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EQUIPMENT

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WORKSHOP INSTRUCTIONS

FLYWHEEL MAGNETOS

MODELS FA1, 2F1 and 3F1

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FLYWHEEL MAGNETOS

MODELS FA1, 2F1 and 3F1

1. GENERAL

Ignition by flywheel magneto is used with small petrol engines where a conventional magneto or a coil ignition system would be cumbrous or inconvenient. Common applications are rope or strap started single cylinder stationary engines (two stroke and four stroke) of up to 220 c.c. capacity.

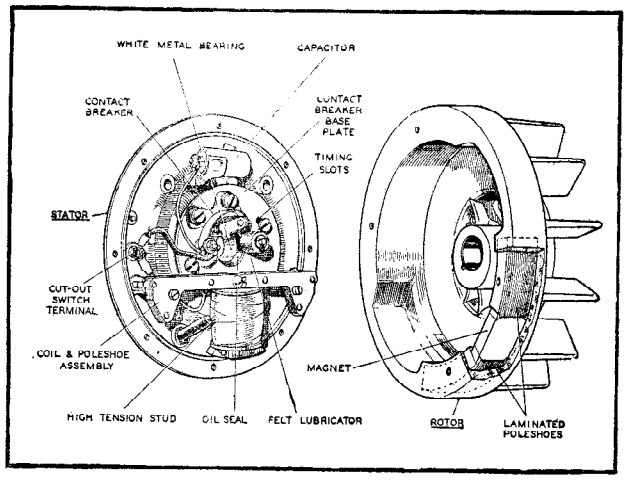

Fig. 1
Flywheel magneto, stator and rotor

As shown in Fig. 1, the typical flywheel magneto consists of two main components, the stator and the rotor. The stators of models covered in this Section are of zinc base alloy, die-cast to form part of the crankcase walls. A white metal bearing in the stator centre boss carries one of the engine main journals. The stator also carries an oil seal, a laminated three-limb poleshoe assembly having a coil on its centre limb, a contact breaker (mounted on a plate with slotted fixing holes to provide angular adjustments for timing), an ignition cut-out switch and a capacitor. Splash feed lubrication is arranged for the bearing with a return to sump at the oil seal end. The rotors are also of die-cast construction and, being taper coupled and keyed to the crankshaft, serve as engine flywheels. The rotors contain a cast-in welded assembly of poleshoes and magnet and are provided with fins for general engine cooling.

A cam to operate the contact breaker is carried, like the rotor, on an extension of the engine crankshaft.

MODEL FA1

Flywheel magneto for engines of 100-120 c.c. capacity. Screened and suppressed against interference with radio reception by a metal braided high tension cable with woven-in 5000-ohm suppressor.

MODEL 2F1

Flywheel magneto for engines of 120-150 c.c. capacity. Produced in screened and unscreened forms and also as low tension impulse generators for a twin-spark energy transfer ignition system. In the latter form, the generator coil is series connected with two external 6-volt ignition coils. One coil provides a spark to fire the engine mixture while, simultaneously, the other ignites a paraffin burner for steam cleaning plant, mobile ablution units, etc. The circuit is shown schematically in Fig. 2.

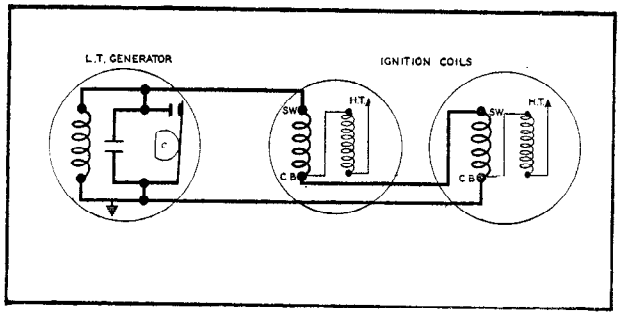

Fig. 2
Model 2F1 twin-spark energy transfer ignition system

MODEL 3F1

Flywheel magneto for engines of 220-250 c.c. capacity. Produced in screened and unscreened forms.

2. ROUTINE MAINTENANCE

(a) AFTER FIRST 20 RUNNING HOURS

(*i*) During the first 20 running hours of new flywheel magnetos and replacement contact breaker sets, most of the bedding-in of the contact breaker heel occurs. Contact breaker

settings should therefore be checked at this time, as described in para. 2. (b) (*ii*), and reset as required.

(b) EVERY 200 RUNNING HOURS

(*i*) Clean all accessible parts using clean fluffless petrol moistened cloth.

(*ii*) Check the contact breaker and, if necessary, clean the contacts and reset the gap to 0.010″—0.012″ (0.25—0.3 mm.).

Removal of the flywheel is essential with model FA1 and preferable with models 2F1 and 3F1.

Trim rough or badly pitted contacts with a fine carborundum stone, silicon carbide paper or emery cloth. Remove all dust with a petrol-moistened cloth.

