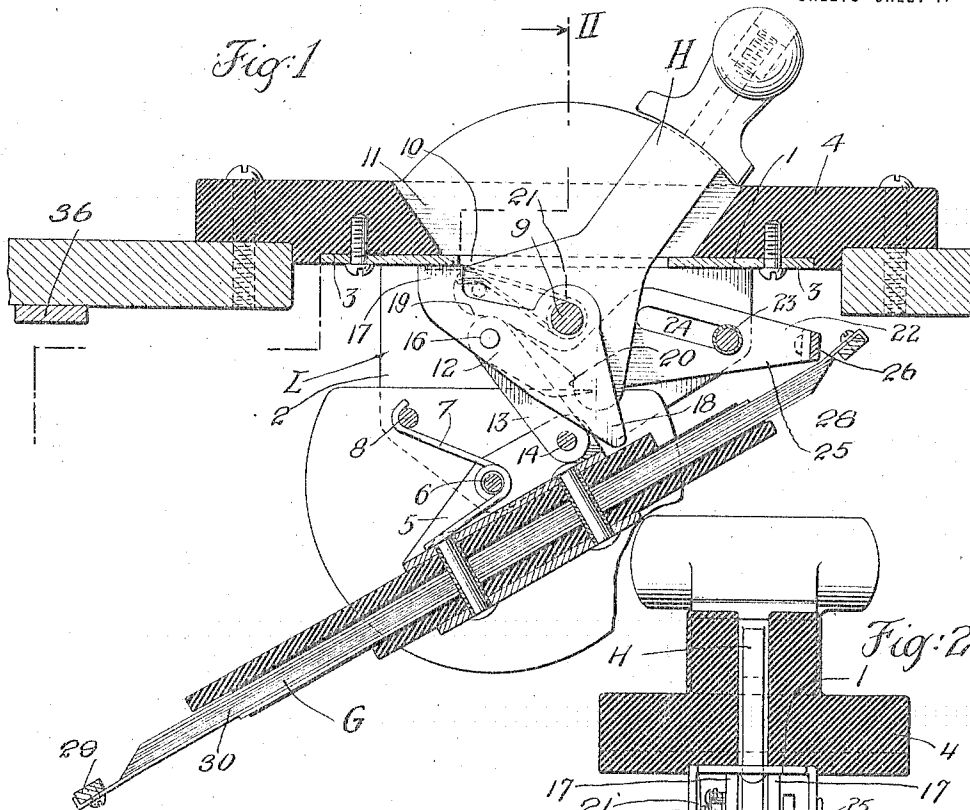
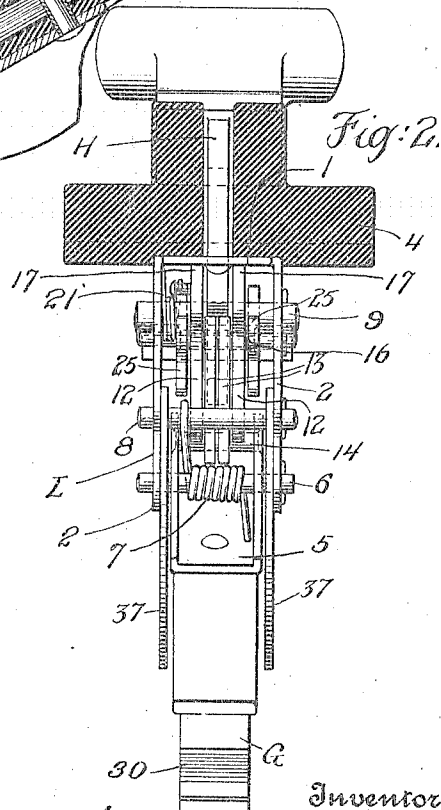
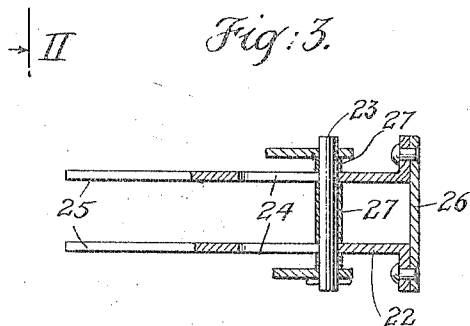


H. KRANTZ.
ELECTRIC SWITCH MECHANISM.
APPLICATION FILED JUNE 16, 1917.

1,399,490.

