

J. H. J. HAINES.

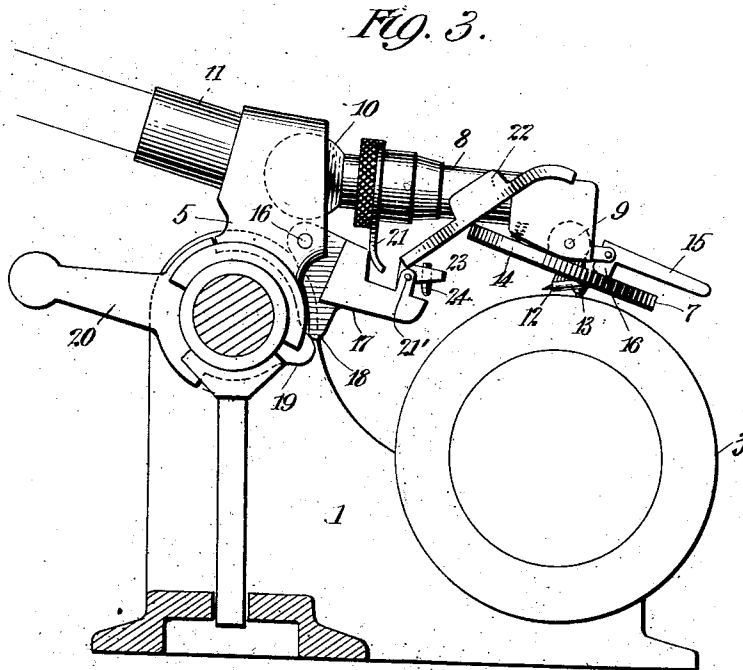
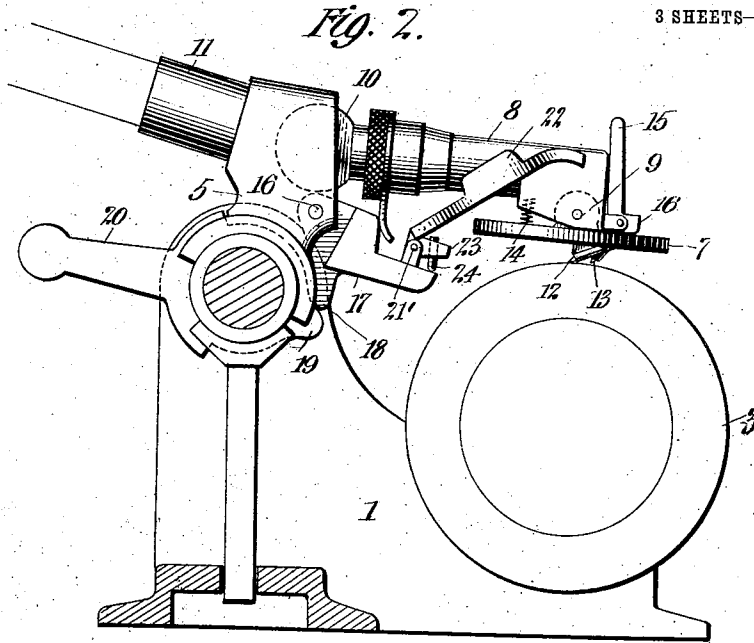
PHONOGRAPH.

APPLICATION FILED NOV. 16, 1908.

1,042,110.

Patented Oct. 22, 1912.

3 SHEETS-SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 4.

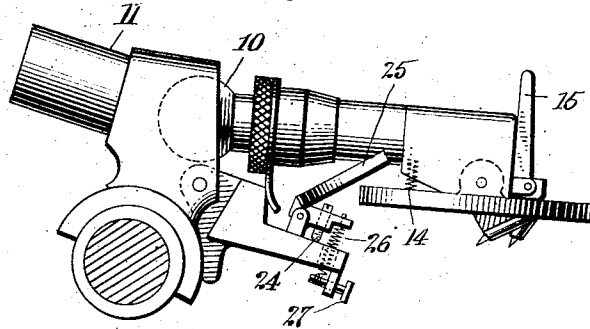


Fig. 5.

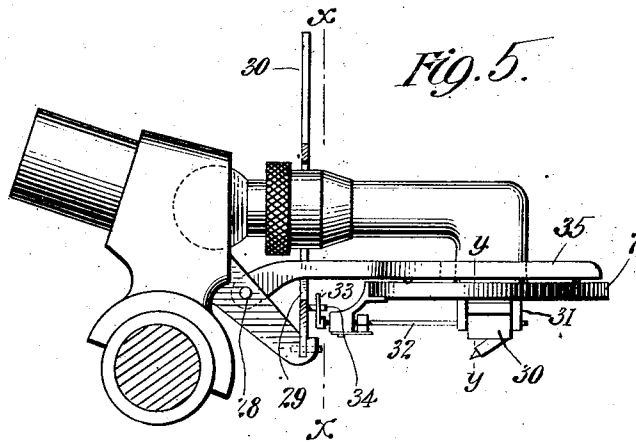


Fig. 6.

