Aug. 18, 1953 R. J. HARTZ 2,649,520

ELECTRICAL SWITCH

Filed May 24, 1951

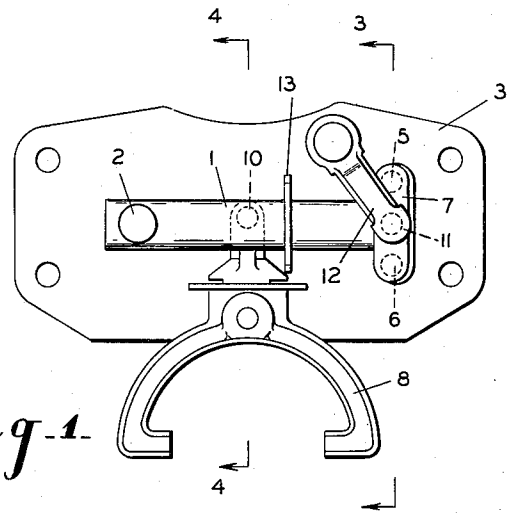


Fig. 1.

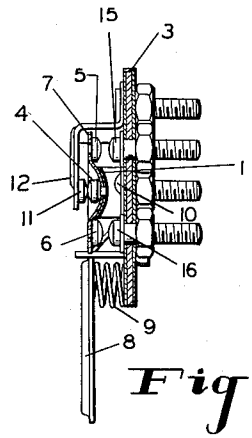


Fig 3

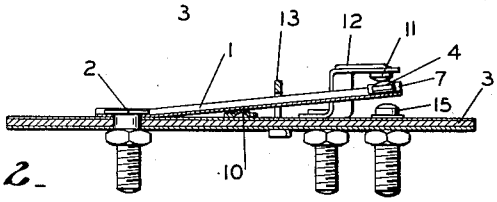


Fig. 2.

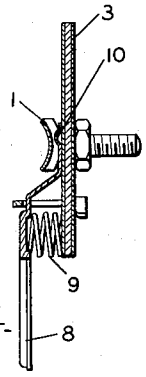


Fig. 4.

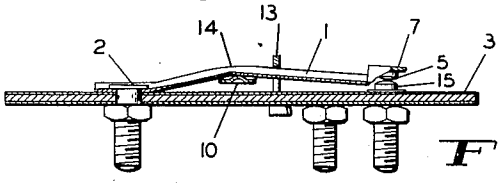


Fig. 6.

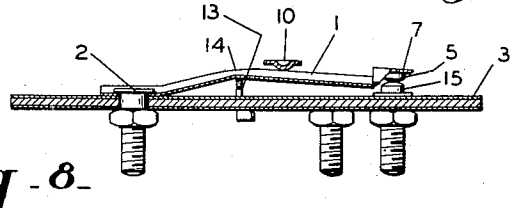


Fig. 8.

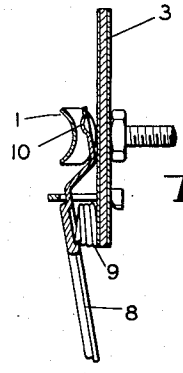


Fig. 5.

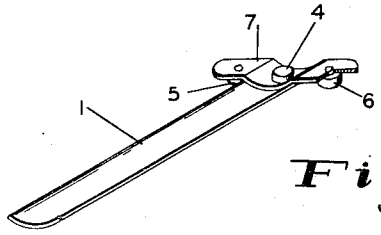


Fig. 7.

INVENTOR.
RAYMOND J. HARTZ
BY
ATTORNEY

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ELECTRICAL SWITCH

Raymond J. Hartz, Cuyahoga Falls, Ohio, assignor to Jack & Heintz Precision Industries, Inc., Cleveland, Ohio, a corporation of Delaware

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5 Claims. (Cl. 200—67)

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This invention relates in general to electrical switches and more particularly to quick-action snap switch mechanism.

One of the primary objects of my invention is to provide a snap switch constructed of the minimum number of simple inexpensive parts and which will be reliable in operation.

