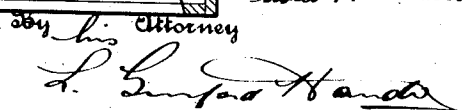


1,428,849.

3 SHEETS—SHEET 1.

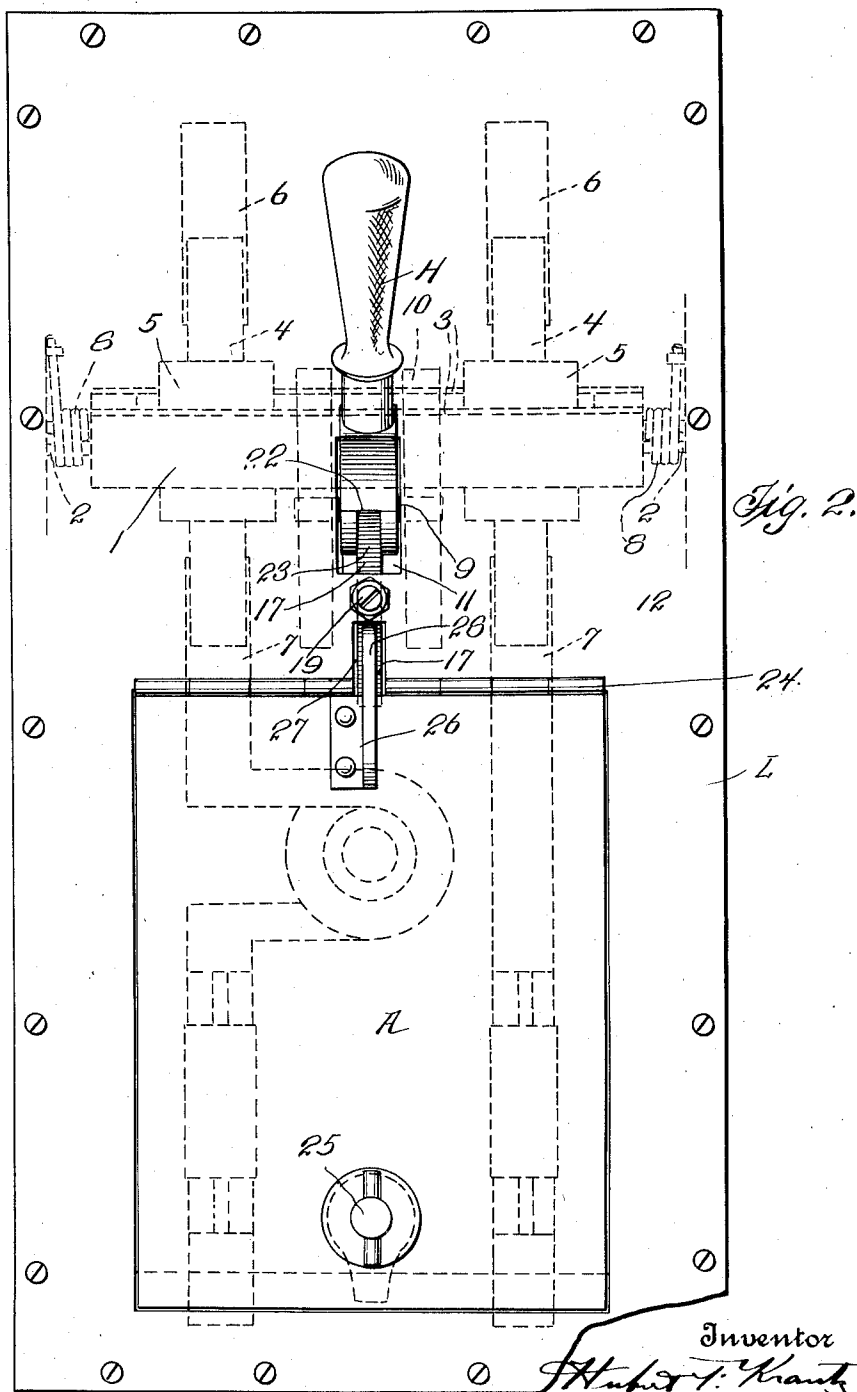


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SAFETY PANEL BOX.  
APPLICATION FILED AUG. 23, 1918.

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Patented Sept. 12, 1922.

