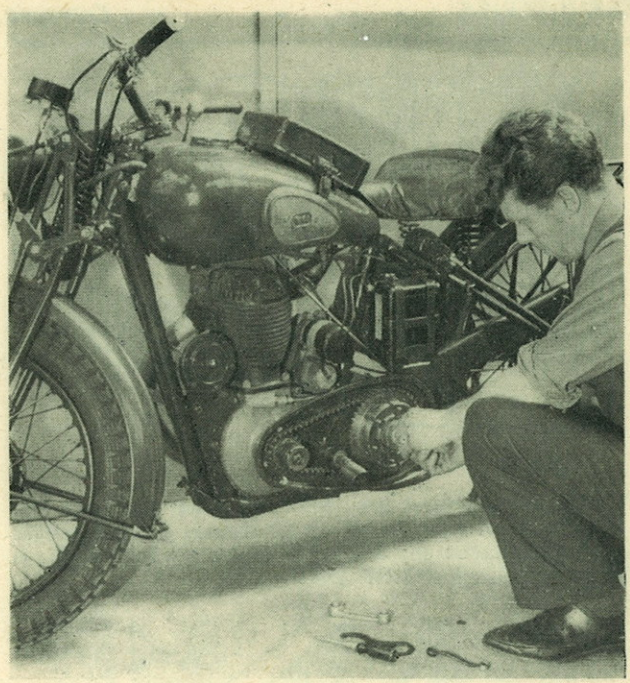
SERVI-SERIES by **BERNAL OSBORNE**

The 496 c.c. s.v. W.D.-type

B.S.A. Model M20

General Upkeep Hints and Tips for a Famous Old Warrior

PART I — The Cycle Parts and Clutch

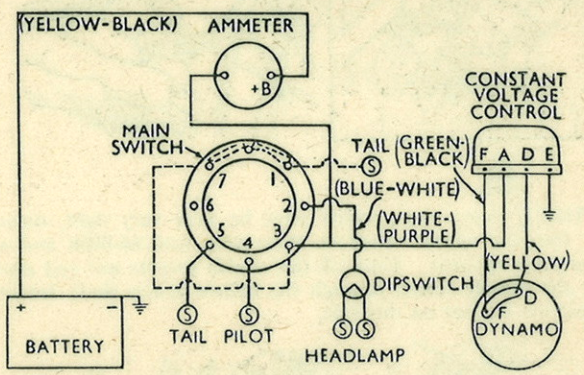


THE 496 c.c. B.S.A. M20 side-valve model was first made in pre-war days. In its 1939 form, with rigid frame and girder-type front forks, it became a W.D. machine. Many thousands manufactured for war service became surplus and have subsequently been offered for civilian use. It is with this type of M20 that the present article, and its successor, are chiefly concerned.

Post-war models, the later ones equipped with telescopic forks and plunger rear springing, carried on the basic M20 characteristics; this general similarity extended to the M21, the 591 c.c. capacity of which was obtained by a 112 mm. stroke (instead of the M20's 94 mm.), with a con-rod and flywheel arrangement to suit.

W.D. machines delivered with the toolbox empty should be re-equipped at least with a skeleton kit. Included should be the B.S.A. "four-way" open-ended spanner (current part No. 1-3051), the double-ended ring spanner (15-832), and the long-reach box-ended socket spanner (66-0068)—without the last-mentioned tool, rear wheel removal is difficult. These items, plus an "adjustable," a plug spanner, screwdriver and tyre levers suffice for general maintenance, but must be supplemented for work on the clutch.

Emphasis is placed on the need to maintain a careful check on nut-and-bolt fixings and to keep correctly adjusted the fork shackles, otherwise handling and steering are adversely affected. The Magdyno lighting system has a negative earth; the diagram on this page shows the wiring connections.



Wiring diagram for M20/21 models of the immediate post-war period, with alternative connections for the W.D. version shown dotted.

THE FIGURES WHICH YOU NEED

General Details

Capacities :	
Petrol tank	3 gal.
Oil tank	⅜ gal.
Front forks (per leg)	½ pint
Gearbox	1 pint
Chaincase	3/16 pint
Tyres	3.25 × 19 in.
Inflation pressures (front)	16 lb./sq. in.
(rear)	22 lb./sq. in.
With sidecar (front)	20 lb./sq. in.
(rear)	26 lb./sq. in.
(s.c.)	16 lb./sq. in.
Wheel rims (front)	WM2–19
(rear)	WM3–19
(sidecar)	WM3–19
Brake diameter	7 in.
Brake lining width (front)	1⅛ in.
(rear)	1⅜ in.

