F. W. HARRIS.

SWITCHING DEVICE.

APPLICATION FILED OCT. 7, 1908.

1,069,331. Patented Aug. 5, 1913.

Fig. 1.

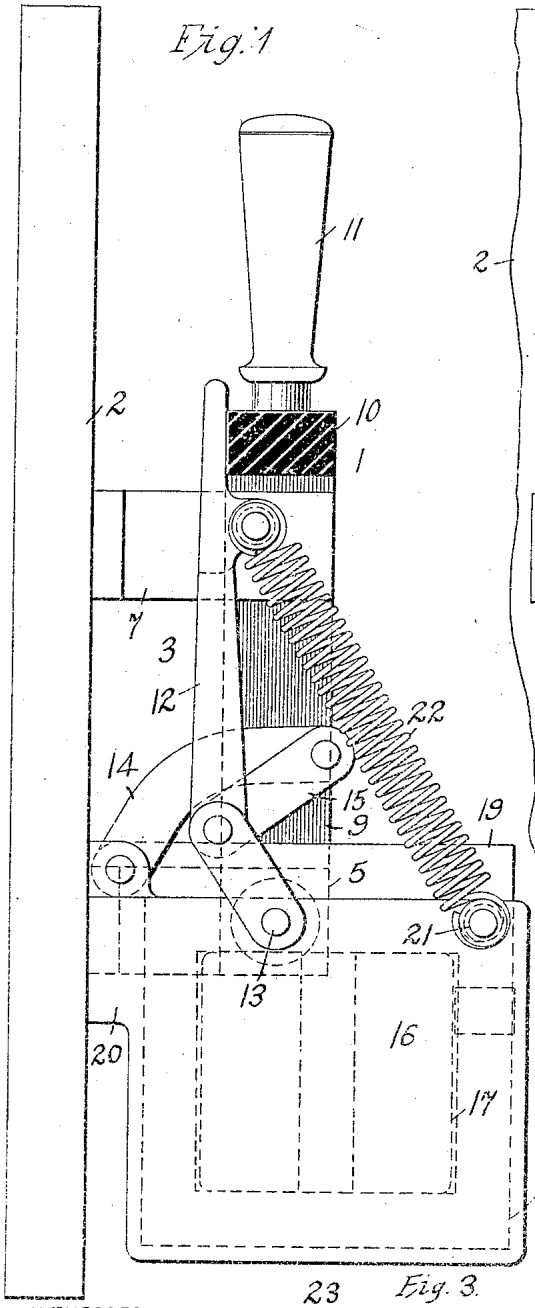


Fig. 2.

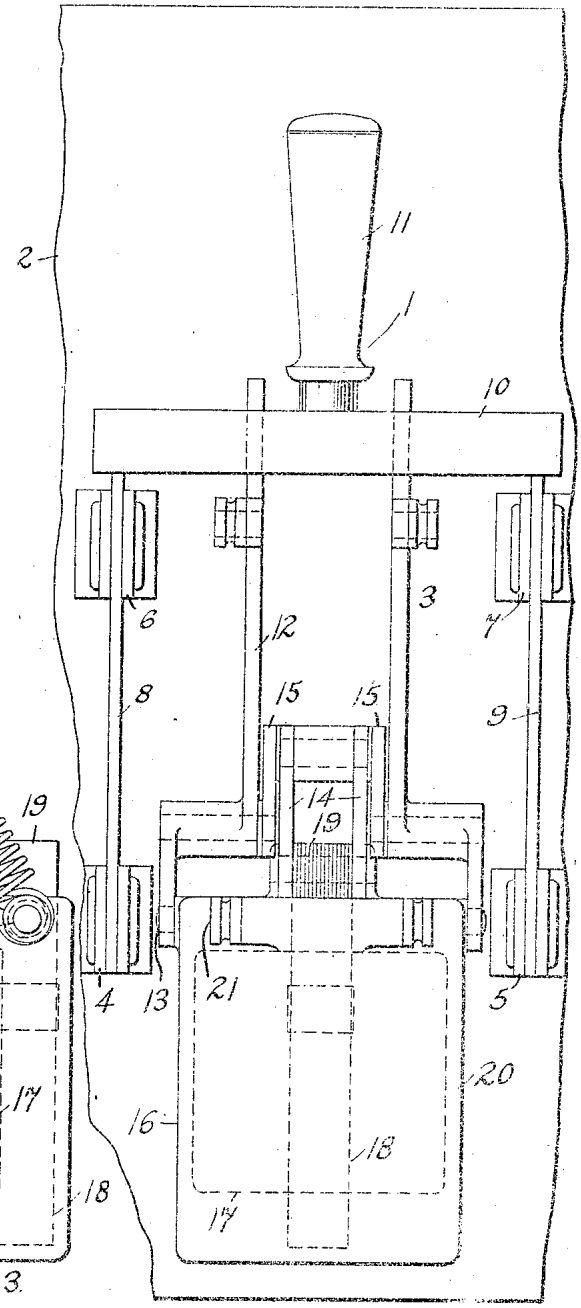
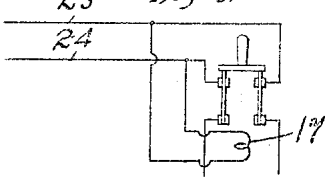


Fig. 3.



