

Oct. 30, 1928.

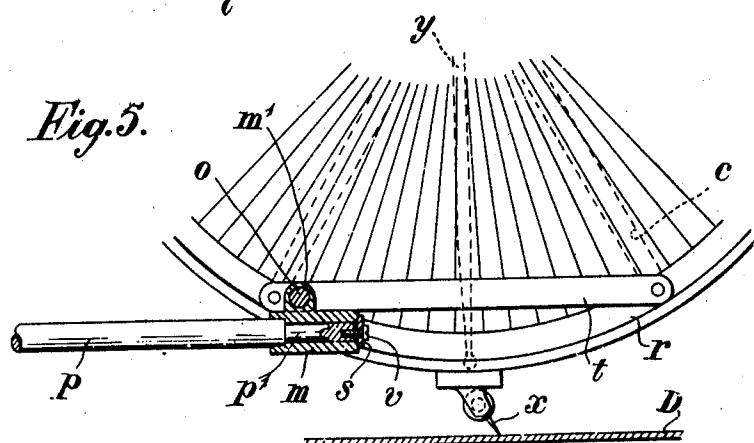
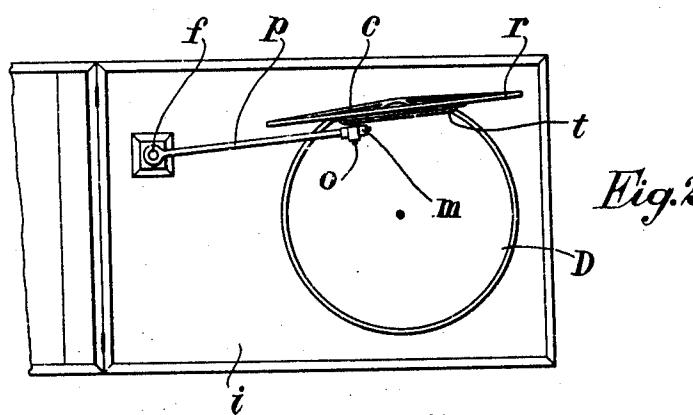
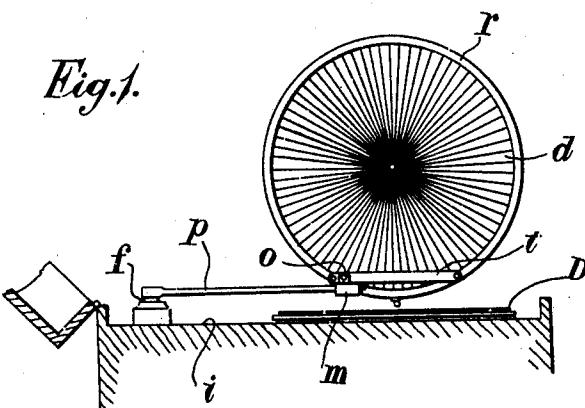
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TALKING MACHINE EMPLOYING LARGE DIAPHRAGM

Filed Nov. 4, 1924

2 Sheets-Sheet 1



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Fig.3.

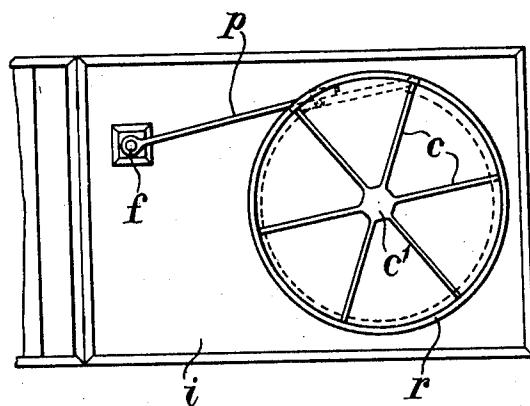
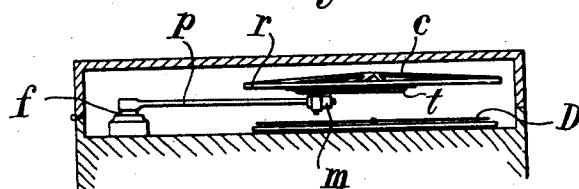


Fig.4.