Transmission

Gear ratios (solo)	5.28, 6.95, 10.87, 15.76 : 1
(sidecar)	5.94, 7.82, 12.2, 17.7 : 1
Front chain	½ in. × .305 in. × 69
Rear chain	⅜ in. × ½ in. × 95
Sprocket sizes :	
Engine (solo)	18T
(sidecar)	16T
Clutch	43T
Gearbox	19T
Rear chainwheel (solo)	42T
(sidecar)	42T

Wheel Bearings

Front	Taper-type, Skefko 2K1178X and 2K1130NI, or British Timken 1178X and 1130NI.
Rear	Taper-type, Skefko 2K05079 and 2K05185, or British Timken 05079 and 05185.

Dimensions

Wheelbase	54 in.
Ground clearance	5½ in.
Saddle height	30½ in.
Overall width (solo)	28 in.
Dry weight (rigid frame)	369 lb.

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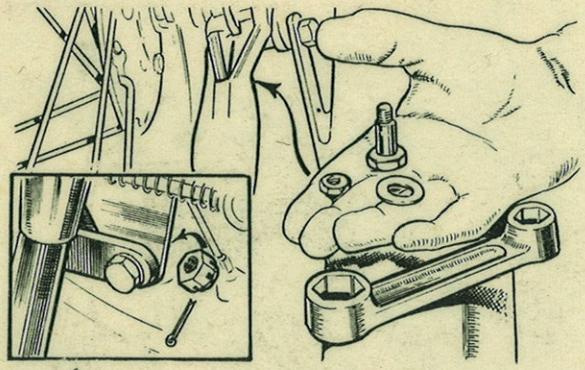
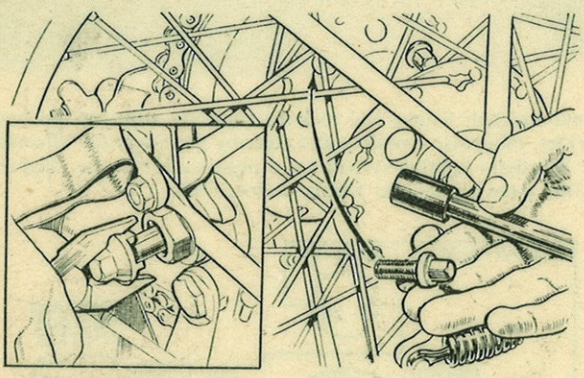
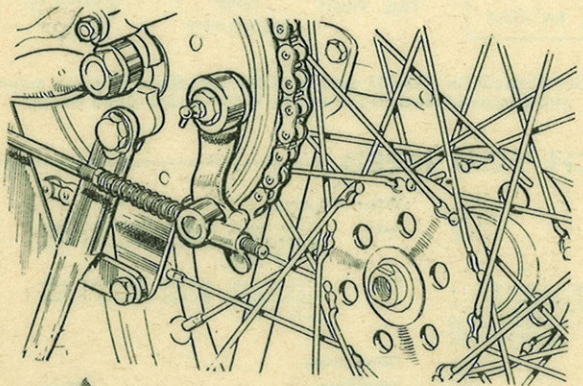
SERVI-SERIES - - - - - - *Continued*



THE rear stand pivot bolts will rattle unless kept tight with the locknuts firmly home. (Inset) the rear brake anchorage is split-pin secured and left intact except when the brake is dismantled. The tool is No. 15/832.



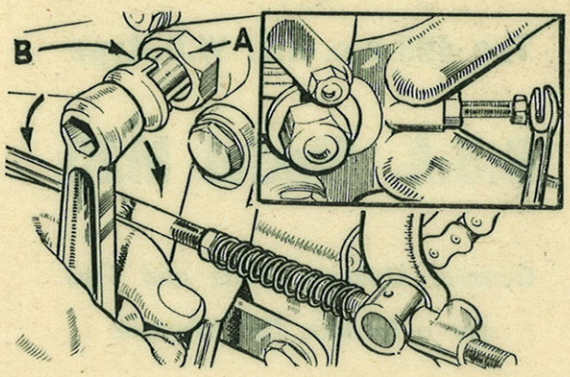
THREE sleeve nuts, which must be kept very tight, secure the rear wheel. Remove them with tool 66-0068 and an adjustable spanner. Take off the offside spindle nut and draw out the spindle (inset) through the hollow centre shaft, leaving intact the big nut on this side.



