

T. H. MACDONALD.

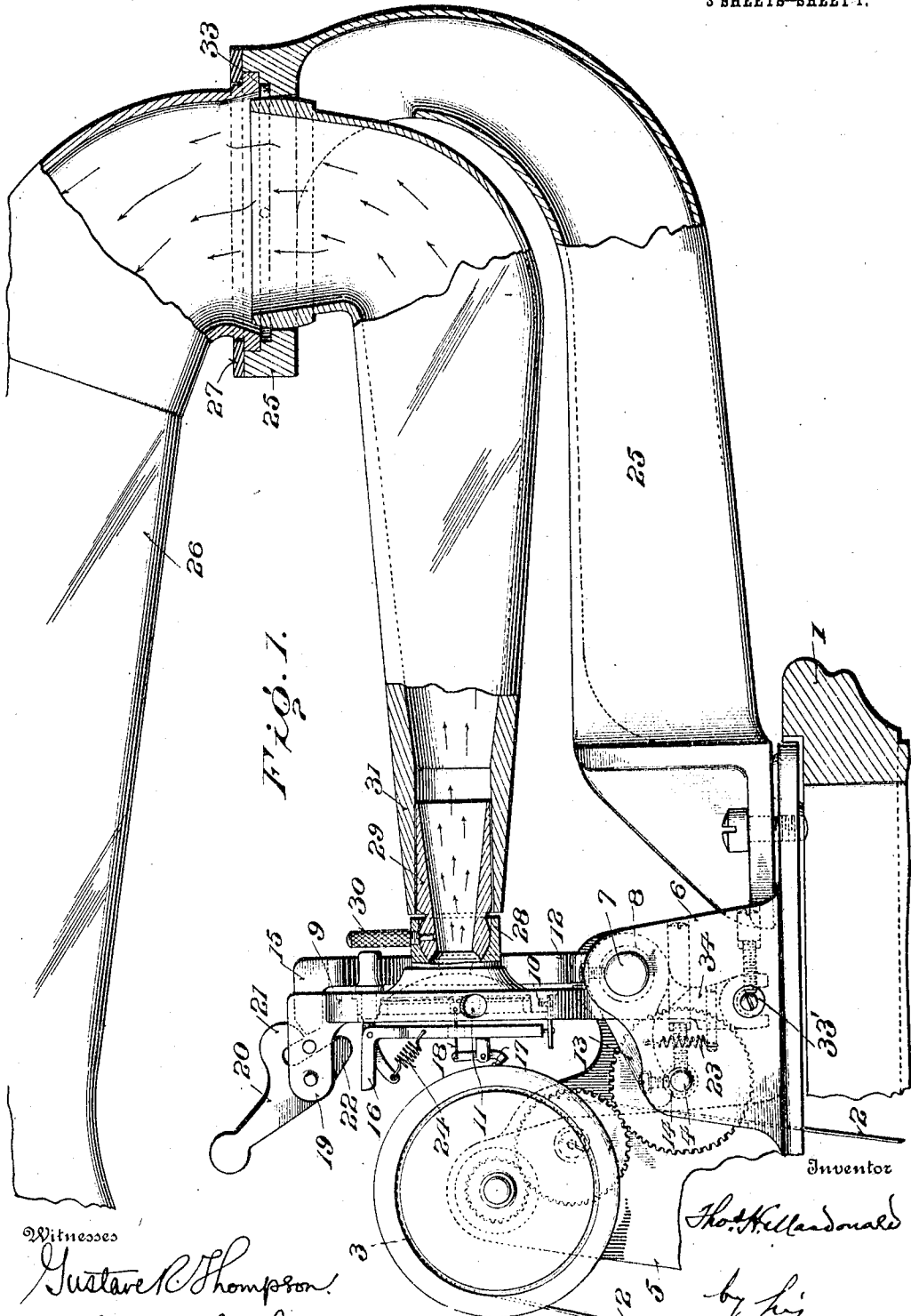
GRAPHOPHONE.

