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WORKSHOP INSTRUCTIONS

MAGNETO

MODEL RS1

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MAGNETO

MODEL RS1

1. GENERAL

This magneto is designed primarily for use on single cylinder stationary and industrial engines. It is of the rotating magnet type, in which the magnet revolves and the less robust parts, such as the windings and the condenser, are stationary and not subjected to the mechanical stresses of rotation.

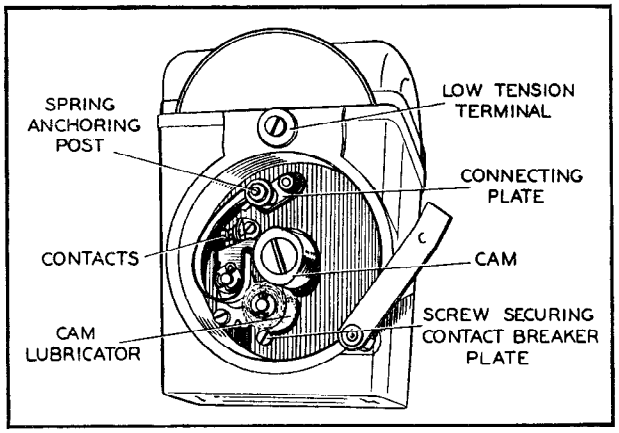

Fig. 1.
Contact breaker end view

This construction, coupled with the use of gaskets and seals to prevent the ingress of moisture, results in increased reliability and consequently in reduced maintenance.

The rotor is driven from the engine, and by its rotation induces an alternating low tension current in the primary winding of the coil. At the moment when this current is at or near its maximum value it is interrupted by a cam-operated contact breaker : the subsequent collapse of the magnetic field linked with the coil induces a very high voltage, of the order of several thousand volts, in its secondary winding. This voltage is passed, via a pick-up spring in the coil cover and a length of rubber-covered cable, to the sparking plug, where it breaks down the plug gap and produces a spark.

To enable the engine to be stopped easily and conveniently, the low-tension winding of the coil is brought out to a terminal on the body, from which a lead may be taken to an earthing switch in some convenient position. Operation of the switch stops the engine.

2. ROUTINE MAINTENANCE.

(a) LUBRICATION

About every 150 hours' running, remove the contact breaker cover and inspect the felt cam lubricator. If the pad is dry, apply a few drops of thin machine oil. About every 250 hours' running, apply a single drop of thin machine oil to the pivot on which the contact breaker lever works.

Do not allow any oil to get on or near the contacts

The rotor bearings are packed with grease, and will only need attention in the event of a major overhaul, or say every two years.

(b) CLEANING

Occasionally remove the moulded coil cover, and clean it, inside and out, with a soft dry cloth. Wipe any dirt or moisture from the high tension cable and sparking plug.

About every 250 running hours, remove the contact breaker cover and examine the contacts. If they are blackened or dirty, clean them with fine carborundum stone or very fine emery cloth, afterwards wiping away any metal dust with a cloth moistened with petrol. Provided that the cam is lubricated regularly it should maintain a clean condition, but if necessary it may be cleaned with a petrol-moistened cloth.

(c) ADJUSTMENT

Turn the engine by hand until the contacts are fully opened, and check the setting with a gauge having a thickness of ·010″ to ·012″. The gauge should be a sliding fit between the contacts : if the gap varies appreciably from the gauge, loosen the two screws securing the fixed contact plate and move the plate to adjust the gap. Re-tighten the fixing screws, and check again to ensure that no accidental movement of the plate has occurred.

(d) REPLACEMENT OF HIGH TENSION CABLE

If the insulation of the high tension cable shows signs of perishing or cracking, it must be replaced by a suitable length of 7 mm. rubber-covered ignition cable.

