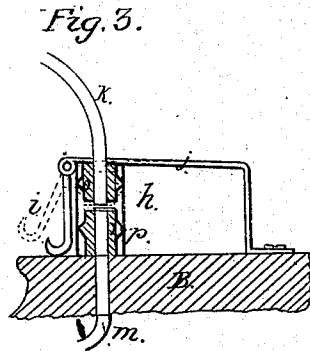
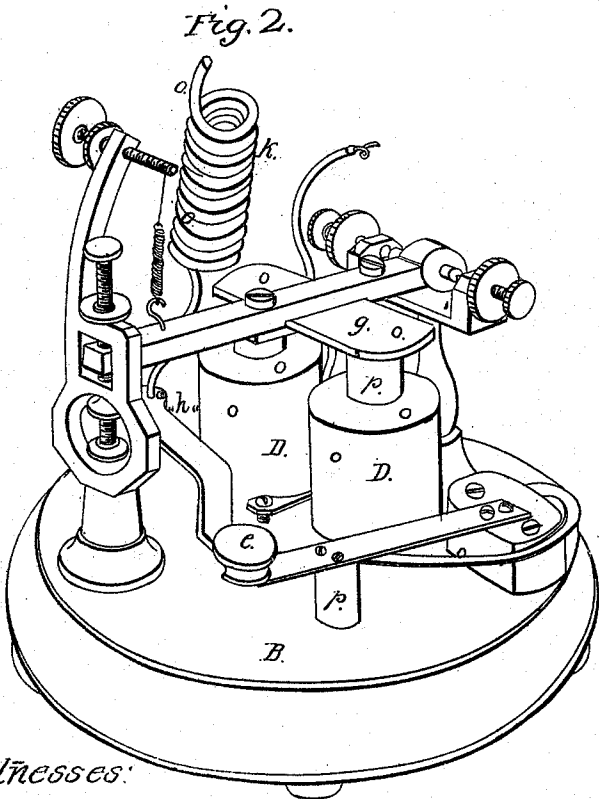
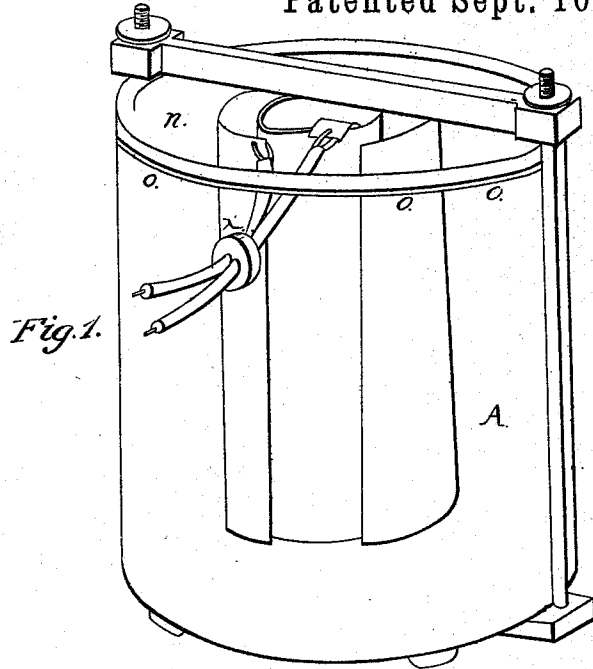


G. W. NICHOLS.

TOTAL INSULATION OF TELEGRAPH LINES AND APPARATUS.

No. 68,779.

Patented Sept. 10, 1867.



