

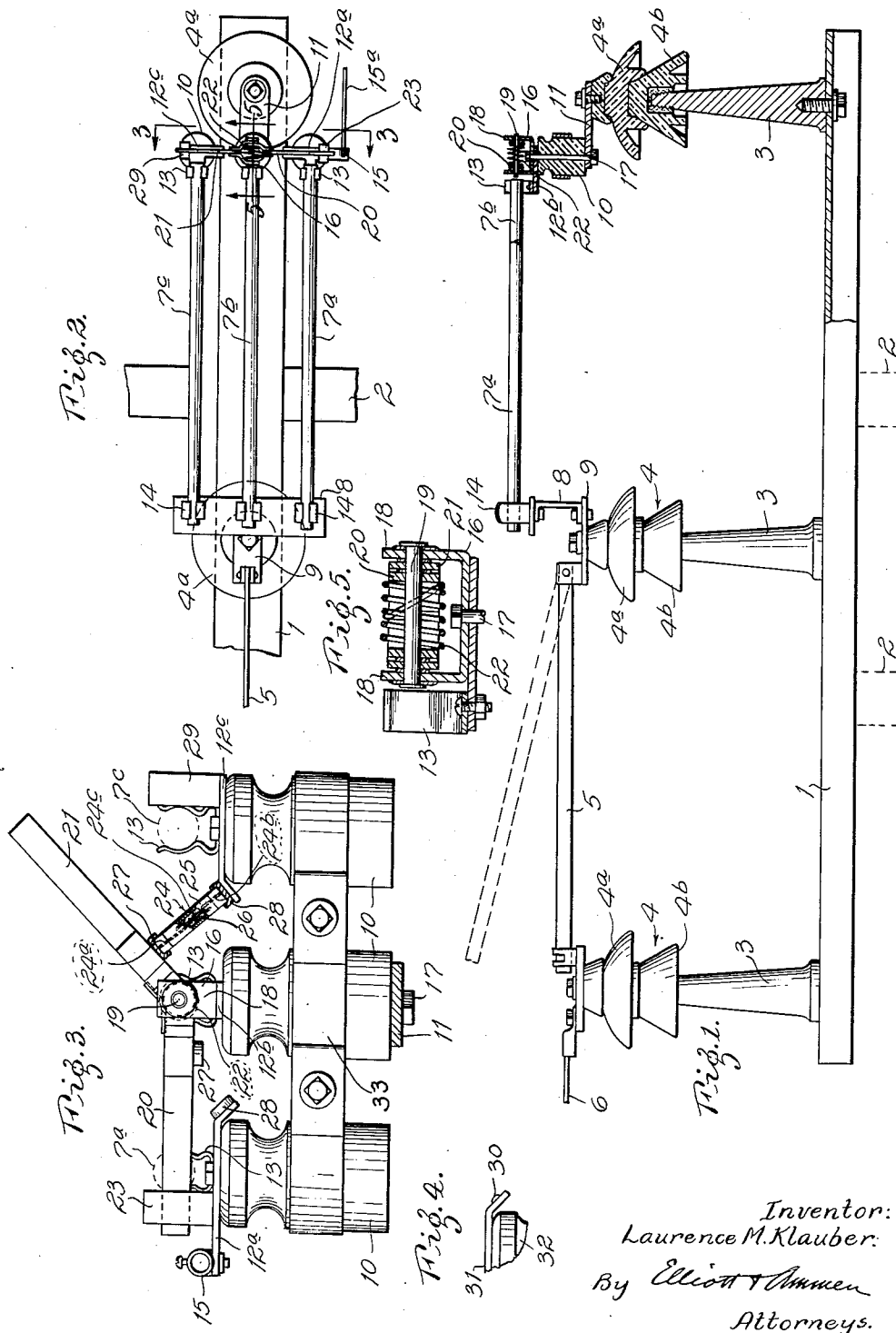
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AUTOMATIC CIRCUIT MAKING SWITCH FOR HIGH POTENTIAL CIRCUITS

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UNITED STATES PATENT OFFICE.

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AUTOMATIC CIRCUIT-MAKING SWITCH FOR HIGH-POTENTIAL CIRCUITS.

Application filed March 15, 1922. Serial No. 544,054.

To all whom it may concern:

Be it known that I, LAURENCE M. KLAUBER, a citizen of the United States, residing in San Diego, in the county of San Diego and State of California, have invented new and useful Improvements in Automatic Circuit-Making Switches for High-Potential Circuits, of which the following is a specification.

