Aug. 16, 1949. D. L. CLARK 2,479,313

COLUMN SPRING SWITCH

Filed July 29, 1947

Fig. 1.

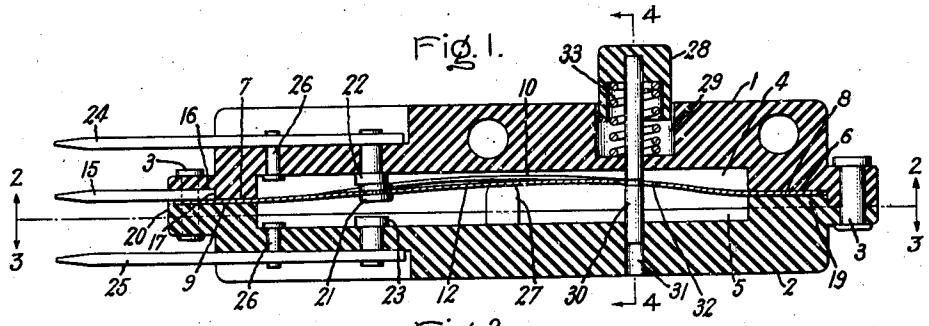


Fig. 2.

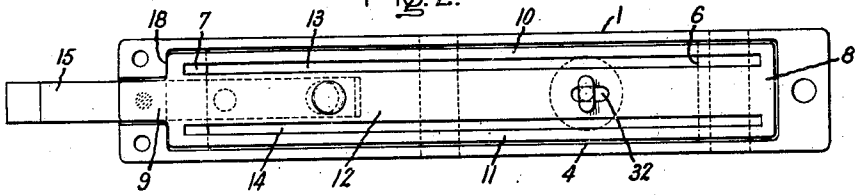


Fig. 3.

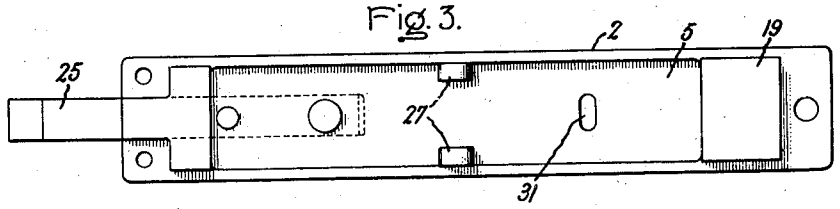


Fig. 5.

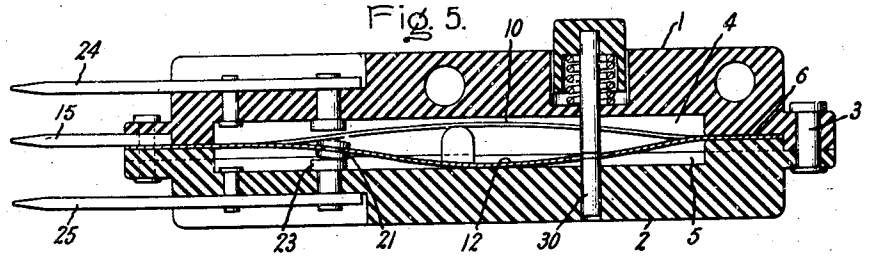


Fig. 6.

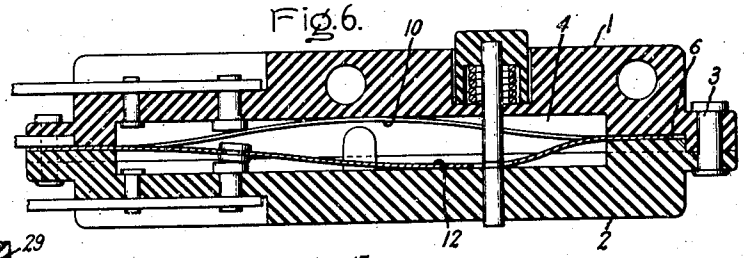


Fig. 4.