Witnesses:

Charles Poole
Joseph A. Cook

Inventor:

G. W. Nichols

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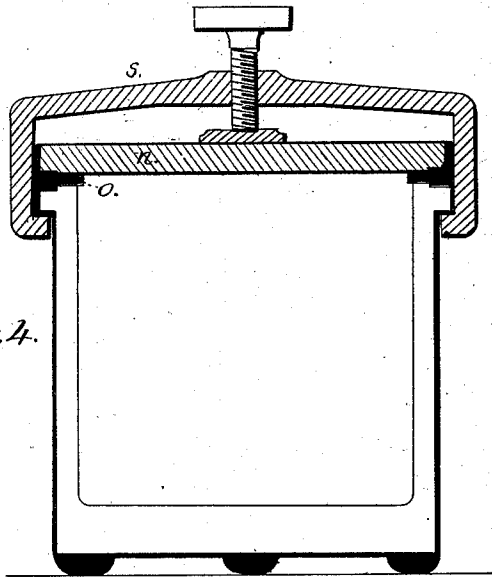


Fig. 4.

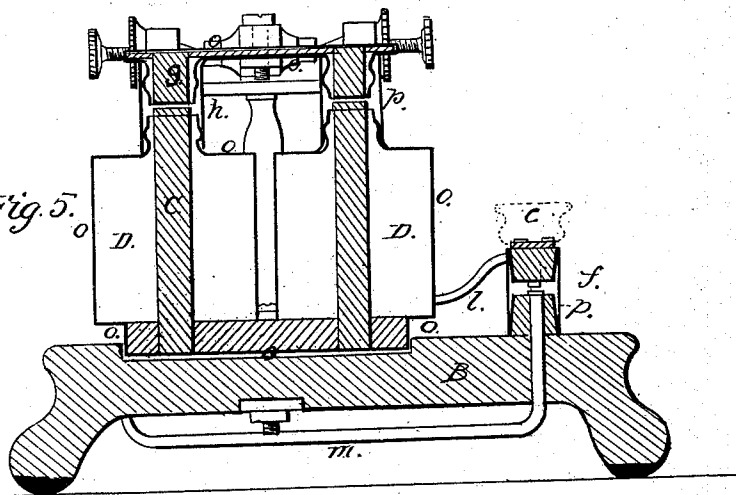


Fig. 5.

Witnesses.

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G. W. NICHOLS, OF CHICAGO, ILLINOIS.

Letters Patent No. 68,779, dated September 10, 1867.

IMPROVEMENT IN TOTAL INSULATION OF TELEGRAPH LINES AND APPARATUS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, G. W. NICHOLS, of Chicago, State of Illinois, have invented new and useful improvements in galvanic batteries, telegraph apparatus, and methods of insulation, which I denominate Nichols's Total Insulation Telegraph; and I do hereby declare the following to be a full and exact description of the same, reference being had to the drawings that accompany and form a part of these specifications, in which—

Figure 1, perspective view of my improved battery-cup.

Figure 2, perspective view of magnet, thumb-key, and some other parts.

Figure 3, sectional view.

Figure 4, sectional view of battery-cup.

Figure 5, sectional view, bisecting vertically the magnet, and surrounding coils, vibrating armature, and thumb-key connection.

Letter A, battery-cup; letter B, magnet-stand; letter C, magnet; letters D D, coils of wire around the arms of the magnets; letter *e*, thumb-key; letter *f*, point of connection when working the key; letter *g*, vibrating armature; letter *h*, point for breaking and closing with different lines or line-connections; letter *i*, brace operating to raise slightly the spring *j*, which breaks the contact; letter *k*, the wires leading to a distant station and return; letter *l*, conducting-wire, leading from the magnet-coils to the key *e*; letter *m*, wire leading from the key *e* to the wire *k*; letter *n*, cover of the battery; letter *o*, an insulating substance, of gutta percha, rubber, silk, or any other good and reliable insulator; letter *p*, extra insulators, in the form of short tubes of gutta percha, or other suitable substance, and placed over the other insulators at the movable parts or points of connecting and disconnecting; letter *s*, clamp for the cover of the battery.

The object of my invention is to provide against the disturbing influences of the perturbations of the electricity of the earth, and to prevent the line from becoming inoperative by having the battery force dissipated by induction, through the agency of the moisture of the atmosphere, as also to protect the line from the ruinous effects of uncontrollable electrical fluid, with which the wires become surcharged during thunder-storms, and often at other times.

