

MOTORS FOR MILITARY PURPOSES.

The value of the automobile in warfare is now generally recognised, and the best authorities are convinced that the ubiquitous motor will make its presence felt in the campaigns of the future. The extraordinary qualities of speed, power, and the practically unlimited capacity for sustained effort (wherein the machine is superior to the animal) which have made the automobile assume the commanding position which it now holds in peace, will undoubtedly prove doubly valuable in war.

Motors have a threefold use in warfare: (1) As a means of transport for material of all kinds. (2) For the rapid conveyance of combatants to the scene of action. (3) As a means of communication.

Taking the automobile in its broadest sense to include the railroad locomotive, it will be evident that it has completely altered the military tactics of the civilised world during the past half century; but it is less with this aspect of the question that the writer proposes to deal than with the automobile in its latter-day form as a vehicle capable of travelling wherever there exists a road, and often where none exists at all.

Now, if the exigencies of warfare permitted operations to take place for the most part in civilised countries and along the line of roads, it would not be necessary for the designers of military automobiles to greatly modify the

PATTERNS WHICH HAVE PROVED THEIR RELIABILITY IN ORDINARY USE.

But the late military manoeuvres, if they have fulfilled no other purpose from the point of view of the motorist, have at least served to show that if the motor is to be a useful adjunct of warfare it must be capable of going wherever a man and horse can go. The ancient Romans may be said to have marched to victory along their marvellously constructed roads, and, perhaps, in the future, victory will rest with the commander who pursues his tactics on the same lines, but meanwhile we are confronted with the problem of rendering the motor fit for use over trackless land. The most obviously vulnerable point of our present-day motors is the pneumatic tyre, and it might seem at the first glance necessary to discard this most valuable accessory. Yet the pneumatic tyre is of incalculable value as a means of minimising discomfort and protecting all parts of the delicate mechanism from inordinate shock, while its facility for repair will probably improve as time goes on. On the other hand,

A PNEUMATIC TYRED CAR OR CYCLE MAY BE ABSOLUTELY DISABLED BY THE FAILURE OF ITS TYRES.

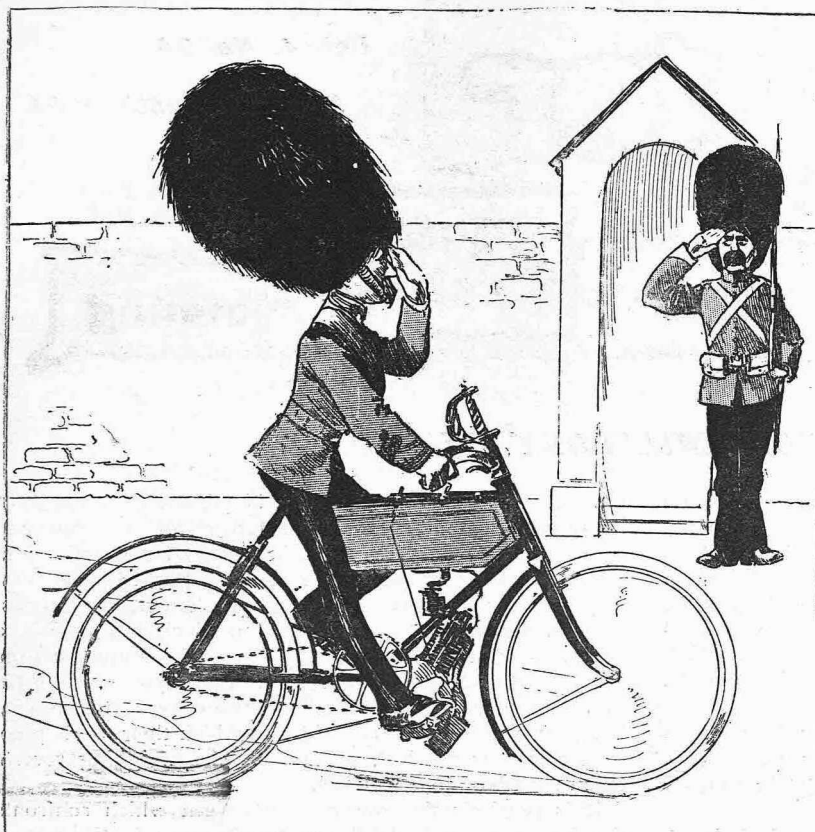
The true solution of the problem would seem to lie in the direction of a compound tyre—pneumatic in the first place, but containing within itself a solid tyre which could be utilised in case of failure of the pneumatic portion. Such a

tyre actually exists; but it would be premature to speak of its present capabilities, and its future possibilities can only be hinted at. Solid tyres are at best only a compromise, and their limitations in the matter of speed preclude their employment for rapid transit. In fact, on ordinary roads, 25 miles per hour is about the limit at which it is possible to drive a solid tyred car; while the wear on the engine, and the mechanism generally, is enormous. Solid tyres would seem to have their uses on the heavier vehicles used for transport; but even here the limit of weight at which their use is practicable is soon reached, and on vehicles weighing several tons they are of no advantage.

It is precisely this question of weight which confronts the designer of automobiles destined for use in the first of the three divisions into which we have chosen to divide military motors. This class includes such vehicles as steam lorries, traction engines adapted for drawing baggage waggons, and motors adapted for special purposes (such as the carrying of the apparatus necessary for wireless telegraphy or an ordinary field telegraph, electric lighting, etc.). At the present time part of this work is carried out by special divisions using the more ordinary means of transport, but it is evident that just here, above all, the motor is destined to supplant the horse. If a vehicle be too heavy it will sink in the ground, and be exceedingly difficult to move: this is precisely what happened to the heavy steam lorries so extensively used during the recent manoeuvres, and

IT WAS OFTEN IMPOSSIBLE TO EXTRICATE THESE UNWIELDY VEHICLES

in time to make them of any real service. A light waggonette, on the other hand, could go practically anywhere; and it would therefore seem a desideratum, even among the slowest of the motor vehicles, to make them as light as is consistent with strength and reliability. The tractive power of such a light motor as we have imagined would necessarily be considerably less than that of the often useless colossus; but, by increasing the number of such light tractors the disadvantages imposed by the lesser load they would be capable of conveying would be counteracted: the weight might conveniently be in the neighbourhood of two tons, which would ensure practical certainty of progression under all ordinary conditions. The uses to which the motor's power may be put in warfare are endless. Suitably arranged, it may be used for driving a dynamo, furnishing current for a complete camp electric light installation or concentrating it to a single searchlight. Electricity is needed for telegraphy, whether wireless or otherwise, and the motor and dynamo would furnish this. Arranged as a hauling engine with the aid of a wire cable the motor is capable of



Lieutenant Ponsonby de Browne-Greene found his motor invaluable in fitting to and from barracks. The busby was really quite intolerable, however, and any other headgear out of the question!

raising loads far greater than its tractive powers would enable it to draw. Enough, in short, has been said to show the possibilities of the motor as a transport and power producer, and it only remains to adapt the machine to the multifarious services which it is capable of rendering. It is interesting to recall

THE USEFUL PART PLAYED BY A SMALL STEAM CAR

of the American runabout type during the late war. It will be recollected that this machine, constructed to withstand totally different conditions, successfully conveyed its passengers over veldt and spruit, was apparently fired with any fuel that happened to be handy, and actually survived a campaign to be finally exhibited in London.

Failing special arrangements for the purpose, the machine was utilised as a stationary motor by the simple expedient of raising the driving wheels clear of the ground, and driving a dynamo by a belt passing over the rim of the road wheel itself.

Resourcefulness combined with knowledge will prove a more valuable asset to the military motorist than to his more peaceful brother. None but those gifted with true mechanical aptitude could ever hope to bring

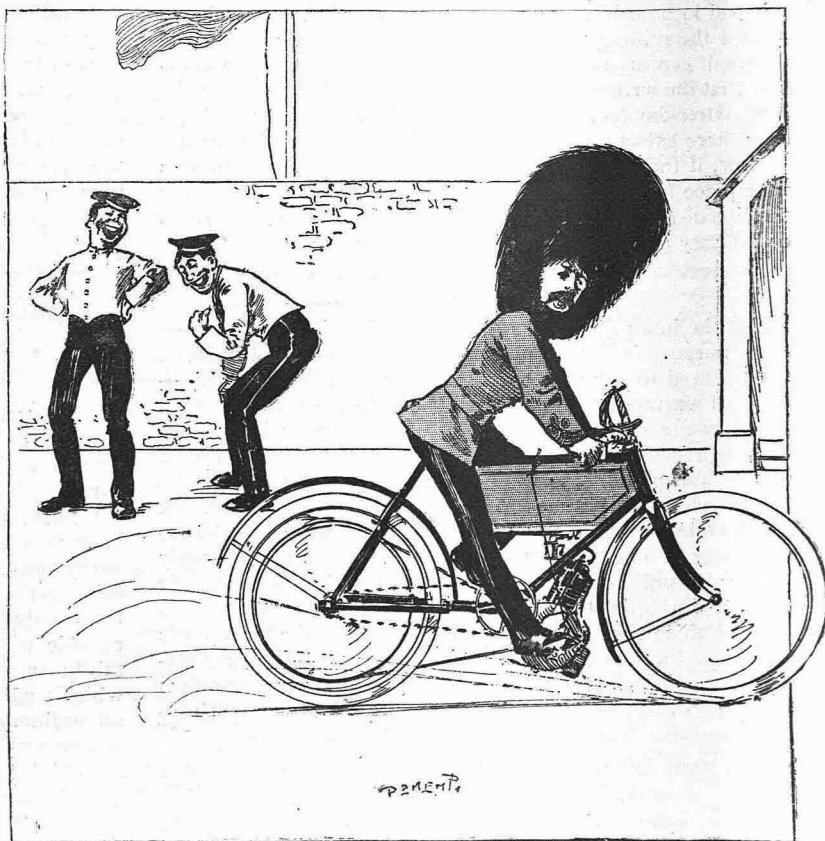
their motors safely through a campaign. It would be asking too much to expect that the competent mechanic, well provided with all possible material for a breakdown and subsequent repair, should be on the spot in time of war; so

THE MILITARY MOTORIST SHOULD BE A HOST IN HIMSELF,

self-reliant, and never in danger of being stranded.

Thus the best of our drivers, racing men and professional chauffeurs, should form the elite of the motor corps of the future. Equally valuable is the careful motorist, the man who spares his machine, whose watchword is reliability. But there is no room for the incompetent.

A particularly distressing case of incapacity came under the writer's notice during the course of the recent manoeuvres. A motorcyclist, seeing a member of the corps, asked for assistance with his machine, which he declared he was unable to start. Inspection revealed that the sparking plug was cracked, the switch out of order, and nearly every terminal on the machine loose. A request for another plug elicited the information that this, too, was broken; but a temporary repair was contrived, and the machine satisfactorily started within five minutes.



The gallant and ingenious officer hit upon this happy solution of the difficulty, and finds it, by Jove! quite the most distinctly dooced comfortable thing in head furniture.

Notwithstanding this, the distressful owner returned no less than three times, declaring that the machine would not climb a stiff hill over which he had to proceed. It was actually necessary to show him

HOW TO USE THE THROTTLE AND ADVANCE SPARK PROPERLY.

The writer naturally questioned him as to how he could volunteer for service in a motor corps in his present state of ignorance, and elicited the somewhat extraordinary answer that "he could drive the machine all right so long as it went well," a feat of which any other fool is equally capable. Such men can only cast discredit upon a motor corps, and are not likely to foster the cause of motoring generally. It is, perhaps, superfluous to add that this individual was driving a heavy and powerful machine, which it was almost criminal on the salesman's part to put into his hands. One small bag, containing hardly any necessary spare parts, was all that the machine carried, and the driver's parting benediction was: "And so you would really advise me to buy a spare sparking plug?"

Turning now to motors used for the conveyance of combatants, these may be divided into two classes: (a) those intended for a single individual (the cycles); and (b) those carrying more than one, preferably several. Inasmuch as the slowest motor vehicle of this class is capable of travelling in a few hours the distance covered by the troops—whether cavalry, infantry, or artillery—in a whole day, the question of speed need not seriously be considered in this relation. If the motor be considered, however, as a means of projecting combatants forward of the fighting line, and enabling them, by covering a distance impossible to the troops,

TO TAKE AN ENEMY BY SURPRISE.

the value of speed becomes more evident. A comparatively

insignificant body of men, if their attack be delivered at the psychological moment, may do a vast deal of havoc; and the disastrous effects of such attacks were frequently exemplified during the late war. The motorcycle offers many facilities for this work. General Miles, of the United States Army, recently expressed an opinion that the cavalry of the future would be mounted, not on horses, but on motor cycles. Although there seems no probability of such a radical change taking place in the near future, such an event is not so impossible as it may seem at first sight.

Given a motorcycle to fulfil the requisite conditions, it would have all the advantages of speed, mobility, and imperviousness to fatigue, while the almost negligible amount of attention required, as compared with the horse, would tell largely in its favour. Even at present it may confidently be anticipated that motorcyclists will play a prominent part as scouts in all future operations. The improvements necessary to adapt our ordinary machines to military work are endless. It goes without saying that the machine should be strong, since it is called upon to withstand conditions which certainly do not obtain in the course of ordinary riding.

THE ADDITIONAL STRAIN IMPOSED UPON THE SPOKES AND RIMS while going over broken ground is enormous, and these parts should especially be seen to. The present standard position of the engine, low down and placed midway between the two wheels, is not all that could be desired for military work. The writer, who rode such a machine during the manoeuvres, frequently found that the crank case came into contact with the ground (where much broken), logs, and other objects, over all of which the machine had to be wheeled.

(To be concluded.)



THE POLICE TRAP OF 1904. TAKING A NUMBER.

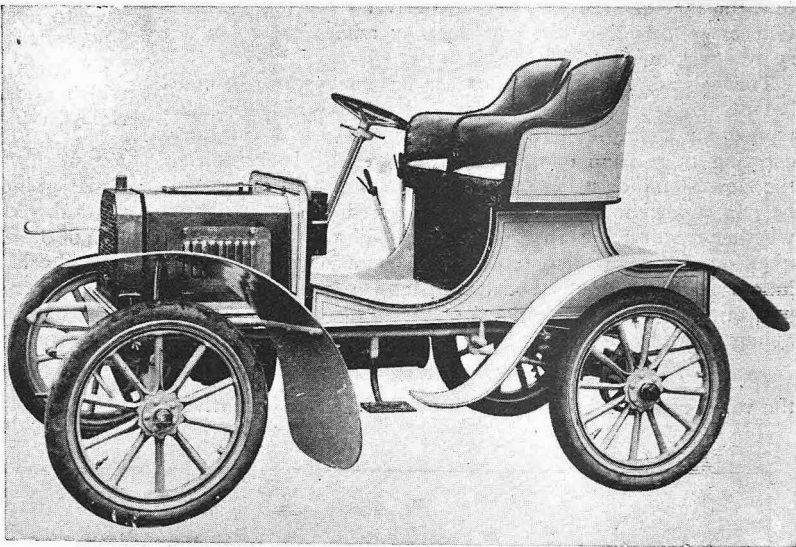
THE GORDON MINIATURE CAR.

We described and illustrated the 4 h.p. car made by the Gordon Motor and Cycle Co., of 140, Seven Sisters Road, Holloway, London, N., when it was placed on the market a year ago. The car then was the outcome of three years' experience and experiment, and it proved perfectly successful, and enjoyed a satisfactory sale; but with the desire to produce the best possible car for the money, every detail of the vehicle has been gone over and improvement introduced

where necessary, and this, combined with the greater facilities which are secured by a larger output, have resulted in the production of what is really a car in miniature, capable of giving excellent service with the freedom from defects which can only be obtained from careful design and good workmanship. Every part of the car and machinery is made at the works in Holloway. Consequently, replacements are quickly obtained, and the makers are able to satisfy themselves concerning every detail of the cars supplied by them. In the new pattern Gordon, a 6 h.p. engine is being employed, made to take parts and fittings of the 6 h.p. De Dion, so that spare valves and such like, should be obtainable everywhere. The bearings for the crank shaft are of extra length, thus ensuring thorough steadiness in the running. The engine is placed forward in the usual position under the bonnet, being securely attached to the frame by four lugs, cast upon the crank case. It is water-cooled by thermal circulation, the water passing through a Mercedes pattern of radiator. For this method there is claimed extreme simplicity combined with perfect cooling and economy of water. A large outside fly-wheel is employed, with which the clutch engages. Power is transmitted to the gear box by the clutch shaft, and from the gear box by a 11 in. pitch Brampton's roller chain. The gear is of the Renault type, giving direct drive on the top gear and a reduced gear through the train of four pinions, which are always in mesh. The whole of the gear runs in oil, and is splendidly made, long phosphor-bronze bearings and

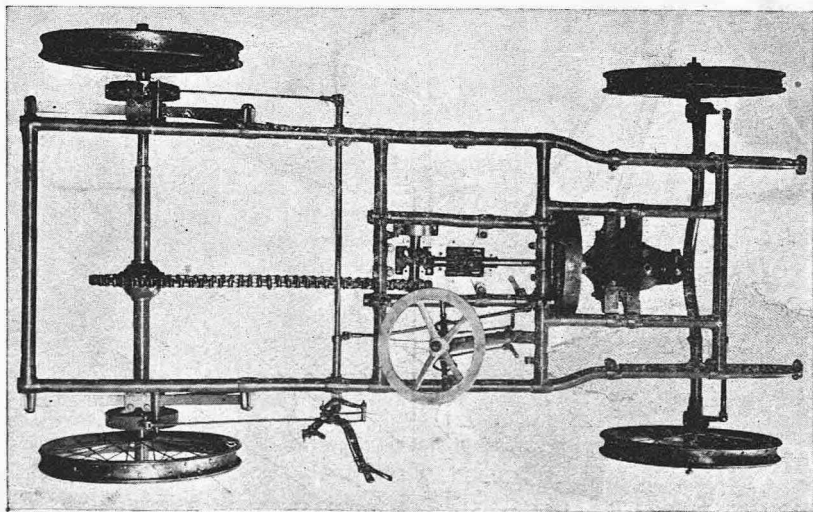
hardened steel wearing parts being employed throughout. The drive is taken to the chain ring encircling the differential on the rear axle. This latter is a very fine piece of work, and we noticed, during our examination, that it had been made amply strong, and that no skimping of material had been allowed.

The framework is tubular throughout, with good malleable dumb irons to take the spring shackles. The



The 6 h.p. Gordon Miniature Car.

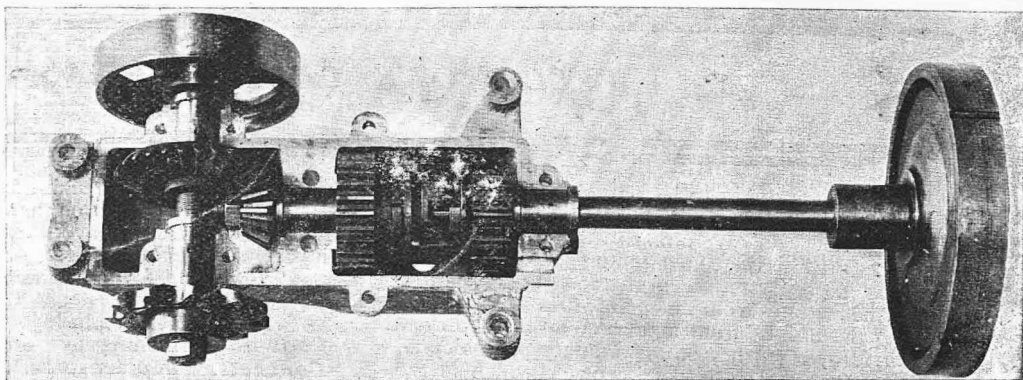
wheels are either of the suspension or artillery pattern, according to the customer's wish. They are carried upon good quality springs, and are shod with Michelin or Dunlop tyres. We noticed that between the springs and the rear axle bearings a hinged joint is provided. This allows the axle a limited amount of lateral movement, which is likely to occur when a wheel drops into a hole in the road. Substantial radius roads, extensible for the purpose of adjusting the chain, are fitted, and altogether the rear axle work is well designed and carried out. The front axle is of strong tubular steel. The body ordinarily fitted is the double bucket seat with a curved after portion, a large space being provided underneath for luggage and spare parts. The petrol tank is carried in this space, the accumulators under the bonnet on the front of the dashboard, and the coil and sight-feed lubricator on the rear of the dashboard. Control is brought to the inclined steering pillar through throttle and spark advance levers, whilst at the driver's right hand are to be found the change-speed lever and the lever applying the brakes to the drums on the rear wheels. Two foot pedals are provided, one for withdrawing the clutch and the other for applying the brake on the driving shaft. In every detail of the mechanism, from the steering joints to the rear axle, full provision has been made for adjustment



Chassis of 6 h.p. Gordon Miniature Car.

for wear. With the engine running at 1,200 revolutions per minute, the car can do 22 miles per hour on the top speed, and from seven to eight miles per hour on the low speed. It can be accelerated up to 27 miles per hour, or it can be geared lower for hilly country. The price is £131 5s. with wire wheels, or £136 5s. with artillery wheels; a price which is not at all high for the excellent quality of the work introduced throughout.

The illustrations which accompany this description show one of the new pattern cars with artillery wheels, a view of the complete chassis and a view of the transmission system. It will be seen from the first illustration



THE TRANSMISSION SYSTEM OF THE GORDON CAR.

This illustration shows the method by which the power is transmitted from the fly-wheel, through the friction clutch, the two-speed gear, and the bevel wheels on the countershaft, to the chain sprocket. A sliding clutch on the squared portion of the shaft in the gear box communicates the power direct on the top gear by locking the larger pinion to the shaft, or through the train of gears (only two out of the four pinions are visible) by locking the smaller pinion to the shaft. The drum on the countershaft is for the application of the foot-applied band brake. The whole of the gear runs in oil.

that the car presents a very smart appearance, whilst it will be observed that the wheel base is of the fullest possible length, and that there is ample leg room for the driver and passenger.

CLUTCHES AND FREE ENGINES: SOME CRITICISMS.

By B. H. DAVIES.

Every year an increasing number of manufacturers exhibit at the Shows machines fitted with clutches giving a free engine, but before accepting any innovation we ought to consider whether it has actually been found a practical improvement or not. The idea of a clutch is (a) that one may dismount without stopping the engine, (b) that one may desire to travel slower in traffic for a few moments than a connected engine allows, (c) that the engine can be tested without pedalling the machine.

The argument that all cars have clutches provided, and therefore bicycles should have them, is, in the writer's opinion, an unsound one, for to restart a car engine means, in nearly all cases, a dismount, and in the case of a multi-cylinder engine, a good deal of exertion, even if we ignore the use of a clutch for slowing down, for hill-climbing, and, above all, for gear changing. Before examining our three points we may note two points against bicycle clutches and one in their favour, to which no one can take exception:—(i.) They are an additional complication. (ii.) They are necessarily small in diameter, and are consequently seldom as efficient as they should be. (iii.) But they permit of much faster and pleasanter coasting down hills.

RETURNING TO OUR ORIGINAL THREE POINTS.

in regard to (a) the bicycle clutch is never employed in practice, except for the briefest dismounts. The engine is almost invariably stopped. The explanation is that the bicycle engine is ungoverned, runs at a very high speed, and is not always efficiently silenced, i.e., when running free, it makes a fearful noise, and is subject to rapid wear. Further, it is usually air-cooled, and therefore very liable to become red-hot, when running stationary, in a very few minutes. I myself use a water-cooled quad, with free engine. It is practically silent on the high gear, but with the clutch out there is so much racket and vibration that I usually switch off, even when I stop only to ask the way, even though this means winding a strap on a pulley at the rear of the machine in order to restart. (b) In traffic equal facility of control is gained by an exhaust lifter worked from the handlebar. In fact, the exhaust lifter has two advantages over the free engine, because (1) it reduces, instead of increasing, the noise, and (2) both hands are available for steering, whereas

most clutches necessitate the employment of one hand (c) The clutch and miniature starting handle are claimed to be a great advantage for starting and testing purposes. Now no good motorcycle in perfect order and adjustment can possibly require more than half-a-dozen complete "operations," i.e., say, 2 revolutions of the crank shaft, to effect a start. If the machine requires 200 yards' pedalling to start the engine, either something is out of order or the driver does not fully understand its manipulation. The use of a free-engine clutch will only

SUBSTITUTE TEN MINUTES "COFFEE-GRINDING"

for 200 yards pedalling.

Pedalling to start the motor is, however, not the best way. The simplest and easiest way is to run a few yards with the machine, put on full compression, and mount by step or pedal, or vault on from the ground. This I prefer to carefully propping the bicycle against a lamp-post, locking the steering, "coffee-grinding," putting handle in one's pocket, mounting, pedalling, and letting in the clutch.

Then for testing purposes no one who understands his hobby continues pedalling when the engine ceases to fire, gradually or suddenly. The free engine is useless for testing the sparking, the valves and gear, or the petrol feed. If the spark is good, engine in order and petrol reaching the carburetter, one can use the free engine to ascertain if gas is reaching the combustion chamber; but there is no need, as by process of exhaustion this is clearly the cause of the stoppage. A free engine again is no help towards discovering a loss of power.

IN FACT, I CAN ONLY SEE TWO ADVANTAGES IN IT,

that of smooth free-wheeling downhill, and that of saving the novice or careless rider a certain amount of pedalling, and I might add that the novice or careless rider is very likely to abuse it and damage his engine.

Of course, it is a necessity on heavy quads and tricycles, and in any machine fitted with a multi-gear; and many people are clamouring for it even on the light fore-carriage, but it is a question for prospective users to consider whether it is a real advantage, or a complication calculated to cause troubles on the road.

CYCLOMOT'S CAUSERIE.

Is Motorcycling Fatiguing?

There seems to be a kind of fixed impression in the minds of some people that if a rider can give himself a careful inspection after a ride on a motorcycle he must of necessity find a large modicum of fatigue about him. And arguing from this point, these good people are comparing the fatigue from a journey on a motorcycle to that imparted by a journey on an ordinary push-bicycle, and doubtfully wag their heads and wonder which is the greater. The idea is so far-fetched that I have come to the conclusion that the fatigue finders have been kept indoors by the weather, and have imagined that distressing symptom from the depths of a particularly comfortable arm-chair. Personally I know which I would rather undertake, a fifty miles trip on a bicycle, providing my own locomotive power, or a hundred miles motorcycle ride with a good machine under me. In my salad—I mean cycling days—my average day's journey was about fifty miles, but as a camera invariably hung in a carrier on the frame, a search for the beautiful and picturesque took me into, if not hilly, at least unlevel country, and the operations of recording those beauty spots, with an eye to possible exhibition pictures (and a more remote possibility of getting a "medalled" picture!) used to absorb a substantial portion of the day. A good day's cycling without any loitering seldom exceeded a hundred miles, and that was reckoned, by me, anyway, as a very creditable distance. And I know just how much fatigue journeys of that sort entailed. Many a time have I ridden to the sea coast and back during the week-end, and, figuratively speaking, patted myself on the back because the double journey had been performed without curling up, despite the fact that hard work and long hours and wet weather had prevented me getting fit. But on a motorcycle now, a week-end trip to the sea coast is quite a light and easy task, and even during a day of pottering about, with or without a camera, one seems to reel off a hundred miles without knowing it. When motorcyclists tell me that they get fatigued so easily they remind me of a friend of mine who, after a course of French living, came over to London, and at his first English meal ordered a steak. He had scarcely got half-way through it before he put down his knife and fork with a sigh and said, "By Jove! this will wear me out!"

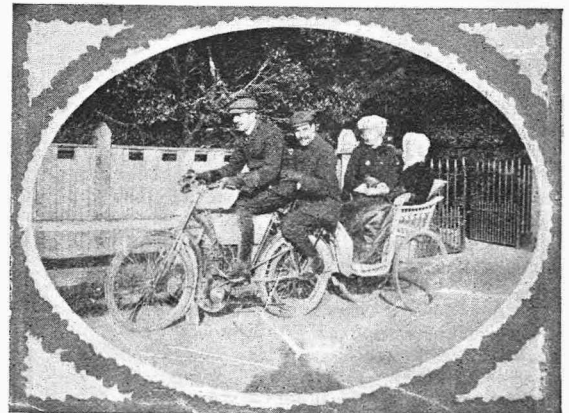
Position at Fault.

I jibbed at the soddened condition of the roads last week-end, and, putting on my thickest boots, and training out some distance, tramped it for some miles along a well frequented main road. There were more motorcyclists about than I had, for a moment, expected, and I almost felt ashamed of myself at times when different friends and acquaintances passed or stopped, and remarked in a tone of surprise, "Aren't you riding to-day?" It became monotonous having to explain so often that the grease was more general than I liked. However, being afoot, I was able to take stock of the riders who passed me, and I was struck by the fact that quite half of them seemed to be sitting in most uncomfortable positions. The number who were crouched in the attitude of the race path was as extraordinary as the pose itself. There were very few but had their backs bent to a curve which is not beautiful in the male back, whilst in some cases the sprawl from the handlebar to the saddle irresistibly gave the impression that the riders were on the verge of slipping off behind. I think it is only necessary for this to be pointed out for every rider to carefully study his position awheel, and get it arranged to suit him in every possible way, particularly with a view to avoiding rounded shoulders. It is not at all improbable that a bad position would create all the symptoms of fatigue: in fact, it is the most likely thing that would happen. And so

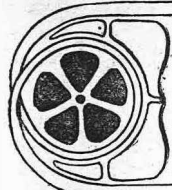
the rider who experiences undue fatigue after a ride has more reason to suspect his position than any other factor in motorcycling. For myself, I favour a somewhat upright position with the weight placed not too far behind the crank bracket, stooping to reach the handlebars being avoided.

Coils and Contacts.

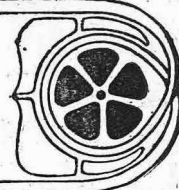
When placing an order for a new 2 h.p. motorcycle a short time ago I found that, in order to get a trembler coil and a wipe contact on the engine a departure was necessary from the standard specification. There was no trouble raised (perhaps the makers knew that I should object to having anything which I did not consider to be absolutely the best), but it meant a certain amount of delay. I am rather surprised, because honestly I would not go back to the ordinary make and break, after having had a year's experience with the wipe contact. But I am willing to concede that there are many reasons for success or failure with either method. Speaking from experience, the make and break system entails considerable trouble, and the wipe contact none at all. Whatever may have been the cause, it always became necessary to adjust the contact points on my old machine every 70 or 80 miles, and frequently this meant that the trembler blade had to be removed and the platinum tip filed fair and flat. Misfiring would be the symptom which pointed to the cause of the trouble, and I have spent a good few minutes at the roadside with the cover off my contact breaker, always to find that a little filing and a slight adjustment of the contact screw had got over the difficulty. Time has also had to be spent on this portion of the mechanism whilst the machine has been in the stable. Now notice the difference with the trembler coil. I have never once had to do a single solitary thing to coil, contact or plug the whole season. In fact, if I had not taken the batteries out for recharging purposes, my ignition system would have gone without attention. Out of curiosity I have removed the cover which protects the trembler on the coil, and passed a duster over the blade and examined the points, and I have also twice removed the cover and inspected the contact blade and cam, and given them a spot of oil now and again. Such behaviour is sufficient to cause me to appreciate the trembler coil, and I, for one, do not intend to desert it or to go back to the make and break system again. I am trying a belt again next year on one machine but I really would prefer a chain, and if the belt gives undue trouble it will be promptly discarded. This is an object-lesson on the effects of luxuries: one gets spoiled, and does not care for the ordinary frugal fare!



A FULL LOAD



PAST AND FUTURE DEVELOPMENT OF THE MOTOR-BICYCLE.



Now that the year is drawing to its close, while the motorcyclist makes his preparations for winter runs—the connecting links between one riding season and the next—it may prove instructive to look back on the past twelve months from a motorcycling point of view. The weather, unfortunately, has left much to be desired from a riding point of view, although it has furnished us with an exceptionally severe test from which the motorcycle has emerged triumphant, as witness the Autocycle Club's Reliability Trials. In fact, reliability may be said to have been the keynote for 1903, so that the year will be remembered as that in which the motorcycle once for all made good its claim to be a thoroughly trustworthy machine.

Amongst the most salient features of the 1903 motor-cycle may be mentioned the V-section belt and pulley, the higher powered engine, the spray carburetter, and the general approximation of design, viz., with the engine in the neighbourhood of the crank bracket, and generally in a vertical position. All of these may be termed taking points in a machine, and have certainly contributed to success from a commercial point of view, although their soundness on theoretical and mechanical grounds may be questioned. Transmission by the V belt is not the most economical system, in the writer's estimation; but then,

IN THE HANDS OF THE NOVICE ESPECIALLY, IT GAVE FAR LESS TROUBLE THAN ANY OTHER SYSTEM.

The powerful engine, usually involving a heavy and unwieldy machine, gave at least an ample reserve of power, even with bad driving, also an advantage from the novice's point of view. The adoption of the spray carburetter was distinctly sound practice, but, as in many cases the makers hesitated to provide a convenient means of regulating the admission of air to the carburetter, or of mixture to the engine cylinder (two levers less made it so much simpler for the novice), many of the advantages of this type were nullified. It is not surprising, therefore, that complaints were frequent, and the surface carburetter—which, in the natural course of events, must in time become rarer and rarer—is still with us. This craze for ultra-simplicity was, however, not of long duration, and makers were not slow to recognise their mistake in thus reducing the efficiency of the machine, so that it is rarely now one sees a motor-bicycle minus a throttle and some means of altering the mixture. Moreover, as improvement succeeds improvement, the semi-automatic spray carburetter—in which the speed of the engine regulates the mixture, while extra adjustment is still provided for—

WHICH HAS PROVED SUCH A POPULAR FEATURE IN MANY OF THE BEST DESIGNED CARS,

will probably be adapted to the motorcycle. At least one example applied to this class of machine already exists, and will be fitted during the coming season, while other makers will not be slow to follow. So much for the carburetter. Turning now to the transmission, the belt—whatever be its form, and although its defects are manifold—has still much to recommend it for the lighter machines—the motor-bicycles proper. Even under the most adverse conditions (and these have surely not been lacking of late) it has proved reliable, while its simplicity and ease of adjustment must ever remain strong points in its favour.

This leads to a discussion of the engine power desirable, and here we stand at the parting of the ways. The desire for sociability, together with a feeling of additional safety, led to the widespread adoption of the fore-carriage (an old idea in a new form), and later the side-carriage (an innovation still subject to much criticism, though its practicability seems proved). With the adoption of these two additions to the

motor-bicycle came the necessity for more power, a form of transmission more suited to the new conditions, and a desire for a closer approximation to details of design embodied in the light car.

THIS HAS RESULTED IN A RECRUDESCENCE OF THE CHAIN OR GEAR DRIVE,

and the variable speed gear, both of which were long ago proved unnecessary for the motor-bicycle, the demise of the Shaw chain driven machine, and the two speed "Chapelle" motor-bicycle, for example, sufficiently attesting this. It must be clearly understood that we are here speaking of the standard motor-bicycle, for at least one type of chain driven machine, the Humber, to wit, remains to attest that, with proper design, this form of transmission can more than hold its own with the belt. The desirability of some device which leaves the engine free to be started by hand, and allows of a reduction of gear for starting, traffic riding, and severe gradients, on the comparatively heavy types of motorcycles designed to carry an extra passenger, is beyond doubt; and the various praiseworthy attempts already made to supply this want deserve every attention, and promise well for the future of this type of machine.

It may be that water cooling will also be found necessary on these machines, although there are no signs of its universal adoption at present. In any case, it must not be overlooked that increased complication detracts from the valuable features of simplicity combined with efficiency, which we have learned to associate with the modern motor-bicycle. But, if we turn to the motor-bicycle *per se*, regarded as a cheap and enjoyable means of locomotion for a single passenger,

COMBINING, AS IT DOES, RELIABILITY WITH LIGHTNESS AND EASE OF HANDLING,

we must not subordinate these essential qualities to an insane desire for speeds to which the machine is totally unfitted or conditions to which it is totally unadapted. It is particularly gratifying to the writer, in view of opinions expressed at a time when the craze for high powered machines threatened to injure the best interests of motorcycling, to find at the present time the many prominent authorities of the motorcycling world, and experts whose advice must be listened to with attention, earnestly advocating the use of machines in which the limit of 2 h.p. shall not be exceeded. Such a machine is capable of any speed up to 30 m.p.h. on good level roads, and will climb all ordinary gradients unassisted, and greater than 1 in 10 with the lightest of pedalling, which is surely all that can be reasonably required of a vehicle capable of traversing a couple of hundred miles in the day without unduly fatiguing the rider, opinions to the contrary notwithstanding. Several excellent devices for minimising vibration are already in existence, and others are promised; and these, together with the numerous detail improvements which follow the inevitable laws of demand and supply, all combine to render this class of machine as well-nigh perfect as may be.

THE PROSPECTIVE PURCHASER FOR THE 1904 SEASON will, therefore, be well advised to determine clearly in his own mind which class of machine he requires, for he may be well assured that a motorcycle equally well adapted for both purposes, and combining, at the same time, all that is best in each type, does not exist, and is not at all likely to exist.

The vertical position of the engine, low down and midway between the wheels, seems to have been determined by the fact that the efficient lubrication of the cylinder and stability of the machine are more easily secured by adopting this position than by any other, so it is not surprising to find this design steadily gaining in favour.

High tension ignition is still the standard system; but many improvements in the details, such as plugs, accumulators, and the mechanism of the contact breaker, are to be recorded. The external spark gap, a device for which much was claimed, has been proved unnecessary, and probably, in careless hands, proved harmful to the coil.

On the other hand, the old form of sparking plug, of which the De Dion is a representative example, and which from its very nature seemed to invite short circuiting from the moment when the porcelain became covered with soot or charred oil, is gradually being replaced by new and improved types, in which the risk of short circuiting is minimised. By careful study of the details of the accumulator, makers have succeeded in producing storage batteries which, with proper care and attention,

MAY BE RELIED UPON TO FURNISH AN ADEQUATE SUPPLY OF CURRENT.

The fitting of two accumulators and a two-way switch will probably be a feature that will become more and more general. The chief improvement in contact breakers has been the increased strength of all working parts, together with the increased facilities for adjustment now afforded. In many of the 1902 motor-bicycles the contact breaker was of far too flimsy a description for such an essential part: it is noteworthy that the plain make and break type has proved thoroughly satisfactory in prolonged use, and the use of a trembler coil and wipe contact seems, in the writer's opinion, to offer no marked advantage on a motor-bicycle. It is also instructive to observe that one of the leading French makers uses a plain make and break contact, precisely similar to that fitted to the motor-bicycle, on his latest model of a powerful four-cylinder car capable of attaining a speed of 50 m.p.h.

The wiring of the motor-bicycle is still open to much improvement, and better protection for the wire than that afforded by the ordinary insulation would certainly be desirable. Various neat terminal fittings are noticeable.

IT IS BY ATTENTION TO DETAILS SUCH AS THESE THAT THE PLEASURE OF MOTORCYCLING IS VASTLY INCREASED.

The switch handle has not yet been supplanted by any other of the various devices which are claimed to be so much superior, and it has at least the merit of handiness.

The silencers fitted to motor-bicycles in 1903 left much to be desired, and important improvements in this direction may be confidently anticipated in the leading makes of machines. A cut-out, allowing the exhaust to pass directly into the air

when required, is an excellent feature in some of the improved forms of silencer.