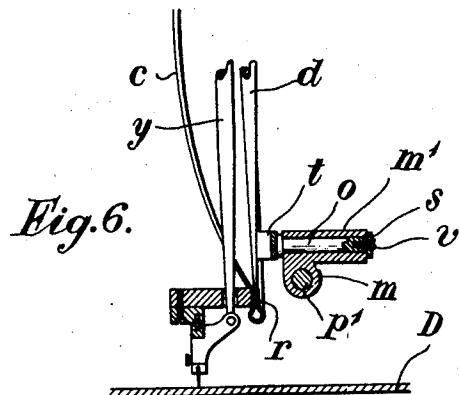


Fig.6.

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## UNITED STATES PATENT OFFICE.

LOUIS LUMIERE, OF LYON, FRANCE.

## TALKING MACHINE EMPLOYING LARGE DIAPHRAGM.

Application filed November 4, 1924, Serial No. 747,860, and in France November 28, 1923.

This invention relates to improvements in talking machines employing large diaphragms. In my application for patent Serial No. 744,036, filed in the United States October 16, 1924, and filed in France November 16, 1923, entitled Talking machines employing large diaphragms, I have described a method of mounting the diaphragm of talking machines employing large diaphragms, so that it can occupy substantially a vertical position, at right angles to the record, during playing, while when not in use it may be arranged to lie horizontally substantially parallel with the diaphragm, so that the lid of the talking machine casing may be closed.

The present invention relates to alternative means for carrying out the invention which forms the subject of the above mentioned application.

According to the present invention a carrying arm is pivoted to a fixed point, for example on the cabinet of the machine, and upon the end of this arm the diaphragm is mounted with a double articulation.

The invention is illustrated in the accompanying drawings, in which Fig. 1 is an elevation showing the diaphragm in the playing position,

Fig. 2 is a plan view of the same, while Figs. 3 and 4 are respectively elevation and plan views of the diaphragm in the non-playing position.

Figs. 5 and 6 illustrate the details of construction on a larger scale, Fig. 5 being a side elevation and Fig. 6 a front elevation partly in section.

The diaphragm *d* may be of any known or suitable form and in the construction illustrated the diaphragm is formed of a strip of paper or the like pleated a number of times and joined at its ends and pressed down in the form of a disc in known manner. The edge of the diaphragm thus obtained is gripped between two metal rings, or in a single metal rim (Figs. 5 and 6) the edges of which are bent over and clamped on the edge of the diaphragm, so as to form a rigid ring *r*. On one face of the ring *r* is fixed a star shaped support, by means of its radiating arms *c*, which

meet at the middle in a boss *c'* (Fig. 4). On the inner face of this boss is mounted so as to oscillate, a bell crank, not shown in the drawing, and one arm of this bell crank is connected to the diaphragm *d* while the other is connected to a transmission member *y* which in

turn is connected to the oscillating needle holder. The details of this construction are illustrated in my earlier application above referred to.

The essential feature of the present invention is that the diaphragm *d* is mounted at one part of its circumference upon the free end of a horizontal arm *p*, the other end of which is mounted to turn about a vertical axis *f*, with a ball bearing if desired, which is fixed at a suitable point upon the top board *i* of the case of the machine, Figs. 1 to 4.

The diaphragm is mounted upon this carrying arm *p* with a double articulation, as will be seen from the drawing, Figs. 5 and 6. On the opposite sides of the ring *r* to that which carries the star shaped support *c*, *c'*, a cross bar *t* is fixed by means of screws or bolts, the bar *t* extending across between the ends of two of the arms *c*, between which is mounted the needle holder, carrying the needle *x*. On the outer face of this cross bar *t* is fixed a stub shaft *o* perpendicular to the plane of the cross bar and of the diaphragm and situated between the transmission member *y* and the rear end of the cross bar *t* (Fig. 5).

The diaphragm *d* is able to rock on the free end *p'* of the arm *p* by means of the stub shaft *o* which turns freely in an eye formed in a lug *m'* on a sleeve *m* which is mounted to turn on the end *p'* of the arm *p*. The sleeve *m* lies at right angles to the lug *m'* and the stub shaft *o*. In Figs. 5 and 6, it will be seen that the end *p'* of the arm *p* is reduced in diameter and that the sleeve *m* is held thereon by means of a washer *s* and a screw *v*. While one type of means has been illustrated for mounting sleeve *m* it is to be expressly understood that the invention is not limited to the particular embodiment illustrated. The vertical shaft *f* about which the arm *p* turns is mounted at a convenient point on the board *i* with regard to the record disc *D*, Fig. 2, in order that the plane of the diaphragm in the playing position may be able to turn through an angle, between the limits generally accepted in relation to a tangent to the sound groove at the point of contact of the needle *x* with the disc *D*.

