

E. O. SCHWEITZER.
FUSE DEVICE.
APPLICATION FILED FEB. 19, 1912.

1,147,448.

Patented July 20, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

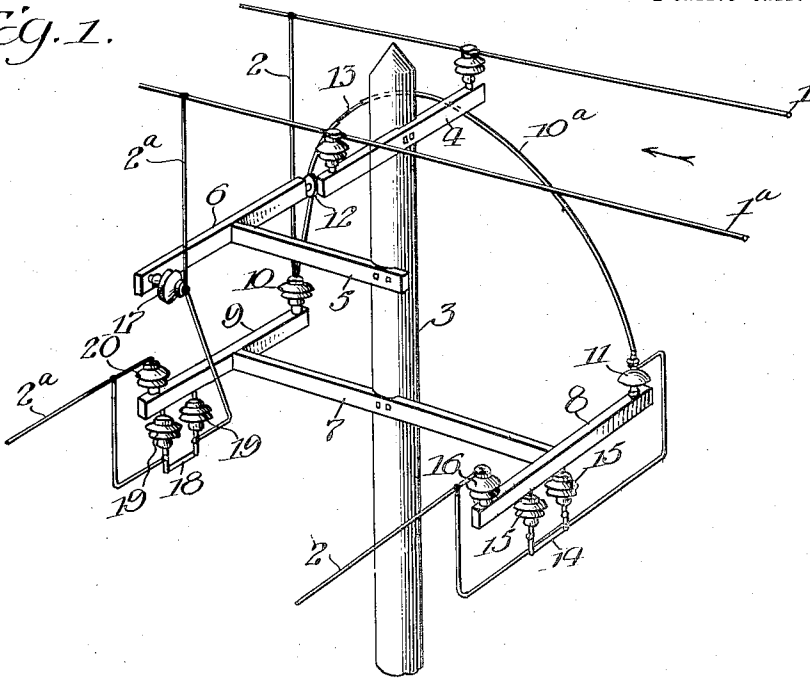
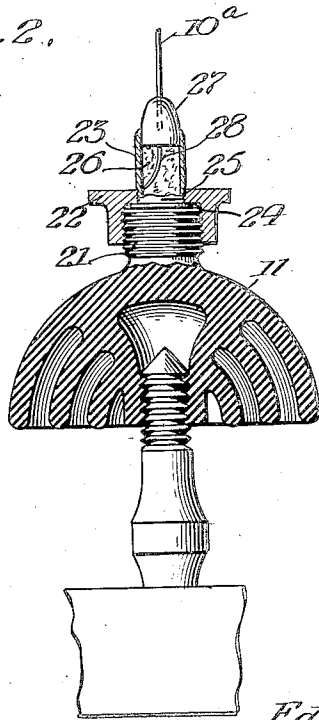


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

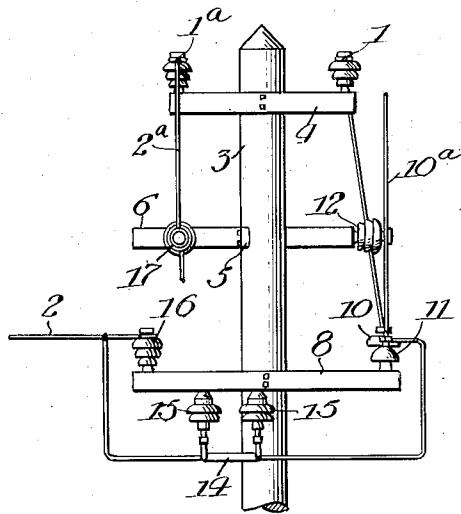


Fig. 4.

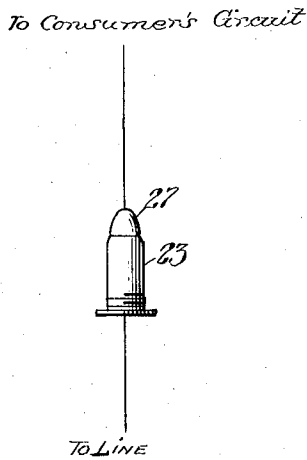


Fig. 5.