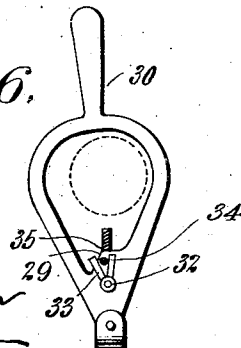
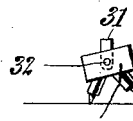


Fig. 7.



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PHONOGRAPH.

1,042,110.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN H. J. HAINES, a citizen of the United States, residing at the city of New York, in the borough of Manhattan and State of New York, have invented certain new and useful Improvements in Phonographs, of which the following is a full, clear, and exact description.

This invention relates to phonographs and other styles of talking machines in which the record is traced in a tablet in the form of a groove varying in depth in accordance with the vibrations of the sounds recorded and to be reproduced. In this type of talking machine it has been customary to employ one device for recording sounds and another for reproducing them. These devices each comprise essentially a diaphragm mounted in a sound box and carrying a stylus, which engages the surface of the record tablet. In the recorder the stylus is caused to cut a groove of varying depth in the recording surface, while in the reproducer the stylus, which is of slightly different construction, is adapted to traverse the groove formed by the recorder and to transfer the undulations of the groove successively to the diaphragm. An essential difference in these two devices is that the reproducer when in action rests more heavily against the record surface than does the recorder. The reason for this is that in recording, the instrument should be in a nearly floating condition with its stylus located so as to just cut the record surface and its movements not be interfered with by the inertia of the frame in which the diaphragm is supported. In other words it must be as sensitive as possible to sound vibration. In the reproducer, on the contrary, the device would not act properly if it were in a floating condition because the irregularities of the record groove which are driven against the stylus by the rotating tablet would cause the stylus to jump or "stutter" and give imperfect reproduction. Therefore in the reproducer it is the common practice to add weight to the frame on which the diaphragm and stylus are supported, so as to hold the stylus to its work in the groove. Hence, aside from the difference in the form of the stylus points, the essential difference between a recorder and a reproducer is that the latter is heavier than the former.

Heretofore and prior to my invention it has been customary, where the talking ma-

chine is intended for both recording and reproducing, to provide the machine with two separate and distinct devices, one to be used for the recording, and this to be removed and replaced by the other, for reproducing.

It is the object of my invention to provide in one and the same instrument, both the recording and reproducing devices, and in so doing to utilize a single head which comprises a diaphragm, sound box and frame. I accomplish this by providing a weight or spring so arranged that when the head is in a position to record, it will be independent of and uninfluenced by the weight or spring, but when the head is thrown into a position to reproduce, the weight or spring is automatically brought to bear upon it so as to afford the necessary additional pressure against the record surface required in the reproducing operation.

To be more specific, my invention consists of a recorder-reproducer comprehending a single diaphragm having attached thereto a recording and a reproducing stylus, means for bringing into active position either one of the styluses at will, and means whereby a weight or the force of a spring will be added to or removed from the instrument accordingly as the reproducing or the recording styluses are thrown into action. My invention thus very much simplifies the operation of talking machines as well as reduces their cost and the time ordinarily required to shift from the recording to the reproducing device is almost entirely saved.

My invention will be now described with reference to the accompanying drawings, in which:

Figure 1 is a plan of a portion of the frame of a phonograph, showing my combined recorder and reproducer in operative position thereon and utilizing a weight instead of a spring; Fig. 2 is an end elevation of the same machine with the recorder-reproducer adjusted for the recording operation; Fig. 3 is a view similar to Fig. 2 with the recorder-reproducer adjusted for the reproducing operation; Fig. 4 is a view showing the device in condition for recording, but with a spring substituted for the weight; Fig. 5 illustrates a modification in the construction of the weight in connection with a modification of the manner of shifting the stylus points; Fig. 6 is a section on line X—X of Fig. 5; and Fig. 7 is a section on line Y—Y of Fig. 5.

Referring to the drawings by numerals, 1 indicates the frame of the phonograph in which is mounted the tapering cylinder 2 which supports the record tablet in the form of a cylinder and indicated by 3.

