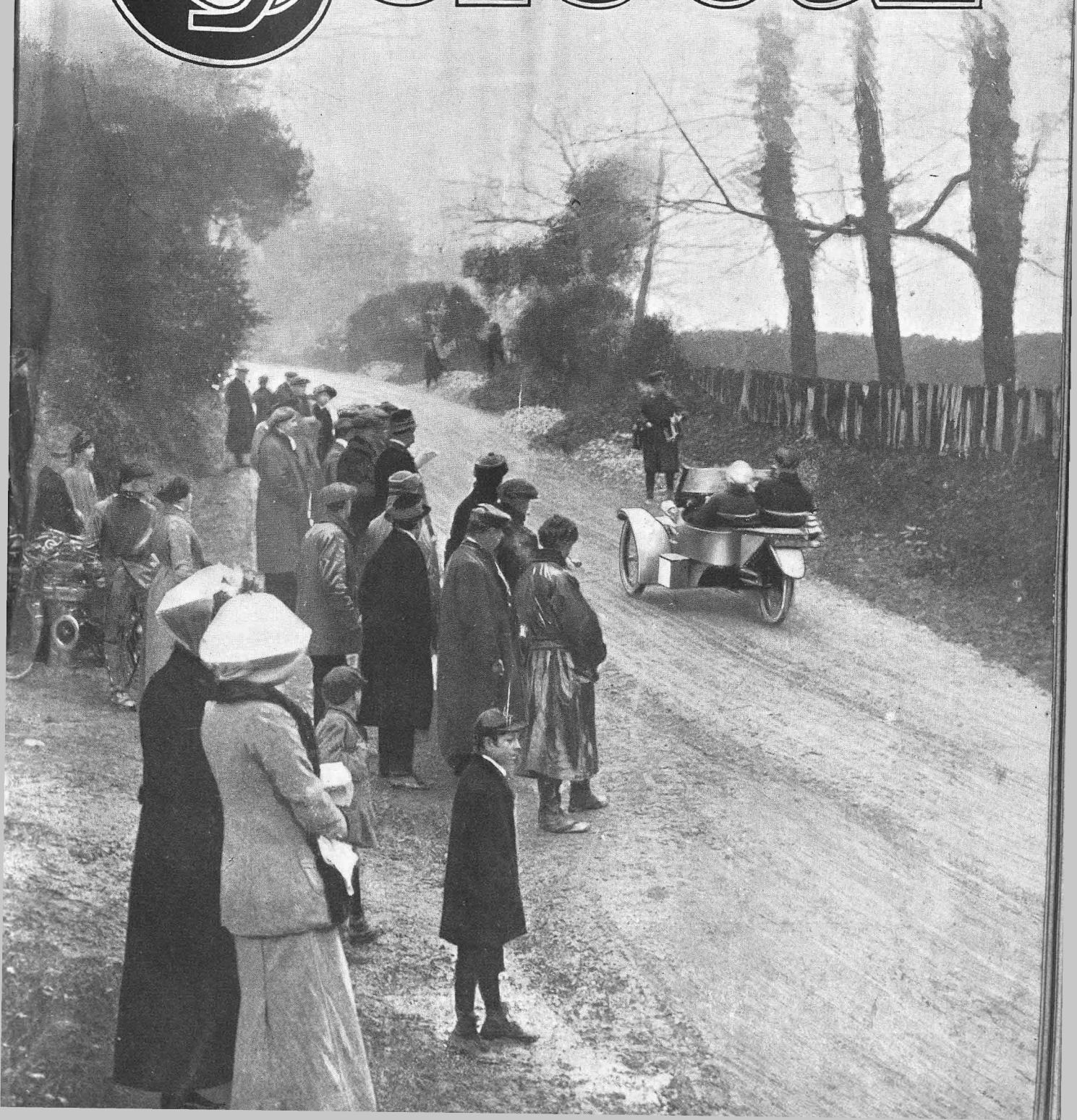


Nº 15.

5TH MARCH, 1913.
ONE PENNY.

Registered at the G.P.O. as a Newspaper

The **Cyclecar**



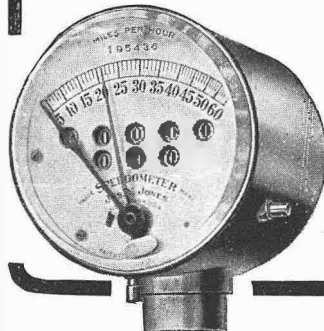
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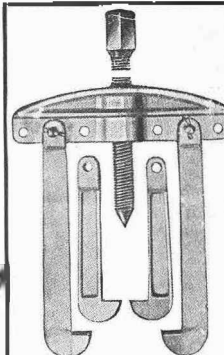


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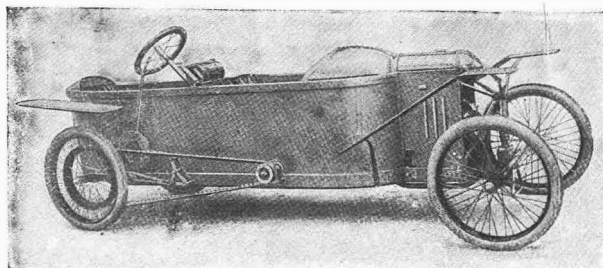
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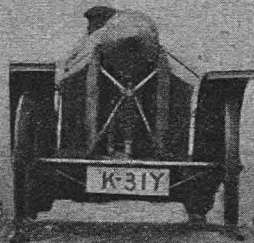
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The Cyclecar



*MORE POWER
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THE CARBURETTER.—ITS PRINCIPLES AND ADJUSTMENT.

MOST engine troubles can be traced to faulty carburation, that is, the failure of the process by which the petrol vapour is mixed with the right proportion of air to form an explosive mixture. It will be readily understood how important an operation this is when it is mentioned that an explosive petrol mixture is one containing anything between 14 and 17 volumes of air to one of petrol vapour. The mixture can be alike too rich and too weak to fire at the right moment.

It is by no means certain that every driver of a cyclecar understands the principles of carburation. Yet a slight acquaintance with those principles, with some knowledge of the working parts of a carburetter and the means of adjusting them, would enable the user to correct any slight derangement which may from time to time occur, or to "tune it up" to give greater efficiency and increased power. This knowledge it is proposed to impart to the reader by methods that should be very easily understood, and for the purpose the simplest type of carburetter and one most in use, namely, a two-lever Brown and Barlow, is taken for illustration.

The component parts are a float chamber, into which the petrol flows through a pipe from the tank. Thence it passes to a very fine jet enclosed in a mixing chamber. The two chambers are placed side by side. The induction stroke of the engine sucks up petrol from the nozzle of the jet, together with a certain amount of air drawn all round the jet and vaporizing the spirit at the same time. If the petrol flowed direct to the jet it would be continually running over, far too much spirit would be sucked in by the engine, and the mixture would be too rich. Therefore we must control it so that the supply is

shut off except on the induction stroke. This is very simply performed by keeping the level of the petrol in the float chamber below the orifice of the jet, so that it cannot rise except by the suction of the engine. What more simple method of doing this could be devised than to have a well in which a hollow float rests on the surface of the spirit, and as it rises automatically shuts off the petrol supply by means of a needle valve? When the suction of the engine draws off a certain amount of petrol the level in the float chamber is lowered, the needle rises off its seating, more petrol flows in, and the needle automatically cuts off the supply again. This process is going on continually, and it will be readily appreciated that such a delicate operation can be easily interfered with by grit stopping the free working of the moving parts, or even resting on the seating of the needle valve and preventing it shutting off the supply.

By partially throttling the suction of the engine the quantity of mixture sucked in is reduced; by opening or closing a "port," the supply of air is increased or decreased, and thus in simple words we have the system of controlling the mixture.

A glance at the accompanying illustrations will help to make the various parts easily recognizable, to get familiar with which we will imagine a series of operations. In sketch Fig. 1 we have the complete carburetter, and we will suppose that it is in a very bad condition indeed; the throttle and air slides have jammed owing to grit being forced between them and the walls of the carburetter, the jet is choked up, the float chamber has little blobs of water in it, the various passages are half stopped up, and the level of the petrol in the jet has become either too high or too low.

CARBURETTOR ADJUSTMENT (contd.).

We will now proceed to dismantle the carburettor and give it a thorough overhaul, first of all presuming that the carburettor and the supply pipe have been detached from the machine completely. The first step to take is to undo the supply pipe union. When this has been detached make sure that the supply pipe is perfectly clear; do not be content with simply blowing through it, but make sure that the petrol flows very freely; in fact, it ought to gush out to a height of about 2 in., although, of course, this depends upon the amount of petrol in the tank. When the pipe has been disconnected a small piece of gauze, which performs the function of a filter to a certain extent, will be seen. Carefully extract this with a pin and clean it thoroughly with petrol. It may be asked how it is that anything large enough to stop up the jet or obstruct any of the small passages in the carburettor can pass this gauze, and it is wonderful how anything can do so, but we are faced with the fact that various substances do collect in the carburettor. By undoing the screw of the locking band it will be possible to detach the upper part of the carburettor, and the next step is to take out the throttle and air slides. In the case of an automatic carburettor there would be no air slide to take out, owing to the fact that the throttle slide performs the functions of both. In most cases these slides are operated by Bowden wires passing through a lid, and this lid is held in position by a bayonet catch. If, therefore, the lid is turned to the left it will be easily detached. As we have supposed that the slides have jammed owing to becoming gritty some force will be necessary to withdraw them. There need be no fear of breaking the Bowden wires, however, so a good pull, combined with a squirt or two of petrol, will generally detach them. Next thoroughly clean the slides with a cloth, also the barrel whence they have been withdrawn. If this cleaning is not enough to make them slip in and out easily, polish with a fine emery cloth. The wires should be oiled, and if there is any rust on the springs they should be well cleaned with paraffin.

When the throttle or air lever is shut the slides are forced downwards by the spring, the opening to the engine is closed, and less air and petrol are sucked in. The pull of the springs is comparatively light, and a Bowden lock lever retains the slides in any desired position without the use of ratchets.

We now come to the more important functions of the carburettor, viz., the supply of the correct amount of petrol to the jet. The cover of the float chamber is unscrewed, and in most carburettors the needle valve mechanism, with the exception of the float, comes away with it, being to some extent incorporated with the cover.

This mechanism consists of two balance weights, a needle valve that has a recessed circular collar driven upon it, and a large hollow metal float, a glance at Fig. 2 showing these completely dissembled.

It will be seen that the balance weights are hinged to the cover, and that the pivoted ends are engaging with the recessed collar of the needle valve. At the bottom of the float chamber is a small orifice through which the petrol flows from the supply pipe. When the carburettor is empty it is obvious that the float,

through which runs a hole to accommodate the needle valve, will be resting on the bottom of the float chamber, and as the two balance weights exert a leverage on the needle valve the latter will be slightly raised. When a quantity of petrol flows into the float chamber the float, of course, will be gradually raised. It will come into contact with the two balance weights and will raise them, but as they are hinged to the cover with their ends working in the collar of the needle valve, the needle valve will be depressed, the fine point will be forced into the small orifice, and the flow of petrol stopped.

Connected with the float chamber is a smaller one—the mixing chamber—which accommodates the jet. This jet takes various forms, the simplest being a small diameter tube with the end closed up, through which is pierced a very small hole (see Fig. 3).

Now, as there is a connection between the float chamber and the jet chamber, and as there is an opening at the bottom of the jet, so that petrol can pass up the inside of it, it will be obvious that the petrol will be the same height in the jet as it is in the float chamber. The needle valve should close when the petrol has mounted to just within 1/8 in. from the top of the jet.

It is in the matter of the petrol level in the jet that trouble sometimes arises. If the collar on the needle valve shifts at all it is plain that the time of the shutting off of the petrol will be affected. If the collar moves up the needle the petrol will be cut off sooner, and vice versa. If by chance the collar

has moved down the needle, the float will have to rise very high in the float chamber before the balance weights are forced up enough to, in turn, depress the needle so as to cut off the petrol. It will be obvious then that the petrol will be flowing over the top of the jet, and this is what is known as "flooding." In consequence of this a very rich explosive mixture is obtained, for no matter how much air is admitted, should the carburettor be flooded it is impossible to admit enough air to nullify its effect. The remedy is quite easy, for all one has to do is to detach the needle valve, and by placing the edge of the collar against some projection gently tap the top of the needle until the collar is once again in its proper place, which can be generally seen by the mark that the collar originally made. If the petrol level has fallen too low the collar will have to be driven down the needle. It is obvious that we shall be unable to exactly reverse the process explained above owing to the impossibility of hammering on the needle point. The only course therefore is to grip the needle in the wood-covered jaws of a vice and tap the collar down with a hollow punch. However, once the level has become deranged it is a good plan to invest in a new needle, which only costs a few pence.

It is, of course, impossible to see actually when the petrol level has fallen too low, but the circumstance can be estimated in several ways. The most obvious is the longer time it takes to flood the carburettor, providing this is not caused by any obstruction. Too low a level is generally accompanied by a restricted movement of the needle valve, owing to the fact of the collar being placed too high. The effect it has upon the engine is to tend to throttle it down automatically when the throttle has been opened wide for a little time, and if the throttle is not closed the

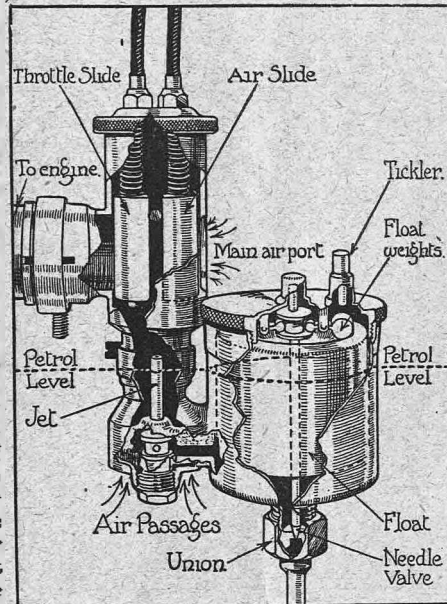


Fig. 1.—Sectional view of a carburettor (a two-lever B. and B.).

CARBURETTER ADJUSTMENT (contd.).

engine will start misfiring. This is due to the fact that the petrol is sucked out of the carburetter faster than it is supplied, owing to the needle valve closing too soon. To ensure that the level is perfectly correct, it is best to file about $\frac{1}{8}$ in. off an old jet, insert, and see that the petrol just comes to the top of it, the proper jet, of course, being inserted afterwards.

One good tip to remember in regard to the petrol level is that it is far better to have a large jet and a very low level than a small jet and a high level.

It will be readily understood that, owing to the needle moving up and down practically continuously, the seating that the needle makes with the orifice at the bottom of the float chamber will become somewhat worn. This will become apparent by a slow drip from the carburetter owing to petrol leaking past the needle, although it is being held down in its seating. To remedy this the needle has to be ground in, and it will be necessary to obtain some knife powder. If a little of this is mixed with enough oil to make it just moist and the mixture is smeared on the needle, a perfect seating can soon be obtained by revolving the needle with a finger and thumb whilst pressing it gently into the seating.

In time the two balance weights may become slightly worn through coming constantly into contact with the float, a flat being thus worn on the underside, allowing the float to rise a little higher and giving too high a level in the jet. To remedy this all that has to be done is to detach them and turn them over, the top side, of course, being quite unworn.

The next detail to examine is the jet. This must be detached, and a very fine wire pushed through it to clear off all bits of grit, etc., that may have accumulated. It is advisable not to blow through it, as it is quite possible to choke it with the saliva. Make sure that the passage from the float chamber to the jet chamber, which in the ordinary way is closed by a small grub screw. If this is removed the passage can be flushed out thoroughly.

To get more power from the engine, experiments should be made with various jets. Each jet bears a number—31 has a finer orifice than a 32. Having found the number of the one originally fitted, four

more should be obtained—both larger and smaller (B. and B. jets only cost 6d. each) and experiments made with the engine running. The jet screws in the bottom of the mixing chamber, and it is not necessary to take down the whole carburetter to remove and replace it. When the correct size is ascertained, it will be found that, when going all out, the engine will take not quite full air and about half-throttle. Needless to say, this experiment should not be carried out with the machine standing idle, racing the engine being most injurious to it.

Before taking the carburetter to pieces, examine carefully its manner of attachment. To take it down looks a very formidable process, but by applying a spanner to the nut on the end of the petrol pipe it can be quickly loosened, and the petrol pipe can then be dismantled. Next, the inlet pipe (from the engine) must be detached, by unscrewing the nuts that clip the carburetter on to the pipe by means of a collar. In replacing, see that this collar is well screwed up, to exclude air. To make an air-tight joint, wrap round it a length of insulated rubber tape, which only costs a few pence.

