

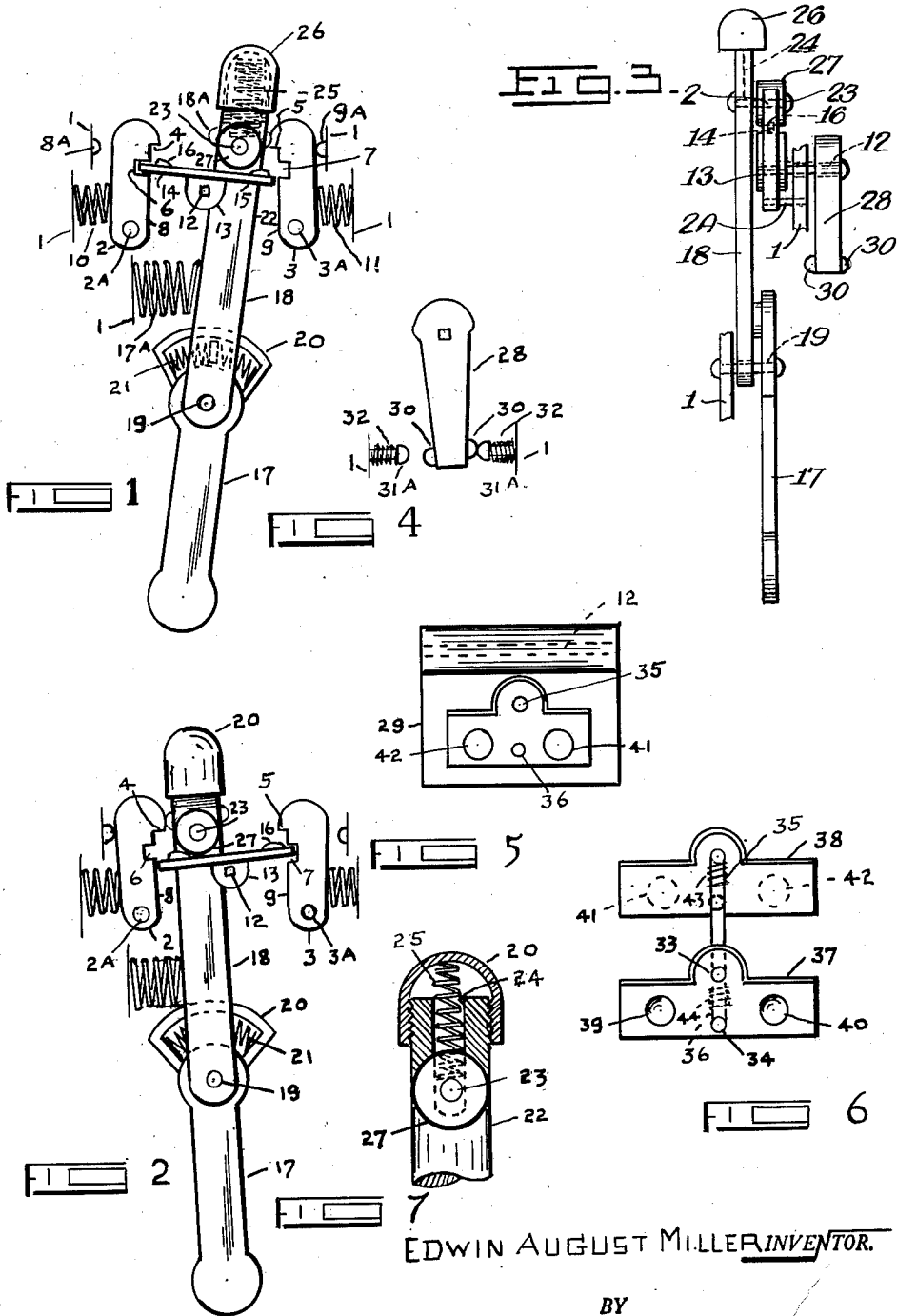
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LATCH-RELEASE CONTACT FOR ELECTRIC SWITCHES

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LATCH RELEASE CONTACT FOR ELECTRIC SWITCHES

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5 Claims. (Cl. 200-70)

1 This invention relates to latch-release contacts for electric switches and more particularly to such a latch-release contact that is accompanied by a throw-off movement that insures snap-acting and wiping contacts.

The objects of the invention are to provide positive locking contacts; to provide a very linear and light operating pressure; to provide a more compact switch mechanism; to provide a more uniform contact pressure; to provide less actuator movement; and to provide a switch mechanism with such snap-acting contact wiping, and making-and-breaking movements as will break apart sticking or welded contacts.

