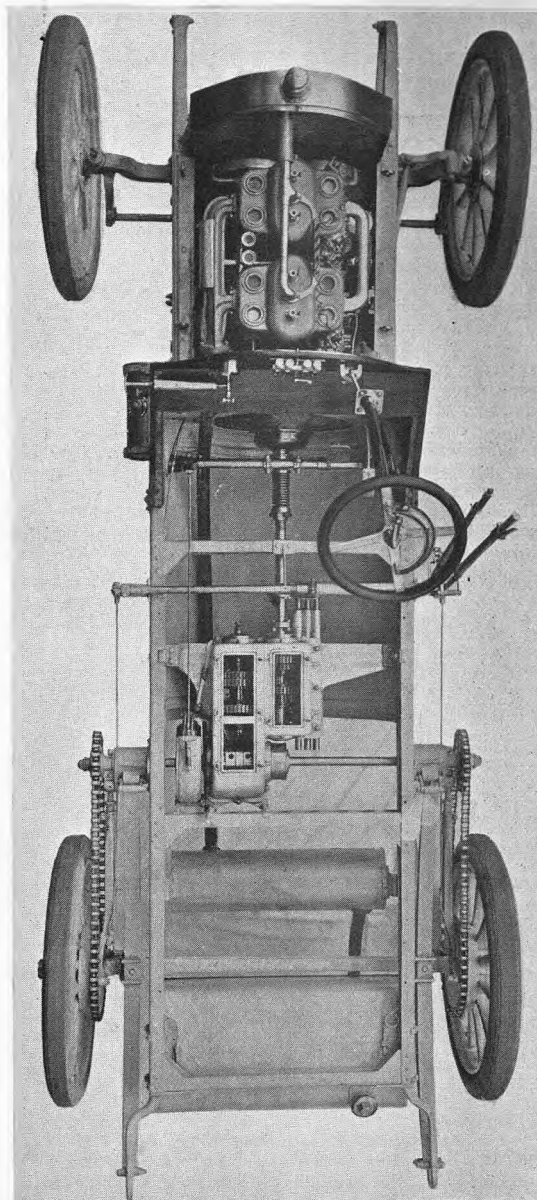
THE STANDARD MOTOR CO., LTD., Coventry (84).—This exhibit is composed of two items, but both of them are well worth studying, and show considerable advance by this company, whose work has already earned an excellent reputation. First we notice the six-cylinder chassis of 24-30 h.p. The cylinders are all cast separately, and have the inlet valves on the one side, and the exhaust on the other, both being mechanically operated. The frame is, of course, of pressed steel, and the cylinders are fed in two sets of three each by Rover carburetters. No governor is fitted, the control being arranged from the steering wheel through Bowden mechanism. Below the base chamber is a plunger pump, which forces the lubrication throughout. Motion is communicated through a metal-to-metal clutch, and drives direct on the third speed, there being four in all, in addition to the reverse. The complete car shown has a four-cylinder motor, and drives direct on the fourth speed. It is fitted with a handsome side entrance body, wide enough for three at the back, and two in front. Hoffmann ball bearings are used throughout the gearing and wheels. The company seem quite at home in the larger class of work they are now undertaking.

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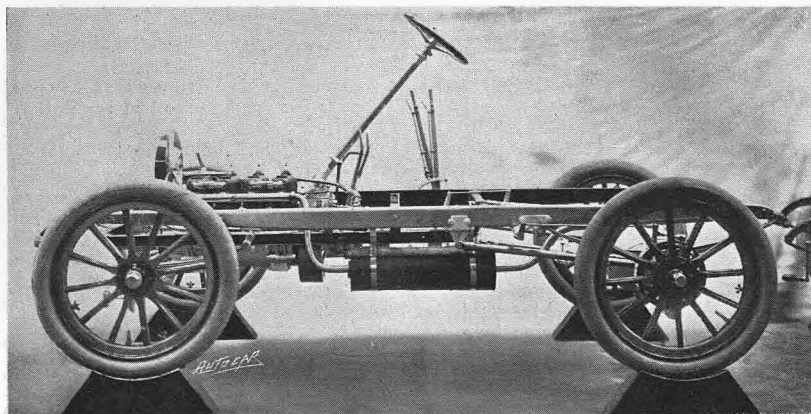
STRAKER AND MACCONNELL, LTD., Avonmore Road, W. (85).—There are several cars of considerable interest on this stand, but the one that naturally attracts the most attention is the Bianchi. This, as its name implies, hails from Italy, and promises to uphold the excellent reputation that Italian cars at present enjoy. The larger specimen is shown in chassis form with 30-40 h.p. four-cylinder motor, with inlet and exhaust valves on opposite sides. The frame is, of course, of pressed steel, and is carried on H section axles. Low tension magneto ignition is provided, the armature being gear driven by the same spur wheels that also drive the water pump, Oldham couplings being introduced in each case. The spokes of the flywheel form vanes, and the clutch is of the plate type. The gearing provides four speeds, and the final transmission is by side chains. The brake question has been very thoroughly studied. Two hand brakes applied by separate pedals are fitted on the gear, besides expansion brakes in the hubs. One of the foot brakes can be disconnected from the clutch if desired. In addition to the usual throttle and ignition controls is a device for shutting off the carburetter when running down hill. A car on similar lines is shown of 18-28 h.p. with side entrance body and canopy top. The Bianchi should be heard a good deal of in the future. The 24 h.p. Mors landaulet is shown, and another of the same pattern body is of the Berna make. This last has the two-cylinder motor arranged under the driver's seat, which is detachable, and the car is on the lines now generally associated with the town motor carriage. The control is restricted to a throttle lever on the wheel and a pedal which actuates both the clutch and the brake. A cheaper car of the same make and about two-thirds of the horse-power is shown with a single-cylinder motor and a handsome side entrance body, to the back of which access is provided by sliding part of the front seat and opening the upper and lower parts of the door in opposite directions. This car has a cardan drive, but most of the others are by side chains. The carburetter is so far automatic that no levers are applied to it at all. In fact, this firm was one of the earliest to fit an automatic air valve.

SUNBEAM MOTOR CO., LTD., Wolverhampton (77).—Four fine examples of the automobiles turned out by this well-known Midland house are staged on this stand. Two are fitted with standard double phaeton bodies, one finished in green with black margins, lined white, and the other dark red and similarly embellished. The 16-20 h.p. Sunbeam chassis can be examined by the light of the full description given in *The Autocar* of Nov. 4th, page 544, wherein the details of this admirably constructed car were fully illustrated and described. Before the visitor quits this stand we would recommend him to pay particular attention to the body finish of these cars, which is equal, if not superior, to anything in the exhibition. This is the work of the Sunbeam Motor Co. themselves, and proves how excellently such work can be turned out when special and conscientious provision is made for so doing.

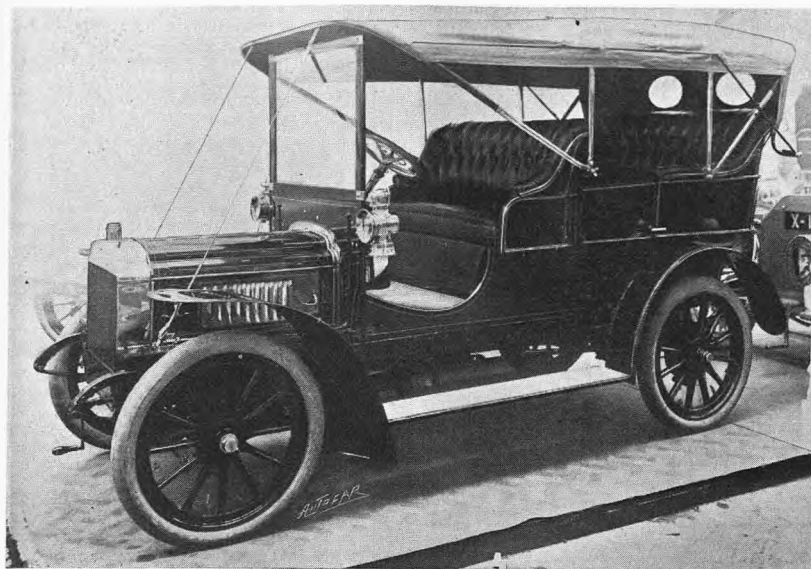
THE SWIFT MOTOR CO., LTD., Coventry (51).—The exhibit on this stand includes small and light cars of two, three, and four cylinders, which are of particular interest to the man of moderate means. The cars include the 7 h.p. two-cylinder car fitted with White and Poppe engine. This is practically the same as last year, except that it has an improved gear box, and that most of the details have been brought up to date in accordance with the very latest practice. The same remark



The 30-40 h.p. Bianchi chassis exhibited by Straker and MacConnell, Ltd. applies to the three-cylinder 10 h.p. and the four-cylinder 12-14 h.p. This car, in addition to the new gear box, has an improved ball bearing back axle, and one or two other detail improvements. The 16-20 h.p. is quite a new car. It is fitted with four-cylinder engine, with valves on one side, fired by single or duplex ignition, as desired. The clutch is conical, leather to metal with universal couplings between it and the gear box. The gears are engaged by a striking lever working in a gate quadrant. In this quadrant there are three tracks; in the first two the four forward speeds are obtained, whilst in the last the reverse only is engaged. The striking lever is provided with the usual catch, which has only to be operated for engaging the reverse. An interlocking device is fitted to the striking gear, preventing the accidental engagement of any gear. The live axle is supported on ball bearings, and in the bevel box there are ball bearings, as well as plain ones, the balls taking the thrust, and the plain the load. The engine and gear box



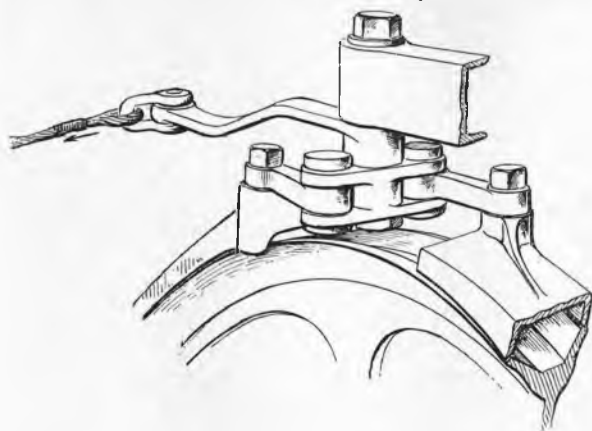
The Swift four-cylinder 12-14 h.p. chassis.



A three-cylinder 10 h.p. Swift car fitted with hood and glass screen.

are carried by an underframe, which is extended the whole length of the main frame, and tied to the front and back cross members. It is also supported in the middle. In the side of the bevel box is provided an opening covered by an easily removable inspection plate.

JOHN I. THORNYCROFT AND CO., LTD., Chiswick, W. (57).—The Thornycroft stand has samples of the 14 and 24 h.p. cars, the first of these being their Tourist Trophy type. The car remains in practically the same condition as it was in the race referred to. This is a four-cylinder car with all the cylinder heads cast in one, with the valves operated from the top. For this purpose a layshaft is carried over the top of the cylinders and actuates the valves with rockers. This layshaft is driven by a vertical shaft, on which is arranged the governor of rather special type. The 24 h.p. car has a four-cylinder engine with valves on opposite sides. Over the inlet valve is the usual cap, but it carries the low-tension magneto make and break mechanism. Each of these make and break devices is actuated by its own vertically



The Thornycroft brake, showing operating mechanism and section of drum.

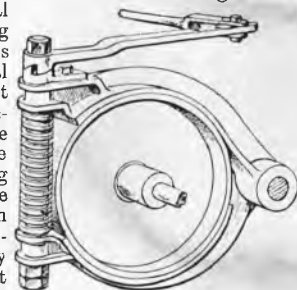
operating shaft. Each make and break plug is, of course, provided with a separate insulated cut-out. The clutch in both cars is of the Hele-Shaw plate type, and is provided with a clutch brake. The gear box in both cars is controlled by a single lever working in a gate quadrant. The drive from the gear box to the back axle is by propeller-shaft. Our attention was drawn to the dashboard, which is provided with a minimum of lubricators, etc. On both cars steering wheel control is provided, as also is an underscreen carried from the radiator to the rear of the gear box. Unfortunately, the best features of the now well known and highly appreciated Thornycroft

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cars cannot be appreciated from examination on an exhibition stand. There are the particular quietude and sweetness of running qualities in which we were perforce obliged to remark as two of these cars passed us on Hammersmith Road on our way to the show. Moreover, running over dusty surfaces, they throw very much less dust than the average vehicle. Thornycroft cars are rapidly attaining a reputation equal in their own sphere to that of Thornycroft boats.

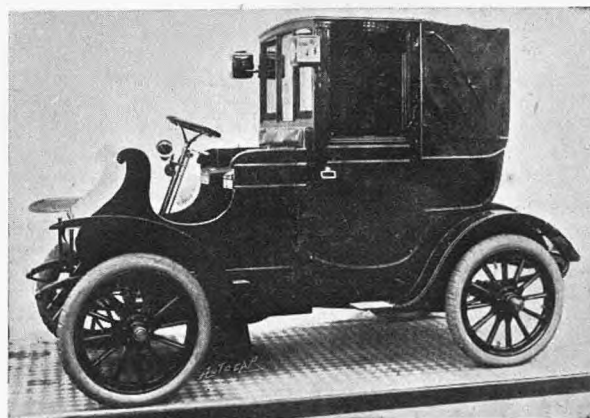
VAUXHALL AND WEST HYDRAULIC ENG. Co., Leadenhall Street, E.C. (90).—The new four-cylinder engine car, of the motor of which we gave two illustrations in our issue of Nov. 11th, is exhibited by this firm, and contains several points of interest. The cylinders, which are 3½ in. bore by 4½ in. stroke, are cast separately, and mounted upon an aluminium crank chamber of ample proportions. The ignition, which is of the coil and accumulator type, is worked with a single coil and high tension distributor. The contact breaker is placed on the dashboard, directly in view of the driver, while the distributor is on the forward side of the dashboard, where short leads are available to the sparking plugs. The contact breaker shaft is

chain driven from the valve camshaft; the latter is on the right-hand side of the engine, while the exhaust valves are placed on the left-hand side. The water circulating pump is chain driven from the inlet valve camshaft, and the shaft between these being effected



The Vauxhall foot brake.

removed also makes the extra air inlet valve accessible. The lid carries the adjustment screws, by which the tension of the air valve can be regulated, and a similar screw regulating the height of the spray cone above the petrol jet. The mixture pipe is taken from the carburettor to between the centre pair of cylinders and the inlet ports of each engine for connecting with each other by means of a short length of pipe. The engine control is by means of a lever set beneath the steering wheel,

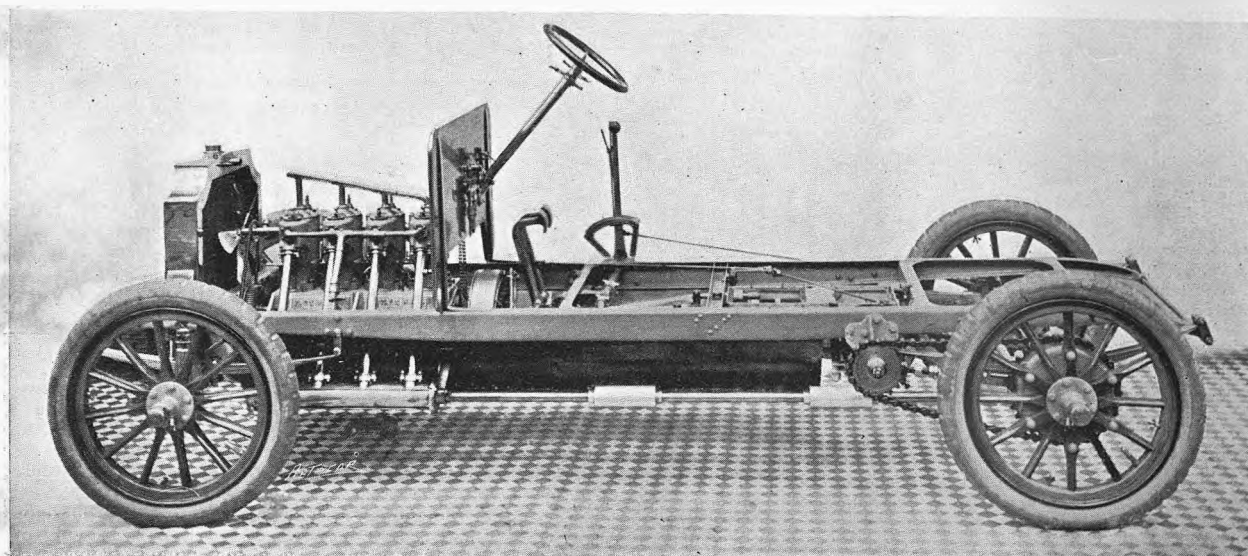


The Harper petrol-driven brougham, exhibited by the Anglo-American Motor Car Co., Ltd. See page 654.

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by motion of the wedge type. The ignition advance is set opposite to the inlet valve control. Power is transmitted from the engine to the change speed gear through a conical clutch, having the leaf form of springs, which has been associated with the Vauxhall car since the commencement. The actuation of the clutch through the pedal is

brakes, which are applied by the usual side lever, are substantial in construction, and are designed to distribute the strains as equally as possible. Close beside the chassis is shown a finished car of this pattern, which is certainly graceful in its outline, and a practical-looking vehicle. A chassis of the now well-known 9 h.p. three-cylinder car is presented



The Vauxhall four-cylinder 18 h.p. chassis

effected direct on to the clutch collar, the cross member forming its own fork, the end of which, being convex in forming the point of contact with the clutch collar, is always central. The change speed gear gives four speeds forward, direct drive on the top gear, the gears being controlled by means of gate form of quadrant, there being a safety stop to prevent the reverse gear being inadvertently put into operation. The bevel drive and differential gear on the

for the inspection of visitors interested in this type of vehicle. A novelty is the 9 h.p. car fitted with a hansom cab type of body. This is actually a hansom cab body, as the driver occupies the same position as would a driver of a conventional hansom. The car strikes us as being well adapted to the use of medical practitioners. A little three-seated car of the same h.p. is also shown, this being fitted with a light hood and glass screen.



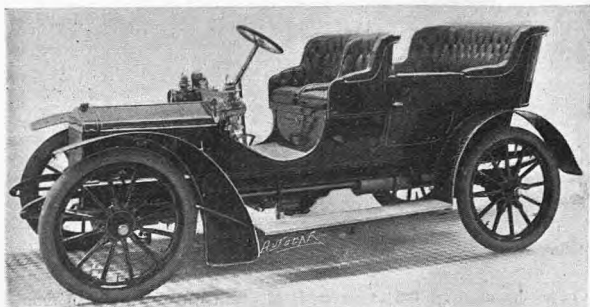
A Vauxhall 9 h.p. three-cylinder standard chassis carrying a hansom cab body. As can be seen the steering and control gear are taken up to the driver, who sits in the usual hansom cabdriver's position. A number of the cabs are being built to the order of the Metropolitan Motor Cab and Carriage Co. by the Vauxhall and West Hydraulic Eng. Co., Ltd., of 45 Leadenhall Street, and of Luton

countershaft is contained in a box separate from that carrying the change speed gear, but it is in one and the same case, so that rigidity is ensured. The differential and bevel gear are well provided for lubrication, as the whole practically works in an oil bath. Mounted on the countershaft is a metal-to-metal pedal-operated brake, the details of which will be appreciated from the sketch which we give herewith. Rear

THE VICTORIA CARRIAGE WORKS, LTD., Long Acre, W.C. (118).—The special feature of this exhibit is a chassis of the new 12 h.p. four-cylinder De Dietrich car. This is a new model of smaller horse-power than is usually associated with the maker's productions, but nevertheless contains all the features to be found in the cars of larger horse-power. The change speed gear affords the usual four speeds forward, and is mounted upon ball bearings, as also are the road wheels. The side brakes have a spring compensation, and are interconnected with the clutch. The use of the spring enables the brakes to work smoothly and yet efficiently. The control of the car is good, and a note should be made of the fact that the engagement of the starting handle automatically retards the magneto ignition, so that it is impossible to experience backfire. The operating of the clutch automatically throttles the engine down, and so prevents its racing when changing speed, or other reasons cause the clutch to be brought out of action. The needle regulation of the petrol supply to the carburetter is fitted to this engine. There is a small lever fitted on the dashboard, and this regulates a needle, which is placed over the orifice in the petrol jet, so that the amount of spirit drawn through the jet may be regulated as may be necessary. There are also exhibited on this stand a 24 h.p. Leon Bollée car with a handsome limousine body, and also an 18 h.p. Siddeley with Roi des Belges body. Both are very good specimens of the combined efforts of the automobile engineer and the coachbuilder.

THE VULCAN MOTOR MFG. AND ENG. Co., LTD., Southport (38).—Two kinds of cars are exhibited by this firm—a 10 h.p. and a 20 h.p. The first is fitted with a two-cylinder engine, and the latter with a four-cylinder engine. Dealing with the higher-powered car first, this has the four cylinders cast separately, with the valves placed on each side. The water-circulating pump is driven by a train of gears on the half-time gear, as is also the high tension magneto, which is the form of ignition adopted on this car. The clutch is of the usual conical form, transmitting the power to change-speed gear, giving four speeds and reverse, operated by a side lever working over the quadrant. The car has the usual live axle drive, the gear being shown open, which reveals the fact that oil is passed to the end bearings of the propeller-shaft, whence it

runs to the rear end bearing, and so into the bevel gear box, which is thus kept constantly supplied with oil from the sight feed lubricator, pressure fed, which is set upon the dashboard. The control of the engine is by levers set upon the steering wheel. The car is up to date in every respect, and the chassis in the finished car of the same power is fitted with a nice side entrance five-seated body, and shows careful workmanship throughout. In the 10 h.p. chassis the pump is driven from the forward end of the half-time shaft, while on the corresponding end of the inlet valve shaft is mounted the governor



One of the Vulcan Co.'s four-cylinder cars, with side entrance body.

acting upon the throttle. The contact breaker is in this case placed in the front of the governor box in a readily accessible position. The change-speed gear, giving three speeds forward and reverse is of the usual sliding type, but is operated by the ordinary form of notch quadrant. The same type of countershaft brake is employed on this type of car as on the larger one. The rear brakes, instead of being of the internal expanding type, are of the ordinary band variety. The control is supplemented by accelerator pedal. Two finished cars of this power are exhibited on the stand—one of the tonneau type, and the other with side entrance body. Both are very nice-looking cars. In addition to these types of bodies, there is also exhibited a landaulet body, which the firm is fitting to its cars to order.

WHITLOCK AUTOMOBILE CO., LTD., Kensington, W. (25).—This firm makes a very fine show with three cars, two 15 h.p. four-cylinder Whitlock-Asters, one with a very handsome and beautifully finished landaulet to open and close, and the other with limousine body with removable top. In the centre of the stand we find a 22 h.p. four-cylinder Whitlock-Aster chassis carrying a special Roi des Belges body beautifully finished in claret red, with panels lined in lighter red, black margins, and brass trimmings. As is well known, the engines used in these cars are the Aster, and the driving mechanism, which is turned out in the best possible way, is kept as simple as possible throughout. Exceptionally powerful brakes are fitted, and the Whitlock-Aster cars as shown here are undoubtedly

desirable and practical automobiles in every particular. Both mechanically and as carriages they are worthy of every commendation.

Show Report—Petrol Cars.

THE WINTON MOTOR CARRIAGE CO., Holborn Viaduct, E.C. (70).—To the motor-car student, as well as to the purchaser, the Winton stand, and especially the 25 h.p. chassis, is sure to be of great interest. We recently gave a short description and an illustration of this car, and only refer to the chief features here. The automatic inlet valves are, as usual with Winton cars, pneumatically controlled, a pedal cutting out the controlling system, which thus acts as an accelerator. The exhaust valve stems and their springs are all enclosed by a pair of boxes. The crank chamber is divided vertically, and an inspection opening of large dimensions provides access to its contents, so that even the crankshaft is removable without dismantling the cylinders. In addition to this car is a 16-20 h.p. two-cylinder car, which is turned out with three different bodies. In addition, there is to be found the 16-20 h.p. car which is last year's model improved.

THE WOLSELEY TOOL AND MOTOR CAR CO., York Street, Westminster (48).—The new types include the 15, 18, and 32 h.p. Siddeley cars. First we notice a chassis of the 15 h.p. car. This is constructed with vertical cylinders, and the lift of the valves is adjustable by rotating the eccentric fulcrum of the rockers which actuate the valves. The lift is controlled from a lever on the steering wheel, but the governor acts upon the throttle of the automatic carburettor. The high-tension magneto ignition comprises a distributor, which may also be utilised with the accumulator ignition if fitted. The lubricating oil is lifted on to a shaft, from which it is led into the various drip feeds as required. The clutch is provided with a friction pad, and the power is transmitted to a live axle through a three-speed gear and propeller-shaft, this, as well as the vertical arrangement of the cylinders, being distinct departures in Wolseley practice. The 25-32 h.p. chassis is on much the same lines as that just described, but the carburettor is provided with a dashpot control, and low-tension magneto ignition is fitted as standard. The lubricator has one force pump acting upon it generally, subsidiary pumps acting on the individual feeds. The variable gear gives a direct transmission on the third instead of on the fourth speed. The 110 h.p. racer, as driven in the eliminating trials, is on the stand, and inspires an amount of respect. By way of contrast should be noticed the 6 and 8 h.p. small cars, which remain practically the same as last year, with horizontal motors. The 12 h.p. has been altered by actuating the valves mechanically, and fitting it with a governor. An 18 h.p. car with natural wood limousine body was to be staged shortly after our inspection was made. Among other bodies we noticed a landaulet and one having three bucket seats. The advanced and varied constructions now offered by the company should be sufficient to meet any reasonable requirements, and success should succeed success. An illustration of the new 15 h.p. chassis appears on page 713, and shows the main features of the model.

