

C. ADAMS-RANDALL.
TELEPHONIC APPARATUS.
APPLICATION FILED NOV. 1, 1912.

1,062,754.

Patented May 27, 1913.

2 SHEETS-SHEET 1.

Fig. 1.

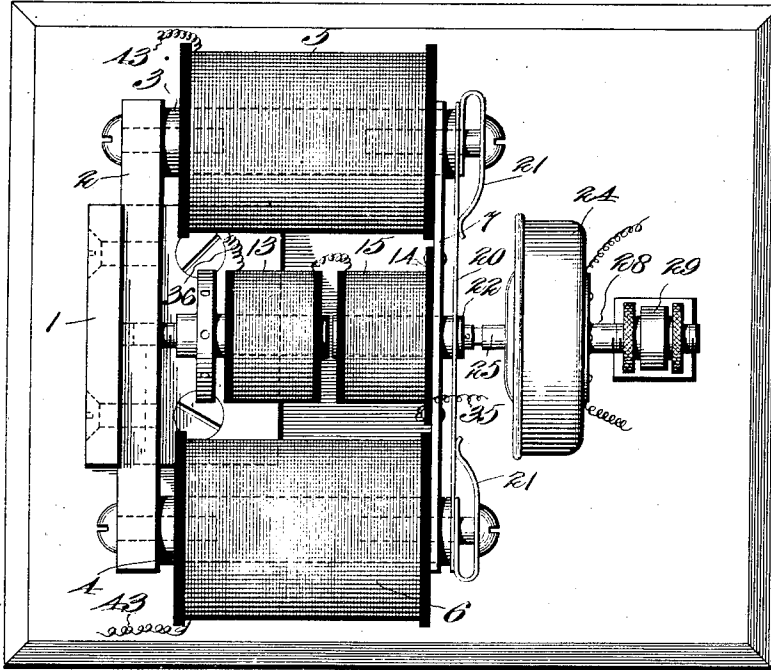
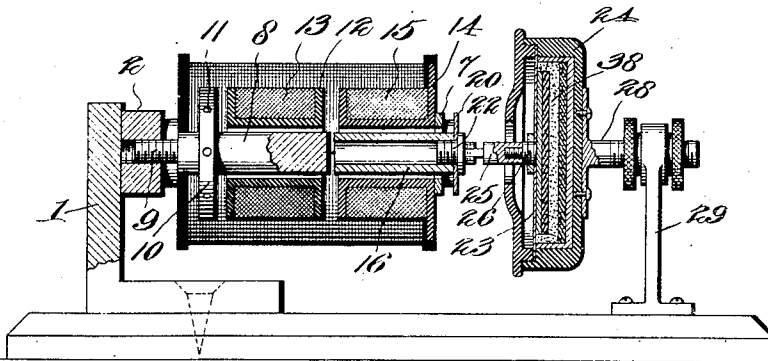


Fig. 2.



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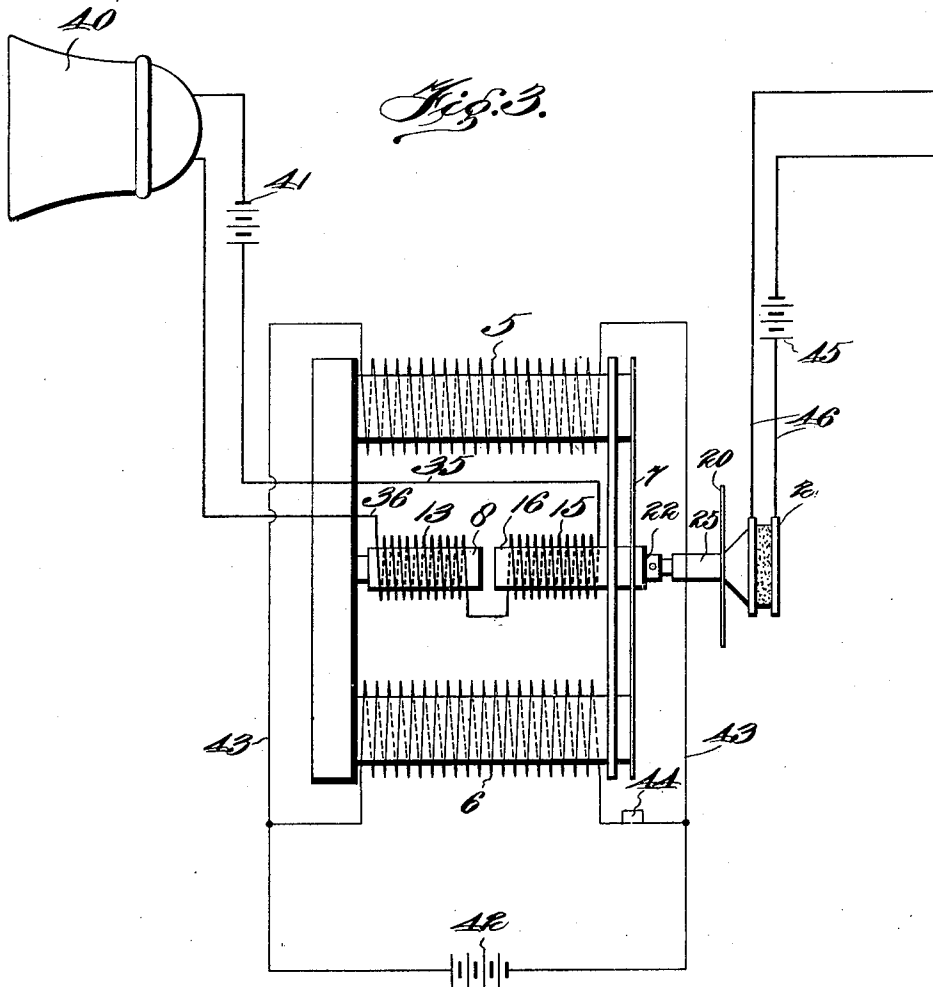
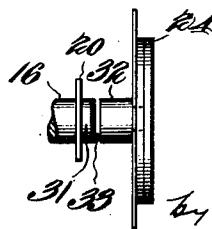


