

(No Model.)

E. T. GILLILAND.

MAGNETO ELECTRIC MACHINE FOR TELEPHONE SIGNALING.

No. 307,290.

Patented Oct. 28, 1884.

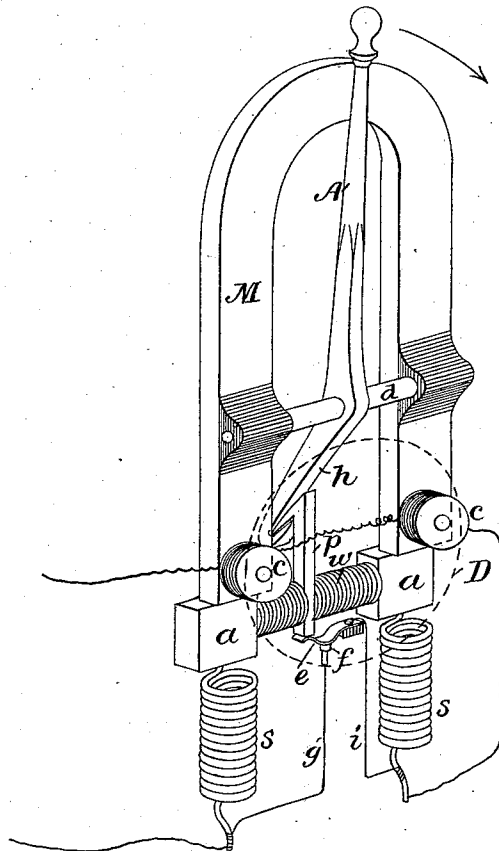


Fig. 1.

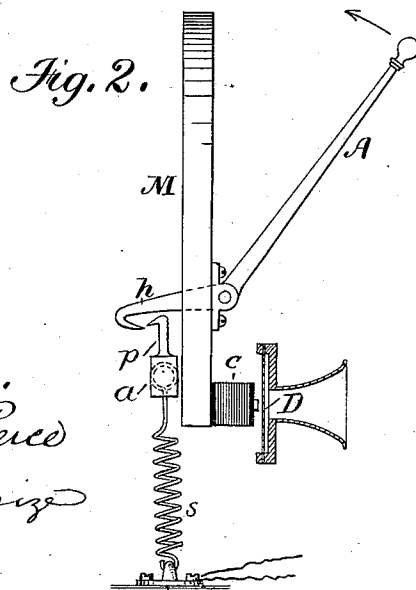


Fig. 2.

Witnesses.
Geo. Willis Pierce
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UNITED STATES PATENT OFFICE.

EZRA T. GILLILAND, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE
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MAGNETO-ELECTRIC MACHINE FOR TELEPHONE-SIGNALING.

SPECIFICATION forming part of Letters Patent No. 307,290, dated October 28, 1884.

Application filed April 21, 1884. (No model.)

To all whom it may concern:

Be it known that I, EZRA T. GILLILAND, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Telephone and Magneto Generators, of which the following is a specification.

The object of my invention is to provide a simple, reliable, and easily-operated apparatus for signaling or calling on telephone-lines, and, further, to provide a telephone with such apparatus in a compact form; or, in other words, to provide a combination-instrument embracing means for calling and communicating. For this purpose I have devised means for generating an electric current by magneto-electric induction produced by a reciprocating mechanical movement.

My invention consists of an inducing-magnet and an armature-coil having a soft-iron core normally held by springs in a retracted position a short distance from the poles of the inducing-magnet, but in a line with a longitudinal surface of the pole thereof. Attached to the armature is a hook or catch in position to engage a hook or catch upon one arm of a pivoted lever, whereby upon moving the lever in a given direction the said armature is drawn past the poles of the inducing or field magnet; but after moving or rotating the lever a certain predetermined distance the relative position of the two hooks or catches is so changed that they disengage, and the retractile force of the armature-springs carries the armature rapidly back across the poles of the magnet, the said magnet, by its attractive force, causing the armature to slide or pass in light contact therewith, whereby two impulses of opposite polarity of electricity are generated by magneto-electric induction in a well-known manner and a signal-bell or other appropriate instrument caused to respond. In its normal position the armature rests slightly withdrawn from the poles of the field-magnet, which is uninfluenced thereby, and therefore free to perform other functions. Means for automatically removing the armature-coil from circuit are provided. In a telephone a permanent magnet is used, and I have found it very convenient and desirable to employ the same per-

manent magnet for both the call apparatus and telephone. Where there are two or more stations on a line, it is customary for each station to respond to a different number of strokes upon the signal-instrument, and my device is peculiarly adaptable to this class of service. As each movement of the actuating-arm produces but one impulse or stroke upon a polarized instrument or bell, the required signal may be given by moving the lever the required number of times. The use of a combination set will be found of great utility in the substitution of the telephone for those uses to which the well-known speaking-tube is most commonly put, as in hotels, factories, &c.

