No. 897,590. PATENTED SEPT. 1, 1908.

F. B. COOK.

SUBSTATION PROTECTOR.

APPLICATION FILED NOV. 8, 1907.

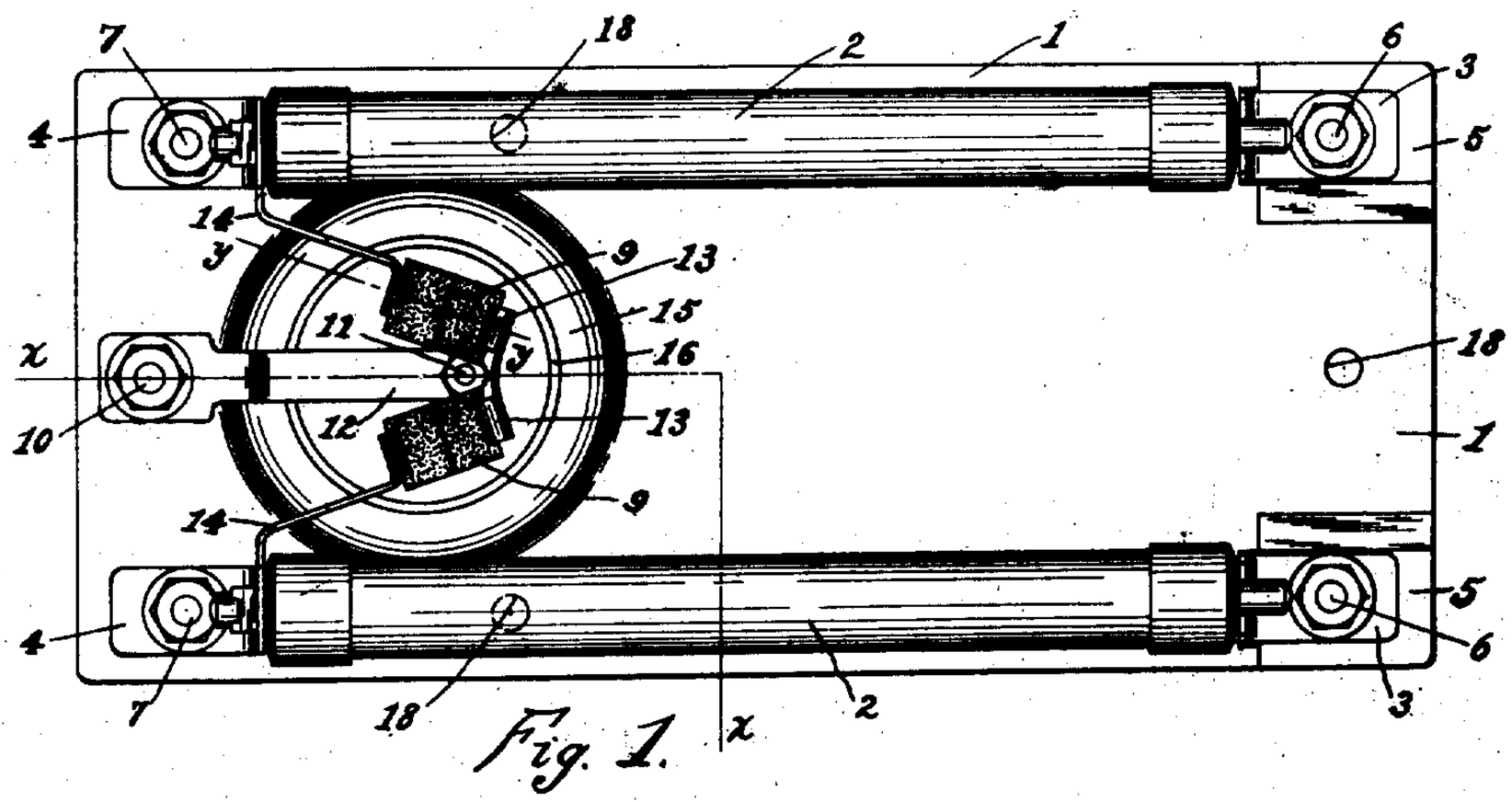

Fig. 1.

