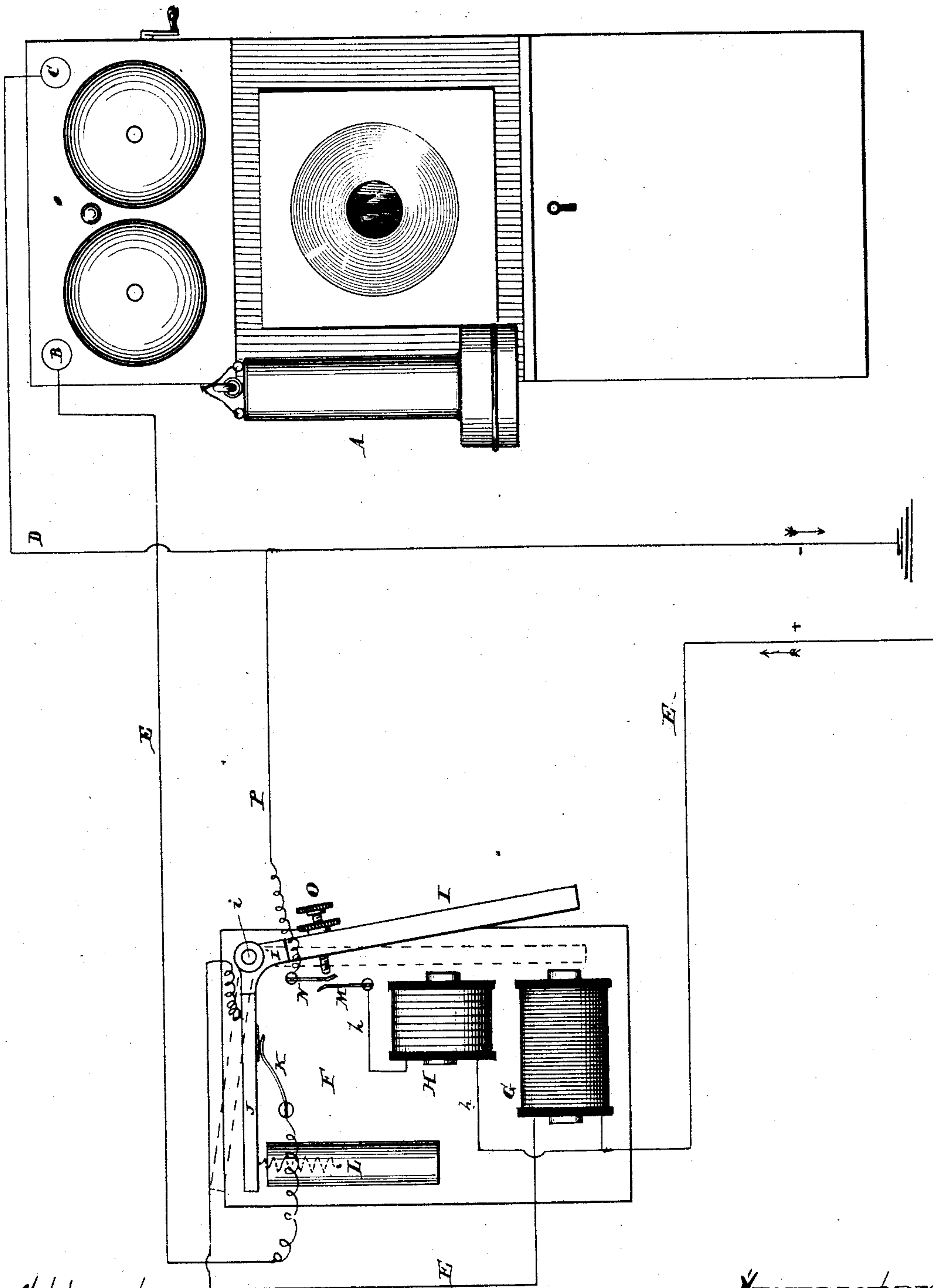


(No Model.)

J. W. DYER.
LIGHTNING ARRESTER.

No. 287,647.

Patented Oct. 30, 1883.



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J. W. Dyer
Witness

Inventor
Josiah W. Dyer
By his atty.
J. W. Dyer

UNITED STATES PATENT OFFICE.

JOSIAH W. DYER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
AUTOMATIC CURRENT PROTECTOR AND ELECTRIC MANUFACTURING
COMPANY.

LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 287,647, dated October 30, 1883.

Application filed February 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH W. DYER, of the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented
5 an Improvement in Lightning-Arresters, of which the following is a specification.

My invention has reference to what are technically known as "lightning-arresters;" and it consists in certain improvements, fully set
10 forth in the following specification, and shown in the accompanying drawing, which forms part thereof.

The object of my invention is to provide a telephone or telegraph circuit with one or more
15 lightning-arresters adapted to automatically cut out of the line-circuit the telephonic or telegraphic instruments without interrupting the continuity of the line-circuit, or to ground said line-circuit, dependent upon the location
20 of said lightning-arrester.

It will be understood that although technically called a "lightning-arrester," the device is equally adapted to convey off currents of high intensity and quantity generated by dy-
25 namo-electric machines, which currents are especially utilized on electric-light lines.

In the drawing is shown an intermediate telephone-station with my improved lightning-arrester attached thereto.