STEAM AND ELECTRIC CARS.

THE ELECTROMOBILE CO., LTD., Curzon Street, W. (67).—Specimens of electric town cars are to be found on this stand. A feature which strikes one at once on inspection of these cars is the springing. The front dumb irons are half elliptic springs, whilst the rear end of each of the rear springs is shackled to a transverse spring clamped to a bow-shaped frame extending from the main frame. The motor (8 h.p.) is supported by and drives direct on to a back live axle. The batteries are underslung, providing a perfectly flat chassis, and the batteries can be removed for charging purposes. A special form of controller is provided, giving five speeds forward and a reverse. An automatic cut out is fitted, which prevents a driver applying his brakes without switching off the current.

THE KRIEGER ELECTRIC CARRIAGE SYNDICATE, LTD., 24, Gillingham Street, Eccleston Square, S.W. (129).—Three types of Krieger electric cars are exhibited—one a four-seated landau, a two-seated victoria, and a four-seated landaulette. These are all driven on the Krieger system, which consists of mounting two independent electric motors on the front axle, each driving one of the front wheels. This system gives considerable scope to the carriage builder, who, so far as the body is concerned, has produced as near as possible the horseless carriage.

CARL OPPERMANN ELECTRIC CARRIAGE CO., LTD., Camden Town, N.W. (171).—The electric landaulets here shown have

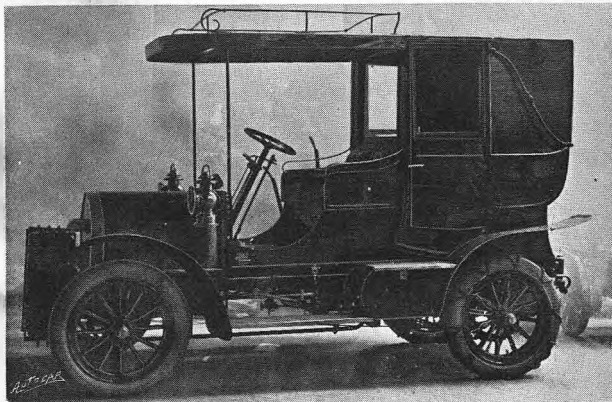
one or two distinctive features. The motor, and in fact all the bearings, are of the ball type. The motor is slung about two-thirds forward along the frame, and drives on to the live back axle either by a central Hans Renold silent chain or by a cardan shaft and worm transmission. The controller is of the firm's own make, and provides five speeds forward and one reverse, a safety catch ensuring that the reverse is not thrown in accidentally. The motor is a 6 h.p. one, and the minimum limit is guaranteed at forty miles. Two pedal-operated brakes are provided, one having a retaining catch.

THE SPEEDWELL MOTOR AND ENG. CO., LTD., Knightsbridge, S.W. (100).—The new Serpollet, which is shown for the first time, is a great improvement on its predecessors in every way. The engine is now carried under the bonnet in front, and it drives through a long universally-jointed propeller shaft direct to the bevel gear on the back axle. The hand pump is entirely done away with. A donkey pump supplies water to the boiler, and automatically cuts itself out when the normal pressure is exceeded. When heavy demands are made on the generator, and the pressure shows signs of falling, the action of the donkey pump can at once be accelerated by hand by the mere turning of a small lever on the dashboard. This is simply opened as one would open a throttle, and a greater supply of water is forced into the generator, in its turn to be instantaneously converted into steam. We are told that the instantaneous generation of

Show Report—Steam and Electric Cars.

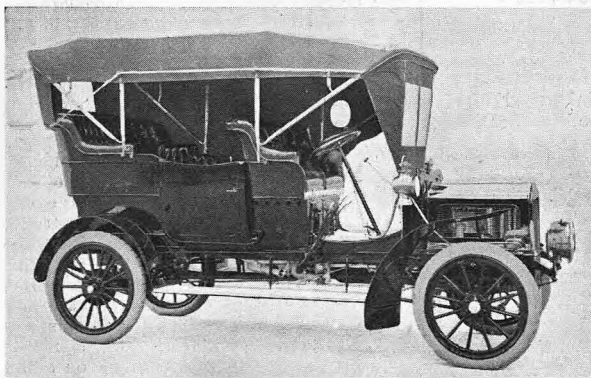
steam under the new conditions is really remarkable, even to those who are used to the quick steam-raising qualities of the Serpollet. The burner and generator are at the back, and, in the main, are unaltered, but the exhaust from the donkey pump is utilised as a blast to improve combustion, and as the exhaust from the pump is naturally strongest when the greatest amount of water is being passed into the generator, we have what is to all intents and purposes an automatic blast, supplying the burner with a larger amount of oxygen when it is required. The generator is unaltered, and still consists of the very thick small bore pipes of circular section. The engine, too, we ought to add, is also unaltered, consisting, as it does, of the well-tried four-cylinder type with mushroom valves, mechanically operated, which pattern has been found by long experience to be absolutely satisfactory, although using steam of a very high superheat. All lovers of steam cars should make a point of seeing the new Serpollet.

TURNER'S MOTOR MFG. CO., LTD., Wolverhampton (44).—This stand is devoted to the exhibition of four specimens of practically the only steam car constructed in this country, and we are pleased to be able to say that it does its origin justice. The generator is of the flash tubular type, and is heated by a



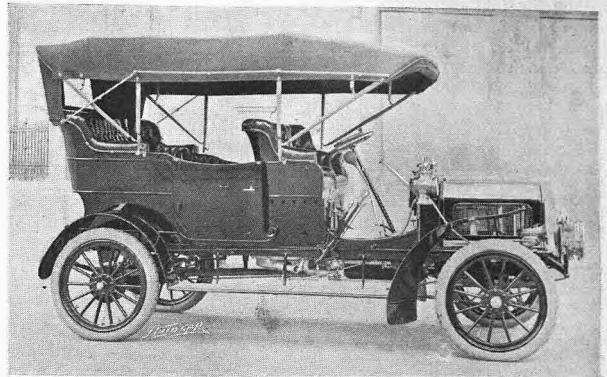
A Turner-Miesse steam-propelled landaulet.

paraffin burner. The burner and generator are fitted under the bonnet in front of the car. The engine comprises three horizontal cylinders, and is single acting, after the manner of the internal combustion motor. A feature is made of the fact that the control is positive throughout, except that the pressure on the fuel tank is kept up automatically. The control is effected by the quantity of water delivered to the generator, and this is regulated by a handle situated in front of the steering column. Behind the column is a second handle by which the point of cut off is regulated, and by a movement of the left hand the engine is reversed. In case the lower section of the generator should be burnt out, it can be detached and the water supply coupled up to the remainder, the damaged section being replaced at leisure. The cars are shown in two powers, 10 and 16 h.p. respectively, and fitted with various bodies, viz., Roi des Belges tonneau, side entrance, limousine, and landaulet—all of these appear to be very finely constructed.



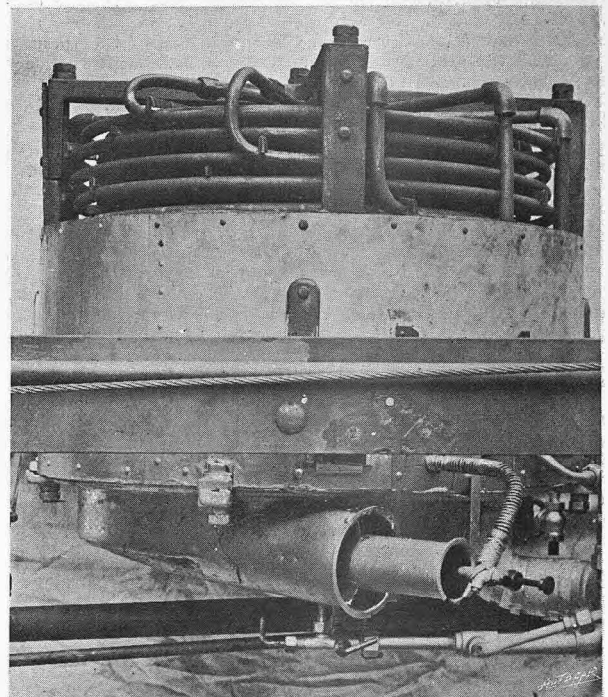
The White steam car, with one of the side curtains down and the front screen in position.

WHITE STEAM CARS, Regent Street, W. (50).—One cannot fail to be struck with the handsome appearance of the White steamers. A separate engine is exhibited with the bottom of the crank chamber removed. It discloses the existence of the ball bearings for the crankshaft, a feature which the majority



One of the latest White steam cars, fitted with an exceedingly handsome body by Cann, Ltd.

of people are not aware that the White steam car possesses. It also incidentally demonstrates the accessibility of the little compound engine generally. The burner has been improved, and there are no longer any air openings in the casing, all the air being taken through the vapour orifice at the side. The steam is taken from the generator to the high pressure cylinder, then from this to the low. After working this it is exhausted through the condenser, being effectively caused to



The new White steam car burner, vaporiser, and generator.

resume the liquid form for further use. The compound engine can be instantaneously converted into a single acting one when desired for starting or an extra effort. Each of the bodies is exceedingly handsome; the one with which we were most struck was a side entrance 18 h.p. car with a double Cape hood. This has been built for Earl Russell, and is his third White car. The shape and finish of the body, and the appointments generally, are all that could be wished, and the car is one of the handsomest carriages in the show, and we are glad to note that it is not spoiled, as so many comfortable carriages are, by the absence of the side doors at the dashboard.

CARRIAGE WORK, FRAMES, AND WHEELS.

THE BURLINGTON CARRIAGE CO., 315-317, Oxford Street, W. (177).—On a 24 h.p. Delaunay-Belleville chassis we find mounted a good example of a double landaulet body finished in chocolate and fine lined in red with the utmost taste. There is ample room for four passengers within the roomy and most luxuriously upholstered interior of the landaulet, but the seat for the two front passengers who face rearwards folds up against the front of the carriage and affords ample room within. The interior is finished in dark blue, buttoned and pleated leather, and blue cloth. A fixed canopy protects the occupants of the front seat, and a glazed weather screen rises up from the dashboard, and this can be swung up to the roof when not required. The windows between the front seat and the rear of the carriage can also be swung up in a similar manner. Luggage can be carried on the forward canopy and also on the wide running footboards. A luggage grid capable of taking a big portmanteau is provided at the rear. It is quite a triumph of motor body building.

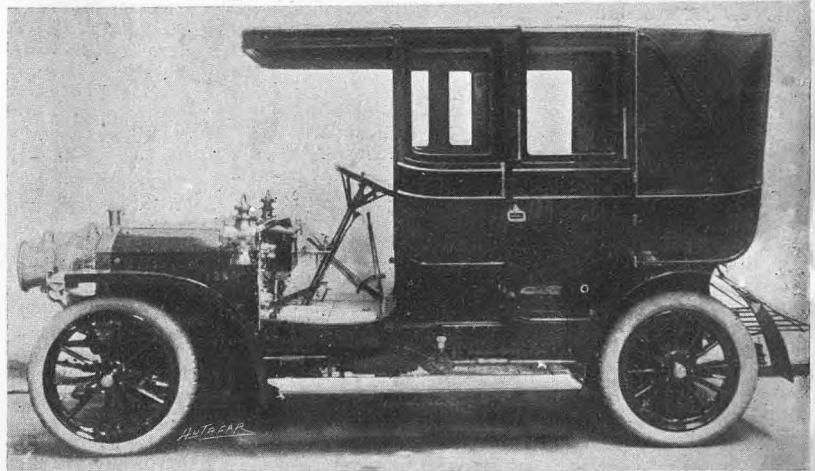
CANN AND CO., Miller Street, Camden Town, N.W. (176), show a 15 h.p. White steam car, upon which is mounted a grand example of body building in the shape of a Roi des Belges double phaeton body, with canopy roof and glazed back, roll curtain to sides, and sliding up glass front to dashboard, giving most effectual protection against the weather. The upper end of the boiler casing, which projects segmentally into the rear portion of the carriage, is made available as an extra seat. The body is most handsomely and tastefully finished in Panhard red, with black beadings, lined primrose, making a most tasteful appearance. Bucket seats are placed in front, and the upholstery is in red buttoned and pleated leather of the best quality. The ample mudguards are of sheet steel, and there are running footboards which provide ample carrying convenience for luggage which does not go on the roof. It cannot be denied that this body ranks with the best carriage building efforts in the show.

THE FARMAN AUTOMOBILE CO., LTD., Long Acre, W.C. (32).—On this stand is a 45 h.p. Mors chassis carrying a very fine example of a double limousine body built to the order of the Northern Counties Garage by J. Rothschild et Fils, of London. The body is magnificently finished in dark blue picked out with primrose, while the fittings are most luxurious throughout.

H. A. HAMSHAW, Leicester (181).—An improved covered phaeton is being shown on this stand. This has a cover to the rear seat, and an extension, which can be pulled out over the front seat, or drawn back into the cover of the back seat. In the back of the front seat is arranged to slide verti-

cally a glass screen, which shelters the occupants of the back seats.

HOWES AND SONS, Norwich (7).—Two Wolseley cars, 6 h.p. and 14 h.p., are shown here, one fitted with a special body,



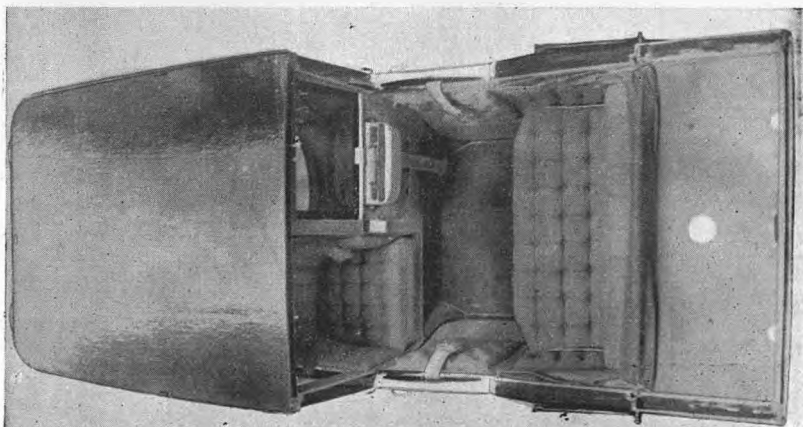
Side view of the Mulliner three-seated landaulet.

hood, and screen, and the other with special landaulet body well finished and upholstered. The 6 h.p. body deserves inspection, and should attract the attention of medical men on the look-out for a body suitable for their requirements. The landaulet is very nicely fitted both inside and out.

J. A. LAWTON AND CO., Orchard Street, Oxford Street, W. (102).—The well-known coachbuilders have quite a display of Mercedes, Panhard, and Berliet cars. The cars themselves are dealt with elsewhere, so we confine ourselves to the coachwork, which is nothing less than superb. We were particularly struck with the Mercedes with open side entrance body. The two front seats are of the Roi des Belges type, and a wide back seat accommodates three with the utmost comfort, ample leg room being left. It is one of the handsomest bodies of its type we have seen. The shaping of the door and angles of the body are most graceful, and we were pleased to note that the back seat, although of ample width, is not too deep, as some are nowadays, nor too high, which is another common defect. There is no need for the back seat to be made so high when there is ample leg room, as there always is with a side-entrance body. This fact seems to have been lost sight of by some coachbuilders, but Messrs. Lawton have evidently kept it in view. The closed carriages, particularly broughams, are also perfect examples of the coachbuilder's art, and should be studied by all who can appreciate good well considered and artistic coachwork.

MORGAN AND CO., 127, Long Acre, and 10, Old Bond Street, W. (185), show two bodies, one a double phaeton side-entrance, and the other a double limousine with glazed back and sides, practically in the rough. That is to say, the naked wood and aluminium panels are innocent of paint. In each case aluminium enters largely into the construction, and we need hardly say the work bears the closest inspection. Both serve to show the excellent work and material which is put into such bodies by this old established carriage building firm.

MULLINER'S CARRIAGE BUILDING AND MOTOR CO., LTD., Northampton (4).—The three-seated landaulet shown on this stand is perhaps the most original example of body building in the exhibition. Hitherto, when a landaulet has been used for conveying two ladies and a gentleman to theatres, dinners, etc., it has been necessary for the male passenger to travel on the outside seat beside the driver, or to be cramped within,



Plan view of Mulliner's three-seated landaulet; the third seat is seen on the left.

Show Report—Carriagework, Frames, and Wheels.

uncomfortably seated on a child's inconvenient seat. To overcome this objection Mr. Mulliner has built a very handsome and tasteful body in which the seat hitherto occupied by the left hand front seat is built into the body of the landaulet itself, and becomes part and parcel of the interior. In this case the gentleman drives comfortably with his lady companions, and is protected equally with them against the effects of the weather. This is a beautiful example of body building in green, and is mounted on an 18 h.p. Napier with interior chains. The interior of the body is most handsomely and comfortably upholstered. The effect of enclosing the front left-hand seat in the manner indicated also gives additional protection against the weather to the driver himself, as he is enclosed on three sides. The design of this landaulet has been registered in Great Britain and France. This is a town carriage *par excellence*. Another interesting example of body building is a landaulet mounted on C springs on the chassis of an 18 h.p. Napier. This gives most luxurious hanging, and has quite the comfort of the old-fashioned C spring-supported coach. We particularly draw attention to this body as demonstrating the fact that there is at least one firm of carriage builders who are not at a loss for novelty and inventive design with regard to adapting the comfort of the old carriage to the motor chassis. This body is upholstered in soft fawn cloth in a highly luxurious and tasteful manner. In both these carriages the doors open full wide, so that the carriage may be entered at right angles instead of in the crab-like manner usually common with side-entrance bodies.

THE NEW ENGINE CO., Acton, W. (91).—At the time of our visit to this stand there were two vehicles staged. These show only the possibilities of the car from the user's and the coachbuilder's point of view. In the design of this car the aim has been to make the car as nearly as possible on the lines of the ordinary brougham, victoria, and such like carriages; and to this end the engine and car have been specially designed. One of the two bodies exhibited is a very useful form of modified victoria with a remarkably neat hood. This hood when down folds up very neatly, and when desired for use there are two supports which are lifted up from behind the back of the driver's seat, where they are permanently hinged, and on the hood being pulled forward the supports engage with the stretchers which are put into position. In order to gain accessibility to the upper part of the engine the two front seats are unhinged at their outer edges and open out like a double lid, while to give still more room for inspection purposes the steering wheel is hinged. The method of springing is exceptionally good. The car is mounted as to the front

axle upon two special springs of half bow shape, the fixed point being at the bottom of the front axle, and at the top from the rear axle, so that in meeting an obstacle the front wheels rise easily over it, and the back wheels do likewise. It is claimed that these cars are most comfortable in their riding, and from what we can judge of them on an exhibition stand we should say that this is so. This easy riding is further contributed to by the fact that the standard diameter for the wheels is 40 in. This size enables solid tyres to be used with a great degree of comfort, and in using pneumatic tyres their life is greatly lengthened owing to the large diameter. There is also staged here an exceedingly comfortable landaulet, which together with the vehicle described, is well worth attention.

JOSEPH OWEN AND SON., LTD, Stanley Mills, Liverpool, and London (184).—This stand is devoted to woodwork for motor car construction that is more particularly the bodies, wheels, and wings. The wings and cape frames illustrate the firm's skill in bending, as also do the seat box. Wheel parts are also exhibited in the rough and finished state.

C. S. ROLLS AND CO., Regent Street W. (186).—The Hallé spring wheels, which went through their 4,000 miles trials, can be inspected on this stand, together with new models.

RUBERY, OWEN, AND CO., Darlaston, Staffs. (183).—Here we have the only exhibit of pressed steel frames in the show. They show frames as constructed for a number of different makers, such as the Argyll, Rolls-Royce, and Humber. Special attention should be given to the cross members, which in several cases are pressed with complete ends—that is to say, the boxing is done without cutting the metal. Those with a taste for machinery should inspect the photograph of one of the presses in which the strips of steel are converted into frame members.

F. SELBY AND CO., LTD., Birmingham (219).—A display of metal fittings of all kinds, including axles and axle fittings, steps, etc. Most is made of the body fittings, which include Cape cart hoods, parts, and hinged wind screens. It is impossible to refer to all or even a majority of the fittings to be found which interest the trade more than the user.

S. STEVENSON AND CO., Logan Street, Glasgow (198).—A great variety of wood wheels are shown here, ranging from the light hand steering to an immense lorry wheel with an iron tyre 10½ in. by 1½ in., which has been compressed on hydraulically whilst cold. Special attention is drawn to a 'bus wheel having a single hub on two sets of spokes and separate felloes and tyres. The cross bolts connect the two parts of the wheel at the felloes. The advantage claimed is absence of side-slip.



A feature of the Olympia Show is the striking vehicle illustrated above, and which is to be seen on the stand of the New Engine Co. The engine is of 25 h.p., and the model is known as the Alexandria.

W. AND F. THORN, Great Portland Street, W. (180).—The quick change convertible landaulet and victoria body of Messrs. W. and F. Thorn, described in our last issue, can be seen "in the flesh" on this stand. On the same stand is a handsome tonneau body fitted with a Cape cart hood on a Lea and Francis chassis. The evidences of body making for motor cars seen at this stand show that our old coach builders are quite equal to the most finished motor body building.

W. THURPP AND MAHERLY, 425, Oxford Street, W. (126).—A very practical exhibit is made by this well-known firm of carriage builders. Covered-in cars are apparently in preponderance in the exhibit, and here they show as three to one. There

Show Report—Carriagework, Frames, and Wheels.
is a fine limousine body mounted on a Hotchkiss chassis, the particular feature of this being that the top is dismountable, so that it is convertible to an open car when occasion requires. There is also a double landaulet fitted to a Daimler chassis, and a three-quarter landaulet Mors car. One example of the open carriage pure and simple is seen in a very fine double tonneau side-entrance car, giving a total seating accommodation for seven people, including the driver. This is fitted to a Mors chassis. The whole car is very complete and comfortable, and should be particularly warm, for there are no large open spaces between any of the seats which so much contribute to cold feet.

TYRES AND NON-SKIDS.

THE COLLIER TYRE CO., LTD., Long Acre (247), have this year added to their patterns a beaded-edge tyre which is made in all sizes. The Collier tyres have such a well deserved reputation for reliability, a reputation which was founded even before the last Automobile Club tyre trials, that it will be welcome news to many to know that they can now obtain these covers to fit the ordinary rims. Many automobilists are so used to the manipulation of the beaded-edge variety that, however reliable a tyre may be, they prefer to keep to a form of attachment with which they are thoroughly well acquainted.

J. W. AND T. CONNOLLY, LTD., King's Cross, London (250), are showing their well-known solid tyres, the method of attachment of which is worth inspecting.

THE CONTINENTAL TYRE AND RUBBER CO. (GREAT BRITAIN), LTD., Clerkenwell Road, E.C. (256).—In addition to the ordinary Continental tyres a novelty is to be found in the studded tyres, a solid tyre, which is vulcanised to a rim ready to attach to the ordinary wheel rim, and also the new 150 mm. pneumatic tyre. The effect of this tyre can be most easily realised by an inspection of the car built for His Majesty the King, which is staged upon the Daimler stand, and which, greatly to the credit of the Continental Tyre Co., is shod with these huge 910 mm. by 150 mm. tyres. A car so fitted must necessarily run with the acme of luxurious comfort, and considering the excellence of this company's manufacture they are to be congratulated upon tackling the question boldly, and putting a tyre of this magnitude upon the market.

THE DUNLOP PNEUMATIC TYRE CO., LTD., Aston, Birmingham (236).—In addition to the ordinary Dunlop tyres there is shown a new security bolt, the base of which instead of being of canvas only is of canvas with a core of rubber, which prevents crumpling, as happens with the ordinary security bolt. The introduction of this new feature will be warmly welcomed by amateur drivers who tackle their own tyre repairs at home or on the road. In fitting an altogether new cover to the rim there is nothing which presents more difficulty and annoyance to the amateur than the handling of the stiff plated security bolts hitherto used. The latest introduction of the Dunlop Co. will very largely do away with trouble in this direction. On this stand also we find a large exhibit of the various well known tyres made by this world-famous company. The non-slipping treads still largely obtain, and as a proof that their non-slipping qualities are upheld in practice is the fact that they are ordered in larger and larger numbers every year. So excellent are the Dunlop tyres now made that the firm do not find it necessary to introduce any further features, but as examples of care in construction, excellent material, and scientific treatment of rubber, we commend the visitor to examine what he will find here.

