(No Model.) 3 Sheets—Sheet 1.

J. H. HOWARD.

MECHANICAL TELEPHONE.

No. 357,995. Patented Feb. 15, 1887.

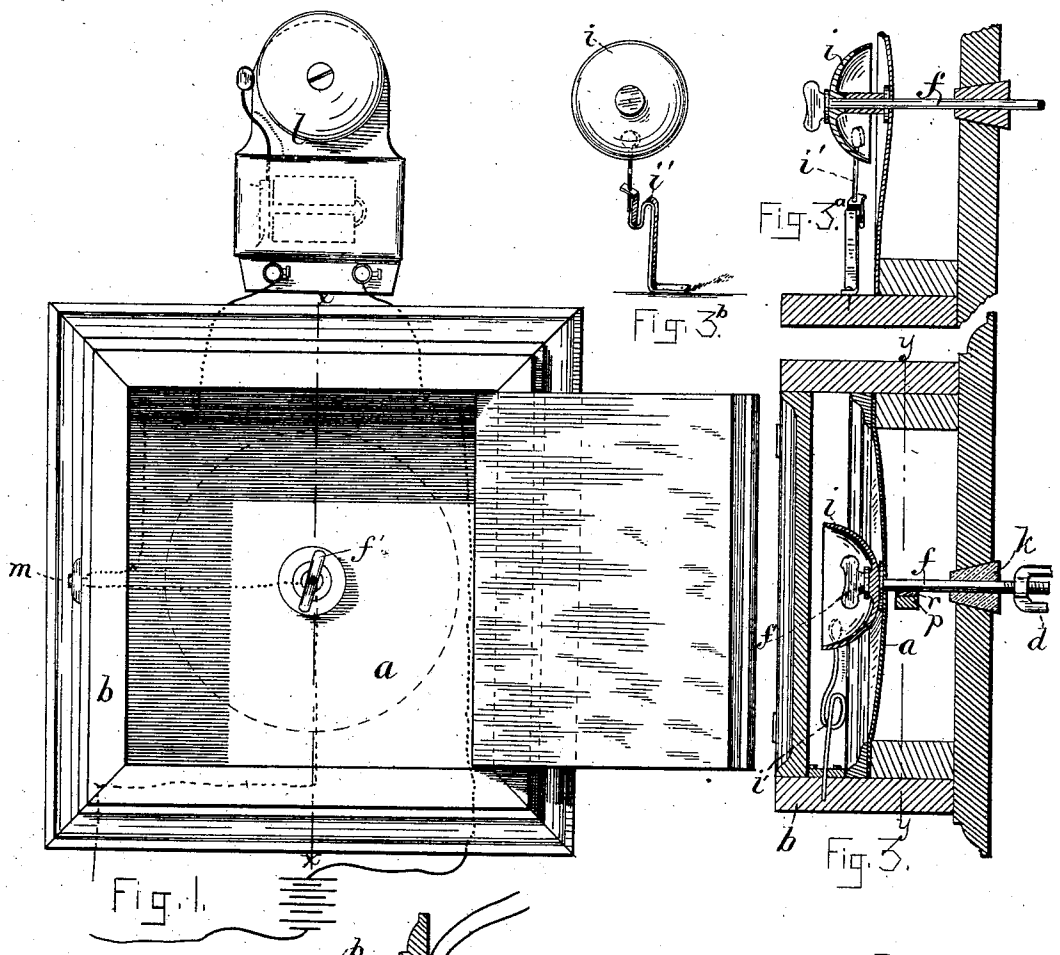

Fig. 1. Fig. 3b. Fig. 3. Fig. 3.

