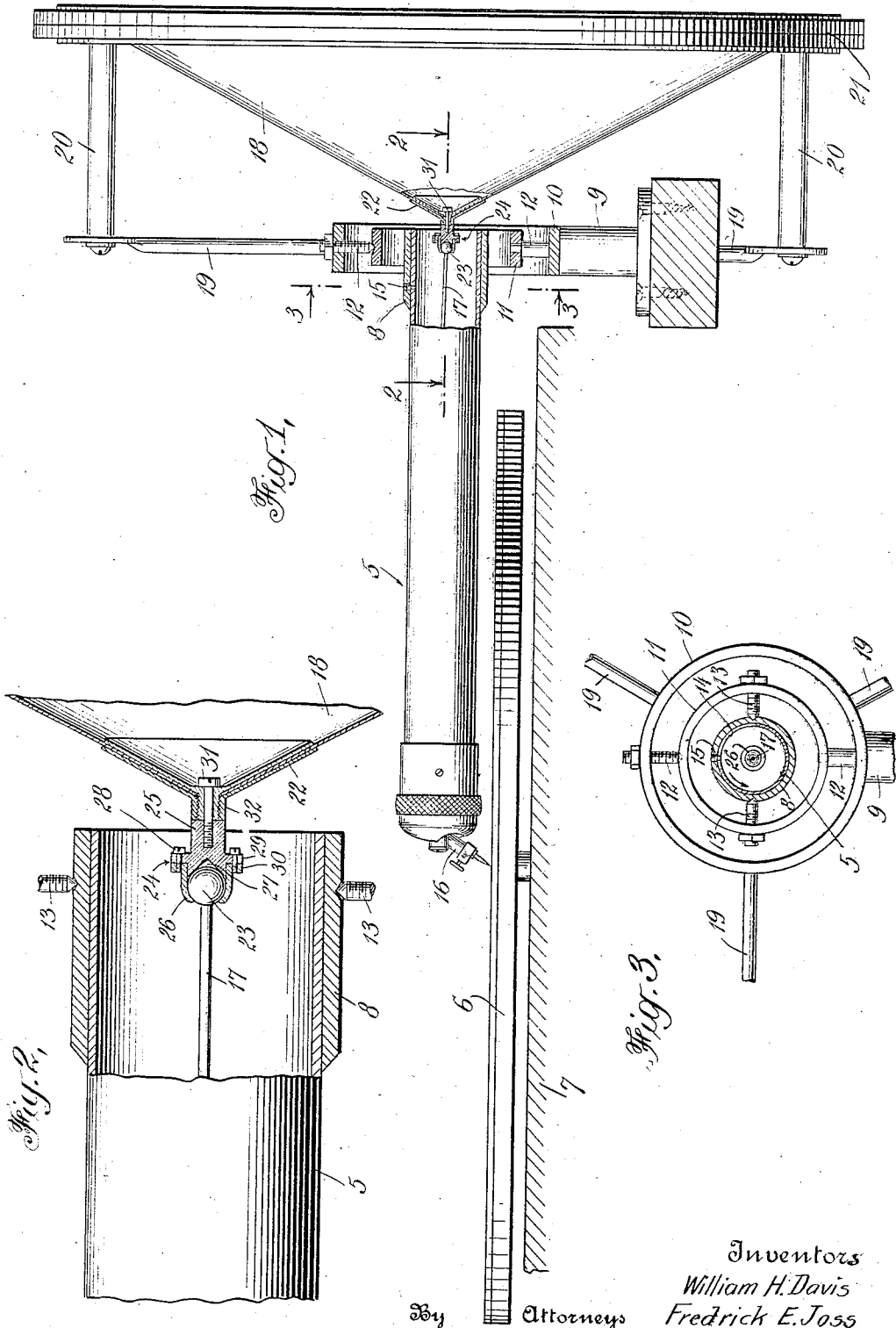


W. H. DAVIS AND F. E. JOSS.
TALKING MACHINE.
APPLICATION FILED JULY 13, 1918.

1,312,959.

Patented Aug. 12, 1919.



By Attorneys

Pennie, Davis, Marvin & Edmonds

Inventors
William H. Davis
Fredrick E. Joss

UNITED STATES PATENT OFFICE.

WILLIAM H. DAVIS, OF BRONXVILLE, AND FREDRICK E. JOSS, OF BROOKLYN, NEW YORK, ASSIGNORS TO LEKTOPHONE CORPORATION, A CORPORATION OF DELAWARE.