In the accompanying drawings, Figure 1 shows my combination-instrument in its normal position. Fig. 2 shows the magneto-call arrangement in operation. The lever and armature-hook are shown as having arrived at the disengaging-point.

M is a magnet. *a* is a soft-iron armature-core bearing a coil of insulated wire, *w*. A hooked bar, *p*, is securely fastened to the armature near its center. Armature *a* is normally held in a retracted position a sufficient distance from the magnetic field to make its influence therein imperceptible by coil-springs *s s*, which springs respectively form the opposite terminals of the armature-coil. When the armature is in a position of rest, a projection therefrom closes the spring contact-point *e* upon contact-stop *f*, thus forming a short circuit around coil *w* via elements *i*, *e*, *f*, and *g*.

A is a lever suitably pivoted, as at *d*, capable of rotating upon its bearings. The shorter arm, *h*, bears a hook moving in line to engage the hook upon bar *p*. In a normal position the two hooks interlock, as shown in Fig. 1. Upon giving to the arm *A* a movement of rotation upon its bearings in the direction of the arrow in Fig. 1 the armature is carried in the arc of a circle the radius of which is the arm *h* of lever *A* into the position shown in Fig. 2, where the relative position of the two hooks is such that they disengage. The influence of the magnetic strength of *M* contributes to this result, and also causes the said armature in its backward movement to make light contact

with its surface, whereby the inductive effect is increased. As the armature glides over the poles of the field-magnet two impulses of electricity, one of each polarity, are sent into the main-line circuit, and the armature arriving at its extreme retracted position is cut out of circuit, as before described.

My combination-instrument also embraces the coils *c c*, similar to those found in the well-known Bell telephone.

Dis a diaphragm, in proper relation to which is a mouth-piece, for the purpose of concentrating the sound-waves in the well-known manner.

The parts being in normal position, as in Fig. 1, in the main circuit, as shown, the method of operation is to pull down the handle *A* until the catches or hooks disengage. The resulting impulse will cause a signal upon a polarized bell at the receiving-station. The operation may be repeated one, two, or more times, as required, to produce the required number of strokes on the receiving-instrument or bell at the distant station. A reply being received, which may be transmitted from the distant station in a similar manner, conversation is proceeded with, as usual. As the armature-coils are cut out before completion of the return movement of the armature, the strokes will be uniform and sharp.

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

1. In a magneto-electric machine, the combination of one or more magnetic field-poles, an armature, a spring holding the armature to one side of the field-poles, and means for putting the spring under tension, so that on its release it draws the armature once across the field-poles, restoring it to its normal position, thereby producing two impulses of opposite polarity, substantially as described.

2. In a magneto-electric machine, the combination of a field-magnet, an armature normally held away from the poles of said mag-

net, means for giving said armature a movement across the poles of said magnet, and an automatic circuit-closer, substantially as described.

3. An instrument for telephonic communication comprising a magneto-generator having a field-magnet, an armature therefor, means for giving said armature a movement across the field-poles, one or more coils fixed to the pole or poles of the field-magnet, and a diaphragm, substantially as described.

4. In a magneto-electric machine, the combination of a field-magnet, an armature-coil containing a soft-iron core normally held to one side of the field-poles, and means for giving said armature a single rapid movement across and in contact with the field-poles, substantially as described.

5. The combination of a field-magnet, an armature normally held by a spring to one side of the field-poles, and a handle for carrying said armature to the other side of the field-poles, so that on its release the said spring rapidly restores it to its normal position, the armature passing across the field-poles and producing two impulses equal in strength but of opposite polarity, substantially as described.

6. In an electric generator, the combination of magnet *M*, armature *a*, having a hook or catch, *p*, lever-arm *h*, and retracting-springs *s*.

7. In an electric generator, the combination of a field-magnet, *M*, armature *a*, interlocking arms *h p*, and shunt-circuit *e f g i*.

8. In a combination-instrument, the magnet *M*, armature *a*, interlocking arms *h p*, springs *s*, stationary coils *c*, and diaphragm *D*.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 17th day of April, 1884.

EZRA T. GILLILAND.

Witnesses:

WM. B. VANSIZE,
GEO. WILLIS PIERCE.