

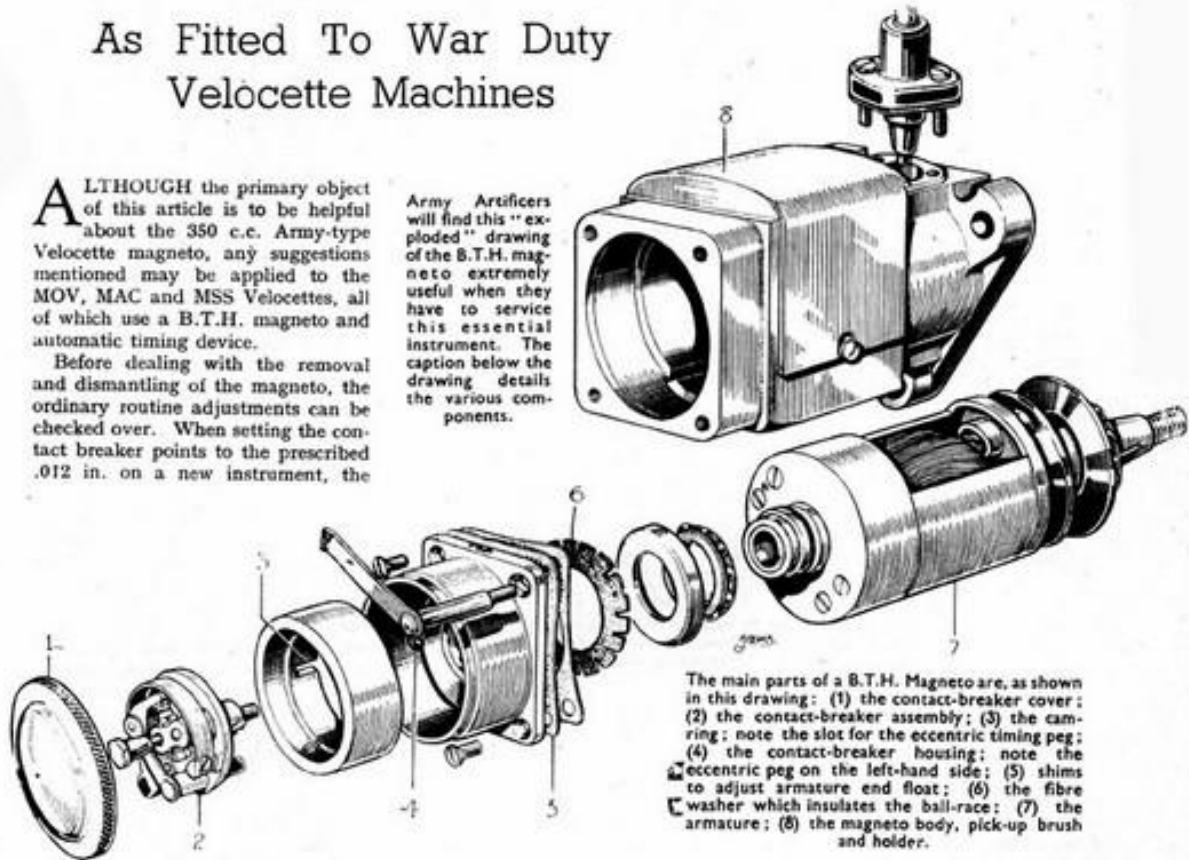
How to Service The B.T.H. MAGNETO

As Fitted To War Duty Velocette Machines

ALTHOUGH the primary object of this article is to be helpful about the 350 c.e. Army-type Velocette magneto, any suggestions mentioned may be applied to the MOV, MAC and MSS Velocettes, all of which use a B.T.H. magneto and automatic timing device.

Before dealing with the removal and dismantling of the magneto, the ordinary routine adjustments can be checked over. When setting the contact breaker points to the prescribed .012 in. on a new instrument, the

Army Artificers will find this "exploded" drawing of the B.T.H. magneto extremely useful when they have to service this essential instrument. The caption below the drawing details the various components.



The main parts of a B.T.H. Magneto are, as shown in this drawing: (1) the contact-breaker cover; (2) the contact-breaker assembly; (3) the cam ring; note the slot for the eccentric timing peg; (4) the contact-breaker housing; note the eccentric peg on the left-hand side; (5) shims to adjust armature end float; (6) the fibre washer which insulates the ball-race; (7) the armature; (8) the magneto body, pick-up brush and holder.

gap must be measured in the centre of the points as they are slightly domed and only meet in the middle until they have bedded down. If they are touched up, only fine emery cloth should be used, remembering that a grey appearance without pit marks is a sign of good health. The low-tension brush should be free in its holder and cleaned with a drop of petrol, the same attention being correct for the H.T. pick-up.

