

The Motor

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IS THE HIGH POWER MOTORCYCLE ENGINE A MISTAKE?

By "MAGNETO."

The extraordinarily rapid development of the motor-bicycle as a reliable machine has been accompanied by an alarming increase in the power of the engine fitted, and the question may now be fairly asked—When will a limit of power be reached? Three seasons ago we had the 1 h.p. motor; now we have the $3\frac{1}{2}$ and 4 h.p. motor, and we may even expect an advance on this for the 1905 season. Power for weight, the motor-bicycle is the most powerful motor vehicle in use, and to still further increase the power to weight ratio without full consideration of the consequences that may ensue would be, in the writer's opinion, a great mistake. It will be granted that the first machines that came into practical use in 1900 were not efficient. Nominally, the motors were rated at $1\frac{1}{4}$ h.p.; whereas the real truth was that these motors rarely gave $\frac{1}{2}$ h.p.; consequently, as the equipment brought the weight of the machine well up to 100 lbs. it could not be considered a "motor-assisted pedal bicycle," nor yet a motor-driven cycle, because

IT COULD NOT BE RIDDEN UP A REALLY STIFF HILL

even with pedal assistance; hence it did not satisfy any class of rider. The following season was heralded by the coming of the $1\frac{1}{2}$ and $1\frac{3}{4}$ h.p. motor. As hill climbers these machines were a great advance on the $1\frac{1}{4}$ h.p.—so-called. There was more weight, but the increased power available more than compensated for it. But just about this time the trailer was becoming popular, and although these $1\frac{1}{2}$ h.p. engines were quite equal to drawing a trailer and an eight stone passenger at 15 miles an hour on a level road, it was rarely that a hill having a steeper gradient than 1 in 20 could be surmounted without dropping the passenger—rather a bad advertisement for the new motor vehicle. The 2 h.p. motor followed, and these were more satisfactory for trailer work, and for a single rider they proved fully equal to the average work demanded of them; that is to say, hills up to 1 in 8 or 10 might be ridden with only light pedalling assistance. The 2 h.p. motor was fully twice as powerful as the earlier motors placed on the market. In the matter of speed the 2 h.p. motor could do 25 miles per hour on the level and average 16 on hilly roads. But the demand for more power continued and increased and with it came increased weight, vibration and petrol consumption. The fore-car-

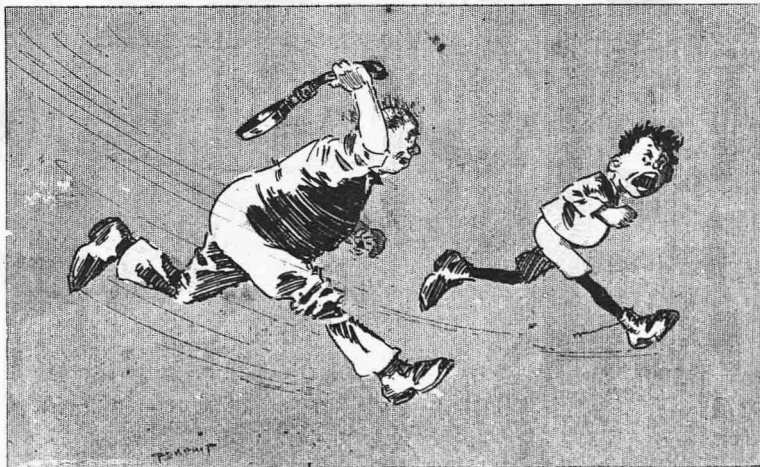
riage boom set in now, and it was quickly found that, although the 2 h.p. might pull a trailer fairly well, it was not equal to pushing a fore-carriage or drawing a side-car. The $2\frac{1}{4}$ h.p. motor was found to be the least that would do the work required, and even with this power one came across hills at times which the machine could not climb even with pedalling. It is this fact that has induced manufacturers to supply 3, $3\frac{1}{2}$ and 4 h.p. motors. The writer fully agrees that high powers of this class are necessary for driving a fore-carriage satisfactorily. The advent of the perfect two-speed gear is not yet, hence one must put up with the disadvantage of driving a heavy and uneconomical motor to have the necessary power in hand to tackle hills with; but when it comes to having this high power as the standard equipment of a two-wheeler for a single rider the case is a very different one. Let us look at the

ADVANTAGES RESULTING FROM THE ADOPTION OF A LOW POWERED MOTOR.

The writer has mentioned the fact that, with the exception of a 2 h.p. motor's inability to climb (unaided) the exceedingly stiff hills that one comes across in, say, 500 miles of average riding, it can propel the machine at a speed exceeding that at which any rational rider would wish to travel. It may not average the new legal limit of 20 miles per hour, but the question may fairly be asked if any motorcyclist can honestly say he enjoys travelling for several hours on end at this speed. The best of our British roads, it must be remembered, are not equal to those of France with their cement-like surface and long straight runs between the villages. The writer holds the opinion that 15 to 17 miles per hour is the average maximum one can do in comfort.

A great and telling feature of the motor-bicycle at one

time was its wonderful economy in petrol and lubricating oil. Of course, there are riders who will say it matters little whether one gets 50 or 150 miles of running from a gallon of petrol; the cost of travelling compared with other methods of locomotion still works out very favourably. But there is no getting over the fact that petrol has greatly increased in price of late, and that the higher the power of the machine the more limited is the range of action, so to speak. One cannot always gauge the petrol supply



BELT DRIVING!

to last right up to a motor depot; hence it is that riders of machines fitted with motors of $2\frac{1}{2}$ to $3\frac{1}{2}$ h.p. never venture on a 100 miles run unless they are provided with a spare gallon can of petrol. Then there is the important question of vibration and its effects. It has been the writer's experience that the vibration is infinitely less from a motor developing its power at a high rate of speed than from one running at a lower speed. In the first case the explosions are comparatively light, but rapid; and in the other case the shocks are heavy and slow. The driving of a 3 h.p. machine at a very slow speed in traffic is, as will be generally admitted by those who have tried it, by no means easy or comfortable; the machine travels with a series of violent jerks, which are greatly accentuated on lumpy roads like some of the city paving, for example, in London and Paris, where depressions several inches deep are of common occurrence. Of course, another disadvantage is the great weight entailed with these high powered motors. The admirable feature of handiness in a motor-bicycle has to be completely sacrificed to the craze for speed and power. How many 3 h.p. motor-bicycles are there whose weight, if accurately tried, will come out at less than 170 lbs? This enormous weight

CANNOT BE MANIPULATED WITH THE EASE OF A MACHINE
SCALING 80 OR 90 LBS.

and the fact of the weight being only supported on two wheels renders the machine positively dangerous in the event of a skid. The greater the weight the less chance there is of recovering the balance; and the results of a bad fall with a heavy motor are too well known to need recapitulation. Many riders are taking serious notice of this fact, and hence it is that for winter riding they are taking to the three-wheeler in the shape of a fore-carriage ridden without passenger or attachment. If high powers and great weight must be used, then let us distribute it on three wheels and, at least, have a safe vehicle. In the writer's opinion, there will undoubtedly be a reaction in favour of safer mounts, and the fore-carriage principle seems to be the solution of the problem.

There are other aspects of the question. For instance, many authorities hold that it is not possible to adopt air-cooling to give good results with motors of more than $2\frac{1}{2}$ to $2\frac{3}{4}$ h.p. The overheating trouble already worries riders of lower powered machines, and if we are to go up

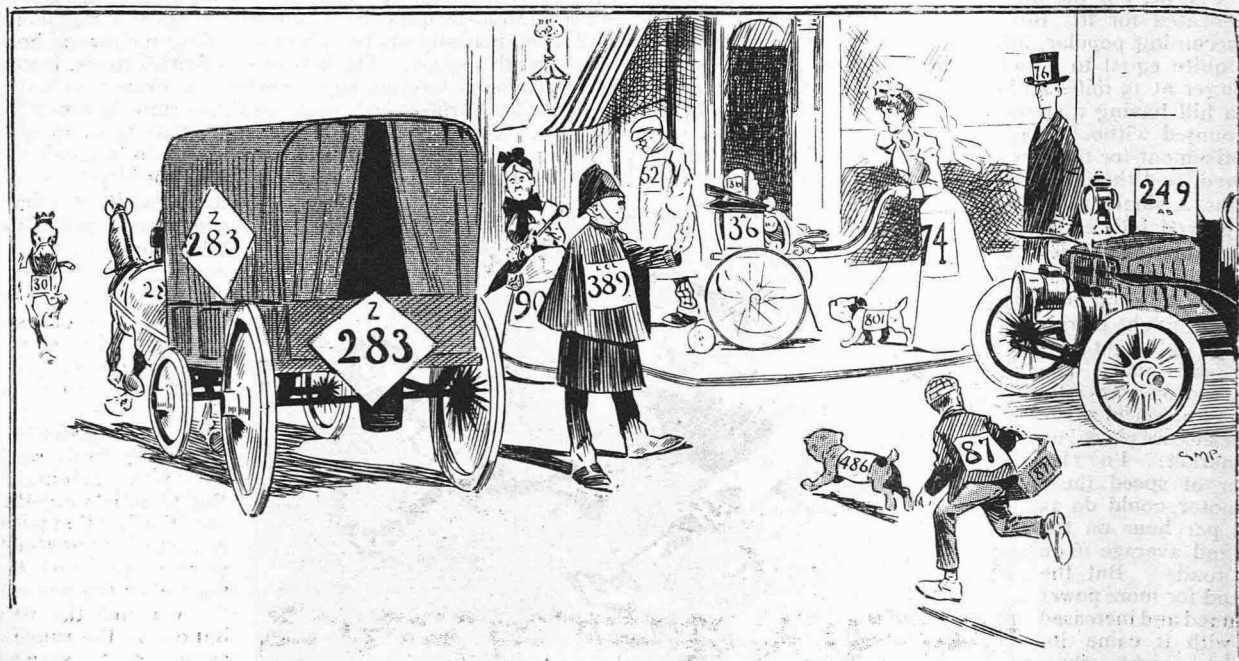
to $3\frac{1}{2}$ or 4 h.p., these troubles will be greatly multiplied. The writer does not mean to say that every 3 h.p. is liable to overheat, but makers must take into account the fact that

THE AVERAGE RIDER OF A MOTOR-BICYCLE DOES NOT
INVARIABLY DRIVE WITH THE SKILL AND JUDGMENT
NECESSARY

to keep his motor cool under all conditions. The temptation, as a rule, is to run the motor up to its full capacity, instead of reserving the extra power for hill climbing. Some makers have foreseen the possibility of these troubles, and have decided on introducing water-cooling in part or entirely. This introduction of extra and unnecessary complication is to be regretted; once bring these into the design of the motor-bicycle and its most valuable feature of simplicity is gone. It has often been advanced as an argument against the lower powered machine that to make it a complete success a two-speed gear is necessary; and if a two-speed gear, then water-cooling is necessary as a matter of course, as the motor would quickly run hot on the low speed without it. The writer does not agree with this view at all. The two-speed gear has yet to prove its value, and when it is proved a success its place is on the fore-carriage, where there is room to fit it and scope to use it. Rather should makers experiment and give us a more perfect 2 h.p. motor; that is to say,

ONE GIVING OUT MORE POWER AT A GIVEN WEIGHT

than they do at present. Especially in the radiator system there is room for much development. Given a better 2 h.p. motor and a machine kept down to the minimum of weight consistent with strength, fast tyres and efficient belt or chain transmission, the writer believes that for real motor-cycling work, such as ordinary week-end runs, business purposes and long tours, the rider of such a machine will be far better equipped than the rider of a 4 h.p. machine with its immense weight, high speed, expense of running, mass of complications, with all their attendant worries. The writer is strongly in favour of retaining the pedals; they have numerous advantages, and it is difficult to see any single disadvantage, unless it can be said that they do not form ideal foot rests; but then one has always the advantage that a change of position is easily possible, and auxiliary foot rests can be fitted if desired.



THEIR DAYS ARE NUMBERED.

Will the numbering idea be extended by this time next year?

THE LIMIT OF SPEED IN MOTOR RACING.

By
"SPARK GAP."

That the margin of safety in high-powered motorcycle racing has almost been reached, if not passed, in England, has already become evident from the several serious accidents which have occurred, owing to the rider's inability to control the machine and keep it from skidding up the banking. To the untrained eye it may appear quite easy to steer a motorcycle round a highly banked track; and to the spectator the day when a speed of 70 or 80 miles an hour will be accomplished is easy of imagination. The opinion, however, of experienced riders such as Fred Chase, his brother A. A. Chase, H. Martin, or J. van Hooydonk is clearly to the contrary, and they all agree that the limit of speed for existing British tracks has almost been reached.

Chatting with A. A. Chase on the subject, the writer asked him his opinion, and

HE PUTS THE FIGURE AT 1 MIN. 4 SECS. FOR THE LIMIT OF SPEED at which the mile will be accomplished, and then at considerable risk, taking Canning Town as the finest and most suitable track. Fred Chase, however, thinks that 1 min. 3 secs. to 1 min. 2 secs. may be accomplished; but inside that the rider, whoever he may be, will run the life hazard in the endeavour to keep himself and machine on the track, and from collision with the fencing at the top of the banking.

In view of their years of experience in fast track riding, the opinions of these men are worthy of the fullest attention from would-be record breakers who value their necks. Harry Martin and J. van Hooydonk also consider 1 min. 2 secs. for a mile about the fastest pace attainable with the banking at present used on English tracks: faster time is only a question of engine power, gearing, and banking; as there are plenty of machines already capable of higher speed if the rider dared let the engine out to its best. It is a fairly easy matter to see

HOW FACTS COINCIDE WITH THE OPINION OF THESE PROMINENT RIDERS

by considering the forces at work, viz.: (1) The weight of the cycle plus the rider acted upon by gravity on a given banked track. (2) The friction between tyre and track. (3) The centrifugal force which increases with the velocity of the man and the cycle. In the case of a motor-bicycle, the effect of gravity on a banked track is to keep the vehicle down the track, friction, of course, allowing steering to be possible: this vertical force of gravity may be resolved into two forces, one acting normal to the track, and the other parallel to the track; and consequently the greater the banking the greater is this latter component. The effect of centrifugal force is to hurl the rider and bicycle horizontally outward: this force may also be resolved into two other forces, one normal to the track, and the other parallel to the track and up the banking. Thus, neglecting friction for the moment, we have four forces acting; two of these are normal to the track, and may therefore—except from a frictional point of view—be neglected:

THE OTHER TWO FORCES ACT PARALLEL TO THE TRACK, one due to gravity downwards, and the other due to centrifugal force upwards. Consequently, so long as the parallel

component due to gravity is greater than the parallel component due to centrifugal force, the rider is perfectly safe; but if centrifugal force is the greater component, then the rider—but for friction—would fly off the track over the banking. Friction is a very variable force, and must always be judged with considerable caution, as it varies very greatly with the state of the surfaces in contact. Thus the friction between the surface of the track and the tyres is considerable where the track is dry and the tyres cold; whereas the heating of the tyres and the wetting of the track will materially lower the coefficient of friction. The coefficient of friction for tyres on the track would probably range from 25 per cent. to 60 per cent.; by this it must be understood that

IF THE COEFFICIENT OF FRICTION FOR GIVEN TYRES ON A GIVEN TRACK

was 40 per cent., and the motor, etc., weighed 200 lbs., then a side pull of $\frac{40}{100}$ ths of 200 lbs.—i.e., 80 lbs.—would cause the motor to slip over the track. Of course, a track may be so banked that as a motorcycle passes round slowly, and there is practically no centrifugal force, the friction of the tyres may not be sufficient to hold the machine in place, and it will slide down the banking. The friction—whatever it may happen to be—in conjunction with careful steering assists gravity, and helps to keep the motor on the track.

To determine centrifugal force let W =weight of revolving body in pounds, R =radius or distance from centre of motion in feet (the centre of motion is the point where you would put the sharp end of a pair of compasses, if you were striking the curve of the track), G =gravity, V =velocity in feet per second. Then centrifugal force=

$$\frac{W \times V^2}{G \times R}$$

Now let us consider that a motor-bicycle, with rider, weighs 300 lbs., and is

TRAVELLING AT 60 MILES PER HOUR

(88 feet per second) on a track banked 1 foot in 2 feet, with a radius of 125 feet. Then, using the formula just quoted, centrifugal force=

$$\frac{W \times V \times V}{G \times R} = \frac{300 \times 88 \times 88}{32.2 \times 125} = 601.2 \text{ lbs.}$$

Resolving this into two forces, we get a normal force of 268.8 lbs., and a parallel force of 537.6 lbs.

AGAINST THIS CENTRIFUGAL FORCE WE HAVE NORMAL AND PARALLEL COMPONENTS

due to gravity acting on motorcycle and rider (tending to keep the vehicle down the banking), and the friction of the tyres, for which we will take a coefficient of 50 per cent. The normal force due to gravity will be 268.3 lbs., and the parallel force will be 134.1 lbs. The two normal forces are available for friction, which will equal 50 per cent. of $(268.8 + 268.3) = 268.5$ lbs.

Thus, at 60 miles an hour there is a force of 537.6 lbs. up the banking, and a force of $134.1 + 268.5 (=402.6 \text{ lbs.})$ down the banking:

IT WOULD BE IMPOSSIBLE, THEREFORE, TO NEGOTIATE THE CORNER CHOSEN

at a speed of 60 miles an hour; and it is easy to see that if the force down the bank is slightly in excess of that up the bank it would be possible for a rider to get round the first lap or so; but that when the coefficient of friction became less as the tyres got warm it would be necessary to reduce the pace in order to reduce centrifugal force, or inevitably skid up the bank. It must be understood that in the above calculations the banking and radius of the track are only given by surmise; but if the official figures of each track are obtainable

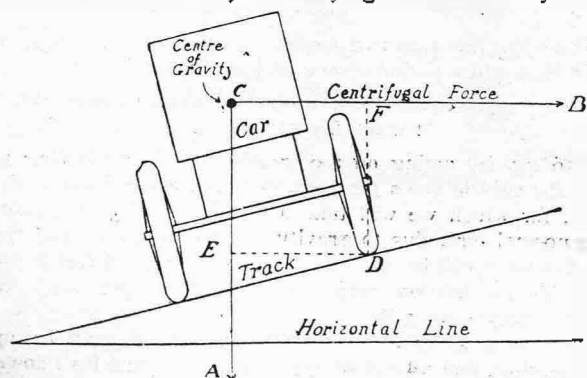
THE SAFETY MARGIN OF SPEED FOR EACH TRACK CAN BE CALCULATED.

The figures given, however, are, no doubt, somewhere near the actual conditions; and it is evident that if greater speed is desired by riders and the public it will be necessary to increase the banking—as is done on the many Continental tracks, where far greater speeds are permissible than on any British track. The same effect could also be obtained by increasing the radius of the track; but that, of course, would be inadmissible, as from the spectacular point of view it is necessary to keep the radius as short as possible, consistent with the safety of the competitors.