J. E. HOPKINSON AND CO., LTD., Cromer Street, W.C. (253).—The feature of the Hopkinson solid tyre to be found on their stand in the Gallery is the method of attachment. It is gripped between two internal serrated rings, which are bolted together, and to the wheel rim. The tyre is channelled down the centre of its periphery, which improves its non-skidding qualities.

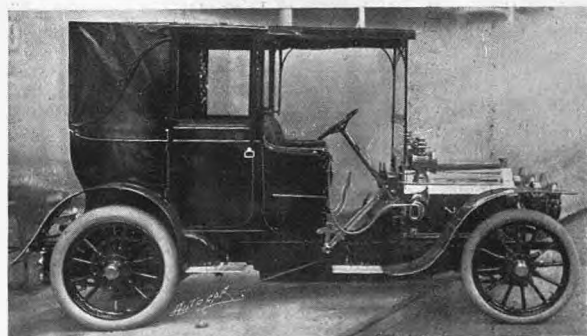
THE IMPERIAL TYRE AND RUBBER CO., LTD., Holborn, E.C. (249), have samples of tyres with both flat and round tread on show, and also non-skidding tyres of the studded leather and studded rubber type.

J. LIVERSIDGE AND SON, LTD., Old Street, E.C. (252).—The De Nevers notched solid tyres and also an improved artillery wheel are shown on this stand. A feature of the wheel is the employment of a sectional wooden hub which receives the ordinary bolts and enables a spoke to be removed without taking the wheel to pieces.

THEO MASUI, Hanover Street, W. (251).—Samson studded leather non-skids are to be found on Captain Masui's stand.

THE MICHELIN TYRE CO., LTD., South Kensington (230).—The chief object of interest on the Michelin stand is the non-skid tyre, such as was used in the Gordon-Bennett race. This has rubber sides and a leather centre carrying the non-skidding steel studs. The leather centre is built up with the rubber cover in course of construction, and on all hands one learns that this tyre in practice on fast and heavy vehicles has given the best possible results. It was not to be supposed that a firm like Michelin would put a tyre upon the market which would not redound to their credit. That this is so, all admirers of the Michelin tyre will be pleased to hear, and we are able to testify from actual experience and trial that there is no non-skid on the market which acts better on greasy surfaces and gives greater satisfaction in use. The remaining tyres exhibited show no departure from the well-known Michelin system, which has made for itself so great a reputation throughout the world. The tyres fitted to several famous racing cars are staged, and also examples of tyres which have been used for very long distances on ordinary touring cars.

DAVID MOSELEY AND SONS, LTD., Ardwick, Manchester (255).—A bold step has been made by Moseley and Sons. They state they will guarantee all tyres sold by them to run 3,000 miles or for six months. The easy detachability of their tyres is being demonstrated by a number of girls, who are to be seen fitting, removing, and inflating tyres on the stand. These well-known rubber manufacturers have a large assortment of their various tyres which they have been for years past putting upon the market. Of course, the most interesting feature of the stand is the Perfect tyre, in which the outer cover is retained on a flat segmental rim by means of a split hollow edge, brought together by left and right-handed threaded screws and Tommy-nut. In order to detach the tyre from the wheel it is only necessary to slack off this nut and gently prise the retaining rim edge over the edge of the rim itself. The tyre can then be made to follow it with the greatest ease, no difficulty being experienced with the valve. The new "all steel wheel" lately introduced by Messrs. Moseley, in which nave, spokes, and felloes are all in metal, but wear the appearance of a wide artillery wheel, should be seen here as a distinct advantage to automobile construction. A pair of perfect tyres which have run over 4,000 miles, carrying a heavy car, are shown, their condition speaking for the excellent quality of material of which they are made. A very special feature of this firm's work is the retreading of worn covers, in which they have been so successful that their plant for this purpose has been trebled within the last two years.



A 16 h.p. De Dietrich landaulet shown by Jarrott and Letts, Ltd.

Show Report—Tyres and Non-skids.

A sample of a worn type partially retreaded is extremely interesting.

THE NORTH BRITISH RUBBER CO., LTD., Edinburgh (248).—The well-known Clincher tyres, including the 135 mm. type, are to be found on the North British Rubber Co.'s stand. For sound work, careful construction, and perfect rubber treatment the North British Rubber Co. are unsurpassed. Their long experience and great facilities enable them to produce the perfect article, and this is evident from the samples of tyres of all descriptions which are staged here. We have had an opportunity of testing the quality of a pair of Clincher tyres, 810 mm. by 90 mm., which we have had in use upon two medium weight cars for some time past. These tyres have run for two seasons in a perfectly satisfactory manner, and are still in fair running order, although they have been used over some of the most tyre annihilating road surfaces in this country. There is no denying the fact that the motor tyres produced by the North British Rubber Co. are equal in quality and construction to anything upon the market.

THE PALMER TYRE, LTD., Shaftesbury Avenue, W.C. (257). The Palmer cord tyres are no longer a novelty, but they have

now thoroughly proved themselves as among the most reliable made. The system on which they are built up can easily be mastered by examination of the sections on the stand. It will also be apparent why these tyres should be so stable laterally, and, consequently, should behave so well in grease. We are glad to say that the flange fixing has not been dropped, though the majority of Palmer tyres are supplied with thickened edges to fit the usual inturred rim.

THE PARSONS NON-SKID CO., LTD., Clapham, S.W. (239), are showing their now well-known non-skids in profusion. They are also to be found on the King's car downstairs, and on many other exhibits.

THE SELF-SEALING RUBBER CO., LTD., Birmingham (229), have samples of their tyres and tyre accessories, including samples of tyre repairs effected by them.

THE SIRDAR RUBBER CO., LTD., Piccadilly, W. (254).—In addition to the Sirdar solid tyres such as are used on motor buses, this firm are exhibiting a pneumatic tyre of their own make, the air tube of which is of the non-nipping type. This is vulcanised, so that when deflated it takes a U form, and is not nipped when fitting or removing the cover.

ENGINES, PARTS, AND FITTINGS.

ASTER, LTD., Oxford Street, W. (79 and 179).—This firm confines its manufacture to the mechanism of cars, not being complete car constructors; their engines and gears are often found in cars sold in this country, and the exhibit should by no means be passed over. Four chassis are shown, of 10-12, 12-14, 16, and 22 h.p., the number of cylinders varying from two to four, according to the power. Most of the frames are of the pressed steel pattern, now almost universal, but one is of ash, armoured with fitch plates. The engines are governed automatically, and are also controlled from the steering wheel, and it is noticeable that the latter levers have a friction grip on the quadrant instead of a ratchet action, so that an infinitely fine movement may be made, and wear avoided. Ignition is by means of the Aster high-tension magneto, and also by battery and coil. Lubrication is effected mechanically by a pump, and another pump drives the cooling water through the horizontal tubes of the radiator, the draught through which is promoted by means of a gear-driven fan. Two forms of driving gear are provided, namely, the propeller shaft and side chain systems. In the latter the differential gear is made up in a separate case, located at some distance from the change speed gear, so that each can be dealt with separately. The steering mechanism should be carefully noted. Instead of the usual single thread and nut, a double thread of opposed direction is employed, and works in two nuts. On Stand 179, in the Annexe, Aster engines in one, two, and four-cylinder patterns are staged. With each engine is now fitted a throttle valve operated by an automatic governor. The carburetter is not supplied with the engine, but is adapted to be coupled to the throttle valve, and the latter to the engine. A new 18-20 h.p. four-cylinder is the new type. This is on standard lines, with valves on opposite sides, and has separate cylinders. One half-speed shaft drives the pump, and the other the magneto, both of which are fixed to the crank chamber.

BRAMPTON BROS., LTD., Birmingham (224).—Brampton chains of all types and sizes are being shown in the Gallery. This exhibit is interesting to the automobilist who realises that Messrs. Bramptons were the pioneer motor chain makers.

THE COVENTRY CHAIN CO., LTD., Coventry (201).—The merits of this exhibit are hardly to be appreciated from the samples displayed, as though these show great accuracy and fineness of finish it requires actual use to demonstrate the sterling qualities of the transmitters themselves. The chains shown exhibit an immense range of size and pattern, but all are well adapted for the purpose for which they are intended, and the company assist both themselves and the manufacturer in issuing tables enabling the chains to be put to their right work and their right work only.

THE COVENTRY MOTOR FITTINGS CO., LTD., Coventry (264).—The chief novelty of this stand of the Motor Fittings Co. is the Hamilton radiator. This consists of a number of thin hollow plates connected together by pipes, each of the hollow plates having in it a baffle which sends the water the whole length of the hollow plates. These plates are made up of stampings, with a neck portion which fits together and forms the pipe connections. Lubricators, pumps, carburetters, and many other accessories used in the construction of motor cars, are also shown here.

THE HOFFMANN MFG. CO., LTD., Chelmsford, Essex (197).—Steel balls are not particularly interesting in themselves except in so far as they are made of extraordinary accuracy. This company guarantees all theirs to be right within one ten-thousandth part of an inch. The way in which the balls are arranged in the bearings, however, is extremely clever. Each hub bearing contains four rows of balls, two of these being adapted to take the vertical load only, and the other two the lateral pressure only, thus all jamming is avoided. The company's single row bearings with spaced balls, and their propeller-shaft thrust bearings for marine work are also exhibited in a convincing manner.

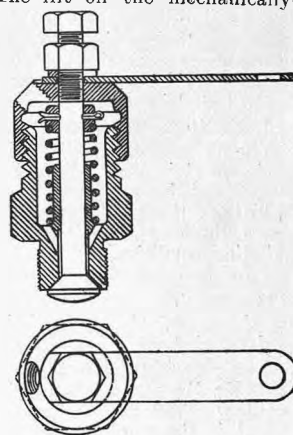
THE LINDSAY MOTOR CO., Woodbridge (14).—A neat little car is shown here, fitted with Lowe variable gear—a form of double belt drive, with a countershaft pulley variable at will.

W. MILLS, LTD., Sunderland and Birmingham (194).—A good selection of aluminium and aluminium alloy castings are displayed here both in the rough and finished state. Some of the samples show very fine work in both senses of the word. The finished articles exhibit a very high polish.

THE SPARKS-BOOTHBY HYDRAULIC CLUTCH, LTD. (218).—A sectional model of the Sparks-Boothby clutch is shown working on this stand. This has been improved since last year, and was described in connection with our review of the Morgan car. This clutch is of the hydraulic (oil) type, full information of which will be found in our review above mentioned.

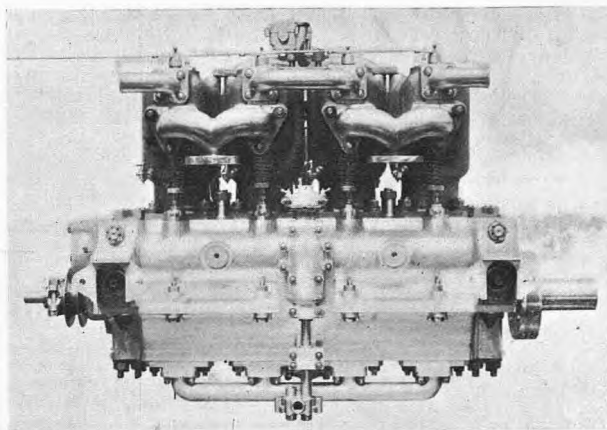
G. STRAUS AND CO., LTD., Upper Thames Street, E.C. (209).—The celebrated Fafnir motors are here shown in considerable variety, including engines for boats, as well as for car propulsion. For the latter purpose they are generally manufactured in two or four-cylinder form, and are shown complete with clutch, variable speed gear, and live axle or countershaft for side chains, the latter being sometimes built up with the variable gear. The lift on the mechanically-operated inlet valves is a prominent feature in these engines; the largest size shown is a 24 h.p. four-cylinder.

WHITE AND POPPE, LTD., Coventry (178).—The White and Poppe engines are being shown by that firm in all their different forms. The single, two, and three-cylinder engines of 3½, 7, 10, and 14 h.p. remain practically unaltered since last year, except that crank chambers are now fitted with hangers enabling the engine to be attached to any frame with the minimum of fitting. The new engine, which we hope to describe more fully later, is the 28 h.p. This has many distinctive features, and should be examined. The crankshaft bearings are carried



The White and Poppe compression relief tap.

in the top half of the crank chamber, so that by removal of the lower half the crankshaft can be readily got at. On each side of the engine there is a vertical shaft, that on the right hand side driving at its bottom an oil pump, and at the top the contact breaker. The right-hand shaft has at its bottom a centrifugal governor of a distinctive type operating in a distinctive manner on the throttle valve. Particular attention has been paid to lubrication. Each crank has its own oil well with hollow leads. Oil overflowing from any one will fall down the walls into the pump duct, and is consequently circulated. This prevents excessive lubrication and any one cylinder from running short when the engine is inclined. A half compression device is fitted to facilitate starting on the four-cylinder engine. A cap with a quick pitch thread is fitted with a lever and adjustable set-screw. A slight angular movement of the lever screws down the cap on to its lower member, which is screwed into the cylinder top, and the point of the set screw then presses the mushroom valve off its seating against the action of the spring shown. The compressed gases can then escape past the valve spindle, and out through the hole shown in the gap. This is an exceedingly neat fitting, and serves to emphasise the attention paid to detail.



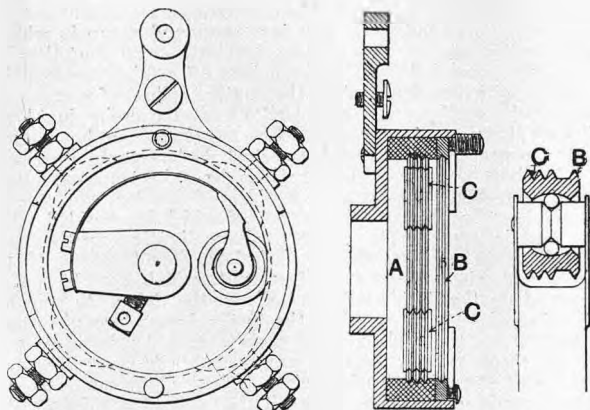
The new 28 h.p. White and Poppe four-cylinder engine.

ELECTRICAL.

BROWN BROS., LTD., Great Eastern Street, E.C. (202).—Though samples of a large number of other articles are exhibited by these universal providers, the stand is principally devoted to the E.I.C. specialities. First we have the new solid accumulator, in which there are no plates but the elements are arranged inside and outside porous pots. This gives a greatly increased capacity, and also avoids the risk of shorting. A very ingenious internal contact breaker is introduced, in which a double-flanged roller runs, as to one flange continuously in contact with earth, and to the other intermittently with the primary contacts as required; flanges and the grooves, being both of V section, ensure a rubbing contact

tension mechanism is situated at opposite ends of the machine. The firm also show high tension switches for use with double ignition.

PETO AND RADFORD, LTD., Hatton Garden, E.C. (192).—Messrs. Peto and Radford have as usual much too large a collection of electrical apparatus to be dealt with completely, but we may direct attention to two or three novelties, premising that their standard articles are still well to the fore. First we notice an electrical communicator, by which the occupant of a landaulet can direct the driver as to his wishes by pressing a series of buttons which are connected up to printed directions on the dashboard. The apparatus is provided with a bell, but it is not necessary to ring it. A soft pressure on any one of the buttons merely indicates the direction without ringing the bell, but a sharp touch will appeal to the driver's ears as well as to his eyes. A very convenient stand-by in the form of a wet primary battery is exhibited. This has a very long life, and a decidedly low price. It is brought into use by filling up the cells with water. Prior to that, the cell may be carried for a great length of time without fear of deterioration. Lastly, we may mention the Umpire hand lamp. This is a very convenient and safe method of showing a light in the motor house or in other places where a naked flame would be unsafe. The case contains a secondary battery, and is provided with a good bull's-eye front. The battery can be recharged as occasion requires, and special attention has been paid to accessibility.



1. The new E.I.C. contact breaker.

Section of contact roller.

A, insulated ring. B, "earth" contact.

C C, contact pieces insulated.

notwithstanding free lubrication. There are two special coils; one is of particularly large dimensions, and will give a spark something like 1½ in. long. The other has duplex high tension windings, and is provided with double terminals, so that two plugs can be fired in each cylinder. A wipe contact distributor constructed on similar lines to the contact breaker is also shown, and is calculated to put much less strain on the coil than where two or three spark gaps are arranged in the connections. A generator to be used on the car for keeping accumulators fully charged was expected shortly after our visit.

LACOSTE AND CO., Shaftesbury Avenue, W.C. (217).—This firm have electrical accessories of all kinds on their stand, which include many novelties. They show an insulated high-tension terminal clip. It can instantly be attached to, and detached from, the sparking plug. One of the most interesting exhibits is the Lacoste magneto. This is of the type which requires no separate induction coil. All the high-tension parts are very efficiently enclosed, as are also the magnets and the armature. Both the contact break mechanism and the high tension distributor are geared from the armature shaft, being situated above it, and the high and low

PORTABLE ACCUMULATORS, LTD., Shaftesbury Avenue, W.C. (221).—The Pfluger accumulators are shown on this stand. Some of the cells are provided with wooden divided plates, which are a novelty in accumulators of this type. Accumulators of all sizes and testing instruments are shown.

VAN RADEN AND CO., LTD., Coventry (195).—Several novelties are introduced on the stand, but the high and low-tension magnetos, which promised to be very interesting, unfortunately had not arrived at the time of our visit. We may have something to say about these subsequently. One of the latest novelties consists in a cleverly-arranged combined amperemeter and voltmeter. By opening the cover of the case in one direction, the instrument acts in one way, and when the cover is reversed it serves the other purpose. Some neatly-arranged high-tension distributors are exhibited, and one of them combines also in itself a low-tension contact-breaker. One of the principal items consists of a supplementary ignition set, to be employed in combination with a low-tension magneto. It consists of a coil and two accumulators, having a very long range, and provides for a simple connecting up to the magneto system. Lastly, we may mention a spare trembler device, which may be carried ready to substitute for the ordinary article in case that should fail.

H. WATSON AND SON, Birmingham (214).—A large variety of the accessories with which Mr. Watson's name is so well known are found here, but perhaps the most interesting feature on the stand is the Watson combined contact breaker and high tension current distributor, for use with a system of synchronised ignition. The body of the distributor is formed of a short brass cylinder, in the back of which is placed an

Show Report—Electrical.

insulating disc carrying a ring of brass formed with four jutting lugs. The commutator shaft passes through this disc of insulating material and projects within the brass cylinder. On the end of the commutator spindle is carried an ebonite disc, on the rear face of which is set a spindle carrying four steel rollers. These rollers when the ebonite disc is rotated by the commutator shaft make contact with the two opposed lugs in the before mentioned brass ring, and complete the primary circuit. A distributing segmentally-shaped arm, also mounted on the commutator spindle, and to which the secondary current is fed, rotates therewith, and passing under four ebonite insulated terminals set at equal intervals in the

forepart of the brass cylinder, distributes the firing current to the sparking plugs. In this apparatus the make and break is most effective and perfect in action, and the delivery of firing current to the cylinders equally satisfactory. This distributor can be employed horizontally or vertically, and can be fitted wherever a commutator spindle is run off the half-time shaft either by chain or gear. The apparatus is most beautifully made and finished. Indeed, it looks like a good optician's rather than an electrical engineer's job, and one of its best features is the fact that no metal fragments can be carried on to insulating material, so forming a short as so often happens with many devices of this kind.

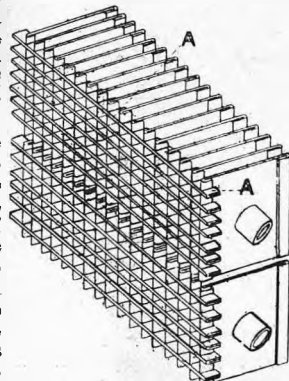
ACCESSORIES.

BRANSOM, KENT, AND CO., LTD., Goswell Road, London (207).—This firm has a varied range of accessories as usual, special features being made of the Syren horn, in which the sound is produced by the movement of a circular series of fans rotated from the rim of the flywheel. Another leading line is the Darrop sparking plug, in which two series of sparks are produced—one between the terminal and the body of the plug and the other between the terminal and a central cap. There is also a full line of lamps, batteries, and other parts and fittings.

THE CONTINENTAL HARDWARE AND CYCLE CO., Great Eastern Street, E.C. (212a).—Though this company does business with wholesalers, its exhibit is not without interest to the ordinary motorist. A well-considered form of non-skid is introduced. In this, the rivets, instead of coming in contact with the ground themselves, are employed to secure hardened steel cups which should wear well, and be efficient in preventing side-slip. The studs are mounted upon separate transverse leather straps, which are themselves threaded on to wires on each side of the tyre. The device is therefore very flexible, and may be readily attached and detached. A variety of electric lamps is shown, and also an easily adjustable lamp bracket to take lamps of different widths. A new carburettor for paraffin, or, better, Borneo spirit, is introduced for the first time. It has a very simple action, and, we understand, works well. In the electric department are self-adjusting tremblers, a renewable dry battery, and, lastly, the Sphinx accumulator, in which the paste is packed in between the leaden blades instead of being fixed directly into a grid. The plates are isolated from one another by celluloid envelopes. The firm are wholesale agents for the Stepney spare motor wheel.

G. DAVENPORT AND CO., Hatton Garden, E.C. (243).—The chief feature of interest on Davenport and Co.'s stand is a combined watch and speed indicator. This takes the form of a clock fitted on the dashboard, and containing gear driven from the road wheel. By the particular form of driving gear used, the mechanism is driven at a very low speed to reduce the wear. The mechanism seems simple, and the apparatus is sold at a very reasonable figure. In addition, the same driving gear is shown actuating a distance indicator, with which is intended to be used a stop watch marketed by the same firm. By reading the stop watch in conjunction with the speed indicator it is possible instantaneously to ascertain one's speed in miles an hour.

THE DOHERTY MOTOR ACCESSORIES CO., LTD., Coventry (188).—A new radiator, which is of the gilled type, but has the appearance of a honeycomb, is shown. We illustrate this, our illustration showing two gilled pipes slightly separated for the sake of clearness. The pipes are provided with rectangular gills, the front edge of each of which is turned over and provided with incisions. These incisions are in a line across the radiator, and into them are inserted transverse strips A at a distance apart equal to the vertical spacing of the gills. This divides the front of the radiator up into a number of rectangles, as in a honeycomb radiator, the thickness of a gill being about equal to that of the walls of an ordinary honeycomb cell. The radiator pipes are stacked together in the ordinary



The new Doherty radiator.

way, and the appearance from the front is very similar to that of a honeycomb radiator, with all its neatness.

A. W. GAMAGE, LTD., Holborn, E.C. (205).—Were it not for the intrinsic merit of the novelties one could hardly bring one's self to attempt descriptions of the multifarious exhibits on this stand. As it is, of course we do not attempt to deal with a tithe of the articles shown, but several of the novelties cannot be passed over without notice. First, we are shown the new Ruck speed indicator. This consists of clockwork mechanism, which not only records the time, but indicates by exhibiting a little red flag when the car is exceeding the legal limit. By actuating a stop in a certain manner the actual speed at which the car is travelling is indicated, and the indicator can be left in position till another test is desired to be made. Further, the instrument records the distance travelled, and is listed at a comparatively low price, though the workmanship appears to be all that could be desired. Next is a small revolution counter for testing the speed of motor crankshafts, and following that is a chronometer in which the rate of travelling is worked out for the user, all that he requires to do being to actuate the stopping mechanism at two consecutive mile-posts, when the hand will show the rate at which the car has covered the distance. Two novelties are introduced in the way of tyre inflators. One is a compound pump in which the two barrels are arranged concentrically, and the other is a small mechanical pump to be driven off a friction wheel in contact with the flywheel of the motor. This, of course, is intended to relieve the user of all physical exercise in blowing up the tyre. Two good devices are shown in the way of petrol pourers, and the various petrol dealers could do much to facilitate the use of these articles by fixing on a standard thread for their can caps. The idea of a roller map case is worked out in two good forms, one of which is provided with an electric lamp which can be used for lighting up the map at night. The new Reflector back lamp is, of course, to be seen, and also a very neat foot mat, which can be easily secured on the dashboard, and allows the driver to pop his feet in and get a warm when the traffic does not require their presence on the pedals. Car owners may be interested to know that Messrs. Gamage are now stocking the leather dust protectors for steering joints. Generally one has to get these made on purpose, with all the risk of a misfit. We think we have said enough to show that, as hitherto, the motorists' requirements are as fully catered for by this firm as one can expect they ever will be by one concern. A very full range of clothing occupies a large part of the stand, and one item we specially noticed was a fur lined waterproof rug fitted with a foot muff and hand pockets. This should make a very warm and comfortable apron. Lastly, we may mention a pair of celluloid wind shields to protect the ears in driving. These fold up into a small space and should be a great comfort in cold weather.

HARVEY FROST AND CO., LTD., Great Eastern Street, E.C. (225).—Vulcanisers comprise three types—the workshop type, the garage type, and the portable type. The principle remains practically the same as before, the chief novelty being the portable pattern. This is intended to be carried on the car, so that vulcanising work can be effected on the road. It is adapted to be bolted to the lamp bracket so as to hold it firm when being used. Its over all dimensions are about 10in. by 6in. by 6in., packing away into a neat case of these dimensions.

