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E. BAUSCH

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SWITCHING MECHANISM

Filed Feb. 24, 1930

FIG. 1

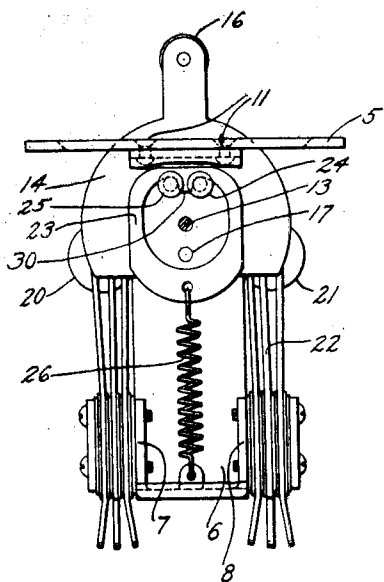


FIG. 2

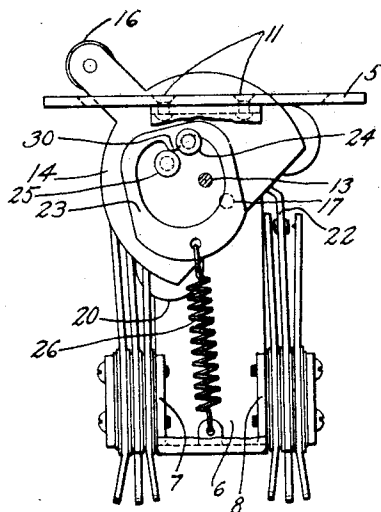
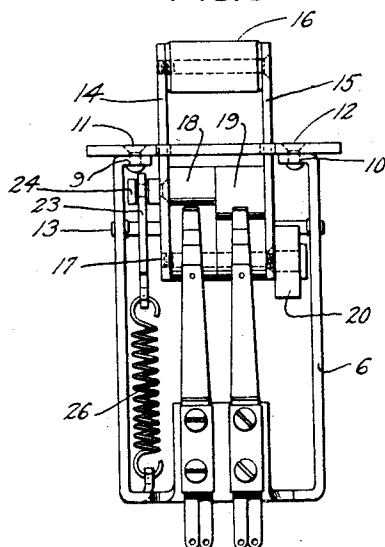


FIG. 3



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SWITCHING MECHANISM

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This invention relates to switching mechanisms and more particularly to sequence switches of the manually operated lever type.

In the general construction of lever type switches, particularly those having a center or normal position and two operate positions, it is common practice to employ crook-springs mounted on the contact spring pile-up to maintain the operating lever in its actuated position and to aid in restoring it to normal. In switches wherein crook-springs are utilized to actuate a plurality of contact springs simultaneously this type of structure has proven a very satisfactory circuit controller. However, in cases where it is desirable to perform switching operations in a certain sequence and timing, which necessitates the use of camming devices, crook-springs may not be employed to advantage. It has also been observed that the use of crook-springs as a means for securing the operating lever in its normal position as well as its operate positions is not entirely satisfactory in instances where the switch is subjected to undue shock, jarring or kindred standard conditions.

It is the object of this invention to improve the design of sequence switches of the lever type.

This object is attained in accordance with a feature of the invention by the provision of a spring controlled mechanism which insures a positive normal position of the operating lever and safeguards against accidental disturbance of the lever when in its normal or operate positions.

The switching mechanism of this invention comprises essentially spring sets which are cam operated through the medium of a manually actuated lever, the cams being so shaped as to furnish a predetermined timing and sequence of the switching operations. The mechanism which insures a positive center or normal position of the operating lever consists of a floating member, hereinafter referred to as a cam ring, mounted on two pins rigidly secured to and extending from an operating lever, and spring tensioned at its mid-point to a trunnion extending from the

switch mounting plate through the medium of a coil spring.

The invention will be more clearly understood from the following detailed description made with reference to the accompanying drawings in which Fig. 1 is a front elevation of a switching device embodying the features of the invention; Fig. 2 is a similar view of the switch structure shown in Fig. 1, in one of its actuated positions; Fig. 3 is a side elevation of the switch shown in Fig. 1.

Like characters throughout the several views designate similar parts.

The frame work of the switch comprises a designation plate 5 and a substantially U-shaped bracket provided at its midpoint with two vertically extending flanges 7 and 8 which serve as supports for the spring pile-ups, and two smaller horizontally extending flanges 9 and 10 which are made fast to the designation plate 5 by means of screws or rivets such as 11 and 12.

A main pivot or axis 13 extends from one side of the U-shaped bracket 6 to the other and serves as a support for the arms 14 and 15 which, with the finger grip 16, constitute the operating lever. A screw 17 passes between the lever arms 14 and 15 near their lower ends and serves as a mounting for the contact spring controlling cams 18 and 19. Secured to one of the lever arms 15 are two shock absorbing buffers 20 and 21, which engage with the designation plate 5 when the switch is in its operated positions.

