May 19, 1942. J. G. PETERSON 2,283,509

ELECTRIC SWITCH

Filed June 22, 1939

Fig. 1.

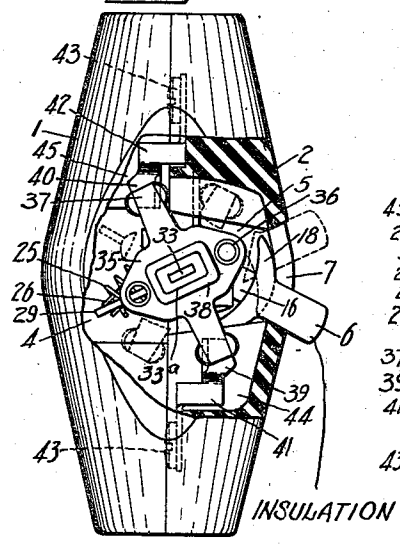


Fig. 2.

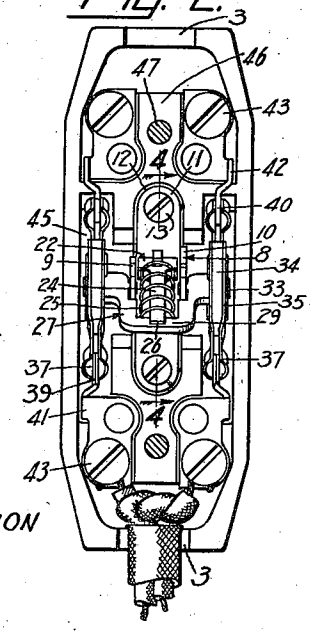
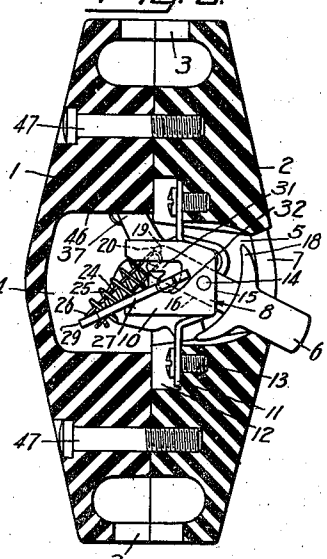


Fig. 3.



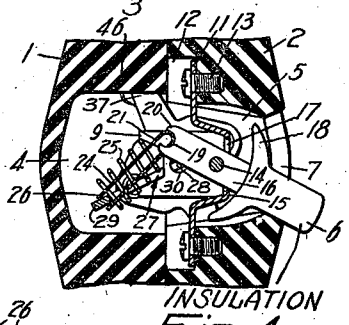


Fig. 4.

Fig. 6.

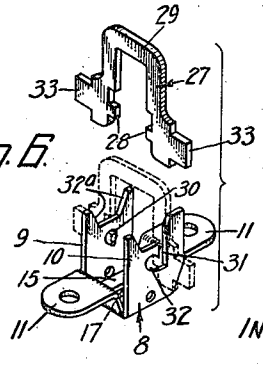
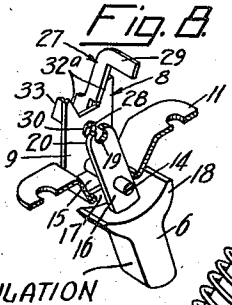


Fig. 8.



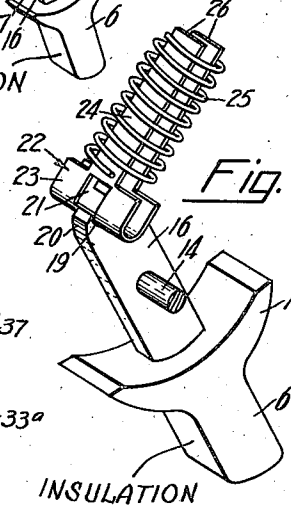


Fig. 9.

Fig. 5.

