

# WORK ON THE REX ENGINE

## General Maintenance Routine on the Power Unit of the Phillips "Gadabout"

**T**HOUGH offering a high performance for its size, the Rex two-stroke engine which powers the Phillips "Gadabout" is quite simple in both design and construction, and provided the correct tools are used the average moped owner should find no difficulty in maintaining it in good trim.

Of the routine jobs which are necessary one of the most important is the periodic checking and refilling of the oil sump which provides for the lubrication of gear-box, primary drive and clutch. This must be done after the first 600 miles of the machine's life, and thereafter at 1,000-mile intervals. Carry out the task when the engine is hot—at the end of a run, for instance, when the oil is warm and thin. Have ready an old baking dish, in place under the machine, and with a 14-mm. open-ended spanner remove the drain plug, which is located below the engine, on the clutch-cover side. A 14-mm. spanner will undo the filler plug atop the clutch casing. Lightly replace the drain plug and pour in a quantity of flushing oil. Replace the filler plug, and run the engine for a few minutes with the machine in gear. Then unscrew the drain plug again, and allow the flushing oil to drain away. With it will go any impurities which have found their way into the machinery. When the flushing oil is completely gone, screw the drain plug well home, and refill the sump to the correct level with an S.A.E. 80 oil. One word of warning—the drain plug is *not* the 11-mm. hexagon you'll find beneath the engine. That is the lower pivot for the selector fork, so leave it alone.

### Tools You Need

It should not be necessary to decarbonize before 1,500 miles have been covered, and sometimes engines have run for two or three thousand miles before a falling-off in power has shown it to be strictly necessary. So judge by the feel of your engine when it is in need of this attention.

To do the job, first assemble the requisite tools—a 10-mm. box spanner; a 14-mm. box or open-ender; a 1/2-in. B.S.F. plug spanner; a pair of pliers; a good screwdriver; a scraper and a clean piece of rag. You will also require a new cylinder-head gasket, and exhaust gasket and asbestos packing. First of all, before you do anything else, clean down your engine, using a grease solvent washed off by water, and then dry off with a piece of clean rag. You are now

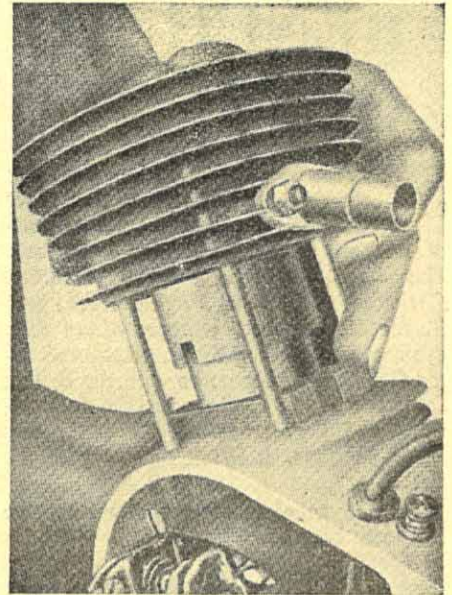
ready to start work. Using the screwdriver, slacken off the screw on the clip attaching the decompressor actuating unit to the cylinder head, and remove the unit. Disconnect the ignition lead, and undo the two 10-mm. nuts which secure the exhaust pipe to its flange. Now undo the nut and bolt securing the silencer to the rear support clip, and take off the entire exhaust system.

The 14-mm. spanner will fit the bolt which passes laterally through the cylinder head lug to secure the engine to the frame. Remove this, and then undo the four 10-mm. nuts holding down the cylinder head. Lift off the head, then the gasket, but do not disturb the cylinder barrel. Instead, engage the clutch and turn the rear wheel to bring the piston just below the exhaust port. Hold the barrel during the process, or it may lift itself off. Now scrape away any carbon in the port, drawing a thin strip of rag through from inside the bore to clear away the scrapings when you have finished. Bring the piston to the top of its stroke, and carefully scrape away the carbon from its crown, not forgetting to wipe it clean when you have finished.

