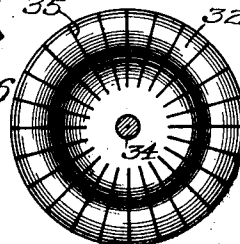
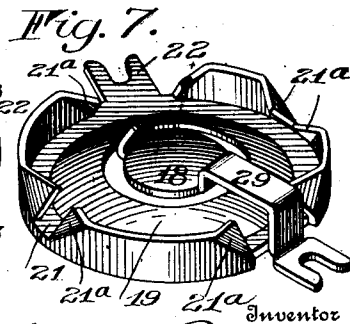
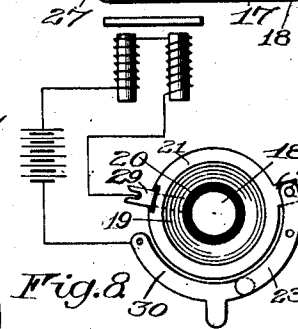
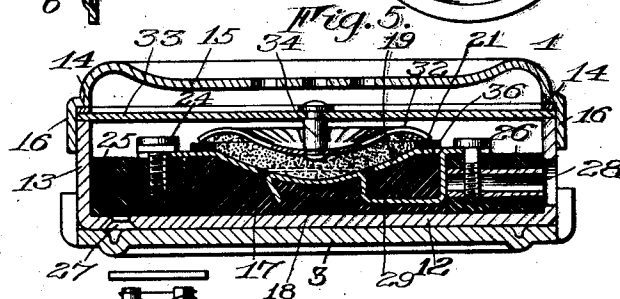
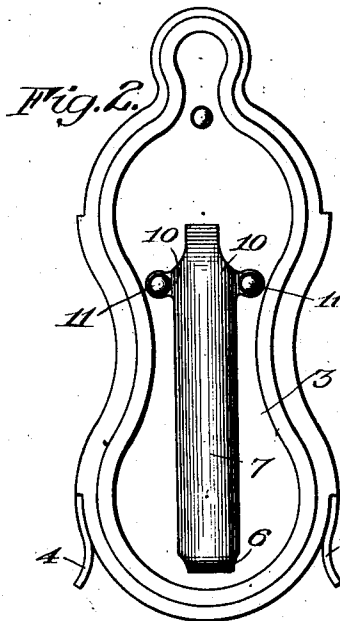
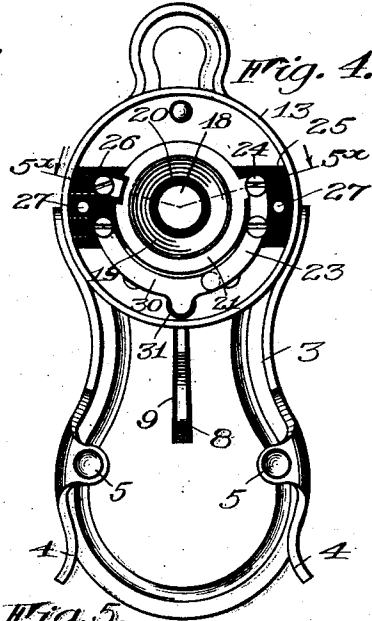
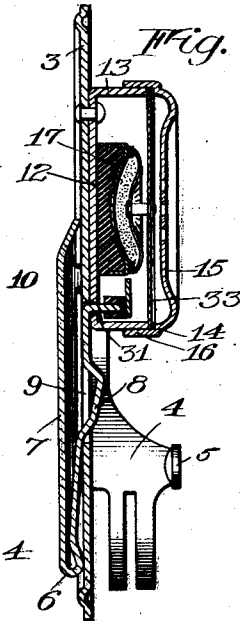
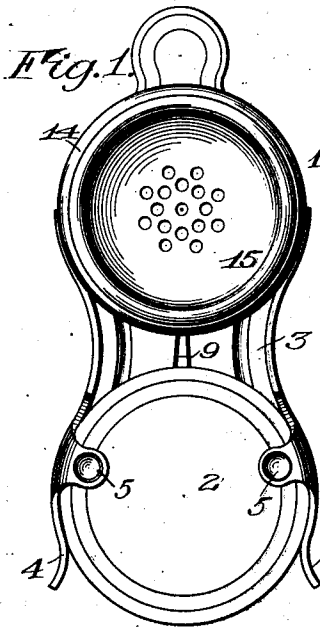


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TELEPHONE APPARATUS.
APPLICATION FILED MAY 8, 1908.

