Chapter 84

TIME SWITCH, TEDDINGTON, TYPE FHM/A/24

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Time switch, Type FHM/A/24 ...	*Stores Ref. 5CW/5761*
Voltage	*12 to 29 d.c.*
Governed speed of motor	*6,000 r.p.m.*
Reduction gearing	*5,926 : 1*
Current consumption at 24 V (nominal) —	
Motor	*0·8 amp. (max.)*
Clutch	*0·25 amp. (max.)*
Weight	*2 lb. 13 oz.*
Overall dimensions	*4·5 in. x 5·5 in. x 4·2 in.*
Rating of switch contacts —	
Contacts B, C, D and E	*5 amp.*
Contacts A	*10 amp.*

Introduction

1. The time switch, Type FHM/A/24, is used as a gas turbine relight switch, and provides an automatically timed sequence for the necessary operations.

2. This switch is a resetting type, and is similar to that described in A.P.4343, Vol. 1, Sect. 11, Chap. 19, but differs in the contact arrangement and operating sequence.

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

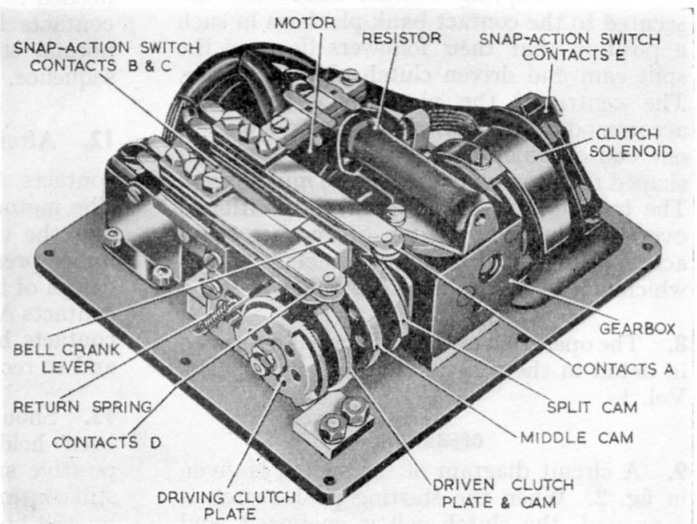

Fig. 1. Time switch, Type FHM/A/24

(*A.L.96, Feb. 57*)

banks of leaf-spring contacts (contacts A and D), and a snap-action change-over switch (contacts B and C). 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.

4. 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 E) alongside the clutch solenoid. A friction spring is fitted to the clutch plate assembly to assist in smooth engagement, and is secured to an anchor bracket via a coil type return spring.

5. Mounted on the top of the gearbox is a bracket which carries a resistor, of either 80 or 85 ohms, which is shunted across the motor governor contacts to prevent undue arcing and overheating.

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

A shim washer
A split cam assembly (contacts A)
A return spring assembly
A laminated shim washer
A middle cam (snap-action change-over contacts B and C)
A driven clutch plate and cam (contacts D).

7. 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 on the middle cam. The free end of the bell crank is positioned over the operating button of another snap-action change-over switch (contacts B and C) which is held in a U-shaped bracket.

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

OPERATION

9. A circuit diagram of the switch is given in fig. 2. When the starting push-switch is depressed, the clutch coil is energized, and also, through the closed contacts D, the motor, which starts to run. The energizing

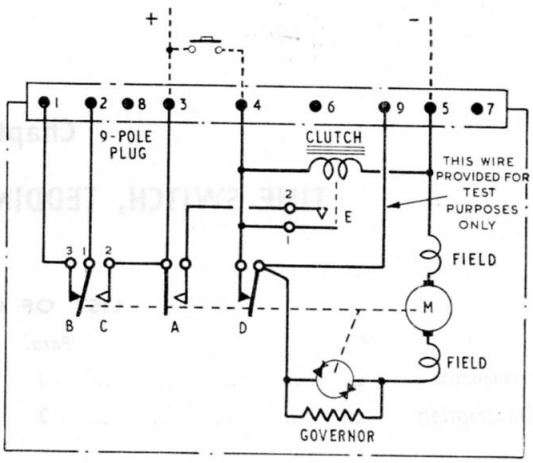

Fig. 2. Circuit diagram

of the clutch closes the snap-action switch contacts E, and also brings the clutch plate into engagement with the clutch cam, so that the cam bank starts to rotate.

10. Within 1·3 seconds, the split cam closes contacts A, thus providing a hold-in circuit, so that the starting push-switch can be released.

11. After a further $0{\cdot}2^{+0{\cdot}5}_{-0}$ seconds, the middle cam operates the snap-action change-over switch B and C, so that contacts B open and contacts C close to give a positive supply to the various services, such as priming pump, torch igniters, and booster coils, which are needed to restart the engine. The opening of contacts B isolates these services from the normal starter panel during the restarting sequence.

12. After 28^{+3}_{-0} seconds, the split cam opens contacts A, so breaking the hold-in circuit. The motor and clutch coil are de-energized, and the cam bank is disengaged and reset under pressure from the return spring. The design of the split cam, however, is such that contacts A cannot be remade before the other contacts have returned to the reset position and so recycle the time switch.

13. Should the starting push-switch have been held depressed, thus maintaining a positive supply on pin 4, the motor would still continue to run, until the circuit is broken by the opening of contacts D, operated by the clutch cam, 1·0 seconds (minimum) after the opening of contacts A.