In the same way the ordinary two-inch tyres, which were quite suitable for the lighter machines, proved inadequate when the adoption of high powered engines involved a large increase in weight, so that the forthcoming season will witness a proportionate increase in diameter of motor-bicycle tyres, with a consequent increase of comfort and decrease of wear. Brakes for motorcycles are still open to some improvement, although no startling innovations are to be expected in this direction. The fitting of band brakes acting on the wheels of the fore-carriage is essential, the brake on the rear wheel of the motor-bicycle not being sufficient under the altered conditions. In one or two machines sold during 1903 it was only possible to fit a front rim brake,

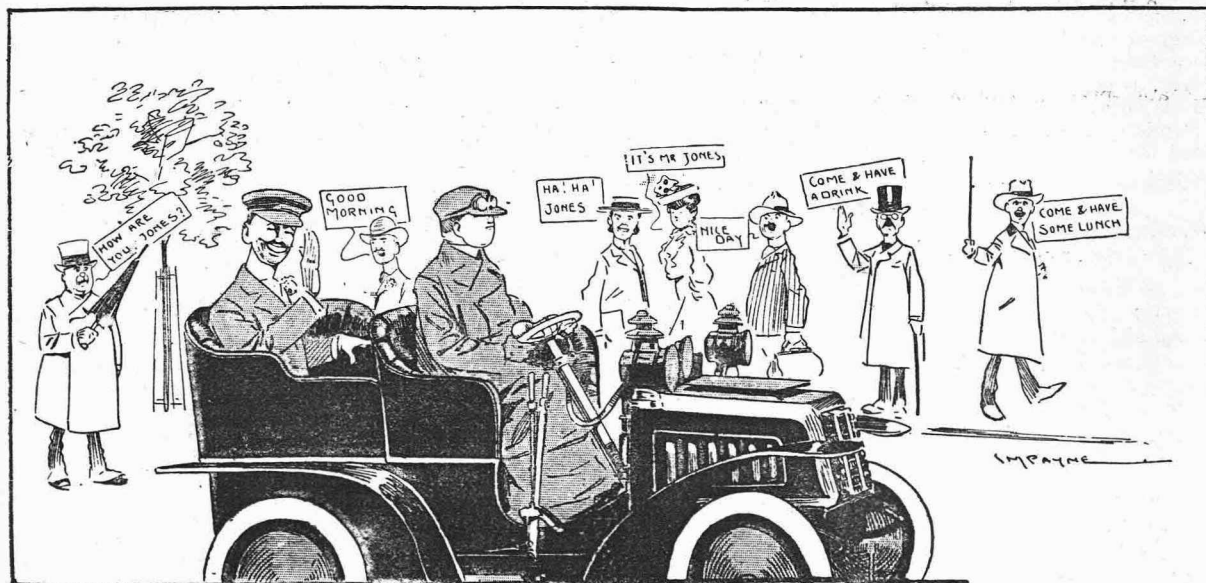
THE DESIGN OF THE BELT PULLEY PRECLUDING THE EMPLOYMENT OF A BRAKE ON THE REAR WHEEL.

This, besides being in defiance of the law, is a distinctly bad and dangerous practice, and it is to be hoped that machines with this feature will not be offered for sale during the coming season. Tanks were in many cases insufficiently secured to the frame, which resulted in occasional fracture of the petrol and oil feed pipes. A little attention to this detail will often save a deal of trouble in the long run. The writer has found it advantageous to secure the clamps which hold the tank in place by lock nuts. The lubricating devices fitted to motor-bicycles are, if simple, somewhat primitive, while splash lubrication is far from being ideal. It is to be hoped that more attention will be given to the problem of automatic lubrication on motorcycles. Among accessories for the motorcycle, the provision of a really good lamp, which shall combine great light-giving power with reliability, in a small compass, seems far and away the most crying need of the moment. The fixing of such a lamp by means of a well designed bracket of ample strength also needs attention.

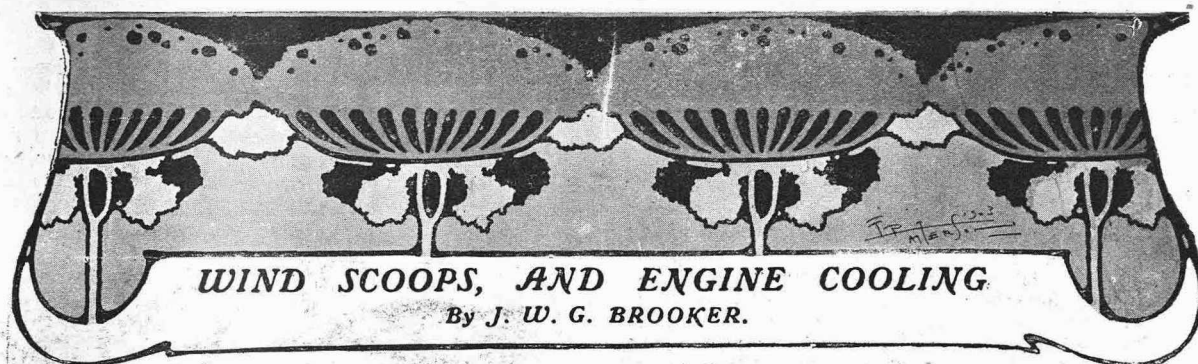
SEVERAL GOOD DESIGNS OF THE COMBINED STAND AND CARRIER HAVE BEEN MARKETING

during the past season, and the motorcycling public was not slow to adopt this useful device. A design in which the support can be utilised without disturbing the baggage carried is to be preferred.

Finally, the motorcyclist will be well advised to exercise judgment in the selection of his new mount, not forgetting that, although substantial improvements may be confidently anticipated on all hands, those emanating from makers of repute merit particular attention. "PETROLIA."



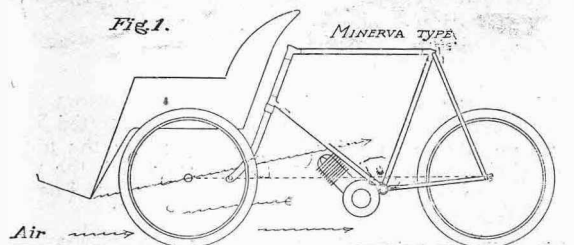
It is surprising the number of people who know Jones when he sallies forth on his latest motorcar



WIND SCOOPS, AND ENGINE COOLING

By J. W. G. BROOKER.

It is generally admitted that the tendency of the engine to overheat is much greater on a fore-carriage than on any other type of motor vehicle. In the majority of cases this overheating is due largely to the direct shielding action of the carriage work; slightly to the fact that the engine—having two passengers to drive—is being fed all the time with a fairly strong mixture; and also slightly to the use of a lower gear ratio—1 to 6 or 64. The shielding action of the carriage varies very considerably with different types; that is to say, it depends on the position of the engine. Thus Mr. Hooydonk claims that he is troubled very little from overheating,



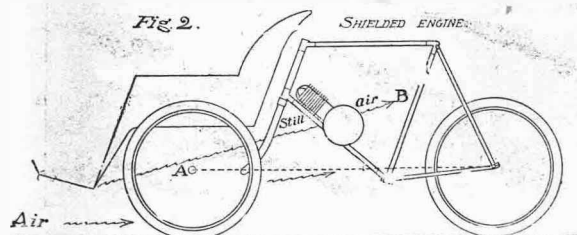
and a glance at the outline drawing of his Phoenix Trimor (Fig. 1) shows that, compared with many, his motor is in a very favourable position: if it were a trifle lower or more inclined towards the horizontal

IT WOULD MEET AN EVEN BETTER AIR CURRENT FROM BETWEEN THE FRONT WHEELS.

In Fig. 2 we have a very different state of things; above the line A B, whatever the speed of the vehicle, there will exist a still air region due to the suction of the back part of the carriage; and the engine being in the centre of it is deprived of all air-cooling current. To this latter type of fore carriage side scoops are added; but unless they project appreciably beyond the sides of the carriage they cannot be of much use. As a more efficient device I would suggest a curved or V shaped plate of thin sheet copper, strengthened at the edges and suspended from the carriage and front axle: this would have the effect of deflecting a large air current on to the whole length of the cylinder (Fig. 3). The plate should be about two feet wide and bent down the middle, somewhat in the shape of a flat V. This plate, placed in the proper position,

WOULD PROBABLY HAVE A BENEFICIAL EFFECT ON THE PHOENIX TYPE,

and on the low placed vertical Werner or Rex type; but the difference would not be so marked.



I would also suggest that the plate be adjustable, so that at a high speed downhill, etc., when it would not be so much needed, it could be tilted horizontally so as to eliminate wind pressure.

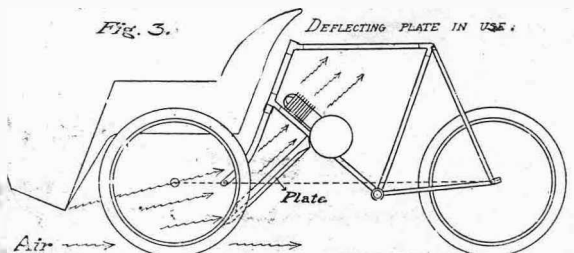
Personally I am in favour of a water-cooled cylinder; it proved, I believe, satisfactory on tricycles and is used on all quads. Its advantages are great, and include, amongst others, hill-climbing power, efficient running and durability. The water should be circulated by a small high-speed rotary pump, driven direct from the motor (no belts), ensuring a better flow than is obtained by a natural circulation; and practically no reserve tank would be needed if an adequate length of thin cooling tubing, which would be coiled under the footboard of the carriage, were used.

I have examined a 2 h.p. Clement-Garrard machine fitted with fan cooling. The fan was fixed to the engine axle, collected air through a scoop, and directed it through a tube on to the head of the cylinder. If this catches the owner's eye perhaps he may be induced to publish his experiences with it.

IT COULD BE IMPROVED A TRIFLE BY EXTENDING THE RANGE OF THE SCOOP

by carrying forward a tube terminated by a wide funnel to the side of the carriage so that it meets an uninterrupted air current.

Since writing the above an interval of a few days has elapsed, and my attention has been drawn to a decision of the Clement-Garrard firm to adopt water-cooling on all their



motors except the smallest pattern. A fore-carriage, fitted with their $2\frac{1}{2}$ to 3 h.p. water-cooled engine, two-speed gear, chain drive, a large sized back tyre, and a special saddle will make, to my mind, an efficient and popular vehicle. Mr. Hooydonk's two-speed gear and chain drive is a step in the right direction, but because he has succeeded in driving a passenger up Muswell Hill without appreciably overheating the engine it does not necessarily follow that another driver could do it. Few attain to his expertness. I am as firmly convinced that water-cooling will be extensively adopted in the near future as I am that the manufacture of motors will develop into an immense industry. A reasonable tariff on foreign motor goods entering England and the graceful resignation of a few isolated J.P.'s. would suffice to place us in an enviable position. Now that fore-carriages are becoming such popular vehicles the time appears opportune for a discussion of the pros and cons of the various methods of cooling motors.

A NOVEL FORE-CARRIAGE DESIGN.

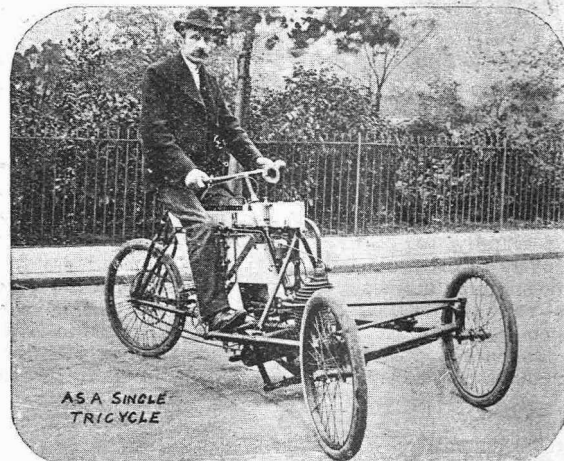
By E. R. C.

The photographs reproduced with this article show a somewhat novel tri-car or fore-carriage type of machine. About two years ago the writer came into possession of sundry cycle and engine parts, and forthwith commenced to construct a motor-tricycle for two persons. The design occasioned a deal of thinking out, and, after consideration, it was decided to follow the lines of an ordinary bicycle for the back portion, fixing the engine vertically on a cross-tube in front. A single back wheel was to be used for driving, and two wheels in front for steering, thus obviating the necessity of having a differential gear. Then came the question of the shape of frame to carry a chair for passenger. Several schemes were tried, amongst them being two parallel tubes bent round at the rear portion, and uniting one end of each tube to attach to the spindle of the back wheel. But as the machine was to have pedals, it was thought that the feet would be somewhat awkwardly placed, and that in the event of a hurried dismount, unless the machine were at a standstill, one might step inside the frame with unpleasant results.

THIS METHOD OF CONNECTING THE SIDE TUBES WAS DISCARDED in favour of shortening them and joining to the main frame by a cross tube, as this—being in front of the pedals—forms a convenient footrest, leaving the rear of the machine as clear as an ordinary cycle. The side tubes, although of considerable strength, were thought to be insufficient to stand the thrust and weight of the engine, so stays were added, making the forepart of the machine like a trussed girder, and strong enough to withstand any strain. That stays similar to these would be an improvement to the usual type of fore-car has recently been demonstrated to the writer by an inspection of a machine whose side tubes had been very considerably bent out of their original straight line. The frame being satisfactorily constructed, the problem of transmitting the power from engine to driving wheel had to be considered. Bearing in mind early experiences of broken and slipping belts, a chain drive was adopted; but the idea of having to pedal the machine for starting not being approved of, and for the purpose of giving better control in traffic,

THE DRIVING CHAIN WAS FITTED IN TWO SECTIONS, the first chain connecting the engine to a countershaft running on ball bearings. On this countershaft is fitted a spring clutch, which is put in and out of action by means of a pedal operated by the right foot. From the clutch the second section of chain connects up the driving wheel.

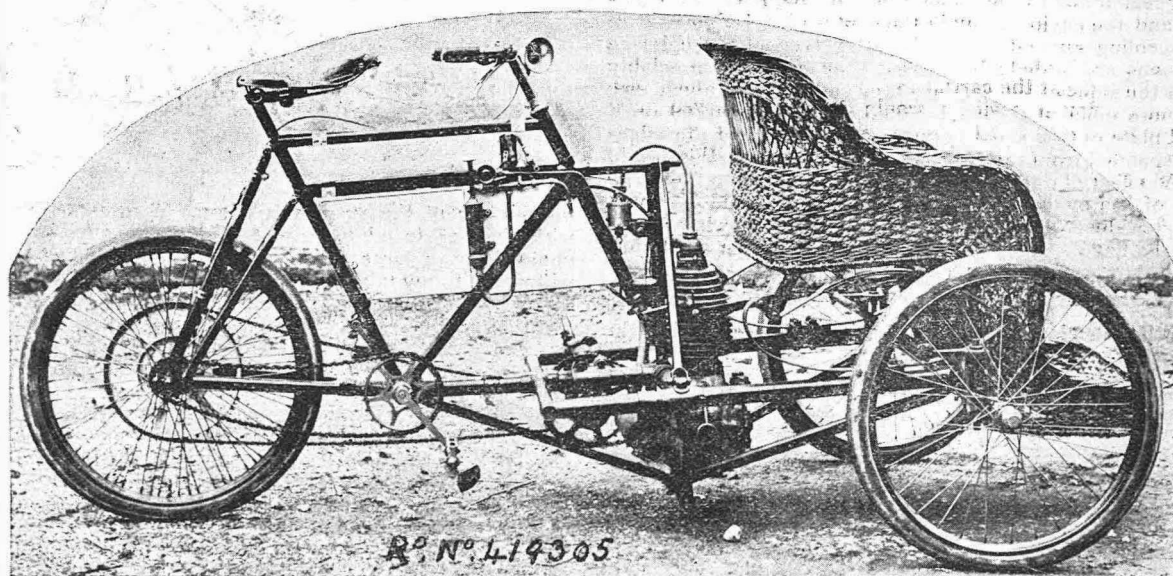
"Cyclomot," in a recent issue, advised a chain drive similar to the system here described. This method has been in use on the machine illustrated for several months, and the writer has found it perfectly satisfactory. One need have no fear of driving amongst or being shut in by traffic, as it is easy to stop and restart without a dismount or touching the pedals. When coasting down hill the engine can be



ASA SINGLE
TRICYCLE

allowed to rest and cool, and when near the bottom of the hill the clutch can be let in and the engine restarted by the momentum of the machine. With regard to the alleged extra wear on tyres by chain drive, those which the writer has in use are as good and the pattern on the tread as clear now as when first fitted.

THE ENGINE, WHICH IS $3\frac{1}{2}$ H.P., APPEARS LOW IN POSITION, and the photographs somewhat accentuate this. So far no trouble has arisen, but in future machines a few inches more clearance from the ground should be given. The power having proved sufficient for all purposes, only one gear is fitted; but the writer hopes shortly to perfect a two-speed gear, simple and free from any cog-wheels or complicated mechanical movements. Having already occupied more space than was originally intended, any enquiries will be gladly answered by the writer through "O.P.V."



THE NOVEL FORE-CARRIAGE REFERRED TO ABOVE.



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OPINION

The Shows.

Thoughtful and careful study of the exhibits at the two Shows leads to the conclusion that in matters concerning the man of moderate means extraordinary advances have been made during the past twelve months. In mere number of motorcycles and light cars the growth of the industry is at once apparent: the alterations and improvements in designs and mechanical details confirm this impression, and although it would be idle to even suggest that the next year will not be fruitful of still further changes, it must be admitted that the most cautious buyer can now find no reason whatever for further deferring the purchase of his first motor vehicle. In motorcycles the greatest mechanical and structural progress is apparent, and whilst we find that powers are being increased all round, until 3 h.p. has become quite an ordinary matter, yet it is to be observed that the moderate powered machine is as prominent and as popular as ever. Chain driving has made some progress, though not so much as some would have expected, but the round belt has now practically given place entirely to the V-shaped pattern, flat belts not being favoured by the trade. In many details the motorcycle is being improved with a view to making it accessible and comfortable in every respect, and the fullest attention is being paid to controlling and speed checking methods. The three-wheeled vehicle has progressed marvellously, until it has now become almost a replica of the car, with a lot of its conveniences, and without some of its disabilities. The new Regulations dealt with in the next column will give this class of machine a very great fillip. The light car is increasing enormously in numbers, as we shall be able to demonstrate in our next issue, but as it reached a stage a year ago which left but little scope for improvement, the alterations and changes are but in matters of detail, greater comfort and better finish being the points where most difference is observable. There is every evidence that the November Shows are absorbing the greater proportion of the interest of the man of moderate means, and in course of time we should not be surprised to find that the Shows held in the early spring will lose their grip of this branch of the industry. Should the trade and the exhibitions split up in this way, it will certainly be to the advantage of the cheap and moderately priced vehicle, which obviously runs a risk of being overshadowed by the more powerful or more luxurious and more costly car when the two appear side by side.

The Local Government Board's Regulations under the new Act.

A copy of the Board's Regulations and the circular to the County and County Borough Councils have just reached us and have enabled us to breathe freely once again, because the provisions are now moderate and practical as compared with the draft regulations issued a few weeks ago. Exigencies of space in this issue will prevent our doing more than to merely scan the Regulations; comments must be deferred till next issue. These Regulations only deal with registration and licensing. They describe the method by which the Councils shall keep their registers and assign index marks and numbers to applicants. An owner may register a car with any Council he may please. Each Council will have a separate mark; these run from A to Y and from AA to FP. London is A, Middlesex H, Nottingham AL, and so on, and it is suggested by the Board that no number having more than three figures shall be issued so that at the best a mark may be as short as A 1, and at the worst as long as AK 278. Two number plates must be carried, in front and at the rear, placed where the owner pleases, subject to the Council's approval, and the owner may use a square or oblong plate with the letter above the number or in line with it. Each character must be $3\frac{1}{2}$ inches high and about $2\frac{1}{2}$ inches wide with a half-inch margin above and an inch margin at the sides. The owner provides his own plates or the Councils may provide them, if the owner so desires, at a fixed charge. The shortest oblong plate will be $7\frac{1}{2}$ inches long by $4\frac{1}{2}$ inches deep, whilst the longest can be $16\frac{1}{2}$ inches in length. The characters must be white on black ground and they may be included in a design. The plate for a motorcycle will be a quarter of the area of the car plate (one-half of each dimension), and need not be rectangular. By a further provision the front plate may be such that it projects forward and shows an inscription on both sides. At night time the rear plate on all vehicles must be illuminated, but the driver of a motorcycle may instead illuminate his front plate, and in order to make the lighting provisions workable, different plates may be used at night time to what are used during the day. A plate belonging to a motor vehicle must be carried on any vehicle pushed or drawn by it. The register of motorcars will be open to inspection by the Police and Inland Revenue officers; other persons will be provided with a copy of any entry on payment of 1s. and on showing reasonable cause for requiring such a copy. The fees for registration of a new ownership will be 5s. in the case of a car and 1s. in the case of a motorcycle. With regard to licensing, it is provided that an owner must apply to the Council within whose jurisdiction he resides; on the other hand, a non-resident in the United Kingdom may apply to any Council for a licence. A licence will not be limited to any particular car or cycle, but to drivers over 14 and under 17 years of age it will be restricted to cycles only. A duplicate of a licence may be obtained on payment of a fee of 1s. if the original be lost or defaced, but it will bear any endorsement borne by the original. A licence will remain in force for twelve months from the date of issue, or at the applicant's request may be dated forward not more than a month.

In the circular issued to the Councils, the Board points out that under the new Regulations cars and drivers will be readily identified and that the penalties for offences are heavy; and as the provision of the Act with regard to special roads is only intended to apply to very narrow roads and roads of an exceptional character, the Board recommends local authorities to refrain from applying for the imposition of restrictions or special speed limits, which would only be burdensome to motorists and would be expensive and troublesome to carry out. This being the attitude of the Board, it is obvious that local authorities will not find it at all easy to exercise their prejudices and get roads closed to motor traffic.

It will thus be seen that the Regulations and suggestions of the Board are extremely fair and thoroughly practicable. We hope to deal more fully with this important matter next week.

THE MOTOR EXHIBITS — — AT THE STANLEY SHOW.

The first Stanley Show was held in March, 1878. It has been continuous yearly since, and the present exhibition at the Agricultural Hall is the twenty-seventh. At the first Stanley Show seventy-four machines were exhibited. At the present Show there is the largest number of exhibitors for some years. Motorcycles are more numerous than ever before, and the variety of the fore-carriages and other suitable attachments on view forms one of the leading features of the Show. The Stanley Show remains open to the public till next Saturday.

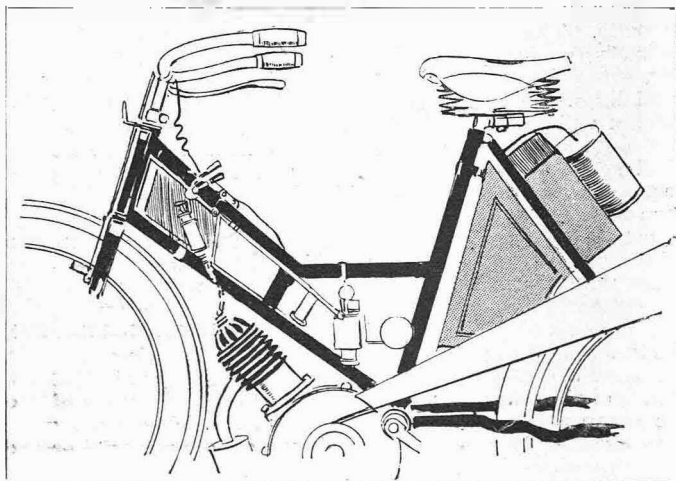
There was a large and representative gathering of the leading manufacturers at the opening ceremony on Friday. The usual luncheon followed in the Welcome Club, at which Mr. Robert Todd presided. Sir Albert Rollit, M.P., proposed the toast of the "Stanley Show" in a very interesting and humorous speech. He expressed the opinion that the trade of this country was not so black as it was painted, and that what we required to fight our foreign competitors was a better education and a more careful study of the methods of production. In dealing with the enormous strides made in automobilism, Sir Albert remarked that we were told that the leopard could not change his spots. "I shall be prepared, however, even for such a transformation to take place. The leopard by means of a motor may change from one spot to another." Mr. Robert Todd replied on behalf of the Show. Mr. Lough, M.P., proposed the health of the "Chairman," and created a deal of amusement. Mr. Cohen, M.P., having seconded this, Mr. Todd in response referred in eulogistic terms to the services rendered by Mr. E. A. Lamb. He thought the Show one of the very best they have organised. It is, indeed, a very interesting and instructive exhibition.

2. Dunlop Pneumatic Tyre Co., Ltd., Birmingham. A fine array of motorcar and motorcycle tyres is being shown. The former are made in all degrees of strength—from the lightest voiturette to the heavy vehicle of several tons weight. A new 4in. size has been added to the company's standards. The motorcycle tyres are made in three sizes, 2in., 2½in. and 2¾in., and are supplied with either wired or beaded edges. Motorcar wheels are among the exhibits, and in addition to a large number of useful rubber goods a special feature is made of motor garments. The Dunlop Company is sparing neither trouble nor expense in order to produce the best possible tyre for use on motor vehicles.

155. Minerva Motors, Ltd., of 40, Holborn Viaduct, E.C., are making a very complete display of Minerva motorcycles. For 1904 there are three sizes of engine, the 2 h.p., the 2½ h.p., and the 3½ h.p., and each size can be obtained for either the upright or inclined position. We must say that we have not hitherto been at all sweet on curved tubes, whilst the attempt at securing symmetry was apt to look overdone, but the machine with the engine placed vertically, when seen in actuality, presents a particularly neat and workmanlike appearance, and as a matter of fact, the curved diagonal offers structural advantages at the bridge piece and in the space between it and the mudguard for a tank or shaped tool-bag. The arched strut being below the tank does not give the appearance of an attempt at mere "prettiness," such as would seem from an illustration. We do not hesitate to recommend the vertical Minerva and curved frame. All Minerva engines have mechanical valves, this improvement having been a great success. The new Minerva-Longuemare carburetter is an advance upon all previous devices, and will be supplied as a standard. Tank, oil reservoir, levers, silencer and other details have been vastly improved. A V belt is now supplied and other improvements consist of twin accumulators and a new mica sparking-plug with a metal dome covering the inner end of the insulation whilst the insulated wire is always within sparking distance of the body of the plug. The Minerva of 1904 will uphold the reputation already earned by this popular motor.

62. Longstreths, Ltd., 427A, Strand, London, W.C. The most interesting feature on this stand is the Lathanode unspillable accumulator: this is filled with liquid acid, in the ordinary way, but to prevent this escaping small ducts are arranged inside the case, with the result that the accumulator can be turned upside down, or laid in any position, without any leakage of acid.

97. Elswick Cycle and Motor Co., Newcastle-on-Tyne. This firm shows a twin-cylinder engine of 4 h.p., which they claim to be lighter than the ordinary single engine: it is built into a specially constructed frame of the loop pattern. Provision is made for using either one or both of the engines at the same time. A special form of carburetter of the spray type is used. The front forks are worthy of consideration, differing from the usual form of the duplex type in that the side tubes are joined together over the tyre and form a single tube which is attached to the head by a strong fastening. This makes a very neat form of strengthening the front forks. The brake is of the compensating type, and double in action.



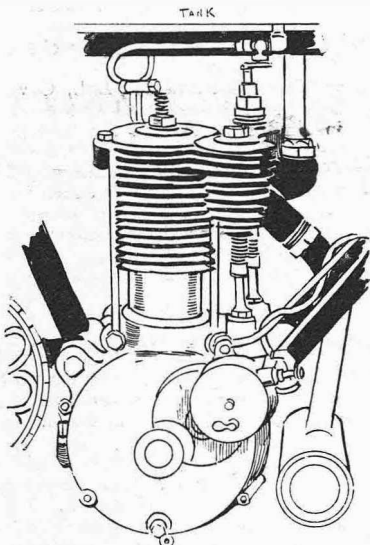
Minerva lady's motor frame.

138. Bransom, Kent and Co., Goswell Road, London, stage eight motorcycles, including a trailing car. The B.K. motor-cycle is made in three sizes, 2, 2½ and 3 h.p. These are all fitted with mechanically operated valves, Minerva-Longuemare carburetter, V belt and improved spark-plug and silencer. The frames are built throughout with the firm's own fittings, extra long wheel base and girder front forks. The mudguards are extra wide, with extended front, and Lycett's La Grande motor saddle is fitted on all machines. The free-wheel is the special Micrometer pattern. Two-inch tyres are fitted on the 2 h.p. machines, and 2½in. back tyres on the higher-powered machines. The makers can supply either a vertical or inclined position for the motor. One of the machines is shown with a handsome aluminium finish, the others being part aluminium and black enamel finish. The trailer is a smart-looking little vehicle, at a reasonable figure.

14. Faceler Motor Syndicate, Camberwell, S.E. A solitary motorcycle was on this stand when we inspected it. This is fitted with a Faceler 2½ h.p. engine which is built into the frame. It is chain-driven, the engine having two independent fly-wheels driving a second shaft, mounted on balls, through a spring-mounted gear-wheel. It is claimed that this arrangement saves friction and strain on the shafts. A valveless float feed carburetter is fitted, and the valve shaft is driven by worm and interrupted screw thread on fly-wheels, thus ensuring a quick opening and closing of the valves.

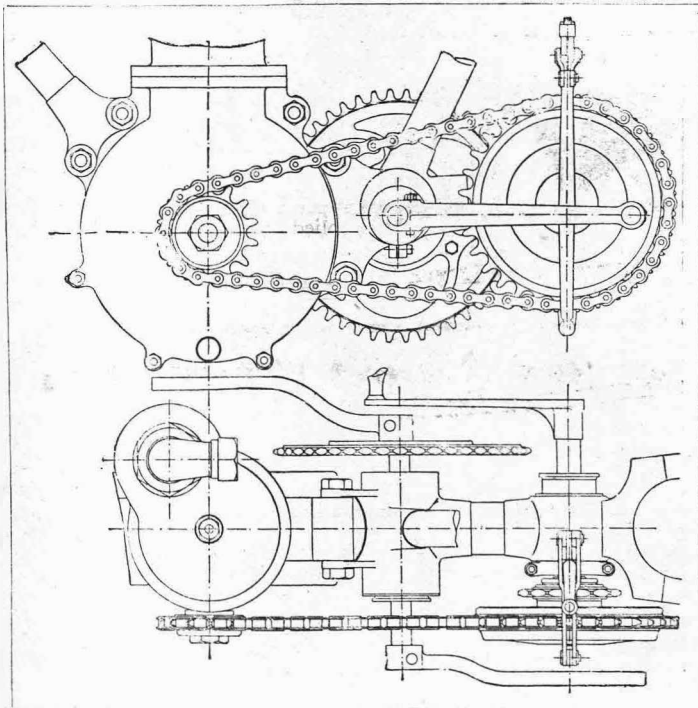
112. The Jehu Motor Co. Ltd. The well-known Jehu motor-bicycle is shown in several powers, most of the specimens on view having free engines and chain drives. In the pattern with direct chain drive the clutch is on the engine pulley, and is operated by a lever on the left handle grip, by means of a Bowden wire. Another pattern has a short chain from engine pinion to a countershaft behind bottom bracket, the clutch being situated on the countershaft, from which another chain (giving a further reduction in speed) runs to pinion on road wheel. All engines are vertical, and are dove-tailed into the frame of cycle. Duplicate accumulators are fitted in a box behind the main down tube, and a two way switch is provided.

121. Werner Motors, Ltd., 151a, Regent Street, London, W. The founders of the motor-bicycle industry are well up to date. The new Werner simply bristles with improvements. The powers for 1904 are 2½ and 3 h.p. The combustion and valve chambers are cast in one piece, with an air space between, and radiating flanges



Werner with radiating ribs encircling the valves.

completely encircling the valves. The carburetter is situated in the tank, an inspection door hiding it from view. A free engine is obtained by expanding the flanges of the engine pulley to enable the V belt to slip on a free running ring. The bracket spindle is divided so that both cranks can hang down together, giving a comfortable "freeling" position. Directly the left pedal is released, a



The Jehu Clutch and chain-drive arrangement.

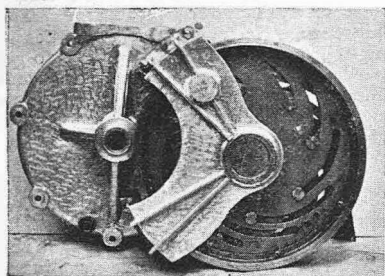
spring in the bracket brings it back to its normal position for pedalling. The inlet valve is now mechanically operated, and there is a most ingenious system of regulating the speed automatically when the free engine clutch is thrown out: this is an electrical device causing the spark to short circuit every other revolution instead of jumping the plug: this is effected by means of a special rotary contact piece which comes into action when the engine is thrown out of gear at handle-bar. The compression tap is another clever device which allows a certain amount of air to be drawn into the cylinder at high speed and assists in giving a perfect mixture and cooler engine. The exhaust tube is now carried as nearly straight from the engine as possible to get the exhaust gases clear away. The controlling levers and all minor details have been greatly improved, and the front mud-guard is now extended over the wheel. The petrol tank is more capacious than formerly. The ignition details are really excellent, especially the circuit breaker combined with the brake lever. The makers are now adopting a Bowden rim brake on the rear wheel. One machine is shown with a substantial luggage carrier. The Werner fore-carriage has many good points, notably a very rigid frame, 3½ h.p. motor, and rim brakes on the front wheel. On the standard bicycle the rear rim should be inspected: it is now made with a central flange to which the belt rim is most securely clamped by steel arms.

294. British Steam Traction Co. A cure for all tyre punctures is shown here in the shape of Millennium, sold in pumps, by means of which the puncture closer may be forced into the inner tube through the valve. The pump is screwed direct on to the valve stem, and is thus very convenient for rapidly inserting the preparation. A pocket electric lamp and battery, at a very low price is shown.

215. C Lohmann, 36, Aldersgate Street, is showing a varied range of accessories for the motorcyclist. The well-known Perfecta acetylene lamp has been further improved this year: it is fitted with a really strong and practical rigid bracket, which holds the lamp on both sides. This bracket fastens to the head of the machine, and is secured by lock nuts. The lamp itself is of solid construction throughout, and the carbide and water containers are of ample dimensions, the lamp burning five hours on one charge, a gas bag is fitted at the back of the parabola reflector, thus ensuring a steady flame: the water valve is fitted with a wire, so there need be no fear of its becoming clogged, as it can be instantly cleaned. A rubber tube connects the generator with the burner, the risk of a dangerous explosion being thereby minimised. A plain glass is fitted, and the workmanship is good; and altogether this lamp marks a distinct advance in motorcycle lamps, and should not be missed by those on the look-out for a satisfactory article. A new design of swing crank, actuated from the handlebar, and fixed or free at will, is also shown. Several useful types of leggings and leather clothing merit attention. The Superba saddle is priced extremely moderately, whilst motor horns, goggles, funnels, and, in fact, everything requisite for the motorcyclist will be found here.

5. London Machinists Co., Kingsland, N. This firm is catalogued to show tri-cars fitted with 3 h.p. Minerva engines, a tradesman's motor carrier, and a Royal Sovereign 3 h.p. motor-bicycle. The stand, however, was not ready when we called.

102. The Paradox Variable Gear Co., of Lincoln, whose change speed gear has proved so serviceable for bicycles, have now had it re-designed to suit the motor-cycle, and it is being made in two forms, so that it can be clamped on to the crank case of the engine, or can be screwed on



The Paradox Motor Cycle Gear.

to the hub. When fixed to the engine case, a small pinion is fastened to the crank shaft, and engages with the spur ring which is attached to one of the changing discs. The changing mechanism is duplicated for the sake of strength, and the chain ring is sandwiched in between. The changes are easily made whilst the drive is constantly maintained—a very important factor in motorcycle driving. Seven changes of gear are provided, and a single chain communicates the power to the road wheel. In the pattern which is screwed to the hub, the power is taken by chains from the sprocket on the engine to the chain ring on the gear, a countershaft naturally being used in order to get the first reduction of gear. The chain ring being contracted or enlarged, in creases or decreases the gear within the range provided. The change speed for motorcycles will be placed on the market in a few months' time, and it promises to be a very great success.

96. Clarke, Cluley and Co., Coventry. The Globe motorcycle is the speciality of this firm, made by them throughout, and there are many points worthy of consideration. A revolving float shows the height of the petrol in the tank. There is also a special feature in the contact maker. Besides the usual brush contact, a separate blade contact is provided, making a perfect earth, and it cannot fail to act even up to as high as 3,000 revs. per min. Adjustable ratchet levers for all control gear, large Longuemare carburetter, and an easy mode of obtaining access to the valves are provided. Two-way switch, high speed trembler coil, and Invicta accumulators make up a very neat and compact machine. This firm also stages a fore-carriage, mounted on cradle springs, with powerful band brakes on both wheels, operated by the foot of the driver. Adjustment is also provided for the chain, the main tubes of the carriage being carried back to the back forks of the motor. It will be noticed that the driving tyre is extra large in diameter.

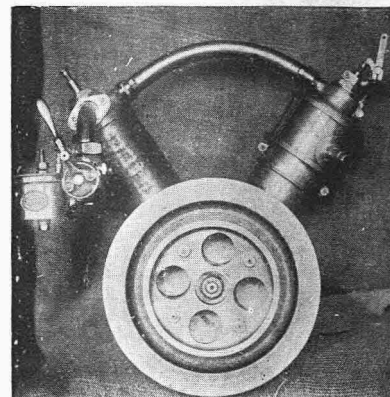
186 Price's Patent Candle Co., Ltd., of Battersea. This well-known firm has an exhibit of various kinds of oil for cycles and motors. Price's motor lubricants are guaranteed absolutely neutral and free from any oxidising or gumming tendency. Among the specialities are the Motorine for air-cooled and water-cooled cylinders, gas engine oils for water-cooled cylinders, Bilmoline for axles and bearings, and Rangraphine for motor and cycle chains.

98. Hobart Bird and Co., Ltd., Coventry. The general design of this motor-cycle is similar to that of the past season, but the makers have added several improvements worthy of attention. An emergency handle is provided, which is of the inverted type, and its first action on being applied is to break the connection; further application lifts the exhaust valve; and finally there is application of the brake to the back wheel. The engine is of the vertical type, and is made by the firm as are the carburetter, throttle for the air supply, two-way switch, Lincona belt, and two powerful brakes. On the fore-carriage either a 3½ h.p. air-cooled or a 2½ h.p. water-cooled engine is fitted.

184 O'Halloran and Co., 164, Clerkenwell Road, London, E.C. This stand was not complete when we visited it. We understand, however, that two O.H.B. light touring cars would be on exhibition during the show. This light touring car is fitted with a 4½ h.p. engine, and is capable of travelling at 25 miles an hour. It is a two-seated vehicle, and is guaranteed to climb a 1 in 6 gradient. Two speeds are fitted, and a reverse can be added at the customer's option. It is chain driven, and the body is supported on cross and elliptical springs, which, it is claimed, eliminate vibration to a remarkable degree. The cars may be painted to the customer's taste. The price is extremely moderate—115 guineas, a feature that will commend it to those on the lookout for a light car at a moderately low figure.

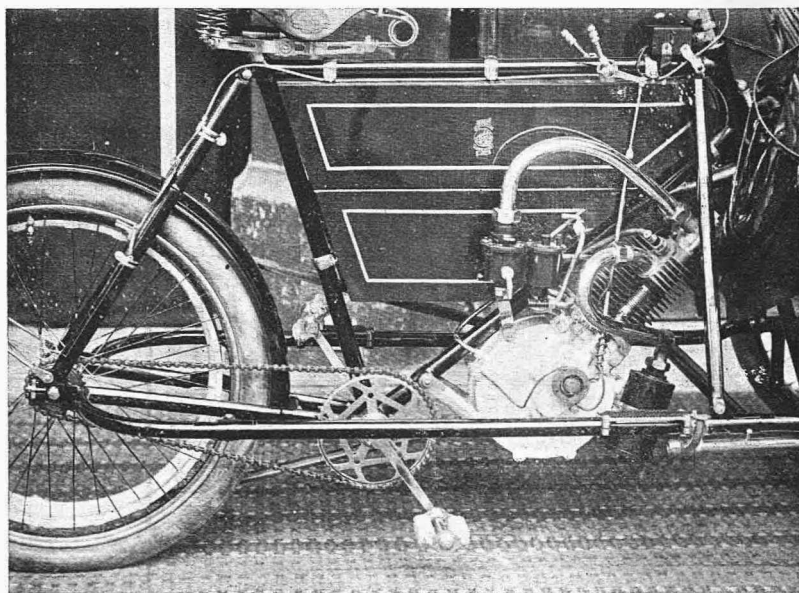
166. G. Goldschmidt, 323, Green Lanes, London, N., displays an imposing array of motor lamps, horns, goggles, oil cans and funnels on this stand. The leading line, however, is Schmitt's acetylene lamp for motorcycles: this is complete with bracket and cleading pin for water valve. Its principle feature is a gas bag which feeds the burner and, it is claimed, prevents the light from falling through vibration or strong winds: it is certainly a good thing, and should be examined.