Removal

If any water bother is experienced with the H.T. lead holder, the space between the wire and its Bakelite socket can be packed with H.M.P. grease or Plasticine, the outside being wrapped with insulating tape. A dirty slip ring can be cleaned up with a petrol-soaked rag pressed against it by the end of a piece of

wood, $\frac{3}{8}$ in. by $\frac{1}{4}$ in., passed through the H.T. brush holder hole while the engine is kicked over.

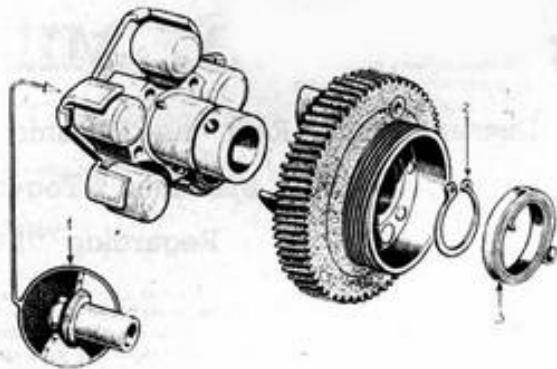
Apart from these few minor running adjustments, it is best to deal with any further troubles after removing the magneto, because the removal of the armature calls for remagnetizing. In an emergency the instrument will work without the last-named operation, but, when possible, this should be done to ensure maximum efficiency.

Removing the timing wheel and automatic timing gear is done simply by unscrewing the R.H.-threaded self-extractor nut, which first loosens and almost at once tightens again, drawing the timing wheel by means of a shoulder which bears on the outside plate. A sprag, used as described in the recent Velocette engine servicing article, prevents any risk of damage to the roller cage ear

against the peg fixed in the timing wheel.

After undoing the three flange nuts the magneto can be withdrawn and placed on the bench for further work, which should be started by removing the H.T. brush holder, followed by the contact breaker and then the cam ring. After undoing three screws and the end cover spring-clip pillar, the contact breaker housing and the armature can be withdrawn from the magneto body. This housing is marked TOP at the top, in which position it must be replaced, so that the cam timing is correct in relation to the magnetic field.

Looking from the contact breaker end, a screw will be found in the left-hand side of the housing on which is an eccentric peg which engages with a slot in the cam ring. Before leaving the works this is set electrically to give the optimum position for the



The automatic retarding mechanism: (1) the self-withdrawing nut with shoulder against moving cage plate; (2) the circlip to locate the oscillating hub relative to the gear wheel, and (3) the spring to ensure that the moving cage returns to the full retard position.

points to open, then locked in position, and it should not be disturbed. In case of need, however, a good working timing can be obtained if the points are set to break when the keyway is 10 degrees over T.D.C. in the direction of rotation.

The Timing Device

It is improbable that a faulty armature can be mended, therefore a spare should be fitted and the old part returned to the works for repair. No attempt should be made to remove the magnet from the magneto body, as remagnetizing can be carried out, after removing the magnet cover, by placing the magnetizer poles against the magneto body poles which are exposed when the cover is removed.

Should the ball races be faulty they can be replaced if special tools are available for drawing and replacing

the inner and outer journals. This, however, is not recommended, because a spare magneto should be available complete with new races.

Ball races as separate units are not usually supplied, each magneto body, contact breaker housing and armature shaft having new journals fitted before being sent out. When reassembling the armature in the body, the two races should be packed with H.M.P. grease and there must be sufficient end play to be just perceptible, i.e., .002 in. This can be adjusted by means of phosphor-bronze shims between the contact breaker housing and the magneto body.

Turning to the automatic timing device, it might be as well to explain how it works. A cage, free to oscillate relative to the timing-gear wheel, is attached to the armature shaft. Five

rollers are interposed between five curved ears on the outer edge of this cage, and five corresponding ears on a cage riveted to the gear wheel. A spring inside the oil slinger pulls the oscillating cage, and, therefore, the armature shaft, backwards, when the engine is stationary or running slowly.

When the engine speed reaches 1,000 r.p.m., the rollers, or bob weights, are flung outwards, causing a wedging action between the ears of the two cages, and moving the armature shaft forward relative to the driving gear, until the fully advanced position is reached at 2,000 engine r.p.m. Replacements are supplied as complete units. However, the outer cage and roller assembly can be separated from the timing wheel, if by any chance the latter becomes damaged, by removing the coil spring and circlip inside the oil slinger from the hub of the oscillating cage.

Retiming

The timing wheel is riveted to the oil slinger and one half of the roller cage, and no attempt should be made to dismantle this sub-unit. A pair of circlip expanders are highly desirable for removing the circlip, which is too strong for the successful application of electrical screwdrivers.

On reassembling, the oscillating cage must have a little end float, likewise the rollers must also have end clearance. Great care should be taken of the cage ears, which, if bent, will upset the amount of advance and retard automatically provided.

When retiming the magneto the device will be at the full-retard position, and the points should break 4 degrees before T.D.C. on the compression stroke.