No. 802,497. PATENTED OCT. 24, 1905.

F. B. COOK.

GROUND STRIP FOR PROTECTIVE APPARATUS.

APPLICATION FILED AUG. 5, 1904.

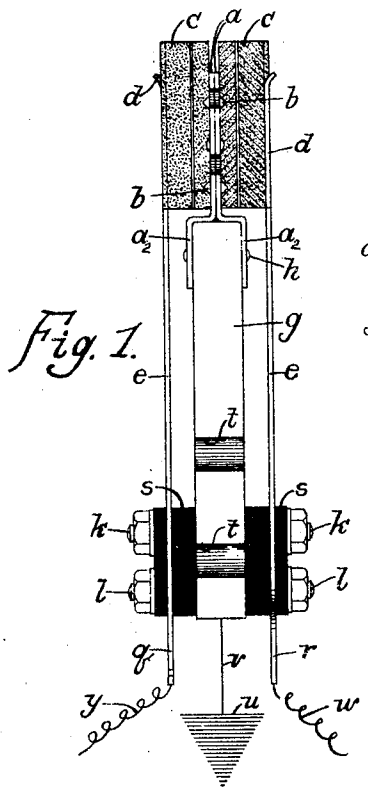

Fig. 1.

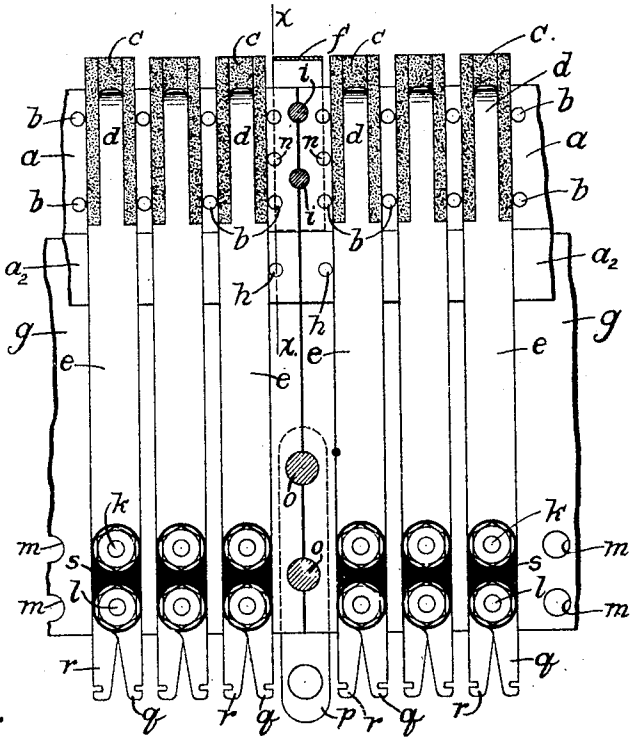

Fig. 2.

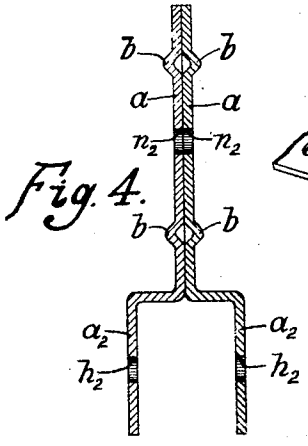

Fig. 4.

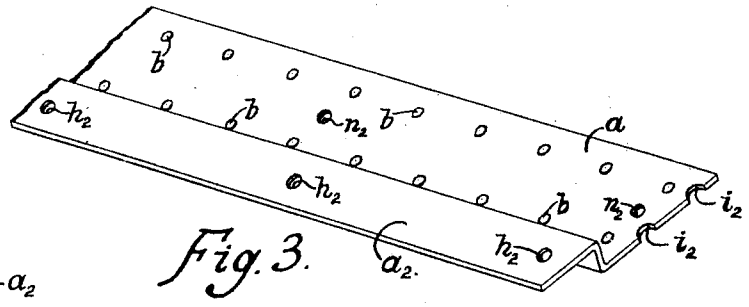

Fig. 3.

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GROUND-STRIP FOR PROTECTIVE APPARATUS.

No. 802,497. Specification of Letters Patent. Patented Oct. 24, 1905.

Application filed August 5, 1904. Serial No. 219,645.

To all whom it may concern:

Be it known that I, FRANK B. COOK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Ground-Strips for Protective Apparatus, 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 a ground strip or plate to be used as a common ground connection for electrical protective devices, preferably lightning-arresters, my object being to provide such a strip which may be readily and cheaply manufactured, and which at the same time serves all the purposes for which such a piece of apparatus is intended.

