

No. 703,153.

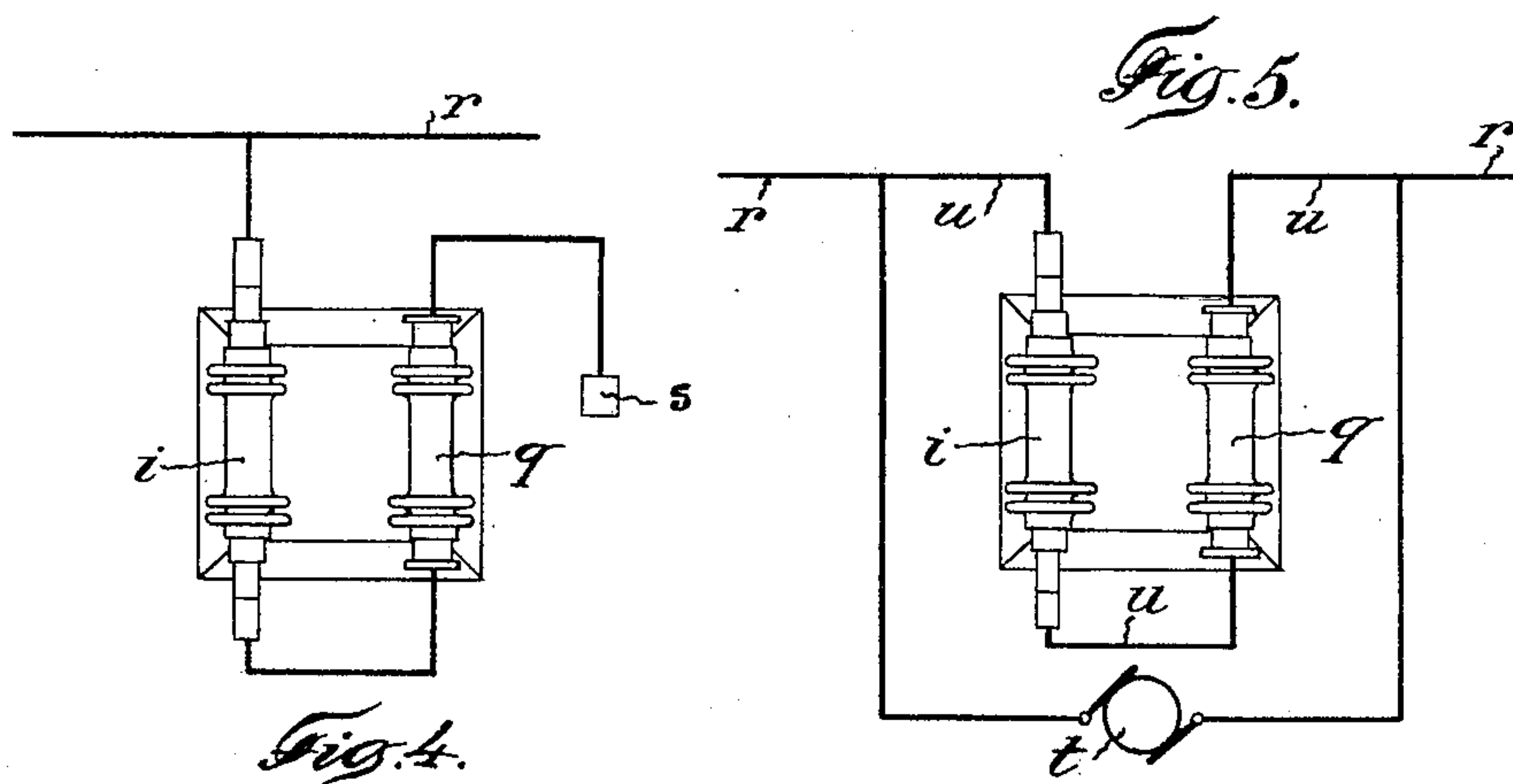
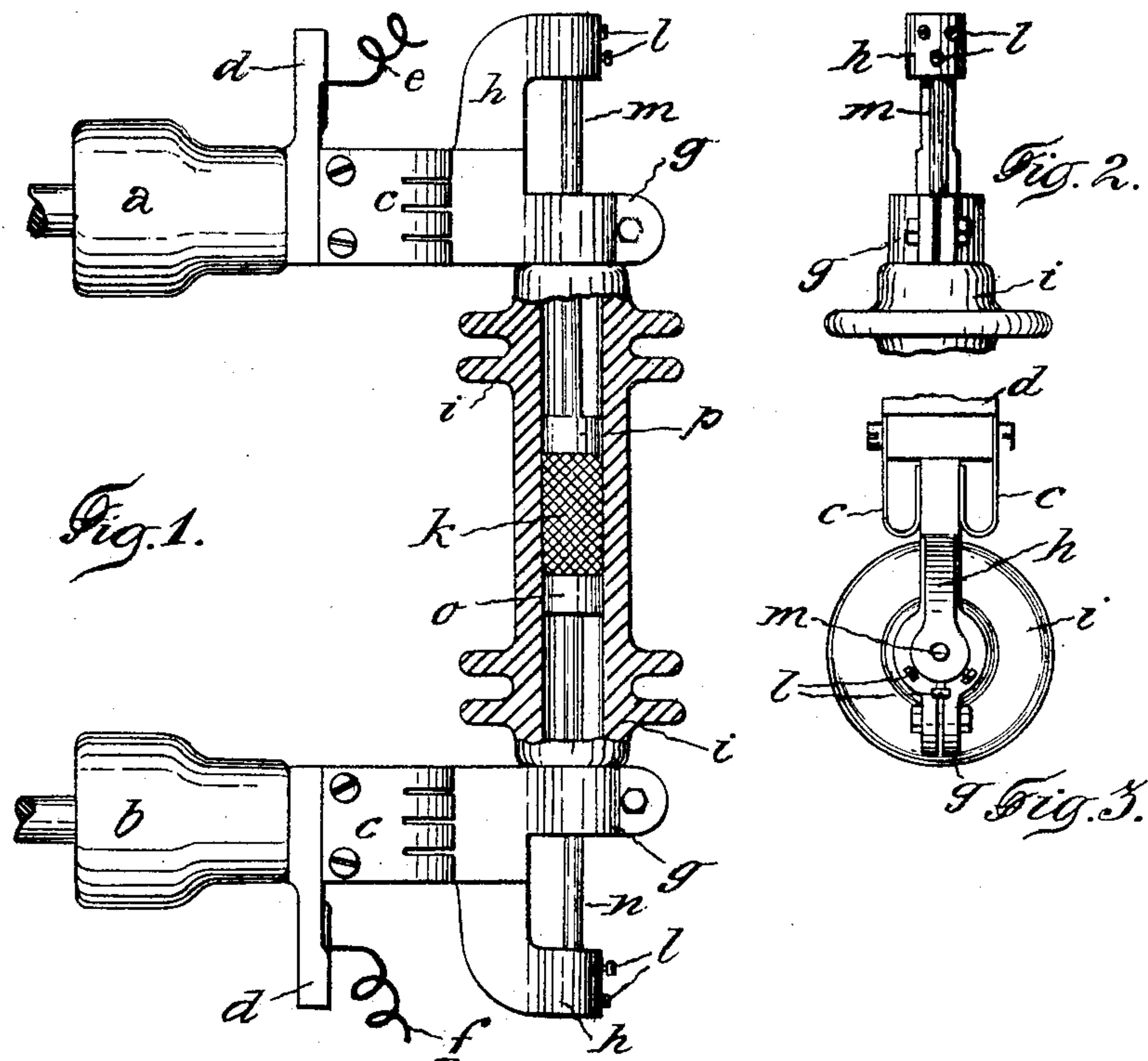
Patented June 24, 1902.