4 is a rod along which the carriage 5 travels.

The recorder-reproducer consists of a sound box or frame 7 in which is mounted the diaphragm, and a tubular arm 8 to which the sound box is pivoted at 9 and which communicates with the interior chamber thereof above the diaphragm. The arm 8 is connected by means of a universal joint 10 with the carriage 5 and the latter is provided with a nipple 11 to receive the end of a flexible tube and through which a passage leads into the arm 8, thus forming a continuous sound passage from the upper side of the diaphragm to and through the flexible tube, the outer end of which is to be attached as usual to the mouth piece or horn.

At or near the center of the diaphragm are fixed two stylus points 12 and 13, the point 12 being for recording and the point 13 for reproducing. The sound box 7 on one side of its pivot 9 is subjected to the pressure of a spring 14 which tends to hold it in a horizontal position, as shown in Fig. 2, the end of arm 8 on one side of the pivot 9 serving as a stop.

15 is a lever pivoted to the end of arm 8 and having an eccentric lug 16 which is adapted, in one position of the lever, to bear against and tilt the sound box 7 into an oblique position, as shown in Fig. 3, while when the lever is thrown upward into its other position as in Fig. 2, the sound box is permitted to return to a horizontal position under the action of and be held by, the spring 14. When the sound box is in the horizontal position, the recording stylus 12 is in position to engage the record surface of the tablet 3, as seen in Fig. 2, and when the sound box is in the oblique position, the stylus 12 is thrown out of contact with the record surface and the stylus 13 is thrown into operative position therewith.

Pivotaly attached to the carriage 5 at the point 16 is a bracket 17 provided with a lug 18 adapted to be engaged by another lug 19 which is manipulated by a hand lever 20 to raise and lower the instrument. The instrument for the purpose, is provided with a tongue 21 which bears against a shoulder on the bracket 17 as shown, so that when the bracket is swung upward, the instrument is raised and can be moved along the rod 4 to any desired position and when the bracket is lowered, it will drop into engagement with the record tablet. This device for raising and lowering the instrument is an ordinary one and forms no part of my present invention. Preferably attached to

this bracket 17, however, by means of a pivot 21' is a weighted lever 22, being a bifurcated plate embracing the opposite sides of the tubular arm 8. This lever has a projection 23 carrying a set screw 24 which may be adjusted to determine the elevation of the lever when supported at its lowest point. The weighted lever extends over the inner edge of the sound box 7 and the screw 24 is so adjusted that when the sound box is in the horizontal position shown in Fig. 2, the weight is supported wholly by the bracket 17 and is entirely clear and independent of the sound box or speaker, but when the sound box 7 is tilted to the oblique position shown in Fig. 3, the inner edge of the sound box strikes and lifts slightly the weight so that the latter rests upon or is sustained by the sound box.

The operation is as follows: When the instrument is used as a recorder, the lever 15 is raised to the vertical position, as shown in Fig. 2, and the sound box allowed to assume its horizontal position, thus bringing the recording stylus 12 into active position and relieving the instrument of the weight 22. The record is then made in the usual way by transmitting the voice or other sounds through the tube to the top of the diaphragm. When the record has thus been made, if and when it is desired to reproduce, the lever 15 is thrown downward to the position shown in Fig. 3 which removes the recording stylus 12 and simultaneously throws into active position the reproducing stylus 13. At the same time the forward upper edge of frame 7 strikes and lifts the lever 22 thus transferring its weight from the bracket 17 or other part of the frame to which it may be attached, to the sound box frame. This weight which is thus added to the instrument is of the proper amount to afford the additional stability or inertia required for the proper action of the reproducer and thus affords a reproduction as faithful and clear as if the reproducing instrument were entirely independent and distinct from the recording instrument.

It will be observed that in changing from the recorder to the reproducer, it is not necessary to remove and replace any of the parts, but that it merely requires the operator to shift the position of lever 15. The cost of this combined device is only a trifle more than that of either the recorder or reproducer alone and no skill is required to make the change from one to the other.

The construction of Fig. 4 is the equivalent in every sense of that of Figs. 1 to 3, since a spring is used instead of its equivalent, the weight. In this construction the weight becomes a mere lever 25, having the same stop screw 24, but provided with a tension spring 26 which tends to throw the lever 25 downward with a force dependent upon the

adjustment of screw 27. Thus when the sound box 7 is tilted, it lifts the lever 25 and is subjected to the tension of the spring 26 which is the equivalent of the weight 22.

