No. 751,344. PATENTED FEB. 2, 1904.

L. SANDS & C. C. CADDEN.

TELEPHONE RECEIVER.

APPLICATION FILED MAR. 6, 1903.

NO MODEL.

Fig. 1.

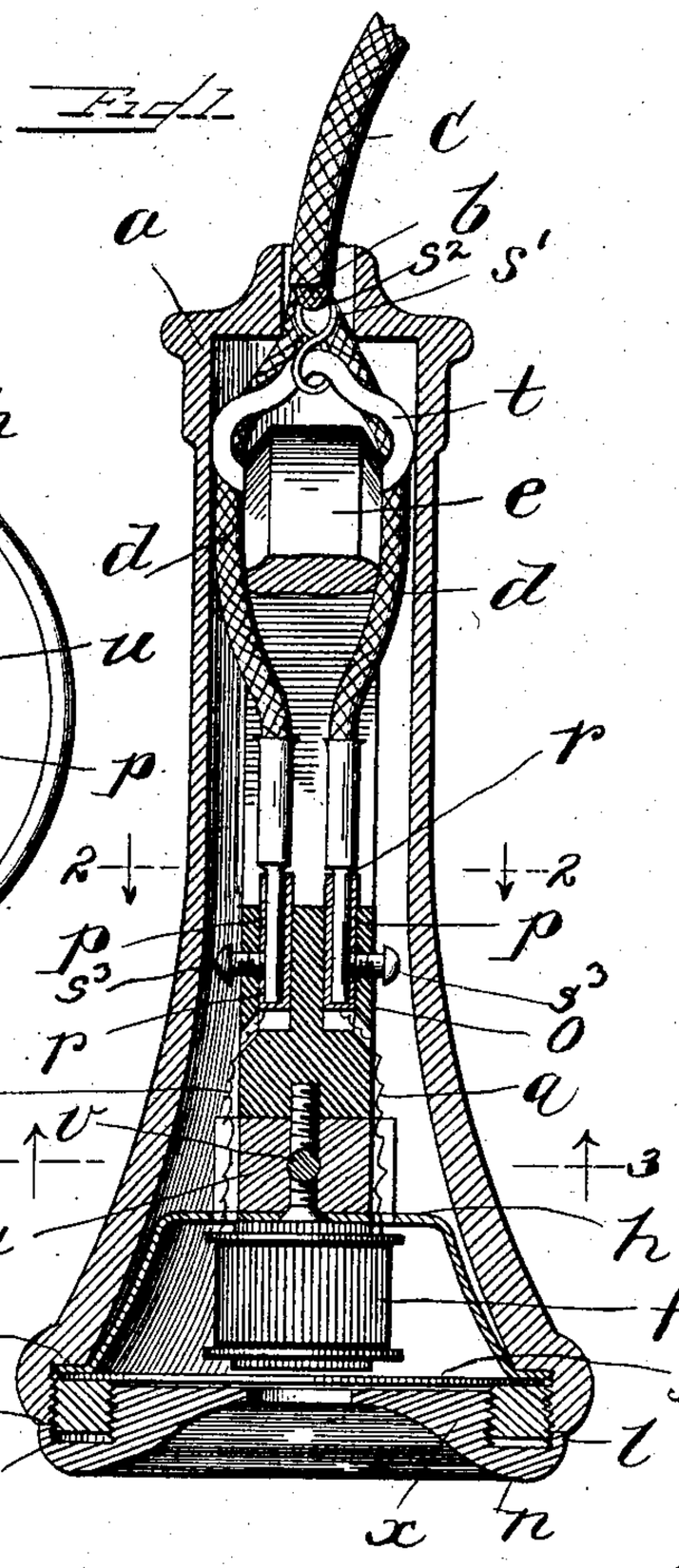


Fig. 2.