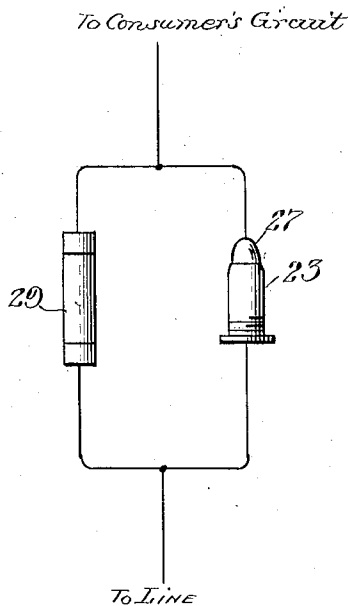
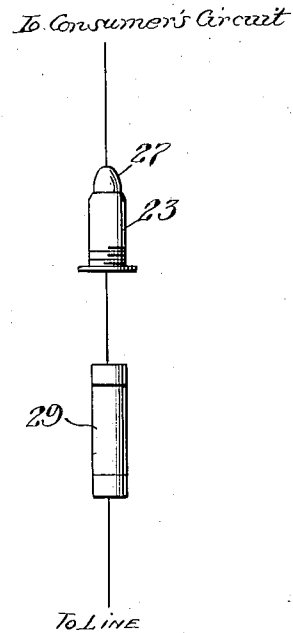


Fig. 6.



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UNITED STATES PATENT OFFICE.

EDMUND O. SCHWEITZER, OF CHICAGO, ILLINOIS.

FUSE DEVICE.

1,147,448.

Specification of Letters Patent.

Patented July 20, 1915.

Application filed February 19, 1912. Serial No. 678,611.

To all whom it may concern:

Be it known that I, EDMUND O. SCHWEITZER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Fuse Devices, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to an improved fuse device, and has as its principal object the provision of a cheap but efficient means for rupturing a high tension circuit.

A further object of my invention resides in the particular arrangement and combination of parts hereinafter described.

Referring more particularly to the drawings, Figure 1 is a perspective view showing my device as installed on a pole to control a consumer's circuit where it connects with the main transmission line; Fig. 2 is a cross sectional view through the center of my device illustrating it in detail; Fig. 3 is a view of the same structure shown in Fig. 1 looking directly along the main transmission line, as indicated by the arrow in Fig. 1; Fig. 4 is a diagrammatic view of my device illustrating its use by itself to control a circuit; Fig. 5 is a diagram representing a circuit controlled by my present invention described herein when placed in parallel with a cut-out device of another type; and Fig. 6 illustrates my present invention as connected in series with another type of cut-out.

Throughout the separate views the same part is indicated by the same reference numeral.

Referring more particularly to the drawings, 1—1^a are two high tension wires of a long distance transmission line; 2—2^a are the wires of a branch circuit. The wires of these circuits are shown supported on a pole 3 by means of convenient cross arms. The wires 1—1^a are supported by cross arm 4.

Beneath the arm 4 is a bracket 5 running parallel to the wires 1—1^a.

Supported at the outer end of the member 5 is a cross arm 6. Beneath the bracket 5 in turn is mounted a second bracket 7 which carries cross arms 8 and 9 at its opposite ends.