H. M. HOBSON, LTD., Chelsea, S.W. (6).—On this stand is shown the Brewer protector, which consists of a waterproof rug and a light metal frame. In the front the rug is attached to the dashboard by eyelets and by means of two sockets, and the frame is held securely at the top. The result is that the two occupants of the front seats are entirely protected. The

rug can be set at any height, and of course it is best to have it almost up to the chin. It will be imagined from this that the motorists would be unduly hampered; as a matter of fact they are not. It is really easier to get in and out than with an ordinary rug, as the frame is so made that it can be lifted up instantly, and one or both can alight without difficulty. Of course it will be understood that it not only protects the feet from all draught, but the frame is sufficiently high to cover the steering wheel, and sufficiently wide to include the gear and brake levers, so that the driver is not exposed to any direct current or cold air. We are told that the arrangement is most comfortable, and we have no reason to doubt it. It appears to us to be an excellent thing for the many who object to driving behind glass, while a point in its favour is that it can be fitted to practically any car without any structural alteration whatever, and without any need for damaging the paint or finish of a well-appointed car. It is made by Mr. R. W. A. Brewer, of Queen Anne's Mansions, S.W., and is illustrated on page 669.

HEDLEY S. HUNT AND Co., College Street, E.C. (262), are showing samples in different sizes of their compound foot pump, which, as the name suggests, is double-acting. It is a most efficient pump and well made.

J. LACOSTE AND Co., Shaftesbury Avenue, W.C. (217).—A simple little tool to be found on Lacoste's stand is a pneumatic valve grinder, which enables the valve to be ground in and lifted from its seating by the use of this tool alone.

THE LACRE MOTOR CAR Co., LTD., Poland Street, W. (196).—A special feature here is the new adjustable spare tyre carrier. It consists of a pair of jaws, which can be locked in position, or released by a belt passing through serrated eyes. It is mounted on different types of bracket, according to the construction of the car to which it is to be fitted. Two other items of interest are the new exhaust valve lever with adjustable fulcrums, and a new form of box spanner, the bosses of which are notched to receive the tongue on the handle.

LOVEGROVES, Piccadilly, W. (203).—Messrs. Lovegroves are showing, as agents, a number of the Goldsmid specialities, including the well-known Octopus horns. One of these is made in double form, giving two notes, and another is the Syren compound, with the ordinary bulb horn. The separate Syren has an adjustable register, whereby the volume of sound can be regulated as required. For reducing the glare of lamps when required, an iris diaphragm is arranged in such a way that it can be contracted in front of the reflector, thus reducing or increasing the size of the light as may be required.

LOWE, BEVAN, AND Co., Birmingham (213).—This exhibit consists chiefly of body fittings, added to which two or three

Show Report—Accessories.
samples of collapsable wind screens are shown. These and the fittings are well worthy of inspection by members of the trade. In addition to these, there is a show of side and head lamps.

PANHARD AND LEVASSOR (Harvey du Cros concessionnaire exclusif), Kilburn, N.W. (204).—In addition to the full range of Panhard parts exhibited here, are a number of accessories, and some of these, of an electrical nature, are very well displayed on a board arranged for the purpose. Distributors for magnetos are shown, and also two very handy indicators described as controller. These consist of a dial marked with three or four positions according to the number of cylinders, and when the hand is turned to each, that cylinder is, or should be, firing. It is proposed to show the apparatus in actual working during the show, but we were too early to see it under these conditions. It should prove a most useful accessory.

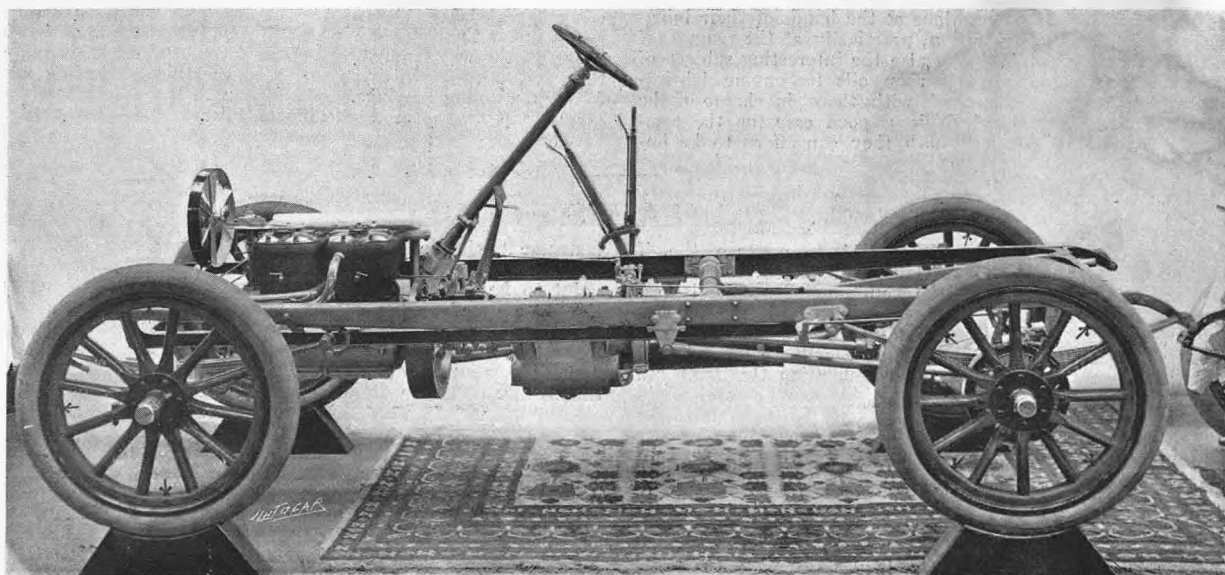
F. W. PECKHAM MOTOR SYNDICATE, LTD., Sackville Street, W. (214a).—The Gabriel chime horn is a novelty in the way of road clearers. It comprises three or more pipes resembling those of an organ. The device is fed from the exhaust, and controlled by a pedal-operated valve. The intensity of sound can be graduated at will. The invention is being demonstrated in the grounds outside the exhibition.

G. T. RICHES AND Co., Gray's Inn Road, W.C. (245).—Those in search of accessories should visit Riches' stand. Amongst the novelties which will probably interest them are the new Eisemann magnetos, including one for V type engines, a low priced speed indicator, a gradient meter, and a new compound called Plaxeline for cleaning the hands.

ROTHERHAM AND SONS, Coventry (220), have a good show of lubricators, grease cups, etc.

S. SMITH AND SON, Strand, W.C. (206).—Messrs. Smith and Son show their speed indicator in a considerably elaborated form; that is to say, as combined with a watch and speed recorder. The watch mechanism rotates a dial and the speed mechanism marks on the dial the varying rate of travel at different times. The instrument acts continuously, and should be very valuable in a police prosecution case. They also have a neatly constructed electric communicator whereby the passenger inside the car can communicate his wishes to the driver. It is combined with a bell so that the driver's attention is called to the indicator both by means of that and also by the light of the small electric lamps that are set glowing at each operation.

UNITED MOTOR INDUSTRIES, LTD., Poland Street, W. (226).—Probably nobody in search of accessories will miss the United Motor Industries' stand, on which a good array of all kinds will be found. Amongst the novelties there is a new



The 16-20 h.p. Swift chassis, some particulars of which are given on page 684.

Show Report—Accessories.

Longuemare carburetter, a new Castle radiator, the Norman epicyclic gear, of which a two-speed model is shown. There is also the Stepney spare wheel, the object of which is to enable a car with a damaged tyre to be driven. It consists of a rim carrying a tyre, which is bolted on to the side of the damaged tyre. There are, of course, many other

novelties to which the exigencies of space preclude us from detailing in this report, but no visitor to the show should omit a long and careful inspection of the fascinating display of motor accessories of all sorts which are handled by this firm, who are well known as being always first in the field with novelties of utility and worth.

CLOTHING.

AQUASCUTUM, LTD., Regent Street, W. (215).—The chief feature of the Aquascutum coats is the detachable leather, or similar lining, enabling the coat to be used for winter or summer use.

DRYKITT, LTD., Oxford Street, W. (200).—A very good modification of the umbrella coat is to be seen here. While the great feature of that garment—the absence of any opening—is still retained, the discomfort of drawing a tight band over one's head is avoided by the simple means of making the neck and chest with a double fold, which can be opened out in putting on and taking off the garment.

THE DUNLOP RUBBER CO., LTD., Aston, Birmingham (263).—An improved ladies' umbrella coat is to be seen on the stand of the Dunlop Rubber Co. In this the rubber neck is split down the back and is laced up when the coat is on.

J. E. HUTTON, LTD., Shaftesbury Avenue, London (244).—A good range of Burberry clothing is shown here, and in addition to the waterproof qualities warmth is assured in many cases by fur lining. In addition to the clothing, we notice a complete range of spare parts for Mercedes cars and a good selection of lamps. A handy cleaning outfit is put up in a very compact form.

THE LACRE MOTOR CAR CO., LTD., Poland Street, London, W. (196).—A good collection of motor clothing is to be found here, special attention having been paid to the requirements of the ladies. A long waterproof coat lined with musquash

fur and trimmed with a beaver collar and cuffs looks extremely serviceable, as also is the green Lovat costume trimmed with green leather. It is out of the question to even mention a tithe of the items shown, but among those which struck us as being particularly worthy of mention were the foot-muffs and over-boots, which should be particularly acceptable to those who suffer from a sluggish circulation. Then, again, gloves were shown in an almost endless variety, and we were particularly struck with a loose rubber glove for wet weather, which we consider would be infinitely better than the tight-fitting sort.

LOVEGROVES, Piccadilly, W. (203).—This firm have a good show of their very practical clothing in leather, frieze, and other materials. The chauffeur's uniform in fine corduroy looks very neat and serviceable. Ladies are well catered for both in coats and head gear. Some of the fur lined hoods look particularly cosy.

C. MACINTOSH AND CO., LTD. (258).—Motor clothing and clothing accessories of all kinds are to be found in good array on this stand. Ladies will be particularly interested in the waterproof motor hoods shown.

NICOLL AND CO., Regent Street, W. (215a), have on their stand samples of their driving coats—either cloth, tweed, or fur, with leather or wool linings. They also show leather waistcoats, and such clothing in great variety.

LUBRICANTS.

S. BOWLEY AND SON, Battersea Bridge, S.W. (190).—This is an exhibit of Messrs. Bowley's well-known motor spirit. Their oils may not be in such general use as the spirit itself, but if they are of as good quality as the spirit, we have no reason to doubt that they must be excellent indeed. Besides fluid lubricants, there are also various grades of grease for gears and those shafts which require a heavy lubricant.

PRICE'S PATENT CANDLE CO., LTD., Battersea, S.W. (260).—Their well-known lubricants are shown on Price's stand. No firm has given closer or more successful attention to the preparation of suitable oils for automobiles than Price's Candle Co., this work being done at the hands of their lubricant expert, Mr. Veitch Wilson, practically at the request of motorists themselves. There is also the interesting subject of compound *versus* pure hydrocarbon oils for engine lubrication, which may be discussed with those in charge of the stand. Messrs. Price have made a good case for the compound oils, and as they sell both they can afford to be im-

partial in their arguments. The special gear oils are excellent too, and are made in different grades to suit either winter or summer temperatures.

THE STERN-SONNEBORN OIL CO., Gracechurch Street, E.C. (231).—Their usual well-known lubricants and specialities are stocked on the Stern-Sonneborn Oil Co.'s stand.

VACUUM OIL CO., Norfolk Street, W.C. (216), show specimens of their well known lubricants.

W. H. WILLCOX AND CO., LTD., Southwark Street, London (193).—At this stand the firm make a speciality of their oils and greases for motor cars. A number of pumps, drills, and other apparatus are shown, but the description of these will be found under the firm's other stand. The lubricants here shown range all the way from thick greases for the gear box, through the various grades of cylinder oil, to the thin lubricating oils for light-running bearings. In addition to the oils themselves is an assortment of storage cabinets, oilcans, and other similar articles.

LAMPS.

ANDRE A. GODIN, Holborn, W.C. (211).—On one of the, if not the, finest stands in the Gallery are discovered a very large and interesting array of the well-known Ducellier lamps. Many samples in various sizes are shown of the newly-designed Ducellier acetylene headlights, which we lately described in detail and by diagram. It will be remembered that the means of charging and discharging this lamp are particularly simple, and that the carbide can be retained in the retainer, and the water in the tank, for an indefinite time ready for use at any moment. In this lamp nothing but the usual commercial carbide is required. At this time of day it is unnecessary to dwell upon the excellent workmanship of these fine lamps. The name Ducellier carries with it its own qualifications. Also on the stand are shown a very large selection of the well-known Dinin accumulators, the construction of which has been from time to time described and referred to in our columns, and which are now well known to the automobile public as sound, reliable articles, well made, and durable. A special feature of the stand is the Hydra magneto, an extremely simple and well-designed

instrument, the details of which are so arranged that failure of the machine to supply current is almost impossible. A point to be remarked is the fact that this magneto runs at the same speed as the engine, and therefore the motor can be started up from the magneto with great ease. This magneto is fitted with a safety gap device on the commutator, which forms a safety short circuit, saving the coil from injury should any of the leads or plugs themselves become short-circuited. In this magneto the armature is not rotated to obtain the advance or retard of the firing, but the contact-breaker case is rocked in an exactly similar manner to those fitted with accumulator ignition system. Another interesting feature of this stand is the Tachymeter Krauss, four samples of which are shown. One of these is for attachment to railway trains, the other for tramways, and the remaining two for automobiles, with and without lineal paper register. This ingenious machine, the accuracy of which is guaranteed, registers by means of the travelling paper and the reciprocating pencil the exact speed at any moment of a run. The paper on which the speed line is traced is divided longi-

tuinally in ten-mile divisions, the speed being registered from zero to seventy miles an hour. These machines have also attached to them distance and trip recorders. We have no doubt that we shall find many of the tram-owning municipalities mounting this apparatus upon their trams in order that their drivers may not exceed the legal limit, as is so often done, in the Metropolis at least. It is our intention to illustrate both the Hydra magneto and the Tachymeter Krauss in full detail, with diagram, at an early date.

JOSEPH LUCAS, LTD., Birmingham (208).—Messrs. Lucas have now adopted the drip feed system in their acetylene headlights, and also the condensing form of lens. Some of the glasses are frosted as to the upper halves, to save other traffic from excessive glare. Lamps are made both with and without separate generators, according to requirements. We have used the Lucas lamps for coated carbide for a long time with satisfaction, and the new one burning cycle carbide is even less trouble, as it can be kept fully charged with water and carbide till wanted. Petrol funnels, with incurved edges to prevent splashing, are made a speciality of, and are turned out in various sizes. The novelties are not startling, but Messrs. Lucas have ever made their strong point that of sterling quality. We also find on this stand the Brooks non-skid treads and gaiters. A feature is made of using a soft rivet carried on a hardened steel stud. In this way long wear is ensured, and yet the risk of the rivets breaking is avoided. Another Brooks speciality consists of a tyre cover envelope. This is made

Show Report—Lamps.

of waterproof canvas, with wide edges and straps, so that it may be fastened closely round the cover. In the space enclosed within the cover may be arranged a circular box to contain air tubes.

SALSBURY AND CO., LTD., Long Acre, W.C. (261).—We make no attempt to describe the Salsbury lamps on this occasion, but we may say for the information of those already possessing these excellent light givers that a compound lens is now made which can be fitted to almost any of the existing Salsbury "flares." We need hardly say that the intent of this lens is to concentrate the light as far as possible ahead of the car rather than to spread the light close to it where it is not wanted.

F. SELBY AND CO., LTD., Birmingham (219).—Howes and Burley's lamps are shown on this stand. These were reported on in a recent issue, after we had subjected them to a good test, out of which they came in an entirely satisfactory manner.

WELDHEN AND BLERIOT, LTD., Long Acre, W.C. (223).—Of powerful light givers probably the most popular is the oxygen petrol limelight Bleriot lamp, which is to be found on this stand. This was fully described in a recent issue, but the lamp itself should be examined, especially a new pattern which has just arrived in this country. Lamps of all types, and also hooters, are shown. There are one or two novelties, including a single hooter with twin pipes and bulbs, and a combined siren and hooter with a single trumpet portion.

MISCELLANEOUS.

THE ANGLO-AMERICAN OIL CO., LTD., Billiter Street, E.C. (208A).—Pratt's spirit is exhibited here in the familiar green cans, and interest is added to the show by models of their large tank steamer and others of railway and road tank cars.

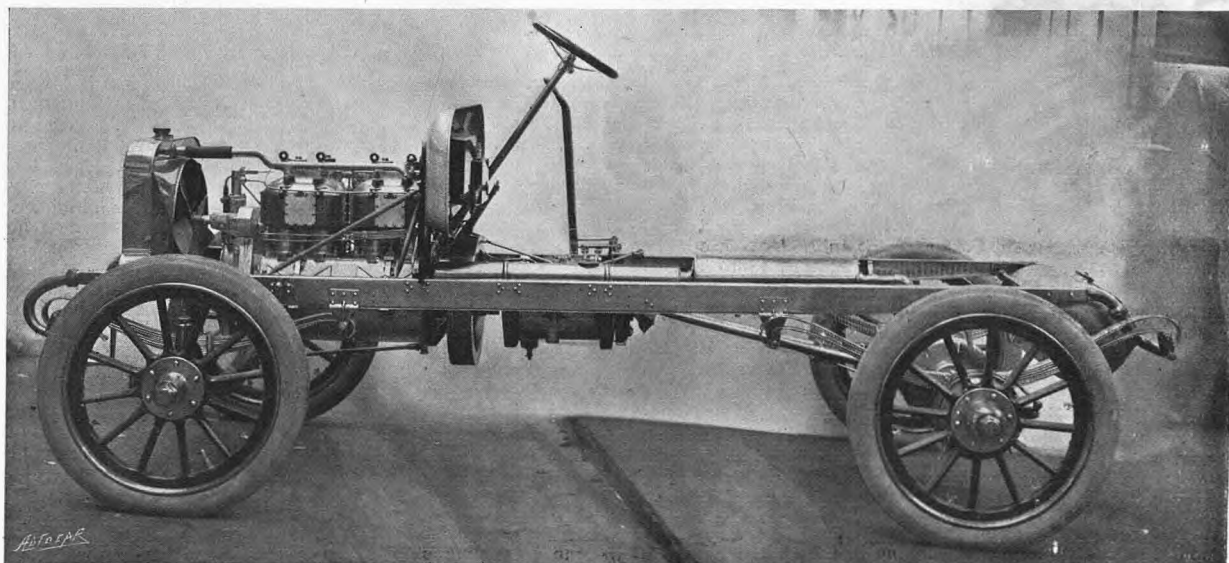
CONNOLLY BROS., Chalton Street, N.W. (191).—This is a handsomely got up stand devoted to the exhibition of hides for motor upholstery. A great variety of colours is shown, many of them of a very tasteful nature.

THE GENERAL PETROLEUM CO., LTD., Billiter Street, E.C. (242).—Shell motor spirit is to be found on this stand, or at least the distinctive cans in which this excellent spirit is put up. Considerable improvements have been effected in the air-venting and pouring of these cans, which we are sure will appeal to the spirit user who has suffered so much from lack of attention to these important details. Mr. Harris, who initiated the eight can case-system in connection with Pratt's, has still further improved packing and forwarding methods in connection with the "red" containers.

SALSBURY AND SON, LTD., Long Acre, W.C. (261).—On Salsbury's stand is a new petrol level indicator, which is worth seeing. A float with pegs on it is arranged within a pipe,

which has a spiral cut lengthwise in it. As the float rises it rotates a vertical spindle, which has arranged at the top a magnet. This magnet acts upon an ordinary compass arranged in the top of the tank, and graduated with marks showing the petrol capacity. This indicator can be used with pressure-feed tanks, as there is no perforation through the top of the tank. In the Salsbury side lamps shown the body is made out of one piece of metal, and the complete reflector can be withdrawn for cleaning.

W. H. WILLCOX AND CO., LTD., Southwark Street, London (122).—Lubricants and tools suitable for the motorist are shown in profusion. Probably the parts which appeal most to the average motorist would be the fine selection of lubricating oils and motor lubricants which are staged, also the tool kits which are made up to be carried either in box form or in roll leather. An assortment of various spanners, screw plates, jacks, press drills, etc., show that the wants of the motorist have been carefully studied, whilst such things as the well-known flap valve pump is not forgotten. Emery wheels, power drills, leather belting, and other incidental fittings suitable for engineers' workshops made up an exhibition which is not only of interest to the repairer, but also to the amateur mechanic.



A good example of American motor construction. The Winton 25 h.p. chassis exhibited at Olympia

MACHINE TOOLS AND WORKSHOP APPLIANCES.

ALFRED HERBERT, LTD., Coventry (120).—Though not large in number, the exhibit of machine tools is extremely interesting, and shows the latest and most up-to-date developments of the machine toolmaker's art. In connection with automatics and semi-automatic machines the name of Alfred Herbert, Ltd., has become, one might say, almost a household word in the engineering profession, and we think that motor manufacturers cannot do better than study the fine examples of motor parts which are exhibited on this stand. The time occupied in machining such things as cylinders, flywheels, gear blanks, differentials, and so forth, as set out on the boards whereon the parts are exhibited, should be an eye-opener to engineers of the old-fashioned school, who think there is nothing so good as a hand-operated lathe which depends upon the skill of the manipulator for the excellency of its work. With automatics and semi-automatics, as now turned out by this firm, the skill of the operator counts for very little; the machine looks on while the machine does the work. The hexagon turret lathe is a piece of machinery which should be viewed with great interest by those responsible for the running management of works, as should also the automatic vertical milling machine. A horizontal spindle milling machine also has most excellent points in design which cannot fail to appeal to interested parties, and we would strongly advise all visitors to the show whom this work interests to make a point of seeing what can be done with such good up-to-date machinery.

W. T. FLATHER, LTD., Sheffield (222).—On W. T. Flather's stand are specimens of particular types of steel for the various requirements of motor car construction.

LAKE AND ELLIOT, Braintree (212).—A speciality is made this year of lifting jacks. These are provided with both ratchet and screw actions so that the platforms can be raised into contact with the axle instantaneously. A complete vulcanising plant for garage use is exhibited, and the firm are also going into the manufacture of steel castings for motor parts. Their well-known and well-tried tools are exhibited as hitherto.

RICHARD MELHUISE, SONS, AND CO., LTD., Holborn, E.C. (121).—Screw-cutting treadle lathes, blacksmiths' hearths, sensitive drills, hand drills, treadle saw benches, grindstones, and other articles of the like character are the principal exhibits at this stand. The thousand and one parts required for use in works, such as press drills, spirit lamps, leather belting, oil and waste tins, hand vices, portable vices, etc., are shown in great profusion, whilst an article of special interest to motorists is the Melhuish improved tool roll, which, whilst carrying every possible tool that may be required with a motor car on the road, is at once neat and handy. Electrical accessories, including small charging switchboard and indicating gauges, complete an exhibit full of interest.

RICHARD MELHUISE, LTD., Holborn Circus, E.C. (206).—This firm show a great range of tools and machines in connection with motor work, from parallel action pliers to lathes and milling machines. They have also worked out two very complete tool rolls, the larger one even including a small drill and hack saw. Their reputation in their own line requires no addition on our part.

SELIG, SONNENTHAL, AND CO., Queen Victoria Street, E.C. (123).—Universal millers, vertical millers, a fine shaping machine, grinding wheels, and a self-acting lathe at once strike the eye of the visitor at this stand. An exceedingly strong and staunch radial drill should prove a most handy tool in a workshop, where great variety of work has to be operated upon. Motor work, with its variously shaped crank cases, cylinders, gear boxes, differential gears, etc., is the class of work in which a radial drill becomes almost a necessity, as so many jobs can be expeditiously performed by the use of this drill, which with the ordinary drill could hardly be touched without an excessive waste of time in fixing up the work. A couple of neat pillar drilling machines, one being of the sensitive two-spindle type, are handy tools. A Kemp Smith plain miller is a most useful tool where larger quantities of chain wheels, sprockets, and such like repetition work has to be expeditiously accomplished. The fact that the spindle is well stayed should make work turned out from this machine particularly accurate. Not the least interesting exhibit on the stand is a three-spindle lathe, the spindles being arranged in rising progression one behind the other, so that the operator can reach any of the three articles being turned and size them up without the danger of being trapped by the spindle immediately in front. For such things as differential shafts, gearshafts, and other work of this nature three times the amount of work can be accomplished in a given time as with a single piece operated on an ordinary lathe.

E. G. WRIGLEY AND CO., LTD., Birmingham (181a).—Here are samples of the gear cutting operations which this firm carry out, including spur, worm, and bevel transmission gears. Samples of the tools which they make are also shown. This firm are drawing attention to their high and ordinary speed twist drills, of which they are showing samples for motor car construction.

WILLANS AND ROBINSON, LTD., Rugby (187).—This firm's stand is of chief interest to the constructor and designer. Here are to be seen samples of their work, which is pretty well known, but novelties consist in samples of vanadium steel, which has passed through various exhaustive tests, also of metals cast by the Eaton process, by which excellent wearing qualities are obtained. There are also samples of stamped crankshafts and forged crankshafts and bevel blanks in different stages.

