Feb. 8, 1927. 1,617,040

P. H. ZIMMER

SNAP SWITCH

Filed Oct. 22, 1925

Fig. 1.

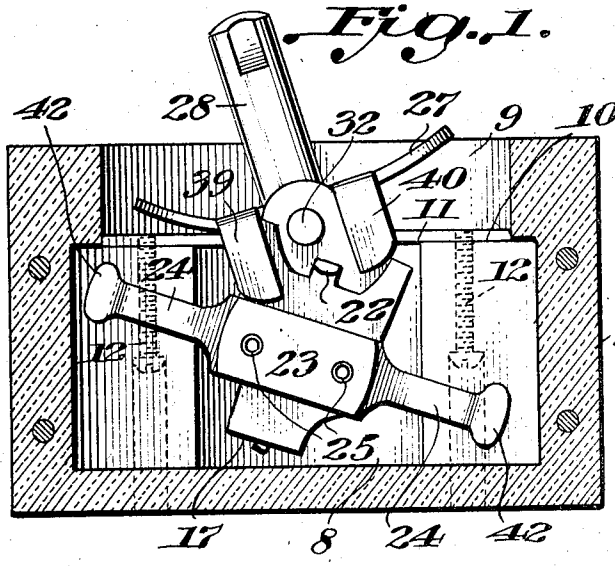


Fig. 4.

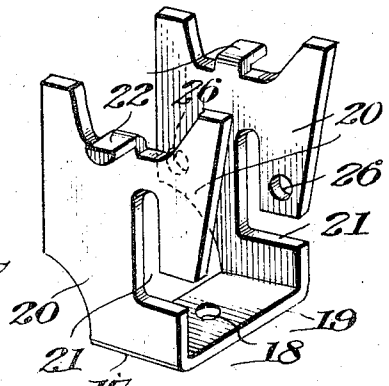


Fig. 5.

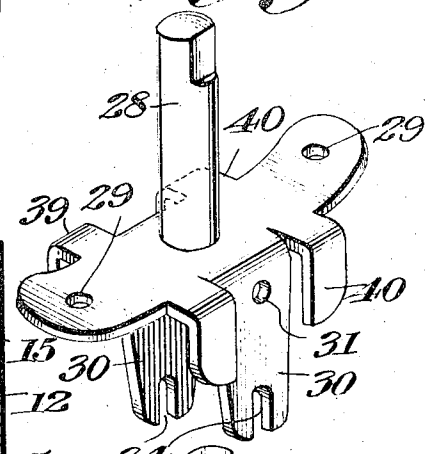


Fig. 2.

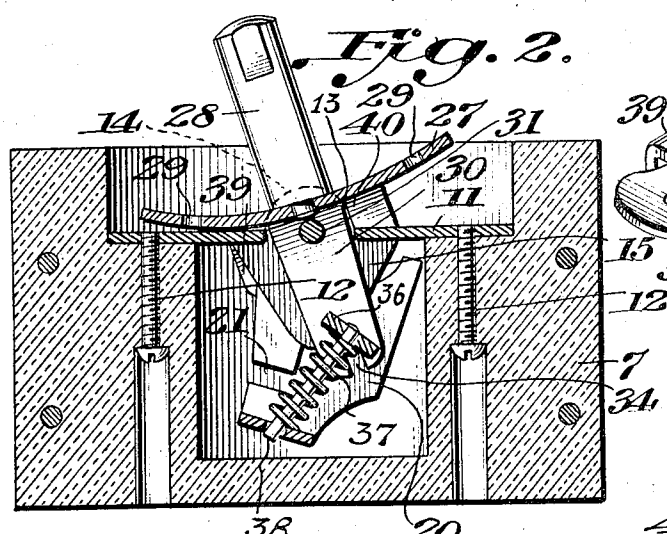


Fig. 3.

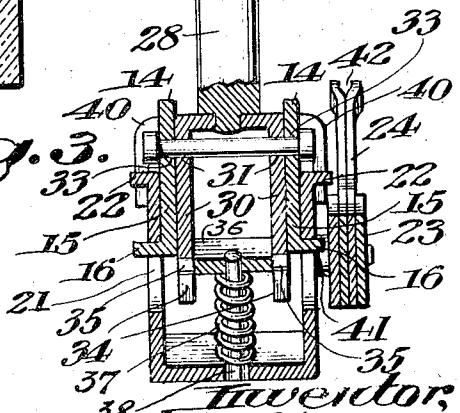
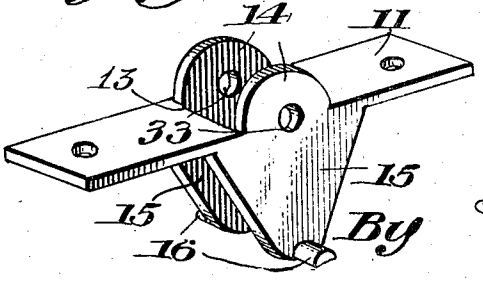


Fig. 6.



