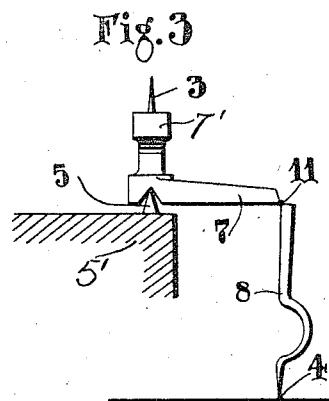
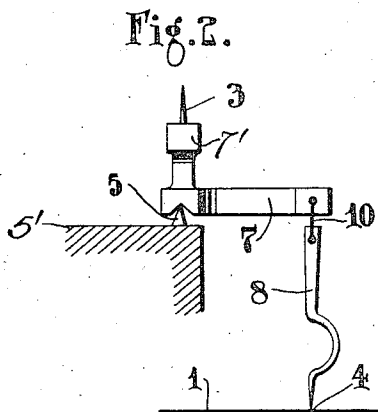
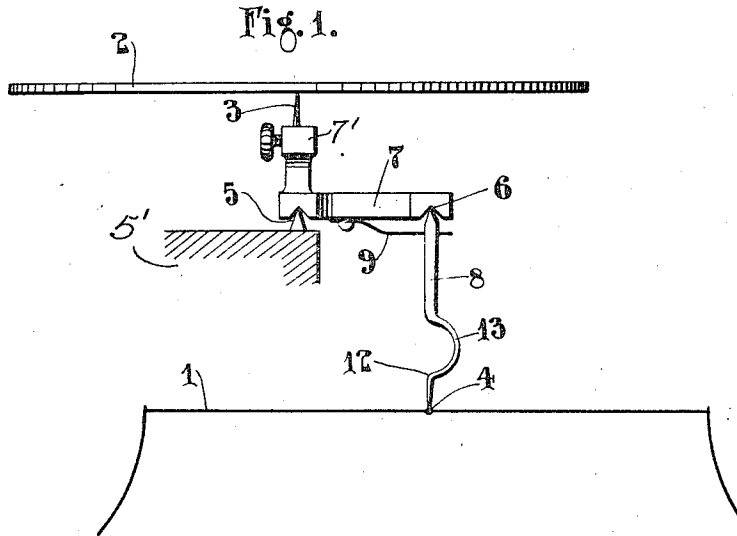


L. LUMIERE.
TALKING MACHINE.
APPLICATION FILED NOV. 19, 1909.

1,036,285.

Patented Aug. 20, 1912.



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UNITED STATES PATENT OFFICE.

LOUIS LUMIERE, OF LYON, FRANCE.

TALKING-MACHINE.

1,036,285.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LOUIS LUMIERE, a citizen of the French Republic, and residing at 262 Cours Gambetta, Lyon, France, have invented certain new and useful Improvements in and Relating to Talking-Machines, of which the following is a specification.

This specification relates to improvements in talking machines, particularly to that type of talking machine illustrated in and forming the subject-matter of my Letters Patent of the United States, No. 986,477, dated March 14, 1911, special reference being had to the construction illustrated in Figure 10 of said application.

My invention has for its object, to provide improved means for connecting the stylus with the diaphragm.

A further object of this invention is to so construct the connection between the stylus and the diaphragm, particularly when diaphragms of large diameter are employed, such as are illustrated in my above mentioned application, that the said diaphragms are permitted to and will vibrate freely and fully without being subjected to any torsional or other strains, due to the fact that the diaphragm is attached to a stylus bar, the axis of oscillation of which is comparatively remote from the diaphragm; and to so arrange the connection that the point of the attachment of the stylus with the diaphragm will not vibrate in any other manner than in a line substantially normal to the plane of the diaphragm.

In carrying out my invention, I make the connection between the stylus and the diaphragm in such a manner that the diaphragm is located substantially parallel with a disk record, and I provide such a connection between the diaphragm and the point of the stylus that by simply turning the sound box through a right angle in the plane of the diaphragm, the sound box may be used with both of the common types of disk records; that is to say, with disk records in which the sound waves are recorded in the form of a groove, the bottom of which is provided with vertically arranged undulations corresponding to sound waves, or with disk records in which the sound is recorded as a sinuous line or as a groove of substantially uniform depth, but provided with lateral undulations in the side walls thereof. When the diaphragm of the sound box is parallel to the disk