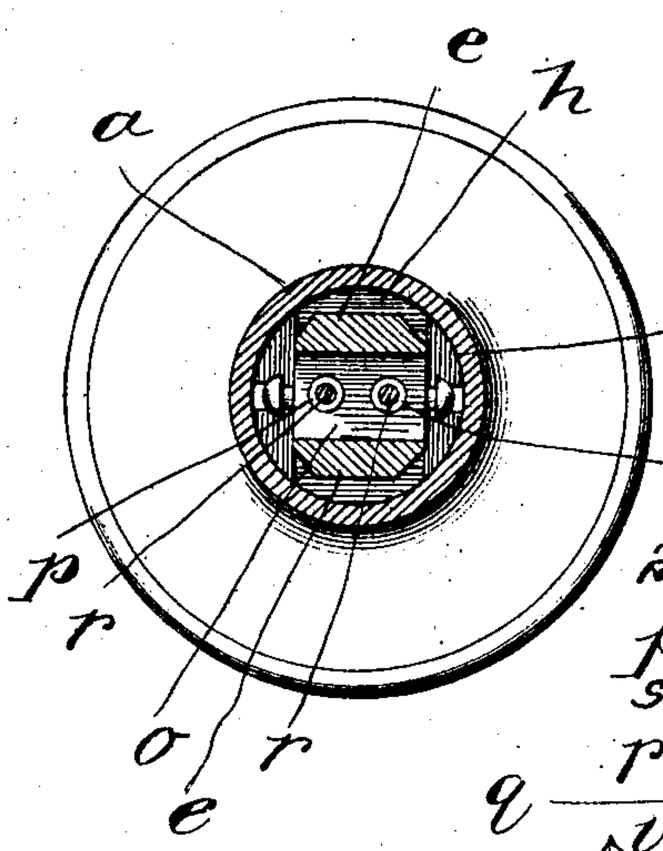


Fig. 4.

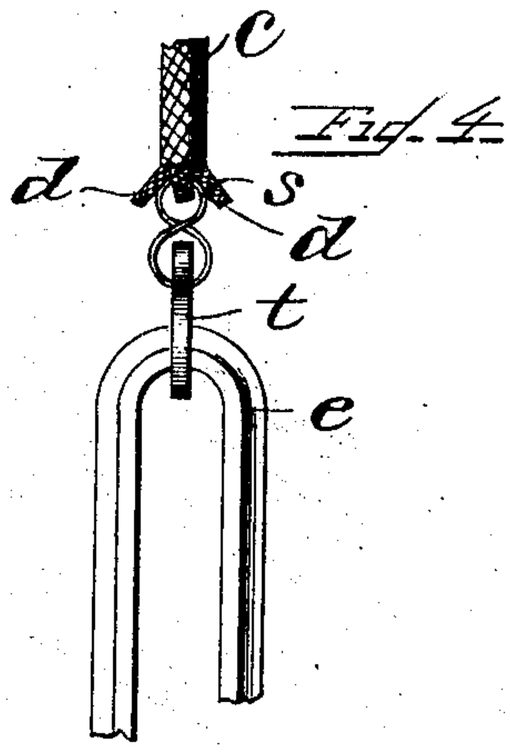


Fig. 5.

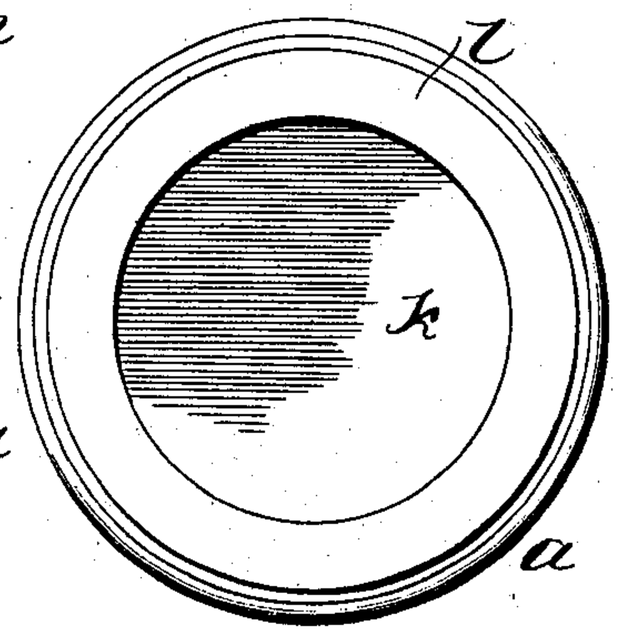
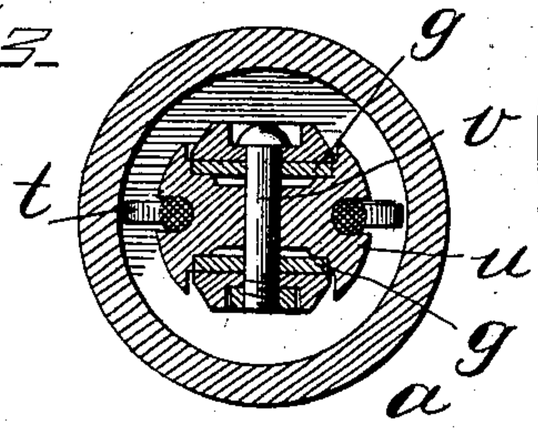