3 SHEETS—SHEET 2.



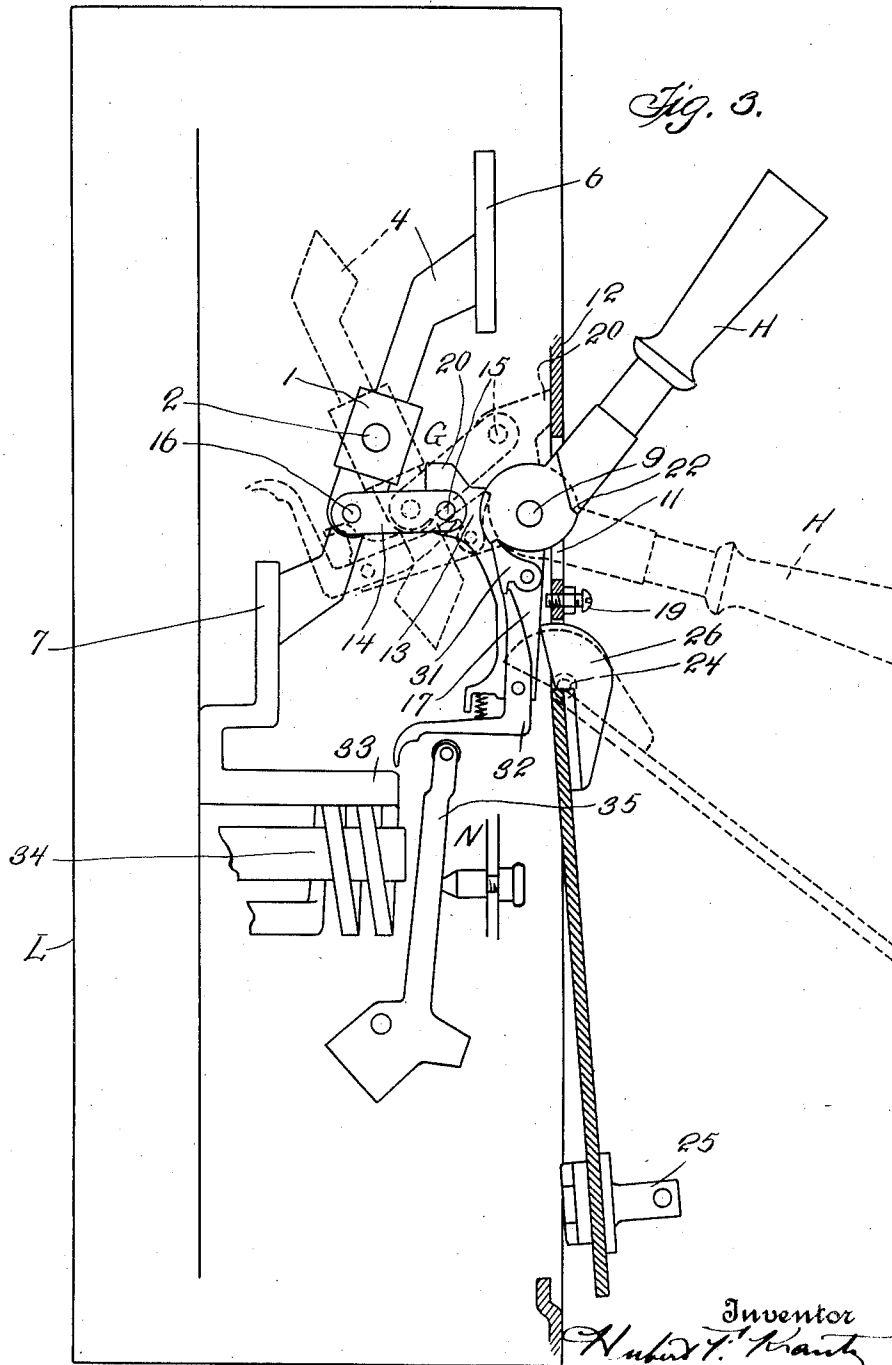
Inventor  
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By *L. Sanford Hand* Attorney

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3 SHEETS—SHEET 3.



Inventor  
H. F. Krantz  
By his Attorney  
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# UNITED STATES PATENT OFFICE.

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

## SAFETY PANEL BOX.

Application filed August 23, 1918. Serial No. 251,079.

*To all whom it may concern:*

Be it known that I, HUBERT F. KRANTZ, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Safety Panel Boxes, of which the following is a specification.

This invention relates to a safety panel box which is in many respects similar to that shown and described in my pending application Serial No. 248,330, filed August 5, 1918.

A particular object of the present invention is to provide improved and positively operating means for rendering the panel box safe to be handled even by an inexperienced operator.

A further object is to provide a panel box in which switch mechanism is mounted, and in which an entrance door is so associated with the switch mechanism as to preclude possibility of the switch being "on" after the entrance door has been opened.

A further and more detailed object is to provide a panel box having quick break toggle operated switch mechanism therein, and to provide the entrance door for the panel box with a part disposed to positively engage one of the toggle members to trip the same whenever the door is opened.

