

Nov. 8, 1949

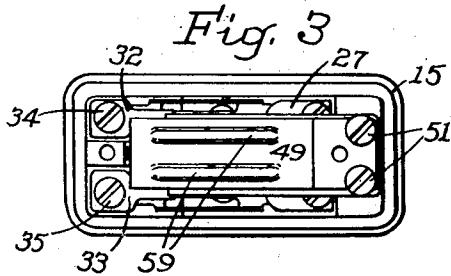
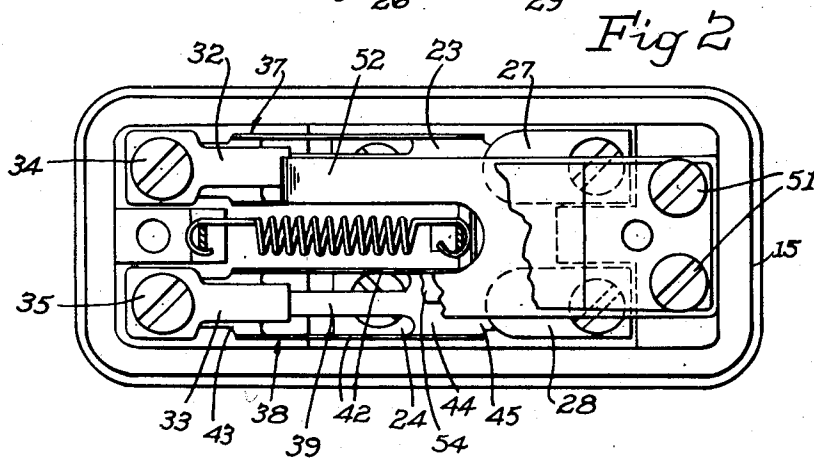
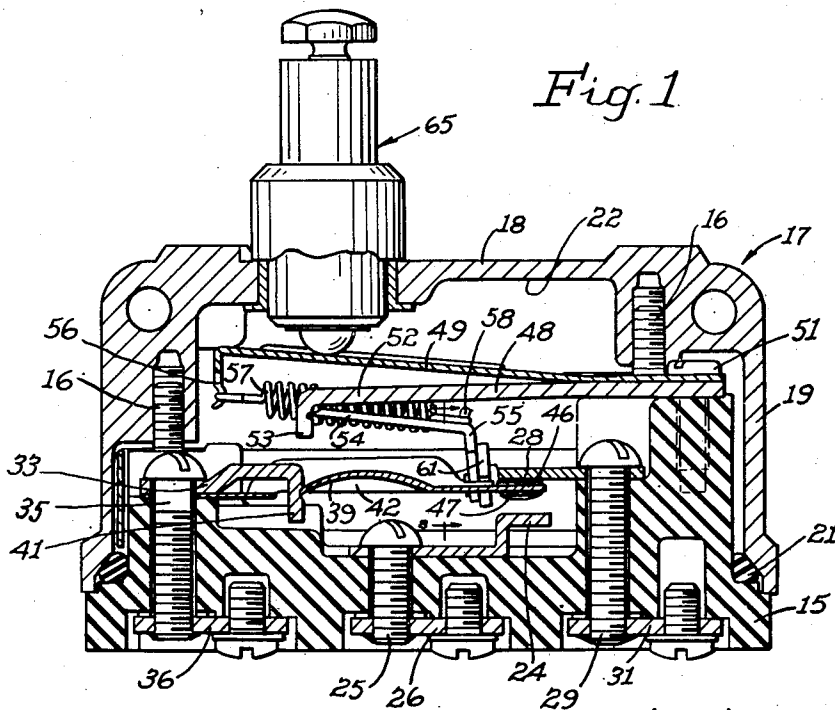
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2,487,374

