No. 876,350. PATENTED JAN. 14, 1908.

D. HIGHAM.

GRAPHOPHONE.

APPLICATION FILED APR. 16, 1908.

2 SHEETS—SHEET 1.

Fig. 2.

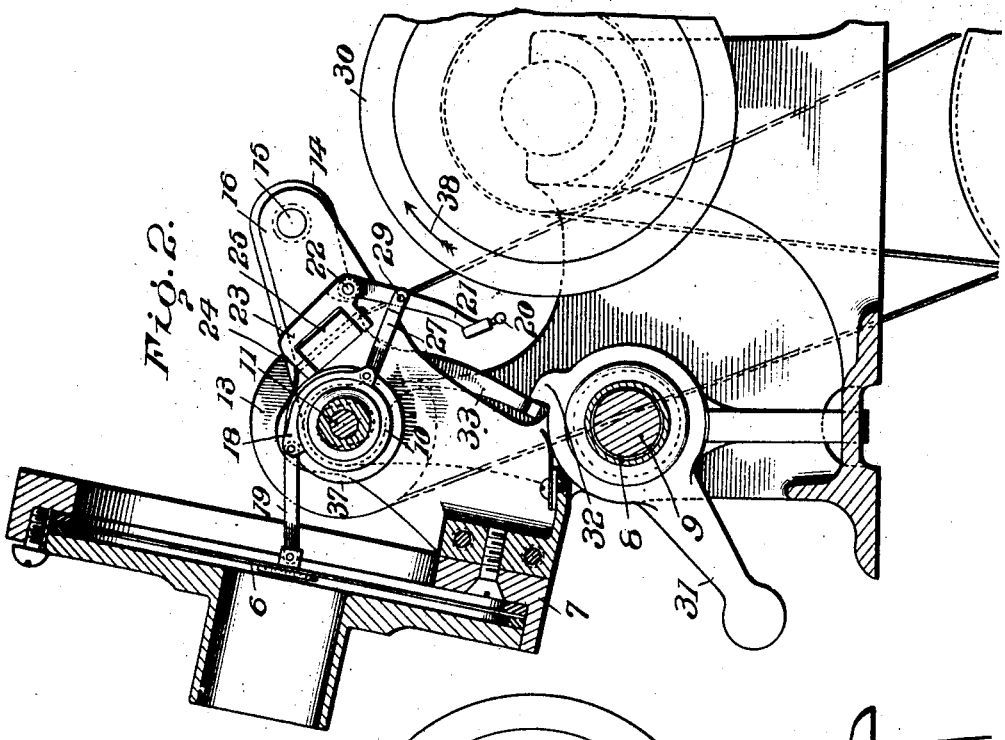
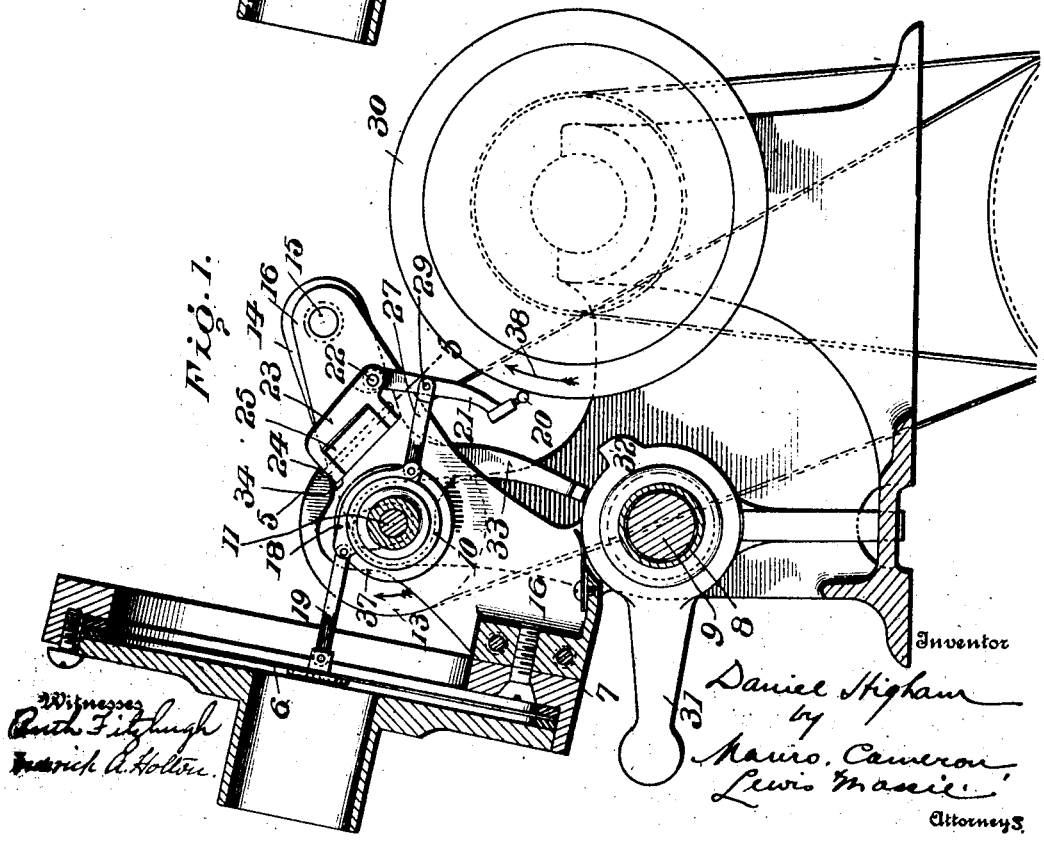


Fig. 1.