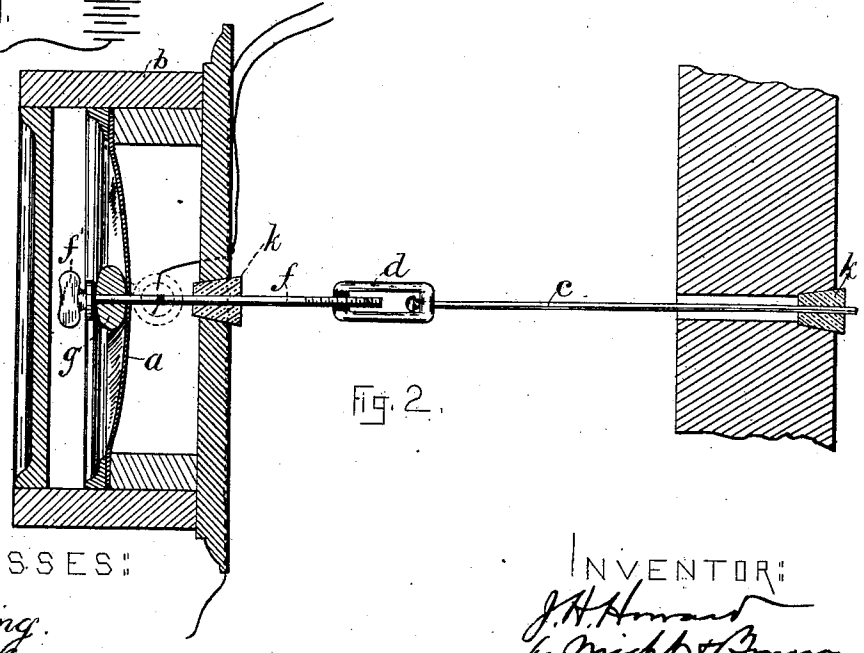

Fig. 2.

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MECHANICAL TELEPHONE.

No. 357,995. Patented Feb. 15, 1887.

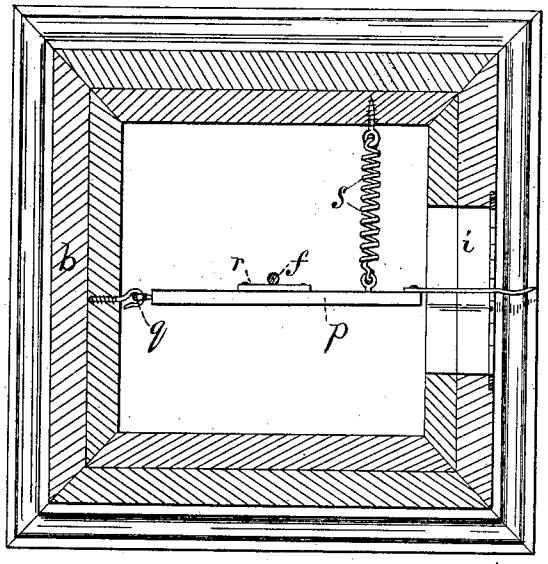

Fig. 4.

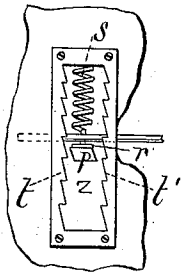

Fig. 5.

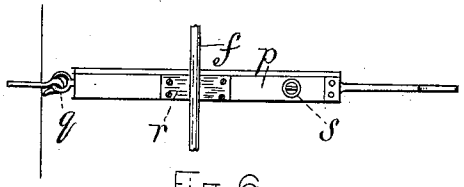

Fig. 6.

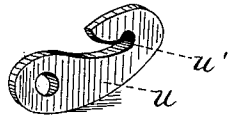

Fig. 8.

Fig. 10.

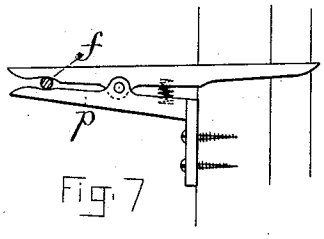

Fig. 7.

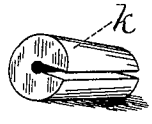

Fig. 9.

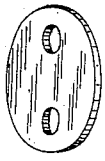

Fig. 11.