Cleaning is more easily effected if the contact breaker is completely removed from the stator. To do this, remove the nut, insulation piece and connections from the end of the contact breaker spring. Mark the position of the base plate securing screws in the timing slots and withdraw the screws and the plate.

Before reassembling the contact breaker, smear the pivot post with a spot of Mobilgrease No. 2.

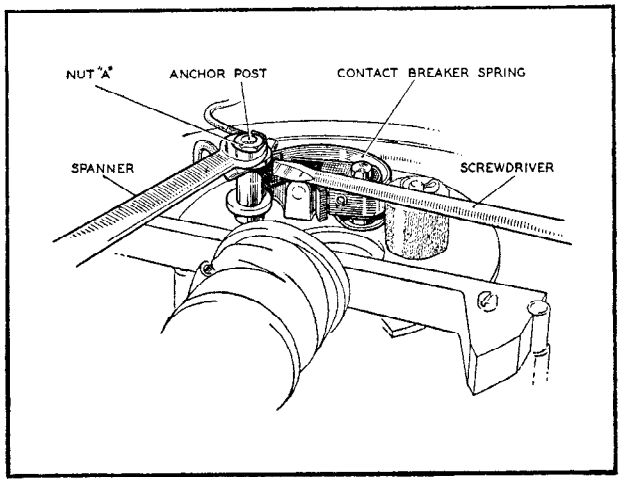

Fig. 3
Tightening the contact breaker spring retaining nut on earlier models

Note: When tightening the contact breaker spring retaining nut of earlier production 2F1 and 3F1 flywheel magnetos (Nut "A" in Fig. 3) care must be taken to prevent rotation of the spring about the anchor post. Rotation will reduce the clearance between the inside of the spring and the tip of the contact breaker and might allow the two to foul in operation.

The anchor post was later repositioned to obviate the possibility of fouling.

(*iii*) The cam is lubricated by contact with an impregnated felt lubricator.

Circular shaped felts must be turned at intervals to present a fresh lubricating surface to the cam. At the same time, a little Ragosine Listate grease should be applied to the cam. Fit new felts as required.

Flat shaped felts should be replaced every 500 running hours or annually, whichever is the lesser.

(*iv*) Examine the high tension cable and replace as required. The cable core is attached by solder to a stud on the coil.

When soldering, care must be taken to avoid overheating and damaging the varnished taping of the coil.

Screened cables should be renewed as complete units consisting of inner cable, outer metal braiding and fittings and, in the case of the cable for model FA1, ignition resistor WS5 78119.

3. DESIGN DATA

(a) Contact breaker gap: 0.010″—0.012″ (0.25—0.3 mm.).

(b) Contact breaker spring tension, measured at the contacts: 18—24 oz. (511—680 g.).

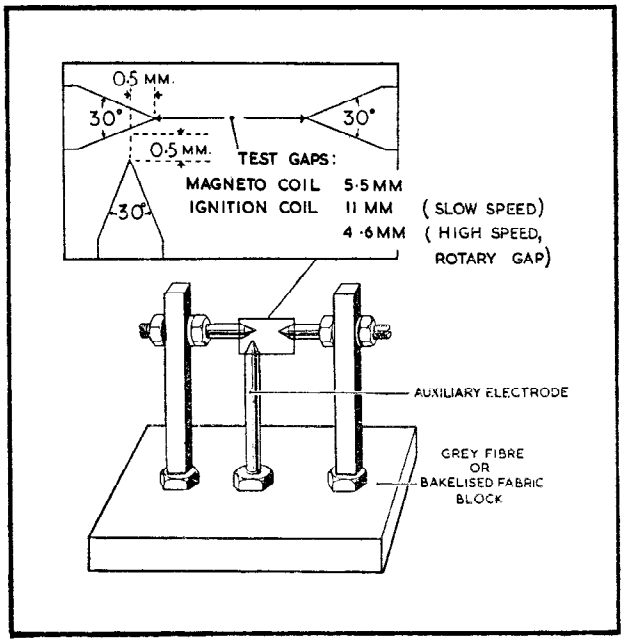

Fig. 4.
Gap details for spark testing

(c) Capacitance of capacitor: 0.18—0.23 mfd.

(d) Resistance of coil (Flywheel magnetos):
(*i*) Primary winding: 0.65 ohm ± 10%.
(*ii*) Secondary winding: 3000 ohms ± 10%.

(e) Resistance of coil (Flywheel twin-spark generators): 0.32 ohm ± 10%.

(f) Resistance of radio interference suppressor in Model FA1 high tension cable: 5000 ohms ± 20%.

