THE SACHS ENGINE

A German Power Unit Fitted to Many Popular Mopeds

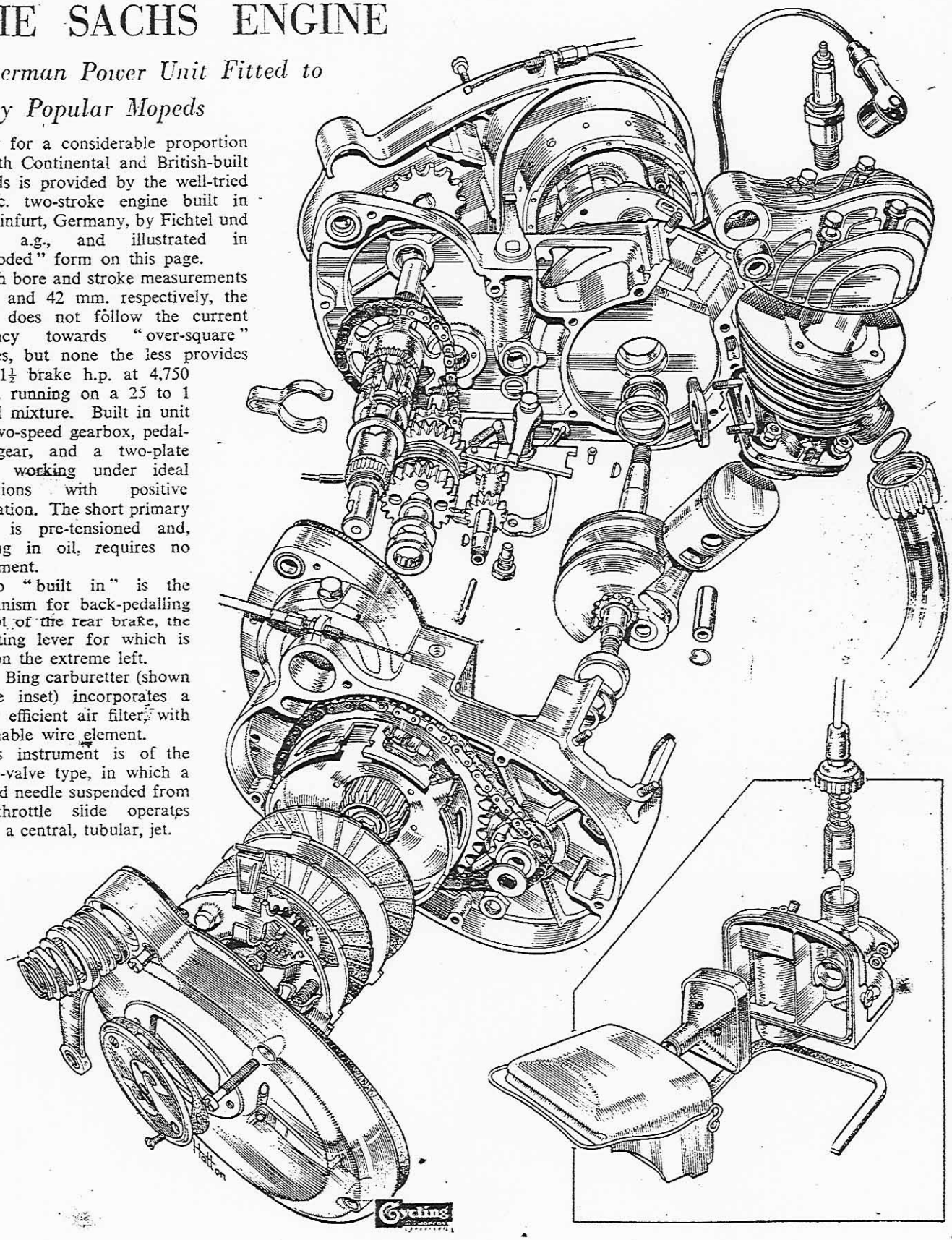
Power for a considerable proportion of both Continental and British-built mopeds is provided by the well-tried 47 c.c. two-stroke engine built in Schweinfurt, Germany, by Fichtel und Sachs a.g., and illustrated in "exploded" form on this page.

