

(No Model.)

C. E. ALLEN.
TELEPHONE.

3 Sheets—Sheet 1.

No. 306,044.

Patented Oct. 7, 1884.

Fig. 1.

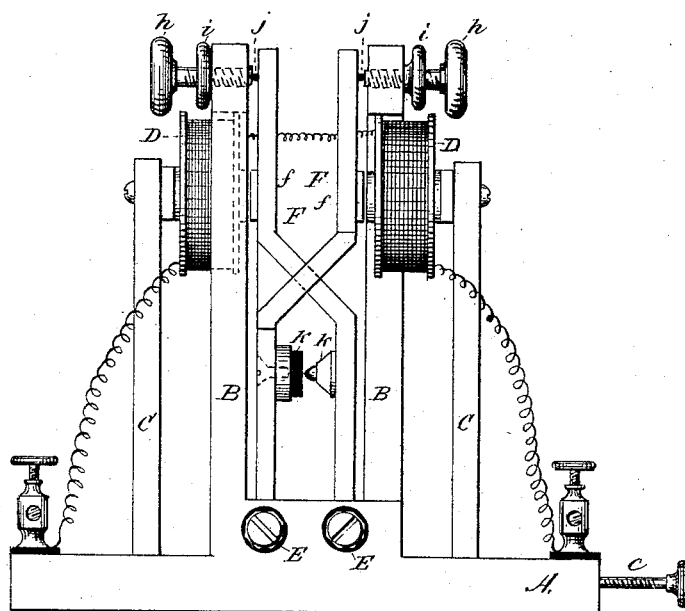
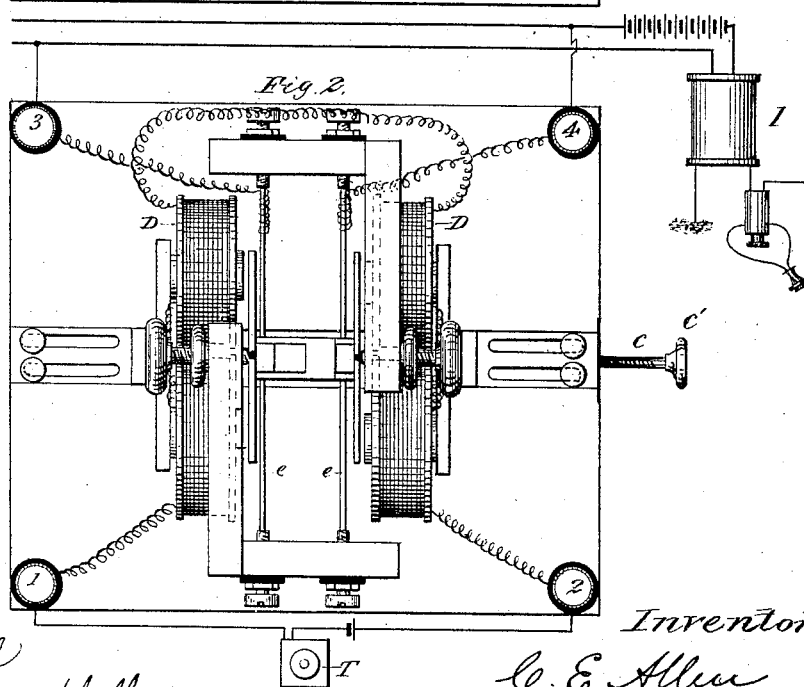


Fig. 2.



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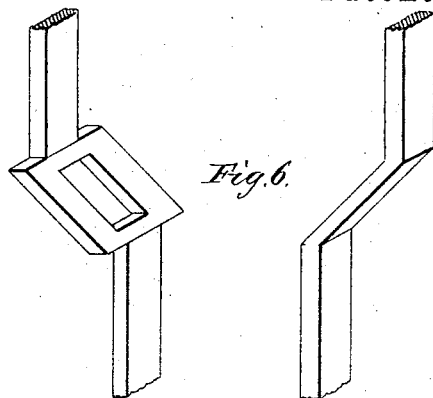


Fig. 3.

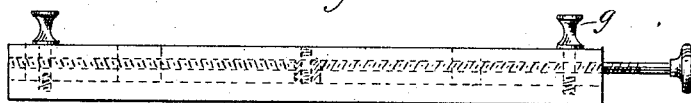


Fig. 4.

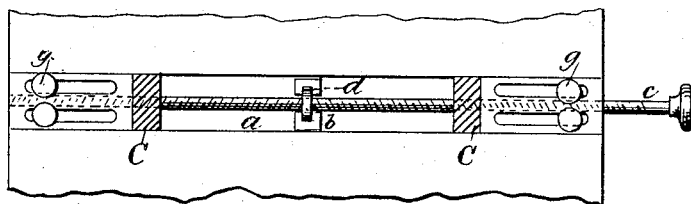


Fig. 7.



