

would remind our readers of the existence of a fund for defraying the legal expenses connected with the crusade, and any assistance from sympathisers will be appreciated and acknowledged by Messrs. Joseph Fullbrook, of Slough; Joseph Taylor and Cecil Howlett, of Eton; or the bankers, Messrs. Barclay and Co., Slough.

THE PROPOSED TRIAL OF LIGHT MOTOR DELIVERY VANS.

The Automobile Club have issued a circular invitation to many of the large London business houses to send representatives to a meeting to be held at the clubhouse, 119, Piccadilly, on Thursday, December 4th, at four o'clock, to discuss the arrangements for an extended trial of light motor delivery vans under the organisation of the club. Manufacturers and others interested in the supply of these vehicles have also been invited. It should provide an excellent opportunity for the designers of such vehicles to hear the views of the prospective users of them. While speaking of light delivery vans, we are reminded of one point in connection with them which we do not think has been previously discussed, though it is of no little importance. We refer to the height of the driver above the road. Without in any way suggesting high speeds, it is well known by those who are accustomed to the handling of autocars that the handiness and easy control of the vehicle make it possible to save a great deal of time by passing slower-moving traffic, but this can only be done with the utmost safety when the driver is seated at a fair elevation. It is almost impossible for him to tell what is coming towards him unless he can see over the highly-laden vans, buses, and similar vehicles. While it is not necessary for him to be seated so high as their drivers, it is certainly desirable that he should have a more commanding position than that which is generally given him. Some makers have placed the driver on the top of the motor bonnet, the old Daimler P.O. vans and some types of Benz vans being examples of the kind, and giving an indication of what can be done in this direction.

In referring last week to the latest ascent of the Gas House Hill, Norwich, we left Mr. H. W. Egerton out of our calculations. It is true that we remembered his Locomobile climb, but it seems he has also been up six times on a Werner motor bicycle, pedalling, of course, being resorted to, and besides this a standard pattern 12 h.p. Gladiator with ordinary gearing will take him up. Last, but not least, a standard pattern 10 h.p. Brooke car has made the ascent, although the bottom gear was a high one—nine miles an hour. Under these circumstances, the climb was a particularly meritorious performance.

* * *

The British Automobile Commercial Syndicate, Ltd., have just delivered 15 h.p. Panhards to Mr. Lucas Ralli and Mr. Leo Bonn. They are both fitted with Limousine bodies by Messrs. J. Rothschild et Fils. One of the bodies is made so that the whole of the back takes off, and two seats are fitted so as to form a tonneau. They are two of the most handsome bodies yet turned out by Messrs. Rothschild.

New Patents.

This department is conducted by Mr. G. Douglas Leechman, consulting engineer and registered patent agent, 18, Hertford Street, Coventry; 32, York Street, Dublin; and 9, Exchange Chambers, New Street, Birmingham; from whom any further information respecting patents, designs, and trade marks may be obtained.

The following list of specifications were printed and published on November 20th, 1902. All notices of oppositions to the grant of patents on the several applications should be filed not later than January 5th, 1903:

1901.

17,221.—E. Tilston and S. Salisbury. The blocks of rim brakes are connected to the hand lever through a balancing device.

22,107.—F. I. Gibbs. Built-up articles are tinned all over, and sweated together and nickel-plated over the tinned surface.

21,268.—T. B. Browne and F. L. Martineau. An internal combustion motor and a two-speed gear are built up *en bloc*.

21,652.—W. Bettis. Free-wheel clutch and other gearing for cycles fitted with wind motors.

23,500.—F. W. Lanchester. Actuating riding sleeves in friction clutches and brake mechanism.

23,617.—F. W. Lanchester. Operating certain forms of change-speed gear by a single lever.

23,647.—L. F. C. Rich. Brakes and other controlling devices with detachable handle-bars.

23,995.—W. Klement. Motor bicycle, with special frame and controlling devices.

24,134.—J. G. Accles and F. H. de Veuille. Clip and loop electrical connection.

24,420.—E. Mathieu. Screw steering-gear, in which the worm has a longitudinal as well as a rotary movement.

24,912.—H. Falconnet and M. Perodeaud. Metallic and textile puncture preventing device for pneumatic tyres.

26,445.—A. E. Walker and C. Macintosh and Co., Ltd. Wired-on solid tyres.

1902.

2,383.—F. A. Seiberling. Attaching solid tyres to inverted rims by curved transverse wires.

Answers to Correspondents.

QUERIES OF GENERAL INTEREST.

O. H. B.	L. Bell.
E. J. Ellis.	D. G. H.
G. Crooks.	L. Patrick (Rhodesia)
E. F. Murray.	J. H. Knight.
P. H. Dods.	G. L. Watson.
J. H. M. Davidson.	C. F. Ellis.
E. Lloyd.	E. S. Youse
H. W. Brock.	(Reading, Pa.)
L. B. Usher.	A. Passmore.
B. H. Gainsford.	A. A. (Dublin).
H. Reimers.	W. H. B.
D. D. (Dumfries).	J. W. Knowles.

Our thanks are due to the following for items of news and various topics of interest which have been or will be dealt with: W. Hartnup, jun., R. E. Fletcher, Robert Ranger, B. C. Sellars, H. S. Streetfield (much appreciated), W. B. Jevons, Bennett and Wood, C. A. Booth, J. R. Wade, N. Macdonald, and others.

NOTICES.

SUBSCRIPTIONS.

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

EDITED BY H. WALTER STANER.

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In "The Autocar" of November 8th, a coloured supplement plate—"The 16 h.p. Napier"—was published. Separate copies of this supplement can be obtained packed flat, post free, for 7d. from the publishers, 3, St. Bride Street, Ludgate Circus, E.C.

COLONIAL AND FOREIGN EDITION.

IN ADDITION TO THE USUAL EDITION OF "THE AUTOCAR," A SPECIAL THIN EDITION IS PUBLISHED EACH WEEK FOR CIRCULATION ABROAD. THE ENGLISH AND FOREIGN RATES WILL BE FOUND ON THE LAST PAGE. ORDERS WITH REMITTANCE SHOULD BE ADDRESSED "THE AUTOCAR," COVENTRY.

The Autocar can be obtained abroad from the following:

AUSTRALIA: Phillips, Ormonde, and Co., 533, Collins Street, Melbourne.

FRANCE: Nice, Levant, and Chevalier, 50, Quai St. Jean Baptiste.

UNITED STATES: The International News Agency, New York.

Notes.

The Gordon-Bennett Race.

The Automobile Club, which has the power to nominate the cars which shall defend the English title to the cup, has decided that Messrs. S. F. Edge, Ltd., shall be nominated to enter two Napier cars, and that the other two manufacturers desirous of doing battle for Great Britain—the Wolseley Tool and Motor Co. and the Star En-

gineering Co.—shall take part in an eliminating test on April 10th next, and the car which performs the more satisfactorily shall be nominated as Great Britain's third representative vehicle. The test is to take place on the mile track at Welbeck or some similar course, and on a hill which the committee will select. A number of miles will be run against the watch by each car and the times taken. These times will be divided by the number of trips made, and the mean speed worked out. Three ascents will be made of the hill, and the car which covers the total distance in the shortest time will be the winner and the selected vehicle. To ensure that the competitors mean business in every sense of the word, each entry will have to be accompanied by a cheque for £500, which will be returned on the proviso that the car entered conforms to all the requirements of the Gordon-Bennett rules, and is a *bona-fide* vehicle suitable to compete in the race. The French Club have stated that they cannot consent to the running of the race over a circular course of one hundred kiloms., and the secretary of the Automobile Club of Great Britain is taking steps to ascertain whether there is a road in Ireland suitable for a course of ninety-four miles, as the Gordon-Bennett rules permit the race to be run up and down a course of not less than that distance.

A County Council Tour.

It will be no doubt of interest to motorists in general and county councillors in particular to know that a committee of the Breconshire County Council, in the three days ending Wednesday, 19th November, made a tour of inspection of roads in the county by motor car, traversing in all a distance of about two hundred miles. The cars which carried the committee were a 10 h.p. Wolseley, kindly lent and driven by Capt. D. Hughes Morgan, of Brecon; a two-cylinder M.M.C. car, lent and driven by Col. Thomas Wood, a member of the committee; a four-seated Locomobile, also lent by Col. Wood; and a 3½ h.p. Benz victoria, owned and driven by the County Surveyor, who was accompanied throughout the trip by the chairman of the Main Roads Committee of Breconshire. Considering the very rough nature of the roads traversed, the gradients, and the loads carried (many of the cars having at times more than their proper complement of passengers, some of whom were heavyweights), the cars behaved exceedingly well. The little Benz car, in spite of its low power, did the journey as well as the larger cars, at times carrying three and occasionally four passengers. It is worthy of note that among the party there were as many as six J.P.'s, whose delight at the speed, which often reached twenty miles per hour, was more than once noticed. The weather was as perfect as could be expected at this time of year, being bright and frosty, while the roads

were hard and free from grease, although in many parts as rough as roads could be. In short, the tour has been a great success, giving the various members of the committee such a thorough idea of the state of the roads all over the county as they could have obtained in no other way, and also giving them the opportunity of comparing the highways in Breconshire with those in the adjoining counties of Carmarthenshire, Glamorganshire, and Monmouthshire. An official itinerary and timetable was prepared and placed in the hands of the members of the County Council Committee, so that they knew exactly what route would be followed each day as well as the times of arrival and departure at and from the principal places. It was altogether a well-planned, businesslike, and up-to-date road inspection on which those who organised it and those who took part in it deserve the sincerest congratulation. Business men would do well to note that the use of autocars as conveyances enabled the committee to do in three days what otherwise must have occupied six.

The Numbering Question.

Among the many letters which we have received endorsing our arguments and those expressed by correspondents whose communications we have published against the numbering proposals, we the other day received a letter which strikes us as very clearly putting a view of the question which, to a large extent, has been neglected. Our correspondent says: "I happen to be one of those owners of

motor cars who are not blind enthusiasts, but busy men of affairs, who vastly prefer mechanical traction. Such people know very well that nothing but time is needed to adjust and settle the whole question, and they are entirely averse to feverish legislation for a class. They are by no means prepared to submit to an offensive regulation which will benefit no one but the semi-professional, and, if carried out, will force them back to the use of horses. I have two cars, and am trying to get another, but I doubt if my objection to the horse is strong enough to stomach that plaque. As no doubt you know, this is the prevailing view among that class of everyday users which the trade, if it is wise, should cater for. Should they be driven away and disgusted, there will be another dreary period of non-horseless traffic."

Road Trials for 1903.

The sub-committee which was appointed by the trials organisation committee of the Automobile Club to consider and make recommendations with regard to the form which next year's trials shall take and to draft certain new regulations, has completed its work. Particulars of the sub-committee's recommendations will be submitted to a meeting of members of the industry and trade, which is to be held at the Automobile Club on Tuesday next, December 9th, at 3 p.m. Manufacturers and sellers of motor vehicles are invited by the club to attend personally or to send accredited representatives, so that the subject may be fully discussed.



Miss Chandler, of Kirkby Lonsdale, driving her 6 h.p. John o' Gaunt car. This lady is an enthusiastic automobilist, and, as we mentioned on Oct. 4th, had driven her car over 2,000 miles. With the exception of the rough cleaning she looks after the vehicle entirely herself, and when driving never takes a mechanic with her, as she is quite competent to make any little roadside adjustment, while she regards a tyre puncture as a mere bagatelle.

THE 40 H.P. GEORGES RICHARD CAR.

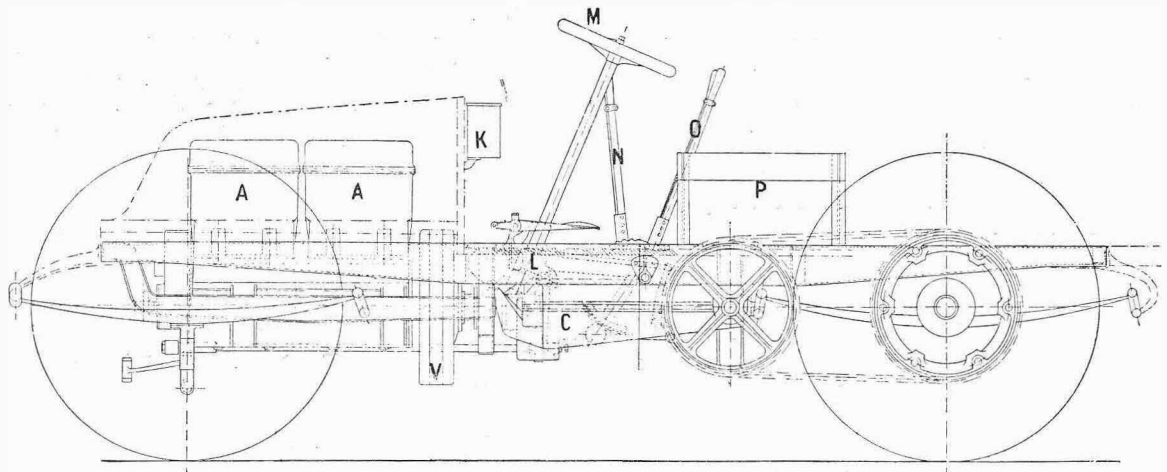


Fig. 1.

A A, cylinders. C, gear-box. K, lubricating tank. L, worm and wheel steering gear, enclosed. M, steering wheel. N, side brake lever. O, change speed lever. P, petrol tank. V, flywheel.

By the courtesy of Messrs. Mann and Overton we are enabled to give chassis diagrams of the 40 h.p. Georges Richard car.

The details shown in figs. 1 and 2 are somewhat sparse, but they allow a good idea to be obtained of the disposition of the driving gear, etc., of these well-known vehicles.

The frame is of ash, reinforced by well-cambered steel flitch plates running the whole length of the frame on the outer face of the longitudinal wooden members. The underframe upon which the engine is borne is formed of two down-swept carriers of channel steel bolted to bearer plates on the front transverse members by their forward ends, and bearing upon a second transverse member, also of double channel steel, at their rear ends. The gear case is carried on the rear portion of the double transverse member just mentioned, and upon the countershaft, as seen in fig. 2. The gear within the gear box gives four speeds forward and one reverse, the drive being direct (without any intervening

gearing) on to the countershaft on the fourth (top) speed. The rotating magneto ignition is driven off a separate lay shaft on the right of the engine, this shaft also serving to drive the force feed lubricating pump in the lubricating tank K. The weight of this car is $17\frac{1}{2}$ cwts. in racing trim, and it will be remembered that, driven by Brazier, this car beat the 40 h.p. Mercedes driven by Baron Forest in the Gaillon hill climb. The petrol tank from which the spirit is fed by gravity to the carburetter is placed beneath the driver's seat.

The special carburetter employed upon this and the 20 h.p. Georges Richard cars has several points of interest. As fitted to the 40 h.p. four-cylinder car, the carburetter is provided with four induction pipes with jet to each at outlet from the carburetter, the particular claim for this arrangement being that each jet serves but one cylinder, and can be attuned to the needs of that cylinder exactly, in lieu of one jet having to serve, and to be averaged as to service of petrol between the four.

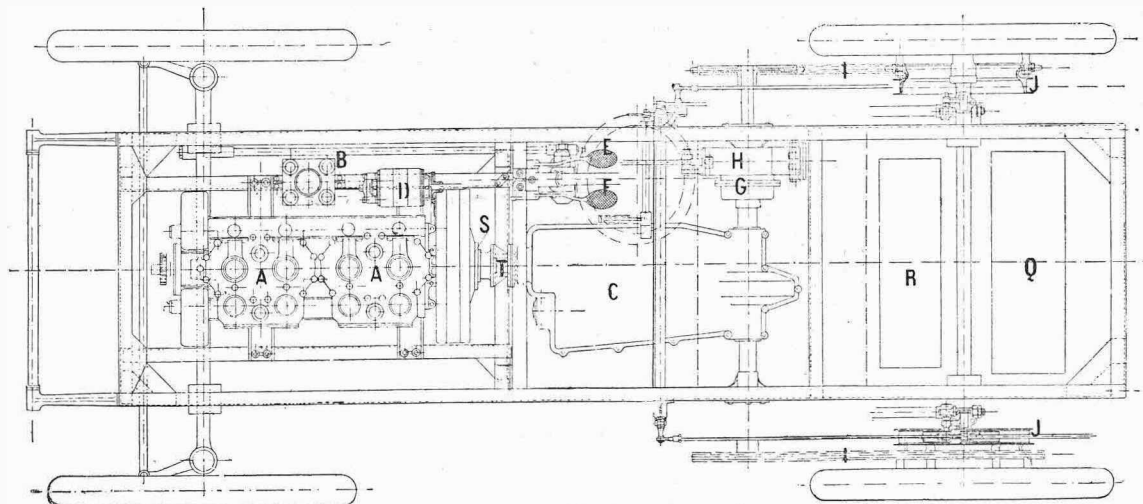


Fig. 2.

A A, combustion chambers of cylinders.
B, carburetter.
C, gear-box.
D, rotating magnets.
E, pedal actuating drum-brake on countershaft.
F, clutch pedal.
G, differential gear box.
H, brake on countershaft.
I, I, driving chains.
J, J, band brakes on driving wheels.

R, silencer.
S, clutch.
T, clutch stop.
Q, water tank.

THE CHELMSFORD STEAM CAR.

(Concluded from page 543.)

Fig. 5 is a horizontal section of the countershaft or differential gearshaft case, also in aluminium, which is bolted to the cast steel bed-plate 1111 (fig. 3) through the bolt holes MM shown. The shaft H^2 is carried in four double ball bearings 5 5 5 5—one on each side of the differential gear case 2 2 2 2 and one at each end of the shaft immediately inside the chain sprocket bosses 6 6.

