July 4, 1967 J. ROGERO 3,329,784

ELECTRICAL SNAP SWITCH WITH IMPROVED GUIDE MEANS

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Fig. 2.

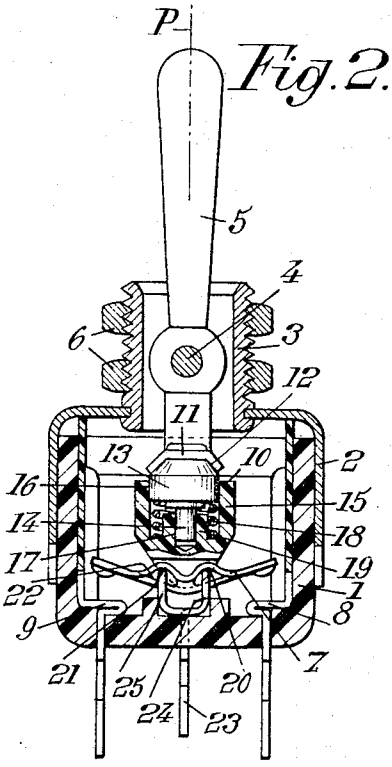


Fig. 1.

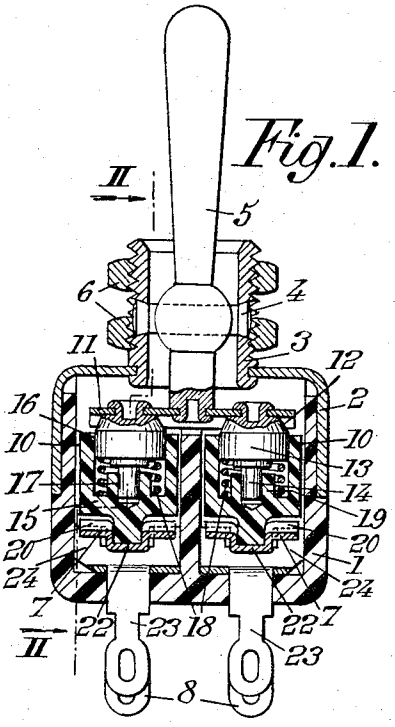


Fig. 3.

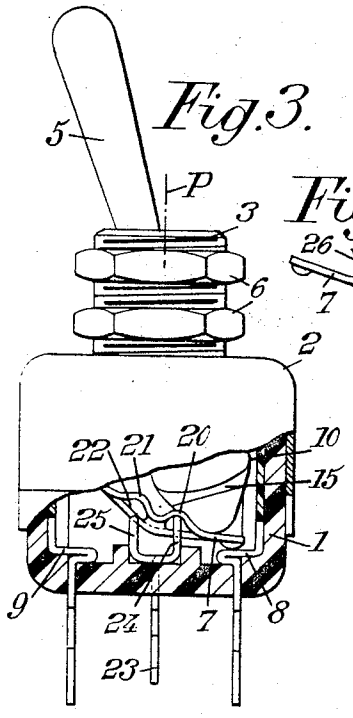


Fig. 5.

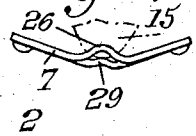
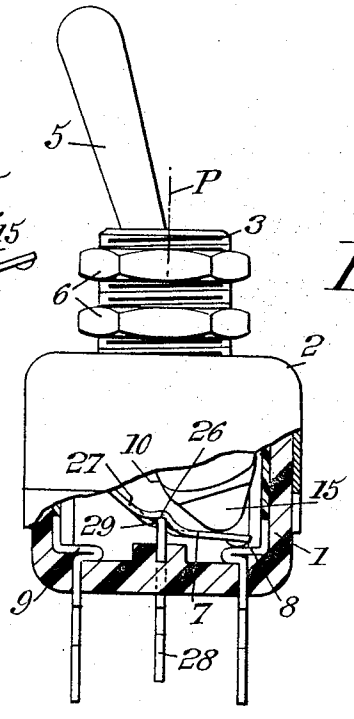


Fig. 4.



