(No Model.)

E. THOMSON.

LIGHTNING ARRESTER.

No. 464,595. Patented Dec. 8, 1891.

Fig. 1.

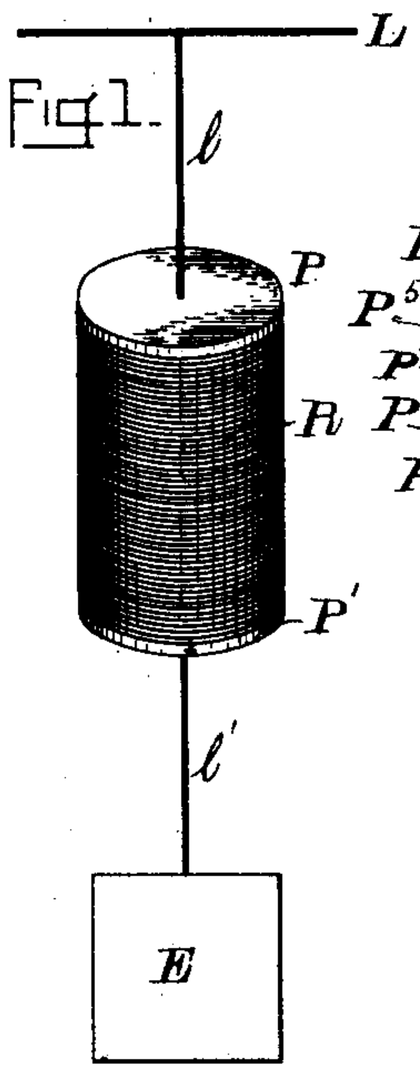


Fig. 2.

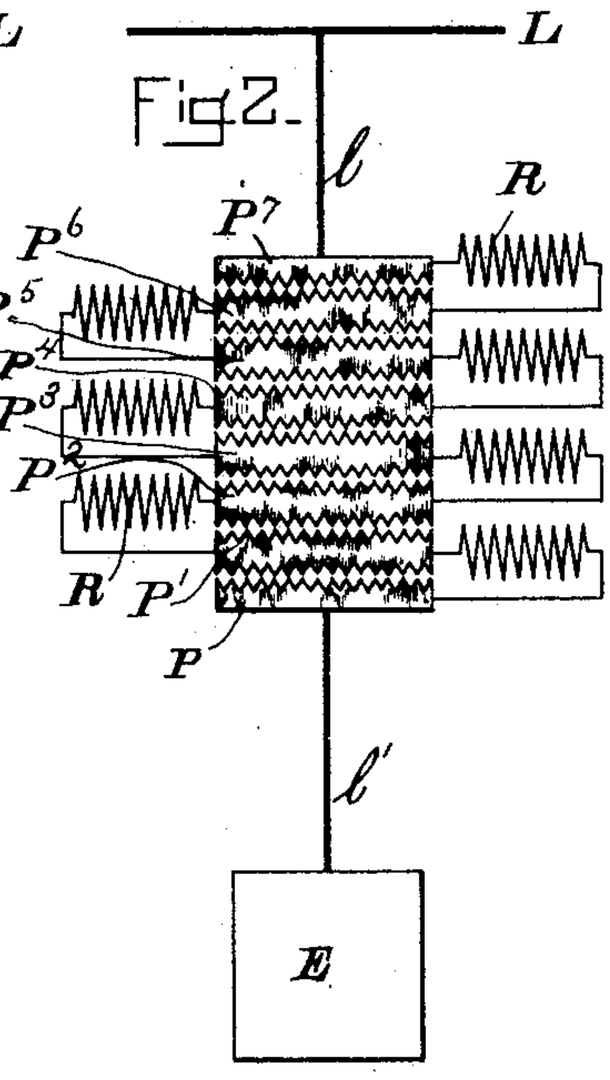


Fig. 3.

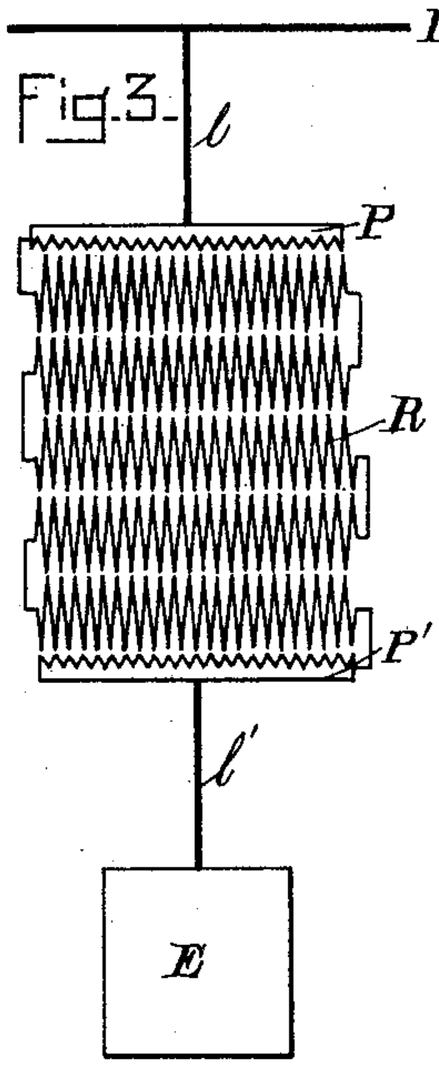


Fig. 4.