TALKING-MACHINE.

1,312,959.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, WILLIAM H. DAVIS and FREDRICK E. JOSS, both citizens of the United States, residing at, respectively, Bronxville, county of Westchester, State of New York, and borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Talking-Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

15 The present invention has reference to talking machines, and more particularly to machines of the general type disclosed in U. S. Letters Patent to Marcus C. Hopkins, No. 1,271,527, of July 2, 1918.

20 In machines of the type specified, the vibrations of the stylus, during its travel along a phonic line, are transmitted to a conical diaphragm of large area, freely supported in unconfined air, in a manner to move the entire conical portion of the diaphragm bodily. The diaphragm is connected to the rear end of a supporting bar, which is mounted to move across the record or its equivalent and which carries a transmission device that comprises a rod or wire extending from the stylus holder to the center of the diaphragm. The connection between the supporting bar and the diaphragm is usually of a rigid character, so that the two move in unison both during the horizontal swinging movement of the bar across the record and during its vertical swinging or rocking movements, the latter movements occurring when the stylus passes over uneven portions of the record and when the bar is raised for the purpose of changing the stylus. In consequence, space enough must be provided within the cabinet to enable these movements to take place freely; and since the diaphragm is of quite large size, as previously stated, practically the entire rear portion of the cabinet is required for that purpose. It follows, therefore, that the brake adjusting devices and other adjuncts cannot be disposed at the rear of the turn-table, as is usually the case, but must all be located in the front portion of the cabinet, which may possibly entail some material changes in their construction.

It is the object of this invention to im-

prove the arrangement just described by providing a connection between the diaphragm and the vibration transmission device which is of such a character as to enable a stationary mounting of the diaphragm while at the same time permitting the supporting bar to make all of the movements previously mentioned, besides being capable of an additional, rotary movement in either direction about its longitudinal axis for the purpose of playing both vertically and laterally cut records.

According to the embodiment of the invention herein disclosed, the supporting bar has a universal mounting, which enables it to move as above indicated and which is preferably connected to the diaphragm to hold it in fixed position; and a universal connection is provided between the transmission rod and the diaphragm to permit the former to move in unison with the bar but relatively to the said diaphragm. The invention is not limited, however, to the precise details of the construction whereby the object stated is accomplished, as embodied in the present disclosure, excepting in so far as may necessarily result from the phraseology of the appended claims.

The accompanying drawing illustrates one form which the invention may take in practice, and therein:

Figure 1 is a side elevation, partly in section, showing the improved arrangement of parts.

Fig. 2 is an enlarged horizontal section on line 2—2, Fig. 1; and

Fig. 3 is a vertical section on line 3—3, Fig. 1.

Referring more particularly to said drawing, 5 indicates generally the supporting bar of a Hopkins-type machine, and 6 the record-carrier or turn-table across which it is arranged to move, the latter element being mounted above the deck 7 of the machine and driven from a motor (not shown) in any desired manner. The bar 5 is rotatably fitted at its rear end in a supporting sleeve 8, which is itself supported by a gimbal joint from a bracket 9, fixed to an extension of the deck 7 or to some other stationary part of the machine; the gimbal joint preferably comprising outer and inner concentric rings 10 and 11 provided with bearing members 12 and 13, which respectively engage the

inner ring 11 and the sleeve 8. In consequence the arrangement is such that the bar is enabled to swing in both a horizontal and vertical plane and to turn in either direction about its longitudinal axis.

Means are provided to limit the rotary movement of said bar, so that in one position the parts will be set for playing laterally cut records, and in the other position for playing vertically cut records, such means preferably embodying a quadrant slot 14 in which a pin 15 is arranged to travel. In the present instance, the slot is formed in the bar, while the pin is secured to the bearing sleeve 8, as shown in Fig. 3. The adjustment of the supporting bar from one playing position to the other involves an independent adjustment of the stylus holder 16, constituting one element of the vibration transmission device, the other element of which, as usual in machines of the type disclosed, is in the nature of a rod or wire 17 extending from the holder to the diaphragm 18. This independent adjustment of the stylus holder is necessitated by reason of the fact that when the bar is rotated from one of its two playing positions to the other, the stylus holder moves with it, so that said holder must therefore be moved backward to bring the stylus into record-engaging position.