Like all other operations for improving the running of a machine, they are not half so difficult as they seem, and as soon as they are tackled in earnest it is seen how very simple they are after all.

The foregoing directions will apply, with modifications to suit the different designs, to practically all two-lever carburetters. Their principle is the same in each case, one lever operating the throttle and the other the air slide. A number of automatic carburetters are operated by an accelerator pedal which acts on the throttle. All carburetters, in practice, are provided with a float and needle similar to that described, but it is in the position of the jet, and in the arrangement for preserving the correct mixture that carburetters differ. In automatic carburetters, the air valve is sometimes controlled by a spring, and sometimes steel balls are raised from their seats by the suction of the engine in order to allow air to pass. The adjustment varies with different makes, and with all the well-known carburetters the makers issue a book of instructions explaining simply and clearly the various working parts. Once the underlying principles of carburation are thoroughly grasped, it is not a difficult matter to effect adjustments, whatever the design of the carburetter.

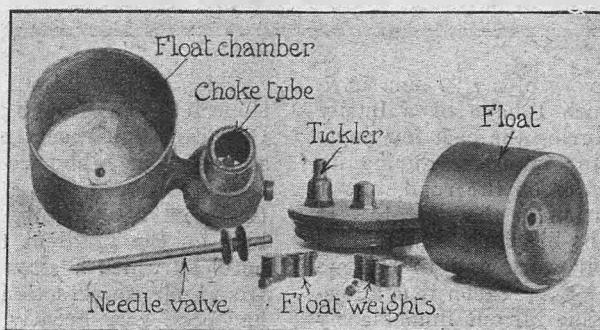


Fig. 2. —The float chamber completely disassembled.

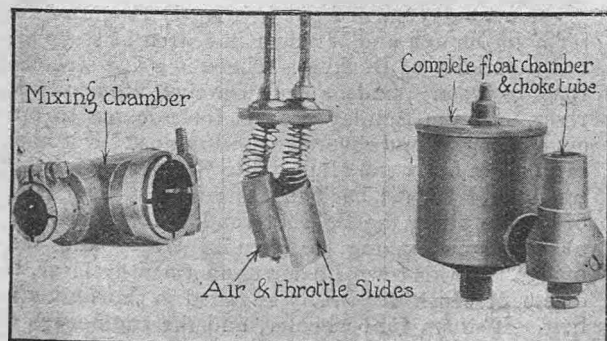


Fig. 3.—The throttle and air slides, mixing chamber (left), float chamber and choke tube (right).

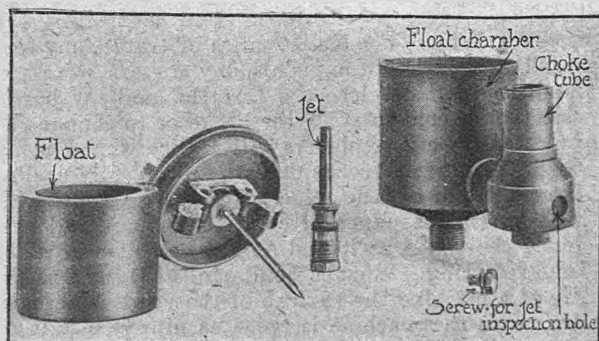


Fig. 4.—The jet, float, and needle valve detached, showing grub screw giving access to passage under jet.

CROSS-COUNTRY COMMENTS.

A New Engine—An Amusing Conversation—Looking for Steep Hills—Cross-Country Hill-climbing—Dust.

I HAVE at last taken delivery of my 90 mm. bore twin J.A.P. engine, which I have been busily engaged in running in during the past few days. Generally speaking an engine improves during its first one or two thousand miles on the road, but it is wise to proceed with caution at the outset. It takes quite a long time for the bearings, pistons and rings to settle down to their work and to become really free in action, and for that reason it is advisable not to drive a new engine all out immediately one takes delivery—plenty of oil and two or three hundred miles gentle pottering will work wonders.

The new engine is of the short stroke, big bore type, but as I am not getting the best results out of it, it is too early to compare it with my old 85 mm. by 85 mm. twin. However, it seems to be fairly economical in petrol consumption, for I filled up the petrol tank at the Colmore Depot in Birmingham, ran to London, and then out to West Ealing on two gallons of spirit, which gives me about 65 miles to a gallon. I know that this test was accurate, because it took just two gallons of petrol to fill up the tank in Ealing.

The journey from the Midlands, with the exception of the section from Birmingham to Coventry, was accomplished early one morning. It was very cold, for there had been a frost during the night, as I burbled out of the City of Three Spires. The motor factories were just opening and hundreds of mechanics were on their way to the seat of their daily labours—some of them seem to cycle in from the country quite a considerable distance. The first 10 miles was done in the dark, and then the dawn broke, the road becoming gradually more distinct with the coming light, whilst the speed increased. As usual, the machine never gave a moment's trouble, and our London offices were reached well in front of schedule time, the engine and road wheels not having stopped between Coventry and London. I found that when I tried to get out of the machine I resembled a marble statue more than anything else, for I was almost frozen to the seat. So useless were my limbs that I had the greatest difficulty in controlling the machine through the last 10 miles of traffic: my feet would not push down pedals, my fingers were too numb to open or close the throttle, and my hands were too icy-cold to apply the brake or to change the gears. Antarctic explorers will realize what I mean when I say that a frozen driver is practically useless as a conductor of a machine. However, I would willingly suffer the pangs of cold if the frost had hardened the roads as it had on the occasion to which I am referring. What a wonderful difference to the life of a machine the surface of the road makes: on dry roads the machine is twice as nippy as it is on grease, for it glides along at 20 or 30 m.p.h. with the throttle only just open, whereas under worse conditions the speed would be reduced to half.

A day or two later I went looking for hills. The slope between Slough and Beaconsfield, where the Cyclecar Club recently disported themselves, never slowed "The Jabberwock." The corners were a little tricky at speed, but the gradient cannot be worse than 1 in 12, and quite a crowd of yokels had assembled on the gradient to see the fun, whilst at the hotel at which I stayed afterwards it was evident from their conversation in the smoke-room that they had been very greatly interested, for the discourse was something like this:

"There were some trials here this afternoon—cyclecars they do call 'em, eh?"

"Ah, they be funny looking things methinks, and some of them have queer names."

"Oh, ah! One had 'Tête Rouge' painted on the body. It means red head, but I could not see anything red about the machine. Ha, ha! And I saw one called 'Puffin' Billy,' with seats fore and aft, and there's another the 'Juggernaut' or something—the funniest looking thing you ever saw in your life."

At this point I hid my blushes in my tankard and waited for more tit-bits.

"But some of yon cyclecars are pretty looking machines indeed."

"And how did they climb the hill?" asked someone.

The man who had been to the scene of the day's adventures replied:

"Some went up wonderful well, but some stopped altogether. There was one chap on a motor-bike. My word, you should have seen him go up there. Must have done 40 miles an hour. Rode an Ariel, I think. The first time he tried the hill his driving strap broke on the corner, and would you believe it he was going at such a rate that, although the engine was not driving him, his impetus took him right up over the top of the hill. You don't believe it? Well, Jimmy and Jarge were there, and they'll tell ye it was true."

"Lucky the strap didn't catch in the machine," said someone. And then they began to discuss events of a more local nature.

The next day turned out brilliantly fine, and I set forth via Slough and Windsor in search of steep hills in the vicinity of Dorking. There is a fine stretch of road between Windsor and Datchet alongside the river, but the Sunday crowds forbade me to open out the engine and cover them all in dust. Not knowing the way, I went almost into Staines by mistake, but then I turned back in the run of a long string of motors along the Bagshot road, leaving this for a narrow lane leading to Virginia Water and Weybridge. In this town I came upon a new cyclecar, the owner of which was busily engaged in shortening his belt. It was a four-wheeler, and the engine was set in line with the frame, and drove by one belt to a sliding countershaft, at the other end of which was another belt that conveyed the power to the offside

HOW I BECAME A NEW MOTORIST.

The Confessions of an Absolute Novice.

I AM a "new motorist" in every sense of that term. Prior to the last Olympia Show I had no idea of becoming a cyclecarist, and the only introduction to motoring that had ever been contemplated in my philosophy was by the possible means of a motor-bicycle weighing about 60 lb., or a motor-bicycle and sidecar. The former I found impossible, and after feeling the weight of various machines, and realizing that with my comparatively feeble strength it was all I could do to handle one, motor-cycling solo was relegated to the plane of the impossible. As for the sidecar combination, nothing but a very lukewarm regard for its pleasures could be aroused. The handlebar of a motor-bicycle seemed a hideous place for disposing of an appalling array of levers. What should I do if the machine went too fast? How should I find the steering, bearing in mind the necessity for learning in a public thoroughfare? What if the sidecar became detached? What a horrible thing to drive if it were wet, however well protected the passenger might be!

These and kindred thoughts prevented me taking up motoring. Cheap American cars seemed to me flashy to look at and unreliable, while driving a car at all seemed an undertaking, especially after a minute examination of the working of a gear lever. How a driver could ever remember to do the right thing in an emergency was more than I could understand, and I felt quite certain that I could not.

The cyclecar instantly took my fancy. A sum roughly in the neighbourhood of £100 left me with sufficient spare cash to spend upon the pastime. The few levers and the apparently simple control seemed easily comprehensible, and accordingly a trial run with a belt-driven machine of the variable pulley type was arranged at the end of Show week.

It is impossible to picture the sleepless night and the groundless fears that possessed me before the appointed day dawned. Add to that the anticipations of a sideslip on a greasy road, and you can easily realize that when, some 20 miles from town, I took the steering wheel, my hands were shaking like an aspen leaf. The instructor kindly started the engine, and with foot placed on the brake pedal ready instantly to stop the instrument of destruction, I gripped the belt pulley lever. The instructions were to pull it back, so causing the pulleys to close up and grip the belts, and at the same time to gently depress the accelerator pedal. Naturally the first time I performed the former operation, but forgot the other, with the result that the engine stopped. I felt relieved,

like a murderer waiting to be hung when by some hitch a brief respite is given him.

The next time I remembered the pedal, fought my nervousness, pulled the lever back hard, and depressed the accelerator pedal. The engine raced and darted forward with a bound. Bang went the brake pedal and the engine stopped.

The third time I got the hang of things, the machine moved off slowly, and I was actually steering a moving cyclecar. We proceeded very gently, but in a straight line. Steering seemed absurdly easy, for the machine answered the wheel perfectly. The instructor shouted to me to depress the accelerator pedal more, and we bounded forward at what seemed to me a great speed, which resulted in another abrupt stop as my ever-ready left foot came down hard on the brake pedal.

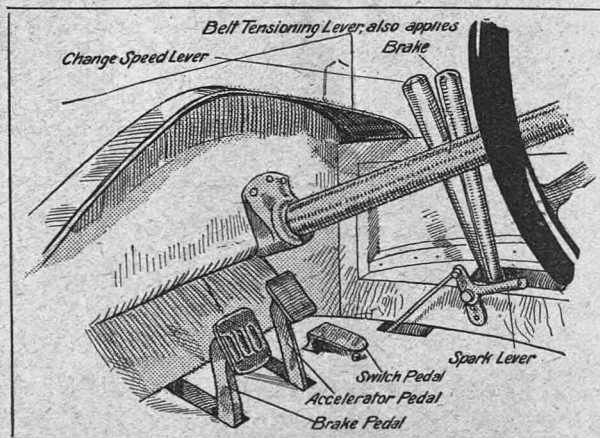
This sort of performance was repeated several times in the course of a mile, when confidence in the ability to stop the machine quickly enabled me to concentrate attention upon the accelerator pedal. By anchoring my heel on the floor board I was able to get such purchase on the pedal that it could be depressed and raised very gently, and in minute graduations very easily.

Five miles found me quite at home with the machine, but keeping the speed down to a very moderate pace. A right-angled corner was in front. "Push the belt lever away from you," said the instructor, "and take your foot off the accelerator pedal. Sound the horn. Too fast! Brake!" Bang went the brake and we stopped half-way.

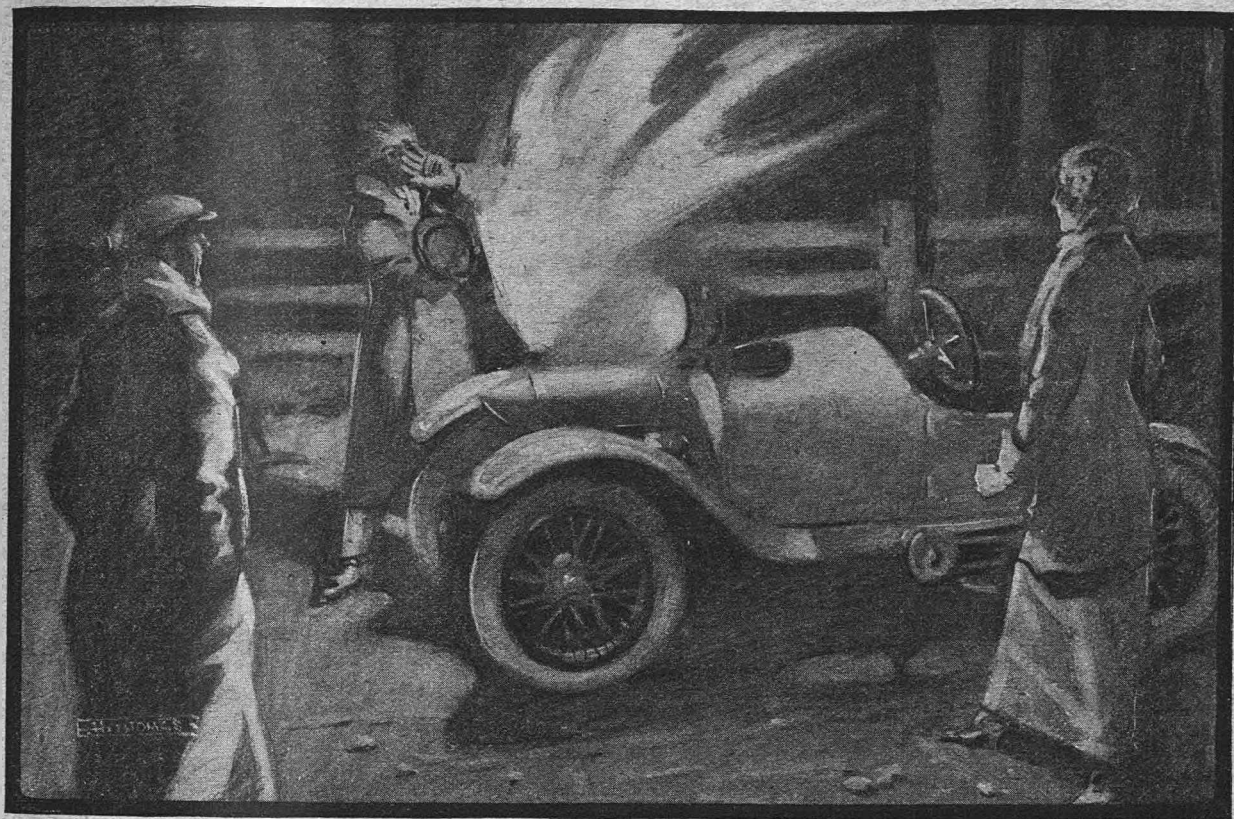
Restarted, another opportunity for taking a corner occurred shortly after. The second attempt was performed successfully, but at what seemed a dangerous speed. (Now, I swing round corners quite twice as fast.) With the idea that the machine would overturn as I realized the speed we were travelling, I took the corner far too wide and nearly landed in the ditch. Afterwards I realized that the weight of a cyclecar is placed too low for it to overturn.

As mile after mile sped by confidence came to me naturally, and soon the pleasures of the new motoring began to soar uppermost. It was exhilarating indeed.

We were rapidly approaching our first stopping place, outside which I perceived a number of personal friends. We must stop gradually and keep the engine running, I thought. How! Alas! we pulled up with a jerk and stopped the engine, while the instructor mildly informed me that it was usual to slacken the belts with the belt lever.



A typical variable pulley control system (the Duo).



An alarming accident caused through carrying a big headlight in proximity to the petrol filler. The driver lit up his lamps immediately after filling up before replacing the filler cap. Presumably some of the spirit had splashed over the tank, with the result that an explosion occurred and the cyclecar was very badly burned.