Fig. 4.



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UNITED STATES PATENT OFFICE.

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TELEPHONIC APPARATUS.

1,062,754.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES ADAMS-RANDALL, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Telephonic Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable other skilled in the art to which it appertains to make and use the same.

This invention relates to telephones, and especially to apparatus that is electro-magnetically actuated and adapted for automatically relaying, repeating, or re-transmitting telephone messages.

The invention has for its object to produce such an apparatus that will be simple in construction, comparatively inexpensive to manufacture, and more efficient in action than those heretofore proposed.

With these and other objects in view, the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:—Figure 1 is a plan view of an apparatus made in accordance with my invention; Fig. 2 is a sectional side elevational view of the parts shown in Fig. 1; Fig. 3 is a diagrammatic view illustrating one form of circuits which may be employed in connection with my invention; and, Fig. 4 is a modified form of connection between the transmitter and vibrator.

1 represents any suitable support on which is mounted the yoke piece 2 joining one end of the cores 3 and 4 of the coils 5 and 6 respectively, and 7 represents a non-magnetic strip joining the other end of said cores. Secured to the yoke piece 2 is the core 8, having the screw-threaded pin 9 rigid therewith, and also rigid with said core and pin is the disklike member 10, provided with the holes 11 by which the said core 8 may be readily adjusted to and from the said yoke piece 2. Loosely mounted upon the core 8 is a spool 12 provided with the coil 13, and rigidly mounted upon the strip 7 is the spool 14 provided with the coil 15. Passing through the said spool 14 is the hollow core piece 16, the end of which closely approaches the end of the core 8, as

shown. Said coils 13 and 15 are preferably located between the coils 5 and 6, as shown.

20 represents a vibrator magnetically connecting the cores 3 and 4 and consists of a thin strip-like member of soft iron, or other magnetic material, secured to the said cores, and serving to close the magnetic circuit of the larger electro-magnet, as well as to afford a path for the lines of force passing through the yoke 2, through the said cores 3 and 4, and through the cores 8 and 16 of the smaller electro-magnets. The said vibrator must be firmly held to the cores 3 and 4, by suitable means. As shown, flexible springs 21 are used, the inner flat surface of the springs bearing upon the strip 20 and holding it firmly to the cores by the screws passing into the said cores 3 and 4, while the outer curved ends of the springs are made to bear upon the vibrator with the required pressure through a proper adjustment of the screws; the springs therefore also act as dampeners.

The hollow core 16 is secured to the vibrator 20, as by means of the screw-threaded member 22, and vibrates freely therewith, and the said member 22 is preferably connected with the diaphragm 23 of the transmitter 24 by means of the screw-threaded members 25 and 26. The said transmitter 24 may be suitably supported by means of the member 28 upon any suitable support, such as 29. Instead of thus mechanically connecting the vibrator 20 and the diaphragm 23 of the transmitter, a magnetic connection may be provided, as shown in Fig. 4. That is to say, the magnetic core 16 may be suitably connected with the vibrator 20 as by the magnetic piece 31, and the diaphragm 23 may be provided with a coating magnetic piece 32 leaving the magnetic gap 33 open. Instead of the electro-magnet comprising the coils 5 and 6, cores 3 and 4, and yoke piece 2, of course, a permanent magnet could be substituted.

