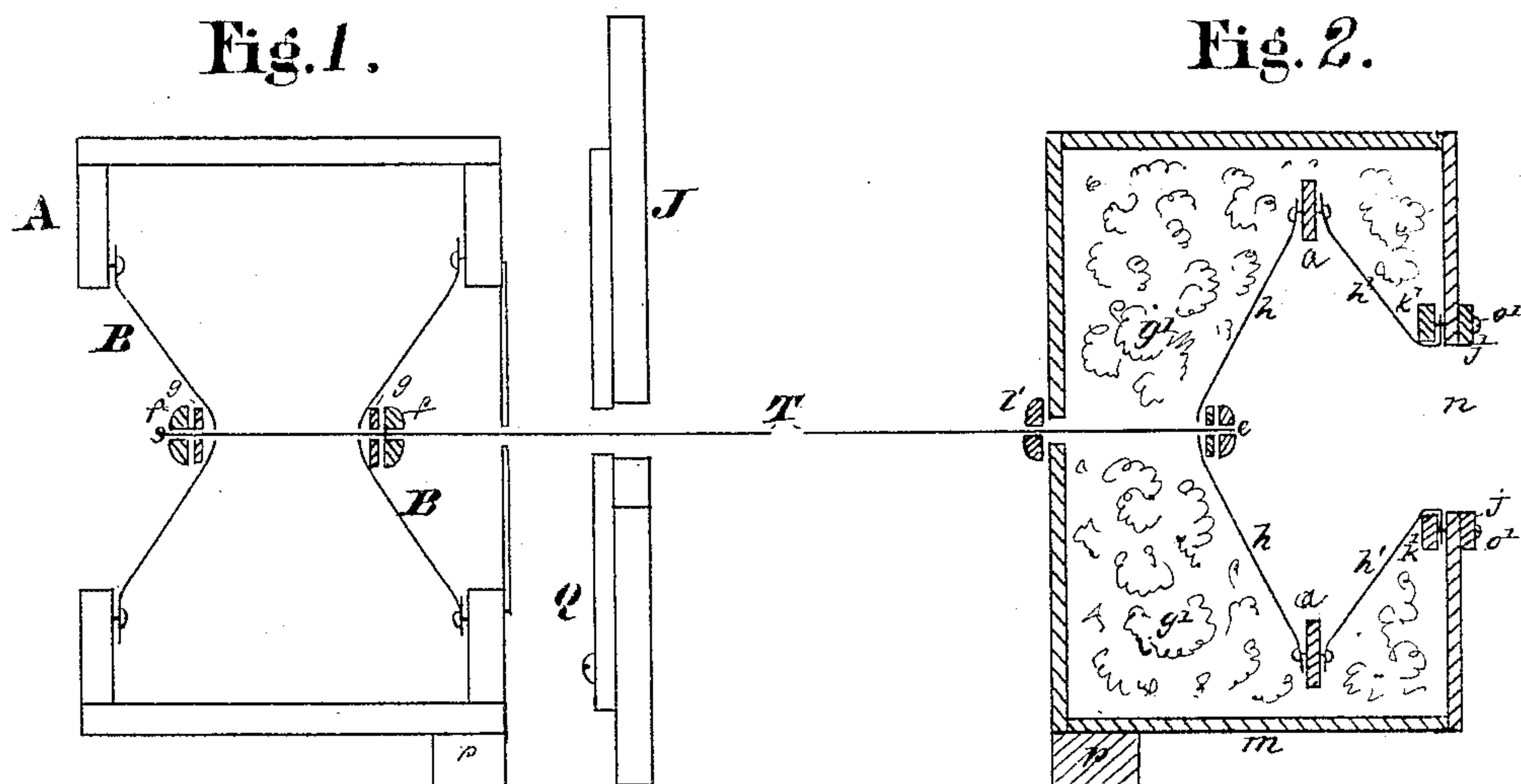


J. W. MAXWELL.  
Mechanical-Telephone.

No. 216,051.

Patented June 3, 1879.



Witnesses.

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# UNITED STATES PATENT OFFICE.

JOSEPH W. MAXWELL, OF LOUISVILLE, KENTUCKY.

## IMPROVEMENT IN MECHANICAL TELEPHONES.

Specification forming part of Letters Patent No. **216,051**, dated June 3, 1879; application filed November 7, 1878.

*To all whom it may concern:*

Be it known that I, JOSEPH W. MAXWELL, of the city of Louisville, county of Jefferson, and State of Kentucky, have invented certain Improvements in Telephony, of which the following is a specification.