The applicant is aware that the prior art discloses other contact-locking switches, but the latch-release contact making and breaking cooperating mechanism herein disclosed introduces novel and useful combinations of movement with operating parts so arranged that there is introduced thereby a greater and more uniform contact pressure by reason of the fact that movable parts of contact operating means are consistently co-operating with, rather than against, relative movements thereof.

Referring to the accompanying drawing, the Figure 1 is an upright front view of the mechanism of the device in one position; Figure 2 is a similar front view as that of the Figure 1 but with movable parts in different relative positions; Figure 3 is an enlarged side view of a portion of mechanism of device showing operating lever parts in substantially upright alignment and casing supports for pivotal parts; Figure 4 is a plan view of a single contact member and yielding stops; Figure 5 is an upright view of a double contact member; Figure 6 is a forwardly tipped detail of the front and rear plates of a double contact member; and Figure 7 is a detail of upper extremity of operating lever partly in cross-section.

With more particular reference to the accompanying drawing, the numeral 1 designates the base and various portions thereof. Pivotal-ly mounted as at 2A and 3A upon the base 1 are the upright relatively spaced latch members 2 and 3, each having on the inwardly facing side edge thereof a laterally extending nub 4 or 5 and therebelow on said edge, a recess 6 or 7, the opposite side edge of each latch member 2 or 3 being engageable, as at 8 or 9 with fixed stop means 8A or 9A provided by said base 1 to limit one way the movement of each latch member 2 or 3. Also engageable with said opposite side edge of each latch member 2 or 3 is a spring

2 10 or 11 supported at one end by the base 1. Pivotal-ly mounted upon the rod 12 supported by said base for rotation intermediate the latch members 2 and 3 is a rocker element 13 having relatively aligned arms 14 and 15, the extremity of each arm being adapted for insertion within a recess 6 or 7 of the spring-pressed latch member 2 or 3, the upper edge of each of said arms 14 and 15 being provided with a cam surface 16 increasing in elevation toward the extremity of that arm. The rod 12, while pivotally movable within the base 1, has a square or angled-shaped cross-section engaging and carrying the rocker element 13. Upon the opposite side of the base support 1 the rod 12 again assumes said angled-shaped cross-section extending rearwardly for a purpose to be explained.

The actuator lever is constructed in two normally continuous parts 17 and 18, the part 17 being pivotally mounted on the base 1 by means of the pivot 19, and the part 18 being pivotally mounted, in overlapped relation to the part 17, upon the same pivot 19. The lever part 17 is extended beyond the pivot 19 to provide a fan-shaped box portion 20 containing and supporting equally stiff springs 21 upon either side of, and in engagement with, that portion of the lever part 18 extending through said box portion 20, the extremity 22 being movable between the latches 2 and 3. As illustrated by the Figure 6, the upper portion of the lever part 18 is provided with a sliding pivot 23 within a slot 24 provided with a spring 25 having its lower end engaged against the pivot 23 in its lowest position within the slot 24, the upper end of the spring 25 being engaged within a cap 26 having threaded relation with the exterior surface of the lever part 18, the pivot 23 carrying the roller element 27 in engagement with the upper edge of the rocker element 13 and engageable with the cam surface thereon.

Between the cap 26 and the roller element 27 there is provided by either side edge of the lever part 18 a laterally extending nub 18A engageable with either of the said nubs 4 or 5 of the latch members 3 or 4, respectively.

55 Either form of interchangeable contact arms 28 or 29, as illustrated by Figures 3-4 or 5-6, may be fixedly keyed to, and carried by, the rod 12 at the rear of the mechanism illustrated by the Figure 3, the contact arm 28 or 29 so carried being movable only with the rocker element 13. The contact arm 28 carrying contacts 30 is thus movable between yielding stops 31A, each spring-pressed by a spring 32 having one end supported

by the base 1. The contact arm 29 is provided with upper and lower bores 33—34 for connecting rods 35—36 extending therethrough, said rods 35—36 supporting at either end the contact supports 37—38, each carrying a pair of contacts 39—40 and 41—42, respectively, the rods 35—36 each being provided with springs 43—44 in engagement with and between supports 37—38 and either side of the contact arm 29.

The actuator 17—18 is shown as having upon one side a return spring 17A, but if desired this spring 17A may be omitted if the actuator 17—18 and mechanism of the device is to have maintained positions.

