Chapter 47

FLASHER UNIT, TYPE FOG/A/2

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Flasher unit, Type FOG/A/2	*Stores Ref. 5CZ/5134*
Voltage	*21 to 29 volts d.c.*
Governed speed of motor	*3500 r.p.m.*
Current consumption (power unit at nominal 24V)	*0·2 amp.*
Current rating of switch contacts	*4 amp.*
Weight	*1 lb. 8 oz.*

Introduction

1. The Type FOG/A/2 flasher unit has been designed to operate the flashing navigation lights of an aircraft in an automatically controlled time sequence. In the event of a failure of the flasher unit while in use it is arranged to "fail safe" by switching the navigation lights circuit to steady "ON".

Fig. 1. Flasher unit, Type FOG/A/2
(A.L.66, May 56)

DESCRIPTION

General

2. The mechanism is completely enclosed in a 2·75 in. dia. cylindrical housing which is sealed to withstand a pressure differential of 20 p.s.i. The unit (*fig.* 1) is mounted on a bracket integral with the cylindrical case and having fixing holes for four 2 B.A. bolts. Electrical connections are made by a six-pole Mk. 4 miniature plug, and the internal wiring is shown at fig. 5.

3. The mechanisms within the unit are mounted on both sides of an internal mounting plate which also supports the front and rear end cover plates on pillars. These end plates have rubber sealing rings and the securing bolts have bonded sealing washers to render the unit pressure tight. The front end plate has a pressure test hole sealed by a bolt and washer.

4. The flasher unit essentially comprises two switches (*fig.* 5),

(1) A centrifugally controlled, snap-action, single-pole change-over switch which, when the unit is not in use puts a power supply directly to the navigation lamps circuit, and when the unit is running to speed switches this power through a flasher switch in series with the lamps.

(2) A cam operated flasher switch which intermittently breaks the power supply to the navigation lamps or which may switch this supply alternatively to the navigation lamps and fuselage lamps.

Centrifugal switch (*fig.* 4)

5. This is a snap-action switch mounted at one end of the motor unit and is secured by four screws to the motor end bearing housing. The operating button of the switch bears against a button on the centrifugal mechanism which protrudes through the centre of the motor end cap. Correct operation of the switch is obtained by fitting shims under the motor end cap.

Flasher switch (*fig.* 3)

6. The flasher switch is mounted on a plate which is dowelled and held by screws to the rear of the internal mounting plate. It consists of three contact blocks, two carrying fixed adjustable contacts and the third supporting the moving blade contact which