30 A is the telephonic or telegraphic apparatus, the former being shown. B and C are the two terminals or binding-posts therefor.

D and E are the line wires or circuits. If it be a terminal station or cable connection,
35 then wire D is a ground-wire. In the line E I interpose my lightning-arrester F, which is constructed as follows:

G is an electro-magnet of comparatively high resistance, and H one of low resistance,
40 both of which are adapted to attract the armature I, pivoted at *i*, the said armature being secured to a non-magnetic piece, I', which carries the armature J, preferably arranged at right angles to the armature I, the two being
45 made solid. The line E passes through the magnet G, and then to armature J, thence through spring-contact K to line again and binding-post B, the armature J being held down upon the contact K by a permanent mag-
50 net, L, or, if desired, a spring, the same also tending to move the armature I from the elec-

tro-magnets G and H. The electro-magnet H is also connected to the line E by wire *h*, which terminates in a spring-contact, M, arranged close to a similar spring-contact, N, which lat-
55 ter is in circuit with the line or ground wire D by wire P.

The armature I is provided with a circuit-closing adjustable screw, O, which is adapted, under certain conditions, to press the springs
60 M and N into contact with each other, and also with the said screw or contact O.

The apparatus being in the position shown, and the line being in condition for use, the operation is as follows: If the line-wire be-
65 come overcharged by lightning of combined quantity and tension, or by contact with an electric-light wire, the electro-magnet G attracts the armature I, but instantly the screw-contact O presses the springs M and N together,
70 and simultaneously therewith, or, preferably, immediately thereafter, breaks the line-circuit at contact K, which action first closes the line-circuit through electro-magnet H, contacts
75 M and N and O, and circuit P to line or ground wire D, and at same instant cuts the instruments A out from the line-circuit, but without breaking it, as the current in part passes through piece I', armature I, and contact O to
80 spring N and wire P. From this it is seen that the electro-magnet G first puts the arma-
ture into action, putting the low-resistance electro-magnet H into circuit, when the cur-
85 rent from the line divides in proportion to the resistances offered by the two paths open to it, the main part of it going through the magnet H, thus preventing the destruction of the mag-
net G, and afterward recombines and passes off by wire P to line or ground. If it goes to line,
90 the lightning-arrester at the next station may pass it to ground. The electro-magnet H alone would not attract the armature soon enough to save the destruction of the telegraphic or tele-
95 phonic instruments; and if not used, then the high-resistance magnet G would be destroyed and the device rendered inoperative. As soon as the discharge has taken place, the magnets G and H are demagnetized, and the magnet
100 L or the spring attracts the armature J, and all the mechanism is brought to the position shown, the normal current now passing through the line and telephone or telegraphic instru-

ments A. Any excess of current, from whatever cause, will sufficiently electrify the magnet G as to attract the armature I.

The advantage of not breaking the line-circuit in the act of cutting the instruments out of said line is in preventing the formation of an arc between the contacts, which would fuse and become destroyed.

I do not limit myself to the exact construction shown, as it may be modified in various ways without departing from my invention; but I prefer it for its simplicity.

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

1. The combination of an electric circuit and receiving-instruments included therein with automatic mechanism consisting of high and low resistance magnets and connections, substantially as described, constructed to automatically cut out the receiving-instruments and close the line around the said instruments when said line is overcharged, and continuity-preserving contacts, whereby the line is never broken.

2. The combination of an electric circuit and receiving-instruments included therein with a pivoted armature, two electro-magnets, one of high and the other of low resistance, the former of which is in the line-circuit, and means controlled by the armature to cut out said receiving-instruments and ground the line-circuit through the electro-magnet of low resistance upon said line being overcharged with electricity, substantially as and for the purpose specified.

3. The combination of an electric circuit and receiving-instruments included therein with automatic mechanism consisting of a high and low resistance magnet, and connections, substantially as described, constructed to automatically cut out the receiving-instruments

and close the line around the said instruments when said line is overcharged, continuity-preserving contacts, whereby the line is never broken, and mechanism, substantially as set forth, to automatically bring all of apparatus to its normal position, upon the line being freed of its excessive charge of electricity, to complete the line again through said receiving-instruments.

4. The combination of telephonic or telegraphic instruments A, line-wires E D, electro-magnet G, of comparatively high tension, in line E, electro-magnet H, of low tension, in a shunt-circuit, wire *h*, contacts M N, ground-wire P, armature I, carrying contact O, contact K, armature J, and magnet L, substantially as and for the purpose specified.

5. The combination of telephonic or telegraphic instruments A, line-wires E D, electro-magnet G, of comparatively high tension, in line E, electro-magnet H, of low tension, in a shunt-circuit, wire *h*, contacts M N, ground-wire P, armature I, carrying contact O and J, contact K, and means to keep said armature I away from said electro-magnets, substantially as and for the purpose specified.

6. The combination of telephonic or telegraphic instruments A, line-wires E D, electro-magnet G, of comparatively high tension, in line E, electro-magnet H, of low tension, in a shunt-circuit, wire *h*, contacts M N, ground-wire P, armature I, carrying contact O, non-magnetic pivot-piece I', contact K, armature J, and magnet L, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

JOSIAH W. DYER.

Witnesses:

R. M. HUNTER,
W. McWADE.