

No. 665,601.

Patented Jan. 8, 1901.

W. HART.
GRAPHOPHONE REPRODUCER.

(No Model.)

(Application filed Nov. 2, 1899.)

2 Sheets—Sheet 1.

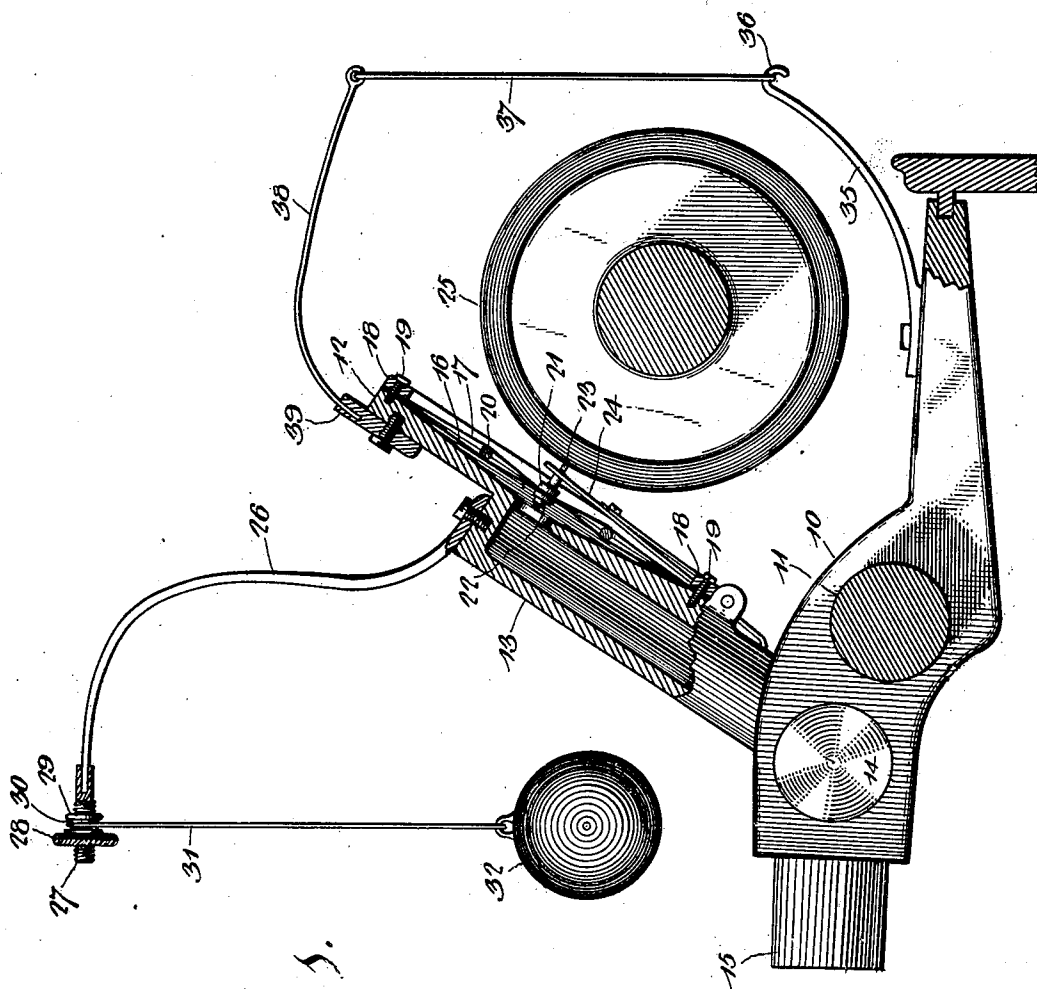


Fig. 1.

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2 Sheets—Sheet 2.

Fig. 2.