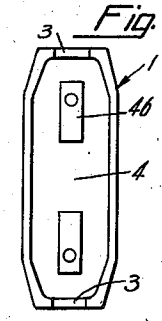
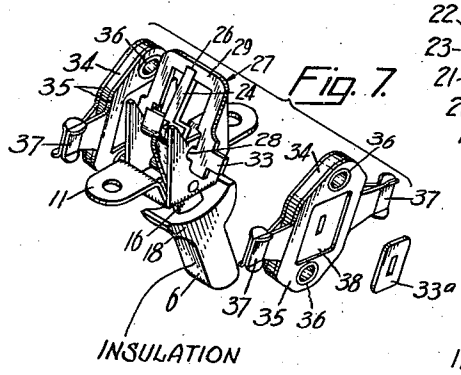


Fig. 7.



INVENTOR
Johann G. Peterson
By
ATTORNEY

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2,283,509

ELECTRIC SWITCH

Johann G. Peterson, West Hartford, Conn.

Application June 22, 1939, Serial No. 280,591

7 Claims. (Cl. 200—67)

My invention relates to electric switches.

It has among its objects to provide an improved switch, and, more particularly, an improved switch especially adapted to use in through switches, and of substantially larger capacity than heretofore available in such switches. A further object of my invention is to provide an improved switch of the so-called toggle type having improved toggle mechanism whereby the spring is centrally located in an improved manner and it is made possible to use a larger spring and produce a construction having uniform tension and throw which is consequently adapted to stand up longer in service. Still further objects of my invention are to provide an improved swinging toggle member associated with such a spring mechanism and to provide an improved cooperating contact actuating member and an improved cooperating toggle carrying bracket, all whereby the parts are enabled to be readily and quickly assembled manually without requiring the use of machinery. Still other objects of my invention are to provide improved contact carrying commutator means cooperating with such an actuating member and so actuated thereby as to enable the switch to have substantially increased capacity and to be of the double pole, double break type. Still another object of my invention is to provide such an improved switch which, while having the advantages aforesaid, is also very compact in such manner as to be adapted to use in a through-switch casing, and which further is adapted to be inexpensively produced as compared with previous switches of like capacity. These and other objects and advantages of my improvements will, however, hereinafter more fully appear.

In the accompanying drawing, I have shown for purposes of illustration one embodiment which my invention may assume in practice.

In the drawing:

Figure 1 is a side elevation of a through switch casing having my improved switch therein, portions of the casing being broken away to facilitate illustration and the switch being shown in full and dotted lines in on and off positions;

Fig. 2 is a plan view of the switch mechanism when one of the casing members is removed;

Fig. 3 is a longitudinal central section through the casing members, the operating mechanism being shown in full with one of the commutators removed to facilitate illustration;

Fig. 4 is a detail sectional view on line 4—4 of Figure 2;

Fig. 5 is a reduced plan view corresponding to Figure 2, but of the other casing member;

Fig. 6 is a detail perspective view of the bracket and toggle member showing the latter in full and dotted lines in different positions during assembly;

Fig. 7 is a perspective view of the toggle mechanism and commutators, one of the latter and its connecting means being shown in spaced relation to facilitate illustration;

Fig. 8 is a further detail perspective view of the toggle operating mechanism, certain parts being shown in section, and the coiled spring being omitted to facilitate illustration, and

Fig. 9 is an enlarged detail perspective view of the toggle operating mechanism and including the coiled spring, the parts being in the same relation shown in Figure 8.

In this illustrative construction, I have shown my invention embodied in a through switch casing comprising cooperating longitudinally divided casing members 1 and 2 having usual conductor apertures 3 in the ends thereof, and also cooperating switch chambers 4 and 5 intermediate their ends communicating with these apertures, and switch mechanism operative in these chambers 4 and 5 including an operating member 6 projecting through and movable in a suitable longitudinal slot 7 intermediate the ends of the casing member 2; this switch mechanism and its enclosing and supporting structure being of an improved construction, as hereinafter more fully described.

Referring more particularly to the switch mechanism, it will be observed that the same includes a bracket, generally indicated at 8, and comprising parallel upstanding toggle supporting arms or members 9 and 10 and angularly and longitudinally extending end portions 11. These portions 11 herein extend into suitable recesses 12 on opposite sides of the chamber 5 in the member 2 and are suitably connected to the latter member by screws 13, while the bracket 8 is so supported by these portions in the chamber 5 that the bracket bottom 15 is spaced inwardly from the slot 7. Further, it will be noted that the operating member 6 is pivoted on a transverse pivot pin 14 disposed just above the bottom 15 of the bracket 8 and has an extension 16 extending through a longitudinal slot 17 in this bottom. As shown, the protruding end of the operating member 6 is formed of insulation and receives the outer extremity of the portion 16 which is of metal, in such manner as effectively to insulate the latter. Further, it will be noted