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ELECTRICAL SNAP SWITCH WITH IMPROVED GUIDE MEANS

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Fig. 6.

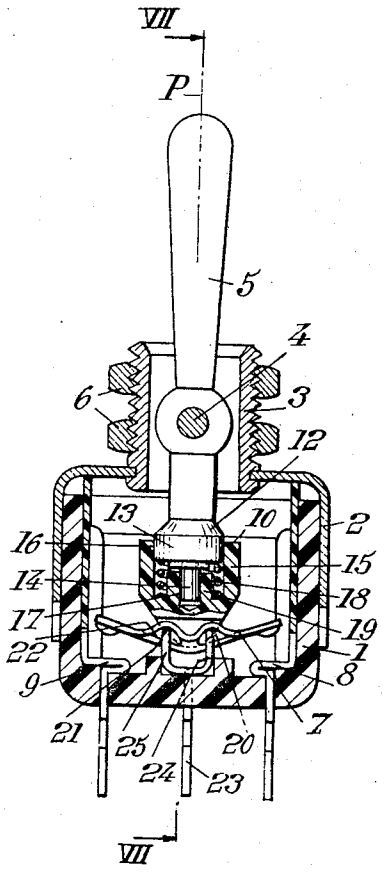
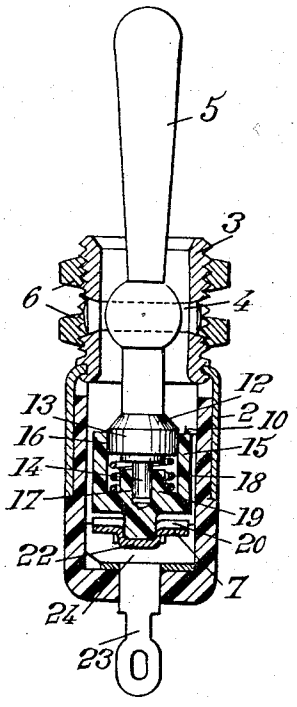


Fig. 7.



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ELECTRICAL SNAP SWITCH WITH IMPROVED GUIDE MEANS

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3 Claims. (Cl. 200—67)

The present invention relates to electric switches, either of the single pole or of the multiple pole type and more especially, but not exclusively, to electric switches having a single control lever.

According to a first feature of my invention, the electric switch, comprising at least one intermediate contact member adapted to pivot under the action of a spring mechanism about at least one axis fixed with respect to a fixed middle contact to cooperate with at least one fixed end contact, said intermediate contact member carrying a track on which a push-piece is slidable along a line thereof located in a plane perpendicular to said axis, is characterized in that said spring mechanism comprises, on the one hand, a support rigid with a pivoting control lever and comprising two coaxial cylindrical guide portions of different respective diameters, said push-piece being provided with two coaxial bores adapted to accommodate said respective cylindrical guide portions, and, on the other hand, a spring housed in one of said push-piece bores, said spring keeping said push-piece applied against said track of the intermediate contact.

According to another feature of my invention, the electric switch, comprising at least one intermediate contact member adapted to pivot under the action of a spring mechanism about at least one axis fixed with respect to a fixed middle contact to cooperate with at least one fixed end contact, said intermediate contact member carrying a track on which a push-piece is slidable along a line thereof located in a plane perpendicular to said axis, is characterized in that said pivot axis is offset toward said spring mechanism with respect to said line of the track of the intermediate contact member.

