(No Model.) 2 Sheets—Sheet 1.

G. W. LORD.

ACOUSTIC TELEPHONE.

No. 346,594. Patented Aug. 3, 1886.

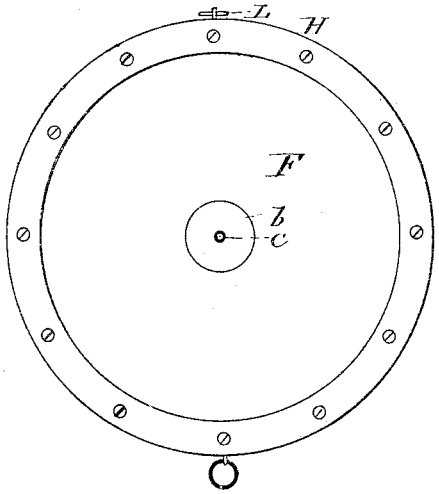


Fig. 1.

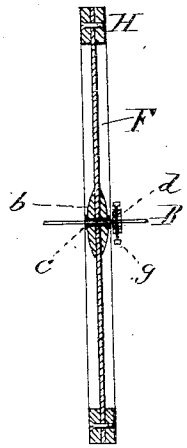


Fig. 2.

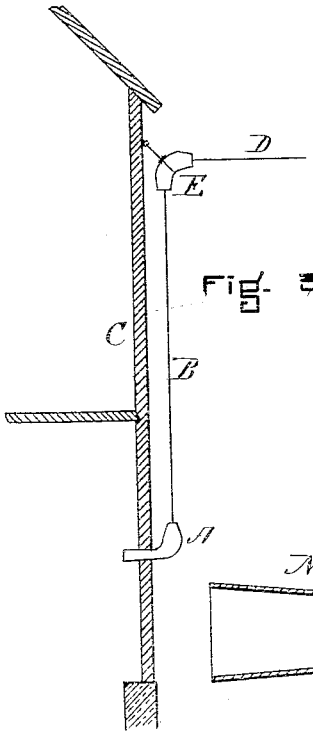


Fig. 3.

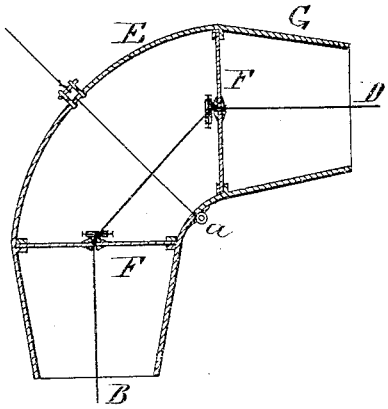


Fig. 5.

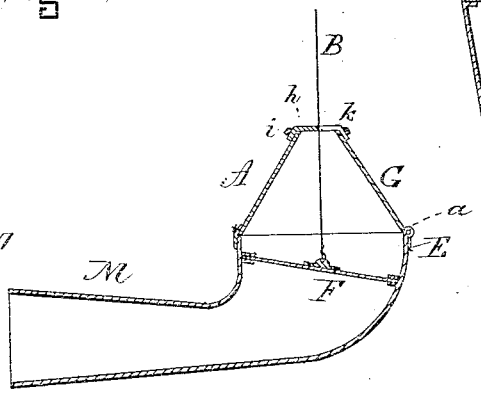


Fig. 4.

WITNESSES.

Edward A. Freeman

Frank A. MacKenzie

INVENTOR.

George W. Lord

by his attorney

Alex. L. Hayes

(No Model.) 2 Sheets—Sheet 2.

G. W. LORD.

ACOUSTIC TELEPHONE.

No. 346,594. Patented Aug. 3, 1886.

Fig. 6.

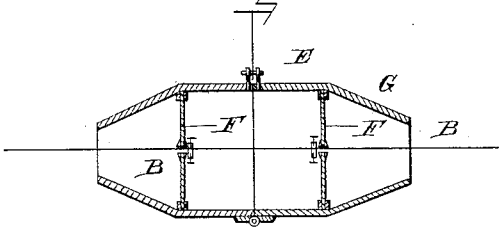


Fig. 7.