Fig. 3.



Witnesses.

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No. 751,344. Patented February 2, 1904.

UNITED STATES PATENT OFFICE.

LEWIS SANDS AND CHARLES C. CADDEN, OF CLEVELAND, OHIO, ASSIGNORS TO WILLIAMS-ABBOTT ELECTRIC COMPANY, OF CLEVELAND, OHIO.

TELEPHONE-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 751,344, dated February 2, 1904.

Application filed March 6, 1903. Serial No. 146,586. (No model.)

To all whom it may concern:

Be it known that we, LEWIS SANDS and CHARLES C. CADDEN, citizens of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Telephone-Receivers, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to telephone-receivers, and has for its object the provision of a simplified construction thereof, improved means for securing the diaphragm and earpiece in position, improved means for securing the attachment of the line conductors to the terminals of the electromagnet of the receiver, and the provision of improved means whereby the terminals of the line conductors are relieved of any strain that might be occasioned by handling the receiver-cord.

One embodiment of our invention relates particularly to that class of telephone-receivers into the interior of which the receiver-cord is led, which receiver-cord has connections with the terminals of the receiver's electromagnet upon the interior of the receiver-casing. Hitherto in instruments of this type the terminals of the receiver-cord would be subject to any strain that would be occasioned in suspending the receiver by its cord. Our invention in this respect resides in providing the attachment between the cord and a portion of the contents within the receiver-casing rather than with the receiver-casing directly, as hitherto. The latter construction is not at all adapted to receivers of the class specified unless metal parts are provided upon the exterior thereof, which is objectionable. In other words, this feature of the invention consists in forming a mechanical attachment between the receiver-cord and the receiver proper rather than between the telephone-cord and the casing for the receiver proper. The portion of the receiver proper with which such mechanical connection is effected is preferably the permanent magnet, and the attachment preferably comprises a ring or loop through which the permanent magnet is passed and a connection, preferably a reversed loop, through which the ring is passed and which is preferably sewed to the serving of the cord and desirably to the serving that embraces the individual branches of the cord. The advantage of this construction is that most of the parts of the receiver may be assembled and the cord secured in place and electrically connected before the casing of the receiver is put into position.

A second feature of our invention also relates to the type of receivers wherein the terminal connections are provided upon the interior of the receiver-casing and comprises a supporting-block provided with apertures in which are permanently mounted terminals of the receiver's electromagnet in combination with the tag ends of the receiver-cord, that are adapted to be slipped into these recesses to have electrical connections with the said terminals, screws being desirably employed for forcing tight engagement between the said terminals and the tags. These terminals within the said recesses are desirably in the form of sleeves or tubes, into the interior of which the correspondingly-shaped tag ends of the receiver-cord are adapted to be inserted, apertures transverse to the said sleeves being provided in the support thereof and in the sleeves, so that the binding-screws may be forced into the interior of the sleeves to engage the tag ends to effect the desired intimacy of contact, other apertures being provided in the support for the said sleeve-terminals, through which wires from the electromagnet are passed, these wires being soldered or otherwise electrically united with the said sleeves.