Preferred embodiments of the present invention will be hereinafter described with reference to the appended drawings, given merely by way of example, and in which:

FIG. 1 is an axial sectional view of a switch made according to the invention having a middle position, the intermediate swinging contact member of said switch being shown in its middle position;

FIG. 2 is a sectional view on the line II—II of FIG. 1;

FIG. 3 is a view analogous to FIG. 1 but with parts hidden by the switch lid, the intermediate contact member being shown to cooperate with one of the fixed end contacts;

FIG. 4 is a view analogous to FIG. 3 of a switch according to the present invention having no middle position;

FIG. 5 is a detail view showing, in elevational view, an element of the switch of FIG. 4;

FIG. 6 is an axial sectional view of a single pole switch according to the invention;

FIG. 7 is a sectional view on the line VII—VII of FIG. 6.

In the embodiments of FIGS. 1, 2 and 3 the switch comprises a casing **1** made of an insulating material and a lid **2** made of a stamped metal sheet, said lid **2** being secured to casing **1** through suitable means (not shown).

Lid **2** carries, fixed thereto, a screw threaded tubular portion **3** in which is mounted a pivot spindle **4** about which control lever **5** is pivoted. Portion **3** also carries nuts **6** for fixation of the switch to a panel.

In the bottom portion of casing **1** are disposed two systems comprising each an intermediate swinging or rocking contact member **7** intended to cooperate with two fixed contacts **8** and **9**.

Each of said intermediate swinging contact members **7** is actuated by a distinct spring mechanism **10**, both of said spring mechanisms **10** being fixed through a rigid plate **11**, generally metallic, to control lever **5**.

Each spring mechanism **10** has one of its ends secured to rigid plate **11**, for instance by setting, its other end constantly bearing upon the corresponding swinging intermediate contact member **7**.

As shown by FIGS. 1 and 2 spring mechanism **10** comprises:

On the one hand a metallic piston-like structure **12** including two cylindrical guide portions **13** and **14**, of respective different diameters, said structure **12** being rigid with control lever **5** through rigid plate **11**,

On the other hand a push-piece **15**, made of an insulating material, comprising two bores **16** and **17** adapted to cooperate with said guide portions **13** and **14**, respectively, which slide therein,

And, still on the other hand, a spring **18** housed in bore **16**, said spring **18** urging push-piece **15** away from piston **12**.

As shown by FIGS. 1 and 2, each of the pistons **12** is fixed by setting on rigid plate **11**.

As for push-piece **15**, it comprises, between the outer bore **16** and the inner bore **17**, a projection **19** which serves to center spring **18**, which thus extends between said projection **19** and the wall of the outer bore **16**.

In order to provide, for swinging contact member **7**, a middle position where it cooperates neither with fixed contact **8** nor with fixed contact **9** (as shown by FIG. 2), the switch is made as follows:

On the one hand, each intermediate swinging contact member **7** is provided with two concave portions **20** and **21** disposed symmetrically with respect to the plane of symmetry P (FIG. 2) of the switch, the two concave portions **20–21** of a pair being located respectively on opposite sides of a track **22** rigid with said swinging contact member **7**,

And, on the other hand, each of the two intermediate swinging contact members **7** is supported by a fixed middle contact **23** in the form of a fork having two branches **24** and **25**. One of the two concave portions, to wit **20**, of each intermediate swinging contact member **7** cooperates with the branch **24** of fixed contact **23** whereas the other concave portion **21** of member **7** cooperates with the other branch **25** of said fixed contact **23**.

As shown by FIGS. 2 and 3, push-piece **15**, intermediate swinging contact member **7**, middle fixed contact **23** and end fixed contacts **8** and **9** are arranged in such manner that the parts are separated from each other in a sudden manner, either between intermediate contact member **7** and fixed end contact **8** or between intermediate swinging contact member **7** and end contact **9**.

The track **22** of each of the two intermediate swinging contact members **7** is arranged in such manner that, when the contact member **7** that is considered is in its middle position, its lowest point is lower than the pivot axis constituted

By the branch **24** of middle contact **23** and the pair of concave portions **20** of intermediate contact member **7** when the break is to take place on the side of end fixed contact **8**,

And by the branch **25** of middle contact **23** and the pair of concave portions **21** or intermediate contact member **7** when the break takes place on the side of end contact **9**.

