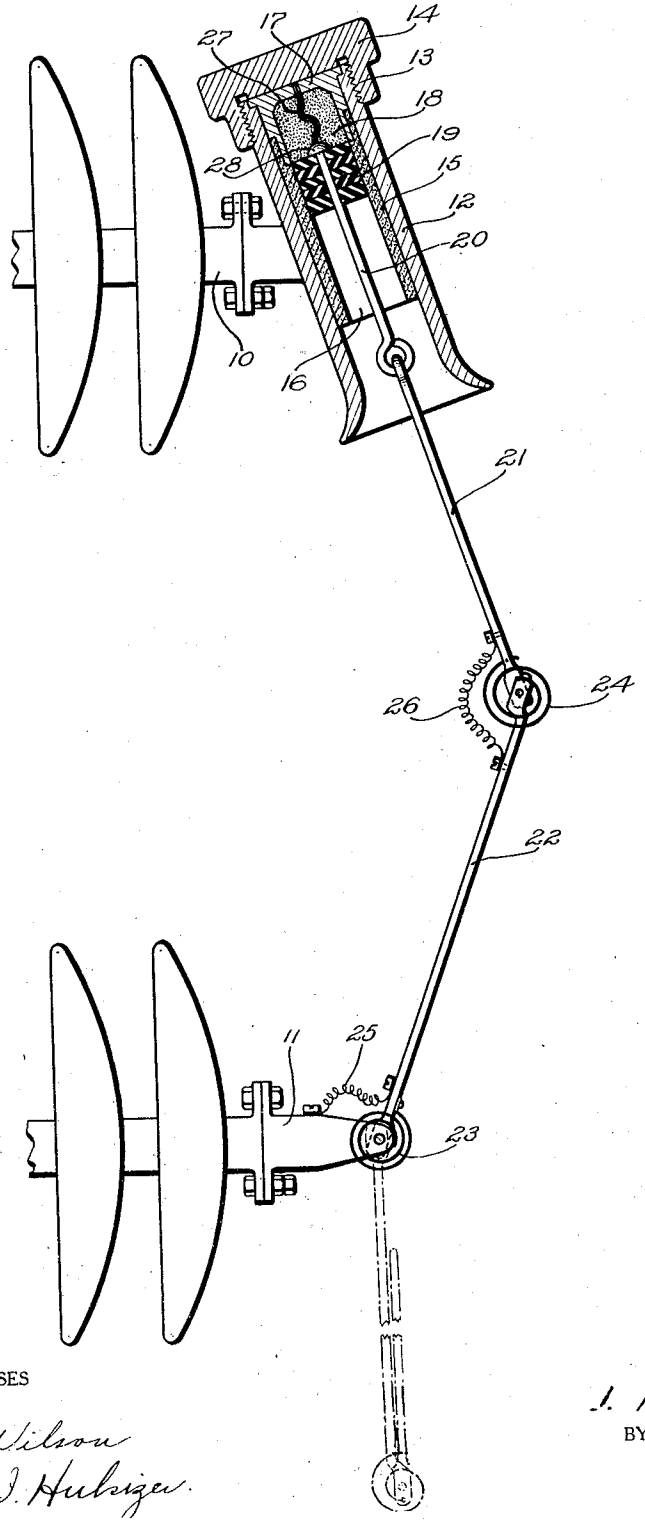
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EXPLOSIVE BLOW-OUT SWITCH

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WITNESSES

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## EXPLOSIVE BLOW-OUT SWITCH.

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This invention relates to an explosive blow-out switch.

An object of the invention is to provide a switch which is instantly disconnected when more than a predetermined amount of current passes therethrough, this disconnection taking place instantly due to an explosive action and causing such a separation of the switch element that no possible short circuits can occur and taking place so rapidly that the liability of any high destructive arcs is reduced to a minimum.

A further object resides in the provision of means whereby the elements of the switch are extremely simple and economical in their construction and operation, so that to reset the switch after it has been blown is a relatively simple matter.

A further object is to provide a blow-out switch in which all the current must flow through a fuse wire, thus making it possible to calibrate the switch to blow out as accurately as any cartridge fuse.

A further object is to provide a construction as above mentioned which will cause the elimination of current leakage.

A further object is to provide a blow-out switch in which no mechanical strain is placed on the fuse wire.

The invention is illustrated in the drawing, which is a side elevation of the switch showing the explosive operation of the mechanism in section.

The form of the invention shown in the drawings is a preferred form, although it is understood that modifications in the construction and arrangement of the parts and in the character of the materials used may be adopted without departing from the spirit of the invention as set forth in the appended claims.

In its general aspect the invention comprises a switch device to be disposed between the supporting elements in a circuit, preferably a high tension circuit. The idea is to provide a linkage or system of leverage, spring-controlled and having operative and inoperative positions. In the inoperative position the springs are not under tension but in the operative position the springs are under tension and one end of the lever system is held by the frictional engagement of suitable elements such as wads thereon, which are disposed in frictional engagement with the walls of an explosion chamber. A fuse is in electrical contact with the lever system and the other side of the electrical circuit. It is not mechanically strained by reason of this connection because the pulling tendency of the lever system is equalized by the frictional engagement of the wads. Surrounding the fuse there is disposed a quantity of explosive mixture, preferably black powder, which is electrically insulated, preferably, from the fuse by having the fuse coated with insulating material such as varnish or shellac which will, however, conduct heat but will not melt until the current in the fuse becomes abnormal.