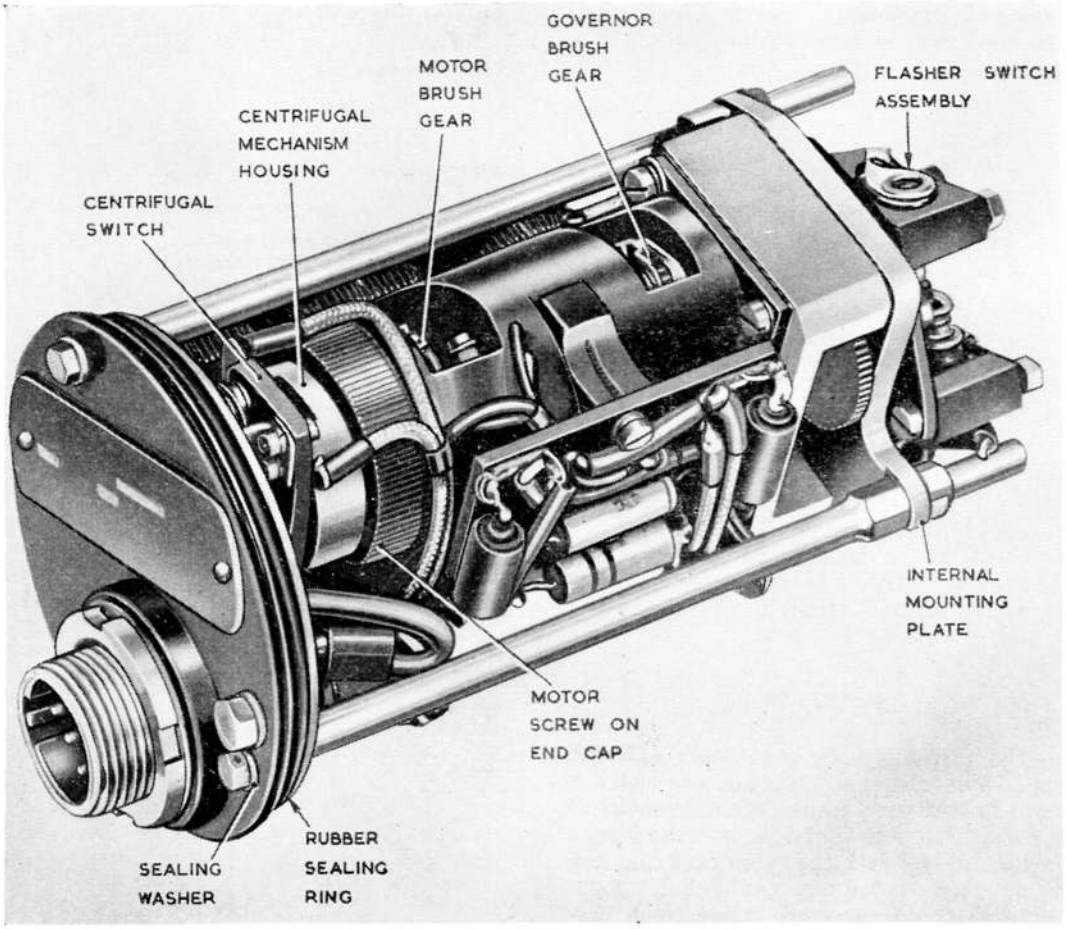

Fig. 2. Front internal view of flasher unit

oscillates between them. This blade has a roller which bears against a cam on the output shaft of the reduction gearing from the motor. The contacts are tungsten tipped, and the two fixed contact screws have lock nuts for setting up adjustment. Condensers are connected across the contacts to reduce sparking.

Motor yoke and casing (*fig. 4*)

7. The driving motor is a two-pole shunt motor whose laminated field yoke is fitted into a cylindrical aluminium alloy casing having one end blank and flanged and the other end threaded to take a screw-on end cap. The motor casing is cut away at each side of the field yoke to provide easy access to the commutator brush gear and the governor. The commutator brush gear mounting plate is located on two special bolts through the blanked end of the housing and passing through the field laminations where they are secured with nuts. Spacer tubes on these bolts are fitted between the brush mounting plate and the field assembly and serve to secure and locate the brush gear.

8. The motor casing has two centrally positioned lugs to which an insulator base is fitted which carries two choke coils, a suppressor and the centrifugal governor resistor. The blank end of the casing is machined to accept the armature ball bearing through which the toothed output shaft of the motor projects to mesh with the first gear in a reduction train. The flanged end of the casing is dowelled and secured by screws to the gearing housing which, in turn, is secured to the internal mounting plate.

9. A shouldered bearing housing assembly is made a push fit into the open end of the motor casing where it locates by a dowel pin registering in a slot in the casing. This assembly houses the ball bearing for the armature and carries the governor brush gear