To connect a length of cable to the magneto, remove the moulded cover and loosen the cable securing screw inside the cover. Cut the end of the cable squarely at the correct length, and (without baring the core)

push home into the cover. Tighten the securing screw to pierce the insulation and make good contact with the cable core. Finally refit the cover, making sure that the gasket is correctly fitted between it and the body, and tighten the two securing screws.

3. TEST DATA

(a) Contact breaker gap : 0·010″ — 0·012″.

(b) Contact breaker spring tension : 20 — 24 oz., measured at contacts.

(c) High speed test : there must be no missing with the high tension lead connected to an 8 kV. rotary spark gap and the magneto running at 3,000 r.p.m.

(d) Low speed test : regular sparking must occur on a 5·5 mm. 3-point spark gap at speeds not greater than 100 r.p.m.

4. SERVICING

(a) TESTING IN POSITION TO DETERMINE THE CAUSE OF IGNITION FAILURE OR INEFFICIENCY

Disconnect the high tension cable from the sparking plug, and hold it so that the free end is about $\frac{1}{8}$″ from some part of the cylinder. Turn the engine by hand : if a strong and regular spark occurs at the gap between cable and cylinder, then the fault lies with the sparking plug, which should be removed for cleaning and adjustment, or if necessary renewed.

Next examine and if necessary renew the high tension cable.

Disconnect the lead from the earthing switch at the low tension terminal. If the magneto now functions normally, examine the lead and switch for an accidental short circuit to earth.

If the fault was first noticed after the magneto had been removed from the engine for some reason, the magneto may be incorrectly timed. Refer to the engine maker's instructions.

Clean and adjust the contact breaker as described in Para. 2 above.

(b) CONDENSER

The possible causes of condenser trouble, and the symptoms by which each can be recognised, are as follows :

(a) Open circuit, indicated by excessive burning of the contacts.

(b) Short circuit, indicated by complete ignition failure and no sparking at the contacts.

(c) Abnormally low insulation resistance, indicated by poor low speed performance of the magneto after a period of running has raised the temperature of the condenser to about 80°C.

It should be noted that, in the case of (c), the insulation resistance must fall to an exceptionally low value before it can adversely affect ignition performance.

A suspected condenser is best tested by replacing it with a standard component of known efficiency, and noting the effect on the performance of the magneto.

(c) DISMANTLING

(*i*) Disconnect the high tension and low tension cables and remove the magneto from the engine.

(*ii*) Take out the two screws securing the moulded cover, lift off the cover and remove the gasket.

Unscrew the condenser terminal nut and lift off the lock washer and eyelet. Remove the screw and lock washer from the condenser clip, and lift off the condenser.

(*iii*) Take out the four screws from the bridge pieces securing the coil and remove the bridge pieces. Turn the rotor until the pole pieces bridge the air gaps : as the coil core is not now part of the magnetic circuit, it may easily be lifted off the laminated inserts on which it rests.

(*iv*) Remove the contact breaker cover. Unscrew and remove the nut, lock washer, plain washer, insulating bush and second plain washer, securing the end of the contact breaker spring. Withdraw the split pin from the contact breaker pivot, remove the metal washer and insulating washer and lift off the contact breaker lever. Lift the large fibre washer off the pivot pin.

(*v*) Unscrew and remove the two screws, complete with lock and plain washers, that secure the fixed contact plate. Remove the plate from the contact breaker housing.

Withdraw the split pin and washer and remove the lubricator pad.

(*vi*) The connection from the coil to the contact breaker is made by means of an insulated screw, passing through the body into the contact breaker housing. A metal plate, insulated from the magneto body, fits over this screw and over the contact breaker spring securing post to make the connection to the spring.

To dismantle this connector assembly, unscrew the nut at the upper end of the metal plate, and lift off the lock washer and the plate. Remove the insulating bush from the spring securing post, then the two insulating plates and finally the insulating bush from the connecting screw.

Note the arrangement of these components, in order to ensure correct replacement.

(*vii*) Take out the screw at the bottom of the contact breaker plate, and remove the plate from the body.

