

May 22, 1934.

M. H. RHODES

1,959,645

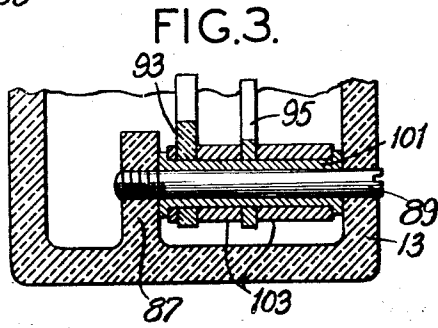
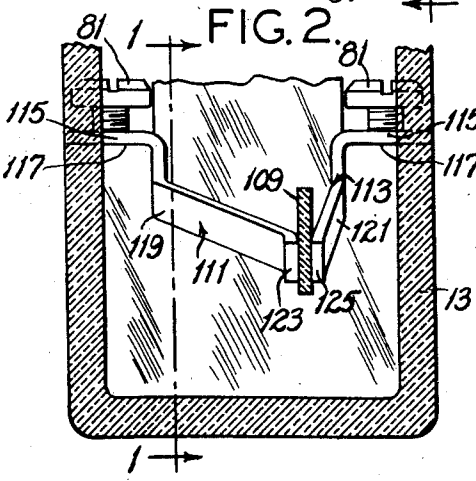
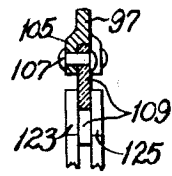
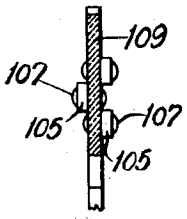
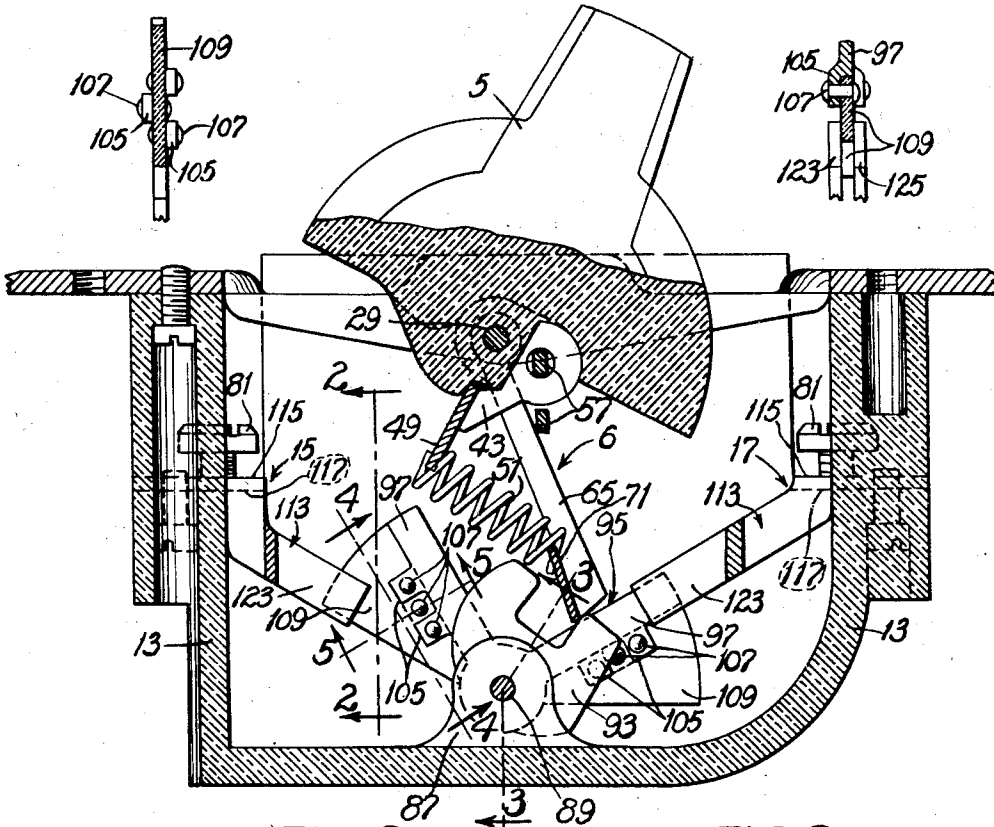
SWITCH

Filed April 9, 1932

FIG. 4.