With bore and stroke measurements of 38 and 42 mm. respectively, the Sachs does not follow the current tendency towards "over-square" engines, but none the less provides over 1½ brake h.p. at 4,750 r.p.m., running on a 25 to 1 petroil mixture. Built in unit is a two-speed gearbox, pedalling gear, and a two-plate clutch working under ideal conditions with positive lubrication. The short primary chain is pre-tensioned and, running in oil, requires no adjustment.

Also "built in" is the mechanism for back-pedalling control of the rear brake, the operating lever for which is seen on the extreme left.

The Bing carburetter (shown in the inset) incorporates a highly efficient air filter, with detachable wire element.

This instrument is of the needle-valve type, in which a tapered needle suspended from the throttle slide operates within a central, tubular, jet.



Maintaining Your Moped — *No. 2*

THE BING CARBURETTER

OF straightforward design, and sturdy construction, the 50 c.c. Sachs two-stroke engine-gearbox unit is the product of a German concern—Fichtel und Sachs, of Schweinfurt, Main. On the Continent, it is one of the most popular units for moped propulsion, and with the influx of Continental-inspired models into Britain the Sachs unit is becoming rapidly more familiar to British moped riders.

There are few snags in doing running adjustments and top overhauls on this engine, providing (*vide* the first article in this series) that a proper metric toolkit has been obtained.

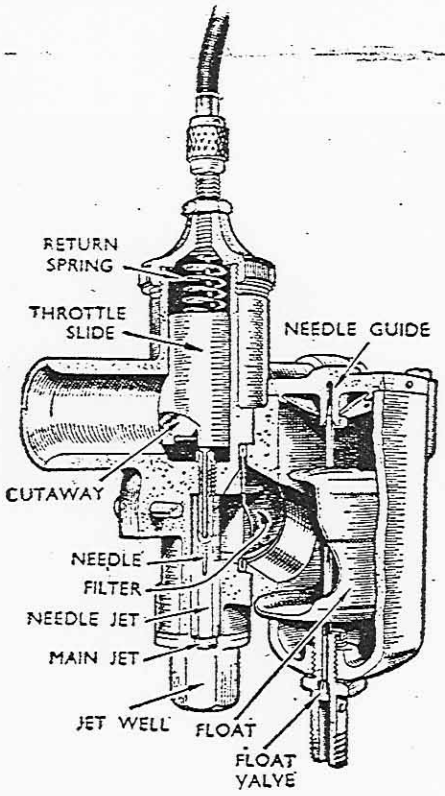
One routine job which must be regularly carried out is the cleaning of the carburetter air filter—failure to do so will result in a lowered performance and increased fuel consumption, as the air supply to the engine will inevitably be cut. Once in 500 miles is about right, so if you use your model to ride 10 miles backwards and forwards to work each day, plus a spot of shopping at week-ends, you should do the job once each month.

It entails removal of the carburetter, which is held in place by two 9 mm. nuts. First, however, undo the knurled ring atop the instrument which holds the mixing chamber cover in place and detach the throttle valve, looping the cable on any convenient part of the machine to keep the throttle out of harm's way.

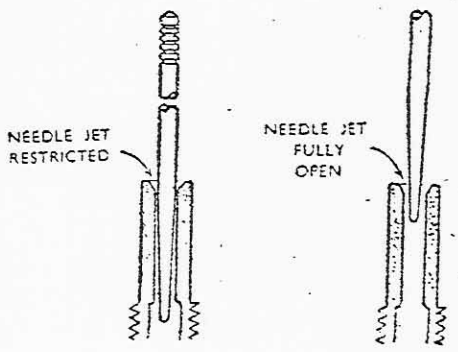
Once the nuts and washers are off (remember to put them somewhere safe, or there'll be the deuce of a hunt for them later on !), remove the carburetter, and invert it. You'll see that the air filter is held in place by a wire circlip. Gently prise this off with a screwdriver bearing against the upturned ends. Or, if you're careful, you can simply press the ends together with your fingers and lift it off. That frees the filter element, which should be thoroughly washed in petrol, and then moistened with, say, a thimbleful of S.A.E. 50 engine oil before refitting. Replace the circlip, and that's *one* job over for the month.