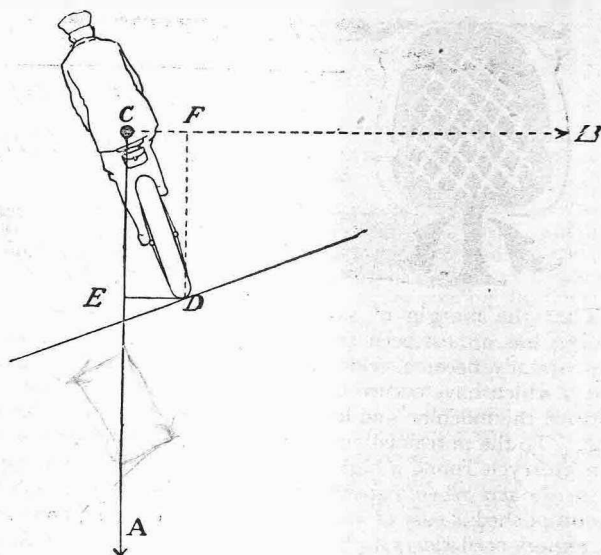
TAKING INTO CONSIDERATION THE HIGH VELOCITIES NOW ATTAINABLE BY RACING CARS,

it will be seen from these calculations (which apply equally, as there is only the difference of weight) that racing on a curved track is practically impossible, unless the curve is constructed with a gigantic radius. With a small radius, and consequently acute curves, the action of centrifugal force would overcome both gravity and the coefficient of friction, and lift the inner wheels from contact with the track, throwing the whole load on to the outer wheels, the tyres of which would probably collapse and upset the vehicle.

One has only to turn a corner sharply on even a heavy touring car to experience this effect of centrifugal force. During the late motor trials the writer had a queer sensation on the day of the run to Winchester, when, in running round a turning at an angle of about 90 degrees, a heavy car, in which he was a passenger, slithered across the road over the greasy surface and, finding a dry spot, lifted on to the off side wheels, but luckily pulled up broadside within an ace of smashing against a tree: it was a miraculous escape, and all that saved the car from overturning was the fact that the mechanic was sitting on the footboard, on the inner side, and his weight, being low down, was just sufficient to counteract the centrifugal force and bring the inner wheels down with a bump to mother earth. It was an incident which afforded an opportunity of demonstrating to the driver the necessity of studying the laws of dynamic



1.—Forces acting on a car running on a banked track.



2.—Forces acting on a motorcyclist riding on a banked track.

energy and centrifugal force, and at the same time of conceiving this article.

If racing over a circular course is to be indulged in by heavy vehicles, it is evident that the radius of the track will have to be very extensive, and the banking fairly steep, in view of the high velocity at which the curves will be taken. But, on the other hand, given a straight course, and a vehicle of sufficient weight to provide a coefficient of friction on the track surface, there is

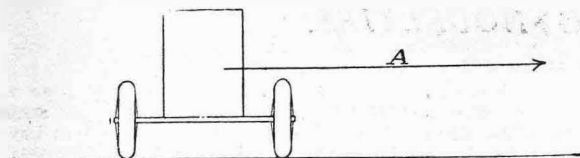
PRACTICALLY NO LIMIT TO THE SPEED

attainable by a racing automobile, this speed being entirely dependent on the rigidity of the steering, as with the slightest swerve or deviation from the straight course—at a high velocity—centrifugal force will do its deadly work, either by bursting the outer wheels or overturning the vehicle. With a racing motorcycle the effect on a straight course is somewhat different, and the speed is limited, owing to the lightness of the vehicle, which gravity is unable, at very high speeds, to retain in contact with the surface; so that the vehicle proceeds in a succession of leaps and bounds, which render steering a matter of impossibility.

THE ACTUAL FORCES AT WORK WILL BE BETTER UNDERSTOOD from the illustrations. In Fig. 1 C is the centre of gravity. Force one is represented by the arrow CA, and acts at a leverage ED about the wheel as shown, the effect of this being to keep the vehicle on the track, it equalling the weight of the vehicle \times distance ED. Force two is the coefficient of friction, which can only be determined by actual experiment, and which I allude to later. Force three is represented by arrow CB, and acts at a leverage FD, and the effect of which is to tend to overturn the vehicle, and is equal to centrifugal force \times distance FD. In the case of a motor-bicycle (Fig. 2) C is the centre of gravity of man and machine, and the force tending to send him over is centrifugal force CB \times leverage FD. The opposing force keeping the man and machine upright is the weight of both acting through centre of gravity \times leverage ED, and so long as weight \times ED is greater than centrifugal force \times FD,

THE MACHINE AND RIDER ARE PERFECTLY SAFE;

but if centrifugal force \times FD becomes the greater then in this lies the danger. As in every car and cycle the position of the centre of gravity will vary considerably, according to height, etc., each car must, of course, be considered on its merits. With regard to a car or cycle sliding up a track in



3.—Illustrating method of determining coefficient of friction between car and track.

this case the position of the centre of gravity, and the leverage ED does not enter into the question. The points which have to be considered are the weight of car or the cycle and rider, the centrifugal force, banking of the track, and the friction of the tyres on the track. The weight of car is easily determined, also the centrifugal force, while the banking of track and the friction of the tyres thereon want to be considered together. Supposing for every three feet of banking you rise one foot, then force tending to keep car down the bank is one-third the weight of the car or cycle. A bank of one in four, then one-fourth weight; a bank of one in one

would be vertical, and 1 of the weight of car, would tend to keep it down. A bank of one in five, then one-fifth weight of car, and so on.

In measuring the rise of a bank,

ONE MUST MEASURE UP THE INCLINE OF THE BANKING, AND NOT ON THE HORIZONTAL.

The coefficient of friction cannot be exactly determined, as it is such a variable quantity; but surmising that it is something between 25 per cent. and 60 per cent., that means that if a car had a cord A attached to it, a pull of .25 to .60 of the weight of the car applied to the cord would overcome the friction between the tyres and the track, and the car would slide sideways. It would prove a subject of deep interest, and undoubtedly useful, if a series of experiments were carried out to determine the coefficient of friction.

From the foregoing it will be easily seen that a track may be banked so much that when a car passes round slowly, and there is practically no centrifugal force, the friction of tyres may not be sufficient to hold the car, and it would slide down the banking.

CAUSES OF MYSTERIOUS LOSS OF COMPRESSION.

By "MAGNETO."

There are few motorists, whether they drive a car or a cycle, who have not at some time or other been puzzled to account for the motor having weak compression. When it is found that the engine, after running well for weeks perhaps, begins to flag and grow tired on hills, the first detail the driver goes for is the exhaust valve; this, he says, must require regrinding. It is safe to say that a good exhaust valve does not require the somewhat frequent regrinding that it gets. There are other points, not always suspected, where loss of compression can occur; for instance, it is generally assumed that the inlet valve never requires attention; well, neither does it in the way of regrinding, but the valve seatings require cleaning. It is not possible to prevent a small amount of lubricating oil getting on the seatings, and in time this forms a layer quite sufficient to prevent the valve closing properly. Hence

IT WILL BE FOUND AN EXCELLENT PLAN TO RUN A SMALL QUANTITY OF PARAFFIN THROUGH THE VALVE,

and vigorously twirl the valve round on its seating with the forefinger and thumb. Petrol is not so good as paraffin, because it evaporates too quickly. The valve spring sometimes gets softened, as the result of the motor having been run in an overheated condition for some time: this is more likely to occur when the inlet valve is bored in; in cases where the valve is exposed to the cooling of the air it is rare that a burnt spring occurs. This is a good feature of the Quadrant and Clement-Garrard motors. Of course, a burnt spring will not pull the valve back quickly enough on its seating, and part of the compressed charge is blown out. The seating of the valve casing is another place where an escape can occur; the facing may be either ground in or be fitted with a washer. The simplest way to detect an escape here is to place a small quantity of soapy water around the joint and watch for bubbles when the compression is put on.

THE JOINT BETWEEN THE CYLINDER AND COMBUSTION HEAD CAN BE TESTED IN A SIMILAR MANNER.

Of course, where the cylinder and head are made in one piece, no loss can occur, but it must not be forgotten that the one-piece cylinder and head is not without its own particular disadvantages. A bad sparking plug is another

prolific cause of poor compression: some of the cheaper ones have the porcelain so badly packed that it is quite possible to detect the compression blowing through, or if a small quantity of paraffin is put in the cylinder, and the ignition started, a puff of white smoke can be observed issuing out from the stuffing box at each explosion. For this reason the writer has always favoured a mica (E.I.C.) plug, which he has always found quite gas-tight, as no packing is used. If the spark plug has what is known in the trade as a "drunken" thread, i.e., one cut on the skew, it will be quite impossible to make a tight joint at the washer; also, if the screw thread is a loose fit in the hole, the compression is liable to blow out along the thread. If all these details are quite sound and the loss of compression still continues, there is nothing for it but to

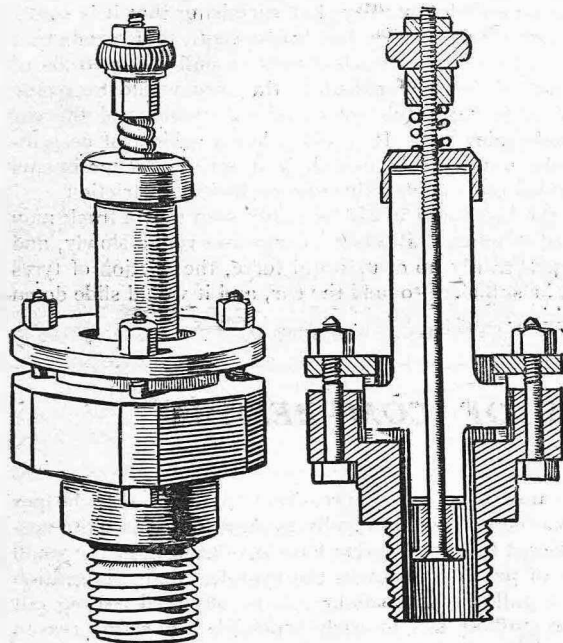
EXAMINE THE CYLINDER AND PISTON FOR TRACES OF LEAKAGE.

Although it is hard to believe it in these days, it is an absolute fact that instances are not rare in which a motor has been sent out with its cylinder bored on the taper, i.e., larger at the bottom than at the top: this fault is more likely to occur in a one-piece cylinder and head, because the boring tool cannot be run right through from end to end. The result of having a taper-bored cylinder is that the rings fit well at the top and are slack lower down, and let the compression through. The rings may have sufficient elasticity to open out to the larger bore, but they cannot, of course, conform to the coned surface, and can only fit along a line as it were; hence the charge gets past the ring easily. The only remedy for a cylinder of this description is to have it bored out perfectly parallel. If the taper is only slight it may be possible to use the same piston, and simply fit new rings; but if a cut about 3-32nds of an inch has to be taken, a new piston and rings will be necessary. It is easy to test the bore of a cylinder by means of a pair of inside callipers. If these be adjusted to fit easily in the end of the cylinder they will bind on the lower part. An escape of gas past the rings will show itself by a discoloration of the bright surface, that is to say, a brown or black patch will show itself. Another sure indication of a leakage is heating up of the crank case, because part of the exploded charge exhausts itself, as it were, into the crank case.

SOME INTERESTING NOVELTIES.

The A.V. Spark Plug.

The Motor Castings Company, 101, Gray's Inn Road, London, W.C., have sent us a sample of their A.V. plug, which they claim is the only guaranteed plug on the market. The special features of this



New Sparking Plug shown at the Paris Show by the Societe d'Allumage Electrique Compound.

plug are that the insulation is practically soot proof, being protected by a metal screen, and the porcelain, moreover, is recessed, giving a very high insulation. The insulator is fitted with a spring to allow for the expansion. It is a highly finished plug and is well worth the 3s. 3d. asked for it.

A New Light Car.

A 6 h.p. light car called the "Normalis" has been introduced by the Normal Powder and Ammunition Co., Ltd., Hendon. It is a two-seater, but an extra seat can be added, or the car can be supplied with a tonneau so that it will seat four. The engine is a De Dion and three speeds and reverse are provided. A maximum speed of 25 miles per hour and good hill climbing powers are guaranteed by the company.

The "Gripwell" Brake.

A new brake for motorcycle use has been introduced by Messrs. Wass and Cocks, Pembroke Cycle Works, Ealing Dean, London, W. In its main details it consists of a lever working in a clip which fixes on to the compression stay of the machine. One end of the lever has a brake block fitted which can be supplied to fit either a flat or a V belt rim. The other end of the lever is provided with a pawl upon which the crank presses when back-peddalling, thus applying the brake. The pawl is so designed that it can be quickly thrown out of action when the brake is not required. The power of the brake can be regulated to a nicety according to the pressure used in back-peddalling. The price complete is 15s. 6d.

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The Bygrave Accumulators.

We have had sent us for inspection two samples of accumulators made by W. Bygrave, of Barnet, Herts. One of these has a capacity of 20 ampere hours, and the special features about it are the very effective insulating sections between the plates, rendering short circuits impossible. These sections are of perforated celluloid. The terminals and lugs are very substantial, and a special point is made of having the terminals gold plated, and thus quite acid proof. The screw vent plug is another good feature, being so designed as to obviate any chance of the acid splashing or leaking. In addition to this size there is also made a very neat and strongly constructed spare cell of about 5 ampere hours' capacity, which can be stowed away in any odd corner of the machine. These cells are sold at a reasonable figure, and are worth attention by motorists.

A New Motor Spirit.

Lancashire motorists especially will be interested to learn that Messrs. Whitaker and Co., St. Mary's Works, Lower Broughton, Manchester, are now making a very good grade of petrol selling at a very reasonable figure.

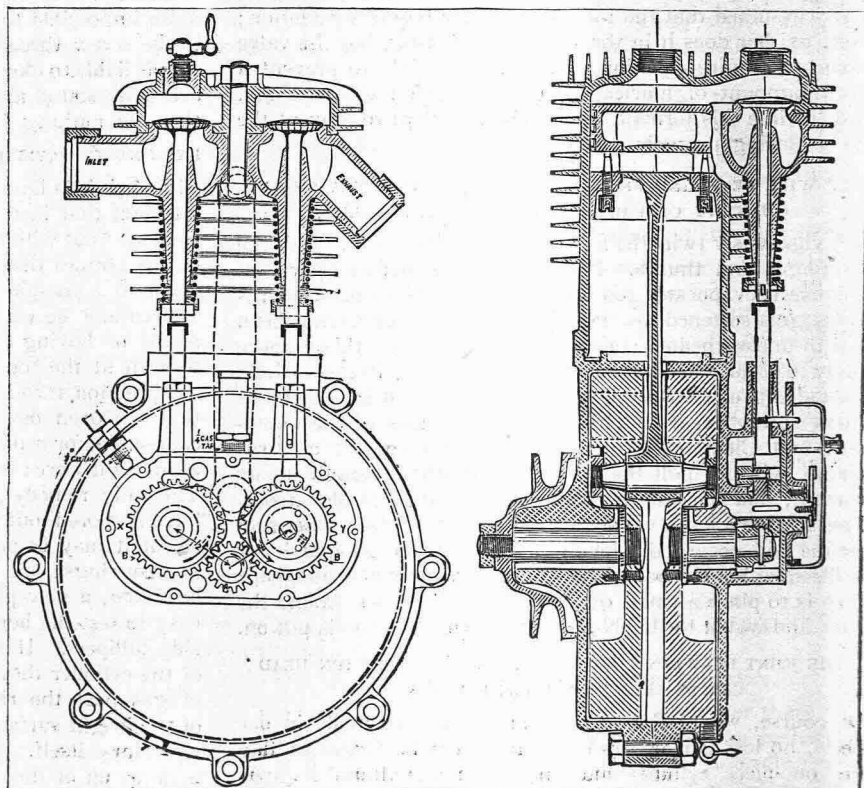
A New Plug.

The plug illustrated on this page was exhibited at the Paris Show by the Societe d'Allumage Electrique Compound, Levallois. In this plug the porcelain insulator is quickly detachable, the joint being made by asbestos washers, and it is designed so that short circuiting through burnt oil on the points is impossible. It is really a beautiful piece of work, and we may mention that Messrs. Peto and Radford, Hatton Garden, are the London agents.

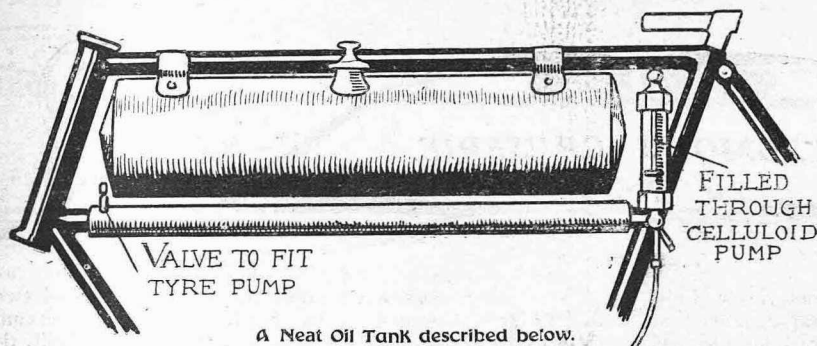
The "Noble" 2½ h.p. 1904 Motor.

This is quite a departure from the 1903 pattern and shows in its design strong individuality and resource. The mechanically-operated inlet valve is retained, but as can be seen in the diagram, its mechanism is different from that hitherto employed. An important feature is the accessibility of the valves. The valve boxes are cast in one piece, and bolted up to the cylinder by a single bolt, the joints being made by two copper and asbestos washers. By removing the one bolt both valves can be disconnected from the cylinder for grinding-in, when necessary, thus enabling this operation to be done with ease, and without the risk of emery powder getting into the cylinder. Another improvement of importance is the using of a second cam on the exhaust cam shaft, which is brought into action by a wedge-shaped piece carried by the contact-breaker base plate.

When the spark is retarded the wedge is brought under the tappet rod, causing the exhaust valve to give a lift when the piston is half-way up on the compression



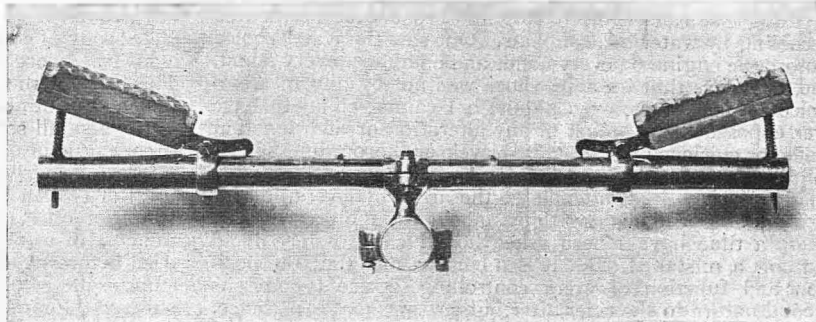
The 2½ h.p. "Noble" Motor for 1904.



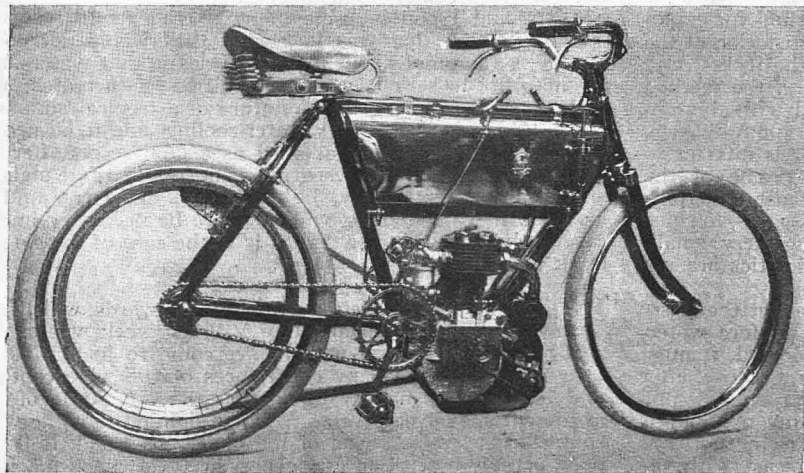
A Neat Oil Tank described below.

stroke, allowing half the charge to escape and proportionately reducing the compression. The advantages are that the engine can be more easily started with a slacker belt, even on an up grade, and that speed in traffic can be reduced to a "crawl."