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UNITED STATES PATENT OFFICE.

PAUL H. ZIMMER, OF JACKSON, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO REYNOLDS SPRING COMPANY, OF JACKSON, MICHIGAN, A CORPORATION OF DELAWARE.

SNAP SWITCH.

Application filed October 22, 1925. Serial No. 64,201.

This invention relates to snap switches.

In quick brake or snap electrical switches of the toggle variety, there are times when the switch blade or bar becomes "frozen" to the contact terminals, incident to oxidation or for other reasons the blade or bar sticks to the terminals, with the result that the toggle spring fails to perform its function of throwing the switch blade or bar in view of which, dangerous conditions are likely to arise.

It is, therefore, an object of the present invention to provide a "kick-off" means adapted to exert influence upon the toggle in cooperation with the spring element of the toggle to effect a positive quick snap action when the spring of the toggle is conditioned to effect the throw of the switch bar carrying yoke or frame and thereby ensure positive operation of the switch.

Another object of the invention is to provide a switch of the toggle snap type with a "kick-off" means adapted to coact with the spring toggle element to effect a quick positive throw of the switch bar carrying members.

With these and other objects in view, the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:

Figure 1 is a view showing, partly in section and partly in elevation, the insulating body in which the switch mechanism is mounted, the switch mechanism being shown in elevation;

Fig. 2 is a similar view except that the switch mechanism is shown in longitudinal section;

Fig. 3 is a transverse sectional view of the switch mechanism removed from the insulating body;

Fig. 4 is a detailed perspective view of the switch blade carrying frame or yoke;

Fig. 5 is a perspective view of one embodiment of switch operating means;

Fig. 6 is a detailed perspective view of the means for mounting and supporting the switch mechanism within an insulating body.

Referring now more particularly to the accompanying drawings, the reference character 7 indicates a phenol condensation product, or other insulating material, adapted to be enclosed within a metallic box or other receptacle, or casing, (not shown), sufficient material being shown to illustrate an efficient mounting for the switch mechanism.

The insulating material 7 is provided with a chamber 8 which communicates with a recess 9 of greater width than the chamber, forming a shoulder 10.

A plate 11 is secured on said shoulder 10 by means of suitable fastenings 12 and obviously additional securing means may be employed, if desired. This plate 11 has an opening 13 intermediate its ends which establishes communication between the chamber 8 and the recess 9 and adjacent the sides of said openings, ears 14 rise from the side edges of the plate, there being tapering arms 15 extending from the side edges of the plate 11 adjacent said opening 13 into said chamber 8 and at their smaller or minor ends carrying outwardly projecting journals 16.

A switch blade or bar carrying frame or yoke 17 is swingingly supported from the aforesaid journals 16. This yoke or frame 17 is substantially U-shaped in cross section, having an aperture 18 in its bight portion 19 for a purpose presently explained, and in its side walls 20 having L-shaped slots 21 at the inner closed ends of which lie the aforesaid journals 16 whereby to support the yoke or frame 17 from the aforesaid tapering arms 15. The yoke or frame 17 has each of its sides 20 provided with a laterally outwardly directed kick-off stud 22 for a purpose presently explained and on one of its sides the bar 23 of the switch blades 24 is fixedly secured by means of suitable fastenings 25 operating in the apertures 26 of the frame or yoke 17, the switch bar and blades thereby being fixedly secured to said frame or yoke and swinging with the latter.

An operating device for actuation of the switch is journaled in the aforesaid ears 14 of the plate 11. This operating device may consist of a curved member 27 which con-

stitutes a rocking lever and which may be operated by a hand piece 28, or by means of push buttons (not shown) which may be fitted in any suitable manner in the apertures 29 at the ends of the rocking lever 27. Lever arms 30 project from the rocking lever 27 intermediate the ends thereof on opposite sides of the same and these lever arms 30 are provided each with an aperture 31 whereby to pivotally mount the operating device on a pivot 32 mounted in the apertures 33 of the aforesaid ears 14 of the plate 11, said lever arms 30 projecting through the opening 13 in the plate 11 into the chamber 8 parallel with the aforesaid arms 15 and within the latter and adjacent thereto. The lower ends of these arms are bifurcated as at 34, and these bifurcations pivotally embrace the journals 35 of a rocking plate 36 disposed between the outer ends of the arms 30. This rocking plate 36 is held between the lever arms 30 with its journals 35 normally at the closed ends of the bifurcations 34 by means of a spring 37 bearing at one end against said plate 36 and at its opposite end bearing against the bight portion 19 of the aforesaid yoke 17, said spring 37 being held in operative position by a rod 38 fixed at one end to said rocking plate 36 and at its opposite end mounted to pass through the aforesaid aperture 18 in the bight portion 19 of the yoke 17. The spring 37 thrusts against the bight portion 19 of the yoke 17 and the rocking plate 36, forming with the yoke and operating lever a spring actuated toggle.