record, it will cooperate, for instance, with a record such as is above described, having the sound recorded in a groove having lateral undulations, and when the sound box is turned through an angle of 90 degrees it will be adapted to cooperate, with a record in which the sound is recorded as a groove having vertical undulations. This operation or manipulation of the sound box to cooperate with these different types of sound records is provided for and accomplished by means of the connection between the stylus and the diaphragm, illustrated in the drawings of this application, and the construction consists of a bell crank lever, one arm of which is provided with means whereby the stylus may be attached thereto, and the other arm of which is connected by a direct connecting bar with the diaphragm, the said connecting bar being arranged normally to the plane of the diaphragm, and attached to the arm of the bell crank lever by means of a flexible or yielding connection. From the above it will be seen that the disk record is substantially in a plane parallel with the diaphragm and with one arm of the bell crank lever, while the axis of the other arm of the bell crank lever and the connecting bar between the bell crank lever and the diaphragm is substantially parallel. In order that the rigid bell crank lever may not exert a tension upon the diaphragm in any other direction than in a line normal to the plane of the diaphragm, the bell crank lever and the said connecting bar are yieldably attached to each other by means of any suitable elastic joint.

Further objects of my invention will appear in the specification and claims below.

Referring now to the drawing forming a part of this application, Fig. 1 is a partial side elevation of one construction embodying my invention; and Figs. 2 and 3 are similar views of modified forms of my invention. In all these figures the manner of mounting the diaphragm and the manner of mounting the stylus bar, in so far as the support for these parts is concerned, are not illustrated, inasmuch as they are substantially the same as is illustrated in the drawings of my aforesaid Patent No. 986,477.

Referring to Fig. 1, the diaphragm 1 is arranged substantially parallel to the disk record 2, upon which sounds are to be recorded or from which sounds are to be reproduced. My invention relates to the con-

struction of the stylus bar between the stylus 3 and the point of attachment 4 of the same with the diaphragm. This stylus bar is mounted in any suitable manner, as upon knife edges 5, carried by a suitable support 5', which support may be connected in any suitable manner with the casing upon or within which the diaphragm 1 is mounted. The stylus bar proper consists of a bell crank lever 7, one arm of which is provided with a socket 7', within which is secured the stylus 3, and the other arm of which engages and is connected to the connecting bar 8, which extends at right angles to the arm of the bell crank lever with which it is in engagement, and has its opposite end secured to the diaphragm 1 at the point 4. In this embodiment of my invention, the arm of the bell crank lever which is connected with the connecting bar 8 is provided with a recess or V-shaped groove 6, and the adjacent end of the connecting bar 8 is provided with a knife edge resting therein. This provides a flexible or a yielding connection between the stylus bar 7 and the connecting bar 8. In order that the stylus bar 7 and the connecting bar 8 may be in actual operative engagement at all times, the leaf spring 9 is provided, attached in any suitable manner at one end to the bell crank lever 7 and having its other end secured to said connecting bar 8. It is sometimes desirable to make the connecting bar slightly yielding in the direction of its length, and for that purpose a bend 13 may be provided in order to give the bar a slight elasticity.

With such a construction as I have above described, it will be clear that if the disk record 2 be provided with a record groove in which the sound is recorded as vertical undulations in the bottom thereof, the stylus 3 will be vibrated in following the undulations in said groove, and will cause the outer end of the bell crank lever 7 to vibrate in the same manner. The vibration of the bell crank lever is communicated to the diaphragm 1 through the connecting bar 8, and on account of the yielding connection between the bell crank lever and the connecting bar, the vibrations will be transmitted to the diaphragm substantially in a line normal to the surface of the diaphragm. It will also be apparent that if the disk record 2 be provided with grooves in which the sound is recorded in the side lines of the groove as lateral undulations, the stylus 3 will be vibrated thereby if the sound box and the stylus bar and diaphragm carried thereby be merely turned through an angle of ninety degrees in the plane of the diaphragm, and in coöperating with such a record the stylus will be vibrated similarly to the manner in which it was vibrated with the other type of record, and the vibrations

of the stylus will be transmitted to the diaphragm in the same manner. The flexible connection between the stylus bar or bell crank lever 7 and the connecting bar 8 avoids all tendency of the stylus bar to impress upon the diaphragm strains or tensions in any other direction than in a line normal to the plane of the diaphragm, no matter how long the arm of the stylus bar or bell crank lever may be, or how remote it may be from the axis upon which it vibrates. This construction is therefore particularly adapted for use in connection with diaphragms of large diameter. The leaf spring 9, which holds the connecting bar and the bell crank lever together, prevents any lost motion or rattle between the said parts. It prevents, in fact, all motion except a slight angular motion at the knife edge joint.