Another object is to provide a longitudinally channeled leaf spring contact arm, with a contact disposed between two contact points, and operating mechanism whereby positive snap action of the contact arm is insured to bring its contact into positive engagement with one or the other contact point, in response to the operation of the operating member without any lag, or hunting between the two contact points, so as to avoid arcing or sparking.

A further object is to provide, in connection with such a snap action channeled leak spring contact arm, a single operating arm spring biased to engage one contact point and operable to flex the contact arm away from this contact point, and a bridge, or stop located adjacent the point of contact of the operating mechanism, and between the same and the contact carried by the arm, to cause the channeled arm to become flattened where it is engaged by the operating arm, thereby producing a snap action of a considerable portion of the length of the arm that supports the contact, to insure positive snap action without lag, or hunting of the contact between the two contact points.

With the foregoing and other objects in view, the invention resides in the combination of parts and in the details of construction hereinafter set forth in the following specification and appended claims, certain embodiments thereof being illustrated in the accompanying drawings, in which:

Figure 1 is a fragmentary plan view of the switch and operating mechanism;

Figure 2 is a view in longitudinal section taken through the switch and operating member, showing the contact arm spring biased to bring its contact into engagement with the upper contact point;

Figure 3 is a view in section, taken along line 3—3 of Figure 1;

Figure 4 is a view in section taken along line 4—4 of Figure 1, with the operating arm in normal position;

Figure 5 is a view similar to Figure 4, with the operating arm manually depressed;

Figure 6 is a view similar to Figure 2, with the contact arm manually operated to snap its contact into engagement with the lower contact point;

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Figure 7 is a detailed view in perspective of the channeled leaf spring contact arm, and

Figure 8 is a view similar to Figure 6, showing a modified form in which the bridge is supplanted by a post to be the pivot point and the pressure is applied to the concave side of the spring between the post and the contacts.

Referring more particularly to the drawings, I have shown my channeled rigid resilient contact arm 1, which is secured, with its concave face upward, near its one end, at 2 to the base, 3. On its upper concave face, near its other end, the contact arm carries a contact 4 and on its lower convex face a pair of contacts 5 and 6 are carried by a cross strip 7 carried by the arm 1.

Pivotally secured to the base is an operating arm 8, normally urged by a coil spring 9 into horizontal position, as shown in Figures 1, 2, 3 and 4, to bring its contact arm engaging button 10 into engagement with the lower convex face of the arm 1 to normally flex the arm 1 upwardly so that its upper contact 4 engages the upper contact point 11 on a bracket 12 carried by the base 3, as shown in Figures 2 and 3. Further, as shown in Figure 2, the base 3 also carries a bridge 13 which limits the upper movement of the spring arm 1. Reference to Figure 2 shows the contact 4 forced upwardly against contact point 11 by member 10 and the spring arm 1 just short of engagement with the limit stop bridge 13. It is to be noted that bridge 13 is located just to the right of member 10, as viewed in Figures 2 and 6.

Movement of lever 8, against the action of spring 9, causes an upward movement of member 10, which brings the spring arm 1 against the lower side of bridge 13. Continued upward movement of member 10 against the convex under surface of the channel arm 1 causes it to become flattened at the point of engagement of member 10 with the arm 1, which results in a quick snap action of arm 1 at point 14 as a pivot point. This quickly snaps contact 4 out of engagement with contact point 11, and snaps contacts 5 and 6 into engagement with contact points 15 and 16. This snap action is quick and positive and the described arrangement and spacing of members 10 and 13, with respect to the contact carrying end of the contact arm 1, creates a leverage with a substantial length of spring between the bridge and the contacts. This provides a positive snap action that insures normal engagement of contact 4 with contact point 11, or engagement of contacts 5 and 6 with contact points 15 and 16, upon operation of lever 8, with no lag, or hunting between the upper and lower

contact points, thus avoiding arcing or sparking.

As an alternative form, as shown in Figure 8, I may elect to apply pressure by point 10 to the concave side of the channel spring 1. The bridge 13 here takes the form of a post and forms the pivot point as the pressure point 10, between post 13 and the contacts, snaps contact 5 into engagement with contact 15.