In apparatus such as protective apparatus for telephone systems it is the usual practice to employ a common conducting-strip for grounding one conducting member of each lightning-arrester, the said strip being secured to a suitable support, preferably to the edge of a grounded supporting-plate. Such ground-strips are usually provided with pins extending therethrough, which are adapted to hold the lightning-arrester in place therebetween against each side of the ground-strip. Then again, such strips usually consist of one piece of metal provided with a flange portion against which the lightning-arresters are placed and a forked portion adapted to be placed over an edge of the ground-plate and secured thereto, or of a flange portion for the lightning-arresters and an offset flange portion adapted to be secured against one flat side only of the ground plate.

In my present invention I provide a ground-strip for the lightning-arresters comprising two similar pieces secured together so as to form a flange portion adapted to accommodate lightning-arresters on each side thereof and a forked portion adapted to be placed over the edge of the ground-plate and be secured thereto. Then I provide series of projecting points on one side of each of the strips forming the ground-strip, the said points being formed out of the thin strip itself and being arranged to hold the lightning-arresters in place against the strip. As each strip of the ground-strip is made of a thin piece of metal, each complete strip, projecting points and all, may be formed up all at once, thus greatly simplifying the manufacture of the strip and considerably reducing the cost of same.

I will more particularly describe my invention by reference to the accompanying drawings, illustrating same, in which—

Figure 1 is an end view of a protector-strip, showing the improved ground-strip and lightning-arresters mounted upon opposite sides thereof, one lightning-arrester being shown in cross-section. Fig. 2 is a side view of a portion of two protector-strips, showing the lightning-arresters mounted along the said strips and the method employed for fastening the protector-strips together. Fig. 3 is a perspective view of a portion of one-half of the complete ground-strip; and Fig. 4 is a cross-section of the complete ground-strip, taken on line $x\ x$ of Fig. 2.

Like characters refer to like parts in the several figures.

The complete ground-strip is composed of two thin metal strips $a\ a$, each provided with series or rows of projecting points $b\ b$ thereon, and secured together, preferably by rivets n n of Fig. 2, which extend through holes $n^2\ n^2$ of Fig. 4 in both strips $a\ a$. The projecting points $b\ b$ of one strip a are preferably arranged opposite to respective points of the other strip a, so that a pair of lightning-arresters may be placed on opposite sides of the ground-strip, against same, directly opposite each other. These points are for the purpose of preventing lateral displacement of the lightning-arresters. Each strip a is provided with a flange portion a^2, formed, preferably, as shown in Fig. 3. The portions $a^2\ a^2$ of the ground-strip are adapted to fit over one edge of the supporting-plate or ground-plate g and to be secured to g, preferably by rivets $h\ h$, extending through the plate g and the holes $h^2\ h^2$ in the flanges $a^2\ a^2$. At each end of plate g I provide half-holes $t\ t$, adapted to receive bolts $o\ o$, which clamp the plates $g\ g$ together by means of a strap p on each side of the plates $g\ g$. This gives a very convenient means for securing the banks of protective apparatus—say banks of twenty or twenty-five pairs—together. The straps $p\ p$ may be secured to any suitable support to which the protective apparatus is to be mounted. At each end of the ground-strip I preferably provide half-holes $i^2\ i^2$, adapted to receive bolts $i\ i$, which hold the ground-strips together and which also secure the number-plate f (shown

in cross-section in Fig. 2) in position. The plate *f* preferably carries numbers to indicate the number of the protector immediately above and of the protector immediately below same.

On each side of the plate *g* is mounted a series of springs *e e*, each spring *e* being insulated from the plate *g* and from the other springs by suitable insulating bushings and washers *s s* and being provided with a narrow end portion *d*, adapted to fit into a groove in the lightning-arrester *c* to hold same in place and with a terminal *q* or *r*, adapted to receive a circuit-conductor. Each pair of springs *e e* on opposite sides of the plate *g*, directly opposite each other, is secured in place by bolts *k* and *l*, which extend through the plate *g*. Line conductors *y* and *w* are connected to terminals *q* and *r*, respectively. Plate *g* is preferably connected to ground *u* by conductor *v*.

Between each end portion *d* of springs *e e* and the ground-strip *a* is inserted a lightning-arrester *c*, preferably consisting of carbon blocks with an interposed dielectric, the spring *e* holding the lightning-arrester *c* against the ground-strip *a* and in electrical contact therewith. The projecting points *b b* on strip *a*, between which the lightning-arresters are placed, serve the purpose of holding the latter in place against the strip *a*. When a high-potential current or charge comes in over the line conductor *w* or *y*, it passes from the line-spring *e* through the lightning-arrester *c*, strip *a*, and plate *g* to ground *u*, discharging through the thin dielectric of the lightning-arrester in a manner well understood.

While I have shown particular details of construction in this invention, I do not wish to limit the same to such exact details.