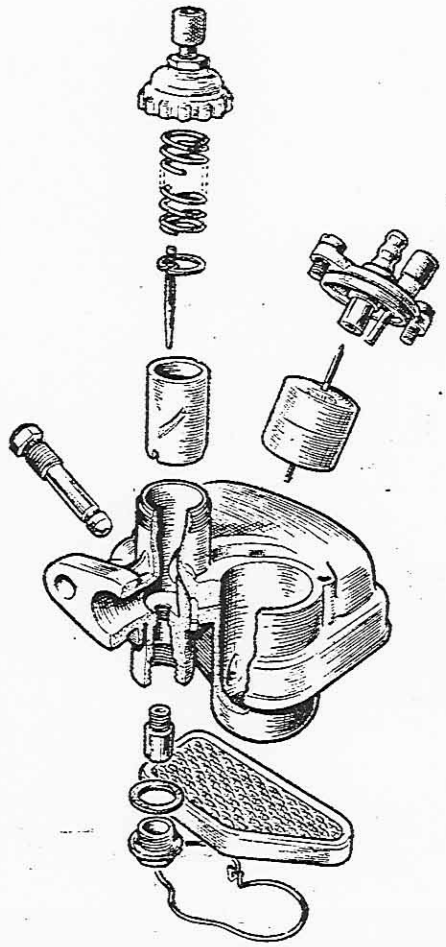
If the model has shown signs of overheating or has been pulling badly, it may be that the main jet has become partially blocked with dirt. On the Bing carburettor, it is a simple task to clean it, for its head is the 8 mm. brass bolt projecting from the off-side of the carburetter. Undo it, remove and blow through it to clear any obstruction. You can also poke it through with a paint brush bristle or a fine strand of copper wire. Never use steel wire or a needle—the jet, being made of soft material, is liable to be damaged if you do. And be careful when replacing it, for if you are hamfisted with the spanner and overtighten it there's a very real danger of flattening the end and thereby restricting the jet size. To avoid this, screw it up finger-tight, and then simply lock it by a gentle pressure applied by a spanner.

Further work on the carburetter involves dismantling the float chamber for cleaning. This should not be necessary more than twice in any one year. With the instrument detached, undo the screws visible on the top, and remove the float chamber cover and the fuel pipe. That leaves the float exposed and, together with its needle, it can be removed and the float chamber swilled out with petrol.



This cutaway drawing (above) of an Amal carburetter gives the names and location of the principal parts of a needle-jet instrument. On the right is a diagram explaining how the needle-jet works.





The Bing carburetter fitted to the Sachs engine. Later models have the type of air filter shown in our engine drawing last week.

On some Sachs engines, overflooding and bad "four-stroking" have been experienced. This has been traced to over-heaviness in the float assembly. If *your* model has this shortcoming, a cure can be effected by detaching the float needle (it is retained by the two parallel wire springs soldered across the brass float) and taking it to your dealer, asking him to grind the centre run (the part which lives inside the float) down to half its present diameter. This slight weight saving has usually been found to be a complete cure.

Sludge may gradually accumulate in the jet well — located right at the bottom of the instrument. Like the rest of the carburetter, this should be well flushed with clean petrol, and then re-assembly commenced. The sequence is, first, to replace the jet well on to the body (not forgetting its fibre washer); fix the float needle into the float and place the whole assembly in the float chamber. Add the cover; the main jet; and the air filter. Refit the throttle valve (this works without lubrication—oil would encourage dust to settle, leading to jammed slides) and fuel pipe, and slide the whole instrument back on to its studs, finally replacing the two 9 mm. nuts.

