

No. 690,858.

Patented Jan. 7, 1902.

J. W. HENDERSON.
HORN FOR PHONOGRAPHS OR GRAPHOPHONES.

(Application filed May 11, 1901.)

(No Model.)

Fig. 1.

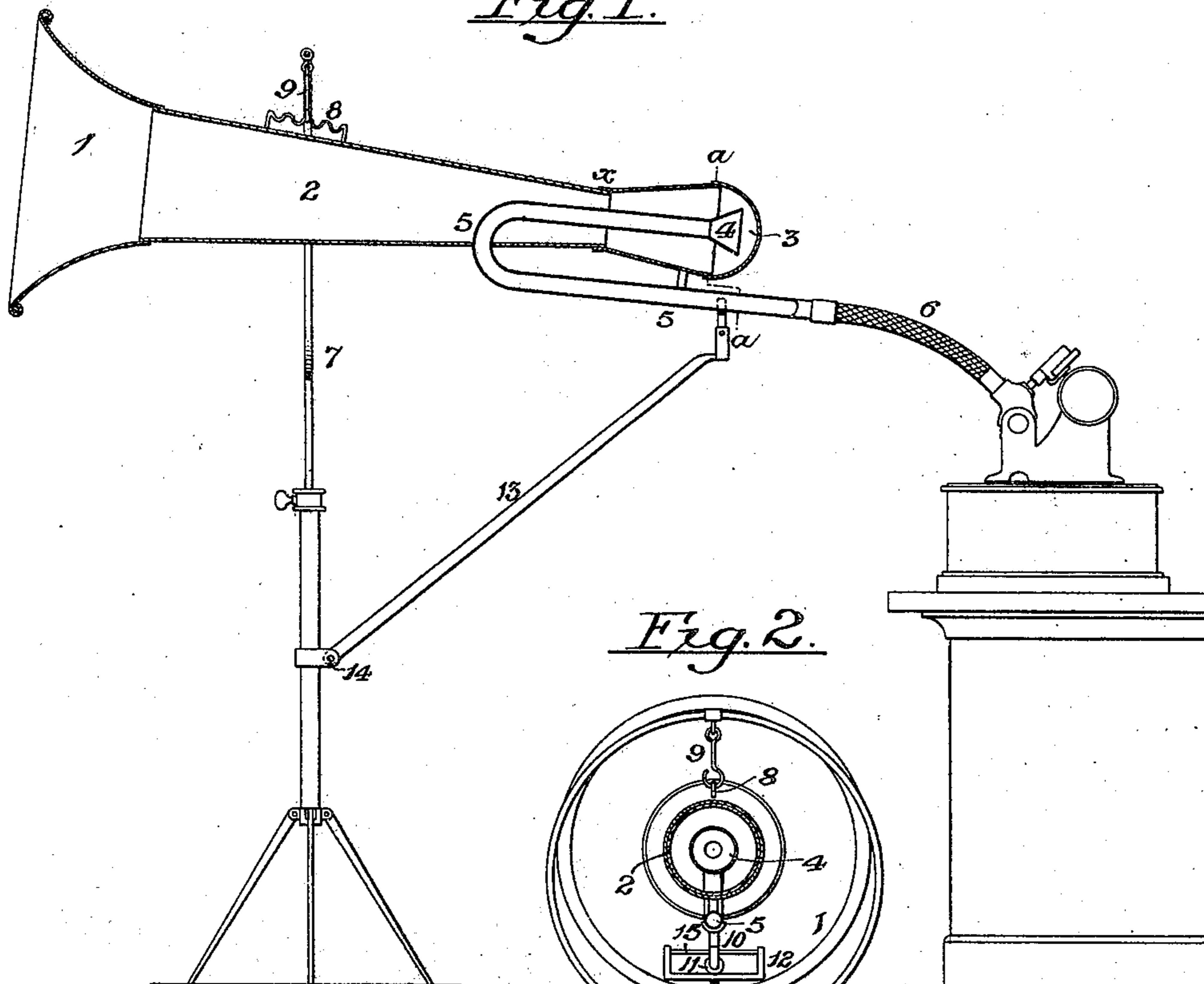


Fig. 2.