Great length of bearing and wearing surface is provided, all bearings being bushed with hard phosphor-bronze and fitted with steel pins and shafts. This matter of suitable bearings has received special attention, the makers recognising its importance on the life of the motor. Those interested should write to the Noble Motor Company, 170, Blackfriars Road, London, S.E., for a descriptive booklet.



Footrest open to its full length



Peugeot touring Motor-bicycle, fitted with rotary magneto-electric ignition (note the chain drive for armature).

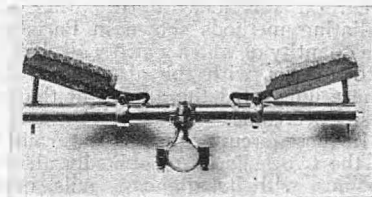
A Neat Oil Tank.

The new Bat lubricating oil tank is shown in the sketch. It fits along the second tube of frame, and looks just like a nickel-plated tyre inflator. It is extremely simple in use. The cap of lubricating pump is unscrewed and plunger removed. The oil is then poured in, the valve being opened as a vent for air. To force oil back into lubricating pump, the tyre pump is screwed on to valve (shown), and air pressure introduced thereby into the tank. When the two-way tap is turned on the celluloid pump is at once filled with lubricant ready for conveyance to the crank chamber. It is simple and very effective, and with the air pressure to force the oil into the pump, no difficulty should be experienced in using the thicker brands of oil which are especially suitable for air-cooled motors.

A Telescopic Footrest for Motorcycles.

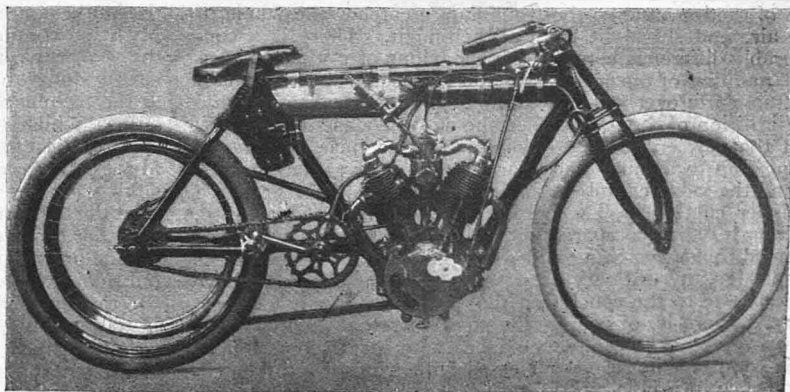
The photographs depict a patented new type of footrest, just put on the market by A. B. Clark, engineer, Curfew Ironworks, Sandwich. The special features of this invention are that the ends of the rest having the rubber covered foot plates fitted, telescope into the main tube, which is provided with a clip to fit the down tube of the motorcycle. The foot plates are mounted on springs so as to absorb vibration, and a trigger attachment is combined with them, so that by slight pressure on the plates the telescopic ends are forced out by internal springs, and

thus the rider's legs are kept clear of the engine. When the footrest is required to be out of the way, it is only necessary to apply slight pressure to the ends, when the tubes collapse to normal dimensions. Those riders who find the ordinary pedals as fitted to most machines somewhat

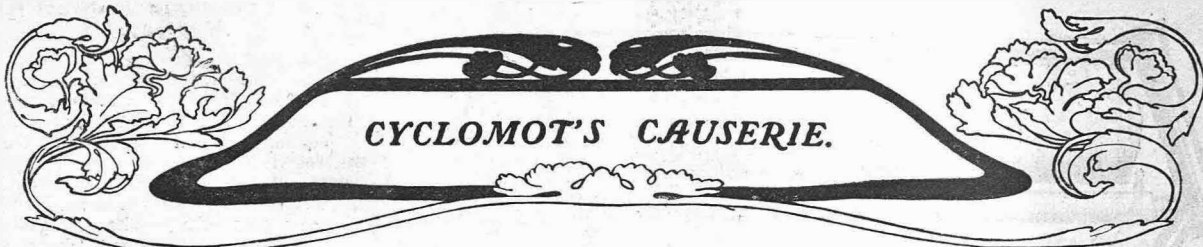


Footrest closed.

tiring, will be specially interested in this invention, which should prove a satisfactory rest. It is a well made and finished article, and the retail price is 22s.



The "Griffon" speed machine. This is intended for high speeds on road or track. It has a 5 h.p. Zedel twin-cylinder engine fitted. The wheel base is extra long.



CYCLOMOT'S CAUSERIE.

Water-cooling.

The features of the latest motorcycles built for the French market, and displayed at the Paris Show, gave one considerable food

for thought, but I think that the feature which more than anything else caused me to stop and brood was the method of cooling by water instead of air. One saw the water-cooled motorcycle engine on every hand, and on almost every stand, and I confess that its appearance was not by any means a welcome one to me, even although I cannot claim to have ever opposed the adoption of any alteration or addition that made for efficiency in the motor-bicycle or thoroughness in its control. In fact, I have seen many a good man and true stop and shudder as he contemplated the array of levers and indicators and switches and things about my motorcycle, and many a time have I been asked how I can possibly avoid making a mistake! But it is a curious fact that the position and function of every controlling device become as second nature to the rider after but a very short experience. Water-cooling, however, is a complication, because, whilst it is essential that it should do its work well, it cannot do it better than that, and any variation in its working makes for inefficiency. And my experience of water-cooling for explosion engines tells me that, what with the incrustation of the water system, the scaling of particles from the jacket, and the occasional choking of pipes and radiators, the method is always liable to cause trouble. Combined with this objection, there is the fact that, in the case of a motor-bicycle, the water tank is necessarily small, whilst it is difficult to secure a sufficiency of radiating surface. Some of the radiating methods shown in Paris were almost ludicrous, the quantity of water which was able, in some cases, to come into contact with the air-cooled tubes being very small. These illustrated the argument that the difficulties are not easily overcome.

In these circumstances it naturally follows that the lesser of the two evils is undoubtedly air-cooling. Before water-cooling, with its attendant evils, need be adopted, it must be very much more efficient than air-radiation, because, after all, the occasions on which overheating occur are few and far between, and, in fact, overheating, in my opinion, is rather due to faulty construction or faulty driving. It has been by no means unusual to see engines cast with the radiating flanges so arranged as to look pretty, but to bear no relation whatever to the direction of travel. In some cases the flanges are set crossways or at right angles to the line of motion, and so the front flange catches the whole of the air, and shields it from all behind it. There is a considerable difference between the behaviour of my present engine and that of the engine which it replaced. The latter used to frequently overheat, the signs being a loss of power and self-ignition of the gases when the current was switched off. But the new engine has never overheated once, this result being due to a much better arrangement of radiating gills round the valve chambers, and, in fact, to a better designed cylinder casting. The engine gives me a good $2\frac{1}{2}$ h.p., although, when compared with other $2\frac{1}{2}$ h.p. engines, it has seemed to deserve being called a 3 h.p., and as this power is ample for any ordinary purpose on a motor-bicycle, I have quite come to the conclusion that water-cooling is unnecessary. There is, of course, the possibility that in a different temperature air-cooling would be quite insufficient, but in this country we are never blessed with tropical weather except once in a blue moon; and if an engine should, in such exceptional circumstances, show signs of overheating, the supply of gas can be cut down, and the rider may take a little beneficial exercise, and so put a stop to the trouble.

Is it Necessary?

When we come to the three-wheeled two-seated cycle, a different set of circumstances prevails, and the added weight, the use of a variable speed gear and a tour in hilly country will all point to the need for the most complete study of cooling methods, and the adoption of the most efficient, in order to get the best work out of the engine. The body of the fore-carriage catches a large proportion of the cooling atmosphere, and wind scoops, although they are of some small service, do not entirely fulfil the requirements. A colleague of mine is an advocate of fans for the creation of a forced draught, and I am inclined to agree with him that the fan is well worthy the attention of makers and riders. It might on experiment prove to meet the requirements in the case of a fore-carriage, but in any case it should be well tried before water-cooling is resorted to, in my opinion. To sum up the whole situation: air-cooling should be ample and sufficient for motorcycles up to 3 or $3\frac{1}{2}$ h.p., provided that the rider be willing to give a little pedal assistance uphill on a very hot day. (Put in that blunt way, I am fain to confess that this combination of circumstances is not very attractive, and I can imagine many a reader muttering to themselves that that was just what they would not do!). However, my point about motor-bicycles is that water-cooling need not be seriously tackled until power increases, and we also get something in the nature of a tropical summer. With Trimos and fore-cars water-cooling might be necessary, but should only be adopted as a final resort after all else has failed. At the present moment fore-carriage makers are aiming at simplicity, lightness and efficiency, and it looks as if water-cooling will no more be necessary in the case of the three-wheeler than it is in the case of the single-track machine.

Coils and Contacts.

The letter from C. Edwards which appeared in "O.P.V." last week was one of several which have come to hand since I gave my experiences of the wipe contact, and it was published by us so that the other side of the argument should be given. My own opinion that the wipe contact was streets ahead of the make and break is based upon actual observation and experience. My 1902 machine has run for two years with the coil and contact breaker supplied by the makers, and as the platinum tips become pitted in about 70 or 80 miles, and want refacing, my opinion of the make and break system is not a very favourable one. My wipe contact, on the other hand, has run the whole of the season without needing any attention at all, and before sitting down to write I had a good look at the contacts and at the trembler on the coil. There was nothing amiss with either, whilst the platinum tips are but slightly mottled—and this is after the machine has run for the whole year! Mr. Edwards, on the other hand, has had unsatisfactory results with the trembler coil, whilst his make and break (identical in make with my own of 1902, by the way) has gone for 7,000 miles with but an adjustment of the trembler on one or two occasions. In the face of such testimony, the only conclusion is this: either system can be good, if only the makers will take care to supply a really good coil, that is to say, one with a core of the best grade of soft iron to obtain a high magnetic efficiency, the primary winding being suitably proportioned to take minimum current from the accumulator, the secondary winding being specially well insulated, and the condenser being carefully proportioned so as to get the minimum of sparking at the trembler contacts. It will pay makers to adopt the best in coils.



The Circulation of "The Motor" exceeds that of ALL other motor papers combined.

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OPINION

Publicity v. Obscurity.

The following circular-letter has been addressed to us by the "Technical Secretary" of the Automobile Club:—

"Some considerable amount of discussion has taken place recently as to the need for further Trials for light cars. An excellent opportunity will be offered to manufacturers who really desire such Trials to obtain an Automobile Club certificate for 100 miles non-stop run together with a record of fuel consumed and speed on hill climbs, by entering for the next quarterly Trials, which will be held on February 12th, starting from the Automobile Club garage at 9 o'clock. The last day on which an entry can be received will be February 6th; the entry fee is ten guineas, of which six is returnable if the vehicle actually starts, and this fee includes the registration of driver and vehicle."

The reader will observe the innuendo lurking between the lines in the first sentence. It very clearly implies that, in spite of the four pages of letters we published favourable to our proposed light car run, the Automobile Club adheres to its erroneous opinion that no such event was wanted. If manufacturers "really desire such Trials," an excellent opportunity will be offered in the next quarterly Trials, and if makers of light cars do not choose to enter—as, in our opinion, they assuredly will not—then we shall no doubt be told it is clear that such Trials are not desired. The fact is that the trade set very little value upon the quarterly Trials, and the Automobile Club certificate is not keenly sought for. So far as their value from the public point of view is concerned, it is practically nil, for the Trials are carried out in obscurity, and rarely, if ever, does a record of the performances of the vehicles appear in the public Press. The light car manufacturer cannot afford to hide his light under a bushel. He is appealing to a wide field, and not to the affluent few, and what he desires most of all is publicity. If his car performs well, it is absolutely vital to his interests that the results should be set out in a comprehensive and not too technical manner and given as much publicity as possible. At present—and this is apparently what the Club does not, or will not, understand—the quarterly Trials are dead to the public, and a certificate is no consolation to an up-to-date maker, whose first concern is with the public. That is why the quarterly Trials do not appeal to the maker who is studying the needs of the man of moderate means.

We wish, above all, to emphasise to the Automobile Club the fact that it is folly to dally with the popular side of the

pastime as it is doing. If it concludes from the result of its appeal for light car entries for its quarterly Trials that the light car trade does not require some bold, comprehensive and popular event, it will be committing another of its egregious and fatal errors.

The New Affiliation Scheme.

The Automobile Club has now made public the scheme, which has been privately circulated for some little while, for bringing members of motor clubs and organised bodies of automobilists into affiliation or association with the parent body. Whether or not the scheme will prove acceptable to provincial clubs, we are unable to say, but if the quid pro quo offered by the Club in return for the subscription asked from every individual member of an associated club be deemed insufficient, such a matter could be easily adjusted as the parent body grew in strength, both numerically and financially. The success or failure of the scheme will rather turn upon whether provincial automobilists, who may not wish to pay the fee of half-a-guinea per head demanded for the full privileges attaching to affiliation to the Automobile Club and membership of the Motor Union, will be content with so distant a relationship to the former body as is embodied in the alternative propositions of membership of the Motor Union (with an intangible association with the Club) at five shillings and half-a-crown per head, according to the privileges offered. In some ways these latter propositions could be improved, but we certainly think that provincial clubs would do wisely to accept the olive branch held out by the Automobile Club, and so prevent the possibility of a split in the ranks of automobilism at a time when unity of purpose is so essential.

Why Not?

Visitors to the Paris Exhibition cannot fail to be struck with the very wide range of automobile accessories which the French manufacturers are able to display. The French have ever shown a genius in this direction, but the forward strides which they are making even now are really remarkable. Particularly is this so with regard to electrical devices, such as accumulators, coils, switches, plugs, and electric speed indicators and lamps. America once had a commanding lead with electrical appliances all round, but in the smaller things there is no doubt that she is now supplanted by France. In many instances English accessories cannot be beaten, and are justly famed even outside of the British Isles. With regard to electrical contrivances, however, we have, generally speaking, much to learn, or, at any rate, to emulate. We are not by any means overlooking the fact that there are several well-known and skilled electrical firms in England who turn out exceedingly clever and high-class work for automobiles. We are, however, writing in the broad sense, and all people who are qualified to judge will agree with us that we are, on the whole, beaten not only as to quality, but as to price also. One has only to make a careful examination of the English-made cars and motorcycles in this country to find that at least eighty per cent. of them are fitted with batteries, coils, switches, and other electric apparatus of French design and manufacture. Thus thousands of pounds pass from this country to France every year for electrical accessories alone. Why is this? Why cannot English makers—again we are writing broadly—turn a more serious attention to this important side of automobile work? Whilst the French have an undoubted knack of meeting the popular demand, both as regards class of work and low price, it cannot be truly stated that the British electrician lacks the ingenuity to meet the Frenchman on his own ground. By so doing he would prevent the wholesale importation of accessories that ought to be made sufficiently well and in sufficiently large quantities in this country to satisfy the demand for them. The question is a most serious one, and we ask manufacturers to give it their very best consideration. Even with regard to lamps there are many of excellent design and finish to be found at the Paris Salon which are bound to find favour in the eyes of many English automobilists, not only because of their general reliability and illuminating powers, but because they are turned out at a price which defy competition in this country. How is such a state of affairs to be altered?

NEWS.

A.D. 1904.

Next year's number!

A Happy New Year to all numbered motorists!

The traction engine bids fair to rival the motorcar as a "street danger." Three fatal accidents have occurred within the last week or two.

The new American "Hewitt" car which has been built for the Gordon-Bennett race is said to be unusually light, weighing only about 2,000 lbs.

A Scotch motorist advocates that autocars should be named in the same way as yachts and pleasure boats and as the engines of some railway companies are.

Earl Russell's car, one of English make, by the way, was the first car registered under the new Act in the County of London, and will therefore carry the number A1.

We have received from Minerva Motors, Ltd., 40, Holborn Viaduct, E.C., a copy of a very artistic coloured calendar, which they are willing to send to any agent who may make application for same.

The roads in London are always in such a filthy state of mud and slime that some strenuous steps should be taken to put an end to the blot. Cannot the Roads Improvement Association move the authorities?

The Colorado (U.S.A.) Automobile Club has petitioned the municipal authorities to discontinue watering dusty streets in an excessive manner, and has pointed out that if the streets were kept *cleaner*, little or no dust would form.

Germany is taking steps, by generous grants of money, to be adequately represented at the St. Louis World's Fair. The big motor firms will be much in evidence. Nearly £200,000 has been voted already by the German Government.

Residents of Berkshire have decided to form a Berkshire Automobile Club. Sir Gilbert A. Clayton-East, Bart., has been elected chairman; Colonel W. Waring, hon. sec.; and Mr. E. Shrapnell Smith hon. treas. Forty-three members were elected at the first meeting.

Mr. Harnsworth has asked that his name should not be used in connection with the International Cup given by him for motor boat racing. Truly it must be disconcerting to have a new meaning given to one's name, as has become the case with the name of J. Gordon-Bennett.

Mr. Basil H. Joy, the Technical Secretary of the Automobile Club, enters the holy bonds of matrimony early in January. He has the good wishes of the world of automobilism, and particularly of the light car movement, the interests of which we know he has, personally, at heart.

The Automobile Club is seeking a private piece of road, surface either with asphalt, cement, or wood, for the carrying out of the Club's side-slip trials. If possible the road should be within ten miles of London. Perhaps one of our readers may know of a suitable course, and will advise Mr. Joy, at 119, Piccadilly, London, W.

A Radiant Prospect.

C. H. Gage, an American inventor, claims to have perfected a simple method of extracting radium from ore. He also claims to have invented a small battery which, with one charge of a preparation of radium, will run a motorcar for 300 miles.—Laffan.

O Radium! The time will come
When every radi-car
Will raid the country far and wide,
Devoid of fume and fuss:
And radi-bronghams will wider sweep
When they no longer are
Restricted to a ramble round
Within the Radius.

The Holland Park Motor Co., Princes Road, Holland Park, W., has the agency for the Prosper-Lambert car, described in our Paris Show report.

The Automobile Club announces that it will identify itself as prominently with motoring afloat as with motoring ashore. In the forthcoming motor boat reliability trials, which are to be held under the aegis of the Club, there will be more than the usual justification for being "all at sea."

The United Motor Industries, Ltd., 45, Great Marlborough Street, London, W., have just brought out a new edition of their catalogue. This is a very comprehensive and well illustrated list of all the well-known motor accessories stocked by the firm. This catalogue can be obtained by writing to the firm for it at the address given.

We understand that Mr. Chas. Jarrott has definitely undertaken to drive a de Dietrich car in the Gordon-Bennett race.

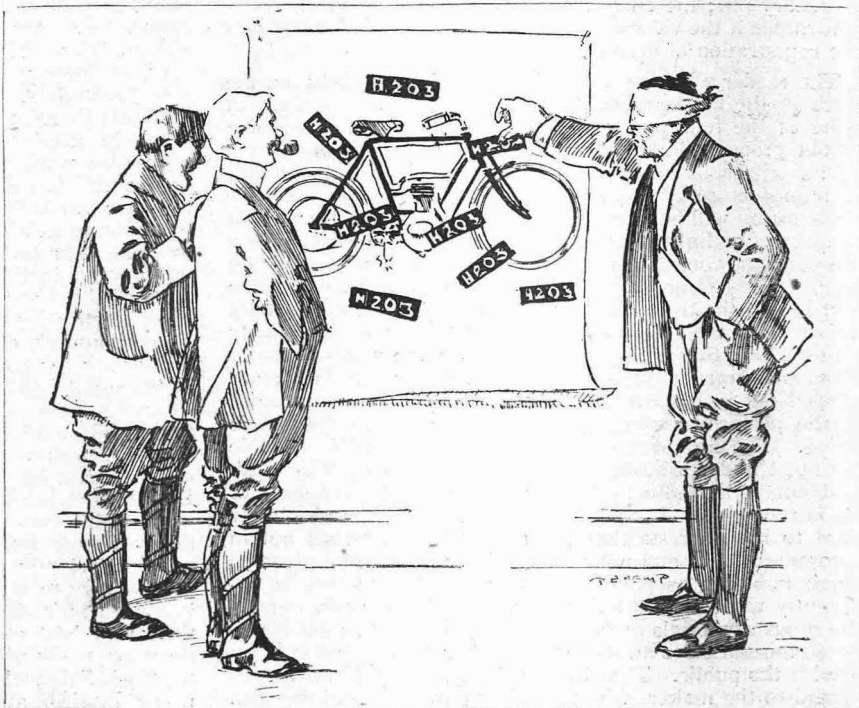
Mr. J. E. Hutton is reported to have expressed the opinion that the restrictions imposed on fast driving in this country are answerable for the dearth of expert drivers.