P. RUDHARDT.

PROTECTING APPARATUS FOR ELECTRICAL MACHINES AND PLANTS.

(Application filed July 28, 1901.)

(No Model.)



WITNESSES:
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PROTECTING APPARATUS FOR ELECTRICAL MACHINES AND PLANTS.

SPECIFICATION forming part of Letters Patent No. 703,153, dated June 24, 1902.

Application filed July 23, 1901. Serial No. 69,359. (No model.)

To all whom it may concern:

Be it known that I, PAUL RUDHARDT, engineer, a citizen of the Republic of Switzerland, residing at Grand Pré, No. 30, Geneva, Switzerland, have invented a Protecting Apparatus for Electrical Machines and Plants, of which the following is a specification.

The object of this invention is to provide a reliable and conveniently operated and inspected lightning-arrester; and the invention consists of a lightning-arrester comprising a tubular body of insulating material, pistons in said body and provided with shanks extending out of the same, a mass of mixed pulverized conducting and non-conducting material in said tubular body between the pistons, contact-heads, one at each end of the tubular body and provided each with an inner and an outer arm, means for clamping the inner arm of each head to one end of the tubular body, means securing the shanks of the pistons, respectively, to the outer arms of the heads at opposite ends of the body, contact-lugs on said body, and spring-clamps adapted to receive said lugs.