WITNESSES:

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SWITCHING DEVICE.

1,069,331. Specification of Letters Patent. Patented Aug. 5, 1913.

Application filed October 7, 1908. Serial No. 456,613.

To all whom it may concern:

Be it known that I, FORD W. HARRIS, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Switching Devices, of which the following is a specification.

My invention relates to switching devices and it has special reference to knife-blade switches.

The object of my invention is to provide simple and inexpensive means which shall automatically open a knife-blade switch, in the event of a failure of the voltage of the circuit in which it is included, and which shall not interfere with the manual manipulation of the switch.

Automatic circuit interrupters of various types and sizes have heretofore been constructed for the purpose of automatically interrupting electric circuits under predetermined conditions, such as overload, underload and no-voltage. These devices, however, are relatively complicated and expensive, as compared with the usual forms of knife-blade switches which are manually operated. Knife-blade switches are obviously unsuitable for interrupting a circuit which is traversed by relatively large currents or high voltages, on account of the detrimental effect of electric arcs on such devices.

It is sometimes desirable to utilize a switching device which will automatically interrupt the circuit upon the failure of the line voltage and, according to my present invention, I provide a very simple actuating mechanism which is adapted for use with knife-blade switches of the usual type and which does not interfere with the manual manipulation of the switch. A switching device, when so constructed, is obviously free from electric arcs, since its automatic operation is dependent upon the failure of voltage in the circuit to which it is connected.

My invention is illustrated in the accompanying drawings in which—

Figure 1 is a side elevation of a switching device constructed in accordance therewith, Fig. 2 is a front view of the same and Fig. 3 is a diagrammatic view showing the circuit connections for the switching device and its magnet winding.

Referring to Figs. 1 and 2 of the drawing, the device here illustrated comprises a double pole knife-blade switch 1 which is mounted, in the usual manner, upon a slab or base 2 of the insulating material and an automatic actuating mechanism 3 therefor, of which the operation of the knife blade switch is normally independent. The switch proper may be constructed in any suitable manner and may be provided with one or more poles, within the scope of my invention, the switch illustrated being composed of four stationary contact members 4, 5, 6, and 7, a pair of switch blades 8 and 9 that are pivotally mounted on the stationary contact members 4 and 5 and are adapted to engage the contact members 6 and 7, an interconnecting or spacing block 10 of insulating material and an operating handle 11 secured thereto.

The actuating mechanism 3 comprises a two-part lever 12 pivotally mounted, at one end, on a pin shaft 13, in alinement with the switch blade pivots, a lever 14, a pair of connecting links 15 and an electro-magnet 16 having a coil 17, a stationary core member 18 and a movable core member or armature 19 one end of which is rigidly connected to the lever 14. The free end of the lever 14 is connected to an intermediate point of the lever 12 by the links 15, the arrangement of parts being such that a force tending to move the armature downward, such as the magnetic pull when the coil is energized, holds the long arms of the lever substantially in the vertical position in which manual manipulation of the switch is permitted. The stationary core member is supported in a box or bracket 20 which is secured to the insulating slab or base 2 and the outer edge of this box is provided with pins 21 to which are attached the lower ends of springs 22, the upper ends of said springs being attached to the long arms of the lever 12 which are adapted to engage the spacing block 10. The tension in the springs, when the switch is closed, is sufficient to open the switch and interrupt the circuit when the electro-magnet is deënergized.

Referring to Fig. 3, as here shown, the switch blades are interposed in the respective sides of an electric circuit 23—24 and the coil 17 of the electro-magnet is connect-

ed across said circuit. This coil is consequently energized at all times except when the line voltage fails, in which case the coil will be deënergized. With this arrangement, the actuating lever will normally be held in such a position that the switch may be freely opened and closed. In some cases it may, however, be desirable to connect the coil of the magnet to the distributing circuit on the other side of the switch. With this arrangement, the coil will always be deënergized as soon as the switch is opened and the actuating lever will follow the switch blade whenever the switch is manually operated. The automatic operation of the switch will be the same in either case.

It is to be understood that various structural modifications may be effected within the scope of my invention, as defined in the appended claim.

I claim as my invention:

The combination with a knife-blade switch, the movable member of which is normally unrestrained except by friction between jaw and blade, of a lever and a spring for forcing said movable member to open-circuit position, a voltage magnet coil and toggle mechanism acting in opposition to said spring.

In testimony whereof, I have hereunto subscribed my name this 25th day of Sept., 1908.

FORD W. HARRIS.

Witnesses:
FRED W. CLOUD,
BIRNEY HINES.