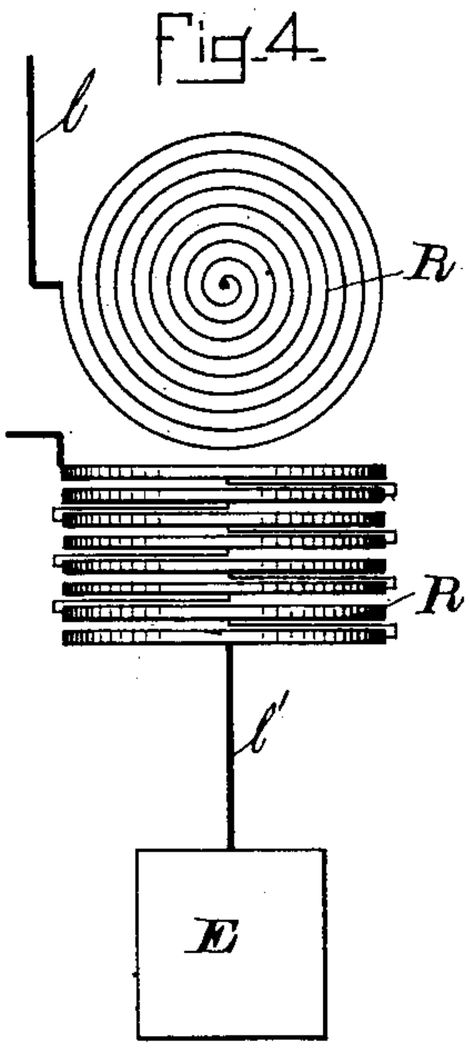


Fig. 5.

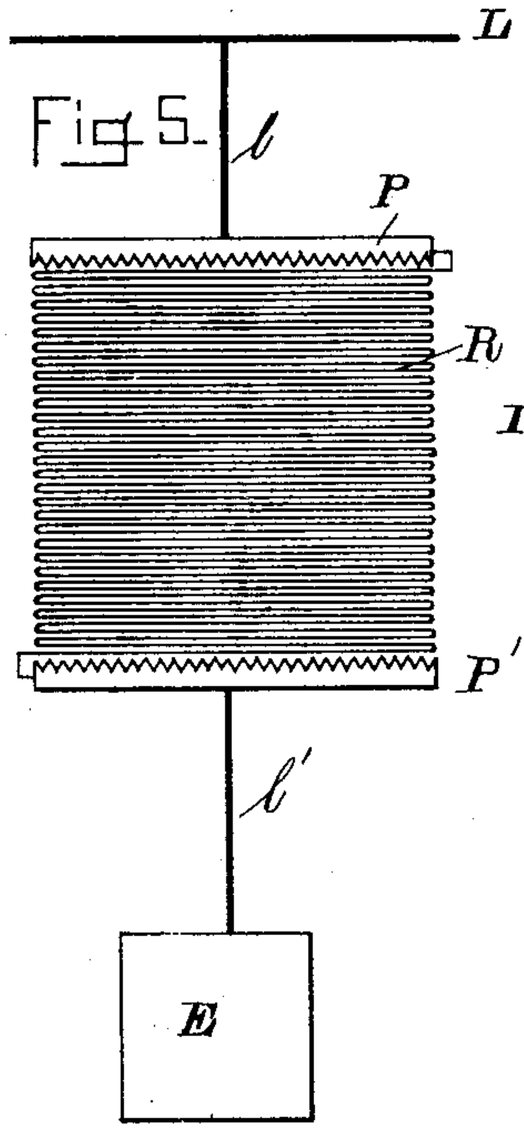
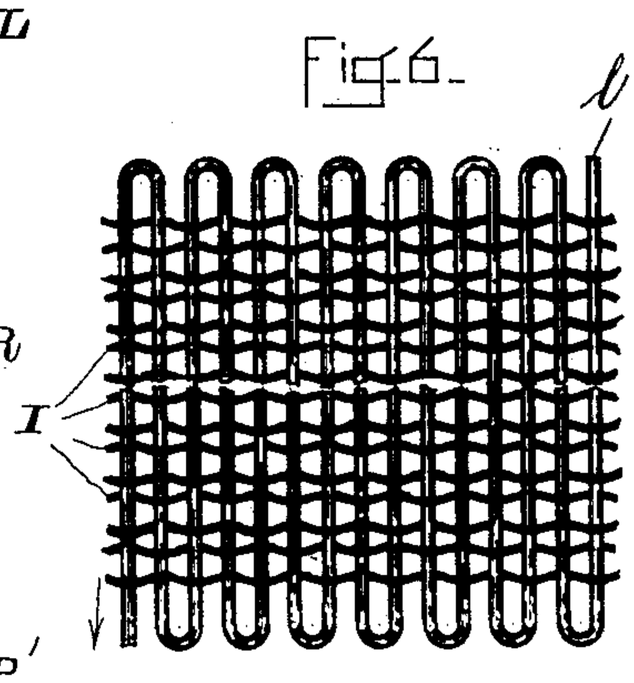


Fig. 6.