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:

Fig. 1 is a transverse vertical sectional view through a safety panel box constructed in accordance with this invention, parts being illustrated in full lines.

Fig. 2 is a top plan view of the panel box shown in Fig. 1, and

Fig. 3 is a diagrammatic view showing the elements of Fig. 1 in two different positions.

Referring to the drawings for describing in detail the structure illustrated therein the

reference character L indicates the panel box generally. This may be made up of any suitable material, either sheet metal or otherwise, according to preference. In the drawing it is shown to be made of sheet metal.

The switch mechanism within the box is represented generally by the reference character G. It is similar in all respects to the switch mechanism shown and described in the above mentioned application, and includes a switch blade carrier 1 which extends transversely across the box and has pivot extensions 2 by which the carrier is supported in suitable bearings at opposite sides of the box.

The carrier itself is of the general construction shown and described in my Patent 1,248,415, and includes a pair of clamp plates 3 between which the switch blades 4 are rigidly held in insulated spaced relation, sections of insulating material, as 5, being interposed between the blades and the clamp plates for insulating the blades from each other and from the clamp plates.

The blades are held by their mid-positions and the opposite ends of both of the blades project laterally from the carrier into cooperative relation with fixed contacts 6—6 and 7—7 respectively, the contacts 6 being the main line contacts and the contacts 7 being for branch line connections.

One or more springs, as 8, are connected with the carrier to normally urge it into position with the switch blades "off."

An operating handle H is provided for manually moving the switch blades at will. This handle is pivotally mounted upon a pivot pin 9 which is carried by a supporting bracket or frame 10 within the casing, the outer end of the handle projecting through an opening 11 in the front wall or cover plate 12 of the box to a position of accessibility exteriorly of the box.

A toggle, made up of links 13 and 14, is connected to be operated by the handle for moving the carrier in response to the movements of the handle. The link 13 is pivotally mounted upon the pivot pin 9 and is connected to the link 14 by a pivot pin 15 forming the knee of the toggle. The opposite end of the link 14 is pivotally connected, as at 16, to the carrier 1 at one side of the center line of the carrier.

Whenever the toggle is "made," the blades

stand "on," but as soon as the toggle is "broken," the blades snap quickly into "off" position under the impulse of the springs 8.

The link 13 is provided with an extension 17 which is arranged to engage against the inner end of a set screw 19 carried by the cover plate 12 for limiting movement of the toggle in the "made" direction. Preferably this same link is also provided with an extension 20 disposed for engaging against the inner surface of the cover plate 12 to limit movement of the toggle in the "broken" direction.

A light spring 21 is mounted upon the pivot pin 9 adapted to engage between the operating handle and the frame 10 for counter-acting the weight of the outer end of the operating handle.

The operating handle is provided with a shoulder 22 disposed to engage against a surface portion 23 of the link 13 whenever the handle is moved downwardly to break the toggle, said shoulder being positioned to press against the surface 23 only when the handle is in a position near its lowest extreme of movement, the engagement being maintained only sufficiently long to cause the pivot 15 to pass center. The springs 8 then complete the toggle movement to full "off" position.

The set screw 19 is adjustable so as to alter the degree of movement of the pivot 15 beyond center when the toggle is being made.

The entrance door is indicated by the reference character A and is mounted to displace a portion of the front wall 12, being pivotally mounted to swing about a hinge 24 which is preferably, though not necessarily, disposed with its axis parallel with the axis of the pivot 9. A suitable latch member 25 is provided at the free edge of the door for engaging the adjacent portion of the box to maintain the door closed when desired, said member also constituting a handle grip by which conveniently to open the door.

When the door is open, access is given into the interior of the box for the replacement of fuses, or for other appropriate purposes.

In order that the door may not be opened, however, while the fuses or other parts accessible through the door opening, are live, the door is provided with a heel piece 26 projecting beyond the hinge 24 adapted to engage against the extension 17 of the toggle link 13 to break the toggle upon opening movement of the door. The heel piece 26 operates through an opening 27 formed in the adjacent portion of the cover plate 12. A slight opening movement of the door, as shown by the full lines in Fig. 3, will move the pivot 15 backwardly well past center and the springs 8 will complete the "off" movement and place the switch blades in the full "off" position, as shown by the

dotted lines in Fig. 3. The blades being then "off," the opening movement of the door may be continued and the operator may insert his hand into the box without danger of coming into contact with any live parts.

The heel 26 is formed with a substantially concentric surface portion 28 which stands to be engaged by the extension 17 and to thereby prevent return of the switch blades "on" at any time while the door is open, this regardless of the extent to which the door has been swung in the opening movement.