7. J. C. Hencke, 47, Seething Lane, E.C. Four nicely finished belt-driven motor-bicycles fitted with the well-known Bichrone engines are the chief features here. These engines, as we have stated on many occasions, are made on the two-cycle system, i.e., the impulse of driving is imparted at every revolution instead of



The Bichrone Two-Stroke Motor.

at each alternate revolution as in the four-cycle or Otto types. A large number of Invicta accumulators are shown; and a new form of contact breaker of the wipe type, which works a non-trembler coil: this latter is well worthy of close inspection.

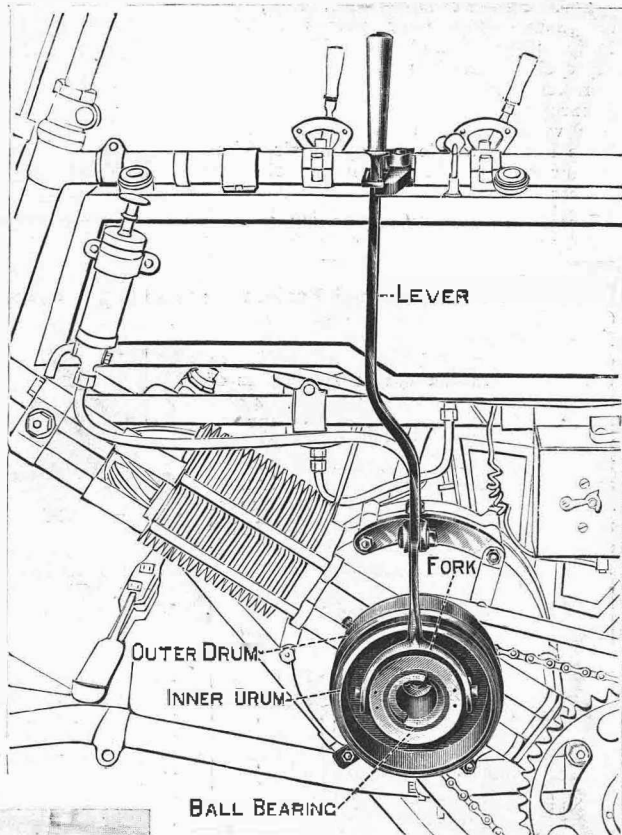


Showing foot brake and other details of the Globe motor forecarriage. Shown by Clarke, Cluley and Co.

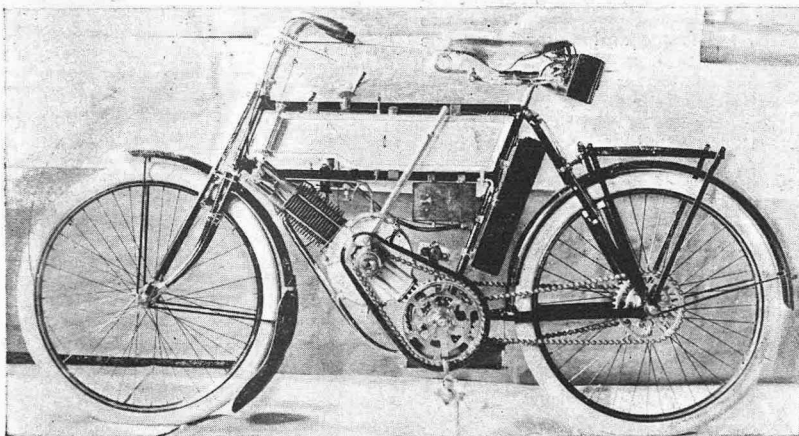
154. Humbers, Ltd., Beeston and Coventry, devote a stand entirely to their motorcycle productions, and there is always an interested crowd inspecting these excellent examples of chain driving. The new introduction in Humbers is the lightweight Beeston. It is designed on Hummer lines, with the engine in the inclined position, and carried by the four tubes from the bottom of the head to the bracket bridge. The engine is 70 mm. by 70 mm., developing 2 h.p. A Longuemare carburetter, wipe contact, trembler coil, two accumulators in the case fixed on the diagonal tube, chain drive through a spring friction clutch on to 26 in. wheels; these features of the Hummer are all retained, and yet the machine only tops the scale at 112lbs., or a little over. This machine will sell at £50. The 2½ h.p. Beeston selling at the reduced price of £55 has the free engine and clutch, with an improved clutch lever. Another improvement (there is really little or no room for improvement in the Beeston) is the fitting of an exhaust valve lifter worked from the front brake lever. The Coventry Humbers have the Hummer pattern carburetter and a single accumulator case with sliding door. The lightweight has 26 in. wheels, weighs about 112lbs., and sells at £42, whilst the 2½ h.p. sells at £45, the free engine and clutch adding three guineas to this price. The Hummer bicycles are identical with the bicycles up to the saddle pillar, the drive being taken on to the differential

245. J. A. Phillips and Co., Birmingham, are making a speciality of a motorcycle brake adjustable to suit large diameter tyred wheels, and a pedal of extra strength. These lines are of excellent finish, and come out at a moderate figure.

305. J. H. Martin. Southampton, show inner tubes, wearing treads, and outer covers. This firm also supplies V section raw hide belting, motor mats, solid tyres, and other rubber goods for motorcycles and cars. Their Dreadnought motor clothing is vulcanised after it is finished, thus making it strong and very waterproof. The firm show a pneumatic tyre made either with wired or beaded edges. This is supplied in 26 and 28 inch sizes. A speciality is the "Southon's" solid tyre, and an improved motor coat completes this exhibit of useful articles.



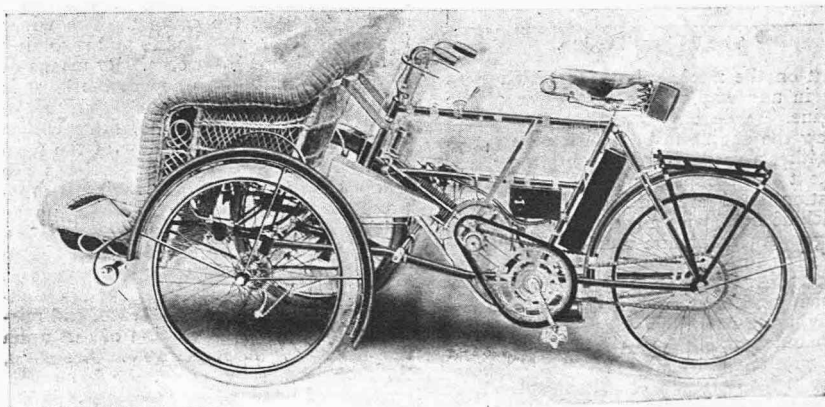
The Coventry Hummer Clutch.



The 1904 Beeston Hummer.

163. J. A. Prestwich and Co., Tottenham, N. The Jap engines for motorcycles have gained such popularity, and have been so frequently described in our columns, that we content ourselves with referring to the 3½ h.p. type, which has only just been introduced. This engine is distinct from the 2½ h.p. inasmuch as the inlet and exhaust valves are now fitted to the top of the cylinder: the plug is also given a similar position. The firm claim that this method keeps the engine cooler, as the exhaust gases have a direct exit. The valves are mechanically operated, and can be adjusted to suit all makes of exhaust boxes. The engine in no way competes with the other design, but is especially manufactured for fore-carriage and trailer work.

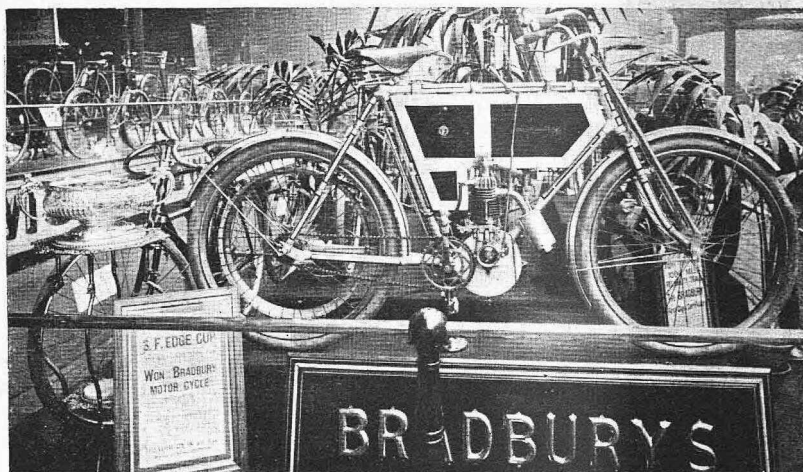
on the rear axle. The Coventry Hummer Olympia tandem has a water-cooled engine, with the tank on the head just behind the body and radiators projecting from the ends of the tank. The car is provided with a free engine and clutch, and all other features of the Hummer mechanism. The body is erected on a tubular frame, and is splendidly upholstered and thoroughly well sprung. Particular attention has been paid to silencing, the exhaust box being very large. The price is now considerably less than before, namely, £80 complete. A fore-car built for the G.P.O. exhibited on the stand presents a very fine appearance. On this page will be found illustrations of the Hummer motor-bicycle, the Hummer Olympia and a diagram showing clearly the clutch fitted to Hummer motorcycles. The exhibit is one of the most interesting in the Show



The Hummer Olympia for 1904.

226. Parker's Lamp Co., Ltd., Birmingham, show their new motorcycle lamp, "The Squire." This burns ordinary cycle oil and has a rim wick. It will burn ten hours on one filling, and the light is exceptionally brilliant for an oil lamp. The ventilation is so designed that the lamp has an ample supply of air, while it cannot blow out. The lamp weighs 24 ounces, and is fitted with a spring back. Experiments extending over six months have shown this lamp to be a reliable article for use on motorcycles.

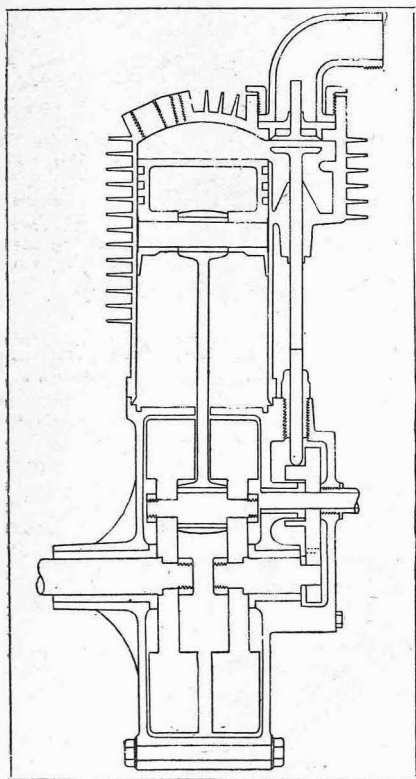
178. Whitley Motor and Engineering Co., Ltd., Coventry. An interesting display is made by this firm of their well-known engines for motorcycles. The powers of the engines vary, there being samples of 2½, 3½ and 4 h.p., air-cooled, and 4 and 5 h.p. water-cooled. Several improvements are noticeable in the 1904 models, the bearings are large, and the motors are now fitted with large direct exhausts. A new and improved wipe contact breaker is fitted, while it is claimed that the silencer is not only one of the most effi-



The Bradbury Motor-bicycle and the Trophy recently won in the M.C.C. Reliability Trials.

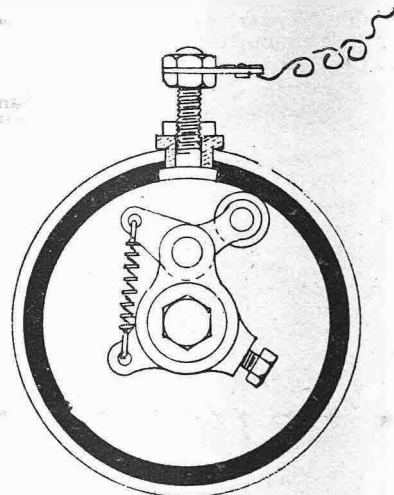
105. The Bradbury 1904 Peerless Motor-Bicycle. Few firms in the trade have introduced so many improvements in their 1904 model as this company. The frame of the machine has been still further strengthened, while the general arrangement of the motor parts have been improved almost beyond recognition by those acquainted with last year's pattern. The engine case forms the basis of the frame work, and the frame, being of triangular formation, all the tubes are straight, the frame and motor being one solid structure. Two sizes of engines are fitted, a 2 h.p. and 2½ h.p., both of which they guarantee to give the full extent of the power indicated. The Longuemare carburetter is fitted. The tank has been considerably enlarged, and has a capacity for two gallons of petrol, just double that of the old pattern. An extra supply of lubricating oil may also be carried. The silencer has been entirely re-arranged, and is now most effective in every way. A trembler coil is supplied, and two accumulators provided for. These are strapped close together, and a two-way switch enables the rider to use one or the other in case of emergency. Probably the most noticeable and noteworthy improvement in the new model is that of an entirely new form of contact breaker. This is of the wipe type. The contact case is a metal ring, oscillating on a bracket attached to the crank chamber, fitted internally with a hard fibre ring, and a metal section to make the contact. The wiper is a swing lever, attached to and revolving with the exhaust lifter cam. By means of the tension spring the end of the lever is pressed upon the fibre ring during the revolutions, and it is further fitted with a roller to prevent undue wear of the fibre ring. A transparent cover encloses the whole of the mechanism, making it dust-proof, and at the same time enabling the rider to see that effective contact is being made without opening the case. The firm claim that this contact has two great advantages. Firstly, the mechanism is entirely closed in a dust-proof case, and misfiring from the accumulation of dirt upon the fibre ring is impossible. Secondly, that the higher the speed the better the contact. In the usual type, the outside wiper has a tendency to make a less per-

fect contact at high speeds, whereas in the contact breakers adopted on Bradbury's centrifugal pressure upon the ring becomes greater as the speed increases, and consequently great regularity in firing is secured. It is interesting to recall that



The Whitley Engine.

cient on the market, but one which does not in any way reduce the power of the engine. The clips are detachable, and allow the engine to be fixed to the frame in either a vertical or horizontal position. Patent air scoops for cooling the combustion head are also shown, as is a machine fitted with a convertible fore-carriage. An automatic feeding carburetter is also in evidence, while there are numerous other well-made accessories, which tend to show that the firm are not only up-to-date, but fully competent to turn out work of the best description. The illustration shows a section of the engine, in which the length of main bearing will be seen, and also the valve arrangement.



Bradbury Contact Breaker.

the Bradbury 2 h.p. motor-bicycle was awarded a first-class certificate in the reliability trials. A specimen of the Peerless motor fore-carriage here exhibited will well repay inspection.

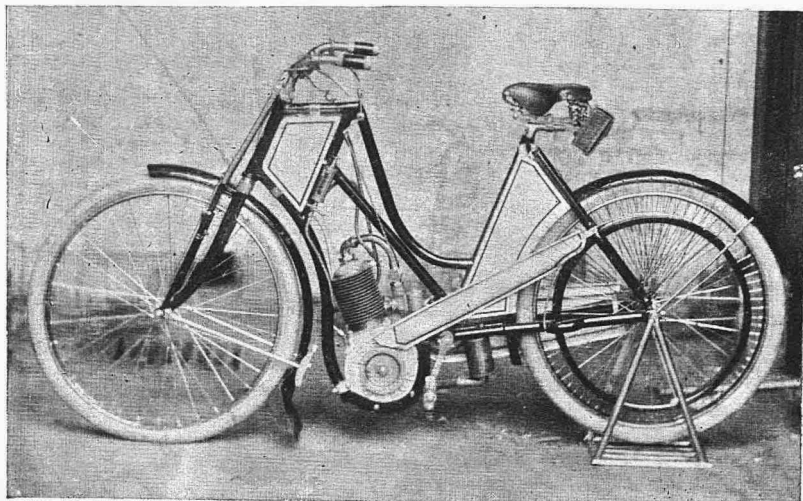
268. Joseph Bradbury. A strong folding stand for motorcycles is here shown. It consists of two parts which are separated by coiled springs and adjusted towards each other by a bolt and wing nut for different widths of machines: it folds quite flat for transport. Some handy motor jacks, in different sizes, are also to be seen. A free-wheel clutch detacher, which is very useful, is made by this firm. A set of box spanners for ten different sized nuts at a very low price, 2s. 6d., should prove useful to the motorcyclist, and save the spoiling of nuts. Other articles and machines, specially interesting to makers and repairers, are on view.

I. F. Reddaway and Co., Ltd., Great Eastern Street, E.C. Tyres for cars and motorcycles, covers, solution, non-slip-ping treads, inner tubes, and general rubber sundries are being exhibited by this house, but at the time of our visit the stand was not ready for inspection.

87. D. Moseley and Sons, Ardwick Manchester. This exhibition displays a quantity of indiarubber goods of all kinds, including air tubes, covers of every description, cycle and motor tyres, bicycles pedals, pouches, etc. All kinds of materials for tyres are shown, and the Simplex cover which fits Westwood rims.

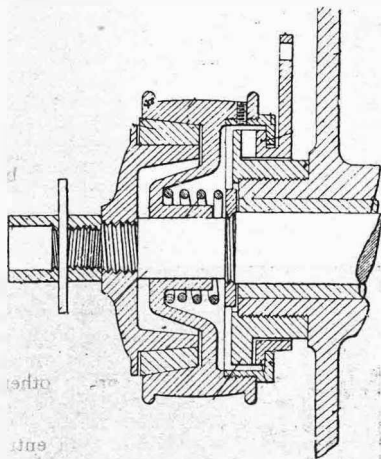
88. Capon, Heaton and Co., Hazlewell Mills, Stechley, Birmingham. This well-known firm has an interesting exhibit of indiarubber goods, suitable for cycles and motors, such as the Fleuss tubeless tyres, cab tyres, outer covers, inner tubes, pedal rubber, inflator rubber, brake rubbers, coated canvas, cushion and solid tyres, patching sheet, pump clip rings, etc. Capon Heaton also show rubber goods, suitable for the general trade, hose and gas tubing, etc. They also execute repairs to motor tyres, vulcanising new treads to old tyres, etc.

225. South British Trading Co., Ltd., 13-15, Wilson Street, Finsbury, E.C., are exhibiting their new Vindec Special motor-cycle. This is fitted with the new 2½ h.p. F.N. engine, the bore and stroke being 70 by 80 mm. The contact breaker is of an especially reliable type, requiring little attention. The motor is placed vertically midway between the wheels, and low down. Drive is by a V belt, and the throttle and advance spark levers are placed conveniently on the top tube. A good feature is that both brakes, switch, and exhaust valve lifter are actuated from the handlebar. This is especially useful in traffic. Both brakes are hand brakes, and particularly smooth in action. The petrol, lubricating oil, coil and accumulator are all contained in one tank, which is constructed of heavy gauge brass. A neat fitting is the tool bag which fills in the space between the rear diagonal and the compression stays. This contains not only a full kit of tools, but also the pump and repair outfit. The mudguards are 3 inch, and the rear one is hinged to allow of easy repair of the tyre. A new design of switch combined with the right-hand brake lever seems to overcome many of the disadvantages inherent to this type. Lubrication is by sight feed pump. The forks are strongly built, and the machine is well finished, and good value for the price at which it is retailed, viz., £40. The firm also exhibit the Fisk single tube tyre, which is now made in a detachable form. In its latest form it is held on by two rings, one on either side of the rim, held down by clips and bolts. It is claimed for this tyre that it cannot roll or creep off the rim, whether inflated or not, and that, owing to the ease of detachment, it can be more easily repaired than the ordinary type of tyre. Lobe circulating pumps for water-cooled motors are shown in various forms. A gear pump shown is especially adapted to low powered cars, as it requires little power to drive it. Laminated wood steering wheels and various tools are also included in the firm's exhibits.



The Kerry Lady's Motor-Bicycle shown by the East London Rubber Co.

27. Iris Motor Co., Holland Street, Brixton, S.W. This well-known firm are showing a large number of their water-cooled bicycles. The most interesting exhibit on the stand is the 5 h.p. double-cylinder water-cooled machine. This is fitted with a friction clutch and a hand-starting device. The water tank has an ingenious little radiator on each side, and carries sufficient water for 200 miles. The



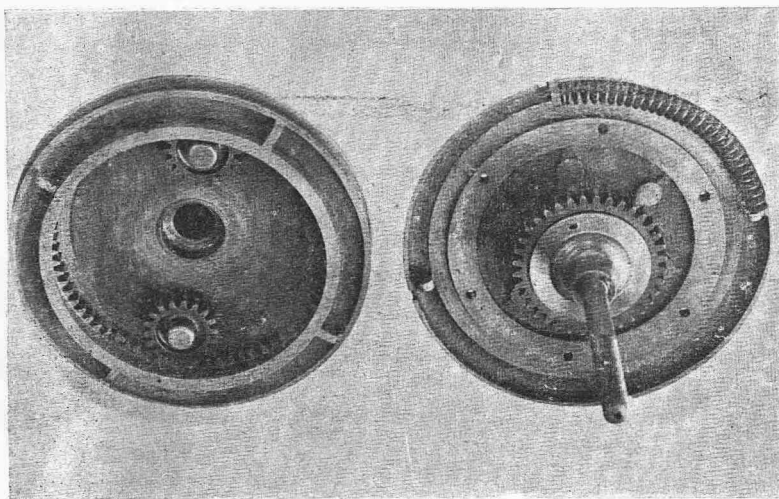
The Iris Clutch.

machine is compact in appearance, and notwithstanding that it is water-cooled, and has two cylinders, its weight does not exceed 160lbs. A new type of carburettor is noticeable having an automatic mixture adjustment. A similar machine is attached to a fore-car made under license from the Phoenix Motors, Ltd. Lower powered machines are on the stand, as are a number of useful electrical accessories made by Bara and Pascault, of Paris. A four-cylinder coil for cars, with only one high speed trembler for the four plugs is a new device which is shown for the first time. This is a feature that has been attempted many times before by other makers, and is therefore sure to create a large amount of interest. We give an illustration of the Iris clutch on this page, and shall shortly describe its action.

80. The Continental Caoutchouc and Guttapercha Co., Holborn Viaduct, E.C. The celebrated Continental tyres, used by many of the fastest motorists of the world, are exhibited here, including the original set of tyres used by Jenatzky in the Gordon-Bennett race. Considering the enormous strain to which these tyres were subjected in the big Irish race, they present a splendid appearance, and could apparently be safely used for many thousand miles more. The Continental tyres are manufactured of the best quality rubber and strong canvas, and are therefore exceedingly durable. The company is not yet placing a motorcycle tyre on the market.

76. The Warwick Tyre Co., Ltd., Coventry. The motor tyre exhibited by this company is well worth inspection. It is constructed with a view to securing the greatest strength and durability whilst at the same time maintaining to the full the attributes of life and resiliency. Immediately under the rubber of cover, instead of the light fabric used for cycle tyres, a special cotton fabric is used. The strands are so arranged that there are four layers immediately under the tread of the cover, and two layers only around the attaching wires. It is claimed for this arrangement, that when running on the road the whole strength of the material is used to the greatest advantage.

86. The Clipper Pneumatic Tyre Co., Ltd., of Coventry, show specimens of the Reflex Clipper and ordinary wired-on Clipper tyres. The Clipper Continental motor tyre, for light and heavy cars, is a tyre which has become famous from a long list of successes by the speediest motor racers. This firm are the sole agents for the Continental Caoutchouc and Guttapercha Co., of Hanover. The Continental Co. guarantee that the Clipper Continental tyres are constructed in exactly the same way, and of the same material, as their Continental motor tyres, which have for many years enjoyed a great popularity throughout the whole of the Continent of Europe, particularly France and Germany. The Reflex Clipper motor tyres are also shown, made in three sizes—21in., 21½in., and 22in.



The Bowden Two-Speed Hub taken apart.

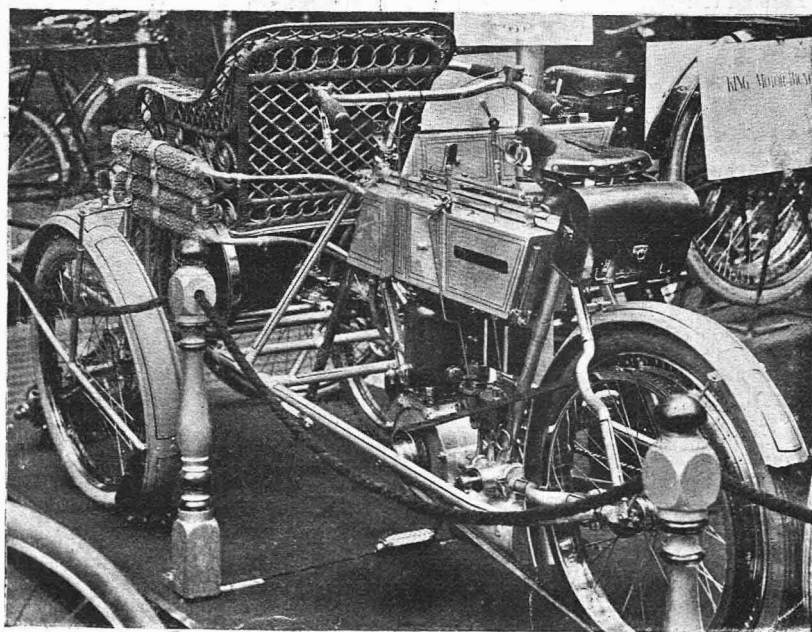
127. W. R. McTaggart, Ltd., 48, Wells Street, Oxford Street, London, W. The F.N. motor-bicycle is almost too well known to need a description at our hands. The engine—now $2\frac{1}{2}$ h.p.—is in the same position as last year, vertical in front of the bracket, clipped to the down tube, which is divided to surround the cylinder. An additional and adjustable stay runs from a point on the down tube to the crank case. The crank case, by the by, is an iron casting. A wide flat belt takes the drive to a wooden belt rim; or a V belt is fitted, if required, in which case a metal belt rim is used. A novelty is a sight gauge, showing the amount of oil actually in the crank case. The F.N. engine has particularly wide bearings of $2\frac{1}{2}$ in. and $1\frac{1}{2}$ in.; this is a good practice.

130. Bowden Patents Syndicate, Baldwin's Gardens, Gray's Inn Road, London, W.C., have an extensive display of all possible applications of the Bowden wire transmission. The brake gear, of course, is a great feature; but in addition are shown carburetter regulators and controllers, change speed controllers, band brake mechanism, ship signalling gear, Bowden patent flexible oil tube, etc., etc.

There are five Bowden motor-bicycles shown, having the new $2\frac{1}{2}$ to 3 h.p. F.N. motor fitted, and also a chain drive and special friction clutch, which has proved eminently successful during the past season. Entire control from the handlebar is by wire transmission. A very neat and well thought out electric ignition arrangement is fitted, in conjunction with a circuit breaker on the back brake. Two fore-carriages are also shown. The most interesting feature about these machines is the pedal starting gear, which is very ingenious, and dispenses with the starting handle. Patent compensating brakes are fitted to the front wheel. One of the fore-carriages has a pedal-actuated system of band brakes, which is most effective. This particular machine has a novel hand starting device, consisting of a piece of gearing on to the back chain wheel, which drops automatically out of gear when the starting handle is removed. There is a wealth of interesting features on this stand, because the products of the Bowden Company are always thoroughly thought out before they are offered to the public.

D10

113. W. King and Co, Cambridge. The original King motor-bicycle, which secured the gold medal at the Crystal Palace in February last, is on view here. Bicycles with various engines are shown, from $2\frac{1}{2}$ h.p., air-cooled, to 4 h.p. water-cooled, the latter having 10 feet of small gilled radiating tubes in front of the head. Longuemare carburetters are used on all models, also duplicate accumulators with two-way switch. One machine is fitted with foot-rests built out from the crank case of the engine, and a spring seat pillar. All levers have ratchets, to prevent their position being altered by vibration. The King silencer is of ample dimensions, and is oval in section, so that it can be slung between the pedals, under bottom bracket. The water-cooled fore-car which we illustrate is a well-designed vehicle, amply stayed in all directions. The method by which the radiators effect their purpose will be clearly apparent from the illustration.



Water-cooled Fore-car, exhibited by King and Co., of Cambridge.

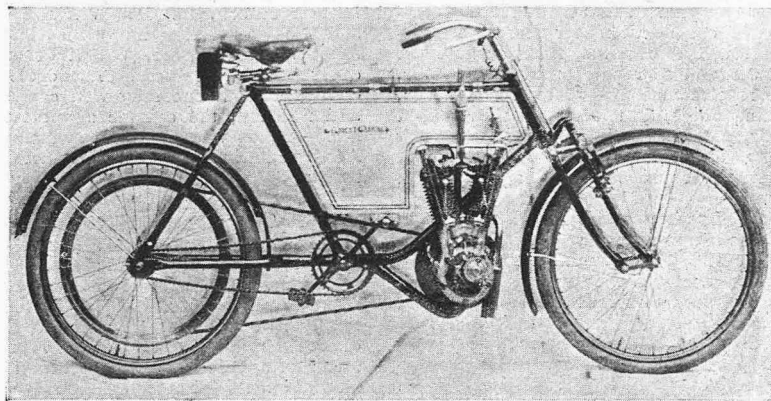
220. Bluemel Bros., Globe Road, E., are showing their motor-bicycle saddle, which follows the usual lines; also a large motor pump, made of celluloid, and fitted with a gauge. This pump is fitted with an aluminium foot, and is unusually light for its size. The firm makes a speciality of celluloid fittings, such as mudguards, gear-cases, etc. A high-class accumulator, of the best quality, is sure to be examined. A new non-skidding device, for attachment to motorcars, is exhibited. This consists of a chain of chilled steel cubes, which trail along the ground, and will, it is claimed, effectually arrest the tendency of the tyre to side-slip. The fitting is attached to the rear axle, and one goes to each wheel. Inflators, made of celluloid, are shown in all sizes, and the manifold uses to which this substance may be put are well illustrated by this exhibit.

311. Alfred Dunhill, Ltd. The articles here exhibited cover every requirement for the motorcyclist's or motorist's use. The new Bobby Finder is a combined goggle and small field glass which may be attached and detached with rapidity, enabling a motorist to see clearly objects at a distance. The new hand protectors, which will fit any handlebars, are a great comfort in cold weather. A combined gaiter and leggings is very smart in appearance and is easily put on to the leg. Some cheap stout drencher proof cloth jackets lined with camel fleece lining, and a very chic eider skin cap which is light, waterproof and warm are worthy of inspection. A new back lamp, burning paraffin oil, is now ready for 1904: it has a red back light and throws its main light on to the registration number. A novelty is seen in the new duplex lamps for cars (which are made for oil or acetylene) having an inner condenser carried by three arms on the front, conical reflector, and an outer glass: the back reflector is parabolic, and the lamps are very powerful. Everything shown at this stand is of excellent quality, and is thoroughly well adapted for the purpose intended.

196. The Stern Sonneborn Oil Co., Gracechurch Street, London. Every variety of oil and grease appears on this stand, from the heaviest kinds required for heavy work to the thinnest for finely adjusted mechanism. The company have oils for internal uses with flash points as high as 800 degrees, proving the perfection which has been arrived at by them.

22. Seabrook Bros., Featherstone Street, W. The smart American Jaxon light car, for which the above firm are the sole European agents, is attracting considerable attention here. The engine, which is placed in the rear, is of 6 h.p., with a 5 inch bore and 6 inch stroke. It has a large crank shaft and interchangeable bronze bushings. Compression is reduced when starting, thus making it easy to start. The radiator consists of a large capacity coil of brass tubing, closely fitted with corrugated copper flanges, and the water tank is placed under the front hood, so as to give the car a smart appearance. Water is circulated by means of a special rotary pump. The transmission is of the balanced sun and planet variety, with solid cut gears of ample size to ensure durability. All the gears are enclosed, and are claimed to be silent and effective. The vehicle, which has two speeds forward and a reverse, has a wheel base of 72 inches. The rear or live axle is fitted with a spur differential gear; powerful footbrakes are also noticeable features. The body is nicely finished, and is made to carry two persons, while an extra front seat can be fitted at a small cost. The price of the car is 160 guineas.

238 The Garrard Manufacturing Co., Ryland Street, Birmingham, have a highly instructive exhibit in the gallery. They stage four machines, all bristling with interesting details. The Paris-Rome model machine is a remarkable line, sold at 29 guineas: it has the famous little featherweight engine, mounted vertical, and driving by a long belt. The surface carburetter fitted has a very large capacity, and lubrication is by pump: the wheels are 26in., with 2in. tyres. The Paris-Rome model chain driver has a two-speed gear, long wheel base, spray carburetter, front rim brake, and back-pedal brake: this machine is priced at £40. The twin-cylinder machine is 3 h.p., with vertical motor in a most rigidly constructed frame, surface or spray carburetter, long belt drive, very large diameter driving pulley, the new spring forks, large petrol capacity and 26 by 2in. wheels: price £57. The Phoenix Park model has a 2 h.p. motor fixed on the down tube, combined chain and belt drive, spring forks, and aluminium control levers: these are fitted to all machines; the price is £44. The finish on all these machines is of a very high class. The very special feature of the C.G. machines is their recently patented handlebar control, with indicator mounted in the centre of handlebar: this system consists of a flexible shaft fixed in the handlebar, and gearing on to the indicator, thence by another shaft down the steering column to the spark advance; the positions "slow," "half," and "full speed," are marked on the indicator. The spring fork is now made lighter, and the general equipment is in every way of a superior order. The mudguards are extended, and a new nickel finish has been introduced for the wheels. The practical rider will find this exhibit most interesting.



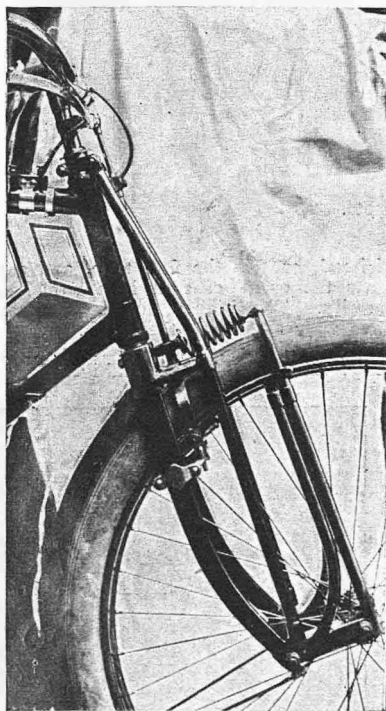
The Clement-Garrard.

115. A. R. Macbeth and Co., 286, Holloway Road, London, N. One specimen of the Macbeth motor-bicycle, with Minerva engine and V belt drive, is shown by Mr. Macbeth. It has an Eadie frame, with long wheel base, duplicate front forks, and extra petrol tank in rear panel.

101. Thomas Motor Celeripede Cycle Co., Barnet. The motor here fitted is the ordinary Minerva which calls for no particular description, but the point to which this firm especially draw attention is their patent spring fork. A secondary fork of triangular form is pivoted to the fork

172. Sanders, Redhers, and Co., of 108, Fenchurch Street, E.C. This firm has an exhibit of Pfuger ignition batteries, which have been specially constructed for low discharging current, and are fully guaranteed to stand the continuous vibration of a motorcar. The Pfuger electric lamp for motorcars gives a light for 30 hours by a single discharge of the battery. A distance of about 350 yards in front of the car is lighted up, and every object is made clearly visible.

240. The East London Rubber Co., Great Eastern Street, London, show their special line in the Kerry motor-bicycle, which has earned a great reputation for reliability. The motor of 2½ h.p. is mounted vertically, drives by a V belt, and has all the good features of last year's mount. In addition, there is here a most comprehensive line of accessories, including accumulators, coils, carburetters, new lamps, radiator parts, lubricators, pumps, sparking plugs, and interchangeable parts for standard engines. The Kerry set of motor-bicycle parts is a strong line. Ammeters and voltmeters, possessing new features, and, in fact, practically all accessories the motorist requires, are to be found here. The compact and simple lines of the motor-bicycle should be noted. There are minor improvements in the engine, especially about the 2 to 1 gear, that are worthy of close attention.



The Thomas Spring Fork.

ends proper, one on each side, which are joined together in an arch fitting clear of the tyre; these side forks are made adjustable for any size of wheel. Between this arch and the crown of the front forks a powerful spring is placed in compression, so that the vibration of the front forks is absorbed by the action of the spring.

314. N. S. U. Cycle and Motor Co. Ltd., This is a fine exhibit, and includes motor-cycles, a motor-tricycle with front seat for lady, a motor carrier tricycle, various powered motors, and parts for motor-cycles and cars, all made by this firm. All the motor-cycles are belt driven, have vertical N.S.U. engines built into the frame, and powerful front brakes acting on a drum on the front wheel. A 3½ h.p., with a longer frame than the smaller h.p. machines, and long handles coming well back, looks a speedy mount. The motor-tricycle, with wicker front seat, is convertible into a bicycle, and has a pleasing appearance. The carrier tricycle, 3½ h.p., is fitted with a starting lever, a steering wheel, large mudguards, is water-cooled, and has a comfortable seat, provided with a back rest. The cooler or radiator is of cylindrical form, and has air tubes passing through it. It is carried over the back wheel, to which a powerful band brake is fitted. All the machines are well finished and of good design.

252. The High Level Brand Co., Newcastle-on-Tyne. This firm makes a speciality in cycle and motor oils of all description, tyre cements, rubber solutions, black enamels, repair outfits for cycles, motorcycles and motorcars, lamp wicks, brazing fluids, tyre levers, and all rubber goods, patches of all descriptions, motor grease, and a new liquid cement called Phasticko, capable of sticking anything.

250. Leatheries, Ltd., Birmingham. Various forms of leather goods are shown on this stand, and amongst the novelties is a new motor saddle with girder frame, manufactured under licence from Messrs. Brooks. It is of a very strong and substantial make, and should prove very comfortable for the motor ride. A large selection of motor tool bags is also exhibited. A special motor mud flap for front mudguards is a very useful fitting: it is made of two-ply leather, and is secured by two screws to the mudguard.

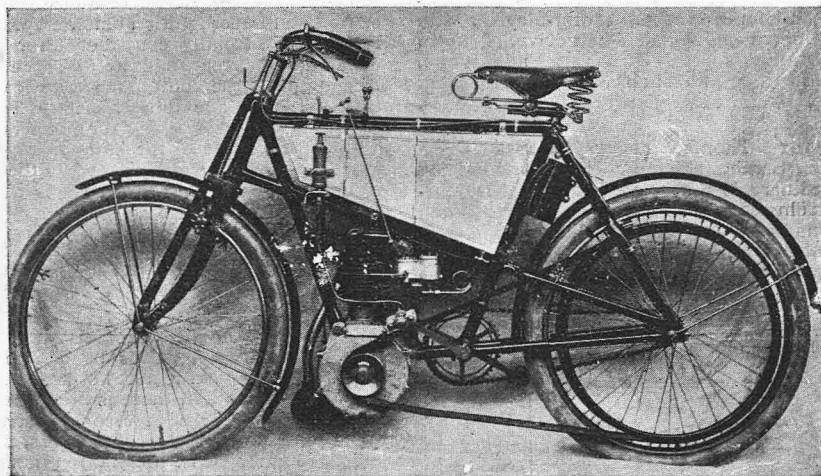
118. The Referee Cycle Co., 332, High Holborn, London, W.C. On this stand is an Ariel motor-bicycle, with Ariel vertical engine, V belt drive, and other popular features. The cycle work on the Ariel is specially well carried out and finished, the outside support to the head—which was a feature on the famous Ariel pedalling quads and quints—being fitted.