From some one of the three above-mentioned causes, telegraph lines, as ordinarily constructed, are inoperative, and, for the time, worse than useless, for in times of great emergency one may trust the telegraph, and, after waiting, it may be, a time sufficient for the ordinary mail to have compassed the object, find the treacherous elements have betrayed him.

I propose to remedy this by insulating totally the entire line—not the leading wires merely, but the magnet, the battery, the vibrating armature—coating all the wires, and surrounding all the movable and adjustable points of opening and closing the circuit with non-conducting substances, so that the entire apparatus which forms the line proper is entirely shut out from all of the hereinbefore-mentioned disturbing influences. I accomplish this, in the case illustrated, by surrounding the magnet-coils D, the exposed parts of the magnet C, the armature *g*, all the connecting-wires, like *l* and *m*, the field-lines *k*, and the metal plates on the thumb-key straps and on the armature *g*, with gutta percha, as indicated in the drawings by the letter *o*.

The model of battery represented in the drawings is of glass, and insulation is provided for by the gutta-percha annular disk, represented also by the letter *o*, shown in figs. 1 and 4. At the movable parts the letter *p* represents gutta-percha thimbles, or short tubes, and are drawn on over the other parts, as represented in figs. 3 and 5. There may be as many of the line-connections, as represented at *h* in figs. 2 and 3, as there are different lines to connect with at any given station.

The battery is represented as of glass, and standing on glass knobs, and provided with gutta-percha stopper at *x*, through which the wires pass to reach the desired connections within. The battery in drawings being of glass, a non-conducting substance, the stoppers *x* prevent any passage of electricity from without to the interior of the battery. As before said, when the battery is made of a conducting substance, a non-conducting covering is used, as represented in fig. 4. This is what I call insulating the interior of the battery from atmospheric electricity. Batteries of other material than glass may be used; but if not in themselves insulating they will be covered completely with some suitable insulating substance, wrapped around, as already illustrated in the case of other parts of my apparatus, or applied in plastic or other forms, and with such modifications as the various forms and styles of battery may require. Fig. 4 represents the entire battery-cup as surrounded

by the non-conductor *o*. So also there may be various modifications of the methods of applying the insulating material. But these will all come within the scope of my device and invention, if confined to the matter of producing total insulation and relief from the hereinbefore-mentioned disturbing influences.

As before mentioned, I may use various substances to produce the insulation desired. The relay-magnet, when used, may be insulated by being placed in glass vessel, like the battery-cup in fig. 1, or of other suitable form. As a partial guard against the disturbance directly from the earth I sometimes set the battery-cup, especially if made of any substance for its outer parts not an insulator of itself, on gutta-percha feet or knobs, or some other suitable insulator. I do also adopt this same for the magnet-stand and conjoining parts, as illustrated in figs. 2 and 5. And this same care to shut out all electricity from the earth I extend to all parts of the apparatus, as a provision against disturbances in the battery or the operating magnet by induction.

My invention does not consist in the discovery of any new medium of communication, nor in the discovery of any new material affording more perfect insulation, but in so constructing some parts of the apparatus, and so insulating all parts that form the line proper, or galvanic circuit, and, if need be, other parts, as to entirely remove all that should be subject to man's control from any and all of the disturbing causes hereinbefore mentioned, and which so often render communication, even between points not far removed from each other, utterly impossible.

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

1. Surrounding or covering the various parts of telegraph apparatus, as specified and set forth, with an insulating substance, as and for the purposes specified.
2. The insulation of the interior of the battery-cup A, substantially as described and set forth.
3. The covering of the outer surface of the battery, when not made of an insulating substance, with gutta percha or other suitable insulating material.
4. The total insulation of the entire telegraph circuit, for the purposes specified and set forth.
5. The insulation of the relay-magnet, substantially in the manner specified.

G. W. NICHOLS.

Witnesses:

JOSEPH NOCK,
CHAS. F. WILSON.