Fig. 5.

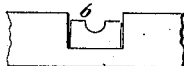
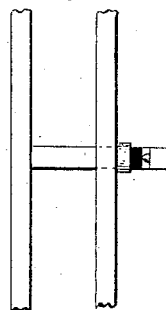


Fig. 8.



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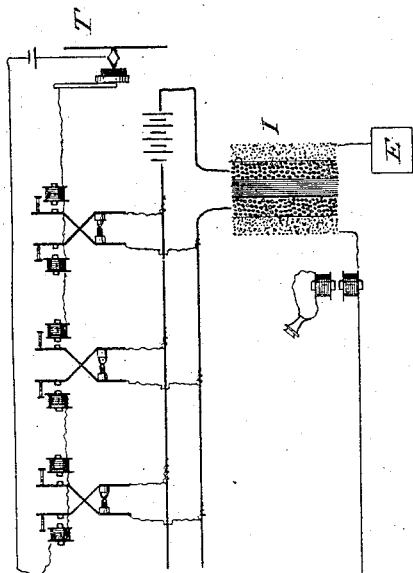
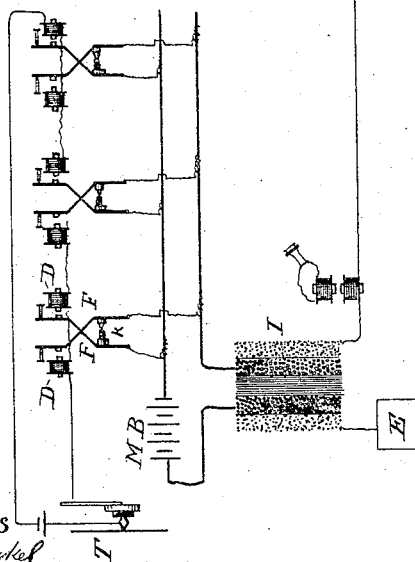


Fig. 9.



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UNITED STATES PATENT OFFICE.

CHARLES E. ALLEN, OF ADAMS, MASSACHUSETTS, ASSIGNOR OF ONE-HALF
TO FRANK J. CALANAN, OF UTICA, NEW YORK.

TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 306,044, dated October 7, 1884.

Application filed January 19, 1884. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. ALLEN, a citizen of the United States, and a resident of Adams, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Telephones, of which the following is a specification.

My invention relates to the reproduction of articulate speech by means of electrical variations produced in an electric circuit by sound-waves; and it has for its object to produce in an electric circuit strong and powerful electric variations for the above purposes. It also has for its object to enable the reproduction of sound-waves at great distances by the aid of strong and powerful electrical variations.

It is a well-known fact that in the ordinary transmitters it is impracticable to use a heavy current without injury to the electrodes, thereby hindering the perfect transmission and reception of articulate speech.

The transmitting apparatus consists of a number of pairs of electrodes so arranged that the current from a powerful battery passes through them in multiple arc, and thence through the primary of a large induction-coil. The secondary of said induction-coil forms part of the main line containing the receiving-instrument. The relations of these electrodes to each other is controlled by variations in electro-magnets operating the same, the said magnets being situated in a local circuit including a transmitter of the ordinary construction.

It will be apparent that the variations in the relations of the electrodes, arranged so that the main battery-current will pass through them in multiple arc, will be an enlarged reproduction of the variations in the circuit in which the ordinary transmitter is located, said circuit being controlled by the action of electrodes operated by the sound-waves and controlling the action of the electrodes arranged in multiple arc. By the particular manner in which these electrodes are mounted and acted upon by the magnets, as will be more particularly hereinafter described, I also produce a mutual action between them, which greatly aids in avoiding detrimental breaks and sparks in the circuit when powerful currents are used.

Referring to the accompanying drawings,

Figure 1 is a side elevation of one form of the contact operating mechanism. Fig. 2 is a plan of the same. Figs. 3 and 4 are side and plan views of the means for adjusting the magnets. Figs. 5 and 6 are details. Figs. 7 and 8 are detail views showing one modified form of the contact-levers, wherein one electrode is placed on the outside of one lever and the other lever is provided with a bent arm carrying the other electrode in contact with the first. Fig. 9 is a diagram showing an arrangement of my instruments in a circuit for communicating between distant stations.

A metal base-piece, A, having standards B B, is provided with a longitudinal slot, *a*, having a recessed block, *b*, secured at its center.

Passing through the slot *a* is a right and left hand screw-rod, *c*, having a disk, *d*, secured at or near its middle, which disk is fitted into the recess in the stationary block *b*.

Fitted to slide in the slot *a*, and screw-threaded for the reception of the screw-rod *c*, are two right-angled standards, C C, to the upper ends of which are secured the electro-magnets D D.