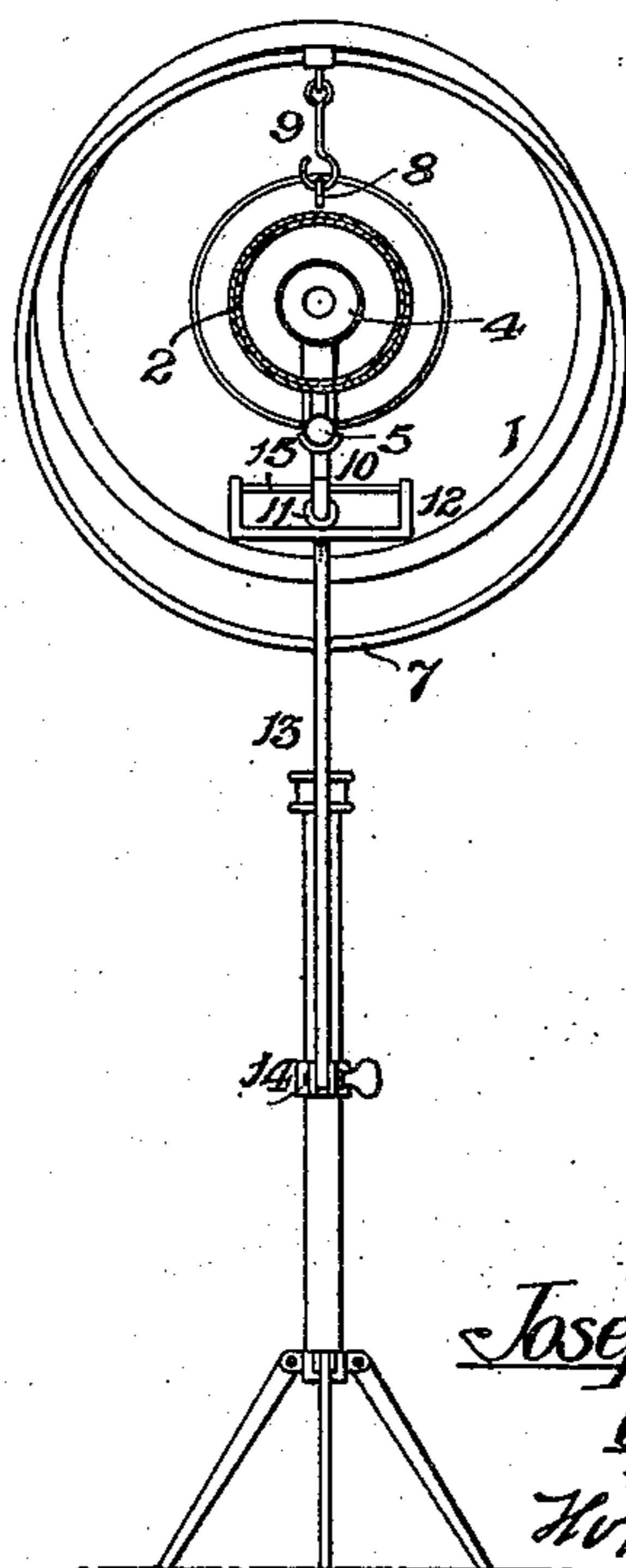
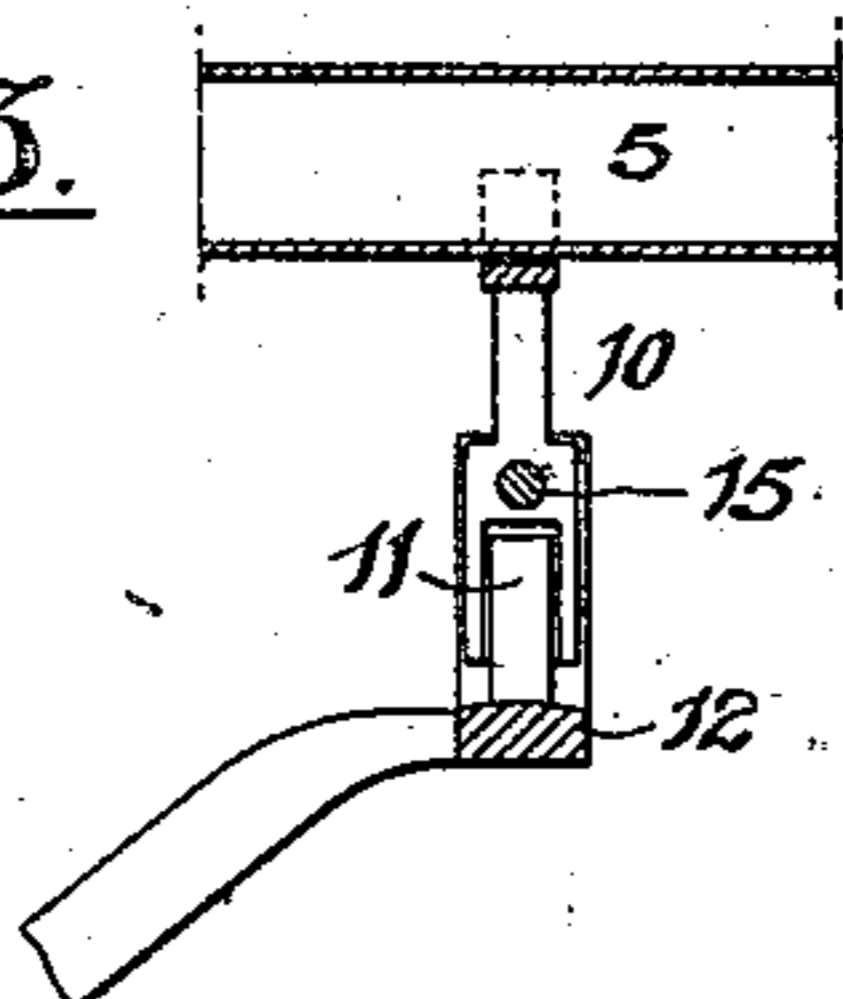


