INTERRUPTER SPRING SET DESIGN

Improvements incorporated in the SE50 Strowger Selector

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A sound principle of design is the reduction of the functional elements of a mechanism to the smallest quantity of the simplest parts that will achieve the purpose for which the mechanism is designed. This principle is particularly important when precisely similar conditions have to be met at more than one place on a complete piece of apparatus. The provision of two or more dissimilar forms of mechanism to accomplish the same purpose is fundamentally unsound from the aspects of design, production, maintenance and provision of spare parts.

On two-motion selectors, the rotary magnets, and sometimes the vertical magnets, are fitted with interrupter spring sets. While the general purpose of these spring sets is the same, there has been a marked difference in basic designs.

The simple form of interrupter spring set used in the G.E.C. C600 selector provides for a coincident point of *break* and *make* in the operational cycle of the magnet system. This action, similar to that provided on the uniselector, is shown in diagrammatic form in Figure 1 In this construction the spring-set operating member is integral with the armature proper.

To ensure positive and consistent operation of the self-interrupted magnets now used for two--motion selectors, the *break* and *make* should be

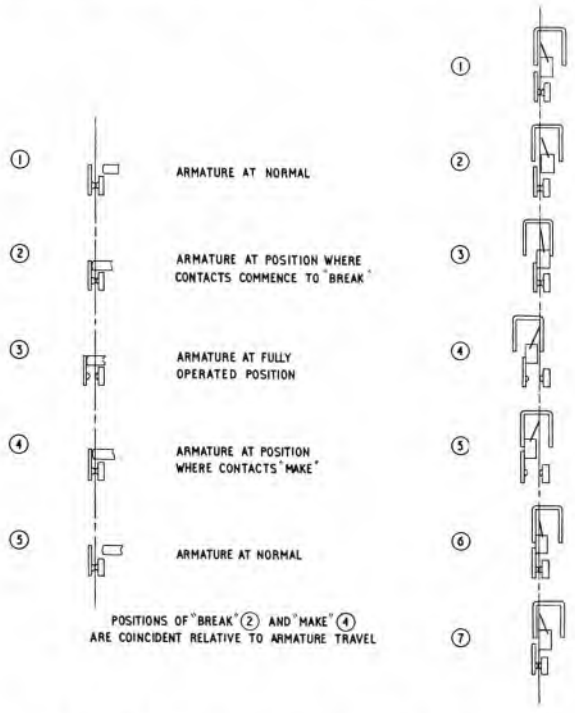

Fig. 1.—G.E.C. C600 Strowger selector and uniselector.

ARMATURE	TOGGLE ARM	SPRING SET
AT NORMAL	AT NORMAL	IN "MAKE" POSITION
MOVING FROM NORMAL	AT NORMAL	IN "MAKE" POSITION
MOVING FROM NORMAL	MOVING FROM NORMAL	IN "MAKE" POSITION
FULLY OPERATED	FULLY OPERATED	IN "BREAK" POSITION
RETURNING TO NORMAL	FULLY OPERATED	IN "BREAK" POSITION
RETURNING TO NORMAL	RETURNING TO NORMAL	IN "MAKE" POSITION
AT NORMAL	AT NORMAL	IN "MAKE" POSITION

POSITIONS OF "BREAK" ④ AND "MAKE" ⑥ A NOT COINCIDENT RELATIVE TO ARMATURE TRAVEL

Fig. 2.—G.E.C. SE50 Strowger selector

Figs. 1 & 2.—Cycles of single break interrupter spring set operations.

effected at the most efficient points in the operating and return strokes of the armature.

These two points not being coincident, a design is necessary in which the spring set is operated by a mechanical system independent from, but controlled by the armature.

An action complying with this condition is shown diagrammatically in Figure 2.

Interrupter Spring Set for SE50 Strowger Selector

G.E.C. Patent No. 657410.

The interrupter spring set unit designed for the SE50 Strowger Selector comprises (Fig. 3) :—

1. A central contact member (a), so shaped that it provides at one end a two-way anchorage for a toggle arm , and at the other end an upturned lug which anchors the bias spring and limits the travel of the toggle arm.

2. A toggle arm of reinforced moulded-plastic material (b) actuated by adjustable lugs on the armature, and controlled by a bias spring. The two-way anchorage on the central contact member acts as a fulcrum for one end of the toggle arm. The other end of the toggle arm is slotted, with angular faces proportioned to limit the travel of the toggle within its effective operating transit and grooved to accommodate one leg of the bias spring. This construction avoids the use of a pin bearing or its equivalent.