### Source of Leakage

Now remove the plug from the cylinder head, and scrape away all the carbon which has accumulated there. It is as well to examine the decompressor valve, too, to see if there are any signs of leakage. If you suspect that gas has been escaping, it will be as well to remove the valve and examine it. To do so, compress the spring and washer so that the pressure is off the split-pin which secures them, and remove the pin with the pliers. The spring, washer, and valve can now be removed, baring the decompressor port. This may be cleaned out if it shows signs of becoming choked; in any case, examine the head of the valve carefully. Should it be burned or pitted, replacement is the best bet; if not, clean it and reassemble the unit. First put the valve back into the head; then add the spring and washer, compressing them with a broad-bladed screwdriver to enable you to insert a *new* split-pin. Never use the same split-pin twice.

Should you wish to remove the cylinder barrel, as you would if stuck or broken rings are suspected, it would be a good idea to make up a piston support plate to ease reassembly. You can do this by cutting a slot about quarter of an inch wide and two inches long in a piece of three-eighth hard-



Use of a simply-made support plate ensures that the piston skirt will not suffer damage during removal and replacement of the Rex cylinder barrel. The plate should be made from a piece of clean hardwood, with no splinters or saw-dust left around the cut edges. Dimensions are given in this article.

wood, the width of which should be 1 1/2 in. Raise the barrel two inches on its studs, and as the piston rises with it slip the plate between the lower edge of the piston and the top face of the crankcase. Now pull off the barrel. Should you need to remove the piston, make a shallow mark on the crown to indicate the front face, and then remove the circlips, using round-nosed pliers. To free the gudgeon pin, it will be necessary to heat the piston to between 175-212 deg. F. This means the application of near-boiling water... a difficult task with the engine still in the frame. If you possess a pair of washing tongs, some clean rag wrung out in water of the correct temperature and then wrapped around the piston should do the trick, and the pin may then be driven out by means of a soft drift.

### The Silencer

Cleaning of the silencing system is simple. A 10-mm. box spanner can be inserted into the tail-pipe to undo the nut on the centre rod, and the internals can then be removed for cleaning. When reassembling, use the new asbestos packing which you have procured. Engine rebuilding is simply the same as dismantling, but in the reverse order. Beware, however, of over-tightening your nuts and bolts—as tight as a light pressure with an open-ended spanner will achieve is sufficient.

In the next article in this series, which appears in next week's issue, we will be considering maintenance of the electrical system, the carburetter, and the Phillips cycle parts.

## ELECTRICAL and GENERAL WORK

### Keeping the "Gadabout" in perfect trim

**L**AST week, we dealt with work on the actual engine of the Phillips "Gadabout." This time, we will consider briefly what needs be done to keep the "electrics" and the carburetter in good tune, before passing on to the upkeep of the cycle parts.

Current for ignition and lighting is supplied by a Bosch 6-volt 17-watt flywheel magneto-generator. It is not necessary to dismantle this to do such routine jobs as point gap-setting or timing adjustment, since the flywheel is provided with large apertures through which such work can easily be carried out.

Access to the magneto is gained by removing the left-hand crankcase cover. This simply involves driving out the cotter pin retaining the left crank (removing the nut first, of course!) and then undoing the three screws which hold the cover to the crankcase. The contact-breaker points will be visible, mounted at the top of the armature plate within the flywheel. Check that they are fully open, and then insert a feeler gauge to determine the gap. It should be between .015-in. and .020-in. If it is not, slacken off the screw which holds the stationary point—the more rearwardly placed of the two—and slip the screwdriver into the adjuster slot atop the point base, easing it open against the spring pressure. Now insert a .020-in. feeler gauge between the points and, with the gauge nipped there, retighten the clamping screw. Pull out the gauge, and the gap will be correctly set. The sparking plug gap should also be checked—.020-in. to .024-in. are the permitted limits. It goes without saying that the plug should be perfectly clean.

### Re-timing

Should the actual timing of the spark be suspect, turn the flywheel until the piston reaches top dead centre. Then swing it backwards (opposite to the direction indicated by the arrow stamped on the rim) until the piston has moved to one-eighth of an inch below T.D.C., measured through the sparking plug hole in the cylinder head. The contact-breaker points should now be just beginning to open. If they are not, slacken the two screws which hold down the armature plate, and turn the plate clockwise if you wish to advance their opening, anti-clockwise if you wish to retard it. Re-lock the plate, and carry out a running check to

make sure that your work has been accurate.