ELECTRIC SWITCH

Filed Aug. 29, 1945

3 Sheets-Sheet 1



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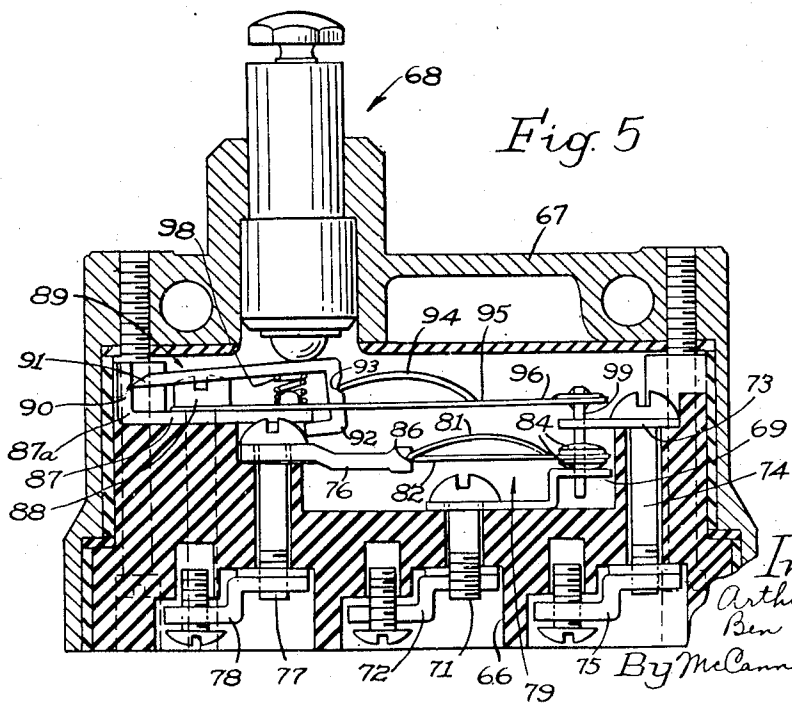
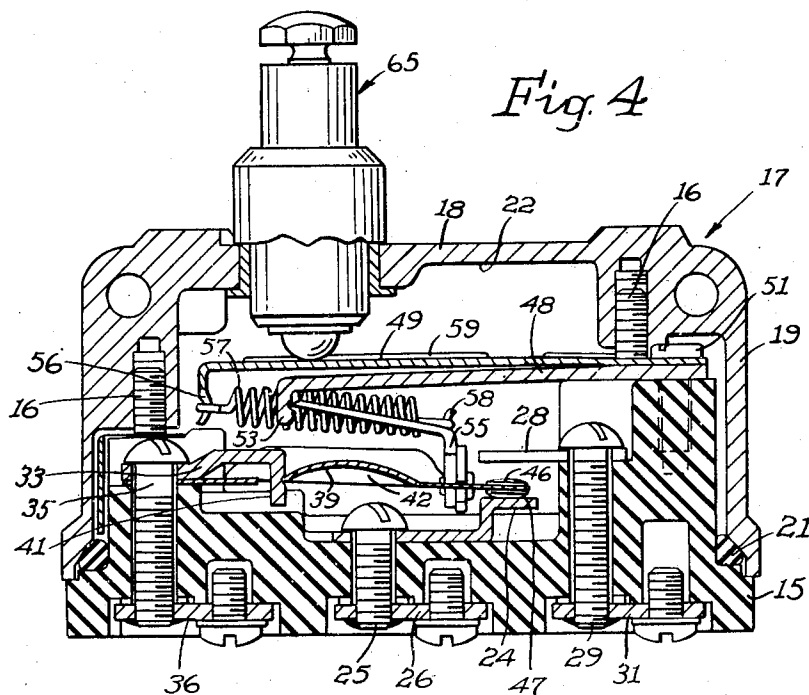
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2,487,374