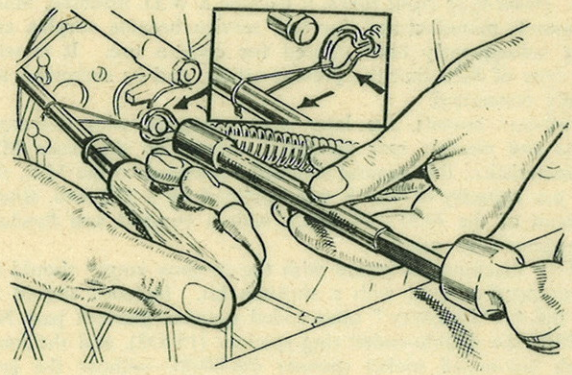
WITHDRAW the wheel, leaving the transmission and brake intact. If necessary, disconnect the rear lamp at the snap, or screw-type, connector, and take off the detachable mudguard end.

B4

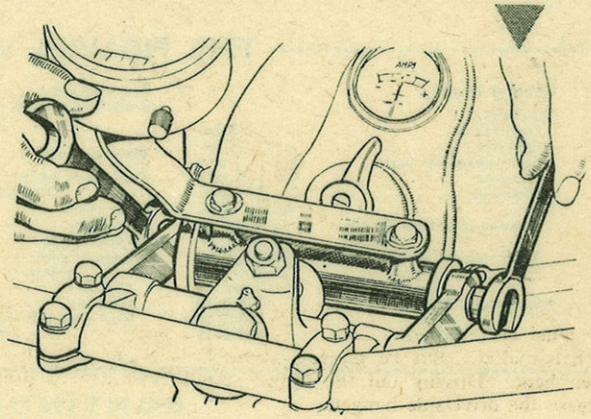
FOR rear chain adjustment, slacken the offside spindle nut and nut "A" on the nearside. The spindle, shown part withdrawn for clarity, pushes in to engage a snail cam. Compensating offside adjustment is shown (inset); finally tighten spindle nuts.

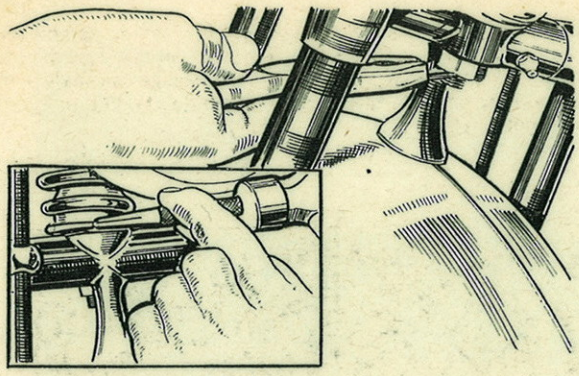


WHEN fitting a rear-stand spring, tie the end eyelet to a long screwdriver and lever back until it is level with the anchor stud, when the socket tool 66-0068 is used as a hollow drift to punch the eyelet home.

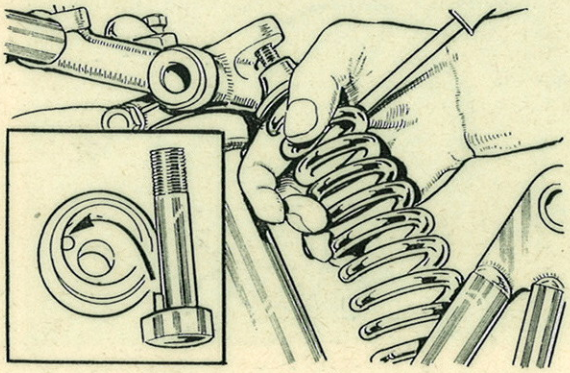


TO remove play from the forks, slacken all offside locknuts and the damper knob. Then adjust at the spindle bolt heads to give easy movement without side-play, locking up each in turn when O.K. Finally tighten the damper to suit conditions.

