

R. C. BROWNE.
TELEPHONE TRANSMITTER.
APPLICATION FILED APR. 26, 1907.

920,425.

Patented May 4, 1909.

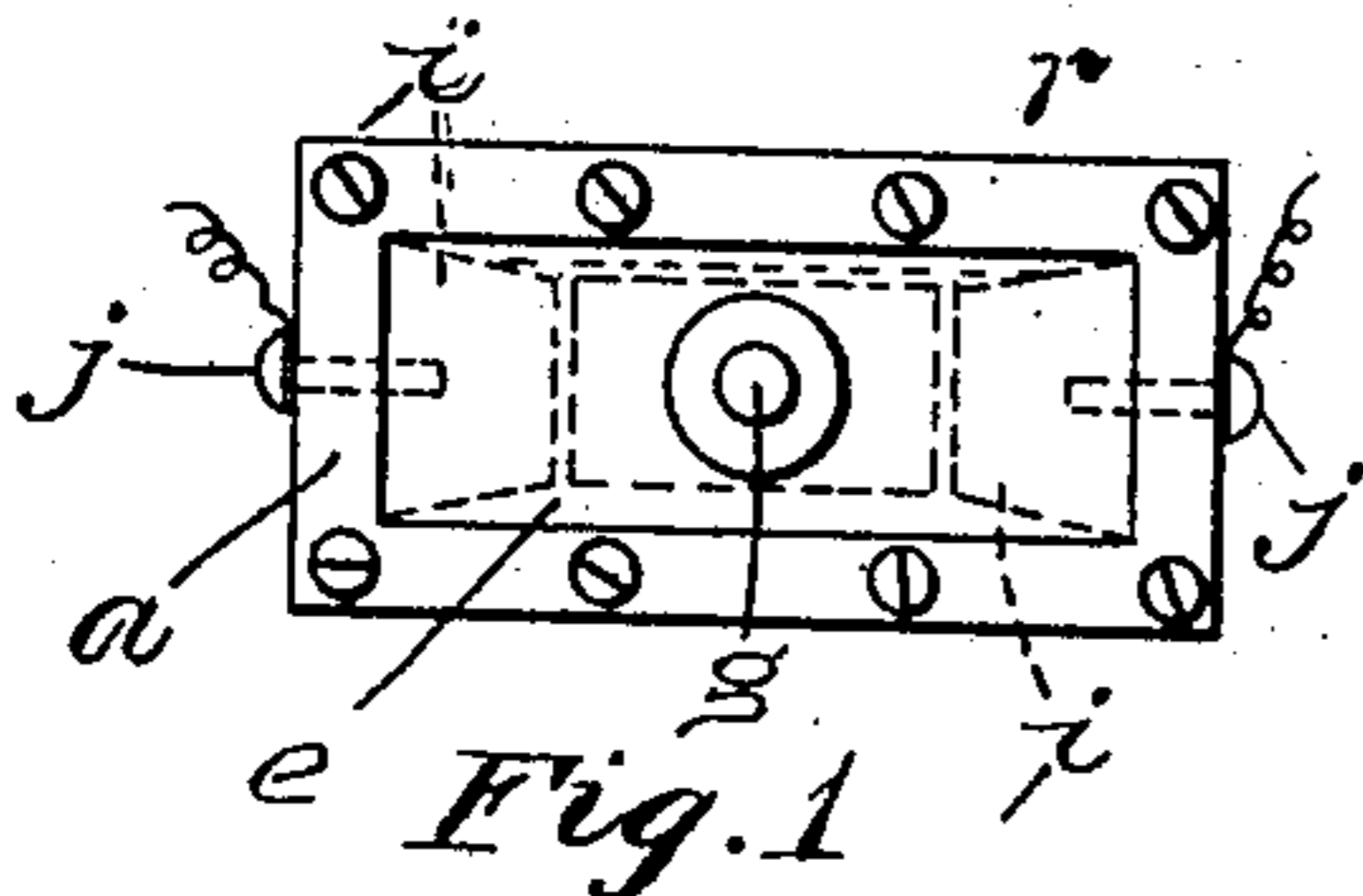


Fig. 1.