This invention relates to an automatic circuit-making switch intended to be used in high potential circuits such as high potential transmission lines or lightning arrester connections. In my Patent No. 1,352,816 for repeating fuse apparatus, I disclosed a construction in which a dielectric resistance device operated to hold open a switch consisting of spring members which operated to come into contact with each other when the dielectric resistance device became disrupted by the current. The general object of the present invention is to produce an automatic circuit-making switch of this nature, but constructed in such a way that in spite of the high currents carried by the switch, no injury will result from them to the spring or resilient properties of the switch. A further object of the invention is to produce a simple and compact construction for such a switch and which will facilitate placing the dielectric resistance devices in position.

Further objects of the invention will appear hereinafter.

The invention consists in the novel features, and in the general combination of parts to be particularly described hereinafter, all of which contribute to produce a simple and efficient automatic circuit-making switch for high potential circuits. A preferred embodiment of my invention will be particularly described in the following specification, while the broad scope of my invention will be pointed out in the appended claims.

In the drawing—

Figure 1 is a side elevation and partial section of apparatus embodying my invention;

Figure 2 is a plan of the right end of the apparatus shown in Figure 1;

Figure 3 is a vertical section taken about on the line 3—3 of Figure 2 upon an enlarged scale and further illustrating details of the apparatus; in this view the seats or cups for

a dielectric resistance device are shown in cross-section;

Figure 4 is a detail elevation and shows a modified construction for the seat that may support the dielectric resistance device; and

Figure 5 is a section upon an enlarged scale and taken on the line 5—5 of Figure 2. This view particularly illustrates details which may be embodied in the construction.

My switch may be used with contacts having different connections to the circuit organized so that when each contact comes into the circuit a new path or outlet for the circuit is made. In the following specification and in the drawing, I have represented the switch as applied to a repeating fuse apparatus, the function of the switch being to bring a plurality of fuses successively into the circuit, thereby enabling a new fuse to be immediately substituted automatically for a fuse which has burnt out.

Referring more particularly to the parts, 1 represents a base bar which may be mounted on arms 2 and this base bar may be provided with pins 3 supporting insulators 4 which may consist of shells or sections 4^a, and 4^b. Between two of the pins 3, an ordinary switch bar 5 is provided, the free end of which connects with a conductor 6 from one side of the line or circuit. Between the other two pins 3, 3, are mounted a plurality of fuses 7^a, 7^b and 7^c which are connected metallically at one end with a metallic frame 8, the base plate 9 of which supports the switch lever 5. The pin 3 which is located at the end of the bar 1 opposite to the line wire 6, supports three or more insulators 10 which correspond in number to the number of fuses which are employed. These insulators may be supported on a plate 11 attached to the upper side of the insulator 4, and extends toward the frame 8. The insulators 10 are surmounted by plates 12^a, 12^b and 12^c respectively, which project toward the frame 8 and are provided with spring clips or jaws 13 which engage the ends of the fuses so as to hold them in position. Similar spring clips or jaws 14 are provided on the upper side of the frame 8 for securing the opposite ends of the fuses.

The plate 12^a which is connected metallically with the fuse 7^a, is provided with means such as a socket 15 for attaching a conductor 15^a connected with the other side

of the circuit or line in which the fuses are to operate; when the three fuses are all intact, the initial circuit will be established through line wire 6, switch 5, frame 8, fuse 7^a and line wire 15^a. In applying my invention to such an apparatus, I provide a contact to co-operate with a movable switch member which is actuated by a spring consisting of a part distinct from the switch member and I employ a dielectric resistance device located or suitably mounted between the movable member and the contact so that it prevents the spring from moving the movable switch member into engagement with the contact. This dielectric resistance device is constructed so as to disrupt under a potential higher than a predetermined limit and thereby permit the spring to move the switch lever against the contact. The movable switch member or switch lever and its spring are so constructed that all, or substantially all of the current, passes over the switch member. In other words, the switch member operates to relieve the spring of carrying a dangerous current which could injure its resiliency. I also prefer to construct the switch in a double form so that two switch members, to co-operate with two contacts, will have a common pivot and a common spring.

In the present instance, I provide the middle insulator 10 which carries the plate 12^b, with a U-shaped bracket 16 which may be secured in place by the same bolt 17 which secures the insulator. The arms or forks 18 of this bracket carry a transverse pin 19 which passes through the bifurcated ends of two switch members or levers 20, 21, which extend in opposite directions from the pivot pin 19. In other words, the levers 20 and 21 are preferably mounted on a common pivot pin 19. On this pivot pin I provide a coil spring 22, one end of which presses downwardly on the switch lever 20, and the other end of which presses downwardly on the switch member or lever 21. In this way a single spring suffices for both switch levers.