In the accompanying drawings, Figure 1 is a side elevation, partially in vertical section, of my improved lightning-arrester. Fig. 2 is a front view of a portion of the arrester. Fig. 3 is a top view of the portion shown in Fig. 2, and Figs. 4 and 5 show in diagram two suitable connections of the device for use.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, *i* indicates a tubular body of suitable insulating material, such as porcelain. Within the body is located a mass composed of a mixture of conducting and non-conducting fire proof material, such as pulverized hard coal and pulverized magnesia. This mass is retained in the tube by means of two pistons *o* and *p*. The piston *o* is provided with a shank *n*, which extends from one end of the tube, and the piston *p* with a shank *m*, extending from the other end of the tube. To each end of the tube is applied a contact-head. These heads are of like construction and are composed each of an inner arm *g*, an outer arm

h, and a contact-lug or body portion from which said arms project. The inner arm *g* of each head is so formed as to fit over one end of the tube *i*, and for clamping such arm to the tube the arm is split and provided with a clamping-screw for clamping the two parts together around the tube end, as clearly shown in the figures.

The outer arm *h* of each head is provided in line with the shank of the respective piston with a bore adapted to receive the same, and the shank of the piston is of such length as to enter the bore when a suitable quantity of the mass described is located in the tube *i*.

Set-screws *l*, seated in the arm *h*, engage the shank of the piston. By this engagement of the inner arm with the end of the tube *i* and the engagement of the outer arm with the shank of the piston the contact-heads serve for locking the pistons immovably in position at any desired point in the tube.

Two spring-clamps *c* of like construction are adapted to receive the contact-lugs, respectively, of the contact-heads, as clearly shown in Figs. 1 and 3, whereby the device is supported. These clamps permit ready removal of the device for inspection or for eliminating it from the circuit entirely. For inspecting the arrester it is only necessary to withdraw the device from the clamps *c* and release the screw which holds the split inner arm of the one contact-head clamped upon the tube *i*. The head, with the piston attached, may then be withdrawn, the piston passing out of the tube *i* and permitting a complete inspection of the interior to the other piston.

Conducting-wires *e* and *f* are attached to suitable lugs *d*, which make contact with clamps *c*, and said lugs and clamps are supported, respectively, on the insulating mounts *a* and *b*.

Fig. 4 illustrates the application of the lightning-arrester to an ordinary line-wire. *r* is the line-wire; *i*, the lightning-arrester; *q*, a tube containing one or more fusible wires, and *s* indicates an earth-plate.

In Fig. 5, *r* indicates the line; *t*, a motor inserted on the line. *i* and *q* are respectively

the lightning-arrester and a fuse-tube, as in Fig. 4, which are located in a shunt *u* of the line.

When a lightning discharge strikes the line-wire *r*, Fig. 4, it passes off at once into the earth through the lightning-arrester, fuse-tube, and plate *s* and does not pass to the machine connected with the wire *r*. The current ordinarily passing over the wire *r* from or to the machine connected therewith is not of sufficiently high voltage to bridge the space between the conducting and non-conducting particles of the mass *k*, and consequently does not pass to earth. The lightning-arrester has no effect, therefore, upon the current ordinarily flowing over the line. Should said current, however, by accident due to any cause pass the lightning-arrester, it will immediately melt the fuse-wires in the fuse-tube *q*, which will stop the escape of said line-current to earth.

When a lightning discharge strikes the line *r*, Fig. 5, it is conducted through the shunt *u*, and the machine *t* is not endangered. The main-line current coming over the wire *r*, however, cannot pass the lightning-arrester and flows through the motor *t*. Should said line-current by any means pass the lightning-arrester, it will melt the fuse in the fuse-tube

q, thereby immediately opening the shunt and preventing further passage of the line-current therethrough.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

A lightning-arrester consisting of a tubular body of insulating material, pistons in said body and provided with shanks extending out of the same, a mass of mixed pulverized conducting and non-conducting material in said tubular body between the pistons, contact-heads, one at each end of the tubular body and provided each with an inner and an outer arm, means for clamping the inner arm of each head to one end of the tubular body, means for securing the shanks of the pistons respectively to the outer arms of the heads, at opposite ends of the body, contact-lugs on said heads, and spring-clamps adapted to receive said lugs, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

PAUL RUDHARDT.

Witnesses:

E. IMER-SCHNEIDER,
L. H. MUNIER.