116. The Crypto Works Co., Ltd., 29, Clerkenwell Road, E.C. This old firm have three motor-bicycles and two tri-cycles on view, with engines of various makes and powers, but all bolted vertically into the cycle frames. A feature of the Crypto tri-cycle (built to take a fore-carriage) is the fitting of expanding-metal to metal-brakes on the front hubs. A new frame, of registered design, has a through tube from bottom of head to back wheel axle, leaving clearance beneath for the engine. Another tube runs from top

285. C. Lohmann, 36, Aldersgate Street, E.C., shows a motor-bicycle with a patent adjustable swing crank. The specimen produced betrays much careful thought in its construction, and should be closely inspected by visitors. The workmanship leaves nothing to be desired.

20. Griffon Motors, Ltd., 16, Upper St. Martin's Lane, W.C. The latest Griffon motor-bicycle is one of the lightest machines in the Show—the whole structure, when ready for the road, only weighing 110lbs. It is fitted with a 2½ h.p. vertical motor which has mechanically operated valves. A new exhaust box has been designed which, it is claimed, gives the least possible back pressure with the minimum of noise. A Fulman 20 ampere accumulator is adopted, as is the Nilmelior coil. There is an eccentric chain adjustment in the bottom bracket giving rigidity to the rear wheel, and the forks are of the girder type. Clipper tyres may be fitted if desired. The actual machine on which Demester won the Circuit d'Ardenne is an interesting exhibit. As a souvenir the firm are giving away a copy of the New Motor Cars Act.

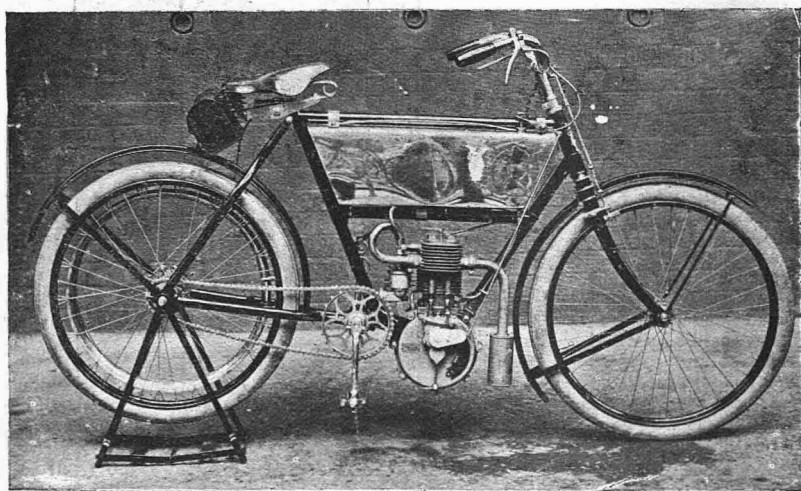
230. Messrs. Kynoch, Birmingham, show for the first time a motor-bicycle of excellent design and finish. The engine is of 3 h.p., mounted in an oblique position and fixed between the bracket and head socket. The transmission is by chain on to a countershaft and thence to a rear chain wheel. The Longuemare carburetter is used and ignition is on the usual high tension system. The silencer is of extra large dimensions, and a noteworthy feature is the substantial design of the control levers. A neat idea is provided for releasing the inlet valve at starting. Two band brakes are used, one on each hub. The electrical gear is contained within a wood case of ample proportions. The frame is of very graceful design, and front forks of duplex pattern are fitted. The front mudguard is provided with a sensible mudguard flap. Every part is made on the interchangeable system, and the whole machine is worthy of the most careful inspection. This firm has a great reputation for the accuracy of its light engineering work, a reputation which this machine will certainly enhance.



The 1904 Crypto.

224. H. Miller and Co., Birmingham, show lamps of all sizes for motors. The new motor Cetolite is remarkable for its light weight, this being slightly over one pound. The back is fixed, and is adjustable to any bracket. The addition of a gas bag contained in the back ensures a steady flame. The drip of water from the reservoir is regulated by a disc, while an extremely ingenious disposition of the handle ensures safety from explosions. The handle is, in reality, hollow, and is connected to the generator. In the event of more gas being given off than the gas bag and generator combined can retain, the overflow finds its way through an orifice in the handle, and the pressure is thus relieved. The burner can easily be unscrewed for the purpose of clearing it with an inflator, should it become clogged. The front glass is detachable, and the lamp presents a neat appearance. A lamp burning colza oil, and adapted for motorcycles, is also shown. This has a spring back, an extra handle, a lens front, and detachable aluminium cone and reflector. Well-finished headlights for cars, showing much ingenuity in detail, construction and design are shown in three sizes. The firm also show a new side lamp burning petroleum. Illustrations of some of this firm's specialities are crowded out.

of head, crosses the first tube, and supports the crank case at its forward extremity. The higher powered Cryptos have wide flat belts, the 2 h.p. machine having a V drive. Mr. James is to be congratulated on his fine exhibit.



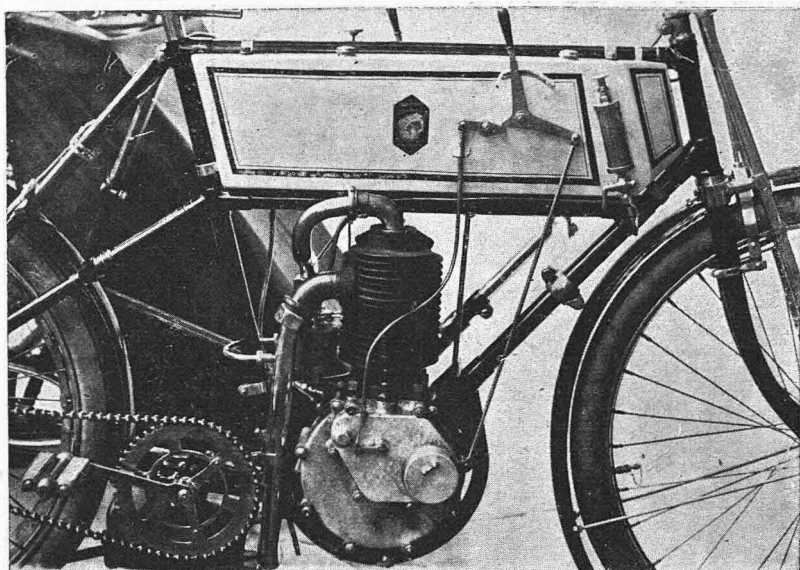
The Griffon Motor-Bicycle.

180. Robert W. Coan, 15, Myddelton Street, E.C., shows specimens of aluminium castings of every description for motorcycles of all kinds. A special feature is the Coan aluminium hollow cast steering wheel made in one piece. It is claimed that this is the strongest wheel on the market. Mr. Coan also shows model cycle crank cases, forming a coin box.

182. Graham Bros., of Enfield Town, have an exhibit of motorcycles; one—the Parade—is fitted with a De Dion $2\frac{1}{2}$ h.p. engine, belt-driven, weighing 112 lbs.; another—the Ariel—has a Minerva engine of $3\frac{1}{2}$ h.p. A novelty is the $2\frac{1}{2}$ h.p. De Dion motor-bicycle fitted with patent Liberty detachable sociable; with this attachment a motor-bicycle is made into a very light form of two-seated car. It is claimed that this machine is absolutely free from side-slip. Fixed to an ordinary bicycle and adapted as a carrier it makes a very useful tradesman's carrier.

254. Rex Patents, Ltd., 3, The Exchange, Clapham High Street, S.W. It would require many pages to set forth all the various useful patents of this company, goods well-known for their handy adaptation to various parts of cycles, motors, etc., be it pump, clip or saddle. All wants are studied by this firm, the demand for a thing has but to be expressed and the Rex people have it on the market the next day. This season they give us amongst other things, the Midget motorcar for children, a miniature car which, luckily for our children, is driven by pedal-power and not by petrol, but it partakes of the form and shape of its well-grown prototype. They also show $3\frac{1}{2}$ h.p. motor engine of London make.

99. Clyde C. and M. Car Co., Ltd., Leicester. This is one of the few firms which fits the magneto ignition on the Simms Bosch low tension system. The engine is fitted in a loop frame of a registered pattern, and vertical in position. A new arrangement is adopted for the advance sparking, whereby the lift of the trip rod is constant, whether the spark be advanced or retarded. Special facility has been given to enable the valves to be re-ground, a point often forgotten by even good makers. The three levers for controlling the motions are all mounted on one shaft; a spring washer keeps them all rigid in position, although free to work. This firm can, if desired, fit the ordinary high tension system with accumulators.



Imperial Motor-bicycle showing lever controlling the spark advance and exhaust valve lifter.

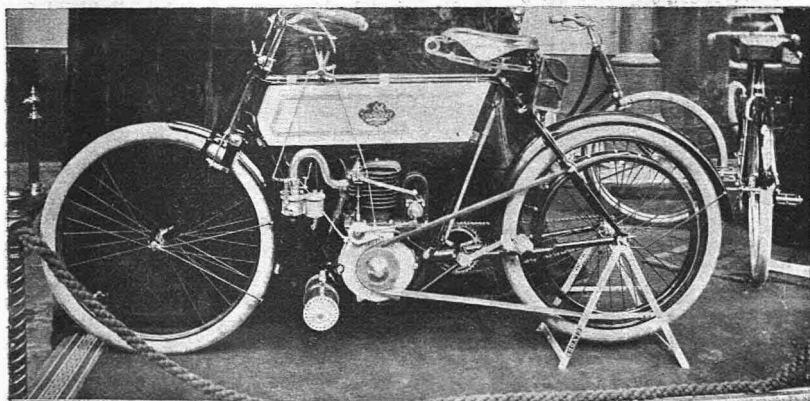
231. Meredith, Jones and Co., Century Tanning Co., Wrexham, exhibit a special motorcycle belt, in V and flat sections. This is specially treated, and of greatly increased strength, and unaffected by wet or other atmospheric conditions. It is also remarkably pliable. Undoubtedly the great feature about the belt is its immense strength—a point that visitors should prove for themselves by visiting this stand and testing a sample. The firm also make a speciality of leather for motor clothing.

231a. Rushbrooke and Co., Moor Street, Birmingham, show motor lamps of various sizes, several small motors, and a motor-bicycle frame, with girder head, duplex forks, and large hubs, and made to take a detachable fore-carriage. A fore-carriage frame is shown complete, fitted with aluminium body. A speciality of the firm is a motorcycle pedal, of large size, which obviates vibration and ankle strain. The Yelstan 3 h.p. motor shown is light for its power, has large fly-wheel, and non-slipping pulley. The Vevo spark-plug is a well-made fitting, with a very superior porcelain. A monster show model of this plug is exhibited. A complete set of motor frame parts of guaranteed accuracy is shown, and many other accessories.

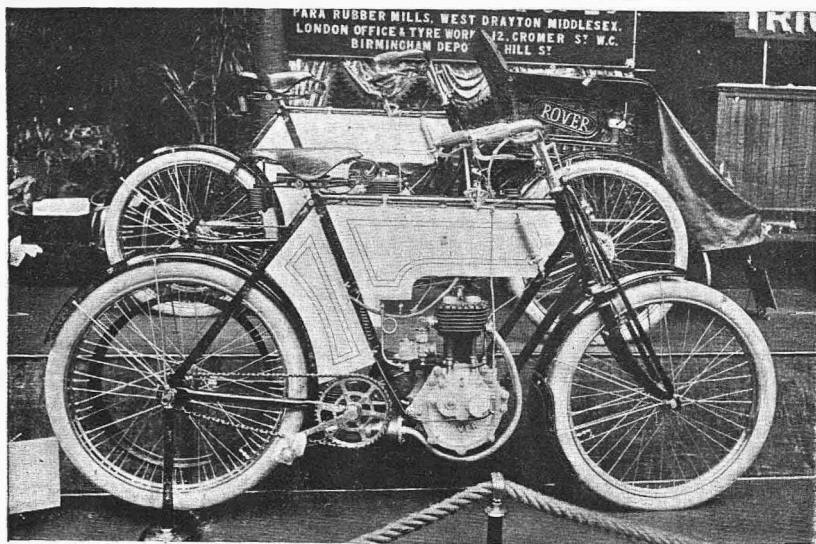
282a. R. Talbot, Berlin and Paris. This firm is the agent for the Zedel motor for the British Colonies and Germany. A Zedel motorcycle, $2\frac{1}{2}$ h.p., is on view, fitted with a Zedel carburettor. Errtee sparking plugs, coils, accumulators, brakes, and batteries are also shown. This firm can supply a complete motorcycle, fitted with Zedel motor, for export to the Colonies, at a low figure.

244. Lintine and Co., 23, Gt. Eastern Street, London, make a great feature of motor accessories, of which an immense variety are shown. There are some very special lines in coils and accumulators, and a neat enclosed spark gap calls for notice. Another good thing is a handle-bar switch of neat construction. Further specialities include lamps, tool bags, horns, oilers, tyres, jacks, saddles, motorists' clothing, etc., etc. The firm also stage a motor-bicycle with $2\frac{1}{2}$ h.p. vertical motor fitted in a loop frame and possessing all the characteristic features of an up-to-date machine.

103. The Imperial C. and M. Co., Birmingham. This firm make a specially constructed frame, which they claim to be mechanically correct in form, having a cradle made in a loop form of T section steel, this loop carrying the case of the motor. The T section starts from the down diagonal, and ends near the crank axle of the bottom bracket, and it affords a very steady bed for the motor. A second top tube is provided between the front post and the saddle pillar, and an extra back stay is fitted from its junction to the back forks. No doubt this frame must be extremely rigid. A point is made of the fact that the advance sparking lever, when brought full back, raises the exhaust valve, thus dispensing with one lever. The engine is of English make, well designed, and fitted with strong duplex front forks, and a one-way switch fitted to the handlebar, and operated by thumb pressure. B. and M. trembler coil, P. and R. accumulators, Lycett belt, and Longuemare carburettor of the latest pattern.



The Clyde Motor-Bicycle.



The Rover.

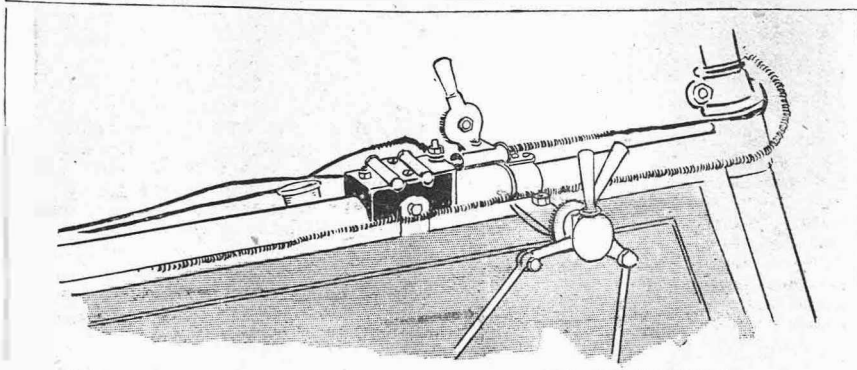
149. **Rover Cycle Co., Coventry.** On a separate stand Rover motorcycles are shown and naturally they create an excellent impression, which is increased and enhanced as the delicate and beautiful work introduced into the machines is observed. The standard Rover is fitted with a 3 h.p. engine, placed vertically in a complete cradle which forms the connection between the twin lower members of the frame and the diagonal tube. The engine is provided with mechanically operated valves. The commutator is quite novel in form and action. There is no trembler or platinum-tipped screw, a wipe contact being employed, but as the cam is only in contact for a fraction of a second there is no friction or wear constantly going on. The blade is kept up to its work by a spring, and its movement is confined by a set screw which serves as a stop. All these points are insulated, and the circuit is completed on contact with the cam. The result is that friction is reduced, contact is certain even at the highest speed, and the adjustment of the points need not be so fine as is necessary with other systems. Twin accumulators and a Waterson coil are employed. The capacity of the tank is a gallon and a half: the oil reservoir is placed in the forward end of the tank with an outside lubricator pump. The carburetter is the best that the company can obtain: in fact, the aim has been to secure the best of everything where the article is not made at the Rover Works. The power is transmitted by a V belt. The coil and accumulators are carried in a metal case behind the seat tube. A well-designed girder fork, ample mudguards, a two-way switch on the top tube, two brakes and a Brooke's special saddle form part of the equipment; the machine with Clincher A Won tyres selling at £55. The machines are all equipped with a portable stand and carrier, whilst the rear portion of the mudguard is readily removable in case of need. The silencer is placed behind the bottom bracket, conveying the gases clear away. The exhaust tube, it will be seen, is carried right round the crank case. The same machine fitted with a fore-car sells at £65.

257. **Salsbury and Son, Ltd., 124, Long Acre.** The name of Salsbury is deservedly popular in cycle and motor circles, because of the excellent character borne by the goods which emanate from this well-known firm. Salsbury lamps are a household word, and we can confidently recommend visitors to the Stanley Show to closely inspect this exhibit. The Salsbury-Flare lamps and the Salsbury-Dietz lamps are particularly worthy of notice.

248-249. **Eadie Manufacturing Co., Ltd., Redditch.** This firm, amongst its many types of component fittings, is making a special set of fittings for motorcycles for the Minerva type of engine only, both vertical and inclined. A special backstay bridge has been registered, so that straight tubes can be used for the chain stays, the principal object being to enable the rider to remove the wheel without requiring to spring the stays. A speciality is also being made of a resilient front fork, which is composed of tubes running from D section at the top to round at the ends, thus absorbing vibration. Not only do these tubes taper in section, but also in gauge. The continuation of these forks forms a triple head fitting. They are also showing the Fagan two-speed back hub, of which they are the sole licencees and manufacturers. Their well-known coaster hub is still in evidence, differing only in improved detail from those of past seasons.

275. **H. G. Turner, Eldon Grove, Manchester.** The well-known Turner carriers are shown here and some novelties have been introduced. A new device which should prove very popular is a combination stand and mudguard lifter for either front or back wheels. The stand is collapsible and easily adjusted, and protects the end of the mudguard from the ground. In case of puncture the greater portion of the tyre is quickly and easily exposed. The new front stand carrier for motorcycles is fastened to the girder stays by means of a claw clip which automatically fits any width or section of the stays and is actuated by a screw terminating in a ring at the end of the carrier. In another form of back carrier and stand combined the base of the carrier and the stand form the mudguard.

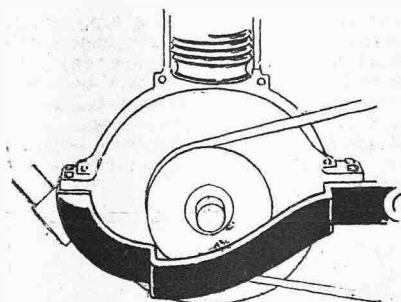
126. **Riley Cycle Co., Ltd., Coventry.** Motorcyclists will have to be very critical if they are not impressed by the machines exhibited here. The firm are not novices at motorcycle construction, and, as the result of several years' experimental work they are in the position of being able to display really high-grade machines. The engine, which possesses several interesting features, is placed in a vertical position, and is the work of the Riley Engineering Co., Coventry. The standard motor is of 3 h.p., with a bore and stroke of 80 mm. by 80 mm.; but 1 and 3½ h.p. engines can be fitted if desired—the latter are either air or water-cooled. A Longueunare carburetter, and Basse-Michel coil are fitted, while two Peto and Radford non-spilling electrolyte accumulators are adopted. The latter are operated by an extremely simple but ingenious two-way switch, the design of Mr. Allan Riley, which is fitted on to the top rail. This device, which is connected with the usual handlebar switch by a Bowden wire, provides for the working of the two accumulators—either singly or together. The switch is on the plug or interrupter system, and its utility when the accumulators have run down can be easily understood, inasmuch as the use of two plugs gives an increased voltage. That is to say, the two sets of partly run down cells can be coupled in series, and still give considerable capacity. Other interesting features will be appreciated by motorcyclists, who should make a point of closely inspecting the machines. We may state that we are about to test one of the 1904 models, and hope to report upon our experiences with it in an early issue.



The Riley Two-way Switch.

263. Crabbe Brake Co., Ltd., Birmingham. The ingenious rim brakes made by this firm, which is an offshoot of Cycle Components, are to be seen on a handsome stand next to the Welcome Club in the gallery. The front rim brake for motorcycles which we recently described and illustrated can be examined here. It is actuated by a pull-up lever, and has a powerful spring arch. It is a fine piece of work, and is likely to become as popular amongst motorcyclists as the lighter types are amongst the legion of riders who employ them on pedal-propelled machines.

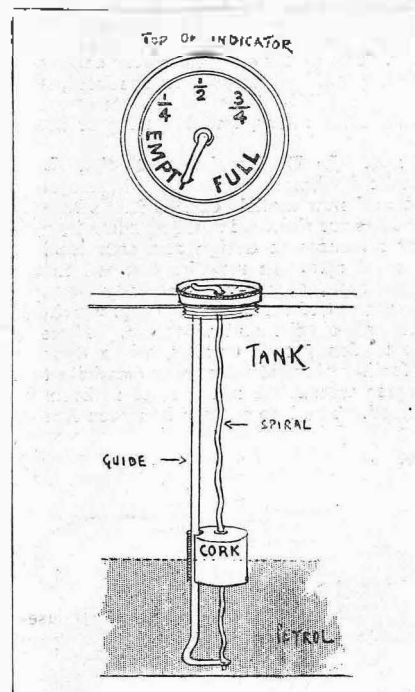
95. Alldays and Onions Engineering Co., Ltd., Birmingham. An imposing array of 24 h.p. motorcycles please the eye here. Exclusive of the coils and accumulators, the machines and their component parts are entirely of Messrs. Alldays and Onions' own manufacture—a fact of which the firm are justly proud. The engine which is fixed vertically to an ingenious and registered design of cradle is excellently made, and runs at 1,400 revolutions per minute. The crank and shafts are hardened and ground to dead size, and all bushes are especially hard and toughened. Provision is made for proper lubrication, and phosphor-bronze and wide bearings are maintained throughout. The radiating gills on the cylinder are closer, deeper, and thinner than those usually seen, and as a result the tendency to overheat is minimised. The tank is of a very neat design, and is divided into various compartments to accommodate coil (high speed trembler), accumulator, petrol, and lubricating oil. The petrol tank holds sufficient spirit for 160 miles, while enough lubricating oil can be carried for 250 miles. The carburettor is of the float feed spray type, and the belt is of V pattern. The contact breaker is of the trembler type and of improved design. The framework is very substantially built, the front forks being strengthened by side head tubes. Efficient brakes are fitted, and the machine carries detachable mudguards and stand.



The Alldays' special Cradle.

Buyers have the option of either Dunlop or Reflex-Clipper tyres. There is no doubt that the "Alldays" motor-bicycle is a beautifully finished and serviceable machine, all the parts of which are made to gauges and interchangeable. A machine fitted with a newly designed and handsome fore-carriage of the bucket seat type is also fitted. The firm's excellent little 5 h.p. Traveller voiturette is also to be seen. As we have referred to it on many occasions we content ourselves by stating that it has two speeds and a reverse, and is priced at £150. It is a well designed and thoroughly useful little vehicle.

122. The Ormonde Motor Co., Wells Street, Oxford Street, London, W. Two patterns of Ormonde motor-bicycles are being marketed for next year: the old reliable, with engine behind down tube, is still supplied; a new pattern is being introduced, which has a vertical engine, situated in front of the bracket; this engine



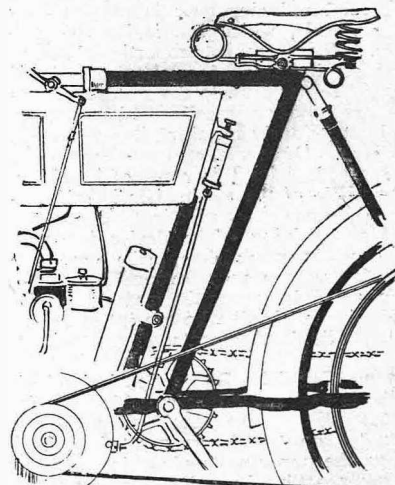
The Ormonde Tank Indicator.

has an unusually large fly-wheel. In belts the Ormonde Company have a new water-proofed cotton belt, of U section and an original belt-chain, composed of flat pen steel blocks, lined with leather, with steel rollers on projecting pins; the rollers engage with the toothed flanges of the engine pulley, forming a positive drive, the back wheel carries an ordinary flat pulley. Inlet and exhaust valves are both mechanical and are interchangeable. The Ormonde Company have always made a feature of their automatic lubricator with sight feed, which relieves the rider of much anxiety as to whether his motor is being efficiently lubricated. Another good feature is the long wheel base, giving stability on greasy roads. A detail improvement has been effected at the vacuum valve in crank case making a leakage of oil impossible. The carburettor—which is, of course, a spray type has been made larger and fitted very close up to the engine. The two to one gear has been so re-designed that a much finer setting of the timing can be effected. The rear driving rim is secured to the wheel by short spokes, and a specially designed brake acts on the rim. The tank compartments are very well thought out and the electric ignition system has received careful attention, particularly in the matter of the wiring. Another detail advance worth noting is the sparking plug being fitted right over the inlet valve where it meets the purer mixture. Needless to say the Ormonde machines are finished off in a style to suit the most critical. In the petrol indicator (illustrated) the rising float causes the spiral to turn, and so move the pointer.

137. Chas. Binks, Ltd., Nottingham, exhibit a distinctly novel type of motor-cycle or two-wheeled car, as they term it. The motor has four cylinders, giving 5 b.h.p. in one pattern, and 4½ h.p. in another pattern. The motor is mounted between the two main tubes of the frame—longitudinally in one pattern, and transversely in the other. The transmission is by clutch and chain, and ignition by the usual high tension electric system.

243. Lake and Elliot, Braintree. This stand is especially attractive to members of the trade, as a full range of the firm's high-class tools for cycle and motor work is displayed. Motorcyclists, however, will be interested in the new pattern combined carrier and stand which is being shown: this is of neat design, and can be put into use without unscrewing nuts or clips. There are also a number of motor jacks, the best being the Universal, which is made on telescopic principles, and can be quickly raised from 8½ to 20½ inches, and also to any intermediate height: it has an aluminium body, and is, like all the other articles on this stand, splendidly finished.

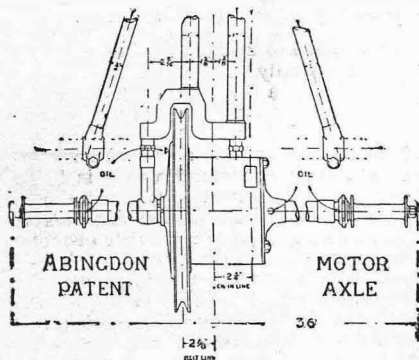
333. Birmingham Small Arms Co., Ltd., Small Heath, Birmingham. This distinguished firm has an excellent array of goods of interest to the motor trade. The B.S.A. spring frame for motorcycles has been designed to overcome vibration, and will suit inclined engines from 2 h.p. up to 2½ h.p. The standard size of frame is 23 inches, with 8 inches steering head reinforced girder type, and suits 26 or 28 in. equal wheels, taking cranks up to 7 in. The B.S.A. Bi-Flex brake which is shown here is a combined back and front brake, hand applied by a single lever: it is fitted with the well-known B.S.A. moderator spring, and is under the complete control of the rider. The firm also supply motor-cycle fittings of all kinds: these are beautifully made, and are of great reliability.



The B.S.A. Spring Motorcycle Frame.

The care bestowed upon their production has rendered them household words in the motor trade. There are many items of interest to be seen here peculiar to cycle construction. These are referred to in "Cycling"; but we can cordially recommend all visitors to the exhibition to take careful survey of the various details: they will be amply rewarded for their pains.

326. Abingdon Works Co., Ltd., Birmingham. As usual, this well-known house tempts traders with a full range of motor fittings; in addition, there are Starley axles, and a new Abingdon tricycle axle of excellent design. The most interesting feature of the exhibit, however, in our opinion, is the firm's new patent differential geared axle for a belt-driven



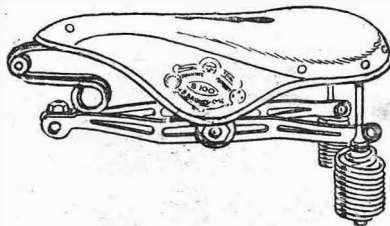
motor-tricycle. The axle is schemed on the well-known and approved Starley axle lines, with the outer containing or supporting case entire, or undivided, thus ensuring perfect stability of the structure, and absolute alignment of the bearings, with simple adjustment. The axle is designed for adaptation to an ordinary motor-bicycle frame, thus converting it into a tricycle. The drive is communicated by the ordinary belt, which, in the event of the engine failing, can be removed so as to allow the rider to pedal in the ordinary way. This would not occasion excessive fatigue, for the axle does not add materially to the weight of an ordinary motor-bicycle. In order to prevent the belt pulley fouling any obstacles in the road, it is made with a reduced diameter, and to obviate a rise in gear when fitting the axle to a standard motor, a special reducing gear is provided by spur wheels, which run inside the axle case. These are so proportioned as to give an increase of mechanical advantage of 20 per cent. to the motor, making the machine an excellent hill climber, without seriously curtailing its speed upon the level. Of course, excessive speeds are undesirable with this class of machine. The whole of the mechanism is self-contained, beside being practically dust-proof and oil-retaining. The device is excellently made and finished, and we are sure it will create a very favourable impression, not only among the members of the trade, but with all who are interested in automobile developments.

322. Cam Rim Brake Co., Ltd. This brake is now made in a suitable form for motorcycles. The brake blocks are mounted on two levers pivoted to each other, the upper parts of the levers being moved apart by the action of a cam which is rotated by a flexible wire, the lower parts of the levers being pulled apart by springs. An adjustment is provided enabling the brake to be used with different widths of forks, and enabling the blocks to be adjusted when they become worn. This adjustment also enables the brake blocks to be rapidly opened out when it is desired to remove the wheel. The cam brake is very powerful without being, in the least degree, heavy.

D.F.

318. County Chemical Co., Ltd. This firm is showing the "G.B." motor grease, motor oil, motor outfits, chain lubricant, belt dressing, car polish and metal polish, so called because many of these articles were used in the Gordon-Bennett race. The firm also supplies Hill's special vulcanising rubber solution for motor tyres, deodorised carbide specially prepared for motor lamps, celluloid cement for repairing leaky accumulators, and petrol intensifier. The motor outfits are very complete, and, in addition to the usual articles, they contain celluloid cement, sheets of celluloid, corn emery, and large repair band.

259. J. B. Brooks and Co., Ltd., Great Charles Street, Birmingham. Several new models of this firm's famous saddles are shown, including some important advances in design and construction. Special attention may be directed to the Broo type, showing an entirely new arrangement of compound springs which absorb all shocks and vibration. There is a tendency to bouncing, while there is a feeling of smoothness and elasticity to a degree which has not heretofore been attained. The Broo pattern has been further improved in design, and is fitted with a new powerful clip, which prevents slipping under any strain whatsoever, thus

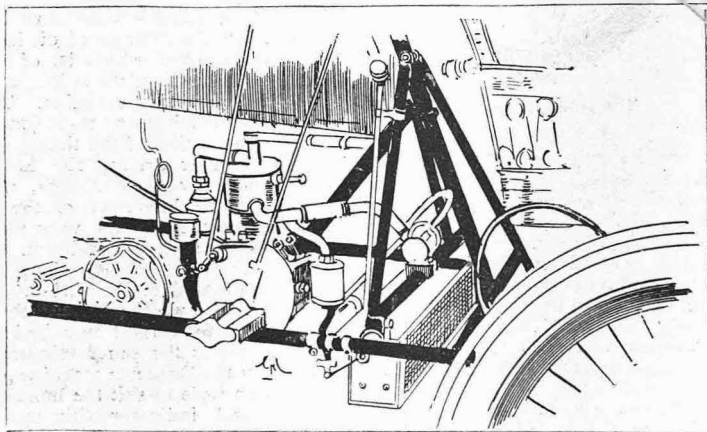


Brooks' New Patent Spring Motor Saddle.

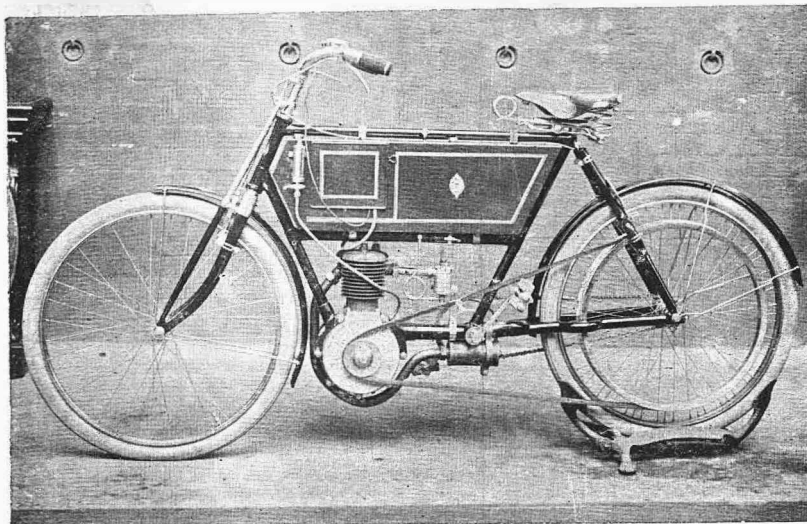
giving absolute security. B80 is another attractive type weighing but 31bs. 5ozs. It has a broad seat carried on three coiled springs at the back, and is fitted with the patent gilder bracket. All the above patterns are supplied in a larger size suitable for heavy riders, and are provided with ample spring action. There are several new designs of motor bags, which will be found compact and convenient, many small improvements in fastening, etc., having been introduced. The new patent collapsible carrier bag will meet with favour, as it closes or expands according to its contents. The Challenge bag is a new design with many loops, giving ample accommodation for tools, and fitted with a patent locking strap which prevents them from rattling. The quality of material and workmanship of goods shown are of the very best.

264. J. Lucas, Ltd., Birmingham. Many new lines in motor accessories may be found here. Some new motorcycle and fore-carriage lamps for burning acetylene gas are shown, notably the "Acetyphoto" and "Luminator." "The King of the Road" is a powerful headlight for acetylene, which contains several improvements and is supplied in large and small sizes, the height being 12in. and 10in. respectively: side lamps and back lamps in great variety for petroleum or oil may also be seen. The exhibit includes articles of every description for motorcycles and cars, such as force-feed oilers, petrol squirters, terminals, etc. There is a new back carrier on view which will be found convenient and useful. Engine cylinder oils and motor oils embracing special qualities both for water and air-cooled motors are supplied for high speed engines: these oils will endure at high temperatures and remain limpid in winter: they are also free from any sticky tendency. Various motor pumps and horns are shown, and every article may be depended upon to be of the best make and of excellent finish.

140. The Triumph Cycle Co., Coventry. The predominating feature of this firm's display of motorcycles is the most symmetrical design and exquisite finish of the machines. The frame has a long wheel base, with the engine mounted vertically. The 2 1/2 h.p. machine has the Longuemare carburetter, Denlop silencer and V belt transmission. The ignition gear has been most carefully thought out, and a special device has been fitted to obviate explosions occurring in the exhaust box. This cuts off the current before the exhaust valve is lifted. The petrol tank is made of a special lead lined sheet steel, quite acid proof, and of great strength. The spark adjustment is worked on a ratchet, giving a very fine gradation. The 3 h.p. machine is on the same lines, petrol capacity equal to 120 miles' running, double accumulators, handlebar switch, special speed governor on the exhaust, band and rim brakes, and numerous detail features. The fore-carriage shown has a 3 1/2 to 4 h.p. motor, water-cooled by pump and honeycomb radiator, which is fitted low down to catch the air. This drives a V belt, and three special band brakes are fitted. Large tyres, well sprung fore-carriage, wide mudguards and substantial lamp brackets are some of the features of this excellent mount.



The Triumph Fore-Car, showing arrangement of cooling device.



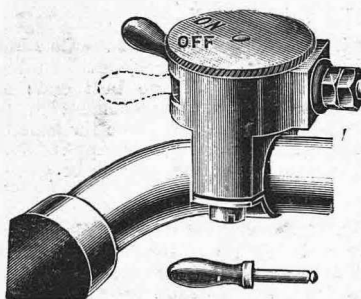
The 1904 Noble.

260. Herbert Smith and Co., 29, Finsbury Pavement, E.C., exhibits a quantity of cycle and motor accessories of every description, including motor tyre outfits, Hescol tyre repair bands, instantaneous connections, pump connections, carbide motor lubricant, sparking plugs, accumulators, switch handles, voltmeters, motor saddles, jockey pulleys, induction coils, tanks, belting, goggles, etc.

9. Noble Motor Co., Pocock Street, Blackfriars, S.E. Noble motor-bicycles long since sprang into popularity, and those on exhibition are well up to the firm's reputation. The engines on the 1904 models do not vary much from those exhibited last year and recently described by us, the chief difference being that the valves are now mechanically operated, the inlet being also operated by a relief compression to enable easy starting uphill and on greasy roads. All the machines shown are belt driven, but, if desired, a chain drive can be substituted. As hitherto, the coil, accumulator, petrol and lubricating oil are all contained in a neatly designed tank. Complete engine sets are shown, and also a stoutly built motor launch.

93. Bord Light-weight Motor, Bord Motor Co., 29, Finsbury Pavement. This firm show their 1½ h.p. motor which can be fitted as an auxiliary to the ordinary cycle—provided there is 3½ in. clearance between the back stays at 9 in. radius—or to the other pattern of the specially built machine. The motor is slung to the top tube of the machine, and securely gripped to the down diagonal. The petrol tank, round in shape, is fitted to the handlebar, and will hold a supply for 100 miles. Wipe contact, ordinary coil, large accumulator, New Departure Hub, and front rim brake are supplied. The driving pulley is made detachable from the fly-wheel to facilitate renewal. The motor which is so placed on the frame as to balance properly, is supplied separately at £18 10s., or on a specially built machine at £19 10s.—a price far below anything yet attempted. A very ingenious mode of joining the twisted hide belt is by forming two eyes, one on each end of the belt, and on one end a tongue is also made: the two eyes are brought over each other and the tongue passed through.

199a. Mason and Brown, Leicester. A large display of switches, ignition coils, voltmeters, charging sets, testing lamps, wipe contacts, accumulators, high and low tension wire, attracts attention here. A 2½ h.p. engine is exhibited; but the most

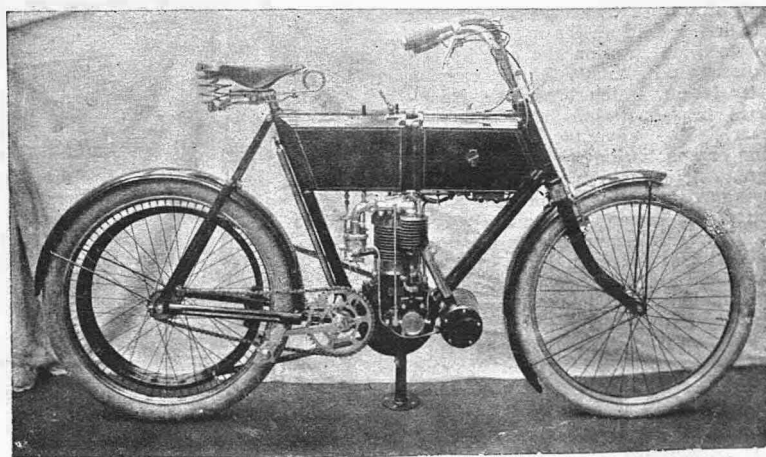


Mason and Brown's Patent Switch.

interesting device here is the two-way handlebar switch for motor-bicycles, which was described and illustrated in "THE MOTOR" when it was first introduced. This arrangement consists of a nickel-plated brass case, which is secured to the handlebar by means of a rounded plate and screws. This fixes it rigidly,

and forms the connection to the frame. The other connection to the wire is made by means of a nut on the outside of the case. A pin is carried through to the inside, and is insulated by means of an ebonite bush from the remainder of the case. The contact is made by an incomplete circle of strong German silver, inside the case, which is moved backwards and forwards by means of the detachable handle shown in the illustration. When the plug is at the position marked "On," the circuit is completed by means of a spring and the inner end of the terminal receiving wire. At "Off," the contact is definitely broken.