that inner insulating wing portions 18 are provided on the member 6 of such shape as to enable the latter member to move from the full to the dotted line position shown in Figure 1 in on and off positions of the switch without conflict with the walls of the chamber 5, while enabling the end walls of the slot 7 to provide abutments limiting movements of the member 6 in opposite directions. Herein, the inner end of the extension 16 is provided with a rounded opening 19 in its extremity forming spaced and rounded end projections 20 on opposite sides of this opening which are alternately receivable in opposite slots 21 in the enlarged base of a resilient toggle actuating member or yoke 22. This member 22 herein is generally U-shaped and formed of stamped metal and provided with a wide base 23 having more narrow, elongated, longitudinally extending, flat extensions or resilient arms 24 centrally located on the open sides of this base 23 and integral therewith. As shown, a coil spring 25 of substantial diameter also encircles these extensions 24 and the latter fill the spring and thereby center the latter in an effective manner. Herein the extremities 26 of these arms 24 also extend to opposite sides of a generally U-shaped but oppositely disposed toggle actuated, or rocker, member 27 pivoted on pivots 28 on the bracket arms 9 and 10. Further note that the construction is such that the ends 26 may slide transversely relative to and midway between the ends of a cross bar portion 29 of the member 27. As a result, obviously the spring 25 will be compressed between the base portion 23 and the cross bar 29, whenever the portion 16 is moved to swing the base portion 23 to opposite sides of a straight line between the pivot 14 and the extremities 26; the member 27 thus being moved in either direction with a snap action in a manner usual in toggle switches. Here it will also be noted that the member 27 has its pivots 28 projecting inwardly from opposite sides thereof, and that one of these pivots 28 is receivable in a small round hole 30 in the bracket arms 9, while a vertical slot 31 is provided in the bracket arm 10 having a communicating laterally located, partially round opening 32 disposed coaxially with the hole 30. Also, it will be observed that upstanding sloping abutments 32*a* are provided on opposite sides of the aligned openings 30 and 32 in such manner as to provide stops for the member 27 at the opposite limits of its snap movement in either direction as the toggle goes across its center.

Operatively connected to the toggle actuated member 27 is also improved contact mechanism. Herein, the member 27 is rigid in the form of a plate and provided at each side with an extension 33 disposed in the plane thereof, these extensions extending in opposite directions from the pivot 28 and each herein carrying like improved commutator means. As shown, each of these means includes an elongated insulating base plate 34 having pointed ends and also having like contact members 35 on the opposite faces thereof and suitably attached to this base by rivets 36 passing through the pointed ends thereof. These contact members 35 herein each also have oppositely extending spring contacts 37 thereon, while each contact member 35 also has a central cut out portion 38, herein rectangular, through which the extension 33 on the member 27 extends; the construction being such that a holding plate 33*a* suitably peaned on the end of the extension 33 is spaced by the opening or cut out portion 38 from possible contact with the body of the contact members 35. Herein, the contacts 37 on the movable contact members 35 also cooperate with stationary contacts 39 and 40 carried on contact members 41 and 42 which are suitably attached, as by binding screws 43, to the inner face of the casing member 2 on opposite sides of the switch chamber 5; one of these contact members 41 extending down into the latter chamber, while the other extends into the corresponding chamber 4 on the casing member 1.

In operation, it will be evident that with each movable contact member 35 having its contacts 37 oppositely disposed, and different sides of the line being connected to different binding posts 43, the circuit will be broken at two points on each side of the line simultaneously as the members 35 are swung reversely by reverse swinging movements of the toggle actuated member 27 and operating member 6. More particularly, when the parts are in the full line position shown in Figure 1, current flow will be established through both sides of the line, while when the operating member 6 is moved into the dotted line positions shown in that figure, the movable contacts 37 will then occupy the dotted line position shown therein, each side of the line then being broken at the stationary contacts 39 and 40. Obviously, during each operation of the operating member 6, the member 27 will be swung by the spring 25 with a snap action after the toggle has passed over the center and following a sliding movement of the extremities 26 on the cross bar 29 of this member 27.

