

Chapter 24

TIME DELAY SWITCH, VENNER TYPE

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LEADING PARTICULARS

Time delay switch	Stores Ref. 27N/56 and Stores Ref. 27N/113
Operating voltage	...	...	16 to 29 volts d.c.
Current consumption	...	...	2.5 amp. at 28.5 volts d.c.
Coil resistance at 20 deg. C.—			
Main relay coil	...	...	14.6 to 17.8 ohms.
Hold-in coil	...	...	124 to 152 ohms.
Contact rating	...	...	5 amp. at 28.5 volts non-inductive
Overall dimensions—			
Length	...	...	4.37 in.
Width	...	...	3.78 in.
Depth	...	...	2.25 in.
Weight	...	...	1.25 lb.

Introduction

1. Time delay switches are used in the fire extinguisher system to delay the discharge of the main methyl bromide spray over the engine after initiation by the pilot. This allows sufficient time for the engine to come to rest, but whether the engine has come to rest or not, it is flooded automatically after the delay period, thus preventing the spread of fire. One switch is installed for each engine, and an adapter plate (Stores Ref. 27N/57) may be used when the switch is installed in place of the old delayed action switch, Mk. 1.

2. The operating sequence of the time delay switches, Stores Ref. 27N/56 and 27N/113, is identical. Stores Ref. 27N/113 is a modified version of the original design, and has an additional ratchet device on the centre spindle to allow the switch to be re-set without disengaging the gear train, as was the case when re-setting 27N/56.

DESCRIPTION

3. The switch (fig. 1 and 2) incorporates

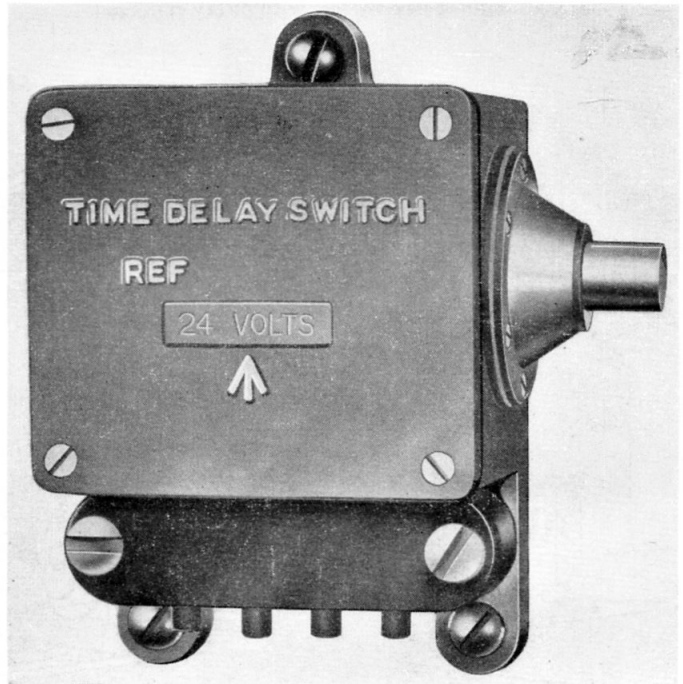


Fig. 1. Time delay switch

three sets of contacts and a clockwork mechanism. Two sets of contacts are actuated by cams driven by the mechanism and operate 8 and 19 seconds respectively after initiation. The third set is operated by a relay coil.

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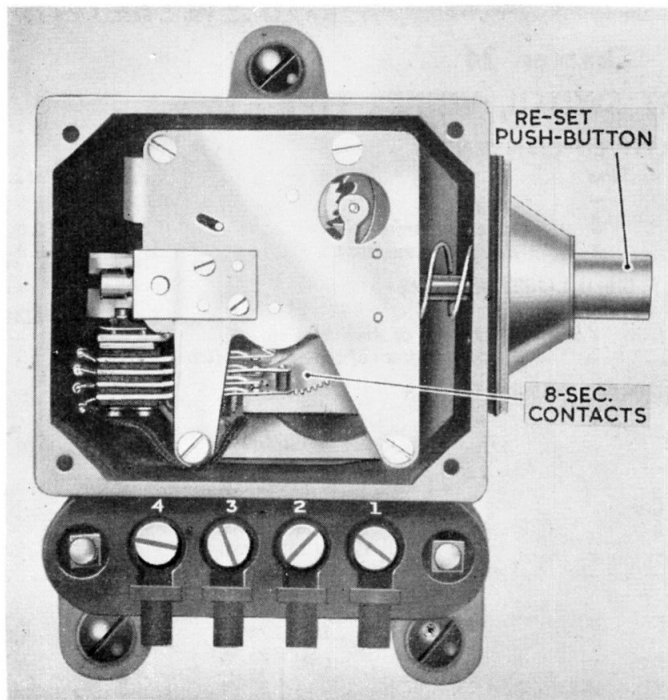


