Motor Cycling & Motoring

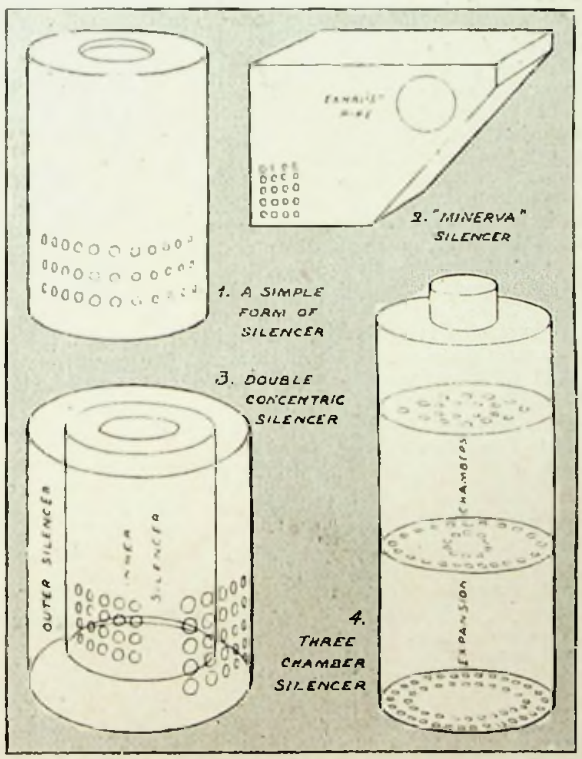
Vol. 1, No. 12,
April 30th, 1902.

SILENCERS:

The part they play on a motor. The type as applied to small patterns. And some experiments.

THE exhaust box, or silencer, is a detail of the motor's construction that would appear not to have received proper consideration, if one might judge from the noise created when the average motor-bicycle is travelling. The desirability of having the motor as free from an objectionable noise as possible is being just at present much discussed in the motor-cycling world. It is obvious that the noise will be a serious drawback to the motor-cycling movement at the outset. Most ordinary cyclists will agree that the silent running of the cycles of to-day is one of its greatest charms, enabling conversation to be kept up en route without the slightest difficulty between two or more riders; but this cannot be said of the motor-bicycle. In fact, one fears to imagine what it would be like to be in the company of a crowd of motor-cyclists on a long run or tour with the combined noise and clatter of twenty motors or so. Now, there is no reason whatever why this problem of obtaining a really efficient silencer should not be solved. It has already been solved in connection with the best makes of cars, some of which, even of large horse-power, run beautifully quiet, and might, in fact, be mistaken for being steam-driven instead of being driven by an explosion engine.

A few seasons ago, when the main efforts of the designers were directed solely towards obtaining the maximum power out of the engine, the fact of having to get a silencer at all was regarded in the sense of being a necessary evil. Thus we can understand how it is such slow progress has been made, but public opinion would not for long tolerate noisy motors, and at last a real move forward has begun.



DIAGRAMS ILLUSTRATING THE VARIOUS FORMS OF SILENCERS REFERRED TO IN THIS ARTICLE.

The Function of a Silencer.

It will, of course, be readily admitted that we cannot have explosions taking place without an accompanying noise, and that the more rapid these explosions are the more intense and penetrating the noise. For instance, take an ordinary gas engine running at 280 revolutions per minute, and developing 3½ h.p., and compare the noise made with that of a high-speed petrol motor of similar power. In the first case the explosions will probably only be a quarter of the number of revolutions, or 70 per minute, and in the latter 800 to 1,000 a minute, hence the great difference in the noise. In designing an exhaust box for a gas engine, it is the practice to allow at least twice the area of the exhaust pipe in the exit holes, and provide sufficient room for the exhaust gases to expand in the box so that they enter the atmosphere at as low a pressure as possible. Now we may take it that the function of a silencer is to break up the volume of exhaust gases into a large number of small streams before allowing it to enter the atmosphere. This object is attained in gas engine practice by having a cast-iron box of large capacity fitted with "baffle" plates for the gas to impinge upon: over the plates a good depth of smooth round pebbles are placed, which form numerous tortuous channels for the gases to traverse. Under the most favourable conditions of design, etc., the exhaust box will offer a certain resistance or back pressure against the inrushing gases; if we wanted all available power, we should have to exhaust into a partial vacuum, or at least straight into the atmosphere. This damping, or choking-back effect is well understood by riders of fast cars and racing tricycles, and it may often be noticed that when trying for a record they remove the silencer altogether, so as to obtain every particle of power out of the motor.

The Type Applied to Small Motors.

In the majority of cases the silencer simply consists of a cylindrical sheet-iron vessel, closed up at one end and provided at the other with a screwed nipple to attach to the

exhaust pipe. To allow the gas to escape, a dozen or more small holes are drilled in the side of the cylinder at the end farthest from the inlet. This pattern cannot be said to comply with accepted principles, and unless the capacity of the cylinder is large, has very little silencing effect. This is easily proved by riding with and without it. With the exhaust going straight from the pipe into the air the noise made by the explosions is strikingly like that of a Maxim gun; going through the silencer the sound would only appear just to have had its "sharpness" taken off somewhat. The damping, or back-pressure effect is also considerable, and is mainly the cause of loss of power through overheating of the motor cylinder, as the gases cannot get away quickly enough. A modified form of this exhaust box is to be found on motors of the Minerva pattern. It is certainly an improvement on earlier patterns of the cylindrical form, as the gases have at least some room to expand in, owing to it being made in the form of a square box of fair size.

Some Experiments.

An improvement on the single chamber type of exhaust box is the one illustrated in the second diagram. In this the exhaust passes into a small cylinder and then into a larger one that surrounds it, and which is about three times the size of the inner one; this particular type the writer has adapted to a particularly noisy "Werner" with excellent results. Some experimenting led to the conclusion that about 20 1/15-inch holes in the small one and 50 1/32-inch holes in the larger gave good silencing effect without unduly lessening the power. In fitting this type it is important to have the two series of holes at opposite sides, so that the gas forced from the inner cylinder is deflected or baffled up against the walls of the outer one, thus having its energy lessened before reaching the small holes. Another pattern of compound chamber silencer consists of a sheet-iron cylindrical box, about 2½ in. diameter and 7 in. long. This is divided into three compartments by having two plates riveted in it, so as to form partitions. These partitions have holes drilled through them concentrically in rows, but at different diameters, so that they do not come opposite each other in the two plates. The compartments are of different sizes; the one next to the exhaust pipe being small, and the second and third of increased proportions, thus allowing room for the gases to expand before passing through the numerous small holes in the end of the box. From actual trial this type is also effective, and would probably be as good a type as any to adopt when it is desired to carry the exhaust through a pipe to underneath the frame of the bicycle.

A type of exhaust box used with success on high-powered cars consists of a series of iron tubes arranged concentrically within each other. These are closed at alternate ends, and thus form a long zig-zag path for the gases to traverse. It will also be noticed that most of the silent running cars have more than one silencer, generally two arranged in series. This, however, could hardly be adopted on a bicycle for want of room.

Remarks in General.

Sometimes, even when a properly designed silencer is fitted to a motor, the noise of the explosions is still very unpleasant. This may be, and probably is, due to faulty design in the motor itself, owing to the compression being too great, causing a violent shock at each ignition. At times a badly-proportioned mixture will give irregular and violent explosions. Experienced riders always endeavour to regulate the gas supply and ignition so as to obtain the peculiar "elastic" impulse characteristic of a correct explosion. The position the silencer should be placed in is a point worth considering. Although some makers place it below the frame for appearance sake it is not the best practice as long exhaust pipes with bends in them exert considerable back-pressure. As near the motor as possible and with the outlet holes pointing in the opposite direction to which the machine is travelling will prove the best arrangement for the silencer, always keeping in view the fact that the larger and more sub-divided the silencer is made the more efficiently will it act. In conclusion, we might say that a number of queries relating to answers addressed to us by correspondents are answered in this article.

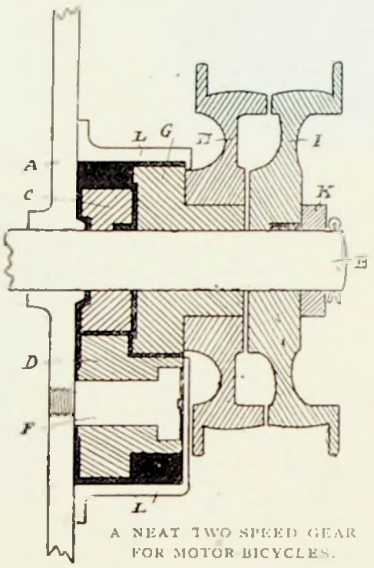
ADVANCING TOWARDS PERFECTION.

A Couple of Ingenious Ideas.

The other day we had a call from Mr. F. H. Hadfield, of Durban, a mechanical and electrical engineer of experience, who is now over in this country in connection with motor-cycle and other inventions. Two good lines he has provisionally protected are described and illustrated below.

The first is a neat and efficient two-speed gear for motor-bicycles.

This would appear to have solved one at least of the problems in motor design. Curiously enough, it is designed somewhat upon lines which our contributor, "Magneto," must have had in his mind when touching on the subject in his recent article. It will be noticed that the motor shaft *B* has a flat belt pulley *I* keyed to it, and providing the normal speed, say 2,000 revolutions a minute, on the motor shaft; and close in to the crank case is a steel gear *C*. This meshes into a phosphor bronze gear *D* of equal diameter, which, of course, runs at the same speed as the motor; a pinion *E* is formed as part of *D*, and this revolves upon a fixed stud *F*; the pinion *E* then gears into *G*, which runs loose upon the shaft; this gear wheel really forms part of the pulley *H*, which runs at half the speed of *I*, say 1,000 revolutions per minute. Any other ratio, however, can be arranged for. The pulleys are made to take a ¾ in. flat belt, and this can be shifted on to either speed by means of a belt-shifter, worked by a Bowden wire, from handlebar of bicycle; the gears are contained within a neat aluminium box which holds the lubricating grease.

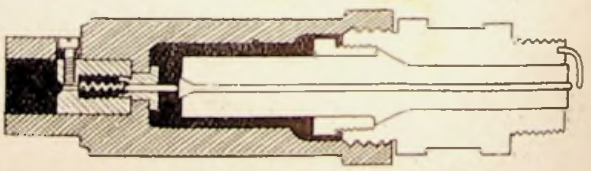


A NEAT TWO SPEED GEAR FOR MOTOR BICYCLES.

This idea seems to us less complicated than anything so far submitted in a practical form; the only point that might be questioned is that the width of the pulleys is too small. We should say that a ¾ inch belt is the minimum that will transmit the power. An extra bearing might also be fitted to end of the shaft *b* to take the strain off the main bearing.

A Protection for Sparking Plugs.

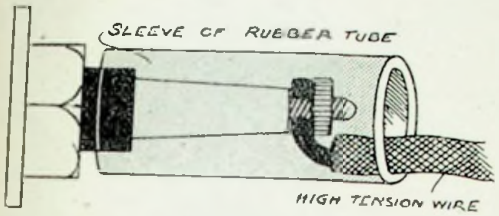
The other idea is a protection for sparking plugs. It consists in applying a cover or shield of an insulating substance capable of standing great heat—called ambroin—to the sparking plug in such a manner as to always retain a dry surface upon the actual plug and thus prevent the great



electrical leakage caused in wet weather in exposed positions. It also does away with the usual milled or hexagon nuts for holding the wire in position. The end of the shield is intended to hold the insulation of the wire, and the wire itself is held by a small side screw, which may then for absolute security be covered with gutta percha. The action of screwing down cover makes contact inside with the sparking plug by means of a spring buffer. The cover is securely held in position against vibration. The United Motor Industries, Limited, have taken up the selling agency in this country.

Riding in Wet Weather.

It is sometimes noticed that the ignition system will behave in an erratic manner when riding in a wet or foggy atmosphere. Misfires occur, and the sparking may actually stop altogether. This can be traced to the fact that there is a leakage taking place of the high tension electricity. If the coil is exposed the ebonite cover gets wet, and moisture being a good conductor, the current short circuits to the frame; or if the porcelain or mica of the sparking plug gets damp the current will leak over the surface to the metal in preference to jumping across the points of plug. In the first case the coil can be made quite damp-proof by having a close-fitting cover of thin waterproof material made for it, and for the plug a piece of ordinary good indiarubber tubing slipped over the insulation, and projecting well over the terminal screw and wire will render leakage impossible. In fact the plug should be so protected in all weathers, as even dust on the porcelain will promote a leakage sufficient to cause a misfire now and then.



Concerning the Metric System of Measurement as used in Defining Motor Measurements.

