

C. E. WEST, JR.  
SOUND RECORDING AND REPRODUCING MACHINE.  
APPLICATION FILED JUNE 3, 1907.

956,460.

Patented Apr. 26, 1910.

Fig. 1.

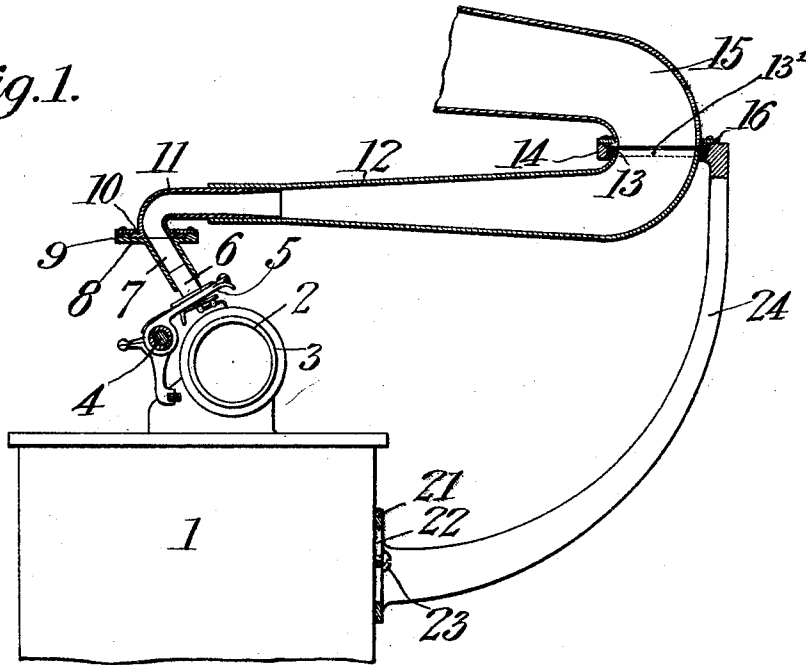


Fig. 2.

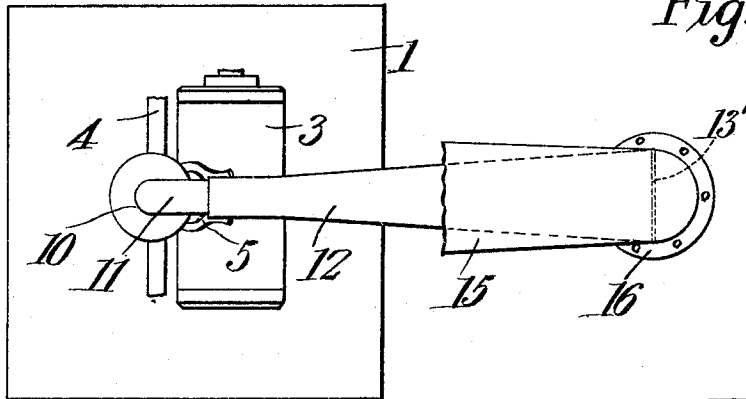


Fig. 3.

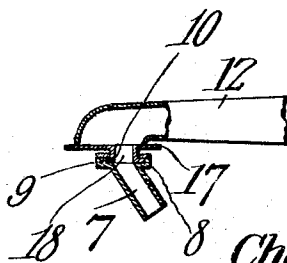
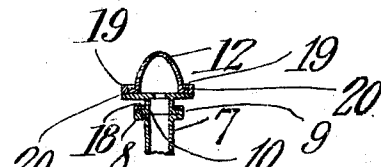


Fig. 4.



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# UNITED STATES PATENT OFFICE.

CHARLIE E. WEST, JR., OF HOPKINSVILLE, KENTUCKY.

SOUND RECORDING AND REPRODUCING MACHINE.

956,460.

Specification of Letters Patent.

Patented Apr. 26, 1910.

Application filed June 3, 1907. Serial No. 377,092.

*To all whom it may concern:*

Be it known that I, CHARLIE E. WEST, Jr., a citizen of the United States, residing at Hopkinsville, in the county of Christian and State of Kentucky, have invented a new and useful Sound Recording and Reproducing Machine, of which the following is a specification.

This invention has reference to improvements in sound recording and reproducing machines of the type where the recorder or reproducer is constrained to move in a right line across the record tablet.

The object of the present invention is to adapt to such a machine the type of sound amplifier wherein either the amplifier as a whole is movable in one plane only about a vertical axis, or one member only is movable to any point of the horizon and the other member is moved by the sound box as it travels across the record tablet, and both members coact to constitute a single continuously-expanding sound horn or amplifier.

The invention consists essentially in providing a sound reproducing or recording machine of the type wherein the sound box is positively propelled across the record in a straight line with a taper horn movable in one plane only or with a swinging taper arm connection forming a part of a sound amplifier, the other part of which connects at its smaller end with the large end of the taper arm and is expanded into an open mouth or bell of usual type.