Maintaining Your Moped — *No. 3*

DECARBONIZING

A Simple, Routine Task on the Sachs Engine

JUST as a chimney needs sweeping from time to time if the fuel which is shovelled into the grate is to be used to its best effect, so an internal-combustion engine must be decarbonized periodically to remove the deposit caused by burning of the petrol/air mixture. All burning leaves a deposit. Coal leaves soot; petrol and oil a harder coating, known as carbon. It adheres to the inside of the combustion chamber and to the top of the piston, thereby steadily increasing the compression ratio to the point where "pinking" and overheating will set in. It can drastically restrict the area of the exhaust port, thereby trapping spent gases in the cylinder and adulterating the new mixture. It can build up around the sparking plug recess, become red-hot, and fire the mixture prematurely, leading to a form of misfiring known as "pre-ignition." In all, or any, of these ways it reduces the efficiency of the engine, raises the fuel consumption and cuts the power.

But don't be scared . . . it's easily rectified. On a two-stroke engine such as the Sachs a complete decarbonizing should take no more than a morning of easy work, and involve nothing more technical than the removal of a few nuts and bolts. In fact, it's a sight easier than sweeping that smoky chimney!

Begin by removing the knurled ring securing the exhaust pipe to the cylinder stub. A special C-spanner is required for this. If it's tight, it is permissible to tap the spanner gently with a hammer. But *gently*—new cylinder barrels are expensive, you know. Once the ring is free, take off any remaining clips which secure the pipe to the machine, and put the whole system on one side.

Now take off one of the nuts securing the lateral engine mounting bolt in the lug at the rear of the cylinder head, and with a 10 mm. box spanner unscrew the four cylinder head bolts. This frees the head.

Next to come off is the carburetter (first the slide, then the two nuts on the inlet manifold). This done, the four 10 mm. cylinder base nuts can also be removed.

Turn the engine over, now, until the piston is at the bottom of its stroke, and lift off the cylinder barrel, taking care not to damage the paper base washer.

Next, it's the turn of the piston. With a pair of sharp-nosed pliers (or with the blade of a screwdriver) compress the upturned ends of the two wire circlips which hold in place the gudgeon pin (that is, the member on which the piston pivots). Have handy a couple of flannels (not your wife's prize bath flannels, if you value domestic peace!) wrung out in very hot water. Apply these to the piston, wrapping them around it. This expands the light alloy slightly, and enables you to tap the gudgeon pin out easily with a brass or copper drift. Support the piston while doing so. Bare hands or a piece of soft wood are best as a shock-absorber.

When you have detached the piston, carefully slide the two rings out of their grooves, top ring first. This is done by expanding the rings with the two thumbs, but only enough to enable you to lift them free, as they are made of brittle material, and can easily snap, especially if too great a pressure is applied in the first place.

Now begins the actual decarbonizing. Using a scraper (which can be purchased from your dealer) or else a piece of hardwood with one end well bevelled, chip all the black deposit off the piston crown, finishing off with a rub down with very fine emery cloth. Never, never, *never* use emery cloth on the sides of the piston. It's an expensive practice!

When the top of the piston is again a glistening silver, check that there is no carbon on the inside of the piston itself. If there happens to be an accumulation, scrape it off. Scrape, also, the sides of the piston between the crown and the top ring groove, and complete the job by carefully cleaning the ring grooves, and the rings. These latter may now be edged back into position, taking care to place them in their original grooves.

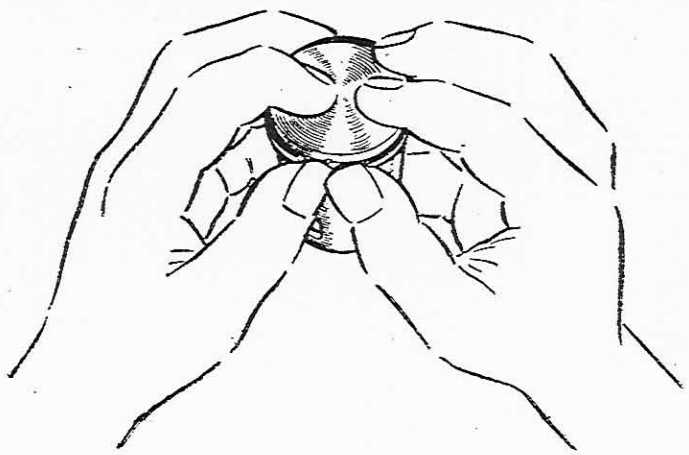
Scrape and clean the inside of the cylinder head, being careful not to damage the seating joint. Take especial care, too, to get the area around the sparking plug 100 per cent. clean.