ELECTRIC SWITCH

Filed Aug. 29, 1945

3 Sheets-Sheet 2



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Nov. 8, 1949

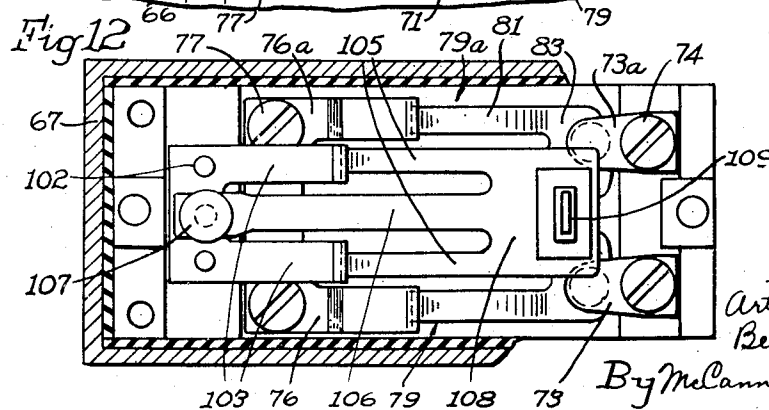
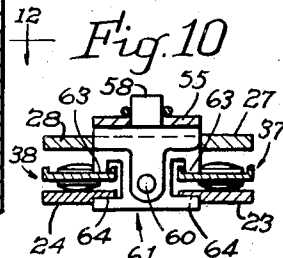
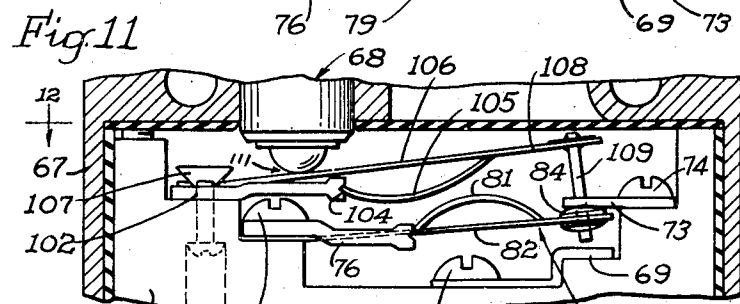
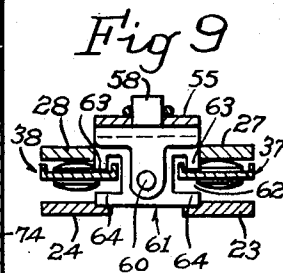
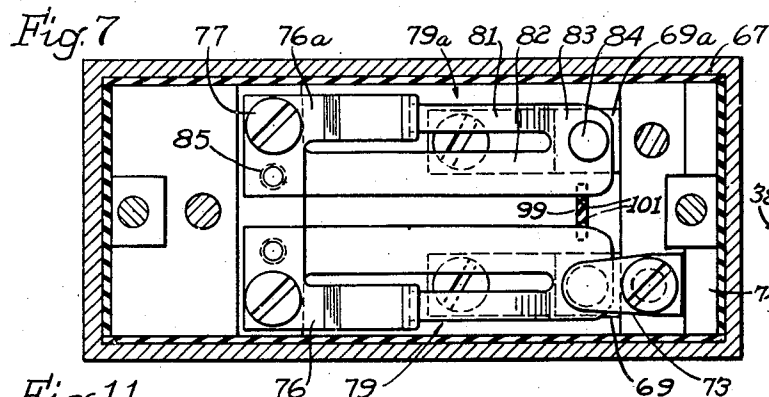
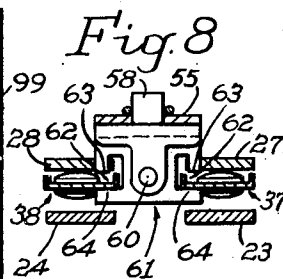
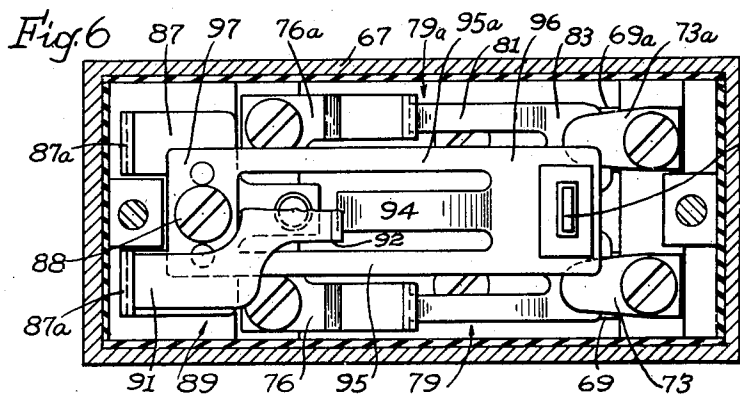
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ELECTRIC SWITCH

Filed Aug. 29, 1945

3 Sheets-Sheet 3



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2,487,374

ELECTRIC SWITCH

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Application August 29, 1945, Serial No. 613,284

11 Claims. (Cl. 200—67)

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This invention relates to electric switches and has special reference to snap acting switches of the small precision type.

An important object in the invention is the provision of a novel switch wherein the mobile contacts are carried on an over-center snap spring system and a snap spring driving system acts with a hammer blow to move the contact carrying snap spring system over-center to shift the contacts between opposed positions.

A further object is the provision of a switch of the character described in which the contact carrying snap spring system is actuated by a hammer blow delivered in close proximity to the mobile contacts so that vibration and bounce of the contacts are held at a minimum.

Another object is the provision of a switch of the character described wherein the mobile contacts are carried on an over-center snap spring system and an over-center snap spring driving system actuates the first spring system after the driving system has been moved past center and after preliminary free snap motion of the driving system so that the first spring system sustains the contact pressure until the mobile and stationary contacts are separated with a hammer blow by imparting snap motion to the mobile contact.

A further aim of the invention is the provision of a switch wherein the contact carrying spring systems are stressed to remain in either position of rest and in which the driving spring system may be stressed to return to a predetermined normal position upon release.

Another object of the invention is the provision of a double pole, double throw switch having mobile contacts, each carried on a separate snap spring system and a snap spring driving system for simultaneously driving the contact carrying snap spring systems between opposed spring positions by imparting thereto a hammer blow adapted to break minor welds and carry the spring systems over-center.

Other objects and advantages will appear from the following description and the accompanying drawings in which:

Figure 1 is an enlarged vertical sectional view through a switch embodying the invention.

Fig. 2 is an enlarged top view of the switch mechanism of Figure 1 with the cover removed, certain portions of the switch being broken away.

Fig. 3 is a full scale top view of the embodiment shown in Figure 1.

Fig. 4 is a view similar to Figure 1, showing the switch parts in actuated position.

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Fig. 5 is an enlarged vertical section through a modified form of the invention.

Fig. 6 is a top view of the switch mechanism of Fig. 5 with the cover in section and certain parts broken away.

Fig. 7 is a view similar to Fig. 6 with the driving spring system broken away.

Figs. 8, 9, and 10 are views substantially on the line 8—8 of Figure 1, showing moved positions of the parts in passing from the position of Figure 1 with that of Fig. 4.