Doubtless many of our readers are fully acquainted with the metric system, but for the benefit of those to whom the terms employed are quite new and unintelligible we propose to explain them as clearly as possible. The unit of length employed on the Continent and adapted to scientific work is called the *metre*; this is exactly equal to 39·37 inches. This unit is sub-divided into 1,000 parts, each of which equal 1 millimetre, or thousandth part of a metre, and abbreviated to m.m. for general purposes. Where absolute accuracy is not necessary it is well to remember that 1 m.m. equals 1·25th part of an inch. A kilometre equals 1,000 metres and is the standard for long-distance measurement, and is just equal to 6·10ths of a mile. For measuring liquids (such as petrol) the "litre" is often used as the unit; 1 litre equals exactly 1¾ pints. For reference we just tabulate these comparative measurements. Thus:—

1 inch	is equivalent to	25·4 millimetres
1 foot	,,	304·8 ,, ,,
1 mile	,,	1,609 metres
1 mile	,,	1·609 kilometres
1 kilometre	,,	·621 mile
1 metre	,,	39·37 inches
1 kilometre	,,	1,093·6 yards
1 litre	,,	1·76 pints
1 pint	,,	·568 litres
1 kilogramme	,,	2·2 pounds

Sound Joints.

Occasionally it will be found that the compression is not as good as it ought to be, even when the valves have been re-ground. If so, try the joints by just wetting round about the packing-washer for leakage; if it is noticeable even when screwed up quite tight, replace the copper and asbestos washer with one made out of a piece of sheet aluminium. The writer has been experimenting with different metals, and he finds that the aluminium to be just ductile enough to make an excellent joint; it also stands the heat and action of the gases very well. About 1/16-inch thick sheet does nicely for the exhaust cover and compression tap.

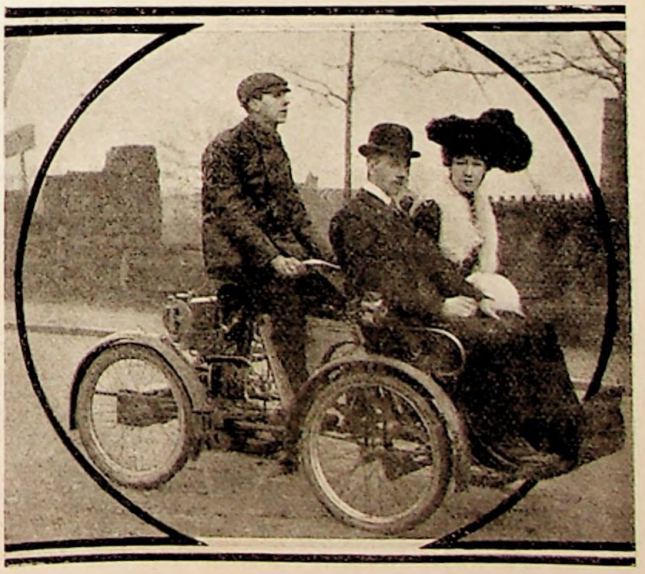
Now that most up-to-date motors are being fitted with crank lubricating devices which can be operated from the saddle whilst in motion, and that exhaust valve lifts are taking the place of compression release valves, the lever and connecting rod formerly employed for the compression tap may be adapted to open and close the crank chamber oil drain cock—an important point in attempting long non-stop runs.

A Mysterious Breakdown Explained.

An instance came under the writer's notice, the other day, in which a practically new machine, which had run splendidly for the first hundred miles or so, had in some strange manner begun to rapidly deteriorate in its working, misfires and explosions in the exhaust box become frequent, until finally the motor absolutely refused to start. The rider has tried all the details in a very careful manner; the coil gave a fine long spark, the valves were reground, carburetter overhauled, and even another brand of petrol tried, but all to no purpose. At the writer's suggestion the sparking-plug was removed once again and very closely examined. The points were clean, and the correct distance apart, and with the wire from the coil in position on its terminal, and the metal case of the plug touching the polished handlebar, a good flaming spark was obtained on moving the trembler. However, it was noticed that the screw thread of the plug was coated with a hard greasy film, and also the face of the nut and combustion chamber hole. Some emery cloth was obtained and this film removed, so that the two clean metal surfaces made good contact. The advancing rod for the contact maker was now examined at the joint where it forms the frame connections for the primary circuit, the nuts were removed and washed with petrol to get the oil off. Things were now replaced and the belt slipped on to the pulley, current switched on, and the machine just wheeled slowly along the pavement. Lo! and behold, a couple of yards had scarcely been covered before the motor started, and began to gather speed so quickly that it almost bolted on its own account down the street. It was afterwards tried on a 40 mile out and home spin, when it ran superbly without a single miss. This little episode points to the importance of keeping oil away from all contact surfaces, but as a matter of fact, there is a simple method of making the connections so that even oil cannot affect the sparking in the least. This will be fully explained in an illustrated paragraph shortly.

Carries Two Passengers.

One of our readers sends us the accompanying photo of his Ariel quad, with extra wide front seat. It is fitted with the firm's two-speed gear and water-cooled head, and all the front part is built extra strong, although the owner is sure, from experiments made, that the standard Ariel quad is built quite strong enough for two passengers—providing an extra wide seat is ordered. The reader who sends us the photo stated that he has the latest 3 h.p. engine in his Ariel, and with two



ten stone passengers on the front, never has to assist it. On the low speed he can climb anything; ordinary hills he can climb easily on the top speed. "I frequently go on a 100 mile run in a day and think nothing of it," he writes, "and I keep my machine in perfect condition by attending to it, and always keeping it clean."

IN TRANSIT.

Some Feelings and Experiences of a Cyclist in the Transition Stage.

Increasing One's Knowledge.

A great point in favour of dabbling with motors is that one is carried by the subject into so many bye-paths of knowledge. In fact, motoring comes next to photography among the simple arts for adding to the store of information possessed by its votary. Photography, at the start, calls for nothing more than button pressing and a compliance with directions given on two or three bottles of fluid, but sooner or later, as troubles arise and the thirst for knowledge is gained, one is insensibly carried into the sciences of light and of chemistry, and the arts of composition and drawing, and is induced to cultivate any pictorial sense that may have been lying dormant. So in motoring, one is content to know that the manipulation of certain levers effects certain results, but before very long one wants to go further and to know the reason why, and again chemistry comes into play, not only in connection with the spirit and the formation from it of the explosive gases, but in the composition of the lubricating oils, and in the changes that take place in the charging and discharging of accumulators. Then the gnition system demands a knowledge of electrical science and an insight into magnetism.

Subjects which at first seem to be very abstruse and to be weighted down with complication soon clear themselves when practical experience goes hand in hand with careful study, and, for this reason, the perfect machine would be useless as a tutor; in fact, to be perfect it must be entirely automatic and self-governing, and fool-proof—and then nobody would want to buy it, such being human nature! It comes about, that a mishap or trouble should be regarded not altogether an unmixed evil; it may be a nuisance, coming maybe at an awkward moment, but there is knowledge to be gained from it, and the discovery and correcting some defect at the roadside will have given the rider an infinitely keener insight into the why and the wherefore of the subject than would the study of half a dozen volumes thereupon. This is mainly because of the difficulty of dealing with any highly technical subject in cold type in a lucid manner, and again because of the practical impossibility of anticipating every likely and unlikely fault. In this way I always console any of my friends or myself, should we happen to get hung up for a mishap of some kind; but the reminder that "goodwill" is being bought does not always seem to be as welcome as it ought to be.

Two Ways of Doing it.

Writing on this subject reminds me of two things that are worthy of a word or two. If the engine is not doing its best, and two apparent faults are located, it is always advisable to endeavour to get one right before tampering with the other. Thus, to take as an instance an occurrence that fell to my lot the other day. I slightly disturbed the points of the sparking-plug, and, between the attempts to get them nicely set, I started to adjust the contact breaker and, as a consequence spent close upon half an hour in worrying out various combinations which I need not have troubled about. The other matter I wanted to mention is a small pamphlet entitled, "Accumulators" by those acknowledged experts on the subject, Messrs. Peto and Radford, of 57b, Hatton Garden, London, E.C.

Anybody having the slightest interest in the electrical details of the motorcycle should write for a copy of the pamphlet, which, no doubt, will be sent post free to anyone mentioning this paper, but it would be courteous to enclose a stamp to cover postage. The pamphlet gives the simplest and clearest description of the accumulator, its capabilities and its functions, that I have ever read, and all the mysteries of voltage and amperage are thoroughly elucidated. The reason why a storage battery of the size of a postage stamp will give exactly the same voltage or pressure as will one of the size of a house is explained; and one is also told why the accumulator should not be allowed to run down below a certain voltage, and what happens should it do so. The way in which the battery should be treated is very clearly and briefly put. Altogether it is a most interesting little brochure.

Petrol or Motor Spirit.

Recently I indicated a desire to know which was the better—petrol or motor-spirit—and I can only confess to being just as puzzled as ever, because the correspondence which has reached me is most contradictory. I should very much like to publish some of the letters, but I fancy that a summary will be equally serviceable to my readers. Opinion seems to be greatly divided on the subject. Some riders swear by the one brand, and some by the other. Some have had bad results with A and good with B, whilst other riders have experienced entirely opposite results. Some say that the one is the more economical; others say the opposite. The only conclusion that can be come to is that there is not much to choose between them, so far as practical results go, and it is rather a question of taking up a particular brand and getting used to it. I have, however, elicited two facts which may have some bearing on the subject. It is said that motor-spirit is distilled in America and is imported into this country, and it is possible that the length of time which elapses, between the date of manufacture and that of use, may result in the spirit getting stale, and as there must be a large variation in the time, variation in the spirit itself probably takes place. Petrol, on the other hand, is distilled in London from the crude petroleum and is despatched from the works immediately, so that it may generally be relied upon to be fresh and of an even density. The hydrometer test seems to be in favour of petrol, because the contents of a tank seldom or never vary in density at a given temperature, whereas with motor-spirit variations have been noticed which would suggest that it is bulked, being made up of varying densities which refuse to mix intimately, the heaviest going to the bottom and the lightest to the top. I also hear that the price of petrol has been reduced for the second time, until it is now a shilling a gallon. The reduction is due to the cheapening of the raw material.

CYCLOMOT.

Discussing the pros and cons of two motor-bicycles and a voiturette at East Rudham.

THE PHŒNIX MOTOR-BICYCLE.

This well-known machine, which is manufactured by Mr. J. Van Hooydonk, is one which has many improvements in detail. These have gone far to make the present pedal-propelled bicycle the satisfactory piece of motor mechanism it now is.

Mr. Hooydonk, an old racing man who has taken part in cycle sport at various distances from a mile on the track to 24 hours on the road, and who is also a manufacturer, can confidently be expected to know what a motor-bicycle has to stand; and naturally, when designing a frame to stand such hard work, pays particular attention to the vital matter of strength. At the same time he makes the wheel base about four inches longer than the ordinary machine, to ensure the steady running which is always associated with the added length; and by keeping the wheels 26 inches in diameter the whole is kept rigid, and allows of a low built machine. This is a source of great convenience in mounting and also enables the rider to touch the ground with both feet keeping the machine up should the occasion demand it, in traffic, or should an abnormally greasy piece of road give the machine a tendency to side-slip. So much for the bicycle.

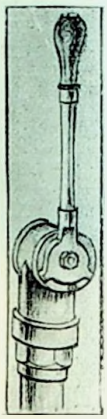


FIG. 1. LONG LEVER TO THROTTLE AND MIXING VALVE.

The Engine.

As to the engine, this is of the well-known Minerva type, an engine which has now proved itself suitable in every way for the purpose intended, added to which are such improvements as thousands of miles of hard road riding have proved to be necessary and desirable.

One of the chief improvements is the manner of lubrication. This allows of introducing the necessary oil into the crank chamber without the need of dismounting. It very soon became apparent to the practical rider that to have to stop to lubricate the engine every 20 miles or oftener was putting the machine at a great disadvantage, and the Phœnix was one of the first to obviate this messy and unpleasant performance. We give an illustration (Figure 4) of the lubricating device. The oil is introduced by gravity from the supply tank through the orifice A, and thus fills the barrel B. On the wing piece on the top of the rod being turned, it raises the hollow plunger C by means of the cam D. This at once closes the inlet, while allowing the oil to flow out through pipe F to the crank chamber. After leaving the oiler in this position for a few minutes the thumb piece is then given a further turn, when it reaches the topmost portion of the cam. Then the spring G again draws down the hollow plunger bringing hole E against the fibre washer H, and opening the inlet A. The oil then again fills the barrel to be in readiness when another supply is required. The carburetter, the function of which is to turn the petrol into vapour, which on being mixed with a certain portion of air forms the explosive mixture for the engine, is of the surface type, and a great improvement on the older pattern, when a bump in the road or an excess of petrol would upset the mixture. While a good many claims are being advanced in favour of the spray carburetter the pattern such as is fitted to the Phœnix is certain in action and economical in use, at the same time not depending on any delicately adjusted needle valves, small levers, and microscopical openings, such as are found on the spray variety. These, as well as being liable to be made inoperative through a little dust or foreign matter, are also very troublesome in cold weather on account of the constant freezing, should the outer air be at all moist.

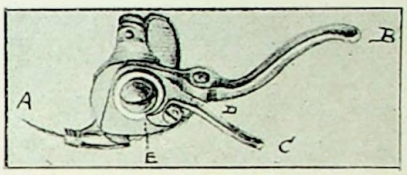


FIG. 3.—CATCH LEVER OF EXHAUST LIFT.