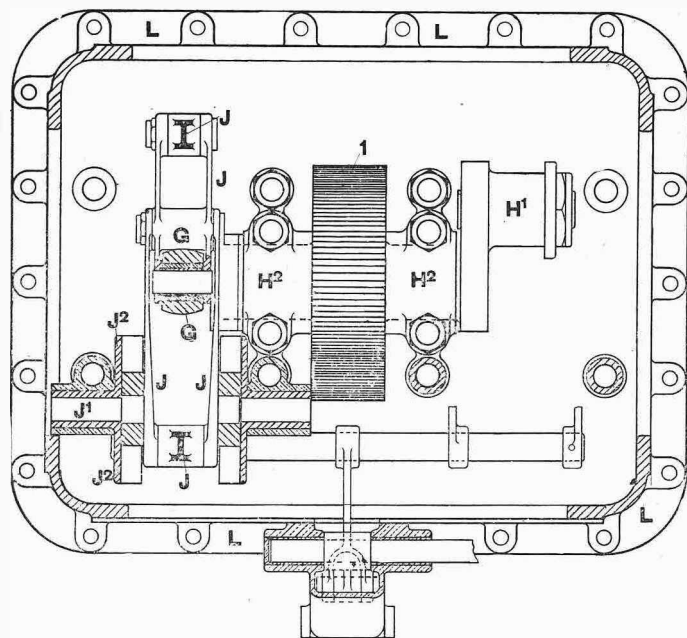


Fig. 4.—Transverse section of engine, showing crank on right and Joy gear on left.

G G, connecting rod.
H⁴, crank pin.
H² H², crankshaft bearings.
J J, Joy valve gear levers.
J¹, valve crosshead.

J² J², segmental guide for Joy valve gear.
L L L L, aluminium engine case.
I, steel driving pinion on centre of crankshaft H H.

On the shaft H^2 are mounted four eccentrics X^1 , X^1 , X^2 , X^2 , the former actuating the water pumps for boiler feed and return water, and the latter the oil pumps for lubricating oil and oil fuel.

All four of these pumps are identical with that shown in vertical section in fig. 6.

The drive passes from the ends of the countershaft or differential gearshaft by Brampton chains from the chain sprockets 6 6 to chain rings bolted to the spokes of the road driving wheels.

Fig. 6, as we have already suggested, is a vertical section typical of the two water and two oil pumps, the construction of which is made sufficiently evident by the referenced and lettered drawing. The valve box G G G G is interchangeable on all four pumps, and it will be noted that both suction and delivery valves are of large area and have very small lifts.

It will, we think, be admitted that the highly important matter of lubrication has been most carefully and effectively considered. Beginning

with the oil feed to cylinder, the lubricant employed, viz., a mixture of graphite and heavy hydro-carbon oil, is delivered by the lubricating oil pump to the orifice in the cylinder walls marked R on fig. 3. It is distributed longitudinally by the travel of the piston, the piston rod receiving its share when the piston is at one end or the other of the cylinder, and thus providing what is necessary for the stuffing-box D. The lubricant is carried down the steam ports by the exhaust steam, and so serves the valve faces.

The valve spindle J^3 is served by the oil draining from the cavity of the distance piece $E^1 E^1$ through the tube T.

In the engine case L L L L, the lubricant is delivered from the lubricating pump through the orifice X, falling first on to the rocking spindle of the Joy valve gear, and thence on to the upper portion of the crosshead guides in which a channel with holes is formed to allow the oil to reach the top and bottom surfaces of the guides. The oil still dropping reaches the valve crosshead J^1 through the holes shown in the valve crosshead guide.

The success of this system is partly due to the fact that the most perfect form of lubrication possible has been adopted, the oils used being well adapted to their work, and are, moreover, readily separable from the condensed steam. From the condensers the water and the oil—which it has picked up in its passage through the cylinders in the form of steam are drawn by a pump, and then forced through a separator, or filter, which retains the oil. The water is, of course, returned to the supply tanks for further use.

The automatic regulator, to which reference has already been made, is actuated by the variation of the temperature of the water and steam in place of the steam pressure, as is more usual. The principle of the apparatus is that as soon as the water falls below a certain point the temperature is raised on account of its being surrounded by superheated steam instead of water at boiling point. The movement thus obtained by the working of a piston within a cylinder is communicated by levers to the oil supply, cutting it down

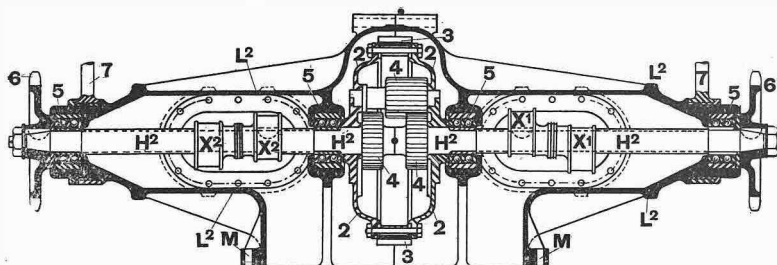


Fig. 5.—Vertical section through differential or countershaft gear case.

H² H² H² H², differential or countershaft.
L² L² L² L², countershaft gear case.
M M, holes for bolting countershaft gear case L² L² L² to cast steel plate.
2 2 2 2, differential gear case.
3 3, phosphor bronze toothed ring meshing with steel pinion 1 on crankshaft.
4 4 4 4, differential parallel pinions.

5 5 5 5, countershaft ball bearings.
6 6, chain sprockets.
7 7, radius rod ends encircling countershaft case.
X¹ X¹, eccentrics driving water pumps for boiler feed and return water.
X X, eccentrics driving pumps for lubricating oil and oil fuel.

or increasing it, as the case may be. The car is controlled almost entirely by the throttle valve, "linking up" being very rarely resorted to. With the exception of the Joy valve gearing every working part has been cut down, and great attention has been paid to accessibility; and, as will be seen from the drawings, ample dimensions have been given to all working parts.

All the pressure and other gauges are set conveniently upon the dashboard in front of the driver,

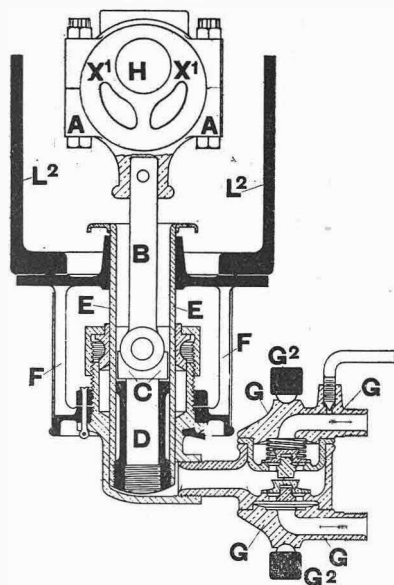


Fig. 6—Section through pumps

A A, eccentric strap.
B, steel connecting rod.
C, saddle piece taking thrust of rod B.
D, screw attaching plunger to valve rod.
E E, plunger.
F F, cage bolted to bottom of L², carrying body of pumps.

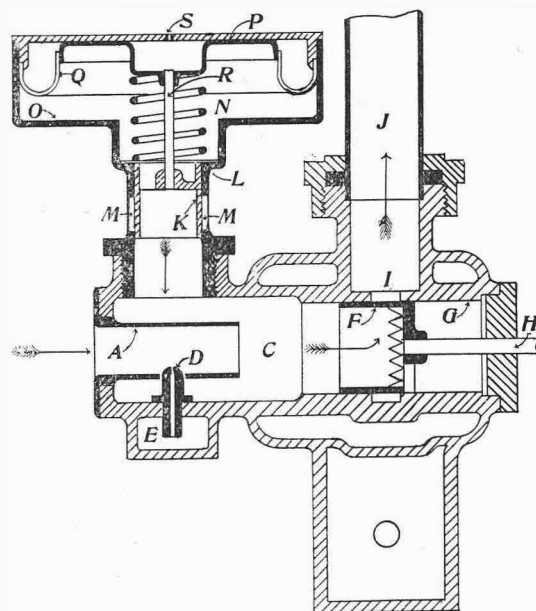
G G G, valve box interchangeable on all pumps.
G² G², section of steel clamp retaining valve boxes in seatings.
L² L², part of countershaft gear case.
X² X², eccentric.

a pipe from the water tanks R¹ R¹ (fig. 2) being brought to a gauge glass, so that the driver may be kept posted as to the quantity of water at his disposal. The throttle valve is controlled by a small hand wheel on the throttle valve spindle which projects through the dashboard.

THE KREBS CARBURETTER.

In throttling a motor with inlet valves actuated by suction, it is a matter of great difficulty, if not an impossibility, to regulate by hand the admission of air to the mixing chamber in a way to secure an absolutely uniform mixture when the motor is running at far below its normal speed. To avoid this inconvenience, Major Krebs, director of the Société Penhard et Levassor, has designed a new system of carburetter, in which the admission of air is regulated automatically by the engine, so that, as the mixture is always the same, and only varies in quantity, the motor will run at a low speed without danger of stopping through the admission of poor gas. This carburetter is regarded as of so much importance for the economical and efficient working of a motor that it was described last week before the Paris Academy of Sciences. As will be seen from the accompanying drawing, it is designed in three parts. The first consists of an air inlet A

communicating with the mixing chamber C. The spray nipple D descends into the receptacle E, which communicates with the float chamber. The second part forms a regulator consisting of a piston F moving in the cylinder G. The piston rod H is actuated by the centrifugal governor of the engine. The cylinder G, moreover, is in communication with the motor cylinders by the port I and the pipe J. The third part is the extra air inlet consisting of another piston K in the cylinder L, which communicates with the chamber C. The piston K opens and shuts the ports M M in the cylinder L, and the rod R is joined at its upper extremity to a piston P of smaller diameter than the large cylinder O in which it moves. The periphery of the piston P is connected with the sides of the cylinder by a loose elastic diaphragm Q. A small aperture S admits air above the piston and diaphragm. The piston is kept in position by a spring N. Its operation is as follows: The piston F varies in travel according to the speed of the motor; the suction of which draws spirit through the pulveriser D and air through the orifice A, and at the same time tends to draw down the piston K, and uncover more or less the air ports M M, which are closed when the piston P is kept up by the spring. When, therefore, the motor is running at high speed the piston F has a long travel and takes in a large quantity of spirit, but at the same time, as only a small fixed quantity of air is admitted through A, the piston K is sucked down to uncover the ports M M, which admit the necessary quantity of air for the mixture. As the motor slows down, the piston F, actuated by the governor, has a shorter travel, and the ports M M are only partially



Section of the Krebs carburetter.

opened during suction strokes; and when the piston F is at its shortest travel, the suction is insufficient to overcome the resistance of the spring N, with the result that the ports M M remain closed, and air is only admitted through A in quantity proportionate to the smaller admission of spirit through D. The air is thus kept strictly proportionate to the spirit, and the mixture is uniform at whatever speed the motor may be running.

MOTOR CYCLE MATTERS.

By A. J. WILSON.

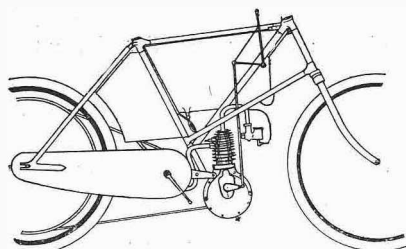
The impression left upon the mind of the visitor to the Stanley and National Cycle Shows is one of general uniformity in regard to the main features of the motor bicycles exhibited, combined with an amazing variety of detail. The appended illustrations will reveal how diversified are the methods of carrying the motor in positions approximately similar to each other. In the great majority of cases it will be seen that the vertical position of the motor just in front of the pedal crank bracket is adopted, the engine being most usually hung so that its mainshaft is level with the pedal crank spindle.

Float Feed Spray Carburettors.—Modifications of the Longuemare and Panhard types are almost

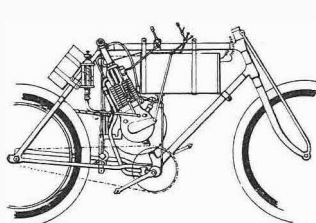
afford extra rigidity. When a $2\frac{3}{4}$ h.p. motor is used no pedals are provided, but footrests. For an extra payment a spring frame is provided, consisting of a vertical tube supporting the saddle and footrests, joined to the main frame by links, and hung upon four suspension springs.

The Bradbury.—One of the few first-class machines surviving with a surface carburetter. The crank case is cast in one piece with the lugs, into which are brazed the frame members, one side face of the crank case being detachable by the removal of ten nuts.

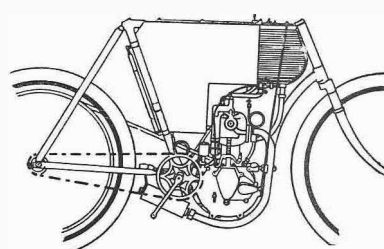
The Celeripede.—The engine is placed in the Ormonde position, but the strong feature about this



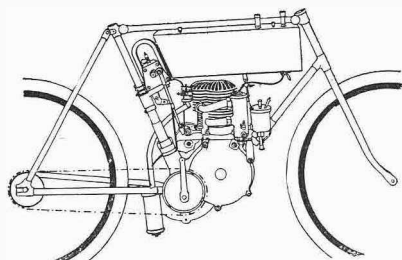
Stanley A.V.



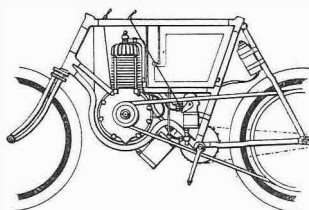
Longuemare.



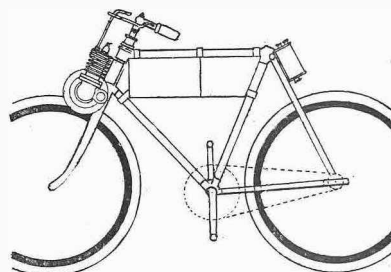
Whirlwind.



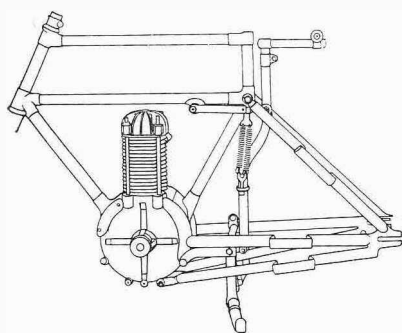
G.M.C.C.



Morris.



Indian.



Bat.

universal; and whilst the non-vibrating, so-called trembler, steel blade style of contact breaker is most general, there is a growing number of makers who adopt the wipe method of spark production, practically always in conjunction

with the Carpentier trembler coil. Although few of the motor bicycles are radically peculiar in their design, the majority display some little point of difference from their competitors. Increasing favour is bestowed upon the practice of casting the cylinder in one piece with its head and valve box. In the following notes needless repetition has been avoided, and only points of singularity have been mentioned:

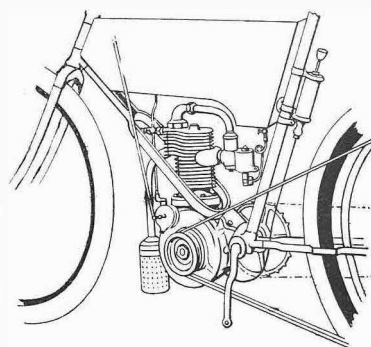
The Bat.—The engine is set vertically in cradles formed upon the ends of the frame tubes. The chain stays or lower back forks are duplicated to

bicycle is its spring front fork—almost the only survival of all the spring front forks that have been exhibited at various times.

The Clarendon.—This is a good example of an engine with the drive stiffened by the provision of a bearing outside the belt pulley, the motor cradle being specially shaped for the purpose.

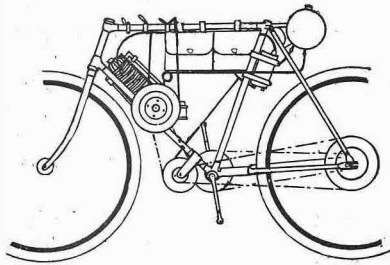
The Crypto.—A big M.M.C. engine is hung in cradles between the bracket and the front tube with but little lengthening of the frame, the front tube curving down to follow the curve of the front wheel.

The Davison.—One of the few motor bicycles furnished with magneto ignition; also one of the few upon which the jockey pulley is still used. The petrol tank and lubricating oil tank have glass

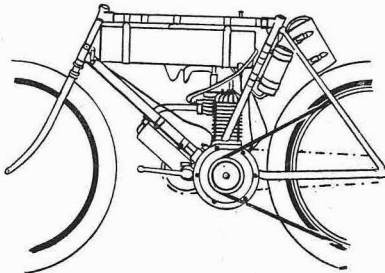


F.N.

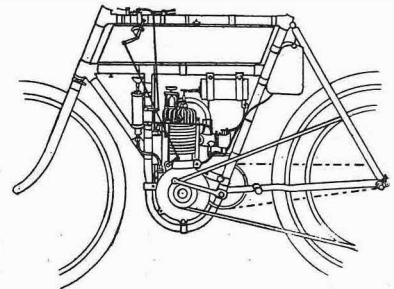
SOME SPECIMEN TYPES OF NEW MOTOR BICYCLES.



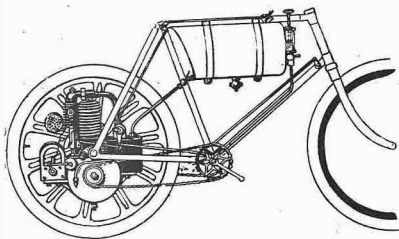
Garrard



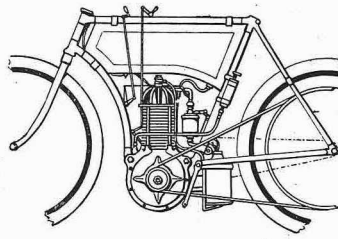
Gamage.



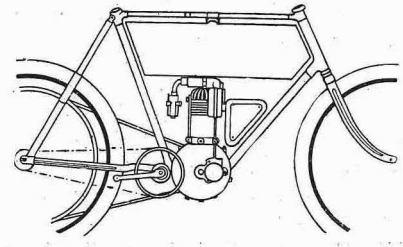
Jesmond.