Mounted on and insulated from the frame flanges 7 and 8 are sets of contact springs each having a transfer spring such as 22 resting on a cam such as 19. When the operating lever is actuated, the end of the transfer spring rides on the surface of its associated cam, making or breaking contact with associated contact springs depending upon the contour of the cam.

The floating cam ring 23 is loosely mounted on two grooved metallic roller studs or pins 24 and 25 which are rigidly secured to the lever arm 15. A spiral spring 26 has one end hooked to the lower mid-point on the cam ring and the other end secured to the

trunnion 28 integral with the mounting bracket 6.

As shown in Fig. 1 the switch is in its normal position and is positively held in this position by the force exerted by spring 26. This force is equally distributed between the roller pins 24 and 25 and as these pins are located on either side of the center line of the switch which passes vertically through the axis 13, the switch lever is firmly held in its center or normal position and will withstand considerable shock or accidental knocks without being disturbed. By increasing the distance of the pins 24 and 25 from the switch center line the tendency for the switch lever to maintain its normal position is augmented.

When the switch is actuated as shown in Fig. 2 the pins 24 and 25 follow the movement of the lever and in so doing the pin 24 being confined in the notch effected by the projecting camming surface 30, carries the cam ring with it, the camming surface 30 riding over the groove in roller pin 25. In this position it is evident that the force exerted by the spring 26 is concentrated upon pin 24 and as this pin is now located to the left of pivot 13 the lever will be locked in its operated position.

Should it be desirable to render the switch locking in its normal position and non-locking in its operated position, the pins 24 and 25 would be separated by a greater distance so that when the lever was actuated to its operating position the pin 24 would be located to the right of the center line drawn vertically through the pivot 13. Then the force exerted by the spring 26 concentrated on the pin 24 would tend to restore the lever to normal.

The descriptions of the two functions just given have been directed to the switch when actuated to the left as shown in Fig. 2; it is obvious that the same effects are produced when the switch is actuated to the right.

From the foregoing description it is apparent that this locking mechanism is flexible to such an extent that a switch may be rendered locking or non-locking in its operate positions and that a positive center position of the lever is always assured. The positions of the pins 24 and 25 relative to a vertical center line drawn through the axis 13 determines the locking characteristics of the switch.

What is claimed is:

1. In a switching mechanism, an operating lever having a normal position and an operating position and means for automatically centering said lever in its normal position upon its release from its operating position.

2. In a switching mechanism, a lever adapted to actuate contact springs through the medium of a cam, a pivot support for said lever, a spring for influencing the movement of said lever, whose line of action normally

coincides with the vertical center line of said switching mechanism and means effective upon the actuation of said lever for shifting the line of action of said spring.

3. In a switching mechanism, a lever adapted to actuate contact springs through the medium of a cam, a pivot support for said lever, a spring for influencing the movement of said lever, whose line of action normally coincides with the vertical center line of said switching mechanism and a floating member mounted on a two-point support on said lever and in engagement with said spring, effective upon the actuation of said lever for shifting the line of action of said spring.

4. In a switch structure, an operating lever, a pivot mounting for said lever, a spring for influencing the movement of said lever, and means intermediate said spring and said lever for distributing the force exerted by said spring on said lever evenly on each side of said pivot mounting when said lever is in its normal position.

5. In a switch structure, an operating lever having a normal and operate position, a pivot mounting for said lever, a spring for influencing the movement of said lever, and means intermediate said spring and said lever for confining the force exerted by said spring on said lever to one side of said pivot mounting when said lever is in its operate position.

6. In a switch structure, an operating lever having a normal and operate position, a pivot mounting for said lever, a spring for influencing the movement of said lever, and means intermediate said spring and said lever for distributing the force exerted by said spring on said lever evenly on each side of said pivot mounting when said lever is in its normal position and confining the force exerted by said spring on said lever to one side of said pivot mounting when said lever is in its operate position.

7. In a switch structure, an operating lever having a normal and an operate position, a pivot mounting for said lever, a spring for influencing the movement of said lever, and a cam ring floatingly mounted on two pins extending from said lever and in engagement with said spring, the positions of the mounting pins relative to said pivot mounting determining the influence of said spring on said lever.

8. In a switch structure, a mounting frame, an operating lever pivotally supported on said mounting frame, a plurality of cams rigidly secured to said lever, contact springs secured to said mounting frame and having a contact arm normally in engagement with said cams for actuating said contact springs in response to the operation of said operating lever and means for exerting a pull on said lever at each side of its pivotal support to insure a positive center position of said lever when in its normal position.

9. In a switching mechanism a lever adapted to actuate contact springs through the medium of a cam, a pivot support for said lever, a spring for influencing the movement
5 of said lever whose line of action normally coincides with the vertical center line of said lever and means effective upon the actuation of said lever for shifting the line of action with respect to the center line of said lever.
10 In witness whereof, I hereunto subscribe my name this 17th day of February, 1930.
EWALD BAUSCH.

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