The only objection that can be made to the surface carburetter is the delicacy of adjustment required on the air or mixing lever. This is entirely overcome by making the handles of both the throttle valve and mixing lever much longer than usual. The levers (Fig. 1) being six inches long, a movement of, say, quarter of an inch, which is quite practical at the extreme end, makes the movement at the lower or valve end infinitesimal so that the nicest adjustment can be obtained as regards mixture, while the fine adjustment of the throttle allows the pace of the machine to be adjusted to every conceivable rate, from, say, five to 25 miles per hour. Should still further speed be desired, this can be obtained by advancing the spark advance lever. It is the working of the latter in relation to the throttle valve which enables the very best results to be obtained.

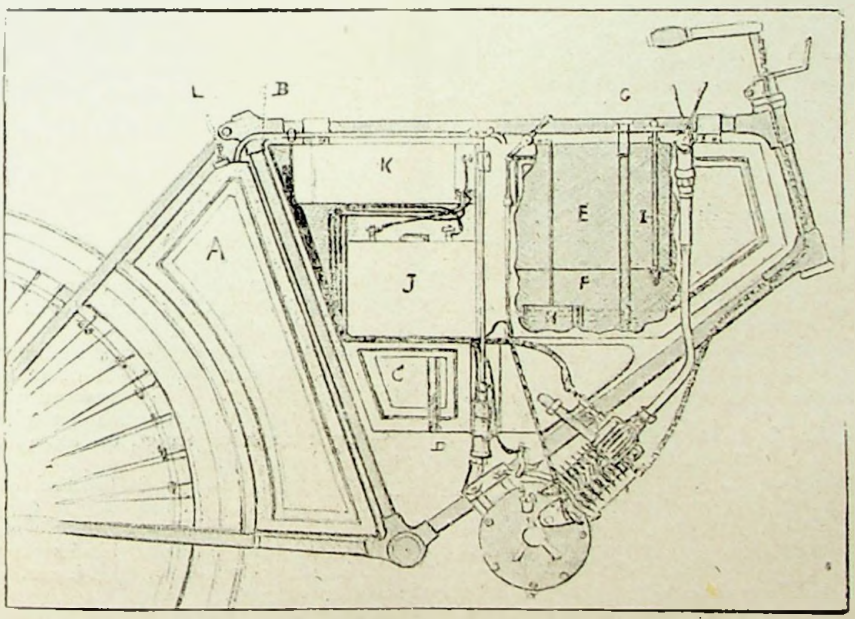


FIG 2.—THE INTERNAL ARRANGEMENT OF THE PHŒNIX.

A, *Spare petrol tank*; B, *tube connecting* A *to* E; C, *lubricating oil reservoir*; D, *lubricator*; E, *petrol tank*; F, *carburetter*; G, *chimney admitting air to* F; H, *float*; I., *nozzle for air pump*; I, *valve admitting petrol to* F; J, *accumulator*; K, *coil*

When the running is light, such as with a rear wind or down hill, the spark is advanced, and the throttle brought back; this not only economises the fuel, but also tends to keep the engine cooler, the power of each explosion being only just sufficient to keep things moving. It is when coming to a gradient, when the light running would cease, that the throttle is gradually opened, giving more power to each explosion to overcome the extra resistance. It is when the gradient is so stiff as to still retard the engine that the sparking

lever is brought back, so as to make the explosion take place at the right moment, which the slower moving of the engine necessitates. The two levers in question, being within convenient reach of the right hand, can easily be manipulated, and to the driver this soon becomes a mere matter of habit, while always giving him the means of "nursing" the machine up a particularly steep hill.

We now come to a device (Fig. 5) which makes the Phœnix one of the easiest to control in traffic, and also considerably minimises the effort required in starting. This is the combined exhaust valve lift and current interruptor.

In the first place, this method of making and breaking the electrical circuit does away with the external electric wires, which in many instances while being an eyesore to the observer are also in constant danger of getting disarranged, causing short circuiting, etc., Also the wires being shorter, a higher efficiency is obtained, which no doubt accounts for the successful running of the machine in question. The negative wire F is connected on to the clip E, which is insulated from the frame. The rocking lever C, which is actuated by the Bowden wire A, and provided with means of adjustment at B, serves the double purpose of first breaking the electrical circuit by being separated from contact with clip E, and on further being moved lifts the exhaust valve, thus freeing the engine from all compression, while no current or gas is being used. The other end of Bowden wire terminates into a catch lever situated on the handlebar and operated with the rider's thumb (Fig. 3). A slight movement of the thumb lever B lifts the rocker and breaks the current at E; this immediately stops the engine, the compression of which then becomes a powerful brake; on further pressing the lever, the exhaust valve is lifted, freeing the engine; the catch C then falls into the notch E, and this, it should be noted, can be instantly released on pressing the smaller lever C.

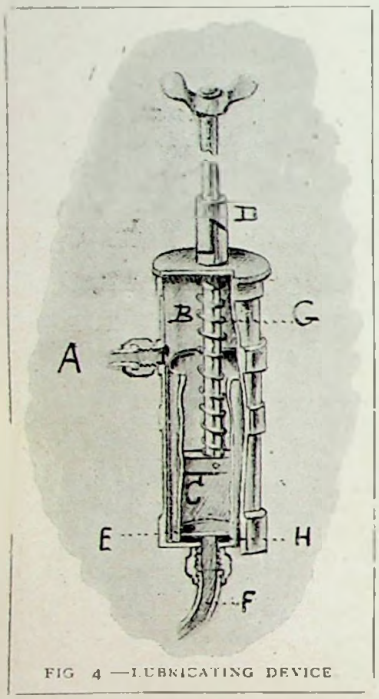


FIG 4.—LUBRICATING DEVICE.

It will be noticed that the position of the hands on the handlebar has not to be changed to stop or re-start the motor, no matter at what speed the engine may be running, and as only the thumb is required to perform the operation both hands are at liberty to operate the powerful front rim brake on the left, and the Bowden back rim brake on the right of the handlebar.

The matter of brakes has been carefully studied, and the machine can be stopped in a much shorter space than would be the case with an ordinary bicycle.

It is only when all is going well, and the speed or power of the engine has to be regulated, that the rider need touch the other levers and momentarily release the handlebar with one hand.

Another point which has been studied in the Phœnix is the large capacity for petrol. A spare tank of registered design is fitted between the seat column and the rear wheel. This, with the tank and carburetter in the front portion of the frame, enables a distance of from 200 to 240 miles being ridden without any need for replenishing the fuel supply. It is only when riding a motor-bicycle, and covering longer distances than would otherwise be the case, that one appreciates the benefit of not having to worry about the next petrol depot that might be found; and the fact of being able to go out for a good week-end ride without having to bother about any supplies is worth more than would at first sight appear.

The supply of lubricating oil is equal to about 800 miles, while the accumulator on an average will run a like distance.

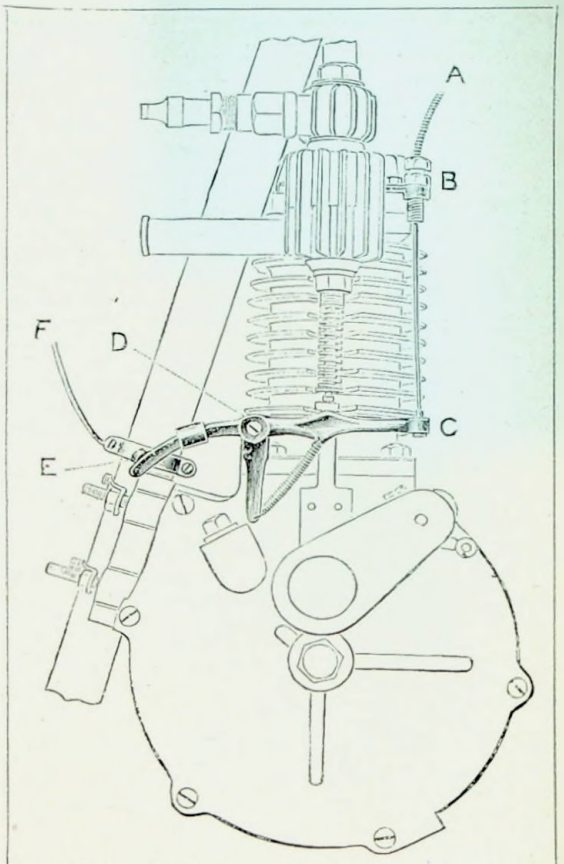


FIG. 5.—COMBINED EXHAUST VALVE LIFT AND CURRENT INTERRUPTOR.

A gauge glass is fitted to the oil tank to indicate the quantity in reserve, while the petrol in the carburetter is kept under notice by the usual float.

A sketch of the tanks as fitted to frame is given, showing the wiring and the position of the various parts. The door of the middle portion has been removed for the sake of clearness, and a portion of the carburetter is also shown cut away for the same reason.

Reference to the letters will explain the whole system.

The petrol from tank A is forced into tank E by means of the tyre inflator. This is screwed on to nozzle L. The tube B goes to within half an inch of the bottom of tank A, and on air pressure being forced on top of the petrol this flows up tube B into tank E.

The whole machine is finished in aluminium with neat black lines, full 2in. motor-cycle tyres, Clipper, Clincher, or Dunlop, and Brooks' B 90 saddle is fitted, and wide pedals with solid square rubber blocks give the rider the comfort which is necessary on a machine of which the pedals merely serve as footrests.

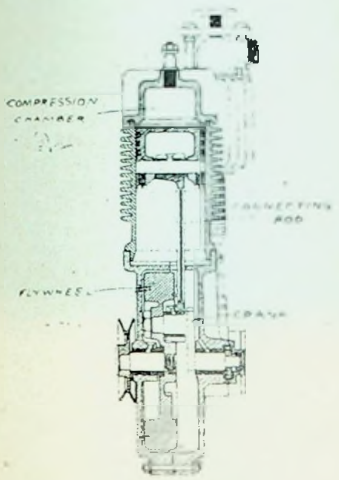
The Phœnix is also made in combination tandem form, a machine which forms an ideal touring mount for a lady and gentleman. While possessing the speed of an average motor-car, it retains the handiness of a bicycle, allowing it to be stored almost anywhere, and should bad weather overtake the touring couple the nearest railway station is all that need be looked for, a convenience to be preferred to driving in inclement weather for many miles, and the sociable side is obviously not overlooked.

INVENTION.

The latest improvements in motors, motor cycles, and accessories.

Reducing the Width of the Motor.

We illustrate a cross section of a motor constructed by the Aachener Stahlwaaren Fabrik, in which it will be seen that one arm of the crank is part of the fly wheel. By this means the crank casing is reduced to narrow dimensions without unduly reducing the breadth of the bearings for the crank axle.



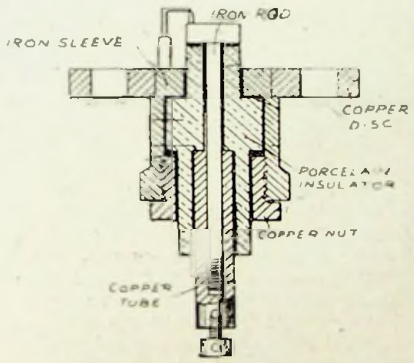
REDUCING THE SIZE OF THE MOTOR.

Emery for Grinding Valves.

We have been testing for some months a tin of special emery for our valves. The use of this is certainly a great saving of time. The price is 1s. per tin, and is prepared by W. J. Davies and Sons, Emery and Black Lead Mills, Weston Street, London, E.C.

An Unbreakable Sparking Plug.

The sparking plug shown in the illustration has been invented by Dr. Pierre Martin. It is formed with a central iron rod which screws into a copper tube at its lower end, the expansion of the iron rod acting in the opposite way to that of the copper tube, and so combining with the expansion of the porcelain insulator as to effect a compensation when the whole becomes heated, thus ensuring a constant tightness of the joints and preventing breakage and loss of the porcelain insulator.

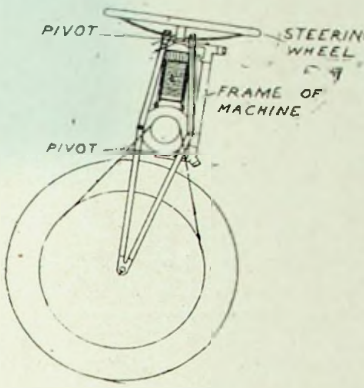


The Lincona Motor Belt.

James Dawson and Son, Ltd., Lincoln, have brought out a new belt, after a series of experiments in leathers of various kinds; this they call the Lincona. The company claim that the leather (specially prepared by themselves only) is of exceptional tensile strength and flexibility, while being almost entirely free from stretch. The shape is slightly V, the grip being obtained by a wedging process of the belt bearing upon the sides of the pulley, ample clearance being allowed below. The belt is of sufficient thickness to withstand the most severe tests without buckling or breaking, a sudden strain only increasing the grip upon the pulley and thereby avoiding the dangers consequent upon an engine "racing." We understand the belt has been used with notable success upon a "Rex," which Mr. H. W. Stones rode in the Crystal Palace tests and elsewhere. The above-named company supply to the wholesale only, but the belts can be obtained through agents.