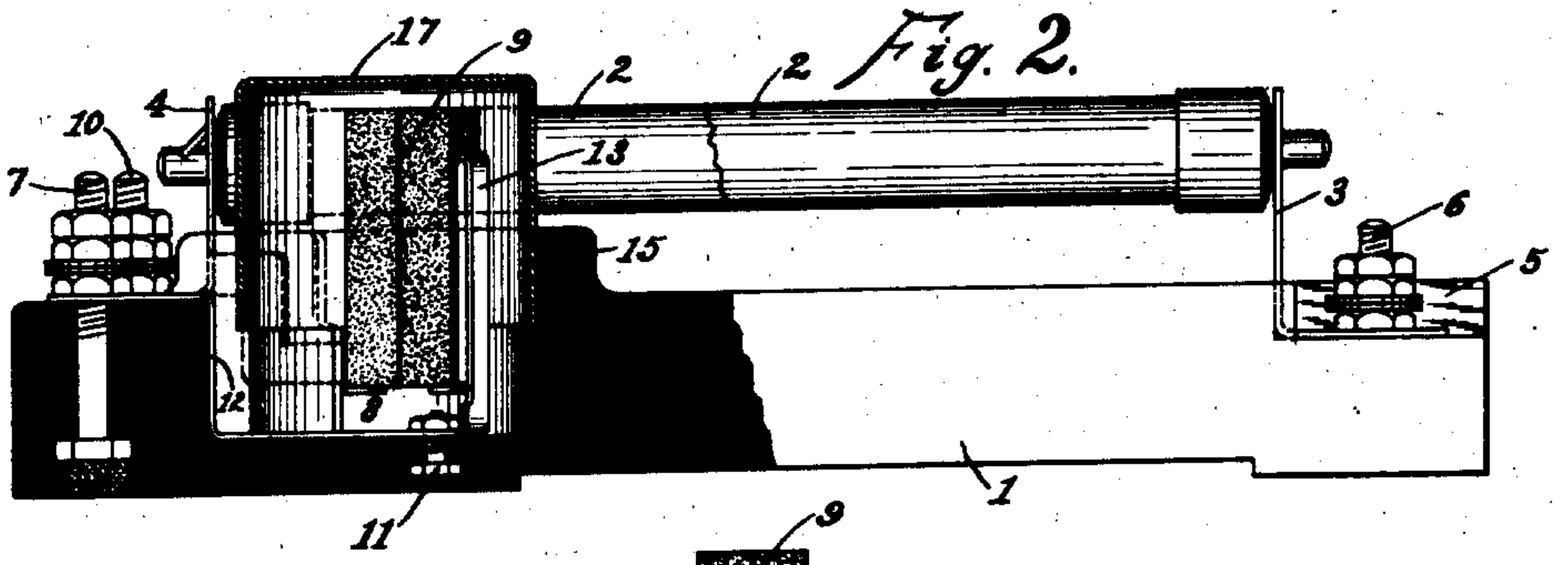

Fig. 2.

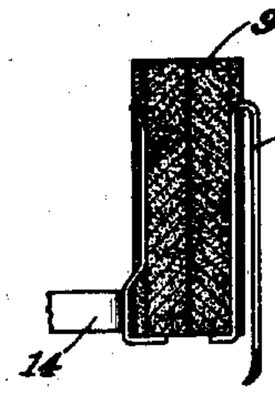

Fig. 3.

WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK B. COOK, OF CHICAGO, ILLINOIS.

SUBSTATION-PROTECTOR.

No. 897,590. Specification of Letters Patent. Patented Sept. 1, 1908.

Application filed November 8, 1907. Serial No. 401,348.

To all whom it may concern:

Be it known that I, FRANK B. COOK, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Substation-Protector, of which the following is a specification, reference being had to the accompanying drawings, illustrating same.

My invention relates to electrical protective apparatus, and more particularly to protector units adapted for protecting individual lines of an electrical system, such as a telephone system.

The principal objects of my invention are to provide a compact and simplified form of individual protector unit of the character specified; to provide an improved arrangement and mounting of the lightning arresters of such a protector; and to provide improved means for inclosing the lightning arresters of the protector.

Other objects will be apparent from the following specification.

The protector unit of this invention comprises a mounting base upon which are mounted two forms of protective devices, namely, fuses for protecting against abnormally large currents of electricity, and lightning arresters for protecting against high-potential electricity.

By reference to the accompanying drawings, Figure 1 is a plan view of the protector unit of this invention, with the cover for the lightning arresters removed; Fig. 2 is a side elevation of the protector unit shown in Fig. 1, with portions shown in cross-section taken on line $x\ x$ of Fig. 1; and Fig. 3 is a longitudinal cross-sectional view of one of the lightning arresters of the protector unit, taken on line $y\ y$ of Fig. 1, with the spring members shown in elevation, showing the mounting of the lightning arrester in detail.

Like characters refer to like parts in the several figures.

The protector unit of the invention comprises a suitable insulating base 1, preferably made of porcelain, along the sides of which are mounted a pair of inclosed fuses 2 2 by suitable spring members 3 3 and 4 4. The inclosed fuses 2 2 are of an approved type which do not blow up or emit a flame when blown by excessive current. Each spring member 3 is preferably mounted in a recess 5 on the base 1 by a binding screw 6, so as to keep it from turning upon the base 1, and each spring member 4 is preferably mounted on the base 1 by a binding screw 7, preferably as shown. Between the fuses 2 2 and near one end thereof is provided a cylindrically-shaped recess 8 in the base 1 within which recess 8 the lightning arresters 9 9 are mounted perpendicular to the base 1, each lightning arrester 9 preferably comprising the usual pair of carbon blocks with an interposed dielectric. The ground connection for the lightning arresters 9 9 is preferably in the form of a spring member 12 mounted upon the base 1 by a binding screw 10 and within the recess 8 by screw 11. The end of the spring member 12 which is in the recess 8, is provided with a pair of prongs 13 13 which double back upon themselves as shown in Fig. 3, to provide spring contact members for the lightning arresters 9 9. Each spring member 4 is provided with an arm 14 extending into the recess 8 and formed at its free end as shown in Fig. 3, so as to provide a line-spring contact member for each of the lightning arresters 9 9. Portions 12 14 14 pass through the circular wall 15 of the recess 8 through slots formed in the wall 15. The wall 15 extends above the top of the base 1 so as to provide a deeper recess 8 for the lightning arresters 9 9 without increasing the thickness of the base 1.