THE INAUGURATION OF THE SHOW—IMPORTANT SPEECHES.

The show was inaugurated on Friday with the usual luncheon. Mr. Sidney Straker, A.M.I.C.E. (president of the Society of Motor Manufacturers and Traders), occupied the chair, and was supported by a distinguished company, including Earl De la Warr, Lord Montagu of Beaulieu, Sir J. H. A. Macdonald (Lord Kingsburgh), Sir Boverton Redwood, Sir Edward Clarke, the Hon. Arthur Stanley, M.P. (chairman of the Motor Union and the A.C.G.B.I.), Col. Holden, Messrs. W. Bull, M.P., H. Arnold Foster, M.P., Julian Orde (secretary A.C.G.B.I.), W. Rees Jeffreys (secretary Motor Union), etc.

The Hon. Arthur Stanley, M.P., in proposing the toast of "The Society's Exhibition," said his first inclination on being asked to perform this task was to decline, but after all it was not a difficult toast, because the show spoke for itself. He thought they hardly realised how great the movement was which they represented. When they remembered that ten years ago there was practically not a single motor car in England, and that they were then in the pre-historic days of gentlemen walking about with red flags in front of traction engines, which anybody could have crawled out of the way of; when they remembered that there was not then a single penny of capital invested in any way in the automobile industry; and then turned to the present time, and saw that at a very moderate computation the value of cars running in the United Kingdom was no less than fifteen million pounds; when they considered that there was certainly at least as much again invested in the

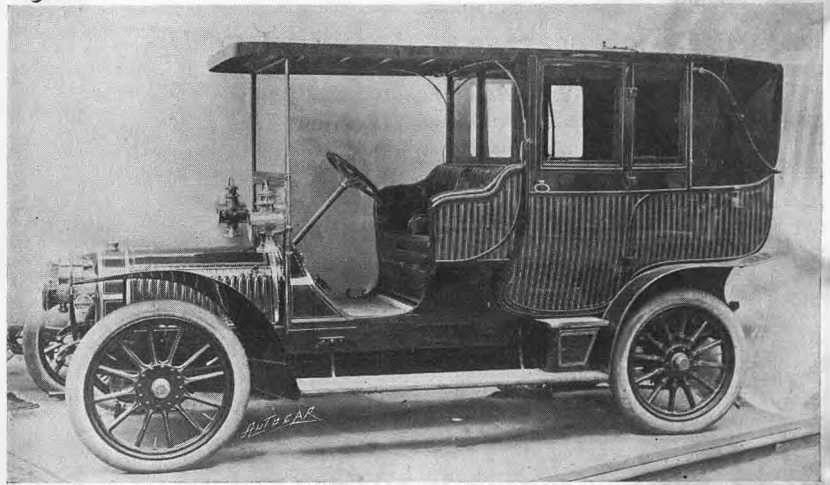
industry, and that at a moderate computation orders had been received for at least two million pounds worth of cars for next year, they would get some inkling, if they had not arrived at a full perception, of the magnitude and the enormous importance of the industry which had grown up during the past ten years. (Applause.) He thought his figures had been very moderate, and that he might have put them a great deal higher. Only four or five years ago, two motor firms with which he was acquainted thought themselves rather adventurous in putting up a capital of fifty thousand pounds, but to-day those firms thought themselves well within the limits and extremely moderate in their demands in asking a capital of five hundred thousand pounds. This was a healthy sign, and gave an indication of the way in which the industry was going ahead in this country. At this time they liked to take stock of what they were doing, and to show that they were not only holding their own with the nations of the world, but making up for lost time, and taking their right place in the front rank of automobile manufacture. While the industry had thus gone ahead with such tremendous strides, and while the quality and quantity of the orders had increased almost beyond recognition, the roads had remained practically as they were. ("Hear, hear," and "Shame.") It was rather difficult to talk of roads without treading on somebody's corns, and his experience of the corns of local authorities was that they were particularly sensitive—(laughter)—though it was curious that after they had

been trodden upon by so many people they had not become a little more callous. He did not wish to propose any revolutionary measure such as depriving county councils or local authorities of the control of their roads; a movement like this could only come gradually, and it would be the height of folly, if not worse, to propose anything in the nature of so drastic a reform. It was impossible that the money spent upon roads could be so well and economically administered by an enormous number of small local authorities as by a central body. (Applause.) No one in his senses would propose off-hand or suddenly to effect so drastic a reform as to pass to a central authority the whole maintenance of the roads, but there were certain great arterial highways to which the Government already contributed about £1,800,000 a year. What he hoped to propose—with more chance of success in a new Parliament than in the present one—was that the main roads should be placed under a central body, not merely to secure uniformity and unity of action, but on the grounds of efficiency and economy in working. (Applause.) He believed this could be done quite easily, without causing any disturbance and without necessitating a single penny of new taxation or new expense on a single person in the community. Adding together the various sums taken from motorists—registration fees, license fees, and fines for merely technical offences—the amount so contributed was about two millions a year. The amount spent on main roads, so far as he could ascertain, was only slightly in excess of that sum. What they must show was that, even at the present moment, if all this money were invested in a central fund it would be sufficient for the maintenance and up-keep of the main roads. If that were so now, how much more so was it likely to be in a few years' time, when at the rate they were going on the number of motor vehicles in the United Kingdom would be doubled or trebled? He would not expatiate on the prospects of the future, when from every populous centre of industry there would be radiating dustless roads—(hear, hear)—connecting them with every other populous centre throughout the country, but when they thought of the present state of some of the main roads out of London, and of what they might be under altered conditions, it was enough to warm the heart of the most stony-hearted and anti-motorist road surveyor. Closely connected with this question was a problem which was seriously exercising the minds of social reformers, namely, the question of how to deal with congested districts in the great centres of population. Scheme after scheme had been proposed, only to be rejected as impracticable, but everyone who had a heart would wish to bring light and air and sunshine into those noisome and foul dens which now existed in large cities. That was impossible, but the solution of the problem lay with those present. Although it was not possible to take air, sunshine, and light into those places, it was possible to take the inhabitants of those places out into the country where they could enjoy those privileges. (Applause.) If ever the problem of congestion was to be solved, it would be solved by means of those great roads and the use of motor cars upon them; and workers, instead of being huddled around the places where their trade existed, would be able to live healthier and happier lives in the country. The great problem of the unemployed was also intimately associated with this new movement. He suggested that the unemployed should, under skilled guidance, be set to work upon the improvement of existing main roads, and, where necessary, upon the construction of new ones. He coupled with the toast the name of Mr. Straker, and congratulated the society on the success of this year's show and upon having so able a president. He also congratulated Mr. Straker on presiding over so excellent an association. (Applause.)

Mr. Straker, in reply, said his duty as president, though onerous, had its pleasing side. It was a pleasure to meet with the numerous and distinguished guests who had honoured the society by their presence. Besides lending lustre to the proceedings, they furnished conclusive proof of the interest evinced in automobilism. It had been a pleasure to him to administer the destinies of this association, and although there might be from time to time points which generated friction, he was convinced, speaking of the political side of automobilism, that so long as Mr. Stanley retained the chairmanship of the Automobile Club and the Motor Union,

The Inauguration of the Show.

they would have no difficulty in riding over those difficulties. This, the fourth show held by the society, and the second under its own administration, was international in character, and greater in extent than any previous show held in Great Britain; it was greater even than the Paris Salon. The society desired not only that the show should prove of value to the members individually from a business point of view, but that it should make a demonstration to the public of the progress of this great industry, and the possibilities which lay before it. The society had paid about ten thousand pounds out of its exchequer to render Olympia more suitable for the purpose. He did not think that any other promoter would have ventured to spend so much money in carrying out the alterations necessary to give a good send-off to the automobile industry. The show date, as they were aware, had been altered from February to November. This had been done largely at the instigation of the British manufacturers, who found that the altered date would give them time to produce, before the next spring, cars ordered at the show. That was an advantage both to the British and foreign manufacturer. The French Salon had hitherto afforded the earliest opportunity for the display of the newest models, but they found at this show a great number of French models, thus to some extent anticipating the French show, so that it was unnecessary to go to Paris to see them. This society had always endeavoured to make London the great buying centre for automobiles, heavy and light, and he



A handsome Delaunay Belleville Brougham.

trusted they were on the right road towards the achievement of their object. Those who advocated a second show would see from the applications for space—originally nearly thirty per cent. over and above the space available—that this exhibition nearly filled the bill, so that there was no necessity for a second show in the spring, to be devoted solely to heavy vehicles and motor boats. In the first place, the motor boat people would not agree to that, and, in the second place, the authorities at Olympia could not arrange a spring fixture. He would therefore like them to accept it from him that there would be no spring exhibition next year, but that the various sections would be embodied in one show, as heretofore. He referred to the honour that had been conferred on the society in having secured the patronage of the King and the Prince of Wales, who had both evinced the keenest interest in automobilism. He hoped that on the occasion of the next show they would be favoured by a visit from both these royal patrons. He referred to the great loss the society had sustained by the death of Lord Montagu of Beaulieu, and to the interest which the new Lord Montagu took in the work. He also referred with pleasure to the honour conferred upon Lord Windsor, and concluded by expressing the hope that the action of the society in furnishing evidence for the Royal Commission would be productive of good.

Mr. E. M. C. Instone, in a graceful and interesting speech, proposed the toast of "The Press," remarking with pleasure upon the altered tone of the press towards motors and motorists, as compared with the hostile attitude adopted in the earlier days of the movement.

The toast was acknowledged by Mr. J. E. Vincent (*The Times*) and Mr. H. W. Staner (*The Autocar*).

The company afterwards dispersed.

USEFUL HINTS AND TIPS.

300 WRINKLES by Lieut. Windham, R.N.

255.—Shape of a Petrol Tank.

Very often one sees petrol tanks (gravity fed) constructed on the wrong principle, with the result that, if the spirit is low in the tank, the car comes to a standstill, or refuses to start again if the engine is stopped. The reason is obvious; take, for example, the tank of an English-built car which I possess at the present moment. The petrol pipe is on the left or near side. Supposing now the car is stopped on a hill, with the off-side or right wheels in the gutter, and the tank not very full, the petrol will all run to the back of the tank on the right hand side, and except for the little spirit which may be in the carburetter, it can get no more unless more is added to the tank. Undoubtedly the correct way to build a tank is like the one fitted to the Clément, that is, with one side of the tank some 4in. deeper than the other; the pipe should be placed as far back as possible.

256.—Rusty Rims.

Sometimes the rims of the wheels, when the cover is removed, will be found to be rusty; they should be well cleaned with emery paper and painted or rubbed over with blacklead; otherwise the inner tube will suffer.

257.—Height of the Carburetter.

The carburetter in a gravity-fed car should be placed at least six inches lower than the lowest part of the petrol tank, else the car will probably fail to climb hills, owing to lack of petrol.

258.—Taking off the Wheels.

From time to time it will be necessary to remove the wheels and clean out their bearings. To remove a wheel, the right and only way is to use an appliance which screws on in place of the axle cap (usually supplied by the maker), and in the centre of which is a screw, which on being turned forces the wheel outwards and off. On ordering a car I should make it a *sine qua non* that the makers should supply one, as the bearings—especially the ball races—are very liable to rust by reason of water finding its way in while they are being washed. If they are not constantly cleaned out and re-lubricated the balls or the cone will probably crack or split and cut away the ball race.

259.—Changing Speed.

When changing speed, especially from the second to the first, wait till the speed of the car is about walking pace. I have noticed that the majority of gear wheels are chiefly worn in coming down from the third to the second in a four-speed gear, and from the second to the first in a three-speed gear, because the driver will not sufficiently reduce the speed of the car before making the change. Take for example a Panhard; on coming down from the second to the first the car has to be almost at rest to make the change effectively.

260.—Divided Crank Chambers.

Crank chambers should be divided into two parts, otherwise on ascending a hill the oil will flow to the after cylinder, flooding it out, and will leave the others without any lubrication. This applies only to the "splash lubrication" system.

261.—Back Brakes acting with the Clutch.

Some cars have the back brake connected with the clutch—that is to say that when the back brake is put on it relieves the clutch. To my idea this is not necessary for the following reasons:

- (1.) When descending a hill the engine can be used as a powerful brake if the clutch is not disconnected.
- (2.) It will be found impossible to leave the car standing still as is often done with the first speed in gear, and the possibility of anyone starting the car by accident is reduced to a minimum.
- (3.) Should the foot brake be not working satisfactorily the car can be taken down the steepest hill by using the side brakes or the gear in the first speed.
- (4.) In a heavy car if the engine is also used as a brake when going downhill it is a great saving to the brakes.

262.—The Seats of a Car.

The seats should be made to slope backwards and downwards. This not only adds to the comfort of the seat, but prevents the water lodging on them. A "roll" fitted on the edge of them also adds considerably to one's comfort.

263.—Water in the Crank Chamber.

Water sometimes is apt to find its way into the crank chamber. This is due, as a rule, to one of the three following causes: (a.) The water finding its way through the relief pipe or inspection holes while the car is being washed, especially if a hose with a powerful jet is used. (b.) Through the water jacket being cracked. If through the latter cause it should be instantly stopped. (c.) If the oil is under pressure from the circulating water it may happen that the oil in the reservoir is finished. Consequently, the water being under pressure, would force itself through the drip feeds into the crank chamber. One or two cars I know of use this method, and others, like the Darracq, etc., used to use this method of forced lubrication by water, but have since given it up. Personally, I think it is bad for the above-named reason, and also because, should the water-circulating pump fail, the oil would stop dripping. If the water circulation fails the more need there is for extra lubrication, while in the above case the engine would have none.

264.—Pneumatic Tyres in Hot Countries.

In India and other hot countries the tubes stand the heat much better if, before blowing up the tyres, a little water is put in the inner tube through the valve.

265.—Enclosing the Sprocket Wheels.

Many body builders have a habit of closing up the sprocket wheels, so that they cannot be got at without removing the splashboards, etc., etc. This should be noted when ordering the body.

266.—Know your Car.

Always remember that every single nut and screw, every pipe or bolt, every thread, and peculiarity of design, any increased thickness of metal, and every mark or number, is there for some reason, and if you wish to be the master of your machine, the sooner you learn the reason why it is there, and what purpose it serves, etc., the quicker you will be able to locate your trouble and become a competent chauffeur.

"Useful Hints and Tips for Automobilists."—Under this title "Useful Hints and Tips" have been reprinted from *The Autocar* in book form. 2s. 6d., post paid 2s. 9d., from *The Autocar* Offices, 20, Tudor Street, London, E.C.

HUNTING MEN AND THE MOTOR.

The Sporting Instinct.

Having written in a recent article on the motor as affecting sport in general, an instance of the individual attitude of the hunting man may not be out of place.

Mr. Edge was coming down to spend the week-end!

Three years ago such an announcement would have created little or no interest. "Who is he? Oh, he's the fellow who drives one of those beastly motor cars," some extra well-informed person might have drawled. But times have changed. When the fact was mentioned by my husband in the hunting field, a strong desire to meet the hero of the Gordon-Bennett—the pioneer, who has done more, perhaps, for motor-ing than any other man in the United Kingdom—was immediately manifested among sporting spirits of the chase. Unfortunately, we do not dwell in a palace, and the number of invitations was necessarily limited. Our hardest men to hounds are the keenest about automobilism. This is natural enough, for these fine sportsmen are accustomed to danger, and it possesses no terror for them. They have broken most of the bones in their body, thrusting through thorny bullfinches and tumbling head over heels when negotiating a stiff flight of ash rails. Pale, shaken, but undefeated, they arise from Mother Earth and struggle once more into the saddle. A love of speed is inherent in their nature. Racing over the green pastures and for pride of place at a fence has developed it. No sooner have they purchased their first car than they begin to discover that they want to go uphill faster, and, consequently, require increased horse-power.

The Motor Fever.

It was quite an innovation in the shires for the guests invited to dinner to all arrive by motor car. One well-known, all-round sportsman had only been driving for a week. Afraid of misfortune overtaking him, he deemed it prudent to hold a full-dress rehearsal on the previous day. He wisely desired to ascertain if his vehicle would successfully climb the hill approaching our domicile. That afternoon we heard the ever-welcome roar of a four-cylindere engine, and rushed to the front door. There was our typical country squire beaming with delight at the feat he had accomplished, whilst her ladyship and their son and heir, tucked round with rugs innumerable, sat securely behind in an open landaulette. The faces of all three were wreathed in smiles; they were as proud and happy as children. It did one good to see them. They had caught the motor fever, and it was hot and strong upon them. A little afraid, perhaps; a little nervous as to possible events and future happenings, but hugely delighted and on terms of friendship with themselves and all mankind. Whilst we conversed the motor was silenced. Would they be able to start back? A certain under-current of anxiety was visible to the experienced eye, although concealed in the most praiseworthy manner by the occupants of the car. A few moments of painful doubt ensued, during which the adventurous owner wrestled manfully with the starting handle. Then, oh, joy! once more the responsive engines thundered forth their inspiring music.

On the following evening the party appeared to dinner, even before the appointed hour, so well and swiftly had the trusty car borne them, its sportsmanlike owner at the helm, and scorning the services of a chauffeur. The guests assembled as punctually, nay, far more so than if they had been conveyed to their

destination by the time-honoured horse. The host caused considerable amusement by exclaiming, by way of greeting, "I wonder how you will all get back again!"

But they managed to do so somehow, and his visions of spare beds, hastily-lit fires, and weary wanderers seeking a midnight admission were destined to fade as quickly as they had arisen. At the table there was more petrol talked than hunting. Even the ladies joined with zest in the conversation.

All Sorts and Conditions of Hunting Men.

The next morning Mr. Edge brought out the celebrated Napier car of Bexhill fame. At the time, a veritable controversy raged as to its actual horse-power. Was it a twenty as claimed, a forty, or a sixty? It had been known to beat a Mercedes of the latter power. To us the answer was immaterial. We knew from experience that the car could travel. From the Pytchley came one of the best and hardest riders, accompanied by his wife and son. Mr. Fernie's hunt was represented by a man, known for his gallantry, who scorns to take a lead across country, and who glories in selecting the biggest place in fences already famous for their size and strength. With him came a canny Scot, no longer in his first youth, notorious for his shrewd commonsense, his cheeriness, and sagacity. The pair were admirable representatives of the hunting field: the first, brave, dashing, full of "go" and impetuosity; the second, cautious, careful, clear-seeing. They dismounted quickly from the Rochet-Schneider, in which they had arrived, and transferred themselves to the famous Napier. Soon we were bowling along, taking the steep hills between Market Harborough and Kettering entirely on top speed, and at times attaining to a speed of fifty miles an hour. What a contrast to the days when we toiled up these same hills on our modest 3½ h.p. Benz, using the hateful Crypto, and like children making believe to one another said, when we reached the summit, "Is not this glorious?"

Now we were simply romping up the various ascents as if they did not exist. It was a sight to see the Scotsman's face.

"Are you at all afraid?" I asked him, presently.

"Afraid!" he answered, indignantly; "with S. F. Edge at the wheel! I should think not, indeed!" And he smiled from pure physical enjoyment as we sped uphill and down dale. He pulled out his watch, and commenced to time every mile as we flew past the milestones. "One eighteen, one twenty-two, one seventeen, one twenty, one fifteen!" he cried, triumphantly. "By Jingo! I have never been on such a car in my life. She's a ripper, and no mistake."

In very truth we were moving. The icy January wind cut our faces like a sharp-edged knife; the winter dust flew from the driving wheels like a thin wisp of grey gauze; the car bounced and bounded with rare life over patches of newly-laid metal, and its occupants felt a sense of exhilaration steal over them. Despite the Arctic cold, our spirits rose higher and higher.

"It's as good as a run to hounds," said these hunting men, and they meant it.

Intensely Interested in Motors.

Later on, at luncheon, there was quite a scramble to obtain the coveted seats next to Mr. Edge. He was plied with questions one minute, listened to with the greatest attention the next. Two years ago such a

gathering would scarcely have been possible, so great was the animosity displayed by many of our friends and neighbours to the motor car. But automobilism is making astonishing strides in this country. In spite of their love for horses, hunting men are rapidly developing into keen votaries of the new form of locomotion. The harder they go to hounds, the greater is their desire to possess a high-powered car, capable of travelling quickly from place to place. It appeals to their sporting instincts. In quiet country families, men, women, and children are alike catching the motor

fever. Where it will lead us, none in this generation can tell, but that the use of automobiles is spreading and will gradually become almost universal is patent to even those eyes which have hitherto prided themselves on being resolutely closed to every innovation connected with the road. Hunting men are now making amends for the tenacity with which they clung to the horse, and realise that, if as a hunter he reigns supreme, he possesses a formidable rival in the swift, powerful, and reliable modern moto.

MARY E. KENNARD.

THE GUILDFORD BENCH.

A pronouncement from the Chairman of the Guildford Magistrates (Sir William Chance) was made last week which bears evidence of a more broad minded view being taken of motoring and motorists by this hitherto harsh and uncompromising bench. The remarks were made at a meeting of the Surrey County Council while a report on the working of the Motor Car Acts was under consideration. Sir William said he was chairman of a Bench of magistrates which had been subject to a great deal of obloquy and abuse, because they had the misfortune to have a good many people before them in their administration of the Motor Car Act. On the other hand, they had gained a considerable amount of money for the country, but his conscience had not been at all satisfied as to that. He

thought it very inadvisable that there should be any general limit of speed. He was not speaking of towns and large villages, where it might be necessary to have a reduced speed, but of a general limit all over the country. He was not satisfied at all that a considerable amount of injustice had not been done. As a Bench of magistrates, they had to carry out the law, whatever opinion they might hold upon it, and they had felt bound when cases came before them to convict, but they had felt in many cases that they would only be too glad to let some people off if it could be done legally. To his mind many careful motor drivers suffered by the infringement of a speed limit, and he objected most strongly to a general limit on account of the injustice it did to individual motorists.

FOUR v. SIX-CYLINDER ENGINES.

Are four cylinders obsolete? I am afraid they are. There cannot be much doubt that six-cylinder engines are as superior to four-cylinder engines as four are to twin-cylinders. The principal point which strikes you when you get to the wheel of a "six-cylinder" for the first time is the delightful flexibility of the engine. You crawl across Piccadilly Circus on your "top" with your throttle nearly closed and the clutch in. You see an opening in the traffic, and dart through—the next moment you are again jogging along behind a 'bus.

Change speed? Oh, no! You are still on your "top," have not even had your clutch out. You ponder. In those few seconds the engine speed has changed, and gone through a range of from 100 to 1,000 revolutions per minute. You begin to wonder how many speeds you have, and question the necessity for such complications.

The next thing that strikes you is the smoothness of running and absence of effort on the part of the engine. You could almost imagine that the engine itself did not know when it had a charge to explode, but continued to turn, lazily, drowsily, without fuss and without bother, but as the quintessence of mechanical efficiency.

Your next surprise is the hill-climbing power. You have climbed hills before on 30 h.p. cars, and done it well with four cylinders, but alas! you are familiar with the feeling of "will she do it?" when clinging too long to your top gear to be good for your engine, and with the distressing pulsations which accompany this. The surprise now is the practical absence of pulsations. Suppose the hill is too steep for your top speed, your six cylinders will "pull" even when the speed of the car is down to walking pace, and still not rack your soul and car to pieces with syncopated beats and

pulsations. The delights and advantages of this are, of course, obvious to everyone; nothing is more deadly to engines, chains, gears, and tyres, than spasmodic jerks.

"But surely," you say, "it is more difficult to drive six cylinders than four." This seems reasonable, but it is not true, for, to your joy, you find six-cylinder cars infinitely easier to drive than anything in the motor line yet evolved. One habitual user has asserted that "you have only to sit still and steer." He was wrong. You have to control the throttle lever as well as steer, but the throttle control is as obvious as turning a bicycle to the right or left. Gear changing—the bugbear of novices—is practically never necessary. "What about wear and tear?" you say. This should be appreciably less, horse power for horse power. Take two cars, one with four and the other with six cylinders, each car of 30 h.p.; in the case of the four for a given movement of the crankshaft there will have been four separate applications of $7\frac{1}{2}$ h.p. to make up the 30 h.p., whereas in the case of the six-cylinder for the same movement of the crankshaft there will have been six overlapping (overlapping, mind you, that is the point) applications of only 5 h.p. Evenness of turning being, therefore, very much greater, it is reasonable to suppose that wear and tear must be less, especially so with the tyres. This reminds me of a riddle which a friend of mine, a six-cylinder enthusiast, is very fond of asking: "Why is my six-cylinder engine like a nagging wife?" He tells the answer with great glee, "Because of the constant torque (talk)."

Is there anything then against the six-cylinder? Yes, the price. But granted you can afford the initial cost, the fours are certainly obsolete for you.

G. SMITH.

CORRESPONDENCE.

EDITORIAL NOTICES.

No letters from members of the motor industry will be published when they deal with subjects which may be regarded as advertisements for the writers' or their business interests. At the same time as many of the most practical suggestions come from those engaged in the motor industry, their letters will be inserted when possible, though the names of the firms they represent may be expunged, and the initials of the writers substituted.

Letters of a personal nature will be withheld.

The Editor, although accepting no responsibility for the opinions expressed by correspondents, reserves the right to publish a portion of a letter, and to omit any part which he does not consider interesting or essential.