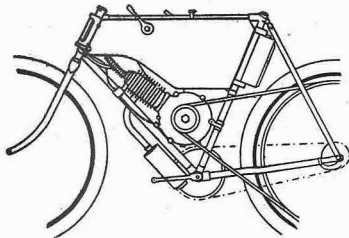
Singer



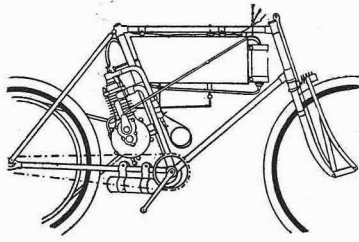
Crypto



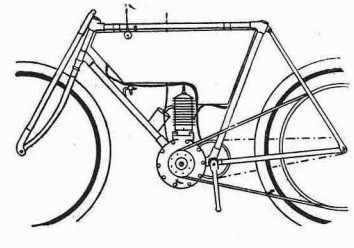
R. & P



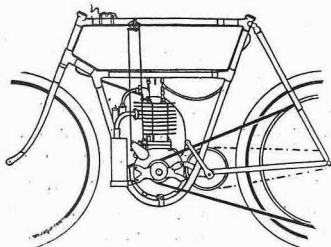
Wearwell.



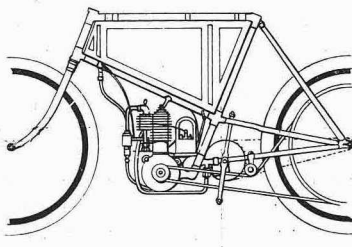
Celeripede.



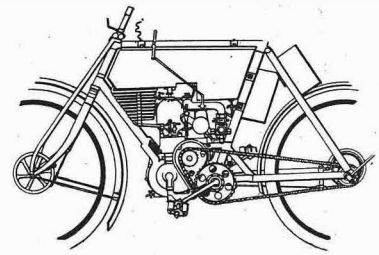
Bradbury.



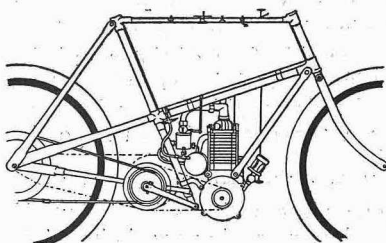
Clarendon.



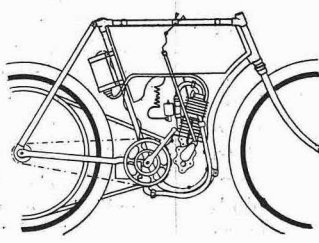
Davison.



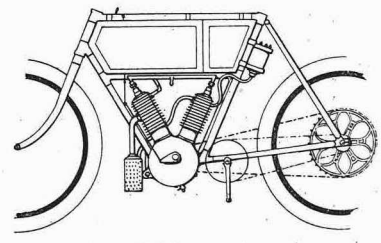
Entfield.



Raleigh.



Kerry.



Princes

gauges let into their sides, by which the quantity of oil can be ascertained.

The Enfield.—This combines the original features of water cooling and chain driving from the countershaft. The water jacket is furnished with fluid from a tank in front of the petrol tank, cooled by passage through a series of radiating tubes underneath the tank. The usual two-to-one countershaft on the engine is replaced by a six-to-one gear carrying the driving sprocket for the chain, and the one chain serves also for the pedal drive by passing down underneath the pedal crank sprocket. The necessary elasticity is imparted to the drive by means of a spring clutch inside the countershaft.

The F.N.—In order to use a motor of greater power, with flywheels enclosed in the crank case, the F.N. engine is now situated in front of the crank bracket, instead of above it, and the lower front tube of the bicycle is made with a loop, inside which the cylinder is accommodated, thus avoiding excessive lengthening of the frame. The sparking plug, which in this machine was last season placed centrally over the piston, is now shifted to a position immediately under the induction pipe, the central position having been found to expose the sparking plug points to splashing of lubricating oil.

The Gamage.—This is peculiar by reason of the crank case being built into the frame, with the pedalling gear in front of the engine. The control is by twisting the handles. There is a Transatlantic look about the machine generally, but if it be American it is the best American machine we have seen.

The Garrard Two-speeder.—With the Clément-Garrard motor situated as usual on the top of the lower front tube, this bicycle is driven by chains, one of which takes the drive from the motor pulley down to a two-speed gear situated in a hanger bracket bolted in front of the pedal bracket, whence a second chain conveys the drive to the road wheel pulley. The reduction in speed is twenty-five per cent., the ratios of engine drive to road wheel being as eight to one and six to one respectively.

The G.M.C.C.—It was generally remarked at the show that there seemed to be "a lot of machinery for the money" about the bicycle exhibited by the General Motor Car Co., for while the price is low the machine contains not only a friction clutch drive, but a free engine which can be started by the pedal before the bicycle is moved. The tubes are all built into the crank case and tightened by turret nuts. There is a reducing gear in a box—cast in one with the pedal bracket—on the left-hand side, whence the power is transmitted through the pedal crank spindle to a clutch sprocket on the right-hand side, the pedal gear with free-wheel clutch being enclosed in the same bracket, so that a single chain conveys both the engine drive and the foot power to the friction clutch in the road wheel hub.

The Ixion.—Fitted to the Primus motor bicycle, whose makers still adhere to the method of driving the front wheel by means of a friction roller on the tyre, the Ixion two-stroke motor cannot be said to have made its *débüt* under the most favourable conditions. The principle of a valveless motor exploding at every down stroke of the piston deserves more consideration than can be given to it by means of a cursory examination at a show. Suffice it here to

say that the engine is hung upon one side of the front wheel tyre, the flywheel upon the other side of the front wheel tyre, with a roller in between bearing upon the tyre, so that both belts and chains are dispensed with.

The Jesmond.—This is another water-cooled engine, very firmly bolted into projecting lugs in a strongly designed double U-frame. The water is contained in two small cylindrical copper boxes mounted upon either side of the steering head, and circulates through a coil of five convolutions with radiating ribs, fixed in front of the head.

The Kerry.—One of the few motors placed with the engine inclined forward but supported inside a U-tube; the crank case is made with extension lugs on each side to clip around the frame tube.

The Lamaudière.—A good example of a type of motor popular across the water, the engine itself taking the place of the usual diagonal tube in a direct line from the saddle cluster to the pedal crank bracket.

The Morris.—A large engine is vertically placed higher up than usual, supported by lugs on either side of the upper part of the crank case, fixed to the frame tubes, as well as clipped below to the U-curved tube.

The Princeps.—It is significant that this, which was one of the only three chain-driven machines on the market less than a twelvemonth ago, is now made with belt drive, although the chain drive is retained for those who prefer it, and the position of the engine is lowered to the fashionable place. In two-cylinder form the engine is neatly disposed in the same position, but with the cylinders necessarily sloping away from each other.

The Royal Sovereign (not illustrated).—With a very long wheelbase, this bicycle carries its motor vertically in a frame formed of two parallel members horizontally connecting the back forks with the front tube, a bridge on the belt side supporting a bearing outside the belt pulley. The surface carburetter is fitted with numerous baffle plates, to reduce the splashing and surging about of the petrol, and the muffler consists of a straight tube perforated with numerous holes covered over with a tightly-wound coil of wire.

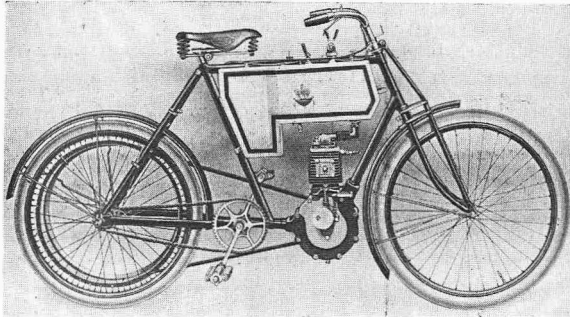
The Raleigh.—This is full of novel points. The frame is a cross surrounded by a diamond, with the Aachener engine geared to a sprocket running freely on the pedal crankshaft by means of a chain, whence the transmission to the driving wheel is through a belt. Thus the drive is geared down in two steps. All the operating levers are connected with the handles, so that the control is complete without letting go of either handle.

The R. and P.—Another bicycle with the crank case forming an integral part of the frame, the crank case being cast in one with the pedal bracket, and having projecting lugs into which the frame tubes are brazed, one side face of the case being detachable for the insertion of the engine. A large triangular silencing box is, we think, wrongly placed where it will screen the engine from the cooling influence of the air.

The Royal Mail (not illustrated).—This has a cylinder cast in one piece with its head, but the valve box detaches by unscrewing two bolts. The flywheel is outside. It has the Garrard-Maxfield contact breaker, designed to ensure a quicker break

than usual by means of a spring-controlled plunger placed tandem to the cam-actuated plunger. On the road wheel hub is a locking clutch, which can be shifted to free the road wheel from the drive, so that the engine can be run on free from the wheel. The controlling levers are placed conveniently on the handle-bar by a simple arrangement of connecting rods.

The Rex (illustrated on this page).—One of the first motors to be made in England, this is noticeable by the rectangular plan of its radiators. The muffler consists of several perforated baffle plates through which the exhaust is ejected, mounted upon the side of the valve chamber itself instead of being



The Rex motor bicycle

connected thereto by an exhaust pipe. The crank case is fixed in a rigid cradle, which surrounds two-thirds of the case on both sides, the same set of bolts that secure the case to the cradle also serving the purpose of holding the two halves of the case together.

The Singer.—Whilst retaining their preference for the original Singer wheel, the makers have introduced an alternative pattern in which the same engine is mounted inside a wheel having spokes on but one side, so that, the other side of the engine being open, a chain can transmit the power forward to the pedal bracket, whence it returns on the opposite side of the bracket to a sprocket on the road wheel hub, inside which is a spring wheel imparting the desired elasticity to the drive.

The Starley.—The practical outcome of the Accles-Veuille-Starley combination is a belt-driven motor containing many good features, the Accles-Veuille worm drive having been found impracticable. It is the only motor bicycle with a gear case over the pedalling chain. The engine is put together on an interlocking system free from screws and keyways.

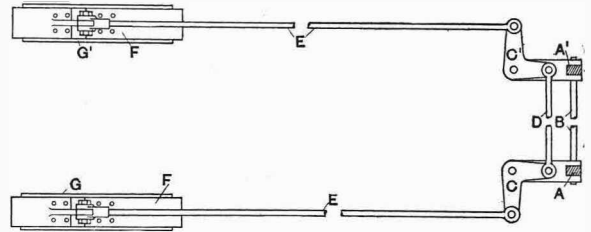
The Wearwell.—This engine is somewhat nearer the horizontal than any other, the crank case being clipped inside the frame, and the top of the cylinder clipped to the front tube.

The Whirlwind.—Made in several patterns. The most interesting is the water-cooled D.E.C. engine of 3 h.p., the cylinder being completely water-jacketed. The water tank is situated in front of the tank, where it meets the air.

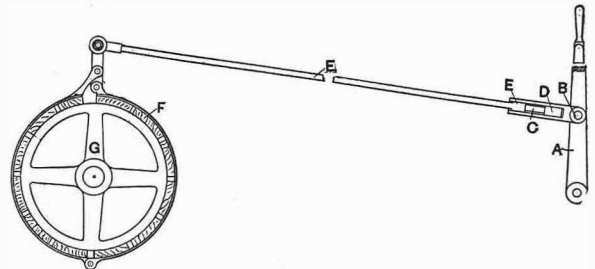
Captain Wells wishes to have motors separate from the fire engines or vans, and the Brigade Committee have asked the Council to sanction the purchase of an experimental tractor costing £750, with a view to buying six more at £600 each.

THE ARGYLL BRAKES.

The annexed illustrations depict the road driving wheel brakes as fitted to the latest pattern two-cylinder Argyll car. The compensating levers C C¹



are arranged on the side lever A and its opposite lever A¹, which are in connection through the shaft B,



and an adjustment nut is fitted to the compensating rod D. The brakes are applied by the rods E E operating the bands F F on the drums G G. The whole of the brake gear is in tension, and steel rods replace wires, as are more generally used.

Indian officialism has apparently set itself against the autocar, as it is to be made subject to the Boiler Act, and a pronouncement declares that none shall use an automobile unless he be accompanied by a third-class engineer.

* * *

At the Marylebone County Court, London, on Monday, before Judge Stonor and a jury, Charles Ben Butwright, 5, Connaught Place, Bayswater, W., sought to recover £10 from Mr. Frederick Hemsley, 16, Park Parade, Harlesden, N.W., for personal injuries and damage to a bicycle, said to have been caused through the defendant's negligent driving of a motor car. The collision occurred at the junction of the Slough and Windsor roads, and had been the subject of a prosecution, in which the charge against the defendant of exceeding the legal limit had been dismissed. Lt.-Col. Crompton had tested the car, which was only a small voiturette, and found its maximum speed was only ten miles an hour, and its ordinary speed eight. In rounding the corner in question defendant said he was only travelling at six miles an hour, and the cyclist, who met him on his wrong side, lost his head. Notwithstanding all this, and the intimation from the judge that the balance of the evidence was by far in favour of the defendant, the jury returned a verdict for plaintiff. Mr. Staplee Firth, defendant's solicitor, asked for a stay of execution, with a view to an application being made for a new trial. As this is a matter of importance to automobilists in general, it is perhaps not too much to suggest, seeing that defendant is a poor man, that the case should not be allowed to fall through for lack of means.

PROPOSED AUTOCAR LEGISLATION.

BY G. LACY HILLIER.

There has been considerable discussion concerning the acceptance by the Automobile Club of certain proposals made by the Hon. Scott Montagu with regard to the numbering of autocars.

The proposal to number bicycles was a hardy annual for many years, yet in those early days, when cyclists were young and lacking all influence in public affairs, they successfully resisted the scheme. The ground they took up was sound. "A bicycle," it had been decided, "was a carriage within the meaning of the Act." The bicycle was its owner's "carriage"—his private carriage—and unless all private carriages were to be numbered like hackney cabs, the bicyclist objected to his bicycle being so numbered, and objected successfully.

Surely the users of autocars, possessing more influence and more weight than bicyclists did twenty-five years ago, should resist the proposal instead of endorsing it as a few do.

Certain minor objections may be first considered. I use the expression above, "numbered like hackney cabs," but does anyone suppose that the police will be content with a small number-plate? A small plate may be legible if the car is stopped, but the police will demand a number visible when the car is passing or going away from an observer. What size will the number or numbers have to be? Cars themselves are often absolutely invisible from behind on a dusty day.

Presumably, the police will be able to summon the driver of a numbered car without stopping it at the time of the alleged offence; and rebutting evidence, either of driver, occupants, or lookers-on will be unobtainable. The watch-holding constable will be able, of course, to swear that he was observing the car, whereas the passengers in the car will have to admit that they had no special reason to particularly note the pace at the time of the alleged offence. Truly a tremendous weapon to put in the hands of the police.

What are users of autocars to get for this concession on their part—this "giving away of themselves" absolutely and finally? They are promised the removal of the twelve miles an hour regulation, conditionally on the more stringent enforcement of the "driving to the danger of the public" clause.

Let us assume for the moment that this is done. Police persecution will at once become rampant. *A policeman is one of the public*, and a car driven along a straight road without a single person in sight is being driven to the danger of the public if a hidden constable crawls out of the ditch and stands in the road. It is not consciousness of wrongdoing that makes a motorist see in every ditch an officer; where prejudiced magistrates encourage police persecution of autocar users, every ditch on every good stretch of road will contain an officer.

Some of your readers may consider this a far-fetched idea. Let them ponder these facts, bearing in mind that there has never been a "legal limit" for cyclists. Certain members of the Polytechnic Club were riding down Godstone Hill when a whistle sounded, and well beyond the bottom they were stopped and sum-

moned. Godstone Hill is a cutting through the chalk with high sides. The policeman who whistled was hidden in a quickset hedge ten or more feet above the road. A runaway traction engine could not have put him in danger. No one else—no representative of the public—was on the road; the first persons encountered were a long way from the hill, and the cyclists had pulled up to a crawl before they saw them. Nevertheless the cyclists were fined by an intelligent bench for "furious riding to the danger of the public." I myself was fined for a similar offence, when the only person in front of me was the constable who came out of a cottage when I was within twenty yards of it, and dismounted without any trouble before reaching him.

Without doubt the "danger to the public" clause will increase the facilities for police persecution, mainly because it is so vague. Cases do occur—rare, certainly—in which a driver with a wrecked motor car can actually convince a bench of justices that it could not possibly have been travelling thirty-five miles an hour; on the other hand, no evidence could upset the statement of a constable who said he was in danger when he stood in front of a car.

Apart from all these points, however, is one on which I am not competent to express an opinion, but upon which many autocar users want information. As they understand it, the bargain proposed is put thus: If we, the Autocarists, will assent to be numbered, we, the Legislators, will assent to the elimination of the twelve miles an hour limit from the Act.

A large number of persons who may be called the parties of the first part do not assent—many members of the Automobile Club amongst them—and they are seeking to make their voices heard, despite the fact that the official organ of the club has contained a "thrash them and send them to bed" article on the subject. The parties of the first part, then, are not agreed, and, counting members of the A.C. and non-members, the opponents of the proposal undoubtedly outnumber its supporters.

What about the parties of the second part—the Legislators (Parliament)?

The representative of the alleged views of automobilists will accept the proposal to number motor vehicles. No doubt the acceptance will be welcomed, but the question we want answered is, Will the other side of the bargain be also accepted?