APPLICATION FILED DEC. 27, 1906.

1,054,359.

Patented Feb. 25, 1913.

3 SHEETS—SHEET 1.



Witnesses

Gustave R. Thompson

Ruth C. Fitzhugh

Inventor

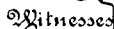
T. H. MacDonald

by his Attorney
Mauro Cameron & Co.

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3 SHEETS—SHEET 2.



Witnessed
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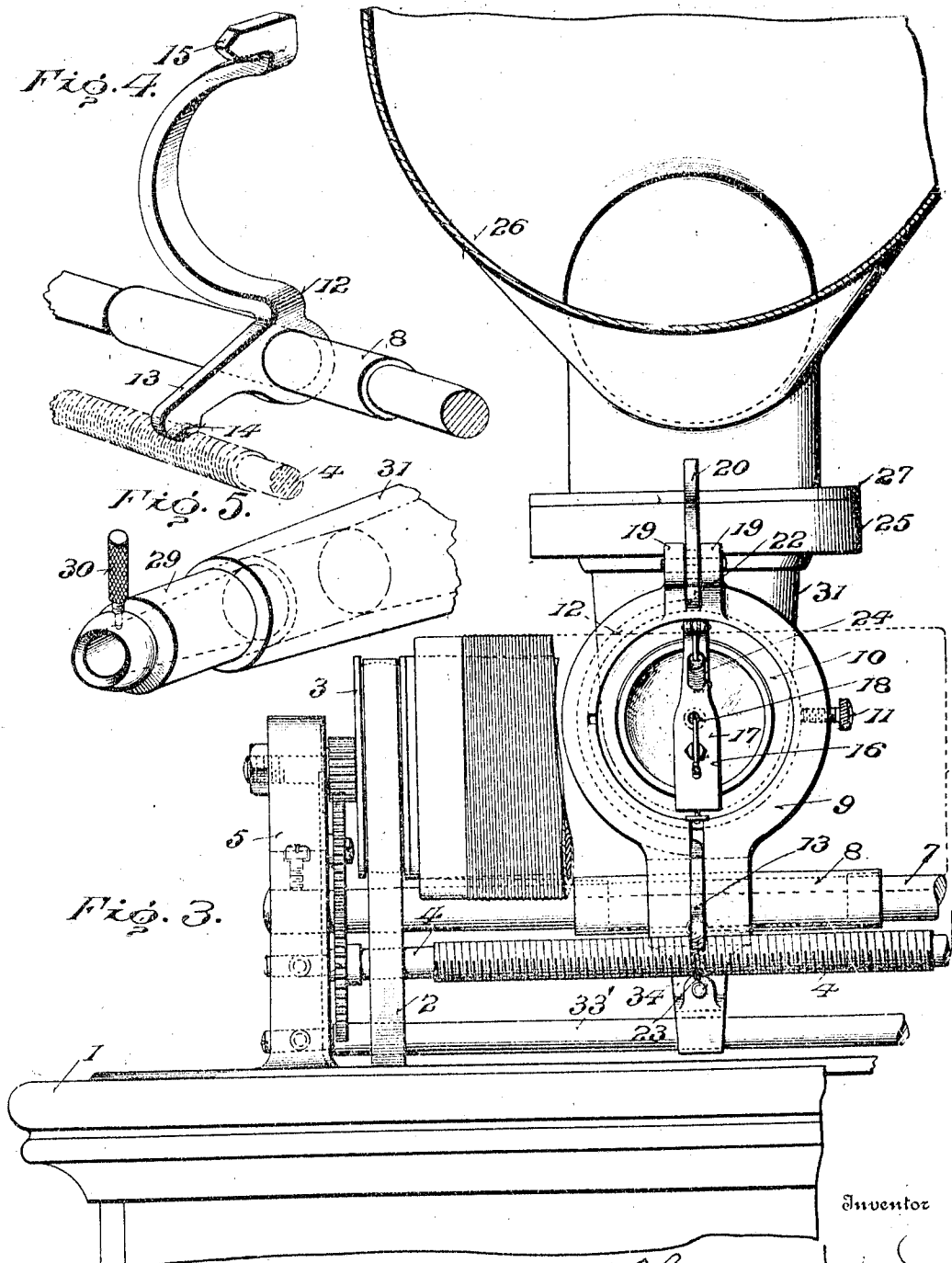
By *Thos. H. MacDonald*
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3 SHEETS-SHEET 3.