All communications under a nom de plume should be accompanied by the name and address of the writer, not necessarily for publication, but to assure the Editor as to good faith.

Enquirers who ask for the experiences of private owners with specified cars, parts, or accessories, are requested to enclose a stamped addressed envelope so that replies which space will not permit us to publish may be forwarded to them. Circulars or letters from interested parties will not be forwarded.

THE NEW TOURIST TROPHY REGULATIONS.

[10221].—All open-minded automobilists will be glad to see that the Automobile Club proposes to admit steam cars to the great automobile event of the year, under conditions which will give steam cars a chance of finishing the course which is set before them.

The Automobile Club, however, proposes to give steam cars considerably more fuel than is allowed to petrol cars, and steam cars are to be given the opportunity of winning the trophy on an allowance which is admittedly arbitrary.

The foundation of the Tourist Trophy Race was that all cars should have the same fuel allowance, and that the car which is most efficient should win. The proposal of the Automobile Club destroys the whole foundation of the race, as the suggestion is that an admittedly inefficient car may win the trophy, and the public will only recognise the bare fact that a steam car has won it, and will overlook the important factor that the car had an extra allowance of fuel on account of its inefficiency.

I sincerely trust that the committee will reconsider this matter, and will revert to the foundation of the race, viz., an equal quantity of fuel for all cars, and the most efficient car wins.

Would it not be preferable that a special cup should be instituted for steam cars, to be run for at the same time and over the same course as the race for the Tourist Trophy, and that the allowance of fuel for the steam cars shall be the same as the allowance of fuel for the petrol cars, but that the course for the steam cars shall be 137½ miles long, as compared with the course for the petrol cars of 208½ miles long?

The steam cars would have lots of sport one against the other, and there would be no danger of the public being misled into believing that in an efficiency race the steam car can win a trophy from a petrol car.

C. JOHNSON.

SPRING WHEELS.

[10222].—Mr. A. V. Roe [10201] brings forward the question of spring wheels. He is perfectly correct in all he writes. It is much simpler, more mechanical, and almost, if not quite, as good to have more supple springs than a spring wheel in which the springs are between the hub and the rim. On the other hand, if a spring wheel is made so that only a very small portion of the rim moves when it meets an obstacle, the inertia of this portion is so small that it has practically no effect on the car. Of course, in the first case the rim and spokes of the wheel are lighter than a simple wheel and axle, but the spring wheels usually are heavier than simple wheels. It is an axiom in the designing of automobiles that the part of the car which is not insulated from the road by some resilient material must be as light as possible. This leads us on to the question of live axles or double chain drive. It is obvious that the simple axle must be considerably lighter than the live axle, with its large bevel wheels, differential, and heavier construction throughout. Therefore, other things being equal, a car with double chain drive would be more comfortable than a car with a live axle.

I quite agree with everything Mr. F. Strickland writes in *The Autocar* for November 18th on springs for motor cars, but I do not think he says enough about the influence the diameter of the wheels has on the running of the car. Not only does a larger wheel bridge over the holes in the road, but when it comes in contact with an obstacle on the road it strikes it with a force inversely proportional to its diameter. The kinetic energy of a body varies as the square of its velocity. Therefore, other things being equal, the jolts are inversely proportional to the square of the diameter of the wheels; but a large wheel is heavier than a small wheel, so the jolts would probably be inversely proportional the diameter to the power of 3-2 (approx.)

Another advantage of large wheels is that the tyres last longer, because a larger portion of the tyre touches the road at a time, keeps cooler, and any certain portion does not touch the ground so often; but if the front wheels are large the car cannot turn in so narrow a road unless the frame of the car in the front is made narrower.

H. LINLEY BYRD.

[10223].—I have read with much interest Mr. Verdon Roe's letter [No. 10201], and also much other matter which has appeared lately on this subject in the press.

Mr. Roe is quite right when he says that the pneumatic tyre (in its present form) is doomed. But it by no means follows that the type of spring wheel having a rigid rim, which, with one or two notable exceptions, is the form which most of the recent inventions have assumed, is the true solution. Speaking from the point of view of the great mass of non-technical amateur drivers, to which I belong, I must point out that this type is not at all what we regard as the perfect form. Let us take, for the purpose of discussion, the same case as that taken in Mr. Roe's letter, namely, the case of a spring wheel with a rigid rim meeting a two-inch obstacle. What happens is that the whole mass of the rim must be raised two inches, and having been raised, it falls again on the far side of the obstacle without returning in the form of a forward impulse any of the power previously expended in overcoming the inertia of the rim, and compressing the springs, pneumatic hub, or other means employed to vary the distance between the axle and point of contact of the wheel with the ground.

With the present form of ordinary pneumatic tyre the power expended in absorbing an obstacle is almost completely returned in the form of a forward impulse: and the return takes place in the direction of the radius of the wheel, the best direction to secure a forward impulse by expansion against the obstacle when surmounted; not, as in a spring wheel, in a direction at right angles to the ground, in which direction the returned energy is obviously useless as a forward impulse. Also, in the pneumatic tyre, no power is wasted in overcoming the inertia of the rim, since the rim remains at the same distance from the ground.

I fear Mr. Roe slightly confuses the issue when he goes on to say that it is immaterial whether the springs are placed between the rim and the hub, or between the hub and the body. For, in the first case, the inertia to be overcome in surmounting an obstacle is that of the rim only; but in the second case that of the rim, spokes, hub, axle, and (if live axle) the differential and propellershaft. This all means a loss of power, which can be easily and definitely calculated in foot-pounds for a given obstacle. From the foregoing it is clear that the spring wheel is nevertheless a step in the right direction, inasmuch as it reduces the mass (or, more loosely, the weight) of which the inertia has to be overcome in surmounting an obstacle, as compared with an ordinary wheel with solid tyres. This leads me to formulate a "law of spring wheels": "The smaller the mass of the parts (otherwise their weight) which move relatively to the hub, the more perfect the wheel, provided that it is so constructed that the hub does not rise in surmounting an obstacle."

The ideal spring wheel is one in which it is only necessary for that portion of the tread in actual contact with the ground to approach the hub on surmounting an obstacle—the very condition, in fact, which prevails in the present pneumatic-tyred wheel. But we want that condition arrived at by some sounder and more durable means than that presented by the pneumatic tyre. Let me point to that recently-produced form of bicycle wheel which has spiral springs in contact with the ground placed on the rim; not by any means as the perfect spring wheel, but as the direction in which original research should be directed. I fear that I shall be accused of "rediscovering" most of the foregoing points, but I ventured to think that a recapitulation of them would be useful to amateurs, like myself.

ALL-BRITISH CARS.

[10224].—I have read with much interest the description appearing in your issue of the 11th inst. of the new all-British car which Messrs. Morgan, Ltd., of 10, Old Bond Street, have just brought out.

I saw one of these chassis on the road recently, and as so

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many parts thereof seemed to my eyes to resemble in every way those of a well-known French make, I beg through the medium of your valuable journal to ask Messrs. Morgan, Ltd., to be kind enough to let me know whether it would be possible for me to go over their works and see their cars in course of construction?

If then I find that every part is made in England, I shall be only too glad to publicly apologise to them for ever having entertained the thought that their cars were other than what they term them, viz., all-British.

In the meantime—to be perfectly candid—I don't believe they are.

COLIN DEFRIES.

SPECIAL ROADS FOR MOTOR CARS.

[10225].—With reference to a letter [10206] on the above subject, might I point out to your correspondent that in raising such an objection as he does it is only natural that he should affirm that there is nonsense in the scheme and, by implication, sense in his objection? If the proposed road to Brighton will, when finished, devolve into a scorching track, then I am sure that nine-tenths of the automobilists in the country will join issue with Mr. Walford in a chorus of hearty condemnation; but the prophecy is not fulfilled, and criticism is premature. There is a need for the building of special roads for motor cars. The disturbance of the road surface by the passage of a car may or may not be very serious; the solution of the dust problem is all important. In these days it is fashionable for each and every foot passenger to have his own personal and distinct prejudice against automobilism; yet it is a fact that a vast proportion are unanimous in their dislike by reason of the discomforting dust clouds raised by the passing car. What is more natural than that a road should be experimentally constructed, and that it should lead to Brighton, the Mecca of automobilists? And what is more improbable than that it should be absolutely straight and without a gradient worth calling such?

I trust that the English motoring public will back up this scheme, which, if carried into execution, will not prove to the detriment of motor cars, but to the advancement of their use, and at the same time the extension of a great industry.

ROLAND PHILIP.

[10226].—I most heartily agree with Eric W. Walford's most sensible letter [No. 10206] in your valuable paper of November 18th. I sincerely hope the Automobile Club will do its utmost to oppose such a dangerous useless scheme. If there is so much money floating about, why is it not used to put the present roads in a good state? For instance, rounding off dangerous corners and paying the landowners (I am not one myself) compensation when necessary; widening and banking the roads properly, and, where suitable, giving foot passengers a footway; also preparing the road surfaces with a proper dust-preventive for summer use. If some of the money were only spent on making the roads of granite, properly rolled in, instead of the present country method of throwing down flints, half rolling them in, and then throwing mud on top (which when dry forms dust), there would be some sense. On behalf of all sensible-minded motorists I trust this ridiculous bill will be met with the strongest opposition.

HUGH HUGHES.

[10227].—I notice in your last number a letter which speaks very strongly against the proposed motor road to Brighton. Why a motorist should oppose this work I cannot understand. I am not one myself at present, but certainly would back up the construction of such roads, and use them, if I were. The motor is becoming gradually too fast for the generality of our present country roads, and should have a road of its own. The growth of the motor traffic seems to be analogous to that of the railroad; at first there was no protection to other traffic, but as the speed increased the railroad became more and more isolated, and altogether separated from the usual street traffic. In Canada and the United States the different stages of evolution can be seen going on at the present time.

To diverge a little from the subject, did not Jules Verne, or some other author, predict wireless telegraphy when it was thought impossible? Jules Verne's "20,000 Leagues Under the Sea" was a forecast of the present submarine, and to finish these "far fetched" ideas, did not H. G. Wells write a book on England in the future, in which he says railroads are done away with, their place being taken by airships and motors on specially-made roads? The airships are on the way, as is shown by the continued improvements in dirigible balloons, and, to my mind, the motor roads should be also. I certainly believe that motor roads, designed on railroad

lines, will be one of the features of this new century, paralleling the introduction of railways at the beginning of the nineteenth.

Does not this cavilling at a new idea rather retard the progress of our country in many ways? Was it not the great opposition to "those noisy stinking things" which allowed France to get so far ahead of us in the earlier productions of motor cars? Do you not think that we should rather

elcme new ideas, enquire into them, and try and find the best in them, always looking to the future, instead of trying to retard the march of progress?

G. FRED VOLLMER.

CHEAP FUEL FOR STEAM CARS.

[10228].—I have seen several enquiries in previous numbers of *The Autocar* regarding cheap fuel for steam cars, and some writers appear to throw doubt on the possibility of obtaining same at anything like the prices desired. It may be of interest, therefore, to know that I have driven my White steamer this season on heavy benzine, .740, obtained from Meade-King, Robinson, and Co., Liverpool, at 6½d. per gallon, and have had no trouble whatever with same. The spirit is delivered in fifty gallon steel barrels, and it is a simple matter to syphon the benzine out with a bent piece of ordinary lead gas piping into the ordinary two-gallon petrol tins, which are much more convenient for using and storing.

WILL CLAYTON.

MOTORISTS AND ROAD MAINTENANCE.

[10229].—I think Mr. Charles Bidwell, in his presidential address to the Surveyors' Institution, is rather hard upon motorists. In asking that they should contribute towards the cost of maintaining main roads and bridges, he seemed to forget that beyond the usual carriage license of £2 2s., payable yearly, there is also £1 registration to pay, and, again, 5s. yearly for a driving license. This mounts up to the man of moderate means, and any further taxation of motors would scarcely be fair. As regards road maintenance, what becomes of the fabulous fortunes collected in fines from the unfortunate motorists? Why is not this money used to keep up the roads?

H. HUGHES.

MOTORISTS AND THE PUBLIC-ROAD DAMAGE.

[10230].—I see from the newspapers of November 15th that the Surrey Highways Committee hope to get rid of the dust caused by motors by putting absurd restrictions upon them. If this intelligent committee would turn their minds to a more practicable solution of the difficulty by making the roads properly, and laying a dustless material upon the surfaces where required, they would find a vast improvement. Motors and their uses and conveniences have many times been demonstrated. If drivers, instead of being restricted to absurd regulations, were encouraged in the use of motors, manufacturers would have more orders, more orders mean more work, more work means more hands, and so on. We should then hear less about the unemployed and lack of employment. There is a vast industry to be opened up in the manufacture of cars, etc. England has already made a good start; let her by all means be encouraged in this great undertaking.

H. HUGHES.

TOP GEAR RUNS.

[10231].—Referring to your correspondents' letters, I do not think that I stated that it had appeared in *The Autocar* that the car was driven one and a half miles an hour on top speed, but it appeared in other journals. It is no use blinking the fact that if the car is capable of travelling one and a half miles an hour on the top speed, as asserted by Mr. Baker [letter No. 10190], it is practically impossible for the car to be geared any higher than four to one, which would give the revolutions at 59, and if the car will do this it is exceedingly creditable. But then, if it is going to do forty-five miles an hour, which a car of this power ought to be able to do, I contend that an engine speed of 1,770, which it must have, is altogether too fast.

However, Mr. Mason now says that the lowest speed claimed is five miles per hour, which, of course, is quite possible, but I still contend that any experienced motorist who had such a car would be exceedingly dissatisfied in travelling along good straight roads to have his engine running at 1,770 revolutions per minute. What he would say to himself is this. "What a pity it is that I have not a higher gear," as, I take it, what everyone wants is the smoothest running car possible with the lowest engine speed.

The high speed means short life and excessive petrol consumption. Mr. Baker says it is grossly unfair for me to compare the eight-cylinder C.G.V. car with the one in question. I am sure that Mr. Edge would not feel offended at the comparison, as there are no better cars made than the C.G.V., and if their eight-cylinder car had been geared lower it would have done exactly what the Napier did; but the makers of the car evidently were strongly averse to running their engines at 1,770 revolutions per minute to get forty-five miles an hour, consequently they came to the conclusion that a gear box was absolutely necessary. I do not mean that it is necessary for ordinary running. Any decent car will run for scores of miles on a give and take country road without changing gear, but sooner or later hills and positions are encountered which make the gear box necessary. As this matter is of such vital importance to motorists generally, I think we might ask Mr. Edge for a definite statement as to whether he is turning his standard six-cylinder cars out without gear boxes, or even if he has any such project in view.

I observe in the last issue of *The Autocar* Mr. Rolls announces that the four and six-cylinder Rolls-Royce cars will be fitted with four speeds. It would be difficult to find a more experienced driver than Mr. Rolls, one would think. Mr. Baker also refers to the gulf there is between my theoretical arguments and practical right, but I would inform him that no amount of theory can possibly alter the results of gearing on a motor car, and if a car is geared four to one, and has 34in. wheels, the engine must be travelling at 1,770 revolutions per minute in order to produce forty-five miles; and if travelling one and a half miles an hour, as he states, the engine must be running at 59 revolutions, and, in conclusion, what I would say is this—that 59 revolutions is as impracticable as 1,770 is undesirable.

CHARLES BINKS.

[10232].—I read in the *Automobile Club Journal* that the gear on which the six-cylinder Napier car was driven from Brighton to Edinburgh was equivalent to 2.17 miles per hour at 100 revolutions. Surely this is a very roundabout way of expressing 21.7 miles at 1,000 revolutions, which was published as the normal revolution of the Napier engine.

I agree with Mr. Goff [10188] that it would have been interesting if the club had measured and recorded the petrol consumed on the journey, and it is difficult to know why it did not do so, seeing that the consumption of petrol was recorded and published in connection with the trial of the Hallé spring wheel.

Your representative, in your last issue, gives an interesting account of an ascent of the Macclesfield and Cat and Fiddle Hill made on the top speed by a six-cylinder Rolls-Royce car, but, unfortunately, omits to state what speed in miles per hour the car would be travelling if the engine were making 1,000 revolutions.

I presume that if enquiry were made it would be found that, following in Mr. Edge's steps, the Rolls-Royce people had fitted the car with a gear which gave twenty miles an hour at 1,000 revolutions.

Can you enlighten me and your other readers on this point?

HENRY KOESEN DOMVILLE.

[The ratio of engine to gear upon the six-cylinder Rolls-Royce which climbed the Cat and Fiddle Hill gives thirty-seven miles an hour at 1,000 revolutions per minute.—Ed.]

[10233].—*Re* Mr. Edge's recent top gear trip on the six-cylinder Napier, I fail entirely to see what this exhibition was intended to demonstrate. That it is possible to gear any car so as to climb all hills has been understood for a long time.

It has also been understood that to do this entails a great waste of available power when running on the level, whilst it is impossible to attain anything like the speed one has a right to expect. Mr. Edge's trip has borne out these obvious facts with a clearness worthy of a higher object.

I was led to believe that the car would be timed over a measured distance to prove that it was not ridiculously geared. It subsequently transpired that this 60 h.p. car attained a speed of forty-five miles per hour; not a very striking performance; in fact, to be candid, a particularly rotten one—one that compares very unfavourably with that of, say, the 60 h.p. Daimlers at Brighton and Blackpool.

Furthermore, the object at which this trial aims is utterly unworthy of the attention of such men as Mr. Napier. Personally, I do not view the prospect of having to change gear with great apprehension, but the thing which irritates me beyond measure is to sit behind nine out of ten English drivers and hear them crawl up hills on their top speed with

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the engine pulling so slowly that each impulse can be clearly felt in the tonneau. Apart from the fact that it is ruinous to the engine, I can see no point in it; how much pleasanter to come back to a lower gear and feel the car once more master of its work.

If, as Mr. Baker asserts, the engine of this car does not race it is because it is throttled or designed in some way not to do so; if it gave its proper speed on the level it would, of necessity, race. As it is, look at the miserable speed attainable with your 60 h.p. engine. It is needless for people to write pointing out that forty-five miles per hour is fast enough for anyone. Personally, I think it is, but it can be obtained very much more cheaply by the use of a smaller engine.

It is waste of 60 h.p. as it is, when the addition of another gear would probably make a difference in speed of ten to fifteen miles per hour.

By all means have the direct drive on the old speed, but have a higher gear for the man who wants to utilise his 60 h.p. engine to the full.

J. KENNEDY.

[10234].—On page 596 of *The Autocar* you give an account of a run up the Cat and Fiddle Hill by a Rolls-Royce car, which is stated to have climbed this hill on top speed. The gradient is said to be 1 in 17.6 in the first two miles, and the average gradient of the steepest portion on Dashwood Hill is said to be 1 in 16.

I know both Dashwood Hill and the Cat and Fiddle Hill, and I make bold to say there is no comparison whatever in the two gradients.

The natural inference to anyone not knowing the two hills would be that a car which climbed the Cat and Fiddle Hill without difficulty at top speed would also climb Dashwood on its top speed.

Perhaps you can insert this letter in your next issue, with your remarks thereon.

FREED.

[If our correspondent will take the trouble to glance at the section of the Cat and Fiddle Hill, as given on page 193 of Messrs. Gall and Inglis Contour Road Book, he may be able to see that according to that section the hill ascends as nearly as possible 600ft. in two miles from a point about half a mile outside Macclesfield, therefore the gradient over this distance is 1 in 17.6 or thereabouts. The steepest portion of this distance is given in the above work as 1 in 15. The figures quoted *re* Dashwood Hill are taken from the A.C.G.B. and I. Section, and are as quoted in their reports on the 100 miles quarterly trials. The impression produced on our correspondent is produced upon him alone; certainly no inference can be drawn from our remarks that we sought to suggest that the six-cylinder Rolls-Royce would take Dashwood on its top. Our correspondent's letter seems to be prompted by a desire to discredit a good car and a good performance. We have no sympathy with such efforts, or with the spirit that prompts our correspondent's *nom de plume*.—Ed.]

NUMBER OF CYLINDERS.

[10235].—As a believer in the six-cylinder engine, I observe that Mr. Jarrold, in comparing its advantages with the four-cylinder [letter No. 10219], made a curious slip where he said that the two additional cylinders of a six-cylinder engine would weigh as much as the saving of weight in the flywheel on the six cylinder, but I think he has overlooked the fact that for a four-cylinder engine to be as powerful as a six-cylinder engine it would be necessary for each of the four cylinders to be greater in size than each of the six. If Mr. Jarrold will very carefully weigh the matter up he will find that his argument on this point is fallacious, and that instead of finding there are only a number of points in favour of six cylinders, he will find every point to be in favour of six-cylinder engines for motor car use.

C. H. HELE.

[10236].—The letter [10219] in your issue of November 18th in reference to the number of cylinders is exceedingly interesting, as showing how even such a generally well informed manufacturer as is your correspondent can overlook many points of advantage that the six-cylinder engine gives to a motor car, and to the user of it.

It is, of course, pleasing to read from so eminent an authority that he agrees that there are a number of points in favour of the six-cylinder engine, and he then very properly goes on to set out what he considers are the disadvantages, but I hope to show you clearly that these points which

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he refers to are the result of a slight lack of knowledge on the subject, and have nothing to do with the six-cylinder principle.

In the first place, he suggests that a flywheel of twice the weight required on a six-cylinder car of the same h.p. is not a disadvantage, as the extra two cylinders would weigh as much as the heavier flywheel on the four-cylinder car. Let us, for the purpose of argument, agree to this. He forgets, however, how much heavier all the shafts and other parts which have to take the wear and shock would have to be to take the greatly increased shock of the explosion of the four-cylinder engine plus the flywheel twice the necessary weight. This would increase the whole weight of the car very greatly if equal wearing capabilities were expected from it that one would get from a similar h.p. six-cylinder.

Secondly, in referring to the loss of wall heat, I think he has confused loss of wall heat with loss of power. If he would kindly work out what eighteen per cent. loss in wall heat means compared to its influence on loss of h.p., he will find it so small as not to be worth considering. Obviously if one only made an engine from the point of view of reducing the loss through wall heat one would simply have a single cylinder engine of the greatest possible dimensions, but your correspondent is quite as well aware as I am that this would not be a practical vehicle, as the other parts of the car would have to be so abnormally heavy to stand this fearful shock that the car would not be a practical vehicle, and it is for this very reason that the six-cylinder engine, owing to its extremely smooth turning motion, enables one to reduce weight in pistons, transmission, and flywheel, and yet at the same time have a car with which a guarantee as to freedom from mechanical repairs can be given that it is impossible to obtain with a fewer number of cylinders.

Thirdly, in regard to petrol consumption, Mr. Cecil Edge's letter in your last issue makes this very clear, but perhaps your correspondent would state what he considers would be the correct petrol consumption of the 40 h.p. four-cylinder foreign cars which he sells, and I should then be pleased to run a six-cylinder 40 h.p. against his car for petrol consumption, and show him that even in petrol consumption a six-cylinder 40 h.p. will consume less petrol than a four-cylinder 40 h.p.

In regard to his suggestion that a six-cylinder engine necessitates an abnormal wheelbase, this requires no answer on my part. I need only refer him to the published details of the foreign car in which he is interested, and he will there see that the wheelbase of his 40 h.p. car is given as 10ft., and in the same information published he will see that the wheelbase of the 40 h.p. six-cylinder Napier is 9ft. 8in.—4in. shorter than his own car. Personally, I do not consider the wheelbase of his car is abnormal, but if he thinks it is, then I would suggest that he have his design altered to that which he thinks is correct.

In conclusion, as to the question of silence and flexibility, it is of course obvious that to take two engines of a given h.p., the one that has six cylinders must obviously be quieter and more flexible than the one that has a less number of cylinders, simply because each of the six can have a smaller explosive charge in it, just in the same way that a 9in. gun makes more noise than a rifle per explosion.

S. F. EDGE.

SPEED INDICATOR TRIALS.

[10237].—We are pleased to note the correspondence in your columns on the subject of speed indicators, and if the Automobile Club or your good selves will take the tests up, we should be pleased to enter our names if the tests are arranged for reliability, durability, and adaptability.

G. DAVENPORT AND CO.

[The following letters have been crowded out of the paper during the last few weeks. Other letters still in type will appear as space permits.—Ed.]

CONSIDERATE DRIVING.

[10238].—There is a very interesting paragraph in Mr. T. Scott Foster's letter [10154] referring to Sir A. Conan Doyle's driving. I happen to drive a motor car in the same district as Sir A. Conan Doyle, and can fully endorse Mr. Scott Foster's statement that "he is one of the most considerate and careful of motorists." He is more than that—he is one of the "most considerate and careful of mortals." The sad thing is that he lives on a main road (I don't), and it is still sadder that the police on that road do not care whether a motorist (or mortal) is "considerate and careful" or not. If

I may be so bold as to advise Sir A. Conan Doyle, I would ask him to sink his own amiable personality and treat the question from the "Sherlock Holmes" point of view. I have no doubt that the celebrated detective would have arrived at these deductions:

(1.) Here is a straight road with no hidden dangers. Deduction: Here is also a police trap and I must go very slowly.

(2.) Here is an extremely dangerous piece of road with sharp corners and unsuspected cross roads. Deduction: Here I can drive as recklessly as I please, as it is quite certain that there will not be any police in a dangerous place.

