(No Model.) 3 Sheets—Sheet 1.

L. MELLETT.

MECHANICAL TELEPHONE.

No. 392,816. Patented Nov. 13, 1888.

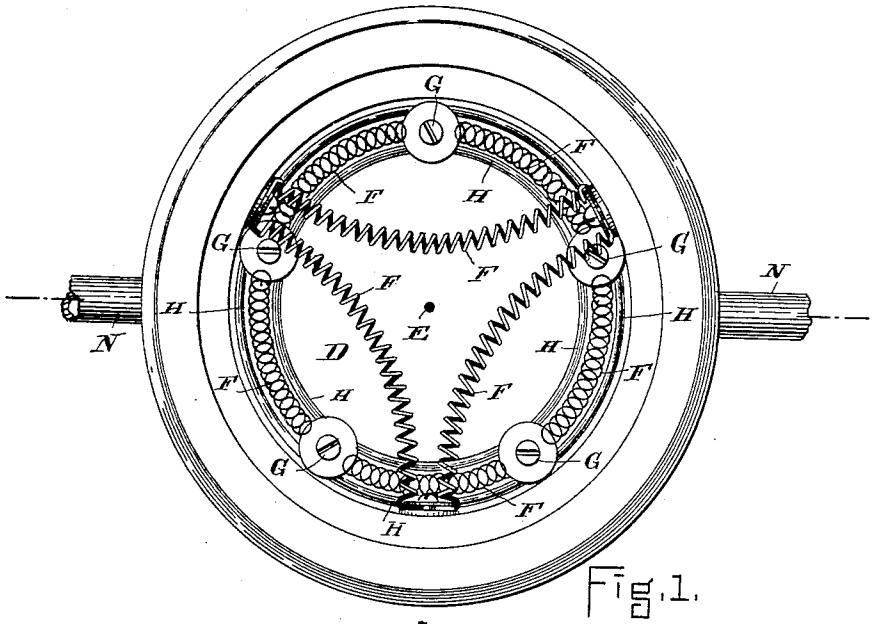


Fig. 1.

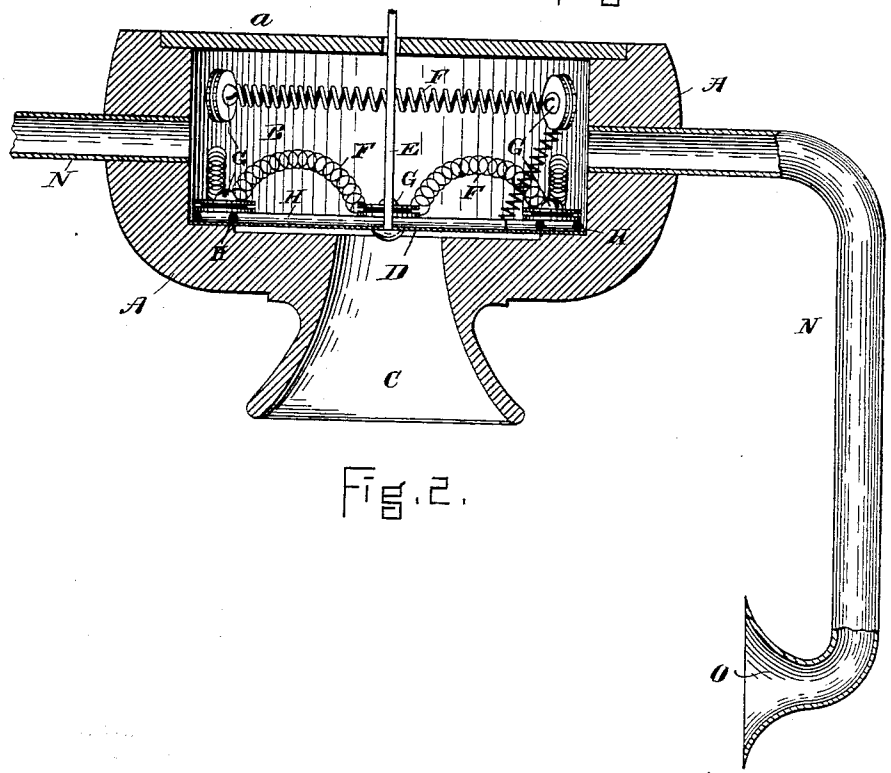


Fig. 2.