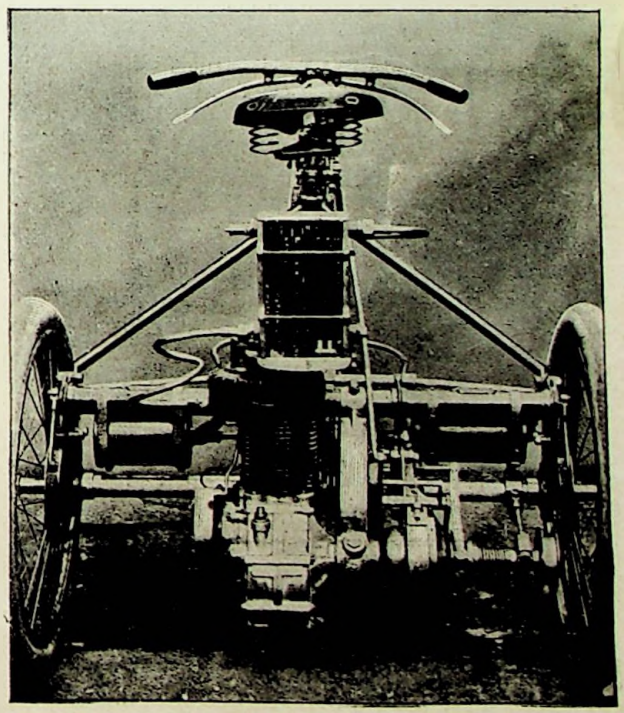
A Unique Position for the Engine.

Mr. A. J. Winship has recently invented a method of mounting the engine so that its centre of gravity lies in the line of the steering axis. In the illustration it will be noticed that the front fork consists of two tubes on each side of the wheel, which are connected together at their upper part by means of a steering wheel. The frame of the machine is pivoted to the top and bottom of the motor, which is supported at the upper part of the fork by means of clips which connect the tubes rigidly together.



A Radiator for the Tricycle.

The new Castle Radiator introduced by the United Motor Industries, of 42, Great Castle Street, Oxford Street, London, W., offers many advantages for tricycles and quadricycles having water cooled engines. The usual water tank can be dispensed with when the new radiator is used, and weight can thus be reduced and appearance improved. The radiator



is shown in the accompanying illustration just above the motor. The water it carries will last for many hundreds of miles. The price is £6, less 10 per cent. with order. We can recommend those interested to call and inspect the new device.

Readers having ideas for Inventions can obtain free advice and particulars as to the best way to protect a patent, by communicating with this Journal. All letters should be addressed "Patent," care of "Motor Cycling." C

Motor Cycling & Motoring

Conducted by
EDMUND DANGERFIELD
and WALTER GROVES.

Manager:
ERNEST PERMAN.

Proprietors:
TEMPLE PRESS, LIMITED,
7, 9, 11, 13, 15, ROSEBERY AVENUE, LONDON, E.C.

OPINION.

Back Again.

It is with pleasure that we are able to announce that Mr. Walter Groves has sufficiently recovered from his severe illness to return to business. It is no less than eleven weeks ago since he was so suddenly taken ill and that period has been an age of anxiety to his friends and relations, for even after getting well on the road to convalescence he has had relapses which have dashed to the ground repeated hopes of complete recovery. However, by the time these lines appear, our old friend will be amongst us rejoicing at being once again in the thick of the fray. Almost simultaneously with this an important addition has been made to the staff which will take full effect within the next few weeks. Altogether the hard-worked staff is congratulating itself upon the prospect of easier times—and also upon the continued success of "MOTOR CYCLING," which is full recompense for their labours.

The Future Form of the Motor-Bicycle.

"Magneto" has completed his say upon the question of the future of the motor-bicycle and we think it will be readily conceded that his series of articles was full of good points.

"Magneto," like ourselves, believes in making the most of a good thing and in letting improvements come along all in their own good time. So that, although he has laid down definite lines upon which he thinks the future vehicle will be built, he does not let that fact rob him of the pleasure to be obtained from the new pastime. We think that it will be conceded that a good case is made out for the two speed gear, and, moreover, a feasible plan is suggested for obtaining this improvement. A better method of securing the belt rim to the rear wheel was asked for in the article, and we noticed at the Agricultural Hall that the suggestion made for fastening the belt rim direct to the tyre rim had been adopted, only instead of a larger belt rim being used the ordinary one is taken and is separately spoked to the tyre rim. The result is perfect truth and a removal of the driving strain from the spokes of the wheel to the rim. Magneto's suggested improvement in the electrical system, whereby the energy could be obtained from a small charging dynamo driven from the rear wheel, seems to us to be very practical, as the addition to the present system would not be great, a suitable dynamo having to be fitted and connected up in circuit to the accumulator, whilst a brush contact could be substituted for the present contact breaker. With the summer coming on, we shall not hear of many complaints of sluggish carburation, but from experience we can endorse our contributor's praise of the wick vapourisers, and certainly the fitting of a petrol warmer from the exhaust and a gauge glass to indicate the quantity of petrol in the tank would both be appreciated. The appeal for the keeping of weight within bounds deserves to be fully endorsed, but we cannot say that we are by any means prepared to support him in his contention that the front of the machine is the best engine position, our own experience suggesting that side-slip can be better obviated by placing the weight further aft. The views of our readers upon one or more of the points raised by the two writers, who, so far, have discussed this matter of the form to be taken by the motor in the future, will be welcomed because of the bearing such opinions must have and the weight they must carry with those who are still engaged in attempting to solve what, after all, is not an easy problem.

The subject is one upon which silence will not be observed in these columns, because we are fully alive to its importance. We realise that the sooner the motor-bicycle becomes a perfectly reliable and efficient vehicle, the sooner will that great army of motorcycle riders, now in embryo in the cycle ranks, be induced to come in and make their purchases. We therefore thoroughly believe in fully ventilating the subject for the benefit of all concerned—makers, agents, and riders—and to that end our correspondence columns are thrown open to readers, and we propose to deal with the subject in article form from time to time, as matters crop up which have any bearing upon the elucidation of the problem. We desire once again to emphasize the fact that it were the height of folly to defer any indulgence in the new pastime until the perfect machine is produced. In the first place, perfection never can be reached, because ideals are progressive, and the machine which would have been ideal last year will be reached and passed by next year, and a fresh ideal would have then been created. As a consequence he who waits for perfection would go to his grave having missed the opportunities that his life had afforded him. Rather would we recommend everyone with a leaning towards the new pastime to go into it at once, because there is so much more to be learned whilst the machine is in its early stages.

The Need for Springs.

However slow may be the demand for the spring frame amongst ordinary cycle riders there is every evidence that for the motor-cycle its coming will be swift and sure. Even with the small powered motor the rider experiences a certain amount of discomfort with a rigid frame, while the accessories, if not well made, show a tendency to shake loose when a fair speed is kept up over give and take roads. Steps have already been taken to provide comfort for the rider, by introducing a spring handlebar, a spring seat pillar, and spring forks. These have, of course, to be specially made for the purpose, and it is almost worse than useless to use patterns which have been made for the ordinary type of machine. It is more than probable that a strong, simple and business-like resilient frame will be devised, and this will, we believe, find a ready market. The insulated frame is but one of many refinements which will be effected in the motorcycle from time to time conducing to comfort and the furtherance of the pastime; and indeed, at no period has the need for comfort been more apparent than at the present time. That this is the case, it is only necessary to compare the modes of travelling to-day on carriages for road and rail with the rigid, jolting, and cumbersome vehicles of the past.

We are always glad to receive from our readers contributions of a literary or artistic character. At holiday times, especially, opportunities readily present themselves for picking up interesting "snaps" and experiences which are worthy of appearing in print. Incidents on the road, snapshots of general interest to motorists, and sketches may be submitted.

SOME IMPRESSIONS OF THE SHOW.

To all appearances, and it would be difficult to come to a conclusion unless one were allowed to judge from appearances, the Automobile Club's Show at the Agricultural Hall which has just concluded has been an unqualified success. Except on Wednesday, which was a half-crown day, there was always a big crowd, and although the gangways were exceptionally wide it was frequently a difficult matter to get by. The class of visitor all through the week was exceedingly good, and there was generally a string of smart equipages waiting in Upper Street, whilst the attendant footmen stood in the draughty entrance, being greatly admired by the urchins of Islington. To a large number of those for whom the exhibition catered the question of price of admission was a minor detail, and there were as nice a set of people there on the shilling days as upon this special Wednesday.

Another factor for success was the

VISIT OF THE PRINCE OF WALES

on Wednesday. This is the first occasion on which a member of the reigning house has visited an exhibition dealing with the motor and cycle industries. And it may be that this visit resulted in the big attendance on Thursday, when many a notable face and form was seen.

THE ROUND-THE WORLD CAR.

Still a third reason for writing down the exhibition as a success was the evidence of good business being done. "Sold" cards were displayed in goodly numbers, names and addresses of purchasers being given in nearly every case. The Swift voiturette was the sensation of the Show in the matter of sales and, as we go to press, we learn that no less than close upon 20 of these useful little vehicles had been sold. Some notable names were to be seen here and there fastened to a car, Mr. L. de Rothschild having purchased a New Orleans, Col. Harry McCalmont, M.P., a big 40 h.p. Panhard, Mr. H. Hirsch a 16 h.p. Milnes, and so on all round the exhibition. In fact, we were irresistibly reminded by these "sold" cards of the palmiest days of the cycle shows, when bicycles used to be bought at the show

THE CAMERA AWAITS THE PRINCE.

and taken away on the Saturday evening by the proud purchaser.

Taken all round, it was

A WELL-VERSED CROWD

and the attendants at the stands had to be continuously on their guard. They never knew when they might be talking to a world-famous engineer on a subject with which he might be far more familiar than they were. Naturally, there were many to whom the motorcar did not seem a difficult vehicle to drive. They perhaps mounted into the driver's seat and grasped the steering wheel with an air of trying to look pleasant whilst a photograph was being taken. Then, as the attendant explained that this lever, pushed forward, advanced the firing and so increased the speed, whilst that lever controlled the gas supply, and one foot lever was the brake and the other the clutch, the novice would come to the conclusion that it was all very simple and that it would be better still if, in the secrecy of his stable, he attached little labels to the levers to show which was which. But when the attendant, flushed with success at making so good an impression, took the unfortunate novice to the chassis, a look of blank dismay would be observed to steal slowly but surely over the face of the latter as he commenced to realise that

THERE WERE OTHER THINGS

besides steering wheel and levers. One such had just had explained to him the principles of the four-cycle engine, and feeling that he could without shame ask for secret information, said to the attendant, "Now, tell me, what is a carburetter, really? Some tell me it is a kind of float and others say it is a sort of squirt—ah! spray, that's it!" In this particular case the attendant was none too clear, because he explained that a carburetter was really a gasometer and between the three visions of a float for fishing, a squirt or spray for sprinkling the lawn and a gasometer which held gas, the enquirer went away bewildered.

Another man wanted to know the minutest details of the manufacture of an accumulator: "What these things were? Oh! plates; and what were they made of? Oh! lead. Nothing else?" You see, he was very ignorant on these matters and he wanted to know what made the electricity. "Ah, that's a coil, is it? Well, what does that do? Yes, I see." And at that point the attendant completed the circuit and the secondary current jumped the gap with a little crack. The inquisitive man started back in alarm, but quickly recovered his equanimity, and called his friend to "Look! Look!" But, as we said, taken all round it was a very well-versed crowd,

THE CAR FROM SOUTH AFRICA.

THE LOVE OF THE FAIR SEX FOR FURS.

and the Prince of Wales himself made a good impression. He sought information on many deep points, not only of the attendants, but of his escort. Mr. Roger Wallace, the Hon. C. S. Rolls and the Hon. Scott Montagu

DID THE HONOURS OF THE SHOW.

Some of the attendants to whom the Prince had put questions were more excited and ill at ease after the interview than during it and, as one observed the look of elation, one instinctively anticipated a line something to this effect in the next edition of the catalogue: "H.R.H. the Prince of Wales was particularly interested in this car and especially asked to have explained to him all its working details."

Of cyclists, there were many at all times and the keen interest which they took in all the details of the mechanism showed pretty conclusively that from the ranks of cyclists will be drawn a continuous supply of motists. We noticed a cyclist going round one afternoon wearing the gold North Road badge, the unique distinction which denotes that the wearer has beaten record. He was looking, oh, so longingly, at a big 22 h.p. Daimler. Speed to him was

AN IRRESISTIBLE ATTRACTION,

and having about done all that he could do with one form of locomotion, was seeking another.