Witnesses
 Gustave R. Thompson.
 Ruth C. Fitzhugh

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 Thos. H. Macdonald
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UNITED STATES PATENT OFFICE.

THOMAS H. MACDONALD, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO AMERICAN GRAPHOPHONE COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF WEST VIRGINIA.

GRAPHOPHONE.

1,054,359

Specification of Letters Patent.

Patented Feb. 25, 1913.

Application filed December 27, 1906. Serial No. 349,696.

To all whom it may concern:

Be it known, that I, THOMAS H. MACDONALD, of Bridgeport, Connecticut, have invented a new and useful Improvement in Graphophones, which improvement is fully set forth in the following specification.

This invention relates to graphophones, and has for its object to improve the construction and general arrangement of parts entering into said machine.

As heretofore constructed, graphophones and similar talking machines using the cylindrical form of record, have generally employed a reproducer resting approximately upon the upper surface of the record, so that the weight of the reproducer rises and falls in response to the irregularities of the record as a whole, and the reproducer was supported by the advancing carriage in approximately a horizontal plane. In case an amplifying horn was employed, such horn has been carried bodily on the front side of the reproducer carriage, to the end that the reproduced sounds might be directed by the horn toward the front of the instrument; or if a larger horn is employed, the same has been mounted upon a stand in front of the machine and connected to the top of the reproducer and on the front side of the carriage.

According to the present invention, the reproducer is mounted to the rear of the cylindrical record and rigidly fixed in the carriage, so that the reproducer as a whole is not capable of movement toward and from the record, the reproducer style being pressed against the record by a spring tension. Furthermore, by the present invention the amplifying horn is mounted upon a rigid supporting bracket projecting to the rear of the machine, the horn, however, being so mounted on said arm that it is capable of swinging so as to direct the open or mouth end of the horn to any point of the compass. Moreover, extending between the reproducer and the point where the horn is supported by the rigid bracket, there is a hollow sound-conveying tube preferably tapering in form, and so mounted upon the supporting bracket as to be capable of swinging in a horizontal plane, and also of more or less movement in a vertical plane, though this last freedom of movement is not essential. The reproducer carriage, and hence also the reproducer, move in a

right line past the cylindrical record, and in order that the union between the horizontal sound-conveying arm and the reproducer may be a continuous one, (notwithstanding the increase of distance between the axis of said arm and the reproducer as the same is advanced along the record), the said arm is connected to the reproducer by means of an expanding or telescopic joint. The carriage is advanced along the slide or way supporting it by means of a suitable nut engaging the operating screw, and means are provided for simultaneously lifting said nut from the screw by overcoming the tension of the spring which holds it in operative position, and at the same time lifting the reproducer stylus from contact with the record, and likewise overcoming the tension of the spring holding it against the record.

There are other features of invention which will be specifically hereinafter described and then pointed out in the claims.

One of the several mechanical expressions of which the inventive idea is capable is shown in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved graphophone, parts being broken away for greater clearness of illustration; Fig. 2 is a top plan view with the amplifying horn removed, a portion of the same, however, being shown in dotted outline; Fig. 3 is a front elevational view with a part of the cylindrical record and supporting mandrel broken away in order to show the reproducer and connected parts; Fig. 4 is a broken perspective detail illustrating the nut by which the carriage is connected and operated by the advancing screw; and Fig. 5 is a perspective detail illustrating the telescopic joint between the reproducer and the connected tone-arm.