137. Robinson and Price, Chatham Street, Liverpool, are well to the fore with a splendid array of R. and P. motor-bicycles. This firm's exhibit last year was one of the features of the Show, owing to the superb finish and ingenious details and design of their motor-bicycle. The engine is built vertically into the frame, and two powers of motor are supplied, viz., 2½ and 2½. All bearings are extra long, and a single large diameter fly-wheel is used. The silencer is extra large and effective, and an improved valve lifter provides for easy starting, and all control is effected from the handlebar by Bowden wires, the wires being carried in channels between the tanks for protection. Lubrication is by sight feed pump, and petrol capacity is equal to 150 miles' running. The ignition is by brush contact and trembler coil, the high tension cable being reduced in length to 4 in. This contact breaker is a detail that should be closely examined, as it is undoubtedly one of the best designed of its class we have seen. The "wiper" consists of a curved and hardened steel blade, adjustable through a considerable arc of a circle. A very small movement takes up any wear that may take place on the V piece after prolonged use. The combined terminal and clamp for the wiper blade is neat and highly effective in gripping the spring at any position it is set to. The mechanism runs in semi-solid grease. The contact cam is of hardened steel. The carburetter is a Longuemare, fitted with throttle and air regulator. The firm make a special feature of using enamel finish as far as possible to make the machine as weather-proof as possible. This is distinctly good, and will be appreciated by practical riders.

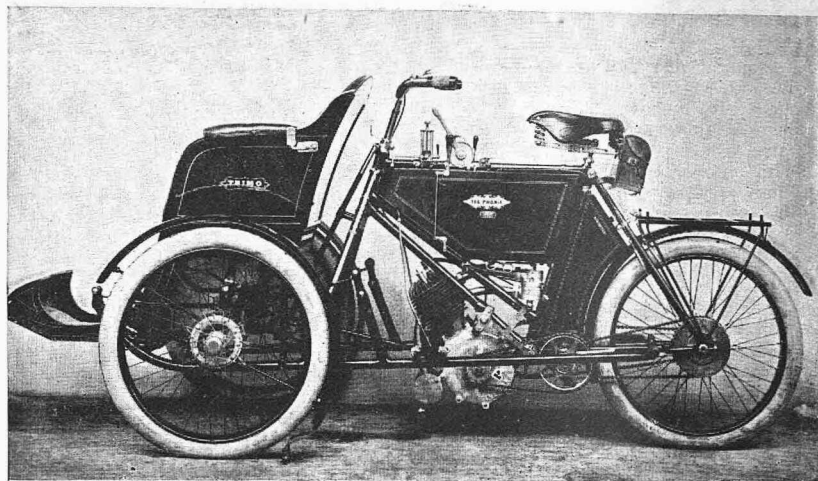


The 1904 R. and P.

193. J. Dawson and Sons, Ltd., Lincoln, show the two varieties of their well-known Lincona belts for motor drives, the "Magna" and "Standard" together with hook and simplex fasteners and a suitable dressing for the belts. The quality of these belts is well-known, users being well satisfied with their lasting powers.

269. Micrometer Engineering Co., Coventry. This enterprising firm have, as usual, a large number of their high-class specialties on view, including a free-wheel clutch of the ordinary Micrometer type—but extra strongly made—and a free engine clutch for motorcycles attached to fore-carriages. The latter is designed with the view of starting the engine with a handle on the lines of a car. It is claimed that there is an entire absence of end thrust when the clutch is in full work, and that the action of taking it out steadies the engine and prevents racing. The device is a fine piece of workmanship, every part of the mechanism having been carefully thought out. The well-known Duad lubricators are to be seen here, while the firm is also exhibiting a registered design of non-slipping tyre for motorcycles and fore-carriages.

136. Phoenix Motors, Ltd., Blundell Street, Caledonian Road, London, N., were early in the field with the motorcycle and they have always sought to improve and modify in order to make the popular motor vehicle a practical article in every possible way. A number of the features of the present day motorcycle have originated with Mr. Hooydonk and we should be surprised if some of the Phoenix novelties shown at the Stanley for the first time do not become general. Phoenix features set the fashion. The company show the 2 h.p. and the 2½ h.p. Phoenix motor-bicycles, the former selling at 40 guineas, and the latter at 45 guineas; the new model, the 2½ h.p. motor-bicycle with chain drive and two-speed gear selling at £55. Besides these, there are four types of Trimo. With belt drive the 2½ h.p. sells at £60, and the 3½ h.p. (twin belts) at £67 10s. With chain drive, free engine and two-speed gear the 2½ h.p. Trimo sells at £70, and for a 3½ h.p. engine the price is £75. The Phoenix tricycle without coach body for passenger can be obtained at a reduction on the above prices. To now deal with the new Phoenix features. The two-speed gear and free engine device was fully described by us a week or two ago. It drives solid on the high gear: in the intermediate position the gear is entirely disengaged whilst a clutch can be gradually let in, which brings an epicyclic train into operation, thus reducing the gear. The advantages when hill climbing or negotiating traffic are exceedingly great. The chain drive is taken from the engine to a countershaft placed behind the bottom bracket and thence to the rear wheel. There is separate and independent adjustment for each of the chains. The new carburetter is designed with a view to simplicity in adjustment and management, and it should prove one of the most successful features of the 1904 Phoenix. An improved luggage stand and carrier with a portion of the rear mud-guard attached to it, the petrol and oil gauges and other items are well worthy of inspection. Two great improvements are introduced into the Trimo. The frame



The Phoenix Trimo.

is now extended to the footboard of the coach body, and long C springs are interposed between the frame and the front axle. The effect is to not only insulate the passenger, but also the driver and the mechanism, and with the free engine and two-speed gear to make the Trimo more like a car than ever.

328. The Patent Butted Tube Co., Ltd., of Birmingham, show specimens of tubing with butt ends. These butt ends are formed to give a reinforcement at the joints, and are claimed to be far superior to brazed in liners. The tests applied show them to have a tensile strength of 30 tons per square inch.

108. The Viaduct Motor Works Co., Coventry. On this stand are three Davison motor-bicycles, fitted with Simms' engines, magneto ignition, long belt drive, handlebar control and other special features. The Davison frame is quite original, the engine being bolted to a half-cradle, just in advance of the bottom bracket. Glass gauges are fitted on the outside of both oil and petrol tanks, figured to show the quantity of liquid in the tanks. The weight of the complete machine is 100lbs., and the work and material "British throughout."



New Handle Control and New Girder Fork on the Davison Motor Bicycle.

190. W. B. Fordham and Sons, Ltd., York Road, King's Cross, N., make all the well-known types of Selvyt now before the public. They are of varying sizes for special purposes, such as dusters for motors, gloves, straps for cleaning hubs of wheels, saddle covers, rain covers, handlebar covers, knicker shields and cycle wraps. A goodly array! One has only to name his requirements to find them speedily met by "Selvyt."

174. Moebius and Son, of Homerton. This exhibit consists of motor oils and motor grease. Mr. W. H. Phillips, who represents the firm, is in attendance to explain the excellent qualities of this firm's productions. All packages up to and inclusive of 1 gallon are delivered without charge for tins. The oils are supplied in special enamelled tins, and are obtainable in every town in the United Kingdom. The motor grease is said to maintain its consistency in summer and winter alike.

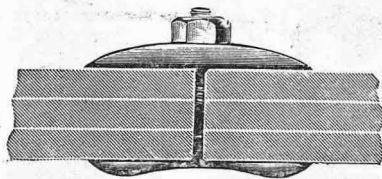
319. Brown Bros., Ltd., Great Eastern Street, London. The Brown motor-bicycles which are shown by this firm embody several important improvements for the 1904 season. The 3½ h.p. engine has been introduced specially for fore-carriages. The new 2½ h.p. and 3½ h.p. bicycles are fitted with a triple head and girder forks of special design, mechanically operated valves, and very large fly-wheels. The tank has been improved and increased in capacity. There are, in addition, a number of minor but important improvements, such as the fitting of a larger belt, a new front rim brake, extended mud-guard, etc. The 2 h.p. bicycle, having proved satisfactory, has not been altered, except in very minor details. The bearings to the Brown motor-bicycles are of gun metal, and of exceptional length, being two inches wide on the driving pulley side. Special attention has been directed to the construction of the crank case, which is absolutely air-tight. The belt pulley is also oil retaining, thus keeping the belt free from oil. An exhaust valve lifter is fitted: this, together with the advance sparking, are actuated by one lever. The Longuemare float feed carburetter with a throttle is fitted.

106. Raglan Cycle Co., Ltd., Coventry. Following in the wake of other cycle firms, the above company have, during the last year, devoted their attention to motor-cycles, and, as a result, they are showing two machines, one of which is fitted with an extremely comfortable and pretty fore-car. The engine, which is of their own make, is of $3\frac{1}{2}$ h.p., the crank-case being bolted to the frame low down. The cylinder has a water-cooling jacket, which is fed by a tank fitted behind the fore-car, and on a level with the fork crown. This tank, which has a capacity for one and a half gallons, is cooled by two air funnels which pass through it. The exhaust valve is lifted by means of a Bowden wire operated from the handlebar. The sparking-plug is placed in a vertical position on the top of the combustion head, and an efficient silencer is fitted. A band brake is attached to each of the front wheels of the fore-car, in addition to a Bowden brake on the rear wheel of the machine. The combination is not only smart in appearance, but is strongly built, and is, no doubt, a very serviceable vehicle. We shall illustrate it in our next issue.

134. The Ariel Motor Co., Bournbrook, Birmingham, show about a dozen motorcycles of a variety of types. This firm have come right to the front in the motorcycle trade by the sheer merit of their machines, the workmanship being of an order that could not fail to satisfy the most critical eye. The No. 1 model motor-bicycle is made in $2\frac{1}{2}$ and $3\frac{1}{2}$ h.p. sizes. The engine is mounted vertically in bracket extensions. Transmission is by V belt, and it is noteworthy that the free-wheel is fitted with a protector to keep the mud out. The No. 2 motor-bicycle is a splendidly equipped machine with a 2 h.p. Ariel-Minerva engine with mechanical inlet valve, spray carburetter, two rim brakes and Dunlop motor tyres. This comes out at the remarkably low figure of 35 guineas. The Ariel side-carriage should be closely examined. This is one of the very best things in this line we have yet come across. It has very substantial attachments and long springs and handsomely upholstered carriage. This complete is priced at 57 guineas with $3\frac{1}{2}$ h.p. motor. Old riders of the motor-tricycle will view with interest the Ariel tricycle and quad shown. The tricycle has a $3\frac{1}{2}$ h.p. motor with two-speed gear, and every detail has been most carefully thought out. The price comes out at 50 guineas. The quad is a splendid piece of work fitted with 34 h.p. motor, with water-cooled head and two-speed gear. The front carriage is supported on elliptical springs and is comfortably equipped. A notable feature about this machine are the foot controlled tyre brakes. This machine is sold at 100 guineas. The Ariel fore-carriage has many distinctive features. It is fitted with a 3 h.p. engine, extra wide V belt transmission, Longuemare carburetter, compensating band brakes on the fore-carriage wheels and a back pedal brake provided with an ingenious cut out to enable the machine to be wheeled backwards. The inlet valve is mechanically operated, and interchangeable with the exhaust valve. The contact breaker is visible through a window and a novel worm gear lubricating device is another of the numerous valuable features of the Ariel machine. A coupler is also shown for attaching a bicycle. It has compensating joints.

60. The South British Trading Co., Ltd., 13-15, Wilson Street, London, E.C. The Vindec Special motor-bicycle, with F.N. engine of $2\frac{1}{2}$ h.p., V belt drive, triple head and bank brakes on both road wheels is the piece de resistance here. The back mudguard is hinged, to facilitate tyre repairing. The tool kit on this machine is worth noticing: a large leather bag is shaped to the recess in frame between down tube and back wheel, and contains all spanners, etc., in pockets; the tyre inflator is fixed to the outside of this bag. Another good feature is a lamp bracket of sensible proportions, on which one may safely trust a valuable lamp. The S.B.T. Co.'s motto is "a first-grade machine at a second-grade price," viz., £40, and it looks good value at that figure.

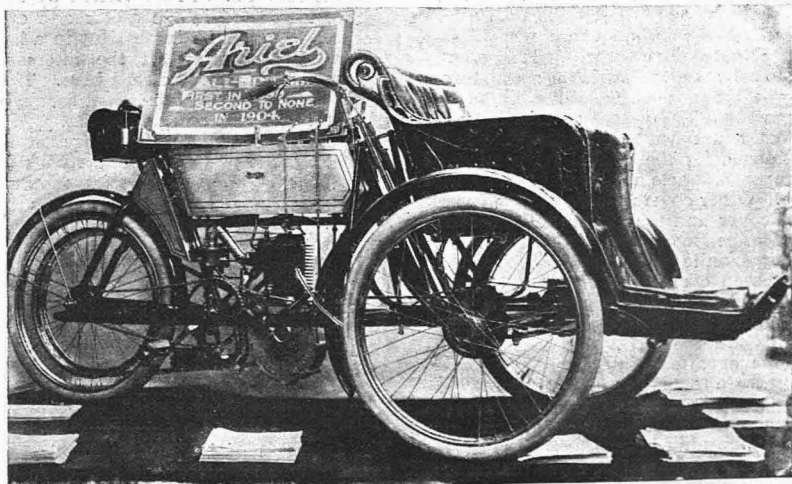
202. Eclipse Motor and Cycle Co., Birmingham. Motorcycles fitted with $2\frac{1}{2}$ and 5 h.p. twin-cylinder engines are staged here. The particular feature of these motors is their extreme simplicity; one lever will bring either cylinder into operation, or will cause both to work simultaneously. Twin cylinder coils are



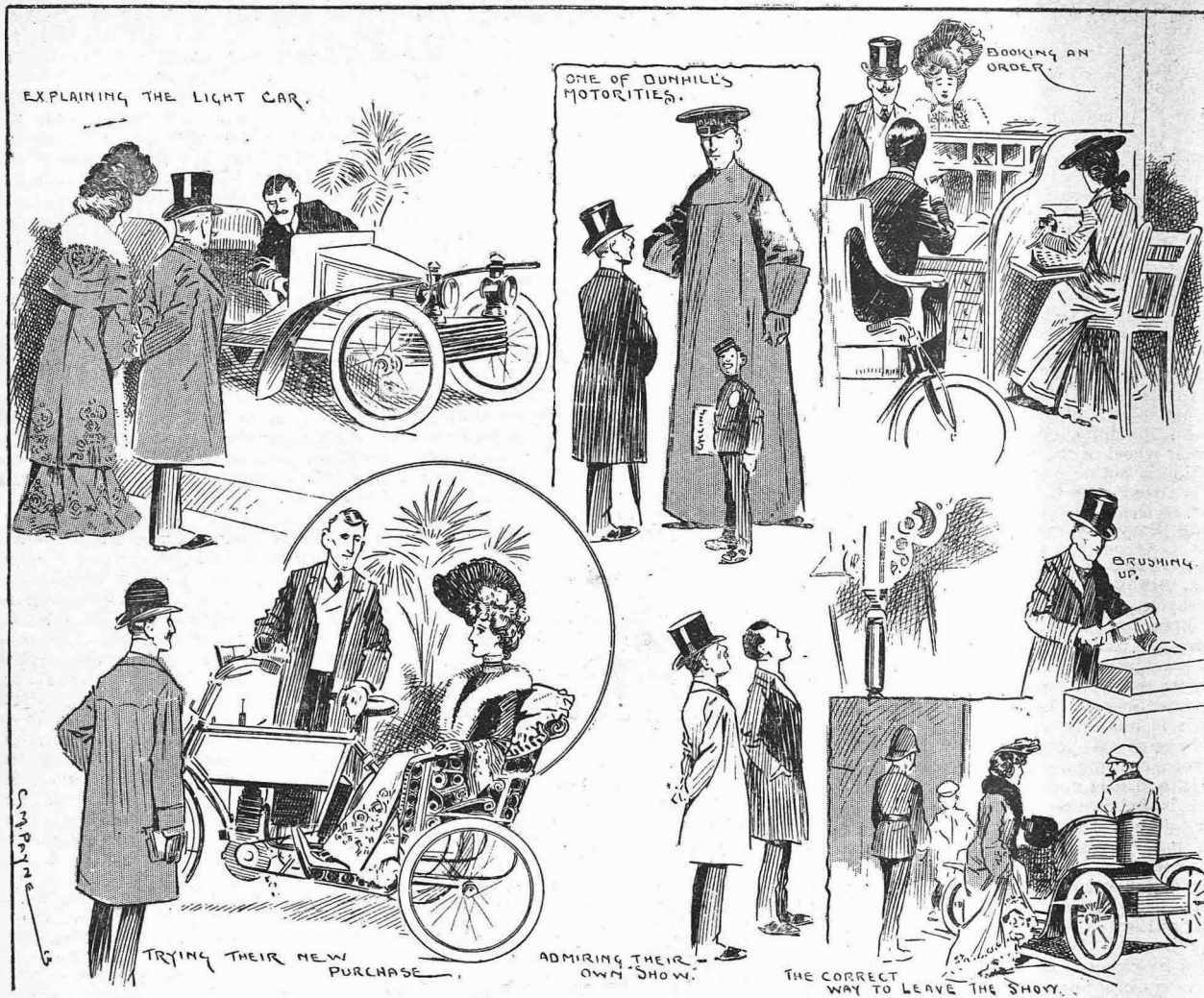
fitted, as are two accumulators, and a special form of valve lifter. The firm inform us that they have patented a new form of drive, dispensing with belts, chains and cogs, which will give 100 different gears, and which can be fitted to all makes of motors. Two clutches are fitted to the back hub, and are connected to the engine by driving rods. On the engine is a variable throw crank, which can be altered whilst riding, and any number of gears obtained, as well as a free engine. The device will be on show during the week. The illustration clearly shows the design of a new belt clip which the firm have just placed upon the market. This consists of two serrated steel plates, which are made to grip the faces of the belt by means of a nut and bolt fastening.

128. The Pebok Motor Co., Leadenhall Street, London, are showing the very popular Pebok motor-bicycle. This has a $2\frac{1}{2}$ h.p. motor mounted vertically in a loop frame. The carburetter is the Longuemare, and transmission by V belt. A specially good feature about this machine is the substantial type of regulating lever fitted. The inlet valve is mechanically operated on some of the machines. To avoid short circuits, the length of wiring is reduced to a minimum. The tank is made in four sections, the fore compartment carries lubricating oil, the second the battery, the third the coil, and the rear part has capacity for petrol to run 100 miles. The spark lever and valve lifter work together. Two brakes are fitted, and the mudguards are of extra width. The frame looks an exceedingly strong one, and the forks are extended right up to the ball head. The firm's speciality for this season is a new $3\frac{1}{2}$ h.p. machine, with M.O. valve, two accumulators, extra petrol capacity, and Bowden back brake.

132. The James Cycle Co., Sampson Road North, Birmingham, make a speciality of two types of motor-bicycle, one fitted with the new 2 h.p. F.N. engine. The frame is of substantial build throughout, and handsomely finished. The transmission is by the usual flat raw-hide belt on to a wood belt rim. The wheels are 28 inch, fitted with 2 inch tyres, and the mudguards are of extra width. There are two rim brakes fitted, the rear one being the Bowden pattern. The carburetter is of the usual F.N. pattern, and ignition is by coil and accumulator. The other machine has a $2\frac{1}{2}$ h.p. Minerva engine fitted vertically in a loop frame, and driving by V belt. A noticeable feature of this machine is the method of supporting the motor by aluminium bridge pieces between the down tube and diagonal, giving a very rigid support. The front forks of this machine look immensely strong, and are carried right up to the head. The carburetter is the latest pattern Minerva. Dunlop tyres are fitted, and also two rim brakes. The finish of this machine is of a very high order, and will stand a critical examination. We hope to illustrate this machine in our next issue.



The Ariel Fore-car.



JOTTINGS ON THE OPENING DAY AT THE SHOW.

258. Dover, Ltd., Northampton. The Dover gear-case was the first detachable gear-case placed on the market, and has ever since been in the foremost rank. It is made in a range of sizes to take up to 52 teeth, $\frac{1}{4}$ inch pitch chain wheel, and from 17 to 20 $\frac{1}{2}$ inch centres. It is adaptable to all standard variable speed hubs, free-wheel and back-peddalling brake arrangements. The patent automatic brush lubricator included in the gear-cases is an easy means for the perfect lubrication of the chain, and acts as a preventive against rattle. Other covers shown are the Revod chain cover and the Revod tandem chain cover. The Dover people also exhibit the tubular exonite mudguard, and exonite compressed cycle handles. A novelty is the lighting-up time handle, which gives a perpetual lighting up calendar. Other exhibits are the D.L. steel socket spanner, the exonite inflator, and the Dover patent table tennis ball. Special attention is drawn to the castings for the motorcycle and engineering trades in aluminium, gun metal, phosphor-bronze, and brass, including crank chambers, name plates, etc. The Dover people also carry out plating, enamelling, brassing, and lining for the cycle and motor trades.

D20

262. Components, Ltd., Bournbrook, Birmingham. Occupying a prominent position in the Gallery, the exhibit of the Components Co. will be visited by most people interested in the motor and cycle trades. It would be impossible in a brief notice to enumerate all the interesting novelties which may be seen here. There are, for example, very excellent specimens of motor-bicycles, of 2, 2 $\frac{1}{2}$, 2 $\frac{3}{4}$ and 3 $\frac{1}{2}$ h.p., with sociable and fore-carriage attachments, Crabbe motor brakes for back and front wheels, Liberty special motor-bicycle tyres, cycle and motor rims and valves. The Components Co. stock also the Fleet cycles. The Fleet motor-bicycle is of 2 $\frac{3}{4}$ h.p., and has a tank which encloses accumulator and coil, and is finished in aluminium, with black lines. It has Crabbe brakes back and front; the ball head is fitted with girder forks. The Liberty side-carriage for motor-bicycles is a beautiful addition. It is upholstered in red or green leather cloth, well hung on triple C springs, with a waterproof apron. The Liberty sociable can be supplied for practically any motor-bicycle upon the market.

A number of reports of motorcycle exhibits are unfortunately crowded out.

50a. Mecanique et Moteurs, Liège, Belgium. This Belgian firm shows a 3 $\frac{1}{2}$ h.p. air-cooled motor-bicycle; a 2 $\frac{1}{2}$ h.p. water-cooled motor-bicycle; and a 12 h.p. twin-cylindrical Jenatz-Martini car, fitted with a patent magnetic clutch.

3. Palmer Tyre Co., Ltd., Birmingham. A large amount of space is occupied by this well-known firm of tyre makers. Mounted sections of all the tyres manufactured by them are shown, those for motorcars and motorcycles being the most prominent. As the result of much experimental work, the company are now producing what they style the new cord tyres for motorcars, which, owing to pressure upon space in this particularly crowded issue, we must describe fully next week, as in the limited space at our disposal it would be hopeless to attempt to do justice to the invention. Suffice it to say that in the new fabric the Palmer Company has once again stepped to the front in tyre design, for, besides being immensely strong (a single layer of the fabric is shown supporting well over a ton weight), it should serve to make the tyre so speedy and resilient as to be qualified to rank with the original Palmer cycle tyre.

SOME LIGHT CAR EXHIBITS AT THE STANLEY.

212. Perry and Co., Ltd., Birmingham. In addition to an interesting display of motor-bicycle frames and fittings, the firm exhibits a neatly designed and well finished $3\frac{1}{2}$ h.p. air-cooled engine, complete, with contact breaker, sparking-plug and pulley. The bore is 84 mm. by 84 mm. stroke, and the driving power is sufficient for fore-carriage or trailer attachments. A handsome fore-carriage, suitable for fixing to any make of motor-cycle, is also amongst the exhibits. Two stays direct from the fore-carriage axle are carried to the axle of the rear hub of the machine; these telescope into each other for the purpose of adjustment, and are firmly locked together by a lug, with nut and bolt. They may also be utilised as footrests. Angle stays, fixed fore and aft of the ball head, assist in preventing twisting and vertical strains. The basket is hung on strong "C" springs. Band brakes operate on drums on both sides of the axle and are manipulated from the handlebar of the cycle by Bowden wires.

216. Lycett's Saddle and Motor Accessories Co., Ltd., Birmingham, are showing specimens of their new motor saddle, which is constructed on an entirely new principle, said to reduce vibration to a minimum. Owing to the special construction the peak of the saddle is prevented from rising. The 130 La Grande motor saddle is no less than $11\frac{1}{2}$ in. wide at the base, and 13 in. long. The Rawide belt is V section, with eyelets in place of the usual rivets, it being therefore only necessary to cut a short piece off the belt when slipping begins, and to hook the fastener into the next eyelet. The belt is made in three sizes, the largest being suitable for the powerful motors used for fore-carriage work. An ingenious front wheel carrier, designed for a large bag and accumulator case is shown. The bag is 10 in. long and 5 in. high, is tin lined, and is fitted with pockets for all necessary tools and spare parts.

214. Messrs. Bransom, Kent and Co., Ltd., 332, Goswell Road, London, are showing accessories of every description for the motorist. A fine exhibit of motor horns and lamps, both gas and paraffin, is set out. Neat wrenches and screwdrivers of compact design, and accumulators of all sizes are shown. A handy screwdriver, only 4 in. long, should prove a useful addition to the toolbag. Further on are Longemare carburetters, in various useful sizes, the newer patterns being fitted with the automatic air regulator; while an attachment suitable for fitting to the older patterns is priced very moderately, and should prove a useful addition. A neat throttle, suitable for F.N. and similar carburetters, minus this indispensable accessory, is worth noting. The Watawata V belt, for which the firm are the sole agents, is shown. A full description of it appeared in our columns recently. Extraordinary pliability and power, with maximum efficiency and durability, are claimed for this belt, which, it will be remembered, is constructed on an entirely new principle. The price compares favourably with that of the first-class V belts. Various useful forms of belt fasteners, suitable for V belting, are included in the exhibit. Several motor-bicycles are also exhibited. These have all the latest improvements fitted, and are of good design and finish.

208-209. Lintine and Co., Birmingham. Two 6 h.p. Mobile voiturettes, fitted with genuine De Dion engines, meet the gaze at this exhibit. The cars have three speeds forward and a reverse, while the Panhard type of gearing is employed. The drive is direct on the top speed, while the Mercedes style of bonnet and radiator has been copied. The bucket seat holds two persons, and the artillery wheels are fitted with Dunlop tyres. The cars are priced at 170 guineas.

27. The Motor Manufacturing Co., Ltd., of Coventry, make a most effective display of a finished 8 h.p. M.M.C. car, a chassis of the same type, and a number of motorcycle and car engines. The latest production for motorcycles is a $3\frac{1}{2}$ h.p. engine, with cylinder and head cast in one piece. The four coilionettes, which have always been a feature of M.M.C. engines, disappear, and the two valves, which are mechanically operated, are placed at the forward side of the engine. The two-to-one shaft is placed at the top of the crank case, the gearing on one end, and the commutator on the other end of the shaft, the cams on the shaft lifting the valves. The radiating ribs are set in order to get the greatest efficiency in cooling. The ordinary $2\frac{1}{2}$ h.p. motor has not been altered, but wipe contact or make and break can be had at option. A 4 h.p. water-cooled engine, 80 mm. by 85 mm., is shown for fore-carriage and trailer work, and it is capable of driving a small car. This engine has mechanically operated valves. A $2\frac{1}{2}$ h.p. motor is shown, with magneto ignition, driven by a large fibre spur wheel from the two-to-one shaft. This exhibit of bicycle motors will interest every maker and user of the popular two or three-wheeled vehicle.

13. The Societe des Automobiles Francaises, of 77 and 78, High Street, Marylebone, W., are showing four Papillon cars—two of them being in chassis form—the Bucket motors, and a number of special novelties, for all of which they are sole English agents. The 6 h.p. Papillon is driven by a De Dion engine, driving through clutch, gear box giving three speeds and reverse, and a flexible shaft to the differential on the rear axle. The body has a phaeton seat for two, and a large platform at the rear on which luggage can be carried, or a dickey seat fixed. With Michelin tyres, the car sells at £210, or £10 less without the dickey seat. Larger cars of 9 h.p. and 12 h.p. are also stocked. The Bucket motor is 70 mm. bore by 70 mm. stroke, and is said to give 3 h.p. Pulleys of various sizes and designs are fitted, and the motors are well finished. Some electrical novelties here are well worth inspection. There is a well placed handlebar switch, which is a decided improvement on the twisting handle. The Bijou plug, with a protecting bridge over the sparking points; a well-made adjusting lever, which has a locking device in the quadrant, so that it can, by the action of the thumb, be made to stay where it is put; a couple of good two-way switches and many other useful sundries are to be found here, all of which will appeal to the practical motorist.

29. O. C. Selbach, 66, Great Russell Street, London, W.C., exhibits the well-known Regal car: the price of the two-seated 6 h.p. car is 135 guineas; a two-cylindred 10 h.p. car, with tonneau body, comes out at 275 guineas, and a big 24 h.p. car, with tonneau de Luxe, at 700 guineas. All Regals have propeller shaft drive.

16. The Enfield Cycle Co., Ltd., of Redditch, are showing two 6 h.p. and two 10 h.p. Enfield cars, built on popular lines. The 6 h.p. car has a De Dion engine, placed under a long bonnet in front, with tubular radiator and large water tank. The petrol tank is placed behind the dashboard, together with the oil reservoir. The car is provided with three forward speeds and a reverse. A roomy seat, with ample space on the footboard, is fitted, and there is a platform at the rear for luggage or a tool box. The car sells at £175.

26 Shippey Bros., Ltd., 13-14, King Street, Cheapside, London, E.C. The Toledo steam car, for which Messrs. Shippey are sole English agents, is shown here; it is a two-seater on standard American steam car lines. The auxiliary water pump is combined with the steering handle, so that the driver can pump water to the boiler (in the event of the automatic pump going wrong), and steer with the same hand. Diamond single tube tyres, in various weights, and also in evidence, and also a special puncture sealing compound for motor tyres.

28. The Motor Car Co., Ltd., 168, Shaftesbury Avenue, London, W.C. Two Deauville cars and one Pegasus catch the eye at this stand: the latter is a newcomer, and is fitted with a 6 h.p. genuine De Dion engine, three speeds and reverse, bevel wheel and propeller shaft drive, tonneau body, and bucket front seats—price £195, including lamps, tools, etc. The radiating tubes are situated at the sides of the bonnet, and natural circulation is relied upon to cool the water, no pump being employed. There are expanding brakes on the rear hubs, and a bronze band on a steel drum acts as a propeller shaft retarder, so that plenty of braking power is provided. Ignition is on the high tension system, and there are many good features that will prove worth inspection.

SPECIAL.

We much regret that owing to the great pressure on our space, to which this crowded issue bears witness, we are unable to fully report and illustrate the light car exhibits at the Stanley and National Shows, many of which exhibits were unready at the time of our final inspection. All the light cars on view at both Shows will be fully dealt with and illustrated in an enlarged issue of "THE MOTOR" next week, in which we shall also deal with a number of other exhibits which space will not allow of our reporting on in this issue.

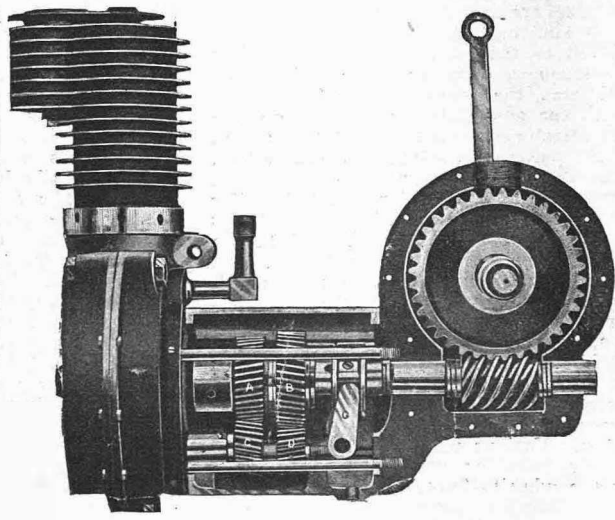
THE MOTOR EXHIBITS AT THE NATIONAL SHOW.

The first National Show was held in January, 1893. It has always been held at the Crystal Palace, and the present Show is the twelfth of the series. A good number of the best makes of motorcycles are on view, together with a good show of light cars. The Show remains open till next Saturday.

7 and 8. The Raleigh Cycle Co., Ltd., of Nottingham, have come to the front with a bound. It has been obvious to all who know the company and its traditions and who were acquainted with Mr. G. P. Mills that the reason why a Raleigh motorcycle (we mean in the full meaning of the word "Raleigh") had not previously been placed on the market was that hitherto Mr. Mills had not satisfied himself that he had secured or produced the best possible article. The new Raleigh is well in advance of modern ideas. It is driven by a 3 h.p. governed engine, the governor permitting the machine to travel at any required speed. It is claimed that the elasticity of the engine is so remarkable that the machine may be entirely controlled through the governor. We shall hope to fully describe and illustrate this device in an early issue. The power is communicated by chain from a spring clutch on the engine shaft to a countershaft and thence by chain again to a spring chain wheel on the driving wheel. This method gives great flexibility to the drive and overcomes all jar and shock. The machine is well equipped in every particular. Large tyres are used and the head of the machine is a sound piece of work. Twin accumulators with a two-way switch are provided, and every detail of the machine is rendered thoroughly accessible. If required the new Raleigh two-speed gear may be fitted at an extra cost. The machine is minus pedals, but these are rendered quite unnecessary in the circumstances. A similar machine, but with belt drive, is also made. Another Raleigh novelty is the three-wheeled motor tandem known as the Raleighette. This is a new departure in fore-carriages. It has a 3½ h.p. water-cooled engine with a spring drive through chains and a two-speed gear, and it is claimed that any hill can be surmounted with the full load without danger of overheating. A starting handle is provided and the engine is started and then thrown into gear with a leather-faced clutch actuated by a foot pedal. Another pedal for the right foot applying the brake. All wheels are braked, and in other details as well as in the management the Raleighette is similar to a car. Moderate priced motorcycles with 2 h.p. engines are also staged. Altogether the Raleigh exhibit is one which must not be missed.

6. Starley and Co., Coventry. One of the most interesting cycles in the Show is undoubtedly that staged by the above company. It possesses quite a number of original features (as already detailed in our columns) and is, needless to say, attracting much attention. Its 2 h.p. engine is of the single cylinder vertical air-cooled type; it is free, and is fitted with a two-speed change gear. The motor drives through a single chain and a worm gear which is the most striking feature of the machine. This form of drive is really an ingenious adaptation of the gear attached to the well-known Lanchester car, and it is claimed that this system of transmission not only gives increased power, but is more silent and less subject to vibration than those usually adopted—and from actual experience we may say that there is a great deal of truth in these assertions. As can be seen from the illustration the worm has six threads, and is so designed that it is reversible—that is to say, it works in unison with the worm wheel whether it turns forward or backward. The latter possesses 36 teeth and its speed therefore is one-sixth greater than the worm. A shaft passes through the worm wheel centre, to which are attached the usual pedal cranks. A free wheel clutch is fitted between the crank spindle and the worm wheel enabling the rider to "free-wheel" at will. A similar arrangement is also attached to the back hub so that the engine can be freed at will for coasting purposes. By the aid of two tube supports, which are ingeniously fitted, the engine may be put in operation before starting out. The tanks are well-designed and not too bulky. Indeed the machine bristles with good points, and we are not surprised to hear that the demand for it is greater than the firm are able to supply; but this will soon be remedied.

46-47. Mills and Fulford, Coventry. This exhibit, which is most tastefully arranged, was the first to be ready for inspection, and it is well worthy of a visit. A large number of fore-cars and trailers are on view, and the entire display reflects the greatest credit upon the enterprising exhibitors. The firm now supply motorcycles and cars complete, and several handsome combinations are noticeable, the two "Trykars" being particularly striking. On one the fore-car is well sprung, and is made of raffa cane, tastefully upholstered in pegamoid. The other has a tonneau-shaped coach-built body, upholstered in morocco. The engines fitted to these miniature cars are made by the Hamilton Motor Co., Coventry, and are as described under that firm's notice, the only difference being that they are cooled by fans connected with the driving pulley. Side-cars are also shown—one with a patent steering device being particularly comfortable—as well as delivery cars, and a sample of the carrier which the firm supply to the postal authorities. The pioneers of sociability with the motorcycle, Messrs. Mills and Fulford are never content to stand still, but are always improving upon their past record.



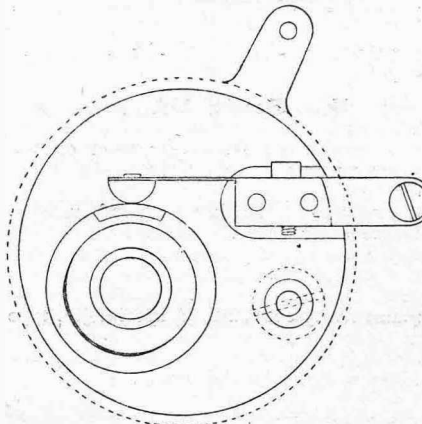
The Starley Worm Gear.

45. Self-Sealing Air Chamber Co., Ltd., Hinckley Street, Birmingham, in addition to a fine display of general rubber goods, are showing a range of specially strong self-sealing inner tubes for car and motor-cycle tyres, in all sizes; also a new non-slipping tread. This may be described as a series of W's, raised on the tyre. It is named the Zig Zag, and should prove very effective. This firm make a speciality of vulcanising treads on to worn motor tyres, several specimens that have been so treated being on view.

49. The Dunlop Pneumatic Tyre Co., Birmingham, London, and almost everywhere else. The old original firm are still in the very front rank of tyre makers. They show Dunlop tyres for motors, bicycles, and vehicles of every description—from the tin. single-tube racing tyre (beloved of the cycling champions) to the 5in. bolster for heavy motorcars. The Dunlop non-slipping motor tyre is now well known, and the imprint of its corrugated surface is to be found on all roads used by motorists. The Dunlop Rubber Works also produce waterproof motor clothing, rubber mats, driving aprons, in fact all rubber motor goods. The Dunlop stand is an elaborately designed edifice at the foot of the great orchestra, and it is prettily decorated with green trellis work and many mirrors.

1. Montgomery and Co., Bury St. Edmunds, have a very fine array of their patent side-carriages, no less than ten, being effectively staged. A novelty shown by this firm is a double side-carriage. This is really a motor-bicycle, with 3½ h.p. motor, and fitted with a carriage on each side. The side-carriages, of course, have the patent compensating joints which have proved the secret of its success. The joints allow the carriage to ride with great smoothness over rough ground, and its ease of fixing is remarkable, only two bolts being used. The company make a speciality of fitting the Kerry motor, which they have found an eminently satisfactory one. The Ensign motor-bicycle is a special line, fitted with 2½ h.p. motor, 80 x 85 mm. F.N. carburetter, with throttle and air levers and electric (high tension) ignition is used. The silencer of this machine is large and effective, and the petrol tank has a capacity equal to 130 miles' running. The front forks are duplex pattern, and a neat handlebar switch are good features. The finish on these machines is exceedingly good.