Fig. 2. Time delay switch, with cover removed

4. The mechanism of the switch is shown in fig. 3, and the internal circuit in fig. 4. The latter indicates the positions when the mechanism is cocked and the relay de-energized. The 8-second change-over contacts complete the circuit to the fire extinguisher bottles when the relay is de-energized, and the 19-second contacts break the circuit to the relay coil. A hold-in coil keeps the armature in the closed position, and thus ensures the continued running of the mechanism for the first eight seconds after initiation.

Functioning

5. The spring actuating the clockwork mechanism is re-set by depressing a push-button

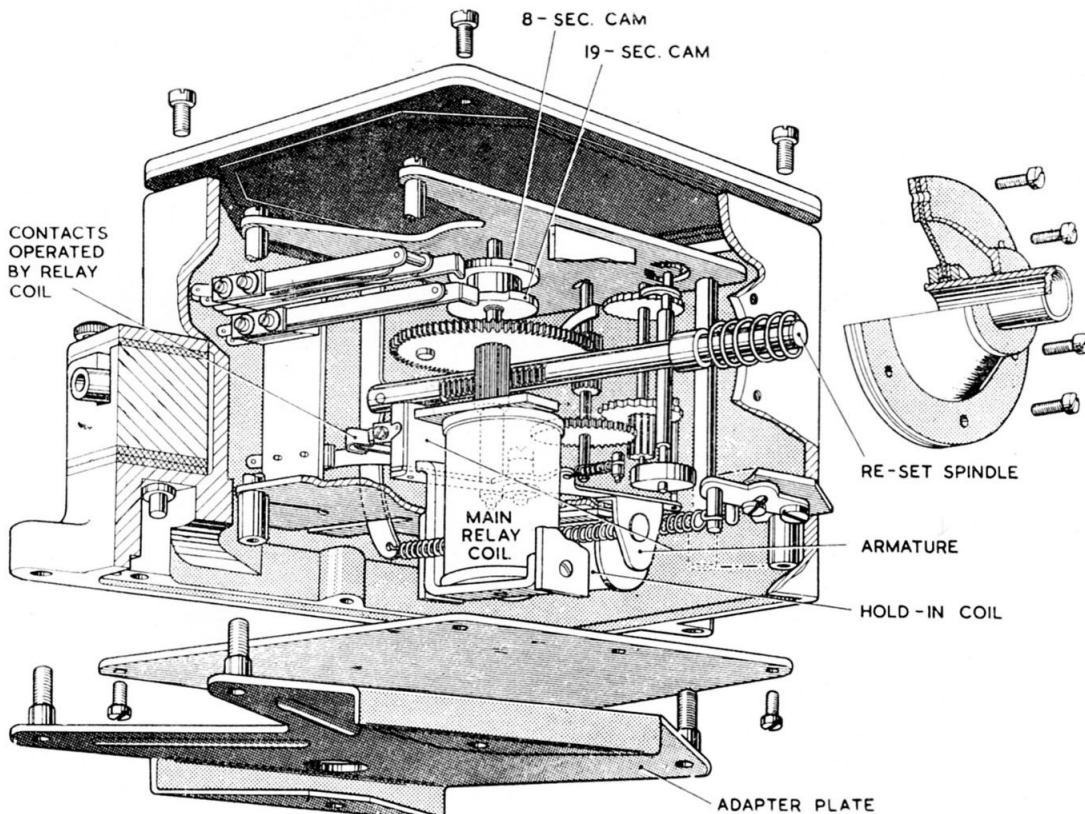


Fig. 3. Mechanism of time delay switch

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on the side of the switch. In the wound or cocked position, with the coils de-energized, the contacts in fig. 4 marked A and D are open and those marked B, C, and E are closed. When the feathering button is depressed, positive potential is applied to terminal 1, the main coil is energized, contacts E open and D close, and the hold-in coil is energized through the 8-seconds contacts B. After 8 seconds, contacts B open and A close, thus preparing the fire extinguisher circuit, and the hold-in circuit is opened. After 19 seconds, contacts C open and the main coil is de-energized, the armature is released, and contacts D open and E close, thus completing the circuit to the fire extinguisher bottles through contacts E and A.