Patented Dec. 6, 1921

2 SHEETS—SHEET 1.



Inventor
Hubert Krantz
By his Attorney
L. Sanford & Son

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Fig. 4.

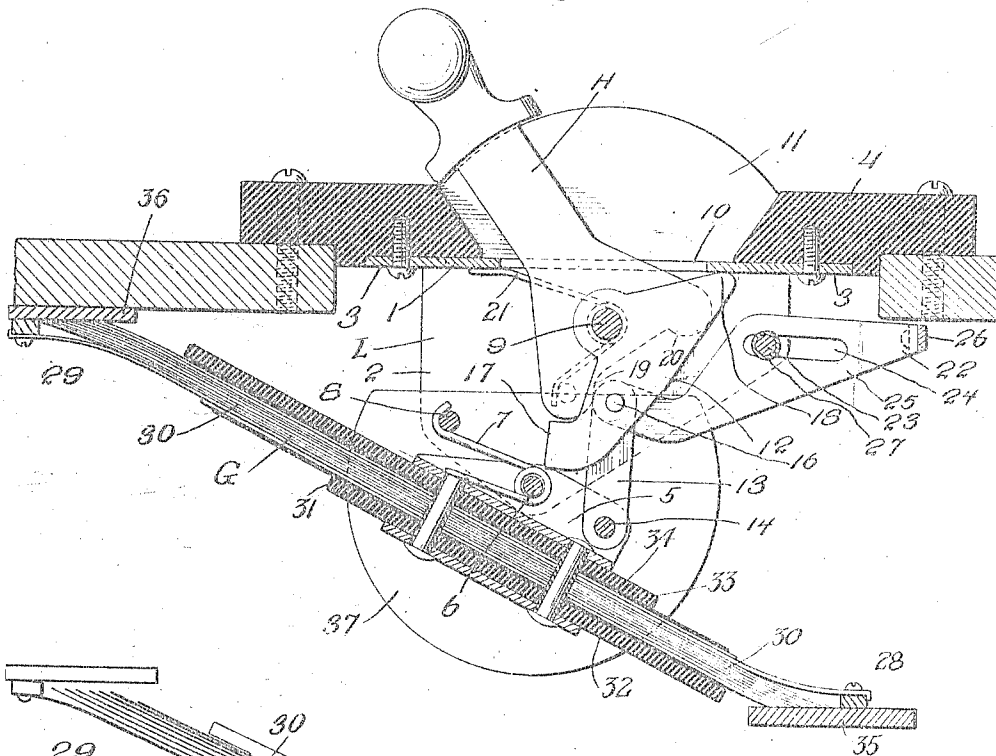
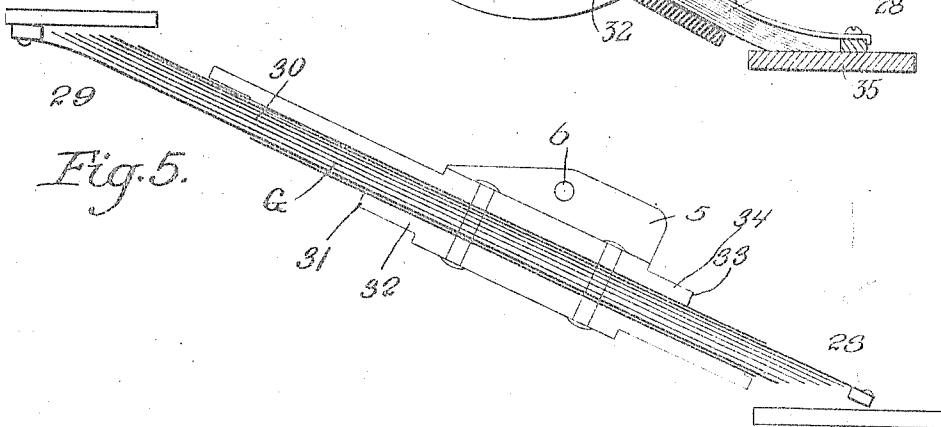


Fig. 5.



Inventor
H. Krantz
By his Attorney
L. Sanford Vander

UNITED STATES PATENT OFFICE.

HUBERT KRANTZ, OF BROOKLYN, NEW YORK, ASSIGNOR TO KRANTZ MANUFACTURING COMPANY, INC., OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

ELECTRIC-SWITCH MECHANISM.