WITNESSES.
R. Henry Marsh.
Ada M. Spencer.

INVENTOR.
Lemuel Mellett,
by A. St. Spencer, atty.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 2.

L. MELLETT.

MECHANICAL TELEPHONE.

No. 392,816. Patented Nov. 13, 1888.

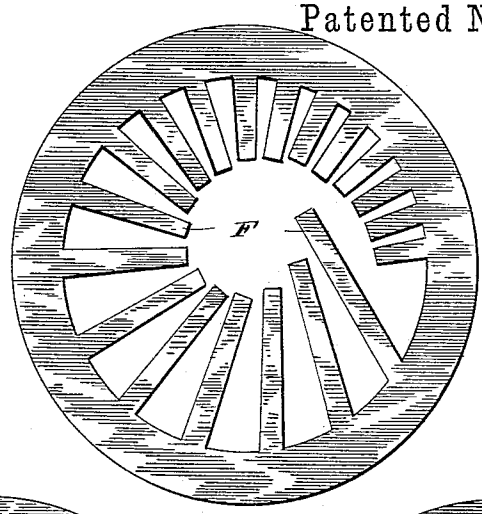


Fig. 3.

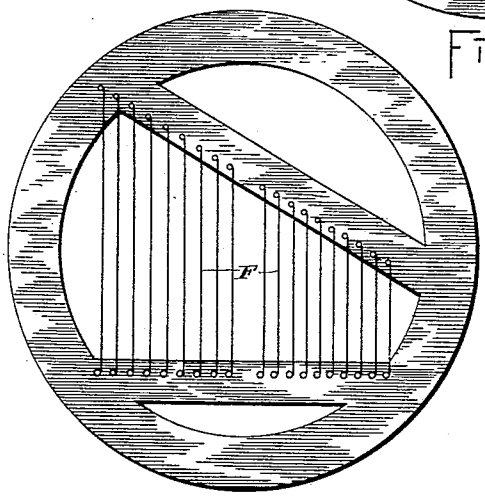


Fig. 4.

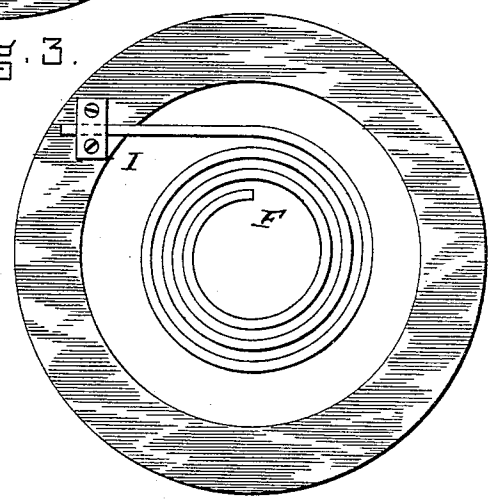


Fig. 5.

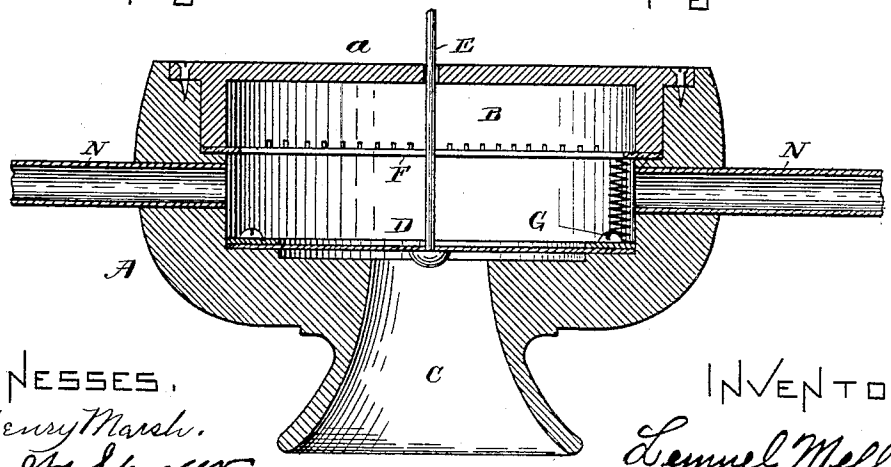


Fig. 6.