With the arrangement just described, a very intense magnetic field will be formed between the ends of the cores 8 and 16, and if the terminals 35 and 36 of the coils 13 and 15 are connected with a distant station, the voice-caused currents passing over said coils will produce a comparatively very energetic vibration of the member 20, which in turn will be transmitted to the granules 38 of the transmitter 24. This action is greatly facilitated by having one of the

cores, such as 16, secured to said vibrating strip 20, and the other, such as 8, adjustably secured to the yoke piece 2. Further, by having the coils 13 and 15 loosely surround
 5 their cores, the said cores may move freely within the coils and may be adjusted without turning the coils. Further, the movements of the core 16 encounter no friction at all, because there exists an air space be-
 10 tween the spool 14 and said core.

The above particular mounting of the cores and coils however, is not essential to my invention, because, of course, other arrangements could be provided.

15 When it is desired to adjust the core 8, it is only necessary to insert a small instrument in one of the holes 11 and turn the same, until the desired result is attained.

In Fig. 3, I have illustrated one form of
 20 electric circuits, but it is evident that other forms may be used with equal advantage. In this figure, 40 represents a transmitter which may be either located at a local or a distant station, and 41 the usual source of
 25 current. 42 represents a source of current for the coils 5 and 6 when an electro-magnet is used, 43 lead wires, and 44 a suitable resistance or other box, if desired. 45 represents a source of current for the trans-
 30 mitter 24 and 46 the circuit wires leading to a distant station.

In operation, it is evident that the usual induction coil, not shown, may be used, if desired in the usual manner,
 35 and that voice-caused currents proceeding from the transmitter 40 will vary the magnetic field between the cores 8 and 16, that this variation will cause a change of resistance in the transmitter 24, and thereupon
 40 produce corresponding variations over the circuit 46, or other circuit.

It is obvious that those skilled in the art may vary the arrangement of parts, as well as the details of construction, without de-
 45 parting from the spirit of my invention, and therefore I do not wish to be limited to the above disclosures, except as may be required by the claims.

What I claim is:—

50 1. In a telephonic apparatus the combination of a magnet; a magnetic connection between the poles of said magnet; a non-magnetic connection also carried by said magnet; an electro-magnet having its core joined
 55 to said magnetic connection; and a second electro-magnet mounted on said non-magnetic connection and associated with said first electro-magnet, said electro-magnets

adapted to be connected with a telephonic circuit, substantially as described. 60

2. In a telephonic apparatus the combination of a magnet; a magnetic connection between the poles of said magnet; an electro-magnet having its core joined to said magnetic connection; a second electro-magnet
 65 associated with said first electro-magnet, said electro-magnets adapted to be connected with a telephonic circuit; a transmitter; and means for connecting said transmitter with said first electro-magnet, substantially
 70 as described.

3. In a telephonic apparatus the combination of a magnet; a magnetic connection comprising a vibrating member between the
 75 poles of said magnet; an electro-magnet having its core joined to said magnetic connection; a second electro-magnet associated with said first electro-magnet, said electro-magnets adapted to be connected with a tele-
 80 phonic circuit; and means for adjustably moving the core of said second electro-magnet toward and from said first electro-magnet, substantially as described.

4. In a telephonic apparatus the combination of a magnet; a vibrating member closing
 85 the magnetic circuit of said magnet; an electro-magnet adjustably joined to said magnet; another electro-magnet joined to said vibrating member, the cores of said electro-magnets forming an adjustable gap
 90 between them; a telephonic transmitter; and means connected with said vibrator for varying the resistance of said transmitter, substantially as described.

5. In a telephonic apparatus the combination of a magnet; a vibrating member closing
 95 the magnetic circuit of said magnet; an electro-magnet adjustably joined to said magnet; another electro-magnet joined to said vibrating member, the cores of said electro-magnets forming an adjustable gap be-
 100 tween them; a non-magnetic support for the coil of said last mentioned electro-magnet; a telephonic transmitter; means connected with said vibrator for varying the re-
 105 sistance of said transmitter; and means to support said transmitter in operative relation to said vibrator, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses. 110

CHARLES ADAMS-RANDALL,

Witnesses:

JOSEPHRAIL PERRY,
 I. McD. GARFIELD.