Mounted near the right hand end of cross arm 9 is an insulator 10. Owing to the length of the arm 9 this insulator is mount-

ed on the outside of the vertical plane containing the line wire 1. In connecting up the wires as shown, the line 2 runs directly from the line wire 1 slanting outwardly from the pole to a support on the insulator 10. The line 2 then passes in a loop 10^a from the insulator 10 to the insulator 11 mounted on the cross arm 8. Near the insulator 10 this loop 10^a is braced by the insulator 12 which projects from the right hand extremity of the cross arm 6. Close to the insulator 12 this loop is provided with a weakened link 13. The arm 8 being approximately of equal length with the arm 9, insulators 10 and 11 are at the same distance from the pole and consequently the plane of the loop is outside of and parallel to the vertical plane containing the wire 1. Leaving the insulator 11, the line 2 is bent downwardly to connect with one pole of a switch 14, the two poles of which are supported on insulators 15—15. From the switch 14, line 2 is bent upwardly to a connection with insulator 16, from which point it runs off clear to the main transmission line. In a similar way the consumer's wire 2^a can be traced from its connection with the line wire 1^a to a support on insulator 17 which is carried on cross arm 6 and from insulator 17 to one pole of the switch 18 which is supported by insulators 19—19. From the switch 18 line 2^a runs to an insulator 20 on cross arm 9, from which point the line 2^a runs parallel to the line 2 in any desired direction.

Applicant's improved fuse is shown more in detail in Fig. 2 and is shown as mounted on the insulator 11. This insulator may be of any standard type in the main, but is modified at its top so as to have a threaded projection 21. Carried on this projection is a threaded cap 22 which has a central aperture. Mounted on the top of the projection 21 and projecting through the aperture and the cap 22 is a cartridge 23. This cartridge is quite similar to the ordinary rifle cartridge. The rim of the cartridge 24 is shown as clamped beneath the cap 22. The side of the cartridge may also have a threaded engagement with the cap 22, as indicated at 25.

Carried within the cartridge is a body of explosive or expansible material 26 which may be ordinary black powder, but I wish to be understood that I do not wish to limit myself to any particular explosive or ex-

pansible means. Any substance which is capable of being compressed into a small place but expanding greatly when heated may be used for this purpose, provided it gives off arc extinguishing vapor or gas. A leaden or metal bullet 27 is carried in the head of the cartridge and is shown as having a central bore for the reception of the end of the loop 10^a. Any means of making connection between the loop and the bullet may be employed.

It will be obvious that there will always be a certain amount of contact resistance between the shell of the cartridge 23 and the bullet 27. Consequently current passes from the cartridge to the powder and from the powder to the bullet, instead of passing directly from the cartridge to the bullet. If desired this effect may be increased by coating the bullet with paraffin or shellac. The ordinary black powder, mentioned above, being a conducting compound, permits of this method of operation.

Within the cartridge 23 I prefer to employ a fuse wire 28 which is connected to the bullet at one end and to the cartridge at the other. This fuse wire may be omitted, if desired.

It will be understood that while the cartridge 23 is preferably of conducting material and carries part of the current in the circuit, that it may be made of insulating material and the size of the fuse 28 increased accordingly.

In the operation of my device the current normally flows through the shell of the cartridge 23 and the fuse wire 28 without heating these elements sufficiently to ignite the material 26 or cause such expansion of the same as to force out the bullet 27. Upon an abnormal flow of current, however, the material 26 expands under the influence of the heat caused by the current and forces out the bullet with a high velocity. This causes a wide break, and owing to the vapors caused by the substance 26 and the length of the break the passage of the current is almost immediately interrupted. In case the fuse wire 28 is used and a substance such as gun powder is used in the cartridge, any excess current will fuse the wire 28 and thereby ignite the powder. The consequent explosion aids very materially in rupturing heavy arcs while the rapidity with which the bullet is expelled is sufficient to break the weak link 13, so that the loop 10^a may not dangle and endanger persons or animals passing underneath the line. However, if the position of the cartridge were changed to the insulator 10 and the supporting insulator were shifted to a position near insulator 11, the dangling end would be dead and a weak link such as 13 might not be needed.