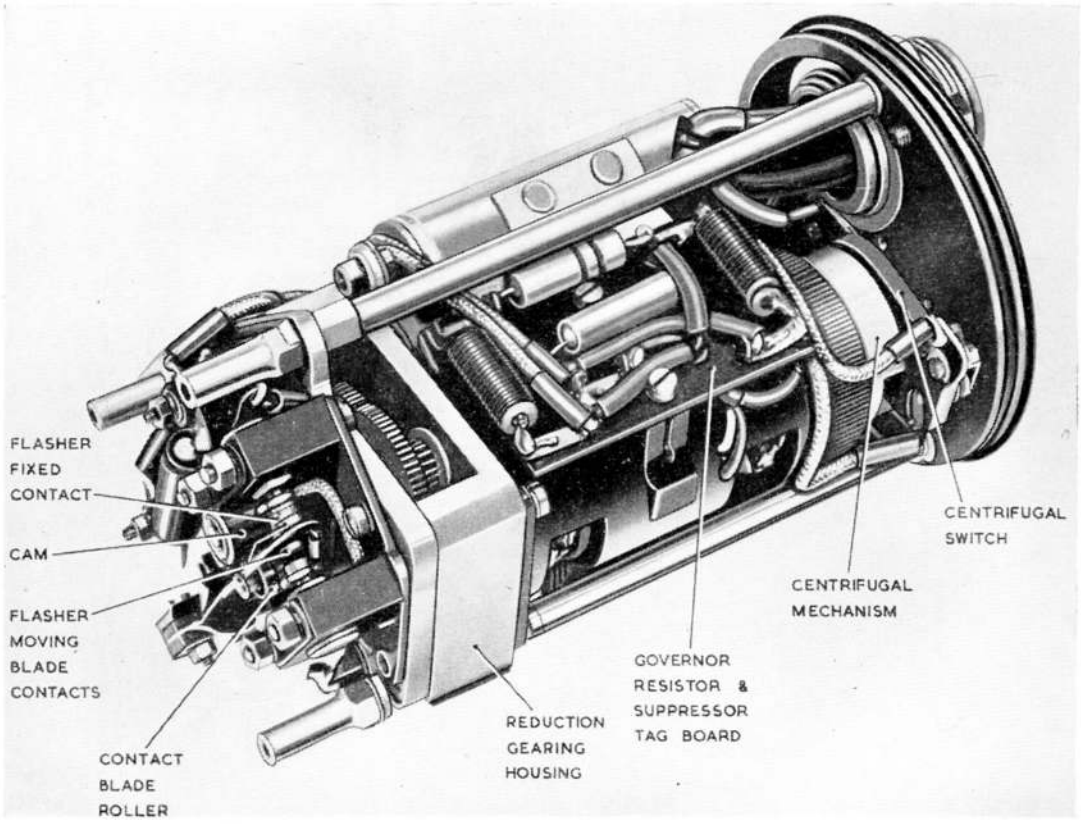

Fig. 3. Rear internal view of flasher unit

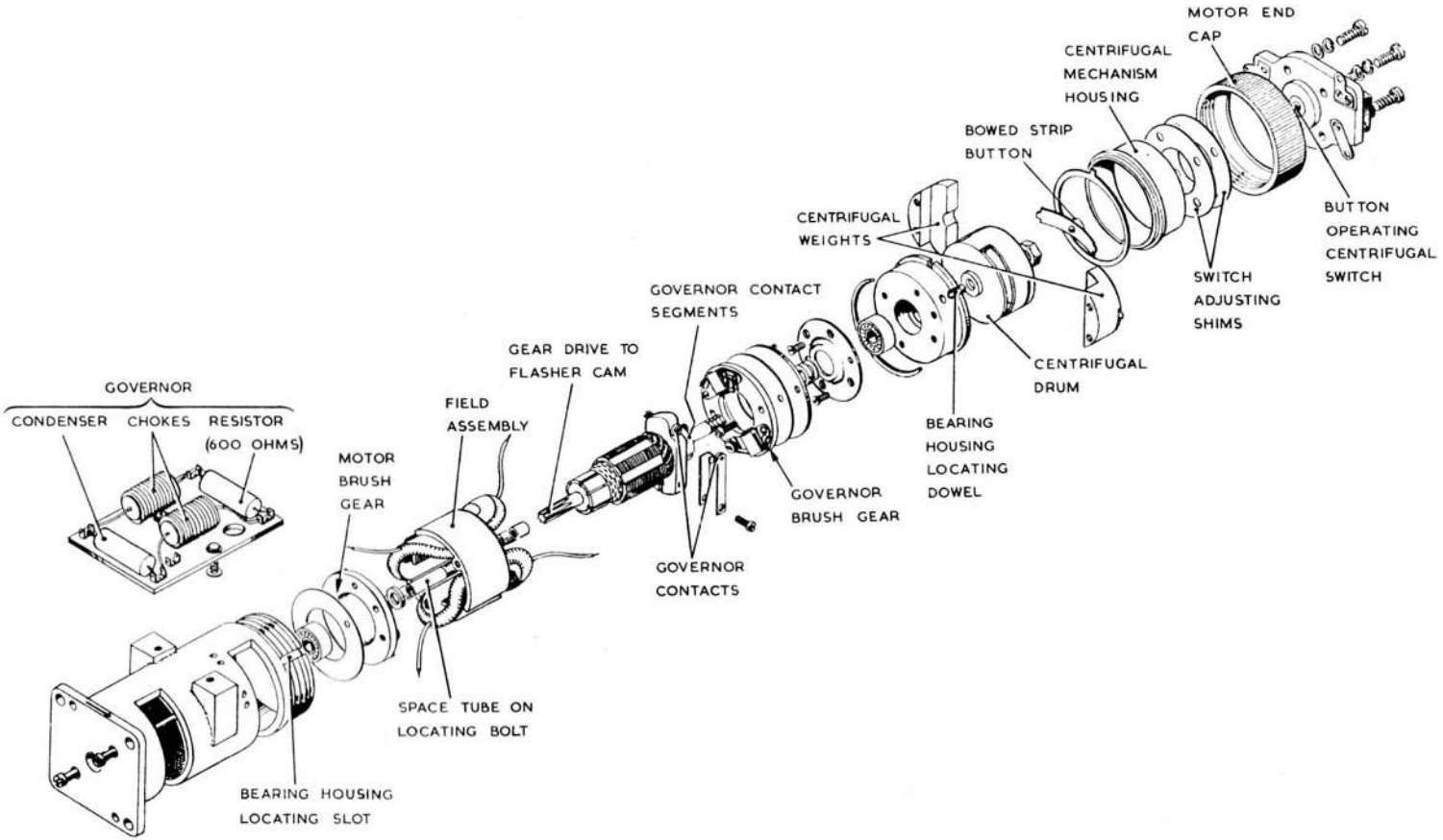

Fig. 4. Exploded view of motor

on its inner face. The outer face is recessed to house the centrifugal mechanism which is further enclosed in a cylindrical housing bearing against the rim of the bearing housing and secured by the motor end cap.