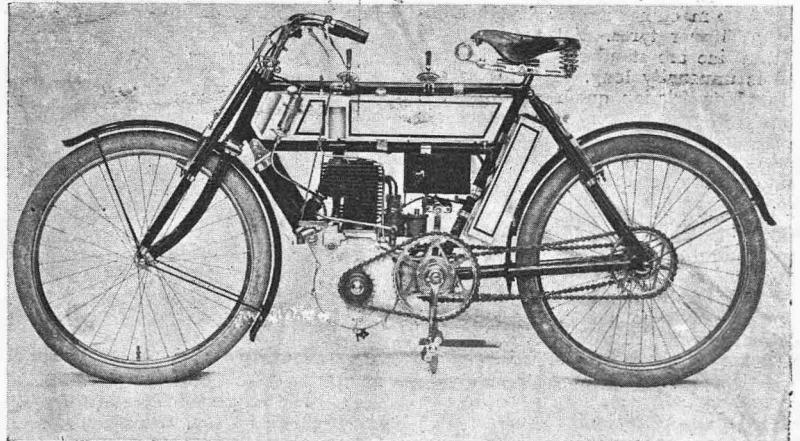
38. Lacoste and Co., 175a, Shaftesbury Avenue, specialise in electric ignition apparatus, including coils, contact breakers, switches, accumulators, ammeters and voltmeters. A new coil has just been in-



produced by this firm adapted for screwing on to the dashboard of small cars. This coil has a double-blade trembler,

is a very successful speciality of the firm's. It runs in oil, and is very certain in action. In accumulators there is a large selection shown: some of these are fitted with a celluloid ridge to prevent leakage of acid and short circuiting. A clever idea to be seen is a pressure gauge for testing ignition apparatus. The spark plug is screwed into it, and air pumped in to the pressure indicated by the gauge. The spark can then be seen under working pressure condition. The latest pattern Longuemare carburetters are shown, and all varieties of cable. An ignition controller which facilitates the testing of multi-cylinder engines is a speciality well worth inspection.

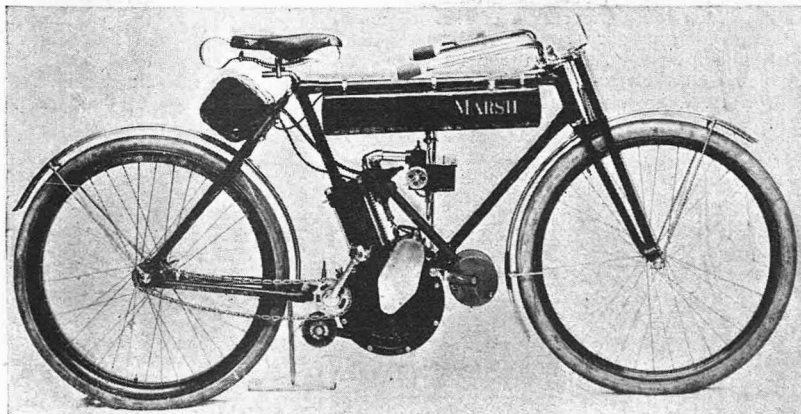
11-12. New Centaur Cycle Co., Ltd., Coventry. Two handsome types of motor-bicycles—chain and belt driven—are to be seen here. The machines, including the engines, were manufactured entirely in the company's factory, and from their own designs. The engine on both types is placed in a vertical position, and although it is built into the frame it is easily detachable. It is described as 3 h.p., but, as a matter of fact, it is of higher power, as no motor is passed out of the



The 1904 Centaur Chain-driver.

working at a very high speed. In contact breakers a neat wipe contact for motor-bicycles (as illustrated) is worth inspection, and a new adapter contact for De Dion motors, fitted with the old type make and break. The four-cylinder make and break, as fitted to the Clement and other cars,

testing shop until it registers about 3½ h.p. on the brake. The valves are readily accessible—the inlet being mechanically operated. An interesting feature of the machine is the novel form of silencer: this in reality forms a part of the frame—in fact it supersedes the usual down tube—and gives the machine a very compact and smart appearance, and is at the same time an exceedingly original and effective device. A patent anti-vibratory head is fitted. This takes the form of rubber buffers, which are placed between the crown and the strong duplex forks which are a feature of the machine. A Longuemare carburetter and Carpentier coil are used, while two accumulators, which are enclosed in a neat case, are provided with a two-way switch, which enables either to be immediately brought into operation. The chain-driven machine is fitted with a smartly designed friction clutch which, it is claimed, prevents any harshness in the drive. Both machines are well worthy of inspection, and we congratulate the firm upon the smart appearance and up-to-date features of their exhibits. The detail finish is well up to the firm's high reputation which they have earned for their cycle work.



The Marsh Motor-Bicycle—an American machine shown on Stand 34 by W. P. Brough.

116. The Motor Car Emporium, Ltd., Notting Hill, W. An "Addison" voiturette, fitted with a 6 h.p. engine, and with three speeds forward and reverse and top speed direct drive, was to have been staged here but it had not arrived when we called at the stand.

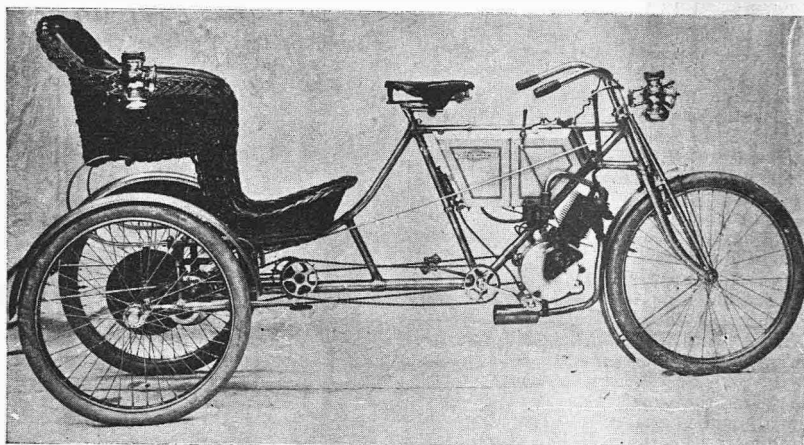
62. Pitcher and Bartlett, 119a, Holland Park Avenue, London, W., show their P and B. motor-tandem. This machine has several excellent features which should not be missed, notably the design of the frame and position of the engine. The transmission is by a crossed belt, which the makers claim has many advantages over a plain belt drive. The frame is adapted for a lady rider, and should prove a popular mount.

69. The Clarendon Co., Ltd., Coventry, show a collection of 12 handsomely finished motor-bicycles. The motor is mounted vertically in a loop frame, and has the company's patent ball bearing pulley fitted. The motor is of 3 h.p., driving by belt, Longuemare carburetter, and high tension ignition are used. The inlet valve is mechanically operated, and the front forks are duplex. The coil and accumulators are fixed behind the down tube. The machines are fitted with Dunlop or Clipper tyres. All the parts of this machine are standardised. The belt drive is unusually long. The levers are all fitted on friction quadrants, and the carburetter has a very convenient air regulating lever. The petrol capacity is equal to 120 miles running, and the accumulators fitted are the well-known Lithanode.

72. Hillsdon and Co., Hunsford, have a very interesting exhibit in their Eddington tandem motor-cars, fitted with $4\frac{1}{2}$ h.p. Automotor engine, water-cooled. It is provided with a Dupont two-speed gear and free engine. A special point is that the engine can be started either by hand or pedals. The chairs are easily detachable, and a small parcels delivery box can be fitted on for tradesman's use. The tyres are $2\frac{1}{2}$ inch Dunlops. The whole machine is distinctly on new lines, being similar to a tandem tricycle, with rear carriage. All the control levers are arranged for the front rider to operate. There are two patterns, the No. 1 air-cooled motor, and No. 2, as just described. In the smaller power machine the motor is mounted on the down tube, and drives on to the Dupont gear by a long chain, or the makers will fit a bevel gear and shaft drive. Another new pattern to be introduced will have a chain drive on to the back axle something similar to the Locomobile steam car drive. There is also a 3 h.p. motor-bicycle shown made up with Chater Lea fittings.

59. A. G. Taylor and Co., 17, Poland Street, London, W., make a speciality of the "Quick-Grip" spanner, which was illustrated in our columns a short time since. This is on the lines of a pair of strong pliers, with specially formed jaws, which fit square on to nuts up to 1 in. in diameter. It grips a nut quickly and properly.

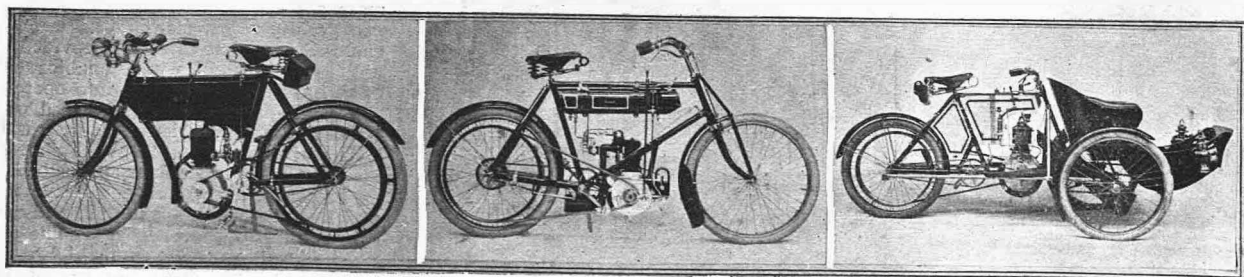
50. Hans Renold, Ltd., Manchester. This firm shows a variety of chains for many purposes, from that used on the ordinary pedal bicycle to that suitable for the heaviest type of motors, and although this make of chain has been four seasons before the public the makers do not see any necessity to make any radical alteration except as to price, so that whilst the price has gone down, the quality has remained very constant. A special $\frac{1}{2}$ in. type is made for the chain-driven motor, and amongst its users are Humbers, Centaurs, Singers, Raleighs and others.



The Eddington. A novel form of motor-tandem, shown by Hillsdon and Co.

37. The Wilkinson Tyre and Tread Co., Ltd., East Parade, Huddersfield. The Wilkinson non-skidding tread is now well-known. It is made in sizes and thicknesses to suit motorcycles or heavy cars, and consists of a tread or band of rubber, into which are vulcanised innumerable wire spikes—similar to engineers' file carding; these spikes project through the rubber and get a good grip of the road. The New Wilkinson outer cover is also on exhibition, this can be fitted over his tyres by the motorist himself, being held on by inflation; it acts as a prevention of side-slip, and a discourager (?) of puncture producing implements. From accounts which we have received we believe that the Wilkinson tread answers the purpose intended.

96. Williams Tyre Co., 4, Denman Street, Piccadilly Circus, W. This firm show their Uvula tyre, the section of which is not unlike the part of the human throat being that name. The tyre for motor-cars of any type and weight, is made with sufficient slackness to permit its being passed over the beaded edge of the rim, and a steel band is passed through the inside, which is fastened by a bolt passing through the tyre and rim. This secures one end of the steel band from moving, the other end is caught by a finder bolt placed tangentially to the rim, which, when the bolt is screwed up, brings in all the slack of the steel band, thus tightening the tyre into the wheel. It is claimed that the shape of the tyre prevents side-slip.



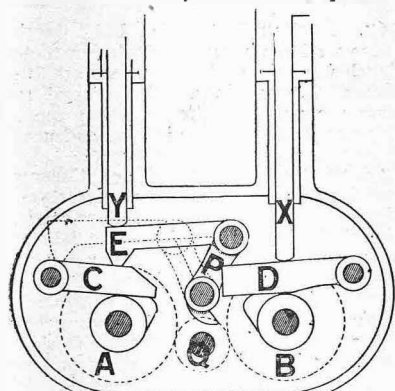
The Wilkinson Motor-Bicycle.

The Singer Belt Drive.

The Rex Forc-Car.

118-9. The Star Cycle Co., Wolverhampton, are displaying a fine collection of motorcycles built on popular lines. The engine is air-cooled, and is placed vertically in a cradle joining the lower tube which is taken from the ball head to the crank bracket. The engine is fed by a Longuemare carburetter with suitable adjusting levers. The tank holds a gallon of petrol, the accumulator, coil and oil compartment. The feed pump is contained in the oil tank, the oil being drawn in through an automatic valve which opens from the tank under suction, and to the engine under pressure. A compression tap is fitted to the engine. The drive is by a V-shaped Ada-chrome belt, the gearing being 5 to 1. The brakes are applied to the rim of the front wheel and to a drum on the rear wheel. The $2\frac{1}{2}$ h.p. machine sells at 40 guineas, and the 3 h.p. at 46 guineas; the machine being equipped with tools and tool bag, guards and duplex forks.

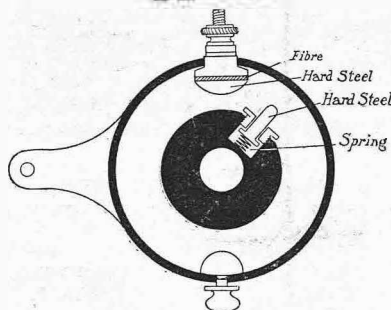
46, 7. The Hamilton Motor Co., Ltd., Coventry, who are fast coming to the front, have two of their $3\frac{1}{2}$ h.p. engines fitted to fore-carriages on Messrs. Mills and Fulford's stand. The cylinder and combustion chamber of this motor is one casting, possessing large radiating gills, which run half-way down the cylinder.



Patent Valve Mechanism of Hamilton Motor.

A. Induction valve, wheel and cam. B. Exhaust valve, wheel and cam. C. Pinion on fly-wheel shaft. D. Lever on exhaust valve cam. E. Lever on induction valve cam. F. Rocking arm connected to handle bar with Bowden wire. G. Lever working on rocking arm P.

The bore and stroke are $3\frac{5}{16}$ inch and $3\frac{1}{4}$ inch respectively; the width over contact breaker and pulley is $7\frac{1}{2}$ inch, while the total weight is only 58lbs. The contact breaker is of the wipe spark pattern, and the valves are mechanically operated. The fly-wheels have the crank pin and shafts stamped solid, and have hardened sleeves pressed on; accordingly it is impossible for a wheel to come loose, while the system allows of the use of larger bearings. A very interesting feature of the engine is the firm's patent valve gear by means of which the induction valve is controlled by a Bowden lever hand wire from the handlebar. The gradual movement of this reduces the lift of the induction valve to zero, whilst a further movement lifts the exhaust valve and leaves the induction valve closed. The firm claims by this arrangement simplicity of control in traffic, the dispensing with throttle valve, greater economy, and higher speeds.

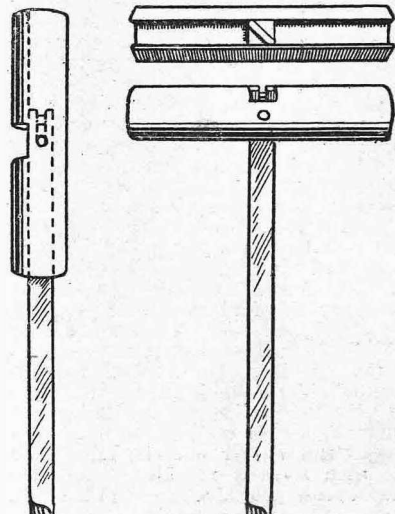


Contact Breaker. Shown by C. Peacock & Co.

95a. Charles Peacock and Co., 35, Clerkenwell Road, London, E.C., have a highly interesting display of small motors and accessories, ignition accessories being a strong line. This firm have introduced very complete sets of parts for De Dion, Werner, Minerva, Darracq, Panhard, Aster, and other standard motors. The small motors shown comprise a $1\frac{1}{2}$ and $1\frac{3}{4}$ h.p., beautifully made, for a narrow tread machine. The inlet valve is readily accessible from the outside, and a clever idea in the way of valve lifters is fitted. A novel arrangement of oiling is used; thus the oil from the pump is carried direct to the bearings first, and then into the crank case. The spark plug is fitted right in the centre of the head. The two-cylinder motor shown is $4\frac{1}{2}$ h.p., designed for driving a fore-carriage. The other novelty is a two-stroke motor, remarkably light, weighing 18 lbs. only, and claimed to develop 24 h.p. at a very high speed. A very long bearing is a good point, and also an automatic oiler. The radiating surface is extra large. Other good lines are gear-wheels, lamps, horns, accumulators, pumps, speed indicators, measuring instruments, etc. The illustration depicts a new design of wipe contact maker for motor-bicycles. The principal feature is a steel plunger rubbing on a hardened steel sector, giving a very easy and certain contact. It runs in oil.

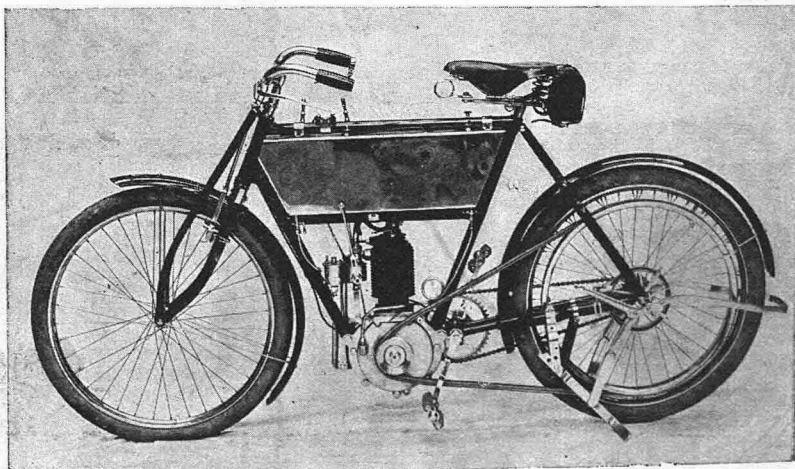
3. The Buckley Motor Wheel and Carriage Co., Sheffield. A $2\frac{1}{2}$ h.p. engine is slung in an aluminium spoked wheel, on the lines made popular by Singers, with the additional advantage of a through axle: a small pinion on engine shaft drives the large gear wheel.

21. White and Poppe, Ltd., Coventry. This firm shows a motor, designed and made entirely by themselves, having many special points, amongst which is the great advantage of being able to detach both the exhaust and inlet valve boxes for cleaning, whilst the adjustment is made by a screw and lock nut. The valve is driven by a separate cam of special construction. Each of the cams drives a lever, and this operates the valve lifter. Special attention has been paid to the contact make and break so as to obviate wear and tear and ignition troubles. All the outside case bearings are in blind bushes. The working parts are well designed, proportionate, and of



Neat Screwdriver. Shown by White and Poppe.

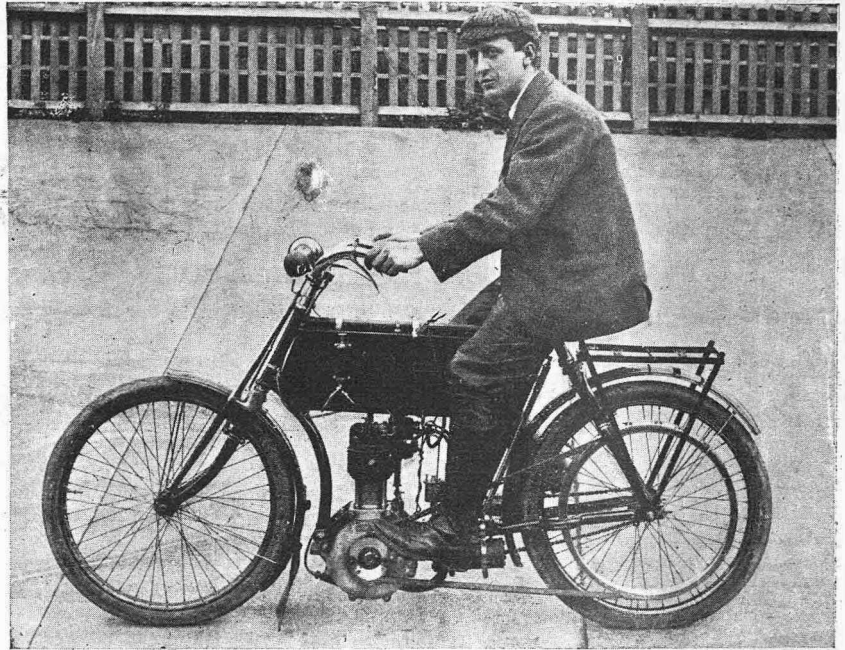
spring steel; whilst nickel steel is employed on such parts as work under heavy strains. The firm also makes a speciality of what is known as gauge limit work, which provides the certainty of any part so made being certain to work without fitting. A very neat little screwdriver is amongst their exhibits, as well as machines for cutting threads, four-spindle drilling machines, the large gear, etc., the firm making a speciality in shell fuses for the British Government.



1904 Star Motor-Bicycle.

87. Chase Motors exhibit specimens of their patent Flexo raw hide belt, which is claimed to be superior to all other forms of V belt. The belting is composed of five plies of raw hide, cemented together, and sewn with copper. It can also be supplied as a flat belt, both single and double ply. The special dressing supplied by the firm is recommended for use with this belt. Owing to the special construction, the belt is extraordinarily pliable, and beds well in the pulley grooves.

103. Chase Motors, Anerley, London. This firm show a stand full of motorcycles varying in power from the 2½ h.p. ordinary road machine to the 3½ h.p. special racer, although the latter size is equally adaptable to the former class. The engine is either the Ariel or the M.M.C., according to the size, the latter being for the 2½ h.p. and 3½ h.p., whilst the former is for the 2½ and 3 h.p. The M.M.C. engine is so designed as to take the place of the down diagonal of the frame, being securely bolted into it within a pair of segments, which are attached to the front and back members, thus allowing for the easy withdrawal of the engine. The engine is placed as far forward as possible, so as to allow of a long belt drive, a point often forgotten in the life of the belt; at the same time, this forward position produces a much longer wheel base, minimising side-slip and maintaining great steadiness in the machine. The Longuemare carburetter with throttle is fitted. The levers for advance sparking and the throttle are mounted on cone bearings, with a Thackeray spring washer on each; thus a free but rigid lever is provided. Bowden wires operate the valve lifter and the back brake, and the main wiring is concealed as much as possible so as to prevent moisture getting to wires, or other damage. The tank is a combination one, providing for 1½ gallons of petrol, one pint of lubricating oil, two P. and R. accumulators, and either a trembler or ordinary coil, at purchasers' option. The drive is by a Flexo belt, made by the company, many types of which are at Stand 87. The history of the Chase family is so well known that the public can depend upon every point likely to occur in the design of a motorcycle being carefully thought out by them. It will be remembered that the Chase secured the Auto-Cycle Club's first-class certificate in the 1903 Trials.



The Chase Motor-Bicycle.

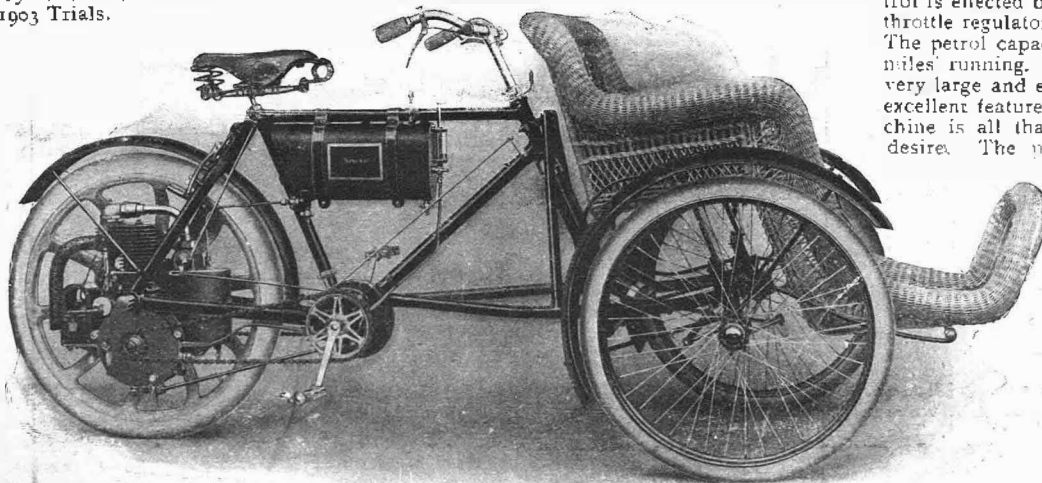
85. Burkin and Clarke, Beckenham. This firm exhibit a serviceable portable canopy, fitted with spring blinds, suitable for motorcars. It is easily attachable, and only weighs 20lbs. It has no wind resistance, and acts as a dust shield. A car is on view fitted with the device.

63. The Whippet Motor and Cycle Co., Clapham Junction, have a well-finished fore-carriage, fitted with 3½ h.p. Aster engine. The transmission is by belt, and carburetter is a Longuemare type. A novelty is a sight feed lubricator for the motor. This machine has the well-known Whippet two-speed pedal gear fitted. A motor-bicycle is also shown. This has a 2 h.p. F.N. motor, fitted vertically in a loop frame a Longuemare carburetter and sight feed lubricator are used, and a petrol tank of extra large capacity is a special feature. Dunlop tyres are fitted, and a noticeable detail is the two-speed pedal gear fitted in a gear-case. This gear is actuated by a lever mounted alongside the down tube.

67. Anglian Motor Co., Ltd., Beccles. Three well-constructed belt-driven motor-bicycles are shown here. These are fitted with 2½ h.p. engines. No special features are noticeable, except that the arrangement of the tanks is neat and novel.

73, 79, 80. Singer and Co., Coventry, have a splendid display of 14 motorcycles. The leading line is the 3 h.p. fore-carriage with chain drive. This has a special steering arrangement and the front carriage is extra well sprung and finished. The gear-driven machine is still in considerable demand for tricycles and tri-voitures. The 3 h.p. chain-driven bicycle is shown for the first time; this has the firm's very successful system of transmission. The very latest development in Singers is the belt driven 3 h.p. engine fitted in a special cradle in the centre of the frame. This has the magneto-electric ignition, spray carburetter, tank arranged parallel with top tube, and a very special feature is a starting clutch for the engine. The control is effected by a single lever combined throttle regulator and exhaust valve lifter. The petrol capacity is equal to about 150 miles' running. Duplex front forks and a very large and effective silencer are other excellent features. The finish of this machine is all that the most critical could desire. The price, with clutch, is 52

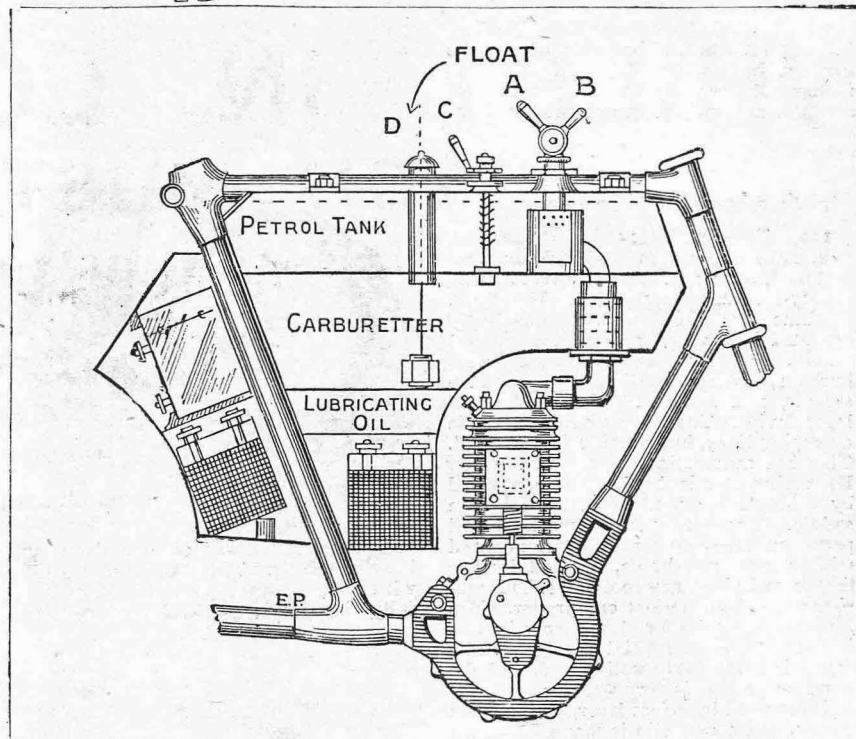
guineas, or 50 guineas without it. This stand will undoubtedly prove one of the best features of the Show. In addition to the motorcycles there is the tri-voiturette with 2½ h.p. engine with several distinct improvements. The carriage portion can be removed from the frame by disconnecting one belt. The carriage opens at the side. As a miniature car this line will be examined with interest,



The 3 h.p. Singer fitted with fore-carriage.

42. James Price and Sons, Fitzroy Place, Euston Road, are showing their well-known Chez Lui enamels in an endless variety of colours. A speciality is an aluminium enamel for tanks, bonnets and radiators, and a transparent enamel for plated parts.

122. Bayliss, Thomas, and Co. Ltd., Coventry, have an exceedingly fine display of Excelsior motorcycles on one of the largest stands in the exhibition. Without any essential departure from previous patterns or styles, the 1904 Excelsior presents many novel features. The company are now making their own engines, under license from De Dion's, adopting the standards of that firm in the case of the two larger sizes. These are the 4 h.p. water-cooled engine for driving fore-carriages, and the 3 h.p. air-cooled engine for motor-bicycles, etc. A 2½ h.p. engine is also being made. The leading line in Excelsior motorcycles is fitted with the 3 h.p. engine, driving through a Lincona belt. We notice that the gear is now a shade lower than was the case last season. A very capacious tank is employed, taking about 2½ gallons of petrol. At customers' option, either the surface or spray carburetter is supplied, the former having a large surface area, and feeding through a large mixture tap, the engine is never starved of explosive gas. The spray carburetter recommended as an alternative is the Longuemare, the adjusting levers of which are most conveniently placed. A wipe contact and trembler coil are being used, the contact being frictionless, except at the moment of completing the circuit. Two Lithanode accumulators are used, the interrupter plug being employed to put one or other into the circuit. Special attention has been paid to brakes, and the new pattern of exhaust-lifting lever is particularly handy. With Clincher tyres, the 3 h.p. Excelsior sells at 50 guineas. The same machine, fitted with the 2½ h.p. engine, sells at £45. In three-wheeled vehicles large advances are shown: the framework is carried right back to the rear axle; the steering column is supported on three ball bearings, and in turning corners the wheels take the correct incline. These machines are shown as three-wheeled singles, and also fitted with passenger bodies or baskets for carrying goods and samples.

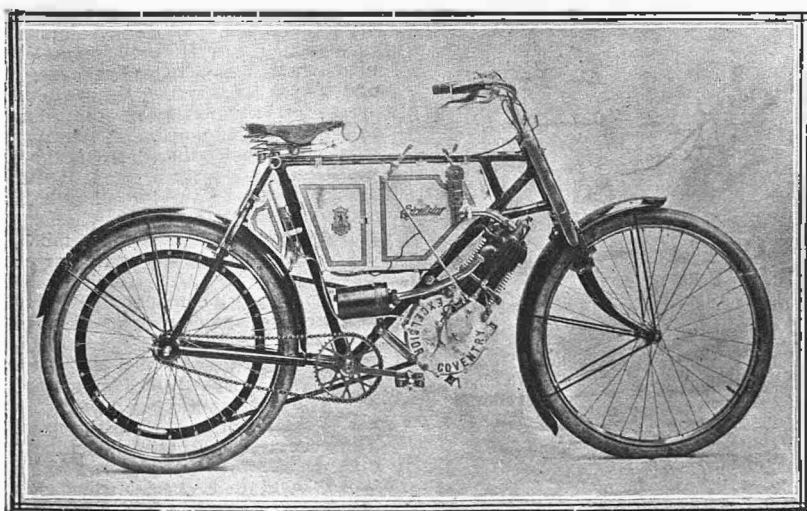


Sectional view of Tank and Carburetter of Rex Motor-bicycle.

104-5-6. The Rex Motor Manufacturing Co., Coventry, make a really imposing display of motorcycles. No less than 50 samples of their 3½ h.p. vibrationless motor-bicycles are shown on a stand occupying 100 feet of space, the largest in the whole exhibition. We have so recently dealt with the new features in the Rex 1904 models that it would be superfluous on our part to repeat the full details here. We will, therefore, just touch upon the more important improvements, and ask our readers to inspect the machines for themselves. Their high grade character is well-known, and their popularity is proved when we state that the firm have to employ an all-night staff in order to cope with the demand for them. The Rex system of silencing the exhaust is effected by the casting of an extra cham-

ber on the side of the cylinder, from which the burnt gases issue through three baffle plates. This device does away with all back pressure, and there is no undue heating or loss of power. Further than this, the breaking up of the exhaust gases at the moment of expansion makes the silencer more effective. Another interesting innovation is an air passage between the exhaust chamber and cylinder: this gives a greater cooling area (viz., 3.07 feet), and it is claimed that it entirely prevents overheating. The forks are still built of oval tubes and on the girder system; but the design has been improved. The coil and accumulator are now carried in the rear, thus reserving a capacious petrol and oil supply in the main tank. There is also space for a spare accumulator. Generally speaking, the engine does not depart much from last year's model, and this has been found to meet all requirements. It is, however, now secured to the frame by only three bolts to a registered design of cradle. The carburetter is still of the surface type, but larger vaporising space is provided, the result being that a good mixture is assured, even if the petrol be above the ordinary density. Handsome tri-cars are shown, while a serviceable light tradesman's van is fitted to one of the machines. Altogether the exhibit is well worthy of the great reputation of the firm.

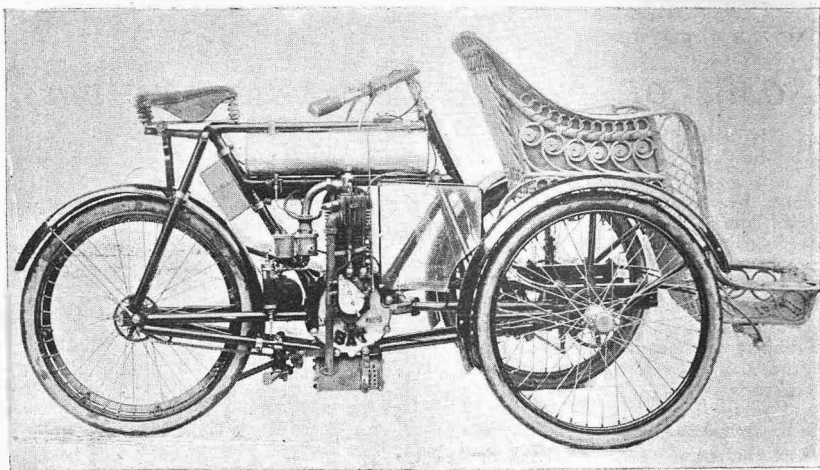
95. The Adaptable Motor and Sporting Garment, Westbourne Park. The garment here displayed consists of the following combination which can be worn together, or, if desired, separately:—Coat and waistcoat, frock coat, overcoat, knickers and driving apron. These articles of clothing are made of excellent material and are most suitable for automobilists. The prices range from £4 4s. upwards.



The 1904 Excelsior Motor-bicycle.

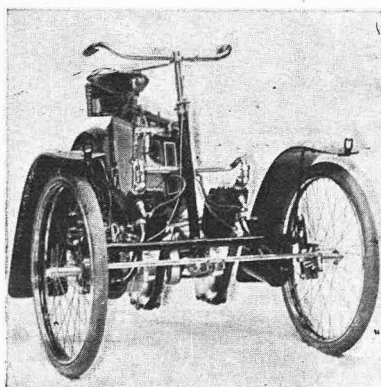
75. John J. Plater and Sons, Birmingham. This stand is occupied by various carriage bodies suitable for attaching to motorcycles as trailers and fore-cars. All are of handsome design and mostly of the wicker type, but a coach-built wood fore-car, with a circular back, painted and upholstered in green, is particularly attractive and comfortable looking.

130. The Bat Motor Co., Penge, London, have one of the largest displays of motor-bicycles in the Show, there being twenty-four machines staged. The No. 1 machine is fitted with mechanically operated inlet valve, motor arranged vertically, trembler coil, Longuemare carburetter, new combined oil pump and reservoir, and a patent switch and brake lever device. The No. 2 machine is made on racing lines, but suitable for the road. This has automatic valves, and the new Bat carburetter is fitted. It is controlled by a single lever, fitted in front of the saddle. The spring frame machine will prove an interesting model. It is fitted with a new rim brake, applied by the thumb, and also a new foot brake. This machine also has the Bat carburetter. The fore-carriage calls for close inspection, as it has numerous special features. The frame is particularly well stayed, and the band brake gear is very well thought out. It is actuated by a foot lever, giving great power, and a new clip is mounted on the handlebar for holding the exhaust valve up. The motor is a $3\frac{1}{2}$ h.p., fitted with the firm's patent pulley, as are all their machines. The side-car is a very special line. The attachment is exceedingly strong and simple, and the motor fitted is $3\frac{1}{2}$ h.p., and a special point is made of the fact that the machine can be driven by the passenger when alone in the car. The firm are turning out a Special motor-bicycle, with many excellent features. The engine has a mechanically operated valve, new Longuemare carburetter, with automatic air regulator, exhaust box, with a cut out for hill climbing, and duplex forks, with a new system of adjusting the head. The coil is a Bassee Michel, and it is noteworthy that all the accessories about the Bat machine are of the highest quality. There being no pedal chain on the Bat machine, the belt can be readily adjusted by draw bolts on the rear axle. The



The Bat with Fore-carriage

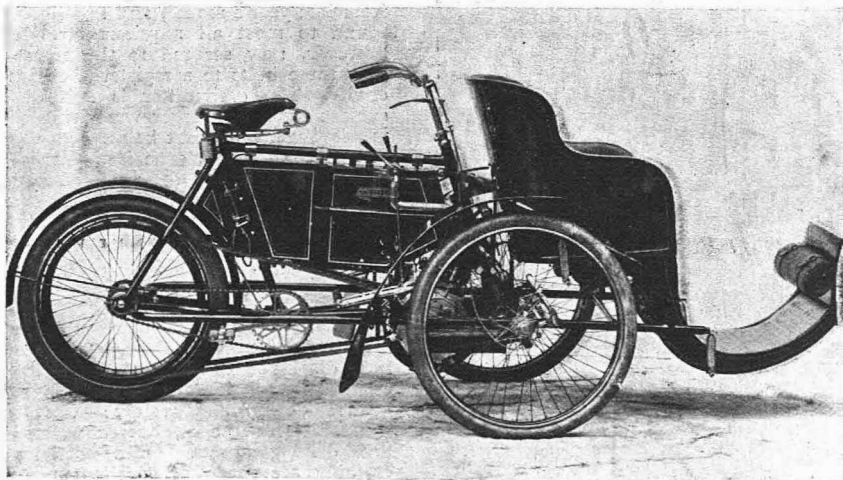
handlebars fitted are of new shape and heavier tubing. This exhibit is bristling with good features, and should be carefully inspected, particularly the com-



Quadrant with Fore-car entirely removed, showing two engines.

pany's new stand, lifting either wheel at will, and also a new air pressure lubricating arrangement.

13-14. Quadrant Cycle Co., Sheepcote Street, Birmingham, have nine motor-cycles representing the firm's latest patterns. The motors fitted are 2 and 3 h.p. A special feature is a new spring fork on the bicycle, which looks a most effective device for overcoming vibration. The front wheel axle is suspended on a spiral spring at each end and the amount of "give" when pressure is applied to the handlebars is very noticeable. This speciality in itself should render the Quadrant machines more popular than ever. The combined spring fork and special anti-vibrating spring saddle should give quite luxurious riding. The make and break ignition gear is another strong point with Quadrants. Its special feature is that it is self-adjusting. The lubricating device for the motor has proved very successful during the past season, and it is worthy of notice that it is impossible for any leakage of oil to occur from the crank case, owing to the pressure being relieved through a small hole in the centre of the axle—a place where none of the oil can remain, as it is thrown away from the centre by the centrifugal force. The engine, in its main features, remains the same as last season's; but an exhaust valve lifter is now fitted at option. The firm make a special feature of their surface carburetter. The new Quadrant tri-car, which we illustrate, will prove a great attraction; this has two motors of $2\frac{1}{2}$ h.p., which can be used separately or together, by means of an ingenious pedal clutch: the fore-carriage is hung on spiral springs, which insulate it from vibration in a most effective manner; the transmission is by V belt; the control is the firm's well-tried single lever, with throttle in addition. There are three brakes fitted, acting on the hubs of the wheels. The petrol capacity is equal to 130 miles, and the accumulators are extra large: arranged on the pedal clutch gear is a cleverly designed contact to break the ignition circuit when one engine only is used. It will be observed that very large side wings are fitted, on the extremities of which are attached the lamp brackets. The body is readily detachable, making a handy tricycle of the machine. The general finish of this machine is excellent. The price is £97 10s. The rear tyre is a $2\frac{1}{2}$ inch special Clincher. The oiling arrangement has some special points that are well worth attention.



The Quadrant with Fore-carriage attached.