FIG. 1.

FIG. 5.



Marcus H. Rhodes,
Inventor,
Delos G. Haynes,
Attorney.

UNITED STATES PATENT OFFICE

1,959,645

SWITCH

Marcus H. Rhodes, Hartford, Conn., assignor to
M. H. Rhodes, Inc., Hartford, Conn., a corporation of Delaware

Application April 9, 1932, Serial No. 604,282

1 Claim. (Cl. 200—151)

This invention relates to switches, and with regard to certain more specific features to electrical circuit making and breaking switches.

Among the several objects of the invention may be noted the provision of an electrical switch of the class described which is quick and positive in its action; a switch in which the arrangement of parts is such that in one position it is connecting a first pair of terminals, while in a second position it is disconnecting said first pair of terminals and connecting a second pair of terminals; a switch of the class described in which the arrangement of parts is such that the assembly occupies a minimum of space; and a switch of the class described including means for inhibiting arc formation as contacts are broken, and which is thereby enabled to safely carry currents of relatively high value. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claim.

In the accompanying drawing, in which is illustrated one of various possible embodiments of the invention,

Fig. 1 is a vertical cross-section of a switch embodying the present invention;

Fig. 2 is a vertical cross-section taken substantially along line 2—2 of Fig. 1;

Fig. 3 is a cross-section taken substantially along line 3—3 of Fig. 1;

Fig. 4 is a cross-section taken substantially along line 4—4 of Fig. 1; and,

Fig. 5 is a cross-section taken substantially along line 5—5 of Fig. 1.

Similar reference characters indicate corresponding parts throughout the several views of the drawing.

The present invention comprises a switch of the general type shown in my copending application, Serial Number 509,333, filed January 17, 1931, patented May 1, 1934, Number 1,956,998. In distinction to said prior application however, the present invention comprises a switch of a single pole, double throw type (the prior application showing a switch of a single pole, single throw type). In addition, the present switch is designed for carrying currents considerably in excess of those safely carried by said prior switch, without appreciably increasing the size of the switch or needlessly changing the majority of the parts.

The present switch, as illustrated in Fig. 1, comprises a control handle 5 which manipulates the over-centering device indicated generally by numeral 6. The end of the over-centering device 6 is in a lost-motion engagement with the anvil piece 93, which is carried rotatably upon a pin 89. Also rotatably mounted on the pin 89, but non-rotatable with respect to the anvil piece 93 is a contactor bar 95. The contactor bar 95 engages, or disengages as the case may be, terminal pieces indicated broadly by numerals 15 and 17, at its left and right hand sides respectively, as actuated by the over-centering device and the control handle.

The over-centering device of the present invention is not substantially different from that of said prior application, and will accordingly be described only in general terms. It comprises a swingable hammer saddle 65 which is pivoted about the same pin 29 on which the control handle 5 rotates. Mounted on the control handle 5 is a saddle member 43 which has a nose 49 extending therefrom. The saddle 43 is non-rotatable with respect to the handle 5. Supported between the nose 49 and a nose 71 on the hammer saddle 69 is a compression spring 51. A movement limiting means 57 restricts the degree of rotation of the control handle 5.

It will be seen that as the control handle 5 is moved from one position to another, the relative position of the noses 49 and 71 change, with the result that the compression spring 51 is at first compressed against the nose 71 and then, as the central position is passed, it expands and forces the hammer saddle 69 in the opposite direction with a snap-action. The same action occurs on reverse manipulation.

The contactor assembly comprises the anvil piece 93, which is rigidly mounted upon a sleeve 101, which is in turn rotatably mounted on the pin 89 (see Fig. 3). The pin 89 is supported at one end by a side wall of the switch housing 13, and at the other end by a projecting lug 87 likewise formed from said housing. The anvil piece 93 is preferably fiber or other insulating material. Spaced from the anvil piece 93 by collars 103, but likewise rigidly mounted on the sleeve 101, is the contactor bar 95 per se. It will be seen that the anvil piece 93 contactor bar 95 are immovable with respect to each other, but simultaneously rotatable about the pin 89.