Is it not possible that an amendment fixing the maximum speed at fifteen or twenty miles an hour may be proposed and carried? If it is, *can the acceptance of the numbering proposal be revoked?*

I am not learned in Parliamentary procedure, but are bargains of this sort usual or successful? There are plenty of rabid anti-autocarists in the House of Commons, just as there used to be plenty of rabid anti-cyclists. Was not one M.P. of some note going to shut certain inns in, if not the highways of, Kent, to cyclists, because a number of them used to visit one particular house on Sundays and actually looked at him and his family as he went to church? Is there any certainty that such an amendment may

not be moved and carried? If it is, and the maximum speed is put at twenty miles, is there not an absolute certainty that in the case of every motorist summoned by the police their evidence will prove to the satisfaction of the magistrates that he was going twenty-one miles an hour, just as at the present time he is proved to be going thirteen? "Tis as easy as lying."

In short, whatever is done, no amelioration of the conditions under which the autocar is used in this country will follow until a general desire to decide cases in accordance with actual facts is shown by the great unpaid. The policeman is not to blame; he has to look after himself. The constable with the best record of successful cases secures promotion as an "active and intelligent officer"; he would not deserve the second epithet if he could not recognise with "half an eye" patent prejudice when displayed by a bench of facetiously styled "justices." He plays up to that prejudice with confidence and safety; any fable he tells as to pace is accepted as gospel. Half-a-dozen competent civilian witnesses' testimony goes for naught against his glib tale. No effort is made to test his capacity to judge pace, and with few exceptions fines and costs are inflicted. His fellow constables of necessity follow his lead, and we have such exhibitions as that at Reigate some years back, when nearly four hundred cyclists were fined without a single case being dismissed—men, women, and children; the cyclist on the latest pattern, and the shop boy on a hickory-wheeled boneshaker. Whether the legal limit be fixed at fourteen, twenty-one, or twenty-eight miles an hour, it is certain that the police will

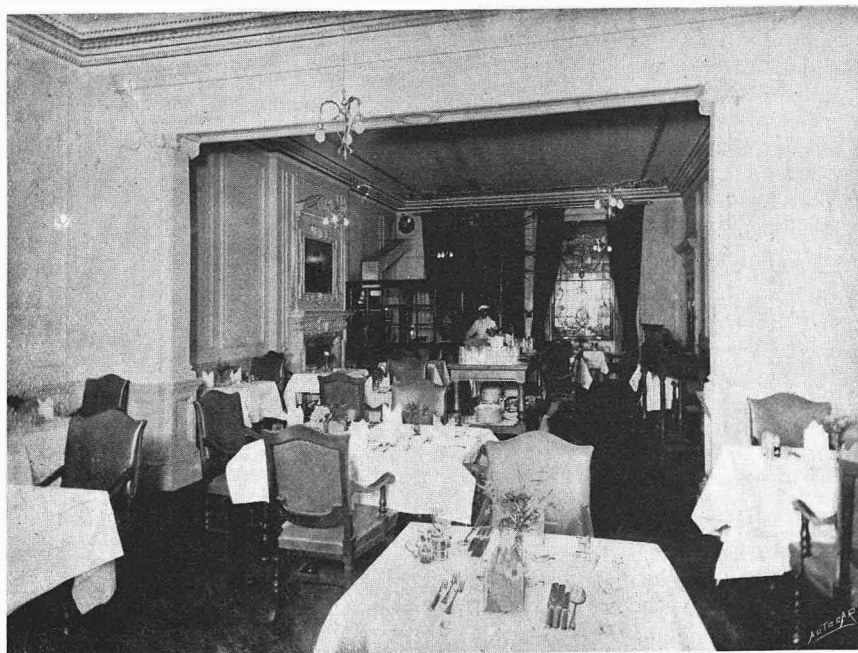
under these conditions swear to fifteen, twenty-two, or twenty-nine miles an hour, duly clocked with something in the similitude of a watch, over a distance alleged to have been accurately measured. Possibly, as at Reigate on one occasion, the police witnesses will not agree as to the distance measured, but that will not affect the result. If the "legal limit" is actually eliminated, the "danger to the public" clause will become effective, and as the constable will always be able to swear that he was in danger, with less strain on his veracity than hitherto, the magistracy will be able to pile up fines and costs, and innumerable constables will be able to boast openly, as does one Surrey policeman, of the amount with which he has enriched the court by his efforts.

Absolutely the only results which will remain should this unwise proceeding be carried out will be that the autocarist's private carriage will be decorated permanently with a number of a size to be visible under all conditions; whilst if the bargain is observed and no amendments are adopted, a further means of persecution infinitely more difficult to deal with than the "legal limit" will be provided for the use of police constables in districts where prejudiced magistrates encourage and promote the persecution of autocar users.

Overheard at the National Show. Lady (to husband): "What does 10 b.h.p. mean?" Husband: "Ten *British* horse-power. When the British say ten they mean ten; when the foreigners say ten they mean eight." (Fact.)

THE CLUB NEARING COMPLETION.

During the past few weeks rapid strides have been made towards completing the handsome and comfortably appointed premises of the Automobile Club at 119, Piccadilly, for use of members. By the beginning of next week it is probable that everything will be ready, and already a number of members have dined in the spacious and tastefully decorated dining-room overlooking Piccadilly and the Green Park. Our photograph shows this room as laid out to accommodate forty-two diners at tables seating two and four guests. At the far left-hand corner of the room is the grill divided from the rest of the room by a glass screen and marble slab counter. The walls are panelled in white, with slight gold relief, and light is provided by eight triple electric light pendants. Comfortable armed chairs in light oak, and upholstered in smooth green leather, are provided to the tables. An electrically-



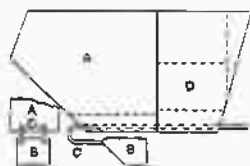
The dining-room, from a flashlight photograph.

driven fan is placed in the corner above the grill to draw out all smell of cooking and provide for proper ventilation.

USEFUL HINTS AND TIPS.

Carburettor Consideration.

Many of our readers who use motor cycles have been experiencing some trouble with their carburettors during the cold weather. On such machines as are fitted with the tank form of surface carburettor a simple method of overcoming the difficulty is to pass a small branch pipe from the exhaust pipe or silencer through the base of the carburettor.



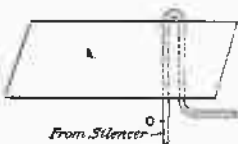
Two methods of carrying out this idea are illustrated in this column. The first depicts a form of carburettor largely in use at the present time. A is the spirit tank, the carburettor proper being the portion below the dotted line. B is a silencer from which two pipes C (more clearly shown in the end view to the left) are led through the carburettor and the case D to the rear of the seat-tube.

× × × ×

The two tubes should be of thin gauge—say, 20—brass or copper seamless tubing, bent to the shape shown in the drawing or to suit the circumstances of the case. The chief thing to avoid is sharp bends. Holes equal to the outside diameter of the tubing must be drilled in the silencer and in the tank itself. The ends of the tube should be a nice fit into the holes in the silencer, and at the points where they enter and leave the tank washers should be run over them and carefully soldered to the tank. These washers are of great assistance in securing a tight joint and preventing it from breaking away. If desired, a tap or plug may be fitted to close the exhaust end of the tubes to shut off the exhaust. By closing the exhaust end, a certain amount of useful heat is retained in the tubes, while the tap or plug is in the best position for operating, being prevented from jamming by the heat.

× × × ×

The second drawing shows the method of fitting a heating pipe to a simple tank carburettor. On account of its being a little more difficult to fit, it is perhaps advisable to use a single tube of larger diameter in preference to the two smaller ones. A



3/8 in. diameter tube of similar gauge to the smaller ones is sufficient for the purpose. The method of fitting the pipe needs no description, as it is plainly indicated by the drawing. The worst feature of this fitting is that all the bends necessary have to be put in after the tube has been fixed in the tank.

× × ×

These methods serve to keep up vaporisation when the engine has been started, but any roadside stoppage in very cold weather, and of sufficient duration to allow the tubes to cool, results in severe measures having to be taken to get the vaporisation started again. Cloths immersed in hot water and applied to the sides of the tank form an excellent method of starting, but this, of course, can only be practised when hot water is procurable. An expedient we adopted when "stuck" on the bleakest of bleak moors was to warm up by burning petrol

beneath the tank—a proceeding which is anything but safe unless carefully carried out. Having a tin with a few small spare parts in the bag, we used the lid of this as a burner tray, placing it on top of the silencer. A small quantity of spirit was poured into the tray and ignited, the heat from which vaporised the spirit sufficiently to give us the much desired start. A method which has been recommended, but which we have not personally tried, is to carry a small flask of petrol in an inside pocket, pouring in a little of this to start on. This does not sound very promising, however, and we should be loth to rely upon it.

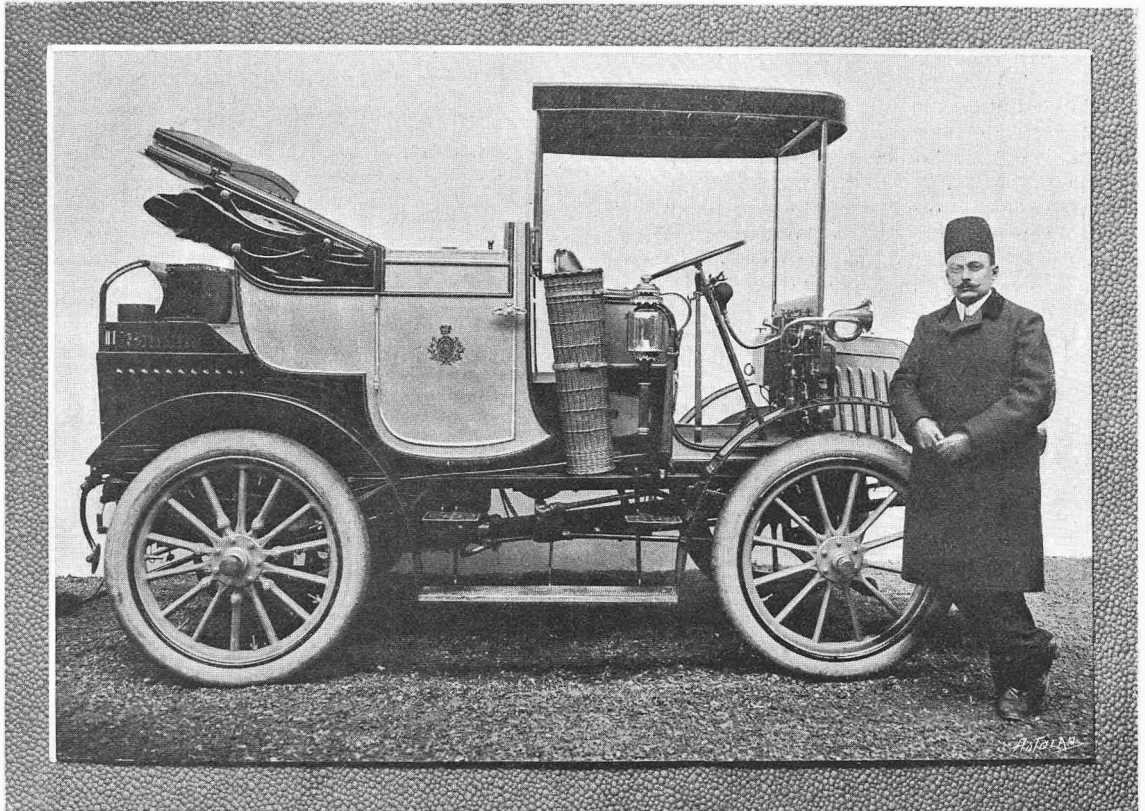
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Surface carburettors are not alone in giving trouble during the cold season, for the spray type on cars as well as on cycles is liable to give up when least expected, i.e., while running. The reason of this is that at certain temperatures snow forms in the carburettor, choking the passage to the engine. Cold head winds and rapid travelling are conditions at which snow will readily form, this being caused by the rush of cold moist air being met by the still colder petrol spray. There are many ways of preventing this occurring, by far the best of which would be a hot jacket, if makers generally would provide it. This could be connected to the exhaust pipe, and a tap provided so that the heat could be regulated to suit the conditions of the moment. Another way, and perhaps a better one, would be to run hot water from the cylinder jackets around the carburettor. This would have the advantage of giving a regular heat, for after all the efficiency of heating from the exhaust is a matter of back pressure. The greater this is, the better the heating will be, as there will be a greater rush of spent gases, while with a lesser pressure there is lower heating value, as the gases will take the line of least resistance; therefore there is little going through the branch for heating purposes. By keeping the carburettor close to the engine, sufficient warmth may be thus obtained to keep it working until extreme cold is reached. In the same way, the air intake may be formed with a bell mouth and placed close to the exhaust pipe, though this method is not always satisfactory in really cold weather.



A horseless carriage.

CONTINENTAL NOTES AND NEWS.



The Shah of Persia's new 50 h.p. Gardner-Serpollet steam car

The Shah's New Car.

One of the cars ordered by the Shah of Persia during his last visit to Paris has just been finished at the Gardner-Serpollet works and despatched to Marseilles, where it will be shipped for Teheran. It is in the form of a brougham, or rather of a coach of the Louis XVIII. period, and the gilt copper lamps and accessories are all designed and finished in this style. The body is yellow, picked out in blue, and the armorial bearings of the Shah are painted on the sides. The lamps are lighted with acetylene. Upholstered in blue, the coach is fitted with all sorts of requisites for smoking, writing, and for fixing a watch, thermometer, etc. The Shah signals to his mechanic by an electric button which shows the name of the place he wishes to go to on a board in front of the driver. At night the board is lighted electrically, and the name of the town appears red, while each change of name is accompanied by the ringing of an electric bell to draw the attention of the mechanic. The steering connections are in gilt copper, and the whole arrangements are of a very luxurious character. Propelled by a 50 h.p. Serpollet engine, and weighing a ton and a half, the new coach is the biggest and most powerful vehicle the Shah possesses, to say nothing of its being the fastest, though, in view of the Persian monarch's well-known antipathy to fast travelling, it is doubtful whether this royal coach will often have an opportunity of showing its best pace.

Autocar Speed in Paris.

For about three months past, a commission of the Municipal Council of Paris has been drawing up a new set of rules governing autocar traffic in Paris, and they are naturally being awaited with a good deal of interest, for the situation of automobilists is becoming so intolerable that there is serious risk of the industry being imperilled unless something is done to modify the excessively stringent application of the existing regulations. At present the legal limit of speed is fixed at twelve kiloms. in Paris and six kiloms. in the Bois de Boulogne and the Bois de Vincennes. As a matter of fact, the limit is a purely arbitrary one, which is left to the judgment of the police, and it is absolutely impossible for an automobilist to know how fast he is allowed to drive without running the risk of being summoned. The traffic in town is under the jurisdiction of the Prefect of Police, who has given instructions that a certain tolerance should be shown towards automobile drivers, except when they are manifestly driving to the danger of the public, such, for example, as in thick traffic or at crossings. In the outlying thoroughfares, where the streets are broad and partly deserted, there is little danger in driving at twenty kiloms. unless the owner should happen to catch the eye of a policeman who is anxious to distinguish himself. As a rule, however, it may be said that in most parts of the city autocars are not unduly interfered with unless the speed is obviously excessive. But once in the Bois, or in the avenues

leading thereto, the scene changes, for the management of the traffic here is under the direction of the Prefect of the Seine, who has decreed that autocars are not to travel at more than six kiloms. an hour, while in some parts even the limit is reduced to four kiloms.—that is to say, less than an ordinary man's walk. Under these circumstances, it is really difficult to drive in the Bois without getting stopped by cycling policemen, who are told off specially to chase automobiles, and as bicycles are not usually sufficient for the purpose one of the policemen has recently equipped himself with a motor cycle. What makes matters worse is that a summons is equivalent to two or three days' imprisonment. This is almost invariable, and it is easy to imagine that once a busy man has been put to the enormous loss and social indignity of being incarcerated with thieves he begins to think the pastime is too dangerous, with the result that another customer is lost to the automobile industry. The matter was recently taken up in the Municipal Council of Paris, where several members have protested strongly against the present illogical method of fixing a speed limit. One of them holds that it is absurd to fix the present limit of seven and a half miles an hour in Paris, where the conditions of traffic vary not only in different parts of the city, but also at different hours of the day, and while in some cases the limit may be too high in others it is much too low. For instance, an autocar can only crawl by a crossing where the traffic is particularly heavy and would be liable to cause serious accidents if it were driven up to the legal limit, while it is manifestly unfair to keep the speed of autocars down much below that of horse-drawn vehicles in big outlying thoroughfares where there is at times scarcely any traffic at all. The member also made a comparison between the speed of autocars as regulated and the speed of horses, which often travelled up to fifteen kiloms. an hour, as against the twelve allowed for autocars, and yet the public were so accustomed to the horse that it did not regard it as excessive driving. The remedy suggested was to raise the speed limit to, say, fifteen kiloms. in town and in the Bois, but the drivers are to regulate their speed according to the condition of the traffic, and the police are to be entrusted with the duty of estimating whether the driving is dangerous. At the same time, it is hopeless to leave the task of estimating speed to the average policeman, and it is therefore proposed that a special brigade should be created. They should pass through a short apprenticeship in automobile factories and should possess drivers' certificates, when it is hoped that, having a practical knowledge of the autocar, and knowing how easily it is kept under control, they will be able to exercise better judgment in the survey of automobile traffic. Whether these suggestions will be adopted may be open to question, but the Municipal Council thought they were interesting enough to refer them to the commission.

Last week we referred to a Wolseley car having been sent over to run a trial against the watch on the Dourdan record road. This was not the case. The vehicle was one of the General Motor Car Co.'s cars—the same machine with the long beak to the motor bonnet which we illustrated last week on page 560.

Correspondence.

SOLIDS V. PNEUMATICS.

[2692.]—It would be interesting to me to know what make of solids "A Devon Member A.C." has on his Wolseley car, and the size of them.

I have solids on my Miesse 6 h.p. steam car which have not been too satisfactory in the short time they have been on the road.

As I intend taking a car to the tropics next year, I am greatly interested in the subject of "solids," which I have used on my Miesse carriages for the last four years.