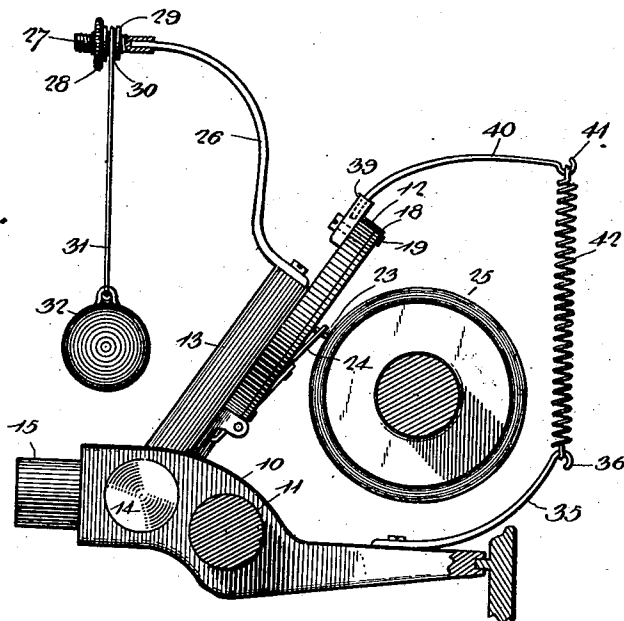
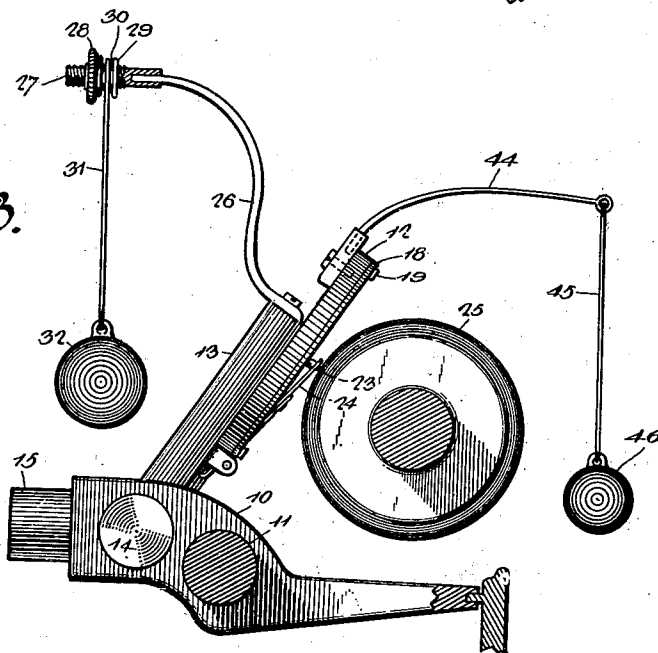


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM HART, OF KIRKSVILLE, MISSOURI.

GRAPHOPHONE-REPRODUCER.

SPECIFICATION forming part of Letters Patent No. 665,601, dated January 8, 1901.

Application filed November 2, 1899. Serial No. 735,609. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HART, a citizen of the United States, residing at Kirksville, in the county of Adair and State of Missouri, have invented a new and useful Graphophone-Reproducer, of which the following is a specification.

This invention relates to graphophone-reproducers in general, and more particularly to the construction and equipment of the sound-box and diaphragm; and it has for one object to provide means for counterbalancing the weight of the sound-box and at the same time for holding the sound-box yieldably with the stylus in engagement with the record, the construction preventing the rattling and other noises incident to looseness of the stylus upon the record.

A further object of the invention is to provide a construction and arrangement of diaphragm which will permit adjustment of the tension of the diaphragm in a simple and efficient manner.

In the drawings forming a portion of this specification, and in which similar numerals of reference designate like and corresponding parts in the several views, Figure 1 is a side view of the sound-box and its supporting-bracket with the end of the record parts being shown in section and parts in elevation. Fig. 2 is a view similar to Fig. 1 on a similar scale and showing in elevation a modification of the means for holding the sound-box in the direction of the record. Fig. 3 is a view similar to Fig. 2, showing a different means for holding the sound-box in the direction of the record.

Referring now to the drawings, 10 represents the bracket which supports the sound-box, and which bracket has the usual slide-bearing 11. The exterior of the sound-box is of the usual construction and comprises the diaphragm-receiving frame 12 upon the rear side and radially of which is secured a sound-tube 13, the lower end of which is provided with trunnions 14, which have a bearing in the bracket 10. The lower end of the sound-tube has an extension 15, which is adapted to receive the horn or the ear-tubes. The front face of the frame 12 is dished, as shown, and upon this front face and engaging the outer edges thereof is disposed the diaphragm, com-

prising two disks 16 and 17, of metal or of other suitable material, which are clamped upon the frame 12 through the medium of a common clamping-ring 18, provided with clamping-screws 19. Between the elements 16 and 17 and concentric therewith is disposed a rigid ring 20 of proper diameter, and which is preferably circular in cross-section or has such other form as will cause it to engage the elements 16 and 17 each in a single line. Centrally of the elements 16 and 17 is formed a perforation, through which is passed a headed bolt 21, having a clamping-nut 22. By means of this nut 22 and the bolt the central portions of the elements 16 and 17 may be brought together and the tension of the elements thus increased, the increase of tension being of course dependent upon the thickness of the ring 20 and consequent normal separation of the elements and also upon the diameter of the head of the bolt and of the nut.