This done, turn your attention to the barrel, the object here being to have the exhaust port absolutely clear. Chip the carbon away by working from the exhaust pipe end of the port. If you are lucky enough to possess an electric drill (or even a hand drill) a cheap set of wire brushes will enable this work to be done more quickly and efficiently than will a scraper and emery cloth. Don't forget to wash the barrel thoroughly in clean petrol once you have finished, so that any carbon that has flown into the bore is removed.

Finally, clean the exhaust pipe itself (a small stiff wire-handled brush of about 1 in. diameter would be useful here) and, if the silencer is of the type which lends itself to dismantling, the muffler also. A time-honoured dodge is to immerse them for half an hour in a bath of strong caustic soda solution, but this must only be used with steel components—the soda would permanently damage light alloy pipes and silencers.

Re-assembly is simply the reverse of the procedure previously outlined. A point to watch is that the piston must go back facing the same way as when it was dismantled. On a newish engine, you should still be able to see the arrow facing forward on the piston crown; otherwise, remember that the top piston ring peg (the little cross-piece in the ring groove which prevents the ring from turning) must be on the same side as the flywheel magneto—i.e., on the left, when viewed from the rear. With your fingers, compress the top ring, and lower the barrel over the piston, easing it gently. Then, when the top ring is trapped in the bore, compress the lower ring in the same way (making sure it is in the right position relative to its peg) and repeat. Then lower the barrel down on to its studs and base washer, finger-tighten all four base nuts, and then lock them with the spanner. Tighten them in sequence—first the left-hand front, then the right-hand rear; then the right-hand front, then the left-hand rear. This ensures that the barrel is squarely fitted. With the piston at the bottom of the stroke, smear a little oil over the inside of the bore, and then replace the cylinder head, tightening the bolts in the same way as the base nuts. Fit the carburetter, the engine mounting bolt, and, finally, the exhaust system, knocking the ring up tight. Again, however, beware of over-tightening it.

Assuming normal use, and correct mixture and oiling, this operation should be carried out every 2,500 miles—once or twice a year, at the outside. However, it is advisable to clear the exhaust port at between 1,000 and 1,500 miles, irrespective of this.



Removal of the piston rings is a delicate job. It can be done, however, by using the thumbs as shown to spring the rings gently from their grooves in the piston.

Maintaining Your Moped *No. 4*

BOSCH ELECTRICS

Straightforward Work on the Ignition System of the Sachs Engine

THERE is nothing over-complicated about the "electrickery" of the Sachs engine, which is basically the same as that employed on the vast majority of two-stroke power units of this type. It consists of a flywheel-magneto-generator, in which a high-tension coil for the ignition and a 17-watt lighting coil, together with condenser (a sort of electrical shock-absorber which prevents surging in the circuit) and contact-breaker points are mounted on a stationary armature plate, with magnets contained in the rim of an enclosing flywheel. When the wheel is rotated, the action of the magnets is such that current is generated in the windings of the coils. A cam on the flywheel spindle causes the points of the contact-breaker mechanism to open and close. Each time they open they break the current—really, it's a form of switch, nothing else—and when *this* happens a high-tension current is generated. This leaps the gap in the sparking-plug, thus firing the mixture.