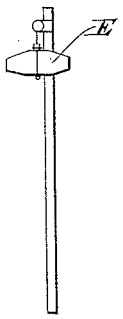
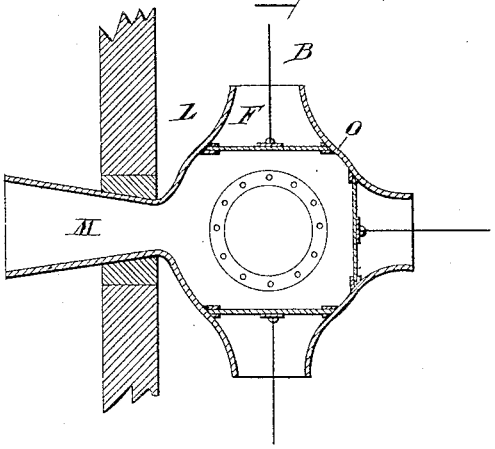


Fig. 8.



Witnesses:
Howard L. Schmidt.
W. R. Haight.

Inventor:
George W. Lord,
by W. H. Babcock
Attorney

UNITED STATES PATENT OFFICE.

GEORGE W. LORD, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO HENRY E. TOWNSEND, OF SAME PLACE.

ACOUSTIC TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 346,594, dated August 3, 1886.

Application filed July 23, 1885. Serial No. 172,466. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. LORD, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Acoustic-Telephone Systems, of which the following is a specification, reference being had to the accompanying drawings.

In the use of acoustic telephones as heretofore constructed it has been found that any angles or turns in the conducting-wire seriously interfere with the transmission of sound, and therefore that these telephones can only be successfully operated when the line is straight or nearly straight. It is almost impossible to attain these straight lines in cities and towns, and consequently in these places, where acoustic telephones would be exceedingly useful for the transmission of articulate speech for short distances, their use has not been as extensive as would have been the case had it been possible to operate on lines having turns and angles.

The object of my invention is to enable articulate speech to be successfully transmitted on an acoustic-telephone line, no matter how many turns and angles such a line may have, and also to increase the distance to which articulate speech can be transmitted by this system of telephony.

The invention consists, principally, in novel devices for supporting the conducting-wire of a telephone at points where it is necessary to make a bend or turn on said wire, and such means are fully hereinafter described; but it also consists in various details of construction and arrangement, which need not be specifically referred to here, but are afterward fully described, as well as set forth in the claims.

In the accompanying drawings, Figure 1 is a front view of the diaphragm used for supporting the conducting-wire. Fig. 2 is a sectional view of the same. Fig. 3 is a diagram showing the manner of connecting the line to the wall of a building and the manner of supporting it at a turn or angle. Fig. 4 is a sectional view of the mouth-piece and diaphragm. Fig. 5 is a sectional view of the device for supporting the line at an angle. Fig. 6 is a sectional view of the device for supporting a straight line. Fig. 7 is a diagram showing a line so supported. Fig. 8 is a sectional view of the device for connecting several lines to a common mouth-piece.

In these several figures the same letters refer to the same parts.

In Fig. 3 is represented an acoustic-telephone line, showing the telephone A attached to the outside of a building and provided with a mouth-piece, which extends into the interior of the building C, and the line B extending vertically along the wall of the building to such a height that it can be extended conveniently in any direction horizontally. At the angle formed in the line at this point a device is used which is represented more fully in Fig. 5, and which I prefer to make use of for supporting the line at any angle. It consists of a curved case, E, constructed preferably of metal, and provided at each end with a diaphragm, F, which diaphragms are placed at such an angle to one another as may be required by the angle made by the line. These diaphragms are constructed as will be more fully described hereinafter, and as shown in Figs. 1 and 2, and through these diaphragms the conducting-wire passes. The case E is attached to the building in any suitable manner, preferably by a cord. For the purpose of conveniently getting at the diaphragms the case is made in two parts, hinged at *a*, and fastened together in any suitable manner.

Figs. 1 and 2 represent the diaphragm. This is made of any suitable material—such as thin metal, parchment, or leather—and is suitably fastened in a wooden or metallic rim, H. A convenient size for the diaphragm is about five inches in diameter. To each side of the center of the diaphragm is attached a plate of wood, *b*, preferably hard wood, about one inch in diameter, and through the center of these plates and the diaphragm extends a perforation, through which the conducting-wire passes. A metallic eyelet, *c*, is placed in this perforation and struck up on each side, by which means the wooden plates and the diaphragm are securely clamped together. By the use of these wooden plates the diaphragm is prevented from being injured by the tension of the wire.