SOME OF THE LIGHT CAR EXHIBITS AT THE NATIONAL.

26. H. E. Hall and Co., Tonbridge and Paris, show several specimens of the 6 h.p. De Dion Populaire, 1904 pattern, which Messrs. Hall are retailing at £190 nett, and of which they can give immediate delivery. Novel features in the De Dion for next season are a new nest of water radiating pipes, and the fact that the cylinder and head are not now cast in one piece; the top of the cylinder is screwed into the cylinder proper. Five Darracqs are also shown, four of these being 1904 models—the first delivery in this country. Messrs. Hall and Company have recently opened depots in Tunbridge Wells and Brighton, and contemplate further extensions.

110. The Vauxhall Ironworks Co., Ltd., of Wandsworth Road, London, S.W., are showing four of the useful 5 h.p. Vauxhall cars. We have already fully described this make of vehicle. It is driven by a low speed governed engine placed horizontally, partly below the foot-board, with the fly-wheel under the bonnet. It is provided with two forward gears, and drives on to the differential through a chain. Selling at 130 guineas, the car during the past season has made many friends, particularly in hilly districts, where it has an opportunity of showing its capabilities in surmounting heavy gradients. The cars exhibited are well worthy of the closest inspection; two of them are fitted with hoods, one having a four-seated body and extra front seat accommodating either two young persons or one capacious adult. The finish and the workmanship of the Vauxhall will undoubtedly attract considerable attention.

111-112. The General Motor Car, Co., Ltd., Norbury, S.W. Seekers after light cars at a moderate price cannot do better than pause and inspect the smart and strong-built vehicles to be found on these stands. Several types are exhibited, the prices ranging from 120 to 160 guineas. The "doctor's" two-seated car at the latter figure is exceptionally good value. It possesses three speeds and a reverse, and is fitted with a 6½ h.p. water-cooled single-cylinder Aster engine, which is placed in the front under the bonnet. The chassis shows good workmanship, the frame being of wood, with fitch plates. The drive is by a cardan shaft to the live axle. The wheels are of the artillery type, and are shod with pneumatic tyres. The car is tastefully upholstered in pegamoid, and the body can be painted in accordance with the customer's specification. At the rear there is a lock-up receptacle. This is provided for the purpose of carrying medical instruments or other small articles. A delivery car of the same power, and of similar design is also staged. This, however, is made with a detachable box, in the place of which a third seat may be substituted. A useful tradesman's delivery car of 4½ h.p. is fitted with a box, which can be detached for pleasure purposes. The vehicle, however, only has two speeds, and is driven by chain to the rear axle. It is interesting to note that the company have a car running in the grounds which has covered over 5,000 miles on special mail service.

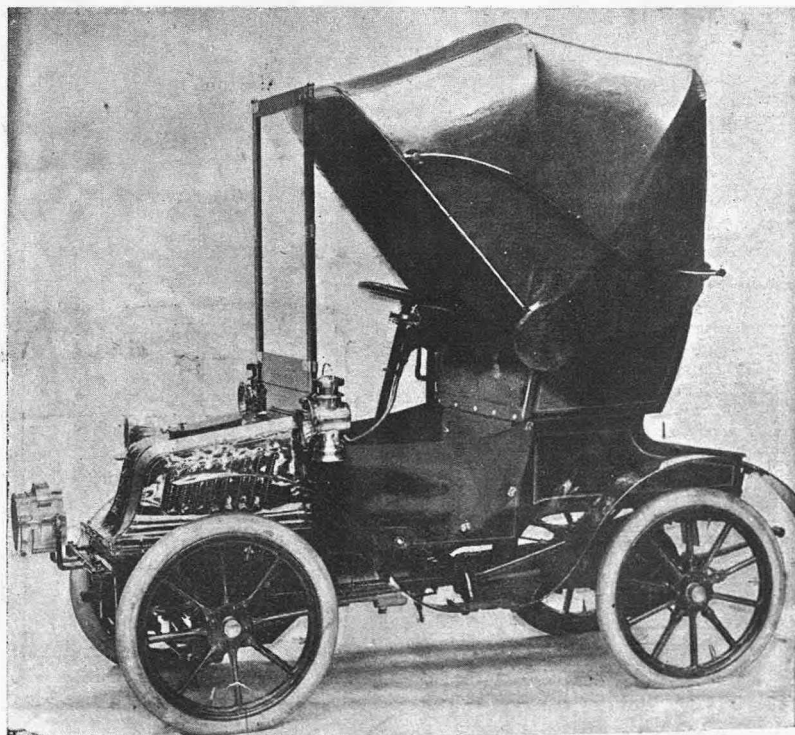
19-20. Messrs. John Marston, Ltd. This famous old Wolverhampton firm is showing the well-known Sunbeam and Mabley cars. The Sunbeam is a car of A1 quality, at 500 guineas: it has a four-cylinder engine and the workmanship, material, and finish are first-class. Both the Sunbeams shown are fitted with complete metal gear-cases for the side chains, so that these run in a "little oil bath." Messrs. Marston have been celebrated for their cycle gear-cases for many years. For the modest motorist the Mabley car is shown. This car, which we have described fully on previous occasions, is built on rather original lines; it has four wheels, which make four tracks; the two central side wheels are drivers, and the fore and aft ones are the steerers.

22. Friswells, Ltd., of 1, Albany Street, Regent's Park, N.W., are showing half-a-dozen Baby Peugeot cars. This popular 5 h.p. car has been enjoying a very large demand and has given immense satisfaction to its users. The 1904 pattern presents very little difference over last season's car. An arm rest between the two seats is now fitted whilst the back of the body slopes downward, giving a somewhat more raking appearance. A very useful device is a foot pedal, which acts on the plunger of the oil pump, and enables the driver to lubricate the engine without having to stoop forward over the steering wheel. All of the cars shown are fitted with hoods; one has a glass screen in front, and one has a clock on the dash-board, which is shaped to carry it; these, of course, are extras, the price of the car with Clipper Continental tyres being £175. The Baby Peugeot has wood wheels and its coachwork is well finished.

113-115. The Beaufort Motor Car Co., Ltd., 14, Baker Street, W., exhibit several Beaufort cars of large horsepower. The most interesting feature of this stand, to the majority of our readers, will be the single cylindered 9 h.p. car, with two-seated body, selling at £216 13s. All Beaufort's have mechanical inlet valves and magneto ignition. Needless to say, equal wood wheels are adopted.

107. The British Automobile Commercial Syndicate of 97, Long Acre, W.C. show the new Talbot cars for the first time. These are made under the patents and designs of M. Clement, the well-known French motor manufacturer. They are in all sizes and powers from 6 h.p. to 27 h.p., and are being manufactured at the new works at Notting Hill. The 6 h.p. Talbot will be single-cylindered and water-cooled with mechanically-operated valves and magneto ignition. The power is conveyed through a cone clutch and a gear box giving three speeds forward and reverse, all controlled by one lever. From the gear box the power is communicated through a propeller shaft to the rear live axle. The car seats two, and is well appointed throughout, large Clincher-Michelin tyres being employed. It will sell at £240 complete, and should be excellent value at that price.

We greatly regret that, owing to great pressure on our space, a number of light car exhibits remain to be dealt with in our next issue, in which we shall devote a considerable amount of space to descriptions and illustrations of popular cars. Many of the stands were incomplete at the time of our last visit.



The new hooded Baby Peugeot.

NEWS.

The Shows!

Vast exhibitions of motor improvement.

Although we devote 26 pages to our reports of the exhibits, much remains to be dealt with next week.

In our next issue will appear a special article of very great interest to men of moderate means. It will comprise a table which will prove of great value.

A motor racing track six miles long and 22 yards wide is to be constructed at Ville-neuve, on the outskirts of Paris. Paul Baras, the well-known chauffeur, is to have the management of it.

Owing to an error in the Clyde advertisement this week, the address of the sole London agents, Messrs. The London Stereoscopic Co., Ltd., 108, Regent Street, W., was inadvertently omitted.

The Marquis De Dion proposed, at the last meeting of the Automobile Club of France, a commercial motor trial for 1904. The committee unanimously adopted the proposal.

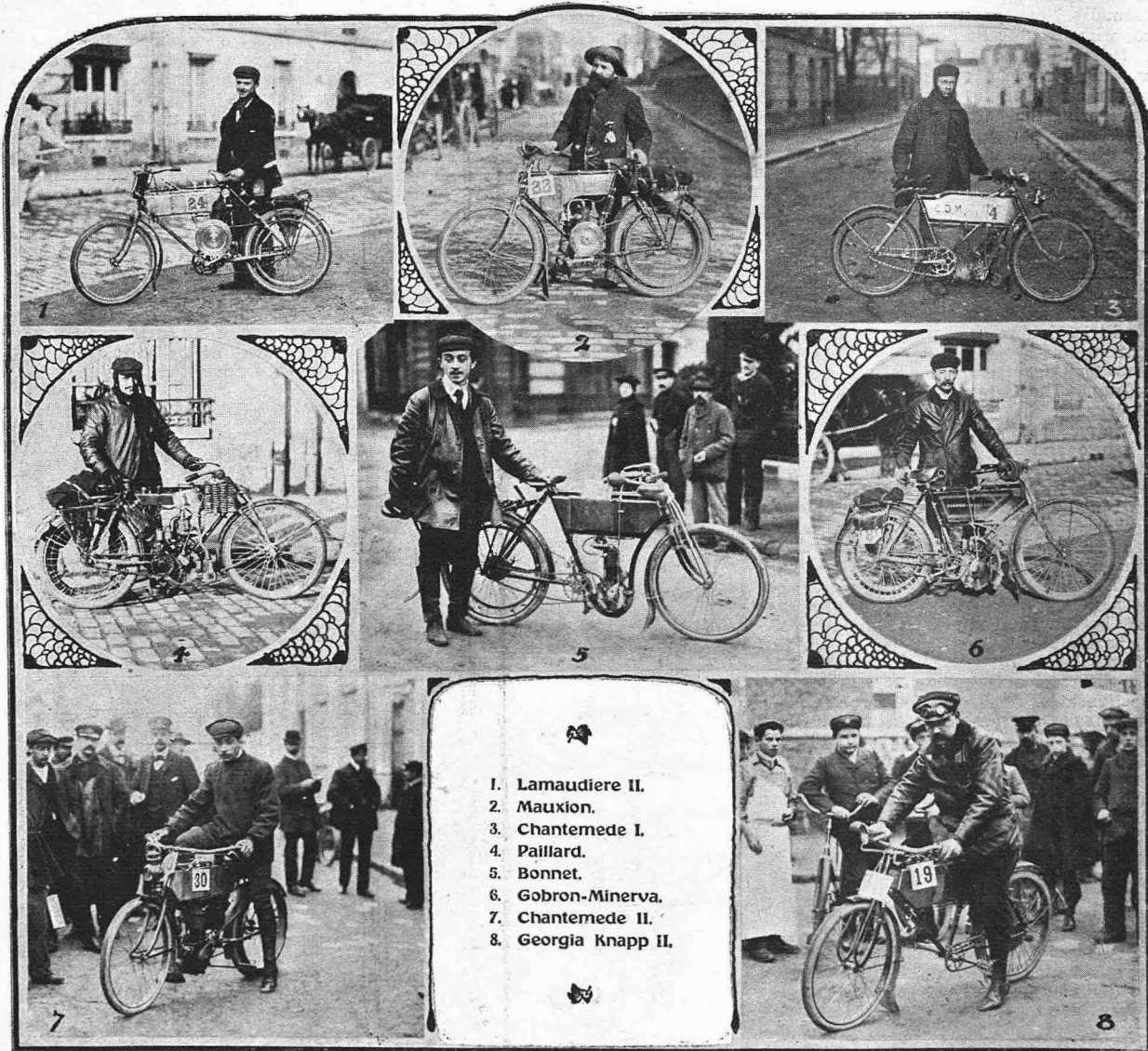
Major C. G. Matson's recently published book "The Modest Man's Motor" is well spoken of. The title is not a felicitous one, since it hardly expresses the meaning of the motor for the man of moderate means.

An international motor launch cup to be raced for on something like Gordon-Bennett lines has been offered by a well-known French sportsman, Mons. Georges de la Nezieres. The first competition will take place early in December. Mons. de Nezieres is the representative in France for the Wolseley cars.

Increased engine speed and higher compression will be two desirable results of a limitation of cylinder capacity in Mr. Henry Sturmeys opinion.

Reproductions of the photographs of the various "dust clouds" raised by the cars in the dust trials on the cycle track at the Crystal Palace last September will be exhibited at the House Dinner of the Automobile Club on Thursday (Nov. 26th).

The "Durkopp" motor omnibus, with accommodation for 20 passengers, filled up a good deal of the blank space in the Crystal Palace towards the end of last week. Compared with the 1904 two-horse 'bus this up-to-date motor vehicle has something of the appearance which a cruiser would present when placed alongside a Thames barge.



THE MOTOR-BICYCLE TRIALS IN FRANCE. SOME OF THE MACHINES WHICH COMPETED.

Count Sierpstorff, a prominent member of the Automobile Club of Germany, thinks that any of the three proposed Gordon-Bennett courses—in Westphalia, in Mecklenburg, or near Frankfurt—would be suitable, but prefers the last on account of its proximity to Homburg, and the beauty of the surrounding scenery.

The High Tension Cable.

If anyone doubts the necessity for wrapping the high tension wire in such a thickness of insulation, let him fit a piece of thinly-covered wire in its place, and, holding the wire in his hand, gently agitate the contact-breaker. If he fails to see a star-shower of surprising brilliancy he may rest assured that his accumulators have gone wrong.

More Reliability Trials in France.

The automobilism of France does not believe in handing over the well-being of the sport and the industry to the more or less spasmodic energy of any amateur organisation. Speed and reliability trials are of frequent and continuous occurrence, all the chief sporting papers organising competitions from time to time. The latest announcement is that of two important reliability trials, one for electric vehicles from November 26th to 29th, and the other for steam and petrol motor vehicles from November 30th to December 5th.

Those German War Cycles.

With reference to those marvellous motorcycles which the "Evening News" tells us are to be supplied to the German Army, we have been wondering how the poor private would proceed in case of a puncture. Mudguards generally get sufficiently in one's way when repairs are in progress, but a steel plate covering the wheels! spare us!—"Heinrich! für das Lieb von Himmel, geben sie mir das Sardinie opener! der Feind ist only ein couple of miles hinter, und Ich can't get at diese blessed inner tube!" (P.S.—If the German is not strictly according to Wittich, one must remember the natural agitation of the punctured private.—Ed.) As for the battery, it appears to us to be a case of assault and battery with plenty of (as)sult. Ahem!

The Efficiency of Car Brakes.

Bands of hair, even if it be camel's hair, that char when tightened on their drums, can scarcely constitute an effective brake. The true brake is that which can pull up a car at the shortest notice compatible with the security of its occupants. Few brakes, however, stand a long-continued application. The heat given out by the friction when they are kept on too long is so great as to disintegrate, if not melt, a brake, even if made entirely of metal. A remedy for this difficulty may perhaps be found in continuous water-circulation; but such an arrangement has not yet been brought into practice. The simplest and most effective solution of the problem consists in providing the car with two brakes of equal power, to be put on alternately—say for five minutes at a time. It is well-known that the burning of a brake is caused solely by too prolonged action, so that, if it be allowed to cool, this difficulty will not arise. *A fortiori*, if two brakes are better than one, three are better than two; and with such an arrangement two brakes can be put on together in an emergency, while the third is cooling. This, too, observes M. Baudry de Saulnier, is

the solution adopted in the new Dion-Bouton motorcars specially designed for climbing mountains.

In view of the fact that several French firms are exhibiting at the Stanley Show, the French Press speaks of it as "un avant-gout"—a foretaste—of the Salon de Paris.

The value of the wind-shield on the pacing motorcycle in lowering cycle records has struck Yankee trotting enthusiasts—and the latest form of trotting match is that in which the competing horse is paced by a sulky fitted with a windshield. Two or three seconds is said to have been taken off the mile record by this device.

'Ware Shoddy.

Although the modern motor-bicycle is, when intelligently looked after, remarkably free from trouble, yet most people manage to find a good deal of it in one way and another; quite enough, in fact, to make the cautious buyer think twice before investing in a low-priced article. It is simply inviting disaster to expect hard work from a machine thrown together at starvation prices and decently painted over to hide its little blemishes.

The Exhaust Cam.

The novice, studying the working of his new motor, is rather apt to underrate the amount of work done by the exhaust cam. It looks to be such an easy job, just to lift the stem a fraction of an inch—but the lifting involves not only the overcoming of the spring resistance, it also means pushing the valve open against the full pressure of the charge just exploded in the cylinder, although, of course, this resistance is removed directly the valve opens. On the whole, it is small wonder that the stem sometimes "loses its head" and gives up the ghost.

Rapidity v. Red Tape.

Although the post office motor van is not a thing unknown in this country, we dare not hope that the new vehicle will seriously compete with, much less oust, the horse van for many years. The history of the Post Office is not one which indicates any desire to experiment rashly with a new invention. It has, it is true, availed itself—tardily—of modern locomotive improvements as exemplified in the express train and the ocean greyhound; but it has never sought to discover for itself new ways of increasing its utility to the public by the employment of more rapid methods of collection and delivery. The consequence is that the delivery of letters, even to-day, is an infinitely more laborious and protracted operation than it need be if the Post Office would avail itself to a fuller extent of the facilities offered by automobile locomotion. The Post Office has always failed to recognise that the carrying of a letter from sender to addressee in the shortest possible time is its first duty, and that its efficiency must be calculated according to its capacity for doing this. It is not enough to employ express mail trains and swift ocean liners to transport letters at lightning speed from town to town, and from continent to continent, if the collection for and the delivery from these vehicles of transport is conducted by slow and old-fashioned methods. Of what practical use is it to us that our letters travel from St. Pancras to St. Enoch's in eight hours, if they take four hours to get from Streatham to St. Pancras, and another four to travel from St. Enoch's to our correspondent in the Glasgow suburb? And is it not just in this matter of collection and delivery that the automobile van—even in its present condition—would perform services of incalculable value?



R. W. STEVENS OF DUBLIN.

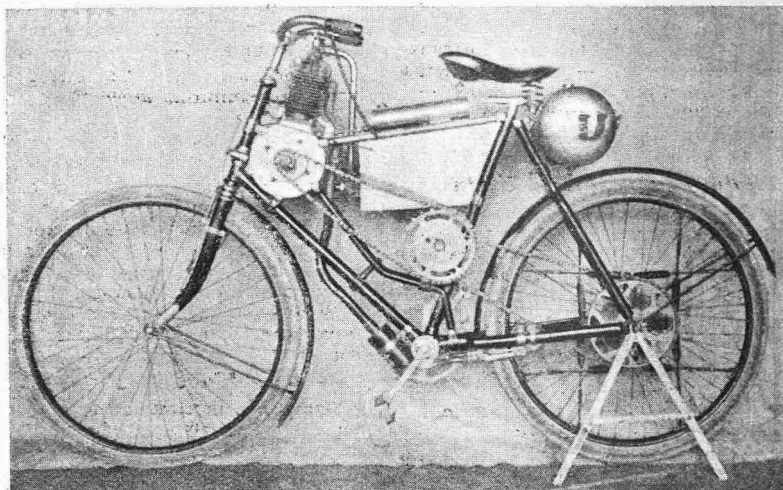
Mr. Stevens claims to be the winner of the first motor-bicycle race held in Ireland and the first hill-climbing contest. Mr. Stevens is in the motor trade in Dublin and handles Phoenix, Star Grifflers and James motors. He is mounted on a Phoenix.

The Federation.

Mr. Albert E. Newton, of the Reading A.C., writes as follows regarding the progress of the proposed federation:—"I have much pleasure in acquainting you with the progress of the federation scheme. Fifteen clubs have already signified their approval and have decided to send delegates to the conference which has been fixed for a date early in December. Several other clubs have discussed the scheme in committee and have decided that there is need for such a federation, but before they appoint delegates, they have decided to call a general meeting to confirm the committee's opinion. It has been suggested in some quarters that there would be friction in the ranks of automobilists, caused by the existence of two organisations, but we quite fail to see where the friction would arise. The fact that there is a strong feeling in favour of federation is evidenced by the favour with which the scheme has been received, and by the entire lack of relevant adverse criticism. We have received, it is true, three or four unfavourable decisions from provincial clubs who are already affiliated with the A.C.G.B. and K., but on the other hand we have received favourable decisions from at least five who have also signed the affiliation agreement."

The 151 Miles an Hour Electric Train.

Some further details concerning the motor train which recently achieved the sensational speed of 131½ miles per hour on the Marienfeld line in Germany are now to hand and serve to throw further light on the matter of how the feat was accomplished. The power of the motor carriage is enormous. At full speed the motors were developing 2,400 horse-power and are actually capable of touching 3,000 h.p. as a starting effort. The terrific momentum of the car can best be gauged when it is considered that with the compressed air and electric brakes exerting their full force on the wheels it required a distance of well over a mile to bring the car to rest. The weight of the complete car is over 50 tons. Elaborate apparatus is installed in the driver's portion of the car to control the motors, the principal operations being effected by compressed air to minimise any risk of the driver coming in contact with the high pressure current (16,000 volts). Such a pressure would prove instantaneously fatal. Metal screens are provided to shield off all the conductors, these screens being connected up to the earth through the wheels. Thus in case of a leakage of current it finds a tolerably sure path to the earth. To light up the car a set of accumulators are provided. The driver of the car found it quite impossible to distinguish objects on the landscape, nothing but a blurred field of view was visible. It will be obvious from this fact that an entirely new system of signalling to that used on our railways would be imperative. Passengers who travelled in the car say that they experienced a curious tingling sensation on the face and hands—probably due to the air pressure—but the running was perfectly smooth. The track upon which the trial was made is dead straight for many miles, and it is interesting to note that the time the car was actually visible—that is from the time it appeared as a black speck and disappeared again—was just 50 seconds.



Novel Chain-drive Motor-Bicycle described on this page.

Some Practical Motor Notes.

In the new Dion-Bouton sparking plugs there is a metal-plastic joint between the mounting and the porcelain. If the joint should become unscrewed and the sparking plug should leak, all that is required is to take a spanner and tighten the gland. If the necessity should arise for dismounting the centrifugal pump, difficulty will sometimes be experienced in getting at the nuts which fasten it to the frame. In such a case the best method to adopt is to take

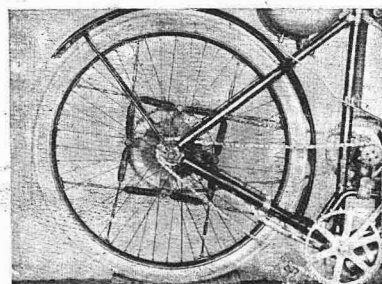
for allowing the air to leave. Tools can be kept clean and bright by rubbing them with a woollen cloth and a mixture of one pound melted lard with half an ounce of camphor, and, after skimming, add a pound of graphite, taking care to leave a coating of this mixture on the tools for 24 hours before cleaning it off.

Seventy-six Miles an Hour on a Light Car.

The world's light car record for the flying kilometre may be assigned to the Frenchman, Baras, who recently covered the distance on a measured kilometre in the Forest of Senart. Messrs. Tampier and Gaudichart, official timekeepers to the Automobile Club of France, had certified the accuracy of the time, but it was not until an official measurement and survey of the course had taken place that the genuine nature of the record could be established: this has now been done, it being found that at one part of the measured kilometre there was actually a slight up gradient. Baras' time, 25½ secs., is equivalent to a speed of 76 miles an hour. The car was a Darracq weighing 13 cwt.

A Novel Chain Driver.

The illustrations depict a chain-driven motor-bicycle in which the motor is mounted in a curious position behind the steering column. The frame is somewhat on the lines of a lady's drop frame. The transmission is by chain off a seven-tooth cog on motor to a 22-tooth cog on a countershaft. This countershaft is carried on a bracket, which can be adjusted on the curved down tube. From the countershaft the drive is by another chain to a spring chain wheel mounted on a loose sleeve on the rear wheel hub. The springs it will be observed are arranged tangent fashion and are secured to arms held at eight positions on the rim. The maker claims that this drive has proved very successful, being very elastic and absorbing the engine shocks. The position of the motor conduces to effective cooling, but it is doubtful if it would be a safe machine on greasy roads. It will be noticed on the smaller illustration that the pedalling chain is carried over a cog on the countershaft for starting the motor. The maker is J. Marchant, 26, Bohemia Road, St. Leonard's-on-Sea.



Showing tangent springs of Mr. Marchant's Motor-Bicycle.

out the two front bolts which attach the cover bracket and slightly raise it, keeping it in place by a wedge. If a hind wheel has to be unshipped, it is sometimes difficult to prevent putting the brake strap out of truth. In such a case the best method is to leave the strap on its sheave and remove the two washers which hold it by its ends. Attention should be paid to lubricating the pins passing the eyes of the car springs, for preventing a noise like that resulting from rusted joints. The practice of coating leather strap brakes with resin should be avoided, because such a coating first causes the brake to act too suddenly, and afterwards forms a glazed surface that simply slips on the sheave without exerting any effect. When a leather strap brake ceases to act the best method is to scrape the surface and clean it with spirit. Stiff grease is preferable to oil for lubricating the wheel hubs, because when oil is used a few drops are apt to get upon the brake and prevent it from acting. When it is required to let the circulation water run off through fear of frost or any other reason, it is advisable, on refilling, to slightly unscrew the nut at the top of the reservoir

OTHER PEOPLE'S VIEWS.

NOTE.—These columns are set apart for the discussion of motor topics by bona-fide readers of "THE MOTOR," and trade letters containing veiled advertisements are not admitted.

The Editor invites correspondence on any motor subject, but owing to the very large number of letters received he directs attention to the following rules:

1. Plain Writing. Type-writing for preference.
2. All letters to be written on one side of the paper.
3. Letters to be kept as brief as possible.
4. For the purpose of illustrating any letter, rough diagrams may be sent, which will be worked up by one of our artists.

The Editor is not responsible for opinions expressed by correspondents in this section.

POLICE TRAPS.

On the Bath Road.

Sir,—Allow me to state for the benefit of your readers that there is a police "trap" on the Bath Road, between Hounslow and Colnbrook, about two and a half or three miles from Colnbrook.—Yours faithfully,
P. R. SCHMIDT.

Christchurch, Hants.

Sir,—It may be of interest to readers of "THE MOTOR," who are thinking of touring in Hampshire, to know that in the High Street, Christchurch, there is a police trap between the Antelope Hotel and the motor shop. The measured distance is 220 yards, and there is telephone communication.—Yours faithfully,
C. E. M. SHARP.

Between Hinterton and Queen's Ferry.

Sir,—I write to inform your readers of a police trap on the Chester road, just after passing the Shrewsbury Arms, Hinterton, going towards the Queen's Ferry cross roads. I was myself caught on a recent Saturday, and fined £3. I had the satisfaction of knowing, however, that I had saved others from possible persecution, as I stopped my car and warned seven or eight motorists who were going in that direction.—Yours faithfully,
"12 H. P. DARRACQ."

Near Oxford.

Sir,—Will you please warn your readers that there is a well-arranged police trap on the Banbury Road from Oxford, about eight miles from the latter place, between a railway bridge over the roadway and an inn called "Sturgis' Castle"? The officers on duty valiantly conceal themselves in a rather damp ditch, and are quite out of sight behind a double hedge. The trap, which extends for about half a mile, will probably be in a fresh place on the same road on different week-ends, so that motorists should drive at a low rate of speed on this road, especially in the unfrequented parts.—Yours faithfully,
"NEARLY CAUGHT."

Difficulty with 5 h.p. Argyll Car.

Sir,—In reply to a recent enquiry re the above, I may say that I too had constant trouble with the ordinary make and break contact on an Argyll. Since substituting a "Lacoste" positive make and break at a small expense, there has been no trouble whatever in this direction.—Yours faithfully,
H. R. B.

Cure for Leaking Accumulators.

Sir,—Seeing many complaints in "THE MOTOR," re acid leaking on to the terminals, it may be of interest to your readers to know that the remedy I found was "Prout's Elastic Glue" dropped on hot when the accumulator top is dry. This is a material used in the boot and leather trades, and can be obtained from all leather grindery dealers at 1d. per stick. I have made my accumulator completely acid proof by using it round the terminals, and drawing rubber teats over the rubber plugs, as I saw suggested recently in "THE MOTOR."—Yours faithfully,
H. WRESELL.

Lamp and Carburettor Experiences.

Sir,—Judging by the letters which I have read in "THE MOTOR," and by the experiences of my motorcycling friends and myself, the average motorcycle lamp is an accessory that could be greatly improved. I have tried several of both British and foreign make, and they have all been failures but the last one I obtained. This is a Miller's Motor Cetolite 1904 pattern, and it gives me great satisfaction. It does not blow or shake out, and it gives a splendid light. Its weak point is that it throws the water out of the vent holes: all gas lamps have this failing; can any reader tell me how to overcome it? There is one great advantage in buying an English lamp which I think is often overlooked—viz., when a foreign lamp goes wrong there is an end to it as a rule, whereas when an English lamp breaks, the makers are on the spot and, in my experience, treat one in a very generous manner. This season I bought two Motor Cetolite Lamps for my fore-carriage: the back of one of these broke, and I returned it to Messrs Miller to repair: instead of returning it they sent me a 1904 pattern new lamp in its place, and when I told them that it spoiled the look of the fore-carriage to have odd lamps and asked them what they would charge me to change the other 1903 lamp for a 1904 pattern they very generously changed it free of cost. I note that one of your readers has recently had trouble with his carburettor on his "Bat" machine: I have ridden my "Bat" fitted with De Dion carburettor for 3,000 miles without a hitch: I think he will find that if both the levers are put level with the top tube, and the carburettor flooded, the engine will start at once: the air lever should then be lifted considerably higher and the spark advanced.—Yours faithfully,
H. A. CALLARD.

Re Fore-carriage Tyres.

Sir,—May I be allowed to mention, in justice to Dunlop's, that upon showing them my Olympia Humber tandem tyres which had worn badly they immediately gave me a new set? I may add that it was at the request of the Humber Co.—Yours faithfully,
A. G. G.

Wear of Fore-carriage Tyres.

Sir,—In answer to E. Dupont's letter re wear of tyres on his Coventry Eagle Trimmo fore-carriage, I have a machine of the same make and I found my tyres going in the same way: on testing the front wheels I found them "squinting" a full ½ in. I corrected this at once, and now I find no perceptible wear since the alteration, which took place about two months ago: also I found a great improvement in the steering.—Yours faithfully,
F. J. CAPARN.

Sir,—Replying to E. Dupont re the wear of fore-carriage tyres, I have had considerable experience with regard to this complaint, and have always found it due to the fact that the two wheels are not in true alignment; a most important detail, which unfortunately appears to be overlooked by most of the manufacturers of this class of goods: he should take it to some responsible and experienced firm to have the track tested. Of course a good deal of unnecessary wear may be caused by erratic steering, but no matter how bad this was it would not affect the tyres to the extent he complains about. The legal points in his letter I will not attempt to discuss; the fact remains, however, that if the wheels are not in alignment the thickness of tyre will only affect its life by a few miles more or less.—Yours faithfully,
HARRY H. MONKS.

(THE RALEIGH CYCLE CO., LTD.)

Fore-carriage Construction.

Sir,—In view of the attention being given to fore-carriages, why should the rider of a motor fitted with one be compelled to take all the shocks of the fore carriage road wheels? I think it cannot prove a very difficult matter for makers to employ springs for the framework of the motor-bicycle, and then the fore-carriage could be mounted on the framework, or it could have additional springs of its own. Surely it would be a big improvement to have the frame insulated from the shocks of the fore carriage wheels. "Carette," who wrote in a recent issue, might consider this and add this to his specification. I should also be glad if any rider who has a machine 2½ h.p. with M.M.C. motor, fitted with the large size Longuemare carburettor, would tell me the best sized nipple and air cone to use for machine geared to 4½ to 1?—Yours faithfully,
P. H. FARRINGTON.

Inner Tube Splitting Trouble Explained.

Sir,—In your issue of 7th October you publish a letter from a Mr. Robert Neill on the above subject. I would suggest that he should enquire and he would find that the "Bartlett Clincher" motorcycle tyre has an extended flap on one side of the cover that is practically the same thing as the strip of canvas solutioned on as he suggests. In fact, it is much better, as the strip of canvas will probably ruck up in time, whereas the flap referred to is stiff and completely protects the portion of the tube between the beaded edges. This idea is not new, but has been incorporated in the North British Company's cycle tyres for years, and I have never had the slightest trouble with my tyres so fitted.—Yours faithfully,
"FAIR-PLAY."

The Balanced Engine.

Sir,—I think that Jas. T. Towson's design for a balanced engine would be impracticable, owing to the difficulty of attaching the engine to the frame, for (1) If placed horizontally at the bottom bracket, one cylinder would get smothered with mud and dust, while the other would get no draught for cooling it efficiently. (2) If placed vertically in the same part of the frame, one cylinder would almost touch the ground. (3) It would be much more bulky than a single cylinder engine and hence it could not be placed in the frame on account of the space it would take up. (4) If placed in the "Humber" position, it would be extremely awkward to get at the valves, etc., in the lower cylinder. For a vehicle other than a motor-bicycle in which space was no object, I should think this type of engine would be a decided advantage.—Yours faithfully,
C. BIRTCHNELL.

In favour of Maintaining the Quad as a Motorcycle.

Sir,—Being a constant reader of "THE MOTOR," and knowing the spirit of equity in which you insert articles referring to motoring, I feel constrained to strongly protest against your suggestion in your issue of September 30th of placing the quad in the category of a car. You say it is quite as bulky and wide as the light car. If that is sufficient to define it, you might, I think, as well include Trimos, tri-cycles, and side attachments, which I find (after measuring) are quite as wide and in some cases wider. I share the humble opinion of my motor friends that weight as well as width should decide the definition of a car. How can a quadricycle be appropriately called a car when it is built and adapted to be used as a cycle? No doubt there are many like myself who have no accommodation for storing anything wider than a quad, and who, after a lot of trouble (which, by the way, might have been avoided, but which is afterwards regarded as good practical experience), come to the conclusion that the quad with a 2½ or 3½ h.p. engine, water-cooled head, and two speed gear is the most useful, safe, and convenient machine of the cycle type for the man of moderate means, who does not permit the four-wheeled tax to bias his choice.—Yours faithfully,
G. BARNARD.

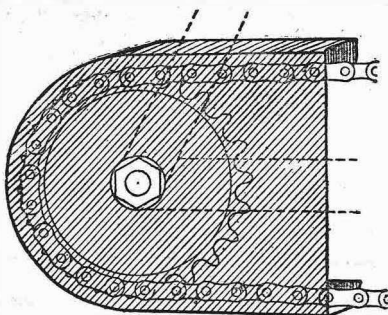
[We have not so much to please ourselves as to satisfy the Local Government Board in this matter, and at the same time safeguard the interests of motor bicyclists.—ED.]

The Lincona Belt.

Sir,—We have read with interest the letter of Mr. Norman H. Joy in a recent issue. As the introducers of the V system of transmission with Lincona belt we have in a number of ways endeavoured to instruct the motorcyclist as to the proper method of keeping this belt in order; in spite of which there are to-day hundreds of users who do not follow good advice, and afterwards would blame the manufacturers for their own palpable negligence. The letter referred to is correct in every detail, and if closely followed by those in trouble would speedily bring the desired result. The Lincona dressing is not intended to be applied in quantities all over the belt, but should only be sparingly used upon the top and bottom layers after riding in wet weather; the application restores the suppleness to the grain of the leather and prevents cracking.—Yours faithfully,
JAMES DAWSON AND SON, LTD.
Boultham Leather Works, Lincoln.

A Simple Protection for Free-Wheel.

Sir,—I have been much troubled recently by the mud choking up the free-wheel on my motorcycle; but I have since found the following efficient and cheap cure: the sketch will make it



clearer. I got a sardine tin and black enamelled it, and cut away the lid and end leaving about a half on the three sides; then bored a neat ¼ in. hole for the spindle, slipped it over the free-wheel, tightened up the step, and have found it a good protector.—Yours faithfully,
C. H. GRADISKY.

Petrol Consumption.

Sir,—It may perhaps be of interest to some to know my experience in the matter of petrol consumption. On a tour in September, of 1,150 miles, through England and Scotland, my 2 h.p. Werner consumed just 10 gallons of spirit, and this under very adverse conditions as regards weather and roads. The cost of the same amounted to 16s., or an average price of about 1s. 7d. per gallon. In Scotland I found the lowest prevailing price to be 1s. 6d. per gal., though at Fort William as much as 2s. 3d. is asked for Pratt's "B" spirit. Here, also, the sum of 3s. was demanded for recharging the accumulator, but a mild protest on my part secured a reduction of 50 per cent. On the whole I found the charges in Scotland, apart from those incidental to my "engine of iniquity," much more reasonable than I had anticipated. To any contemplating a tour in Scotland I should be happy to give such advice as lies in my power.—Yours faithfully,
CHERTSEY. KENT SPENSLEY.

Police Trap.

Sir,—I fell a victim to the police on a recent Sunday. I was travelling from Guildford to Woking and ran right into a trap just on entering the last-named place. I was pulled up at the railway arch about 100 yards from Woking Station. I should like to warn others of this trap through the medium of your valuable paper.—Yours faithfully,
"SPRAYER."

Perfection in the Motor-Bicycle.

Sir,—In Mr. L. Canning's article on perfection in the motor-bicycle, he says: "nothing has been done to make starting the machine easier": I think he must have forgotten the free engine as fitted to the Humber, Bowden and other makes. The adoption of the friction clutch is a big step in the right direction, and with all riders I have met it is a case of once used always used. On the Humber the engine is started by a handle before mounting, and it is a very different thing to start a machine weighing anything up to 170 lbs. with the engine disconnected compared to one of the usual type. The fitting of a monster compression tap would not be so advantageous as throwing the engine completely out of gear by a friction clutch, or by fitting one of the free-wheel pattern in the back wheel; as in addition to the compression, there is the friction of the engine to be taken into consideration, making as it does from 4½ to 7 revolutions to one of the rear wheel, which for the time being is the driver. Mr. Canning is not an advocate of the two-speed gear: he says it is an unnecessary complication, etc., and too much of an attempt to make the cycle into a car. Well, the nearer we can get to the car in comfort and reliability the better, and the fitting of the double gear is a step in that direction. I quite agree that with the 2½ h.p. machine it is possible to negotiate 99 per cent. of hills, but when you meet the hundredth the lower gear is wanted badly, especially for trailer or fore-carriage work; it is another complication, but the gain in comfort and the knowledge that no hill is too much for the engine is well worth it. Coming to the position of the engine I cannot imagine the Ormonde position as the ideal one, for the reason that when the rider is mounted, practically the whole weight is on the rear wheel and, therefore, the front wheel, owing to its light load, will slip in grease. The engine should be built into the frame in a position that will distribute the load almost equally when running. I do not think the belt (of any section) will be the final transmission adopted. After a lengthy experience of every method of transmission on the market (Starley's worm gear excepted) I unhesitatingly say that there is absolutely nothing to compare with a properly designed chain drive: it will stand more neglect and abuse than anything else, and still give no trouble: after the first 100 miles or so it requires no further adjusting all the season, and when it is necessary to take up any slack it is quicker and much cleaner to draw the wheel back by means of the adjusters than to cut a piece out of a belt and punch the hole for the fastener, which may pull out on the first hill that is encountered. The short drive of an engine in the position suggested by Mr. Canning as perfection is to my mind contrary to all engineering practice, and cannot give the best results with a belt

drive. No V sectioned pulley will hold a belt, fitted so slack that there is no strain on the bearings other than the drive, without slipping. After carefully comparing several machines with belt and chain transmissions I cannot find any difference in the wear and tear of the tyres; in fact, I consider more injury is done to the tyres by improper use of the brake than anything else. My ideal of the motorcycle in its present state of evolution is: free engine (started by handle); of about 1 h.p., fitted well forward of the seat tube either vertical or diagonal (there is nothing to choose between these two positions for durability or efficiency, it is only a matter of personal opinion); a nearly silent exhaust; automatic carburettor; chain drive with two-speed gear; 24 inch tyres; and spring seat pillar.—Yours faithfully,
HARLEY GILL.