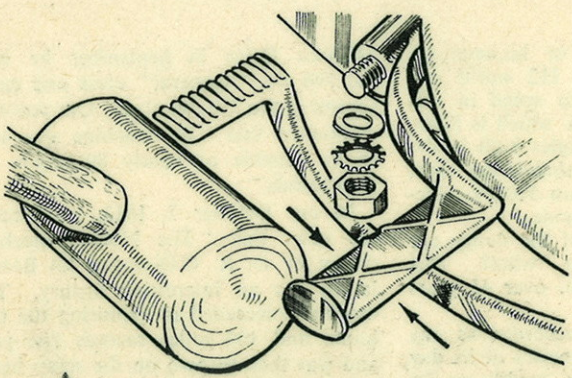




TO replace a fork spring, support the engine base on a box and take out the top links, letting the forks pivot forward. Release the top spring anchorage, dismantle the low split-pin fixing and withdraw spring. Reassemble in a vice, fit and tap firmly into position (inset).

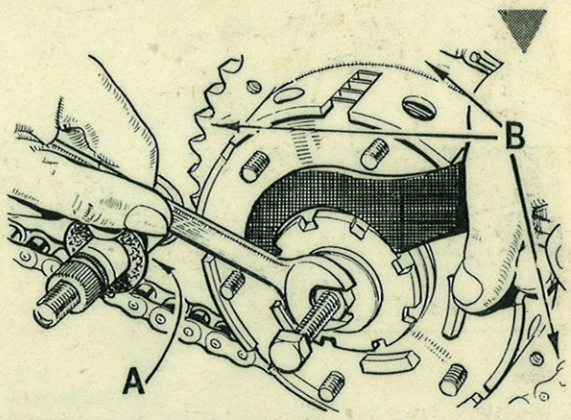


LETTING the forks swing down allows the top fitting, supported by a screwdriver, to be thrust into the yoke. Support is necessary because the scroll is a two-part assembly (inset) with a locating key.

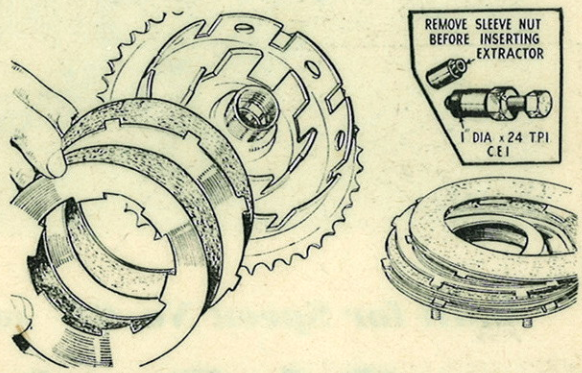


TO get at the primary transmission and clutch, the footrests must be removed. Each fits a serrated sleeve and is freed with a mallet. But be patient, particularly if the rests have been bent. Driving out the centre spindle will not of itself release the drive-side hanger.

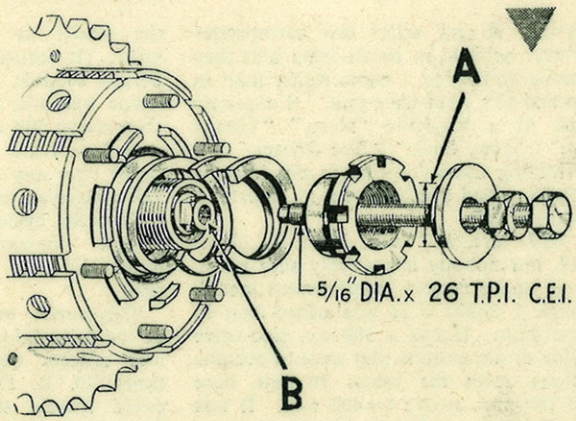
BEHIND the chain cover is a washer and distance piece " A," the clutch cover with an oil-tight gasket at " B," and the clutch outer plate carried on six studs. A C-spanner and spring control tool are used to remove and replace the single spring.



NOTE locations of friction and steel-ring assembly and put back accordingly. Steel rings must be flat, without sign of blueing due to excess heat, and friction rings must be oil-free. To remove the clutch centre, retained by a sleeve nut, the extractor (inset) is applied.



DIMENSIONAL details of the spring-control tool " A." In assembling, this threads into the sleeve nut " B," and the $\frac{5}{16}$-in. nut is tightened against pressure until the castellated ring nut can be engaged.