At the end of a 20 mile run I felt quite at home and decided upon the purchase of a cyclecar, but not upon any one make. All the disadvantages of air-cooled engines, belt drive, and cheap construction were poured into my ear. "You'll never go anywhere without trouble," said one. "Wait until your engine seizes because you don't understand it," said another. (I might mention that in the course of the run the poor wretched engine never received a drop of oil, and was being continually raced in my inexpert hands.) "You won't think much of belt drive when you have to tighten the belts at night in pouring rain, and they are always breaking," said others. I consulted various repairers, and they all poured out a never-ending tale of troubles to come.

In the end they succeeded in completely choking me off the variable pulley type of belt-driven machine, but I was never convinced that belt drive as a whole was to be condemned. Now, with my more expert acquaintance with cyclecarring, I know that my advisers were wrong. For a novice the variable pulley type of machine is very easy to learn and easy to control. I consider that it affords a greater measure of safety to a nervous driver.

In the end I became the owner of a belt-driven machine with fixed pulleys and a two-speed gear. A friend drove the machine out into the country clear of the traffic, and on a secluded road I took the wheel. This time there was two-lever hand control instead of accelerator pedal. The mysteries of this control I grasped at once, but dreaded changing gear. Acting on instructions, with the engine run-

ning slowly, I pushed out the clutch pedal, brought the lever back, released the clutch and—stopped the engine. "Next time you do that just open the throttle lever—this one—an inch," said my friend. I did so, and the machine glided away and soon gathered speed. Then I found the steering, which was frightfully stiff, required mastering, and we swayed from side to side with my vigorous pulling on the wheel. Common-sense dictated more gentle handling of the wheel, and in a few hundred yards we were proceeding quite easily in a straight line.

"Now put in top gear." I pushed down the clutch pedal—the engine raced horribly—and slammed the gear lever forward. "Open your throttle!" shouted my friend, as the engine "conked," and we almost came to a standstill—and then at last I had got the hang of it, but stopped on the first corner.

That was the last failure in my novitiate. Thereafter all operations seemed delightfully simple. The stiffness of the steering was overcome by adjustment, and a week later saw me driving like an expert—almost—and a month, tuning up to get more speed. The belts have only been tightened once, and at the end of a thousand miles I had almost forgotten their existence. Taking hills or corners, coming to a slow or a rapid standstill, are operations which one acquires the habit of doing in the right way instinctively in a very short space of time, and one soon understands the beat of the engine, when to give oil, when to change down, and how to vary the control levers to get the best results. It is, in a word—delightful.

B.N.D.

THE CALL OF THE ROAD. . .

Fitting a Magneto Cut-out.

REFERENCE has been made in these columns to the desirability of a cut-out to the magneto, and some little explanation of how this may be fitted should it not be a standard feature of the machine may be of interest. It is quite a simple improvement that any amateur can carry out at the cost of a few shillings, and I cannot better explain how it may be effected than by describing the manner in which I have fitted a cut-out to my own machine. The magneto (Eisemann) in my case is very accessibly placed outside the bonnet on the off side. On the contact-breaker case there is a terminal, and if in doubt whether this is for the purpose of fitting a cut-out, it should be tested, running the engine the while, with a small steel file with a wooden handle, or any similar tool, by holding the blade of the file so that it touches the terminal and also makes contact with some part of the frame. The current will be short-circuited and the engine will cease to fire. Having located the cut-out terminal, the only thing to do is to attach a length of low-tension wire, which costs about 4d. per yard, and connect it with a switch placed in a convenient position. In my case I have two switches, one placed inside the body just under the scuttle, the other on the steering wheel. Thus I can suddenly cut-out the engine in traffic as a quick method of stopping the machine, by means of the steering wheel button, whilst in descending long hills, using the engine as a brake, when it would be irksome to keep a finger pressed upon a button for any long period, I can cut-out the ignition by the electric light type of switch inside the scuttle dash.

The diagram will more clearly illustrate how these fittings have been attached. Switch A is of the ordinary electric-light type; switch B is screwed to the steering wheel, so that the metal end of the button when depressed comes into contact with one of the aluminium arms of the wheel and thus "earths" the current to the frame. A wire between the magneto and switch A is interrupted by the attachment of another wire to switch B. At the joint the insulation is cut away, the other wire attached, and the joint bound up with rubber insulating tape. Switch A is earthed to the frame by a tiny piece of copper wire pushed into one of the terminals and then wound round one of the bolts attaching it to the body, which in my case is made of steel. If it is to be fastened to a wooden body, the wire, which need not be insulated in this case, must be attached to the nearest available piece of metal work. Care should be taken

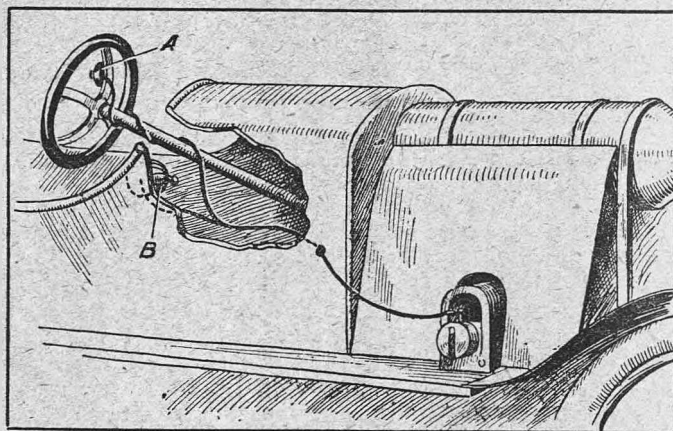
THE JOTTINGS OF JOHN GILPIN, JNR.

to see that there is no abrupt turn or projection, which of course, through vibration, would cause the insulation of the wire to be worn away and thus set up a permanent short of the magneto. Should this be suspected as a cause of the engine failing to fire, it is easily verified by disconnecting the wire at the cut-out terminal of the magneto. Care should also be taken to see that the wire does not rest on the hot exhaust pipes, when of course the insulation would be speedily burnt through and the current would be earthed.

Transverse Road Ridges.

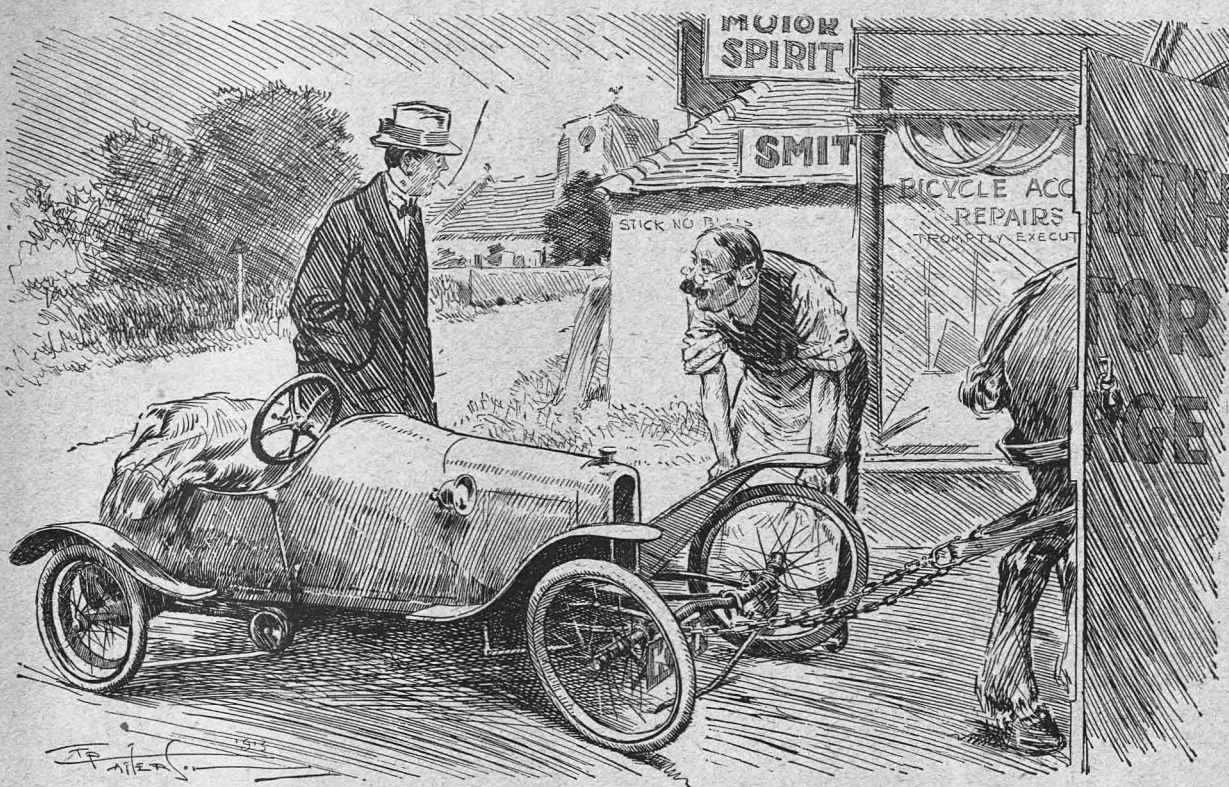
Now that the motorbus services are rapidly extending to a radius of 20 miles from London, many popular roads are deteriorating in a somewhat peculiar way. The surface sets into a series of wavy ridges at right angles to the direction of the road, causing vibration on the best-sprung machine, the injurious effect of which is far greater than that of the worst type of "pot-holed" highway. This peculiarity of surface is probably produced by a combination of the great weight and, comparatively speaking, high speed of the motor omnibus, which must affect the very foundations of the road, for the alternative

ridges and depressions are not produced by mere surface wear. In the last few months I have traversed quite a number of country roads on which motorbus services are run, and they have all deteriorated in the same way. As suggestions for the prohibition of motorbuses on country roads are not likely to meet with any more sympathy than similar recommendations for the exclusion of tramways from rural districts,



A method of fitting a double magneto cut-out referred to by "John Gilpin, Jnr."

it is therefore very imperative that experiments should be made in road construction to determine the depth of the foundations, form of construction, and the type of material to use that will best resist the destructive effect of motor-omnibus traffic. If this problem is neglected, it will result in the almost complete destruction of many expensive stretches of important main thoroughfares. Whilst the successive shocks which are endured in travelling over a road that has worn transversely are bad enough to endure in the average motorcar, which is certainly not designed to meet such a formation of the road surface, there is absolute discomfort for the occupants of such a light vehicle as a cyclecar which happens to be badly sprung, a failing to be found on some of the miniature cars. The tandem type of cyclecar, partly owing to the natural springing afforded by its elongated wooden frame, seems to take these sort of road shocks best, and in travelling fast there is a



New Motorist: "I'm afraid—er—I've messed the thing up a bit."

Repairer: "Yes, sir; wants a new axle, sir."

New Motorist: "How much do you charge for these front axle kind of things?"

Repairer: "Oh, about a sovereign, sir."

New Motorist: "Right-o, give me half-a-dozen—come in useful—I'm always barging into something."

sensation of riding in a boat over a choppy sea with a more or less pronounced swaying. The sensation is not unpleasant, or at any rate better than a succession of violent shocks. It is, in fact, one of the great virtues of the tandem type of cyclecar that it absorbs shocks from the road better than any other type of motor vehicle.

Tandem Seating.

It is really quite extraordinary that the tandem type of cyclecar has not succeeded in this country; at least, not to any great extent. Whenever I meet a user I always find him most enthusiastic with regard to his machine, full of praise for its suspension and its roominess, and anxious to show me that the preconceived notions with regard to its unsociability have little foundation in fact. I believe that this alleged unsociability is the sole objection that can be raised to this type of machine. Mr. Gilbert Bratchell, a photograph of whose tandem Sabella appeared on the front cover some weeks ago, has shown us, however, that in point of sociability the tandem type of machine can actually score over all other types, inasmuch as the great width of the seats enables small passengers, such as the owner's infantile family, to be carried abreast of the driver and his passenger, whilst it is in reality a very pleasing type of cyclecar from the point of view of appearance. Its narrow wheel track renders it particularly handy for negotiating traffic, and its long wheelbase makes the machine very steady on grease. Unlike the so-called sociable type of machine, there is ample

room for both the driver and passenger, whilst luggage can be much more conveniently carried. A small and efficient windscreen at low cost can be fitted and also a hood, but I think it a better plan to place the driver in front, as on the Super cyclecar, and to give the passenger the advantage of greater protection from the weather afforded by the rear seat. Further, the driver has not the disadvantage of looking over the passenger's head in order to perceive his direction of travel, and in the front seat he is certainly in a much better position for gauging his distance when overtaking or being passed by other vehicles, but in the rear-steered tandem cyclecar driving at night must be very tricky. In the matter of sociability I cannot see that it is more difficult to converse with a passenger in a machine where the seats are placed one behind the other than where they are placed side by side, for with side-by-side seats I certainly have to shout very loudly to the passenger for the sound of my voice to rise above the screaming of the wind and the rattle of the valves of the engine, and it would not be more difficult to turn round and speak to the person behind or for the occupant of the rear seat to lean forward to converse with his companion in front. Recently, I had a trial run on a Globe, which has a semi-tandem form of seating, the passenger's seat being placed at the side of the driver's, but slightly behind it. The arrangement is most comfortable, and affords ample leg room, while conversation is rendered somewhat easier. It also reduces the necessary width of the body.

JOHN GILPIN, JNR.

THE POSSIBILITIES OF FLAT BELT DRIVE.

A Run on the 8 h.p. Single-cylinder Globe.

ONE recent muddy week-end we had an opportunity of testing a Globe cyclecar, the machine being selected from the commodious show-rooms of Harrods, Ltd. This machine is fitted with a big single-cylinder Aster water-cooled engine, from which the drive is taken by a 4 in. flat belt to the two-speed and re-

verse gearbox, thence to the off-side back wheel by a single roller chain. The gearbox change speed, brake and back axle are all carried on an under carriage which slides on an armoured wood chassis, this under-carriage being pulled back by strong springs which keep the flat belt at the right tension and take up all stretch. To change speed the left-hand pedal is pressed forward, which slides the under-carriage forward and slack-

ens the belt, giving a free engine. Its action is similar to that of an ordinary clutch pedal on a car, and by pressing the pedal still further forward the brake is applied, whilst a most efficient side brake is also fitted to the car.

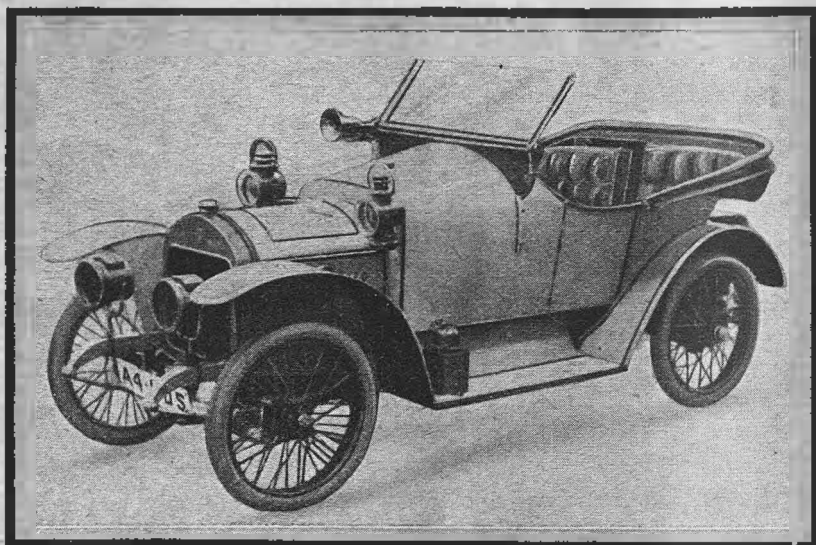
We found the Aster engine, which has a bore of 105 mm. by 120 mm. stroke, very flexible. It is very easy to start, the Mea magneto fitted running at engine speed and giving a big spark. A Claudel-Hobson carburettor, controlled by a foot accelerator, is fitted, and water cooling is thermo-syphonic, whilst lubrication is by sight feed drip and splash. The two-seater body has the seats side by side, the passenger's being about 6 in. further back than that of the driver, behind which is a space for tools, etc.

On the Saturday morning when we took over the Globe we were particularly impressed by the way the cyclecar was equipped by Harrods, it having a splendid kit of tools and spares, a spare tube, five lamps, a good hood, and a folding windscreen.