Perfection in the Motor-Bicycle.

Sir,—Will you allow me to thank the Hon. Leopold Canning for his very generous criticism of my article which appeared some time ago, and perhaps an explanation may clear matters up a little, especially on the question of the two-speed gear and twin cylinder motor-bicycle. If the two-speed gear is reliable it seems to me that this method of cutting down weight is a step in the right direction, because, as has often been stated in your columns, the power is not wanted to such a great extent on the level as it is uphill, and where the 2½ h.p. machine is running—to say the least—not very economically on the level in order to be able to cope with the occasional 1 in 6 incline, the 1½ to 2 h.p. two-speed gear motor is giving its best performance throughout. A good idea I heard of is to have a pulley on either side of the crank shaft, a large diameter on one side, a small diameter on the other; two belt rims, one on either side of the back wheel; a lever so constructed to work a clutch that when in one position the large pulley drives the cycle and the small one is free; another position gives free engine, and in another position the small pulley is driving the machine. Here we have a reliable two-speed gear and free engine at will. I do not know who is the inventor, but it ought to pay if put on the market. Regarding the twin cylinder motor, I am sorry to say I can only take the experience of others as my authority, and until some kind friend lets me have a trial run, or until I am endowed with more worldly goods, this is my position. From what I gather, if the compression in the one cylinder is well relieved the resistance to traction should not be so great. Supplying both cylinders with a minimum amount of gas would, perhaps, alter affairs, and then when the hill looms in front "crowd on full throttle." I have no doubt that many makes of motor-bicycles have the handlebar control, but how many are there on the market at present in which, to effect a stop or to slow down in thick, slimy, slippery grease, one hand has to be released and a lever pulled or pushed on the top tube? If nothing else, let me have an exhaust valve lifter worked from the handlebar. I take it that the machine which the Hon. L. Canning mentions is fitted with such a lubricator that when once the oil is put into the tank no more attention is to be paid to it until exhausted; that there is no pump to inject oil every now and again. I was not aware of such a machine and I congratulate the makers on their in-

genuity. My machine has the usual two-way pump on, so, of course, I cannot speak favourably or otherwise of the automatic device. Perhaps in "O.P.V." riders may report.—Yours faithfully,
LEONARD BELL.

Spray v. Surface Carburetters.

Sir,—I cannot understand the prejudice that exists against the surface carburettor. I have ridden a "Waverley" motorcycle fitted with a 2½ h.p. J.A.P. motor and surface carburettor, mostly with a trailer, for the past nine months. I have ridden in all weathers, and have never had the slightest trouble with the carburettor, and I seldom touch the mixture lever, though I have often used "B" spirit. Probably this is due to the special design of the J.A.P. carburettor; just as in the engine, care has been exercised on details. I have had many splendid runs and should like to hear the experience of other users of this carburettor. I cannot help saying that I have also found the lubricating system of this machine perfect.—Yours faithfully,
ROBERT F. BARKER.

Carburettors, Wind Scoops, etc.

Sir,—There is still a great diversity of opinion as to which is the better of the two, surface or spray carburettor. I have only had experience with the former, which is fitted to my 2½ h.p. "Excelsior," and I have obtained most excellent results, but I should much like to know whether more power is admittedly developed when using a spray, as Mr. Van Hooydonk in his letter a week or so ago seemed to infer this. I drive always with a fore-carriage, and generally a passenger, and find few hills, in the ordinary way, that cannot be climbed with pedal assistance; but if greater power can be obtained from a spray I should be inclined to have one. I have any of your readers practical experience of both, on the same machine? I have had wind scoops fitted to assist cooling (although I have done over 3,000 miles this summer, without once overheating, and 81 miles absolutely non-stop, with 23 stone up in August), but I really think they are useless, and that the cycle maker here who made and fitted them described them correctly in his bill as "wind shields." I have driven on Pratt's "B," but have not been able to get the best results from it, and I am now going to try Carless' for the first time. I quite endorse "Riada" in his statement as to the tyre companies, as Messrs. Dunlop treated me exceedingly well over a faulty pair of tyres, and the North British Company gave me a new outer case for a re-rubbered one that would not keep the rim after they had done it. There seems to be less complaint about belts. Since the 28th of May last I have had one from the "Bat" people which, considering that I have done over 2,500 miles and shortened it not more than six times to date, cannot be considered troublesome. I have a "Bat" pulley which permits of my driving with the belt much looser than on the ordinary pulley and prevents all slipping, and no doubt this is the reason of the belt lasting. I shall be interested to hear your readers' opinions as to the relative power of surface and spray.—Yours faithfully,
O.P.Q.

Belt v. Chain.

Sir,—Your correspondent, "M.I.M.F.," under "O.P.V." column, in a recent issue, mentions a Humber chain having run 1,000 miles without trouble. I have just put on one side a belt, which cost me 2s., including rivets, and which has run 2,500 miles. I could have repaired it; but having a new one of better make ready, I put it into use. This latter cost me 2s. 6d. and looks like beating the other one.—Yours faithfully,
T. FREDK. HUNT.

Launch Motor Details Wanted.

Sir,—I have a 14ft. open centre-board sailing boat which I am anxious to have fitted with a small motor. The boat was specially built and is exceedingly strong and sound in every way. It is 4ft 6in. in beam and 2ft. 3in. deep. As I intend to do the work myself during the coming winter I should be much obliged if some motor-launchist would help me in the following:—(1) What size of motor would be required to drive the boat at a reasonable speed? Would 3 or 4 h.p. be enough? (2) Are small petrol motors on sale by any of the English motor firms or agents? (3) What is their cost with all necessary parts ready for fitting? (4) Is the work required within the scope of an amateur?—Yours faithfully,
J. F. HASTIE.

Glasgow.

Petrol Density: How to Test It.

Sir,—There is so much heavy petrol on the market now that it is almost a necessity for every motorcyclist to carry a densimeter and personally test any petrol he may buy, for what security can a paper label "A" or "B" give us? We are at the mercy of any petty little country tradesman who likes to stick "A" labels on petrol cans and charge accordingly. Now a densimeter of the ordinary glass type is a very delicate instrument, and exceedingly liable to damage, and I wonder if it has ever occurred to readers of "The Motor" that a rough approximation of the density of the spirit can be obtained without a densimeter, without even breaking the seal of the can, simply by the process of weighing? The table below gives the variation in weight of two gallons of petrol, from 680 to 730 sp. gr., and it will be seen that there is one pound weight difference between two gallons of 680 and the same quantity of 730. All that is necessary is to make the vendor weigh the entire can—most country ironmongers have scales—or the motorist might easily carry one of those small spring balances such as fishermen use; this would take up little more room than the densimeter, be far more durable and also be useful in other ways. The table referred to is the following:—

PETROL DENSITY.

Specific Gravity.	Weight of Two Gals. of Petrol in lbs.	lbs. ozs.	Weight of Can. + Petrol.	lbs. ozs.	Carless.
			lbs. ozs.		
680	68 x 2 = 136	13 9½	17 11	18 3½	
690	69 x 2 = 138	13 12½	17 4½	18 6½	
700	70 x 2 = 140	14 0	17 8	18 10	
710	71 x 2 = 142	14 3½	17 11	18 13½	
720	72 x 2 = 144	14 6½	17 14½	19 0½	
730	73 x 2 = 146	14 9½	18 1	19 3½	

The average Pratt can weighs 3½ lbs.
The average Carless can weighs 4 lbs. 10 ozs.
Yours faithfully,
Cambridge. E. T. NEWTON-CLARE.

A Reply.

Sir,—I saw your reply to "B.D." (Arun-dell), re his 3 h.p. Quadrant, and perhaps my experience on my 1½ h.p. may help him. I found that part of the slot in which the electrical lever (if I may so term it) works had become rather dirty in the middle: it was also buckled a little; both of which faults together cut off the current, although a good contact was made at either end of lever.—Yours faithfully,
P. N. MELLOR.

The Vibration Question.

Sir,—With reference to Mr. J. Towlson's letter re the above, may I point out that the arrangement of balanced engines he advocates has already been tried on the "Winton" car, and also on the "Holden" bicycle, although in the latter case the crank shaft was not placed between the cylinders. In neither case was there any conspicuous absence of vibration, and this I think is due to the fact that although a better balance of moving parts may be secured, yet the more important part of the problem remains unsolved—and that is, the balancing of the "recoil" of the explosion. Something may be done to lessen this evil by the multiplication of cylinders, thus lessening the violence of each individual explosion, and also securing a more perfect torque—a practice which is exemplified in the new six-cylinder Napier and the eight-cylinder Clement car shown at last year's Salon. But the true solution of the difficulty would appear to lie in the adoption of the well-known device of twin fly-wheels rotating in opposite directions. This principle is used in a well-known English car with complete success: surely its adaptation to the motor-bicycle would present no insurmountable difficulty.—Yours faithfully,
C.N.

The Jesmond Motor-Bicycle.

Sir,—As one who has had experience with a Jesmond motor-bicycle, I have pleasure in giving Mr. R. R. Jewell my opinion of it. My machine is a 2½ h.p., water-cooled (with radiator) motor-bicycle, frame 26in., fitted with a fore-carriage. My weight is at least 12 stone; and in the fore-carriage I take as passengers my little girl, aged four, and my sister-in-law, who together will weigh probably another 13 stone, a total load of 25 stone. The roads in this district are not, as a rule, flat, nor yet have they good surfaces. I find that I can get the machine, with this load, to take most of the hills without help, and it is only on one or two that I use the pedals, and then it is done more as a preventive than a cure; that is, I pedal because I do not care to run any risk of the engine stopping. Mr. Jewell need have no fear whatever about a machine like mine being able to draw a trailer over a flat road, or even to take a fore-carriage. There will be no "pinch" about it; he will have plenty of power. The flat roads in this district necessitated lifting the exhaust valve frequently in order to keep down the speed and reduce vibration. The surfaces are so bad that a speed of twelve miles an hour is quite sufficient for pleasure. The control of the machine is perfectly simple: it is all done from the handlebars, but I have discarded loose (twisting) handles for the switch, and have had Mason and Brown's switch fitted. In regard to reliability, the machine has never yet failed to "get there," and to bring me home again.—Yours faithfully,
Gateshead-on-Tyne. W. SMITH, M.B.

The Life of Exhaust Valves, etc.

Sir,—I notice that in a recent issue of "THE MOTOR" you mention, under "Hints and Wrinkles," that 3,000 miles' running is a good life for an exhaust valve. May I say that both the inlet and exhaust valves of my F.D. Werner are in excellent order, after 5,850 miles' running, and have only been ground in once; the compression is excellent. The original trembler is also at work. I have a spare one to put in when the platins are worn, but I have never broken a trembler. Perhaps some riders have done even better than this; if so, I hope they will give results through your excellent paper.—Yours faithfully,
T. FREDK. HUNT.

Motor Supplies in India.

Sir,—In your issue of 23rd September, Mr. David Jones asks where he can buy petrol and get accumulators charged at or near Jhansi, India. He can get American petrol from Kirkbride and Co., 60, Tamarind Lane, Bombay; and Indian petrol from the Assam Oil Company, 2, Clive Ghaut Street, Calcutta. In each case the price is likely to amount to about two and a-half rupees per gallon, after paying the cost of drums and railway freight. Your correspondent would be well advised to have a primary battery to charge his accumulator, unless he prefers sending it 700 miles by train to some electrical firm in Bombay.—Yours faithfully,
"ANGLO-INDIAN."

The Non-slipping Pulley.

Sir,—With regard to Mr. Brittain's recent letter in "O.P.V.," describing his duplex pulley, in my opinion there is a considerable amount of engine power sacrificed to obtain the grip he notes. Now suppose he uses a 4 inch motor pulley, and the lateral displacement of the belt is ½ an inch only, there will be, at the least, a loss of 1-24th the motor power on each pulley, back and front, in useless lateral friction. Thus, he spends 8½ per cent. of his power in extra vibration and wear. If he uses a V-shape back pulley the waste will be much greater. The same objection applies to all the belt gripping devices yet brought forward. With these appliances a rider throws away, all day long, something like ten per cent. of his power for the mere advantage of being able to surmount somewhat more easily an exceptional hill or two. For this purpose there is nothing to equal the sliding jockey pulley, used with discretion.—Yours faithfully,
E. CRAWFORD.

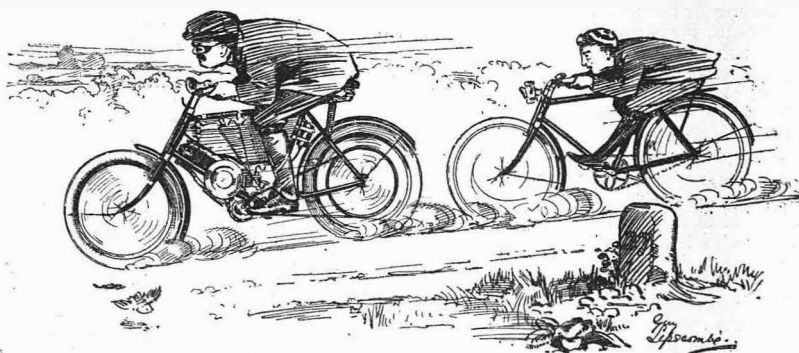
A Road Danger.

Sir,—The other evening while riding my motorcycle after dark, on rounding a corner, after giving ample notice of my approach, I found myself among a drove of young horses. The effect can be better imagined than related, and had it not been for a timely retreat into the ditch the results must have been most serious. The crux of the situation was that the man nominally in charge was between 200 and 300 yards behind the first batch of animals he was supposed to control. It is the custom here, and I presume in the provinces generally, to drive away from the weekly cattle market large herds of cattle which wander uncontrolled over the whole road and footpath also—when there is one. That such dangerous and unwieldy traffic should be allowed to monopolise the road in this manner is a scandal, and it is certain the police would be doing far better work by giving a small amount of their attention to this matter, rather than hiding in ditches to trap anyone who travels in a motor at more than what they consider the legal limit.—Yours faithfully,
"ROAD USER."

Bedford.

Educating the Horse to the Motor.

Sir,—As showing how every motorist can, if he will, assist in making motoring acceptable to non-motorists, the other evening, as I was returning home through a certain road in the North of London, in passing a mounted policeman I observed his horse shy at something, but as there happened at the moment to be rather a lot of smoke blowing into the road from a neighbouring manufactory, I was, therefore, not quite sure as to the cause of the horse shying. Any way, to make quite sure, I immediately returned, and as the shying recommenced with my return, I asked the rider to allow me to do my little towards his mount's education. The policeman (evidently an up-to-date officer) readily acquiescing, I took my motor-bicycle close to the mare's head, and patting and talking to her at the same time, I showed her how foolish her fears were by passing and repassing her on the machine, first by pedalling, and then, after she appeared to get more and more accustomed to it, I took it by her slowly with the power on. The last time she was quite reconciled, even to the hooter, after which I "reconciled" Monsieur le Bobby, and venture to think I made two friends for the motor.—Yours faithfully,
C. M. HOLLOWAY.

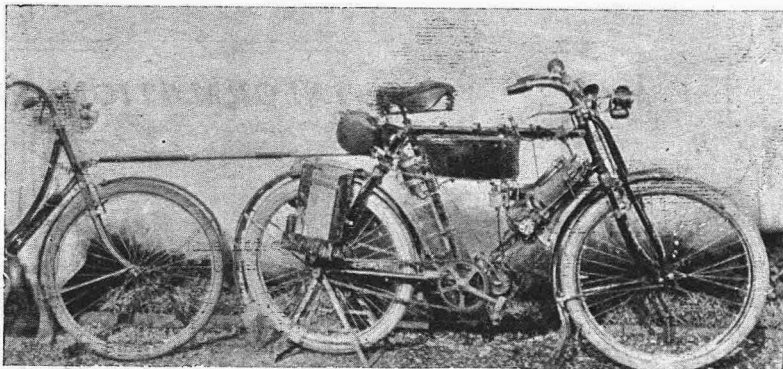


IMITATION, ETC.

Observed on the road recently. A youth, on being passed by a motorist, squatted back on his Turner carrier and free-wheeled down the hill.

Driving with Paraffin, etc.: Interesting Notes.

Sir,—During the past season I have been making notes of my experiences and trust they may be of use to your readers. The machine I use was built to order by Messrs. Kenyon and Trott, of Ipswich. Having had some dozen or so machines from them I knew the workmanship would be satisfactory. They fitted the C. G. two-speed set, which is their speciality. After riding a 100 miles or so, various detail improvements suggested themselves. I found that for easy starting and moderate speeds the spark was too advanced with lever retarded, so I lengthened the connecting link from valve lifter one inch. For running at the low speed, the exhaust pipe was not large enough, so I fitted one as shown in Fig. 1, with most beneficial results as to speed and reduction of heat and noise. I have since run on the low speed for 25 minutes with throttle full open without overheating. An adjustment in the two-speed actuating wire I thought desirable; that shown in Fig. 2 filled the bill entirely. Another useful adjunct is an exhaust valve lifter worked off the front brake lever, Fig. 4. With spark advanced and throttle set for 30 miles per hour, a touch of the hand on brake lever acts like a charm, the speed being reduced to anything above five miles per hour without moving the hands from the handlebars. For conveying a passenger, although I use a trailer, I prefer the "Coventry Eagle" tow-rod, and find 20 miles an hour quite a safe speed on good roads. The rod itself being hardly strong enough for rough usage, we buckled the central joint and had it mended with a sleeve (Fig. 3), which is infinitely stronger and more convenient. By knocking out the bolt, each rider can carry half, which is still attached to machine. On one ride, having run short of petrol just as my passenger was gamely proposing to reverse matters and tow me home, I procured some paraffin and filled



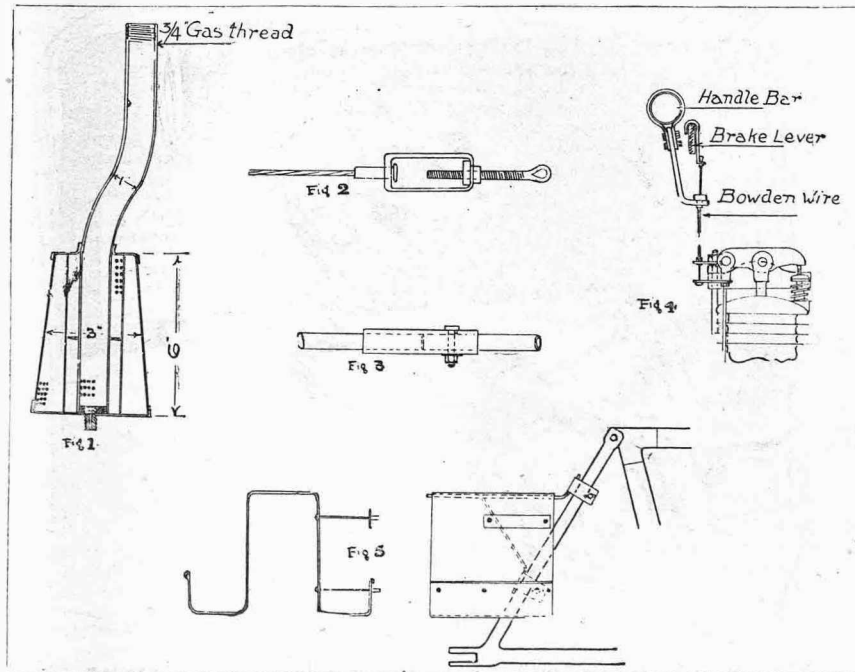
Illustrating letter from "Moto-Cyclo."

the tank. I had no petrol whatever on machine. After 50 yards of vigorous pedalling there were few stray explosions, and on getting the mixture right the engine ran as though possessed, except on hills, when the carburetter seemed tricky, but what was most remarkable (picnic acid users please note!) the power of engine I found was greatly increased. After making a stop we had no trouble in restarting again. The chains give no trouble except for adjustment, which is required every 150 miles. I keep them nearly as tight as a belt; the clutch is always allowed to slip, and on the low speed if engine begins to labour I help with the pedals—thus my back tyre (Clincher motor), after 2,000 miles has not yet worn quite smooth. Engine vibration is an almost unknown quantity, due no doubt to the inclined position of the motor. It is also most noticeable that this type of machine stirs the dust much less than does that of the vertical style. The most economical run I have had to date is 42 miles on one quart of petrol, and with a passenger the same distance on three pints, at an average speed of 20 m.p.h. Total weight of riders

25 stone. With a C.G. motor and a tow-rod the luggage problem assumed somewhat grave proportions, but with the aid of a Turner Bi carrier and a strip of galvanised sheet-iron, 4ft. long by 8in. wide, that trouble was soon banished, as in Fig. 5. Not only was there ample room for luggage, but half a gallon of petrol and supply of spare lubricant could be carried on the other side. As a result of my manoeuvres with this little engine I now look forward to the era of small light motors of quick revolution using a perfected chain drive in conjunction with a variable gear, and in that day we shall smile when we see belt drivers keeping company with the G.O.O. in museums and such-like places.—Yours faithfully,
"MOTO-CYCLO."

A Machine for "Commercials."

Sir,—I have no doubt that many commercial travellers, like myself, intend this coming year to get some form of motor-carriage, if only they can come across the right type. The man carrying little or nothing in the way of samples is already provided for, having the choice of many makes of motorcycles. The man who carries several skips is also catered for by the makers of light cars. The man who is not provided for is the commercial who only need carry one skip, and for whom therefore the light car is an unnecessary expense both in first cost and also in upkeep. What is wanted is some form of tandem having an arrangement by which the forward position can be used either to carry a skip, or in holiday time a front seat for wife or child. Do any of your readers know of such a machine? It must be capable of being used in all weathers, have a free engine of not less than $3\frac{1}{2}$ h.p. I have proved a 2 $\frac{1}{2}$ h.p. motor on tandem to be just too weak for all-round work in a hilly district. Certainty of keeping appointments is of more importance than speed. Magneto ignition would seem to be best, as one does not want to be bothered with run down accumulators, etc., etc. Should the drive be chain or, say, belt and Britannia pulley? If no suitable machine is made, I feel certain that if you could initiate a discussion, and at the end sum up in the form of a specification, you would be helping a large body of would-be motorists. In conclusion, I would say that the machine must be perfectly reliable, for one cannot go to the expense of constantly buying new machines, and it should be of such a type that an intelligent cycle builder could erect it. Yours faithfully,
"BLACKBURN."



Illustrating letter from "Moto-Cyclo."

OUR INFORMATION BUREAU.

SPECIAL NOTICE.

The Editor is at all times pleased to answer any queries put to him by the readers, or to receive correspondence from readers upon any motor topic. In consequence of the large number of letters received, however, he must insist upon the following simple rules being strictly adhered to:

1. Plain writing. Type writing for preference.
2. All letters to be written on one side of the paper only.
3. Questions to be clear, terse, and to the point, without tedious preamble or needless flattery.
4. Should an immediate reply be required, an envelope must be enclosed bearing a penny stamp, and the name and full address of the sender. NOT a stamped undirected envelope.

"Belting" (Silvertown).—Have a flat belt (Dicks' preferably), not less than 1½ in. wide. This ought to stand the load well.

J. S. Irving (Belper).—You will only be able to obtain parts for the engine you name by advertising. The firm went out of the business a considerable time ago.

A. Hodgson (Bradford).—We do not think your idea of a belt drive would work at all with the comparatively short drive on a motorcycle. Of course, it would really want trying. Personally we think two belts running side by side far more practical.

H.I.B. (Newcastle-on-Tyne).—You could arrange the cylinders and cranks as you describe. The lubrication would be good, using a small crank case and outside fly-wheel. With vertical cylinders the cranks would be opposite each other.

De Dion Queries.

"De Dion" (Manchester).—(1) If you find that giving the mixture more air lowers the speed, it shows you are weakening it too much. (2) The jerking you speak of is probably due to the first charges missing fire now and again. (3) Gear works out about 1 to 4; with the larger wheel, 1 to 6½. (4) Machine may stop when you retard your spark to full extent because you do not shut off the air to correspond. (5) The terminals on your coil are these: T to trembler, M to frame, and + to positive pole of accumulator. (6) We do not think you will exceed 18 to 20 miles an hour with 14 h.p. De Dion. Steepest hill, without pedalling, approximately, 1 in 14; a lot depends on how you drive. (7) The brass bands on coil are joined to one end of the secondary winding, and must touch the frame. We are not surprised that you see sparks jump across to frame. It shows contact is very imperfect. Take a wire from bands to motor, and note improvement in spark and power.

D18

"Lumen" (London).—With regard to the suggested acetylene lamp, our advice is that it would be simply a waste of time making it, as small lamps can be obtained so cheaply now. The idea would work after a fashion, but the flame would be very erratic, we are afraid.

A. Green (London).—(1) A good quad, with 2½ h.p. engine, water-cooled, should be quite equal to 20 an hour on the level, and take hills 1 in 10 on the low gear. (2) Prices are so variable for secondhand machines—say, £45 to £60. (3) The wear on the driving tyres is not so great as one might think with a direct drive. Quad drivers, on the whole, say they find the machine economical as regards the tyres.

Charging Humber Accumulators.

R. S. Potter (Ilford) writes:—I am charging my Humber accumulator as follows: Electric mains are 230 volt supply. The two lamps are 16 c.p. each, and I believe pass about .3 amps. Humber label says, "Regime de charge, .8 amps." I have found the poles by negative wire turning pole paper crimson. Is all this right?—The connections on your diagram are quite right. If you could get 25 c.p. lamps the cells would charge at a much quicker rate, however. Better make sure that the poles are right—some pole testing papers give different indications; that is, the positive instead of negative turns crimson. Put wires from lamps in acidulated water, three-quarters of an inch apart. Negative wire invariably gives off hydrogen gas in abundance. This is a sure test.

E. N. Storey (Caterham).—(1) You would have to adopt a centrifugal governor acting on the throttle, and adjust the mixture by hand. (2) Cost might be £6 to make a first-class job, but estimates would vary considerably.

"Minerva" (Liverpool).—(1) Piston should be within ¼th completion of its stroke when the exhaust valve commences to open. On the up stroke the valve must shut simultaneously with the piston completing the exhausting stroke. (2) About 2 h.p. when tested by a brake apparatus. (3) Three rings are much better than two. (4) Quite a matter for experiment to find best tension of inlet valve spring. It should pull the valve back sharply when released, and open with a force of 5 or 6 ounces applied.

Freezing up of Carburetter.

H. Mackenzie (Pitlochry) writes:—I have a 2½ h.p. motor-bicycle, the Longuemare carburetter of which gets choked with ice after I run it for five miles. Will you please tell me what this is owing to, and what would be the remedy? There are no hot air tubes fitted.—We should certainly have the hot air connection made to the silencer. This will remedy the freezing up. The explanation is that the evaporation of the petrol demands a certain amount of heat, and the temperature of the carburetter itself falls so low in consequence that the moisture in the air taken in becomes converted into frost. The outside also becomes so covered.



A further exemplification of "The Motor" deposit system as applied to a light car.

MIXTURE TROUBLES



GREASE



DOGS



POLICE



ROADSIDE



TRAFFIC



NIGHT-RIDING



STUDIES IN EXPRESSION!

W.P. (Colchester).—For particulars of Carburine motor spirit write to the Gas Improvement Co., Devonshire Street, London, E.C. We hear good accounts of it in practice.

Oldfield (Bothwell, N.B.).—(1) It is best to advertise your wants, and we can, perhaps, help you if you let us know the results. (2) Get G. Lavergne's book on the automobile, published by Cassell and Co., London.

"Avis" (London).—The Mason and Brown handlebar switch comes the nearest to your requirements. You will find it advertised in our pages. You might also note that the Bowden Patents Co. have a combined brake and circuit breaker. If it is not suitable on the brake, why not arrange the circuit to be broken when the exhaust valve is lifted?

Increasing Compression.

"Compression" (London, S.W.) writes: (1) Is it possible to increase compression and power of a 2½ h.p. De Dion engine? I have a 2½ h.p. bicycle and fore-carriage, geared 6½ to 1, and which, while satisfactory on ordinary hills, requires some pedalling to get up steep hills, such as 1 in 14-15. The engine has run 5,000 miles, and has never cost me a penny in repairs, so I am keeping the machine for next season. Any help you can give me will be much appreciated; and I may say that since following your advice to reduce gear from 4½ to 6½, the gain in hill climbing and general effectiveness has been immense.—You can try the experiment of bolting an aluminium plate 5-32nds thick on the top of your piston; but we cannot say with certainty that the increase of power will be very noticeable, as it also depends on other factors, which vary in different motors. But we have heard that it has proved successful in several similar cases. The other plan would be to fit a water-cooled head to the engine. It would then develop considerably more power on hills.

"Impulse" (Edinburgh).—(1) To get the power you want would mean having a cylinder 6½ in. bore, 7½ in. stroke; better to have two cylinders, 3½ × 3½ inches. (2) There is no standard relation to give best results between bore and stroke. Hardly two authorities are in agreement on the point. The tendency of the best practice is to make them of almost equal dimensions. The generation and fall of explosion pressure is so rapid that there is very little power gained by lengthening the stroke.

Leaking Accumulator.

R.E. (Mossley) writes:—I have a 2 h.p. Minerva motorcycle (1903). The accumulator keeps leaking, in spite of my attempts at repair. (1) Ought I to add water to cover the plates or acid? (2) Can trembler blades be bought without the platinum rivets? Mine are constantly breaking, and I think the rivets could be used again.—(1) You had better have the leak properly repaired. There are several firms which undertake to make a sound job of the work. You must certainly add the dilute acid. Continually adding water will ruin the cells. (2) Try Gamage's or Bransom Kent.

Compression, etc.,

R.L. (London, W.) writes:—(1) What should be the pressure shown on a gauge when the charge in a 2½ h.p. cylinder is fully compressed? (2) How long may a fully-charged accumulator remain unused without recharging? (3) Is it a good thing to use an accumulator on a four-volt lamp if not required for use on a machine?—(1) Pressures vary with different makes. Nothing less than 30 lbs. per square inch is usual. (2) We have had cells out of use six weeks, without touching, and found them none the worse. As a rule, we advise giving them a charge at not greater intervals than four weeks, as it prevents troublesome sulphating taking place. (3) It will not harm the cells in any way; in fact, will do good—if you recharge again.

A Sluggish Carburetter.

T. H. Smith (Manchester) writes:—(1) I have a 3½ h.p. fore-carriage, with surface carburetter. I have no trouble at starting, but after running about half a mile the explosions become gradually weaker, and eventually stop, unless I begin to shake the float wire, when the motor starts off again all right. Sometimes I have to continually shake the petrol up to go quickly. I found this out by noticing that when going over cobbles or bumpy roads the engine can hardly be kept back, but when going over smooth roads it loses power. (1) Is this the fault of the petrol or the carburetter? (2) I would also like your opinion about motor overheating. Mine gives no trouble, but it soon gets very hot, and sometimes even the driving pulley gets warm, and makes the belt soft. Is this usual, and is it doing any harm? I keep it well lubricated with "D" oil, and the engine piston never sticks. Referring to my first query, I should have mentioned that when I want to rush a hill I have to shake the wire up and down vigorously, and the machine goes up at a very fast rate.—This experience is not unusual with a surface carburetter, and generally results from the spirit being too dense to evaporate quick enough to supply the motor. The use of .620 spirit is imperative with some surface carburetters, but they vary greatly in efficiency, some working quite well with .725 spirit; but these have plenty of evaporating surface, and are warmed up from the motor. In the instance referred to the agitation of the spirit causes more rapid evaporation. We should advise a trial of the lightest spirit obtainable, and care must be taken not to have the evaporating chamber flooded. (2) We cannot say definitely whether your motor overheats to any extent. Of course, the rule to avoid overheating is to run with the smallest possible amount of gas and weakest mixture. If the piston rings are not in good order the crank case of pulley will get hot.

"Abertave" (Birmingham).—We cannot say if the makers would fit artillery wheels; we hardly think they would. The wire wheels should stand all right. It is in the matter of cleaning that they are troublesome. (2) You might get quotations from the firms making small cars and advertising in our pages. (3) The idea of getting light from dynamo for car is not practical, unless you use a set of accumulators in conjunction with it, and then it would require an automatic governor to cut the charging dynamo out at low speeds. Using an 8 or 10-volt lamp you could get a good light.

Gudgeon Pin Trouble.

"Georgius" (Apsdell) writes that the only trouble he experiences with his 2 h.p. motor is the working loose of the gudgeon pin screws. One of these came out recently and damaged the motor to the extent of a bent piston rod and crank pin, costing £1 to put right. He asks if he could dispense with the screws altogether without any harm resulting.—We do not recommend this, as there is a danger of the pin coming loose and scoring the cylinder bore. We should have a couple of tight-fitting screws made, rather longer than usual, and have a lock nut on the thread. Then, in addition, a split pin could be fitted to prevent the screws turning round. The screws require to be a really firm fit in the holes. (2) We do not think it would pay you to make the conversion you mention, but you might get the opinion of a good local agent.

Lighting and Warming of Motor House.

"Frost" (Canterbury) writes:—I should be greatly obliged if you could let me know in your "Information Bureau," which has already been of great help to me since I have driven a car. (1) What you consider the best way of lighting and heating the motor house for a medical man who cannot go to the trouble of filling his water tank every time he is called out at night in the winter, and who wishes to avoid the expense of hot water pipes. Would a tortoise stove in a stall about 12 ft. away from the car, and with a partial screen in between, be moderately safe? Petrol tank is only filled in yard outside coach-house, of course. Another suggestion of mine is this: would a bucket or two of hot water, with a blanket over water tank of car and buckets, à la home Turkish baths, meet the case? Is petrol vapour heavier or lighter than air? This seems to be an important factor when one has a large coach-house, with two stalls in the one compartment, as one might heat a floor level and ventilate above, or conversely. (2) How can snow be negotiated in winter? I have a Benz car, with solid tyres, which I have already found to my cost have no bite at all on damp grass. Perhaps some fellow-Benzite would enlighten me?—For lighting, there is nothing safer than electric light. You would probably get enough light from a few accumulators and an 8-volt lamp, unless you have the ordinary supply convenient. This question of safely warming a motor house in a simple and economical manner is always a difficult one to solve. Of course, where there is petrol, and heat enough to ignite it, there are always the fundamental elements of an accident. A petrol leak occurs at the most unexpected times, and might easily cause a dangerously explosive mixture. Personally, we should not advise keeping any petrol in

the tanks if you adopt the first system you suggest. It should, however, prove effective for keeping the tank and radiator from freezing up, because a few degrees above freezing point will be safe enough. As a temporary expedient, your second suggestion might do. Better still, we think, would be to have the stove arranged just outside, and a heating pipe carried inside the shed close up to the motor. Of course, this pipe would have to be made so that there was no possibility of petrol vapour getting inside. There may be other suggestions which some of our readers could make on the point. Petrol vapour is, of course, much heavier than air. As to the matter of getting the car wheels to "bite" in snow, we do not think there is anything you can adopt unless it be a corrugated tyre, or, perhaps, a device à la Parson's Non-skid, or a cover of some sort. Narrow solid tyres should grip fairly well, we should have thought.

Exhaust Box Explosions.

A.W. (Hammersmith) writes:—(1) I have a 6 h.p. car, and had an Auto-trembler fitted to facilitate starting, and now, though I have no other trouble, when I retard the spark fully in traffic I get frequent explosions in the exhaust box. Can you tell me why this occurs? (2) My car is somewhat noisy. If I fit an exhaust box, half as large again as the one now fitted, will it reduce the power very much?—It is possible you have too much range on your advance and retard lever, and the charge gets fired when the exhaust valve has commenced to open. Another reason may be that, as you slow down, the carburation is disturbed, and several charges pass into the exhaust box unfired, and the next explosion fires them. Reducing the air supply might prove a remedy. Fitting a larger exhaust box should certainly not reduce your power if it is well designed. In fact, you should gain something, as the exhaust has more room to expand.

Accumulators at Fault—most Probably.

J.T.B. (London, S.E.) writes:—I have a Basse and Michel coil on my 5 h.p. twin-cylinder Decauville car, which used to give a 4-inch spark, but I find that lately it has seemed to lose power. It will just tremble and give only a feeble spark. The accumulator is fully charged, and shows four volts. I find that if the coil stands a day it slightly improves. Can you tell me the cause of the loss of power and its remedy? Do you think I can make it good? If not, who would you advise me to take it to?—From the fact that you find the spark improves somewhat after the coil has been standing, we do not think it is the coil that is at fault at all, for this reason. Supposing the secondary insulation had gone wrong, the coil trembler would still "buzz" as strongly as ever, as the primary circuit would be intact. Another reason is that the B. and M. coil rarely goes wrong, owing to its excellent construction. We should first see that it is not merely the trembler out of adjustment, and then put on another battery. Very likely your present one has gone wrong. If you require both the coil and battery tested, doubtless the Streatham Motor Co., 27, High Road, Streatham, would do it. They claim to make a speciality of this class of work. Messrs. Pearcock and Co., 35, Clerkenwell Road, London, E.C., also take a special interest in this class of work.

J. G. Rogers (Aberdeen).—We have no doubt that it is the carburettor at fault from inspection of it. It had certainly got into a very bad condition, and evidently had never been taken apart for cleaning. Two faults are probable, the float valve is leaking and the sprayer is partly blocked and also the hot air tube over the sprayer appears to be broken. A repairer who understood the carburettor could make it all right, but it is a peculiar type and there are not a great number in use. (2) The voltage of your accumulator 3.5 is too low. Once they drop to 3.0 volts the pair it is a sign they will shortly require recharging. (3) Longuemare with throttle or new P.N.

ANSWERS BY POST.

In addition to answers appearing on these four pages the following correspondents have been replied to through the post:—

Thursday, November 12th.—E. B. Hazelton (Sheffield), Flitt Cycle Company (Amphill), C. H. Ackland (Bournemouth), Geo. Cheethams (Boarhills), A. Brain (London), A. J. Halcomb (Sheffield), C. Seelig (East Loos), R. S. Potter (Ilford), R. H. Prichard (Rock Ferry), F. W. Day (Newmarket), W. Partridge (Aylesbury), G. Haslam (Accrington), D. D. (Manchester).

Friday, November 13th.—W. Orchard (Hitchin), F. J. Caparn (Port St. Mary), F. Griffiths (Bristol), M. Hardy (Morley), H. Knowlman (Clulington), F. G. Engham (Clapham), C. M. Park (Streatham), G. E. Milner (Oxford).

Saturday, November 14th.—F. L. Wright (Blackheath), A. Fisher (Stoke Newington), A. R. Mace (Canonbury), W. H. Johnson (Macclesfield), W. P. Green (Southampton), E. W. Kitchen (Haddenham), J. G. Rogers (Aberdeen).

Monday, November 16th.—J. Wroughton (Hertford), B. S. Wills (Leonora, Australia), H. W. Jenkins (Egham), R. Bailey (Widnes), H. C. Armour (Alnwick), N. Hall (London, S.W.), W. Broad (Winchester), E. J. Ward (London, N.), F. Whomes (Bexley Heath), F. W. Hulton (Huddersfield), B. Beeston (London, W.), C. Robinson (West Ham), H. C. Hawker (Long-parish), F. S. Jehanger (Bombay).

Tuesday, November 17th.—P. B. Murray (Manchester), J. Cernes (Wombwell), A. L. Harrison (Galway), H. S. Picton (Thornton Heath), M. Maxwell (Haileybury), R. Hutchings (Oxford), H. Viner (Rugby), G. Hardy (Nottingham), W. H. March (Walkley), C. W. Guillaume (Horsham), F. Wigley (Germantown, Australia).

Wednesday, November 18th.—H. G. Ayres (Stevenage), E. R. Collins (East Dulwich), A. B. Lodge (Bexley), G. Shepherd (London, N.), J. G. Chipchase (Darlington), G. Wrightson (Sutton-on-Derwent), H. H. Adams (Dunoon), G. B. Marston (Poole), J. Thorburn (Newport), D. Kemp (London), W. Ambler (Shrewsbury), J. Darlington (Ealing), J. Petrie (Rochdale).