In Fig. 2, the flexible joint between the bell crank lever and the connecting bar is formed by a leaf spring 10, the ends of which are secured to the bell crank lever 7 and the rod or bar 8, respectively, and in Fig. 3 is illustrated another kind of flexible connection between the said parts, the same being formed by reducing the thickness of the parts 7 and 8 at the point where they engage each other, so that the reduced portion forms a spring. If desirable, similar joints may be arranged at the point 12. It will be plain, however, that whether the arm 7 of the stylus bar and the connecting bar or rod 8 between the stylus bar and the diaphragm be made, as illustrated in Figs. 1 and 2, of separate pieces unitarily held in operative relation, or be made integral and connected together by a reduced portion 11, as shown in Fig. 3, the connection between the said parts is a pivotal connection and comprises a yielding connecting means to permit of a free, angular, relative movement between the stylus bar and the connecting bar.

While other forms of pivotal connections might be used without departing from the spirit and scope of this invention, the forms illustrated in the drawings and described in the specification above, constitute the preferred embodiments of my invention. It is to be further observed that in all these forms above referred to, the means for attaching or connecting the stylus bar with the connecting rod is independent of the support upon which the stylus bar is mounted to oscillate.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States, is:

1. In a sound box, the combination with a support, of a rigid stylus bar mounted to oscillate on said support, a diaphragm, a flexible connecting bar independent of said support and secured at one end to said dia-

phragm, the other end of said connecting bar being rigid and abutting against said stylus bar, and yielding means independent of said support to hold said connecting bar and said stylus bar in operative engagement with each other.

2. In a sound box, the combination with a support, of a rigid stylus bar mounted to oscillate on said support, a diaphragm, a flexible connecting bar independent of said support and secured at one end to said diaphragm, an anti-friction bearing between the opposite end of said connecting bar and said stylus bar, and yielding means mounted independent of said support to hold said connecting bar and said stylus bar in operative engagement with each other.

3. In a sound box, the combination with a support, of a rigid stylus bar mounted to oscillate on said support, a diaphragm, a flexible connecting bar independent of said support secured at one end to said diaphragm, a knife edge bearing between the opposite end of said connecting bar and said stylus bar, and yielding means independent of said support to hold said connecting bar and said stylus bar in operative engagement with each other.

4. In a sound box, the combination with a support, a rigid stylus bar mounted to oscillate on said support, a diaphragm, a connecting bar independent of said support secured at one end to said diaphragm, a knife edge bearing between the opposite end of said connecting bar and said stylus bar, and yielding means independent of said support to hold said connecting bar and said stylus bar in operative engagement with each other, said connecting bar being provided with a flexible and with a rigid portion.

5. In a sound box, the combination with a support, of a rigid stylus bar mounted to oscillate on said support, a diaphragm carried by said support, a connecting bar having a substantially rigid end and having a longitudinally curved flexible portion, the rigid end of said connecting bar engaging said stylus bar in a knife edge bearing, and the other end of said connecting bar being connected to said diaphragm, and yielding means independent of said support holding said connecting bar and said stylus bar in operative engagement with each other.

6. In a sound box, the combination with a support, of a rigid stylus bar in the form of a bell crank lever mounted to oscillate on said support, a diaphragm carried by said support, a connecting bar having a substantially rigid end and having a longitudinally curved flexible portion, the rigid end of said connecting bar engaging said stylus bar in a knife edge bearing, and the other end of said connecting bar being connected to said diaphragm, and yielding means independent of said support holding said connecting bar and said stylus bar in operative engagement with each other.

7. In a sound box the combination with a support, of a rigid stylus bar mounted to oscillate on said support, a diaphragm, and a connecting bar secured to said diaphragm, said connecting bar being provided with a rigid and with a flexible portion, said rigid and flexible portions being integral with each other and said rigid portion being held in pivotal engagement with said stylus bar.

8. In a sound box, the combination with a support, of a rigid stylus bar mounted to oscillate on said support, a diaphragm, and a connecting bar secured to said diaphragm, said connecting bar being provided with a rigid and with a flexible portion, said rigid and flexible portions being integral with each other and in pivotal engagement with said stylus bar.

9. In a sound box, the combination with a support, of a diaphragm, means for holding a stylus, including a comparatively rigid part mounted to oscillate on said support, and a connecting part between said first-mentioned part and said diaphragm, said connecting part being provided with a flexible and with a rigid portion, and the oscillation of said first-mentioned part resulting in the longitudinal reciprocation of said connecting part, and yielding means between said comparatively rigid part and said connecting part, and connected only to said parts.

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

LOUIS LUMIERE.

Witnesses:

GASTON JEANNIAUX,
THOMAS N. BROWNE.