NEXT SERVI-SERIES

B.S.A. M20 PART 2—THE ENGINE

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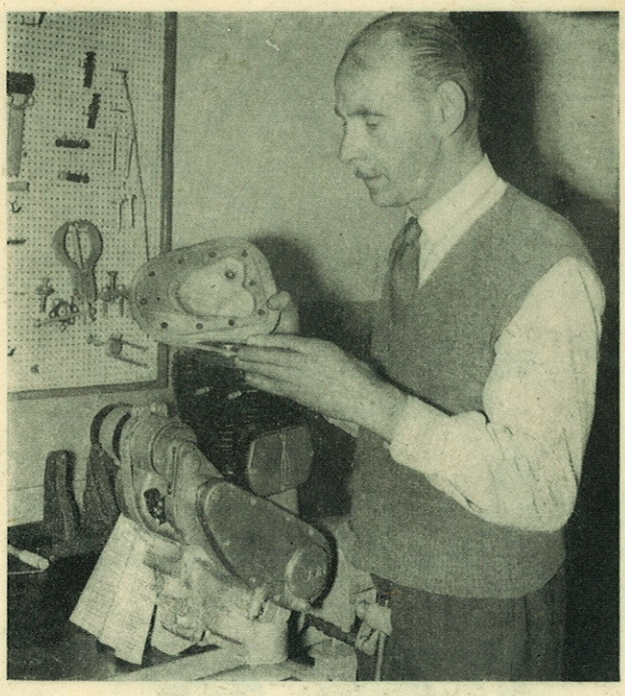

The 496 c.c. s.v. W.D.-type

B.S.A. Model M20

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PART 2—Engine Maintenance

APART from length of stroke, the engines of the B.S.A. models M20 and M21 are identical. Both are side-valve units which, so long as tappet clearances are properly maintained, run very quietly and give good low-speed pulling. All parts are accessible and the units can be stripped down to crankcase level quickly and easily by the private owner.

The skeleton toolkit listed in the previous article, which dealt with general M20 upkeep, should be supplemented by a feeler-gauge set. The B.S.A. tappet spanners listed for the W.D. model have been continued for later engines and are still obtainable. A set of open-ended or ring-type spanners in $\frac{1}{4}$-in., $\frac{5}{16}$-in., $\frac{3}{8}$-in. and $\frac{7}{16}$-in. sizes will also be useful.

Routine decarbonizing should be carried out when power fall-off becomes apparent and is accompanied by pinking and poor hill-climbing. These symptoms should not occur at intervals of less than 5,000 miles. The work can usually be confined to the removal of the cylinder head to clear carbon deposit from the combustion chamber, valve heads and piston crown. At longer intervals, it will pay to remove and renovate valves and springs, regrinding the valve seatings and, if necessary, replacing the piston rings. All this work is described, although the amount necessary will depend upon the individual engine.

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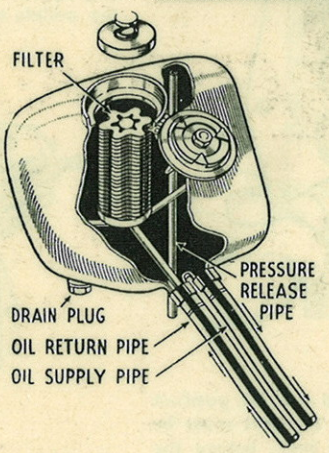

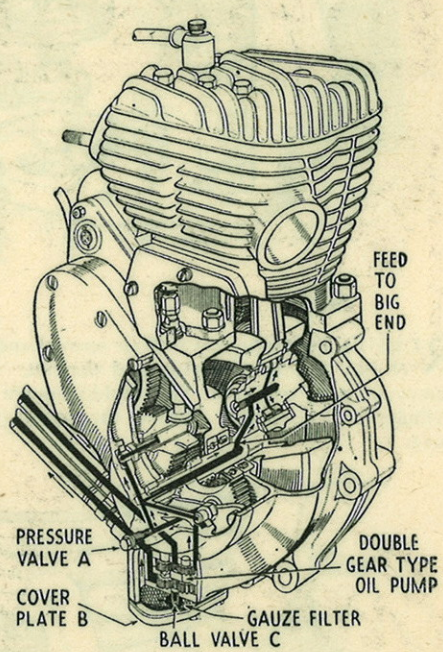

Lubrication details. Pressure valve "A" prevents engine flooding from the feed side when not running, and ball valve "C" controls the return side.