1,399,490.

Specification of Letters Patent.

Patented Dec. 6, 1921.

Application filed June 16, 1917. Serial No. 175,191.

To all whom it may concern:

Be it known that I, HUBERT KRANTZ, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in an Electric-Switch Mechanism, of which the following is a specification:

This invention relates to an electric switch mechanism such as is shown in my pending application Serial No. 42,956 filed July 31, 1915, of which this is a continuation in part.

An object of the present invention is to provide an improved mechanism which may be manufactured and dispensed as an article of manufacture adapted for use under various circumstances.

A further object is to provide a switch mechanism adapted for operating and controlling a double-ended switch blade.

A further object is to provide a switch mechanism by means of which a quick-break action is readily accomplished.

A further object is to provide a switch mechanism adapted for use in connection with safety panel boxes and the like and comprising parts whereby the mechanism proper may be contained within the panel box while an operating handle of the mechanism projects to a point of accessibility beyond the box.

A further object is to provide a switch mechanism operable to control a circuit at two spaced points, and to provide means whereby the control at one of said points is always in advance of the control at the other point, this object being particularly directed to localizing possible arcing difficulties.

A further object is to provide a switch mechanism including a double-ended switch blade pivoted to swing about an axis intermediate its length so as to move its opposite ends into or out of electrical engagement with suitable coöperative contacts, and to so arrange the parts that one end of the switch blade will move into or out of engagement with its respective contact before the opposite end.

A further object is to provide a switch mechanism adapted for use in connection with devices of various descriptions, and to provide means operatively associated with the switch mechanism to be moved at each operation of the switch mechanism and adapted for use in coöperating with or con-

trolling some other element of the device in connection with which the switch mechanism is used.

A further object is to provide an improved mounting for a switch blade whereby to insure a good rubbing contact.

A further and more specific object is to provide a switch mechanism including a suitable supporting frame, a pivotally mounted switch blade, and toggle mechanism connected between the frame and the switch blade for swinging the switch blade about its pivot, together with an operating handle for the toggle and means for limiting the movements of the toggle in both directions.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of the elements, combinations, arrangements of parts and applications of principles, constituting the invention; and the scope of protection contemplated will be indicated in the appended claims.

In the accompanying drawings which are to be taken as a part of this specification, and in which I have shown merely a preferred form of embodiment of the invention:

Figure 1 is a vertical sectional view through a switch mechanism constructed in accordance with this invention, the mechanism being shown in the "off" position.

Fig. 2 is a vertical transverse sectional view taken substantially upon the plane of line II of Fig. 1.

Fig. 3 is a fragmentary detail view.

Fig. 4 is a view similar to that shown in Fig. 1 but illustrating the mechanism in the "on" position, and

Fig. 5 is a diagrammatic view illustrating the manner in which the switch blade moves to break the circuit at one end of the blade in advance of the other.

Referring to the drawings for describing in detail the structure which is illustrated therein the reference character L indicates a frame. This is of inverted U-shape comprising a connecting or base part 1 and opposite leg parts 2. The base part 1 is preferably formed with extensions 3 by means of which the frame may be connected with the wall 4 of a panel box or the like.

The switch blade is indicated by the reference character G and is connected with a

bracket 5 which is in turn pivotally connected, as by pivot pin 6, with the lower end portions of the legs 2. A tension spring 7 is pivoted about the pin 6 and has one of its ends engaging a stop 8 carried by the legs 2 and its other end bearing upon the bracket 5 so as normally to swing the blade in a contra-clockwise direction.

The operating handle, as H, is pivotally mounted upon a pivot pin 9 which is carried by the legs 2 and projects upwardly through an opening 10 formed through the base 1, and through a registering opening 11 formed through the wall 4 of the box.

A link 12 is pivotally mounted upon the pin 9 and a second link 13 is mounted upon a pivot pin 14 carried by the bracket 5 and the links 12 and 13 are pivotally connected together by a pivot pin 16 so as to form a toggle for controlling the movements of the switch blade in response to the movements of the operating handle. The link 12 is provided with an extension 17 for engaging an under-surface portion of the base 1 to limit movement of the toggle in "broken" position, as in Fig. 1, and an extension 18 is formed upon said link 12 to engage another under-surface portion of the base 1 to limit movement of the toggle in "straightened" position, as shown in Fig. 4.