Fig. 3.



Witnesses:

Charles E. Long
Hamilton D. Turner

Inventor:

Joseph W. Henderson
by his Attorneys,
Horn & Horn

UNITED STATES PATENT OFFICE.

JOSEPH W. HENDERSON, OF PHILADELPHIA, PENNSYLVANIA.

HORN FOR PHONOGRAPHS OR GRAPHOPHONES.

SPECIFICATION forming part of Letters Patent No. 690,858, dated January 7, 1902.

Application filed May 11, 1901. Serial No. 59,838. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH W. HENDERSON, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Horns for Phonographs or Graphophones, of which the following is a specification.

My invention relates to sound-amplifying horns for use in connection with phonographs, graphophones, and other machines of a similar character.

The improved horn forming the subject of my invention has a flaring bell-mouth at one end and a rounded cap at the opposite end with tapered portions leading from said ends and joined together near the rounded end, whereby the internal diameter of the horn is contracted, and having an opening for the passage of sound near the contracted portion.

My improved horn is adapted to receive as well as transmit sound, and is especially designed to record and reproduce the human voice. By its use I am enabled to dissipate and remove to a large extent the objectionable metallic tones usually present when records of the human voice are reproduced and to improve the delivery of such tones, simulating to a great extent the natural tones of different sounds, especially the tones of the human voice.

My invention also includes a special mounting for the horn, so that it may readily move with the recording or reproducing instrument.

My invention is fully illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of a horn made in accordance with my invention, showing the same connected to the recording or reproducing diaphragm of an ordinary phonograph or graphophone. Fig. 2 illustrates a cross-sectional view of the horn, taken on the line *a a*, Fig. 1, showing also the stand and special mounting for the horn; and Fig. 3 is a sectional view illustrating a detail of the invention.

A horn made in accordance with my invention may be used with equal success either for recording or reproducing sound. When reproducing records of the human voice as usually made, particularly records of the soprano or tenor notes of singers, such notes are

delivered in sharp metallic tones. This defect is well recognized in the use of phonographs and graphophones, and these tones are particularly objectionable when the voice produced is that of a woman. With the improved horn made in accordance with my invention I can soften the tones produced from a record made with an ordinary horn or in any usual manner, or I can make with the aid of my improved horn a record that may be reproduced with better effect than ordinary records.

In the drawings herewith a horn is shown having the usual bell-mouth 1 and a body 2, which tapers rearwardly to the point *x* and is then enlarged in the form of a rounded end 3, which forms the rear end of the horn and performs the function of a sounding-board. The horn is contracted at the point *x* for two purposes—first, to prevent the escape of the sound received by the horn and thrown against the concaved rear end of the same for delivery to the diaphragm when recording, and, second, to modulate the sound discharged by the bent tube leading from the diaphragm against said concaved end of the horn when reproducing.