WITNESSES.
P. Henry Marsh.
Eda H. Spencer.

INVENTOR.
Lemuel Mellett,
by A. H. Spencer,
atty.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 3.

L. MELLETT.

MECHANICAL TELEPHONE.

No. 392,816. Patented Nov. 13, 1888.

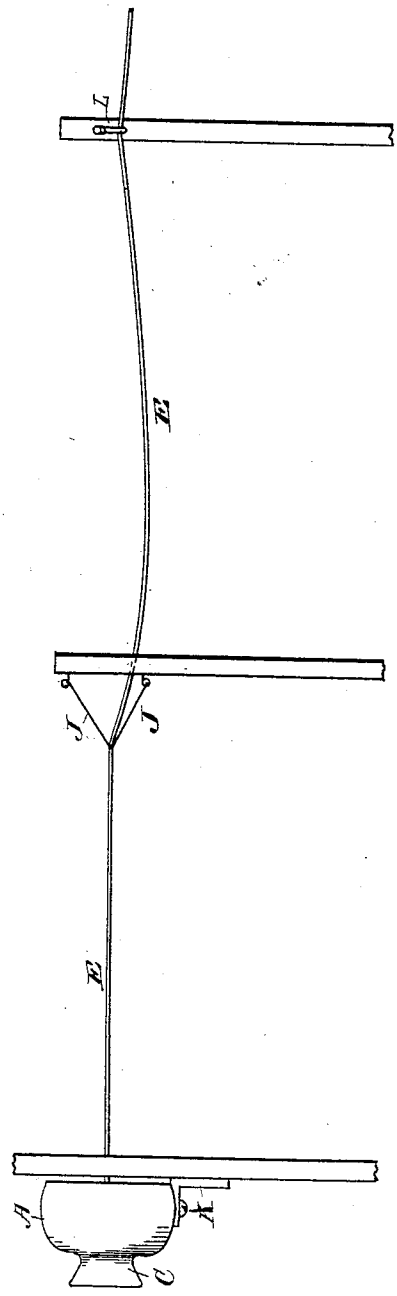


Fig. 7.

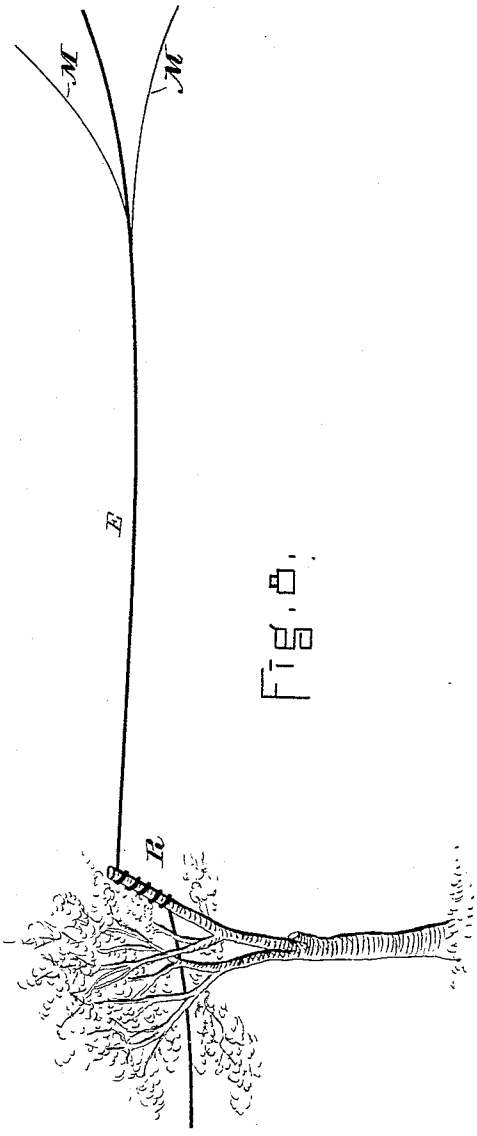


Fig. 8.

WITNESSES.
R. Henry Marsh.
Ada W. Spencer.

INVENTOR.
Lemuel Mellett.
by A. H. Spencer, Atty.

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

LEMUEL MELLETT, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO THE PULSION TELEPHONE COMPANY, OF CONCORD, NEW HAMPSHIRE.

MECHANICAL TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 392,816, dated November 13, 1888.

