(No Model.)

J. & H. M. GOODMAN.

TELEPHONE TRANSMITTER.

No. 551,275. Patented Dec. 10, 1895.

Fig. 1.

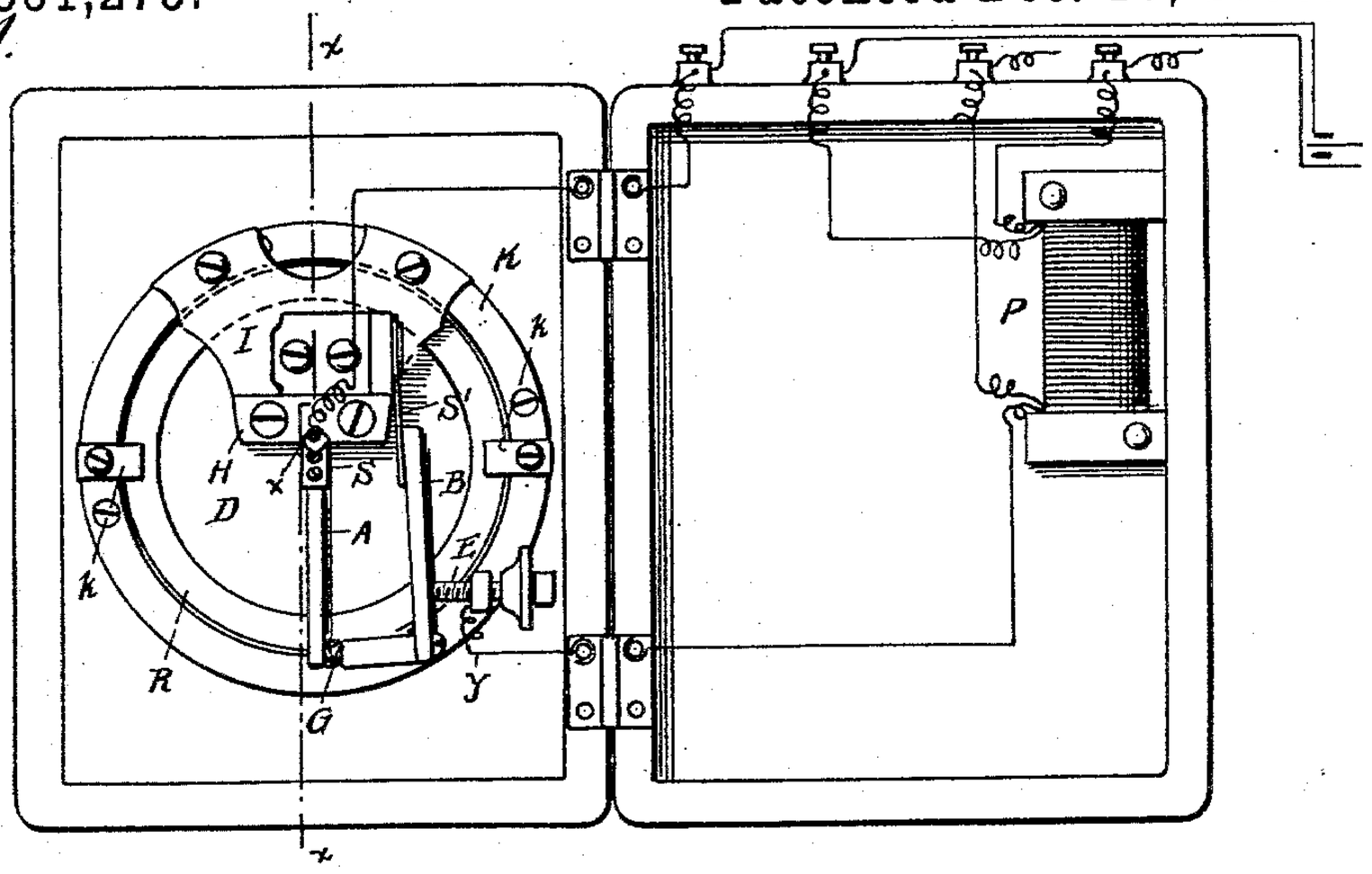


Fig. 2.