974,110.

Patented Nov. 1, 1910.



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UNITED STATES PATENT OFFICE.

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TELEPHONE APPARATUS.

974,110.

Specification of Letters Patent.

Patented Nov. 1, 1910.

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To all whom it may concern:

Be it known that I, GARRISON BABCOCK, of Rochester, in the county of Monroe and State of New York, have invented certain
5 new and useful Improvements in Transmitters; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this
10 specification, and to the reference-numerals marked thereon.

My present invention relates to improvements in telephone apparatus and it has for its primary object to provide a transmitter
15 which is capable of being made diminutive in size and comprises an arrangement of parts whereby the slightest vibrations of the diaphragm will cause corresponding undulations of current in a telephone circuit, thus
20 permitting speech or other sounds transmitted by it to be accurately and distinctly reproduced in a telephone receiver employed therewith.

My invention further provides a suitable
25 holder adapted to form a handle by means of which the transmitter may be supported which is also adapted to contain the receiver when not in use and comprises a circuit controller operated by the insertion of the receiver to cut the transmitter out of the battery circuit.

To these and other ends the invention consists in certain improvements and combinations of parts all as will be hereinafter more
35 fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings: Figure 1 is a front view of a telephone set constructed in accordance
40 with my present invention, the conductors between the transmitter and receiver being omitted. Fig. 2 is a rear view thereof. Fig. 3 represents a central vertical section of the device shown in Fig. 1, the receiver being
45 omitted. Fig. 4 is a front view of the device, the cover of the transmitter and diaphragm being removed. Fig. 5 represents an enlarged section on the line 5*-5* of Fig. 4. Fig. 6 is a detail view of the front electrodes, and Fig. 7 is a detail view of the back electrodes. Fig. 8 is a diagram of the telephone
50 circuit.

The devices illustrating the present embodiment of the invention relate to the general type of apparatus shown in my prior
55 Patent No. 837,534, dated December 4th, 1906; that is to say, the set comprising the improved transmitter and a receiver, is especially adapted to be carried on the person and to be used by those having defective
60 hearing, the apparatus serving to so amplify the sound waves caused by speech that it may be easily and distinctly heard by the aid of the apparatus, although it will be understood, of course, that the apparatus
65 may be used as an ordinary telephone.

The accompanying drawings show one embodiment of the invention wherein—

1 designates the transmitter, and 2 the receiver, both being in the present instance, annular in form and otherwise compact in
70 order to adapt the apparatus to portable purposes, the receiver being adapted to be applied, when not in use, to a suitable holder 3. The latter in its present form is composed of a sheet of material having a portion
75 at each end adapted to receive the transmitter and receiver, the former being preferably secured permanently to the holder, the receiver being detachable, to enable the
80 latter to be applied to the ear of the hearer, while the speaker holds the transmitter. In order to permit the receiver to be easily detached and applied to the holder and when
85 in the latter position firmly retained thereon, resilient arms 4 are struck up at each side of the holder to engage opposite sides of the receiver and other arms 5 project inwardly therefrom to retain the receiver in
90 engagement therewith. On the rear of the holder is secured a switch-controlling member, embodying in the present instance, a spring arm 6, formed by doubling over the narrowed end of a plate 7, which latter is
95 concaved slightly to stiffen it longitudinally and as the concave face is placed against the holder and underlies the spring arm 6 space is provided to receive the latter when it is moved outwardly by the engagement of the
100 receiver 2 with the offset portion 8 of the arm which is adapted to project through the aperture 9 in the holder. The plate 7 is provided at each side of one end with ears 10 through which the securing devices or

rivets 11 may be passed, said devices also serving as the means for securing the transmitter to the holder.