Fig. 11 is a fragmentary side view of another modification, the cover being shown in section, and

Fig. 12 is a view substantially on the line 12—12 of Figure 11.

The invention is shown in the drawings as embodied in a double pole, double throw switch in which some of the features of the invention are of particular merit. So far as the present invention is concerned, the three embodiments herein described and shown are basically the same except for differences in the structure of the driving system. In each embodiment the structure comprises a base having mounted thereon a pair of snap spring systems, each carrying a mobile contact movable with a snap motion between opposite stationary contacts together with an over-center snap spring driving system for actuating the contact carrying spring systems between their opposed positions.

In the embodiment shown in Figures 1 through 3, the structure includes a base designated generally by the numeral 15, in this instance molded from insulating material such as Bakelite, though obviously the invention is not limited to this particular material or mode of formation. Seated on the base and secured thereto by a plurality of screws, such as indicated at 16, is a cover 17 having a top wall 18 and depending annular side walls 19 sealed against the base by an intervening gasket 21 of a material such as rubber which is compressed by tightening the screws. The base and cover thus form a switch chamber 22 housing the switch mechanism. Positioned on the top of the base is a pair of lower switch contacts 23 and 24, each secured in place by a screw 25, the lower ends of the screws each having attached thereto a binding post 26 for the attachment of wires to effectuate suitable electrical connection to the lower contacts. Also attached to the upper side of the base on suitable ledges formed in the base are upper contacts 27 and 28, each of these contacts being secured in place by a screw 29, the lower ends of the screws having

binding posts 31 to establish electrical connections with the upper contacts 27 and 28. Adjacent the opposite end of the base 15 are anchors 32 and 33 fixedly secured to a ledge on the upper side of the base by means of screws 34 and 35 which pass through the base and have attached at their lower ends binding posts 36 to establish electrical connection therewith. The anchors 32 and 33 and the screws 34 and 35 are part of and serve to support on the base a pair of over-center snap spring systems designated generally by the numerals 37 and 38. Each of these spring systems comprises a compression member 39 having one end pivotally carried in a notch on the depending end 41 of the anchors and a pair of tension members 42 disposed on opposite sides of the compression member and interconnected at one end as indicated at 43, this interconnected end being fixedly secured between the anchor and the base by screws 34 and 35. The opposite ends of the tension members and the compression member are interconnected, as shown at 44, to form a contact carrier designated generally by the numeral 45. The tension and compression members are in this instance formed of a single piece of suitable spring metal so that the compression member, the tension members and the interconnecting ends 43 and 44 are integral. Disposed on the contact carrier 45 are upper and lower mobile contacts 46 and 47 positioned to engage the upper and lower stationary contacts, which limit the movement of the contact carrier and the spring system, and define opposed positions of rest. The point of support of the tension members and the compression member is such that the free end, comprising the contact carrier, if undisturbed remains in either position of rest and moves into either of the two opposed positions with a snap motion through an intermediate position of unstable equilibrium.

Disposed in the chamber 22 in a plane above the snap spring systems 37 and 38 and in a position proximate parallelism therewith is a rigid plate 48 and an arm comprising in this instance a leaf spring 49 disposed above the plate, the plate and leaf spring being attached to the base by screws 51. The portion of the plate overlying the snap spring systems 37 and 38 is forked to provide legs 52, the ends of the legs being bent downwardly as shown at 53 and having notches therein forming pivotal bearings for the arms of a compression member, in this instance comprising a U-shaped toggle member having spaced arms 54, one end of each being seated in the notches 53 and the opposite ends being connected by a cross bar 55. The leaf spring 49 has a plurality of stiffening ribs 59, as shown in Figure 3, so that it flexes predominantly adjacent the mounting and acts essentially as a pivotally supported arm biased to the position shown in Figure 1. The overhanging free end of the leaf spring 49 has a depending tongue 56 and a coiled tension spring 57 connects the tongue 56 and the cross bar 55 of the toggle member, the cross bar having a tongue 58 to carry the spring. The cross bar 55 has a depending finger extending down between the over-center snap spring systems 37 and 38 and attached to this finger is a driving element 61 of insulating material. This driving element has the general shape shown in Figs. 1 and 8 through 10, and in this instance comprises a sheet of insulating material attached to the finger by a rivet 60 so that it is free to rotate to a limited degree thereon. The driving element has slots as indicated at 62 on opposite edges thereof, pro-

viding a pair of shoulders or abutments 63 overhanging the contact carrying spring systems and a pair of shoulders 64 underlying the spring systems, the shoulders 63 and 64 being spaced a distance substantially greater than the thickness of the spring systems at the point of contact so as to provide a substantial degree of lost motion.