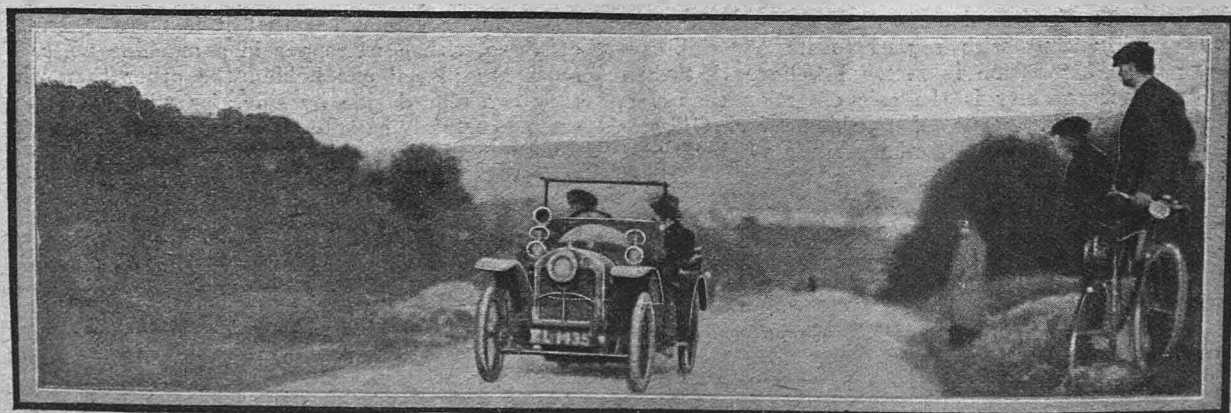
Setting out for Burford Bridge, to attend a meet of the Cyclecar Club, there were plenty of opportunities of testing the car for traffic driving. By just easing the tension of the belt by pressing forward the pedal there was hardly any necessity to use the low gear; in fact, it is quite easy to start the car from a standstill on top gear, as the big flat belt takes up the drive very sweetly. A fine straight stretch beyond the traffic area afforded an opportunity of putting the Globe through its paces. Up to be-

tween 25 and 30 m.p.h. the engine runs very smoothly for a single-cylinder, but after that speed the vibration is rather marked. On Sunday we drove from London to Petersfield and back, en route climbing Hindhead easily on top gear at about 18 to 20 m.p.h. with two up, and at the summit of the hill the water in the radiator was below boiling point. The consumption of petrol worked out to between 30 to 35 miles to the gallon, and of oil to about 1 pint per 100 miles, and still better results could be obtained.

We were very pleased with the reliability of the Globe, for altogether we drove it about 180 miles and never had to make an adjustment of any description, in spite of the fact that the car was new when we took it over. One very useful fitting is an extra pedal



The Globe cyclecar, a feature of which is the arrangement of the seats, one being slightly behind the other, thus considerably reducing the width of the body without loss of comfort.

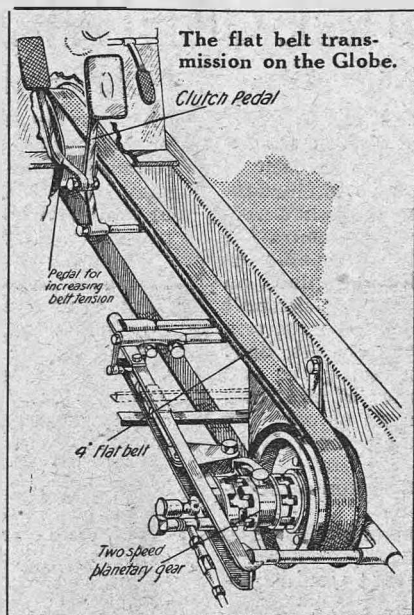


The Globe ascending Bury Hill from a standing start on the steepest portion.

A WEEK-END ON A GLOBE (contd.).

which can be used to tighten still further the belt in case of slipping on a very steep hill, though throughout our run we never had occasion to use it. The car from stem to stern is substantially built, is very comfortable, and has ample leg room under the scuttle dash.

The steering is direct, a large diameter steering wheel being mounted conveniently to the driver, and the springing is by semi-elliptics, the rear ones having long shackles to allow of the motion of the under-carriage previously referred to. The mudguarding is exceptionally good, extensions being fitted between the edge of the wings and the frame. Valances are also fitted between the running boards and the frame, and as a result the little car keeps remarkably clean in muddy weather, as is also the case with the single driving chain which runs in a well-fitted chain case. The one-wheel drive, in practice, gives extremely satisfactory results, and the 75 mm. driving tyre is claimed to average 5000 miles.



The whole machine is very comfortable, and in practice we found that placing one seat behind another actually afforded greater ease in conversing with the passenger, or vice-versa. There is plenty of room for the legs, while the space behind the driver's seat can be used for all manner of purposes, from carrying spare petrol to a week-end bag.

Our brief experience with this machine has demonstrated the possibilities of a long drive by a flat belt. Even with a single-cylinder engine there is no jerkiness in the drive, thus showing that the belt acts as an efficient shock absorber. It is possible to slip the belt to any desired extent, by means of the pedal provided, thus removing the necessity of a number of changes of speed. When the engine begins to labour on a hill, the pedal is gradually depressed, and the belt will then commence to slip, which is easily controlled, thus giving a reduction of gear. The belt will not slip unless required to do so. These cars are manufactured by Messrs. Globe Cars, Ltd., 37b, Duke Street, Manchester Square, London, W.

A GUIDE TO THE INTENDING PURCHASER.

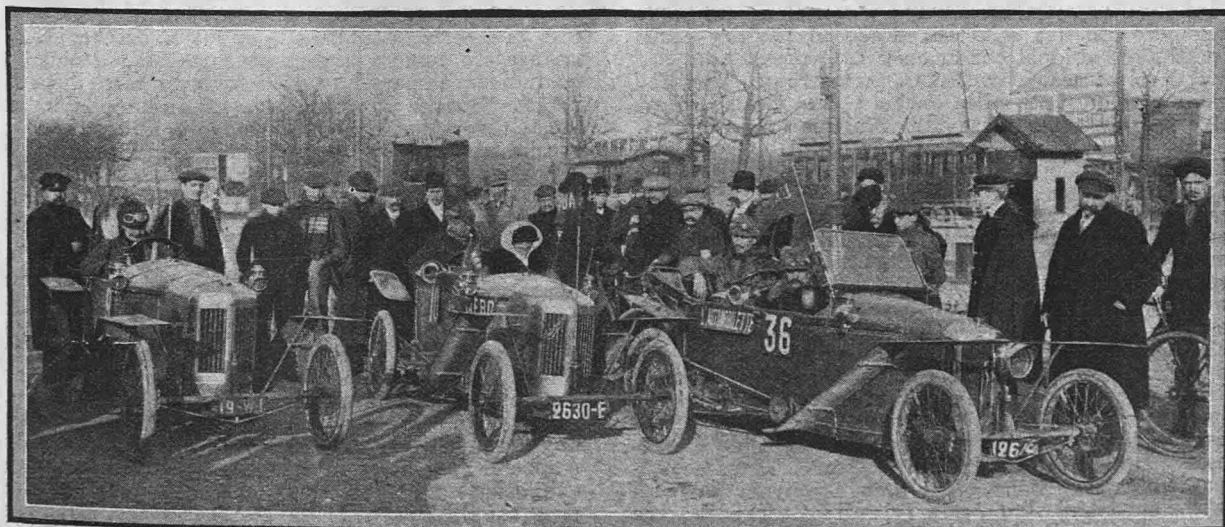
Important Number of "The Cyclecar" next Wednesday.

EVERYONE interested in economical motoring should make a point of ordering a copy of next Wednesday's issue of THE CYCLECAR (12th March), which will be specially enlarged. This issue will deal very fully with the choice of a cyclecar, giving sound and practical advice to those who wish to participate in the newest and most fascinating phase of motoring.

The principal contents include a classified list of leading cyclecars, giving just the information required. The field of choice, with seating arrangement, transmission, prices, etc., is indicated at a glance. There are now over 100 makes of cyclecars offered to the public, the price varying from approximately £70 to £200.

"Advice on the Choice of a Cyclecar," is another important feature, an unbiased article, giving the advantages and disadvantages of every type, and in a way that will greatly assist the intending purchaser to make up his or her mind.

In a sketch of different types of seating, the various kinds of bodywork fitted to standard cyclecars are illustrated. The whole issue will be full of matter helpful to the new motorist. To make certain of obtaining a copy—there has been a great run on THE CYCLECAR of late—a copy of the issue for 12th March should be ordered from a newsagent to be delivered, or a request should be made to have a copy reserved first thing Wednesday morning.



Three Automobillettes lined up for the start of a reliability run from Paris, in which cyclecars competed successfully.

A CYCLECAR RACE THIS YEAR IN IRELAND.

Proposed Race in July Over the Old Gordon-Bennett Course.

THE French Grand Prix is to have a rival attraction, for the Irish Automobile Club is promoting the speed event of the year, which is nothing less than a cyclecar race over the old Gordon-Bennett course in Ireland. The Irish Club has proposed this event as the most suitable commemoration of the tenth anniversary of the Gordon-Bennett race in Ireland. The proposed race will take place on 2nd July over that part of the old Gordon-Bennett course starting at the Ballyshannon cross-roads, and passing through Athy, Carlow, Castledermott, back to Ballyshannon. This was the smaller of the two routes used on the occasion of the race of 1903, and three circuits of it will give a distance of approximately 100 miles. The idea of holding the race in Ireland is very popular among the inhabitants, many of whom remember the days of 1903, when practically the whole island went motor-mad.

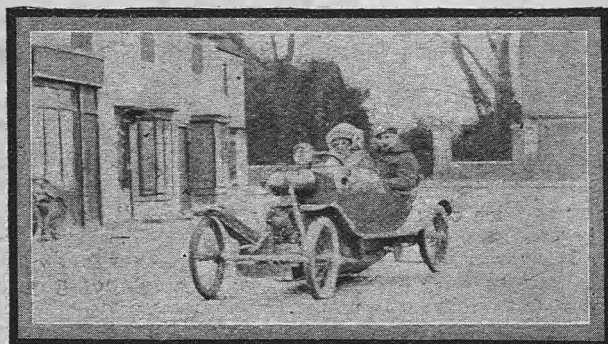
The Royal Automobile Club has been approached on the matter, and the secretary, Mr. Julian Orde, has expressed the opinion that the event would be a

great success, and that, so far as he knew, the trade would support it most thoroughly. It is unnecessary to recapitulate the arguments in favour of a cyclecar road race, as it is agreed on all sides that an event of this nature is necessary for the testing and improvement of the machines.

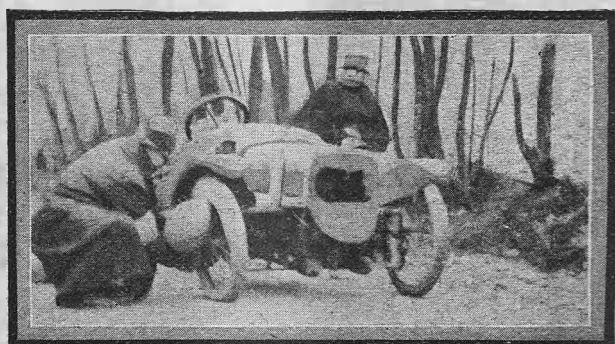
The race is to be held on Wednesday, 2nd July, 1913, over a distance of approximately 100 miles, open to all cyclecars coming under the R.A.C. definition. Further details and arrangements are to be made at a committee meeting to be held shortly. The secretary of the Irish Club considers that there would be little difficulty in getting the roads closed for the event, and he believed they could easily secure the support of the Irish members of Parliament.

The attitude of the trade is somewhat uncertain, but possibly the Club has made up its mind to carry through the event without official trade support.

The announcement of a cyclecar race in Ireland came as a great surprise to everybody, but there seems little doubt that it will be held.



Miss Thomas drives her brother's G.N. down to the run of the Cyclecar Club on Sunday, handling the machine quite skilfully.



An exciting moment—letting out the air from the ballooned tube of Mr. Spenser's Morgan, the front offside cover of which blew off in the A.C.U. trial on Saturday.

Sunshine and Dry Roads.

A glorious morning made the run to Biggleswade, where the Cyclecar Club held their meet last weekend, most enjoyable, and it is surprising that more members did not take advantage of the dry roads and the other ideal conditions which prevailed. The first arrival was Mr. A. C. Armstrong, who had made a tour of 72 miles on his G.N. Others to arrive shortly after were Mr. Phillips (Warne), Mr. Rothschild (Globe), Mr. A. Percy Bradley (Duo), and Mr. Frank Thomas (G.N.), which was driven by Miss Thomas from Hatfield to the venue. Mr. G. C. Stead came on a Warne, while a Morgan and a Bedelia arrived later on. Shortly after lunch, a start was made for the Bull Hotel, Redbourn. The run across country was somewhat exciting, as the winding roads were distinctly greasy, and those with smooth-treaded covers found it difficult to keep a straight course. Mr. Thomas's sideslips were intensely amusing, not only to himself, but also to those following behind. Just before tea, Mr. F. L. de Peyrecave arrived with a passenger on a Duo. Afterwards an impromptu concert took place, Mr. Rothschild and Mr. de Peyrecave contributing items, while Miss H. Carr accompanied on the piano. The return journey to town was uneventful, but some friendly "scraps" were indulged in. With the exception of the Morgan, which did not come on to Redbourn, the machines that turned out for the run, were all belt driven.

B22

The Cheap American Cyclecar.

Further evidence of the approach of the cheap American cyclecar, which is a long way off yet, however, is to hand. Several plants for turning out cyclecars are being established, and two of the leading motorcycle engine manufacturers have decided to manufacture special engines for cyclecars, these being the Spacke Machine Co., of Indianapolis, and the Universal Machinery Co., of Milwaukee. A special hub for cyclecars is being manufactured by the Eclipse Machine Co., of Elmira, N.Y. It is rumoured that a cyclecar, having the unusual track of 54 in., is being manufactured in Calgary, Canada, and mounting either a J.A.P. or Spacke engine.

Entries for the Cyclecar Club Trial.

A splendid entry is expected for the Cyclecar Club Trial on the 15th of this month. It is one without "freak" hills, which really test the skill of the driver instead of the reliability of the machine, and the course, which will be well marshalled and arrowed, should be easy to find. Entries close on Monday next, and are only accepted from members, but a special committee meeting will be held to-morrow (Thursday) night to elect new members. Applications should be sent to the hon. secretary, Mr. Frank Thomas, 172, Belsize Road, London, N.W. All entry forms should be filled in and returned along with the entrance fee, which amounts to 10s. 6d.

INTRICATE CORNERS AND STEEP HILLS.

How the Cyclecars Fared in the A.-C.U. Spring Trial.

LAST Saturday the A.-C.U. spring trial was held in Surrey, the 120 miles course starting and finishing at Dorking. Some 16 cyclecars were entered for the event, in addition to a very large number of motor-bicycles and sidecars. The passenger machines were dispatched last in order that they should not baulk the solo riders by failing on the test hills, of which there were reported to be many in store. Additional entries received since the last issue of THE CYCLECAR went to press included a Gordon and a Marshall-Arter, thus increasing the number of types of machines to six.

Looking over the machines, one could not help noticing the strange types of mudguards that the competitors had been forced to fit in order to qualify for a first-class certificate. Weird and wonderful indeed were some of the attachments fitted hurriedly on the morning of the trial itself.

The course was "arrowed" splendidly, whilst confetti scattered on the turnings, of which there were no end, also helped to indicate the route. The first test hill was Pebblecombe, some four miles from the start. This is a long, steep ascent, the last hundred yards of

handled it on the corner very skilfully. Mr. J. T. Woods came up very fast, and skidded his G.W.K. round the bend in quite Continental fashion. The Marshall-Arter, which is an extremely smart-looking machine, went up on its 15 $\frac{1}{2}$ -1 low gear, the driver not attempting to push the engine unduly.

The competitors then had to circle back into Dorking, the long, steep dip to the town affording glimpses of a wonderful view and an opportunity for cooling the engine.