The transmitter comprises a cup-shaped casing having a bottom 12 and annular side walls 13 on which is supported a disk diaphragm 33 of mica or other suitable material which is retained by the rim 14 on the perforated cap 15 which is preferably composed of sheet metal and is provided with a flange 16 adapted to tightly engage the periphery of the wall of the cup. Located centrally within the latter is a cylindrical support 17 of insulating material on which are mounted the metallic plates comprising a disk 18 and a surrounding ring 19 separated therefrom to form an insulating space or gap between the two plates indicated. In the present instance both plates are concave and arranged with their concave faces outermost. The ring 19 is provided with an outer edge 21 overlying the edge of the support 17 and provided with an outwardly extending ear 22 to which may be secured the end of a contact spring 23 by a screw 24 which also serves to secure the support to an insulating block 25. The latter coöperates with the block 26 to center the support 17 and both blocks being permanently secured to the casing by rivets 27 the support may be readily detached and applied. The mounting of the support 17 in the manner described, provides a simple means for securing it within the casing without attaching it directly thereto, and as the blocks 25 and 26 are provided on their proximate ends with curved faces which engage considerable portions of the periphery of the support, the latter is prevented from lateral movement in any direction. The support 17 is preferably constructed of insulating material molded into the cylindrical form shown while in a plastic condition, which enables the conductor 29 to be embedded therein to secure the disk 18 and the flange points 21^a on the ring 19 to be also embedded to secure the parts of these two electrode plates permanently in fixed relationship.

The block 26 is provided with two sleeves, one of which is shown in Fig. 5, and indicated by 28, which are adapted to receive the terminals or plugs on the circuit conductors, as will be understood. One of the sleeves 28 is connected directly to the center electrode plate 18 by a conductor 29 and in electrical connection with the other sleeve is a spring contact arm 30 which is adapted to engage the end of the spring 23 and to be normally pressed into contact therewith by the forwardly projecting end 31 on the spring 6 which extends through an aperture in the bottom of the casing, as shown in Fig. 3.

Coöperating with the back electrode is another electrode 32 carried on the diaphragm 33

and secured thereto by a central post 34. The member 32 may be made of any suitable material, although it is preferably composed of sheet metal and constitutes a front electrode. This plate is provided with a convex central portion fitting concentrically within the back electrode and having a reversely curved rim which extends into proximity with the rim 21 of the back electrode ring 19. The front electrode is further provided with a plurality of radial slits 35 which add to its flexibility and permit the center of the electrode to move freely without exerting a tendency to check the vibrations of the diaphragm. The electrode being connected only to the center of the diaphragm receives all the vibratory motions thereof and permits the latter to be made comparatively small in diameter without impairing its effectiveness. The flexibility or elasticity of the member 32 may be obtained by means other than the slitting of its edges.

The forward and back electrodes are separated a short distance to provide the space or receptacle usually filled with carbon granules forming the current medium. The curve given the outer edge of the electrode 32 is just sufficient to close the space between it and the ring plate 19 and in some instances it may rest thereon, as in a low tension transmitter, but in high tension instruments a washer 36 of insulating material will be interposed between these parts, as shown.

The efficiency of all transmitters is impaired by the packing of the current modifying medium or carbon granules and in many instances the successful operation of the instrument is restricted by the position in which it is held when in use. However, by curving the electrodes in the manner described, both of the aforementioned objections are obviated as both electrodes will always engage the carbon filling or medium between them in whatever position the instrument is supported. Moreover, by forming one electrode in two parts and making these parts the circuit terminals with adjacent insulated edges, a comparatively large contact area is afforded, permitting the transmission of current undulations of slight variations.

A telephone transmitter constructed in accordance with my present invention is comparatively simple in construction, enabling it to be made at a small cost, and the construction and arrangement of its parts are such that the reproductions of sound are clear and of ample strength, while the battery strength required is relatively small, especially adapting the instrument to portable purposes, although it will be understood that the invention is not so limited. Moreover, the automatic devices for placing the apparatus in-speaking condition by the ma-

nipulation of the receiver, and through the same agency, opening the battery circuit serves to economize the battery energy, and furthermore, enables the apparatus to be used successfully by those having little if any knowledge of devices of this kind, and the compact construction and arrangement of the parts especially adapts the device to the needs of those having impaired hearing.