Armature

10. The armature shaft, at the commutator end, is toothed to mesh with the reduction gearing, and at the other end is threaded to receive the centrifugal drum and lock-nut. The moulded Bakelite governor unit is fixed to the shaft immediately to the rear of the armature winding and carries two contacts, one on a vibrating leaf spring and the other on the end of an adjusting screw, set to make and break contact to maintain the correct speed.

11. The governor contacts are connected to copper contact segments which rotate in line with the governor brush gear and across which is connected the governor resistor. If the motor overspeeds the governor contacts open to insert a 600 ohms resistor in series with the armature and close again when speed falls below that required, to maintain the correct speed within narrow limits. Chokes and a condenser are connected across the governor contacts to reduce sparking.

Centrifugal mechanism (*fig. 4*)

12. A centrifugal switch drum, threaded on to the armature shaft and retained by a lock-nut, rotates in the recess of the motor bearing assembly. The drum houses two weights attached to a bowed beryllium copper strip which lies across the drum. At the centre of the bowed strip is a button projection which protrudes through the motor end cap to bear against the operating button of a snap action switch fitted to the end of the motor.

13. As the motor runs up to speed, the weights will exert force on the bowed strip tending to straighten it. This will cause the button on the bowed strip to move away from the snap action switch allowing it to operate and to insert the flasher switch in circuit. If, for any reason, the motor fails to run, the bowed strip will hold the snap action switch closed to give a steady supply to the navigation lamps.

Reduction gear

14. The flasher switch operating cam is driven through a train of three reduction gears from the motor, in the ratio of 78 : 1. The gear shafts are supported between the front of the internal mounting plate and the gear housing plate and each runs in ball bearings.

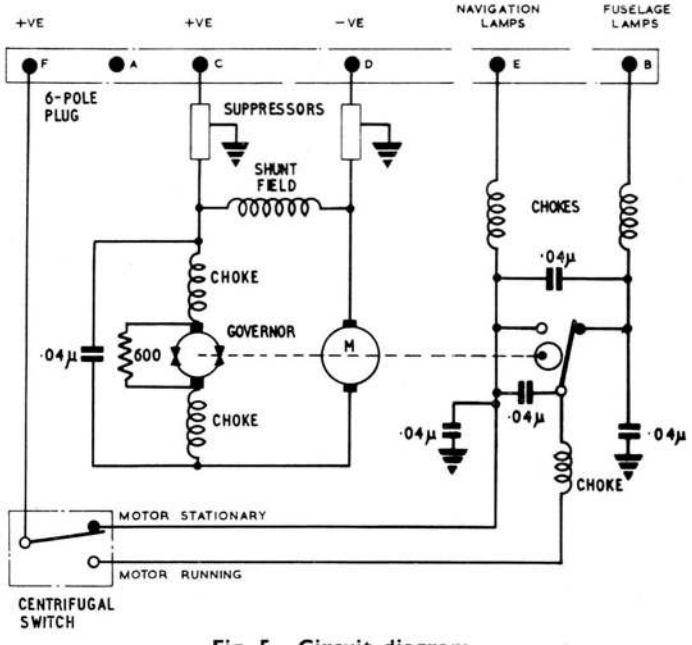

Fig. 5. Circuit diagram

Operation

15. With the motor circuit not energised the navigation lamps will switch on steady. If now the motor is energised it will run up to its governed speed of 3500 r.p.m. The centrifugal mechanism will cause the snap action switch to operate when the motor speed reaches approx. 2000 r.p.m. and will bring the flasher switch into circuit. The navigation lamps will then flash at 50 ± 10 cycles per minute, the switch contacts being adjusted to approximately 37 per cent "ON" and 63 per cent "OFF" time per cycle. When the motor is switched off the centrifugal strip will bow, and its button will operate the snap switch to return the navigation lamps to the steady "ON" state.

Servicing

16. The flasher unit should be inspected at regular intervals to ensure that the plug connection is tight and the unit is secure on its mounting. No other servicing should normally be necessary between routine overhaul periods and any unit becoming unserviceable should be renewed, the defective unit being returned for overhaul.