The stationary outer gimbal ring 10 forms the hub of a spider which is utilized to support the diaphragm in fixed position, the arms 19 of the spider being fastened at their inner ends to the hub or ring 10 and having their outer ends connected by short, horizontal spaced bars 20 to the diaphragm carrier 21. The carrier comprises a pair of co-acting rings which securely clamp between them a peripheral flange or supporting rim (not shown) formed on the diaphragm. The latter has the size and other characteristic features described in the above-identified Hopkins application, to which reference may be had, it being considered sufficient for all present purposes to state that said diaphragm comprises, in addition, to its rim, a conical body portion of light, vibratile material which is vibrated bodily piston-fashion and is thereby enabled to produce self-sustaining sound waves of the same intensity as the original sound waves, so that it takes the place not only of the usual small sound-box, but also of the accompanying horn or other amplifier of like character.

The joint between the rear end of the transmission rod 17 and the diaphragm cooperates with the gimbal joint to maintain the diaphragm stationary during the movements of the supporting bar 5, as has previously been stated, and preferably consists of a spherical element or ball and a socket to receive the same, one of said elements being secured to the rod end and the other to a metallic cap 22 affixed to the cen-

ter of the diaphragm. The body portion of said diaphragm is here shown as truly conical, but the same effects would be obtainable if the cone were slightly flattened; the shape of the cap depending, therefore, upon that of the cone, and the rod being disposed, in any case, in line with the axis of the cone. In the construction illustrated, the ball 23 is fastened to the aforesaid rod end, while the socket 24 is carried by the cap 22 and consists of a body 25 and a sleeve or guard 26, the latter member being curved somewhat at its free outer edge to fit the ball and hold it in the conical seat or recess 27 formed in said body. The two parts 25 and 26 are fastened together by means of small screws or bolts 28 which are passed through mating openings in their outstanding, circumferential flanges 29 and 30, as clearly disclosed in Fig. 2; and the part 25 is attached to the said cap 22 by a bolt 31, the cap having a forwardly-extending axial neck 32 which abuts against said part and through which said bolt passes.

The sleeve or guard 26 fits over the ball sufficiently tight to prevent relative bodily movement between said parts, but has enough resilience or "give" to avoid interfering in any way with the turning or rotation of the ball produced by the movements of the supporting bar, as will be understood.

We claim as our invention:

1. In a talking machine, the combination of a stationary diaphragm of large area; a supporting bar extending toward the center of the diaphragm and mounted for swinging movement relative to said diaphragm in both vertical and horizontal planes; a vibration transmission device carried by said bar and provided at one end with a stylus holder; and a universal coupling between the other end of said transmission device and the center of said diaphragm.

2. In a talking machine, the combination of a stationary diaphragm; a supporting bar extending toward the center of the diaphragm and mounted for swinging movement relative to said diaphragm in both vertical and horizontal planes, and for rotary movement in either direction about its axis; a vibration transmission device carried by said bar and provided at one end with a stylus holder; and a universal coupling between the other end of said transmission device and said diaphragm.

3. In a talking machine, the combination of a stationary diaphragm of large area; supporting means therefor; a supporting bar extending toward the center of the diaphragm and movable relatively to said diaphragm; a stylus holder mounted on the front end of the bar; a transmission element carried by said bar and connected at one end with said holder; and a universal cou-

pling between the other end of said transmission element and the center of said diaphragm.

4. In a talking machine, the combination
5 of a stationary diaphragm of large area; a tubular supporting bar extending toward the center of the diaphragm and movable relatively to said diaphragm, said bar being provided at its front end with a stylus
10 holder; a transmission element disposed longitudinally of and within said bar and connected at one end with said holder; and a universal coupling between the other end of said transmission element and said dia-
15 phragm.

5. In a talking machine, the combination of a tubular supporting bar provided at its front end with a stylus holder; a universal

mounting for said bar to enable the same to swing in both vertical and horizontal planes, 20 said mounting including a sleeve wherein the rear end of said bar is rotatably fitted to permit said bar to be turned in either direction about its axis; a diaphragm located adjacent the rear end of said bar; means 25 for supporting the diaphragm in fixed position; a transmission element disposed longitudinally of and within said bar and connected at its front end with said holder; and a universal connection between the rear end 30 of said transmission element and said diaphragm.

In testimony whereof we affix our signatures.

WILLIAM H. DAVIS.
FREDRICK E. JOSS.