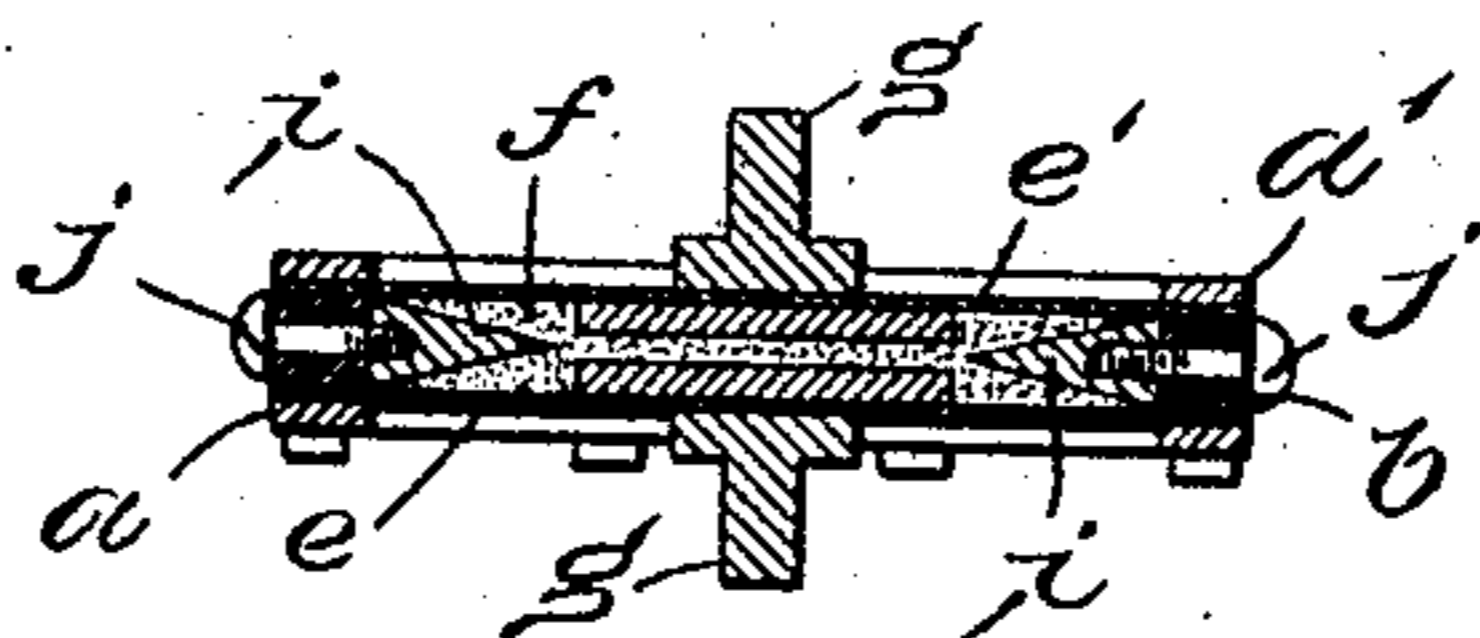


Fig. 2.

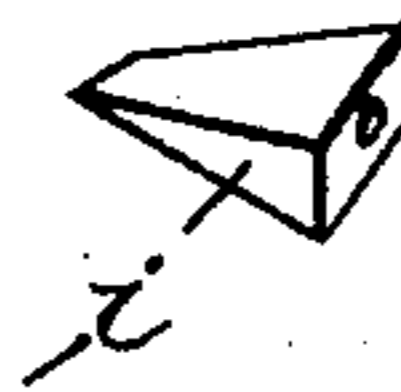


Fig. 3.

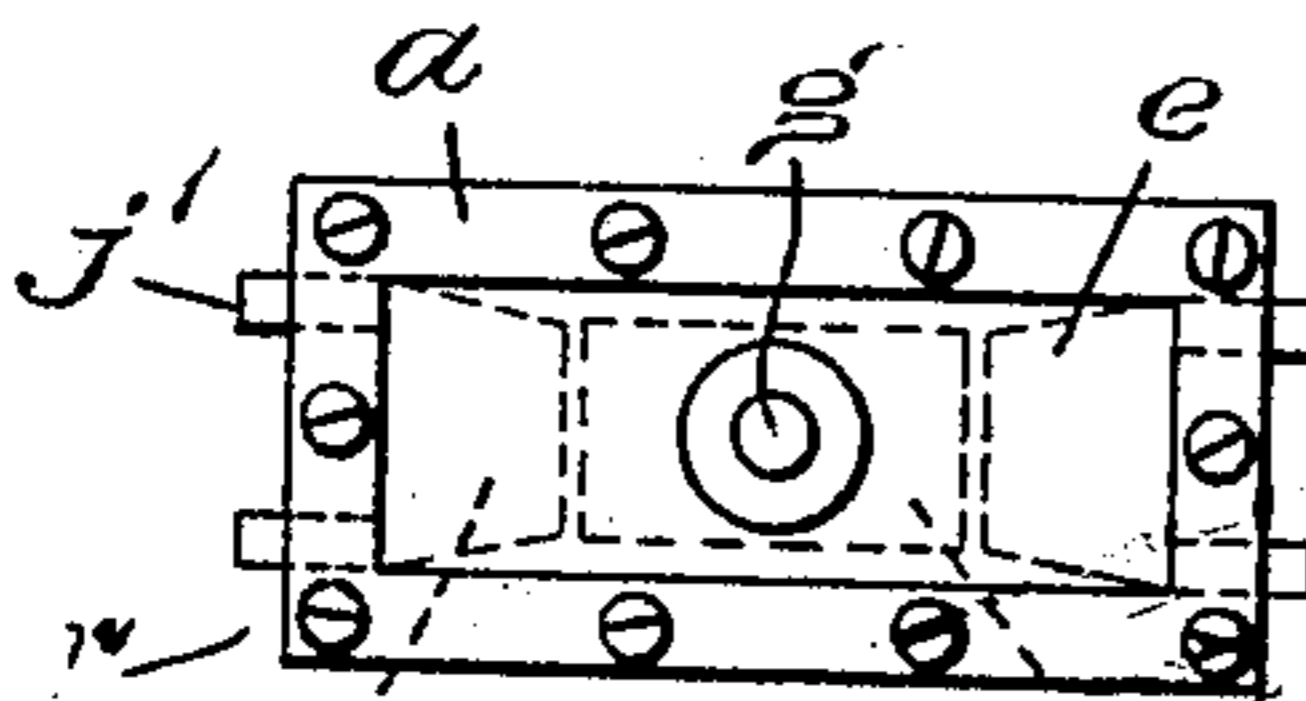


Fig. 4.