One curious thing we noticed was the number of crippled men gliding about in manumotives or being wheeled in invalid carriages. One sight that we saw was rather pathetic and at the same time peculiarly rich in contrast. A crippled dwarf wheeled himself up to a car and intently studied its points. Standing next to him and engaged in precisely the same occupation was a tall, well set-up man with all the air and vigour of a sportsman. But how vastly different must the thoughts of the two men have been! One thought of the exhilarating speed, the glorious spins he could give his friends, the long journeys he could do, and generally the fun of the thing: the other—well, to him it meant all the difference between being house-ridden or limited in his excursions to but a few streets off, with the need of bumping his contrivance up and down kerbs, and being able to go out for miles into the glorious country to breathe the air and view the scenes that would relieve the deadly monotony of an incomplete life.

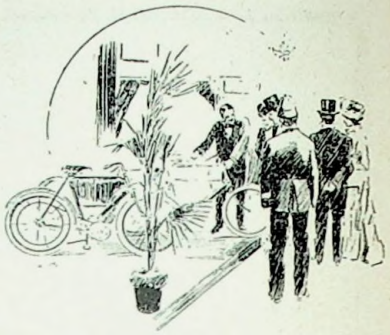
Quite a busy scene rewarded those who, by chance or design, went out into the yard of the Hall. Here all the cars came to land the visitors they were bringing to the Show, and from the yard

TRIAL TRIPS WERE BEING TAKEN,

so that intending purchasers, and many others with no such intention in the world, could satisfy themselves concerning the ease of running and the simplicity of control. But the greatest impression in this direction was made by a sparkling-eyed young lady, who sat in a red car of about 8 or 10 h.p., and who manœuvred it out backwards

TWO FORMS OF LOCOMOTION.

through a crowd of vehicles into Barford Street and then picked up some friends and, after spending some little time in getting her jacket to set nicely, in putting on her gloves and arranging the gauntlets, and in making sure that her appearance did not detract from the "tout ensemble," gave the hooter a hoot, threw in her clutch and sped down the street at full legal limit. The steam cars were doing good business in trial trips; we hope it was



EXPLAINING THE MOTOR-BICYCLE.

profitable. One steam car was running on a stand at the Show, but so quietly did it run that some spectators thought that the wheels were being revolved by electrically-driven drums in the stand.

There were quite a number of

NOTABLE MACHINES ON VIEW.

Most worthy of mention, because something has been attempted and something done, are the flying record cars. There is Serpollet's white torpedo-shaped steam car, which recently accomplished a kilometre at Nice at the prodigious speed of 75 miles an hour. There is the low, powerful-looking 40 h.p. Mercedes car which on the same day did a mile in 1 min. 0⅘ secs. The Hon. C. S. Rolls's 40 h.p. Panhard, which still holds the French kilometre record, is on view at the owner's stand. Another notable machine is the Locomobile, which has seen service at the Front. The King's 22 h.p. Daimler car, always attracted a crowd, as also did the big touring caravan "Passe Partout."

THE PRINCE MAKES A TOUR OF INSPECTION.

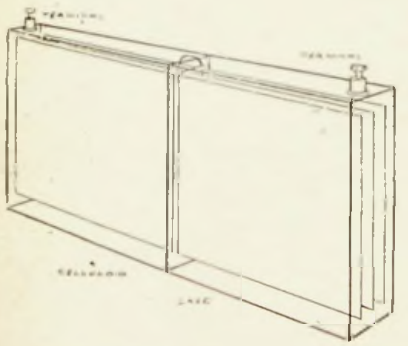
The AUTOMOBILE CLUB'S SHOW AT THE AGRICULTURAL HALL.

CONCLUSION OF REPORT.

The exigencies of space compelled us to defer dealing with some of the exhibits at the Motor Show, and the non-arrival of others till late in the week naturally precluded them from our report in last issue. The Show closed on Saturday after having had a week's most successful run. The annual dinner of the Automobile Club, held on Wednesday, at the Hall, was equally successful.

A Narrow Accumulator.

Mr. H. Waterson, of Birmingham, was showing a very narrow accumulator for use in the cases of the motorcycle in which there is little width but ample



length for the source of the electrical current. The accumulator illustrated is but one inch in width, and has ample capacity, the cells being of full size.

Messrs. Hoare & Sons, High Holborn, have long been known as cyclists' tailors, having made a speciality of rain-proof clothing of all wool materials. Having now turned their attention to the needs of the motorcar driver, all tastes and pockets can be suited.

The Vacuum Oil Co., of Norfolk Street, W.C., exhibited "the oil that lubricates most," and various qualities of it for every conceivable purpose were shown. The No. 1 Mobiloil is suitable for high-speed water-cooled engines and for air-cooled engines of 1¼ h.p., or smaller, whilst the No. 2 is suited to air-cooled engines of greater power. Oils, greases, and appliances for use with them were shown in all varieties

The New Swift Car

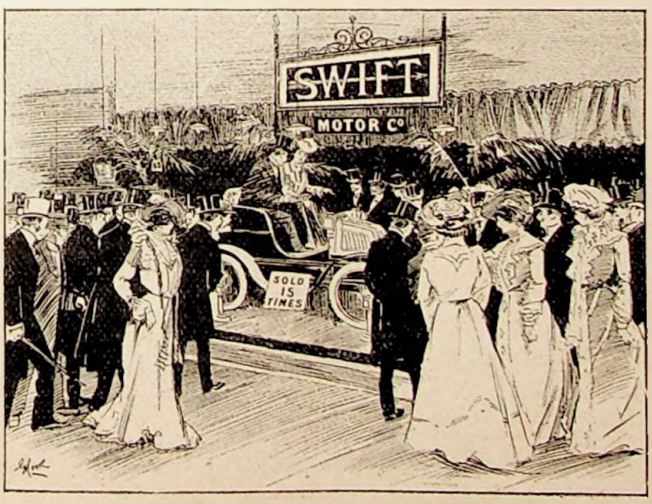
which was exhibited for the first time was one of the most interesting to the man with a modest purse. It is the result of many months of hard work and tireless experimenting, and is manufactured by the Swift Motor Co., Ltd., of Cheylesmere Works, Coventry.

Not differing greatly in appearance from other vehicles of the light voiturette type, the ordinary observer might pass it by; but if he were on the look out for a carefully designed and most reliable car at a moderate figure he would in this case find something to attract his attention. The framework is of tubular construction, carried on the usual semi-elliptical springs, an excellent feature being additional springs of a helical type between the frame and the body.

The engine, a 4½ h.p. genuine De Dion, needs no comment. It is placed forward in a most ingenious cradle and drives through a friction clutch on to the jointed shaft, which in its turn drives the live axle through bevel gears which are always in mesh, and either one of which can be locked to the shaft. This change speed gear is very novel. Two brakes are provided, one acting on the live axle by means of a drum at either side, and an emergency brake acting directly on the tyres of the wheels themselves. A large radiator is carried à la Mors, low down and forward below the bonnet, and a pump driven by a chain. The usual high tension ignition is employed, and by its means, in conjunction with the two speed gear, any variation of pace from 4 to 20 miles per hour is obtainable.

Four cars of the popular tonneau type, a phaeton, and a chassis were shown, and the class of work, both of frame and body, results in a vehicle that any motorist might be proud of possessing.

The price with 3 in. Dunlop pneumatics is £175 or £165 with solid tyres. Anyone examining this car carefully will at once see that the possibility of the poor man's motor is not so remote as is usually supposed.

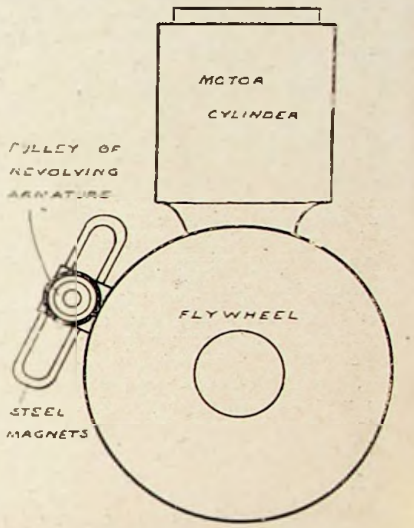


The Swift Car always attracted a Crowd.

The Souverain motor-bicycle has the motor itself hinged at the bracket, and by means of a lever it can be rocked over, so that the rubber wheel on the shaft comes into contact with the road wheel, which is thereby driven.

The Lozier Motor.

We last week fully described the Lozier motor which is sold in this country by Messrs. F. R. Leith and Co., 54, Piccadilly, London, W., and we now illustrate the method employed of



driving the revolving armature of the magneto ignition. The pulley fixed to the armature is tyred with rubber, and is in contact with the fly-wheel, so that a very rapid revolution of the armature is attained.

Salsbury and Sons, Blackfriars, S.E., made a display of their famous lamps for cycles and motorcars, prominent amongst which was the Salsbury Flario Acetylene Lamp. A small size is being made on this principle for use on motor-bicycles, but it was not on view when we called. We will illustrate this article later on. Lamps for burning oil, acetylene gas and paraffin were shown in the many styles and the one exquisite finish for which Salsburys have always been famous.

Price's Patent Candle Company,

Battersea, showed their celebrated oils and greases for use with high-speed engines. This company were among the earliest to study the problem of effective lubrication of the petrol motor, and that they have succeeded in solving it none can deny. Motorine is well known, and justly famed for its high qualities and efficiency under the most trying tests, and from our own personal experience we have never found anything to equal it.

Dalton and Wade showed the Daw motor finished, and also the rough parts for fitting together; these castings are clean and sharp. Another feature is the valve lifter fitted to the finished motor.

J. C. Meredith, Ltd. had an excellent show of motor parts and accessories; also a number of finished motors. In the electrical line there were some specialities in coils, accumulators, plugs, insulated wires; acetylene lamps, in different sizes were also to be seen. In motorcar accessories there were also some specially good things on view.

Wet and Dry Cross.

A very interesting line shown by the firm of Le Carbon is their hermetically sealed sparking battery. This possesses all the advantages of the dry cell without its drawbacks. It can be readily recharged on the road, and owing to its low internal resistance, is capable of giving a strong current.

Peto & Radford had a very complete and interesting line of accumulators; their new armoured battery is a speciality. Measuring instruments, coils, sparking-plugs and testers are also much in evidence. A charging battery for accumulators is also well worth atention. There is also an invertible battery, which will appeal to riders who are addicted to turning their machines upside-down for cleaning or repairing.

Diamond Tyres.

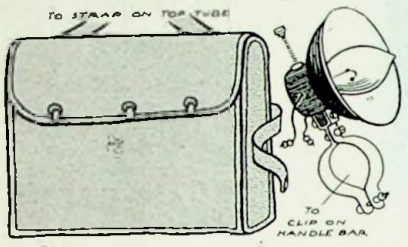
The "Diamond" tyres, made by the Diamond Tyre Co., at Akron, U.S.A., are built up single-tube tyres of excellent quality and workmanship, and are made in suitable sizes and strengths, according to the weights they are required to carry. They are imported into this country by Messrs. Shippey Bros., of 13 and 14, King Street, Cheapside, who are prepared to supply in large or small quantities.

Howison and Co., of 4, Snow Hill, were showing the London Penna motor tyre, which differs largely from the single tube tyres hitherto placed on the market. The layers of fabric are entirely separated from each other by pure rubber, and, as a result, the walls of the tyre are not liable to fracture under the stress and strain of driving. The tyre is exceedingly flexible, and is one that seems to promise satisfactory results in use.

Liquid Air Co., showed a light car, somewhat on the lines of the locomobile; this is driven by liquid air, contained, or stored, in copper cylinders; sufficient can be stored to run the car 40 miles at a speed of 12 miles per hour. Many interesting experiments were shown, illustrating the wonderful properties of this new form of energy. One, in particular, is the production of snow, by simply pouring the liquid air out into the atmosphere. Small models are also shown being driven by it.

An Electric Lamp.

The usefulness of an electric lamp requires to be experienced to be appreciated, but it will be frankly admitted that the light given is not sufficiently powerful for lane riding on a dark night. But for fair weather, for riding in town,



and for use on clear summer nights the electric lamp of about four or five volts capacity is all-sufficient. The "Castle" lamp illustrated is sold by the United Motor Industries, Ltd., and made a good impression at the show.

Dennis Bros., Ltd., Guildford, have of late made such a wonderful hit with their 8 h.p. cars that there seemed at one time to be a danger of the motorcycle being neglected by them, but a convertible motor quadricycle was on view, and an exceedingly fine piece of work it was. It is fitted with two speeds and the engine can be thrown in or out of gear as may be desired.

Holding and Son, of Maddox Street, W. were exhibiting a complete line in tailoring for motor-drivers and motor-cyclists. The most useful garment is the leather waistcoat, which not only affords ample protection to the rider, but is not so conspicuous as a leather coat. It has a kangaroo leather front, wool or leather back (wool being preferred as leather at the back makes one too hot), and lined chamois leather sleeves. It sells retail at 50s. Leather jackets in all colours and descriptions from 35s. upwards, and knickers at same price, are displayed as well as gaiters and caps in leather. This useful material can also be had as a lining to cloth garments, when the nature of the garment is not so apparent.