BLAKE.

THE COMMEMORATION RUN.

[2693.]—Doubtless many of the public who are thinking of purchasing cars will think that cars are still very unreliable, judging by the few which obtained "non-stop" certificates in the recent club run.

It would be as well, therefore, that the public should understand that many cars were disqualified for performing certain of the stages under the minimum time allowed by the club rules, and it would be interesting if a list could be published of cars which were disqualified for this reason, but which otherwise went through the run satisfactorily.

The writer's car was disqualified for being one minute too early at one stage.

THE WESTMINSTER MOTOR CAR GARAGE.

L. SAVORY, manager.

BLACKMAIL—COST OF UPKEEP.

[2694.]—In *The Autocar* for November 22nd appears a letter from the Duryea Co. on the subject of "Blackmail," as they rightly term it. I am glad to notice that they did not comply with the impudent request.

I am sorry to say that their remark re the prevalence of this custom in the carriage and kindred trades is correct.

I myself and my father before me have been heavy sufferers through taking a stand against this iniquitous custom.

The motor car trade is at present in a position to take a firm stand on this question, and I sincerely hope it will do so, and decline, in no measured terms, to accede to such requests. It only requires that the trade should be unanimous on this point, and, if so, it will at once scotch this system. If it is done at the outset, while makers are in their present position, it is very unlikely that the custom will be revived later, when trade may not be so good.

I should be glad if some of your readers who have had experience of both small steam and petrol cars would give, shortly, their experiences from the points of view of—(1) Initial cost, (2) upkeep, and (3) general handiness and ease of management for owners who are not in a position to keep a chauffeur, but who would have to drive and attend to the motor themselves.

ENQUIRER.

MECHANICALLY-OPERATED INLET VALVES.

[2695.]—I saw in a recent issue of *The Autocar* a letter from Mr. F. S. Edge in which he goes into the question of automatic v. mechanically-operated inlet valves. In that letter Mr. Edge states that in the Napier engine the automatic inlet valves open under a negative pressure of only 1 lb. per square inch, and that it only requires $\frac{1}{16}$ in. travel of the piston to produce this pressure, and, therefore, open them. I certainly think that Mr. Napier constructs the best automatic inlet valves, but I also think it would be of considerable interest if Mr. Edge would explain how this last figure is arrived at, and what the clearance and cylinder volumes are in the engine where it occurs.

As to the closing of the valves, Mr. Edge is mistaken in supposing that the advantage rests solely with the automatic system, as it is really exactly *vice versa*, and rests with mechanical inlet valves. As is generally known, automatic valves are fitted with light springs, and if these springs are too heavy the valve will not open soon enough, and if too light will not close quickly enough;

and the happy medium is a simple compromise between these two disadvantages, and is by no means correct.

With a mechanically-operated valve, however, the valve is opened positively at any time in the stroke at the point found best, and is closed likewise positively at any time; and it closes much more quickly, being fitted with a very strong spring which will even close it against considerable pressure.

As to complication. I see no reason why in a well-designed engine there should be any more complication than with automatic valves, and certainly there is no need to have separate camshaft, gear wheel, lugs, etc., as Mr. Edge states is necessary. Also I believe a cylinder head can be made quite as light for mechanical as for automatic inlet valves, and both exhaust and inlet valves, in an engine fitted with the mechanical system, are actually easier to get at, and have the great advantage that both exhaust and inlet valves may be made interchangeable.

Now, as to points not touched upon in Mr. Edge's letter. Does Mr. Napier know the value of forward lead of induction valves? and has he in his scientific researches noted the difference between diagrams of engines using automatic and engines using mechanical induction valves? for if so I think there will be no doubt which valves the Napier engines would use, and they would not be the ones that are in use at present. It is an established fact that, all dimensions, etc., being equal, considerably more power can be got from an engine using mechanically-operated induction valves than from one using automatic valves; and this fact is mainly explained by the action of the mechanical system which enables a valve to be given the necessary forward lead, so that the valve is full open when the piston begins its outward stroke, or whatever part of the whole stroke is found best, and it is closed also at the best moment, and is held full open during the whole outward travel of the piston. Obviously also, where compression is weak, the mechanical system has an immense advantage.

Mr. Edge makes it a little difficult to answer his letter owing to his first paragraph, and especially by the words, "before the English trade is led away by possibly interested people"; and I confess I think they might have well been omitted, Mr. Edge being himself interested in Mr. Napier's make of engine, using automatic valves, and at present continuing to use them. His remarks, therefore, apply directly to himself, especially as the present tendency in best practice is to use mechanically-operated inlet valves; and as many more engines will have them next year than at the present time. However that may be, let me assure Mr. Edge that I am in no way connected with any engine or car builder of any sort, and that I simply write this to put before him facts that by very simple experiment anyone can discover for himself.

To finish, let me add that I think makers who have not tried hardly realise the advantage and increase of power brought about by the use of the mechanical system of operating induction valves.

VALVES.

[2696].—As one specially interested in the above subject I have followed, with close attention, the correspondence as to the advantages or disadvantages of the above as compared with the automatic valve, but there appears to me to be one or two points that have not yet been touched upon.

Many correspondents in their advocacy of the M.O.V. over the automatic (but evidently basing their remarks entirely upon theory) lay particular stress upon the fact that the M.O.V. shall be opened *exactly* at dead centre, with the result, they claim, that the cylinder will necessarily be *absolutely* filled with a fresh charge, which would not be the case with the automatic valve. If this were always the case then nothing else would require to be said in favour of the M.O.V., as this advantage alone would more than compensate for the extra working parts employed. but, as the result of experiments I have been carrying on in my own testing shop for months past, I have found that if the M.O.V. be opened exactly at dead centre as advocated, *under certain conditions* an entirely different result will be obtained from that anticipated, and which entirely destroys this very advantage which they so strongly claim.

Supposing the cylinder from any cause whatever is not thoroughly scoured on its exhaust stroke, what takes place if the M.O.V. be opened exactly at dead centre as suggested? The result is that the remaining exhaust in the

cylinder at once rushes out through the now opened valve, and the induction pipe (which is full of gas from the last suction stroke) is at once emptied, or partially emptied, of this fresh charge, and a considerable portion of the suction stroke has to be expended in refilling the pipe. Here there seems to me something that must be seriously considered, and I have found that the longer the induction pipe the worse the result. Hence, with the almost certain adoption of the M.O.V., my reason for fitting the carburetter in my new engine as close as possible to the engine, in order that, if from any cause whatever the cylinder should not be thoroughly scoured, the effect should not be so detrimental as if I used the longer pipe.

Many correspondents also condemn the automatic valve on all points, whether of opening or closing, some even going so far as to state that this valve cannot close until the compression stroke has commenced. Is this so? I venture to state that, with a properly designed motor, and with a valve fitted with a spring of proper tension, the valve will be closed at the correct time for efficient working, but can the spring always be relied upon?

There is no doubt in my mind that with certain given conditions the M.O.V. will score, and I am convinced that whilst these conditions can be maintained an engine fitted with this device will give greater power than one fitted with the automatic valve, but manufacturers must bear in mind that in all probability after the motor has left their works these conditions may be materially changed, even to such an extent that what advantage may be derived from the M.O.V. will be reduced to such an extent that it may not be worth the extra number of working parts and cost.

I take it that we all are only too anxious to get all the possible power from our motors, and I shall be only too glad to see this matter thoroughly discussed and other points that I have not touched upon brought up.

FRANK MORRIS.

[2697].—With reference to the question of mechanically-operated inlet valves so ably dealt with in your issue of November 22nd, letter 2676, we beg to say that our experience on this point is precisely the same as that of Mr. Edge, and it seems to us that the automatic inlet valve is without doubt—and more especially in the case of cycle motors of small power—the most efficient. If we assume that the cylinder is not quite full of gas in the case of a fast running engine, the loss in efficiency is so small as to be practically negligible when properly designed inlet valves are used, namely, when the valve opening, lift, and spring are correctly made. Against the mechanical valve, we get more complications, there being an extra cam, tappet, and possibly in some designs a number of joints or places where play and noise can be made; also more power is absorbed in driving the cam and tappet in lifting the valve, which is much more than counterbalanced by any increased efficiency that can be obtained on the very small-powered bicycle motor. The ratio of this increased work bears a fair proportion to the total power developed by the engine. In addition to this there is more initial expense in manufacturing, with the result that if an increased amount is not charged for it then scamped work must be resorted to to enable the motors to be turned out at the same price as with the automatic inlet valve. By all means let us have the greatest efficiency, but at the same time simplicity and cheapness should be the keynote and aim of all manufacturers. One interesting point to notice in connection with mechanically-operated inlet valves is that some motors by well-known makers had the valves so actuated in the early nineties, so that the recent discoveries (?) of increased efficiency are rather late in the day; in those early times the device was found lacking in efficiency and safety, and was consequently dropped in favour of the automatic valve.

We noticed at the late shows that most of the firms, who formerly would have none of the float feed carburetter, but swore by the surface type, have performed the volte face, and now have none other than the float feed type; if they are right now, they must have been wrong previous to this year, because all along the surface carburetter had been advocated by them as considerably the more efficient, more economical in use, and as possessing many unstated advantages over the spray or float feed. In our experience we find that such is not the case, as for a long time now this company have fitted the now well-known type of cycle carburetter with float feed, and have arranged for

adjustment of this in their works, so that no air or gas levers are required, thus by one stroke eliminating the greatest source of trouble to the novice and also to the expert, namely, that of obtaining the correct mixture to give the best results.

With this type of carburetter perfect safety is assured under every condition of working, as there is no possible chance of back-firing, with its consequent liability to burst the tank and cause a disastrous fire.

The float feed carburetter also is most suitable for reducing the number of levers required, and we have found that one lever is all that is necessary to thoroughly manipulate the motors on our machines which we fit with such carburetters.

For the DORMAN ENGINEERING CO.,

J. W. ROEBUCK.

P.S.—Your correspondent in letter No. 2687 of the 29th ult. has evidently missed the point of the argument, as a little consideration will show him. When a stronger spring is fitted to the inlet valve it follows that less air will be taken in through the chimney of the surface carburetter, and of course if the spring is made very strong no air whatever will be taken in, consequently there can be no puff back by rebound of the air. With the light springs usually fitted the maximum amount of air is taken in through the chimney, and any increase in the strength of course reduces the quantity and the rebound when air is suddenly brought to rest by stopping at the end of the suction stroke.

MOTOR TRICYCLES.

[2698.]—At the recent National Show of Motors, etc., I was much impressed by the Singer arrangement of a 2½ h.p. motor within the front wheel of a governess tricycle, designed to carry three persons; also with its great possibilities for supplying the requirements of a very large portion of the community longing for a handy little gad-about for visiting, shopping, or running short distances from home, amongst whom are ladies, elderly and lame people, also others of limited walking powers incapable of mounting a cycle saddle, and perhaps some lazy folk. Instead of the governess car body, I would suggest a roomy bath chair, to hold two adults side by side, hung upon easy C springs behind, with suitable front spring; the floor to be as near the ground as possible for convenient ingress and egress. There should be two independent pedal brakes acting both ways. The motor should be manipulated from the seat by means of levers on the tiller steering handle, as adapted to the little Eureka, designed by Mr. Moffat Ford. The hind wheels should be so placed as to secure good wheelbase stability, and also afford a platform behind for tank, etc., and small parcels. Large solid tyres would eliminate tyre troubles, and a light canvas hood protect the riders against wind and weather. Many old fossils (like myself) would gladly welcome such a motor tricycle bath chair in preference to the cumbersome cars now prevailing, which cater only for tourists and active young people. The bath chair need not be very expensive (say within £150), and would, I believe, be used by medical men as a supplementary makeshift whenever their larger cars were suddenly stranded.

Having successfully driven my own little car I have some knowledge of the subject, and of the practicability of my suggestions, which I hope will appeal to the desire of manufacturers to provide for all sections of the public, especially when (as in this case) it can be accomplished profitably to themselves.

HENRY HARLAND, M.D.

A correspondent would be glad to know the experience of any private owner of the Roots and Venables oil car, particularly as to its speed, reliability, hill climbing powers, durability, absence of noise and smell.

A correspondent speaks highly of the reasonable charges and smart workmanship of Mr. C. Scard, of the Winton Cycle Works, Basingstoke.

* * *

The Duke and Duchess of Manchester have been making a tour in the West of Ireland. The Duke is an expert motorist, and is driving a 10 h.p. Rex.

Flashes.

The Yeovil D.C.'s autocar pace meddling was characterised as absurd at Evesham, and their absurd document was officially smothered.

* * *

Lady Viola Talbot (now "sweet seventeen"), only daughter of Lady Shrewsbury, is staying with her mother at Biarritz, and, being a keen automobilist, she is daily to be seen driving herself in her smart little car about the country.

* * *

Some time since we mentioned that Messrs. Friswell, Ltd., intended to hold auction sales of cars which would be all of one class. Next Tuesday the first of these will take place, and will be devoted to steam carriages, which will be sold under steam, and will be driven about in the building.

* * *

Lord Wolverton, Under Secretary of the Board of Trade, and Mr. William James, of West Dean Park, Chichester, have each taken out a Gobron-Brillie car for use at the Delhi Durbar. The cars are timed to run on alcohol (methylated spirits), owing to the petrol difficulty in India, but can be used for petrol if desired.

* * *

The other day, as Lord Wolseley was passing down Regent Street in an autocar, the driver left for a minute to deliver a message, when a curiously constituted constable promptly arrested the vehicle as being a conveyance without a driver. The active and intelligent person appeared somewhat crumpled on receiving name and address, and "moved on" at the double through an appreciative crowd.

* * *

Automobilists in the South of England who have perhaps suffered as much as any by the petrol carriage difficulties raised by the railway companies, will be interested to know that Messrs. F. A. Hendy and Co., Ltd., of Southampton, with praiseworthy enterprise, have started to get petrol down from London by road. Last week a traction engine and trailer brought them thirteen tons, and they tell us that any automobilists on the route can be supplied if they will make known their requirements.

* * *

The Cumberland County Council has been discussing motor cars on a motion to petition the Local Government Board to secure registered numbers and to increase the penalties for breach of regulations. One member laid down the law to the effect that it "allows a person to stop a motor car by holding up his hand." He seemed disposed to go out straightway into the highways and hedges, and, armed with the legal powers which he vainly imagined to be thus conferred upon him, stop all motor cars that came along. A local paper—the *Free Press*—takes the liberty to correct him, and at the same time puts in a good word for the motor car. Our contemporary points out to the erring one that the law only allows the privilege of stopping a motor car to be exercised by a constable or by a person having charge of a restive horse, and, by quoting the records of horse accidents which have appeared from time to time in our pages, argues that it is really the horse that must be looked after.

We have been asked to state that the announcement which was published to the effect that the identical Dunlop tyres which were used in the 4,000 miles tyre trials of the Automobile Club were on exhibition at the Crystal Palace was due to a mistake. The makers did not authorise the statement, and have written to the club expressing their regret that the blunder should have been made, particularly as they have been extremely desirous all along to avoid publishing any statement concerning the trials which should in any way be contrary to the regulations laid down by the club.

Last Thursday, in the midst of a sale at Messrs. Friswell's, when some two hundred persons were present, a fuse was burned out, and all the electric lights extinguished, leaving everyone in darkness for some ten minutes or so.

The New Rossleigh Cycle and Motor Co. have been appointed agents for the Locomobile in Edinburgh and Glasgow, and in all probability will take up the whole of Scotland later. They will not only keep a stock of the different types both in Glasgow and Edinburgh, but, what is more interesting to the automobilist, will be prepared to repair and overhaul any Locomobile that may require attention.

Mr. Joseph Taylor has given notice that on Monday next, Dec. 8th, he intends to exercise his right as a member of the public to pass over Maidenhead Bridge in a vehicle and to resist payment of toll. It was shown at the recent public inquiry that the Maidenhead Corporation has no longer the power to levy tolls, but for all that it appears to be continuing to do so, and consequently Mr. Taylor thinks it is time that the barrage of the highway was forced.

We understand that the Prunel cars, which are well known in France, are about to have a place of their own in the West End of London.



A cup presented by the King of Portugal for a ten miles motor race recently held in Lisbon. The course was a mile circuit on a hill side, being, we believe, a disused horse racing track, and several well-known cars competed, one of them being of 12 h.p., but a Locomobile won with a lead of nearly two miles. The track surface was rolled dirt, and very rough and slow.

the week of her stay in Cardiff to visit Mrs. Langtry, who was staying at Caerleon-on-Usk. Miss Jeffries declares there is no pastime which gives greater pleasure than motoring. Mrs. Langtry also is an enthusiastic motorist, and takes the greatest possible pleasure in the sport.

Fifteen autocars are owned by residents of Penarth—Cardiff's seaside suburb.



A front view of the London County Council motor fire engine. This shows better perhaps than any illustration previously published the desirability of designing a proper motor fire engine, and not a mere horseless fire engine.

of engines 5,000. The total number of cars or frames made to date is 6,000. The total number of motors made to date is 33,000; this, of course, includes motors of all kinds, from the old $1\frac{1}{4}$ h.p. air-cooled tricycle engines of some years back. The number of workpeople employed is 2,150, independent of office staff, which is about 50.

It is reported that the Darracq Co. made £90,000 profit on its year's business. The profits for the previous year are stated to be £75,000.

Mr. T. Andrews, J.P., ex-Mayor of Cardiff, the strongest advocate of the horseless carriage movement in Wales, has been compelled to resign his numerous public positions owing to ill-health.

Miss Maud Jeffries, the well-known actress who recently performed at Cardiff in the "Eternal City," utilised the motor car on several occasions during

The Motor Cycling Club, or, rather, its committee, is already arranging next season's programme, and those wishing to have particulars and application forms for membership, should communicate with the honorary secretary, Mr. G. E. Roberts, 17, Fieldhouse Road, Hyde Farm, Baltham, S.W. We note, too, that the Automobile Club is calling together the motor cycle advisory committee to suggest "what steps should be taken to encourage motor cycles during the forthcoming season."