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(No Model.) 3 Sheets—Sheet 3.

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MECHANICAL TELEPHONE.

No. 357,995 Patented Feb. 15, 1887.

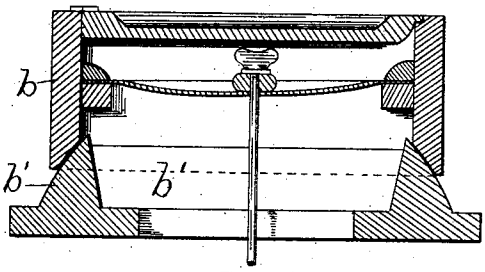

Fig. 12.

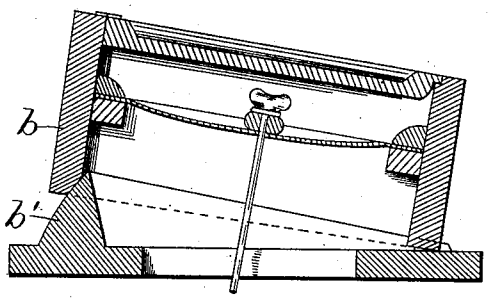

Fig. 13.

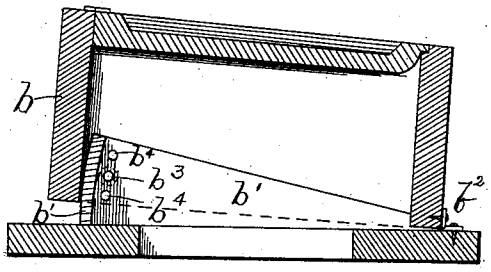

Fig. 15.

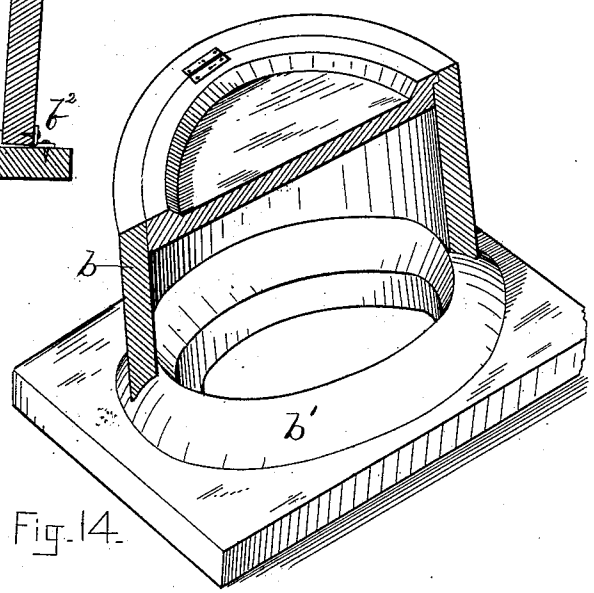

Fig. 14.

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Attys.

UNITED STATES PATENT OFFICE.

JAMES H. HOWARD, OF BOSTON, ASSIGNOR TO RUSSELL C. ELLIOTT, TRUSTEE, OF SOMERVILLE, MASSACHUSETTS.

MECHANICAL TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 357,995, dated February 15, 1887.

Application filed March 29, 1884. Renewed February 24, 1885. Again renewed July 22, 1886. Serial No. 208,807. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. HOWARD, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Mechanical Telephones, of which the following is a specification.

This invention has for its object to provide means whereby the tension of the sound-conducting wire of an acoustic telephone can be conveniently regulated; secondly, to provide improved means for insulating the wire at intermediate points where it is supported; thirdly, to provide improved means whereby a person at one end of an acoustic-telephone line may call or signal a person at the other end; fourthly, to provide improved means for varying the inclination of the diaphragm; fifthly, to provide means for muffling the conducting-wire to prevent transmission of external disturbing sounds; sixthly, to provide certain improved devices for supporting the wire.

