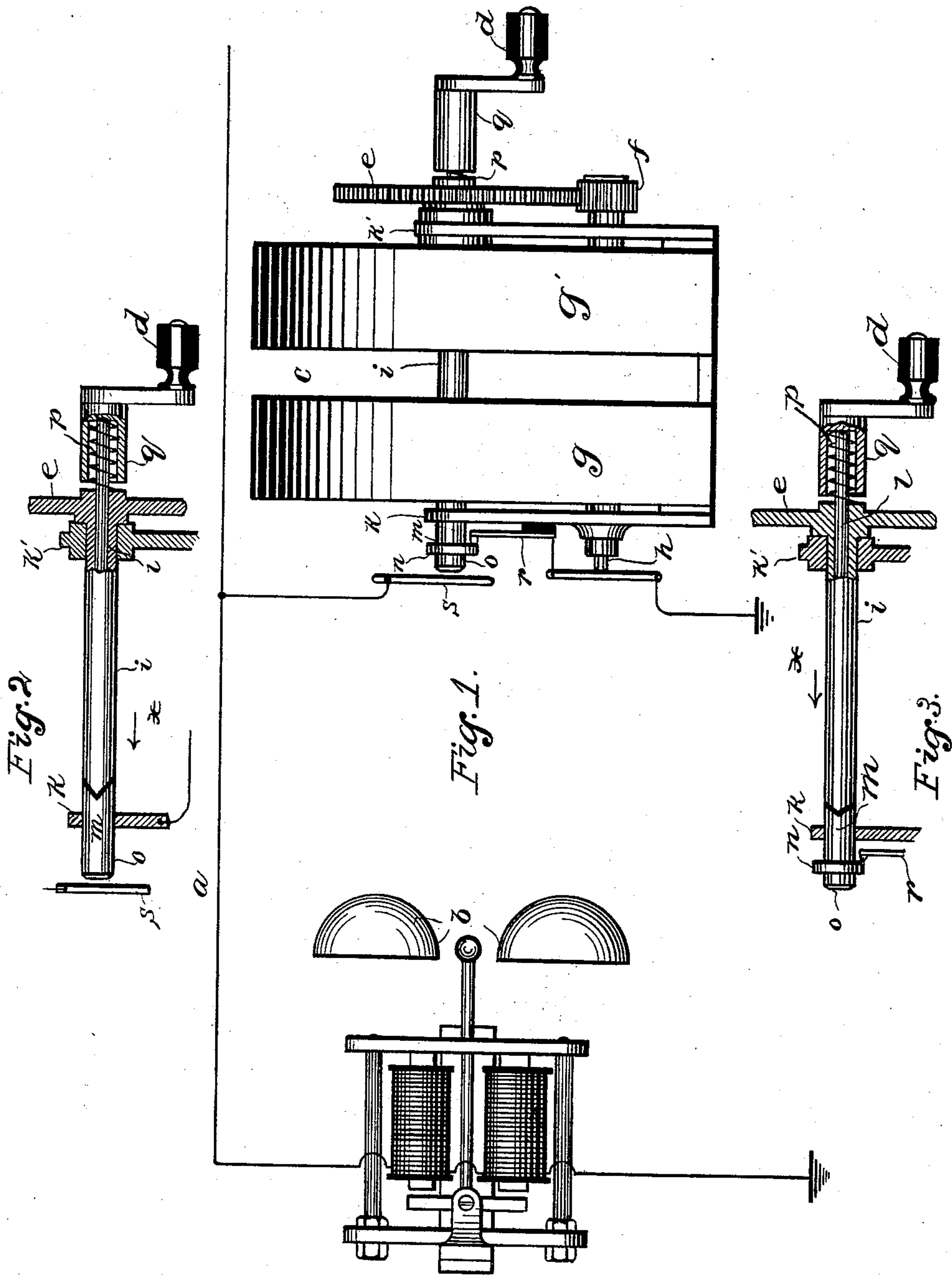


(No Model.)

C. E. SCRIBNER.
MAGNETO CALL BOX.

No. 523,132.

Patented July 17, 1894.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN
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MAGNETO CALL-BOX.

SPECIFICATION forming part of Letters Patent No. 523,132, dated July 17, 1894.

Application filed November 6, 1891. Serial No. 411,086. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Telephone-Exchange Call-Boxes, (Case No. 281,) 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 signaling apparatus for sub-stations of telephone exchange systems; its object is to provide a novel form of calling apparatus, with circuits appropriate thereto, adapted to be self-protective from discharges of lightning or heavy currents.