3. A bias spring (c) which effectively holds the toggle arm at the extreme ends of its operating transit against the reactive pressure of the contact spring. The bias spring can easily be removed from the interrupter spring mechanism by the simple expedient of pulling the toggle arm toward the upturned lug of the central contact member and swinging the opposite end free from the two-way anchorage (d). The characteristics and form of the

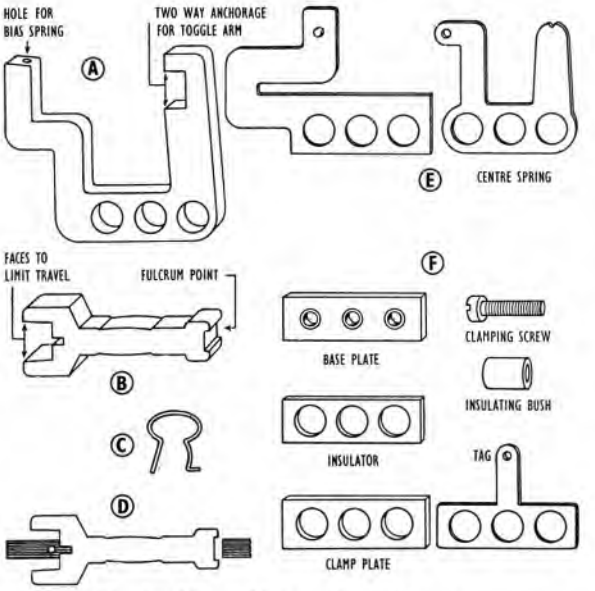

Fig. 3.—Units of interrupter spring set.

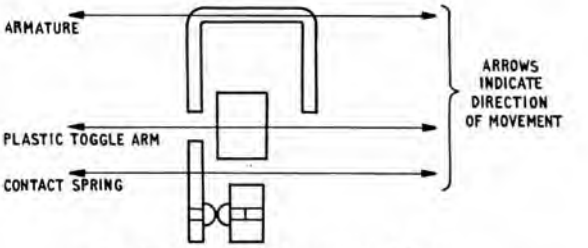

Fig. 4.—Direction of operational forces.

Fig. 5.—Exploded view of complete spring set.

spring are not disturbed in the assembly process, consequently no lug bending or pressure adjustments are necessary

4. Contact springs (e) of substantial thickness and length to facilitate adjustment and ensure stability of contact pressure.

5. Insulators, clamp plates and screws (f).

This interrupter spring set has been designed to give maximum reliability, uniformity and sensitivity

The operational forces are applied in the most direct and efficient manner, i.e. the forces from the armature are applied to the toggle arm in its normal plane of action (Fig. 4), thereby avoiding the frictional losses set up in a mechanism where the operating forces are applied indirectly to the normal plane of operation.

The complete interrupter spring set (Fig. 5), which is suitable for both the rotary and vertical magnet units, is self-contained and can be assembled, adjusted and tested as an independent unit. It is rigidly attached to the rotary- and vertical-magnet units, which in turn are self contained and can be assembled, adjusted and tested as independent units, thus conforming to the basic principle of construction incorporated in the SE50 Strowger selector.

Any provisional adjustment of the magnet units in the selector does not involve a correlated adjustment of the interrupter spring set (or back stop) and in this respect the design represents a great advance over those in which the magnet units, interrupter spring sets and back stops are separate unrelated units of the selector

The principle features of the SE50 Strowger Selector interrupter spring set may be summarised as follows :—

(1) A self-contained pre-adjusted and pre-tested unit suitable for the rotary and vertical magnet units.

(2) A bias spring easily fitted to and removed from the unit, without bending the lugs of the springs and one that can easily be adjusted should the necessity arise.

(3) A moulded-plastic toggle-arm of high impact strength and resistance to wear, in which is incorporated the travel-limiting stop.

(4) A fulcrum type of toggle-arm bearing, which eliminates the use of a bearing pin.

(5) Contact springs of ample length and width to give ease of adjustment and consistency of contact pressures over long periods of service, with maximum accessibility

(6) A mechanism in which the operating forces are applied to the toggle arm in its normal plane of action, thereby giving the most reliable, sensitive, consistent and positive operation.

Figures 6 and 7 show the interrupter spring set attached to the rotary and vertical magnets.