Referring to the drawings, in which like reference numerals indicate like parts, 1 is the casing or box of the machine within which is inclosed the usual or any suitable motor, and 2 is the driving belt extending from said motor to the mandrel 3, which mandrel is connected by suitable gearing with the screw shaft 4. The mandrel has bearings at one end only in the upright bracket 5, while the screw shaft has bearings not only in said bracket 5, but also in the bracket 6 at the opposite side of the ma-

chine. Extending between the brackets 5 and 6 and to the rear of the screw shaft and mandrel, is a guide rod 7 upon which slides a sleeve 8 supporting the frame 9, within which is rigidly mounted the reproducer 10, the same being preferably held in position by a suitable set-screw 11 (Fig. 3). Pivoted in a central slot in the lower part of the frame 9 and positioned so as to turn around the sleeve 8 is a lever 12 (see Fig. 4), in the general form of a bell-crank lever. One arm 13 projects forward from the sleeve 8 and carries a nut 14 engaging the screw on the shaft 4; the other arm is bent in a semi-circular form so as to coincide substantially with the outline of the frame 9 without interfering with the reproducer, and extends upward to the top of the said frame 9, and is provided at its upper end with a forwardly projecting lug or arm 15 whose upper forward corner is preferably beveled, as clearly shown in Figs. 1 and 4.

The reproducer consists of the usual reproducer frame and diaphragm carried in the frame, while pivoted to the frame is a bell-crank lever 16 extending across the face of the diaphragm and supporting the stylus lever 17, which is suitably pivoted thereto, one arm of said stylus lever carrying the stylus and the other arm being connected by a flexible connection 18 to the diaphragm, as clearly shown in Fig. 1. Pivoted on a bracket 19 on the upper part of the frame 9 is a lever 20 which is provided with two cam-shaped arms or lugs 21 and 22 so formed and positioned that when the lever 20 is in the position shown in Fig. 1, lugs 21 and 22 are out of contact with the arms 15 and 16 on the nut-operating lever and the stylus lever, and therefore the nut is held by its spring 23 in engagement with the screw-thread on the propelling shaft, and the stylus is held in contact with the record by the tension of spring 24; but when the lever is thrown backward (that is, from left to right as shown in Fig. 1), the lug 21 wipes upon the cam or beveled end of the arm 15, and the lug 22 wipes against the arm 16 of the stylus lever, and thereby throws the nut out of engagement with the screw and the stylus out of engagement with the record.

Rigidly mounted upon the casing 1 and extending rearward therefrom is a bracket 25, which is preferably formed at its upper rear end so as to afford an annular seat for the amplifying horn 26, which is retained in place upon the bracket by any suitable clamping ring 27 which overlaps the projecting flange on the end of the horn and thus retains it in position so that it can be swiveled or turned around in any direction in its seat. Projecting from the rear side of the reproducer casing is a neck 28 within which there is seated the close-fitting spher-

ical end of a tube 29, which tube is preferably conical on its inside, but with approximately cylindrical walls on its outside, as will be clearly seen from Fig. 1. This tube 29 is firmly held in place in the neck 28 by means of a pin 30 preferably screw-threaded through the neck 28, and provided with a lug or pin-like part entering a suitable hole in the spherical portion of the tube 29. Telescoped over the tube 29 is a tone-arm 31, which is hollow and preferably tapering in form, expanding from a point adjacent to the tube 29 until it practically coincides in diameter with the amplifying horn 26 at the point where said horn is supported in bracket 25. This tone-arm is provided with suitable means for supporting it in the bracket 25 so as to leave it free to turn in a horizontal plane. As here shown these means consist of two trunnions 32, 32 secured to the exterior wall of the end of the tone-arm, which trunnions rest upon an annular ledge 33 (Fig. 1) on the interior face of the annular part of the bracket 25. This leaves the tone-arm free to be turned in a horizontal plane and also in a vertical plane, as may be convenient when adjusting the parts.