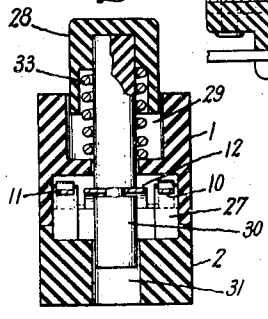
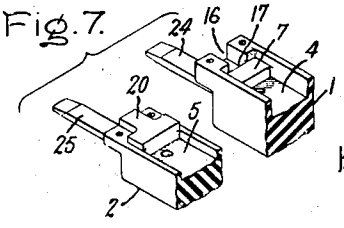


Fig. 7.



Inventor:
David L. Clark,
by Alfred E. Bobst.
His Attorney.

Patented Aug. 16, 1949 2,479,313

UNITED STATES PATENT OFFICE

2,479,313

COLUMN SPRING SWITCH

David L. Clark, Bridgeport, Conn., assignor to General Electric Company, a corporation of New York

Application July 29, 1947, Serial No. 764,265

3 Claims. (Cl. 200—67)

1

The present invention relates to column spring switches and has for its object to provide an improved switch of this type which is simple in structure, reliable in operation, and capable of being manufactured at low cost.

For a consideration of what I believe to be novel and my invention, attention is directed to the following specification and to the claims appended thereto.

In the drawing Fig. 1 is the longitudinal sectional view of a column spring switch embodying my invention; Fig. 2 is a detailed sectional view taken on line 2—2, Fig. 1; Fig. 3 is a sectional view taken on line 3—3, Fig. 1; Fig. 4 is a sectional view taken on line 4—4, Fig. 1; Figs. 5 and 6 are sectional views similar to Fig. 1 showing the switch parts in other positions; and Fig. 7 is a detailed perspective view of adjacent ends of the switch casing sections.

In the embodiment of my invention shown in the drawing, the structure comprises a casing formed in two sections, a top section 1 and a bottom section 2 connected together at their ends by rivets 3. The top and bottom sections are provided with longitudinally extending recesses 4 and 5 respectively which together form a cavity in which the switch movement is located. The casing section 1 is of greater depth than casing section 2. At the right-hand end of cavity 4 the casing wall is provided with a transverse shelf 6 and at the left-hand end with a transverse shelf 7 on which is supported the ends 8 and 9 of a rectangular frame the side strips of which are indicated at 10 and 11. Formed integral with ends 8 and 9 is a column spring 12 the side edges of which are spaced from side strips 10 and 11 as shown clearly in Fig. 2. The rectangular frame with the integral column spring or blade may be formed from a thin flat piece of metal, such as beryllium copper, by taking a strip of suitable width and length and cutting therein two slots as indicated at 13 and 14. This is of substantial advantage in that in their relaxed form the frame and column spring are flat so that large quantities may be stacked together for heat treating.

Fixed to the end 9 of the frame by spot welding or other suitable means is a contact prong 15 which projects out through a slot 16 in the wall of casing section 1. The frame is fixed to the casing at its left-hand end by means of the inner end of prong 15 which engages against a shoulder 17 at the end of the casing section and by the end of the frame which fits against the end of the casing section as indicated at 18, Fig. 2. This

2

serves to hold the frame against both longitudinal and transverse movement. At its other end the frame rests freely on the top of shelf 6. The lower casing section 2 at its right-hand end is provided with a rectangular projection 19 of a size to fit within the side walls of casing section 1. Projection 19 engages with the surface of the end of the frame which rests on shelf 6. At its other end casing section 2 is provided with a T shaped projection 20 (Fig. 7) which enters casing section 1 between its side walls and slot 16 and engages the other end of the frame. Thus the frame is positioned between the two casing sections with its left-hand end fixed to the casing and its right-hand end supported so that it may move longitudinally in the casing, sliding between shelf 6 and projection 19. Shelves 6 and 7 are of a height such that the frame is positioned centrally of the casing.

Carried by column spring 12 is a contact button 21 which in the present instance is shown as adapted to engage with contact buttons 22 or 23 carried by casing sections 1 and 2 respectively. Connected with contact buttons 22 and 23 are contact prongs 24 and 25 respectively. Contact prongs 15, 24 and 25 may be connected with a contact receptacle to which circuit wires are connected, the column spring being used to connect together a circuit connected with contact prong 15 and contact prong 24 or a circuit connected with contact prong 15 and contact prong 25. It will be clear that instead of controlling two circuits the column spring switch may control only a single circuit in which case one of the contact prongs 24 or 25 would be omitted. Contact prongs 24 and 25 are suitably mounted in recesses in casing sections 1 and 2 by means of the contact buttons 22 and 23 which form rivets plus additional rivets 26.