Whereas in an application made by myself for Letters Patent of the United States, filed in the United States Patent Office on the 14th day of October, 1878, for improvement in telephony, I have shown and described an apparatus (among other things) consisting of two sounding-boards and their vibrators, of the same construction and material, placed together apex to apex, apart a few inches only, on the same transmitting-wire, and connected together by another short wire, which extends from the apex of one to the apex of the other, the means of fastening being knots formed on the extremities of the short wire after they had been extended through the vibrators; one apparatus consisting of this combination of parts is placed at each end of a long transmitting-wire, which is passed through the centers of the vibrators, and over and along which vibrations of air or sounds are transmitted from one end of the line to the other, and each apparatus is held to its connection with the wire by a button on each end thereof, and the wire is held taut or otherwise, as the one apparatus may be moved to or from the other.

The sounding-boards may be made of soft pine wood, or any other suitable material, and should have openings in their central portions, over which the vibrators are to be fastened, and should be mounted upon suitable supports or inclosed in suitable boxes, and should be made quite thin, in order to increase their capacity for vibration; and the vibrators are made of sheep-skin or like material, and should be fastened upon the sounding-boards over the openings therein while in a wet and plastic condition, and then have their central portions drawn out and stretched until they assume a funnel-like form, and then be allowed to dry and retain that form.

Now my invention herein claimed relates to the construction of a vibratory apparatus of quite different form and of a much better result from the one hereinbefore described.

It consists, to some extent, of an inclosing-

box, within which the vibrators are operated, the box having a suitable opening in and through the end of it which is opposite to the other end of the line of communication, into which vibrations are received and out of which they are delivered; but the apparatus proper consists of two diaphragms or vibrators of the same material before mentioned, and one of them of exactly the same form, and the other of the same general form, but having a central opening in it, to correspond in form and size with the one in the end of the containing-box before mentioned; and these two vibrators, which are in a circular form, by their outer edges are fastened to and upon the two opposite sides of a thin board of soft pine wood, or other vibratory wood or material, with their concave sides next to each other, and the board is cut away in the center, so as to leave a large opening in circular form in it, and the residue of the board serves as a frame for the two vibrators to hold their outer edges distended, and it does not touch the containing-box at all; and the one of the vibrators having the opening in it has the edge around the opening fastened upon another board, which has also an opening in it, corresponding in size and form with the one in the vibrator and the one in the end of the containing-box, and the board is attached to the inside of the end of the box, so that the openings in the vibrator, board, and box constitute an avenue for the reception and delivery of air-vibrations into and out of the apparatus. The transmitting-wire is passed in through the opposite end of the box, and through the apex of the vibrator that has no central opening in it, and is there held by a button on the end of it on the inside of the vibrator, and when the wire is stretched taut both vibrators are stretched and held taut likewise, and the whole apparatus is held suspended upon the wire at one apex, and the attachment to the board (which is attached to the end of the box) at the other, and the result of this construction is a high degree of vibratory power.

My said invention will be more particularly described with reference to the accompanying drawings, in which Figure 1 represents a central vertical longitudinal section of the said apparatus described in my said application filed



October 22, 1878; and Fig. 2, a like view of the containing-box and operative parts of this my improvement claimed herein.

In Fig. 2, *a* indicates the board to which the outer edges of the vibrators are fastened; *h*, the vibrator, attached to the transmitting-wire *T* by the button *e* and *h'*; the other one of said vibrators, and the same which has the central opening, *n*, in it; and *k*, the board to which that vibrator is attached by the edge around its opening, and it is fastened upon the inside of the end of the box, so that the opening at *n* is through vibrator, board, and box. *g'* indicates the cotton or wool placed around the vibrators within the box, in order to destroy the ring of the wire *T*. The vibrators are stretched and held taut by means of the button *e* on the wire *T*; and but for the button *i* on the wire outside of the box the vibrators would collapse when the wire was relaxed.

In this construction it will be observed that a large portion of the apparatus is made of the sheep-skin or other animal membrane, and there is in it no more of wood, which is itself capable of a high degree of vibration, than enough for a frame to hold the vibrators in position and proper shape, and that it is therefore very efficient for the purpose of condens-

ing and strengthening air-vibrations for transmission, and I have found it to be so by actual experiment, much more so than the one shown in Fig. 1.

I have found also by experiment that a vibrator that is from seven to eight inches in diameter through the center from one outer edge to the other is the most efficient, and that when they are much smaller than this the vibrations made by the vocal organs are of a nasal character; but when an apparatus of proper size is used at one end of the line, then a much smaller one may be used at the other without impairing perceptibly the effect.

A very good effect is secured by using the construction shown in Fig. 2 at one end of the line, and that shown in Fig. 1 at the other.

What I claim as my invention, and desire to secure by Letters Patent, is—

The vibratory apparatus composed of the vibrator *h* and the vibrator *h'*, having the opening *n*, and the suspended board *a* and the fixed board *k'*, constructed and arranged substantially as and for the purpose described.

J. W. MAXWELL.

Witnesses:

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A. M. STOUT.