What I claim as new, and desire to secure by Letters Patent, is—

1. In electrical protective apparatus, the combination with a ground-plate, of a ground-strip secured thereto and provided with projections thereon formed out of the said strip, the said projections being adapted to prevent lateral displacement of protective devices inserted therebetween.

2. In electrical protective apparatus, the combination with a ground-plate, of ground-strips secured thereto and held adjacent to each other, and projections on the respective outer surfaces of the said strips and formed out of their respective strips, the said projections being adapted to prevent lateral displacement of protective devices inserted therebetween.

3. In protective apparatus for electric circuits, the combination with a ground-plate, of a ground-strip secured thereto and provided with a series of projections thereon formed out of the strip, a series of lightning-arresters held against the ground-strip between the said projections, which prevent lateral displacement thereof, and a series of spring-supports adapted to hold the respective lightning-arresters in place.

4. In protective apparatus for electric circuits, the combination with a ground-plate, of ground-strips secured thereto and provided with series of projections thereon formed out of the said strips, the latter being held adjacent to each other, series of lightning-arresters held against the ground-strips between the said projections, which prevent lateral displacement thereof, and series of spring-supports adapted to hold the lightning-arresters in place.

5. In a protective apparatus, the combination with a ground-plate, of a ground-strip secured to one edge of the ground-plate, and provided with projections thereon formed out of the said strip, a spring mounted flatwise on the said ground-plate but insulated therefrom, and a lightning-arrester inserted between the ground-strip and said spring and resting against the ground-strip between the projections thereon, substantially as described.

6. In a protective apparatus, the combination with a ground-plate, of a ground-strip secured to one edge of the ground-plate and provided with projecting points on one side thereof formed out of the said strip, bolts passing through the ground-plate but insulated therefrom and from each other, a spring mounted flatwise on the ground-plate by the said bolts, and insulated from one of the said bolts, and a carbon lightning-arrester inserted between the ground-strip and the said spring and resting against the ground-strip between the projecting points thereon, substantially as described.

7. In a protective apparatus, the combination with a ground-plate, of ground-strips secured to one edge of the ground-plate, against each other, and provided with projecting points on their outer surfaces formed out of the respective ground-strips, a spring for each side of the ground-plate, mounted flatwise thereon and insulated from the ground-plate and from each other, and lightning-arresters inserted between the ground-strips and their respective said springs, and held in place against their respective ground-strips by the projecting points thereon, between which they are inserted, substantially as described.

8. In apparatus of the class specified, a ground-strip, projections thereon formed out of the said strip, and adapted to prevent lateral displacement of protective devices, suitable protective devices placed against the said strip, and means for holding the said devices to the said strip.

9. In electrical protective apparatus, a ground-strip provided with projections thereon formed out of the said strip and adapted to prevent lateral displacement of protective devices placed against the said strip.

10. In electrical protective apparatus, a

ground-plate formed out of two strips held adjacent to each other, and series of projections on the said strips formed out of the latter and adapted to prevent lateral displacement of protective devices inserted therebetween.

11. In electrical apparatus, two ground-strips suitably secured together, projecting points on the respective outer surfaces of the said strips and formed out of the latter, the said projecting points being adapted to prevent lateral displacement of protective devices, suitable protective devices to be held against the ground-strips, and means for holding the said protective devices against the said strips.

12. In protective apparatus for electric circuits, the combination of a plate, a conducting-strip secured to one edge thereof, series of projecting points on the said strip and formed out of the latter, a series of springs mounted on the said plate and insulated therefrom and from each other, and a series of lightning-arresters removably inserted between the said springs and the said strip and held in place by the said projecting points on the said strip, between which they are placed, substantially as described.

13. In protective apparatus for electric circuits, the combination of a ground-plate, a ground-strip comprising two similar, thin, metal pieces secured together so as to form a flat flange portion and a channel portion, one edge of the ground-plate being inserted into the said channel and suitably secured thereto, series of projecting points on each side of the ground-strip and formed out of the latter, series of bolts extending through the ground-plate, a series of springs mounted flatwise on each side of the ground-plate by the said bolts and suitably insulated from the said plate and from each other, a series of lightning-arresters for each side of the ground-strip and removably inserted between the latter and the said springs, the lightning-arresters being held in place by the said springs and the projecting points of the ground-strip, half-holes in the ends of the ground-plate for securing other plates thereto, half-holes in the ends of the ground-strip for securing other strips thereto, and a number-plate at each end of the strip of protective apparatus, the said half-holes in the ends of the ground-strip being also used for securing the said number-plates in place, substantially as described.

As inventor of the foregoing I hereunto subscribe my name, this 3d day of August, A. D. 1904.

FRANK B. COOK.

Witnesses:
FREDERICK R. PARKER,
HARRY B. ELMERS.