In casing section 2 are centrally positioned edge projections 27 which project well above the side walls of casing section 2 as shown clearly in Fig. 1 and engage the side strips 10 and 11 of the frame to cause the frame to assume a bowed or curved contour as shown in Figs. 1, 5 and 6 of the drawing. The upper ends of projections 27 terminate somewhat short of the inside surface of the bottom of recess 4. The bowing of side strips 10 and 11 shortens the longitudinal length of the frame thereby putting a bow in the column spring 12, as shown in Figs. 1, 5 and 6. In Fig. 1 the bow in the column spring is in the same direction as that of the bow in the frame with the result that contact button 21 carried by the column spring is in engagement with contact

button 22. If now column spring 12 is moved downward from the position shown in Fig. 1, it will be pushed across dead center and caused to snap into a bowed position opposite that shown in Fig. 1; this being the bowed position shown in Fig. 5. In the bowed position shown in Fig. 5 contact button 21 engages contact button 23. Thus by moving the column spring 12 back and forth contact button 21 can be moved back and forth between contact buttons 22 and 23 with a snap action.

For moving the column spring there is shown in the present instance a push button 28 which slides in a recess 29 in casing section 1 and carries a stem 30 suitably connected with the column spring. The lower end of stem 30 slides in an opening 31 in casing section 2. In the present instance stem 30 is shown as being oval in cross section and it is connected to the column spring by means of grooves in the sides of the stem in which are positioned side edges of an oblong opening 32 in the column spring. By this arrangement, the column spring may be connected to the stem by passing the stem through opening 32 with its longer dimension extending longitudinally of the column spring then turning the column spring through an angle of 90 degrees to bring the longer dimension of the stem crosswise of the column spring. In the present instance the column spring is shown as being biased to the position wherein its contact button 21 is in engagement with contact button 22 by means of a spring 33 positioned between the under side of button 28 and the bottom of recess 29. However, this represents only one arrangement which may be used. As is obvious the column spring may be operated positively in both directions or biased in either direction to fit the conditions under which the switch is to be utilized.

If push button 28, after having been actuated to move the column spring from the Fig. 1 position to the Fig. 5, has additional pressure applied to it to move it beyond its normal range, as shown in Fig. 6 for example, the frame will be further shortened; its right-hand end sliding on shelf 6, to a position as shown in Fig. 6, the side strips of the frame moving upward toward the bottom of recess 4. This arrangement permits over travel of the push botton without overstressing the frame and column spring.

In accordance with the patent statutes I have described the principle of operation of my invention together with one embodiment thereof. It is to be understood, however, that the construction shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a column spring switch, walls defining a casing, a rectangular frame which extends across the casing and is supported on the casing at its two ends, said frame being fixed to the casing at one end and supported at its other end for axial movement relative to said casing, a column spring strip connected at its ends to the ends of the frame, projecting means on the casing which engage the sides of the frame between its ends to hold it and the column spring strip bowed, means for moving the column spring strip transversely with respect to the frame, and contacts carried by the spring strip and casing.

2. In a column spring switch, a casing, a strip of spring metal supported at its ends on the casing with one end fixed to the casing and the other end slidably supported within the casing, said strip being provided with a longitudinally extending slot which terminates short of the ends of the strip to define a side strip and a column spring strip, projecting means on the casing which engage the side strip between its ends to hold the side strip and column spring strip bowed, means for moving the column spring strip transversely with respect to the side strip, and contacts carried by the column spring strip and the casing.

3. In a column spring switch, a casing, a strip of spring metal supported at its ends on the casing with one end fixed to the casing and the other end slidably supported, said strip being provided with two spaced longitudinally extending slots which terminate short of the ends of the strip to define side strips and a central column spring strip, projecting means on the casing which engage the side strips between their ends to hold the side strips and column spring strip bowed, means for moving the column spring strip transversely with respect to the side strip, and contacts carried by the column spring strip and the casing.

DAVID L. CLARK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,668,974	Mottlau	May 8, 1928
1,934,605	Tarleton	Nov. 7, 1933
2,249,837	Lee	July 22, 1941