Mounted in the top 18 of the cover is an over-travel actuator 65 which may be of any desired construction. As the outer end of the actuator is depressed it moves inward flexing the leaf spring 49 and bringing that end of the coil spring 57, which is attached to the tongue, downward. When the aforementioned end of the spring 57 passes through a plane defined by the pivotal mounting of the toggle arms 54 and the mounting 58 for the opposite end of the spring 57, the toggle member moves from the position shown in Figure 1 to the position shown in Fig. 4 with a snap motion. At the start of this motion the contacts, the contact carrying spring systems and the driving element occupy the position shown in Figure 8 with the shoulders 64 bearing against the lower sides of the contact carriers and pressing the mobile contacts against the stationary contacts 27 and 28. The mobile contacts are also pressed against the stationary contacts under the action of the spring systems 37 and 38. During the early part of the movement of the toggle member the driving element moves from the position shown in Figure 8 to the position shown in Figure 9, the driving element having a lost motion with respect to the contact carrying spring systems until it reaches the position of Figure 9 or, in other words, until the overlying shoulders 63 come into engagement with the contact carriers. It should be noted, however, that during this preliminary movement of the driving element, the mobile contacts are still pressed against the stationary contacts under the action of the contact carrying spring systems so that contact pressure is maintained between the mobile and stationary contacts. During this preliminary free movement the driving spring system has moved well past its position of unstable equilibrium and the driving element has acquired considerable momentum. The shoulders 63 therefore come into engagement with the contact carriers with a hammer blow and drive the contact carrying spring systems through their intermediate positions of unstable equilibrium. As soon as the contact carrying spring systems pass this intermediate position, they function to assist the driving system in movement to the position of Figure 10. In this position it will be noted that both the contact carrying spring systems and the driving spring systems function to urge the mobile contacts against the stationary contacts and thereby maintain contact pressure. When the actuator 65 is released, the leaf spring 49 returns to the position of Figure 1 under its inherent resiliency, reversing the operations just described.

In the form of the invention shown in Figures 5, 6 and 7 the numerals 66 and 67 designate a base and a cover respectfully, corresponding to the base 15 and cover 17 of Figure 1. Likewise, the cover 67 has a travel actuator 68, similar to actuator 65, mounted thereon for operating the switch. Also mounted on the base 66 is a pair of lower contacts 69 and 69a arranged in spaced approximate coplanar relationship and secured thereto by screws 71 to which binding posts 72 are attached. Likewise, the base carries a pair of upper approximate coplanar contacts 73 and 73a secured to the base by screws 74, carrying

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binding posts 75. Toward the opposite end of the base are two anchors 76 and 76a held in rigid position against the base by screws 77 carrying binding posts 78, the anchors serving to support a pair of overcenter snap spring systems 79 and 79a in fixed position on the base. Each of these snap spring systems comprises a compression member 81 and a tension member 82 interconnected at their free ends by a contact carrier 83 having contacts 84 adapted to cooperate with the upper and lower stationary contacts. The other end of the tension member is secured to the anchor as shown at 85 (Fig. 7), by welding or otherwise while the opposite end of the compression member is pivotally seated in a saddle 86 on the anchor, the spring systems being in this manner supported on the anchor in cantilever fashion.

Disposed above the spring systems 79 and 79a is an overcenter snap spring driving system, the driving system in this instance arranged above the contact carrying snap springs and in side by side relationship therewith. This driving system includes a U-shaped anchor 87 secured to the base by a screw 88, the legs of the U having upturned ends as indicated at 87a, each provided with a saddle 90 for the purpose of pivotally supporting a Y-shaped toggle member 89, the toggle member having legs 91 pivotally received in the saddles. The opposite end of the toggle member has a depressed arm 92 (Fig. 5) provided with a saddle 93 to pivotally support one end of a compression member 94. The opposite end of the compression member 94 is interconnected with a pair of tension members 95 and 95a disposed on opposite sides thereof. In this instance the compression member and the tension members are formed of a single piece of strip spring stock, the compression member being formed as a tongue disposed in the center of the strip so that the end portion 96 interconnects the two tension members and the compression member to form a free end movable up and down between opposed positions and an opposite end 97 interconnects the two tension members, the screw 88 passing therethrough and serving to support the tension members against the anchor 87 and in cantilever fashion. A coil spring 98 acts between the anchor and the lower end of the toggle member 89 as will be apparent from Figure 5, to normally urge the toggle member upward; whereas, the actuator 68 is disposed against the opposite end of the toggle member for the purpose of urging the toggle member downwardly by an externally applied force.

Carried on the free end 96 of the driving spring strip is a driving element 99 movable with the end of the strip and depending therefrom, the driving element in this instance being formed of insulating material, the driving element extending down between the spring systems 79 and 79a and having slots 101 on edges thereof, defining spaced shoulders similar to the shoulders 63 and 64 of the embodiment previously described and serving the same function—that is, of imparting a hammer blow to the contact carrying spring systems to carry the latter through a position of unstable equilibrium in response to snap action of the driving spring system.