The "Daily Mail" quoted the whole of our first editorial of last week heading it:—"Wanted, Cheaper Motorcars. Where England can lead in a neglected industry."

The new Velodrome d'Hiver, at the Machine Gallery, in Paris, was opened last week. Motorcycle records and motor-paced cycling races will form one of the chief features of this covered track during the winter.

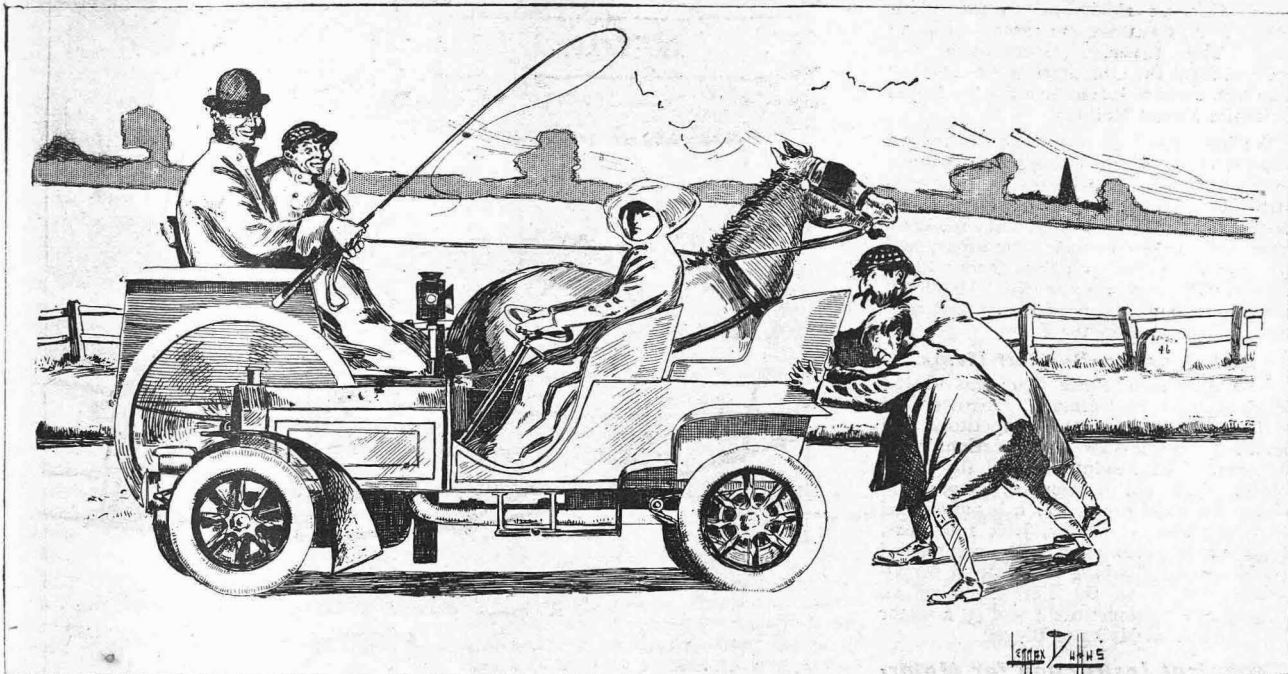
The A.C.G.B.I. deplores in the Christmas week number of its journal the loss from its library of a book entitled, "Letters from a Self-made Merchant to his Son." Some member is evidently ambitious of learning how to construct himself on the "auto" principle.

In connection with the new winter cycle track in Paris, where the motorcycle will play an important part, the management are seeking to compel all competing motorcycles to be fitted with silencers. The motorcyclists object for several reasons, chief among which is the difficulty of finding room on these racing machines to fit a silencer: they assert, moreover, that the fitting of the silencer will diminish the speed 30 per cent.



STICKING THE NUMBER!

A new game (akin to sticking the donkey's tail) that will be played extensively all over the country with the New Year.



IRREVERENT HORSEY BOUNDER: "Say, guv'nor, do you always bring your motor with you when you go for a walk?"

For omitting to stop his car when a teamster in charge of a waggon held up his hand, an American motorist is being sued for £3,000.

Blind Leading the Blind.

A (very) modern handbook of advice to motorists gives some delightful tips to the novice. For instance, "do not apply a brake to the surface of the tyres when running." We presume it is better to wait till the car comes to a standstill, and then apply the brake. It would be better still not to have tyre brakes. Again, "the beadings (of tyres) are intended to be the exact size of the grooves in the rims. Violent usage injures the beadings, and contributes to enlarging the covers!" Does it? Moral: Do not use the edges of your cover as a chest expander.

Uncontrolled Cattle.

We referred recently to stray cattle and somnolent carters, as being matters which might, with advantage, occupy the attention of the Automobile Associations. Now we have to chronicle rather a serious accident, which befell the Marquis of Anglesey's engineer, through a drove of uncontrolled cattle on the highway. The Marquis's man, Mr. Bater, was driving a motorcar in the neighbourhood of Stony Stratford, on the evening of Friday week. Going along very carefully, at about 10 miles an hour, with lamps alight, suddenly a drove of bullocks was encountered, and before the driver could stop, the car had collided with one of the animals. The bullock had to be destroyed, and the bonnet, wings and front part of the car were badly damaged. The driver who was in charge (?) of the animals was meandering along quite 300 yards behind them, and was drunk! We understand that the motorist will take action against the owner of the cattle, with a view to recovering the amount which he has had to expend in repairs to the damaged car.

Against the Police Regulations.

The pettifoggish literalness with which laws and regulations are applied in Germany is exemplified by what has occurred to a motorist named Braun, of Charlottenburg, a Berlin suburb. It is the rule of the road here, as elsewhere on the Continent, to keep to the right, and Herr Braun, instead of strictly observing this rule, had the temerity to drive along the road-car track in the middle of the road. One of Germany's "little tin gods" in the form of a police lieutenant happened to be on the scene and, naturally, exercised his authority, ordering the motorist to drive his car on the regulation side. Two good reasons induced Herr Braun to hold on his way for a while: children were playing on the right side, and a short distance ahead he would have had to turn aside to avoid a cart. As a matter of course, the lieutenant informed against the delinquent and, also as a matter of course, the Charlottenburg police commissioner ordered Braun to pay a fine. Braun objected, and the case came before the Assessor's Court, which, seeing nothing but the regulation and the transgression, sided with the commissioner. Against this decision the motorist appealed, engaging for his defence Count von Bredow, Syndic of the German Motor Club. The Count sensibly argued that, while the objective moment was against his client, the subjective moment—the belief that danger to the children justified a temporary disregard of the regulations—was an adequate set-off. But the superior court declined to consider subjective moments, clung, more Germanico, to the letter of the law and dismissed the appeal, stating that the appellant ought to have driven on the right side and slowed down. Nearly a year has elapsed since the transgression, so that Herr Braun has been put to a good deal of worry and expense over this trumpery matter. By the grim irony of things this

incident has occurred in the very Berlin suburb where the inhabitants are bitterly complaining that through the inefficiency of the police their streets are rendered unsafe at night by prowling hooligans.

At a meeting of the International Committee for the Gordon-Bennett Cup, held on December 16th, it was decided that competing cars must be driven by drivers appointed by the competing clubs, and that the circuit round which the race was run must be of a minimum length of 125 kilometres (78 miles).

An Interesting Booklet.

All readers of "THE MOTOR" should apply to the Palmer Tyre, Ltd., Birmingham for a copy of their interesting 1904 booklet. In so doing, they should mention the name of this paper. Besides containing illustrated particulars of the latest pattern Palmer motor tyres, there is other useful information, including a number of excellent maps on which the main roads, railway stations, dangerous hills, etc., are clearly marked. We recently gave full particulars of the company's new motorcar tyres, but we may say that the motorcycle tyres are made with specially strong fabric, every thread of which is separated and cushioned in vulcanised indiarubber, thus making them remarkably fast and durable. Without being very thick, the side walls are exceptionally strong, and owing to the fact that the rubber is vulcanised the threads of the fabric are not so liable to rot through moisture reaching them. The tread of the tyre is very stout and possesses no canvas or any other material. Resiliency and reliability is thus secured. The tyres are made to stand out well from the rims—a method which gives the maximum amount of air cushioning. This feature means of course that the tyres are speedy and absorb all the vibration possible. The thickness of the tread is sufficient to defy ordinary punctures.

The German alcohol-driven motor industry is now turning out motors of 40-50 h.p. The Prussian Government has ordered from the Oberursel Motor Factory a 40 h.p. alcohol locomotive for the Royal Grinnitz Forest Railway.

We have received a draft of the second portion of the Local Government Board's regulations, dealing with the use and construction of cars. The draft has been issued to the various authorities for criticism and suggestions for alterations, and the regulations in their final form will be made public in a week or two. The document now issued is confidential and may not be discussed in the Press.

Late Gordon-Bennett Items.

The American Motor Club has cabled three entries to Germany. Switzerland will also be amongst the competitors, and hence no fewer than eight nations with 24 cars. The headquarters of the Swiss Motor Club are in Geneva. Over and above the chief event, which is announced to take place on Friday, June 17th next, Homburg's programme will comprehend (1) Mountain climbing competition for alcohol motors on the Fernberg; (2) an "Elegance" competition; and (3) a motor boat race from Mainz to Bingen.

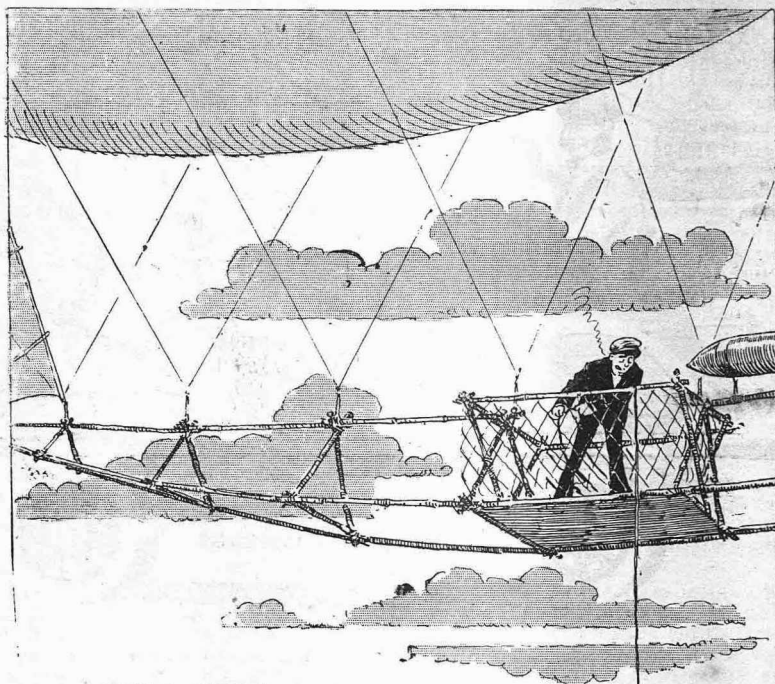
Technical Instruction for Motor-car Drivers.

The classes organised for the instruction of motor drivers held at the Battersea Polytechnic have during the past term proved very successful, we understand. Each student has had 26 lessons, including drawing, lectures and practical manipulation of a car in all its details. Through the kindness of Sir George Newnes in lending a 20 h.p. Darracq car the students were afforded the exceptional opportunity of taking driving lessons and being awarded certificates after a suitable examination in proficiency. The governors of the Polytechnic are about to purchase a car specially for the purpose of demonstration and driving for the new course commencing January 4th.

Resignation of Mr. George Iden.

Mr. George Iden, M.I.M.E., who has acted as works manager and chief designer for the Motor Manufacturing Co., Ltd., Coventry, has tendered his resignation. Mr. Iden has been a prominent worker in the motor industry since the early days and he has an optimistic view as to its future in this country. He is a great believer in standardisation and an examination of the M.M.C. cars which have been built to his designs prove that he has put this belief into practice. He is of an inventive disposition and many of his cars possess original features. Not only has he been able to place reliable and speedy cars upon the market, but he has also built many which have been eminently successful in trials and competitions—in fact, for two years running, his 8 h.p. voiturette won a gold medal in the Automobile Club Reliability Trials. This is no mean feat, but probably his finest creation is the magnificent saloon car which attracted so much attention at the Paris Exhibition and which we believe was sold for £2,000. The M.M.C. will lose an exceptionally brilliant man when Mr. Iden quits their service; however, their loss will be another company's gain for we understand that Mr. Iden does not intend to desert the industry.

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LOOKING AHEAD!

PETROL MERCHANT: "These 'ere airships are all right for trade, but there, you're never sure whether you're going to get your money or not!"

Automobile Club for Berkshire.

A meeting of Berkshire automobilists assembled in Reading ten days ago with the object of forming a club. Sir Gilbert Clayton-East occupied the chair and read letters of regret at inability to be present from Sir Francis Jeune, Lord Craven and others. It was resolved to affiliate to the Automobile Club of Great Britain, and a committee, to frame rules, etc., was elected consisting of Lord Craven, Sir Gilbert Clayton-East, Sir Alexander Henderson, M.P., Mr. Robt. Hargreaves, Capt. Arthur Hill, M.P., Sir Francis Jeune, Mr. C. D. Rose, M.P., Major E. R. Portal and Mr. Jas. F. Ochs. It was unanimously decided to elect Col. Waring, of Beenham Grange, Reading, and Mr. E. Shrapnell-Smith, East Hampstead, hon. sec. and hon treasurer. Forty-two members were elected.

Motor Club for York and District.

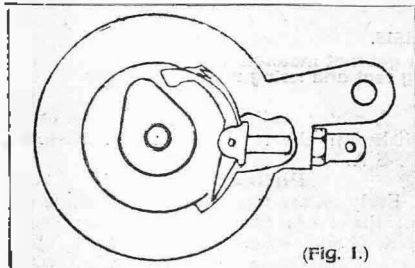
At a meeting of York motorists held at York, on Monday evening, December 21st, it was decided to form a motor club, to be named "The York and District Motor Club." Dr. Noel Hood occupied the chair. The meeting was largely attended and enthusiastic, Dr. Angove and Mr. W. H. R. Hopkins were appointed joint secretaries, and Dr. Hood treasurer. It was unanimously decided to ask E. Gray, Esq., the late Lord Mayor of York, to be the first president of the club. It was arranged to have regular fortnightly meetings to discuss motoring in all its branches. Papers on the various items of interest to motorists will be read and, when necessary, steps taken to protect the interests of users of motor vehicles in the district. Already between 40 and 50 gentlemen have become members, and there can be no doubt but that the club will be a decided success. The address of the hon. sec. is Ash Grove, Haxby.



The 1904 Lloyd Motor-Bicycle.

Messrs. W. A. Lloyd's Cycle Fittings, Ltd., Park Street, Birmingham, have recently introduced several important improvements into their new model motor-bicycles.

We had an opportunity last week of examining their two standard models (2½ h.p. and 3½ h.p.). The bore and stroke of the two engines are respectively 2 13-16ths inches by 3 inches and 3 1-32nd inches by 3¼ inches, developing full power at 1,400 revolutions per minute. In each case the engine is fixed vertically in a loop frame. This is in accordance with the original design, which has been found to be eminently satisfactory. The cylinder and valve chamber are of one casting, the inlet valve being of the automatic type. An exhaust valve lifter is employed, and is operated by a Bowden wire from the handlebar. The lever actuating the wire has two notches, and by lifting the lever to the first notch the contact is broken without the valve being opened. By this means the engine may be used as a brake; by moving the lever,

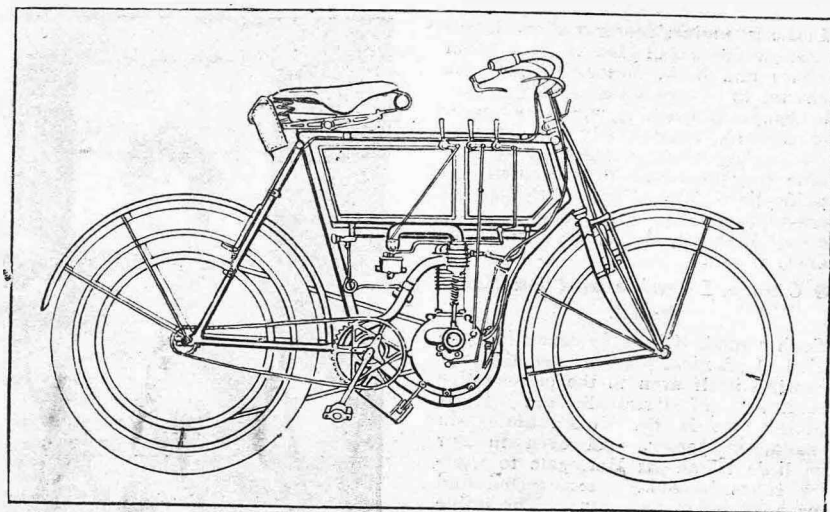


Fibre timing arm fitted to new patent control lever.

however, to the second notch the exhaust valve is opened and the contact broken.

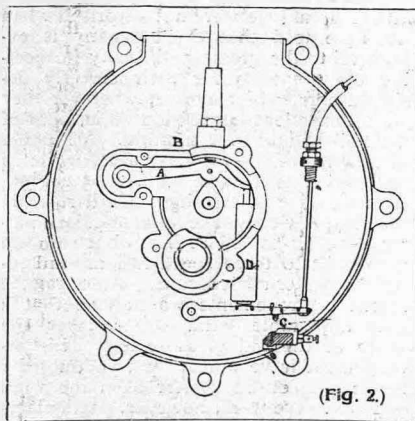
Fig. 1 illustrates the make and break contact. It will be noticed that the make and break lever is jointed to the inner end of the terminal pin, and held in position inside the timing arm groove by the connecting terminal. The lift allowed is about 1-32nd in. A small spiral spring let in the fibre groove dispenses, it is claimed, with all spring breaking troubles, and it is further stated that the efficiency of the contact is not in the least affected by the presence of oil.