After leaving Dorking the second time, the competitors were soon confronted with Boar Hill, the surface of which was in excellent condition. Although the gradient was not severe, the length of the hill upset many of the riders' calculations. Several endeavoured, after climbing the first steep portion, to change up into a higher gear, only to find that they had to come back into the low almost immediately. No machine "cooked out," but several crawled up, though they appeared to have plenty of power in reserve. One of the best climbs was made by Mr. A. W. Lambert, on a Morgan, who simply flew up as if no hill existed, and on top gear



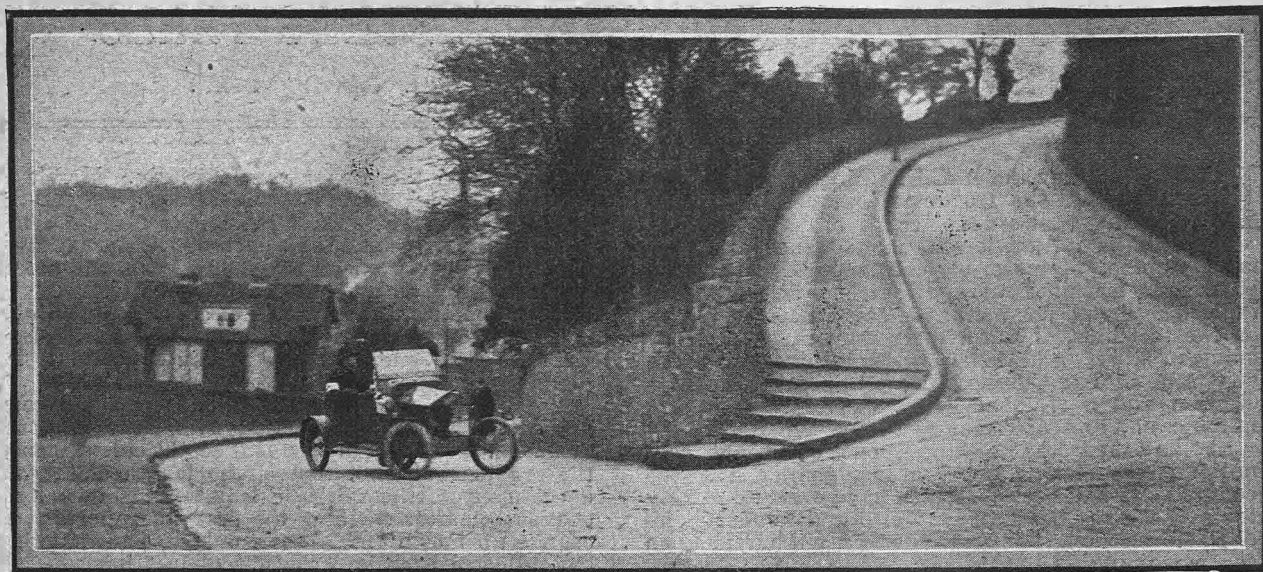
A G.W.K. rounding the hairpin at the foot of Cracknorth Hill, followed by a Morgan.

gradient being estimated at 1 in 5. Here Mr. George Betts was in trouble with his Gordon. He informed us afterwards that the gears gave trouble by coming out unexpectedly. Again, on the Headley loop we noticed him proceeding very slowly.

Numerous acute corners followed, the trickiness of the road being somewhat compensated for by the glorious scenery. The second test hill up to Ranmore Common was encountered soon after leaving Burford Bridge, a long winding ascent to a hairpin bend. It seemed impossible for any cyclecar to get round the acute hairpin bend on the very steepest part of the hill, until a non-competitor, Mr. G. T. Langridge, an old cyclist and motorist, and now a cyclecarist, ascended quite easily on his L.M. The Morgans made fast climbs, and it was noticed that they had added tails to the back wheel mudguards to bring them up to the 180 degrees requirement of the rules. The Gordon was misfiring badly, but both cylinders got going again by the time the critical part of the hill was reached. Miss Ellis, driving a G.W.K., took the hill very steadily, and

After leaving Shere, a long, narrow winding lane, culminating with a nasty corner, brought competitors up on to the Downs. The last few yards were steep, but not bad enough to produce any failures. The most exciting incident was provided by Mr. Spenser on his Morgan. His back tyre was flat, and this caused him to sway from side to side so badly that other competitors gave him a wide berth. His tyre was nearly torn off as he swung round the corner, but he did not stop, and disappeared from view going well. The A.-C.s were slow but sure, while all the other cyclecars made light of the ascent.

A mile beyond this hill an extremely acute hairpin bend was encountered. The narrow road seemed to double back on itself and steepened considerably at the same time. The cyclecars had to be driven with the greatest care at this spot. Even then Mr. A. W. Lambert nearly turned over, but managed to make a complete circle instead before negotiating the bend. Another Morgan driver, Mr. Spenser, had retired a mile earlier through the rear tyre pulling the valve out. He had noticed that the valve was crooked



One of the many hairpin bends included in the A.C.U. Spring Trial last week-end was that on Charterhouse Hill, depicted above. Mr. G. Betts (Gordon) is shown negotiating this difficult climb; at the summit of the hill a large number of Charterhouse schoolboys were watching the event.

before he started, but had not had time to remedy the defect. This hairpin bend occurred at the foot of Cracknorth Hill, the ascent of which had to be begun from a crawl, but the cyclecars made light of the steep rise between high banks.

A devious route brought the competitors to a long climb over the downs near St. Martha's Chapel, on the outskirts of Guildford.

The bad surface composed of loose stones and the bend at the foot made a fast ascent of the hill by St. Martha's Chapel almost impossible. As the lane was narrow, some of the competitors were more or less baulked, but only one came to a standstill. Mr. Wilberforce went up well, although a Matchless motorcycle and sidecar gave him little room to pass, while Mr. Sam Wright, on a Humberette, had actually to stop until a trap pulled in sufficiently to allow him to proceed. He then restarted in good style. All the other competitors went up without much difficulty.

This climb was followed by the tit-bit of the whole trial, an acute left-hand bend in Guildford.

Few knew what was in store for them in the back streets of Guildford, where, on suddenly rounding a corner, several hundred yards of 1 in 5, with a surface of loose stones, loomed ahead. Magnificent bits of driving were accomplished by Mr. Sam Wright, on his Humberette, and Mr. V. Wilberforce, on his G.W.K., who had to steer between two stranded sidecars, one on each side of the road. All the other G.W.K.s made good climbs, but Miss Ellis was overtaken by two sidecars, which collided, and caused a bad mix up. Mr. J. Munday's A.-C. would certainly have won the slow climb had there been one; he just got up, and was loudly cheered on reaching the top. It was an excellent climb for a 6 h.p. engine. Of the Morgans, Mr. P. H. Jones was very fair, Messrs. A. W. Lambert and H. F. S. Morgan were fast, while Mr. W. G. McMinnies, owing to back-wheel slip on the loose surface, did not make the climb quite so easily as the others.

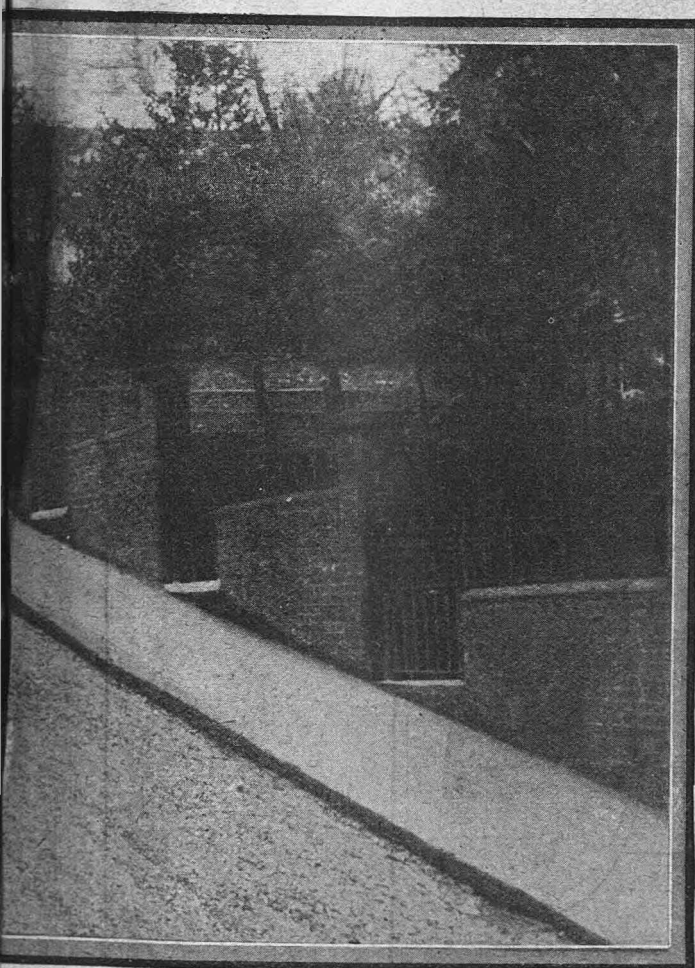
After this the rest of the run into Hindhead was a simple matter. True a number of acute hairpin bends were encountered, but the hills were not nearly so steep as those already conquered. Punctures troubled Mr. Sam Wright (Humberette) and Miss Ellis (G.W.K.), who had to stop several times to mend her rear rubber-studded covers. A long hill in Charter-



The Mount, Guildford, which has a gradient of 1 in 5, a steep climb for the A.C.U. Spring Trial almost from a standing start owing to the aculeous surface. The boy scout on the left is Mr. J. Munday's A.-C.



Punctured. Miss Christabel Ellis (G.W.K.) mending her back tyre, near Hindhead. Note the official observer on the right taking notes as to the cause of the competitor's trouble from the saddle of his motor-bicycle. An A.-C. has just passed Miss Ellis.



stones, and had to be taken by the competitors in the A.-C.U. the foot. The machine climbing the hill is Mr. W. Cooper's good service in scotching runaway machines.

house, with an acute bend half-way up where the usual crowd of spectators was stationed, gave the faster machines an excellent chance of showing their speed. Mr. H. F. S. Morgan and Mr. W. G. McMinnies, one on a two-seater and the other on a monocoque Morgan, came up together. The former is still running his two-year-old Blumfield engine.

All the cyclecars turned up to time at the luncheon stop at Hindhead, a very creditable performance considering the severity of the course. There were so many competitors that no one hotel was large enough to provide lunch for all, so that the drivers had to divide up amongst several. One-and-a-half hours was allowed for lunch and replenishing the machines with petrol and oil. One driver thought that he was within the letter of the law by replenishing his driving chain with oil, but the eagle eye of an A.-C.U. official was upon him, and he will probably lose marks.

The afternoon's run was easy as compared with that of the morning. Sanrock Hill, with its sudden approach and rough surface, near Haslemere, was fairly steep, but Pitfold Hill, which was taken before re-joining the main Portsmouth road near Liphook, was far more difficult. It was approached round a blind corner, the gradient being hidden from view by high banks. The road then steepened all the way to the summit, where the gradient was close on 1 in 4.

The hill in Guildford was probably the worst in the trial, but Pitfold ran it close. The surface was greasy and loose. The competitors must have guessed what was in store for them at the top, as a crowd of spectators, marshals, judges and observers had gathered on this spot. Mr. Sam Wright's Humberette was the first cyclecar to attempt the climb, and it made light work of it, the low gear only being called upon for the last 10 yds. An A.-C. driven by Mr. J. Munday got up slowly, but his passenger stood up and leaned over the back wheel, as it showed signs of slipping on the steepest part of the hill. Very good climbs were made by Mr. C. M. Keiller, on a G.W.K., and Mr. A. W. Lambert, on a Morgan. Mr. P. H. Jones, driving another Morgan, negotiated the hairpin bend with great skill, and started the ascent splendidly. About half-way up, however, he met with misfortune. Going at a good speed, his offside front cover came off, the tube ballooned to immense proportions, but did not burst. It was curious to see the tube flapping



On Bowler's Green Hill, the last steep ascent before lunch. An A.C. ascending.

round and round with the wheel. After a short delay, a fine restart was made, and no difficulty was experienced in reaching the top. The Marshall-Arter made light of the gradient, and had plenty of power in hand, while Miss Christabel Ellis gave a skilful display of driving, and gained the summit with ease. Mr. A. Noble, on an A.C., shed his passenger before he came to the 1 in 5 part, but to no avail, for he came to a standstill, and was pushed up by the crowd. The Morgans driven by Mr. H. F. S. Morgan and Mr. W. G. McMinnies, shot up the steep portion of the hill as if it did not exist.

Capt. Davidson took the gradient of Pitfield Hill and found it to be 1 in 5 on the steepest portion.

A long, uninteresting stretch with numerous acute bends through typical Surrey scenery brought the competitors to Eghurst, where a quarter of an hour's stop for tea was allowed. Here Mr. J. T. Wood, whose G.W.K. had been running splendidly, as had Mr. Victor Wilberforce's machine of the same make, decided it was wise to light up for the last nine miles.

The last tit-bit of the trial was a hairpin bend on the hill at Holmbury St. Mary. Mr. P. H. Jones's Morgan was misfiring, but he got up. The G.W.K.s and Humberettes all put up good performances, and apparently came round without shutting off. The four-wheeled cyclecars were much steadier than the sidecars, and had no difficulty in getting round.

Upon arriving at Dorking the cyclecars were parked at one side of the main street, and judges Capt. Davidson and Dr. Patterson soon had them all officially examined. The following completed the course to time, the official results and list of non-stop runs not being available until next week. The figures after the machine indicate the highest and lowest gear ratios available. Mr. Sam Wright (Humberette 4-1 and 13-1), Mr. J. Munday (A.C. 4½-1 and 11½-1), Mr. C. M. Keiller (G.W.K. 3.57-1 and 9½-1), Mr. P. H. Jones (Morgan 4½-1 and 11-1), Mr. W. Cooper (Humberette — and —), Mr. A. W. Lambert (Morgan 4½-1 and 11-1), Mr. Victor Wilberforce (G.W.K. 3½-1 and 9½-1), Mr. E. Arter (Marshall-Arter 4.63-1 and 15½-1), Miss Christabel Ellis (G.W.K. 3½-1 and 10-1), Mr. W. G. McMinnies (single-seater Morgan "The Jabberwock" 4½-1 and 8-1), Mr. H. S. F. Morgan (Morgan 5½-1 and 11-1), Mr. J. T. Wood (G.W.K. 4-1 and 11-1).

The following failed to complete the course to time: —Mr. G. Betts (Gordon 4½-1 and 9-1), accident and trouble with gears; Mr. W. L. Spenser (Morgan 4½-1 and 11-1), tube pulled out of back tyre; Mr. A. Noble (A.C. 4½-1 and 11½-1); Mr. B. A. Hyem (G.W.K. 3.9 and 9-1).

B26

Owing to the illness of a resident in the neighbourhood of the unmade road beyond Haslemere, this section was omitted.

The course was planned out almost wholly by the Rev. E. P. Greenhill, and is a great testimony to his knowledge of Surrey byways.

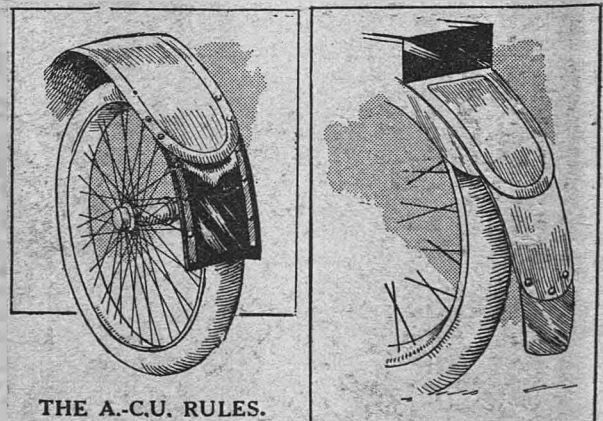
Many interesting photographs and a map of the course are reproduced in this week's "Motor Cycling," which publishes a well-informed report of the trial.

Cheaper Fuel.

Those who wish to know where benzole can be obtained in this country, will find a list of concerns that can supply it in "The Motor" this week. The price varies from 1s. to 1s. 2d. per gallon, which, of course, compares very favourably with petrol, which is now 1s. 9d. per gallon. On Saturday last Pratt's spirit was raised to 1s. 9d., the same as Shell and Movril. Pratt's II is 1s. 7d. per gallon.

The cyclecar movement still spreads. Last week some of our queries came from Newfoundland, Sierra Leone, Canada, Italy and South Africa.

The official results of the Sutton Coldfield trial confirm the success of Mr. S. Wright on the Humberette, who finished eighth with only 221 seconds error in the secret checks, otherwise obtaining full marks.



THE A.C.U. RULES.