It will be seen that when the plunger 68 is moved downward (from the position shown in Figure 5) the toggle member 89 is tilted until the driving spring system reaches a position of unstable equilibrium which approximately corresponds to the point at which the pivoted end of

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the compression member 94 passes the plane of the tension member 95. At this point the end 96 moves upward with a snap motion moving the mobile contacts into engagement with the stationary contacts 73 and 73a in the manner previously described. Upon release of the plunger 68, the spring 98 returns the driving system to the position shown in Figure 5 moving the mobile contacts back into engagement with the lower stationary contacts. The spring systems 79 and 79a are so arranged that the mobile contacts will remain in either position—that is either against the stationary contacts 73 and 73a or against the contacts 69 and 69a.

The embodiment of the invention shown in Figures 11 and 12 is identical as that shown in Figures 5 through 7, except for the driving system. In this embodiment the driving system is so arranged that the contact carrying spring systems 79 and 79a remain in engagement with the upper contacts 73 and 73a in the unactuated position of the plunger 68. In this form the drive spring system comprises a U-shaped anchor 102 having spaced legs 103 provided with saddles 104 at their free ends for the reception of compression members 105 disposed on opposite sides of a tension member 106, the tension member being secured to the top of the anchor by a screw 107. The opposite ends of the compression and tension members are integrally connected by an end portion 108 which is free to move between opposed positions with a snap motion, this end carrying a driving element 109 identical with the driving element 99 of Figure 5 the saddles 104 being disposed below the plane of the tension members 103. The free end of the spring strip will normally remain in its upper position as shown in Figure 11. The actuator 68 is positioned to engage the tension member toward its mounting point as shown at 111 and when the actuator is depressed the tension member is flexed downward. When the tension member is flexed sufficiently to bring the spring past a position of unstable equilibrium approximately corresponding to the point at which the tension member passes the saddles 104, the free end 108 moves to a lower position with a snap motion imparting corresponding movement to the contact carrying spring systems as heretofore described.

We claim:

1. The combination in a snap switch of a base, a first snap spring system mounted on said base having a free end movable between preselected positions through an axis of maximum stress for actuating the first snap spring system, a second snap spring system comprising a tension member movable between preselected positions of rest, a compression member and a portion interconnecting one end of said tension and compression members free to move between preselected positions of rest with a snap motion, means for supporting the opposite end of the compression member to be passed by said tension member, resilient actuating means supporting the opposite end of the tension member movable between preselected positions to move the tension member past the support means for the compression member to actuate the second spring system and a lost motion driving connection between said portion and said free end of said first spring system to initiate movement of the latter between its respective preselected positions with a hammer-blow snap action.

2. The combination in a snap switch of a base, a pair of independent snap spring systems each

having an axis of unstable equilibrium supported on the base and arranged in spaced side by side relationship, each of said systems having an actuating portion movable through its axis of unstable equilibrium to actuate the respective spring system and having an end carrying a contact free to move between preselected positions upon actuation of the spring system, a fixed contact defining one of said positions for each spring system, a driving snap spring system comprising a tension member movable between preselected positions, a compression member and a portion interconnecting one end of said tension and compression members free to move between preselected positions with a snap motion from a first position of rest to a second position of rest, means for supporting the opposite end of the compression member to be passed by said tension member, movable resilient arm means supporting the opposite end of the tension member movable between preselected positions to move the tension member past the support means for the compression member to actuate the driving snap spring system and spaced abutment means carried on said portion of the driving spring system for engaging opposite sides of said actuating portions of said pair of snap spring systems to press the mobile contacts against said fixed contacts to dampen vibration in one position of rest, said spaced abutment means having limited freedom of movement with respect to the pair of snap spring systems upon actuation of the driving spring system and engaging said actuating portions after preliminary free snap movement to move said actuating portions through their positions of unstable equilibrium with a hammerblow snap motion.

3. The combination in a snap switch of a base, a pair of snap spring systems supported on the base in side by side relationship, each of said systems having a contact carrier free to move between preselected positions, a contact mounted on said carrier, a plurality of spaced upper stops positioned for substantially simultaneous engagement by the contact carriers to define one of said positions, a plurality of spaced lower stops positioned for substantially simultaneous engagement by the contact carriers and defining the other position of rest, at least two of said stops comprising contacts, a driving snap spring system disposed in superimposed side by side relationship with said pair of snap spring systems and comprising a tension member, a compression member and a driving element, means for supporting one of said members for movement with respect to the other between opposed positions to move the driving element between positions of rest with a snap motion, means for moving said one of said members in one direction through the application of external force thereto to effect the foregoing movement, and insulated spaced abutment means mounted on said driving element and engageable with opposite sides of the contact carriers movable to simultaneously actuate said pair of snap springs by a hammerblow, one of said abutment means in one of said rest positions of the driving element bears against the contact carriers adjacent the mobile contacts to press the latter against one set of said stops to supplement the contact pressure provided by the pair of snap spring systems, the other abutment means in the other of said rest positions of the driving element engaging said pair of snap spring systems to supplement the contact pressure provided by the pair of snap spring systems.