The point at which the stub shaft *o* is mounted on the cross bar *t*, and consequently the position of the diaphragm, is selected according to the weight of the latter, in order that the pressure of the needle on the disc is within the limits permissible. This point *o*

may not lie within the circle of the diaphragm as will be readily understood by those skilled in the art.

The pressure of the needle *x* upon the disc 5 *D* may also be regulated by means heretofore employed in the art for this purpose.

The arrangement described allows the diaphragm *d* either to occupy a vertical position, for playing, as shown in Figs. 1 and 2, or to 10 occupy a horizontal position, as shown in Figs. 3 and 4, when the machine is not in use. The latter position is obtained by causing the diaphragm to oscillate first of all about the stub shaft *o*, so as to raise the diaphragm 15 from the disc record, and then folding the diaphragm down by turning the sleeve *m* about the end of the arm *p*.

The plane of the diaphragm may be parallel to that of the arm *p* or it may form with 20 it any desired angle, without any departure from the present invention.

The form of the carrying arm *p* may be varied, as also the manner in which it is mounted.

25 I claim:

1. In combination with a casing, a horizontally swinging arm pivoted to said casing, a diaphragm adapted to occupy a substantially vertical playing position, a peripheral 30 mounting for said diaphragm, and means including a pivot member secured to the mounting adjacent the periphery thereof for securing the mounting to said arm, said means permitting movement of the diaphragm about 35 said arm in two planes.

2. In combination with a casing, a horizontally swinging arm pivoted to said casing, a diaphragm adapted to occupy a substantially vertical playing position, and pivotal means 40 for securing the diaphragm to said arm, and permitting movement of the diaphragm in its own plane and also in a plane at right angles thereto, the major portion of said diaphragm being located above said arm when 45 the diaphragm is in playing position.

3. In combination with a casing, a solid arm mounted for pivotal movement in a horizontal plane on the casing, a diaphragm adapted to occupy a substantially vertical 50 playing position and a substantially horizontal non-playing position, and means including a horizontally disposed pivot member secured to the arm above the latter for attaching the diaphragm to said arm.

4. A mounting for a diaphragm comprising, in combination with a casing, a horizontally swinging arm pivotally secured to said casing, a diaphragm, and means for pivotally securing said diaphragm to said arm including a pivot member eccentrically secured 55 to said diaphragm, said means permitting

pivotal movement of the diaphragm about two axes at right angles to one another.

5. A mounting for a diaphragm comprising, in combination with a casing, a horizontally swinging arm pivoted to said casing, a diaphragm adapted to occupy a substantially vertical playing position, a peripheral mounting for said diaphragm, and means including a pivot member secured to the lower portion of said mounting for securing the mounting to said arm. 65 70

6. A mounting for a diaphragm comprising, in combination with a casing, a diaphragm adapted to occupy a substantially vertical playing position, a peripheral mounting for said diaphragm, a horizontally swinging arm pivoted to said casing, said arm being approximately tangent to the lower edge 75 of said diaphragm, and means including a pivot member secured to the lower portion of said mounting for securing said mounting to said arm. 80

7. In combination with a casing, a horizontally swinging arm pivoted to said casing, a diaphragm adapted to occupy a substantially vertical playing position and a horizontal non-playing position, a stylus for said diaphragm, and means pivotally connected to the diaphragm, adjacent the lower edge of the same when the latter is in playing position, and pivotally secured to said arm for adjustably mounting said diaphragm on the arm. 85 90

8. A mounting for large diaphragms comprising, in combination with a casing, a horizontally swinging arm mounted on the casing, a sleeve rotatably mounted on the free end of said arm, said sleeve being provided with an opening therethrough, the longitudinal axis of which is disposed at substantially right angles to the longitudinal axis of said arm, a diaphragm, a frame secured to said diaphragm, and a pivot member secured 100 to said frame and positioned in said opening. 105

9. A mounting for large diaphragms comprising, in combination with a casing, a diaphragm, a substantially rigid peripheral frame for said diaphragm, a supporting bar extending across the lower portion of said diaphragm and secured to said frame, a shaft extending from said bar at right angles to said diaphragm, a horizontally swinging arm mounted on said casing, a sleeve rotatably mounted on said arm, and a lug on said sleeve forming a bearing for said shaft, the longitudinal axis of which is disposed at substantially right angles to the longitudinal axis of said arm. 110 115

In testimony whereof I have signed my name to this specification.

LOUIS LUMIERE.