Should you ever need to dismantle the flywheel magneto, obtain a flywheel extractor from the manufacturers before attempting the task. Then bare the magneto and, holding the flywheel with a holder, unscrew the flywheel nut, using a 14mm. box spanner. The thread is right-handed. Insert the extractor, and—still holding the flywheel steady—screw in the extractor centre-bolt to draw the flywheel from the shaft.

If you need to remove the armature, scribe a mark on the plate and a mating mark on the crankcase, so that you need not re-time the engine on re-assembly. Then unscrew the two holding-down screws, detach the plug cap from the ignition lead, disconnect the terminals of the lighting cable socket (screwing the parts together again once the cable is disconnected, to avoid loss) and draw off the plate. When re-assembling, moisten the ignition lead with soapy water and you will find that it slides easily through the rubber grommet in the case.

### The Carburetter

Thanks to the inclusion of two fuel filters, there should be little work required on the carburetter. Should removal be desired, however, it is simply a case of slackening the screw on the locking clamp behind the instrument, and sliding it off. Then remove the screw holding the top to the body, and pull out the throttle slide. To dismantle, use a screwdriver to remove the jet well and spray tube (large central screw beneath the instrument) and the main jet, which is to be found in the right-hand side of the carburetter. It is worth noting that this can be removed with the instrument *in situ*. A single screw retains the oil-wetted wire air filter in the bell mouth, and the float chamber cover can be removed upon the loosening of two screws. Sediment can be washed out with clean petrol; choked jets can be cleared by means of a stiff bristle (never use a needle or pin) or by a hearty gust of air delivered by air-line, or even by mouth.

On the cycle side, particular attention must be paid to the chain. Check its adjustment weekly, making sure that it is maintained at a steady three-quarters of an inch of play. At the same time, run a spanner (10 mm. box) over the bolts securing the rear sprocket to the wheel, to ensure that

they are tight. Every 3,000 miles, remove the chain completely and clean it in paraffin, subsequently immersing it in warm chain grease.

Brake maintenance resolves itself simply into ensuring that the front brake cable is properly oiled and adjusted. Apply thin oil once a month—more frequently if you wish. To adjust the brake, slacken off the cable adjuster lock nut and screw out the adjuster until the linings begin to rub inside the drum when the wheel is revolved. Then ease the adjuster off until the rubbing disappears—about one turn will do it—and relock the nut. Check again, to make sure that the adjustment didn't alter as you locked up.

Eventually, you may find all the adjustment taken up. In this case, screw the adjuster fully home, and slacken off the anchor-nut attaching the cable to the brake arm. Pull the cable through the arm, re-tighten the anchor nut, and proceed with adjustment as before.

The rear brake is rod-operated. Proceed as for front brake adjustment, save that wear is taken up by screwing the large knurled thumb nut further along the brake rod.

### Cable Care

About quarter of an inch of play should be allowed in the clutch cable, which should be lubricated at the same time as that for the front brake. Two adjustments are provided—one on the clutch lever itself, the other on the clutch cover on the engine. The correct amount of play should be obtained by screwing either of these adjusters in or out, as the case demands.

Three other cables also call for regular oiling and adjustment—the decompressor cable (adjusted by drawing the inner cable through the hole in the pinch-bolt terminal in the lever), the gear-change cable (which has an adjuster beneath the twist grip) and the throttle cable, with similarly-positioned adjuster.

In each case, slight slackness should be allowed in the operation of the control... not much, just a barely perceptible "play" before the strain is taken up. In the case of the gear cable, the slack should be apparent when top gear is engaged. This setting will then ensure that both gears and neutral are correctly engaged when the control is operated.

Every 3,000-5,000 miles it is advisable to repack the hubs with grease. The wheels must be removed, the brake-plates taken off, and the wheel bearings uncovered. Clean out the existing grease, and then carefully pack the hubs with a new grease of "soft" grade. At the same time, check for play in the head bearings by placing the machine on its stand, lifting the front wheel from the ground, and rocking the forks backwards and forwards. If no movement is perceptible the bearings are in order. If, on the other hand, play can be felt, it indicates that the top cone needs to be screwed in a little to take up the wear.

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