4. The combination in a snap switch of a base, a pair of snap spring systems supported on the base in cantilever fashion and arranged in spaced side by side relationship, each of said systems having an actuating portion movable through an axis of maximum stress to actuate the respective systems and having a contact carrier free to move between preselected positions, a plurality of spaced fixed upper stops positioned for substantially simultaneous engagement by the contact carriers to define one of said positions, a plurality of spaced fixed lower stops defining the other position, at least two of said stops comprising contacts, a toggle member, means for pivotally supporting said toggle member for rotation about one end between opposed positions, a tension spring movable past the toggle member support and connected at one end to the toggle member at a point remote from said support means and forming with said toggle member a driving snap spring system, a resilient arm for supporting the opposite end of the tension member in substantially parallel relation with said toggle member, said arm being biased to a normal position in one direction and movable in the opposite direction to bring the tension spring past the toggle member to actuate the driving spring system, a portion interconnected with the tension and toggle members and free to move with a snap motion between positions of rest upon actuation of said driving spring system, pivotally mounted spaced abutment means mounted on said portion and positioned to engage said actuating portions to move the latter simultaneously through their respective positions of unstable equilibrium, said abutment means in one position of said portion urging the contact carriers to one of their positions and in the other position of said portion said abutment means urging the contact carriers into the other position, said spaced abutment means being movable relative to said pair of snap spring systems upon actuation of the driving spring system to drivingly engage said actuating portion with a hammerblow action.

5. The combination in a snap switch of a base, a pair of snap spring systems supported on the base in cantilever fashion and arranged in side by side relationship, each of said systems having an axis of unstable equilibrium and having a contact carrier free to move between opposed positions, stops defining said positions, a driving snap spring system comprising a tension member movable between preselected positions, a compression member and a portion interconnecting said tension and compression members and free to move with a snap motion from a first position of rest to a second position of rest, means for supporting the opposite end of the compression member to be passed by said tension member, movable arm means supporting the opposite end of the tension member movable between preselected positions to move the tension member past the support means for the compression member to actuate the driving snap spring system and insulated spaced abutment means carried on said portion of the driving spring system engaging opposite sides of said contact carriers to press the latter against the stops and dampen vibration in each position of rest, said abutment means being spaced a distance to provide limited freedom of movement with respect to the contact carriers upon actuation of the driving spring system for engaging the contact carriers after preliminary free movement to

move the latter through the positions of unstable equilibrium of said pair of snap spring systems with a hammerblow snap motion.

6. The combination in a snap switch of a base, a first snap spring system mounted on the base having a position of unstable equilibrium, an actuating portion movable between opposed positions through said position of unstable equilibrium to actuate the spring system and a contact carrier movable between preselected positions with a snap action upon actuation of the snap spring system, a snap spring driving system disposed in side by side relationship with the first mentioned snap spring system, said driving system comprising a tension member movable between preselected positions, a compression member and a portion interconnecting one end of said tension and compression members and free to move with a snap motion between positions of rest upon actuation of the driving spring system, means for supporting the opposite end of the compression member to be passed by said tension member to actuate said snap spring system, spaced abutment means mounted on said portion and engageable with said actuating portion to move it through its position of unstable equilibrium, one of said abutments engaging one side of said actuating portion in one of its positions and the other of said abutments engaging the other side of said actuating portion in the other of its positions, and movable means supporting the opposite end of the tension member to move the latter past the means supporting the compression member to actuate the driving spring system for moving said abutments relative to the actuating portion to initiate movement thereof with a hammerblow snap action.

7. The combination in a double pole, double throw snap switch of a pair of snap spring systems supported in side by side relationship, each of said systems comprising a tension member, a compression member and a contact carrier having upper and lower mobile contacts, said members being interconnected to move the carrier between opposed positions of rest, a plurality of upper stops positioned for engagement by the upper contacts to define one of said positions of rest, a plurality of lower stops positioned for engagement by the lower contacts defining the other position of rest, said stops comprising electrical contacts, means for establishing electrical connection to each of said snap spring systems and to said stops, a snap spring driving system comprising a tension member, a compression member and a portion interconnecting said tension and compression members and free to move with a snap motion from a first position of rest to a second position of rest, means for supporting the opposite end of the compression member to be passed by said tension member, movable arm means supporting the opposite end of the tension member movable between preselected positions for moving the tension member past the support means for the compression member to actuate the driving snap spring system and spaced abutment means carried on said portion of the driving spring system shaped to engage opposite sides of said pair of snap spring systems adjacent the contact carriers to press the mobile contacts against the stops and dampen vibration in each position of rest, said abutment means being spaced to provide limited freedom of movement thereof with respect to the pair

of snap spring systems upon actuation of the driving spring system for engaging the contact carrier after preliminary free movement to move said pair of snap spring systems through the positions of unstable equilibrium thereof with a hammerblow snap motion.