(*viii*) Unscrew the three screws securing the circular plate at the driving end of the body. Lightly tap the

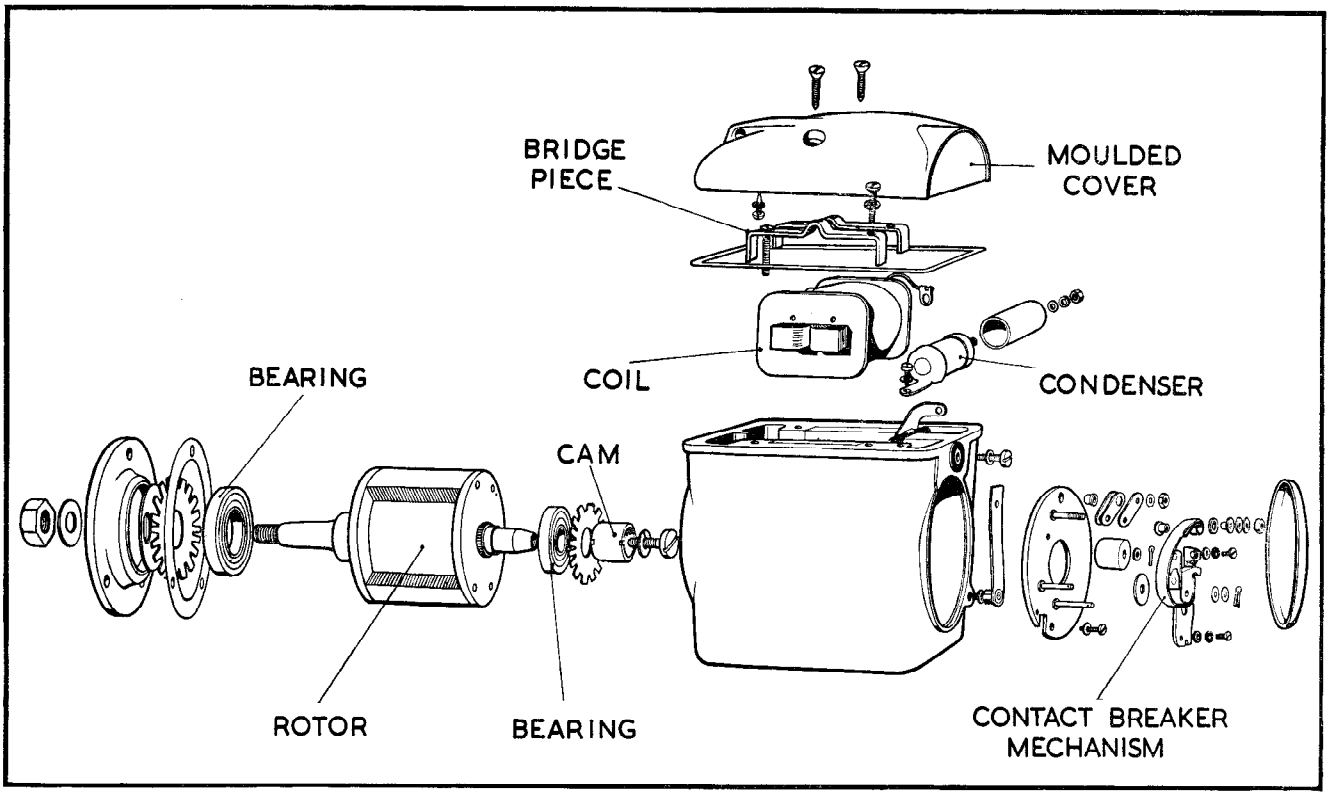

Fig. 2.
Dismantled view

cam end of the shaft with a hide or rubber mallet, to press the end plate out of its housing. Lift the plate off the shaft and withdraw the rotor from the magneto body. Take care not to damage the brass shims fitted between the end plate and the body.

Do not remove the cam unless the cam end bearing requires attention.