To these ends my invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a front elevation of an acoustic-telephone receiver and transmitter provided with my improvements. Fig. 2 represents a section on line *x x*, Fig. 1. Fig. 3 represents a section showing a bell used as a wire-holding button at the front side of the diaphragm and provided with a striker. Figs. 3^a and 3^b represent modifications. Fig. 4 represents a section on line *y y*, Fig. 3. Figs. 5, 6, 7, 8, 9, 10, and 11 represent details. Figs. 12, 13, 14, and 15 show means for varying the inclination of the diaphragm.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents the diaphragm of an acoustic telephone, and *b* represents the box or case supporting the same, said box being affixed to a wall or other support in any suitable way, and preferably provided with a door or cover adapted to be closed over the front of the diaphragm, to prevent the sounds transmitted from the distant station or end from being distinctly heard when stillness is desired, and to prevent sounds in the room where the diaphragm is located from being transmitted to the distant end when secrecy is desired.

c represents the conducting-wire, which is stretched, as usual, between the two diaphragms at the respective ends of the line.

My first improvement relates to the means employed for connecting the wire *c* with the diaphragms and for adjusting the tension of the wire. The conducting-wire proper terminates at a point behind the diaphragm of each station, and is connected by a turn-buckle, *d*, with a metal rod, *f*, or that section of wire which is screwed at one end into the turn-buckle and passes at its opposite end through the center of the diaphragm, and is provided at the outside of the diaphragm with a thumb-piece, *f'*, whereby it may be rotated in either direction, thus drawing the turn-buckle inwardly toward the diaphragm, and tightening the wire, or forcing the turn-buckle away from the diaphragm, and thus slackening the wire. A button or washer, *g*, of rigid material is preferably interposed between the thumb-piece *f'* and the diaphragm, the rod *f* passing through the washer. A person standing at the front of the diaphragm is thus enabled to readily vary the tension of the wire, as circumstances may require.

In Fig. 3 I have shown a bell or gong, *i*, interposed between the diaphragm and the thumb-piece *f'*, and serving both as a bell and as a substitute for the washer *g*. (Shown in Figs. 1 and 2.) A spring-hammer, *i'*, adapted to strike the bell, may be secured to the box *b*. The bell is connected with the conducting-wire, so that when it is sounded its sound-vibrations are conducted to the opposite end of the line and caused to give a more distinct call or alarm there than would be the case if the bell were isolated from the conductor. A result nearly as good may be produced by supporting the bell at a point close to but not in contact with the diaphragm nor with the conducting-wire—for example, by securing it to the interior of the box, either behind or in front of the diaphragm. I do not, therefore, confine myself to the described arrangement of the bell. Fig. 3^a shows the post of the bell bearing against the diaphragm and a striker of peculiar form. (Shown also in Fig. 3^b.)

At the points where the wire passes through a wall or other fixed support I provide an enlarged orifice, and place in the same a filling or bushing, *k*, through the center of which the wire passes. Said bushing is composed of cork, rubber, gutta-percha, or other suitable yielding material, and constitutes an insulator for the sound-vibrations and prevents them from being absorbed by the rigid support. The bushing also excludes air and rain from the passage in an outer wall, through which the wire passes. The cork insulator is preferably made in the form shown in Fig. 9, having a slot in one side, in which the wire is inserted.

In Fig. 1 I have shown an ordinary electric bell, *l*, located in an electric circuit which includes a battery and the wire *c*, and is closed by a push-button, *m*, of ordinary construction at one side of the box *b*. When said push-button is pressed, the electric circuit is closed and a current of sufficient strength passes through the wire to ring a similar electric bell at the other station. It is obvious that the electricity may be supplied by a magneto-generator instead of a battery, a suitable magneto-bell being employed.

p represents a muffler or device adapted to be pressed against the wire or the section *f* thereof, to absorb the sound-vibrations and prevent them from being heard at the front of the diaphragm. As shown in Figs. 3, 4, 5, and 6, the muffler is a lever pivoted at *q* to the box *b*, and provided with a pad, *r*, of soft material, adapted to be pressed against the wire by a spring, *s*. The muffler may be held away from the wire by ratchet-teeth *t* at the side of the slot *i* in the box, through which the free end of the lever projects. Ratchet-teeth *t'*, reversely cut, are placed at the other side of said slot, to enable the lever to be held in place when crowded against the wire, thus providing a closer contact or firmer bearing than would be furnished by the spring alone.