The rocking lever 27 has spaced pairs of overhanging ears 39 and 40, one pair between the lever arms 30 and the respective ends of the rocking lever with the ears offset outwardly from alignment with the lever arms 30 so that upon rocking movement of the rocking lever 27, the coiled spring 37 is compressed on the rod 38 until the toggle parts reach a dead center and immediately prior to the toggle reaching the point of dead center the kick-off devices 39 or 40, depending upon direction of movement of the rocking lever 27, come into engagement with the kick-off studs 22 of the yoke 17 and effect a positive throw of the toggle beyond dead center and consequently effect and provide for a positive and quick snap action of the switch mechanism.

It will thus be seen that I provide a simple, comparatively inexpensive, durable and efficient hand piece or push button type of toggle variety of snap switch in which there is a positive "kick-off" device comprising pairs of kick-off studs 22 carried by the switch bar carrying frame or yoke 17 with which coact pairs of kick-off devices arranged to move into engagement with the kick-off studs 22 to effect a quick snap action and one which is positive so that in the event of sticking of the switch blades to the contacts, (not shown) the switch bar and its blades are positively released from the terminals or contacts thereby preventing undue weakening of the spring element, and otherwise preventing injury to the switch mechanism. As shown the switch bar 23 may be spaced from the yoke 17 by means of suitable spacing means 41 and if desired, the blades 24 may be of the character to embrace the electrical contacts (not shown) as indicated at 42. It might be stated, however, that the particular type of switch bar or switch blade is not essential, nor is the character of terminal contacts essential, the invention going primarily to the switch mechanism and particularly to the kick-off device herein described and illustrated in the accompanying drawings.

What is claimed is:

1. An electric switch comprising a supporting means including a plate having arms, a switch bar carrying yoke swingingly connected to said arms, a flat rocking lever pivotally connected to said plate and having a curved wing at each end and adapted to be rocked into and out of engagement with said plate on opposite sides of its pivotal connection with said plate, said rocking lever having lever arms intermediate its ends between said wings and bifurcated at their outer ends, a rocking plate having its ends provided with journals fitted on the bifurcations of said lever arms, a spring connection between the yoke and the rocking plate, the rocking lever having kick-off devices arranged in pairs on each side thereof, the kick-off devices of each pair being disposed on opposite sides of the pivotal connection between said rocking plate and said lever and offset outside of the planes of said lever arms, the said yoke having a lateral projection on each side disposed between the respective pairs of kick-off devices for engagement by the latter to effect a positive quick snap throw of the switch bar carrying yoke upon the operation of said rocking lever.

2. An electric switch comprising a supporting means including a plate having arms provided with integral laterally directed journals, a switch bar carrying yoke including spaced sides having slots therein and also having projections, one on each side of said yoke, the journals of the arms of the supporting means operating in said slots of the yoke, a rocking lever mounted on said means and having spaced lever arms provided with bifurcations, a rocking plate having journals in the bifurcations of the said lever arms, a spring connection between said rocking plate and the yoke, the rocking lever having kick-off devices arranged in pairs on each side thereof, the kick-off devices being shorter than the lever arms and each pair of kick-off devices being disposed on oppo-

site sides of the pivotal connection between said plate and said lever and offset outside of the plane of said lever arms, the rocking lever and the lever arms and said kick-off devices being formed of a single piece of material, said yoke having a lateral projection on each side disposed between the respective pairs of kick-off devices for engagement by the latter to effect a positive quick snap throw of the switch bar carrying yoke upon the operation of said rocking lever.

3. An electric switch comprising a supporting means including a plate having arms provided with journals, a switch bar carrying yoke supported on said journals to swing thereon, a rocking lever mounted on said supporting means and having curved ends and also having lever arms, a rocking plate connecting the lever arms, a spring connection between the rocking plate and the yoke, the yoke having lateral projections and pairs of kick-off devices arranged on opposite sides of the lever arms and between the latter and the curved ends of the rocking plate and offset with relation to the lever arms whereby upon engagement of the respective pairs of kick-off devices with the lugs of the yoke a quick positive throw of the switch is effected, said rocking lever and its curved ends and the lever arms and pairs of kick-off devices being formed of a single piece of material.

In testimony whereof I have hereunto set my hand.

PAUL H. ZIMMER.