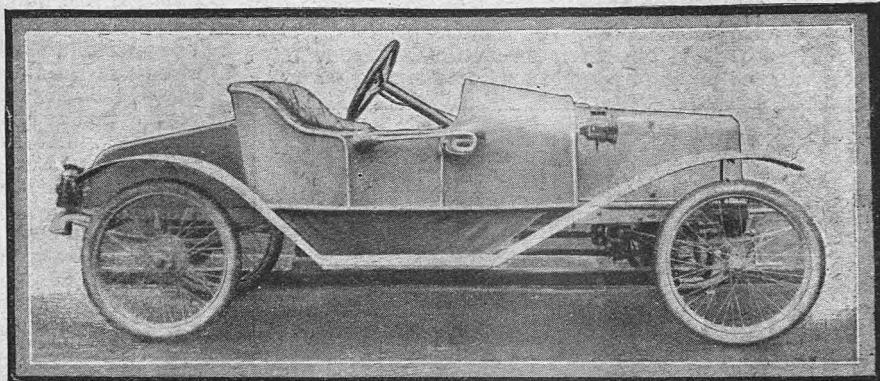
How the competitors overcame the A.C.U. rule specifying 180 degrees mudguards for the back wheel. On left the G.W.K., and right the Morgan extension.

MORE NEW CYCLECARS.

The Zendik Cyclecar.—Interesting Transmission with Friction-driven Reverse.

THE most interesting feature on the new Zendik cyclecar is undoubtedly the simple gearing, which provides a straight-through drive on top gear and a friction-driven reverse. As the engine is set transversely in the frame the clutch shaft is parallel to the main frame members, and in the same straight line with it is the cardan shaft. By means of dog clutches these shafts can be coupled together, thus giving the top gear. For the low gear the countershaft, which is fitted parallel to these shafts, is driven by means of a short chain from the countershaft, while it in turn drives the cardan shaft by another chain. This gear is also operated by means of dog clutches, and has a ratio of 8 to 1. For the reverse two friction wheels, one on the countershaft and the other on the cardan shaft, are brought into contact. In order to put these into operation the end of the countershaft farthest from the friction wheels rotates in a self-aligning Skefko ball bearing, which allows the other

of armoured ash, and is isolated from road shocks fore and aft by semi-elliptical springs of good length. A bonnet and dummy radiator, shaped somewhat like the well-known De Dion is fitted, while the simple

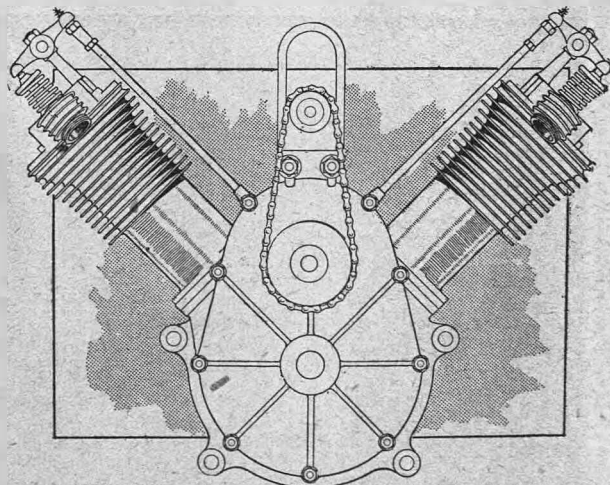


The Zendik cyclecar, described on this page.

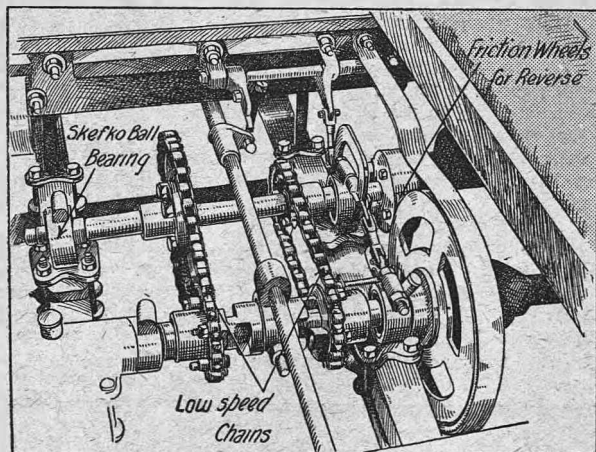
and comfortable body gives the machine an attractive appearance. The wheels are shod with 26 in. by 2½ in. tyres, and are of the usual wire variety, built up with spokes of heavy gauge. Another brake working on the countershaft is operated by a hand lever working in a notched quadrant. The weight of the machine complete is approximately 6½ cwt., while the speed of the vehicle is remarkable.

A short run over some bumpy roads showed that the springing was excellent. The sole agents for this interesting machine are Messrs. H. Jenks and Co., 54, Ebury Street, London, S.W., and they inform us that the price, complete with lamps, will be £110.

We recently took a short trial on the first of the P.D.A. cyclecars which had already 5000 miles to its credit. The enclosed shaft drive with two-speed and reverse gear and the 90 mm. bore overhead valve twin J.A.P. engine appeared in excellent condition, considering the long distance that the machine had to run.



The Buckingham 90 degrees twin engine of 1492 c.c. which is outside the cyclecar limit, but very suitable for fitting to a cyclecar. The cylinders are slightly staggered to enable them to receive equal cooling.



The straight-through drive and gear-changing system of the Zendik cyclecar.

end to swivel until both wheels come into contact. The whole arrangement is compact, simple, and practically fool-proof.

The engine is an 8 h.p. air-cooled Chater Lea, fed by a Lukin automatic carburettor and fired by a U.H. magneto, while it is placed in the frame transversely. Coupled to the engine shaft is an outside flywheel, which also forms part of the clutch. The drive is taken through the gears to the overhead worm-driven back axle, which is provided with a differential, while the control of the machine conforms to usual car practice; that is, the clutch pedal is placed on the left, the internal-expanding brakes on the back wheels being controlled by the right pedal. An accelerator is provided, and the gear lever works in a gate quadrant of good design which allows of easy manipulation. Direct steering is employed, and mounted on the steering wheel is a Bowden wire control for the magneto. The frame is

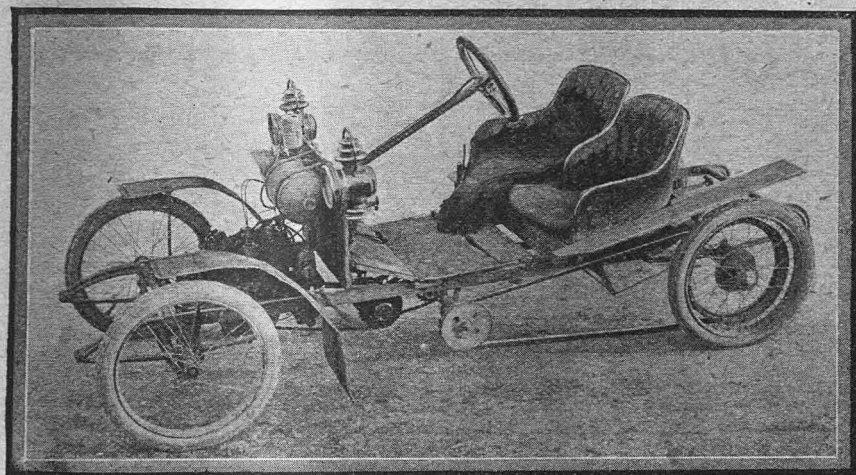
A NEW BELT-DRIVEN CYCLECAR.—THE B.P.D.

A new cyclecar, with long belt drive over large pulleys, which has been undergoing test for some time, is the B.P.D. It is the product of Messrs. Brown, Paine and Dowland, Ltd., of Dolphin Hard, Shoreham-by-Sea. The frame is of pressed steel,

sorbers. The engine, an 8 h.p. air-cooled J.A.P., drives by chain to a two-speed gearbox of the constant mesh type, and thence by another chain to the ball-bearing countershaft carrying the 8 in. fixed belt pulleys. The final transmission is by 11 ft. V-leather

belts to the back wheels. A multiple-disc clutch, running in oil, is provided in the transmission. Internal-expanding brakes with renewable shoes are fitted to the rear wheels, which are of the wired type, and 650 mm. by 65 mm. Lubrication is by the J.A.P. vacuum drip-feed, and ignition by a waterproof Bosch magneto. The carburettor is a two-lever B. and B., the levers being carried on the steering wheel, which operates the wheels by a cable. The body is of the two-seater type, with scuttle dash and spring upholstery, and a large toolbox is provided at the rear. Electric side and tail lamps, with accumulator, horn, and a complete kit of tools, are included, the machine selling complete for 95 guineas. The long belts run over large pulleys is a very excellent feature of the design.

We were very struck with this machine, and the experimental model, which we understand has been run for 5000 miles, looked a very workmanlike job.



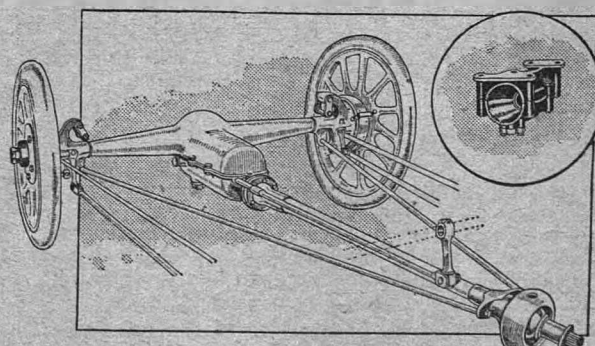
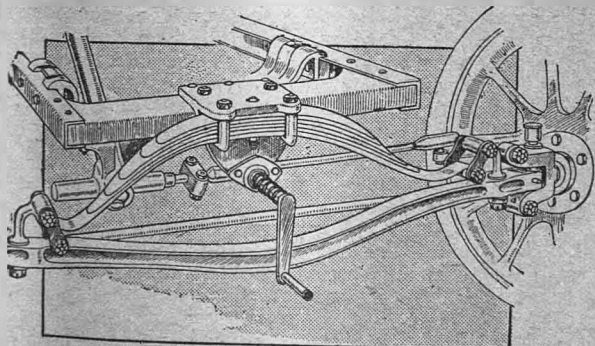
The B.P.D. cyclecar. This is an experimental model which has run 5000 miles, and has only a temporary body. The chassis design is very good.

upswept over the back axle, and supported on the axles by semi-elliptic springs at the front and back, the rear springs being assisted by spring shock ab-

A NEW LIGHT SHAFT-DRIVEN CYCLECAR.

Car practice has been closely adhered to in the manufacture of the Wrigley cyclecar. The car has been designed for an 8 cwt. total load, though it actually scales 5 cwt., thus allowing for two average passengers and 28 lb. of personal luggage. A roomy two-seated body is fitted, and there is ample space at the back for the luggage, while a high scuttle dash provides both room for the tank and protection from the cold for the passengers, high side doors are fitted, and with a hood and screen one is well protected from the elements. At present the machine is only coming out of the experimental stage, but in a few weeks it will be ready for delivery; it will have a 7.9 h.p. air-cooled or water-cooled engine at option, and will be fitted with an automatic carburettor, probably a Lukin, and a Bosch magneto. The engine drives through a clutch of special design to a completely-enclosed universal joint; the transmis-

sion is complete in itself, with the exception of the brake and change levers, while the gearbox is combined with the rear axle, all the mechanism being completely enclosed. The wheels are of the Sankey detachable type, fitted with 650 mm. by 65 mm. tyres, and steering is on the rack-and-pinion system, the shaft being enclosed within a stout column, which does not revolve and could carry controls if desired. Transverse springs are provided both at the front and rear, making for exceptional comfort. The car is capable of 45 miles per hour, and will comfortably climb a hill of 1 in 15 at 20 miles per hour, while the bottom gear is low enough for a standing start on a gradient of 1 in 5, the top gear being 5.4 to 1. The rear axle is of the full floating type, and by withdrawing the side shafts and removing the bolts attaching the gear frame to the axle casing and those retaining the torque ball, it is possible to detach the



The Wrigley cyclecar. Left, front suspension and steering connections; right, back axle and universal joint, an illustration of the casing for which is inset.

NEW CYCLECARS (contd.).

entire transmission mechanism while the car is standing on its wheels. The change gear provides two speeds forward and reverse, the drive being direct on top, while the final drive is by worm gear, a bevel differential being provided. The striker rod is locked in the gearbox so that, however "bumpy" the road surface may be, no difficulty is experienced when changing gear. All parts are mounted on ball bearings, and an ample double thrust bearing is provided at the rear of the worm shaft. The bearings to the

differential have provision for adjustment to 1-1000th inch, and are permanently locked when adjusted. Hand and foot brakes are fitted, and are internal expanding and external contracting, the latter being lined with Ferodo brake lining. The wheelbase is 6 ft. 6 in. and the track 3 ft. 4 in. Very large mudguards are fitted, and the running boards are very neat, being covered with aluminium. The brakes are operated by rods instead of cables. The machine sells complete with hood, screen and lamps for £125. The makers are Messrs. Wrigley and Co., Ltd., Soho, Birmingham.

Competing Against 12 h.p. Cars.

Cyclecars came into competition with 12 h.p. cars in a run from Paris to Coulommiers, Eric Comte Robert and back to Paris. The test consisted of covering the distance at an average speed of 30 kilom. per hour (equal to 18½ m.p.h.) without losing the position given in the procession at the start. The cyclecar competitors consisted of three Automobilettes, two with passengers and one as a single-seater; three Bedelias, a Baoy, a Ruby, and a new model of the Globe fitted with a 1100 c.c. four-cylinder engine. The cyclecars were in competition with a number of 12 h.p. cars. During the morning several of the small cars fell out of the procession, but the cyclecars, without exception, maintained their positions throughout the day, a most satisfactory result. The roads throughout were dry and dusty, so that the drivers of the machines at the end of the procession suffered from the dust thrown up.

Quick Deliveries.

Duocars, Ltd., is one of the few concerns that have been busy turning out cyclecars ready for delivery within a reasonable time of the placing of the order. The A.-C. Sociable is another machine that can be supplied quickly. In view of the early Easter this year, we should be glad to hear of other makers who can supply within a few weeks and the guaranteed time of delivery.

The Difficulty of Depicting Gradients Correctly.

One of the most difficult tasks a motor Press photographer is faced with is in attempting to depict a hill in which the gradient appears really severe. Our front cover this week provides a fair instance of this particular class of work. It indicates a three-wheeled Morgan climbing one of the big hills in the recent Colmore Cup competition. The gradient depicted is approximately 1 in 8 though in the photograph it appears more like 1 in 18.

There will be a race for cyclecars and sidecars at the Easter meeting of the Brooklands Automobile Racing Club to be held on 24th March. The engines of sidecar machines are limited to 1000 c.c., and a male passenger must be carried, but the carrying of a passenger in the cyclecars is optional. Entries close on 9th March.

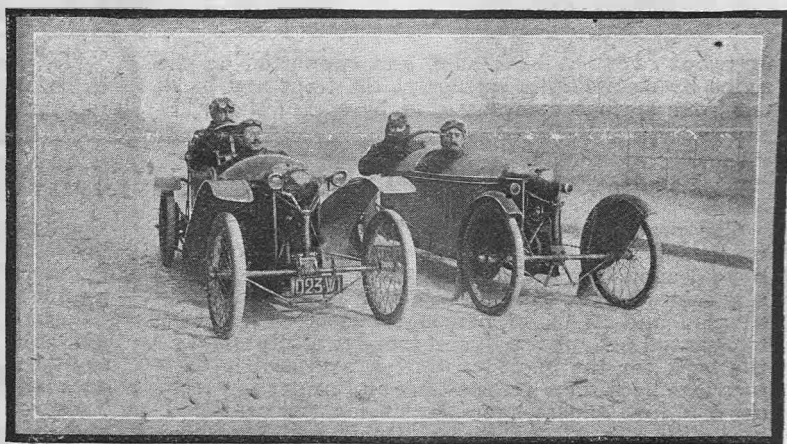
Entries for the open hill-climb which the Essex Motor Club are holding on 15th March must be sent in before 12 noon, 8th March, to hon. organizing secretary, Mr. E. J. Bass, Bishop's Stortford.

The Wizard Motor Co. has been organized at Indianapolis; it is intended to establish a factory for manufacturing engines which will be suitable for cyclecars.

B30

Prices of Second-hand Cyclecars.

A study of the advertisements of second-hand cyclecars in each week's issue of THE CYCLECAR shows that very good prices are being obtained. Further, the advertisements of some machines, evidently in good demand, rarely appear twice. Prices, second-hand, vary considerably for the same make and date of machine, but we have endeavoured to strike an average for several well-known makes. Taking these in alphabetical order, it will be noticed that a 1910 A.-C. is priced at £60, while the average price of 1911 A.-C.s is £67. The 1912 A.-C.s, on the average, are worth £83, according to their owners' estimate. The Bedelias have a larger selection of models, the second-hand price of the 1911 4½ h.p. model being £35, and of the 1912 model £46 10s. The 8-10 h.p. model appears



Two Bedelias lined up for the start of the Paris reliability run.

to be in greater demand, the 1911 models averaging £68, and the 1912 model £80. No Duos are advertised of an earlier date than 1912, and the average price of 1912 second-hand machines of this make is £89. Very few second-hand G.N.s are advertised, the mean price being 75 guineas. The second-hand Morgans of 1912 date average £79. The Rollos of the same date vary considerably in price, but the average may be taken as £76; 1911 Sabellas may be obtained for about £60, and 1912 models of the same make for £70. It is unnecessary to point out that the second-hand price of a machine will vary with its condition, but the above figures represent the average prices asked by private owners.