Few people realise the magnitude of the De Dion-Bouton business, but from particulars sent us it would appear that the yearly output of De Dion-Bouton cars and frames is approximately 2,000, and that

We understand that Messrs. Lea and Francis, of Piccadilly (corner of Dover Street), are the West End agents for Mr. C. R. Base's well-known motor clothing.

* * *

Mr. Henry Fowler, M.I.C.E., M.I.M.E., whose name is so well known in connection with the Liverpool heavy vehicle trials, will give a lecture, illustrated by lantern views and models, at the Midland Railway Institute, Derby, on Tuesday next, December 9th, entitled "Heavy Motor Vehicles," an historical sketch of the rise and progress of self-propelled traffic will preface the lecture.

* * *

A new design of clip terminal for ignition wires is being made by the Dorman Engineering Co., of Northampton. To use the clip the insulation is simply slit down for about three-quarters of an inch, and the wire pulled out. This is placed in a U-shaped piece—stamped out of the clip—and pinched up tight, the insulation being replaced to cover the clipped wire. The main body of the clip is then bent round the insulation and pinched up, making a very firm fastening. The connection of the terminal is in the form of a washer in one with the clip. Like all other fittings of this kind, its weak spot is at the waist between the clip and the washer. The Dorman Co.'s clip, however, lends itself to the pressing up of a rib at this point, a method which would give it the desired stiffness. By adopting this method all the disadvantages of such fittings would be overcome, as there would be no particular place at which a "short break" could occur.

* * *

With regard to the recent climb which he made on his Sandringham car, Mr. Frank Morriss writes to point out that his vehicle has solid tyres, and adds that so far as he knows none of the other ascents of the Gas House Hill, Norwich, have been made with machines fitted with solids.



Mr. H. W. Bartleet, of Nottingham, driving his 5 h.p. Clement. Mr. Bartleet is a motorist of some years standing, having passed through the quad and motor bicycle stages. He took part in the one thousand miles' tour the memorable trip of the Automobile Club in 1900, and has followed the movement very keenly. His name will be well known to many of our readers as a contributor of more than one specially practical communication on pneumatic tyres. He is a member of the Nottingham and District Automobile Club. His tyre scrapers, one of which will be noted on the right hand rear wheel, were made out of an old dog chain, and have been in use all the year.

An automobile service has been established between the Bureaux of the Italian Chambers of Senators and Deputies at Rome and the Central Post Office. The railway station is also connected in the same manner.

* * *

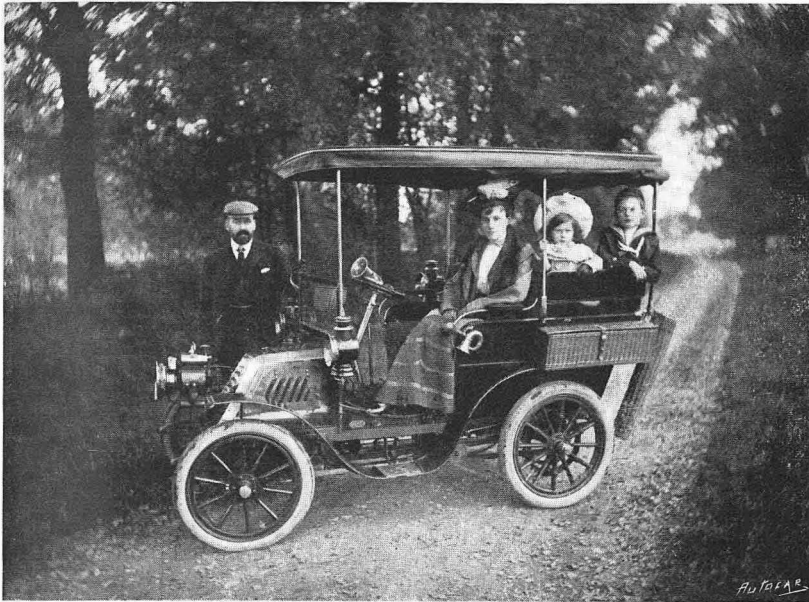
Apropos of piston rings turning until the cuts permit a blow through, the patent linked piston rings of Messrs. Wilson and Pilcher prevent this not only by the fillet placed in the cut, but by reason of the fact that the fillet is anchored by nick and feather to the piston wall.

* * *

The North-Eastern Railway Co.'s new petrol trains—which, as we recently stated, will be run as an experiment between East and West Hartlepool—will be ready very shortly. So far as exterior appearance is concerned, they will look very much like the ordinary electric tram, except that they will be self-contained, and will consequently have no overhead trolley.



It would seem that the coaling records of the navy have a shore equivalent in the smart loading practice of the Road Carrying Co. Our illustration is made from a photograph taken with a squad of the Road Co.'s men alongside one of their lorries just after they had got the load on in two minutes exactly. The lorry was about to start for Blackburn with a mixed load of provisions, weighing in all six tons. The company's scope is steadily growing. Fourteen lorries are now at work, and over 4,000 tons of merchandise have been transported by road during its short existence.



Mr. Henry W. Bowden, Mrs. Bowden, and their two children recently made a 1,500 miles' tour in North Wales on their 62 h.p. Gladiator. Except for a few tyre delays the tour was performed without a single hitch. The photograph was taken at Aylesbury soon after the journey was completed.

In a recent *cause célèbre* a witness stated that the parties drove off from the station in a motor car while she went in a trap. "Did they catch you up?" asked counsel. "No," replied witness, "we caught them up." Then there was a shout of laughter at the expense of the auto-car until it was explained that something went wrong with it.

* * *

Baron Pierre de Crawhez, who does so much for automobilism in Belgium, is now endeavouring to organise a scheme which will be laid before the Assembly General of the Automobile Club of Belgium on the 15th of December. It will include a tour in Belgium somewhat on the lines of the reliability trials which were lately held in England, every car to have an observer, who will report on the behaviour of the machine. In each town on the route there will be automobile races, hill tests, time trials, etc., and the car which scores the best record will be the winner. The president of the Sporting Committee has also suggested making an appeal to the army, so that a trial of military wagons of the same kind might be made in the presence of the authorities. The idea is a good one, and the results should be very interesting.

Baron de Forest has applied for admission to the Auto-club of Germany in view of his entry as one of the competitors of the Gordon-Bennett cup of 1903. The baron will pilot a Mercedes machine in the great race.

* * *

As a result of an agreement between the "Union Sportive Milanaise" of Milan and the Club "Andrea Doria" of Genoa, an international race for automobiles, cycles, and walkers will be organised from Milan to Genoa in the early spring. This will be the first time any tests of so long a distance have been organised in Italy.

* * *

The King of Portugal was driven in King Edward's 22 h.p. Daimler from Sandringham to King's Lynn to attend the Roman Catholic church in the latter place.

* * *

In New Zealand the regulation of the speed of autocars has been fixed on broad commonsense lines. Nothing is mentioned about speed out in the country, where it is presumably "go as you please," but in towns and villages the speed "must not exceed that of a good trotting horse."



A remarkably fine specimen of "motor body building" was recently shown us at the London showrooms of Messrs. Rothschild et Fils. It is a limousine body, which can be fitted to any chassis, and is most elegant in design and comfortable in use. Built exactly as a closed carriage, it provides accommodation for six persons, and presents a very striking appearance. The lines of the body are particularly artistic, and the seating and general arrangement leave nothing to be desired. The interior of the car is entered from the back, and the occupants thereof are cut off from the front seat by a drop window. The side windows are so arranged that they can be "closed in inclement weather and kept open in summer, thus making the car suitable for use both in winter and summer. Ample provision is made for carrying luggage, spare tyres, etc.; lockers are placed under the seats; indeed every provision is made for the requirements of the up-to-date automobilist. The car can be fitted with electric light, and is upholstered in Messrs. Rothschild's well-known style.

Fishing boats in America are now being generally fitted with petrol or electric motors.

* * *

Mr. Alfred Stevens, mayor of Kidwelly, has lately become the possessor of a fine new car.

* * *

Children, among others, have of late been eminently successful in spoiling a certain Portsmouth Road police trap by warning autocar drivers.

* * *

Messrs. C. H. Guest, Ltd., have taken, and will open early in January, a motor garage and show-rooms in the principal street in Derby, where a number of cars will be kept. The firm will stock a large supply of sundries, oils, and petrol, while an experienced staff of workpeople will be in attendance.

* * *

Owing to statements to the contrary, Messrs. J. Rothschild et Fils, Ltd., of 1, Endell Street, W.C., ask us to let it be known that they are the sister firm of the famous house of the Avenue Malakoff, Paris. At the Paris factory all their bodies are made, but the painting and finishing of the English work are done in London by men from their Paris works. In fact, two of the directors of the English company are also directors of the French house.

* * *

The annual dinner of the Halifax Automobile Club took place on Friday, November 21st. The toast of "The Club" was given by the president, who stated that the amount of pluck and energy possessed by the Halifax Club in taking to the sport of automobilism under the geographical conditions of the district was almost unprecedented, and had much to recommend it to those in other places more favourably situated. The several courses on the menu were appropriately called "Starting handle," "First speed," "Advance sparking," "Top speed," "Above legal limit," "Sideslip," "Stop," and "Lubrication."

* * *

The Vaal Motor and Launch Co., Twickenham, recently accomplished a very smart piece of work. On the 10th ult. they received an order for a 4 h.p. paraffin motor dinghey (15ft. long), which had to be strong enough to tow loaded native canoes, and yet light enough to be carried by niggers, in order to avoid some fifteen miles of rapids during an exploration of some rivers on the Gold Coast. The firm undertook to have the dinghey ready in three days. Taking a 2 h.p. motor and propeller out of a boat in course of construction, they replaced it with a 4 h.p. petrol motor, the head of which was bored out to lighten it and to increase the power. A spray carburettor was fitted, this being heated by a blow lamp for starting purposes, when necessary. This was supplied with oil by means of a pump worked by the ignition cam, the stroke of the pump being varied by a set screw holding the plunger at a given position from its actuating cam. When completed, the dinghey, carrying five persons, was launched and put through a most successful trial, the speed attained being nine miles per hour. The little vessel having thus given such a satisfactory account of itself was delivered two hours before the specified time.

Finis! A scholarly contemporary has stormed the motor position with a new verb. To travel by automobile is to "moble."

* * *

The Prefect of the French department Seine et Oise has given permission for attempts to establish records on the Dourdan road three times a week.

* * *

Last week we mentioned a tool case which had been lost near Ashford, and the Roadway Autocar Co. inform us that the owner has applied to them, and that it has been restored to him.

* * *

Mr. J. W. Brown, late works manager of the Yorkshire Motor Car Manufacturing Co., Ltd., now occupies a similar position with Messrs. Mallinson, Ltd., of Hipperholme. The latter firm intend shortly placing on the market up-to-date cars built almost entirely of steel tube and aluminium, and having neither belts nor chains. The motor will be 12 h.p., with two cylinders, governed, and with an improved method of operating the valves.

* * *

What we should imagine was a repairing record was recently accomplished by the British Automobile Commercial Syndicate. A 12 h.p. Panhard was brought to them to have new bearings fitted to the engine and new gearing, and a special request was made that the work should be done by the next morning. This was accomplished, and is a good example of what can be done in the way of repairing when a complete set of parts and renewals are in stock, and competent men to undertake the fitting up the car are at hand.

* * *

In our report of the Stanley Show we mentioned the little Rigal car which was shown by the British Germain Co. This is a little machine for two people fitted with 6 h.p. De Dion engine and three-speed gear, and although seated for two, there is plenty of room to fit a dicky seat at the back, if desired. We understand it was given a good trial immediately after the show, and that it behaved well, being driven through very heavy rain and over exceedingly bad roads without giving the least trouble. The machine strikes us as being of a type that is wanted.

* * *

The Dennis cars for next year will be made in three standard patterns. The smallest type, the 300 guineas car, will be driven by a 9 h.p. De Dion engine, and although it will have certain detail improvements, in outward appearance it will remain much as at present. The second model will be fifty guineas more, and will be fitted with a 12 h.p. two-cylinder engine of the Aster or De Dion make, and will have a longer body than the 9 h.p. single-cylinder car. Lastly, there will be an entirely new type, driven by the 12 h.p. slow-running Aster engine, and having four speeds and reverse with a wood fitch plate frame, and priced at 400 guineas. In this car many new ideas will be introduced, and it will be altogether a larger vehicle than any which Messrs. Dennis Bros. have previously manufactured. These vehicles will be shown at the January exhibition, and among them will be a motor brougham and a motor hansom.

HEAVY CAR TRIALS IN PARIS.

After being allowed to lapse last year, it was hoped that the trials of industrial vehicles carried out in Paris under the auspices of the technical commission of the Automobile Club of France would have been particularly interesting alike in showing the progress that has been accomplished during the past two years and in bringing together a greater variety of vehicles. The eighteen cars competing undoubtedly made an excellent display, but there was still a feeling that they were not entirely representative of this special branch of the automobile industry. Several firms who have hitherto taken a prominent part in the trials abstained from competing, notably Panhard et Levasor and Delahaye, and for the first time there were no steam and no electric cars. The reason for the absence of these two motive powers is perhaps not far to seek. The electric firms know very well that their cars cannot show up favourably in comparison with petrol on the score of economy, and the limitations of these vehicles are so well understood that manufacturers may think it unnecessary to go to the trouble of testing them in public trials, especially when the only real test lies in running them for the longest possible duration. Moreover, makers are apparently quite satisfied with the trade they are doing in luxurious carriages among a class of buyers to whom economy is only a small consideration. The absence of steam is more regrettable, because it seems to imply that the French makers have given up the struggle with petrol, at least for the lighter classes of vehicles. They confine themselves to heavy waggons and tractors, which at present, however, are making far less progress than the petrol vehicles. Again, heavy transport was only represented by three big lorries and five delivery vans for suburban service, all the others consisting of light delivery vans, omnibuses, and cabs for service in towns. The trials, indeed, turned out to be more particularly a test of small industrial cars. This is not to be wondered at in view of the much larger field that exists for light delivery vans, and the fact that they can be manufactured by the majority of automobile firms, while there are only a very few makers who can afford to build and experiment with heavy steam and petrol lorries which have to fulfil particularly exacting conditions as regards economy and efficiency. Petrol was the only spirit employed in the trials, and in a competition where results are based on economy makers have, of course, no inducement to use alcohol of which the consumption is invariably higher than petroleum spirit.

The trials started on November 20th, under the direction of M. G. Forestier, and lasted six days. The eighteen vehicles were entered by seven firms, as follows: The Société Prunel (of Puteaux, Seine), light delivery van; Société des Automobiles Peugeot, omnibus, suburban delivery van, and lorry; Gillet-Forest (Quai Carnot, St. Cloud), town delivery van, omnibus, victoria, and lorry; De Dion-Bouton et Cie., cab, suburban delivery van, and lorry; Vinot Deguingand, suburban delivery van; Clément et Cie., cab and town delivery van; Tony Huber (Billancourt, Seine), town van, cab, Limousine, and suburban lorry. The courses selected were the same as in the previous trials, the light and heavy vehicles being required to go over three routes twice, the former in town and the latter in



The Clement light delivery van.

the suburbs, the distance of each being thirty-seven and a half miles. The lorries, however, went over a shorter suburban route of twenty-five miles. In previous trials those who were anxious to see the cars put to the severest test complained that the date always coincided with a period of exceptionally fine weather, but last week the competitors had more bad weather than they needed—in fact, they had a variety of everything that could make the going as unpleasant and difficult as possible. On the first day there was a fall of snow, which melted in town and piled up in drifts in the suburbs. This was followed by a hard frost, which tempted drivers to defy the rigours of the law and get over the business as quickly as possible, and the frost only broke up to give place to rain, which continued, more or less, all through the trials. In town the streets were soon cleaned up, with the result that the consumptions during the latter part of the trials were low, but in the suburbs the conditions were about as bad as they

possibly could be, with the roads in a very muddy and slippery state. The first vehicle we tried was the Prunel van, weighing 1 ton 2 cwt., including load of about 9 cwt. The van is of light construction, with the underframe built up of tubes, and it is



The Peugeot omnibus.

propelled by a 9 h.p. De Dion motor, with shaft transmission to the differential on the rear axle. The Prunel cars are usually fitted with Aster motors, but the van in the trials was constructed for a customer who had specified a De Dion engine. It is always risky to run a vehicle in a trial before previously testing it, and in the case of the van, the De Dion motor only arrived the night before, with the result that, through defective lubrication, the engine began to run indifferently at the top of the Champs Elysées, and then stopped. As the trouble could not be located, the motor had to be taken to pieces, when it was found that the gudgeon pin bearing had seized. This was simply due to oversight or negligence. The run was resumed in the afternoon, and after covering about four miles between Grenelle and the Arc de Triomphe, one of the tyres punctured, which necessitated another delay. By the time the van had got to the Rue Lafayette the traffic was so thick that the vehicle had to crawl, and the going was so greasy that no attempt could be made to slip through between the carriages. We now saw the advantage of non-slipping treads, which, however, were fitted to none of the competing vehicles. Once out of the traffic the van proceeded along the Rue d'Allemagne at a good ten miles an hour, and then a little diversion was caused by the herds and flocks returning from the cattle market, the bovine tribe showing a curiosity towards the petrol van that was not only inconvenient but sometimes very embarrassing. Remembering the experience of previous years, when competitors were so apprehensive of the half-mile upgrade of fearfully bad granite setts along the Boulevard Sérurier, it was an agreeable sur-

prise to find the Prunel car take this desolate route along the fortifications without the slightest trouble. In fact, no one had a word to say against the Boulevard Sérurier. Its terrors have departed for the industrial vehicles, and this is the best practical proof of the improvements carried out in their construction. Turning off from the outer boulevard, the van made for the Rue de Ménilmontant, where there is a long and steep descent, which was rendered very awkward by the greasy state of the granite-paved road. As a test for the brakes, the descent proved interesting, and the van was steered down through the traffic with the greatest ease. On arriving at the Bastille the vehicle had done rather more than a third of the journey at an average of about seven and a half miles an hour, so that when out of the traffic the actual running must have been nearer twelve miles. The rest of the journey was accomplished without incident. The seizing of the motor on this journey was the only trouble met with by the Prunel vehicle during the trials, and it covered all the journeys in good average times with consumptions varying from 9 litres to 10.8 litres.