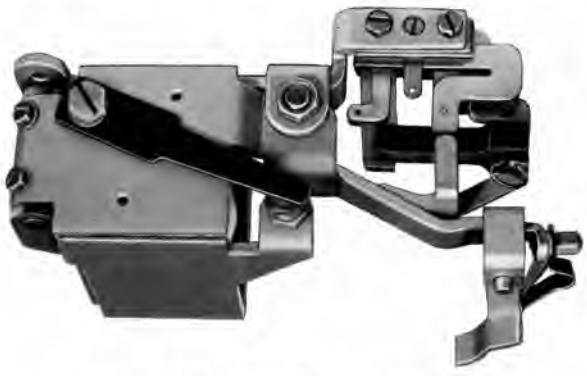

Fig. 6.—Rotary-magnet assembly.

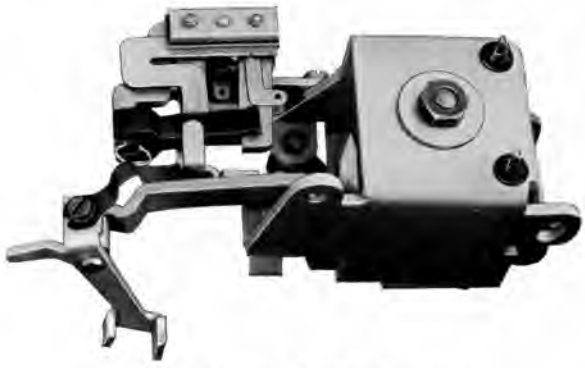

Fig. 7.—Vertical-magnet assembly.

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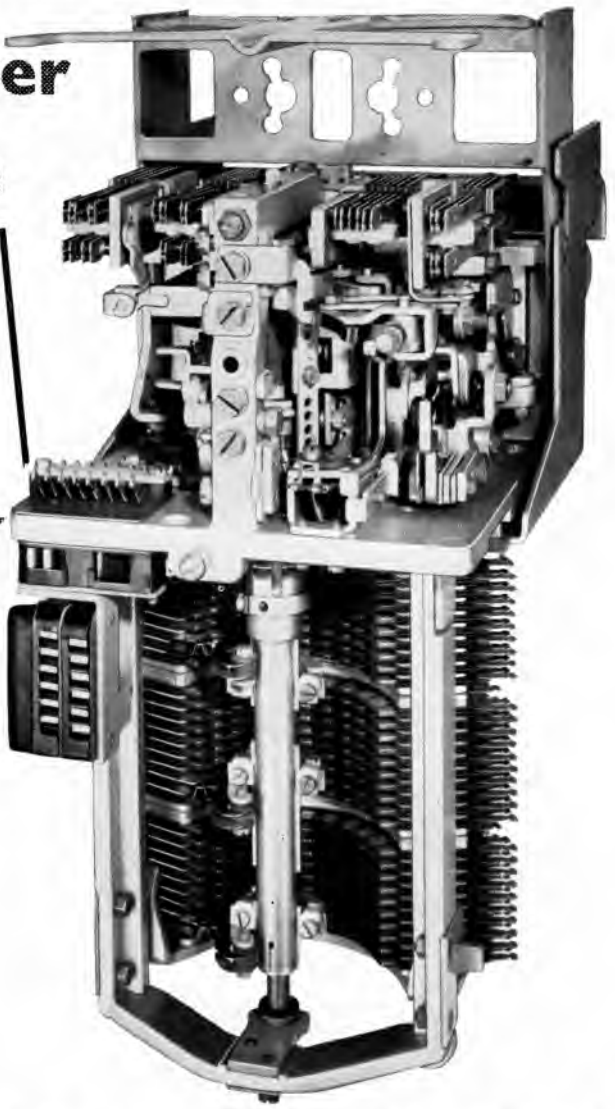

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By far exceeding the British Post Office standard durability requirement—in fact by three times and more—the new G.E.C. two-motion selector, SE50, has more than proved the practical merits of its design. No replacement of parts other than the line wipers was needed during these exhaustive tests Wear on other parts was either non-existant or hardly perceptible, while only two minor adjustments were rapidly and easily made thanks to the ease of maintenance.

- **Major adjustments are relative to one datum position ; no drift occurs from the correct setting.**
- **All adjustments are fully independent.**
- **Adjustments are made by simple movements of the components themselves which are then easily and permanently locked into position.**
- **No special adjustment technique is required for the auxiliary contact spring sets which are of the British Post Office 600 relay type.**
- **Jacks-in in place of the 2000-type selector.**

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