"Folly as it Flies" is the title of a series of highly amusing motoring stories told to "The Motor" by Mr. H. G. Pelissier, the head of the famous "Follies," and appearing in our contemporary this week.

The first intimation of English entries for the French Grand Prix race, on 13th July, comes from G.N., Ltd. They will enter two.

The Cyclecar

Wednesdays—1d.

Conducted by EDMUND DANGERFIELD.

TEMPLE PRESS LIMITED

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*Special Article on the Choice
of Cyclecars.*

Types of Bodies Illustrated.

*Classified List of Cyclecars
on British Market, with Full
Details, Prices, etc.*

Order a Copy Specially from
a Newsagent to Prevent Dis-
appointment.

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EDITORIAL Communications should be
addressed to The Editor, "The Cyclecar,"
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London, E.C.

Letters relating to ADVERTISEMENT
and PUBLISHING Departments should be
addressed to The Manager. SUBSCRIP-
TIONS should be forwarded to the Manager
(rate, 6s. 6d. per annum, or pro rata).

Press Times.

IMPORTANT LATE NEWS and Photo-
graphs can be accepted up to first post
Monday morning for insertion in the
following Wednesday's issue.

ADVERTISEMENT COPY, Blocks, &c.,
should come to hand by Wednesday
morning to ensure careful attention and
allow time to submit proofs, except when
an earlier time is specified.

Return of MSS., &c.

Drawings, Photographs and MSS. not
suitable for publication will be returned
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purpose, but the Publishers cannot hold
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*Advertisements of Cyclecars for Sale,
new or second-hand, Sundry Announce-
ments, and Rates for Advertisements,
will be found amongst the end pages.*

Topics of the Day

WE have always recognized the good that is done by competitions in improving machines, but since some have questioned the wisdom of including exceptionally steep and tricky hills in reliability trials we feel called upon to explain the reason for their selection. A manufacturer enters in a trial a specially-tuned-up machine piloted by his most expert driver, who is expected to climb exceptionally steep hills, it is true, but that is no reason why he should grumble if he fails, because he must remember that many less expert private owners, on far less well-tuned machines, will be faced by hills rather less severe, it is admitted, but nevertheless trying enough to bring to a standstill an under-powered or inefficient machine. In many cases, too, the private drivers' machines will be laden with baggage which the expert in the trial would never dream of carrying, and so the two instances which we have taken almost balance one another. Thus a manufacturer who has learnt how to construct a machine to climb freak hills is more likely to be able to turn out a satisfactory cyclecar than a maker whose machine cannot climb them. Again, it would obviously be futile to include hills in a trial which every type of machine could surmount with ease. The whole object of a competition is to single out the good machines from the bad and to show the makers whose productions fail where they can improve them.

*The Severity
of Trials.*

THERE is a growing tendency amongst drivers of cyclecars fitted with air-cooled engines to allow their motors to run for long periods when the machines are stationary. Sometimes this is unavoidable, as, for instance, in a traffic block, but when it is indulged in through sheer laziness on the part of the driver it is indeed to be deprecated. Restarting the motor is not a difficult matter, and to leave an air-cooled engine running for five or ten minutes whilst the machine is stationary is only courting trouble. If the engine is efficiently cooled by a fan, and with the carburettor set to allow it to revolve slowly, such treatment is not so harmful, but if it is allowed to "race," its life will be considerably shortened and valve troubles may be expected.

*Overworking
the Engine.*

ANOTHER common error among cyclecarists is that they mistime the correct moment for changing gear. The average driver generally changes up too soon and down too late. The art of gear changing is an easy one to master if the beat of the engine is studied. In changing up it is advisable to allow the engine to attain a very fair speed before pulling the gear lever into the next position, during which operation the throttle should be momentarily closed. In changing down it is advisable to reduce the gear long before the engine begins to knock or shows signs of labouring. The moment at which the engine begins to labour can be postponed by the clever driver by manipulating the carburettor levers, but this requires very considerable judgment and experience. To delay changing until the engine knocks is to put a very considerable strain on all its wearing parts.

CAN better results be obtained from hand-operated two-lever carburettor control than from the automatic control provided by an accelerator pedal? Of course, the answer depends largely on the skill of the driver, who, if not an expert, will obtain better results from the automatic system. The driver who understands the niceties of adjustment of air and spirit to meet the varying conditions of the road should obtain greater power and lower petrol consumption by two than with single-lever control. It is a subject, however, that admits of argument in the other direction.

*Single or Double
Carburettor
Control?*

THOUGHTS AND OPINIONS.



*"The suggestions of to-day may
be the realities of to-morrow."*



WHY DOES THE ENGINE KNOCK?

*Theoretical and Practical Explanations of a Metallic Sound from the Engine, the Origin
of which is a Problem of Absorbing Interest.*

What Prof. Arch. Sharp Says.

I am not quite certain as to the exact conditions under which engine knock occurs, nor that the conditions are the same in all cases, and therefore I cannot profess to offer a full and satisfactory explanation of this extremely interesting problem.

Wear on the crankshaft, crank pin and gudgeon pin bearings does not afford a satisfactory explanation, as a badly-worn engine may run without "knocking" at certain speeds and loads, while on the other hand a new engine, with its bearings in perfect adjustment, often does knock—I shall assume that the knocking, in the case of a new engine, takes place only at slow speeds and with the throttle practically fully open, as when the engine is labouring uphill. Under these conditions the actual pressure on the gudgeon pin and crank pin, at the beginning of or early in the effective stroke, may be very much greater than when the engine is running faster, from two distinct causes. Firstly, the maximum pressure of the gases generated by the "explosion" is greater. The term "explosion" just used is a misnomer. What takes place inside the cylinder is "combustion," the propagation of which from the sparking plug throughout the whole charge takes place comparatively slowly—at the rate of 15 to 20 ft. per second, presuming the gaseous mixture is more or less quiescent. But the mixture is by no means lying quietly layer by layer in the engine cylinder. At racing speeds, say, 3000 r.p.m., the speed of the gas past the inlet valve during the suction stroke may have an average value of 150 ft. per second, with a maximum over 200 ft. per second. The violent "turbulence," or eddy motion, set up persists during the explosion stroke, and the combustion is propagated throughout the mass at a much greater speed. It is true that at low speeds the turbulence is less marked, but it is still sufficiently great for the combustion to be effected rapidly, and for a higher pressure to be attained. The partial throttling of the suction charge at high speeds contributes in the same direction.

Secondly, the inertia of the piston has the effect of decreasing the pressure on the gudgeon pin at the beginning of the explosion stroke. Part of the gaseous pressure on the head of the piston has to be spent in accelerating the piston. The gas pressure will increase as the piston moves away from the dead point, while the pressure on the gudgeon pin increases during the early part of the stroke, and again diminished towards the end of the stroke. At slow speeds the inertia effect of the piston is small, and for the present comparison may be neglected. With full throttle the gaseous pressure may reach three or four times that at high speed. Without implying that the oil film may be squeezed out from between the gudgeon pin and bush, the fairly sudden application of this force to the piston and cylinder head may set up sound vibrations of the metallic character that is probably called "knocking." It is possible that at slow revolution speeds, detonation may take place in a motorcycle engine, the combustion being commenced slowly, but being completed with extreme

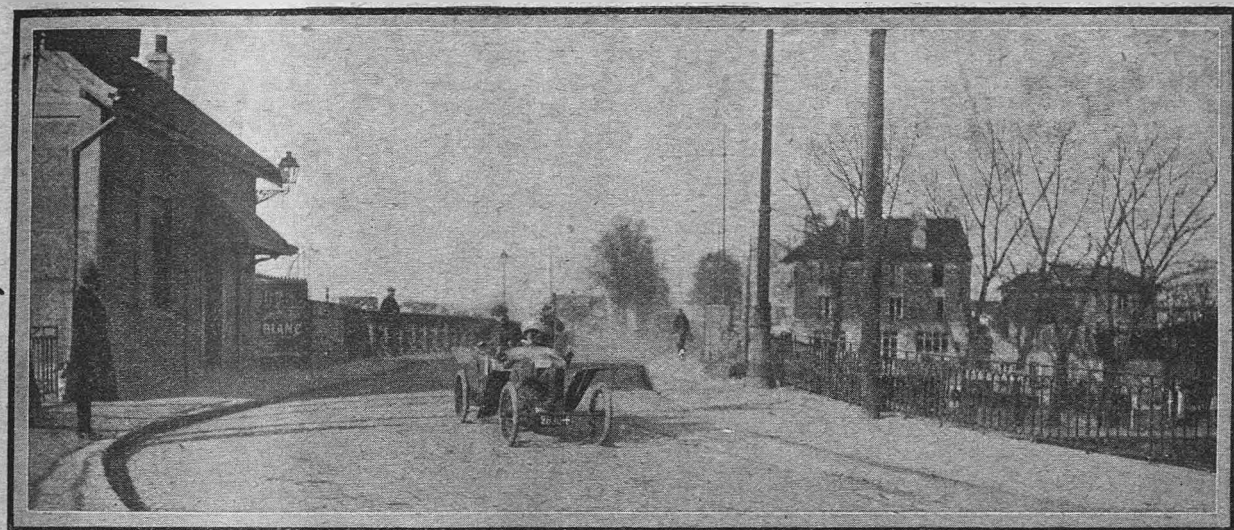
suddenness. The maximum gaseous pressure attained might not be greatly higher than without detonation, but its suddenness might have greater effect in setting the piston and cylinder head into sound vibrations. The necessary slackness of fit of the piston body in the cylinder (about a 10th part of a millimetre), and the change of side pressure from one side to the other, cannot in my opinion account for knocking.

ARCHD. SHARP.

The Views of Dr. A. M. Low.

When people suggest theories, such as the rocking piston and sliding big-end, as being the cause of engine knock, I always agree heartily with them, because their ideas are quite possible, and, with some engines, they may be correct. If we have two surfaces which are not quite level, and one is resting upon the other, it is impossible for them to be absolutely rigid, although they may rest quite steadily upon each other, as in the case of a bearing. If we hit them together with our hand there is no sudden motion—that is to say, the time taken for the parts of the surface to come into contact is comparatively long, and, therefore, we do not get a very sudden jar; but if we hit them with a hammer, the surfaces are brought into contact, or, rather, a bigger area is brought into contact very much quicker. In my opinion, this is the great cause of knocking, and if an explosion is taking place comparatively slowly, the pressure consequently rises quite slowly, so that, even if the piston is not moving fast, there is no large load put upon the moving part which might cause the noise. If, however, we are running slowly, and especially if we have not closed our air, thereby making the explosion also slow, the explosion may be much quicker, and if the engine is carboned up, or is hot, the compression will be almost enough sometimes quite enough, to ignite the mixture when once the first flame is started. If the gas is at this very high temperature, ignition, when once started, will take place excessively quickly throughout the whole mass. Thus the maximum pressure will be reached very fast, and the piston will be unable to move quickly enough to take up the expansion in doing work, but will suddenly apply excessive pressure to the moving parts, corresponding to the blow of a hammer, which is bound to hit the surfaces into actual mechanical contact, driving out nearly the whole of the oil film. This point is generally reached quicker with a higher-compression engine, which, naturally, is to be expected. If knocking is due to a rocking piston, certainly it does not show much sign of wear, although the surface is, of course, large. We must remember that in no case do surfaces actually touch, and we have several points at which there is appreciable play under high pressure, so that, to me, it seems pretty clear that the knock is due to the sudden rise of pressure bringing one or more of these surfaces more closely into contact, almost, speaking very loosely indeed, like the clattering of shunting trucks on a railway.

London, E.C. A. M. Low, A.C.G.I., DSc., etc.



An Automobilette crossing the river Marne, near Paris, the scene of one of the bitterest fights in the Franco-Prussian war.

Why an Engine Knocks.

From the Maker of the Buckingham Engine.

The peculiar metallic sound of a "conking" engine is undoubtedly produced by the violent impact of two metallic bodies, and knocking is generally the outcome of the ignition being too far forward when going uphill, or through accelerating too quickly when on the level. As to the cause, the engine being new, slackness in bearings can be put out of court at once, and I think, if we go direct to the piston and cylinder, we shall be very near the root of the trouble. Now, the clearance all round between the piston and cylinder varies from about $3\frac{1}{2}$ thousandths of an inch in some water-cooled engines to as much as six-thousandths in many air-cooled engines, the higher temperature in the latter case demanding greater freedom. Let us consider the piston returning on the compression stroke and kept in a nearly central position in the cylinder by the piston rings. Supposing the charge be ignited too early, either by too great advancement or pre-ignition, we suddenly produce an enormous pressure on the piston, which, in its turn, produces a very high reactionary pressure between the piston and cylinder wall, owing to the angularity of the connecting rod. If this force is suddenly called into play at slow speeds by early ignition on the upstroke of the piston, it seems only reasonable to expect a sharp, metallic knock to occur when the piston is suddenly thrown against the cylinder wall, as undoubtedly it is by the tremendous reaction caused under these conditions. In the ordinary way, it would be difficult to trace any mark made by this knock, as the heat and discoloration would make it almost imperceptible. I have taken a new engine, which, by means of overloading and over-advancing the ignition (a very brutal test), I have kept knocking merrily for a considerable time. I then took it down and found marks on the piston, which, I consider, supported and proved my theory. They were simply bright marks, which, when the engine was put together and run again in the ordinary way, disappeared.

J. F. BUCKINGHAM.

Coventry.

How to Tell Correct Mixture.

A tip for drivers of cyclecars fitted with automatic carburettors. If their mixture is correct the porcelain part of the sparking plug will turn a light amber colour. If the mixture is too weak it will remain white; if too strong, the plugs will become black.

Lewes.

B. E. GLOVER.

The Mudguarding Problem in Ceylon.

I think it is a great pity that the majority of manufacturers are turning out cyclecars with totally inefficient mudguarding. One of the chief reasons why numbers of people give up sidecarring and go in for cyclecarring is that they wish to keep clean. So far as I can judge from illustrations in *THE CYCLECAR*, the front mudguards fitted to the majority of cyclecars are without any side valances, and are therefore quite useless for protecting the passenger, let alone the body of the machine.

20 INCHES A DAY.
Ceylon.

Requirements for South Africa.

There is a large market in this country for cyclecars, but it is to be hoped that any firm which takes up the export trade will give some consideration to the conditions and requirements of the Colonies. In the first place, roads would have to be considered, as a vehicle which would stand well on the roads at home might fail badly here. Road making in S. Africa is far from being in an ideal state, many of the paths being little more than a pair of wagon tracks, with a good-sized ridge between, while even on the best of roads stretches will be met which are little better than the rough ground at either side. The wheel track is between 4 and 5 ft. When a bad place shows up in the road it is filled up with loose gravel, which in many cases means stones of any size between an egg and a small football. Practically all the road traffic is two-horsed vehicles and bullock wagons, the effect being a road with a high ridge in the centre, and a deep furrow at each side, worn by vehicles weighing over four tons. Another factor in the case is the number of hills which have to be negotiated, with rough surfaces, and where curves occur on them the banking (when there is any) is very often on the wrong side. Again, the river beds and watercourses, which are met with on nearly all roads, are, as a rule, abrupt, with steep banks, occasional grades of 1 in 3, with bottoms of dry sand, rough stone, or an occasional pool of water from 2 in. to as many feet deep. An important factor is the distances which usually separate the would-be purchaser from a repairing centre; and it would be rather awkward if not entirely impossible, to get a machine from the place of a breakdown, to the nearest railway station. From these few remarks it will be seen that one of the first requirements of a cyclecar for the Colonies would be strength of frame, to withstand the shocks along the road, then ease of dismounting the separate parts.

THOUGHTS AND OPINIONS (contd.).

I notice in the majority of cases the machines have fixed wheels, which is a decided drawback. The relative merits of belt, chain and shaft drive could be best considered when local conditions are known. Petrol tanks should be sufficiently large to hold enough to carry one from town to town, often a distance of 80 miles, and fair luggage-carrying capacity would be essential. Magneto ignition is imperative, and should be placed as high as possible.

Queenstown, S.A.

GEO. S. B. REID.