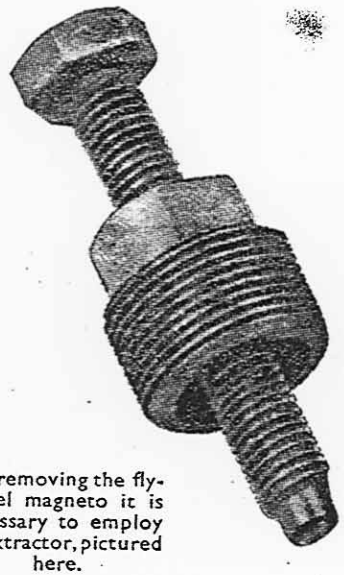
Every 3,000 miles—probably once a year, no more—check the gap between the contact-breaker points. It has to be 16-thousandths of an inch; no more, though it can be a little less. If it is not properly set the engine will still run, but not as well as it should.

To get at the contact-breaker points you should first take off the left-hand pedal crank (secured by a nut and cotter pin, in the normal way) and with a screwdriver undo the two cheese-headed screws which hold the left-hand engine cover in place. This bares the flywheel assembly.

You'll notice that the flywheel looks rather like an unflattering caricature of . . . . you know who! It has two small slots (forming eyes) and a large one (forming the mouth). That's the one to work through.

Rotate the flywheel until the arrow with the letter "M" beneath it on the flywheel rim is in line with the verical line scribed on the top of the crankcase. At this point, the contact-breaker points (visible through the large slot) should just be beginning to separate. If so, the timing is correct. If, on the other hand, the two marks are more than .078-.098-in. (2-2.5 mm.) apart the points need adjusting.

But which way? That's easy, too. You will have been turning the flywheel *backwards*—that's the normal direction of rotation on this unit. If the "M" mark has failed to reach the mark on the crankcase before the points break, the gap between the contacts must be reduced. If "M" has overshot the line, the gap must be increased. Either way, the procedure is the same. With a sharp screwdriver, slacken off the large screw (right in the bottom of the armature plate) which secures the contact-breaker anchor plate. Don't remove it . . . just loosen it sufficiently to free the plate. Now insert a screwdriver into the adjusting slot just beside the screw and, by twisting the tool, increase or decrease the gap as required, checking it with a feeler gauge. It will be correct when the gauge is able to slide between the points but cannot be moved up or down. Finally, tighten the clamping screw, and check the new setting by rotating the flywheel until the "M" mark is again coincident with the scribed line. If the points are just beginning to separate you were right first time.



For removing the flywheel magneto it is necessary to employ an extractor, pictured here.

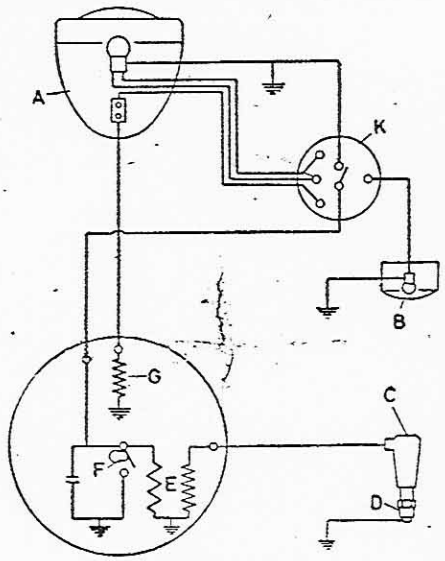
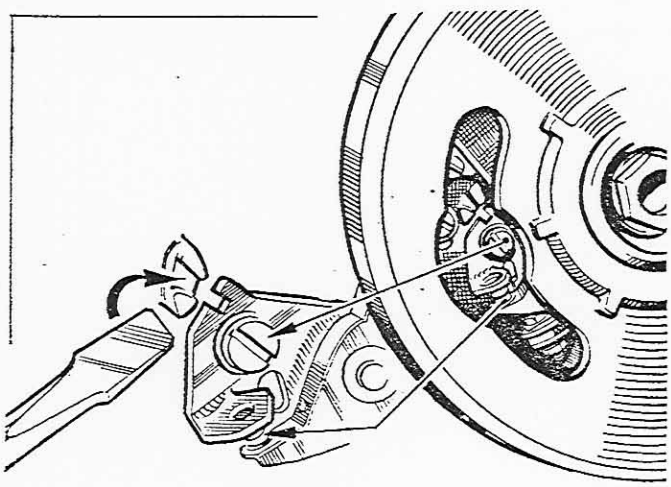