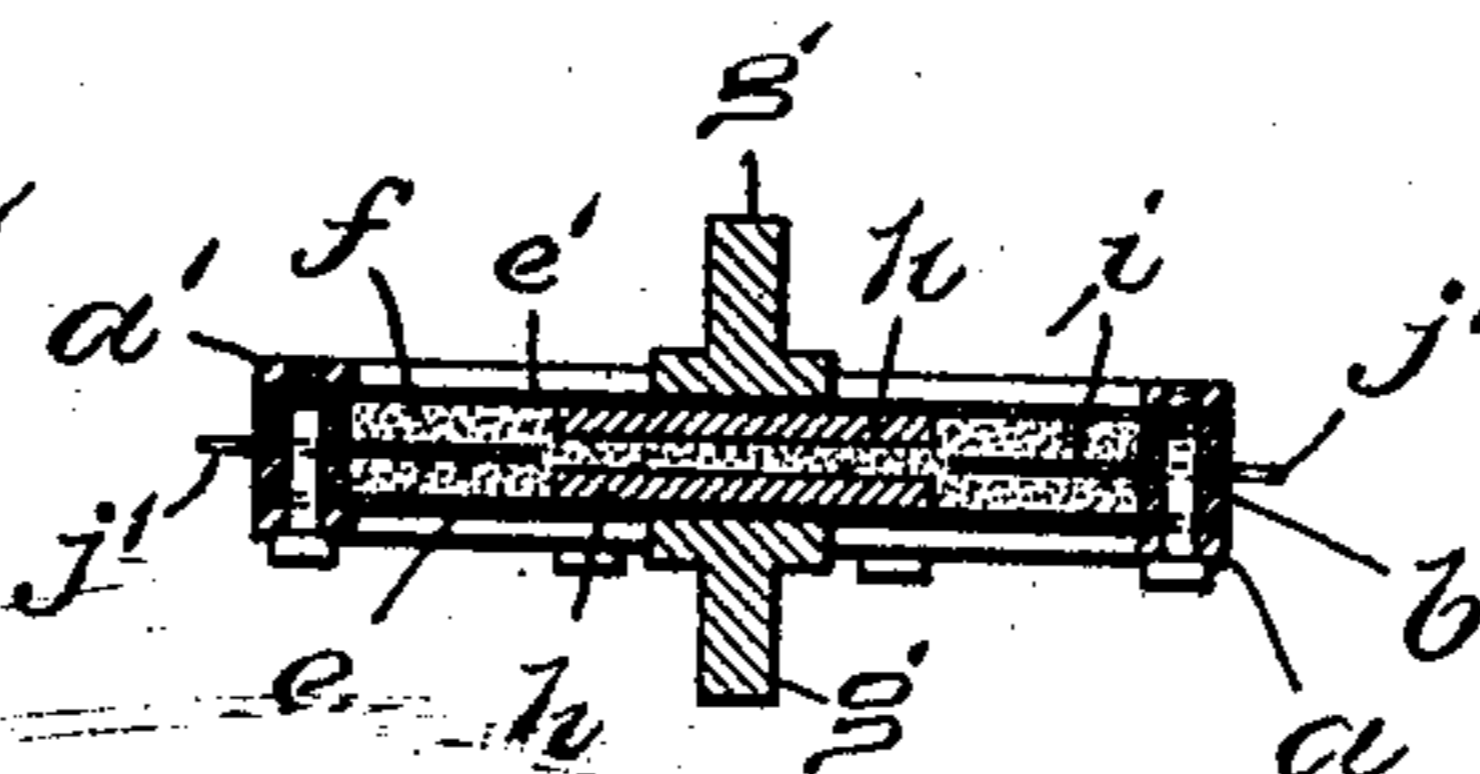


Fig. 5.



Fig. 6.