In the preferred form of the invention shown in the drawing I provide the usual high tension insulating brackets 10 and 11. Mounted on one of these brackets is a projectile tube 12 having one open end and having its rear end threaded as at 13. A cap 14 is threaded on to this end of the tube and is suitably connected in any desired manner to one side of the circuit. Within the tube 12 is a shell 15, preferably a shell similar to the shells used in shotguns. This shell 15 has an open end 16 lying in the direction of the open end of the tube 12 and the other end is provided with a metallic contact cap 17 with its outer face flush against the inner wall of the cap 14. Within the rear end of the shell 15 I dispose an explosive charge 18, preferably black powder, held therein under any desired pressure by means of a plurality of wads 19. These wads are forced into the shell under considerable pressure and are connected to a conductive rod or pin 20 which is pivotally connected to a rod 21 which in turn is pivotally connected to a rod 22, pivoted to the insulator bracket 11. The rods 20, 21 and 22 form a lever system which operates in the manner hereinafter described. Springs 23 and 24 are disposed in the lever system for the purpose of giving it a tendency at all times when in operation to withdraw the wads 19 from the shell. Shunt wires 25 and 26 are provided to prevent the current from passing through the pivot points of the lever system.

Within the explosion chamber, I dispose a fuse 27 which at one end is secured to a cap 17, and at the other end soldered as at 28 to an end of rod 20 which projects through insulating wadding 19. The rod 20 can be easily detached from the rod 21 and thereby enable the insertion of a new fuse when necessary. The rod 20 being pref-

erable of copper or other good current conductor permits easy bending thereof and easy detachment of its connection with the rod or link 21. It is of course to be understood the connection shown between rods 20 and 21 might be changed to provide a more easily detachable connection if so desired.

After the cartridge is exploded a new one can be replaced merely by unscrewing the cap 14 and withdrawing the cartridge, and then substituting a new one in its place. This new one will be provided with the wadding, the explosive mixture and with the fuse, and with the pin 20 projecting therefrom, which can then be readily engaged with the rod 21.

By insulating the fuse I prevent the leakage of current through the powder when the current has to pass through the fuse.

By putting the lever system under tension it will tend at all times to return to its inoperative position as shown in the dotted lines, as soon as the wads are blown out of the cartridge. This construction provides a long air gap and leaves no terminals adjacent the explosion chamber which can be short circuited during or after the explosion.

The function of the powder is to blow out the wads so that the spring effect of the lever system can consummate the opening of the circuit. It is impossible for the fuse to break, through the mechanical strain, because all the load on the fuse is taken up by the degree to which the wadding is held in the shell of the cartridge.

It is also apparent that when this switch is blown it is visibly evident. As a matter of fact, on high voltage installations the fact that the fuse is blown can be seen at least one hundred yards away from the switch. This capacity of ready observation of the condition of the switch is one which is a decided advantage.

What I claim is:

1. An explosive blow-out switch comprising, a shell adapted to serve as a circuit terminal for said switch, an explosive within the shell, a projectile of insulating material adapted to hold the explosive within the shell, means carried by the projectile adapted to serve as a second circuit terminal, and a fuse element embedded in the explosive and insulated therefrom, said fuse element electrically connecting the shell and terminal carried by said projectile.

2. An explosive blow-out switch comprising, a projectile tube or casing having a closure at one end adapted to serve as a circuit terminal, an explosive within the tube, a projectile within the tube insulated therefrom and adapted to be blown from the tube by said explosive when the same is ignited, a second circuit terminal carried by the projectile, and an insulated fuse connecting the tube with the terminal carried by the projectile, said fuse being embedded in said explosive.

3. An explosive blow-out switch comprising, a projectile tube adapted to serve as one terminal of a high tension circuit, an explosive shell removable in said tube comprising an explosive charge and a projectile carrying a second circuit terminal insulated from the projectile tube, and an insulated fuse embedded in the explosive charge and connecting the terminal of the projectile with said projectile tube.

4. An explosive blow-out switch comprising, a projectile tube adapted to serve as one terminal of a high tension circuit, an explosive shell removable in said tube comprising an explosive charge and a projectile made of current insulating material, a second circuit terminal carried by the projectile, and an insulated fuse connecting the second circuit terminal with the projectile tube and embedded in said explosive charge.

5. An explosive blow-out switch comprising a pair of spaced terminals, a fuse wire connecting said terminals, a foldable lever system connected to one terminal, and means whereby with the fusing of said fuse wire the terminal connected to the lever system will be ejected from the other terminal in a direction for permitting the folding of the lever system and greatly spacing said terminals from each other.

6. An explosive switch, comprising a projectile tube adapted to serve as one terminal of a high tension circuit, an explosion shell in the tube and comprising an explosive charge and a projectile of current insulating material, a second circuit terminal carried by the projectile and including a pivoted and spring pressed rod, and an insulated fuse connecting the second circuit terminal with the projectile tube and embedded in the explosive charge.

7. An explosive switch, comprising a tube adapted to serve as one terminal of a high tension circuit, a cartridge in the tube and containing powder and wads, a switch bar extending into the cartridge and secured to the wads, a fuse disposed in the powder and extending between the switch bar and the tube, a lever system connected with the switch bar and to the other side of the circuit, and means for placing the lever system under tension to pull the switch bar out of the cartridge.

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