The two to one gear-wheel has a cam on each side, one actuating the exhaust and the other the contact breaker. The timing arm is fitted into the gear cover, and is very accessible. Fig. 2 shows the gear side of the crank-case with the gear-wheels removed in order to demonstrate more clearly the new valve lifting arrangement, which is operated inside the gear-box. The rocking lever "A" is fitted with a hardened steel roller, and the reciprocating parts are free from all lateral wear, the valve and plunger being lifted vertically. Another new departure is the connecting rod. This is made from a forged steel stamping, and possesses at the crank end an extended spoon-shaped arm, which reaches a little below the fly-wheel. This ingenious arrangement acts as an oil splasher, and has proved, in conjunction with the oil pockets, to greatly assist the lubrication of the bearings, which are long and of ample diameter. A new method of rim fastening has been adopted, which is neat in appearance and effective in drive. The fas-



The 1904 Lloyd Motor-Bicycle.

tener is attached to the belt rim by nuts, and to the spokes by a system of slots; every alternate one is slotted to form a hook, and the intermediate fasteners are at an angle of 75 degrees from the hook. This arrangement is said to give a firm grip and an equal pull on each stroke. A very neat device for the prevention of oil throwing is fitted. On the crank case immediately under the driving pulley is cast a small bracket, through which is inserted a sliding square-shape piece of fibre, specially grooved and adjusted to just scrape the edge of the pulley. This catches the oil, and prevents accumulation or splashing, as the oil runs away down the groove. A high-speed trembler coil is fitted, and also a Longuemare carburetter. In concluding, however, we



A.—Exhaust lift rocking lever with hardened steel roller.
B.—Gear box with covers and gears removed.
C.—Exhaust lift and electric current breaker.
D.—Spring inside plunger guide to keep contact breaker firm.

must not forget to refer to the combination free-wheel hub. The wearing qualities of Lloyd's hubs have long been known to the public, and the high standard of excellence is retained in this speciality; while the combined free-wheel running as it does on a double row of ¼ in. balls assures the rider of absolute freedom from "drag" on the feet. The hub itself runs on 5-16ths in. balls, and the spindle is 7-16ths in. diameter.

Christmastide in the London district was accompanied by doubtful weather—rain or snow threatening, but not falling until the Sunday, with occasional glimpses of sunshine. The roads were in very fair condition and motor vehicles were numerous on every outlet. We saw many instances where the motor was doing "Christmas party work" for the first time, fetching guests from the station taking them for their first motor drives, etc.

The New Hutton Racing Car.

We hear that Mr. J. E. Hutton's Gordon-Bennett racer, which will be shown at the Crystal Palace in February, has some interesting points. The weight of the motor averages 5½ lbs. per h.p. It has six cylinders placed vertically; and a newly designed clutch running in oil. Variations of speed will be attained by a lever on the steering wheel and not by the usual gear wheels. There will be no separate brake lever, the brake mechanism being actuated by pressing a button placed on the steering wheel.

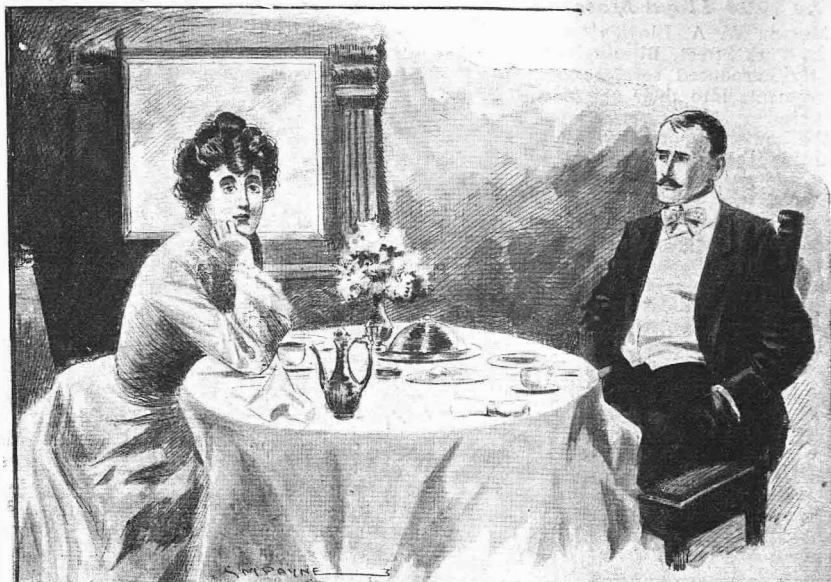
French Automobile Club's Invitation Banquet.

Representatives of the various automobile clubs of Europe and America sat down at the Invitation of the Automobile Club of France to a banquet in Paris, on December 16th. Baron de Zuylen, President of the A.C.F., presided. Other representatives present were:—Count von Sierstorpff (Germany), M. Quinones de Leon (Spain), Mr. R. W. Wallace (Great Britain and Ireland), Count Kratowsky (Austria), Mr. C. G. Dinsmore (U.S.A.), Baron de Crawhez (Belgium), Baron de Sulzer-Wart (Switzerland), and Signor Enrico Marchesi (Turin). The feature of the evening was a long speech by Baron de Zuylen, in which he sketched the initial efforts of automobilism as far back as seventy years ago in England, its intermediate decline and fall into the traction engine and "red flag" stage, and its recent rapid rise into world-wide prominence in consequence largely of the popular interest excited by road trials of the Paris-Vienna and Gordon-Bennett type. Mr. Roger Wallace, who replied for the A.C.G.B.I., complimented the A.C.F. on its enterprise and industry, as manifested most recently in the splendid exhibition then being held in the Grand Palais.

In the seven days' motor trial which will be held at the end of January from Milan to Nice and back, motorcycles will be restricted to motors not exceeding $3\frac{1}{2}$ h.p. No change of machine will be allowed, and roadside repairs only will be permitted. Any speed in excess of 35 kilometres (21 miles) an hour will entail disqualification. The entries up to date include representatives of the Bianchi, Laurin and Klement, Adler, and Zedel machines.

A Cheap, Durable and Dustless Road.

Such a road, if it really comes into the region of practical politics, should surely commend itself even to the conservative constitution of Great Britain. It is claimed that in the United States, in Canada, in Jersey, and even in our own little island—at Harrogate to wit—such roads have been constructed and have answered expectations. The prime disadvantages of all our existing macadam roads are susceptibility to wet and other climatic influences, with consequent lack of durability, cost and labour of repair, and dust and mud producing qualities: wood paving is costly, unhealthy, and non-durable; whilst the various forms of asphalt roadings are both expensive to lay and maintain, as well as dangerous to all forms of traffic under many conditions of weather. The improved method of road-making to which we have alluded employs stone—preferably granite—and tar laid on a concrete bed and topped with a coating of tar, cement and gravel. It is claimed for a road so constructed that it embodies the following advantages: Great saving in cost of construction: perfectly sanitary, the road being watertight: easily kept clean: dries quickly after rain: horses never slide: makes absolutely no dust: takes less time to make than stone pitching or wood blocks. In St. Helier, Jersey, roads have for some time been laid out on this system, and are apparently giving every satisfaction. A short description of the method of construction was published recently in a Jersey paper. First of all, the constructors dug out about 18 inches below the surface. They then began by laying six inches of good concrete turned to the shape the road was to take, with a good crown—for a good crown to throw off the water is the secret of road-making—and this was rolled with the steam roller whilst it was in a plastic condition. On the top of this was put another 6in. layer composed of clean cracked granite of about $2\frac{1}{2}$ in. mesh, mixed with tar to the proportion of about eight to ten gallons to the cubic yard of stone. The stone was first heated to drive off all moisture and was mixed while hot with heated tar. It is not necessary that the stones and tar should be the same temperature; if the stones are hot and dry they will heat the tar and weld perfectly. On this is placed a final 6in. layer of stone and tar, the stone being of somewhat smaller mesh. It is stated that a horse has not been known to fall on any of these roads in Jersey since they were made—one of them as far back as four years ago. As there is neither dust nor mud, no scraping—most potent of road destroyers—is required. Only three halfpence per square yard per annum is the estimated cost for repairs on roads where there is heavy traffic.



THE CRISIS.

HE: "Well, which is it to be—pay the rent or get that motorcar?"

SHE: "Get the motorcar. It's no use paying rent and losing our social position."

In some of the remote country districts in America the motorcar is not yet a familiar object of the roadside. "What kind of patent medicine is you a-sellin'?" is the query which greets the occasional motorist out Lexington way.

The Lanxhester Engine Co.

Calling at the Sparkbrook Works of the above company last week we had the good fortune to meet Mr. Arthur Meyrick, to whom we are indebted for a view of the various shops in the factory. Considerable bustle and activity was apparent on all sides, and we were not surprised when we were told that the company is experiencing the greatest difficulty in meeting the demands for their cleverly designed cars, which create, wherever they go, an excellent impression on account of their silent and easy running. A number of new frames were observable, while in one department alone we saw 25 engines in the course of erection. Until recently the company only made one standard pattern—an air-cooled 10 h.p.—but cars are now built to three specifications, including the water-cooled type. Amongst the recent improvements we noticed that a new adjustable wind shield takes the place of the old glass panel. This arrangement is very neat, and undoubtedly forms a splendid shelter from the wind and wet. We were, however, particularly anxious to learn something about the light car which they had proposed to build, and we were disappointed to hear that, despite the fact that the full design had been completed, it had been decided not to proceed with the manufacture of it, owing to the great and increasing demand for the higher powered cars. The factory is at present greatly taxed, and until considerable extensions have been made the light vehicle will not be forthcoming. It is interesting to note that a good percentage of orders is coming from South Africa, and it is worth recording that all parts of the machines, including electrical, are made in the company's own factory. All parts are standardized and interchangeable.

A motor mail delivery has been established in the rural districts of Missouri, U.S.A.

Pulled Him Up!

Early on the morning of the opening day of the Paris Show a motor fire engine was being driven at a good speed across the Place de la Concorde towards the exhibition, where it was to remain on show. It was a very wet morning and the roads were just passing through the slippery stage, and as the staff of "THE MOTOR" were interestedly watching the progress of the big vehicle it suddenly pivoted on its front wheels and turned a complete half circle, missing the other vehicles around it and pulling up facing in the direction from which it had come. After that the driver went along a little more cautiously.

Compression Troubles.

A small crack in the top of the piston or somewhere in the combustion head or cylinder has often proved a worrying business to even an expert repairer. In a case where the radiating flanges were very thick—much thicker, in fact, than the walls of the cylinder—the continual expanding and contracting of the flanges resulting from heating and cooling had caused a crack to form just under the flange, which was very difficult to detect. A cracked cylinder is useless. A curious reason for loss of compression once came to the writer's notice; this was caused by a slack fitting gudgeon pin: the charge got past the slot in the top ring, and then through the pin bearing: the locking screw of the pin had pushed it slightly eccentric with the hole. It will be found, as a rule, that the injection of paraffin into the cylinder for easy starting often lowers the compression for a few moments, the reason being that the paraffin washes the thick oil away from the cylinder walls. A thick bodied oil, though it has some disadvantages, greatly assists in improving the compression. A new machine will sometimes have a weak compression for a hundred miles or so, but it soon improves when the surfaces of rings and cylinder get worn smooth.

Automobile Ballet.

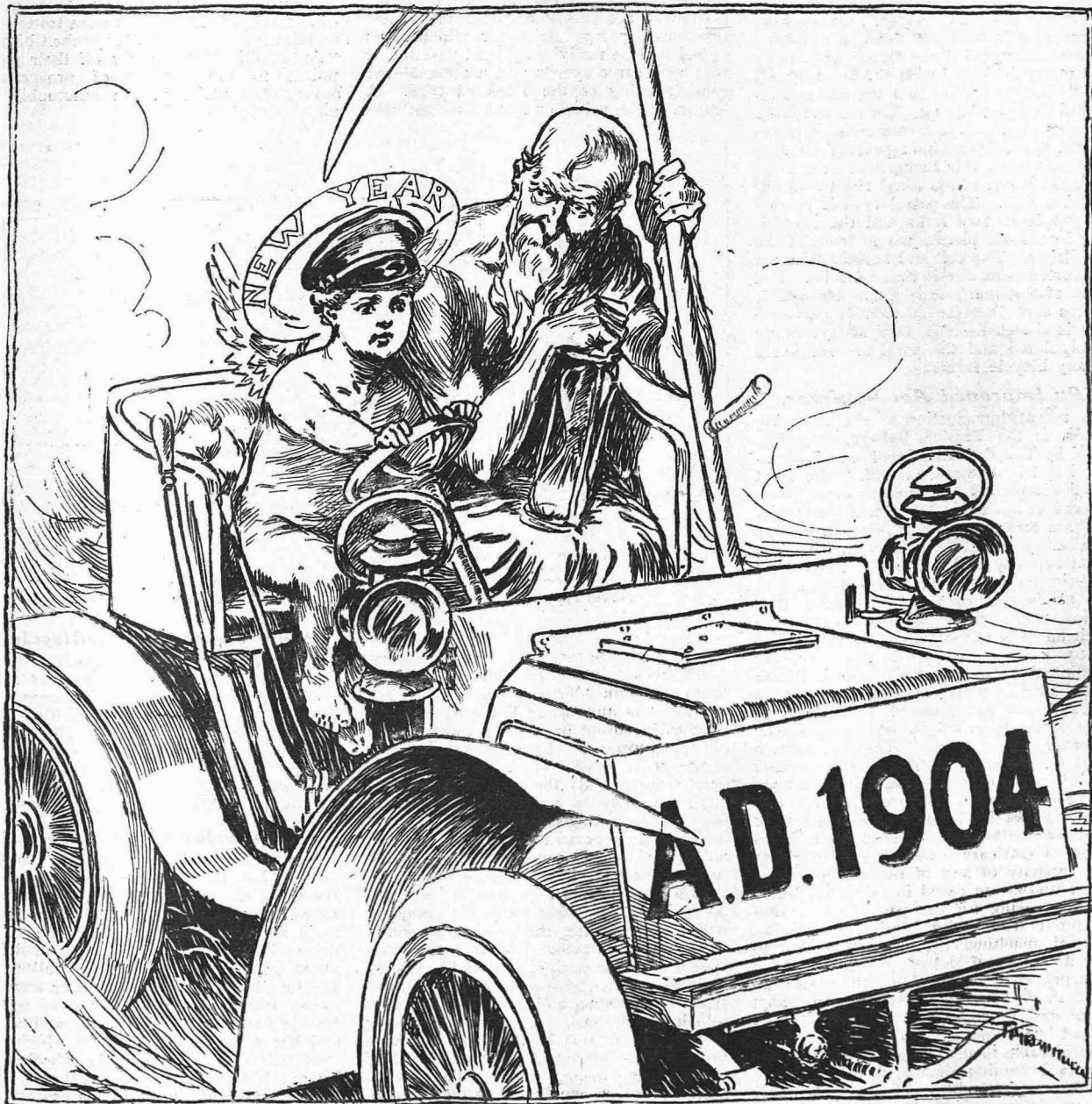
One of the most interesting side shows in connection with the Paris Show, which has just closed its doors, was the automobile ballet arranged for the gala night at the Opera, on Thursday, December 17th. Three thousand guests, including representatives and visitors from all the chief automobile clubs in the world, were invited, and the affair was conducted with that eclat and artistic skill for which the Parisians are famous. The ballet may truthfully be described as novel, seeing that it was composed of motorcars, beautifully decorated with flowers, representing the great motoring nations of the earth—which is, of course, tantamount to saying that all the great powers were represented, with the remarkable and regrettable exception of America.

The "Hooded Van" Danger.

The hooded van—the direct and indirect cause of countless street accidents—will have to be reconstructed after the 1st of May next if it is to comply with the new L.C.C. bye-law. This bye-law, which we have quoted verbatim in a previous issue, enacts that the driver of every vehicle shall have an uninterrupted view of the traffic in front and abreast of him, so that either the hood will have to be made transparent, or the driver's seat raised or placed forward so far as to command the necessary view. In most of the ordinary hooded vans of to-day the driver is so placed that, except for traffic actually coming towards him, or proceeding in front of him, he might as well be blindfolded, and this has constituted a real and very serious danger to itself and all forms of traffic.

Commercial Chauffeurs Exempt.

The question whether a chauffeur is a "male servant" (and therefore liable under the Male Servant Licence Act, having cropped up, it is instructive to note that the L.G.B. have instructed the various County Councils that although a male person employed to drive a motorcar is deemed to be a male servant for purposes of licence duty, the Inland Revenue Commissioners do not propose to require the payment of the male servant licence in respect of servants employed to drive motor vehicles which are properly inscribed with the owner's name and address, and used solely for the conveyance of goods, or of instruments of trade, or husbandry, so as to be within the scope of the exemption conferred in favour of "trade carts."



DULY REGISTERED

The New Year, coached by Father Time, enters upon the scene duly numbered according to the new Act, as A.D. 1904.

Motorcycling in Germany.

The "First Berlin Motor Cycle Club" has decided to join the German Cyclists' Association (Bund) in view of the latter's special privileges to members in regard to insurance against liability and accidents, on the condition that the committee of the association find ways and means of enabling members of "Association" clubs to count also as full members in a motorcycle club affiliated with the Bund. Herr Eugen Glombitz (secretary of the Berlin branch of the Bund) and Messrs. Lange, Schindler and Wallner, all well known Berlin amateurs, have the negotiations in hand.

A Novel Type of Front-driving Motor-Bicycle.

Amongst the curiosities shown at the Paris Salon the motor-bicycle illustrated was one of the most notable. This machine is named L'Auto-Roue Roux, the agents' address being 5 Rue des Beaux-Arts, Paris. The motor is fixed inside the front wheel, which has no spokes, but the rim is supported by arms having rollers at the end. The power from the motor shaft is transmitted by a short chain gearing on to a friction wheel, this being held in contact with the inside of the wheel rim by an adjustable arm. The petrol tank is carried on supplementary forks and the controlling levers are placed just in front of the handlebar. The coil and accumulator are supported from the horizontal tube. The price of this machine is £24. The maker claims that the transmission is perfect—this is doubtful—it is very stable, easily manipulated and the parts are adaptable to any bicycle frame.

An Improved Accumulator.

A recent introduction to the motoring public is the Prested Battery, manufactured by The Prested Miners' Gas-Indicating Electric Lamp Co., Ltd. The need for the improved accumulator arose when the miner's electric lamp was perfected, because that invention required a battery combining three essentials, viz., long life, great capacity and lightness. Exhaustive experiments by this firm have resulted in the production of a battery which they claim secures these valuable qualities to such an extent that they have decided to bring its merits before the motoring public. A fully equipped factory has been established in which every type of cell in demand will be produced, and the company is ready to supply any special size, to order, in one week. The composition used on the grids is different from that used in any other make, and it is claimed that the maximum of electro-chemical efficiency is obtained, and the dead weight of inactive material is reduced to a minimum. Great care is taken not to overstate the capacity of any of the various sizes. All patterns are cased in celluloid, but a unique casing for car patterns is manufactured from solid blocks of teak by special machinery, toughened and rendered acid proof and non-conducting by a new process. In these latter the plates are held in position by a composition which is poured in and afterwards sets firmly. Fixed in this way, the batteries will stand considerable ill-usage without fear of the plates becoming dislodged. The prices compare favourably with those of other accumulators. The address of the manufacturers is: Elthorne Road, Upper Holloway, London, N.

D.R.2

At the Parisian monts-de-piete (pawn-shops) motorcars are occasionally pledged. A well-known Paris-Bordeaux racer and a 60 h.p. Mercedes are stated to have lately paid a visit to "uncle."

The Dangerous (?) Motorcar.

The New York City police have lately published statistics relating to street accidents in 1902. The figures corroborate in a very striking manner the results published recently in this country as to the comparative harmlessness of the automobile. The number of deaths due to traffic accidents in New York during 1902 were:—Street railways, 172; trucks, waggons, and other horse vehicles, 146; automobiles, 9; bicycles, 2.

A New Swift Light Car.