Heretofore, ordinarily, the signal bell at a sub-station has been included in circuit with the calling generator, and a device has been attached to the calling generator adapted to automatically shunt out or short-circuit the armature of said generator when it was not in use. In addition to these, a separate lightning arrester has been provided having plates with serrated edges placed in juxtaposition, one of said plates being connected to line, and the other to earth; a high tension current upon line escapes to earth by leaping across the air space between the two plates. In this arrester any dust which may collect between the two plates acts to ground the line. The plates are necessarily somewhat widely separated in order to avoid this difficulty as nearly as possible, but in so separating them the efficiency of the device as a lightning arrester is diminished. With the signal bell and other apparatus thus arranged, in the event of failure of the lightning arrester, the coils of the signal bell were destroyed.

My invention is designed to obviate these difficulties.

It consists in placing the signal bell,—which is preferably constructed of high resistance,—in a branch circuit from the line to the earth or other return conductor and in connecting in another branch circuit, normally open, from line to the said return conductor, a calling generator provided with a device whereby the branch circuit is automatically closed when the generator is in use. The circuit-closing contacts of this device are arranged to with-

draw to only a slight distance from each other when the generator is not in use, and hence act as a protective device for high tension currents,—one of the contact pieces being connected to line, and the other grounded. The generator armature may be of comparatively low resistance, and the high tension current will follow this path from line to earth in preference to traversing the bell coils of high resistance and self induction.

The two contact pieces of the circuit closing device, although placed near together, are not liable to any accumulation of dust between them, since they are brought into contact, and thereby are cleaned, at each use of the generator.

In addition to the simpler form of circuit closing device just described I have also provided an additional point, a surface in connection with the movable contact piece of the device, adapted to close upon an anvil provided with circuit connections whereby the armature of the generator is itself short circuited when not in use. When this device is employed, the high tension current has an easy path through the air space directly to earth.

My invention is illustrated in the accompanying drawings, and will be more readily understood by reference thereto.

Of the drawings, Figure 1 shows diagrammatically a telephone line having a signal bell and a calling generator equipped with my improved protective device, connected thereto. Fig. 2 is a longitudinal sectional view of the mechanism for bringing the movable contact piece into contact with the fixed piece, when the handle of the generator is rotated, together with the contact pieces and a portion of the circuit connections. Fig. 3 is a similar view showing the disk adapted to short-circuit the armature of the generator, in addition to the mechanism of Fig. 2.

I will indicate parts in the drawings by letters of reference, like parts being designated by similar letters of reference.

Referring to the drawings, *a* is a line wire, which may extend to a central exchange or to another sub-station.

b is a call bell of ordinary construction.

c is a magneto current generator, also of or-

dinary construction. It consists of an armature adapted to be revolved by means of crank *d*, driving wheel *e*, and pinion *f*, in a magnetic field set up by the permanent magnets *g g'*. One end of the armature coil is connected to the frame work of the generator and the other terminates in an insulated pin *h*.

The driving wheel *e* is secured to a sleeve *i*, which is journaled at *k k'* in suitable bearings. A spindle *l* passes through the sleeve *i*. This spindle carries at one extremity the crank *d*, and at the other the collar *m*, the contact disk *n*, and the contact block *o*, which constitute one block of the lightning arrester. The collar *m* has in its inner end a V-shaped groove, cut diametrically across the collar, which groove engages with a corresponding wedge-shaped projection upon the end of the sleeve *i*. A spiral spring *p* exerts a pressure such as to maintain the wedge upon the sleeve *i* normally in engagement with the corresponding V-shaped groove in the collar *m*. This spring *p* is surrounded by a sleeve *q*, integral with the spindle *l*; said sleeve *q* extends to within a slight distance of the hub of wheel *d*.

It will be seen that in this device, the sleeve *i* and spindle *l* are allowed a slight longitudinal and rotational movement independent of each other. When an effort is made to rotate the spindle *l*, the wheel *e* being held stationary, the inclined surface of the groove in collar *m* slides upon the correspondingly inclined surface of the wedge on the sleeve *i*, and thus forces the spindle *l* to execute a small longitudinal movement, in opposition to the spring *p*. This movement is limited by the sleeve *q*, which comes against the hub of wheel *e*; thereafter, the sleeve *i* and wheel *e* will obviously rotate with the spindle *l*. Thus the attempt to turn the crank *d* results in first a longitudinal movement of the spindle *l*, whereby the block *o* and the disk *n* are advanced in the direction indicated by the arrow *x*.