8. The combination in a snap mechanism of a first tension member and a first compression member, said first tension member and said first compression member being interconnected at one end to have a first end free to move between preselected positions, means for mounting the opposite ends of the first tension and compression members to form a first snap spring system, a second tension member and a second compression member, said second tension member and said second compression member being interconnected at one end to have a second end free to move between preselected positions, means for mounting the opposite ends of the second tension and compression members to form a second snap spring system, said first snap spring system and said second snap spring system being mounted in spaced side by side relation with the free ends in spaced relation and disposed in a common plane, an insulated driving member having spaced abutments engageable with opposite sides of each of said free ends of the first and second snap spring systems to form a lost motion connection with each of said spring systems, a third tension member and a third compression member interconnected and mounted to form a third snap spring system, said third snap spring system being disposed at one side of said first and second snap spring systems and having a portion movable with a snap action between positions of rest, means for mounting said insulated driving member on said portion, and means for actuating said third snap spring system whereby said spaced abutments engage the free ends of the first and second spring systems and move the latter spring systems substantially simultaneously between said preselected positions with a hammerblow snap action.

9. The combination in a snap switch of a base, a first snap spring system mounted on said base and having an end free to move between preselected positions, said end in moving between said positions passing through an axis of maximum stress to actuate the snap spring system, a second snap spring system comprising a first stressed member movable between preselected positions, a second stressed member and a portion interconnecting one end of said first and second stressed members free to move between preselected positions of rest with a snap motion, means for supporting the opposite end of the second stressed member to be passed by said first stressed member, actuating means supporting the opposite end of the first stressed member movable between preselected positions to move the first stressed member past the support means for the second stressed member to actuate the second spring system and a lost motion driving connection between the aforesaid interconnecting portion of the second snap spring system and said free end of the first snap spring system for moving the latter through the axis of maximum stress with a hammerblow snap action for actuating said first snap spring system.

10. The combination in a snap mechanism of first and second snap spring systems mounted in side by side relation having portions in spaced parallel relation free to move between preselected positions, first abutment means engageable with

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one side of said portions in one of the preselected positions of the latter and a second abutment means engageable with the opposite side of said portions in the other preselected position thereof, said first and second abutment means being spaced to form a lost motion connection therewith, a first stressed member and a second stressed member interconnected and mounted to form a third snap spring system, said third snap spring system being disposed in superimposed relationship with said first and second snap spring systems and having an end movable with snap action between opposed positions of rest, means for mounting said first and second spaced abutment means on said end in a position to press said first abutment means against one side of said portions and to space the second of said abutment means away from the opposite side of said portions in one of the opposed positions of rest of the third snap spring system, and move to a position to press said second abutment means against the said opposite side of said portions and to space said first abutment means away from the said one side of said portions in the other of said opposed positions of rest of the third snap spring system to successively first release the pressure of the abutment means on said portions, then effect lost motion movement of the abutment means and thereafter initiate actuation of the first and second spring systems with a hammerblow action during the course of snap movement of said end from one of said rest positions to the other, and means for actuating said third snap spring system to effect snap movement of said end between said positions of rest.

11. The combination in a snap switch of a base, a pair of independent snap spring systems each having an axis of unstable equilibrium mounted on the base and arranged in spaced side by side approximately coplanar relationship, spaced opposed fixed contacts forming stops on opposite sides of said axes, each of said systems having a contact carrier with at least one contact movable between said opposed contacts with a snap motion, a driving snap spring system disposed in approximately parallel side by side relationship with said pair of snap spring systems comprising

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a tension member movable between preselected positions, a compression member and a portion interconnecting one end of the tension and the compression members, said portion moving with a snap motion between opposed positions of rest upon actuation of the driving spring system, means for supporting the opposite end of the compression member to be passed by the tension member to effect snap motion of the driving spring system, spaced shoulder means pivotally mounted on said portion disposed adjacent opposite sides of said pair of snap spring systems to engage the latter in close proximity to the movable contacts for moving said pair of independent snap spring systems through the axes of unstable equilibrium thereof to effect selective engagement of the movable contacts with the fixed contacts, said shoulder means in one position of said portion bearing against said independent snap spring systems and urging the movable contacts into engagement with the fixed contacts on one side of said axes and in the other position of the portion bearing thereon and urging the movable contacts into engagement with the fixed contacts on the other side of said axes, and actuating means supporting said tension member, movable to move the latter past the support for the compression member and effect snap motion of said driving spring system to move said portion between its aforesaid positions.

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BEN J. RUSH.

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826,341	Macloskie	July 17, 1906
1,480,394	Johnson	Jan. 8, 1924
1,668,974	Mottlau	May 8, 1928
1,924,639	Corcoran	Aug. 29, 1933
2,144,120	Parks	Jan. 17, 1939
2,318,734	Baak	May 11, 1943
2,324,798	Norberg	July 20, 1943
2,414,778	Tratsch	Jan. 21, 1947