Another feature of our invention is adaptable for use in connection with receivers of various types and is designed to furnish a substantially fixed adjustment between the receiver's diaphragm and the poles of the receiver's electromagnet without the appearance of metal adjusting parts upon the exterior of the casing to any material extent. As is well known, a receiver-casing usually

comprises a rubber casing formed in two parts, the body portion and the ear-cap in threaded engagement therewith. In a device of our invention threaded engagement of the ear-cap with the body portion of the casing is avoided by having this ear-cap placed in threaded engagement with a follower-ring employed to clamp the diaphragm in place. The follower-ring is preferably threaded upon its interior and exterior peripheries, it having threaded engagement at its exterior with the body of the receiver-casing and threaded engagement at its interior with the ear-cap. The ear-cap is preferably so shaped that it will engage the body of the receiver-casing at the periphery of the ear-cap, the contour of the cap and the casing-body being preferably such as to make the cap and body appear as of integral formation.

The features of our invention are improvements upon the receiver disclosed in the application of Charles C. Cadden, Serial No. 59,497, filed May 9, 1901.

We will explain our invention more fully by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a receiver constructed in accordance with our invention, parts being shown in elevation to indicate clearly features of construction. Fig. 2 is a sectional plan view on line 2 2 of Fig. 1. Fig. 3 is a cross-sectional view on line 3 3 of Fig. 1. Fig. 4 is a side elevation showing a portion of the receiver's permanent magnet and the mechanical attachment between the same and the serving of the receiver's cord. Fig. 5 is an end view of the receiver with the earpiece removed.

Like parts are indicated by similar characters of reference throughout the different figures.

The body portion *a* of the receiver-casing has an aperture *b* centrally disposed at its upper end for the reception of the receiver-cord *c*, the cord having two branches *d d* provided with individual servings and separated within the casing and mechanically united under a common serving, as shown, on the exterior of the receiver-casing. The receiver proper comprises a permanent magnet *e*, an electromagnet *f*, and attached by its cores *g g* to the permanent magnet, a cup *h* providing a seat *i* for the diaphragm *k*, the clamping or follower ring *l* and the base portion *m* of the body *a* serving as means for mechanically uniting the said diaphragm and ring. The balance of the receiver-casing and the earpiece *n* do not constitute portions of the receiver proper, but a casing or shell therefor.

Our invention in some of its aspects relates to the construction of the receiver proper in combination with the casing therefor and means for effecting connection with the telephone-cord without placing any dependence mechanically upon the casing. To this end the magnet *e*, which is desirably of horseshoe shape, has united therewith a supporting-block *o*, made desirably of rubber or other insulating material, which is provided with recesses extending longitudinally thereof, in which recesses are disposed terminals *p p*, desirably in the form of sleeves, and which constitute the permanent terminals of the electromagnet *f*, whose terminal conductors *q q* are soldered or otherwise permanently secured to the said sleeves. The cords *d d* are provided with metal tags *r r*, that slip within the sleeves and are secured thereto by means of clamping-screws s^3, which desirably have their engagement not only with the supporting-block *o*, but also with transverse apertures provided in the sleeves. By the construction shown the main elements of the receiver may be completely assembled before the receiver-casing is supplied.

In order that the connections of the cords *d d* with the terminals of the electromagnet *f* may not be impaired by any strain imposed upon the exterior portion of the cord, an attachment is afforded between the receiver proper and the servings of the cord, which attachment desirably comprises a ring *t*, through which the permanent magnet is loosely passed, and a double loop *s'*, through which the ring is passed, and which is sewed to the serving of the cord at s^2. The branches *d d* of the cord are made sufficiently long so that when the mechanical connection between the cord and the permanent magnet is made taut there will be no strain upon the said branches. Referring now to the lower portion of the structure, the cup *h* and the permanent magnet are united by a block *u*, the fastening-bolt *v* passing through the said block, the limbs of the permanent magnet, and the cores *g*, the conductors *q* passing through apertures provided in the cup *h* into permanent connections with the terminals *p*. The block *o* is desirably secured in place by screw connections *w* with the block *u*, as indicated in Fig. 1. The clamping-ring *l* is threaded upon its interior and exterior, the earpiece *n* having an interior shoulder *x* engaging the interior of the ring and having an annular flange *y*, which desirably projects beyond the ring *l* into direct engagement with the body *a*. The ring *l* thus performs the double function of securing the diaphragm in place and of constituting the support for the earpiece, which may thus be made to appear as an integral part with the body *a*, if desired.