The invention comprises a connection between the sound box and the taper arm whereby the latter is permitted to move about a vertical axis so that its smaller end, adjacent to the sound box, describes an arc and, therefore, changes its relation with the sound box. This connection is so related to the taper arm that it will move relatively into and out of the same to permit the arm to travel through a curved path, and it will also have a relative movement with relation to the sound box itself, so as to have a relative movement to the sound box about an axis perpendicular to the axis of the sound box.

The invention will be fully understood from the following detailed description taken in connection with the accompanying

drawings forming part of this specification, in which,—

Figure 1 is a side elevation, partially in section, of a sound reproducing machine with my invention applied thereto, unessential parts being omitted; Fig. 2 is a plan view of the same; Fig. 3 is a longitudinal section, partly in elevation, of a modified form of my invention; and Fig. 4 is a cross section of the structure shown in Fig. 3.

Referring to the drawings, there is shown a case 1 such as is usually provided with sound recording or reproducing machines, and containing the motor for driving the same. Upon the top of this machine there is suitably mounted for rotation a sound-record tablet support or mandrel 2, shown in the drawings as carrying a cylindrical sound-record 3. Carried upon a suitable feeding mechanism 4, such as is usually employed in machines using cylindrical record tablets, there is a sound box 5 shown in the drawings as a reproducer sound box but which may, of course, be a recording sound box. The sound record support and the sound box and its support and feeding mechanism constitute in themselves no part of the present invention and may be of any commercial type found in the machines using cylindrical record tablets; that is, in machines where the sound record is rotated upon an axis but is not movable longitudinally thereon and the sound box is fed in a right or straight line across the record parallel with the axis thereof when cylindrical records are used, or on a radius thereof when flat or disk-shaped records are used. The sound box 5 is provided with a neck 6 of the usual type, designed to convey the sound to or from the diaphragm, from or to the horn or sound amplifier. In machines of this type the sound box is usually so supported that the neck 6 stands at an angle to the vertical, and in the machine constructed in accordance with my invention this neck 6 is received in one end of a short tube 7, the other end of which is formed with a circumferential flange 8 terminating in a thickened periphery 9. The portion of the flange 8 interior to the thickened portion 9 constitutes an annular seat for the flanged end 10 of a short tube 11, so bent that when the flanged end 10 is seated upon the flanged

end 8 of the tube 7, this flanged end 10 will be in line with the tube 7 and the other end of the tube 11 will lie in a horizontal plane. The horizontal portion of the tube 11 enters the smaller end of a taper arm 12, such as is commonly used upon sound reproducing machines of the type where disk-shaped records are employed, and the record groove itself constitutes a feeding means for propelling the taper arm around a vertical axis.

The large end of the arm 12 is formed with a neck portion entering a ring 13 resting on an annular shoulder formed in a ring 14, which latter is formed on or carried by the upper end of a bracket 24 fast at its other end to the case 1 of the machine. Passing diametrically through the neck of the arm 12, and the ring 13, parallel to the case 1, there is a pin 13'. By this structure the arm 12 may turn upon a vertical axis to as great an extent as desired, and also has a limited movement on a horizontal axis. Above the shoulder supporting the ring 13 the ring 14 has another shoulder formed therein upon which is supported the smaller end of an amplifying horn section 15, of the usual type but of which only a portion is shown in the drawings. In order to hold the horn section 15 in place, there is secured to the upper side of the ring 14 a retaining ring 16 which, in order to be applied around the end of the horn 15, is made of two parts and secured to the ring 14 by screws or in any other manner desired.

The mounting of the horn 15 permits it to be moved around a vertical axis coincident with the center of the ring 14 to any point of the horizon desired, and the mounting of the taper arm 12 is such that it may be swung around the same axis. The meeting ends of the larger part of the taper arm 12 and the smaller part of the horn section 15 are coincident, and these two parts 12 and 15 so formed as to constitute a sound amplifying horn, for the sound waves, of constantly increasing diameter from the smaller end of the taper arm to the bell end of the horn section 15. The tube 11 is free to move longitudinally within the smaller end of the taper arm 12, and for this purpose the exterior of the tube 11 and the interior of the taper arm 12, where the tube 11 is movable within the arm 12, are made cylindrical so that the tube 11 is supported by the arm 12 and has sufficient range of longitudinal travel therein to adapt it to the particular machine to which the invention may be applied.

When the sound box is fed across the record positively in the usual manner, it carries with it the tube 7, the tube 11 and the taper arm 12, which latter, it is to be understood, then moves in a horizontal plane

only. Since the sound box moves across the record in a straight line and the taper arm 12 has its smaller end moving through an arc, there is a corresponding change in the relative positions of the sound box and the taper arm. This is provided for by the tube 11 which is capable of moving longitudinally into and out of the small end of the taper arm 12, and also by the manner of mounting the end 10 of the tube 11 in the seat provided therefor at the upper end of the tube 7, this permitting a certain axial movement of the tube 11 with relation to the tube 7 on a vertical axis about the joint formed between the flanged end 10 and its seat in the flange 8.