THE FIGURES WHICH YOU NEED

Valve guides, i.d.:	
Inlet	.3515/.3525 in.
Exhaust	.3525/.3535 in.
Tappet guides, i.d.:	
Inlet	.3745/.3755 in.
Exhaust	.3745/.3755 in.
Cam pinion bush, i.d.	.6245/.6255 in.
Idler pinion bush, i.d.	.7495/.7505 in.
Valve clearances (cold):	
Inlet	.010 in.
Exhaust	.012 in.
Valve timing	Inlet opens 10° before t.d.c., closes 60° after b.d.c. Exhaust opens 59° before b.d.c., closes 9° after t.d.c.
Retime to camwheel markings	
Ignition timing	Points open 7/16 in. before t.d.c. with manual control fully advanced
Bearings:	
Drive side	Roller 25 mm. × 62 mm. × 17 mm. Ball 25 mm. × 52 mm. × 15 mm.
Timing side	Roller $\frac{7}{8}$ in. × $2\frac{1}{4}$ in. × 11/16 in. Ball $\frac{7}{8}$ in. × $2\frac{1}{4}$ in. × 11/16 in.
Cylinder bore	3.228 in.
Reline when wear exceeds .010 in.	
Piston rings	End gap .008 in./.012 in. Vertical clearance .002 in.
Connecting rod	Small end (reamered) .750 in. +.0005 in. −.0000 in. Big end (lapped) 1.7702 +.00025 in. −.0000 in. Side clearance in flywheels, .015 in.
Mainshaft	Sideplay nil. Driveside locked in bearing
Carburetter	
Type	Amal 276C/1B
Choke	1 in.
Main jet number	170
Throttle valve	6/4
Needle position	2
Needle jet	.1065

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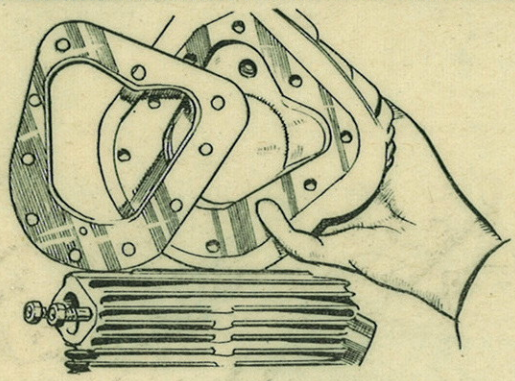
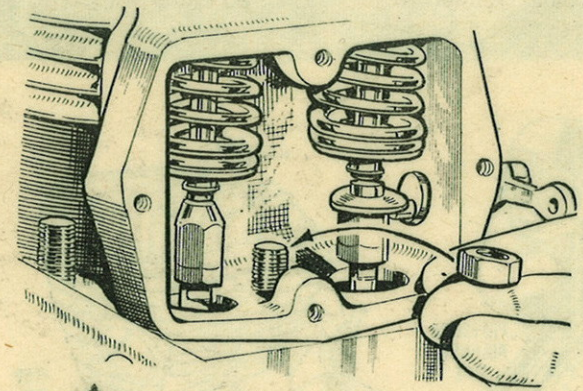
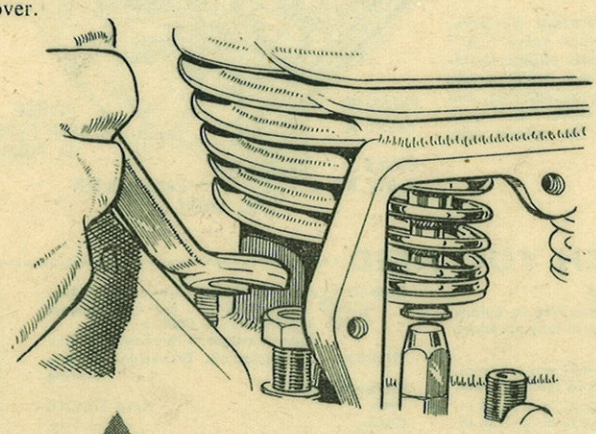


REMOVE the carburetter and exhaust system. Take out the 10 cylinder-head bolts and washers and remove the head. The copper-and-asbestos gasket is usually brittle after use and needs replacing.

