June 18, 1929. P. R. FORMAN 1,718,040

TOGGLE SWITCH

Filed Sept. 29, 1927

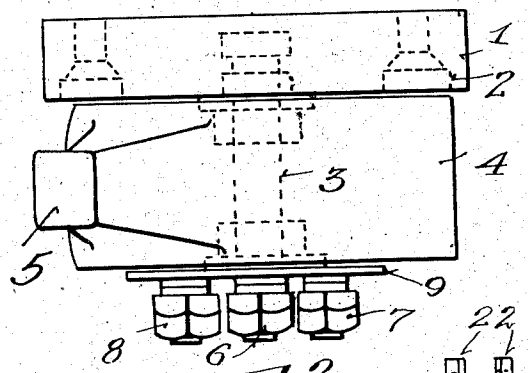


Fig. 2.

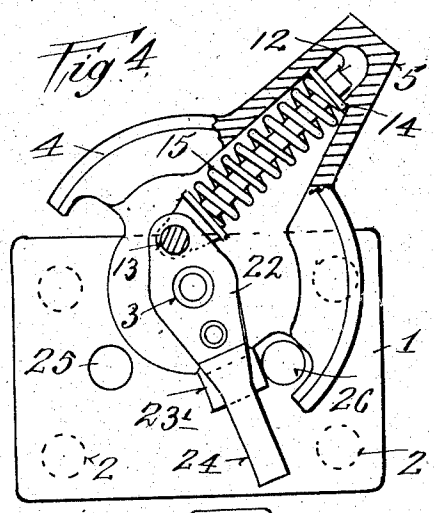


Fig. 4.

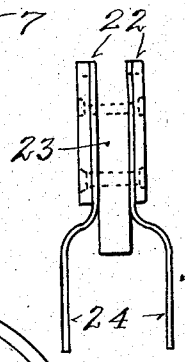


Fig. 5.

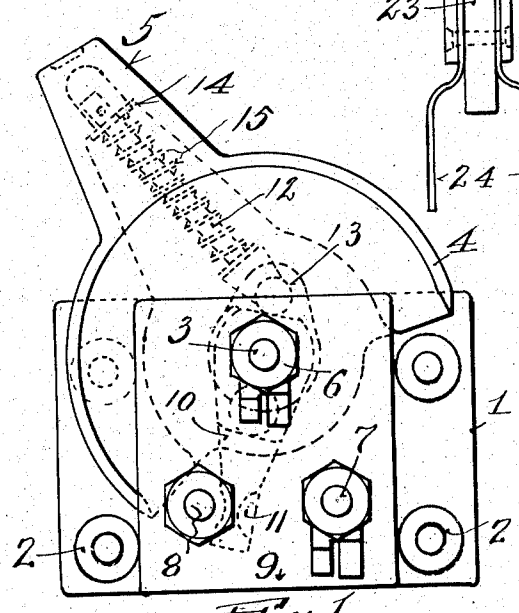


Fig. 1.

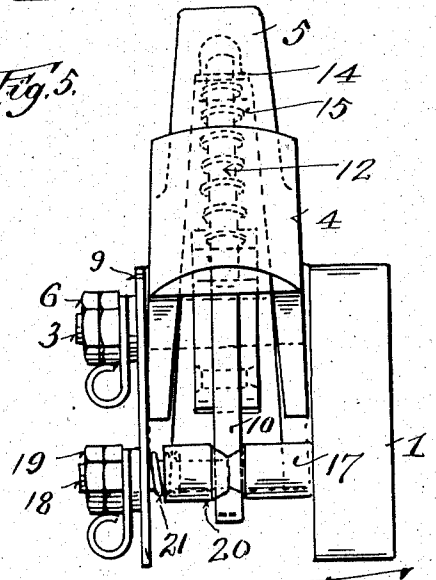


Fig. 3.

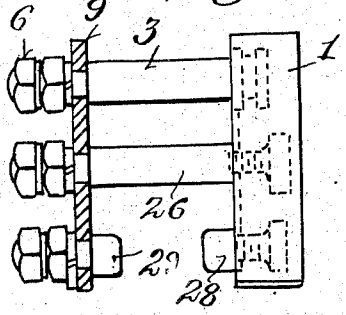


Fig. 6.

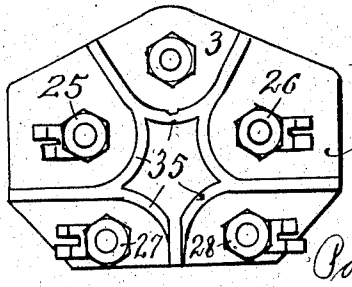


Fig. 7.

Inventor

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By his Attorneys Darby & Darby

Patented June 18, 1929. 1,718,040

UNITED STATES PATENT OFFICE.

PARIS R. FORMAN, OF RAHWAY, NEW JERSEY, ASSIGNOR TO NATIONAL PNEUMATIC COMPANY, OF NEW YORK, N. Y., A CORPORATION OF WEST VIRGINIA.

TOGGLE SWITCH.

Application filed September 29, 1927. Serial No. 222,782.

This invention relates to a toggle or over center switch.

One of the objects of this invention is the provision of a switch having an operating member and a switch arm arranged so that the switch arm is not operated until the operating member is moved past the center of its path of movement.

A further object of this invention is the provision of a switch of this type in which the contact arm and contacts are so constructed as to provide wiping contact therebetween.

A still further object of this invention is the provision of a toggle switch having double contacts for the purpose of reducing arcing by reason of a simultaneous double break in the circuit connected to the contacts.