I will now describe a reversing switch in which there is no middle position, that is to say a switch wherein each of the intermediate swinging contacts 7 passes directly from its position where it cooperates with end contact 8 to the position where it cooperates with end contact 9.

Such an arrangement is illustrated by FIG. 4 wherein the parts of the switch are designated by the same reference numerals as in FIGS. 1 to 3.

In this embodiment, on the one hand, each of the two intermediate swinging contact members 7 comprises a pair of concave portions 26 extending on both sides of the plane of symmetry of the switch, said two concave portions being located on opposite sides, respectively, of a track 27 the middle line of which extends perpendicularly to symmetry plane P, and on the other hand each of the two swinging intermediate contact members 7 is carried by a middle contact 28 forming a knife edge, the pair of concave portions 26 of the intermediate swinging contact member 7 that is considered cooperating with this middle contact 28.

For this purpose, push-piece 15, intermediate swinging contact member 7 and middle contact 28 are arranged in such manner that said intermediate swinging contact member 7 passes suddenly from its right hand position to its left hand position and that it never has a tendency to remain in an intermediate position.

The track 27 of each of the swinging contact members 7 is then given a shape such that the face thereof that cooperates with the corresponding push-piece 15 has, opposite the middle contact 28, a projection 29 as shown by FIG. 5.

I will now examine an embodiment of my invention concerning a single pole switch, as shown by FIGS. 6 and 7, where the same reference numerals designate the same parts as in the other figures.

The embodiment of FIGS. 6 and 7 comprises casing 1, lid 2 and control lever 5 pivoting about spindle 4 carried by tubular portion 3.

At the bottom of casing 1, there is provided a single system consisting of intermediate swinging contact member 7 adapted to cooperate with either of the two end contacts 8 and 9.

The spring mechanism 10 of this switch is directly carried by the lower end of control lever 5.

For this purpose, piston like structure 12 consists of an extension of the lower end of control lever 5, push-piece 15 cooperating, by sliding movements of its two bores 16 and 17, with cylindrical guide portions 13 and 14 of said support.

As for intermediate swinging contact member 7 it is made as above described.

Of course, a switch similar to that of FIGS. 6 and 7 might be arranged so as to have no intermediate position of swinging contact member 7, the latter then passing directly from its right hand to its left hand position.

The apparatus according to the present invention has limited overall dimensions. It is easy to assemble. The contacts it supplies are safe and reliable. It is strong and simple.

In a general manner, while the above description discloses what are deemed to be practical and efficient embodiments of the present invention, said invention is not limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of the invention as comprehended within the scope of the appended claims.

What I claim is:

1. An improved electric switch which comprises a casing, a first fixed contact carried by said casing, a second fixed contact carried by said casing, a movable contact member pivoted to said first fixed contact about the edge thereof and adapted to engage said second fixed contact, a part rigid with said movable contact member, said part forming a track the middle line of the surface of which is located in a plane perpendicular to said edge, a push-piece slidable along said line of said track, a control lever pivoted to said casing about an axis parallel to said edge and means for operatively connecting said lever with said push-piece for moving it along said line of said track, wherein the improvement comprises,

the fact that said push-piece is provided with two coaxial cylindrical bores, a first one and a second one located inside the first one, the part of said push-piece wherein said second bore is located including an annular projection extending from the bottom of said first bore,

the fact that said means comprise a first cylindrical guide portion rigid with said control lever and fitting slidably in said first cylindrical bore, a second cylindrical guide portion rigid with the first one and located between said first guide portion and the end of said push-piece in contact with said track, said second guide portion fitting slidably in said second cylindrical bore, and a spring fitting in the annular interval between said annular projection and the wall of said first bore.

2. An electric switch according to claim 1 wherein said push-piece is made of an insulating material and said guide portions are made of a metallic material.

3. An electric switch according to claim 1 wherein the axial length of said second cylindrical guide portion is greater than the axial length of said first cylindrical guide portions.

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