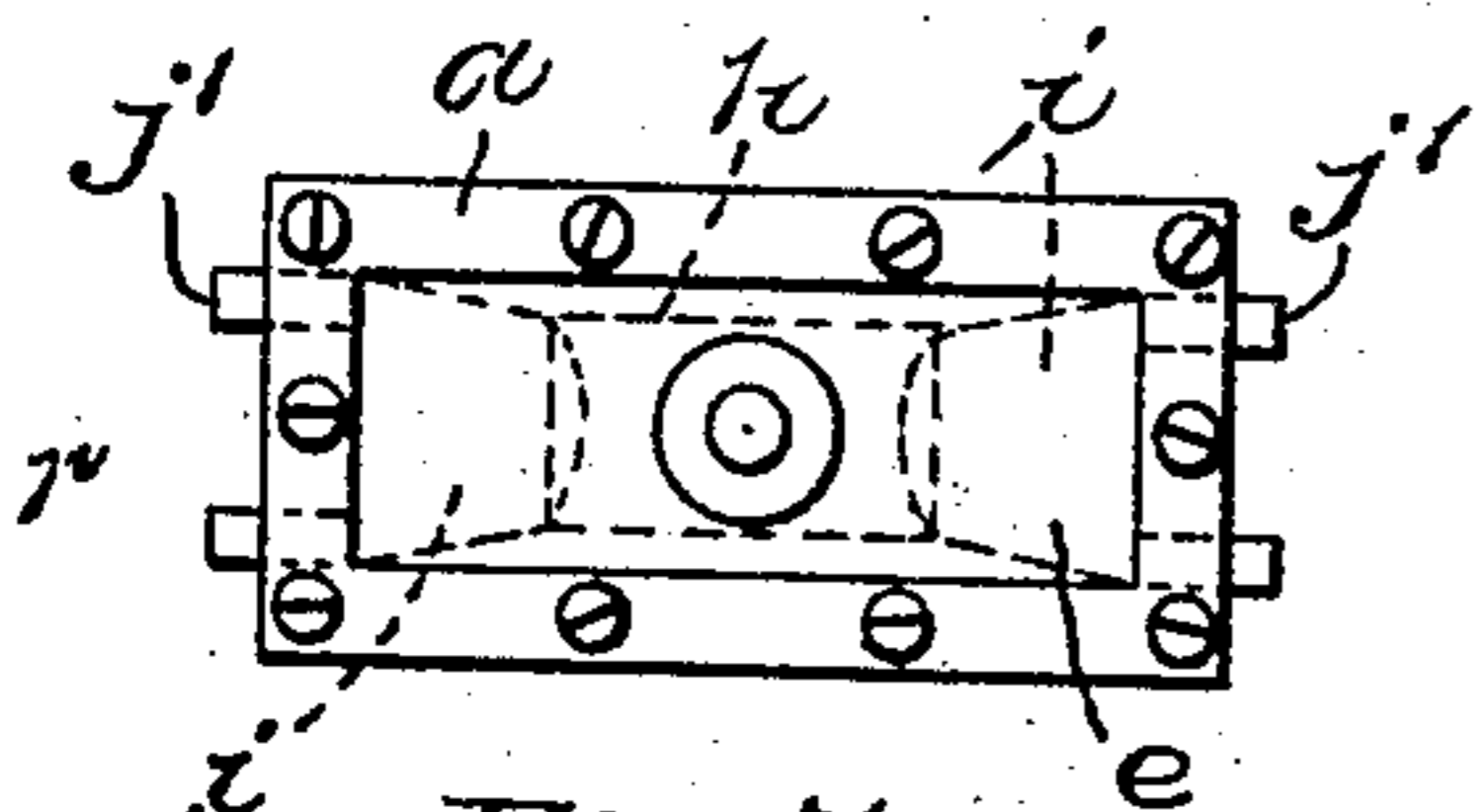


Fig. 7.

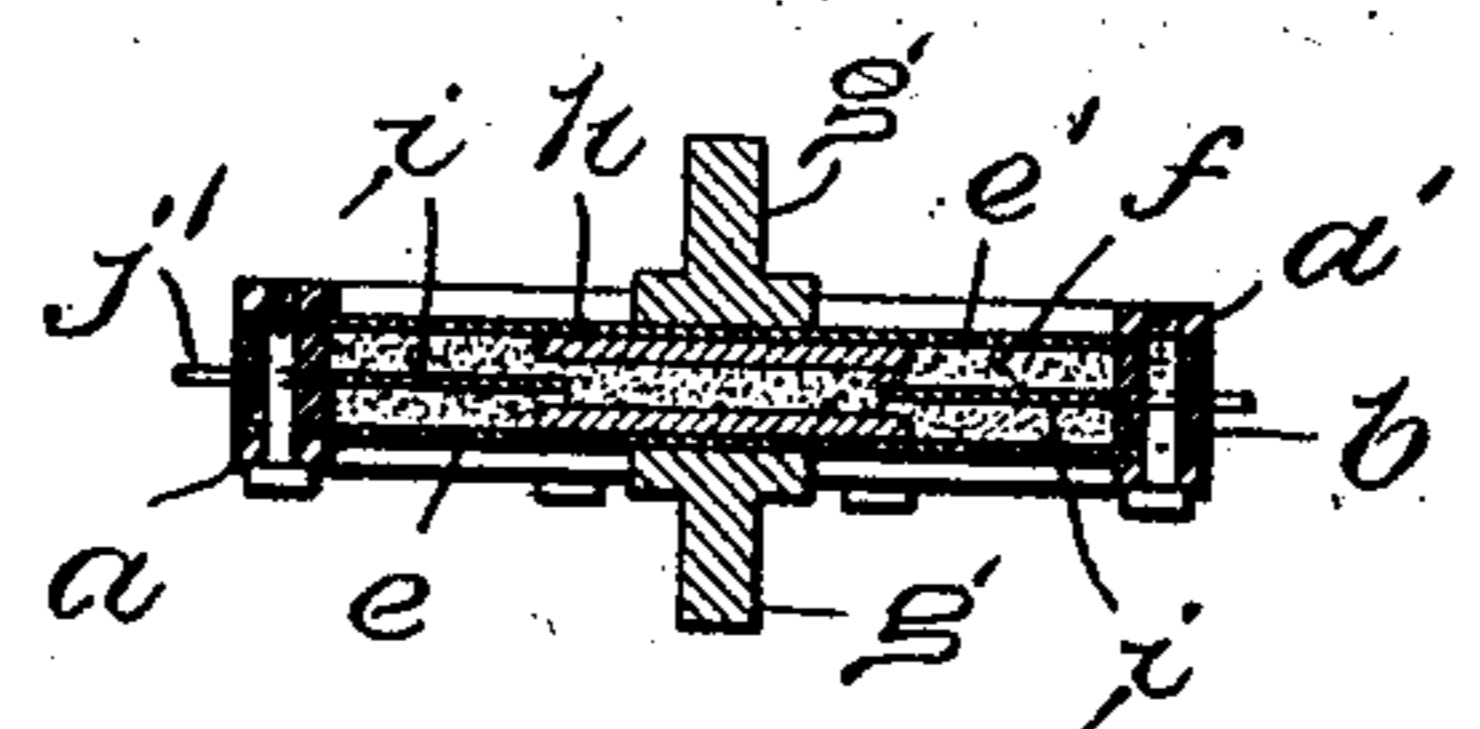


Fig. 8.