Would that "Sherlock" was still with us to deal with both "hedgehogs" and "bench hogs." However, his motto seems to be *Resurgam*, and he may even yet come to the rescue of his parent and that parent's admirers.

WATSON, M.D.

THE HALLE SPRING WHEEL TRIAL.

[10239].—I have noticed in one or two papers that in the comments on the 4,000 miles run of the Halle spring wheel no mention has been made of an accident which occurred on a run to Banbury after the car had done some 2,500 miles.

I was talking to a friend the other day, and found that he was under the impression that spokes had given out in ordinary running, and that they were too weak to stand the strain. I told him that I did not know anything about that, but that I was in the car on that run to Banbury, when in my opinion it was only the strength of the metal wheels that saved us from a severe mishap.

It was dark, as we had made a late start; only the oil lamps were lit, and the driver mistook the turning of the road. I was partially dozing, and was awakened by being thrown forward violently against the front seats of the car.

On leaving the road the wheels had gone through, or rather jumped a ditch, in a slanting direction. The arrival of the back wheel on the opposite side was better felt than described.

We all got down, feeling certain that we were there for the night, but an examination, as far as possible with wheels covered with the encrusted mud of 2,500 miles, showed that one split spoke was all the apparent damage, and we continued our journey—with some nervousness, I confess, on my part.

That the other spokes were loosened and subsequently gave out is not to me extraordinary; it would have been wonderful if they had not.

I may add that I have no pecuniary interest in the invention, being here merely on a visit from South America, but I like to see fair play.

B. RIBBENTROP.

CHANGE-SPEED GEARS.

[10240].—In your "Notes" of the 4th inst. you say "Almost everyone (unless he be the owner of a six-cylinder car) who has a three-speed gear wishes that he had four." Yes, sometimes under favourable circumstances when more speed could be got out of a higher gear. I see the 30 h.p., six-cylinder Napier did forty-six miles an hour on a track. As my own 15 h.p. Darracq touring car does almost forty-five under similar circumstances, I should be crying out for more than a fourth speed should I be the possessor of a 30 h.p. six-cylinder car capable of only forty-six miles per hour. And suppose the gear is raised, the six-cylinder then cannot take the hills on top gear, and has to come down to the level of a four-cylinder car by changing gear. Gear a 30 h.p. four-cylinder car down to forty-six miles per hour and you could undertake the same trip as the Napier on top speed all the way.

HAROLD BOWDEN.

STEAM CARS.

[10241].—I have motored for years and have owned several petrol cars. My present car is a steam one. I have had it four years and it looks like going on for another four, though it was second hand when I bought it. Personally I believe in steam, especially for middle aged people like myself who do not wish to go more than twenty miles an hour, and who object to the vibration and danger of petrol cars. I say danger advisedly; twice have I had a petrol car almost entirely destroyed by fire, and once I was laid up for a month injured by burning petrol. What we want is a steam car owners' association or club, and until we get it steam will not have fair play. Cannot someone give up the time to get such an association going? I may say I have no pecuniary interest in any make of car, steam or petrol.

STEAMER.

Flashes.

The Prince of Wales has just ordered another Daimler car, which will be similar in every respect to that supplied to the King, and which is now on view at the Olympia Show.

* * *

We notice with regret the absence of Dunhills, the pioneers of motor equipment, from Olympia. The show does not appear complete without them.

* * *

One of the Brooke cars at Olympia is fitted with the Gibson indicator. This is a most useful instrument, as it enables one to test the engine cylinder by cylinder in a proper manner, as the indicator shows the exact pressure either of the compression or explosion for each cylinder, so that it is a simple matter to locate a fault.

* * *

The Cowey speed indicator is fitted to cars on the stand of the London and Parisian Motor Co. in the Annexe at Olympia. This company are making an offer during the show to fit one of these indicators free of charge to any car. If at the end of the month the user is satisfied with the device, he will be expected to pay for it; if not satisfied, it can be returned to the firm without any expense being incurred. This device is positively driven by means of a pair of bevels from a front wheel of the car, and the motion is transmitted by means of a universally-jointed shaft through a flexible tube to the speed indicator, which not only indicates the actual speed at which the car is travelling at any moment, but at the same time records the total distance travelled. The principle of this indicator is very ingenious, and the working parts are arranged so that it must read correctly without giving the slightest trouble. No doubt a large number of automobilists will take advantage of this offer.

* * *

Only last week we referred to the general ignorance concerning magnetos and their action. A post or two after we had written this we received from Clément-Talbot, Ltd., a copy of a letter which they had received from an agent, which certainly endorses our statement in an unmistakable and amusing manner. The letter is as follows: "We believe you supply with your cars a carbon brush for 'cleaning the magnetos,' or so it states in a list which you sent. There was not one of these brushes in either of the cars we had. Please send us one by return."

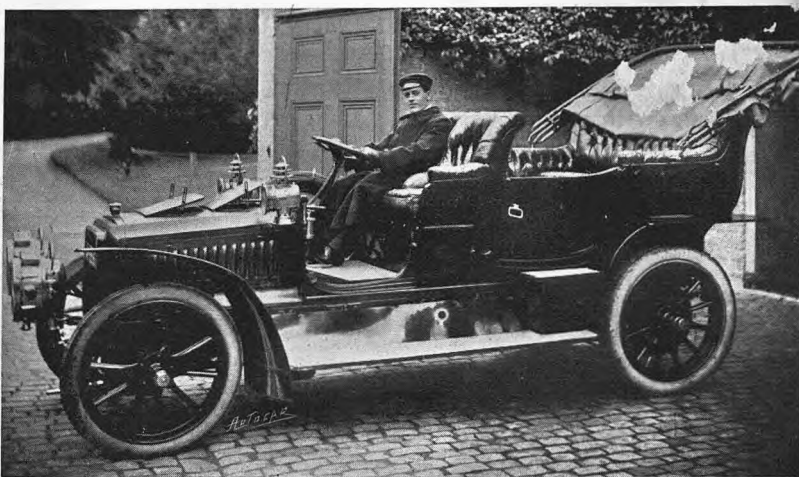
* * *

All paid drivers of De Dietrichs will be interested to know that Messrs. Charles Jarrott and Letts are offering two £50 prizes, one to be presented to the driver who has been responsible for the upkeep of any De Dietrich car and the other to the one responsible for one of the 1906 types—that is to say, for the man who can show the best record of condition of car and lowness of upkeep expenses in relation to distance covered. Owners of De Dietrich cars should take an interest in the matter, because it stands to sense that the automobilists who employ the winners of the prizes must

necessarily have the best men—that is to say, the men who drive and keep their cars in the best possible manner, and this, of course, means that the owner is running with the least possible expenditure.

* * *

Several correspondents have written in terms of the highest approval of the suggestion that Mr. H. Davies recently made in *The Autocar* to the effect that road-menders should provide themselves with a few planks, which they might put down over newly laid stones for the convenience of motorists. All our correspondents say they would only be too pleased to tip the men for their trouble, as they recognise that the money would be fairly earned, inasmuch as it would in most cases save considerable damage to the tyres. One correspondent, however, goes further than this. He not only highly commends the suggestion, but suggests that the Automobile Club should approach the authorities with a view to getting this done as a regular thing. He points out that not only would such an arrangement be



Mr. Charles Wertheimer's 24 h.p. Panhard which has been selected by the Colonial Government for the use of the Prince and Princess of Wales while in Ceylon. We are informed that a British-built car was to have been chosen, but as it was required in a great hurry the Crown agents were obliged to take the very first suitable vehicle they came across.

of the greatest service to bicycles and all other vehicles, but it would enable both sides of the road to be repaired simultaneously. The idea is certainly a good one. We are well aware that some of the local authorities would take umbrage at it, because they seem to think there is some sort of virtue in mending their roads in such a way that the maximum damage shall be inflicted upon the tyres of all vehicles less robust than the heavy farm cart. However, fortunately they are not all so prejudiced as this, and we have no doubt that if the more enlightened authorities could be persuaded to adopt the practice the prejudiced ones would gradually come into line just as they have by degrees seen the wisdom of using steam road rollers. If we cannot have planks for all places, we might at least try to secure them in as many places as possible.

* * *

The Morpeth magistrates the other day dismissed a charge of driving at a dangerous speed which was preferred by the police against Viscountess Ridley's chauffeur. A speed of twenty-eight and a half miles an hour was alleged, but the countess said the police must be mistaken, as her chauffeur was a most careful man. Even the police evidence had to give place to that of the countess, and the case was dismissed.

Flashes.

Moved in all probability by the illustrated and elementary description of the working of a change-speed gear which appeared in *The Autocar* some time since, Mr. Harvey Du Cros, of 14, Regent Street, W., has caused a pamphlet entitled "Hints and Advice for Owners of Panhard Cars" to be produced for dis-

The Lacre Motor Car Co. inform us that they have been appointed the official London agents for the Siddeley cars as well as the Wolseley, for which they previously had the official agency.

* * *

A private visit made by King Edward last Wednesday to historic Medmenham Abbey, where Major Wynne Finch was lying seriously ill, and an incident of that journey to see an old friend on a sick bed, brings out once more that characteristic kindness of the King which so popularises him with his people. Motoring along the Bath Road, the King passed a temporarily broken-down car undergoing repair by the roadside. His Majesty immediately ordered his own car to be pulled up, and sent an attendant to enquire if all was well with the occupant of the damaged car. That favoured individual, who was able to reply in the affirmative,

had scarcely realised the honour done him before the King's car was once more whirling along towards the one-time haunt of the notorious Hell Fire Club, whose well-known motto "Fay ce que Voudras" still appears over an entrance to the abbey, now the residence of Colonel Dawson, Master of Ceremonies to His Majesty's household.

* * *

The Middleton pneumatic hub, which we described in *The Autocar* of November 11th, is undergoing a 4,000 miles' reliability trial under the auspices of the Automobile Club. As in previous instances, the hub will be under the observation of a properly qualified club official during the whole of the period it is on trial, and its behaviour will be carefully noted. Even the smallest thing which may be required to be done to it will be recorded. The car to which it is to be fitted is an 18 h.p. Rochet-Schneider, so that it will be seen the device will be subjected to a thoroughly good test.

The York-Tadcaster Road seems to be a favourite spot of the police for laying traps, as can be judged from a glance at the map published in *The Autocar* of October 7th. The illustration above shows one of them, which extends from the motor car to the white speck against the cottage in the distance. This photograph was taken from the Tadcaster end (2½ miles away from that place).

tribution amongst his numerous clients. By means of lucidly written paragraphs and clear and comprehensive illustrations Mr. Du Cros has in a comparatively limited space explained the construction of the various working parts, and adventured upon a valuable collection of hints as to the general care of these famous cars. The view of the engine of the separated four-cylinder type is most instructive, while the section of the Krebs automatic carburetter, the wiring diagrams, and the interior views of the three and four-cylinder gears make clear to the most uninitiated the working of these vital organs. The Panhard owner who reads, marks, learns, and inwardly digests the advice given in this excellent work by those who know, and who applies it will never find his trusty Panhard play him false.

* * *

In "The Autocars of 1906" published last week the 16 h.p. Albion, which came under the category of cars costing £400 to £500, was, by a printer's error, referred to as a 10 h.p. car.

* * *

A substance recommended for ladies' motoring coats is pony skin, and it is stated that Russian pony skin is better than English for keeping out the cold. This skin is very moderate in price, and looks very attractive in appearance.

* * *

Road-mending operations are now in progress on many of the main roads radiating from London. Heaps of stones on the roadsides in many districts give promise of much trouble to those who drive regularly through the winter months. Whilst on the subject of roads we would warn inexperienced drivers against taking their cars over leaf-covered roads at any speed, they often cover mud.



Another portion of the trapped York-Tadcaster Road taken from the York side. The distance over which cars are timed starts from the handkerchief in the foreground. These two views well illustrate what the police profess to regard as roads upon which a speed of over twenty miles an hour is "dangerous to the public."

A committee of medical men using motor cars has just been formed for the purpose of placing evidence before the Royal Commission on behalf of members of the medical profession who are motorists. The committee will point out how the medical profession will be affected by restrictive legislation or increased taxation of motor cars. The Royal Commission have intimated their willingness to hear as witnesses Mr. Lockwood and Dr. Bruce Porter on November 29th, and they will be pleased to receive any information or suggestions from medical men using motor cars. Such suggestions should be addressed to Dr. H. E. Bruce Porter at 6, Grosvenor Street, London, W.

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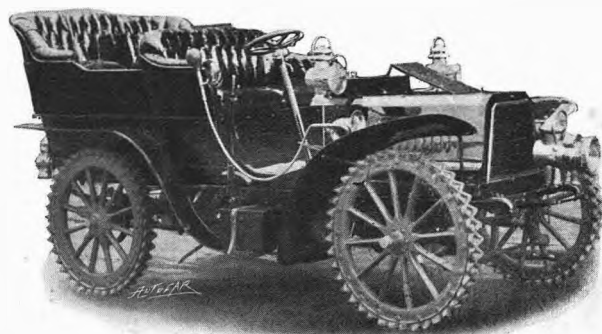
On Wednesday last week, November 15th, an opportunity was taken by the London management of the Winton Motor Co. to herald the arrival of Mr. A. Winton in England for the purpose of being present at the Olympia Show. A number of press representatives and friends of the firm were invited, and the lunch was given in the basement of the premises in Holborn Viaduct, which were most tastefully decorated for the purpose. The function was a particularly happy one, and toasts were kept down to a minimum, that of most interest being, of course, Mr. Winton's reply to his health, which was admirably proposed. Mr. Winton interested his hearers by giving a short sketch of his engineering career, after which the toast of "The Press" was proposed by Mr. Duck, and replied to by Mr. Harry J. Swindley, of *The Autocar*.

* * *

Last week a contemporary published an article on the rubber industry, which was contributed by an authority on the subject, who preferred to remain anonymous. This is perhaps as well. As long as the question of the manufacture of rubber is dealt with the author is quite at home, but when he attempts to show the result of a classical education he is amusingly at sea. The juice or sap, commonly known as latex, this erudite gentleman tells us, derives its name from *lactis*, the Latin for milk. Now, no less an authority than the oft-unpleasant companion of our boyhood, Smith's Latin-English dictionary, informs us that the etymology of *latex* is unknown, and that its meaning is "any liquid, especially water." Moreover, the veriest beginner in the study of the language of the ancient Romans knows that "*lac*" is the Latin for milk, while *lactis* is merely the genitive case.



One of the most striking and original stands in the show at Olympia, and this we illustrate above. The top of the stand is occupied by a scale model of the new Argyll works which are now nearing completion at Alexandria, near Glasgow



A Richardson car fitted with the Richardson non-skidding tyre, to the behaviour of which we referred in *The Autocar* of Nov. 18th, page 641. If the patentee is in want of a distinctive name for this tyre, we suggest that it might be known under the name of the "Platypus" or duck-footed tyre.

We should not have thought it necessary to remind drivers that when leaving a car standing in the road the right hand side lamps and the rear lamp should be left alight. The other night we saw a driver extinguish the right hand lamp, leaving the left hand lamp burning. Needless to say, this is an extremely dangerous practice, and is, in fact, courting an accident.

* * *

The whole Motor Volunteer Corps is unanimous in its congratulations to Sir William Davis-Goff on his being honoured by the King with a baronetcy. Sir William was only last September compelled to retire from the corps, in which he had served as a captain since the 20th June, 1903, owing to his having reached the age limit as laid down in the volunteer regulations. He was always one of the most energetic members, and no distance was too great for him to travel to do his duty. His service in the Motor Volunteer Corps was not the only period in which he gave his military services to the country, for he had previously held a Cornetcy in a cavalry regiment as far back as 1864.

* * *

On Wednesday, the 15th inst., a number of press representatives and friends were invited to dine with the Daimler Motor Co. at Prince's Restaurant, Piccadilly. The chair was taken by Sir Edward Jenkinson, and the prominent officials of the firm, including Mr. Percy Martin and Mr. E. M. C. Instone, were present. After the usual loyal toasts, Sir Edward Jenkinson gave the toast of the evening, and in speaking paid well-merited compliments to the loyal work of the Daimler staff during the past year. He naturally referred with pride to the excellent financial results which are now known to the public. Many replies were made to the toast of "The Press," and later on in the evening, in reply to his health, Mr. Martin made a most interesting speech with regard to the policy which he considered necessary to be closely followed in order to achieve success in the automobile industry in this country. He referred to the methods which had enabled the prices of the Daimler cars to be reduced while their quality and general reliability had been considerably improved, and altogether his speech—which we regret we cannot reproduce in full, owing to lack of space—was a most interesting and instructive disquisition on the construction and control of such undertakings as the Daimler Co. It would have done some of his competitors no harm if they had been present and followed the advice he gave. A most enjoyable evening was spent, and the company broke up at a late hour.

SOME QUERIES AND REPLIES.

We are always pleased to reply to queries, even if they be of an elementary and untechnical description, under this heading. Only a selection of those which are of general interest will be published. Where a reply is desired direct by post, a stamped and addressed envelope should be enclosed. In cases where querists ask for the opinions or experience of others, our readers are invited to reply. When advice concerning different makes of cars is sought, each vehicle should be given an identifying number. Letters should be addressed, The Editor, *The Autocar*, Coventry.

QUERIES.

No. 221.—Confetti Signalling.

WOULD you kindly invite your readers to carry always in their cars a small bag of red confetti, and wherever they judge that motorists are likely to injure their tyres by going too fast to scatter a couple of handfuls?—F.M.W.

No. 222.—Experiences of 20 h.p. Lan- chester Wanted.

I SHOULD be glad to hear the experiences of any of your readers who have been using the 20 h.p. Lan-
chester car during the past few months. Is the short stroke, quick revolution engine a success, in being responsive to calls made upon it, and does it need frequent adjustment in bearings? How is it for climbing? Do brake and clutch need adjustment oftener than the 12 h.p. Lan-
chester? How does it behave on hills, and is it hard on tyres? Is it suitable for touring?—B.W.D.

No. 223.—Alternative Connections to Magneto and Coil System.

I HAVE a four-cylinder Panhard car fitted with magneto ignition, with high tension accumulator in reserve. If the magneto breaks down, I have to disconnect the terminals from the sparking plugs, and fit the four spare ones, which are ready in position to connect the sparking plugs with the high tension accumulator. When this is done, can the car be run without damage to the magneto, or must I disconnect the chain which drives the latter, so as to let it stand still?—no. 36.

No. 224.—Synchronised Ignition.

CAN any of your readers inform me whether there is a perfectly satisfactory system of synchronised ignition for six-cylinder cars? I have a six-cylinder Napier, with which the only trouble I have is the ignition. It goes perfectly well for the first thirty or forty miles or so, but then is very apt to misfire entirely for several revolutions of the engine at a time. Neither the makers nor anyone I have yet met with have been able to explain the difficulty, or show me how to remedy it, and I gather there are other users with whom this trouble is by no means unusual.—No. 63.

No. 225.—Freezing Troubles.

I OFTEN see in your paper letters about water freezing, and the use of glycerine as an anti-freezing mixture, but I have never seen anything about lubricating oil thickening in cold weather. I also wish to mention a new experience of piston seizing last week in cold weather. On the 16th inst., when going to take out the car, a nearly new four-cylinder, the engine could not be turned, and only after warming up all the water by slowly adding hot could the engine be started. On returning home in the evening, all the water was run off by the taps at the pump, radiator, top of cylinder, and at the exhaust valves, and on the morning of the 17th the engine could not be moved. Can any of your readers explain this?—WALTER C. C. LOCK.

REPLIES.

No. 210.—Upkeep of Cars.

The following particulars may be of some use to your correspondent who enquires concerning upkeep. I have been running an 8 h.p. Darracq car constantly since last May, and excluding three tyre punctures have had only two stops for mechanical reasons—both for trifling causes and of about ten minutes

duration. The car runs about thirty miles to a gallon of petrol. Excluding cost of oil and grease my expenditure has been as follows: One piece of rubber tubing for water circulation, 8d.; new starting pin, 2s.; tyre repairs, 18s.—SATISFIED.

No. 212.—Non-skids.

It gives me great pleasure to give you my experience with Michelin non-skids. I did over 4,000 miles during the dry summer months with a 40 h.p. De Dietrich, heavy landaulet body. The left side driver is about ready to be re-treaded, but the offside wheel is in good condition, having only lost three or four of the steel rivets; wheels 920 by 120 mm. I have had good results also with Continental non-skids. If you desire to try any of these tyres I shall be pleased to give you the address of wholesale trade dealers who have supplied me. I daresay they would give you liberal discounts from list price. I have not had much satisfaction from Pullman, See, Smith, etc., bands.—DR. S. SNOW-SMITH.

The best non-skid I have tried are the detachable Durandols. They are cheap, and the studs are properly fixed. I have known them in use on cars up to 40 h.p., and they have given great satisfaction. Personally, I have given up non-skids since using Palmer tyres (range fixing). I can honestly say that I have driven over the greatest roads in England and Scotland, and have never had a skid with them. I got my Durandols from Cintrat, 199, Piccadilly, when I used them. The only argument against Palmer's is the cost—and I had some trouble at first with them, but the Palmer people at once sent me a new tyre free of cost. Rather refreshing treatment after some experiences with other tyres.—P 2212.

No. 217.—Anti-skids for Solid Tyres.

"County Magistrate" will find the Parsons chains quite satisfactory for solid tyres to prevent skidding. The only drawback is that they break rather more frequently than when used with pneumatic tyres; they are, nevertheless, quite easy of repair. I know of no suitable non-skidding band.—DU 338.

I can thoroughly recommend the Parsons non-skid chains for above. This winter I got one for back tyre (solid) of my 28 cwt. car and have felt no skidding, whilst last winter at half the speed I was skidding all over the road. I have no connection with the trade.—SCOTCH.

No. 209.—Boron Charging Cells.

I have been much interested in the opinions expressed by users of the boron cells, especially Mr. Campbell Macdonell, and although I cannot agree with him with respect to some of his remarks, yet as a user of these cells since their introduction, both in their primitive and now improved form, for large and small accumulators they have

given me more than ordinary satisfaction. My accumulators for my large Daimler car are four-volt seventy ampère hours, and also a twelve-volt lighting set. When at home I keep these perfectly charged, and also carry four of these cells on my car for charging spare accumulators on the road. I also charge my accumulators in a workshop, where a plentiful supply of tools is kept. I can assure Mr. Macdonell had they been of a messy nature I should have long since discarded them. Voltmeters or ampèremeters I seldom use, as anyone with very little intelligence can in a short time see if the battery is running down by the change in colour of the depolariser. It would be extremely difficult to construct a more simple, and at the same time more energetic, contrivance than the boron battery for charging accumulators, especially where fume or mess of any sort is to be avoided.—JAMES O'BRIEN.

My experience of the boron cells will undoubtedly be of interest to many readers of *The Autocar* who may be desirous of adopting this system of charging accumulators. Not being near a reliable charging station I procured a six-cell set of boron cells about six months since for charging forty and fifty ampère hour accumulators. I have arranged these cells in two sets of three parallel series, making six volts in all to charge a forty ampère hour accumulator by this means it will take about twelve hours, and cost about 3d. if proper precautions are taken, and fancy prices are not paid for chemicals. One essential feature in these cells is to remove any corrosion that may appear upon the terminals attached to the carbon cylinders by plunging them into dilute sulphuric acid for one moment, and washing them afterwards in cold water. It is surely not necessary to advise any intelligent reader to endeavour at all times to prevent as much as possible any chemicals from coming into contact with the hands or clothes. If your accumulators are in sound condition no measuring instruments are required with these cells. They are far superior to any on the market.—S. CARTWRIGHT.

QUERY AND REPLY.

Cylinder Wall Heat.

WHAT is "wall heat," as mentioned by Mr. Edge in *The Automobile Club Journal*? I am sure a great number of motorists do not know.—IGNORAMUS.

The term "loss of wall heat" means in the instance named that the surfaces or walls of a six-cylinder engine of a certain horse-power are greater than those of a four-cylinder engine of the same power. There is a greater superficial area, and consequently the radiation or loss of heat is greater with the larger number of cylinders. In other words, six cylinders have a greater interior surface than four cylinders of the same cubical content, therefore the loss by radiation is greater.

4,000 MILES TYRE TRIALS.

To supplement the information given last week in regard to these trials, the following conditions may be cited:

These trials shall be carried out under the competition rules of the A.C.G.B.I. for the time being in force. The club will provide official observers for, and give certificates of, the actual performances of any sets of tyres entered for the trials. A set of tyres in Classes A, B, C, and D (see page 636, *The Autocar*, Nov. 18th) shall mean four tubeless pneumatic tyres, or four outer covers and four inner tubes. A set of tyres in Class E shall mean four inner tubes and four covers each with protective device. A set of tyres in Classes F, G, H, and I shall mean four solid rubber tyres, or six if double tyres be used on the back wheels.

The trials will be carried out as far as possible under ordinary touring conditions, and the tyres shall be ordinary touring tyres as sold to the public, and shall be chosen from stock by the club. They shall be fitted to ordinary touring cars as sold to the public. The entrant shall provide a car or cars suitable, in the opinion of the club, for the purpose of the trials at his own expense, and fix the tyres thereto, and shall

be responsible for the provision of everything necessary for the proper running of such car or cars.