In use, assuming that the relative positions of the mechanism parts of the device are found to be in the position as illustrated by the Figure 1 with the actuator 17—18 engaged by the spring 17A and showing an arm 14 of the rocker element 13 locked within the recess 6 of the latch member 2, the actuating lever 17—18 may be moved to the right, thus carrying the upper lever part 18 which ordinarily will remain in strict alignment with the lever part 17 as held by the springs 21. By such movement of the actuator means 17—18 the roller element 27 is made to travel upwardly upon the upper edge of the tilted rocker 13 until reaching the center thereof and then the roller element 27 bears against the arm 14 against the spring 25 until the nub 18A of the swung actuator lever parts 17—18, as one unit causes the engagement of the nub 18A with the nub 4 of the latch member 2 and moves the latch member 2 backwardly against the spring 10 thereby releasing the arm 14 of the rocker element 13 from within the recess 6 and suddenly throws downwardly the rocker arm 14, as illustrated by the Figure 2, and locks the arm 15 within the recess 7 of the latch member 3. This movement being a snap-acting one will also likewise operate the contact arm 28 or 29, whichever one is carried by the rear projection of the rod 12, into contact position with relation to the yielding stops 30A, or will operate the pairs of contacts 39—40 and 41—42 carried by the yielding supports 37—38, respectively, as illustrated by the Figures 4 and 5. The yielding stop 31A or the yielding supports 37—38 fully compensate, with the co-operation of the yielding movement as between the actuator parts 17—18, for all over-operating movements of the actuator means.

The actuator 17—18 having been operated as above described, the spring 17A (or manually moved actuator means) returns the actuator lever 17—18 and the mechanism to relative positions illustrated by the Figure 1. In this return movement, the roller element 27 travels upwardly the upper edge of the rocker 13 of the arm 15 in exactly the same manner as above described with respect to the arm 14, releasing the arm 15 from within the recess 7 and locking the arm 14 within the recess 6 of the latch member 2 and breaking and making contacts with respect to the contacts 30 or with respect to the pairs of contacts 39—40 or 41—42 as already described.

The Figure 2 illustrates the roller element 27 as having travelled up onto the higher level of the cam surface 16 of the arm 14 of the rocker element 13, such elevating movement of the actuator 17—18 being required only provided that the contacts 30, or contacts 39—40 and 41—42, carried by the arms 28 or 29, respectively, stick, or have become welded, to their respective stops

in such manner as to not permit the downward movement of either rocker arm 14 or 15 upon the ordinary engagement of the roller element 27 therewith, such elevated engagement will force the snap-acting movement of such arm 14 or 16 whereby the stuck or welded contacts will be broken away.

It will be further noted that the improved latch-release device above set forth produces novel and useful patentable features in structure not found in the previous art, such as the quick breaking of sticking or welded contacts by means of cam surfaces 16 included in the structure of the upper edge of both arms 14—15 of the rocker element 13; the more constant operating pressure due to the roller 27 moving in an arc comparable with that of the cam surfaces 16; and the structure of the pivotally united actuator parts 17—18 normally held in alignment, one with the other, although relatively yieldable by means of forced movement against stiff springs 21 carried by the actuator part 17 and opposingly engaging the actuator part 18.

I claim:

1. A contact latch-and-release mechanism comprising a rocker member keyed to a pivot mounting extending through a support; a contact arm keyed to said mounting upon the opposite side of said support, said arm carrying contacts for movement between spaced stops provided by said support, said contacts and stops being relatively yielding and wiped; relatively aligned oppositely extending rigid arms carried by said rocker member; cam-surfaces of convex form with which the top edge of each rocker arm is provided adjacent the free end thereof; a two-part pivotally connected lever normally held in relative alignment by opposing spring means yieldable by force applied to one of said parts, said lever extending above and pivoted to said support below said rocker member; a pair of upright spring-pressed and relatively spaced latch members pivoted to said support upon either side of said rocker member, said latch members having interfacing edge recesses to alternately receive an arm extremity of said rocker member as tipped; laterally projecting interfacing nubs provided by latch members above said recesses; fixed stops provided by said support to limit the separating movement of said latch members; and a spring-pressed sliding pivot mounted upon the head of the upper part of said lever, said pivot carrying a roller member for travel upon the said top edge of said rocker member upon the movement of said aligned lever parts.