The Swift Cycle and Motor Co., Ltd., Coventry, are busily engaged on a new two-seated 7 h.p. light car which it is hoped will be ready early next month. It will have three speeds and a reverse—the gearing being of the Panhard type. A feature of the vehicle will be its simplicity

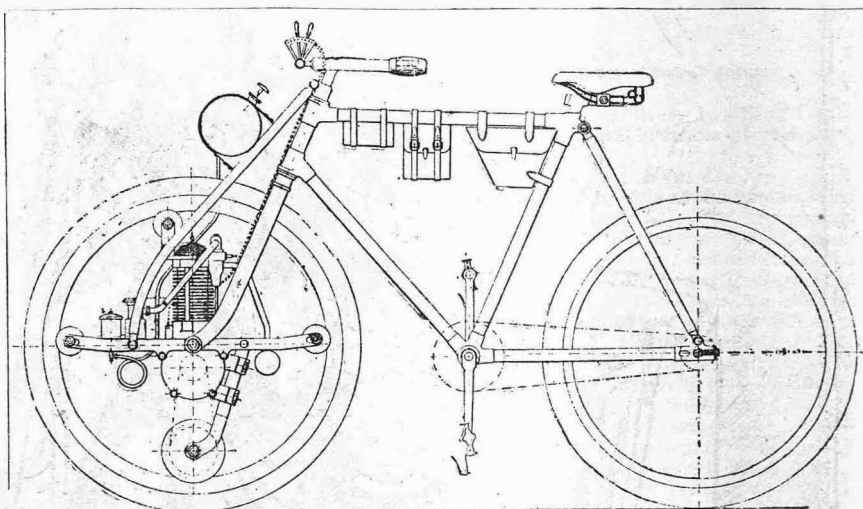
Messrs. Alfred Dougill and Co., Ltd., 34 and 36, Great George Street, Leeds, are building a new 7 h.p. light two-seated car. This will be placed on the market at a popular price—140 guineas.

The Herkomer Prize.

The Bavarian Motor Club has issued regulations respecting the Herkomer prize drawn up by Baron von Schrenck-Notzing, conformably with the resolutions of the club's committee on November 4th. The first competition is to take place in Munich in the first half of 1904.

The Old Order Changes.

The horse market at Cincinnati, U.S.A., for seventy years one of the industrial features of the city's life, has closed its doors, and the site of its stables has been acquired by the Cincinnati Automobile Co. "Where once horses were trotted up and down in the streets," says the Chicago "Automobile," "to show off their good points to the throngs of prospective buyers, the whirr of the automobile is now heard."



Novel type of Front-driving Motor-Bicycle shown at the Paris Show.

of control; one lever will actuate all the speeds and the reverse. It will possess a 6ft. wheel base and artillery wheels. Extra attention is being given to the finish and as it is intended to list it at only 200 guineas it should be able to make a bold bid for popularity. Later on we shall describe it in detail and illustrate its principal features. By the way, it is interesting to note that a Swift 6 h.p. voiturette was the only English two-seated vehicle to secure a silver medal in the recent 1,000 miles trial held under the auspices of the Automobile Club. This car secured 8,763 marks—the highest but one in its class. As we have previously stated the company will market during the coming season a motor-bicycle having a worm gear, two speeds and free engine. This will embody features not to be found on any similar type of machine and will have a very rakish appearance. A belt-driven motor bicycle having a 2½ h.p. air-cooled engine fitted with mechanically operated valves is also being made. The company's new motor premises, which are costing £12,000, are nearly completed and will be ready for occupation on January 1st. A fine plant of machinery is being installed.

New Whitley Motor-Bicycle.

The Whitley Motor Company, Coventry, intend placing on the market early next year a 3½ h.p. air-cooled engine (83 mm. bore by 89 mm. stroke) with a mechanically operated valve. This is in order to meet the demand for this type of motor. In other respects it will not vary from the company's standard air-cooled engines which we recently described.

Wonderful Launch Speed.

The "Gee-Whiz," a 55 h.p. motor launch, has been showing a fine turn of speed on the River Harlem, New York. Like the "Vingt-et-Un" which we referred to in a recent issue, the "Gee-Whiz" is driven by petrol and is capable of doing about 20 miles an hour: her hull is 30 feet long by 4 feet 10 inches beam, and she draws from 7 in. to 8 in. only of water. She is beautifully finished in mahogany and has a forward cockpit in which the steersman can control all the wheels and levers which actuate the machinery. She has an engine of four cylinders cast in one piece and surrounded by a brass water jacket tinned on the inner surface to reduce galvanic action.

SOME NEW AMERICAN MOTOR-BICYCLES.

The King of the Belgians paid a visit to the Paris Salon just before Christmas. His Majesty, who is a keen supporter of automobilism, made a long stay and evinced great interest in the various exhibits. He particularly admired Prince Orloff's new Panhard car, and on being told that it was capable of a speed of 30 miles an hour, he exclaimed—"A very comfortable speed for a pleasure car."

The Use of the Motor Waggon.

"There are certain classes of work in which the employment of motor waggons must, humanly speaking, be a successful departure from either horse or rail. A motor lorry should succeed, in the present stage of the industry, and our general knowledge of their use and failings, where it can travel not less than 175 miles a week, with an average load throughout of 3 tons, at an average rate per ton-mile (which, it must be remembered, covers collection and delivery) of not less than 4d."—E. Shrapnell Smith in the "Automobile Club Journal."

A Stinging Reply.

The following reply to Mr. W. Rees Jeffrey's circular has been addressed to that gentleman by Mr. W. B. Hulton, Chairman of the Main Roads and Bridges Committee of the Lancashire County Council:—

"Your letter was before my committee yesterday, and I am authorised to say that it was considered wholly unprecedented and objectionable in tone; that neither the bribe nor threat contained therein will influence them in a careful administration of the Motor Car Act."

As we stated last week, the full extent of the harm done by the circular in question cannot be fully known for some time, and the subsequent letter of explanation and half-hearted apology will not right matters by any means. No doubt most of the County Councils will treat the first letter with the contempt it deserves; but it is hardly likely that its objectionable tone will be forgotten.

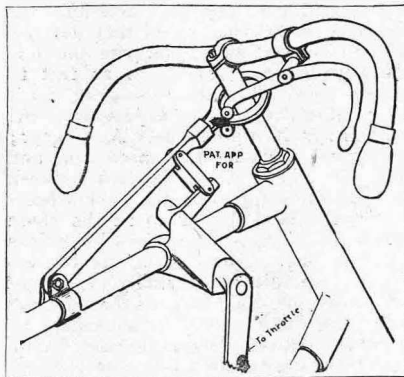
To Baffle the Police.

A speed indicator, which indicates for public and chauffeur alike, has been perfected by a Minneapolis architect, after fourteen months of experimenting. So far as the Patent Office shows, this is the only indicator of the sort which has stood the strain of use. The perfected indicator consists of a small brass cylinder, in either end of which is a white face, a sector of which is missing. This incomplete circle revolves over another, on which are painted sectors in different colours. When the machine is within the town streets and within legal limit, a black sector shows. When the speed reaches ten miles an hour, a light green sector is exposed; while a red sector comes into view when the speed reaches twenty miles an hour. As these faces are parallel with the course of the automobile, pedestrians, and particularly police officers, can tell at a glance whether the machine is going at a proper speed. For the benefit of the chauffeur a tape, exposed through a narrow strip of glass, in the side of the cylinder facing him, tells the exact speed attained. An electric lamp in the cylinder provides light in case the machine is used at night, and the cylinder, which is connected with the front axle by a sprocket and chain and a swivel arrangement, much like that used in dentists' chairs, is fastened in front of the chauffeur.

A number of the 1904 models of American machines are now on the market, and we are able to give particulars of several of them. The "Black Diamond" motor-bicycle is made by Reeser and MacKenzie, 1,100, Betz Buildings, Philadelphia. This has a vertical engine fitted in a loop frame, driving by a chain first on to a countershaft and thence by another chain to rear wheel sprocket. The frame outline is rather a symmetrical one, the petrol tank and coil being carried by the top tube of the frame. The ignition—as is usual on American machines—is by dry batteries carried in a case fixed behind the saddle. It is rather interesting to note that the make and break device of this machine is an imitation of the Gardard-Maxfield patent, but probably

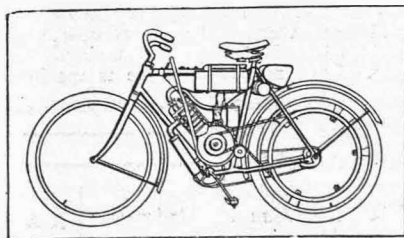
THE MOST STRIKING DETAIL

is the controlling device worked from a handlebar lever so constructed that the steering has complete freedom throughout



The "Black Diamond" Handlebar Control System.

a circle. It will be seen that there is a system of several levers ending in a ring through which the handlebar stem passes. There is a special feature about the inlet valve of this machine, this being used for relieving the compression and also for being automatically moved from its seating when the machine is stopped, and thus preventing the valve gumming or sticking. A spray carburettor of the mixing valve type is used. The total weight of the machine is 130lbs., motor 39lbs., and having a cylinder 2½ by 3½ inches—is about equal to 2½ h.p. The petrol tank holds more than one gallon. It is interesting to note also that to facilitate adjustment of the pedal chain and driving chain, both of these are made of the same length by suitably designing the sprockets. The only brake fitted appa-

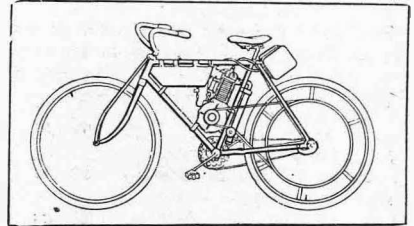


The "Mayo."

rently is a "Coaster Hub" pattern. The 1904 "Mayo" machine has the motor of 2 h.p.

MOUNTED INSIDE THE FRAME,

the diagonal tube being taken further back from the bracket than is usual. The belt drive is comparatively short, but to compensate for it the pulleys are large and a



The "Whipple."

lever adjusted jockey pulley is used for tensioning the belt. The coil and dry battery are mounted behind the saddle pillar. A spray carburettor is used. The weight is claimed to be only 90lbs. The rims are steel and tyres are G. and J. pattern—practically the same as our Clincher tyres. The "Whipple" machine is made by the Whipple Cycle Company, 260, W. Jackson Buildings, Chicago, and is rather a neatly designed mount and comes out at the reasonable figure of 120 dollars (£25). The special features about it are a two-speed gear and clutch only adding 6lbs. to the weight, engine arranged inside the frame, spray carburettor, duplex forks, exhaust taken behind the saddle pillar, belt drive with jockey pulley adjustment and Coaster Hub brake. The ignition is by dry battery and coil carried in a case behind the back stays. The petrol tank which appears to be of small dimensions is fitted in the forward part of the frame. The lubrication is effected by a sight feed oil container screwed into the crank case. The makers claim that this machine is equal to doing 25 miles an hour and climbing any hill on the low gear.

Dawn of the Horseless Age.

Paris anticipates that in five years at most the horse will have disappeared from her streets. A prominent Parisian job-master has been giving his views on the comparative merits of the horse-drawn vehicle and the automobile. He takes as an example a well-known French four-seated electric car which sells at £400, and compares it from the points of view of efficiency and expense with his own horse carriages. He has 35 carriages, which necessitate a stud of 120 horses—these latter costing him 4 francs each *per diem* to feed, shoe and look after; so that the daily cost of running his 35 carriages amounts to 480 francs (about £19). He estimates the daily expense in connection with the re-charging of accumulators, etc., at 5 francs, which for 35 cars would amount to 175 francs *per diem*. That is to say that he calculates on saving, by the exchange from horse carriages to electric cars, 305 francs (about £12) a day. As regards efficiency he considers that the automobile is even now fully as reliable as the horse carriage.

OTHER PEOPLE'S VIEWS.

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

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

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

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

The Humberette.

Sir,—In your issue of the 9th inst. I see that at the end of his letter your correspondent "W.H.G." says that his 5 h.p. Humberette "will now take almost any hill." I should be very much obliged if "W.H.G." would tell me of any hill near London which he has been unable to get up. I have not made a point of testing my Humberette, but I have found no difficulty in taking any hill up to the present, and I have been up some which I thought were very stiff.—Yours faithfully,
"EALING."

Devonshire Roads.

Sir,—I would like to say a few words on Devonshire roads. Mr. Fawcett, I believe, lives in Totnes: now the roads between Newton Abbot, Ashburton, Totnes, and Paignton are limestone, and this in certain stages of wetness or dryness is worse than anything which I have ridden on near, or in, London. The Totnes to Paignton road is particularly bad on account of the heavy coaching traffic. To give an idea of what it is like it suffices to say that one day this summer three cyclists riding in front of me raised such a cloud of fine chalky dust that it was impossible to see past them. Imagine the ruts and the mud when it is wet. Fortunately the limestone district is very small. The Dartmoor roads are granite, and dry almost as fast as the rain comes down. I expect that Mr. Harris, of Tavistock, has never been on the limestone, or he would have more respect for the side-slip demon. I have never been in Tavistock, but I know the road from Prince's Town to Plymouth, and a finer one could not be wished for. My experience has been on a pedal bicycle, but I am hoping to try a motor some time. I have felt both wheels slithering about just like my feet did the first time that I put skates on. The resident cannot help himself, but the visitor who stops in the lowlands deserves to shid for neglecting the glorious moor.—Yours faithfully,

K. H. EVANS.

Gudgeon Pin Troubles.

Sir,—I would like to warn "Georgius," who writes of his "gudgeon pin troubles" in your issue of November 25th, not to dispense with his gudgeon pin screws, as I tried the venture myself—a scored cylinder being the result.—Yours faithfully,
A. E. FISHER.

Motor to Drive a Fore-Car.

Sir,—In reply to "Sparker" in a recent issue, in my humble opinion a 4 h.p. water cooled engine is quite suitable for a fore-carriage. There is not much to choose between the M.M.C. and the Excelsior. He does not say at what speed they develop their full power, but I suppose the Excelsior would not run quite as fast to develop 4 h.p. A chain drive gives much less trouble than a belt, especially if the chain is run in a gear-case. As to gear; how would a Bozier two-speed gear and clutch do, put as a countershaft between the rear down tube and the back wheel? It is not a hard matter to fit the chain wheels to this gear, and the clutch is a good big one. As to governing the engine on the inlet; personally, I do not think governing necessary, as the rider can govern the engine to a certain extent by an exhaust lifter on the handlebar. With regard to the ignition, I only saw it working at the Show in air. Has "Sparker" ever seen the "Daw" 3½ to 4 h.p. water-cooled engine? This is very good and sold at a very reasonable price: the makers are Dalton and Wade, Coventry: it develops 3½ h.p. at 1,650 revolutions per minute, has bore and stroke of 79 × 89 mm., and weighs 60 lbs. I saw it fitted to three or four machines at the Show, and I have got one myself.—Yours faithfully,
"STORAGE."

Automatic and Mechanical Valves.—An Interesting Letter.

Sir,—As the above question still perplexes me, and probably others, I shall esteem it a favour if I may place before your readers the following questions. Given an engine 70 by 70 mm., weight 34 lbs., with automatic inlet valve, it is desired to increase the power of this engine. How shall this increase be effected? By adopting a mechanical inlet it is claimed we allow more explosive mixture to be drawn into the cylinder, thus getting a more powerful working stroke. It is obvious, then, that our mechanical inlet is only useful when the maximum intake of our automatic valve is reached.

This being so, we must assume that our engine is doing negative work until that period is reached, by reason of its having to work the various parts which the adoption of this device entails. But when, and how often, is the period of maximum intake reached that makes this extra complication necessary? Is it not a fact that the greater proportion of riding is done with the throttle more or less closed? Assuming the maximum intake of our automatic valve to be reached, and the mechanical valve to be doing the work it is intended for, is it not a fact that the more intense explosions generate more heat, are conducive to greater wear of the working parts, and increase compression difficulties? Does this mean efficiency and long life? Supposing we replace our 70 by 70 mm. cylinder with one of 72 by 72 mm. (piston and stroke to suit), using same fly-wheels, etc., is it not a fact that this slight increase in size will give the same maximum intake as the mechanical valve gives to the 70 by 70 mm. cylinder? And is not this slight increase to be preferred to the complication of the mechanical valve? The heat generated being the same in each, is not the larger cylinder more effectively cooled? Which gives the smoother drive—the concentrated shock or the same shock over a larger area? Is it not a fact that when the exhaust valve shuts down there still remains a quantity of exploded gas in the cylinder under slight pressure (varying according to speed and exhaust opening)? Has not this to expand before fresh mixture can enter, whichever valve is used? Then, another point is that the automatic valve opens when the cylinder is ready for the mixture, and does not this cause a delightful suck at the petrol jet and good spraying? Is it not a fact that the automatic valve is not the sluggish some say—on a good engine? Do not our leading makers, Excelsior, Humber, Quadrant, Bradbury, Singer, Rex, R. and P., etc.—what names to conjure with!—fit it? Is it not a fact that some other makers are sitting on the fence, one leg at each side, ready to go either way? Is it not true that some makers have fitted mechanical valves against their better judgment? In making comparative tests makers invariably use identical engines, but, in my humble opinion, it would be better to decide whether the desired increase of power shall be obtained by extra complication, or by the simpler method of enlarging the cylinder and exhaust port, as it is undoubtedly the choked exhaust that prevents the inlet valve opening immediately. So far the motorcycle has been mainly used by the trade and professional or amateur engineers; but I fancy those who are neither the one nor the other will prefer a simple, rather than a complicated, engine. Goodness knows the other details of the cycle are quite enough in this latter direction!—Yours faithfully,
A. A.

"The Motor Manual."

The book that appeals to the Man of Moderate Means.

1s.

Crossed Belt Drive.

Sir,—I notice in a recent number of "THE MOTOR," page 453, a letter from "E.H." on "Belt Transmission," in which he advocates the use of a crossed flat belt. Will "E.H." be good enough to say if this means that the belt goes direct from the top of the engine pulley to the bottom of the driving wheel pulley and then from the top of the driving wheel pulley to the bottom of the engine pulley? If so, would not the belt soon wear itself out by friction in crossing itself? Also, as the engine pulley would revolve in the opposite direction to what it ordinarily does, would not the sparking gear be greatly interfered with and work at the wrong moment? One can see that such a belt would have a very much better hold on both pulleys—if it would work—than if put on in the ordinary way.—Yours faithfully,

JOHN WILKIN.

The Motor Launch.

Sir,—In answer to J. F. Hastie's inquiry as to motor launch details, I may state that as I have had considerable experience in fitting small boats with different forms of motors, I beg to offer the following suggestions. First, for a boat 14ft. long to attain a speed of seven miles an hour it would be better to have a $1\frac{1}{2}$ h.p. motor, developing this power at not over 800 revolutions per minute. Second, I know of a very good firm who are manufacturing a $1\frac{1}{2}$ h.p. single-cylinder four-cycle motor, with water jacket, with a complete outfit, at a list price of £33. Third, the fitting up is quite within the scope of an intelligent amateur, who can use a few tools. If Mr. J. F. Hastie will communicate his address to me, through the Editor, I shall be pleased to give him some useful tips, and any other information in my power with reference to the above subject.—Yours faithfully,

W. BURKE.

High v. Low Powered Motor-Bicycles.