The club may test the air pressure of pneumatic tyres at such times as it may see fit, and the entrant shall run the tyres at a pressure not exceeding that declared by him on his entry form.

The car shall be driven throughout at a moderate speed and with due regard to other traffic on the road. The driver shall comply with any warning given by the observer, and disregard of this warning may involve the disqualification of the entry. The speed within towns and villages must be reduced, and in no case must a car be driven to the danger or inconvenience of other users of the highway. Infringement of this rule shall render a driver liable to disqualification.

The full complement of passengers or equivalent ballast, which shall not consist of spare parts, shall be carried throughout the run, and the total weight thereof shall average not less than 150 lbs. per passenger seat. The competitor shall be responsible for filling all the seats, except those for the observer or observers. The observer or observers shall have the choice of seats.

THE DUTY OF PEDESTRIANS.

A reasonable pronouncement on this subject was made at Fermoy (Co. Cork) Quarter Sessions on Saturday by Sir John Chute Nelligan, in giving judgment on a claim by a pedestrian for £50 against a car driver. The evidence went to show that defendant was using ordinary care, and His Honour in dismissing the case, said: "People thought that because they wished to cross a wide street they had a perfect right to do so, and that the only persons bound to take reasonable precautions were the drivers of vehicles, etc. This was not the case, however. The man crossing the street was also bound to exercise proper precaution, and if the want of proper caution on his part contributed to an accident he could not get damages."

There was such a thing as contributory negligence, and if he was guilty of that, and an accident occurred without any evidence of want of caution on the other side, he could not get damages. He could not see any proof of neglect. Defendant was only going at a little more than a walking pace. Every man, woman, or child crossing a street was bound first to look up and down the street and see that no cars were using the road, which they had a perfect right to use. While regretting that the plaintiff should meet with an accident, he felt that he could not give damages against the defendant, as plaintiff was guilty of contributory negligence." Such a pronouncement should be taken to heart by pedestrians generally.

In case the proposed establishment of a Winter Sports Club at Olympia may have given rise to the impression that the annual motor exhibition will no longer be held there, we are asked to state that the Society of Motor Manufacturers and Traders will continue to hold their exhibitions in Olympia every November, their position with regard to the building for future shows being absolutely assured.

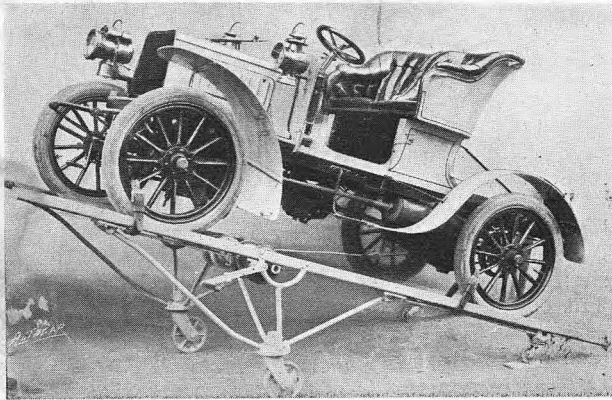
* * *

During a run over the Sevenoaks and Westerham roads one week end, we, in common with several other motorists, were struck with the capital condition of the tarred stretches upon this road. A heavy down-pour early on the previous day put the roads into a very heavy state, yet in contrast the tarred portions were dry and firm, and delightfully smooth underwheel, evidently being impervious against heavy rains. This treatment must be advantageous even for ordinary traffic, since it enables horses to get a better foothold. Certainly the tarred stretches of these and other roads are "weathering" in the most satisfactory manner, and the Kent County Council are to be congratulated upon their dust laying operations of the past summer. We shall have certain stretches under observation throughout the winter, and may have something more to say concerning them.

According to the Copenhagen *Berlingske Tidende* the Danish Government intends at the end of the present year to introduce a bill revising the motor regulations at present enforced in Denmark. In this connection the Minister of Justice has requested the Copenhagen municipal authorities to state how far they consider alterations desirable. The Director of Police has informed the municipality that in his opinion the existing prohibition against motoring by night should be withdrawn, and that cars should be allowed to travel after dark at the reduced speed of two Danish miles (nine and a half English miles) per hour. He is of opinion that if this regulation is adopted the identification letters and numbers should be painted on the lamps as well as on the backs of cars, and that motor cycles should bear the same marks of identification as cars. The director also suggested that any change of ownership in a car should be reported to the police by the former as well as the actual owner. The municipality in their reply concurred in the necessity for a change in the existing regulations, and expressed their approval of the suggestions made by the Director of Police. They thought, however, that the whole question of revision should be threshed out by a commission specially appointed for the purpose, somewhat after the manner of the British Royal Commission.

MOTOR CARS AT THE STANLEY SHOW.

ADAMS AND Co., Tunbridge Wells (55).—A portable motor car elevator. This is constructed of light ironwork, and is fitted with a handle and gear working two small drums with wire cables, by means of which the car is brought from the ground level to the highest point of the elevator. If it is desired to bring the car into a horizontal position, the drums are wound still further until the weight of the car passes the centre of gravity, when it assumes a horizontal position.



The Adams motor car elevator.

A block of wood, or a trestle, can then be placed underneath the front to keep it from tilting forward. It is strong enough to lift any car up to 30 cwt., and is certainly a handy device for anybody unprovided with an inspection pit. In addition, there is the Adams patent quick-lift motor jack and the placing lever jack—a device for moving cars about in garages with restricted area.

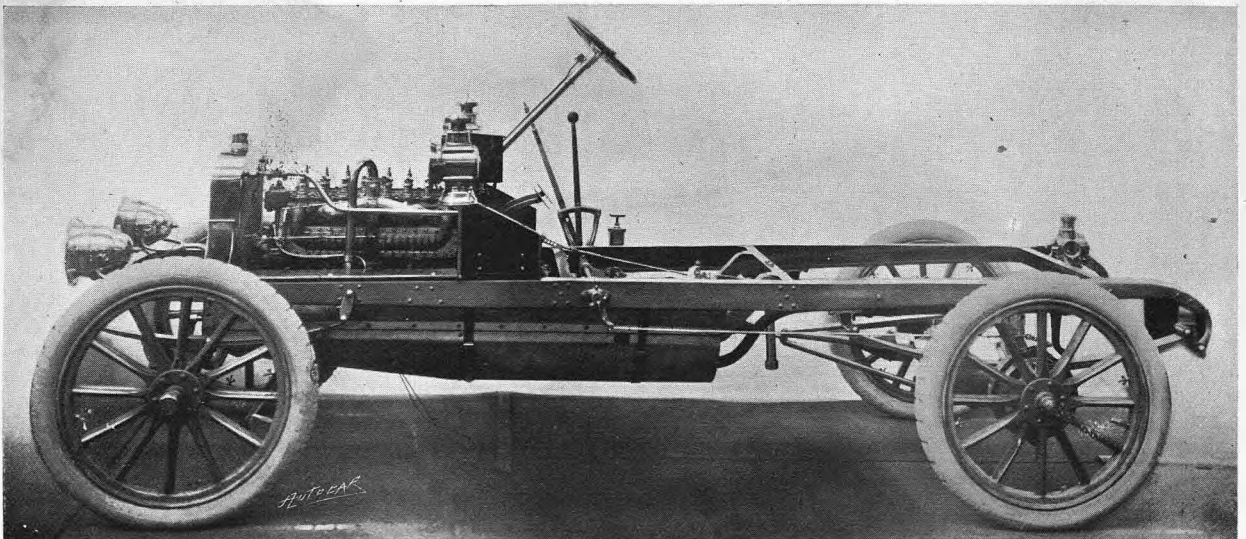
ANTOINE AND SONS, 41, Quai St. Leonard, Liège (92).—The Antoine four-cylinder 25 h.p. engine. This is an up-to-date design provided with the Gianoli high tension magneto driven off the valve camshaft. The engine is complete with a gear-driven pump, and to all outward appearance is excellently finished. If the car engines run as well as the motor cycle engines which this firm have sold in this country for some time, there will be little or nothing of which to complain.

AUTOMOBILES CORRE, LTD., Oxford Street, W. (20).—Unfortunately, this firm are unable to exhibit their 1906 patterns until after the Paris Salon. They will then be exhibited at Cordingley's Show in March at the Agricultural Hall. Among the improvements for 1906 will be a new magneto, new gear box, and the 24 h.p. four-cylinder De Dion engine.

Aster engines are no longer fitted to these cars, and for 1906 they will be driven by De Dion motors of 9 h.p. single-cylinder, 12 h.p. two-cylinders, and 24 h.p. four-cylinders. The car which carried General Booth through his recent tour of England is on view, and it speaks well for its mechanism and general behaviour when we hear that this has covered 2,500 miles without any breakdown.

THE BRITISH MOTOR AND ENG. Co., 5, Castle Street, Old Street, E.C. (23).—A small car fitted with a twin-cylinder 6½ h.p. Fafnir engine, which was illustrated and described in our issue of last week, is staged here, and a larger one with four-cylinder 10-12 h.p. Fafnir engine. One of the features of the car is the gear. Three speeds and a reverse are provided, the gear change being effected by means of the withdrawal of the engine clutch, which works another clutch in the gear box, the speed required being arrived at with the aid of a small handle on the steering column. The gear is somewhat complicated, and the pinions and gear wheels are rather small pitch. To make it clear to the reader, it would require a description of too great a length for the space at our disposal this week, but we hope to return to it later. The radiator consists of a series of hollow rings arranged vertically, each ring being joined up by a short piece of round tubing about ¾ in. long. There is a water tank above and below the nest of radiators. The water in circulation is driven round by an ordinary geared pump. The engine is started from the seat by means of a handle fixed to the dashboard, a chain communicating the power to the engine axle.

THE CENTURY MOTOR Co., Willesden Junction, N.W. (213 and 214, King Edward's Hall), show the Kelvin car—a Scotch production, with several interesting details. The engine, which is made at their own works, has all the valves on one side, and is fitted with a special form of carburetter of the firm's own make, with very easily get-at-able jet. By simply unscrewing a nut on the bottom of a long tube the spraying jet can be removed, cleaned out, and replaced in a moment. Sims-Bosch low tension magneto ignition is adopted. The water-circulating pump is fixed to the casting at the bottom of the radiator, and the same belt that drives the radiator fan also drives the pump passing round a pulley on the engineshaft. The gear box has three speeds and reverse. All gear wheels are in mesh, changes being effected by two double-faced dog clutches. One of these engages the second and third speeds, while the other one engages the first speed and the reverse. The changes are effected by means of a rack and pinion outside the gear box, operating cams which move the dog clutches inside the gear box. A feature of the back axle is that the tubular sleeves, and the two halves of the differential case, are each a solid forging connected with a circular disc. This makes a very strong back axle. The body is particularly roomy, the rear seats being carried a long way back. In a locker at the rear



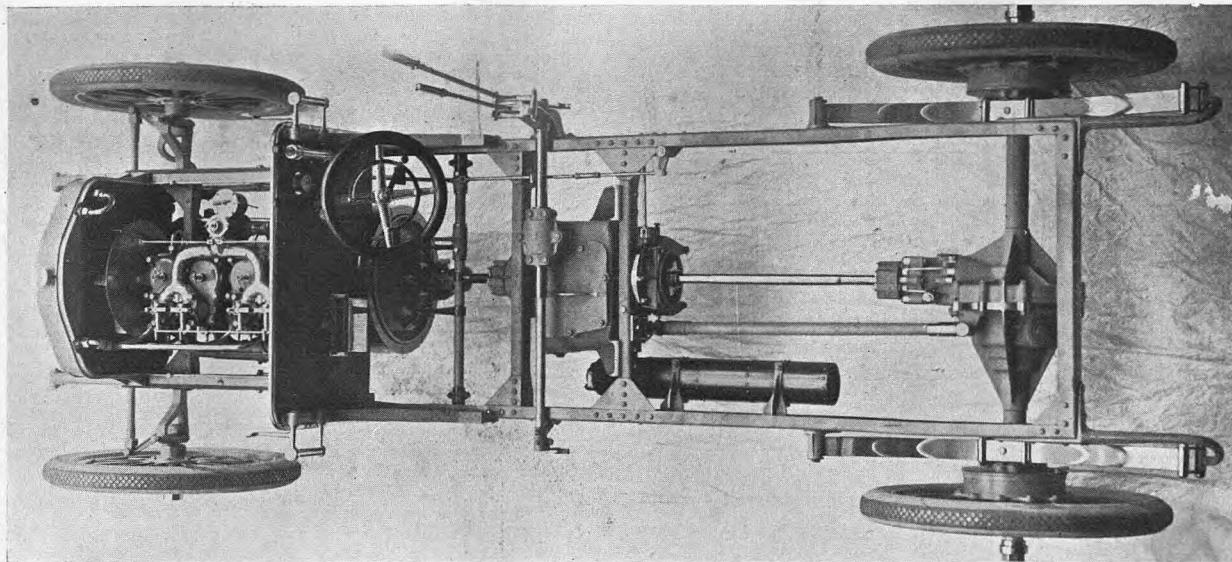
A 20 h.p. Thornycroft chassis, exhibited by Messrs. John I. Thornycroft, and referred to on page 685.

two tins are fitted—one for carrying a spare supply of paraffin, and the other for lubricating oil. The universal jointed shaft from gear box to rear axle has only one joint, and that behind the gear box. This consists of two cross-pieces, one on the gear box shaft, and one on the propellershaft, provided with slots through which two bolts are placed. It is claimed for this device that no matter in what position the rear axle may be, there is no strain on the gear box shaft. The car is in a bad and unlighted position, but it appears to possess several radical departures from ordinary practice in detail, while resembling other cars outwardly, with the exception of the frame, which is absolutely straight from one end to the other.

THE CIVIL SERVICE MOTOR AND CYCLE AGENCY CO., Holborn, W.C. (221).—This firm are the sole agents in England for the Pope cars, which are built in the Pope Co.'s works in America. The new car has a twin-cylinder $4\frac{1}{2} \times 4\frac{1}{2}$ engine, water cooled, with gear-driven pump. Lubrication to the engine is

to describe on paper, but the quick break is arrived at by means of a long flat spring, which, when it has passed over the dead centre on the cam, releases a plunger on the top of the cylinder head. There is also provision for ordinary battery ignition—in fact, the firm is willing to fit any type of ignition, but recommend the special low tension system, which is fitted to the engine. The exhaust and inlet valve pockets are cast on each side of the cylinder, and are rather larger than usually fitted, to allow for an increased quantity of water around the valves. The advance and retard mechanism for the low tension system mentioned above is allowed for by means of a phosphor bronze nut with rather a coarse thread, which, being turned, alters the position of the operating rod in relation to the cam.

THE EAST LONDON RUBBER CO., Great Eastern Street, E.C. (219).—The Kerry 10-12 h.p. twin-cylinder gear-driven car is shown. This has a channel steel frame with tubular front axle, and is gear-driven through an ordinary sliding



Plan view of the new 15 h.p. four-cylinder gear-driven Siddeley chassis exhibited at the Olympia Show.

by two large glass lubricators, the amount of oil fed being variable, according to the speed of the engine and the partial vacuum created in the crank chamber, to which a special form of relief valve is fitted. Ignition is by accumulator and trembler coil. The spray carburetter is of the Scheiber pattern. The wheels are all of equal diameter, 30 by $3\frac{1}{2}$ in., shod with Goodrich detachable double tube tyres. The gear box is fitted with a three-speed gear with the wheels always in mesh, each speed being picked up by means of metal to metal expanding clutches. The ordinary sliding type of gear can also be supplied if desired. There is fitted to the rear axle a means of adjusting the wear of the small bevel and crown wheel, and in the differential casing a roller bearing is fitted which takes the thrust of the small bevel wheel and prevents the large crown wheel from springing under the stress of the drive. The body is a tonneau with side entrance doors, well upholstered and finished. The single-cylinder two-seated runabout has a $4\frac{1}{2} \times 4\frac{1}{2}$ in. engine, and the same system of lubrication as the larger car, two speed gear and reverse, with direct drive on the top speed. This gear has a sliding wheel for the low speed and a dog clutch for the high speed. The spray carburetter has an arrangement interconnecting the throttle and the air supply, so that when the engine is throttled down to a slow speed the extra air supply is cut off in proportion. There is also an adjustable feed to the spraying nozzle by means of a screw outside and a lock-nut. It has 28 in. $\times$ 2 in. wheels, front and back, with the same tyres, viz., Goodrich detachable. On the same stand the Billet non-skid can be inspected. This performed well in the side-slip trials last year; it is of an easily detachable form, and has been described before in these pages.

THE CRYPTO CAR AND CYCLE CO., Mortimer Street, W. (26).—Samples of the Dupressoir chassis, also a new all-British engine called the Bentall. This is a twin-cylinder engine of 10 h.p., with a special form of quick break for the low tension spark. The way it operates is rather a difficult thing

type of change-speed gear box. The wheels are equal 750 mm. by 85 mm. The water tank is situated underneath the footboard, the circulating pump being driven by friction wheel off the flywheel of the engine. In front there is a honeycomb radiator, cooled by means of a belt-driven fan. The dashboard follows Daimler design, and upon it the sight-feed lubricator is fitted, also the high speed trembler coil, accumulator batteries being attached to the front of the dash, underneath the bonnet, supported on a shelf, and clamped with a metal strap. The body is a four-seated tonneau, access to the rear seats being through a tip-up left-hand seat. Side door entrance to the body is also fitted to this car at the same price as the one on exhibition. The figure is extremely moderate for a four-seated car, and if it runs as well as it looks it is very good value for the money.

GAUTHIER AND CO., Great Marlborough Street, W. (27).—This firm exhibits samples of the latest pattern Aster engines, Malicet and Blin gear boxes, Argus engines, etc.

THE HORLEY MOTOR CO., Horley, Surrey (216).—An example of the 9 h.p. Horley car. This is sold at a remarkably low figure, and is now fitted with the Horley motor, $4\frac{1}{2}$ in. by $5\frac{1}{2}$ in. stroke. A new change-speed gear box is provided. There is nothing that calls for special mention beyond the fact that a White and Poppe twin-cylinder engine can be supplied to this car at an extra cost.

HUMBER, LTD., Beeston and Coventry (17).—In the Minor Hall Humber show four complete cars and two chassis. These are practically duplicates of those we have described as being on show at Olympia, with the exception of the long wheelbase Coventry 10-12 h.p. car, which has been increased to 8 ft. This latter has a larger engine, the bore being $3\frac{1}{2}$ in. and the stroke $3\frac{1}{2}$ in. The back axle is fitted with a special form of hub, which revolves on a ball bearing, the weight of the car being carried on the tubular sleeve of the axle, and all the work the axle has to do is to drive by means of a dog

The Stanley Show.

clutch which engages with teeth cut on the end of the hub shell. The gear box has been increased in size, and also the size and width of the teeth on the gear wheels. At the back of the gear box is a special oil-retaining case for the universal joint, which enables the latter to revolve continuously in an oil bath. In the bodywork, the 10-12 h.p. now has double side doors instead of the swinging front seat. A landaulet body is also on view. This looks exceptionally smart, the bodywork and hood being excellently finished for a moderate-priced vehicle. Examples of the 16-20 h.p. Beeston-Humber car are also on view, but as these are identical with those shown at Olympia it would be only repetition to describe them again here.

E. H. JONES, The Hall, Islington, N. (3).—14-20 h.p. and 20-30 h.p. Renault cars, with a new design of landaulet body and sid entrance body with patent Victoria hood, are found here.

THE LONDON AND PARIS AUTOMOBILE AGENCY, Bermondsey Street, S.E. (217), are exhibiting two Darracq cars, for which firm they are agents.

THE MOBILE MOTOR AND ENGINEERING CO., LTD., Birmingham (25).—This firm has no exhibit at Olympia, but shows here three vehicles, the smallest being a twin-cylinder 8 h.p. fitted with Aster engine. The back axle differential case has been increased in size for 1906, but, beyond this, there is no alteration to this vehicle. The fitting of the electrical details show care, all the low and high tension wires from the dashboard forward to the engine being encased in a wood fibre tube. From the dashboard to the batteries, each wire is encased in a separate metallic flexible tubing specially made. A finely finished chassis fitted with a 20 h.p. Aster engine, with each of its cylinders separate, is on exhibition. The frame is of pressed steel, all joints being electrically welded. The dashboard on a landaulet has special glass wind-shield. When this is raised to protect the occupants of the car, contrary to the usual style, there is no wood framing across the shield to intercept the driver's view. The landaulet car has a nicely finished body, and can be supplied with twin-cylinder 14 h.p. Aster engine, or, at an extra charge, a 14 h.p. four-cylinder White and Poppe engine.

THE QUADRANT CYCLE CO., Birmingham (151).—Here is Lloyd's cross roller gear, which was recently illustrated and described in our pages. The chassis has now been completed, and is shown with the clutch pedal and striking gear all complete. There has been no alteration in the method of operating the mechanism, or any other details, since our description was published.

THE STAR ENGINEERING CO., Wolverhampton (19).—The new Star car for 1906 is a four-cylinder 10 h.p., having an ash frame with steel fitch plate. The bore of the engine is 3in., and the stroke 4½in. The engine speed runs up to about 1,600 revolutions per minute, and pulls well even at that speed. The clutch is specially constructed to give no end thrust, except when disengaged. The transmission is by chain, as on the larger Star cars; and at the moderate price asked, it is remarkably good value, fitted as it is with a four-seated tonneau body. Those who are looking out for a roomy car at a moderate price to carry four should not fail to examine the latest Star vehicle. In addition to this new pattern, there are examples on the stand of the 7 h.p., and also of the newly-designed 14 h.p., and also larger Star cars. The 14 h.p. is a four-cylinder car with a 3½in. by 4½in. bore and stroke engine running at a normal speed of 1,000 revolutions per minute. At this engineshaft revolutions the speed on the top gear is thirty-two miles an hour with a 20-teeth sprocket, and twenty-five miles an hour with a 14-teeth sprocket. The cylinder and heads are cast in pairs without water joints, the exhaust

valves being on the left and the inlet valves of the overhead type actuated from a camshaft on the right hand side. The water is circulated by a powerful pump gear driven from the exhaust camshaft, the water pipes and connections being as short as it is conveniently possible to make them. The wheels are 32in. by 3½in. and have internally expanding metal to metal drum brakes to the rear wheels, and an additional brake on the differential at the right hand of the differential gear case. The wheelbase of this car is 8ft. 6in. by 4ft. 4½in. track, and practically all types of body can be fitted, but the dimensions are particularly suitable for a neat side entrance body. The springing is good, a point that should be remembered by those who are on the look-out for a vehicle to stand rough roads and town work. The 7 h.p. twin-cylinder commands a good deal of attention, as it is a remarkably low-priced vehicle taking into consideration that it has a twin-cylinder governed engine of 3½in. bore by 4½in. stroke, 30in. by 3½in. tyres, and well finished body upholstered in real leather. The wheelbase is seven feet, and the general appearance of the chassis is good; this latter, as well as the other chassis, is seen to great advantage by means of mirrors fitted the whole length and width under them. One 18 h.p. car with 4in. by 5in. cylinders, four-speed gear, side entrance body, and one 30 h.p. touring car, complete a very practical and representative exhibit which is securing a lot of attention from Stanley Show visitors.

THE STAR CYCLE CO., Wolverhampton (24).—The Starling is a little car fitted with a single-cylinder engine placed across the front of the frame, the drive from the engine to the gear being by means of a chain, and from the gear box to the back axle again by chain. The gear box shafts are across the frame of the car, so that the drivingshafts of engine, gear box, and rear axle are all parallel. Three speeds are provided, the top speed being direct from countershaft to the rear axle. A special feature is the control which is directly under the steering wheel. A rod actuates the throttle by a pulling-up movement. At the same time, if the rod is rotated it controls the additional air supply. In place of bell cranks the rod goes direct from the steering column to the carburettor at practically the same angle as the steering column. The frame is of ash with a steel fitch plate, the cross bearings being of angle steel, and the water tank is fitted underneath the rear seat, and has a capacity of six gallons. The adjustment of the two chains is provided by moving back the gear box, and also the rear axle, the latter by means of radius rods. The latest pattern has a clutch on the end of



The new 14 h.p. Star car with four-cylinder engine.

the starting handle, and a corresponding one on the engineshaft. This latter is also stayed up to the frame by means of a skeleton bracket. Six of these little Starling cars are staged in different colours, one being shown as a delivery van with a slightly stronger frame and springs, and a lower gear. Taking them all round the Starlings are good value at the price asked.

We have on previous occasions referred to the quaint way in which foreigners express themselves on automobile matters. Two further instances of this kind of quaint assurance are brought to our notice by a firm which has received enquiries from abroad. One of these correspondents, writing from Adjah Bippo, says: "Having seen your address on a certain newspaper that recommended you so highly to me that's why I have to write you to ask you some of your samples and catalogue price list. Please I want to see your goods before

I sent orders to you in fast mail. I hope you will not fail to send me all kinds of your samples and other things quick as possible." The other, writing from Kissy, Sa. Leone, W.C.A., says: "Having heard of your valuable, etc., as I was reading a paper that I find in the Public way, as am reading it, then I turn the Bark of it, I saw your address on it then I said I will send for your catalogue. May you send me one of your catalogue? Believe on me yours very faithfully,—"