"Seamless Monobloc Bodies."

Your correspondent in issue of 19th February has evidently not been informed that for some years a patent material has been on the market which answers every purpose he points out. The material is composed of a powder formation, is cheap, and possesses features that readily make it applicable to cyclecar-body construction, it being lighter than wood, and, when mixed, of a plastic nature easily applied. It is perfectly fire and grease-proof when set, can be had in practically any colour and thickness, is permanent, and is readily made into any shape, in which condition it will remain in all weathers or climates. No joints are required, and vibration will not crack it. Repairs can be easily made and matched, and a polish or paint can be applied in a short space of time.

The material can be supplied in sacks, with instructions, ready for mixing with solution. A company has been formed which has had various tests made during several years.

Croydon.

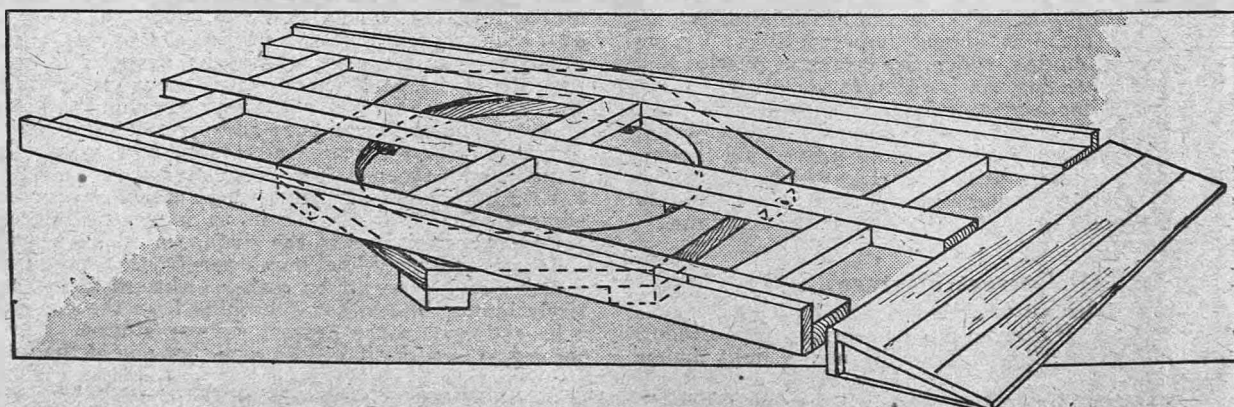
FRANK WINDSOR.

A Simple Turntable.

Apropos the difficulty experienced by many owners of turning their cyclecars and small cars in the limited accommodation of their own premises, I think it will be of considerable interest to many of your readers to know the manner in which I have overcome this difficulty. In collaboration with Messrs. Chipmans, Ltd., of Staines, we designed a small turntable, which they ultimately built and fixed for me just outside the motor shed, by means of which the car can be turned completely round in its own length. It requires very little physical exertion to revolve this turntable. Apart from its utility in reversing a car, I have found the table of considerable assistance when cleaning down the car, as it obviates a great amount of stooping, and also enables inaccessible parts to be reached with much greater ease. Moreover, the whole of the timber framework being treated with creosote, the few buckets of water used in washing down do no harm.

Colnbrook, Bucks.

CHAS. P. IBOTSON.



A simple turntable for the easier manipulation of a cyclecar. See letter from Mr. Ibotson.

"Best Runs."

You are asking cyclecarists what they consider to be their best run. I shall be glad to give you the following:—One day last June I left London at 4 a.m. and drove to a spot called Pakefield, about one mile out of Lowestoft, and arrived there at 8.20, covering the 121 miles in 4 hrs. 20 min. without changing gear once, as the original start was made on top gear. The car was one of our standard 8 h.p. Globes, fitted with hood, screen, lamps, etc. I also had a passenger with me.

LESTER ROTHSCHILD.

London, W.

The Utility Cyclecar.

It is really marvellous to note the new ground that has been turned since the coming of THE CYCLECAR. Men and women of moderate means are now able to keep in touch with friends who formerly lived in too out-of-the-way places to be often visited, and travellers can open up new districts in which to ply their trade. The cyclecar is also used for running to the golf course, to the theatre, to the tennis courts and many other places, and it has a great future to the hunting man who cannot afford a car. A groom can soon be taught to drive one of these simple machines, and a man having been sent on early with the horse, the master arrives at the meet and is able to start fresh, whilst the groom takes the little car home. Some may say that all this could be done with the motor-bicycle and sidecar, but there are thousands who would not.

Cambridge.

C.

How to Start an Engine.

Having owned and run an A.-C. Sociable for the past year without the slightest difficulty in starting the engine, perhaps my method may help "Non-Starter." First open the compression tap; then engage the starting handle and pull it round till it has done one compression stroke, which can be told by the rush of air out of the tap, and one firing stroke, that can be recognized by the suction through the tap, which ceases as soon as the exhaust valve opens. Now shut the compression tap, turn on petrol, and flood the carburettor well. Re-engage the handle, swing it smartly round twice, and the engine will fire at once. By getting the piston into position as described above, one exhaust stroke and one intake take place before the final compression, and such a speed is obtainable in these two half-revolutions that the momentum of the flywheels carries it over compression fast enough to allow the magneto to fire the charge. But if an endeavour is made to start dead against the compression, the effort may have to be repeated six or seven times.

H. E. CROOM.

Pontypool.

THOUGHTS AND OPINIONS (contd.).

Standard Cyclecars in Trials.

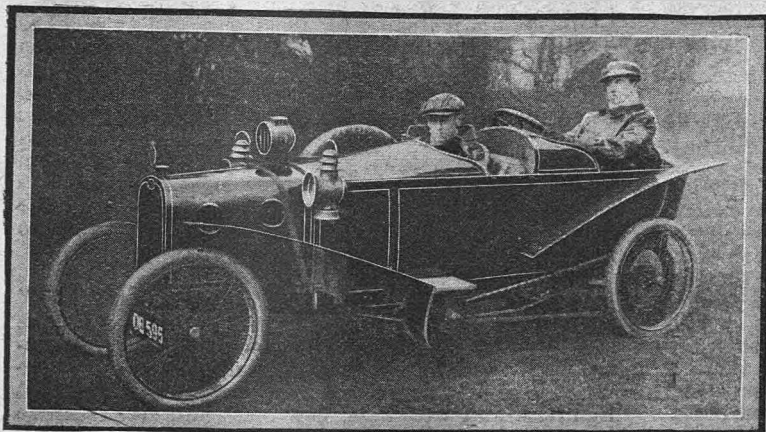
In THE CYCLECAR of the 19th ult. I notice that your contributor, describing the performances of the cyclecars in the recent Colmore Cup competition, says:—"In anticipation of severe hills to come, most of the cyclecar drivers had fitted specially low bottom gear ratios," etc. This confession appears to me to throw grave doubt on the efficiency of trials, especially as a guide to possible purchasers of cyclecars. To be of real use to the public such trials should state definitely whether the winning machines conformed in every way with the standard vehicles as sold to the ordinary buyer. The value of such trials would then be greatly enhanced. Obviously a low gear ratio, that is not standard, specially fitted to a cyclecar for the purposes of hill-climbing trials, must give a very misleading impression to the public who are not aware of the fact. Trials that permit such faking are valueless as indications of what the standard car is likely to do on the road.

SCEPTIC.

Hanover Square, W.

5000 Miles on One Pair of Belts.

As many of your readers seem to doubt the efficiency of belt drive for cyclecars, my experience with an 8-10 h.p. Rollo may be interesting. Since last Whitsuntide, when I took delivery, I have covered between 5000 and 6000 miles, and have had no trouble whatever; in fact, have only removed the belts once to clean them. The clutch and change speed work most



A tandem-seated Rollo with a new body designed by its owner.
See letter from Mr. T. H. Smith.

admirably, and the engine, which is a J.A.P., has enabled the machine to keep up its record for long-distance and no-trouble runs.

T. H. SMITH.

Stockport.

A Two-wheeled Cyclecar !

Referring to the query by "Canoe Car" in the issue of THE CYCLECAR dated 19th February, I am of the opinion that in the very near future we shall see real cyclecars, which are motorcycles with bodywork, having simpler and more effective transmission as well as better springing. The great obstacle and the most serious objection is the instability of the machine while standing or turning. I have designed a machine on motor-bicycle lines with two additional smaller wheels, mounted separately on leaf springs, attached to an axle and worked through a foot pedal. It is designed to carry three people, two in front and one at the rear.

L. PITAL.

Birmingham.

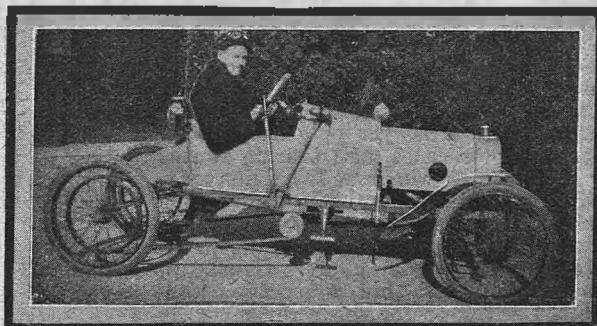
An Interesting Conversion.

A cyclecar which I have constructed may be of interest to your readers. The frame was originally that of an O.T.A.V., but it has been lengthened. The engine is a 5 h.p. Rex, out of a motorcycle, and the body I have constructed myself.

The engine is not sufficiently powerful, and as soon as I can find a suitable second-hand engine of 8 h.p. to 10 h.p. I propose to fit it to the machine. I consider belts the ideal drive for cyclecars, and I have had no trouble with them. As to what happens when rounding a corner, I do not mind what happens in theory, as nothing happens in practice.

Caterham.

A. E. STORY.



An interesting conversion. See letter from Mr. A. E. Story.

Is Insurance Necessary ?

To show how important insurance is, I might mention that before taking delivery of my new cyclecar I took out a policy. On the journey home from the works, the cyclecar caught fire, through careless filling, and considerable damage resulted. The relief to know I was insured, when I saw my £100 worth in flames, and the prompt manner in which a cheque came along within six days of the accident, was well worth the moderate premium paid.

London, N.

H. GARLAND.

Variable Ignition for a V-Twin.

My opportunity to buy a cyclecar came at the beginning of last year, when I purchased an 8-10 h.p. 90 degrees twin Bedelia with accumulator ignition. After adjusting the platinum points and trying to stop misfiring, I searched round for a magneto, which was hard to find, as few firms make one for this type of engine. However, at last I obtained the Fischer from Messrs. Miller, of Bristol, at a cost of only £3 15s., and it acted splendidly. The spark could be retarded and advanced as in an ordinary magneto for engines with cylinders set at other degrees; I mention this as you have pointed out that it was very difficult to obtain a magneto for engines set at 90 degrees. I drove the machine in all weathers for some time, but as I live for the greater portion of the year in a very hilly district, the narrow belts on the Bedelia became an expensive item, were dirty to handle, and required shortening frequently. The strap starter gave trouble, otherwise the machine went excellently and surprised big-car drivers on long, stiff hills.

Cambridge.

ENTHUSIAST.

[The manufacturers of magnetos have devoted their attention to the 90 degrees twin engine, so there is now no difficulty in obtaining a fixed ignition magneto.—ED. THE CYCLECAR.]

NOTES AND QUERIES.

Readers' Problems Investigated by the Editor.

Readers are asked to write on one side of the paper only, and to use a separate slip for each question.

SOME misapprehension exists with regard to the method of answering queries in **THE CYCLECAR**. All questions are replied to by post, and, therefore, a stamped, addressed envelope should be enclosed for the reply. Queries of sufficient interest are commented upon in this page, but the majority are, of course, not inserted, as they deal with specifications of new machines, the answers to which are only of interest to the inquirers. Any questions pertaining to cyclecars or cyclecar matters can be answered. Technical queries are dealt with by a celebrated engineer, legal questions by a lawyer of great experience in motor cases, and touring routes by a gentleman who spends his life touring a wheel and knows every mile of the United Kingdom. These are advantages of membership of no club, but the privilege of every reader of **THE CYCLECAR**. No fee is asked, but a stamped, addressed envelope for the reply must be sent, whilst terseness and moderation in asking questions, each query to be written on a separate sheet of paper, and reasonable time for delving the information are requested. One reader actually sent up 68 pages of closely-written manuscript, asking for the most minute instructions on how to build a cyclecar, while some correspondents write their queries in the corners of the page where they are likely to be overlooked.

FRICION DRIVE.

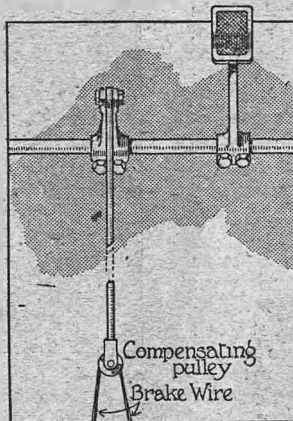
"O.S.P." proposes to adopt friction drive. One of the discs is to be placed on the back axle, whilst the one in engagement with it is to be driven direct by the engine. This is not to be recommended, as it means that all gear reduction between the engine and road wheels has to be obtained on the discs themselves, or, in other words, one disc must be much smaller than the other. It has been proved by experiment that, if friction drive is to be efficient, the discs must be approximately equal in size. The best way out of the difficulty is to set the engine in the frame, so that the disc mounted on the crankshaft lies transversely, and then to place the driven disc on a cross-shaft, the final drive being by chain or belts.

TYRE FILLINGS

ONE of the difficulties with tyre fillings is the impossibility of knowing whether sufficient of the substance has been inserted, and unless the correct amount is accurately gauged, the results will not be satisfactory. I know of a case where the unfortunate owner had to jack up all his wheels whenever the machine was left standing for any time, otherwise the tyres, which were filled with some patent substance, would have subsided, and in time their contour would have been composed of a series of flats. There are various other disadvantages, such as the oozing out of the liquid when the tube is cut; but there are at present some new fillings which are claimed to have overcome these drawbacks. Other readers who, like "F.E.D." (South Shields), want to make experiments, should obtain some sort of guarantee from the manufacturers as to the result. Any filling, no matter what advantages it may offer, will increase the weight and reduce the resiliency of the tyre.

COMPENSATED BRAKES.

Not many years ago compensated brakes on a motorcar were considered an unnecessary refinement, but times have changed. Now, practically every cyclecar is equipped with brakes of this design. There may be many readers who do not know what compensated brakes are or, if they do, are, like "W.H.S." (Lymm), hazy upon the subject. When brakes are said to be compensated, it means that equal pressure is put upon both brakes on the back wheels. This is generally done by connecting the two brake arms by a single wire, which passes over a pulley, and the pressure put on the pedal or hand lever, as the case may be, moves the pulley forward in a straight line. The wire, being round the pulley, is pulled forward too, but as it is not attached rigidly to the pulley, it settles down to a position where it transmits equal pressures to the brakes. This is easily understood from the fact that there is no reason why the pull on one half of the wire should be greater than that on the other half, on account of the freedom with which the wire can pass from one side to another via the pulley. If, instead, the wire was cut, and each end fixed separately to



A typical form of compensating brakes.

the rod which holds the pulley, the brakes would not be compensated. There are, of course, other methods which can be employed. It is a matter of experience that unless equal pressures are applied to each back wheel brake, the tendency for the machine to skid is greatly increased. In fact, it is one of the details which must be incorporated in a taxicab before Scotland Yard will license it for public hire.

LIGHTNESS AND STRENGTH.

THE chief dislike that "J.D.W." (Targes) has for the cyclecar is that it is light, and so, in consequence, he imagines it must be weak and unsafe. It is a mistake which is commonly made; many people thinking that lightness and weakness, heaviness and strength are inseparable qualities. But it does not follow. If a machine that is properly designed in the first instance is light it may possibly be much stronger than another double the weight. Take a very simple illustration. A heavy slab of cast-iron, weighing, say, two tons, might easily be shattered by quite a small force, while a thin piece of steel plate, weighing perhaps a few ounces, would probably be none the worse after receiving a similar blow. The strength of a structure depends on many things, two of which are the nature of the material used and the design adopted. A structure may be sufficiently strong to bear a certain load when it is applied in a given way, but half the force might crumple it up were it applied in a different manner. A length of steel wire is immensely strong when in tension, while it is totally unfit to take any weight in compression. Thus it is not correct to say any piece of mechanism is strong or weak unless the statement is qualified by adding the nature of the strains that it will be called upon to bear. I have penned these notes simply to try and eradicate the false impression that strength and weight are synonymous terms. There are many cyclecars at present which are sufficiently strong although they are lightly built.