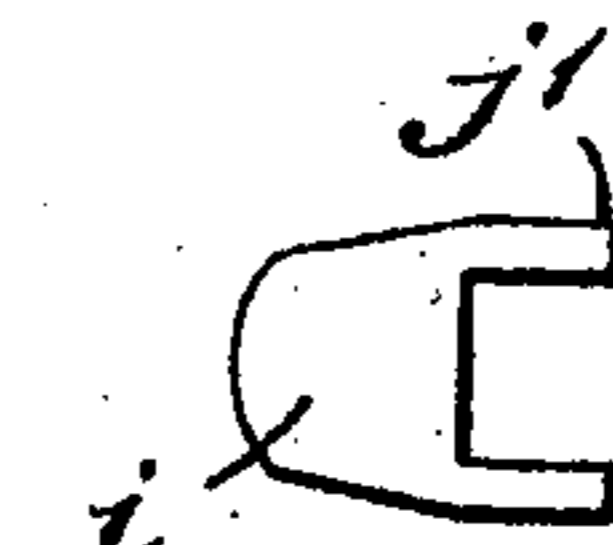


Fig. 9.

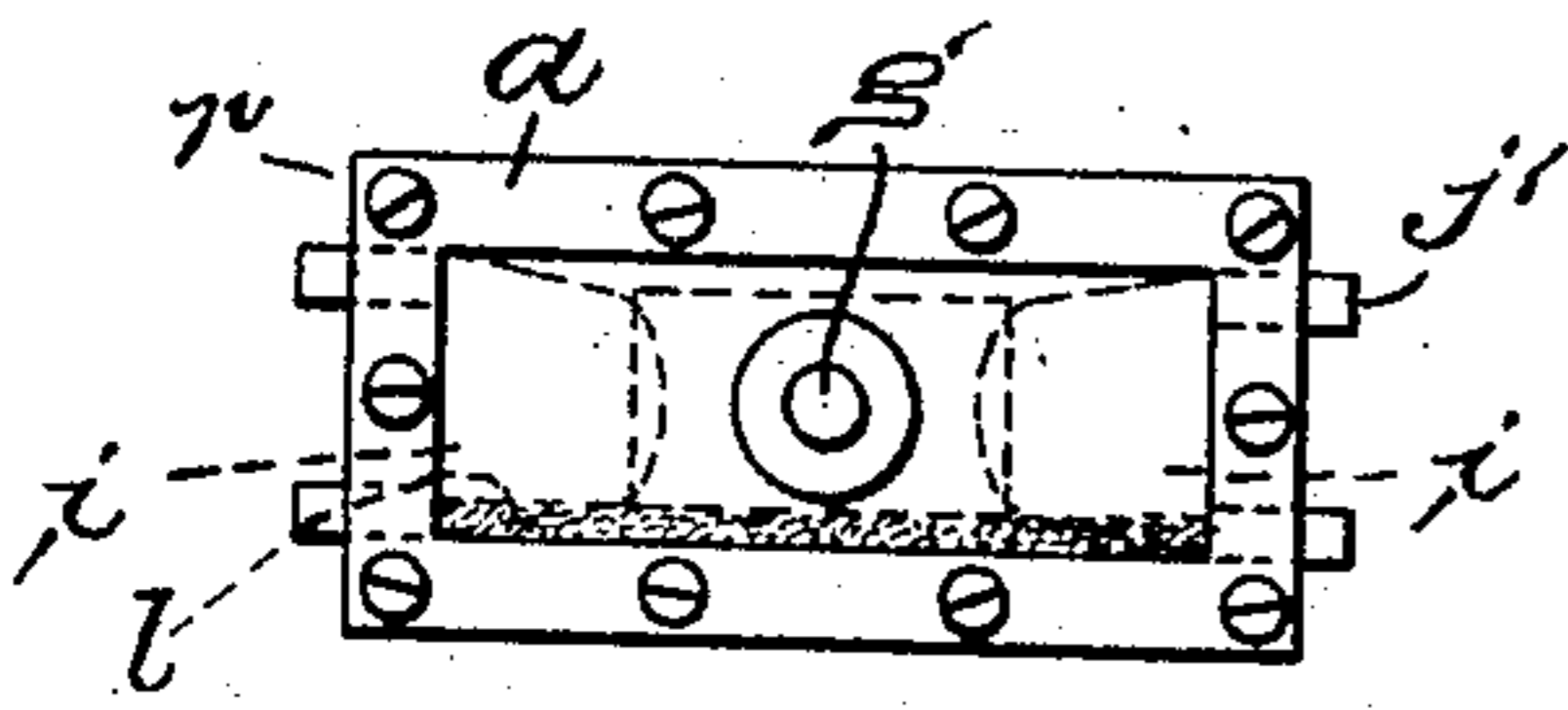


Fig. 10.