It is obvious that many changes may be made in the precise form of the invention illustrated without departing from the spirit of the invention, and we do not, therefore, wish to be limited to the precise construction set forth.

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

1. In a telephone-receiver, the combination with the casing thereof, of a cord therefor passing freely through the casing, a support of insulating material carried by the receiver within the casing, the said support having apertures, terminals within the said apertures, the said support having a second set of apertures through which terminal wires of the receiver's electromagnet are passed into permanent connection with the terminals within the first aforesaid apertures, the receiver's cord being provided with end tags adapted for insertion within the said apertures and electrical connection with the terminals therein, and binding-screws passing through the supporting-block into engagement with the end tags of the cord, substantially as described.

2. In a telephone-receiver, the combination with the casing thereof, of a cord therefor passing freely through the casing, a support of insulating material carried by the receiver within the casing, the said support having apertures, of terminal sleeves within the said apertures, the said support having a second set of apertures through which terminal wires of the receiver's electromagnet are passed into permanent connection with the terminals within the first-aforesaid apertures, the receiver's cord being provided with end tags adapted for insertion within the said apertures and electrical connection with the terminals therein, and binding-screws passing through apertures in the supporting insulating material and the said sleeves into engagement with the end tags of the cord, substantially as described.

3. In a telephone-receiver, the combination with the casing thereof, of a follower-ring for clamping the receiver's diaphragm upon its seat, the said ring being threaded upon its interior and exterior and having threaded engagement at its exterior with the casing of the receiver, an earpiece having threaded engagement with the interior of the follower-ring, said earpiece having an outwardly-extending flange covering the ring and adapted to engage the receiver's casing and a cup *h* supporting at its bottom the magnet of the receiver and carrying the seat *i* for the diaphragm, said cup and diaphragm being both held upon the casing of the receiver, substantially as described.

4. In a telephone-receiver, the combination with the casing thereof, of a cord therefor passing freely through the casing, a support of insulating material carried by the receiver within the casing, the said support having apertures, terminals within the said apertures, the said support having a second set of apertures through which terminal wires of the receiver's electromagnet are passed into connection with the terminals within the first-aforesaid apertures, the receiver's cord being provided with end tags adapted for insertion within the said apertures and electrical connection with the terminals therein, and binding-screws passing through the supporting-block into engagement with the end tags of the cord, substantially as described.

5. In a telephone-receiver, the combination with the casing thereof, of a cord therefor passing freely through the casing, a support of insulating material carried by the receiver within the casing, the said support having apertures, of terminal sleeves within said apertures, the said support having a second set of apertures through which terminal wires of the receiver's electromagnet are passed into connection with the terminals within the first-aforesaid apertures, the receiver's cord being provided with end tags adapted for insertion within the said apertures and electrical connection with the terminals therein, and binding-screws passing through apertures in the supporting insulating material and the said sleeves into engagement with the end tags of the cord, substantially as described.

6. In a telephone-receiver, the combination with the casing thereof inclosing a receiver, of a receiver-cord extending freely through the receiver-casing and attached within the casing to the terminals of the receiver's electromagnet, a ring through which the permanent magnet of the receiver is passed, and a loop through which the ring is passed, the said loop being attached to the cord to relieve the terminals of the cord within the casing of strain, substantially as described.

In witness whereof we hereunto subscribe our names this 19th day of February, A. D. 1903.

LEWIS SANDS.
CHARLES C. CADDEN.

Witnesses:
F. H. LINCOLN,
E. G. GAYLORD.