In the lower part of each of the standards B B are fitted two screws, E E, and insulated therefrom by proper means. The ends of these screws E E are recessed so as to form bearings for the pivot-rods *e e*, which are rigidly fastened to the lower extremities of two crossing levers, F F. To the upper parts of these crossing levers are secured the armatures *f f* in such a position as to be directly opposite the cores of electro-magnets D D. The relation of the magnets to the armatures may be adjusted by turning the screw *c* by means of the thumb-knob *e'*, the right and left hand threads thereon operating to cause both magnets to approach and recede from the armatures equally, and when the proper adjustment is attained the standards may be secured in place by the set-screws *g g*.

In the upper ends of standards B B are fitted two thumb-screws, *h h*, having lock-nuts *i i*, and their inner ends are provided with soft-rubber tips *j j*, adapted to be brought into contact with the upper ends of crossing levers F F.

On the inner sides of the levers F F, and below their point of crossing, are secured the electrodes *k k*.

At each corner of the base, and properly insulated therefrom, is secured a binding-post, 1 and 2 of which are connected with the local circuit containing the ordinary transmitter, T, and the coils of the electro-magnets D D, and 3 4, which are in circuit with the electrodes k k, are connected with and form a branch of the multiple-arc circuit.

From this construction and arrangement the operation will be as follows: Sound-waves are produced in the vicinity of the transmitter T, which is preferably used without an induction-coil, and produce electrical variations in the local circuit connected with the coils of the electro-magnets D D, the cores of which act upon the armatures of the cross-levers F F and cause them to vary the relations of the electrodes k k in accordance with the variations of the electric current. These variations of the electrodes produce corresponding variations in the current from the large local battery, which passes through the electrodes and the primary of the large induction-coil I, the secondary of which forms part of the main line. It will be seen by this that when several of these instruments are connected with their controlling-magnets in series with the transmitter T, and the electrodes in multiple arc with a heavy battery and the primary of the induction-coil I, very strong and powerful electric variations may be sent to line without danger of sparks or undue breaks, as the strong current divides and portions of it pass through separate sets of electrodes, all operated upon and controlled in unison by the variations produced by the transmitter T, and operating with mutual action toward each other. Such an arrangement of instruments is shown diagrammatically in Fig. 9, in which T is the ordinary transmitter in the local circuit, connected in series with the electro-magnets D D, the cores of which operate upon the crossing levers F F, controlling the electrodes k k, the current from the main battery M B passing through the various sets of electrodes in multiple arc, and through the primary of the induction-coil I. One end of the secondary of the induction-coil is grounded, while the other goes to the distant station and the receiving-instrument in the main-line circuit.

It will be seen that by using a large battery and induction-coil and a large number of electrodes such powerful currents may be sent to line that they may be made to traverse long distances and effectually reproduce the sound-waves.

By using the ordinary transmitter in the arrangement above described the variations produced thereby may be said to form a pattern, of which the powerful variations produced by the aggregate electrodes in the main-battery circuit are a fac-simile enlargement, and by

passing these through the induction-coil they are converted into alternate positive and negative variations.

It is evident that without departing from the spirit of my invention the induction-coil can be omitted and the main-battery current thrown directly to line, if desired; also, that the controlling electro-magnets may be connected to multiple arc instead of series, and that the transmitter T may be provided with an induction-coil, and the magnets in circuit with the secondary thereof may be polarized; also, that the main-line battery may be connected for quantity instead of intensity, as shown. It is also evident that each set of electrodes may be connected in circuit with the primary of a separate and individual induction-coil, the secondaries of which may be connected in multiple arc or series circuit or multiple-arc series.

I do not claim, broadly, two levers each carrying an electrode and operated by a magnet in a local circuit to move to and from each other; nor do I claim, broadly, a number of sets of electrodes, each set controlled by a single magnet, or all controlled by a single magnet; but

What I do claim is—

1. The combination, substantially as herein set forth, with a local circuit including a transmitter and a number of electro-magnets, of another circuit including a number of sets of electrodes connected to the main line, and levers for operating the electrodes of each set, so as to move simultaneously toward and from each other.

2. The combination, substantially as herein set forth, with a local circuit including a transmitter and a number of electro-magnets arranged in series, of another circuit including a number of sets of electrodes connected to the main line, and a series of sets of pivoted levers operated by the electro-magnets, so as to cause the electrodes to approach and recede from each other.

3. The combination, substantially as herein set forth, with a suitable support carrying two electro-magnets connected in one circuit, of a pair of crossed armature-levers supported in front of the magnets and controlling a set of electrodes in another circuit, the arrangement of the levers being such that the electrodes are simultaneously moved toward and from each other.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES E. ALLEN.

Witnesses:

F. L. FREEMAN,
H. A. HALL.