One point which was very patent at the Show was that oils are now being made with a thinner body. The lubricating properties are not destroyed but the oil gets to its work better.

The promoters of the Show were busy all the week endeavouring to retain the allegiance of the exhibitors for next year's exhibition, but many had already signified their intention of following the Automobile Club to the Crystal Palace.

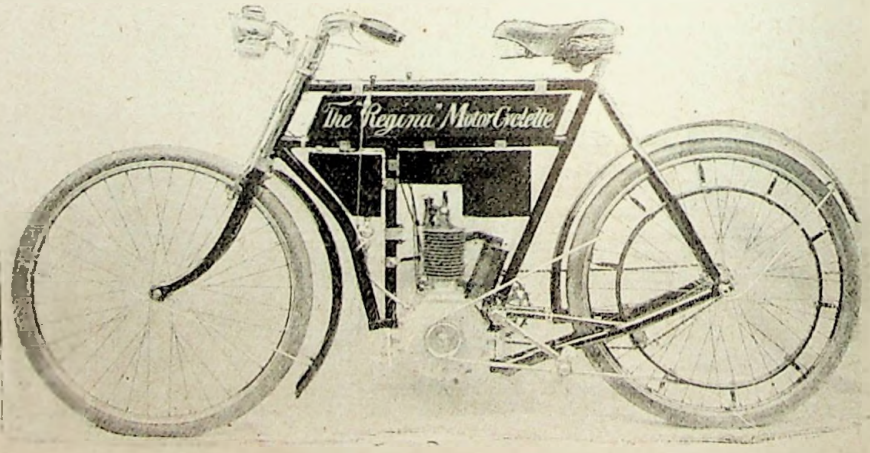
A New Principle of Construction.

The Max Accumulator differs from all other types inasmuch as the plate principle of construction is dispensed with, and a coil of lead wire laminated with antimony (protected by asbestos) is employed. The active material is thus protected from disintegration. A speciality is a bicycle cell, weighing about 2 lbs., having a capacity of 15 ampere hours; the cases of the cells are vulcanite.

Auto Lubrine is a pure hydrocarbon, having a high-flash point, and being of medium viscosity. It is guaranteed free from acids and impurities, and to retain its properties at very high temperatures. It also remains fluid in cold weather, and to prove this a sample is shown in a temperature of about 20 degrees below freezing point. The convenience of an oil which gives satisfaction in working, and at the same time sufficiently fluid to flow into reservoirs quickly, is particularly great.

The Regina Motor-Bicycle.

As we promised in our last issue we give an illustration of the Regina motor-bicycle, which is being made by the Ilford Motorcar and Cycle Co., of High Road, Ilford. As will be seen, the engine is placed vertically. It develops 1¾ h.p. and drives through a flat belt 1¼ in. wide. The frame of the bicycle is specially designed for the purpose for which it is intended, two short vertical tubes serving for the crank case of the motor to be bolted to. The capacity of the petrol and oil tanks is sufficient for a hundred and fifty miles. The machine is splendidly finished and sells at £45.



THE ILFORD MOTORCAR AND CYCLE CO.'S MOTORCYCLE.

NEWS.

The Automobile Show was a big success.

Both the attendance and the business was very satisfactory.

The number of cars which passed to and from the Hall each day was great.

It must have proved a liberal education to the horses in the vicinity: we have not heard that any accidents occurred.

The fine weather which prevailed during the week was a great boon to those who visited the show per motorcycle or car.

A Varied Choice.

Many and varied are the spellings and pronunciations of the name De Dion Bouton which meet the eye and ear: we have heard it called "Te Deum," also "Dee Dyon" (with the accent on the y), but now we see it written "de Don Bantan motar," and this in a technical paper too!

On the North Road.

Distance seems to be a negligible quantity to the motor-cyclist. H. T. Arnott, the old Bath roader, was met last week end at Biggleswade, where he and his son, E. T. Arnott, had ridden over to Eaton Socon from Northampton on Princeps motor-bicycles. H. T. was looking for North Road Club friends returning from Peterborough and was much disappointed that he missed the imposing cavalcade.

The Action Similar.

Riders who combine motor cycling with ordinary cycling will find the twisting handle brake, operated from the left handle, very convenient on their pedal propelled cycles; the action of this brake is exactly similar to switching off the current on a motorcycle, and the working comes instinctively to the motorcyclist who is used to switching off directly he sees trouble ahead, or wants to slow up. One of ours, who uses a motorcycle alternately with an ordinary bicycle, has had the latter fitted with a twisting handle brake, and is particularly pleased with its action: these brakes, of course require careful fitting, but, as made by the Raleigh Cycle Co., they are exceptionally powerful, and also have the distinct advantage that the rider can keep the brake on all the way down a long hill without any strain on the hand.

Snapped at the Automobile Show: The Prince of Wales, Mr. R. W. Wallace, the Chairman of the A.C., and Commander Godfrey-Faussett.

The "Big Event" of 1902.

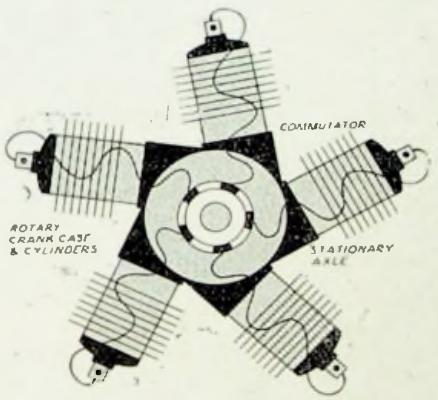
Among motorists, the trials organised by the Automobile Club this year, are being looked forward to with interest. It has been arranged that these will be held in September instead of July, August 2nd being the final day for receiving entries, but it should be noted that after June 28th, the entry fee is increased 25 per cent per week.

The Bexhill Meeting.

The arrangements for the A.C. trials at Bexhill on May 19th are nearly completed. We find there will be two sections, viz., racing and tourists' vehicles, and these will be sub-divided into classes. Motorcycles will be admitted into two classes, viz.:—Speed section, bicycles weighing over 112 lbs.; tricycles weighing over 2 cwt. Tourist section, bicycles weighing 112 lbs. or under; tricycles weighing 2 cwt. or under, accumulators being included in the weight of motorcycles.

A New Motor Principle.

There is to be seen running in the window of a motor depot in New York a petrol motor of high power and efficiency, involving a new principle of construction entirely. It has five separate cylinders arranged in such a manner that they actually *revolve around a fixed crank*. Each cylinder is fired in rotation



from a special coil and five-part contact breaker. The result is a remarkably smooth and even movement. In the ordinary single cylinder motor, an impulse takes place every two revolutions; but, by adopting this new principle, we get *five impulses for one revolution*. It is quite possible that this idea may form the key to the ideal bicycle motor, namely, a high-powered, compact, and low speed type of engine, so that direct driving may be possible. Another curious feature of this system is that the revolving crank case serves as the driving pulley.

Interchangeability of Parts.

The need for one or two spare parts for the Minerva engine took us to 158, High Holborn, last week, where the agents for this popular engine have opened a repair and supply depot. We were immediately supplied from stock. Later on, we started to fit the parts to the engine, so that there should be no question about their suitability when the need should arise for making use of them. We were surprised and pleased to find that very little fitting was required in most cases the parts dropped into their places straight away, and particularly well in the case of screwed parts did the threads engage. This has not always been our experience, and, having found it so in the case of Minerva parts, it is worth recording.

An Interesting Test.

We heard on Saturday that Mr. Cecil Edge was starting that day to drive his 9 h.p. Napier 200 miles a day for at least 10 days. The drive will be carefully checked, and, if successful, a record of 2,000 consecutive miles will have been created.

Carrying His Majesty's Mails per Motorcycle.

More mail-bags are carried per road, behind horses, than most people would realise, and not alone in sparsely populated parts of the country, but between good towns and even (as in the case of Hitchin, etc.) alongside some of the main lines of the railways. This is chiefly because there are no convenient trains. We know that for some time there have been experiments made with motorcars and H.M.'s mails, but there are several districts in all parts of the country where cars entail too much expense, both initially and in upkeep, but where motorcycles could be used to advantage. The writer has had several conversations with P.O. officials on this subject, and the result of his investigations is, that it is very probable that with a cycle trailing or carrying, say, up to 12 or 14 stones weight, there would be plenty of work. A good quad with two speed gear and water-cooled head would do admirably, and it should be arranged that there was always some motor to fall back on in the event of an accident. The rider would have to drive carefully and to be able to effect minor repairs, and then the allowance made for

CARRYING THE MAILS

would allow of a profit being made. It should be possible to get decent drivers, for though the pay may not be high, the work is very constant. Of course, reliability is a stern necessity, and the driver would have to be irreproachable in this direction. The best way would be to buy several cheap good quads or powerful tricycles, and fit them for the work, and to have three or four services run by one man who would have one or more spare motorcycles to fall back on. There would be a time allowance equal to the legal limit, so that there would be plenty of spare time for such repairs as broken sparking plugs. In every postal district there are places where the authorities would pay well for an accelerated service and where the bags could be taken quicker by road than by rail, or, if now taken by road, quicker than the horse-drawn conveyance.

Sketched at the Automobile Show: Something in Furs.

The motor-bicycle fever is ravaging the ranks of the North Road C.C. Several members were "up" on various patterns on the Peterborough run.

In the Malay States.

According to "Commercial Intelligence," Selangor, a State of the Malay Peninsula, is well supplied with motor vehicles. There is a bicycle, tricycle and carriage combined, besides several cars. All the prominent countries making motors are represented, and further extensive orders are being given.

Petrol.

We have received from Carless, Capel and Leonard a copy of their book on Petrol. A supplementary list of agents is now included, making the book exceedingly useful for the motorist. A copy can be obtained from the Hope Chemical Works, Hackney Wick, N.E., upon application.

France and its Record List.

France holds the record for all types of motors at one kilometre and one mile. At the last mentioned distance, standing start, the riders, vehicles and times are as follows: Williams, motor-bicycle, 1 min. 12⅕ secs.; Rigal, motor-tricycle, 57⅘ secs.; Guillaume, voiturette, 1 min. 27¼ secs.; Baras, light car, 1 min. 10⅘ secs.; Degrais, car, 1 min. 9⅗ secs. Rutishauser holds the "steam car record" in 1 min. 21⅖ secs. For the flying kilometre, the records for the above types of vehicles, the riders being in each case the same as those already mentioned, are 40⅕ secs., 33 secs., 49 secs., 35⅕ secs., and 35⅗ secs. Jenatzy is the holder of the electric car record in 35⅘ secs., and Serpollet, on the "steamer" in 29⅘ secs., world's record for all types.

At the Chichester C.C. Sports to be held at Priory Park, Chichester, on Whit-Monday, there will be a three miles' open motor-cycle handicap. Particulars may be obtained from the Hon. Race Secretary, Mr. T. S. Adcock, Chichester.

A Motorcycle Wedding.

A motorcycle wedding is the latest novelty. According to a newspaper report, the bride, bridegroom, four bridesmaids, the best man, and the father of the bride came to the church on motorcycles. Then the happy pair left for Brighton on a motor-tandem.

Degradation.

("A restaurant keeper at Warsaw, in order to attract customers and to induce them to stay late, has placed a motorcar at the disposal of those who wish to return home between 10 p.m. and 2 a.m.")—Daily paper.

The age is one irreverence seems to rule,
And subjects which erstwhile were sacred thought
Are now held up to public ridicule,
And looked upon as matter meet for sport.
We treat them in a light and careless way,
Familiarity has bred contempt.
'Tis so with all things at the present day,
And even the motorcar is not exempt.

Now here we have a Polish landlord who,
Besides the restaurant which he controls,
A motor keeps, which, between ten and two,
Unto their houses bears inebriate Poles!
But, motists, this may soothe your wounded pride—
And put to silence all malicious talk—
Whilst Vodka-stricken gentlemen may ride
The unpolished Polish drunkard has to walk!

Sydney J. Tayler.

A public motorcar service between London, Windsor and Hampton Court, and to Brighton will be inaugurated this summer.

Tolls for Motorcycles.

The toll-keeper at Dunham Bridge, between Retford and Lincoln, still refuses to allow motor-tricycles to pass over at less than 1s. 6d., though he only charges 2s. for cars, however large. As he charges 6d. per wheel, it seems as if he will charge 1s. for a motor-bicycle. Still, he has let the only one he has had through at 2d., the price of an ordinary cycle.

The Man, not the Machine.

We often wonder whether it would be worth the while of the motor trade to refuse to supply motors to utter novices—men whose fingers are all thumbs. This remark is prompted by the knowledge that there is a remarkably fine quad in the Midlands which was sold to a person who really does not deserve to own a motor; one of the first things he did was to leave his switch on, his plug in position, and the electric circuit completed by the trembler being in contact with the platinum-pointed screw; this, of course, quickly deprived him of his current. Since then he has had various troubles, principally brought about by endeavouring to drive on a "mixture" of all gas. Most of the cycle agents in the immediate vicinity of this motist have had visits from him when in trouble, and were it not for the fact that the makers of the quad in question have a particularly good reputation, it is quite possible that their wares might get a bad name in this locality, as many people might attribute the trouble to the quad, whereas the driver is solely to blame, which is rather hard on the makers, it must be confessed.