The operating handle H is formed with a pair of shoulders 19 and 20 at its inner end, said shoulders being spaced apart and disposed for engaging against the upper end of the link 13, that is at the knee of the toggle, for moving the toggle from one position to another. When the parts are in the position of Fig. 1 the shoulder 19 is in position engaging the knee of the toggle and a movement of the operating handle toward the left will press the knee downwardly and into the position shown in Fig. 4. A light spring 21 is carried by the pivot pin 9 and is arranged for urging the operating handle normally into its "on" position. This spring however is of considerably less strength than the spring 7 so as not to interfere with the function of said spring 7. The spring 21 serves principally to retain the operating handle in a normal position against loose play movements.

To move the parts from the position of Fig. 4 backwardly into the "off" position, the handle H is swung to the right so as to move the shoulder 19 away from the toggle knee and to then bring the shoulder 20 against the knee from the opposite direction. By the time the shoulder 20 moves the knee past center the shoulder 19 will have reached substantially the extreme of its backward movement so that as the knee snaps over into toggle breaking position the shoulder 19 will have come to rest and the force of the blow will be taken up by the extension 17 and will not be felt to any noticeable

extent by the operator's hand which is upon the operating handle.

In order to provide a mechanically correct arrangement of the toggle parts the link 12 is made up of two sections which are spaced 70 apart to receive the link 13 and the lower end portion of the operating handle between them, as clearly indicated in Fig. 2.

The member above referred to for cooperating with or controlling some other elements of the device in connection with which the switch mechanism is used is indicated by the reference numeral 22. In the structure illustrated it is in the form of a plunger connected to the pivot pin 16 by its inner end and being slidably supported and retained in position by a guide rod 23 mounted upon the legs 2 and engaging within a slot 24 formed in the plunger so that at each movement of the toggle the plunger is operated either outwardly or inwardly according as the toggle is straightened or broken. A plunger of this character may be effectually used for controlling door locking mechanism, or for constituting means to prevent detachment of the switch mechanism, or for controlling other switch mechanisms and etc., as shown in my co-pending applications Serial Nos. 42,956—158,957—158,958—158,960, also for other uses as will suggest themselves.

For convenience and efficiency in manufacture this plunger 22 is preferably made up with a pair of legs as 25 spaced apart to receive the toggle links and the operating handle between them, a connecting plate 26 being arranged to connect the outer ends of the parts 25 together. This plate 26 may serve as a bumper in certain instances if desired. Suitable collars 27 may be mounted upon the guide rod 23 to retain the plunger centered, as clearly indicated in Fig. 3. As clearly shown in Figs. 1, 4 and 5 the pivotal mounting 16 for the switch blade is arranged nearer to the end 28 of the switch blade than to the end 29, also that the flexible metallic plates 30 forming the switch blade project at greater length beyond the ends 31 of the stiffening elements 32 than beyond the end 33 of the stiffening element 34. By this means a greater degree of flexibility is given to the end 29 than to the end 28.

The result of this arrangement is graphically illustrated in Fig. 5 which illustrates the position of the ends of the switch blade relatively to the two contacts 35 and 36 at the moment following the breaking of engagement with one of said contacts. It will be seen that although the end 28 of the switch blade has already left the contact 35 still the end 29 of the blade remains in engagement with the contact 36. Any spark or arc which may follow breaking of the circuit is localized between the end 28 and the contact 35 as there will be no current

flowing when the end 29 leaves the contact 36. This improvement enables the employment of any desired means in association with the end 28 and the contact 35 for withstanding the effects of the spark or for disposing the spark.

It will be understood however that it is not desired to limit this invention to the use of a switch blade which is arranged to break a circuit at one of its ends in advance of the other, or in fact to the use of a switch blade which is double-ended, as other forms of switch blades than that illustrated may be readily connected with the bracket 5 to be moved thereby.

The reference numeral 37 indicates a pair of plates of insulating material which may be employed in connection with the mechanism illustrated; said plates being arranged one at each side of the switch blade and being supported by the legs 2 or by the pivot and stop pins 6 and 8.

Special attention is also directed to the fact that the pivot at the pin 6 is in a plane above a straight line between the opposite ends of the switch blade and that by this means a rubbing is afforded when the opposite ends of the switch blade engage against the contact members 35 and 36 due to the fact that when the engagement occurs the switch blade is moving bodily toward the left.