It will be understood by reference to Figs. 4, 5 and 6 that I may employ my cartridge

fuse described and claimed herein either by itself or in connection with some other form of fuse device 29, and may connect the two either in series or in parallel. When so used in parallel with some other form of device my intention would be that the cartridge fuse would be relied upon to rupture the greater part of the energy of the circuit, while the other device would aid in carrying the normal current to the line, but would fuse first so that the full current and voltage would be ruptured by my fuse device as described and claimed herein.

When used in series with another form of cut-out, it would be expected that some other form would be chosen which could be placed in a readily accessible place. Consequently my new cartridge fuse would be adjusted to operate only on very heavy currents while the more accessible device, would be expected to open the circuit in the majority of cases, the new explosive fuse being ready for any emergencies in which the ordinary cut-out should be unable to break the circuit.

Having thus described my invention, what I claim is:

1. In a device of the class described, a cartridge, an expansible material in said cartridge, a bullet carried by said cartridge, means for connecting said cartridge in electric circuit, and a wire loop or lash connected at one end to said bullet, said loop having a mechanically weak link therein.

2. In a fuse device in combination, an insulating base, a projection mounted on said base, a metal cap cooperating with said projection having an aperture therein, said cap and projection being provided with means for attaching the one to the other, a cartridge mounted on said projection being clamped by said cap and projecting through said aperture, and a bullet mounted in said cartridge.

3. In a fuse device in combination, an insulating base, a projection mounted on said base, a metal cap cooperating with said projection having an aperture therein, said cap and projection being provided with means for attaching the one to the other, a cartridge mounted on said projection being clamped by said cap and projecting through said aperture, a bullet mounted in said cartridge, and an expansible substance in said cartridge.

4. In a fuse device in combination, an insulating base, a projection mounted on said base, a metal cap cooperating with said projection having an aperture therein, said cap and projection being provided with means for attaching the one to the other, a cartridge mounted on said projection being clamped by said cap and projecting through said aperture, a bullet mounted in said cartridge, an expansible substance in said cartridge, and a fuse wire attached at one end

to said bullet and at the other end to said cartridge.

5. In a fuse device in combination, an insulating base, a projection mounted on said base, a metal cap cooperating with said projection having an aperture therein, said cap and projection being provided with means for attaching the one to the other, a cartridge mounted on said projection being clamped by said cap and projecting through said aperture, a bullet mounted in said cartridge, an expansible substance in said cartridge, a fuse wire attached at one end to said bullet and at the other end to said cartridge, and a wire loop attached to said bullet.

6. The combination of an electric circuit, an explosive circuit device adapted to open the circuit upon the passage of an overload current said device comprising a bullet adapted to discharge in a certain direction, a flexible loop to which said bullet is attached and a support to which said loop is attached, said support being at one side of the path of said bullet.

7. An overload circuit opening device comprising in combination a bullet, means for propelling said bullet in a given direction upon the passage of an overload current, a wire loop attached to said bullet, and an insulated support to which said loop is attached at one side of the path of said bullet.

8. An overload circuit opening device comprising in combination a bullet, means for propelling said bullet in a given direc-

tion upon the passage of an overload current, a wire attached to said bullet, and an insulator at one side of the path of said bullet to which said wire is attached.

9. In a fuse device in combination, an insulating base, a projection mounted on said base, a cap cooperating with said projection having an aperture therein, said cap and projection being provided with means for attaching the one to the other, a cartridge mounted on said projection and clamped by said cap, said cartridge projecting through said aperture, a bullet mounted in said cartridge and a flexible wire attached to said bullet.

10. In a fuse device in combination, an insulating base, a projection mounted on said base, a cap cooperating with said projection having an aperture therein, said cap and projection being provided with means for attaching the one to the other, a cartridge mounted on said projection and clamped by said cap, said cartridge projecting through said aperture, a bullet mounted in said cartridge, a flexible wire attached to said bullet, and an insulator for supporting said wire mounted at one side of the path of said bullet.

In witness whereof, I hereunto subscribe my name this 17th day of February A. D., 1912.

EDMUND O. SCHWEITZER.

Witnesses:

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A. S. DENNISON.