If the consumptions were high during the snowfall they dropped considerably the following day, when there came a nipping frost to dry the roads and stimulate the ardour of the drivers. The quantity of spirit consumed by the Peugeot lorry over the suburban routes fell from 21.6 to 14.25 litres, the Gillet-Forest lorry from 25.65 to 17.79 litres, the Huber van from 19.6 to 15.13 litres, and in all the others there was a considerable difference. On this day we took a seat in the Gillet-Forest Victoria propelled by a 6 h.p. single-cylinder horizontal motor of the firm's well-known type, governed on the exhaust by a very simple and ingenious device. The transmission is by universal-jointed shaft, as is the case with all the cars competing except the Peugeot and Vinot-Deguingand. The Victoria was the lightest vehicle in the trials, weighing only 18 cwt. with three passengers and driver. If the police had been looking out for autocars travelling at more than the legal speed we should have run the risk of many a summons. The



The Huber covered van

Victoria took the second route to the Trocadéro, where it ascended the Rue de Magdebourg without faltering an instant. This is the gradient usually selected for testing the brakes of cars qualifying for certificates. We passed one delivery van in distress on this hill, but the Victoria sailed away and rattled along the granite setts of the outer boulevards, which were then encumbered with a market. The cab twisted in and out of the traffic in a way that was convincing proof of its ease of control, as well as of the superiority of the autocar over horse-drawn vehicles generally. With scarcely a pause, the cab continued its journey with the characteristic beat of the single-cylinder horizontal motor. At Avenue Suffren a short halt was made for refreshment, and this gave time for the water to freeze in the feed pipe to the engine jacket. A little coaxing with a wire soon put things right, and the cab reached the control in the Avenue de Saint-



The Gillet-Forest Victoria.

Mandé in excellent time. The run home was equally fast and regular, and without the slightest incident. The speed averaged about ten miles an hour, which is very good for the gradients and traffic of a busy city. The consumption was 6.1 litres, and fell on two occasions to 5.8 litres. This was only beaten by the De Dion cab, weighing a ton, whose lowest consumption was 4.18 litres, though on other days it ranged from 5 litres to 7 litres. The Gillet-Forest van was exactly of the same type as that which ran from Paris to Nice in March last. Weighing with load 1 ton 9 cwt. 1 qr., the consumption was very low, being from 8.37 to 17.4 litres, and there is no doubt that, despite the prejudice which exists against the single-cylinder horizontal motor, it is by no means to be despised for industrial cars where economy and reliability are chiefly considered. The frost proved a misfortune to the De Dion lorry, which could get no further than Versailles on account of the radiator freezing. All the Peugeot vehicles ran well, and the lorry was especially economical, for, weighing 4 tons 8 cwt. with a $2\frac{1}{2}$ ton load, it consumed only from 12 litres to 16.3 litres for the twenty-five

miles. The omnibus was also fast and regular, but it lost points on the first day through the motor seizing, and it was unable to complete the run. The only vehicle put out of the trials was the Huber Limousine, which was damaged in collision the first day, and had to be withdrawn.

We tried the Huber suburban van on a very depressing day with a grey atmosphere that foretold rain, and it fell steadily all the afternoon. M. Tony Huber is a new maker who entered his first lot of vehicles, all propelled by the same type of motor developing 7 h.p. The engine is of the two-cylinder vertical type of very simple construction, and power is transmitted by a universal-jointed shaft. Excepting the Limousine, the Huber town vehicles performed well, but the lorry was a failure through its carrying too great a load for the power. About 10 cwt. were transported in a van weighing a ton. It was a wretched journey from Paris to

Bezons over the greasy paved roads, and for safety the vehicle had to be driven on the second speed gear. Beyond Bezons an attempt was made to travel on the third speed to Maisons Laffitte, but the motor was running very poorly, and on a road freshly laid with stones the van came to a standstill. Once out of this difficulty fair progress was made through the Forest of Saint-Germain to Poissy, but on the run to Saint-Germain the pace dropped to such an extent that a halt was necessary to overhaul the engine. The van thereupon ran more satisfactorily to Port Marly, but on getting to the foot of the Cœur Volant, which is the *pièce de résistance* on the suburban routes, the van struck work, and nothing could coax it into making a start up-hill. Half of the load had to be taken out, and, thus lightened, the van got to the top, and after unloading the remainder it returned for what had been left. Altogether, the unfortunate driver and the equally unfortunate observer were an hour and a quarter in negotiating the gradient. Meanwhile, the Vinot-Deguingand had climbed up steadily, and the De Dion and Gillet-Forest

lorries had gone down with even greater facility. For the rest of the way the going was easy, and the Huber van partly atoned for its previous indifferent behaviour. As we have said, the Huber van failed entirely on account of its being under-powered, and we believe that the maker has decided upon doubling the power of his engines for suburban vans, though the two-cylinder motor is evidently quite sufficient for lighter loads. The motor is a good one, of very simple and robust construction, and it is probable that with improvements suggested by the trials it will show up more prominently in the future. For its first appearance in a trial the Vinot-Deguingand van ran well, but its consumption was rather high, ranging from 16.1 to 19.1 litres. The vehicle is propelled by a two-cylinder vertical motor, and its weight with load was 2 tons. The two Clément vehicles, with the firm's two-cylinder vertical motors, were well-constructed and handsome cars, but they were beaten in point of economy by the single-cylinder engines.

On the following page we give the judges' awards in the several classes.

CABS.—Gold medal, De Dion-Bouton; plated medal, Gillet-Forest; silver medal, Clément et Cie.

OMNIBUS (four seats).—Bronze medal, Tony Huber.

OMNIBUS (six places).—Gold medal, Gillet-Forest; silver medal, Peugeot.

DELIVERY VAN (500 to 750 kilos.)—Gold medal, Gillet-Forest.

DELIVERY VAN (350 to 500 kilos.)—Silver medal, Prunel.

SUBURBAN DELIVERY VANS (carrying more than 750 kilos.)—Gold medal, Peugeot; plated medal, De Dion-Bouton; bronze medal, Vinot-Deguingand.

LORRIES.—Gold medal, Peugeot; silver medals, Gillet-Forest and De Dion-Bouton.

The trials have shown that if there have been few important structural changes in industrial cars during the past two years the vehicles have, at any rate, undergone a notable improvement in the way of reliability and economy, and the fact that seventeen out of eighteen cars should have succeeded in going through the ordeal is the most satisfactory evidence of the progress made in the meanwhile, especially in view of the exceptionally unfavourable conditions under which the competing cars had to run. At present there are vans and lorries that can certainly be employed with advantage by the commercial user, but it is clear that the best and most suitable type of vehicle has yet to be evolved. There are many things to be cleared up before it can be said exactly what this type should be, and as this can only be done by periodical trials and tests, it is to be hoped that these competitions will be held more frequently in the future, and will be more actively supported by manufacturers themselves.

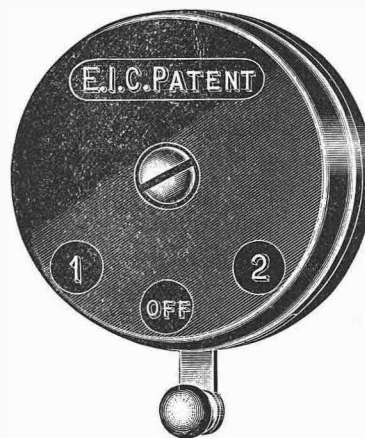
The knotty point has been settled at last, and the exhibition of mechanical traction organised by the "Chambre Syndicale de l'Automobile" is to be held in February, as desired by the Automobile Club of Belgium. The Chamber has given way in order to secure the patronage of the club, which declined to assist if the exhibition were held in April, as originally fixed by the Chamber, declaring that date too late in the season to be of any practical and commercial use. The Chamber's hesitation to hold the show in February—a very cold month usually in Brussels—was quite understandable, for the hall at the Park du Cinquanteaire, which is the only place available for such a monster gathering of machines and their adjuncts, is so vast that it is quite impossible to warm it in any way, and the syndicate feared that an arctic temperature would greatly affect the gate money. April would also have allowed Easter visitors, who flock to Brussels in great numbers, to have examined the latest inventions in automobiles, so, though the arguments advanced by the club were sound, those of the Chamber were also weighty. However, the Chamber, seeing the immense loss to them the lack of patronage by the Automobile Club of Belgium would entail, have in a meeting specially convoked unanimously agreed to meet the club's wishes, and the exhibition, which is sure to be of exceptional interest, will be held in February next. It only remains to hope that the clerk of the weather will be kind.

GOOD WORK BY THE MOTOR UNION.

The Motor Union is neither sufficiently advertised nor adequately supported in view of the good work it carries out from time to time on behalf of automobilists. Last week we referred at some length to the inquiry by a representative of the charity commissioners into the question of the Maidenhead Bridge tolls, and dealt particularly with the part played therein by Mr. Staplee Firth, who, however, we did not mention, was instructed by the Motor Union. The strenuous representations made at this inquiry by the solicitor-in-chief for automobilism have already borne fruit. Mr. Firth showed conclusively that the maximum sum the Corporation of Maidenhead was entitled to levy upon an automobile for the passage of the bridge was twopence. From the fact that the Corporation decided on Monday last to reduce the toll for automobiles to that figure it is evident that Mr. Staplee Firth's facts and arguments were well arrayed. It should, we think, be generally known that any automobilist may become a member of the Motor Union by payment of one guinea, and seeing the kind of work in course of performance by that body in the interests of all, every car owner should blush to remain without the pale of membership. Cheques should be sent to the secretary of the Automobile Club, 119, Piccadilly, W.

A NEAT SWITCH.

The Electric Ignition Co., of the Unity Works, Highgate Street, Birmingham, are now putting two particularly neat switches on the market. They are in black ebonite, and form a natty adornment rather than otherwise wherever fixed. One switch is for use where only one set of accumulators



is carried, and the other where a spare set is taken. The price of the single-way switch is 4s. 6d. and the two-way 5s. 6d. The switch lever in the latter, which is in brass, and is seen below the ebonite block, carries at its central end a square crosshead, in each end of which is fitted a little spring-controlled brass plunger. When the lever is in the "off" position, the plungers are held between two ebonite-ringed studs, and when turned to 1 or 2 the plungers are brought into contact with the terminals corresponding to either No. 1 or No. 2 set of accumulators. When spare accumulators are carried, it is much more economical, besides being at times very convenient, to switch off from one set to the other. It will frequently save time and trouble in testing plugs, etc., when run-down accumulators are at the root of any trouble.

OIL MOTOR CARS OF 1902.

(Extracts from a paper read before the Institute of Mechanical Engineers.)

BY CAPTAIN C. G. LONGRIDGE, M.I.MECH.E.

(Concluded from page 558)

Not satisfied with the sufficiency of these results, the author questioned Messrs. Carlless, Capel, and Leonard as to the temperature at which petrol vapour and air would ignite. On 29th August they replied: "From our experience we should have thought it would be impossible for a mixture of petrol vapour and air to ignite, except on the application of a light." He then addressed an inquiry to Mr. A. Phillips, of Reading, as to the temperature of premature ignition in air-cooled motors. The answer was: "From practical experience with air-cooled motors I find that explosion usually takes place when the walls of the explosion chamber are just below red heat."

There are, therefore, the following phenomena:

1st. Failure of petrol vapour and air to ignite at even partial red heat.

2nd. Ignition of lubricating oil under similar conditions.*

3rd. Automatic ignition of petrol charges in water-cooled motors at comparatively low temperatures.

4th. Similar ignition in air-cooled motors at higher temperatures. The conclusion to which these phenomena point is, that the automatic ignition of petrol charges is due, not to compression or temperatures attainable under running conditions, but solely and directly to the ignition of the lubricant employed. It takes place at a fairly low temperature in water-cooled motors because the oil used has a comparatively low flash point; and it occurs in air-cooled motors at a higher temperature because the lubricant employed has a higher flash point.

Turning for a moment to the lubricating oils in common use with water-cooled motors, the following figures are typical:

Flash point.	Burning point.
40° to 450° Fahr.	460° to 550° Fahr.

If the author's suggestion be correct it might be supposed that three results would be noticeable:

1st. Premature ignition would be more frequent when excessive lubrication is employed.

2nd. It would be continually occurring with lubricants of which the flash point is below 600° Fahr.

3rd. It should leave evidence of its occurrence in the form of carbon deposit.

The first result is distinctly noticeable. The second and third results would not necessarily follow. As Mr. H. B. Case, Managing Director of the Vacuum Oil Co., recently observed to the author: "The assumption that decomposition begins at burning point may be accurate, but practice seems to show that decomposition does not go far enough up to a considerably higher point than the burning point to cause a deposit of consequence. This seems reasonable in view of the fact that the flash and burning points are determined by an accumulation, during a considerable period of heating, of enough vapour to flash or ignite; and, in practice, the vapour escapes, as it is driven out of the oil. After one flash an oil will go to a higher temperature before another flash occurs; and, if at the burning point the flame is blown out after ignition, the oil will go to a higher temperature before it will ignite again. The period of time which will elapse before another flash or a re-ignition occurs varies with the character of the crude petroleum from which the oil was made, and the processes of refining. The wide variation in these two things makes it impossible to deduce accurately from what one oil does, under given conditions of service, what another oil, even though similar in tests, will do under the same conditions." From this it will be seen that to produce the results in question three conditions must be fulfilled: There must be sufficient time for decomposition; sufficient oil to generate

enough vapour to flash; and sufficient continuous burning to cause any deposit of consequence. In practice these conditions are not so frequently present. Excluding the suction stroke, when the temperature is too low for the purpose, the duration of oil exposure to vaporisation or decomposition in the presence of air is confined to the compression stroke. The time factor is, therefore, very short. Unless indeed oil vaporisation is continuously proceeding between the hot surface of the piston and the cylinder wall. On the other hand, continuous burning is or should be confined to the working stroke; very little carbon, therefore, should be formed. On this point Mr. Veitch Wilson, Chief of the Lubricating Oil Department, Price's Patent Candle Co., on 9th September, wrote to the author: "The question as to what we may attribute the tendency of gas-engine oil to carbonise is an exceedingly difficult one, and suggests a prior question, viz., whether the carbon found in gas-engines proceeds from the fuel (gas, oil, or petrol) or from the lubricant. From data before me, supplied by the authorities already referred to, I think that I am correct in saying that, in the case of a gas-engine, the relations of gas and of lubricating oil used, gas being reduced to actual weight in accordance with its known specific gravity, are about 96 to 97 per cent. of gas against the balance in lubricating oil. Analysis shows that the composition of town gas, or of gases from mineral oil or from spirit, closely approximate one another, viz., hydrogen, say 84 per cent., carbon about 16 per cent.; and, on this assumption, it seems not unfair to suppose that the bulk of the carbonaceous deposits which are found in gas and oil-engines is due to the fuel rather than to the lubricant." If this view is correct, lubricating oil, as it undoubtedly flashes during the explosion stroke, might also occasionally do so during the compression stroke, without betraying the fact by any material increase of carbon deposit.

The arguments that ascribe premature ignition to the flashing or burning of the lubricant, might be countered by ascribing it to incandescent carbon in the cylinder or ports. It is quite possible that this also may be a cause of pre-ignition. But it does not fully meet the case. As incandescence would be continuous, it should also lead to continuous pre-ignition; and should make pre-ignition independent of the amount of lubricant used, but the reverse is the case; it should confine premature explosion to cases where such deposit is present, but this is not in accordance with fact.

Speaking with the reserve due to imperfect study of the problem, the author inclines to think that low-flash lubricants are a cause of premature charge-firing. The easiest way out of the difficulty, therefore, would be to use only oils of the highest obtainable flash point. Unfortunately the oils of this description now on the market are extremely viscid. This gives rise to two fresh difficulties: one, the feeding of such oils into the cylinder; the other, the spreading or dispersion of the lubricant within the cylinder. The first difficulty could be overcome by a mechanically-operated lubricator, such as Messrs. Snowdon use for their "Sinol," a graphitic lubricant of high viscosity. The second is thus described by Mr. Case: "An oil fed into steam is blown, by the velocity of the steam, into minute particles, which are carried through all the steam and deposited on all surfaces with which it comes in contact. In a petrol engine a drop of oil entering the cylinder remains almost intact, and oils of as high flash point (585° and 640° F.) and viscosity (234" @ 210° and 320" @ 210°) as 'Hecla' and 'Extra Hecla' will not spread over the surfaces." Both Messrs. Bluman and Stern and Messrs. Snowdon are inclined to differ from this view; the managing director of the former writing: "I am of opinion that by the combustion in the cylinder, the lubricating oil is spread in somewhat similar manner to the process going on in a steam cylinder"; that of the latter stating: "Any good oil, as 'Sinol,' is diffused or sprayed all over the cylinder." The fact, however, that inventions have been patented with a view to overcoming the difficulty mentioned by Mr. Case rather points to its recognised existence, at least in the case of the more viscid oils.

* "It is a curious and interesting fact that, with heavy oils, ignition is more easily accomplished at a low temperature than with light oils. The explanation seems to be that, in the case of light oils, the hydro-carbon vapours formed are tolerably stable from a chemical point of view, but the heavy oils very easily decompose by heat and separate out their carbon, liberating the combined hydrogen, and at the moment of liberation the hydrogen, being in what chemists know as the nascent state, very readily enters into combination with the oxygen beside it. In this manner combustion is more easily started with a heavy oil than with a light one. . . . It is a peculiar fact that oil vapour, mixed with air, will explode by contact with a metal surface at a comparatively low temperature."—"The Gas and Oil Engine," D. Clerk, page 423.