5 In Fig. 5 the sound box 7 remains horizontal at all times. The weight 35 is bifurcated as before and adapted to be lowered upon, or supported above and independently of, the sound box; it is pivoted to the carriage at 28 and rests upon a lug 29 carried by a pivoted lever 30, which lever is to be manipulated by hand. The stylus points radiate from a hub 30 which is pivoted to brackets 31 attached to the diaphragm. The hub is fixed upon a rock-shaft 32 which also carries a fork 33 between the legs of which is a pin 34 carried by lever 30. When lever 30 is swung to one side or the other, the styluses are shifted and the weight 35 is raised or lowered by the lug 29, thus either lifting the weight from or adding it to the instrument.

25 The essential feature of my invention therefore is any structure comprising the elements common to a recorder and a reproducer in combination with a weight or its equivalent adapted to be added thereto or removed therefrom according to the requirements of the operation.

30 What I claim, is:

1. In a phonograph or similar talking machine, a combined recording and reproducing head in combination with a weight adapted to be shifted to and from the same, according as to whether it is to be used as a reproducer or recorder, substantially as described.

2. In a recording and reproducing machine, an instrument comprising a single diaphragm and two stylus points, one for recording and the other for reproducing, in combination with a weight independently mounted with respect to the diaphragm and styli, and means for adding the weight to the diaphragm for the reproducing operation and for removing it from the diaphragm for the recording operation, substantially as described.

3. In a phonograph or similar talking machine, an instrument comprising a single diaphragm and two stylus points, one for recording and the other for reproducing, in combination with a weight independently mounted with respect to the diaphragm and styli, and means for simultaneously throwing one stylus point into operative position and the other out of operative position and adding the weight to or removing it from the diaphragm.

60 4. In a phonograph or similar talking machine, a recorder-reproducer head combined with an independent weight and means whereby the weight may be applied to or removed from the recorder-reproducer head, for the purpose set forth.

5. In a phonograph or similar talking machine, a recorder-reproducer head comprising two stylus points and means for adjusting said points into and out of operative position, in combination with a weight mounted independently of the recorder-reproducer head, and means whereby the weight is automatically applied to the recorder-reproducer head when one of the styli is adjusted to operative position, substantially as described.

6. In a phonograph or similar talking machine, a recorder-reproducer head and a weight supported by the frame of the machine independent of the recorder-reproducer head, and means whereby the weight can be shifted to the recorder-reproducer head.

7. In a phonograph or similar talking machine, the combination of a carriage, a recorder-reproducer head and a weight supported by said carriage independently of said head but adapted to be transferred to the recorder-reproducer head.

8. In a sound recording and reproducing machine, a diaphragm and styli adapted either for recording or reproducing in combination with pressure means mounted independently of the diaphragm and styli adapted to be shifted to and from said diaphragm and styli according as to whether they are to be used as a reproducer or recorder, substantially as described.

9. In a sound recording and reproducing machine, a main frame, a sound-box and diaphragm carried thereby and tiltable with respect to the frame and adapted to act either as a recorder or a reproducer, in combination with a pressure device supported by the frame, and means whereby said pressure device may be operatively connected at will with the sound-box and diaphragm, for the purpose set forth.

10. In a sound recording and reproducing machine, a sound-box carrying a diaphragm, the latter having recording and reproducing styli rigidly fixed thereto in combination with a weight, said sound-box and weight being pivotally mounted on independent axes and means whereby the weight may be brought to bear upon the sound box by a relative movement of said parts upon their axes.

11. A sound recording and reproducing machine, comprising a sound-box carrying a diaphragm provided with rigidly affixed recording and reproducing styli in combination with a weight, means whereby the effective portion of said weight will be carried by the sound-box during the reproducing operation, and a support independent of said sound-box and adapted to carry the effective part of said weight during the recording operation.

12. In a sound recording and reproducing

ing machine, a pivoted frame carrying a diaphragm, two stylus points adapted to cooperate with said diaphragm for the recording and reproducing operations respectively, and means extraneous to the frame whereby the reproducing stylus point may be caused to bear more heavily upon the record tablet when it is in operation than does the recording stylus point when it is in operation.

10 13. In a talking machine, a pivoted frame carrying a diaphragm, in combination with a weight mounted independently of the frame, and means whereby the weight may be applied to and removed from the frame
15 to alter the downward pressure thereof.

14. In a sound recording and reproducing machine, a sound box carrying a diaphragm and two styli, the weight of the sound box being normally applied to the stylus which is in operative position, in combination with a weight adapted to be added to that of the sound box while a particular one of the styli is in operative position.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

JOHN H. J. HAINES.

Witnesses:

WALDO M. CHAPIN,
JAMES D. ANTONIO.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."