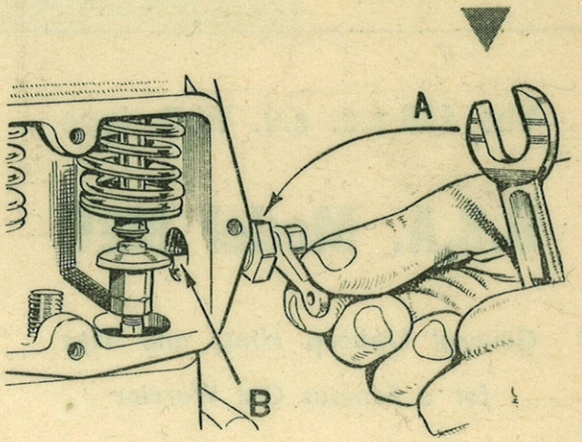


REMOVE the tappet cover (four screws) and note the position of No. 5 crankcase stud and the nut. The nut must be removed, with the other four holding-down nuts, before the cylinder can be lifted. Renew the paper gasket behind the cover.

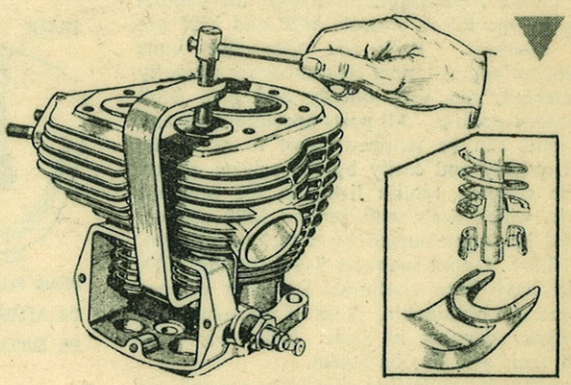


ONE holding-down nut is "surrounded" and a dodge is to modify a $\frac{3}{8}$-in. open-ended spanner by bending the shank to give the necessary working space in the confined area.

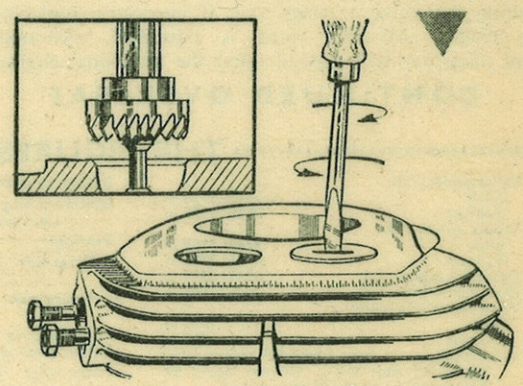
SCREW out the exhaust-lifter unit so that the finger "B" is clear of the tappet flange. Hold the lever and turn the body hexagon "A." When refitting, see that "B" has a working clearance, otherwise it will cause noisy running and a burnt valve seating.

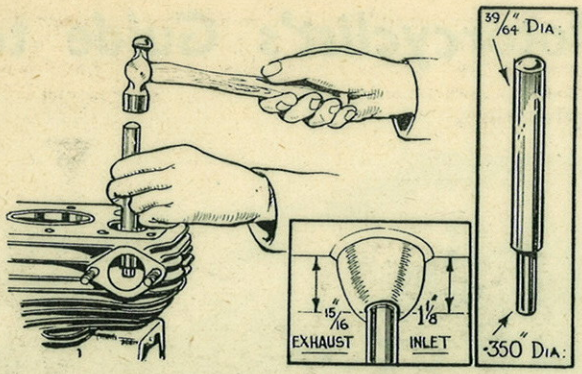


IT is usually best to remove the cylinder before taking out the valves. A proprietary spring compressor can be employed. If working with the cylinder assembled, see that the collets (inset) do not fall into the crankcase.