The forms of diaphragm which I have described are preferably used; but I can use any

other form of diaphragm suitable for use in an acoustic telephone.

When the conducting-wire passes through the diaphragms, as shown in Figs. 3 and 6, it is desirable that a washer, *d*, in contact with the inside of each diaphragm, be placed upon the wire, and be provided with a set-screw, *g*, by means of which the wire may be firmly clamped. This device makes a suitable tension to be given to the wire between the diaphragms. In some cases, more especially on short lines, the conducting-wire may be supported by a single diaphragm, through which the wire passes. As this manner of supporting the conducting-wire of an acoustic telephone does not prevent the transmission of articulate speech, the conducting-wire may have as many angles as is required to conveniently connect the points between which it is desired to transmit speech, and, in the same manner as the conducting-wire of an electric telephone, can be carried vertically along the outside of the walls of a building to a suitable point upon the top of a building, from which it can be stretched horizontally, and on the shortest line between the points which are connected. When a single diaphragm is used for supporting the wire, the rim of the diaphragm is provided with rings D, to which the guy-ropes or wires are attached.

When a horizontal wire is to be extended any distance, it may be supported at suitable intervals, as shown in Fig. 8, by means of diaphragms contained in straight cases similar to those previously described. The wire may pass through the diaphragms, as shown in Fig. 6.

In Fig. 4 is represented a form of telephone which may be placed on the outside of a building, C. The mouth-piece M extends through the wall of the building, and the diaphragm F is placed nearly horizontally, as a slight deviation from a horizontal plane is preferable, but not necessary. The mouth of the resonator G is covered with a cap of soft rubber, *h*, made of a sheet of rubber and secured to the resonator in any suitable manner—as, for example, by a ring of wire, *i*, and provided with a slit, *k*, through which the wire passes. By the use of this curved mouth-piece I avoid any turn in the wire at this point, since it rises vertically directly from its point of connection to the diaphragm.

In Fig. 8 is represented a device by means of which communication may be established with several lines from a single mouth-piece, or by means of which several lines may be put in communication with one another. It consists of a case, L, provided with a mouth-piece, M, and having on each of its sides a diaphragm, F, to which a line is connected. The sound transmitted through the mouth-piece or received from any line will be transmitted through the diaphragms and their connected lines. By well-known means any line may be prevented from transmitting sound.

I have represented these telephones as placed upon the exterior of a building and connected to the interior by a mouth-piece which extends through the wall of the building. This will be found a convenient way of placing these telephones; but they may be placed in the interior of the building.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination, with the conducting-wire of an acoustic telephone, of a tubular case, supported substantially as described, and two or more perforated supports secured within such case and placed at an angle to each other, through which the conductor passes, whereby a sharp angle in the conductor is avoided, substantially as and for the purpose set forth.

2. The combination, with the case E, made in two parts and provided with diaphragms F F, of a central hinge, *a*, substantially as and for the purpose set forth.

3. The combination of the diaphragm F, the rim H, supporting the same, the wooden blocks *b b* on each side of the center of said diaphragm, and the metallic eyelet *c*, or its equivalent, in the center of the diaphragm, and connecting the wooden pieces to the diaphragm, substantially as and for the purpose set forth.

4. The combination of the case E, supported substantially as described, diaphragm F, wooden block *b*, washer *d*, set-screw *g*, and conducting-wire B, substantially as and for the purpose set forth.

5. The combination of the vertical case A, the curved mouth-piece M, extending through the wall of the building, the diaphragm F, placed in a substantially horizontal position within the mouth-piece and outside the wall, and the conductor B, connected to said diaphragm and extending vertically therefrom through the case A, substantially as described.

6. The combination, with the diaphragm, of the resonator G, rubber cover *h*, provided with the slit *k*, conducting-wire B, and ring *i*, or its equivalent, substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand in presence of the two subscribing witnesses.

GEORGE W. LORD.

Witnesses:
ALEX. L. HAYES,
EDWD. A. FREEMAN.