I claim:

1. In an electrical snap action switch, a base carrying spaced upper and lower contact points, a contact arm carrying contacts at one end on its both sides to alternately engage said contact points, said contact arm being of springy material and longitudinally channeled and having its other end rigidly secured with its convex face against said base, a pivoted operating lever having at its free end a single member normally spring urged to engage the lower convex side of said channeled arm to flex said arm to bring a contact into engagement with said upper contact point, a limit stop bridge carried by said base arranged above said contact arm closely adjacent said operating lever member and between the same and said contacts to limit the upper movement of said contact arm, said operating lever, upon pivotal operation against its biasing spring, being adapted to force said contact arm against said bridge and flatten said channeled contact arm at the point of engagement of the operating lever member with said arm to suddenly snap said arm the other direction about said point as a pivot to disengage said contact with said upper contact point and engage said other contact with said lower contact point.

2. In an electrical snap action switch a base carrying spaced upper and lower contact points, a single contact arm carrying contacts at one end on its both sides to alternately engage said contact points, said contact arm being of springy material and longitudinally channeled and having its other end rigidly secured with its convex face against said base, a pivoted operating lever having at its free end a member normally spring urged to engage the lower convex side of said channeled arm to flex said arm to bring a contact into engagement with said upper contact point, a limit stop bridge carried by said base arranged above said contact arm closely adjacent said operating lever member and between the same and said contacts to limit the upper movement of said contact arm, said operating lever, upon pivotal operation against its biasing spring, being adapted to force said contact arm against said bridge and flatten said channeled contact arm at the point of engagement of the operating lever member with said arm to suddenly snap said arm the other direction about said point as a pivot to disengage said contact with said upper contact point and engage said other contact with said lower contact point.

3. In an electrical snap action switch a base carrying spaced upper and lower contact points, a single contact arm carrying contacts at one end on its both sides to alternately engage said contact points, said contact arm being of springy material and longitudinally channeled and having its other end rigidly secured with its convex face against said base, a pivoted operating lever having at its free end a member normally spring urged to engage the lower convex side of said channeled arm to flex said arm to bring a contact into engagement with said upper contact point, a limit stop arranged above said contact

arm to limit the upper movement of said contact arm, said operating lever, upon pivotal operation against its biasing spring, being adapted to force said contact arm against said limit stop and flatten said channeled contact arm at the point of engagement of the operating lever member with said arm to suddenly snap said arm the other direction about said point as a pivot to disengage said contact with said upper contact point and engage said other contact with said lower contact point.

4. In an electrical snap action switch a base carrying spaced upper and lower contact points, a single contact arm carrying contacts at one end on its both sides to alternately engage said contact points, said contact arm being of springy material and longitudinally channeled and having its other end rigidly secured with its convex face against said base, a pivoted operating lever having at its free end a member normally spring urged to engage the lower convex side of said channeled arm to flex said arm to bring a contact into engagement with said upper contact point, a limit stop bridge carried by said base arranged above said contact arm to limit the upper movement of said contact arm, said operating lever, upon pivotal operation against its biasing spring, being adapted to force said contact arm against said bridge and flatten said channel contact arm at the point of engagement of the operating lever member with said arm to suddenly snap said arm, the other direction about said point as a pivot to disengage said contact with said upper contact point and engage said other contact with said lower contact point.

5. In an electrical snap action switch, a base carrying spaced upper and lower contact points, a contact arm carrying contacts at one end on its both sides to alternately engage said contact points, said contact arm being of springy material and longitudinally channeled and having its other end rigidly secured to said base, a pivoted operating lever having at its free end a single member normally spring urged to engage one side of said channeled arm to flex said arm to bring a contact into engagement with said upper contact point, a limit stop bridge carried by said base arranged above said contact arm closely adjacent said operating lever member and between the same and said contacts to limit the upper movement of said contact arm, said operating lever, upon pivotal operation, being adapted to force said contact arm against said bridge and flatten said channeled contact arm at the point of engagement of the operating lever member with said arm to suddenly snap said arm the other direction about said point as a pivot to disengage said contact with said upper contact point and engage said other contact with said lower contact point.

RAYMOND J. HARTZ.

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