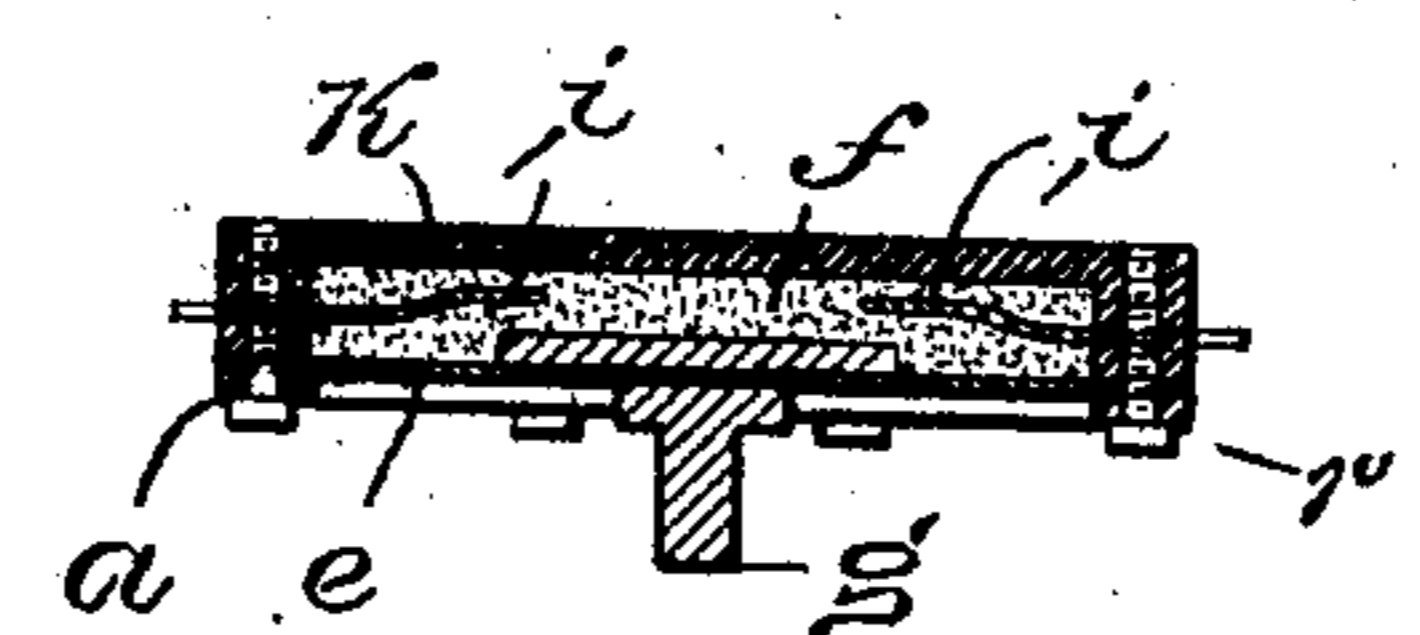


Fig. 11.

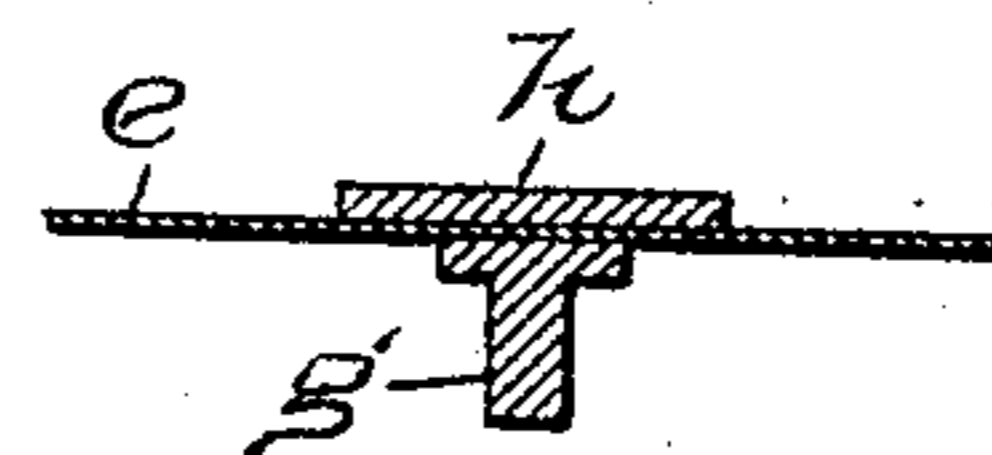


Fig. 12.

