Chapter 59

TIME SWITCH, TEDDINGTON, TYPE FHM/A/54

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Time switch, Type FHM/A/54	*Stores Ref. 5CW/4902*
Voltage	*16 to 29 d.c.*
Governed speed of motor	*9,500 r.p.m.*
Reduction gearing	*6,000: 1*
Current consumption at 24 V (nominal)—	
Motor	*1·1 amp. (max.)*
Clutch	*0·25 amp. (max.)*
Weight	*2 lb. 10½ oz.*
Overall dimensions	*4·5 in. × 5·5 in. × 4·2 in.*

Introduction

1. The time switch, Type FHM/A/54, is used as a gas turbine reheat switch, and provides an automatically timed sequence for the necessary procedure.

2. This switch is a resetting type, and is similar to that described in A.P.4343, Vol. 1, Sect. 11, Chap. 19, but the clutch solenoid in this instance does not operate any snap-action contacts, and the motor runs at 9·500 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

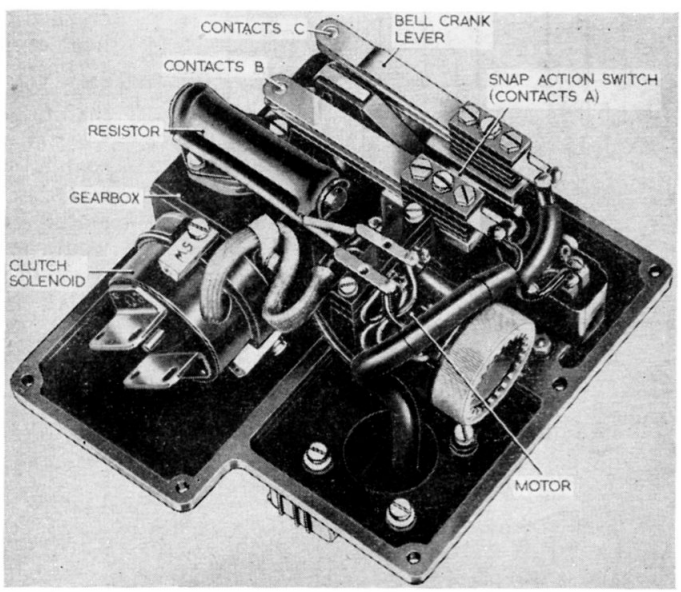

Fig. 1. Time switch, Type FHM/A/54

(A.L.79, Sep. 56)

contacts (contact B and C), and a snap-action change-over switch (contacts A). 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, the cam bank is engaged with the gearbox output shaft.

4. Mounted on the top of the gearbox is a bracket which carries a resistor, of either 80 or 90 ohms, 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:—

A shim washer (0·005 in. thick)

A split cam assembly (contacts B)

A return spring assembly

A laminated shim washer

A snap-action switch cam (contacts A)

A driven clutch plate and cam (contacts C)

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. The centre of the platform is milled to accommodate a wide angle crank lever at one end of which is a hardened steel wedge-shaped follower which lies in the central snap-action switch cam. The free end of the bell crank is positioned over the operating button of the snap-action switch (contacts A), which is held in a U-shaped bracket.

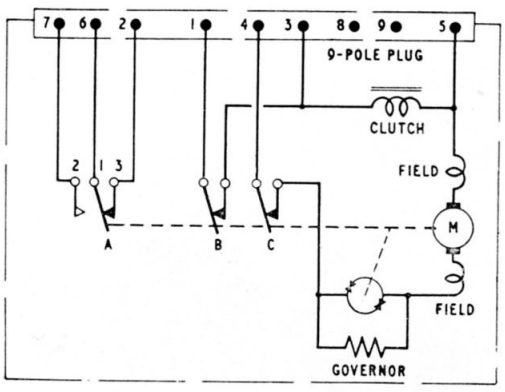

Fig. 2. Circuit diagram

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

OPERATION

8. A circuit diagram of the switch is given in fig. 2, where the contacts are shown in the de-energized position.

9. The switch is normally connected so that the motor field circuit and the clutch solenoid can be energized simultaneously. This causes the motor to run, and the drive is transmitted to the cam bank through the clutch.

10. After 3 seconds, the centre cam operates the snap-action switch to open contacts 3 and close contacts 2.

11 After 15 seconds, the split cam opens contacts B, and the clutch cam breaks contacts C either simultaneously, or within half a second later, thus isolating the motor.

12. The design of the split cam, however, is such that contacts B do not re-make immediately the cam bank starts to return. This allows the external series coupled contacts A to break completely before the cam bank re-sets, closing all contacts ready for the next cycle.

13. If a positive supply to all circuits were maintained throughout the cycle, i.e., due to continuous depression of the starting switch, through pins 2, 3, and 4, this would result in the contacts opening at the times stated, and staying open, because the clutch would still be energized. With the switch wired in this way to the external circuits, the clutch would open, letting the cam bank re-set, only if the positive supply to pin 3 were broken.