6. The hold-in coil keeps the armature in the closed position, ensuring that the mechanism will continue to run for the first 8

seconds after initiation, and prevents the fire extinguisher bottles from being operated even should feathering be completed within eight seconds. If the propeller is fully feathered in the period 8 to 19 seconds after initiation, the positive supply to terminal 1 is interrupted, the armature is released, contacts E are closed, and the bottles are set off. If, however, feathering is not completed in this time, the 19-seconds contacts open de-energize the relay, and the fire extinguisher bottles are set off.

SERVICING

7. ◀ The switch should be inspected at intervals for freedom from damage, security of attachment and electrical connections, and correct functioning. Check that the switch is reset, by depressing the reset push-button fully. Freedom of movement of the button indicates that the switch is set.

8. It is preferable for switches to be stored in the unwound condition. If a switch has been in storage for some time, the mechanism should be removed from the outer casing and inspected to ensure that the lubricant has not tended to congeal, which would adversely affect the performance of the switch. If such congealing has occurred, the old lubricant should be removed, and the parts be re-lubricated with oil OX-14 (Stores Ref. 34B/9100589).

9. To remove the mechanism from the outer casing, unscrew the top cover, back plate and push-button cover. Note that with the removal of the push-button cover, the push-button return spring, collar and shims are loose on the shaft and should be removed to prevent loss. Unsolder the leads from the terminals and unscrew the unit fixing screws, which are in the back of the case and secure the unit to the internal lugs. ▶

Functional tests

10. To check the switch for correct operation the following

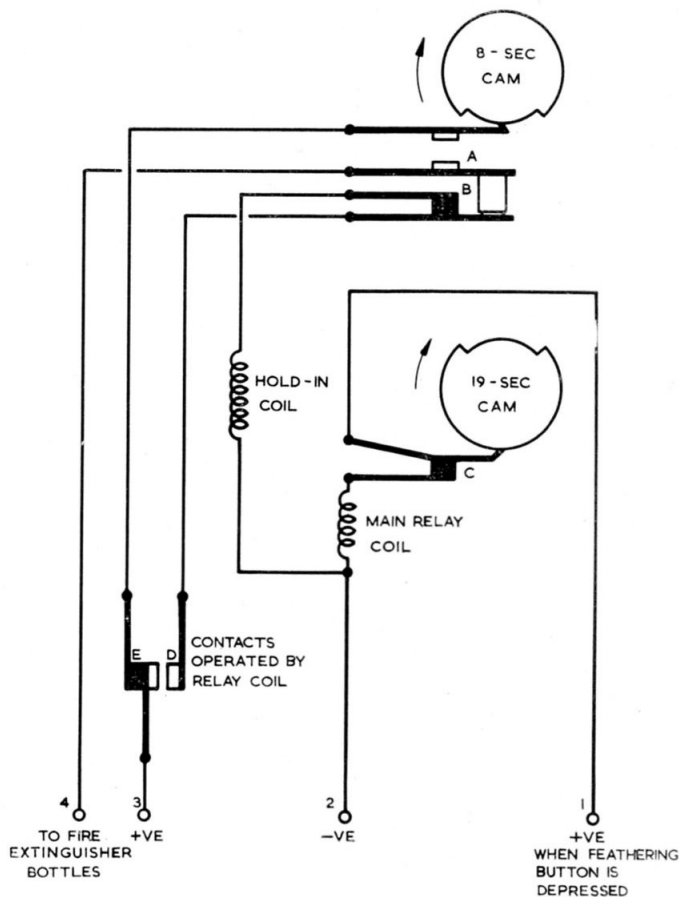


Fig. 4. Circuit diagram of time delay switch

tests should be carried out:—

- (1) Connect terminal 2 to the negative, and terminal 3 to the positive of a 24-volt d.c. supply.
 - (2) Connect a low wattage filament lamp (e.g. Stores Ref. 5L/X.951230) across terminals 2 and 4.
 - (3) Connect a normally open push-switch across terminals 1 and 3, and wind the mechanism by depressing the re-set push-button on the side of the time delay switch.
 - (4) Depress the normally open push-switch momentarily, and check that the time taken for the unit to stop and the lamp to light is between 8 and 10 seconds.
- 11.** (1) After re-winding the mechanism, depress the push-button and keep it fully depressed.

- (2) The time taken for the mechanism to stop and the lamp to light should be between 17 and 21 seconds.

12. The minimum operating voltage with the coils cold (20 deg. C.) must not exceed 16 volts during the performance of the tests enumerated in para. 10 and 11. These tests should not be repeated as the coils are short rated and may become overheated.

Insulation resistance

13. The insulation resistance of the switch should be not less than 20 megohms when measured between any live parts not connected together. The same result should be obtained when a test is taken between all live parts and the casing.