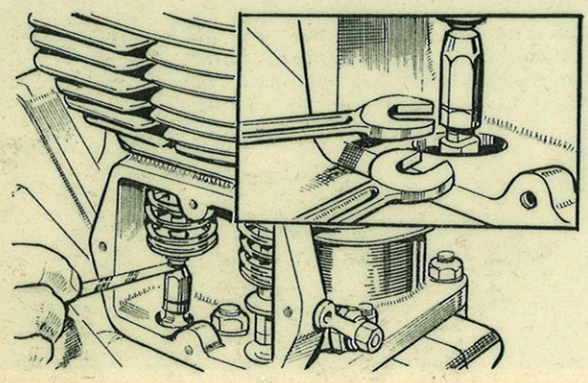


CLEAN the valves and stems and grind in as illustrated, first with coarse and then with fine abrasive paste, washing the job clean before assembling. The 45° cutter (inset) is used to true seats before new valves are fitted.

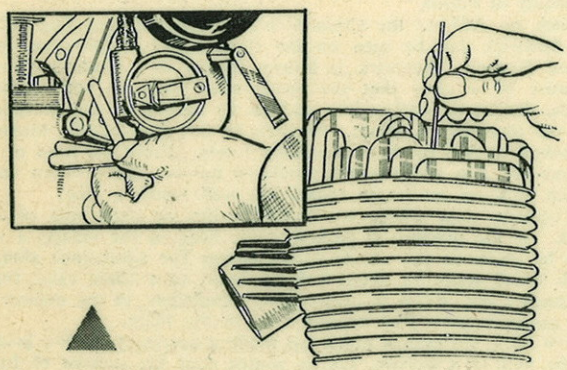




IN a worn engine, valves and valve guides should be renewed together and this double-diameter drift is employed for driving out and inserting. Note carefully the different fitting depths.

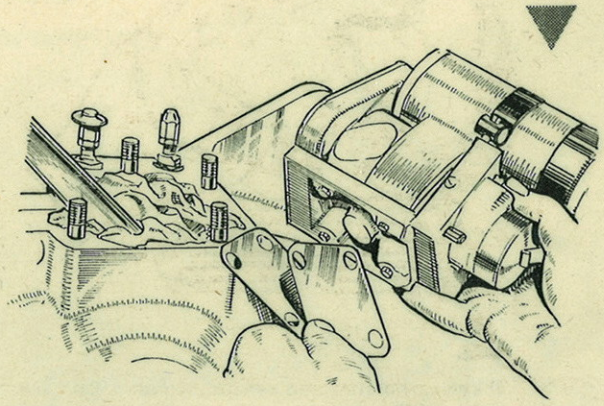


RENEW the base gasket, replace the cylinder, with the valves and springs fitted, and bolt down securely before adjusting the tappets (inset). The lower tappet hexagon is a locknut and the tappet base is squared so that it can be locked during adjustment.

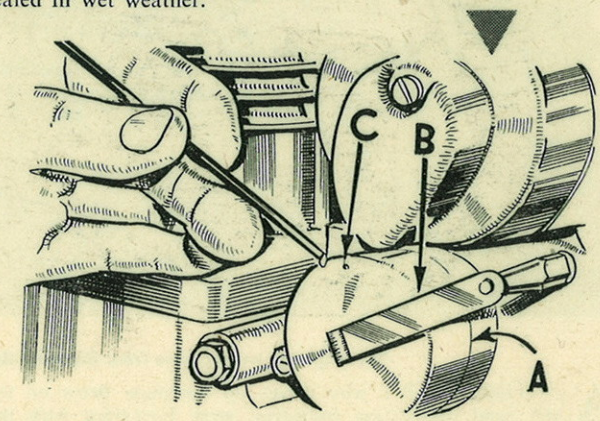


THE contact-breaker (inset) should be adjusted to commence opening when the piston is $\frac{7}{16}$ in. before t.d.c. at the end of the compression stroke. Remove the $\frac{1}{4}$-in. pin to check, as illustrated. with the ignition control fully advanced.

IF the Magdyno is completely removed for service exchange, or new timing gears are fitted, check the base shimming. Noisy drive is corrected by adding a shim to relieve pressure on the gears. Check with the instrument strapped down securely.



THE contact-breaker cover to the body at "A" should be a sound fit and the vent hole "C" should be clear of the retaining leaf spring at "B," where globules of water may gather. Positioned at "C," the vent can be temporarily grease-sealed in wet weather.



HEAVY blue exhaust when starting after the machine has been standing idle shows that the ball-valve in the timing cover is being held off its seating, probably by dirt. Clean and reseat to cure. The plug, illustrated left, locates the oil-pump drive. Remove only to withdraw the pump.