

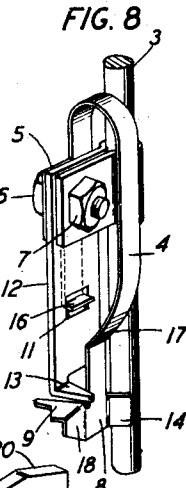
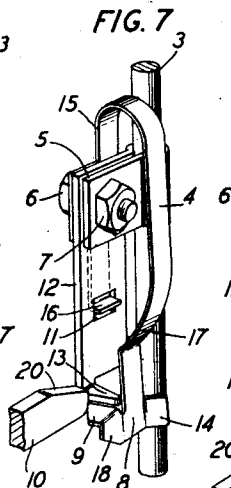
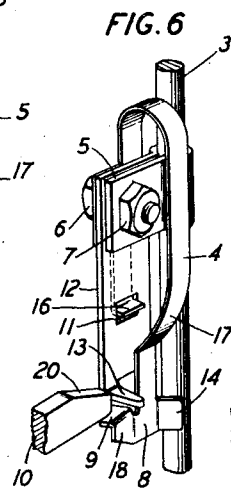
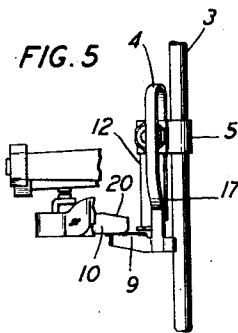
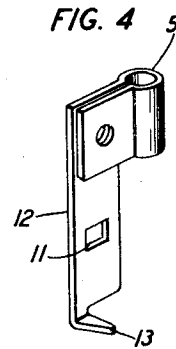
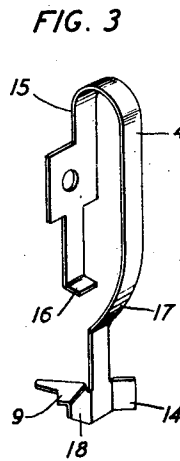
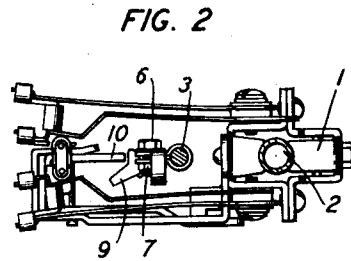
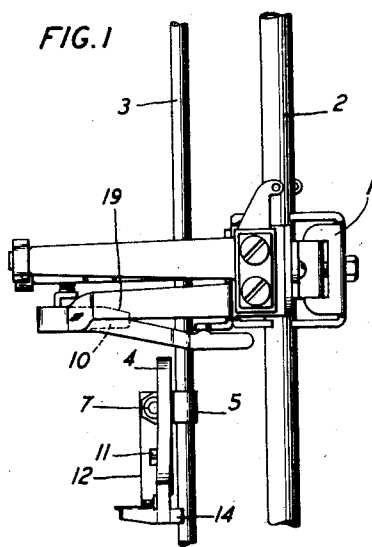
March 1, 1932.

G. W. FOLKNER

1,847,213

SELECTOR SWITCH

Filed April 28, 1931



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UNITED STATES PATENT OFFICE

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SELECTOR SWITCH

Application filed April 28, 1931. Serial No. 533,429.

This invention relates to switching apparatus for use in automatic and semi-automatic systems, and more particularly to a panel switch of the multi-brush type, that is, a switch provided with a plurality of brush-sets any one of which may be rendered operative in extending a call.

The principal object of this invention resides in the provision of improved means for tripping or rendering operative any desired one of the brush-sets of a switch. At the present time, in switches of this type, a brush selecting or tripping rod is provided which is adapted to engage the lever of the desired brush-set for releasing the associated brushes and allow them, upon movement of the brush shaft, to traverse the stationary terminal section with which the brushes cooperate, while the other sets of brushes remain in their inoperative position but move with the shaft. The invention contemplated herein has to do with providing a new and novel tripping device which is reliable in operation and economical to install and maintain.

The tripping device contemplated in this invention comprises a longitudinal flexible spring and a clamp for attachment to the tripping rod. The base of the spring is formed into a finger for coming into proper engagement with the brush releasing lever of the brush-set which is to be released for contact with the stationary terminal section. The spring tripping device is of such length and material that some deflection from its main adjustment can take place. There is one such spring tripping device and clamp for each brush-set, arranged at progressively increasing distances above the normal position of their respective brush controlling levers. These trip springs are so clamped to the trip rod that the lower finger normally extends slightly to one side of the line of travel of the brush levers, means being provided whereby the trip rod may be momentarily rotated to cause the fingers to intercept such line of travel. Thus, it will be seen that during the upward movement of the brush shaft the controlling lever of any desired brush-set occupies a position below the engaging portion of its cooperating trip

finger and in contact with it, the trip rod being momentarily rotated to its tripping position. One of the trip fingers of the rod will engage the lever of the desired brush-set, whereby the brush controlling lever will be released and the brushes, by reason of the resiliency of their supporting arms, will assume their contacting position.