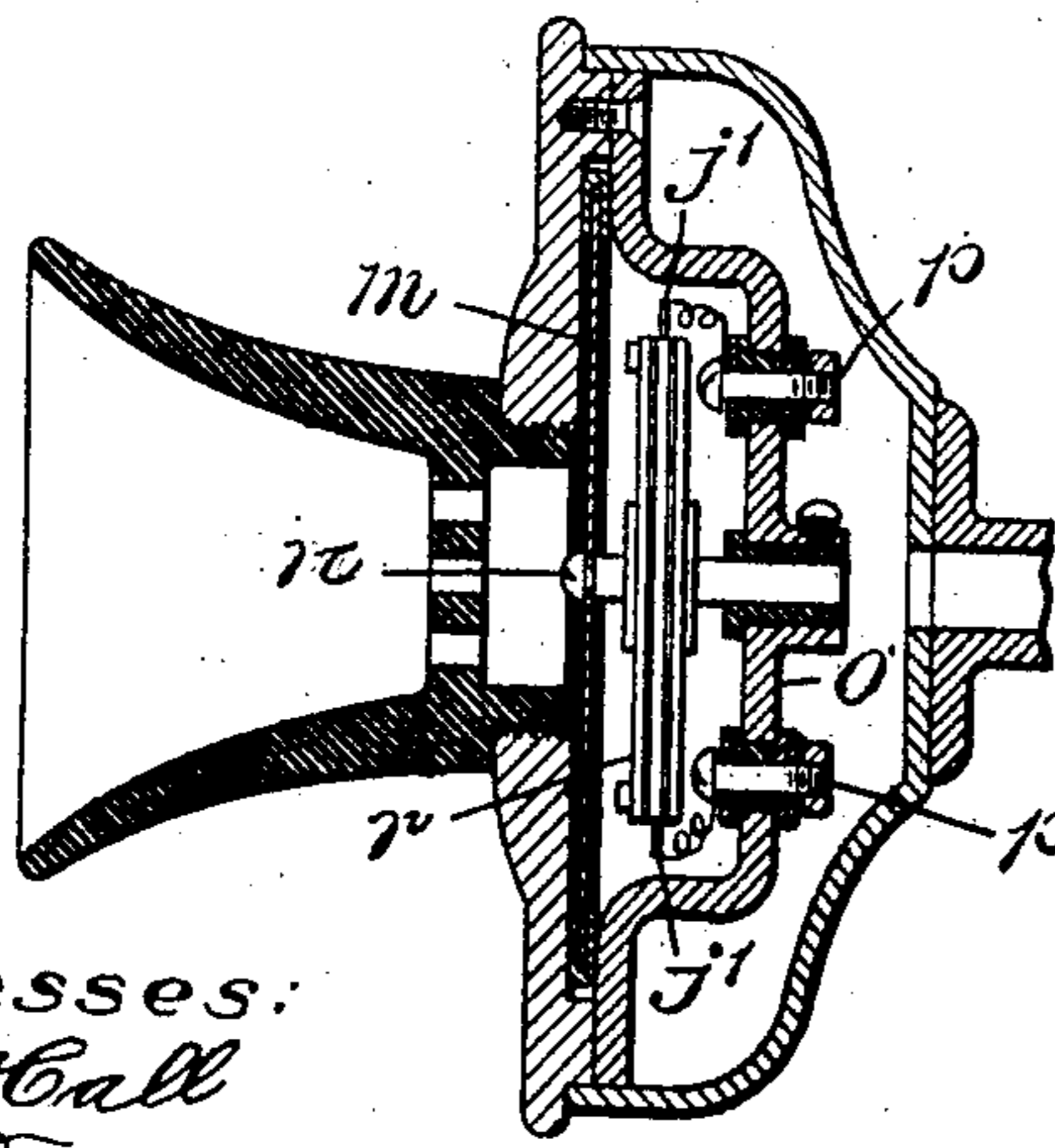


Fig. 13.

Witnesses:
H. A. Hall
A. L. Folsom.

Inventor:
Ralph C. Browne
by
Coughlin, Brown, Dunbar & Day
Attorneys.

UNITED STATES PATENT OFFICE.

RALPH C. BROWNE, OF SALEM, MASSACHUSETTS, ASSIGNOR TO JOHN ABBOTT, TRUSTEE, OF WINCHESTER, MASSACHUSETTS.

TELEPHONE-TRANSMITTER.

No. 920,425.

Specification of Letters Patent.

Patented May 4, 1909.

Application filed April 26, 1907. Serial No. 370,342.

To all whom it may concern:

Be it known that I, RALPH C. BROWNE, of Salem, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Telephone-Transmitters, of which the following is a specification.

This invention has to do with telephone transmitters and particularly to those in which a variation of resistance is brought about by the action of a plunger in mixing and compressing a variable resistance material held between two relatively stationary electrodes, said plunger being so connected to a diaphragm or like device that it is vibrated by the action of sound waves impinging upon said diaphragm. Having found that the greater part of the microphonic action in transmitters of this type depends upon the compressing of the variable resistance material and that the mixing action of the plunger is in fact detrimental, as its uniform action cannot be depended upon, the present invention has for its object to provide a transmitter in which the mixing action of the plunger is nullified and its compressing action is increased.

Another object of the invention is to provide a more perfect contact between the variable resistance material and the electrodes than has heretofore been possible in the class of transmitters herein referred to.

In my invention in order to secure the greatest possible efficiency, by increasing the compressing action of the plunger, diminishing or annulling the mixing action, and further lower the dead or non-acting resistance between the electrodes and active variable resistance material, I make use of the device substantially as illustrated and described in the following drawings and specification.

As the invention has to do with the microphonic member of a transmitter, I make use of the term "button" throughout the specification and claims, as that is the term by which the microphonic member is known in commercial practice.

Referring to said drawings:—Figures 1 and 2 show in face view and in section a transmitter button embodying the invention. Fig. 3 represents one of the electrodes. Figs. 4, 5 and 6 represent another embodiment of the invention, Fig. 6 illustrating one of the electrodes. Figs. 7, 8 and 9 are simi-

lar views illustrating a third form of the invention, in which the electrodes extend into the space between the plungers. Figs. 10 and 11 illustrate an embodiment of the invention in which only one flexible retaining wall is employed. Fig. 12 illustrates the connection of the plunger and the boss with the flexible retaining wall. Fig. 13 represents in horizontal section a transmitter in which a button embodying my invention is employed.