The horn may be made of several pieces, as clearly shown in the drawings, such construction being cheaper. It may, however, be constructed of two pieces—namely, the bell-mouth and body and the rounded rear end—such pieces to be joined at *x*, and such joint may be lapped, as shown, or smooth on the inside and covered by a ring of metal on the outside.

When reproducing instead of delivering the sound produced by the diaphragm directly at the rear end of the horn, as is usually done, I deliver such sounds against the inner surface of the semicircular rear end 3 of the horn from the flaring end 4 of the U-shaped pipe or tube 5. This pipe is arranged within and without the horn, as shown, the connection with the horn being at the bend, and the outer end is connected to the diaphragm of the machine by means of a flexible tube 6. The flexible tube which I prefer to use is one having a wall of coiled-wire spring inclosed in a braided cover. This structure may or may not be combined with a rubber tube.

The horn is suspended in the usual manner from a stand 7, a notched member 8 being carried by the horn, by which it is suspended from a link 9, such arrangement being the usual way of disposing the horn in the desired position.

In order to provide for the positive movement of the rear end of the horn as the reproducing or recording instrument travels along the record, I provide a hanging yoke-support 10, preferably carried by the tube 5, said support having a roller 11, which is adapted to a bracket 12, supported by the stand 7. This bracket is carried by a rod 13, pivoted to the stand at 14, and connection is made with the yoke-support 10 by means of a pin 15, which is carried by the bracket 12 and passes through said yoke-support. This construction permits the easy and positive movement of the horn in unison with the recording or reproducing member of the machine and insures the proper contact of such instrument with the record.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. A sound-amplifying horn having a flaring bell-mouth at its larger end, and a rounded cap at its smaller end, said members having tapering portions joined together near the rounded-cap end, thereby contracting the internal diameter of the horn at a point in advance of the rounded-cap end, and a connection between said horn and the diaphragm of a sound recording and reproducing machine, said connection having its open end within the horn adjacent to the rounded-cap portion of the same.

2. The combination with a machine for recording and reproducing sound, of an amplifying-horn having a bell-mouth at its larger end, and a rounded cap at its smaller end, said members having tapered portions joined together near the rounded-cap end thereby contracting the internal diameter of the horn at a point in advance of the rounded-cap end, a diaphragm carried by said machine, a tube carried by the horn having a portion within the latter terminating adjacent to the rounded-cap end, and a portion outside said horn suitably supported, and means for connecting said tube with the diaphragm.

3. The combination with a machine for re-

recording and reproducing sound, of an amplifying-horn comprising a conical body portion having a flaring bell-mouth at its larger end and a rounded conical cap closing the opposite end, the point of junction between the body portion of the horn and the cap being of less diameter than the rounded end of the cap, a diaphragm carried by said machine, a bent tube carried by the horn and affording communication between the same and said diaphragm, said tube entering the horn at a point in advance of the connection with the cap and having its open end extending into said cap, the portion of said tube outside the horn being secured to a flexible connection leading to the diaphragm, substantially as and for the purpose set forth.

4. The combination with a machine for recording and reproducing sound, of an amplifying-horn having a flaring bell-mouth at its larger end, and a rounded cap at its smaller end, said members having tapered portions joined together near the rounded-cap end, thereby contracting the internal diameter of the horn at a point in advance of the rounded-cap end, a diaphragm carried by said machine, a bent tube carried by the horn and having a portion within the latter terminating adjacent to the rounded-cap end in a bell-mouth, and a portion outside said horn suitably supported, and a flexible connection between the end of the outer portion of the bent tube and the diaphragm, whereby the movement of the latter will not be affected by the movement of the horn, substantially as described.

5. The combination with a machine for recording and reproducing sound, of a sound-amplifying horn, a support for said horn, a bent tube forming the connection between the machine and the horn, a trolley or roller carried by said tube, an adjustable arm carried by the support for the horn, and a track carried by said arm to which said wheel or trolley is adapted.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH W. HENDERSON.

Witnesses:

MURRAY C. BOYER,
JOS. H. KLEIN.