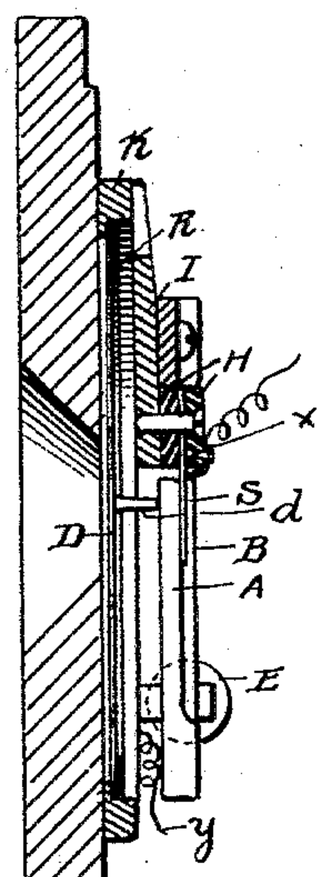


Fig. 3.

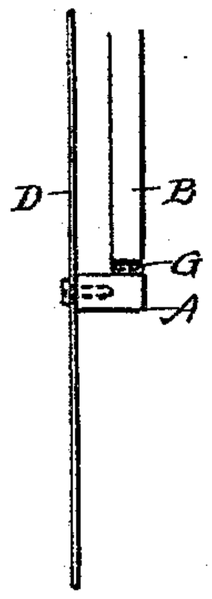


Fig. 4.

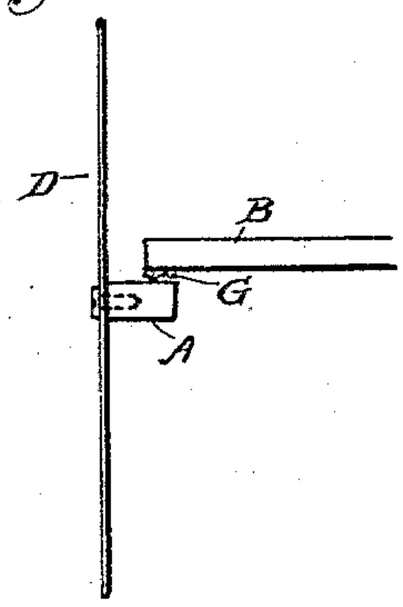


Fig. 5

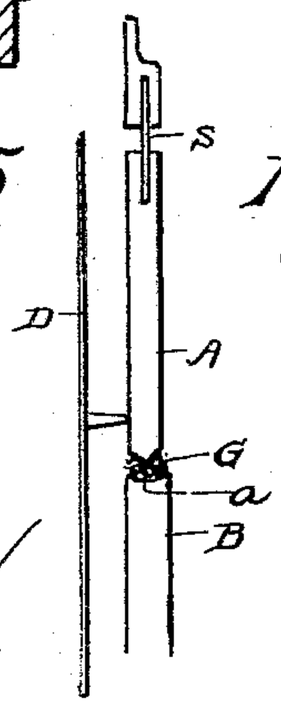


Fig. 6

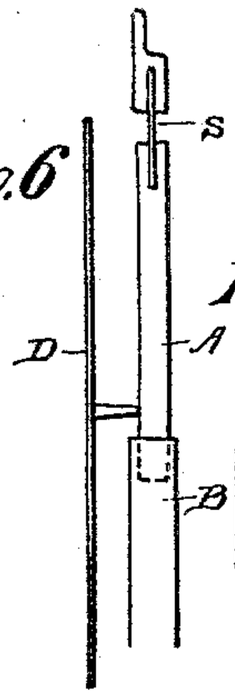
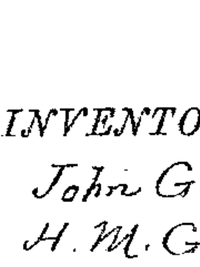


Fig. 7



WITNESSES

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TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 551,275, dated December 10, 1895.

Application filed June 14, 1895. Serial No. 552,836. (No model.)

To all whom it may concern:

Be it known that we, JOHN GOODMAN and HENRY M. GOODMAN, citizens of the United States, and residents of Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Telephone-Transmitters; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is an elevation of telephone instrument with the box open and embodying our invention. Fig. 2 is a section on line *x x*, Fig. 1. Figs. 3, 4, 5 and 6 are views showing different arrangements of the electrodes. Fig. 7 is an edge view of the arrangement shown in Fig. 6.

This invention relates to telephone-transmitters of that class in which magnetic material in a finely-comminuted condition is interposed between a vibratory and a fixed or relatively stationary magnetic electrode; and it consists in the novel construction and combination of parts employed for securing the peculiarity of movement imparted to the vibratory electrode by the diaphragm, as hereinafter described and pointed out in the appended claim.