Application filed August 28, 1888. Serial No. 283,978. (No model.)

To all whom it may concern:

Be it known that I, LEMUEL MELLETT, of Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Mechanical Telephones, of which the following, taken in connection with the accompanying drawings, is a specification.

This application is made in substitution for one heretofore made and filed in the Patent Office by Herman W. Ladd and the present applicant jointly, June 2, 1887, Serial No. 240,093, covering the same identical subject-matter.

The object of this invention is to produce a simple and most effective pulsion-telephone, by which, without any electrical or magnetic current, human speech or other sound may be transmitted to a greater distance and in a more distinct manner than has been possible heretofore without such current. With my apparatus insulation of the wire is unnecessary, and for short distances ground-connections are desirable to reduce resonance. Supporting-coils of the wire at intervals wound around boughs of trees improve the transmission. I form branch lines without insulation to transmit to several points simultaneously from a single line and instrument. The first section of the wire is drawn taut; but the remainder may be slack and frequently grounded. I provide lateral openings from within the instrument for escape of the sound from behind the diaphragm, and preferably extend a smooth tube thence to one or both ears of the operator, to facilitate hearing while talking through the instrument. A spring press-button may close the aperture, when desired.

I utilize in my instruments the principle of harmonic vibration to project through the wire to the receiver tones, words, and sounds from the transmitter, and by providing each instrument with a series of musical reeds, strings, or springs adapted to vibrate synchronously the one is in a receptive state, while the other transmits, and the simple wire connecting their diaphragms pulsates with its messages without an electric or magnetic vehicle of transmission. I introduce the vibrators into the cavity behind the diaphragm, so that some of them will respond in both instruments to any tone or word uttered. There is a suitable metallic connection with the diaphragm, and preferably between the springs.

The apparatus may be mechanically charged with harmonic vibrations by a musical instrument in preparation for use.

In the drawings, Figure 1 is a rear view of one of my improved instruments with the back removed to show the interior of the chamber, and Fig. 2 a transverse section of the same instrument. Figs. 3, 4, and 5 are rear views showing other forms of vibrators. Fig. 6 is a transverse section of the device shown in Fig. 4. Figs. 7 and 8 represent portions of the line with suitable supporting devices.

A represents the shell of the instrument, enlarged to form a reed-chamber, B, and provided with the usual mouth-piece, C. D is the diaphragm spanning the chamber B, secured marginally to the shell and having a central aperture and button by which to connect it to the line-wire E.

The chamber B contains, as shown, in rear of the diaphragm a suitable number of vibrators, F, which may be tuning-forks, musical reeds or strings, spring-wires, or other devices adapted to be vibrated when the diaphragm is acted upon in reponse to spoken words or other sounds reaching it. These vibrators may be fixed firmly to the edges of the diaphragm or the walls of the chamber, with their free ends or vibrating bodies extending rearwardly or inwardly therefrom. For the best results the vibrators should be attuned similarly in both of the connected instruments, and each instrument should have a number of them, representing one or more octaves, so that the sounds uttered in any ordinary pitch or tone of voice shall each have at both ends of the line a chord pulsating in consonance therewith and forcing the sound forward against all ordinary obstacles. The harmonic vibrators thus vitalize the conducting-power of the connecting-wire, greatly increase the power of the instrument by securing continuity of vibration, improve the tone by reason of the harmonic character of the series of vibrators, and give to the apparatus as a whole capabilities hitherto unknown.

Figs. 1 and 2 represent a series of spring-wires coiled spirally and bent into loops of varying sizes, which will vibrate to different tones, the wire being held securely to the diaphragm edges by washers and screws G between adjacent loops, or to the walls of the chamber by similar means. By preference I introduce a wire helix, H, between the diaphragm and the washers as a metallic connection between the several springs and the diaphragm.

Fig. 3 shows another form of vibrators, in which a series of connected spring-tongues are employed, representing the successive notes of the scale, and arranged to vibrate with any tones harmonizing with them severally. In Fig. 4 the vibrators are musical strings of varying lengths stretched across the chamber under tension, as in a harp or piano, and vibrating in harmony with their corresponding notes and in unison at both ends of the line when the diaphragm is vibrated by any tone or sound. The strings may be provided with means of adjustment to regulate their tension and tone. Fig. 5 shows a single spring-vibrator, coiled about as in the so-called "cathedral" gongs for fine clocks. One or more of these may be used in each instrument with the boss or hub I, in which its end is fixed in metallic connection with the diaphragm.