Figure 3 shows the apparatus in a position in which the switch lever 20 has been moved down by the spring into engagement with a contact 23 which corresponds to this lever, and this view shows the switch lever 21 held in its open position by one of my dielectric resistance devices 24. This dielectric resistance device is simply a tube 25 of glass or similar insulating material, the interior of which is provided with a spark gap formed between two terminals 24^a and 24^b, the hooked ends of the terminals being connected by a loop of thread. The tube is filled with dielectric resistant substance such as gun powder, 26, which is explosive; this operates to produce a spark at the gap which explodes the powder and disrupts the re-

sistance device when the potential exerted at this point becomes sufficient. An explosive resistance device of this general type is illustrated in my Patent No. 1,352,816 of September 14, 1920.

In order to hold the resistance device 24 in place, I prefer to provide a shallow cup 27 which may be brazed or otherwise secured to the lower edges of the switch levers 20 and 21. The corresponding plates 12^a and 12^c are bent down and carry similar cups 28 which operate as seats for the lower end of the resistance device or cut-out. As illustrated in Figure 3, the fuse 7^a is supposed to have blown or burnt out. When this occurs, the potential exerted between the seats 27 and 28 corresponding to the switch lever 20 would be higher than a predetermined limit, and would be sufficient to jump the gap between the terminals 24^a and 24^b, and explode the dielectric resistance device holding up the lever 20. The spring 22 would then operate to swing the lever 20 down into a horizontal position and bring it into engagement with its contact 23. This would form or establish a new circuit through the fuse 7^b and through the switch lever 20 and contact 23 to the line wire 15^a. In a similar manner, when the fuse 7^b blows, the potential exerted between the terminals corresponding to lever 21, would operate to disrupt the second or secondary dielectric resistance device, and the switch lever 21 would then move down into engagement with its contact 29. This would establish a new circuit through the fuse 7^c, and this new circuit would pass via the two switch levers 20 and 21 and the line wire 15^a.

Instead of employing seats in the form of the cups 27 and 28, I may simply provide a nib or projection such as the nib 30 on the plate 31 mounted on the upper end of an insulator 32; (see Figure 4), and a similar nib would be provided on the lower edge of the lever to co-operate therewith to hold the dielectric resistance device in place. The insulators may be supported in any suitable manner by a frame construction 33 secured to the middle insulator 10.

The cross-sectional area of the switch levers 20 and 21 is sufficient to enable them to carry substantially all the current, or enough of it at least to relieve the spring from carrying any excessive current. In this way I avoid the necessity for attempting to insulate the spring to prevent its injury by the currents which pass by it.

It is understood that the embodiment of the invention described herein is only one of the many embodiments my invention may take, and I do not wish to be limited in the practice of my invention nor in my claims, to the particular embodiment set forth.

What I claim is:

1. An automatic circuit-making switch to

operate in high-potential circuits, comprising the combination of a switch lever, a contact to cooperate with the switch lever to form a new circuit, a spring consisting of a part distinct from the switch lever and engaging the switch lever to move the same into engagement with the contact, and a dielectric resistance device located between the switch lever and the contact constructed so as to disrupt under a potential higher than a predetermined limit, and permit the spring to move the switch lever against the contact, said switch member and spring cooperating to carry the current to the contact, and said switch lever having a sectional area sufficient to carry the current to the contact without subjecting the spring to injury due to the current.

2. An automatic circuit-making switch to operate in high potential circuits, comprising the combination of a switch lever, a contact to cooperate with the switch lever to form a new circuit, a coil spring mounted at the pivot of the lever and consisting of a part distinct from the switch lever for moving the switch lever into engagement with the contact, and a dielectric resistance device located between the switch lever and the contact, constructed so as to

disrupt at a potential higher than a predetermined limit and permit the spring to move the lever against the contact, said switch lever constructed to carry substantially all of the current and thereby relieve the spring of injurious electric currents.

3. An automatic circuit-making switch to operate in high potential circuits, comprising the combination of a pair of switch levers pivoted at their adjacent ends, a contact corresponding to each switch lever, a spring consisting of a part distinct from the switch levers but engaging them to move them into engagement with their corresponding contacts, and a dielectric resistance device located between each lever and its corresponding contact constructed so as to disrupt under a potential higher than a predetermined limit and permit the spring to move either of the switch levers against its corresponding contact, said switch levers having a sectional area sufficient to carry the current to either of the contacts without subjecting the spring to injury due to the current.

In testimony whereof, I have hereunto set my hand.

LAURENCE M. KLAUBER.