(d) BEARINGS

The two bearings that support the rotor shaft must be in good condition. They are packed on assembly with high melting point grease, and should stand any amount of normal wear : but if they begin to fail, due to a bent shaft or similar cause, the complete bearing must be replaced.

The cage and balls at the drive end can readily be removed from the inner race, and the race may then be pulled off the shaft with the help of an extractor. The other bearing is dismantled in a similar fashion, but it is first necessary to remove the cam by unscrewing the retaining screw and using an extractor to pull the cam from the shaft. Note that the end of the shaft is punched into the cam at one point to ensure correct timing.

The outer bearing races can be removed by means of an expanding-collet type extractor.

When fitting the new bearings, see that they are clean and lightly packed with high melting point grease. Fit the inner races on to the rotor shaft, using a hand press and a sleeve of suitable diameter, and position the balls and cages on the races. Place a new oil seal in the drive end plate, and press the outer races into their housings with a suitable mandrel. A serrated insulating washer must be fitted between each race and its housing, more than one being used if necessary to ensure a tight fit.

(e) REASSEMBLY

(*i*) Insert the rotor in the magneto body, replace the brass shims and end plate and secure by means of the three screws, tightening them down evenly to ensure that the plate enters its housing squarely.

(*ii*) Fit the contact breaker plate into its housing, and secure with the screw and lock washer at the bottom of the plate.

(*iii*) Place an insulating bush over the connecting screw from the coil ; then position the first insulating plate (with two large holes). Fit an insulating bush over the spring securing post, and then fit the second insulating plate and the metal plate, finally securing by means of a lock washer and nut.

(*iv*) Hold the fixed contact plate in position, and lightly tighten the two securing screws on to their plain and lock washers.

(*v*) Place an insulating washer over the contact breaker lever pivot, and fit the lever. Locate the end of the spring over the bush on its securing post. Fit the second insulating bush, plain washer and lock washers, and finally tighten the nut. Note that the spring securing post itself is earthed to the magneto body, and incorrect assembly at this point may result in short-circuiting the primary winding of the coil. Place an insulating washer and a plain washer over the contact breaker pivot, and fit the split pin to secure the lever in position.

(*vi*) Place the felt lubricator pad over its post, follow by a plain washer and secure with a split pin.

(*vii*) Adjust the contact breaker gap to its correct maximum setting of ·010″ to ·012″. Replace the contact breaker cover.

(*viii*) Place the coil on the magneto body, so that the unvarnished surfaces of the coil core correspond to the inserts in the body. Fit the two bridge pieces over the ends of the core with the slotted faces of the bridge pieces on the inside. Secure with the four screws and lock washers.

(*ix*) Insert the condenser terminal post through the hole in the connector strip. Secure the condenser in position by means of a screw through the clip at the end of the condenser. Place the eyelet on the low tension lead from the coil over the terminal post, and fit the lock washer and nut.

(*x*) Place the gasket on top of the magneto body, fit the moulded cover and tighten the two securing screws.

(f) CAM TIMING

If the cam has been removed from the rotor shaft, the magneto must be correctly timed before the cam is locked into position again. The procedure is as follows :

Turn the rotor until its trailing tip is 5° or $\frac{8}{32}$″ past the tip of the stator. (Note that the longer gap between the rotor poles must correspond to the longer pole of the stator). Adjust the position of the cam until the contacts are just about to open : lock the cam in position by caulking the end of the shaft into the recess in the cam, and replace and tighten the cam retaining screw.

(g) MAGNETISING

Turn the rotor shaft until the longer of the two gaps between the rotor poles is at the top and then, facing the driving end of the magneto, check the polarity of the magneto with a compass. The end of the compass needle that normally indicates the north should point to the left-hand side of anti-clockwise rotation machines, and to the right-hand side of clockwise machines. Check the polarity of the magnetiser. Place the magneto in position so that unlike poles of magneto and magnetiser are adjacent, and operate the magnetiser.