As many changes could be made in this construction without departing from the scope of the invention as defined in the following claims, it is intended that all matter contained in the above description or shown in the accompanying drawings, shall be interpreted as illustrative only and not in a limiting sense.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:

1. As an article of manufacture, a switch unit combining a base plate having an opening therethrough, a switch member and operating mechanism therefor located at one side of said base plate and including a toggle for retaining the switch member in open position and means for moving the switch member to closed position with a snap action when the toggle is broken, and an operating handle located at the other side of said base plate and having a lost-motion connection therewith and adapted to directly engage the knee of the toggle and to "break" the toggle and permit closing movement thereof independently of the handle.

2. A switch mechanism comprising a frame, a bracket pivotally supported by said frame, a toggle having one end supported by said frame and having its other end connected to said bracket, resilient means between said bracket and said frame to urge the bracket into a position breaking the toggle,

an actuating handle supported by said frame having a lost motion connection to the knee of the toggle to move the toggle into and out of straightened position, and a switch blade carried by said bracket.

3. A switch mechanism comprising a frame, a bracket movably supported by said frame upon a pivot pin, a second pivot pin carried by said frame, a toggle pivotally connected by one end to said second pivot pin and having its other end pivotally connected to said bracket, an actuating handle also pivotally supported by said second pivot pin and having spaced parts disposed to operate upon the knee of the toggle for moving the toggle into and out of straightened position, and a switch blade connected with said bracket.

4. A switch mechanism comprising a U-shaped frame having a connecting part and spaced leg parts, and said switch mechanism comprising a switch blade supported by said leg parts, toggle mechanism supported by one of said leg parts and being connected thereto and to said switch blade for operating the switch blade, an actuating handle for controlling the toggle having a lost motion connection thereto, and one link of the toggle having extensions thereon disposed for engaging the connecting part of the frame to limit movement of the toggle in two directions.

5. A switch mechanism combining a switch blade pivoted intermediate its ends, a member connected therewith for swinging the same, a rocker pivoted about a fixed axis, a link connecting the free end of said member with the free end of said rocker, a hand operating member having two contact surfaces for throwing said rocker and providing lost motion therefor, and means for limiting the swing of said rocker.

6. In a switch, in combination, a supporting bridge, a face plate adapted to be connected thereto, a contact blade, a blade-carrier pivotally connected to said bridge for supporting and oscillating said blade, a single operating lever extending through said face plate, and an oscillating member flexibly connected with said blade-carrier and connected with said lever to transmit motion from said lever to said blade.

7. In a flush wall switch, the combination of an apertured face plate, a supporting bridge, a contact blade, a pivoted member for supporting and oscillating said blade, a second member pivoted eccentrically of said first member, and operatively connected thereto, and a manually operable lever pivotally supported by said bridge and passing through the aperture in said face plate, and having a lost motion connection with said second member.

8. In a flush wall switch, the combination of an apertured face plate, a supporting

bridge having a pair of depending arms, a contact blade, a member pivoted to said depending arms for supporting and oscillating said blade, a second member pivoted to said depending arms eccentrically of said first member, and operatively connected thereto, and a manually operable lever pivotally supported by said bridge, and passing through the aperture in said face plate, and having a lost motion connection with said second member.

9. In a switch, in combination, a face plate, an operating lever extending there-through, a blade carrier, a contact blade mounted thereon, an intermediate member in connection with said lever, mounted eccentrically with respect to the blade carrier and having a flexible connection with said blade carrier, said connections allowing a movement of said lever in one direction thereby causing said blade carrier to move in the opposite direction.

10. In a wall switch, the combination of an apertured face plate, an apertured supporting bridge having depending arms, a contact blade, a pivoted member for sup-

porting and oscillating said blade mounted upon the depending arms, a second pivoted member also mounted upon the depending arms and operatively connected to the first pivoted member and a pivotally mounted lever mounted upon the bridge and passing through the apertures in the bridge and face plate and having an operative connection with said second pivoted member.

11. In a switch, in combination, a face plate, a single operating lever extending through said face plate, a contact blade, a pivoted member for supporting and oscillating said blade, a second pivoted member having a lost-motion connection with said operating lever and having a flexible connection with said first pivoted member whereby the full movement of the switch blade is made by said flexible connection.

In testimony whereof I affix my signature in the presence of two witnesses.

HUBERT KRANTZ.

Witnesses:

J. L. KOLLE,
K. WHITLOCK.