Diagram of Electric Plant 17 W
A = Headlamp B = Tail Lamp C = H. T. cable hood for plug
D = Sparking plug E = Ignition coil F = Contact breaker
G = Lighting coil K = Lighting switch



Above is seen a typical wiring diagram for a moped. On the left is shown the adjustment for the contact breaker, with the pivot slot for the screwdriver clearly arrowed.

Of equal importance in maintaining the tune of the unit is the condition of the sparking-plug, and the gap between its points. This should be regularly checked, once a week or—at the least—once a fortnight. To clean the plug, all you need is a little wire brush, with which all carbon and scaling can be removed. The gap between the points is critical—it can be between .018 and .020-in. Anything else is wrong.

Should it ever prove necessary to remove the flywheel itself the job can be done very simply with the aid of an old six-inch pedal crank with a sawn-off bolt placed through the pedal spindle. Hook the eye of the crank on to the engine's pedalling crank spindle, and engage the bolt into one of the three flywheel slots. This will hold the flywheel firm while you unlock the mainshaft nut with a 14-mm. box spanner. Now comes the job of drawing the flywheel off its taper. For this, you *must* have a proper flywheel extractor, which screws into the flywheel boss. You will find that the manufacturer of your moped can supply one at a small cost.

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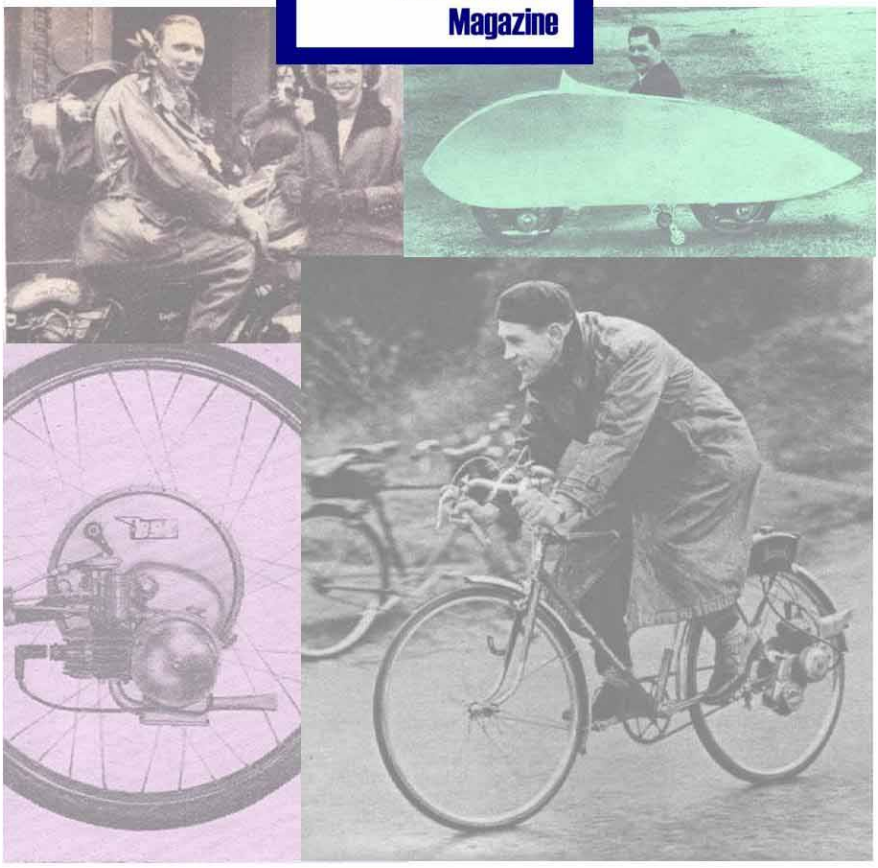

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