The stylus 23 in the present instance is supported by an arm 24, which has a universal connection with the sound-box and which connection, as also the arm, is constructed in accordance with a prior application for United States patent filed by me on the 22d day of July, 1899, and which application bears the Serial No. 724,823. The head of the bolt 21 forms the engaging surface for the rear end of the stylus 23, the opposite end of the stylus being adapted for engagement with the record, which is indicated at 25.

Connected with the upper closed end of the sound-tube 13 or with any other suitable portion of the sound-box is a compound curved arm 26, which extends outwardly and upwardly and then rearwardly to a point beyond the pivotal connection of the lower end of the sound-tube with the bracket 10, and the outer end of this arm is provided with a screw-threaded enlargement 27, which is adapted to receive a thumb-nut 28, which has an extension 29, provided with a peripheral groove 30. With this groove 30 is engaged a cord or wire 31, with a weight 32 attached to its lower end. This weight tends to counterbalance the weight of the sound-box and its connected parts, and thus to neutralize to some degree the pressure of the stylus upon the record. By shifting the thumb-nut 28 upon the threaded extension 27 the position of the

weight 32 with respect to the pivotal connection at 14 may be varied, and the counterbalancing effect of the weight may be altered to secure the best results under different conditions.

One effect of the counterbalancing-weight 32 is to cause the stylus 23 to lie so lightly against the record 25 as to cause the sound-box itself to yield in the operation of the machine, and thus counteract to some extent the vibrating effect of the stylus upon the diaphragm. In order to prevent this action, a second arm 35 is connected with the bracket 10 and extends rearwardly thereof and beyond the rear face of the record. The outer end of this arm is provided with a hook 36, which is engaged with a flexible connection 37, attached at its upper end to the free end of a spring-plate 38, the opposite end of which is fixed in a block 39, secured to the sound-box. The effect of the spring-plate 38 will be readily understood, and in its upward pull upon the connection 37 it forces and holds the sound-box, with the stylus, in engagement with the record.

Instead of employing a spring-plate 38 and the connection 37 an arm 40 (shown in Fig. 2 of the drawings) may be secured to the sound-box in the same manner as the spring-plate 38 and in the same position and may be provided with a hook 41 in its outer end having a helical spring 42 connected therewith, the opposite end being attached to the hook 36.

In Fig. 3 is shown a further modification in which the arm 35 is omitted, while attached to the outer end of the spring-arm 44, which is carried by the sound-box, is a wire or cord 45, having a weight 46 attached to its lower end, this wire or cord passing below and at the rear side of the record in the same manner as does the connection 37 and the helical spring above described.

From the above description it will be seen that with the present structure the tension of the diaphragm may be varied at will and also that the pressure of the stylus upon the record may be modified and the rebounding of the sound-box prevented, the result being a most efficient operation of the machine.

What is claimed is—

1. The combination with a pivoted sound-box having an arm connected therewith and extending beyond and above the pivot of the box, of a nut having threaded engagement with the arm, a flexible connection attached to the nut, and a counterbalancing-weight attached to the connection.

2. The combination with a pivoted sound-box having an arm connected therewith and extending beyond its pivot, of a cord adjustably connected with the arm, and a weight attached to the cord and adapted to swing therewith.

3. The combination with a sound-box, of a diaphragm comprising two disks secured at their edges to the box, means for holding the disks separated at points between their centers and their peripheries, and means for drawing the disks toward each other to increase their tension.

4. The combination with a sound-box, of a diaphragm comprising a plurality of disks secured to the box, means for holding the disks separated at points within their points of attachment to the box, and means for varying the distance between corresponding other points of the disks to vary the tension of the diaphragm.

5. The combination with a sound-box, of a diaphragm comprising two disks secured at their edges to the box, means for holding the disks separated at points between their centers and their peripheries, and means for drawing the disks toward each other at their centers to increase the tension thereof.

6. A diaphragm comprising two plates mutually connected at their peripheries and normally separated at points, and means for drawing the plates toward each other to increase their tension.

7. A diaphragm comprising two plates mutually connected at their peripheries and adapted to vibrate in unison, means for holding the disks separated at points and means for varying the separation of the plates at other points to vary their tension.

8. The combination with a sound-box, of a diaphragm comprising two plates connected at their edges to the box, a ring disposed between the plates and in engagement therewith, a headed bolt passed through the plates within the inclosure of the ring, a nut upon the bolt adapted to draw the plates toward each other, a stylus-arm mounted upon the box, and a stylus carried by the arm and adapted for engagement with the bolt to transmit motion to the diaphragm.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM HART.

Witnesses:

MYRON A. MILLER,
BESS SANDS.