A fixed contact anvil *r* is so disposed that the disk *n* makes contact with it when the generator is not in use.

A block *s* is provided near the piece *o* in such relation thereto that the piece *o* shall be brought into contact therewith when the spindle is advanced as described. The block *s* is connected to the line to be protected, while the block *o* is connected with the frame of the generator, and hence with one end of the armature coil. The disk *n* is also in connection with the frame of the generator, while the contact anvil *r* is connected directly to earth.

Thus in the normal position of the generator, there exists a path from the line to earth including only the small air space between the block *s* and the block *o*, which is readily traversed by a high tension current. Having this path of comparatively low resistance and

of low self induction, the high tension current does not traverse the bell coils of high self-induction. At the same time, there is no danger of grounding or short-circuiting the line by the accumulation of dust or dirt between the opposed faces of blocks *o* and *s*, since, as before mentioned, they act to remove such accumulation each time the generator is used. Thus the instrument set is effectually protected against damage from high tension currents, without any of the difficulties heretofore experienced.

When the resistance of the armature of the generator coil is small, it may not be necessary to provide the contact piece *r* to short-circuit the armature when it is not in use.

The areas of the blocks *s* and *o* may be varied to suit varying conditions. I have sometimes used two disks, mounted like the pieces *o* and *s*, with faces opposed, thus exposing a greater area of metal to the action of the arc or flash, in which case the damage to the plates is less; but the friction of two plates thus bearing upon each other when the generator is used, determines a limit to this extension of surface.

I do not limit myself to the particular device which I have described for imparting to one of the arrester blocks a motion toward the other. Any suitable device which would automatically cause the piece *o* to be advanced into contact with the piece *s* might be substituted for the mechanism shown.

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

1. The combination, with the calling generator, of the contact disk *n*, the contact anvil *r* normally in contact therewith, said contacts *r n* having electrical connections such that they close a short circuit about the armature of said generator, the movable block *o*, the block *s*, and mechanism in connection with the driving gear of said generator adapted to move said block *o* into contact with block *s*, and to separate said disk *n*, from said contact anvil *r* when said generator is in use, substantially as described.

2. The combination, with a calling generator, of a movable contact piece and a movable block, a fixed contact anvil and a fixed block, mechanism in connection with the driving gear of the generator allowing said movable block to bear against said fixed block when said generator is in use, but adapted to withdraw said movable block to a slight distance from said fixed block and to close said movable contact piece upon said fixed contact piece when said generator is idle, and circuit connections joining the fixed block to a telephone line, the movable block and the movable contact piece to one end of the armature coil, the fixed contact anvil to the other end of the armature coil and to earth, substantially as described.

3. The combination, with a calling genera-

tor, of a movable block, a fixed block, mechanism in connection with the driving gear of said generator adapted to allow said movable block to bear upon said fixed block when said generator is in use, but to withdraw said movable block to a slight distance from said fixed block when not in use, and circuit connections joining said fixed block to a telephone line and said movable block to one end of the armature coil of the generator, the other end of said armature coil being connected to earth, substantially as described.

4. The combination, with a telephone line wire, of a signal bell connected in a branch from said line wire to earth or other suitable conductor, a calling generator having a movable block connected to one end of its armature coil and a fixed block connected to said line, the other extremity of said armature coil being connected to the earth or other equivalent conductor, and mechanism allowing said movable block to bear upon said fixed block when said generator is in use, and adapted to withdraw said movable block to a slight distance from said fixed block au-

tomatically when the generator is not in use, substantially as described.

5. The combination with a telephone line wire, of a signal bell connected in a branch from said line wire to earth or other conductor, a calling generator having a movable block connected to one end of the armature coil, a movable contact piece, a fixed block connected to line, a fixed contact anvil, said movable contact being connected with said movable block and said fixed contact anvil being connected to earth or other conductor, and mechanism adapted to allow said movable block to rest against or very near to said fixed block when said generator is in use, but to withdraw said movable block to a slight distance from the fixed block automatically when the generator is not in use, substantially as described.

In witness whereof I hereunto subscribe my name this 20th day of October, A. D. 1891.

CHARLES E. SCRIBNER.

Witnesses:

M. JEANE TALLETT,
GEORGE L. CRAGG.