It will be seen by this construction that there are no parts of the machine in front of the record or mandrel, and therefore, that the same may be much more conveniently reached for placing a record upon the mandrel or removing it therefrom. Moreover, the carriage is quickly and readily connected to the operating screw and the stylus brought in contact with the record by a single movement, while an amplifying horn of any desired size and weight may be employed without imposing any additional burden upon the operating carriage, and the horn be free to be swung during the operation of the machine so as to direct the sound as desired.

Referring to Fig. 2, it will be seen that the end of the tone-arm 31 adjacent to the neck 28 on the reproducer, will, during the reproduction of the entire record, move through the arc indicated by the dotted lines $x x$ in Fig. 2, whereas the reproducer carriage will move in a right line parallel with the record. This movement of the parts is permitted by reason of the telescopic connection between the tube 29 and the tone-arm 31. When the reproducer is opposite approximately the central portion of the record, that is, in the position shown in Figs. 2 and 3, the tube 29 will extend well into the end of the tone-arm 31, but when the reproducer is moved to either side of the medial line, the tube 29 begins to draw out of the end of the tone-arm 31, in the manner clearly illustrated in Fig. 5.

For the purpose of steadying the carriage, there is preferably provided a rod or bar 13

33', extending between the brackets 5 and 6 and below the guide-bar 7, and an arm 34 rigidly attached to the carriage extends downward and engages the guide rock 3 with its lower forked end, thereby steadying the action of the carriage and preventing it from oscillating around the bracket rod 7.

What I claim is:—

1. In a talking machine, the combination
10 of a propelling screw, a vertically disposed movable frame, a sound box mounted in said frame, a diaphragm and stylus, a spring-pressed supporting lever on which said stylus is mounted, a nut connected to said
15 frame and engaging said screw under spring tension, a rocking lever supporting said nut, and a lever pivoted on the top of said frame and provided with two arms which respectively engage said supporting lever and said
20 rocking lever to simultaneously disengage the stylus from the record and the nut from the screw.

2. In a talking machine, the combination
25 of a propelling screw, a vertically disposed movable frame, a sound box mounted in said frame, a diaphragm and stylus, a spring-pressed supporting lever on which said stylus is mounted, a two-armed rocking lever pivoted in the lower part of said frame, one
30 of said arms carrying a nut that engages said screw and the other being bent to substantially semi-circular form, and a lever pivoted on said frame and provided with two arms which respectively engage said
35 supporting lever and said rocking lever to simultaneously disengage the stylus from the record and the nut from the screw.

3. In a talking machine, the combination
of a propelling screw, a guide rod, a collar
movable thereon, a vertically disposed frame 40
mounted on said collar, a sound box mounted in said frame, a diaphragm and stylus, a spring-pressed supporting lever on which
said stylus is mounted, a two-armed rocking
lever mounted in the lower part of said 45
frame and adapted to turn around said sleeve, one of said arms carrying a nut that engages said screw and the other projecting
upwardly toward the top of said frame, 50
and a lever pivoted on said frame and provided with two arms which respectively engage said supporting lever and said rocking
lever to simultaneously disengage the stylus
from the record and the nut from the screw.

4. In a talking machine, the combination 55
of a reproducer having a stylus normally held against the record by spring pressure, a frame moving in a right line and supporting
said reproducer in approximately a vertical
plane, a neck projecting rearwardly 60
from said reproducer, a tube provided with a spherical end that engages in a correspondingly shaped portion in said neck, an
amplifying horn mounted on a fixed support, and a hollow tone arm telescoping over 65
said tube and leading to said horn.

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

THOMAS H. MACDONALD.

Witnesses:

LUCY B. NICHOLSON,
MARGURETT R. PARDOE,