She (impatiently): "Oh! cannot you find out what is the matter?"
He: "No-o-o, my dear, not–yet."
She: "How silly! I feel sure it is only something come unscrewed somewhere!"

We hear that Mr. Alfred Harmsworth is having a special mile course mapped out for motor speed tests, with quarter mile straights. It is his intention, when ready, to invite the leading motorists to partake in the trials which will be arranged.

Motorcycle Racing.

As yet the sport-promoting organisations have not given the motor-cyclist much chance. We rather anticipated that a meeting would take place at Whitsuntide, at the Aston track, but presume that the announcement of a motor-cycling meeting at Coventry, on the Monday, has deterred other clubs from clashing with that fixture.

An Unpuncturable Tyre.

A reader forwards us a print of a new idea for an unpuncturable tyre he has put into practical form. The claim that it is unpuncturable is reasonable enough, but we confess we cannot see where the resiliency comes in, owing to the air tube being buried in the rim—hence its use for a motorcycle would be very limited; for a car it would no doubt be better than a solid tyre in some respects.

Business at the Show.

If the reports as to the volume of business done at the Show are reliable, the leading makers have no reason to complain of lack of orders. The Swift Company made a decided hit with their small car retailed at £175, and the one staged was sold any number of times during the week. Bayliss-Thomas, Singer, and Humbers, all did well with motor-bicycles, in fact, if we can believe the statements made, the ranks of motor-cyclists will receive a considerable accession of strength ere long as the result of the orders placed at the recent Show.

The Decrease of Horses.

The French War Minister has recently proved that the number of horses to be commandeered by the State in case of war has diminished by 5,900, and all this on account of the increased use of motorcars. To these reduced figures, 2,000 more have to be added to show the total reduction. The latter number has been in use for omnibus services which now only employ mechanical power. One great carrier's firm, indeed, has 750 horses less in its employ than it had twelve months ago, having substituted motor for horse power.

Look to the Bicycle.

The novice at motor-bicycling is apt to have his attention so engrossed by the motor that the purely bicycle portion of the machine is allowed to suffer. We came across such a case the other day. The rider was vainly endeavouring to get his motor to start, and although his machine was fitted with both exhaust lift and compression release he was unable to get enough way on the machine to start it, although the surface was firm and level. This looked like a case of the piston being seized or belt so tight as to be binding the crank shaft bearings. On removing the belt both the back wheel hub bearing and the bottom bracket bearing were found to be locked. The machine was a new one, bearings too well adjusted in first place, never oiled at all, and the machine had been forcibly driven by the motor until it could no longer be re-started. Moral—Take off the belt occasionally and carefully test wheel bearings, lock nuts, and screws.

Several motor-bicycles have been entered for the competition promoted by the French Minister of Agriculture with the view of encouraging the use of alcohol in place of petrol.

A Show Incident!

We witnessed rather an interesting incident at the Show. One of the gilded youths in attendance at a certain stand was idly surveying the crowd, when a gentleman walked up and commenced a close inspection of the exhibit, showing especial interest in the driving gear adopted by the firm. His enquiries and comments appeared to annoy the attendant referred to. "Are you an engineer?" at last he remarked, with rather a pitying smile, "if so, you would at once recognise its merits," he added.

"No, not exactly," replied the visitor, "but I know a little about motors and cycles."

Shortly afterwards, he passed on to the next stand, and the gilded youth was again at peace. He little knew that the gentleman he had addressed was one of the smartest and most up-to-date mechanics in the motor industry.

The Automobile Club will probably move into their new premises this week.

An international motor-bicycle race will be one of the principal features of the programme of the Turin Cycle and Motor Exhibition, which opens during the first fortnight of May.

The Prince and the Motor-bicycle.

That the Prince of Wales knows something about, and appreciates the merits of the motor-bicycle, was evident by the interested manner he inspected the Humber motor-bicycles when visiting the Hall on Wednesday last. He appeared very anxious to learn how the chains acted, as opposed to the fibre belt.

A Good Oil Lamp.

A really good oil lamp has many advantages not possessed by other varieties. It does not give such a good light as an acetylene, it is true, but it is far handier and more reliable when a man is out touring. Recently, we have been using one of Miller's Edlite lamps. It gives an excellent light, and now that Miller and Co. have fitted stronger springs at the back, it gives every satisfaction.

Enthusiast (who has just received new machine): "Well, here it is. Isn't it a beauty?"

The Friend: "'Er-yes, but what makes the bweastly thing go, Cholly, old man?"

Enthusiast: "Well, you see ——" (Describes in truly technical style.)

The Friend "Now, look here, Cholly, you'll be ill if you go on like that, you weally will. Let's go and have a brandy and soda first. (Description adjourned.)

OTHER PEOPLE'S VIEWS.

The Singer Motor-Bicycle.

Sir—I have just finished a journey of 470 miles on a Singer without touching a nut or screw. I consider its chief claims are: workmanship, reliability, ease of control, its splendid hill-climbing; the ignition is perfect, and one has not the worry of sparking plugs breaking, or accumulators to look after. The machines are not so speedy as some others on the market, but they are fast enough, 25 miles per hour, and although only a novice, I covered 162 miles in 12¾ hours, including stoppages for oiling and 1½ hour s rest for dinner.

The machines are made to stand hard wear, and I am convinced that in this and other respects the makers have been successful.—Yours faithfully, "NOVICE."

Pedals v. Footplates.

Sir,—In my daily "think" about motor-bicycles, I had just struck out the desirability of an arrangement by which both pedals could be made to assume the same position on the spindle when free-wheeling (or moting). Opening your capital paper last week, I found the same suggestion in "Magneto's" luminous article. If the pedals, when thus in use as foot rests, could also be made to lock in a forward position, say at eight o'clock, the comfort of both the motor and the free-wheel bicycle would be improved by about 50 per cent. Could any of your correspondents or experts give us a sketch of such a device? Some of us would like to make it, and thus hurry on the professional cycle engineer.—Yours faithfully, F. ALCOCK.

A Professional View.

Sir,—Mr. Westlake, "Cyclomot," and others have raised the question of pedals or footplates. Even on the ordinary free-wheel machine a long coast with the legs at awkward angles is tiring, and one has to frequently change position to prevent the resultant stiffness in the joints. In motor-cycling this discomfort is greatly accentuated; and, although temporary relief is obtained by varying the position, yet every position is unnatural and uncomfortable. For comfort and for reduction of vibration one should sit with both feet slightly forward and the knees slightly bent.

Footplates would allow of this; but to do away with pedals one must increase the power of the engine, so that no muscular assistance will be required, even on formidable hills, for it would be no joke to push a hundredweight up a gradient of 1-7 on a hot day. With increased horse power one has to consider heating, extra weight, extra wear and tear on tyres and frame, extra expense in running, and increased difficulty in traffic. Even if manufacturers could guarantee a machine against breakdown, what guarantee have we of never running short of petrol, or of always finding good petrol along the road? The case for footplates begins and ends with comfort.

With pedals one can easily start the machine, the alternative being a run of a few yards and an acrobatic leap into the saddle. That would be rather awkward in the case of a tandem with a lady on the back seat. The pedal allows one to assist the engine when not working at its best, and a well-timed push will frequently make a world of difference. With pedals one can rest content with 1¾ h.p. The majority of riders do not want to injure the sport by flying about the country at 30 miles an hour; 1¾ h.p should climb anything reasonable unaided, and anything formidable with a little assistance. In case of a breakdown—and this is sure to come sooner or later—one can quietly pedal home, or to a station. This is surely preferable to an ignominious return per foot or vehicle.

No, we cannot do without pedals on a motor bicycle, yet footplates are desirable. Then why not have a *via media*, combining the advantages of each? This we claim to have done by a recent patent, which enables one crank to be movable in relation to the other, and so allowing of both pedals taking up the same position at any part of the stroke. A slight movement restores the pedal to the correct angle for pedalling. The arrangements for placing this on the market will, we hope, be shortly completed.—Yours faithfully, G. W. D. AND H. S.

[We shall be pleased to receive further particulars.—ED.]

Position of Engine.

Sir,—It appears to me that neither Mr. Prince nor Mr. Strickland seem to be acquainted with the construction of these motors, so they can hardly discuss the question of lubricating them. In nearly all cases the cylinder is not open to the crank chamber (as they seem to think), but only communicates with it through a narrow slit in which the connecting rod works. The cylinder of a vertical motor is lubricated evenly all round by the piston dipping into an oil collecting groove on the top of the crank chamber, and if the engine was not vertical this groove would not be filled with oil all round. Re valves, I had occasion a week or two ago to take a Minerva motor to pieces, and I found the exhaust valve considerably worn on the underside, while the top side was hardly touched at all, thus proving that they should be vertical, and, if inclined, that they do not turn round. My own machine is fitted with a 1½ h.p. vertical motor, and I have known the exhaust valve to make a complete turn in about a mile.—Yours faithfully,

F. J. POATE.

NEXT WEEK.

Among the numerous striking articles and features appearing in our next issue will be found the following:—

Petrol; *its composition, properties, and hints on using it.*

Tricycle Chat. *By C. A. Smith.*

The Latest Ideas: *Illustrated.*

*** *Our Information Bureau affords advice which will appeal to a wide circle of readers.*

Favours the Vertical.

Sir,—May I be permitted to make a few remarks on the qualities of the vertical engine as against the horizontal and inclined engine? It seems to me that the vertical type has far and away the greater advantages, both as regards lubrication and wear and tear on both valves and cylinder. Of course, as many of the advocates of the inclined type state in the letters on the subject, the valves can be made vertical, but as regards lubrication it must be remembered that in petrol engines it is usual to lubricate the piston by means of the splashing oil out of the crank chamber, and this is bound to lubricate the lower side of the piston and cylinder more than the top side.

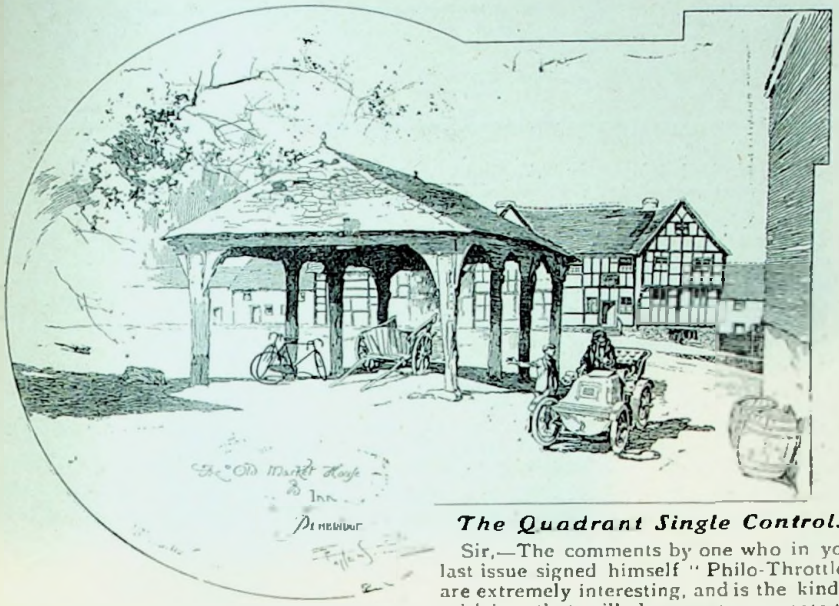
Your correspondent, Mr. William Hucks, junr., in his diagram of a cylinder of a typical gas engine, shows it to run clockwise, and I don't think I am wrong in stating that by far the greatest number of gas engines and oil engines run counter clockwise, and this of course alters considerably the thrust on the bottom side of the cylinder, as in his diagram part of the downwards thrust, due to the weight of the piston (which in a case of 20 h.p. may weigh anywhere up to three or four hundred weight), is somewhat counter-balanced by the counter action of the crank and connection rod, but I think this is more the exception than the rule.

Then again, in all loco's that space admits, the piston rods are carried through both ends of the cylinder to take up some of the weight of the piston and so prevent undue wear and tear on the lower side of the cylinder walls. I also notice one correspondent mentions that loco's are run faster than any other engine, but how about the Willans central valve engine?—Yours faithfully,

TILFORD F. WAUGH.

A Steam Bicycle.