A still further object of this invention is the construction of a toggle switch which is arranged to break one circuit and make another by means of a switch arm which operates very rapidly.

A still further object of this invention is the construction of special contact members which are particularly adapted to provide a wiping action for the switch arm.

These and other objects, as will appear from the following description, are secured by means of this invention.

This invention resides substantially in the construction, combination, arrangement and relative location of parts as will appear more fully from the following disclosure.

Referring to the drawings—

Figure 1 is a front elevational view of one form of switch,

Figure 2 is a top plan view of this switch,

Figure 3 is a side elevational view of a modified form of switch,

Figure 4 is a front elevational view with some parts removed and some parts in cross section of a second modification,

Figure 5 is a side view of the switch arm employed in the second modification,

Figure 6 is an enlarged detail showing the arrangement of the contacts in the second modification, and

Figure 7 is a plan view of one of the supports employed in the second modification.

This invention provides a toggle or over center switch having one main bearing for simplicity with a secondary toggle bearing for throwing the switch arm after the operating member has moved over center. In the arrangement disclosed the operating member must move past the center of its path of movement before the switch arm is snapped from one set of contacts to the other.

Referring to the drawings, the switch is shown providing a supporting member 1 of insulating material having holes therein for attaching it to a support. Mounted in the member 1 is a shaft 3 upon which is journalled a hollow operating member 4 having a projecting arm 5. A second insulating support 9 is mounted on the shaft or post 3 and the whole structure is held in an assembled arrangement by means of the nuts 6 which provide terminal connecting means for a circuit wire.

Two contact pins or posts 7 and 8 are also mounted between the supports 1 and 9. Pivotally mounted on the post 3 or within the operating member 4 is a switch arm 10 which is provided with notches 11 to increase the area contact of the arm with the contacts 7 and 8. A groove is cut in each of the contacts similar to that shown in Figure 3 and these notches are tapered so that a wiping contact is made with the terminal contacts 7 and 8. A rod 12 is pivotally connected to the lever 10 and is mounted to slide through a washer 14 mounted within the operating member against the action of the spring 15.

As will be apparent from this disclosure, when the operating member (Figure 1) is swung between the supports about the post 3 it will snap the switch arm 10 from the left to the right when the rod 12 is moved somewhat past the center path of its movement. The spring 15 which is compressed up to the time when the arm 10 begins to move provides the energy for swinging the switch arm from one set of contacts to the other. This arrangement provides a switch of the two-way type as does the other modifications.

Referring to Figure 3, the contact terminals, of which only one appears in this view—namely 17, have a reduced portion 18 on which is slightly mounted the thimble 20 against the action of spring 21. The end of the thimble 20 adjacent the shoulder on the terminal 17 and the shoulder itself are chamfered. It will be apparent that when the spring arm contacts with the terminals 17 it will force the thimble 20 to the left to provide a wiping and cleaning contact. Oth-

erwise this switch is of the same construction as that shown in Figure 1.

In the arrangement of Figures 4, 5, 6 and 7 the switch arm comprises a conducting member 23, two spring fingers 24 spaced apart by the conducting member, and two members 22, all of which are clamped together to form a rigid switch arm. This switch arm is pivotally mounted on the bearing post 3 as before. The lower end of the conducting member 23 is somewhat enlarged as shown at 23' in Figure 4. Mounted on the support 1 are two contacts 25 and 26 and mounted on the support 9 (Figure 6) are two contacts 27 and 28 which are respectively in alignment with the contacts 25 and 26. With this arrangement the spring fingers 24 are arranged to slide between the respective sets of contacts which have round ends to provide a wiping and cleaning contact. Otherwise the construction of this switch is the same as that shown in Figure 1.

From the foregoing disclosure it will be apparent that I have devised a new and novel form of toggle switch which is relatively simple in construction and which in the normal operation thereof provides means for reducing arcing by reason of the wiping contact as well as a cleaning operation. I am well aware that many changes in the details of construction and relative arrangement of parts will readily occur to those skilled in the art and I do not, therefore, desire to be limited except as required by the appended claims.

What I seek to secure by United States Letters Patent is:

1. In a toggle switch a pair of supports, a pivot post rigidly supporting said supports in spaced relation, contacts on said supports, a hollow member having a stop plate therein movably supported on said post, a switch arm pivoted on said post within said hollow member and means comprising a rod having a stop plate thereon pivotally connected to said switch arm and extending through said stop plate in the hollow member and a spring encircling said rod lying between the stop plates for causing said arm to swing from one set of contacts to another when said member is moved past the center of its path of movement.

2. In a toggle switch a pair of supports, a pivot post rigidly supporting said supports in spaced relation, contacts on said supports, a hollow member movably supported on said post, a switch arm pivoted on said post within said hollow member, a rod slidably mounted in said hollow member and pivotally connected to said arm, and a spring encircling said rod abutting against said member to cause said arm to snap from one set of contacts to another when said member is rotated about said post.

3. In a toggle switch construction the combination of two spaced supports, a pivot post for holding the spaced supports in fixed relation, a plurality of contact posts secured between said spaced supports, said posts comprising a reduced portion on which is slidably mounted contact members under spring pressure, a switch arm pivotally attached to said pivot post, a hollow member forming the switch handle also pivotally mounted on said pivot post, a rod pivotally attached to said switch arm and extending into said hollow member and a compression spring encircling said rod whereby the switch arm is snapped into wiping contact with said contact posts when the hollow member is rotated.

In testimony whereof I have hereunto set my hand on this 23rd day of September A. D., 1927.

PARIS R. FORMAN.