In Fig. 7 the muffler is shown as a spring-clamp, one member of which is attached to the box *b*, while the other is pivoted to the fixed member, the wire passing between the two members. The end of the pivoted member projects through a slot in the box, and may be held away from the wire by ratchet-teeth, or otherwise.

Fig. 8 shows a form of insulating-support, *u*, for the wire where it forms an angle. Said support is made of hard rubber and is formed with a hook, *u'*, adapted to receive the wire, and is provided with an orifice to receive a screw, whereby it may be attached to a fixed support. Fig. 11 shows another form of hard-rubber support, having an orifice for the wire.

Fig. 10 shows a hard-rubber pulley adapted to be secured to a fixed support, and to support the wire *c* at points where an abrupt turn is required.

Figs. 12, 13, 14, and 15 show the inclosing-box *b*, to which the diaphragm is attached, mounted on a seat, *b'*, formed to permit the box to be inclined in various directions.

In the forms shown in Figs. 12, 13, and 14 the box is not attached to the seat, but is held in contact therewith by the tension of the conducting-wire. The form shown in Fig. 14 is adapted to be inclined in any direction, the box being circular, and the seat *b'* a segment of a sphere.

Fig. 15 shows the box hinged at b^2 to the seat, and locked thereto at different angles by a pin, b^3, inserted through holes b^4 in the box and seat. This adjustability of the box enables the diaphragm to be turned as may be desired.

I claim—

1. In an acoustic telephone, the combination of the diaphragm, the sound-conducting wire terminating at the back of the diaphragm, the rod *f*, connected by a turn-buckle to the sound-conducting wire, and provided with a handle or thumb-piece at the front of the diaphragm, as set forth.

2. In an acoustic telephone, the combination, with the diaphragm, the inclosing-case having a cover, and the sound-conducting wire connected with the diaphragm, of a bell located in the space inclosed by the case, cover, and diaphragm, and supported by a connection with one of the sides of said space, as set forth, whereby the sound-vibrations caused by the bell are concentrated upon the diaphragm and the sound-conducting wire.

3. The combination of the diaphragm, the sound-conducting rod or wire passing through the diaphragm, and the bell interposed between the diaphragm and the end of the rod or wire, as set forth.

4. In an acoustic telephone, the combination of the diaphragm, the sound-conducting wire secured to the diaphragm, the bell interposed between the diaphragm and the end of the wire, and a striker adapted to sound the bell, as set forth.

5. The combination, with the sound-conducting wire and diaphragm of an acoustic telephone, of a muffler composed of a movable device adapted to be pressed against the wire behind the diaphragm and provided with means, substantially as described, whereby it may be held either in contact with or away from the wire, as set forth.

6. The combination, with the wire, the diaphragm, and the box or casing having a slot, of the pivoted muffler or lever projecting at its free end through the slot in the box and adapted to be pressed against the wire, as set forth.

7. The combination of the diaphragm-holding box *b* and a seat, *b'*, against which said box is held by the tension of the sound-conducting wire, and on which it is adapted to be inclined, as set forth.

8. In an acoustic telephone, the combina-

tion, with the sound-conducting wire, of a bushing or insulator, *k*, composed of a plug of yielding material adapted to be inserted in an orifice through which the wire passes, and provided with a longitudinal aperture to receive the wire, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 26th day of March, 1884.

JAS. H. HOWARD.

Witnesses:
C. F. BROWN,
A. L. WHITE.