WITNESSES.

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ELIHU THOMSON, OF SWAMPSCOTT, MASSACHUSETTS.

LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 464,595, dated December 8, 1891.

Application filed October 11, 1890. Serial No. 367,852. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Swampscott, in the county of Essex and State of Massachusetts, have invented a certain new and useful Improvement in Lightning-Arresters, of which the following is a specification.

It is the object of my present invention to provide a lightning-arrester which shall be an effective and reliable protection to the electrical apparatus, which it shunts, against injury arising from the high potential static or inductive discharges, and also one in which an arc will not be maintained across the discharge-terminals, thereby requiring the presence of especial means for putting out such arc. I have accordingly devised the form of arrester described herein, in which a continuous electrical conducting-path of high resistance is provided from the line-circuit to the ground and is so arranged as to comprise a series of conducting-surfaces separated one from the other by intermediate disruptive insulation-spaces, which allow a kind of short-circuiting or jumping of static discharges from one surface to another, shunting the various portions of the high resistance. Slower discharges will find their way to earth through the resistance; but this latter will be sufficiently great to prevent much leakage of the normal working current.

The generic features of novelty in this new type of arrester may be availed of in a variety of specific constructions, a number of which are illustrated in the different views shown upon the accompanying drawings.

In Figure 1 the work-circuit L is, it will be understood, connected with a suitable generator of electricity, and from it is led a branch *l l'*, terminating in the earth-plate E and including my improved form of arrester. As shown in this view the arrester consists of a coil or set of convolutions R, whose total length has a considerable resistance, and wound in layers constituting a series of conducting-surfaces, which are separated from one another by the usual disruptive insulation-space, either of air or insulating material, as may be preferred in any particular case. At either end of the coil is a plate or cap-piece P P', and while its total resistance is so great as to prevent much of the normal current passing to earth, it will be understood that a static discharge will leap from one layer or set of convolutions to another and thus pass to ground.

As shown in Fig. 2, the conducting discharge-surfaces consist of parallel serrated plates P' P^2, &c., and the intermediate disruptive spaces are shunted by a corresponding series of resistances R, which connect the successive plates in series and thus complete a continuous conducting-path corresponding to the wire coil in Fig. 1, already described.

In Fig. 3 a still further modification is illustrated. Here the sparking-surfaces are simply a set of coils R, placed alongside one another, as shown, between the serrated end plates P P', with which the ends of the first and last coils of the series are respectively connected. A lightning-discharge will in this instance jump from coil to coil; but no arc will be maintained, because of the number of spark-spaces which have to be passed.

The arrangement in Fig. 4 is very similar to that in Fig. 3, only that the spiral coils are flat and circular and are placed one over the other, as shown in the lower part of the figure.

In Fig. 5 the high-resistance connection between the serrated end plates P P' is formed by a number of wires wound back and forth and running parallel to each other. The arrangement of these wires may be such as illustrated in Fig. 6, where they are woven into a fabric by being passed between insulating-threads, (seen at I,) which serve to bind them together. A sudden static discharge will then jump from side to side or from point to point of the parallel sides of the wires, while a slower discharge will pass to earth through the resistance formed by the continuous wire, which, however, is sufficiently great to prevent any considerable leakage of the normal current.

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

1. A lightning-arrester consisting of an electrically-continuous conductor connected to ground, so arranged as to form a series of disruptive insulation-spaces between successive portions of the conductor for the discharge to leap consecutively and of a total

resistance sufficient to prevent the passage of much of the line-current to earth.

2. A lightning-arrester consisting of a series of parallel conducting-surfaces separated by intermediate disruptive insulation-spaces, but electrically connected in series, and thereby forming a continuous conducting-path of a resistance sufficient to prevent the passage of the normal current to earth, as described.

3. A lightning-arrester consisting of a series of conducting-surfaces separated from one another by an intermediate disruptive insulation-space, and a corresponding series of resistances shunting said disruptive spaces and electrically connecting the conducting-surfaces in series, for the purpose described.

4. The combination, with a work-circuit, of a lightning-arrester comprising a series of conducting-surfaces separated from one another by successive disruptive insulation-spaces, but electrically connected to form a conducting-path of high resistance sufficient to prevent the passage of the normal current to earth.

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