As the author would, no doubt, be asked why in gas-engines oils with 400° to 450° Fahr. flash point do not cause premature ignition of the charge, he may at once say that he has not studied the question. Very possibly, the cylinder temperature being kept lower and the quantity of the lubricant used being much more accurately determined, decomposition is sufficiently impeded. Again, it would appear as if hydro-carbon vapour exerted an influence on lubricants which a gas mixture does not. On 28th August, Messrs. Crossley Brothers wrote to the author: "Some short time after we had commenced manufacturing oil-engines, it was brought home to us that the class of oil suitable for lubricating a gas-engine piston would not do so for an oil-engine, as there appeared to be more tendency for the oil to carbonise and to cause the rings in the piston to stick."

The practical conclusions to which the author arrives are, first, petrol motors should be fitted with positive feed-lubricators, ensuring a sufficient, and no more than sufficient, oil supply; second, that with such lubricators high flash point oils should be used in preference to the oils now commonly employed. The high viscosity of such oils is favourable to the retention of compression; on the other hand, it tends to increase friction and thus also the temperature of the rubbing surfaces.

Conclusion.

The author has endeavoured to bring the present technique of motor-car manufacture briefly before the members of this institution, because the industry is undoubtedly one of growing importance, and because there are so many features that admit of improvement, and so many points that require the elucidation which the members of this institution are pre-eminently qualified to give. The majority of manufacturers do not possess large financial resources, nor much available time for the technical research and

experiment needed for the advancement of the industry. In some cases, alas! they do not seem to recognise the importance nor the real economy of dealing with the problems before them in a scientific manner. Time and money spent on independent research, on obtaining expert advice on testing, analysing, and so on, represents to them expenditure of capital better employed elsewhere; whereas, there cannot be a shadow of doubt that, properly applied, time and money so spent are the most rigid and comprehensive economy that a manufacturing business can effect.

But it is not only to the members individually but to the institution as such this subject is presented. From the former opinions and information are solicited; to the latter is submitted the question, whether considering the magnitude of the industry, the Council of this Institution might not, in accordance with the practice and scope of our association, afford the same assistance as they have given to the gas-engine industry. A Gas-Engine Research Committee has been formed; could not the scope of this committee be extended to the investigation of the many problems surrounding and impeding the progress of the petrol engine?

The author begs to thank correspondents for information, and publishers for the loan of illustrations, courteously accorded.

The paper is illustrated by one plate and twenty-eight blocks in the letterpress, and is accompanied by two Appendices.

This being the conclusion of Capt. Longridge's lengthy and most valuable paper, we purpose giving in our next issue extracts from the most important points raised by speakers at the discussions on the paper. These took place at the Institute on Oct. 17th and 31st, and on Nov. 21st.

MOTOR WAGGONS IN MAURITIUS.



Our illustration is taken from a photograph of three of the heaviest types of Thornycroft steam waggon which were sent out early last summer to the Mauritius in connection with the sugar crop there. Messrs. Thornycroft have delivered a number of vehicles in this part of the world, and we understand they are giving very great satisfaction. The type shown above is the heaviest pattern, carrying up to eight tons of goods on its own platform, and capable of hauling in addition two or three tons in a trailer. It will be seen that all steel wheels are fitted in place of the wood wheels employed in this country, as it is impossible to use wood satisfactorily for this purpose in certain latitudes. Owing to the badness of the roads, it is also necessary to have much wider tyres than are used at home. The engines are extra large and powerful, being capable of developing 45 h.p., and the boiler is also provided with a greater heating surface and grate area to enable the inferior native fuel to be burned satisfactorily.

Mr. W. K. Vanderbilt, jun., has entered his automobile for the Paris-Madrid race, preparations for which are going on with great activity. The Duc d'Arlon and the Marquis de Viana have both been to Paris from Spain in order to study the route. They made the journey in their automobiles and also returned by road.

* * *

A Mr. Clarke, driving through Newcastle-on-Tyne from Edinburgh to London on a Baby Peugeot, had something done to his car by Messrs. George and Jobling. He left behind him a spanner, inlet valve, a few spare nuts, etc. As Messrs. George and Jobling do not know his address, they cannot return them to him. Perhaps he will take the hint.

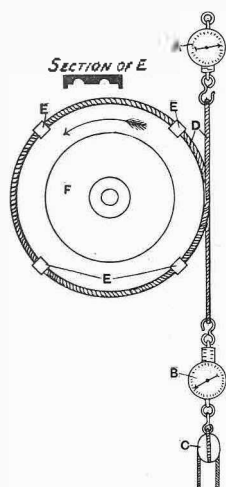
Although no official statement has been made up to the present, it is regarded as practically settled in automobile circles that Mr. Charles Jarrott will be asked to drive one of the Napier cars which have been nominated by the club to defend the Gordon-Bennett title for Great Britain. As most of our readers are aware, Mr. Jarrott has started in business on his own account, and the machines in which he will deal will be mainly Napiers and De Dietrichs. In each type he is having certain ideas of his own embodied, and there is no doubt that in selecting these two makes he has made a very excellent choice. His temporary offices are 11, Haymarket, but he will be moving before long to Great Marlborough Street.

Answers to Correspondents.

QUERIES OF GENERAL INTEREST.

Q.—I shall feel greatly obliged if you will kindly enlighten me on the following subjects, viz.: (a.) What is the proper method of testing motors for brake horse-power, and what is the formula? (b.) Is there any advantage of chain transmission over that by live axle, and what are the advantages and disadvantages of both? (c.) When an engine "knocks" or "hammers" in such a way as to cause a noise similar to two pieces of metal coming into violent contact, what parts of the engine cause this noise? The car I now drive is an 8 h.p. Renault. —PETER.

A.—(a.) It is rather a difficult matter, excepting to those experienced in testing engines, to arrive at the b.h.p. of a motor. The instruments required are a speed indicator to register the revolutions per minute, and two spring balances, or one balance and



some weights. We will presume that two balances are being used, as is most general. One balance weight A is made fast to any convenient point in line with the motor fly-wheel, or a pulley wheel attached specially for the purpose of testing, and to this a rope (single or double) is attached. The rope D is passed around the flywheel or pulley F, and is kept in place by the guide blocks E E E E, the other end of the rope being attached to the second balance B. This must be provided with some means of tensioning, such as applying weights or by tightening up

by means of a block and tackle, as at C. To carry out the test, the engine should be started up, and the rope around the flywheel or pulley tensioned until the speed indicator shows the motor to be running at its normal speed with the full power on. Keep the ropes from firing by pouring water over them occasionally. When running at normal speed note the pull on each balance. The b.h.p. is worked out by the following formula:

$$C \times R \times W$$

$$\text{b.h.p.} = \frac{\quad}{33,000}$$

C = circumference in feet of brake circle.

R = revolutions per minute.

W = weight suspended.

W equals the reading of the balance B minus the reading of the balance A. Another formula largely used in testing motors is:

$$(W-S) D \times R$$

$$\text{b.h.p.} = \frac{\quad}{33,000} = 0.0000952 (W-S) D R$$

S = spring balance reading in lbs.

W = weight on the brake.

D = diameter of brake drum measured from the centre of the rope in feet.

R = revolutions per minute.

(b.) The chief advantages of the side chain drive

are that there is no length of axle to keep lineable. The shorter wheel axles are stiffer for heavy loads, and the power is transmitted better through chains than through bevel gearing for heavy work, though in most cases bevel gear enters into the transmission. The disadvantages are the difficulty in keeping the chains adjusted and protecting them from the weather. The live axle gives a direct central drive, and is not affected by any adverse climatic conditions, the whole of the gearing being enclosed. The drive is continuous, and is not affected by any lateral or vertical movement, this being provided for by universal joints. The principal objection to the live axle is the strain imposed by the thrust of the bevel gearing, though if well supported by bearings on either side close in, this objection does not amount to much. (c.) The noise you describe is such as would be produced by loose connecting-rod bearings, or a worn crank-shaft bearing. If this is happening in your engine we should advise you to have it seen to at once.

HORSE-POWER.

Q.—Will you kindly tell me what horse-power a motor $4\frac{1}{4}$ in. bore by $4\frac{1}{4}$ in. stroke, at seven hundred revolutions per minute, develops?—W. McE.

A.—The i.h.p. of an internal combustion engine

$$P \times L \times A \times E$$

is arrived at by the following formulae

$$33,000$$

P = mean pressure in lbs. per square inch.

L = length of stroke in feet.

A = area of piston in square inches.

E = number of explosions per minute.

The area of the piston is obtained by multiplying the diameter of the piston by itself; the number of explosions are half the number of revolutions per minute. Therefore, assuming the mean effective pressure to be 75 lbs., the formula resolves itself into

$$75 \times .354 \times 14.186 \times 350 = 4.5601 \text{ I.H.P.}$$

$$33,000$$

You can only ascertain the mean effective pressure P by taking indicator diagrams.

TO CORRESPONDENTS.

This week the following correspondents have been, or will be, replied to by post:

W. Lamshead.

Rambler.

H. Shaw.

A. Reader.

G. W. Jeffery.

W. B. Pope.

F. Dale.

H. Ruich (U.S.A.)

J. Robinson.

C. R. Whitten.

R. C. Empson (Sydney).

O. B. (Crewe).

V. Fontaine (Paris).

F. Archer.

Rex.

F. Bailey.

H. E. Wootton.

J. Bell.

J. Jones.

C. W. Thomas.

J. K. Reid.

S. (Glos.)

Wootton.

T. Buckley.

Perplexed.

H. W. Bowden.

G. S. G.

D. Tress.

Puzzled.

F. W. Dobson.

J. T. B. (London)

F. G. Stenning.

C. A.

Our thanks are due to the following for items of news and various topics of interest, which have been or will be dealt with: J. Coop. W. Welford, A. S. M. Best, Thos. M. Harris, and P. Dewar.

New Patents.

This department is conducted by Mr. G. Douglas Leechman, consulting engineer and registered patent agent, 18, Hertford Street, Coventry; 32, York Street, Dublin; and 9, Exchange Chambers, New Street, Birmingham; from whom any further information respecting patent designs, and trade marks may be obtained.

The following printed specifications were published on 27th November, 1902. All notices of opposition to the granting of patents on the several applications should be filed not later than 12th January, 1903.

1901.

17,520.—H. T. Edge. Gas or oil turbine operated by Berthelot's explosive wave.

22,143.—M. Halaubek. A U-section tyre fits over a cushion in a U-section rim, the rim and tyre being sometimes articulated.

22,479.—F. Morriss. Removable Daimler "three-speed" gear wheels.

23,281.—E. Perks and F. Birch. The Singer chain-driven motor bicycle.

23,417.—Rudge-Whitworth, Ltd., and J. V. Pugh. Cable brakes operated by a short reversed hand lever.

23,913.—J. G. Accles and F. H. de Veuille. The A.V. cycle motor.

24,149.—M. J. P. O'Gorman. Contact breaker with a rocking block on the trembler or cam.

24,665.—F. T. Reid and W. Shepherd. Device for starting engines with dynamo electric ignition.

24,988.—J. W. Adams and Humber, Ltd. Controlling by means of a cable actuated by a rotating handle or ring.

26,711.—J. Mitchell.

1902.

452.—C. D. Abel (La Société Anonyme des Anciens Etablissements Panhard et Levassor). Electrical ignition distributing device for multi-cylinder motors.

673.—C. D. Abel (La Société Anonyme des Anciens Etablissements Panhard et Levassor). Motor with separate cylinders and thin water-jackets.

2,578.—J. Hillenbrand. Friction clutch with elastic connection to the transmission-shaft.

4,999.—F. H. Hadfield. Device for protecting ignition plugs against short circuiting by accumulation of moisture.

17,934.—L. G. Nilson. Interrupter with divided armature for sparking induction coils.

17,995.—L. G. Nilson. Electric car having the driving mechanism arranged between the body-supporting springs.

17,996.—L. G. Nilson. Braced steering axle having the wheel spindles in the line of transverse centres of the springs.

17,997.—L. G. Nilson. Motor controller for electric vehicles.

17,998.—L. G. Nilson. Cars are driven by a gasoline motor through a dynamo and electric motor with an equalising storage battery.

18,064.—R. Hennig. Pedal propelling for luggage vans and other vehicles.

19,245.—E. J. Braddock. Iron or steel tyre with gripping surface of softer metal.

20,710.—H. Frenay. Float feed spray carburetter in which a conoidal-ended extension of the inlet tube forms the pulveriser.

POLICE TRAPS.

Roads leading into Shoreham, Southwick, and Fishergate. On the Lower Shoreham Road between Southwick and Fishergate.

At Kingston-by-Sea.

On the Stillorgan Road between Booterstown Avenue, near Kingstown, Ireland.

Brighton Road, from the London side of Handcross to the School House.

At Elwell.

On the Great North Road, each side of Buckden, North of Northallerton.

On the Woodstock road, five miles out of Oxford.

Ripley Road, one mile from Guildford.

Road between Guildford and Portsmouth.

HORSE ACCIDENTS REPORTED IN NOVEMBER.

1,250 accidents in 96 days—172 persons killed and 1,022 injured.

No. of accidents.		Persons injured.	Killed.
781	Brought forward from <i>The Autocar</i> of November 1st	661	99
131	Week ending November 1st	104	14
87	" " November 8th	96	9
67	" " November 15th	42	15
112	" " November 22nd	75	18
72	" " November 29th	44	17
1,250		1,022	172

NOTICES.

SUBSCRIPTIONS.

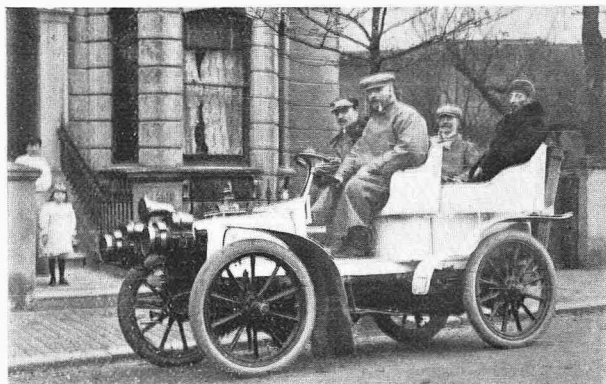
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GREAT BRITAIN.			ABROAD.		
	s.	d.		s.	d.
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Postal Orders.—Subscribers and advertisers are particularly requested to use postal orders when remitting.



The illustration on the left shows Messrs. Bennett, Emberton, and Ryan starting for a drive in a 10 h.p. Panhard from Brighton. The other picture portrays their fate. They were caught in a police trap at Crawley. They were accused of accomplishing thirty miles an hour, though as a matter of fact their speed was about fifteen miles per hour.

THE AUTOCAR

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

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COLONIAL AND FOREIGN EDITION.

IN ADDITION TO THE USUAL EDITION OF "THE AUTOCAR," A SPECIAL THIN EDITION IS PUBLISHED EACH WEEK FOR CIRCULATION ABROAD. THE ENGLISH AND FOREIGN RATES WILL BE FOUND ON THE LAST PAGE. ORDERS WITH REMITTANCE SHOULD BE ADDRESSED "THE AUTOCAR," COVENTRY.

The Autocar can be obtained abroad from the following:

AUSTRALIA: Phillips, Ormonde, and Co., 533, Collins Street, Melbourne.

FRANCE: Nice, Levant, and Chevalier, 50, Quai St. Jean Baptiste.

UNITED STATES: The International News Agency, New York.

Notes.

The Numbering Proposals.

On the 3rd inst. a conference was held at the Automobile Club between the legislative committee and the club committee with reference to the Bill placed before Parliament by the Hon. Scott Montagu, and drafted in conformity with the recommendations of the legislative committee of the club. The

club has issued the following report of the conference: "After discussion it was unanimously resolved, 'That this meeting hereby confirms the action of the legislative committee in accepting the principle of the identification of motor cars coupled with the abolition of the speed limit, but considers that, before the formal assent or approval of the club is expressed, some assurance should be obtained that such regulations will be made as will, as far as possible, minimise the risks to automobilists which might arise from abuses of identification.' A resolution was passed asking the Hon. Scott Montagu to insert, if possible, in his Bill a provision that the speed of the motor car, irrespective of the circumstances of the case, need not necessarily constitute 'furious driving.' The arguments used in connection with these decisions were that if every motor car be identified, a driver who might be driving, for instance, from London to Liverpool, with moderation and conformity to the law, might, a fortnight after the completion of his journey, receive a summons for alleged furious driving said to have taken place in a village quite unknown to him by name. The summons might arise from a complaint lodged by some cantankerous person having a strong antipathy to any means of road locomotion except horse-drawn vehicles. The driver of the vehicle would probably have no knowledge as to the precise portion of the road alluded to in the charge, inasmuch as the name of a certain district only might be mentioned, which might extend for some six miles of the road. He would, naturally, have a very poor recollection of the traffic and other circumstances existing on that portion of the road at the time he passed over it, and he would have no opportunity of finding the names and addresses of persons who witnessed his passage. He would therefore not be in a position to defend himself against any accusation, however preposterous or vexatious it might be. It was suggested in the course of the discussion that the Act, or regulations made under the Act, might provide that the method of identification should not be made use of unless the driver could be charged with having driven to the danger of other passengers then on the highway, or with having failed to stop when called upon to do so by a police constable or the driver of a restive horse. If every driver of a motor car is to be at the mercy of every other passenger on the highway who may see fit to charge him with furious driving the life of a careful driver of a motor car may be unendurable, as it is at present under the twelve-mile-an-hour limit. It is therefore suggested that the new Act should incorporate a provision which will make it impossible for a motorist to be prosecuted for furious driving in circumstances under which a speed considerably in excess of the