Chapter 60

TIME SWITCH, TEDDINGTON, TYPE FHM/A/55

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Time switch, Type FHM/A/55	*Stores Ref. 37F/20564*
Voltage	*24 d.c.*
Governed speed of motor	*8,000 r.p.m.*
Reduction gearing	*5,925 : 1*
Current consumption at 24V (nominal)	*1·3 amp. (max.)*
Rating of switch contacts	*5 amp.*
Weight	*1 lb. 11 oz.*
Overall dimensions	*5 in. × 4·1 in. × 2·59 in.*

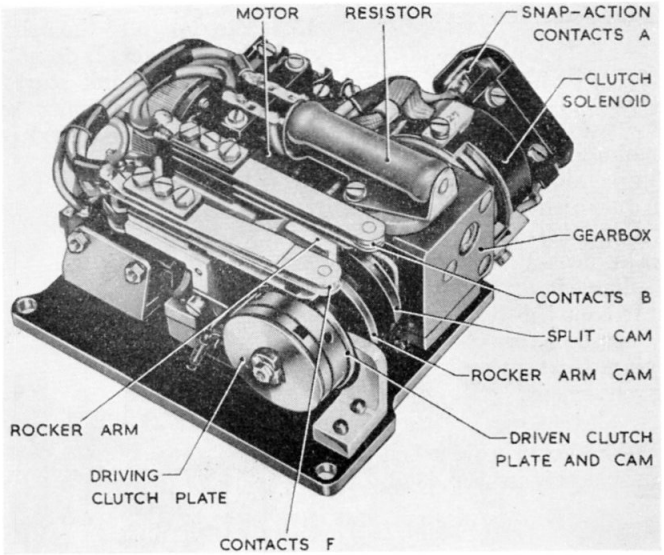

Fig. 1. Time switch, Type FHM/A/55

Introduction

1. The time switch, Type FHM/A/55, provides an automatically timed sequence for the various services necessary for the liquid fuel starting of gas turbine engines.

2. This switch is a resetting type, and is similar to that described in A.P.4343, Vol. 1, Sect. 11, Chap. 19, but varies in the contact arrangement and operating sequence. The motor in this switch is governed at 8,000 r.p.m.

DESCRIPTION

3. The mechanism of the switch (*fig.* 1) consists of a governed, series wound electric motor, coupled to reduction gearing, which drives a bank of cams. These cams operate two banks of leaf-spring contacts (contacts B and F) and two snap-action switches (contacts D and E). On the outer end of the camshaft is a clutch incorporating two serrated plates, actuated by a solenoid at the other end of the shaft; when the solenoid is energized to engage the clutch, thus connecting the cam bank to the gearbox output shaft, this has also the effect of operating another pair of snap-action contacts (contacts A) alongside the clutch solenoid.

4. Mounted on the top of the gearbox is a bracket carrying an 85-ohm resistor, which is shunted across the motor governor contacts to prevent undue arcing and heating.

5. The cam assembly is carried on a bush which runs freely on the gearbox output shaft, and incorporates the following items:—

The split cam assembly (contacts B)

A return spring assembly

Rocker arm cam (contacts D and E)

Driven clutch plate and cam (contacts F).

6. Two leaf-spring contact assemblies are secured to the contact bank platform in such a position that their followers lie over the split cam and driven clutch plate and cam. Between these switch assemblies is a pivoted rocker arm, one end of which rides on the middle cam. The other end is T-shaped, each arm being fitted with an adjustable plunger which bears on the plungers of two snap-action switches mounted on the base plate. As one switch has to operate before the other one of the rocker arm plungers is spring-loaded to absorb the further movement.

7. The operation of the split cam is described in detail in the general chapter in A.P.4343, Vol. 1.

8. Electrical connection to this switch is made to a six-way terminal block mounted on the base plate.

OPERATION

9. A circuit diagram of the switch is given in fig. 2, where the contacts are shown in the de-energized position. The operating cycle of the switch is 18 $\pm$ 1 sec.

10. When the external push-switch is depressed, the clutch coil and the motor are energized through contacts B. Engagement of the clutch closes snap-action contacts A, thus creating a hold-in circuit for the motor and clutch.

11. The cam bank continues to rotate, opening and closing the other contacts as follows:—

Contacts D	Made at start, break at $1\frac{3}{4} \pm \frac{1}{2}$ sec.
Contacts E	Made at $2\frac{3}{4} + \frac{1}{2} - \frac{1}{4}$ sec., break at $9\frac{3}{4} \pm \frac{1}{2}$ sec. from start.
Contacts F	Made at start, break at $1 \pm \frac{1}{4}$ sec. after contacts E make.

12. After 18 $\pm$ 1 sec. have elapsed since the push-switch was first depressed, the split cam opens contacts B, thus de-energizing the motor and clutch coil and opening contacts A to break the hold-in circuit. The cam bank is thus dis-engaged, and returned to the re-set position under pressure from the return spring.

13. The design of the split cam, however, is such that contacts B do not re-make immediately the cam bank starts to return. This prevents any possibility of the motor and clutch coil being re-energized before the other contacts are re-set.

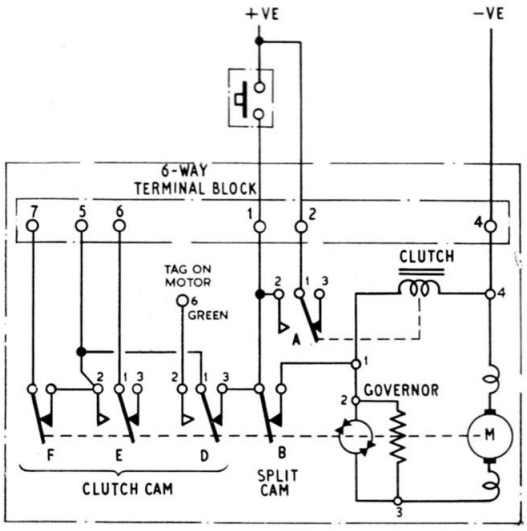

Fig. 2. Circuit diagram