The line-wire E starts from the instrument with sufficient strain to put the diaphagm under proper tension; but it is not requisite that the whole line be taut. I therefore provide short guy-wires J, attached to the line-wire near the instrument and secured to any suitable support, as in Fig. 7. Beyond this point the line-wire may be slack and grounded, or may come in contact with trees or buildings, without losing the power of transmission.

I am accustomed to stretch the wire E from tree to tree, or to support it, without insulation, on poles or buildings. At some of the points of support I form coils R by winding the wire spirally several times around the wooden support, with the successive coils by preference separated a slight distance from each other. I make no present claim to this feature of invention.

I have represented in Fig. 8 the line E extending from the transmitter and branching into several lines, M, each to be provided with one of my improved instruments, working in unison with the transmitter. I am thus able to send the same message simultaneously to several different points, and deliver it at each point in a perfectly-audible manner.

Figs. 2 and 6 represent a feature of this invention in which lateral openings are formed through the shell in rear of the diaphragm to afford escape for the sound into the room. I prefer to extend from these openings flexible or other tubes N, having a smooth bore and extending with a suitable curve around to the vicinity of the operator's ears and there terminating in the diverging ear-pieces O. By this apparatus the operator can talk and hear through the line without changing the position of his head, and the sounds reproduced from the rear surface of the diaphragm are utilized.

In September, 1831, Mr. Charles Wheatstone recorded in the Journal of the Royal Institution, England, that if two musical instruments placed in separate rooms were connected by a wire the playing upon one of them caused the strings of the other to vibrate. In place of such musical instruments I substitute telephones having vibrating diaphragms and resonant chambers with vibrators within them, and by these changes make practical use of the scientific observation referred to for the perfect transmission of human speech.

I am aware that in electric and magnetic telegraphs and telephones the vibration of musical reeds has been made use of to make and break the electric or magnetic currents; but I am not aware of any use of vibrators in telephones not employing such current prior to my invention. In electric and magnetic telephones the diaphragms are not directly connected by the line-wire, as they are in my instruments.

I make no present claim to the improved process or method of mechanical telephoning, which may be carried on by apparatus similar to that herein shown and described.

I claim as my invention—

1. The combination of a shell having a chamber therein, a diaphragm, a line-wire connected to said diaphragm, and a vibrator located in said chamber, for the purpose set forth.

2. The described pulsion-telephone, consisting of a transmitter and receiver with a line-wire connecting their diaphragms, and with harmonic vibrators within the chambers of said instruments, substantially as set forth.

3. The shell A, having mouth-piece C, diaphragm D, and wire E, directly connected to the diaphragm, in combination with one or more vibrators, F, within such shell, for the purpose set forth.

4. In a non-electric and non-magnetic telephone, the plain or uninsulated wire E and the diaphragms D directly connected thereby, in combination with the transmitting and receiving instruments containing vibrators F, attuned in harmony in the connected instruments, for the purpose set forth.

5. The improved telephone described, consisting of a transmitter and a receiver united by a wire connecting their diaphragms, in combination with a series of vibrators, F, attuned in harmony in the two instruments and each series representing a succession of musical notes, for the purpose set forth.

6. The described pulsion-telephone having a series of harmonic vibrators in each instrument and the diaphragm connected by a plain uninsulated wire drawn taut at the end sections, but slackened elsewhere along the line, as desired, for the purpose set forth.

7. In a non-electric and non-magnetic tele-

phone system, the shells A, having vibrators F, diaphragms D, and the plain line-wire E, extending from the transmitter and diverging into two or more branch lines, M, having like instruments, for the purpose set forth.

8. In a telephone, the chamber B and vibrators F therein in rear of the diaphragm, with one or more lateral openings therefrom, in combination with the tubes N, leading from such openings, and with the ear-piece O, for the purpose set forth.

9. The shell A, having chamber B and one or more lateral openings in the walls thereof, in combination with the diaphragm D, vibrators F in rear of the diaphragm, and wire E, for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 23d day of August, A. D. 1888.

LEMUEL MELLETT.

Witnesses:

A. H. SPENCER,

H. W. LADD.