(g) Flywheel details:

	Model		
	FA1	2F1	3F1
(*i*) Weight:			
lb.	6.5	8	11.5
kg.	2.94	3.62	5.21
(*ii*) Diameter:			
in.	7.75	7.75	8.5
mm.	196.8	196.8	215.9
(*iii*) Moment of Inertia:			
g.cm. sec^2.	187	211	352

(h) Model LA6 ignition coils (used with twin spark generators):
(*i*) Resistance of primary winding: 1.0—1.1 ohm.
(*ii*) Spark gap for slow speed test: 11 m.m. (point dimensions as in Fig. 4).
(*iii*) High speed test (on rotary gap): 2750 r.p.m., 8 kv. (4.6 mm.).
(*iv*) Contact breaker type for high speed test: 6-cylinder with 38° ± 4° closed period.
(*v*) Maximum test voltage: 6.5.
(*vi*) Earth polarity: Positive.
(See also Section C-8 of the Lucas Workshop Instructions).

4. SERVICING

(a) SPARK TESTING

(*i*) The following equipment is required:
4-cylinder contact breaker having a minimum closed period of 42° and a speed range of 0—750 r.p.m.
6-volt battery.
3-point spark gap, as in Fig. 4.
1-ohm resistor.
5-amp. moving coil ammeter.

(*ii*) Remove the flywheel.
Disconnect the primary winding at the cut-out terminal or contact breaker, depending on the model.
Make the connections shown in Fig. 5.
Run the contact breaker at 750 r.p.m.
Strong and regular sparking should occur at the spark gap with a primary current of approximately 1.5 amp.

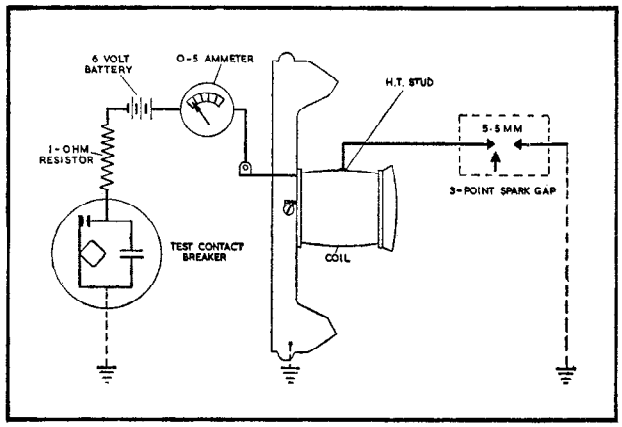

Fig. 5
Circuit for spark testing flywheel magneto coils

(b) BEARING REPLACEMENT

The bearing bush is a press fit in the stator centre boss and is inserted from the back face of the boss. Any hole or slot in the bush must align with the oil feed hole in the stator while in the case of model FA1 an oil hole must be drilled in the bush after fitting, using the drain hole in the casting as as a guide. At the oil seal end of the bush an annular space must be left and the drain hole must be clear. At the other end, the bush must be machined flush with the back face of the boss.

The bush in model FA1 is secured with a $\frac{1}{16}$" (1.59 mm.) dia. peg, drive fitted into a 0.060 in. (1.52 mm.) hole. One end of the peg must be flush with the bearing surface and the other caulked over the boss casting.

When fitted, the bore sizes of bushes used with standard-diameter crankshaft journals should be as listed below. Machine bores to size as required.

Model FA1: 0.875"—0.876" (22.2250—22.2504 mm.).

Model 2F1: 1.000"—1.001" (25.4000—25.4254 mm.).

Model 3F1: 1.250"—1.251" (31.7500—31.7754 mm.).

(c) OIL SEAL

The oil seal must be positioned with the vee-groove towards the bearing bush.

(d) COIL REPLACEMENT

The coil, laminated core and poleshoes form an integral assembly secured by three screws to the stator. To release, disconnect the h.t. and l.t. cables and withdraw the three screws.

(e) REMAGNETISATION

Flywheel magnetos contain a single high energy rotor magnet. This can be remagnetised as shown in Fig. 6. Details of a suitable magnetiser are given in Section D-6 of the Lucas Workshop Instructions.

After remagnetisation, refit the flywheel to the engine and, while running it at 3000 r.p.m., press the cut-out switch at least six times in order to stabilise the magnet system.

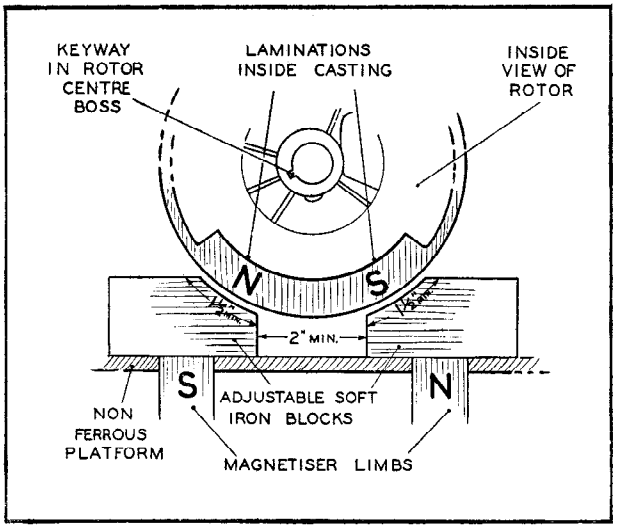

Fig. 6
Rotor remagnetisation