Referring to Figs. 1, 2 and 3, *a, a'* represent two metal or other suitable frames, clamped by means of screws or rivets *c* to an insulating intermediate frame *b*. Before clamping the frames in place two thin diaphragms of mica, paper or like material *e, e'*, are placed over the frame *b*, making a rectangular shaped retaining receptacle, the chamber of which is adapted to hold a suitable quantity of granulated carbon *f*, or other suitable variable resistance material. Clamped to the opposite sides or walls *e, e'*, of the containing chamber are two plungers *g, g*, as shown in Fig. 12. To the face of the wall is secured the base of a boss *h*.

The plungers should be made of insulating material, and should preferably present polished surfaces. I have made use of hard rubber with good results.

In Fig. 3 one of the electrodes *i*, is shown as wedge-shaped and adapted to be screwed to the inner and opposite ends of the central insulating frame *b*, by screws *j*. These screws also serve as connections for wires connecting with the instrument, as shown in Fig. 2. When thus properly placed in the retaining chamber of the button, the wedge-shaped electrodes present thin and pointed edges to the space separating the two plungers *g, g*, so that the current of electricity passing between them passes directly between the opposing surfaces of the plungers, as that is the path of least resistance; and hence on account of the large amount of surface the plungers present to the active material, the dead resistance of the instrument is practically eliminated. Moreover for the same reason the movement or mixing of the variable resistance material adjacent the sides of the plunger will have no action on the working of the instrument, as said material is "dead", and not a part of the path of the electric current. Practically all of the

current being transmitted to the material at the edges, and surface of the electrode. It will be noticed that the electrodes in no way interfere with the proper movement of the plunger *g, g*, since they are not in contact with the walls *e, e'*, or the plungers.

In Fig. 4 a button is shown in which I form the electrodes of thin metal foil, (see Fig. 6), and embed them into the active material opposite the space separating the two plungers. As foil or rolled metal can be obtained that has a fine polish, they give excellent results. Owing to the thin edge presented by the electrodes in this form of my device to the variable resistance material, there is no possibility of the variable resistance material being jammed or packed between the plungers *g, g*.

In Fig. 7 I have shown the preferred form of button, the difference between this and the previously described button being that the electrodes as illustrated in Fig. 9 are made somewhat longer and allowed to enter slightly into the space between the plungers *g, g*.

As clearly shown in Fig. 8 I prefer this form for the reason that the extension of the ends of the electrodes into the space between the plungers, insures that all of the active material intervening between said ends, is compressed by the plungers, and there is no part of the current-carrying material which is not compressed.

In Figs. 10 and 11 I have illustrated an embodiment of my invention in which only one plunger *g* is made use of, it being so placed in the chamber that it compresses the active material between it and a thick backing *k*, that forms the back wall of the chamber (instead of the thin wall *e'* shown in the preceding drawings).

It should be noticed that all the electrodes shown are tapering, and are kept away from the bottom of the chamber at the point where they are nearest together. This is to increase the resistance of the material that would lay beneath or out of alinement with the plungers, which is not compressed and therefore useless. In Fig. 10 I have shown a strip of insulating packing *l*, placed in the lower part of the chamber. This packing is made of some light fibrous material that will hold the variable resistance material up between the plunger and the rear plunger or abutment, and at the same time yield so as not to interfere with the movement of the wall *e*, or plunger.

In Fig. 13, is shown a transmitter in which the diaphragm *m* is attached at its center to one of the supports *h*, of the button *r* by a screw *n*, the opposite support being held by a bridge *o*. The terminals *j', j'*, of the electrodes may conveniently be connected to

binding posts *p, p*, mounted on the bridge, by suitable insulating bushings and screws. 65

Having thus explained the nature of my said invention, and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the modes of its use, I declare that what I claim is:— 70

1. A transmitter button comprising a receptacle containing variable resistance material, thin electrodes at opposite portions of said receptacle embedded in said variable resistance material, and a member arranged to compress the variable resistance material on the line of least resistance connecting said electrodes. 75

2. A transmitter button comprising a receptacle containing variable resistance material, compressors in said chamber adapted to compress a portion of said variable resistance material, and electrodes in contact with said variable resistance material between said compressors. 80

3. A transmitter button comprising a receptacle, a thin layer of resistance material in said receptacle, a plurality of plungers within said receptacle formed of insulating material, one of said plungers being adapted to be vibrated by a diaphragm, and relatively stationary electrodes in said receptacle and having edges which are thinner than the thickness of the said variable resistance material. 85

4. A transmitter button comprising a casing, a plurality of electrodes, a plurality of compressing surfaces independent of said electrodes, and variable resistance material between said compressing surfaces, and means in the casing for flexibly supporting the said resistance material. 90

5. A transmitter button comprising a plurality of compressing surfaces, one of said surfaces being formed on a plunger, a variable resistance material between said surfaces a plurality of electrodes in contact with said variable resistance material, presenting edges to each other thinner than space occupied by said variable resistance material between said surfaces. 95

6. A transmitter button comprising retaining walls, forming a chamber, electrodes at the ends of said chamber, a layer of resistance material in which the ends of the electrodes are embedded, and a movable plunger in said chamber, overlapping but not touching the ends of said electrodes. 100

In testimony whereof I have affixed my signature, in presence of two witnesses. 105

RALPH C. BROWNE.

Witnesses:

M. B. MAY,

E. BATCHELDER.