In all instruments of this character hitherto used which we are aware of the vibratory electrode in its movements approximates and recedes from the fixed electrode more or less directly. During the state of greatest approximation the attraction of the electrodes for each other is stronger than when they are at the point of greatest retrocession. This results in a departure in the movements of the vibratory electrode from a true correspondence with the acoustic impulses which it receives, and impairs the distinctness of the sounds in the receiver.

The present invention consists more particularly in so collocating the two magnets and arranging the mechanism that the approximated pole of the vibratory magnet will move in line or path parallel to the surface of, or uniformly distant from, the pole of the stationary magnet, whereby the two magnets exercise an unvarying action upon each other and maintain a magnetic field of uniform intensity. This not only renders the enunciation remarkably distinct, but it enables us to avail ourselves to the full extent of the advantages of the lever principle described in our Patent No. 525,201, whereby the volume of sound is increased.

We would furthermore call attention to the fact that in this instrument there is no pressure, either mediate or immediate, exercised by the magnetic electrodes upon each other, as they are separated by finely-comminuted magnetic material which is held in gentle suspension by the attraction of the magnets, whereas in all other carbon and like transmitters of which we are aware a certain amount of initial pressure must be established at the outset, no matter whether the electrodes are in direct contact with each other or incased granular conducting material exists between them. This pressure becomes variable when the instrument is in operation, and it implies friction which constitutes an impediment to the free motion of the diaphragm and of the vibratory electrode. In this respect the present instrument has the advantage over all others of a similar class, except those in which the electrodes approach each other in a liquid, or when the vibratory electrode in the shape of a point penetrates a mass of finely-comminuted conducting material unconfined by a case, as in one of our former patents.

Referring to the accompanying drawings, Figs. 3, 4, 5 and 6 represent diagrammatically several methods of collocating the electrodes or magnets so as to obtain the desired movement of the vibratory electrode or magnet. The letter A designates the vibratory magnet, B the fixed or relatively fixed magnet, D the diaphragm, and G the interposed magnetic material.

In Fig. 3 the magnet A is attached to the diaphragm, and the magnet B approaches its lateral surface at right angles.

In Fig. 4 the ends of the two magnets are arranged to overlap, their long axes being parallel.

In Fig. 5 the magnet A is suspended by a spring S and approaches the fixed magnet

B in a straight line, the diaphragm having a point *d* for contact with the magnet A. In this arrangement if the ends of the magnets were transversely plain, there would be a slight approximation and retrocession of their edges. To obviate this the ends of the fixed magnet are usually concaved according to the radius of movement of the vibratory magnet, as indicated at *a*.

In Fig. 6 the vibratory magnet is sustained by a spring S, its long axis being in a direct line with the stationary magnet whose end it overlaps.

In Figs. 1 and 2 I have shown an instrument the parts of which are constructed and arranged on the above described principle. The diaphragm D rests upon a metallic frame K, to which it is secured by clamps *k*, which are secured to the frame and bear upon an insulating-ring R upon the rear marginal portion of the diaphragm. I is a metallic support for the two magnets A and B and which is secured to the frame K. In this case both the magnets are attached to this frame by springs S S′. The spring S of the vibratory magnet A is clamped to the support I between vulcanite sheets H which insulate it. The diaphragm has a central point *d* for contact with this magnet. The relatively fixed magnet is maintained in proper relative position by an adjusting-screw E. G designates the unconfined comminuted magnetic material which is suspended between the poles of the two magnets. In this instrument the arrangement of the two magnets is slightly different from what is shown in the diagrammatic views, the magnets A being arranged to vibrate in a plane at right angles to the diaphragm and parallel with the plane of the end surface of the pole-piece B′ of the magnet B, the two magnets themselves being supported in parallel positions. By means of the screw E the poles of the magnets can be approximated to a greater or less degree with a view to obtaining the proper magnetic field. The current enters at X, passes to the magnet A, thence through the comminuted magnetic material G to the magnet B, which is electrically connected to the frame-work K, and thence outward through the wire *g* to the primary wire of the usual induction-coil P.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

A telephone transmitter consisting essentially of two magnets, the one fixed or relatively so, and the other capable of vibration, said magnets being so collocated and mechanically adjusted that the movable magnet in its vibrations at all times remains equi-distant from the adjacent parts of the stationary magnet, a vibrating diaphragm to which the vibratory magnet is mechanically connected or related, and finely comminuted magnetic material between the two magnets in the magnetic field formed thereby, substantially as specified.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN GOODMAN.
HENRY M. GOODMAN.

Witnesses:
JOSEPH SHORT,
ED. MEGLEMRY, Jr.