The contactor bar 95 is preferably stamped or otherwise shaped from a relatively thin sheet of conducting metal or the like. It comprises radially disposed arms 97. Each arm 97 has

fastened thereto, by means of tabs 105 and rivets 107, an extending fin or blade 109 of insulating material. Together, an arm 97 and its fin 109 are shaped as sectors about a center represented by pin 89. The nature of the attachment of the fins 109 to the arms 97 is shown more in detail in Figs. 4 and 5. The fin 109 is of substantially the same thickness as the arm 97 and thus in effect forms an extension of said arm.

The terminal assemblies indicated broadly by numerals 15 and 17 are similar in construction. Each comprises a pair of pieces 111 and 113 (see Fig. 2). Each piece 111 and 113 has a fiat end portion 115 which is held to a suitable shelf 117 on the casing 13 by screws 79. The portions 115 likewise carry terminal screws 81 by which connections are made from the exterior to the switch. Interiorly of the switch housings, the pieces 111 and 113 comprise suitably shaped arms 119 and 121, which have parallel end faces 123 and 125, respectively, arranged to resiliently hold therebetween the contactor assembly described.

It will thus be seen that the switch provides four exterior terminals, two at each end. When the contactor assembly is in its Fig. 1 position, it will be seen that the conducting arm 97 at the right hand end is connecting the terminal pieces at that end. Meanwhile, the insulating fin 109 is positioned between the terminal pieces at the left-hand end of the switch, thus disconnecting the terminals thereat. When the control handle 5 is thrown to its alternative position, the left-hand terminals are connected and the right-hand terminals disconnected.

Utilized in the described manner the switch as a whole comprises two separate circuit controls which are alternately connected or disconnected, but never at the same time. If, now, one terminal at the right-hand end be connected to one terminal at the left-hand end, so that only three exterior connections in all are made to the switch, it will be seen that the switch will operate as a single pole, double throw switch.

The insulating fins 109 have a function independent of that heretofore indicated, as follows: It will be seen that immediately upon the breaking of either circuit, as the arm 97 leaves the terminal pieces, the insulating fin 109 is interposed therebetween. The fin then acts as a spark or arc breaker or preventer. Further, the fin acts as a transverse barrier preventing air currents, which propagate arc conditions. This function is particularly beneficial in the present type of switch, for should an arc be created, say between the left end terminals and the contactor bar, it might prevail even up to the instant that the bar makes contact with the right

end terminals, and thus create shorts between the two circuits.

It will be seen that the fundamental principle upon which this feature of the present invention is based is that upon a separation of the conducting pieces to break a circuit insulation material is immediately interposed between them, instead of an air gap. This interposed insulation inhibits arc formation to such a degree that currents considerably higher than those normally used with the weight or thickness of metal comprising the contactor bar and terminal pieces may be used. For instance, without changing the relative thickness of the conducting parts, switches ordinarily safely accommodating the order of three amperes of current are, by the addition of the insulating fins, enabled to carry current safely up to the order of twenty to thirty amperes. Thus, with a switch of the size previously considered adapted only to carry small current, it is possible with the present invention to carry currents in the medium or high range.

It will be seen that the insulating fin feature is beneficial both by itself and in combination with the particular switch elements here described. In my copending application Serial No. 604,281, filed April 9, 1932, patented December 12, 1933, Number 1,938,721, this feature is claimed in combination with another type of switch. In the present application, accordingly, it is claimed only in the embodiment here disclosed.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

In a switch, a pair of spaced terminal pieces, an elongated contacting member pivoted at one end, and a fin of insulating material shaped as a circular segment and supported by and extending from said contacting member in such manner that the point of the segment is at the pivoted end of the said contacting member, said contacting member rotating so that its free end moves between said terminal pieces to connect the same together, and to move away from said terminal pieces to disconnect the same, said fin being positioned to move between said terminal pieces immediately as said contacting member moves away therefrom, without allowing an air gap to exist between said terminal pieces.

MARCUS H. RHODES.

60

135

65

140

70

145

75

150