When the switch restores to normal on its downward movement, should the trip lever of any of the brushes engage with the upper surface of the finger of a trip spring, there is sufficient resiliency in the body of the spring to flex edgewise and allow the switch thereafter to proceed undisturbed to its normal position, the trip spring snapping back to its rigid position of rest when the lever gets out of engagement with the said spring.

A clearer conception of the scope and purpose of the invention may be obtained from the following description taken in connection with the attached drawings in which;

Fig. 1 is a normal side view of a selector switch brush-set together with the associated trip rod and improved tripping mechanism which is the subject of this invention;

Fig. 2 is a plan view of the same;

Fig. 3 is a detailed perspective view of the tripping spring forming a component part of the said tripping mechanism;

Fig. 4 is a detailed perspective view of the clamp forming another component part of said tripping mechanism;

Fig. 5 is a side view of the tripping mechanism with the brush springs of the cooperating brush-set removed to show one position of the brush releasing lever of said brush-set in relation to said tripping mechanism;

Fig. 6 is an enlarged perspective view of the position shown in Fig. 5;

Fig. 7 is the same as Fig. 6, except that said tripping mechanism is shown operated by said brush releasing lever in the improved manner described hereunder; and

Fig. 8 is the same as Fig. 7 except that the brush tripping lever is shown clear of the trip finger mechanism.

In Fig. 1, 1 is a brush frame carrying an assembly of brush springs, said brush frame being attached to the selector switch rod

2. The trip rod is indicated by 3, to which a tripping mechanism is attached for each brush-set on the selector switch. A selector switch of this general character is described
 5 in Patent No. 1,123,696, granted on January 15, 1915, to E. B. Craft and J. N. Reynolds and is not further described in this specification except insofar as it aids in a clearer understanding of the present invention. For
 10 any further description of the said selector switch, reference is made to the said patent.

The physical structure of the invention under consideration may be most readily understood by a consideration of Fig. 6. To
 15 the trip rod 3 a clamp 5 is attached. The clamp is shown in detail in Fig. 4 and is made of any suitable material, such as brass, and has two free ends. The left end 12 extends outwardly and then downwardly and
 20 terminates in a horizontal triangular projection 13. Through the upper portion of said left free end and through the corresponding portion of said right free end, aligned holes are provided for the reception of a
 25 clamping bolt 6. The said left free end is further provided with a rectangular slot 11 for the reception of the tripping spring as more clearly set forth hereinafter.

A longitudinal tripping spring 4 for attachment to said clamp is shown in Fig. 3.
 30 It is substantially U-shaped, having an arm 15 with a rectangular central portion for cooperation with the left free end of clamp 5, and having a hole centrally located therein for the passage of the clamping bolt 6.
 35 The left arm 15 of said spring terminates in a small rectangular horizontal lip 16 for engagement in slot 11 of the clamp 5. The arm 4 of the spring parallels the left arm 15
 40 for a distance below the bolt hole and then curves sharply toward the longitudinal center at 17 until it reaches a point approximately under the edge of lip 16, where it sharply bends vertically downward for the remainder of its length. The end of arm 4 of the
 45 spring comprises a rear oblique flange 14 and the front trip finger 9 and supporting flange 18 for said finger.

In the assembly of the tripping mechanism
 50 the clamp 5 is first attached to the trip rod 3 and the spring is then attached by its left arm 15 to the left free end 12 of said clamp by bringing into engagement lip 16 with the registering slot 11 and causing the hole
 55 in the left arm of said spring to register with the bolt holes in said clamp. The location of slot 11 of the clamp, therefore, must depend upon the length and structural determination of the left arm 15 of said spring.
 60 Bolt 6 is then passed through the registering holes and the clamp and spring are clamped tightly to each other and to the trip rod 3 by nut 7 threaded onto the end of said bolt.

When the spring is thus assembled to said
 65 clamp and rod, flange 14 rests against the

surface of the rod, the finger 9 is below the triangular projection 13 of the clamp while the lower part of arm 4 of the spring is between said triangular projection and said rod, there being sufficient clearance at either end
 70 to permit the spring to move freely between said projection 13 and said rod. If the spring, when so assembled, is given a downward or backward thrust, said thrust is transmitted to flange 14 which is in sliding contact
 75 with the rod. The backward motion which the spring would have under such circumstances, is translated into a sideways motion by the flange sliding along the surface of the rod and thereby causing the right arm 4 of
 80 the tripping spring and therefore finger 9 to be deflected to the right.