Part way down the side of the recess 8 is provided an annular offset 16 against which the bottom end of a sheet-metal cap 17 rests when the cap 17 is placed within the recess 8 so as to cover the lightning arresters 9 9 as shown in Fig. 2. The sides of the cap 17 are preferably split so as to enable the latter to spring outward and thereby tightly fit the upper portion of the recess 8 to hold the cap 17 in place. This cap 17, the wall 15, and the recess 8 inclose the lightning arresters 9 9 and thereby provide a simple and substantial protection for the lightning arresters 9 9 and a protection to external portions against any injurious electrical effects which might be produced upon the passage of abnormally high-potential electricity through the arresters 9 9. The inclosure in which the lightning arresters 9 9 are located is vented by the slots in the wall 15 through which spring members 12 14 14 pass. This venting of the lightning arrester inclosure guards against the cap 17 blowing off under abnormal electrical conditions. Other means of venting the lightning arrester inclosure

may also be provided if desired. The base 1 is provided with holes 18 18 18 for mounting the protector unit to a suitable support.

It will be seen that the construction above described provides a very simple and substantial protector unit and one which is absolutely safe to use within a building, the lightning arresters being entirely inclosed and the fuses being of the inclosed type which do not blow up or emit a flame upon an excessive current. It will also be seen that when one of the fuses 2 is removed from the base 1 the circuit is open between spring members 3 and 4 for the entire length of the fuse, there being no metal portions on the base 1 to reduce the length of the gap made by removing the fuse. It will also be seen that the number of spring parts on this protector unit is reduced to a minimum, by their peculiar formations.

Binding posts 6 6 are for the line conductors, binding posts 7 7 are for the instrument or switchboard conductors, depending upon where the protector unit is used, and binding post 10 is for the ground conductor for the lightning arresters. From this description the circuits through the apparatus will be readily understood.

I do not wish to limit this invention to all of the particular details of construction as herein shown, as many modifications may be made therein without departing from the scope of the appended claims.

Having thus described my invention what I claim is:

1. A protector unit of the character described comprising a substantially flat base made of nonconducting material, tubular fuses mounted along the sides of the base substantially parallel therewith, a cylindrically-shaped recess in the said base between the said fuses and near one end thereof, an annular wall projecting from the said base around the said recess to increase the depth of the latter without necessitating the thickening of the body of the base, a pair of lightning arresters located within the said recess substantially perpendicular to the said base, a pair of spring members mounted on top of the said base, formed to provide suitable terminals for the respective fuses and extending into the said recess through slots in the wall of the latter, and having their inner ends formed to provide suitable terminals for the respective lightning arresters, a ground terminal for the lightning arresters, mounted on top of the said base, extending into the said recess to the bottom thereof through a slot in the wall of the recess and having its inner end bifurcated and formed to provide suitable ground terminals for the respective lightning arresters, a bolt extending through the bottom of the base into the said recess for holding the ground-terminal member in place, a ledge around the inner side of the wall of the said recess, a formed sheet-metal cap fitting the interior of the wall of the said recess and resting against the said ledge which limits the insertion of the cap into the recess, the said cap forming a covering for the lightning arresters, the slots in the wall of the said recess through which the lightning-arrester terminals pass forming vents for the lightning-arrester inclosure, and suitable binding posts for connecting circuit conductors to the fuses and lightning arresters.

2. A protector unit of the character described comprising a substantially flat base, a pair of fuses mounted along the sides of the base, a recess in the base between the fuses and near one end thereof, a wall around the recess projecting from the base to increase the depth of the recess without necessitating the thickening of the body of the base, a pair of lightning arresters located within the recess, a pair of spring members mounted on top of the base, formed to provide suitable terminals for the respective fuses and extending into the said recess through slots in the wall of the latter, and having their inner ends formed to provide suitable terminals for the respective lightning arresters, a ground terminal for the lightning arresters mounted on top of the base, extending into the said recess through a slot in the wall thereof and having its inner end bifurcated and formed to provide suitable ground terminals for the respective lightning arresters, a cap fitting the wall of the said recess and forming a covering for the lightning arresters, and suitable binding posts for connecting circuit conductors to the fuses and lightning arresters.

As inventor of the foregoing I hereunto subscribe my name in the presence of two subscribing witnesses, this 6th day of November, 1907.

FRANK B. COOK.

Witnesses:
FREDERICK R. PARKER,
H. ROY COOK.