Sir,—I have read the very interesting letter from Mr. Sadler in your issue for April 9, but cannot agree with him when he says that "the length of the stroke of the piston should be the same as the diameter of the piston." He does not seem to realise the fact that the shorter you make the stroke so you correspondingly lessen the leverage. The usual diameter of a motor-bicycle cylinder is about 2½ with a stroke of 3 in.; supposing we were to make the stroke 3¼ in., provided that we could get sufficient power to work the motor this ¼ in. extra stroke would mean a large increase in leverage. Now as the stroke of the piston is ¼ in longer on the suction stroke it will draw into the cylinder a correspondingly larger amount of "mixture," therefore the motor will be quite able to find the power to work with a 3¼ in. stroke, and that extra ¼ in. will make more difference in its efficiency if put on to stroke than if put on to the diameter of the piston. It may be said that in having a longer stroke you sacrifice the advantage of a somewhat slower piston speed, for the longer the stroke the faster the piston speed. For a wheel of given diameter, however, a slight increase in the speed of the piston would not be objectionable, as methods of lubrication are becoming so effective and larger area of cooling ribs employed, the latter especially, as in the "Rex" motor-cycle. In comparing locomotives with



petrol engines the conditions are not totally different, because the locomotive when "notched up" works principally by the expansion of steam in its cylinders, and the petrol motor works by the expansion of gases. Supposing, then, that these two types of engine may be compared, we see that locomotives with a longer stroke of piston than diameter of it are universal. The "North Star," the first locomotive in steam at work on the G.W.R. in 1838, had cylinders 16 x 16 ins., also some engines with a shorter stroke than diameter of piston were built for another railway about the same time. The latter were comparative failures, and the "North Star" was rebuilt later with cylinders having a longer stroke, and since then, I think, without exception, locomotives have had cylinders ranging from 18 x 24 ins. or 19 x 28 ins., and now on the G.W.R. 18 or 19 x 30 ins. It seems, therefore, that a longish piston stroke is a decided advantage. By the way, I have read Mr. Smith's interesting remarks on a steam bicycle, and have been at work on a design for a complete one myself for some little time, and I think a flash boiler would be vastly superior to an ordinary tubular one as a steam generator.—Yours faithfully,

C. S. Stock.

The Minerva Patents.

Sir,—The attention of our clients, Messrs. S. de Jong and Company, the proprietors of the patents covering the Minerva motors, has been called to a letter appearing in the Cycle press from the solicitors to the Etablissement Pieper.

In reply to such letter we beg to state that the assumption of Messrs. Beyfus and Beyfus that this action will not be proceeded with is without the slightest foundation. The statement of our clients' claim, in which an injunction and damages will be sought, will be in their hands within a short period.

We are instructed to point out that not only the manufacturers of motors which infringe the Minerva patents, but all buyers of such motors, are liable to proceedings at law.—Yours faithfully,

Sugden and Harford.

The Quadrant Single Control.

Sir,—The comments by one who in your last issue signed himself "Philo-Throttle" are extremely interesting, and is the kind of criticism that will do more to promote the evolution of the motor-bicycle than anything else. Every one who took an interest in the ordinary bicycle and was a member of the C.T.C., knew only too well how the criticisms and letters to the Editor in the Gazette, re the different makes of machines, gave a name or otherwise to the various makers, and I believe the majority of such letters were from "bona fide" riders and not the makers.

No doubt it is a difficulty with an Editor to steer between Scylla and Charybdis in not allowing too harsh criticism in a magazine which the trade advertise largely in. I hope this letter is not too irrelevant for you to publish, but at any rate, if it is, you have this compliment from one of your readers for publishing a letter which seems to be an open and unbiassed opinion.— Yours faithfully,

Leonard Jones.

A Reply by the Makers.

Sir,—We fail to understand why gentlemen like "Philo-Throttle" should theorise so much instead of making a practical trial. By taking the latter course they would be able to write of what they know instead of what they think, and so give their readers useful information instead of surmises. If "Philo-Throttle" has had no opportunity of testing a Quadrant "Single Lever" motor-bicycle, and he will write to us, we will endeavour to place a machine at his disposal, so that he can put it through all the tests he can think of, and it is for the purpose of making this offer that we write you. Our experience in this matter is that it is the intelligent, honest doubter who becomes the enthusiast.—Yours faithfully,

The Quadrant Cycle Co., Ltd.

A Quadrant Rider.

Sir,—Your correspondent "Philo Throttle's" remarks concerning the single lever principle adopted by the Quadrant Company would have more weight if he had informed your readers whether he had ever ridden one of these machines. He scoffs at the recent tests and theorises to a considerable extent as to what might happen under certain conditions. Need I remind "Philo Throttle" that an ounce of practice is worth a ton of theory, and that he has no justification for the remarks contained in the closing sentence of his letter. It is "Philo Throttle's" fancy that a Quadrant motorcycle cannot be anything else but "a source of constant worry, for ever prone to mysterious attacks of helplessness." That is the opinion of a gentleman who, apparently, has no practical knowledge of the machine. I have ridden between 700 and 800 miles on a Quadrant motor-bicycle, and my "troubles" have been trifling, and in marked contrast to some of my friends' with other makes of motorcycles.—Yours faithfully,

A. L.

Birmingham.

Horizontal Engines.

Sir,—Having had the pleasure of running a pair of horizontal engines during one season, possibly you will allow me to speak one word in their favour. I have just had the cylinders off, and calipered both the pistons and the cylinders most carefully, but cannot find the slightest trace of their having worn oval.

All makers of gas engines (for fixed purposes), except the Westinghouse Co., have given up making vertical engines, because of the difficulty of efficient lubrication. Mr. Duncan and many others do not appreciate the difference in the method of lubricating a steam and a gas engine. In the former case, the oil is mixed thoroughly with the steam prior to its entering the cylinder, and therefore the cylinder is lubricated equally well all over, whether it be vertical or horizontal.

In the latter case (the gas engine) the oil is introduced into the cylinder one drop at a time, and it does not require much consideration to show that it is impossible to distribute this oil round the piston, unless the cylinder be horizontal or at any rate nearly so.

The reason that electric light engines and such like are made vertical is to economise floor space simply. Where there is room for horizontal engines, the best engineers still prefer them.—Yours faithfully,

A. E. A. Edwards.

Birmingham.

Deals with various views expressed.

Sir,—One of your correspondents remarks that "the weight of the fly wheels" of a cycle engine should be "20 lbs. per nominal horse power." One would have thought that "nominal horse power" was dead by this time; but what can be thought of a rule for fly wheel weight without reference to any other factor by which the kinetic energy can be ascertained, no diameter or velocity being given? In case no one else remarks it, I may be allowed to advise your correspondent Chas. Franklin not to waste any money on his patent; he has shared the fate of many good men in inventing something for the second—or tenth—time; the gear was invented, patented, and used, to my knowledge, 10 years ago, and probably before that.

In all the discussions on front wheel v. back wheel drives, I have not seen any reference to two striking advantages in front wheel driving—first demonstrated, I believe, by M. Krieger — viz., the considerable economy in power, and the superiority in steering. The latter advantage can be easily understood, of course; but the cause of the former is not so obvious, unless it be that the front wheels are rolled over the small obstacles and inequalities in the road surface, instead of being driven against them, as is the case when the back wheels are the drivers.—Yours faithfully,

T. M. Winstanley.

OUR INFORMATION BUREAU.

A large number of replies have been dealt with through the post. Information on all subjects pertaining to Motors, Motorcycles, and Motoring generally, will be given to readers who seek such information or advice. Any reader who desires to ask a question with a view of ascertaining the views of other riders based upon actual experience should send his query, which will be inserted, and replies to such questions will duly appear, if of general interest; if not, a reply will be sent by post; a stamp, therefore must always be enclosed.

C. W. K. (Mold, Flintshire) desires the names of the firms which exhibited motor-cars running on acetylene gas at the Paris Exhibition. We have no information on the subject at hand.

M. S. T. (Liverpool) wants to know the price of a pair of Wilkinson's non-slipping covers for 1¾ × 28 tyres which he desires to fit on his Werner. We should say about 10s. each tyre—that is, attached to existing cover.

R. H. S. (Spilsby).—You will find the 2¾ h.p. Excelsior a good investment, especially as you will have a trailer attached. It will climb most hills. We consider trailers are quite safe for use with motor-bicycles. The tax would be 15/- for each vehicle. In regard to tyres, we should advise Clinchers.

From India.

N. C. (Cawnpore, India) congratulates upon the appearance of "MOTOR CYCLING," and wishes it every success. Having, to use his own words, "seen his fiftieth birthday, and having a Falstaffian figure," he fancies the three wheeler, with a trailer. He has ridden an ordinary cycle for over 15 years. We suggest the Singer as worthy of attention.

A Cycle or a Vehicle.

L. S. D. (Spilsby) enquires if a motor-cycle is a vehicle or a bicycle, as, if it is a vehicle as the law defines it, in certain districts vehicles are exempt from carrying lights from 1st April to 1st October. In plain words, he wants to know if he is liable for riding without a light after lighting time for cycles. We should class him with cycles under these circumstances.

Motor Troubles.

H. W. (Cheltenham) rides a Minerva, and would like to know (1) the cause of bicycle stopping when there is a good supply of petrol and a good spark. Most probably his carburation is at fault, or the petrol is not of the right density; it should not be heavier than ·680. (2) The cause of a squeaking noise in the engine after he has oiled it is evidently caused by some part that misses being lubricated. He must examine each part carefully. (3) Cannot slow motor down to 10 miles an hour after altering contact lever. Reduce the quantity of gas or let in more air to get weaker explosions. (4) After about eight to ten miles he has to let in more petrol from carburetter. Is that right? We should say something is wrong with the petrol, or automatic supply does not act.

R. G. R. (W. Dulwich).—You will find Mr. Calvert's work very good; his motors embody some mechanical advantages.

Butted Inner Tubes.

C. M. Stuart (Catford, S.E.) asks, "What drawbacks have prevented the general adoption of having the air tube sausage shaped instead of circular, so that when laid in its place on the rim and blown up, the two ends butted together?" This idea is the one adopted in most of the American double tube tyres. The ends don't exactly butt together; they overlap for a few inches, the disadvantages are that the resiliency of tyre is affected at the lap, also more joints to leak.

A Would-be Coil Maker.

L. J. S. (Brighton).—In constructing a spark coil, you must adopt the sectional form of winding. These sections should be ¾in. thick—if you wind in layers breakdowns are very probable—paraffined paper separating discs are better than ebonite; approximately, you want ¼ lb. No. 16 d.c.c. wire on primary, and 1¼ lbs. No. 36s s. silk for secondary; core, ¾ in. diameter by 6 in. long, of very soft iron wire. A full article on coil building is in preparation.

The Derby.

D. A. D. (Brockley) asks our opinion of the Derby motor, and as to best position of same. We have found this engine runs very well. We would prefer ourselves the type in which the motor is placed in the Minerva position, it has a more symmetrical appearance than the other. Our correspondent concludes: "Allow me, before closing, to add my congratulations to the way in which your new paper is keeping up to the fine example set by 'Cycling' for so many years. It is a very great help to all possible beginners, like myself." Thanks.

E. Brown (Rhyl) asks our opinion of the Ormonde motor-bicycle. He will find the Ormonde a very good machine. The design and position of engine are special features.

Lights.

E. S. G. (Ashton-on-Ribble) asks, "Will someone kindly give me the correct stipulations for carrying lights on motor-tricycle? I understand they should carry two; I should also like to know if there are any good candle lamps on the market." Motorcycles are exempt from the regulation applying to other light locomotives, but they must have a good light showing in the direction they are travelling. Plenty of good candle lamps; get Lucas' or Miller's catalogue of lamps (see "CYCLING'S" advertisements).

The Mitchell.

Mechanic.—This reader sends us a formidable list of questions re the Mitchell motor-bicycle. It is quite impossible to answer all these at length, but we can say the machine is a particularly strong and powerful one, and will give every satisfaction. The agents here would supply spare parts. Compared with other known makes, it occupies a favourable position. Cost per 1,000 miles for repairs, oil, petrol, and charging accumulators, should not be more than £1—petrol, of course, accounts for more than half of this. The short drive of the Ormonde does not affect its working or wear and tear in the least.

Explanatory Books.

W. J. P. (Clapham Common) desires to know of a good book on petrol-driven motors, and incidentally states that our "valuable little paper is most useful to amateur and professional alike." That is what we desire it to be. We should say that the *best* work on the subject of motors in the English language is "Worby Beaumont's Moter Vehicles and Motors," but it is expensive, 42s. Another good little work is "Knight's Motorcars and Voiturettes," 3s. 6d., or "Automobiles and Motorcycles," by G. D. Hiscox, 14s., and also the "Motor-bicycle," by R. J. Mecredy, 1s., Dame Court, Dublin. In reply to W. J. P.'s further query whether we are contemplating an article on carburetters, we might say that this is already in hand.

Regarding the Exhaust.

J. F. (Glasgow).—"Does the noise of the exhaust in a petrol motor decrease in exact proportion when the area of the exhaust valve is increased? The object of my query is to find out whether, if the area of the usual exhaust valve fitted in small air-cooled motors were, say, tripled, would the noise of the exhaust, in theory, be so sensibly reduced as to enable the silencer to be dispensed with. The advantage of valves opening direct to the atmosphere, and so greatly reducing the heating up of the motor, appeals to me, and I wish to experiment in this direction." No, your theory is not correct. You *must* allow the gases to expand into a large volume and then issue out in small streams. Study the article on silencers appearing in this issue for more information.