In the normal position of a trip finger of an associated brush-set which is not to be tripped in the upward movement of the selector, the tripping lever 10 of said brush-set
 85 clears the left edge of finger 9 of the said tripping finger. In accordance with the operation described in the above mentioned patent, when a particular brush-set is to be tripped, the selector is moved upwards until the inclined edge 20 of lever 10 of the brush
 90 releasing mechanism of the brush-set to be tripped is brought directly underneath the finger 9 of the cooperating trip mechanism. The trip rod is then rotated to the right and surface 20 is locked under the finger 9 and supporting flange 18. The next forward
 95 movement of the selector causes the brush releasing mechanism controlled by lever 10 to be released, thereby allowing the brushes of the associated brush assembly to engage the terminals on the bank to which the brushes have access. In this respect, therefore, there is no difference between the operation
 100 of the tripping mechanism of the present invention and the tripping mechanisms for this type of switch disclosed in the prior art, such as, for example, the tripping mechanism disclosed in the above mentioned
 105 patent.

When the selector restores to normal, the brush lever 10 of each brush not tripped
 110 clears to the left of finger 9. It happens, however, that sometimes, due to faulty adjustments, the lever 10 of the brush releasing mechanism of some of the normal brush-sets in the selector does not clear the finger 9 but will snag with its base directly on top of it during
 115 the downward motion of the selector as more particularly shown in Figs. 5 and 6. If the trip finger is rigid, both the brush-set and the tripping mechanism of the snagging brush may be damaged. With the tripping mechanism of my invention, however, when such a
 120 condition exists, the downward thrust of the lever 10 will push the arm 4 of the spring inwardly. The pressure is communicated to flange 14 and the backward motion imparted to the spring by the downward thrust of the
 125

lever 10 will change the backward movement of the spring to a sideways movement as already described. Under such circumstances, the spring yields sideways and is pushed
 5 aside until the right edge of lever 10 clears the edge of the finger 9 as shown in Fig. 7. The brush lever 10 is then free from the obstruction caused by the snagging and will continue its downward motion until the selector
 10 comes to rest. When the lever 10 has completely cleared the spring finger, the spring will flex back into its normal position and is then ready for service again.

By providing a tripping mechanism which
 15 can be thrust aside by a snagging brush on the downward movement of the selector, the brush releasing mechanism is saved from injury, while the resiliency of the spring will always cause the finger to be flexed back to its
 20 normal position for normal operation.

What is claimed is:

1. In a switch, a movable selector shaft, a plurality of brush-sets, a brush releasing mechanism for each brush-set, and a cooperating device for operating each of said
 25 mechanisms comprising a flexible member, said member operating one of said brush releasing mechanisms when said selector shaft moves in one direction and flexing edgewise
 30 when one of said mechanisms engages said member when said selector shaft moves in the opposite direction.

2. In a switch, a shaft longitudinally movable in an operating and in a restoring movement, a plurality of brushes secured thereto,
 35 means for normally retaining said brushes in an inoperative position, and a rotatable device common to said brushes comprising a flexible spring member for selectively tripping
 40 one of said brushes, said spring member being arranged to flex edgewise when said means for normally retaining said brushes in inoperative position engages
 45 said spring member in the restoring movement of said shaft.

3. In a switch, a shaft longitudinally movable in an operating and in a restoring movement, a plurality of brush-sets secured thereto, a controlling means for each set normally
 50 holding the brushes thereof spaced in an inoperative position and a tripping device common to said brush-sets comprising a plurality of flexible spring members, each of said
 55 spring members being adapted for selectively tripping a specific one of said brush-sets whereby each of said spring members is also adapted to flex edgewise when any of said
 60 controlling means engages any of said spring members in the restoring movement of said shaft.

4. In a switch, a shaft longitudinally movable in an operating and in a restoring movement, a plurality of brush-sets secured thereto, a mechanism for each brush set movable
 65 therewith and adapted to normally maintain

said cooperating brush-set in an inoperative position, a tripping lever for each of said mechanisms, a tripping device common to said brush-sets comprising a flexible spring member for each of said brush-sets and a finger
 70 on each of said springs at the base thereof to engage said tripping lever when the latter is stopped in juxtaposition to the position of said finger for releasing said mechanism to
 75 place the cooperating brush-set in operative position, whereby any one of said spring members flexes edgewise when one of said tripping levers engages said finger in the restoring movement of said shaft.

5. In a brush tripping mechanism, a trip rod, a U-shaped clamp surrounding said rod
 80 and having aligned openings through the arms thereof, one of the arms of said clamp extending downwardly and terminating in an angular projection and having a rectangular
 85 slot, a U-shaped spring one arm of which is provided with an opening and which terminates in a lip, the other arm of said spring terminating in an oblique flange and in a
 90 finger which extends inwardly at right angles to said arm, and a clamping bolt extending through the openings in said clamp and spring for clamping said spring and clamp
 95 to said rod with the lip of said spring in engagement with the slot of said clamp, the projection of said clamp overlying the finger of said spring and said flange in engagement with said rod.

In witness whereof, I hereunto subscribe my name this 25th day of April, 1931.

GEORGE W. FOLKNER.