Sir,—Mr. Ashton champions the $1\frac{1}{2}$ h.p. motor, of the capabilities of which he claims (as an owner of one) to speak with full knowledge. No doubt this power is excellent for riding in towns and traffic; but for all-round work give me the $2\frac{1}{2}$ h.p. or an even higher powered bicycle. Mr. Ashton is able with pedalling to climb any gradient "up to" 1 in 7. In these parts ascents of 1 in 6 and even 1 in 5 are not unusual, and bad surfaces and long curving ascents have to be reckoned with. I have ridden all powers up to the 3 h.p., and find the highest figure necessary; always supposing that I retain a gearing which gives me a high speed on the level, whether road or track. I may add that a relative has been compelled to discard a 2 h.p. machine of the best make as unsuitable for general riding in Devonshire. The compression in this motor was excellent, but no driving could enable it to breast many of the Dartmoor hills, even on the main roads. As a machine desired to "go anywhere" it was useless, and was regarded by us as inefficient. Without question is was of the highest grade, and all who tested it knew their business thoroughly well. The marked superiority of the $2\frac{1}{2}$ h.p. Excelsior, with its M.M.C. engine and large fly-wheels, was very obvious indeed. This is not a question of theory but of fact; and if Mr. Ashton had some experience of Dartmoor riding and

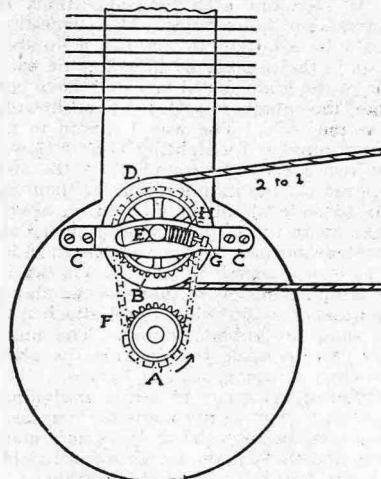
walking (with a low-powered machine to push), he would, I opine, be very readily converted. I do not recommend these high powers to the novice, but they have a high value for the expert. Thus the extraordinary ascent of Haverlock Hill, Liverpool, on the Bat machine, appeals to all of us. Here a pedal-less machine ascends a 1 in 5 or so gradient at over 25 miles an hour. Now, obviously, this kind of machine, which is also very speedy on the flat, is invaluable to the tourist in mountainous places. It is also just what is wanted to pilot that delightful invention, the sidecar, through picturesque districts without a haunting fear of possible ascents to mar one's enjoyment.—Yours faithfully,

E. D. FAWCETT.

Dartmoor, Totnes.

Chain and Belt Transmission.

Sir,—I hear through the columns of "THE MOTOR" of belt slipping troubles, also that the chain drive is not absolutely free from transmission troubles; and I beg to enclose a sketch of what I should like to think was the happy and successful



medium in reducing shocks through buffer H and belt slip on account of large pulley D. The main idea is to keep a regular tension by use of spring H and corresponding spring on the opposite side of the pulley. The explanation of the diagram is as follows:—A is an engine spur wheel driving intermediate chain wheel and pulley BD fixed on crank case and this side by means of outside bearing CC. The adjustable screw takes up "slack" in belt only after long use by tightening spring G. E is a slot forming a segment of circle with its centre radiating from A; thus when intermediate sprocket and pulley BD are moving in slot E they are always at the same distance from A; by this means the chain is always at same tension. By disconnecting sprocket B from pulley D a clutch could be fitted between, and a free engine for water-cooling, or a friction instead of a positive clutch—an additional security against shocks to engine, etc. A round twisted belt would appear sufficient and preferable to a V shape; and though the intermediate wheel BD would take off a percentage of power this should be compensated for by advantages which are perhaps more obvious to a theorist like myself.—Yours faithfully,

J. W. R. SPRINGBOCK.

Automatic Lubrication.

Sir,—I see in your issue of November 25th that Mr. Leonard Bell invites experiences on the subject of automatic lubrication. May I inform Mr. Bell that the Jap bicycle motor is fitted with such a lubricator that when once oil is put into the tank, no more attention is required to it until it is exhausted; there is no pump to inject oil every now and again. I have been riding a Jap motor fitted with this device since April, and failed to see how it could be improved upon, as, short of a regular smash-up, it is impossible for it to get out of order, and it is bound to feed the engine so long as the piston is moving up and down the cylinder, and the tank contains a certain quantity of fairly clean oil. It is quite possible to do nothing further in the matter of lubrication beyond opening a needle valve three-quarters of a turn on receipt of the machine from the makers, and occasionally filling the tank as the oil gets used up. This is quite a different device to that mentioned by the Hon. Leopold Canning, which, though no doubt excellent, still requires some attention, if the engine is not to be ruined. In conclusion, I may say I have no interest in the sale of the Jap motor.—Yours faithfully,

R. L. NORMAN.

Combined Surface and Spray Carburettor.

Sir,—Your "O.P.V." columns and "Information Bureau" interest me greatly every week, but it is very seldom that I require any of the information contained there. Perhaps my reasons for this might interest other motorcyclists. I started in the beginning of 1902, with a $1\frac{1}{2}$ h.p. well-known make of engine, fitted up by one of the first-class makers, but it did not satisfy me, and I determined to be without the bother of belts, batteries, plugs and wires in my next mount. So I invested in a $2\frac{1}{2}$ h.p. gear-driven Singer. There are drawbacks even to this machine, noise being the chief one. But I am never troubled like so many of your correspondents with leaking accumulators, bad carburation and overheating—this last in spite of a gear of 7 to 1. Some people swear by surface and some by spray carburettors; but mine is a bit of both, and where both surface and spray often go wrong, up to the present mine has never gone wrong. I can use old, dense petrol, and always get a start in any weather. This mixture of surface and spray carburettor seems to me to be a good idea, and I cannot understand why more makers do not try it. I have a tank on top, with a needle valve in the centre, the needle being worked by a cork float in the bottom compartment. When there is a layer of petrol in the bottom to form the surface carburettor, the valve is closed, but, of course, when riding it is always more or less open. To start on the spray I empty the surface by a tap, pouring the petrol back into the tank. I am now fitting a fore-car, and have just lately put a Parsons' non-skid on the driving wheel. Do you think a $2\frac{1}{2}$ h.p. motor geared to 7 to 1 enough for all-round fore-car work?—Yours faithfully,

"REVILO NOTLEF."

[$2\frac{1}{2}$ h.p. is not enough. You really cannot get the best results on less than a $3\frac{1}{2}$ h.p. motor.—ED.]

Re Benz Car.

Sir,—In reply to H. Elvidge, I may say I have had considerable experience with Benz cars. I think if he uses sheet asbestos, with linseed oil and red lead well rubbed in, and tightens it well down, and lets it stand for a day or two, he will have no more trouble with the joints of the engine.—Yours faithfully, W. CLAPHAM.

The Belt Problem.

Sir,—Seeing that most kinds of belts slip badly, (1) Would it not be serviceable to have leather braced round the pulleys? (2) Would the above ensure a better grip than in the case of a wooden rim pulley? (3) Would it not be better still, perhaps, to have a system of tongue-shaped springs bolted round the rim pulley at short distances, in the centre, and nutted on the inside of the rim, so fixed that the bolt ends might first receive the grip, also slightly bridged inwards to avoid any back stress occurring at the top. The whole could be braced round with some fabric through slots in the sides of the rim, and this could be easily replaced when worn out.—Yours faithfully,
T. VERNEY CAVE.

The Steering of Tri-cars.

Sir,—I have for many years been an enthusiastic follower of the sport of motoring, and have, in my time, ridden most forms of motor-bicycles. My accumulated experience leads me to ask you to give publicity to this letter, in hopes of its interesting a considerable number of your readers. Many of these, as their weekly letters show, are riders of the very popular tri-car of some form, and it is with the steering of this type that I intend to deal. Practically speaking, the origin of this form of motor was a bicycle with its front wheel removed and replaced by two with a seat slung between them. This naturally led to the retention of the bicycle handlebars as the form of steering apparatus. Now, however, the bicycle fore-carriage combination is a thing of itself. The seat is generally made a permanent attachment, and the tendency seems to be to make the whole more and more like a car in miniature. There is, therefore, a development which I have never yet seen mentioned, though I always keep up to date in motoring literature, and one on which I should be very obliged to hear the opinions of your readers. My point is, Why not replace the handlebars by the ordinary steering wheel of a car, only, possibly, slightly smaller? There are, obviously, pros. and cons. on the question. In the abolition of any time-honoured institution the cons. naturally come first. Against it, then, may be put (1) the narrowing of the points of leverage, (2) the difficulty of fixing brakes, (3) the loss of a handlebar switch, (4) the question of vibration, which is certainly very great in some cars. Now (1) is no real objection. Gearing, in fact, would give far more delicate control than the present direct connection does. The use of bars on a bicycle is primarily referable to their help in maintaining balance, which is not needed to the same extent on a tri-car. (2) Though the present leverage system would have to go, one can easily contemplate the fitting of brakes just below the wheel, catching in toothed quadrants, the steering pillar itself being the fulcrum. This system of levers is, of course, in vogue on many cars—I may in-

stance the M.M.C.—and such brakes could work, as before, through Bowden wires. (3) The handle switch is not universally fitted, and such a switch could be put very near to hand on or below the wheel. (4) The B.S.A. anti-vibratory patents should be as easily fitted to a wheel as to the ordinary bars, and I hold that less vibration would be felt with the wheel in any case.

On the pro. side I maintain that such an innovation would be exceedingly acceptable to most riders. Many of the bars fitted on these machines are unnecessarily wide, and their very length, and, therefore, increased "life," adds to vibration. With a free engine and multiple speeds we have passed beyond the range of the original bicycle. Why, then, retain on these miniature cars a device intended to enable the rider of a bicycle to retain his balance? I only wish I could add that I have put this suggestion to practical experiment. Unfortunately I have no tri-car of my own on which to try it.—Yours faithfully,
P. W. BISCHOFF.

Illuminating the Number.

Sir,—In a recent issue of "THE MOTOR" E. W. Kitchin asks for suggestions re numbers on motorcycles. His suggestion would be all right if you put a number made in the manner he indicates on each side of the lamp, but if you only have one plate the number will read backwards from one side. The way I intend to fix up my number for lighting is as follows. Get two pieces of ground glass the size required for the number, and fix them up side by side about an inch or so apart. Make up in the form of a lamp, using an acetylene burner, with a very small hole, so as to use very little gas. Fix a tap in the lamp generator, so that you can clamp the number on anywhere, and attach it to the lamp by rubber tubing. The numbers can be made by blacking the glass and then scraping out the figures. The method of fixing can be left to individual ingenuity. I have not made the complete affair yet, but am doing so in my spare time, and think it should answer all right.—Yours faithfully,
J. R. DUGAN.

Making Gas-tight Joints.

Sir,—I am pleased to be able to inform H. Elvidge how to joint his Benz car cylinder cover and valve box. I was troubled in the same way with water getting into the cylinder, which caused much trouble in starting engine, and I tried all sorts of jointing, including asbestos of the very best kind, thin and medium, well soaked in oil, red lead, putty, etc., but could get nothing to stand the fire and water combined. I was persuaded to try Docker's Elastic Cement, well mixed into a thick putty with boiled linseed oil, and put on together with fine brass wire gauze. It answers perfectly, and will stand any degree of heat, and, being elastic, allows for any vibration. It does not blow out under the highest pressure, and is easily breakable when required. After the bolts are tightened up, and they need not be strained, start the engine without water in the jacket for a few minutes to warm the joints. Stop the engine, and tighten the bolts a very little, and the job will be a permanent one. It is, of course, advisable, if possible, to allow a few hours before using.—Yours faithfully,
J. H. CAWLEY.

West View, Cockermouth

A Thermal Units Query.

Sir,—Perhaps some of your readers versed in Thermo dynamics would tell me the heating value of one pint of petrol and also one pint of paraffin in British thermal units? And also what quantity of petrol and paraffin would there be in a cubic foot of correct explosive mixture made from either of the above liquids?—Yours faithfully, HAROLD C. READING.

1902 Werner Hints Wanted.

Sir,—I have a 1902 $1\frac{1}{2}$ h.p. Werner, which is troubling me somewhat. I have a good spark at the plug, and also at the contact breaker, and the compression is good. I think the trouble is with the carburetter. It seems to flood, and I cannot get the proper mixture. I may say that I have used all qualities of petrol. Perhaps the same thing may have occurred to other riders of this machine, and they might be able to suggest a remedy. I should also like to know what carburetter "R.E.S.," who wrote under "Carburetter Troubles" in "THE MOTOR," December 2nd, is using.—Yours faithfully,
A.C.C.

Position of Valves.

Sir,—We notice that several writers are advocating the advisability of fitting valves in front of the engine. Personally, we do not consider this the best position from a cooling point of view—if an efficient mudguard is fitted. An efficient mudguard must naturally be a wide one and when running forward, the mudguard, to some extent, creates a vacuum; consequently if the valves are fixed behind the engine this position is by far the best in order to obtain the maximum cooling. This position also admits of the exhaust gases being taken in the proper direction, i.e., away from the engine.—Yours faithfully,

THE ARIEL CYCLE CO., LTD.

Suggested Improvements.

Sir,—I have been looking out for the improvements on the 1904 motorcycles, and have searched the Show Numbers of several motor papers, but cannot find the improvement I looked for most fitted to any machine, that is, a guard to keep the mud from dashing off the tyre on to the belt. I rode a $2\frac{1}{2}$ h.p. Werner all last season, and did not get the best results out of it until I fitted this guard. It would cost manufacturers nothing, and I cannot understand why they do not fit it to all machines, whether chain or belt driven. I see some firms go to a lot of trouble in fitting petrol gauges to tanks. The one I use is simple, accurate and cheap, consisting simply of one foot of light rubber tubing, and about three-quarters of an inch of glass tubing slipped into one end of it. You put the other end on to the drain tap of the tank, and hold the glass tubing against the tank until the petrol appears in it, which will give you the exact level inside the tank. It costs about 3d. Anyone using it with a Werner cycle will have to fit a drain tap. I also find I can get four times more wear out of flexible red fibre rings on the motor pulley than I could out of the leather ones fitted. I have screwed three little studs into the loose flange of the pulley. They project about $\frac{3}{16}$ ths of an inch, and press against the rings, bending them crooked, and preventing them slipping round on the pulley.—Yours faithfully,
REGINALD S. RADCLIFF.

REGINALD S. RADCLIFF.

High Tension Condensers for Ignition Purposes.

Sir,—In answer to the three points contained in Mr. N. Wells' second letter in your issue of December 9th, *re* above, may I say:—(1) There is now no mechanical (or any other) difficulty in the manufacture of this apparatus; they can be made perfectly well, and permanently effective; (2 and 3) a spark gap, whether properly adjusted or not, does not give anything like the same result? But there is a wealth of meaning in Mr. Wells' phrase "properly adjusted." A spark gap is only properly adjusted when it is arranged to work at a little below the normal discharge limit of the accumulators, and it will then work at all stages of the charge. So also will our condensers. This, therefore, also fully answers point (3), because these condensers are proportioned to work below the lowest practicable limit of the accumulators, viz., with 1½ volts only, instead of the usual 4. With regard to Mr. Wells' final remarks, this is the first time the Tesla coil has been brought into the discussion, but from considerable experience of this and kindred apparatus in the usage he speaks of (wireless telegraphy), I can say that such apparatus is of no use whatever for motor work. The increased tension is all disadvantage, in greatly increasing the loss by leakage. What is wanted is a greater quantity at the spark gap, which the condenser gives, but the Tesla coil reduces (under practicable motor conditions of insulation) to almost vanishing point.—Yours faithfully,

A. C. BROWN, M.I.E.E.

Perfection in the Motor-Bicycle.

Sir,—I have just observed a letter from Mr. J. van Hooydonk in a recent issue of "THE MOTOR," which attempts to be a sweeping condemnation of all my suggestions for the improvement of the motor-bicycle. Mr. J. van Hooydonk writes from the Phoenix point of view. I am perfectly impartial on the subject, because my interests are not wrapt up with any make of motorcycle. Mr. J. van Hooydonk severely condemns the position I recommend for a motor on a bicycle, that is, behind the diagonal. In spite of his scathing remarks, I continue to think exactly the opposite. I maintain that the right and only position for a motor on a bicycle is behind the diagonal. To my mind this is unquestionably the ideal position, for you have the weight in the right place, the engine correctly inclined for perfect lubrication, and it is protected from mud, rain, or dust. And in this position alone, I claim, you get absolute immunity from side-slip, a machine capable of being used over any kind of grease, and in any weather, a machine of incomparable stability, steady as a rock, and as comfortable as a car. Balance is also rendered so much better and surer, and a light and free front wheel makes the steering ever so much easier. However, Mr. J. van Hooydonk thinks that the right position for the motor is at the bottom of the front down tube, where it gets caked with mud and mess, splashed all over with water from every puddle, and rusted in consequence, with the rain playing down gaily on the sparking-plug, or else the dust choking up the whole concern. As to the engine when fitted behind the diagonal warming the rider's legs, I will quote Mr. J. van Hooydonk's own

words as applied to another correspondent in same issue. "Whatever heat is developed behind the rider—I need hardly say—is left behind." Far more likely is a rider to have his shins scorched by hot blasts coming off an engine situated just in front of his legs. There are many other things I should like to say, but do not wish to take up more of your valuable space.—Yours faithfully,

Italy.

LEOPOLD CANNING.

The Non-vibrating Frame.

Sir,—I was naturally much interested by Mr. Beresford's letter in your issue of the 9th of December mentioning the pneumatic frame bicycle as invented by my late father. So far back as 1890 he commenced experimenting in this direction, the first idea, singular to say, being exactly that suggested by Mr. O'Gorman and illustrated in the issue referred to above, under the name of an "Anti-Vibration Bicycle"; the only difference being that he sought to apply it to an ordinary bicycle or tricycle. I have by me now the original pieces made. By a process of natural development, much experiment, and laborious work, the method mentioned by Mr. Beresford was arrived at, the patents granted covering an application to the front wheel as well. By 1895 a good working result had been attained, and after exhaustive tests the bicycles were put on the market and were shown at the Stanley Show of 1896, provoking much comment and interest, many orders being booked. I was at that time in charge of the manufacture, continuing so until my father's death necessitated attention to other matters. The bicycles were a most thorough success, were absolutely

rigid laterally, the pneumatic cushions never gave any trouble, and the rider was most effectually isolated from all road shocks. I thoroughly believe with Mr. Beresford that this way lies the solution of the motor vibration difficulty, and that motorcycling would be rendered possible to people of delicate or weak backs by the utilisation of this device. I shall be happy to answer any queries and to give all information in my power.—Yours faithfully,

A. W. FARNSWORTH.

Strand Chambers, Derby.

Light Car Design.

Sir,—I was much struck by the letter from your correspondent Mr. F. J. Clemenson, as such a machine as he describes follows closely the lines of a motor I have recently ordered, and would no doubt fill the requirements of thousands of others. This type is obviously an evolution of the bicycle and fore-carriage (a clumsy makeshift in my opinion). I do not quite see, however, what is to be gained by doing away with the top bar or backbone, and I think the bicycle form of petrol tank to be in many ways most convenient, besides leaving space for the cooling water tank where the petrol tank is suggested in the sketch. I am expecting delivery in January of a little carette which is being built for me to the following specification (omitting the usual details):—3½ h.p. water-cooled Fafnir engine, with starting handle; Longuemare carburetter; chain drive; extra large silencer, say, 9 x 6 x 5 inches; friction clutch on intermediate shaft, actuated by foot lever; two band brakes on front, actuated by foot lever and Bowden hand brake on back wheel; pillar steering; large rubber-covered platforms for feet; broad, 9" mudguards to front wheels; pedal gear; I may mention that I have the broad rubber-covered platforms, and on these the foot levers actuating the clutch and brakes are arranged—one on each side. I have selected the Fafnir engine, for one reason, because the cost is less than the 4 h.p. M.M.C. (the latter being the better admitted) and also because of a very ingenious attachment to the exhaust valve (apart from the usual exhaust lift which is also there) a means of governing the lift (throttling the exhaust), so that when the clutch is out the engine is fully under governed control, although, of course, not automatic. The broad flat mudguards on the front wheels are of a car type, about 4½ in. wide at the top, widening to about 7 in., and turning outwards at the bottom—similar to those shown on the front wheels of the Canterbury car advertised on the page facing Mr. Clemenson's letter. I have retained the pedal gearing in case at any time I have to get home without the assistance of the motor, and because a stroke or two with the pedals at the crest of a particularly stiff hill is preferable to the extra complication of the two-speed gear, the expense also of which is hardly justified by the few times it should be necessary to use it. The handlebars I have also retained, as I cannot see any particular advantage either in comfort or efficiency which the wheel has over them. I may add that the machine is being built for me by the Jehu Motor Company, and the cost is in the neighbourhood of £75.—Yours faithfully,

HORACE W. H. VAUGHAN.