10 I claim as my invention:

1. In a telephone transmitter, the combination with a casing and a vibratory diaphragm, of a rigid electrode member secured to one of the parts, a flexible electrode member disposed in front of the rigid member, a post connecting said flexible electrode to the other part of the transmitter and a current modifying medium situated between the electrode members.

20 2. In a telephone transmitter, the combination with a casing and a vibratory diaphragm, of a pair of electrodes rigidly supported at one side of the plane of the diaphragm and adapted to be covered by a suitable current modifying medium, an insulated electrode member supported on the diaphragm which is capable of flexing independent of the movement of said diaphragm for producing varying pressures on said current modifying medium.

30 3. In a telephone transmitter, the combination with a support and a vibratory diaphragm located in juxtaposition thereto, of a pair of electrode members one of which is rigid and is mounted on the support, the other member possessing the capability of yielding and being so attached to the diaphragm that it may yield during the vibratory movements of the diaphragm and a current modifying medium located between said electrodes.

40 4. In a telephone transmitter, the combination with a casing having an insulated support therein and a pair of electrode members spaced apart and mounted on said support at one side of the diaphragm, of a plate secured to one side of the latter and having an edge extending away from the diaphragm into proximity with the support and forming a receptacle in conjunction with the support and a current modifying medium located in the receptacle.

5. In a telephone transmitter, the combination with a cup shaped casing having a rim, an insulated support therein and separate electrode plates arranged on the support, of a diaphragm supported on the rim of casing, an electrode member lying between the diaphragm and support and having a flanged edge extending into proximity with said support and forming a receptacle in conjunction therewith, a post connecting the member and diaphragm and a current modifying medium located in the receptacle.

65 6. In a transmitter, the combination with

a casing and an electrode member composed of two separate plates having outer concave faces, of a diaphragm, a member supported thereon in front of the plates having its opposing face convex and a current modifying medium arranged between and cooperating with said plates and member.

7. In a transmitter, the combination with a casing and an electrode member arranged therein composed of two separate concave plates, of a cooperating convex member having its convex face arranged concentric to the concave face of said electrode member, a diaphragm, a post arranged centrally on the convex member and connecting it to the diaphragm and a current modifying medium arranged between the members.

8. In a transmitter, the combination with a casing and an electrode member arranged therein composed of two separate concave plates, of a cooperating convex member separated therefrom but arranged concentrically thereto having an elastic edge extending into proximity with said electrode member, a diaphragm connected to the convex member and a current modifying medium arranged between the members.

9. In a transmitter, the combination with a casing and an electrode member arranged therein composed of two separate concave plates, one a disk and the other a ring surrounding it, of a convex member arranged concentrically to said electrode member, a diaphragm connected thereto and a current modifying medium arranged between the members.

10. In a transmitter, the combination with a casing and an electrode member comprising a metallic disk and a metallic ring surrounding it and separated therefrom, said parts being concave, of a convex member arranged concentric to the electrode member and separated therefrom, said convex member being provided with an edge extending into proximity with the electrode and provided with a plurality of slits, a diaphragm connected to the convex member and a current modifying medium arranged between the members.

11. In a transmitter, the combination with a casing, an electrode support arranged therein, blocks secured within the casing and engaging opposite sides of the support and an electrode plate on the latter having an ear secured to one of the blocks, of a member cooperating with the electrode, a current modifying medium between the plate and member and a diaphragm connected to the latter.

12. In a transmitter, the combination with a casing, a cylindrical electrode support arranged therein, blocks secured within the casing at opposite sides thereof having their proximate faces curved to fit the support, and a back electrode plate mounted on the

support having an ear secured to one of the blocks, of a front electrode, cooperating with said plate, a current modifying medium between the electrodes and a diaphragm connected to the front electrode.

13. In a transmitter, the combination with a casing, a removable insulating support arranged therein and blocks secured within the casing and centering the support therein, of separated electrode plates, one of which is adapted to be connected directly to one side of a telephone circuit, cooperating

contact springs attached to each block and adapted to be arranged in the other side of said circuit, one of said springs being connected to the other electrode plate, a diaphragm, a member thereon placed in opposition to the electrode plates and a current modifying medium located between the member and plates.

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