When the toggle moves into the "off" position after being engaged by the heel 26, the operating handle simultaneously moves downwardly due to the engagement of a shoulder, as 29, at the inner end of the operating handle with an opposing shoulder 30 carried by the link 13.

When the door is closed and it is desired to return the switch blades "on," an upward movement of the handle, operating through the opposing shoulders 29 and 30, restores the toggle to its straightened condition.

The shoulder 30 on the toggle link 13 is shown as comprising the nose of a pawl 31 which is pivotally mounted upon the extension 17 and which is adapted to cooperate with a bell-crank lever 32 for rendering the toggle operable by an over-load control device of the kind fully shown and described in the above mentioned pending application. The over-load control device is illustrated herein generally by the reference character N. Briefly it comprises an over-load coil 33 which is interposed in the branch line circuit including one of the contacts 7. A core 34 is provided within the coil, and a movable armature 35 is arranged adjacent to the end of the core adapted to be attracted thereby and to operate the bell-crank lever 32 whenever an excess of current is present in the coil. A spring 36 is provided normally to cause the bell-crank lever to hold the pawl in position beneath the shoulder 29 of the operating handle, but when the armature 35 operates it causes the pawl to fall away from the shoulder 29 and immediately thereafter causes the toggle to become broken so that the springs 8 are able to snap the switch blades "off."

It will be understood from the above that in the structure described there is present three distinct and independently operable means for causing an "off" movement of the switch blades. The first is the operating handle. This may be moved to break the toggle at any time irrespective of the presence of the other two means. The second is the heel 26 on the door. This also is operable to break the toggle at any time regardless of the presence of the other two means. And the third is the over-load control which is also operable at any time to break the tog-

gle irrespective of the presence of the operating handle or the heel 26.

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. A panel box having a movable door, a switch mechanism movable into "on" and "off" positions, the switch mechanism including toggle links movable into made and broken positions, and the door having a part adapted when the door is opened to directly engage one of the toggle links to operate the toggle.

2. A panel box having a movable door, a switch mechanism having a switch blade movable into "on" and "off" positions, the switch mechanism including toggle links adapted to stand in a straightened condition when the switch blade is "on" and to permit movement of the switch blade "off" when the toggle is broken, and the door having a part operable when the door is opened to directly engage one of the toggle links to break the toggle.

3. A panel box having a movable door, a switch mechanism having a switch blade movable into "on" and "off" positions, the switch mechanism including toggle links adapted to stand in a straightened condition when the switch blade is "on" and to permit movement of the switch blade "off" when the toggle is broken, the door being pivotally connected and having a heel piece projecting beyond the pivot adapted when the door is opened to directly engage one of the toggle links to break the toggle.

4. A panel box having a movable door, a switch mechanism within the box having a switch blade movable into "on" and "off" positions, the switch mechanism including toggle links adapted to stand in a straightened condition when the switch blade is "on" and to permit movement of the switch blade "off" when the toggle is broken, an operating handle for the switch mechanism disposed to project through an opening formed

in the wall of the box, and auxiliary operating means for the switch mechanism comprising a part carried by the door and operable when the door is opened to directly engage one of the toggle links to thereby break the toggle.

5. A safety switch mechanism comprising a casing having an entrance door thereto, a switch blade within the casing movable into "on" and "off" positions, a toggle comprising links movable into made and broken positions for moving the switch blade, the door being pivotally mounted and having a heel projecting beyond the pivot thereof, and one of the toggle links having a rigid extension projecting into the path of movement of and directly engaging said heel whereby to break the toggle upon opening movement of the door.

6. A safety switch mechanism comprising a casing having an entrance door thereto, a switch blade within the casing movable into "on" and "off" positions, a toggle comprising links movable into made and broken positions for moving the switch blade, the door being movably mounted to move into open and closed positions, and one of the toggle links having a rigid extension projecting therefrom into the path of movement of the door whereby to break the toggle upon opening movement of the door.

7. A safety switch mechanism comprising a casing having an entrance door thereto, a switch blade within the casing movable into "on" and "off" positions, a toggle comprising links movable into made and broken positions for moving the switch blade, the door being movably mounted to move into open and closed positions, one of the toggle links having a rigid extension projecting therefrom into the path of movement of a part of the door whereby to break the toggle upon opening movement of the door, and said mentioned part of the door being adapted to stand at all times while the door is open in the path of said rigid extension thereby to prevent return of the toggle to made position.

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

HUBERT F. KRANTZ.

Witnesses:

GEO. W. ECKERSON,  
J. A. NEWTON.