It will be seen that by this invention there is provided a large amplifying horn within a constricted space, whereby the floor space of the machine is very considerably reduced from that of a machine provided with a straight amplifying horn supported upon a suitable stand either attached to the machine or separate therefrom. Also, the sound box and those parts carrying the same are relieved from the weight of the horn, which is often considerable even where an attempt is made to counterbalance the horn.

While that portion of the sound-transmitting space between the sound box and the smaller end of the taper section 12 of the amplifying horn, occupied by the tubes 7 and 11, is approximately of constant diameter, as shown in the drawings, these connecting parts may be made of constantly increasing diameter to conform to an extent to the taper of the arm 12, but in practice the short extent of sound conduit of constant diameter has been found to not interfere to a marked degree with the purity and freedom of the tone. The connecting parts between the sound box and the amplifying horn, if made of one diameter throughout, should be made as short as possible, since it is found that where the tubular conduit of constant diameter is of any considerable length there is a muffling or obscurity of tone which is very detrimental to the best reproduction of sound.

In Figs. 3 and 4 there is shown a modified form of the invention whereby the tubular portion 11 is omitted and the tubular portion 7 is connected directly to the smaller end of the taper horn section 12. In the structure shown in these figures the upper end of the tube 7 has a flange 8 with a thickened periphery 9, as in Fig. 1. The tube 11 of Fig. 1 is replaced by a plate 17 having a short tubular neck 18 terminating in a flange 10 seated on the flange 8. The plate 17 projects for a distance to each side of the tube 7 and to a longer distance at the front and back thereof. The plate 17 is provided on its longer sides with overhanging flanges 19 forming a channel for receiving the out-

turned edges 20 at the smaller down-turned end of the taper section 12. The construction is such that the small end of the taper arm moves in a longitudinal direction in the flanges or channels 19, so that a sound box seated in the lower end of the tube 7 may move in a straight line across the record tablet while the taper arm end moves about an arc struck from the axis of the arm.

10 The swivel joint between the tube 7 and neck 18 provides for the slight relative movement of rotation between the horn section 12 and the sound box neck.

The down-turned end of the horn section 15 12 is elongated in the direction of the length of the taper arm 12 to permit the necessary extent of longitudinal movement with relation to the plate 17, and the said plate 17 should be made long enough to always cover the down-turned end of the taper arm section or a suitable slot therein whatever the relative position of the opening in the horn to the opening in the plate 17 may be.

In order to provide for the adjustment of the bracket 24 so that the height of the taper arm 12 with relation to the sound box may be properly adjusted, the said bracket 24 is provided at its point of connection with the case 1 with flanges 21 in which are formed elongated slots 22 and screws or bolts 23 pass through these slots 22 and into the case 1 and coact with the slots to permit the vertical adjustment of the bracket 24.

While it has been customary heretofore to provide the two-part amplifying horn with a taper section movable in one plane only for sound reproducing machines of the disk type, by the present invention such a horn with all the advantages attending its use, is adapted to both sound recording and reproducing machines of the type using cylindrical records.

The proportions of the several parts may be changed to adapt the invention to various types of talking machines.

I claim:—

1. In a sound recording and reproducing machine, a taper horn section movable in one plane only, a sound box movable across the record in a straight line only, and a connecting neck between the sound box and the horn section movable longitudinally in the latter and composed of two parts swiveled together at a point between the sound

box and the horn section, one part being freely rotatable as a whole relatively to the other at the swivel connection on an axis perpendicular to the plane of movement of the horn section.

2. In a sound recording and reproducing machine, a taper horn section constrained to move in one plane only about a vertical axis, a sound box constrained to travel across a sound record in a straight line parallel to the plane of movement of the horn section, a tubular connection carried by the smaller end of the horn section and movable longitudinally with reference to the same, another tubular connection carried by the sound box, and a swivel joint between the two tubular connections having its axis of rotation perpendicular to the plane of movement of the horn section.

3. In a sound recording and reproducing machine, a taper arm constituting a portion of the sound-amplifying means and constrained to move in one plane only, a sound box constrained to move in a straight line across the record tablet, a tubular sound-conveying section carried by the small end of the taper section and movable longitudinally with reference thereto, another tubular section connected to the sound box and provided with an annular seat at one end receiving the end of the first-named tubular connection remote from the taper arm, and means for holding the two tubular sections together.

4. In a sound recording and reproducing machine, a two-part sound amplifier having one section connected at its smaller end to the sound box and formed with an annular flange at its larger end, a supporting ring or collar provided with an annular seat for the flange, another horn section having its smaller end provided with an annular flange and provided with an annular seat of larger diameter than the seat for the other horn section and contiguous thereto, and means for confining the flanges on the horn section in juxtaposed relation.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

CHARLIE E. WEST, JR.

Witnesses:

EDWARD W. CLARK,  
GEORGE E. F. JONES.