In this construction, it will also be observed that both sets of binding posts 43 are adjacent the conductor apertures 3 in such manner that the conductors may be readily connected thereto. Further, the stationary contacts 39 are disposed toward the bottom of slotted longitudinal extensions 44 of the switch chamber 5 in the casing member 2, while the other stationary contacts 40 project into like extensions 45 on opposite sides of central ribs 46 on the member 1, these latter ribs being disposed between the switch chamber 4 and the end conductor apertures 3 in this member 1. Thus, when the casing members 1 and 2 are connected by screws 47 in a usual manner, the structure is such as effectively to enclose the contacts and thereby further minimize objectionable results should arcing occur.

As a result of my improved construction, it is made possible to enable the switch to handle more current than has been possible heretofore in a through switch and, accordingly, substantially to extend the field of use of such switches. Further, due to my improved construction, markedly improved results are obtained in toggle switches, the spring being kept centered by the ends of my improved yoke member which straddle and slide on the cross bar of the toggle actuated, or rocker, member. Further, this construction is such as to enable a larger and stronger spring to be used, my improved spaced arms 24 on this yoke member acting both to fill such a spring and hold it in centered position in a wholly new and obviously desirable manner. Attention further is particularly directed to the uniformity of tension and throw resulting from this improved centering of the spring, and to the resultant longer life of the mechanism. As regards assembly, it will also be observed that this construction is readily assembled without requiring machinery. For example, the spring yoke is obviously readily connected to the rocker member and also ob-

viously readily connected to the operating mechanism, while the rocker member is also readily inserted by hand. Attention is further directed to the fact that the construction is such as to enable the parts to be manufactured at small expense. These and other advantages of my improvments will, however, be clearly apparent to those skilled in the art.

While I have in this application specifically described one embodiment which my invention may assume in practice, it will be understood that the same is shown for purposes of illustration, and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a switch actuating mechanism, a toggle actuated member, toggle mechanism having a coiled spring of sufficiently large diameter to have substantially uniform tension and throw, and a plate spring extending through and centering said coiled spring and forming a toggle link and having superimposed free end portions maintained in spaced relation by said actuated member and maintaining said coiled spring substantially filled during toggle operation.

2. In a switch, movable and stationary contact members, a swinging member for actuating said movable contact member, and toggle mechanism for actuating said swinging member, with a snap action including a coiled spring and resilient means centering said coiled spring and having free ends maintained in spaced relation by said swinging member and spread thereby as the latter is swung.

3. In a switch, movable and stationary contact members, a swinging member for actuating said movable contact member and having a crossbar, and toggle mechanism for actuating said swinging member with a snap action including a coiled spring and a toggle member extending through said spring and comprising a U-shaped plate spring having spaced arms extending through said coiled spring and having their free ends spaced by and slidable on opposite sides of said crossbar during swinging of the latter.

4. In a switch, movable and stationary contact members, a swinging member for actuating said movable contact member and having a crossbar, and toggle mechanism for actuating said swinging member with a snap action including a spring and a resilient yoke having spaced arms extending through and centering said spring and having spaced extremities resiliently engaging opposite sides of said crossbar as the latter is swung.

5. In a switch, movable and stationary contact members, a swinging member for actuating said movable contact member and having a crossbar, and toggle mechanism for actuating said swinging member with a snap action including a substantially U-shaped plate spring having a wider closed end and arms slidably engaging opposite sides of said crossbar and a coiled spring acting between the wider end of said yoke and said crossbar and centered by said arms.

6. In a toggle switch mechanism, a swinging toggle operating member having a notch in its inner extremity providing spaced projecting portions, and a cooperating resilient toggle member actuated by said swinging member and having superimposed arms disposed in the plane in which said arms are swung and connected together at one end of said toggle member and having spaced openings in said arms at said connected end extending through said arms and alternately receiving said projecting portions.

7. In a toggle switch mechanism, a swinging toggle operating member having a notch in its inner extremity providing spaced projecting portions, a cooperating resilient toggle member actuated by said swinging member and having a U-shaped portion having spaced openings in its closed end alternately receiving said projections and also having spaced arms projecting from said U-shaped portion, a swinging contact actuating member having a crossbar slidably engaged by the free ends of said arms, and a spring acting between said resilient toggle member and crossbar and encircling said arms and centered thereby.

JOHANN G. PETERSON.