2. A contact latch and release mechanism comprising a rocker member keyed to one extremity of a rod pivotally mounted upon a support, said rocker being provided with oppositely extending arms; a cam-surface of convex form provided upon the upper edge extremity of each of said arms; a contact member keyed to the opposite extremity of said rod; a two-part lever having pivotal connection, one with the other and with said support, and both parts normally supported in relatively upright alignment by means of opposing stiff springs carried by one lever part against the other part, said lever parts extending directly upward behind said rocker member, the lower lever part serving as an actuator; a spring-pressed roller member carried by the upper extremity of said two-part lever for travel upon said upper edge of said arms; a pair of up-

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right spring-pressed latch members pivotally mounted upon said support upon opposite sides of said rocker member; a recess provided upon each of the interfacing edges of said latch members for alternately receiving an extremity of one of said upwardly tipped rocker arms; a lateral projection upon opposite edges of said upper lever extremity for alternate engagement with said latch members; spaced stops provided by said support to limit the movement of said contact member, whereby the normal operation of said actuator is adapted to move in relative alignment both lever parts to carry said roller member along an upwardly inclined rocker arm and to pushingly engage a projection of said lever against said spring-pressed latch member to release said rocker arm therefrom, but, upon an unyielding welded or sticking contact, a more forceful operation of said actuator makes said roller member travel up onto an inclined cam surface of one of said oppositely extending arms of said rocker member to break such contact, the said stiff springs tending to compensate any overtravel of said lower lever actuator part.

3. A switch contact latch and release mechanism comprising a rocker member keyed to one extremity of a shaft pivotally mounted upon a support, said rocker member being provided with oppositely extending arms; an elongated cam-surface provided by said rocker member including said rocker arms; interfacing inclined cam surface provided by said elongated cam-surface adjacent both extremities thereof; a contact member keyed to the opposite extremity of said shaft; a two-part lever pivotally connected one to the other and to said support and normally supported in substantial alignment by means of opposing stiff springs carried by one lever part against the other part, said two-part lever extending beyond said rocker member and the lower part providing an actuator means; a downwardly spring-pressed roller member carried by the upper extremity of said two-part lever for travel upon said elongated and inclined cam-surfaces; a pair of upright spring-pressed latch members each pivotally mounted upon said support upon opposite sides of said rocker member; a recess provided by each of the interfacing edges of said latch members for alternately receiving an extremity of a rocker arm as tipped therefor; and spaced stops provided by said support to limit the pivotal movements of said contact member whereby an operation of said actuator means is adapted to move both lever parts to carry said roller member along said elongated cam-surface and on the inclined cam-surface of a rocker arm, the upper extremity of said two-part lever operatively engaging a spring-pressed latch member to release a latch recess from a rocker arm.

4. A switch contact latch and release mechanism comprising a rocker member keyed to a pivot-mounting extending through a support; a contact member keyed to said pivot-mounting, said contact member carrying contacts for movement therewith between spaced stops provided by said support, said contacts and stops being yielding and wiped; oppositely extending rigid arms carried by said rocker member; a continuous cam-surface with which an edge of said rocker member is provided including said arms;

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a projection provided by said cam-surface adjacent each of the arm extremities; interfacing oblique cam-surfaces provided by said projections; a two-part pivotally connected operating lever normally held in relative alignment by means of opposing springs each having an end held by one part of said two-part lever and an opposite end held by said other part of said lever, the pivot connecting said lever parts extending through said support, the upper one of said two-part lever extending beyond said rocker member; a pair of upright spring-pressed latch members pivoted to said support one upon either side of said rocker member; a recessed keeper provided by each of the interfacing edges of said latch members for alternate reception of one of said rocker arm extremities as tipped therefor; fixed stops provided by said support to limit the separating movements of said latch members; and a spring-pressed downwardly sliding pivot mounted within a slot provided by the head of said upper part of said two-part lever, said pivot carrying a roller member for travel over said cam-surface of said rocker member and to mount an oblique cam-surface of one of said projections to force a rocker arm to unlatched position as the two-part lever is operated to engage its said head portion thereof against said spring-pressed latch member to release said keeper from said rocker arm while the other of said arm extremities engages against another spring-pressed latch member and slides within the keeper thereof.

5. A contact lock-and-release mechanism comprising a rocker member keyed to a pivot mounting extending through a support; a contact member carried by said pivot mounting upon the opposite side of said support, said contact member carrying contacts for movement between spaced stops provided by said support; relatively aligned oppositely extending arms carried by said rocker member; cam surfaces with which the top surface of each rocker arm is provided; a two-part pivotally connected lever normally held in relative alignment by opposing spring means yieldable to force applied to one of said parts, said lever being pivoted to said support below said rocker member; a pair of upright spring-pressed and relatively spaced latch members pivoted to said support one upon either side of said rocker member, said latch members having interfacing edge recesses to alternately receive an arm extremity of a tipped rocker member; and a spring-pressed sliding pivot mounted upon the upper part of said lever, said pivot carrying a member for travel upon the said top edge of each rocker arm upon the actuated movement of said aligned lever parts.

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