Sutton, Surrey.



Brown Jones is not happy. Since taking out his number it haunts him thus.

OUR INFORMATION BUREAU.

SPECIAL NOTICE.

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

1. Plain writing. Type writing for preference.

2. All letters to be written on one side of the paper only.

3. Questions to be clear, terse, and to the point, without tedious preamble or needless flattery.

4. Should an immediate reply be required, an envelope must be enclosed bearing a penny stamp, and the name and full address of the sender. NOT a stamped undirected envelope.

J. Jackson (Basingstoke).—The old Beeston tricycle motors are practically obsolete now. To get a new combustion chamber, it seems to us the only way would be to advertise for one.

F.G. (North London).—If your Peugeot motor is jammed up so tight that you cannot even move the pulley by fitting a spanner on it, there is little doubt that some screw or pin has become loose inside and got wedged in between the fly-wheel and crank case. If the piston had merely stuck for the want of lubrication a few drops of paraffin would very soon free it.

A Question of Engine Power.

"Intending Purchaser" writes:—I intend to buy a cycle with fore-carriage. (1) Would a $3\frac{1}{2}$ h.p. be too great a power to use as a single or tricycle, as would often be required? (2) Can an engine of this power used as a single be throttled down on the level, to make it as economical as a 2 h.p.? i.e., what is the consumption at slow speed or on level compared to full load on hills? (3) How far, with fairly good driving, should a gallon of petrol take a $3\frac{1}{2}$ h.p. motor (a) as single or tricycle (b) with fore-carriage and passenger? (4) For fair weather riding do you advise chain or belt drive? (5) Would you recommend for fore-carriage work 3 to $3\frac{1}{2}$ h.p., or 2 $\frac{1}{2}$ h.p. and two-speed gear? What about free engine clutch?—(1) A $3\frac{1}{2}$ h.p. motor for a single machine is not necessarily excessive. It is rarely that you would work the engine up to its full power. The only difference would be that the machine would be rather fast for average riding and difficult to control in traffic owing to its weight and momentum. (2) We should not like to say you could run it as economically at slow speed as a 2 h.p. machine. With moderately careful riding the petrol consumption would be half as much again as a 2 h.p., and at full power on hills you will easily use twice as much. (3) Only approximate figures can be given. We should consider 70 miles good for a single, and 45 miles with

passenger, on fairly level roads. (4) A very vexed question; but we should say the belt would do all that was required in fine weather. (5) Providing you could get a really satisfactory two-speed gear we should go in for the 2 $\frac{1}{2}$ h.p. and have the advantage of a lighter and more economical engine. If a free engine clutch is used judiciously it is a desirable addition, but with an ungoverned engine there is a danger of the engine simply knocking itself to pieces with the high speed.

H. W. Eastcott (Gateshead) asks which of the two following methods of connecting up the ignition circuit of a motor-bicycle is the correct one. The coil is a trembler pattern. (1) V to handlebar, P to positive of accumulator, negative of accumulator to the brush contact; or (2) P to handlebar, V to positive of battery, negative of battery to make and break.—Strictly speaking neither is quite correct, although they will work fairly well, but No. (1) is the better of the two, as the current from the accumulator will circulate round the coil in the best direction. The proper wiring is as follows:—P to the positive of accumulator, negative of accumulator to handlebar, and V to the brush contact.

The Two-cycle Motor.

"Interested" (Weston-super-Mare) writes:—I am much interested in your remarks on page 478 of issue 96 respecting the two-stroke motor; but I cannot see how it is possible to lubricate the connecting rod either at the crank or piston bearings, while using the crank case for compressing the new charge. Further, how does the work of this motor compare with a four-stroke motor of similar size, both as regards power and cost of running? Am I right in presuming that the projecting points on the inlet are for the regulation of the compressed mixture into the cylinder?—Lubrication of these motors, as a rule, is effected by introducing a certain amount of oil into the crank case, but it has always been a problem how to get good lubrication in the two-stroke motors without most of the oil getting blown into the combustion chamber. To get the piston properly lubricated there is sometimes attached to the cylinder in certain makes an automatic lubricator, in which a small amount of the exhaust gases actuates a valve on the lubricator, and forces a certain amount of oil around the piston. Although the makers of some of these two-stroke motors assert that they are equal in power, weight for weight, with a four-stroke motor, the consensus of expert opinion does not bear out these statements at all. The chief difficulty in these motors is the getting rid of the exhaust: this can only be partly effected, and what remains in the combustion chamber seriously weakens the new charge. The "points" you refer to are simply the centres of the throttle valve. This is, of course, merely a diagrammatic way of showing it.

G. Panting (Fleet, Hants).—Make the rings 3-32nds larger than the bore of the cylinder.

R.L. (Muswell Hill).—Certainly; the taking out of a license enables you to drive the car in any part of the kingdom.

G. W. Rock (London, S.W.) would be glad if any reader who has had experience with a Locomobile steam car (No 2) would say if he has been able to use paraffin mixed with the petrol quite successfully and economically.

B.W.A. (Windsor).—We should suggest that the reason you cannot get the pump to exert any pressure is that the leather washer on the pump plunger is worn or split. If it appears all sound, then there must be a leakage in the tank.

T. M. Wallis (London).—The address of the makers of the Lovelace tread is, as far as we know, Hentsridge, Somerset. The devices you refer to must necessarily lower the resiliency of the tyre, but many users speak favourably of them notwithstanding. Bates, of Leicester, also has a good non-slipping tread: see the advertisement.

A Jockey Pulley Question.

A. Bamford (Manchester) writes:—I am thinking of fitting an adjustable jockey pulley (run on ball bearings) to my motor fore-carriage. It would appear to have the following advantages: (a) Better grip on engine pulley; (b) could be run, therefore, with slacker belt; (c) and thus add to the life of the belt; (d) I could take up slack in the belt, instead of shortening it; (e) less tendency of the belt to jump off the engine pulley; (f) less friction on all bearings through using a slacker belt, thus taking a little work off the engine and adding to the life of all the bearings. In spite of all these apparent advantages, I find very few machines fitted with a jockey pulley. Can you tell me the reason? What are its disadvantages? I might state that my belt line is very short, which necessitates the belt (a V shape) being run very tight.—From a mechanical point of view there is really nothing serious to be said against the use of a jockey pulley. If it is run on a really good ball bearing, and fixed so as to tension the slack side of the belt, it wastes very little power indeed. The reason makers do not fit it more often than they do seems to us to be because they consider it unnecessary, and simply an extra complication, with the improved belts and pulleys now used. There would also be the temptation for a rider to use an adjustable jockey pulley unreasonably at times, and thereby strain or damage the belt and engine bearings. For instance, a careless rider might neglect his belt, and simply depend on screwing up the jockey pulley to make the belt grip. Another reason is that on some machines with a short drive, and where it could be used with advantage, it is a difficult matter to find a suitable position to fix the pulley and its fittings.

V. (London, E.C.).—It is most important that you keep the groove of the motor pulley a good V shape; otherwise you will not get good results. You could easily have a smaller pulley made having the correct section of groove.

S.R.N. (Portsmouth).—Taking all the points into consideration, and the unusual features you ask for, we should be inclined to put the specification before the Ariel Co. They could doubtless put you in a "Hub" two-speed gear. Price should not exceed £60 complete.

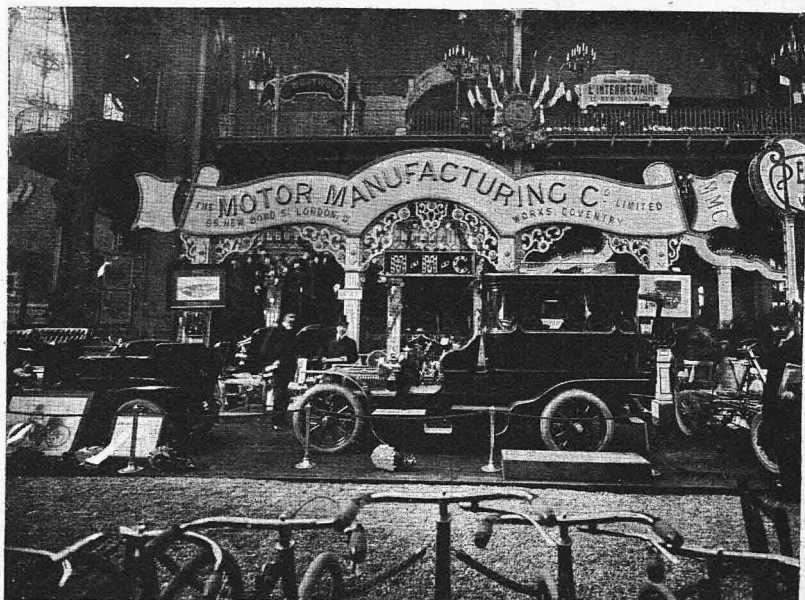
R. Hurling (Killarney).—You will not be able to dissolve used or waste vulcanised rubber. If you have pure para rubber to deal with you will find that benzole (not benzoline, which is quite a different thing) answers very well; another solvent is rock naphtha: bisulphide of carbon is good, but objectionable on account of its vile smell and its inflammability.

Altering Tube Ignition.

R. G. Heyn (Belfast) writes:—(1) I have a Beeston motor-tricycle fitted with tube ignition. The diameter of the cylinder is 1 in.; height of cylinder 8 in.; diameter of crank chamber 8 in. About what power should this develop? (2) Would fitting electric ignition increase either the speed or power? (3) Do you think the machine would be worth fitting with the electric ignition? (4) As I do not go long journeys and do not want to spend much, would dry batteries be successful?—(1) Approximately the power would be 2 h.p. (2) Electric ignition will probably increase it to 2½ h.p. (3) For light work it would pay to have the ignition altered. It has been done in many cases. (4) Dry batteries are satisfactory. The Castle is a good type.

De Dion Ignition.

J.M.C. (Newcastle-on-Tyne) writes:—I am troubled with the ignition on my 2½ h.p. De Dion motor, fitted with De Dion contact breaker and non-trembler coil. I think the trouble lies in the coil, as I sometimes get a good spark at the plug, at other times none at all. Firing is perfect, and when I take the coil out and give it a good shaking I sometimes get a spark and sometimes fail. This rather looks as if the winding of the coil was wrong, or as if the insulation was broken down inside; or perhaps there is a breakage of the winding. I am writing to ask you to give me a diagram with the proper connections, so that I can test the coil out of the machine, in order to be sure it is at fault before ordering a new one. Suppose I place the accumulator on the table together with the coil, please explain how to test the primary and secondary winding of same. I am sure a diagram of this sort would be appreciated by many of your readers. Secondly, may I give a word of advice to your readers regarding sparking plugs. Branson and Kent supply at 8d. each a complete porcelain and terminal, which can be fitted to most plugs, and especially suited to the De Dion. By simply replacing the broken porcelain in the old plug with a new one, costing 8d., one has practically a new plug. I only saw these porcelains advertised a few weeks ago; but since then I have had a lot, and furnished up all my old and broken plugs (which cost 3s. 6d. each), so that I now have quite an array



The stand of the Motor Manufacturing Co., at the Paris Show.

of first-class plugs ready for use. The new porcelains should be packed round with asbestos, so that they are quite tight in the shell.—Diagrams of the De Dion coil connections have appeared in several issues. A very clear one is given on page 263, issue 89, October 21st; and a method of testing for a broken connection appears on page 456, issue 95. From what you say, it seems likely that there is a connection at one of the terminals that has become loose. It is not likely to be an actual breakage in the wire. We are assuming that you have made certain that the fault is not due to an imperfect contact on the wiring of the machine. A coil is a very ticklish piece of apparatus to tackle, and if you do not understand it we should advise you to look up one of the largest electrical supply firms in the town and ask them to test it for you.

Intermittent Firing.

W. C. Shaw (Nuneaton) writes:—I have had trouble with a tri-car of well-known make which has surface carburetter, trembler coil, and plain make and break contact breaker. I get intermittent firing, with practically no reports in the exhaust box. The plug was right, and also the accumulator charged; the coil buzzed every time when the machine was wheeled along. The machine always went well for a few revolutions after a rest of even ten minutes, and would go 100 yards well after a day's rest. I am sure it was not the ignition, but I fancy it was deficiency of gas. I am told, however, that it was grit, etc., on contact breaker. Do you think this likely?—We really question whether it was the carburetter; although, to make sure, you might just try a sample of .680 petrol, taking care that there is no stale petrol in the tank to start with. The symptoms are uncommonly like those of a defective accumulator which just has enough charge left to give a few sparks and then fails; after a rest it recuperates somewhat, and will give more sparks. It is much easier to satisfy oneself that it is not the contact breaker that is fouled up than it is to prove whether the cells are run down.

R. Brown (Llanelli).—Subscription to hand with thanks. The anti-vibration device you refer to is effective to a moderate extent. Our experience has been that the makers exaggerate its capabilities somewhat.

R.H.R. (Glen Parva).—(1) You must take out a licence. (2) Yes, apply to the County Council. (3) Two number plates are necessary, one in front and one in the rear, but only the front plate need be illuminated.

R.E.B. (Oldham).—You might see if the Dunlop Engineering Company could make you a silencer as large as you require. (2) The simplest device you could adopt in the way of giving a free engine would be a small jockey pulley worked by a lever from the top tube as you suggest.

E.A.C. (Westminster).—Your system of gearing is quite correct according to your diagram. The only point we do not like is the use of the very small seven-tooth sprockets: these will tend to wear rapidly, and also put a heavy strain on the chain. The smallest wheel we should use would be a twelve-tooth of one inch pitch.

Two-speed Gears.

"Pop-Pop" (Wicklow).—(1) Your query re the two-speed gear is altogether too complex to give an opinion on from a description. What we should advise is for you to dismount the gear and send it back to the makers; it is obvious that the inclined planes of the clutch have worn, and you will not be able to make anything like a repair of it yourself. (2) There is no reason why you should not fit a larger oil pipe if you wish, but we have never experienced any blocking up of the pipe; surely your oil cannot be clean. (3) We are not so sure that you can fit the 2 h.p. engine on the same frame, as the belt line may not be the same. The vibration, however, would not be any more than with the smaller engine. (4) Have a new cell by all means: the plates of your accumulator are a special type and cannot be substituted.

G. D. Maison (Hinckley) wishes to join a good motorcycle club in the Birmingham district—within 30 miles. Will hon. secs. please send along particulars?

H. F. Young (Sevenoaks).—(1) From all accounts, the two-speed gear you refer to is going to be a good thing, but just at the moment we cannot give a decided opinion pending a trial of the gear. (2) With a 2½ h.p. engine and a low gear you should get good work out of the fore-carriage. (3) Fan cooling would be an advantage if long hills have to be ridden.

"Dissatisfied" (Bootle).—The substitution of the Longuemare carburetter for the surface will mean that you will have to close up the gas and air apertures, and connect up the spray to a pipe running to the lower part of the tank, thus using this simply as a petrol reservoir. Then it will be necessary to have a new inlet or supply pipe from the spray to the motor; and this pipe must have a throttle fitted, unless there is one combined with the carburetter. These are the principal alterations required; the minor details will present no difficulty to you.

Acid for Accumulators.

G.P.R. (London) writes:—I have purchased some sulphuric acid from a local chemist, and should esteem it a favour if you would let me know what proportion of water to mix with same for filling a 20 amp. Eclair accumulator. There appears to be a kind of grey jelly in it. To empty the accumulator I presume that I simply remove the plugs and turn it upside down and let the liquid run out; and to fill I should pour the mixture into the vent holes from which the aforesaid plugs have been removed, allowing the acid to cover the plates about 1-16th of an inch. The strength of the acid is, approximately, 1 part concentrated acid to 4½ parts water (the acid being added to the water, and not the reverse). It is not quite clear what you mean by emptying the accumulators. The jelly-filled pattern are not intended to be emptied, but simply require water adding so as to just cover the plates. But if you clear out the jelly you must, of course, fill up with the acid, sp. g. 1.170.

Y.D. (Southbourne).—In your case it will not be possible to utilise the several switches controlling the three circuits for charging the accumulators. Your best plan is to use the three-light switch and replace the 16 c.p. lamps by 32's. (2) The makers of the Empire B.P. support are the Empire Motor Cycle Co., 2, Bird Street, Oxford Street, London, W.

Accumulator Charging.

J.S. (Penrith) writes:—I am about to fit up a dynamo fitted with drum armature, giving 10 volts 3 amps., for the purpose of charging my bicycle accumulators. Are a voltmeter and ammeter required for testing the current? If so, what type? And how is the latter reduced to the proper charging rate, say, two amperes?—Strictly speaking, you could do without the voltmeter as long as you take care to run your machine up to full speed before switching in the accumulators. But you must have an adjustable resistance and an ammeter. Peto and Radford have some special lines in this respect. The current is reduced by the resistance.

Trembler Coil Query.

O. (Ilford) writes:—I have a trembler coil on my machine. The makers fit a make and break contact breaker, and say this is better than a wipe (which my electrical experience teaches me to consider best). Is their view correct? I have experimented, and find that, unless the contact points are set very wide the accumulator discharges current during ½ths of the piston stroke. Now with a wipe contact this can be reduced to ¼rd or under of the piston stroke, and still be very effective, to the advantage of the contents of the accumulator.—We are of opinion that the wipe or brush contact is certainly the better for a trembler coil, by reason of the certainty of contact between the brush and the sector. But at the same time we do not agree with your view that with the positive make and break you have the current on for ½ths of the stroke. If the contact cam is properly shaped it need not be on for more than ¼rd of the stroke, provided your coil has a high speed trembler fitted.

ANSWERS BY POST.

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

Thursday, December 17th.—R. Wells (London), H. Brown (Croydon), E. Raven (Halstead), F. H. Hall (Ewell), H. Stringer (London), H. Heath (Ipswich), S. Webb (Bromley), L. Watson (London, S.W.), Stevens and Barker (Maidstone), F. L. Lees (Clifton), J. A. Lee (Grasmere), E. A. Crowsley (Westminster).

Friday, December 18th.—G. E. Walsh (Halifax), F. Applebee (Walthamstow), H. Mason (Leicester), G. P. Douglas (Edinburgh), J. Y. Sconlar (Buckingham), N. H. Brown (Lower Hebington), W. F. Taylor (London), H. Proud (Dublin), P. W. McRory (Gainsboro'), E. C. Criswell (Newmarket), H. H. Price (Neath), L. Pogson (Sleaford), W. Smith (Heywood).

Saturday, December 19th.—N. Dalston (London), A. E. Dendy (Ilford), H. Green (Dewsbury), J. Clay (Luddenfoot), E. L. Gardner (Harlesden), J. H. Crawley (Cockermouth), H. Bateman (Sutton Bridge), R. Wells (Camberley), G. N. Rees (Maesteg), E. Bennett (London).

Monday, December 21st.—E. M. Machin (Sheffield), H. Hinde (Bexley), R. A. Bush (London), C. Wyatt (London), E. A. Harris (Leamington), A. Hammon (London), V.O. (London), R. Smellie (Easterhouse), W. Higham (Leyland), R. I. Jones (Abergele), W. H. Cook (Sunderland), T. A. Sullivan (Lralee), C. Farrant (Peckham).

Tuesday, December 22nd.—W. L. Orr (Guthrie, N.B.), H. Beaumont (Longwood), J. Wilson (Glasgow), A. H. Hall (Fermoy), E. Holroyd (Morecambe), J. McKerrrow (Cumnock), H. G. Ware (Salisbury), A. Hughes (Liverpool), J. W. Frost (St. Austell), G. E. Evans (Leeds), W. H. Lee (Pilsley).