Witnesses
Ruth Fitzhugh
Frederick A. Hollett

Inventor
Daniel Higham
by
Munro, Cameron
Lewis Massie
Attorneys

No. 876,350. PATENTED JAN. 14, 1908.

D. HIGHAM.

GRAPHOPHONE.

APPLICATION FILED APR. 16, 1906.

2 SHEETS—SHEET 2.

Fig. 5.

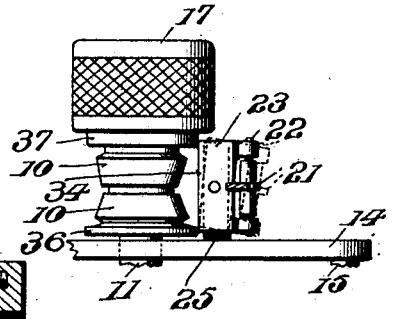


Fig. 4.

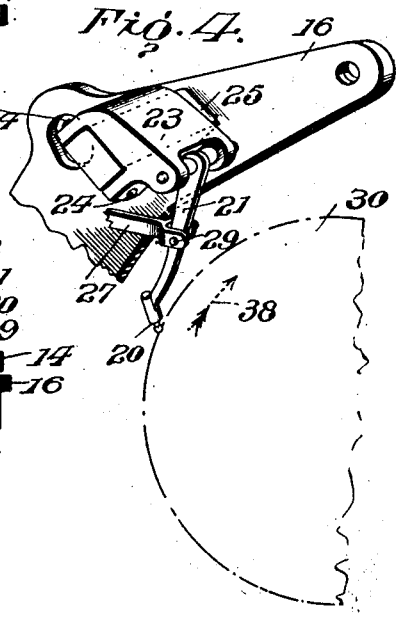
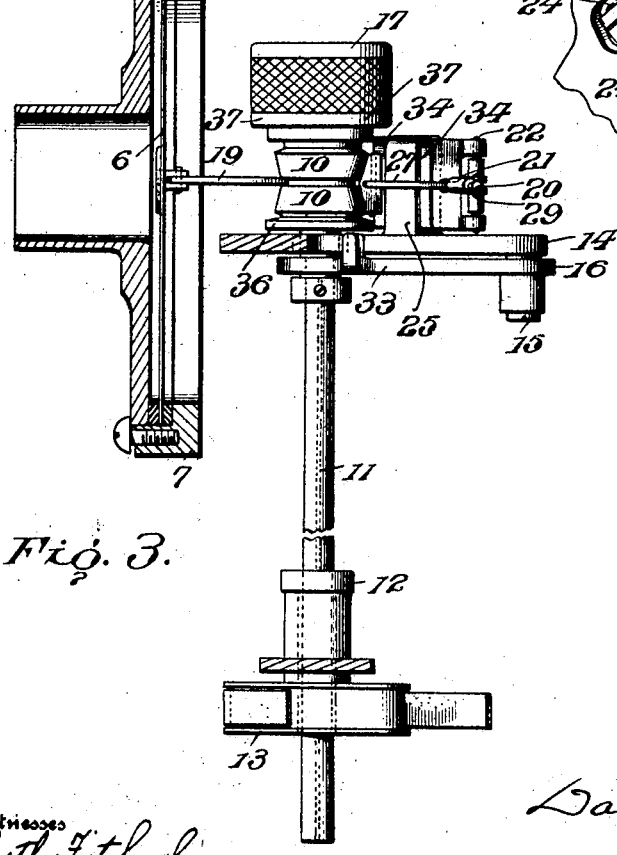


Fig. 3.



Witnesses
Ruth Fitzhugh
Frederick A. Holbein.

Inventor
Daniel Higham

By Mauro, Cameron, Lewis & Massie
Attorneys.

UNITED STATES PATENT OFFICE.

DANIEL HIGHAM, OF BRIDGEPORT, CONNECTICUT.

GRAPHOPHONE.

No. 876,350. Specification of Letters Patent. Patented Jan. 14, 1908.

Application filed April 16, 1906. Serial No. 312,020

To all whom it may concern:

Be it known that I, DANIEL HIGHAM, of Bridgeport, Connecticut, have invented a new and useful Improvement in Graphophones, which invention is fully set forth in the following specification.

This invention relates to phonic apparatus wherein frictional means are used to amplify the force of the sonorous vibrations. Apparatus of this character are described in my Patents No. 678,566 of July 16, 1901, and No. 783,750 of February 28, 1905.

The object of the present invention is to simplify and improve the construction and operation of the apparatus of the general character specified above.

The main improvement effected by the present invention consists in dispensing with the floating weight heretofore employed to keep the stylus in contact with the sound-record with yielding pressure, and in so constructing and arranging the stylus-lever that the swinging shaft serves both to press the friction wheel against the friction shoe by gravity and also to press the stylus against the sound-record by gravity.

The accompanying drawings illustrate the preferred manner of carrying out the present invention:

Figure 1 is a vertical section through the center of the diaphragm; Fig. 2 is a similar view showing the stylus raised out of contact with the sound-record; Fig. 3 is a bottom plan view of the friction devices; Figs. 4 and 5 are detail views of said friction devices, Fig. 4 being a perspective view, and Fig. 5 a view looking downwards in the direction of the line 5—5 Fig. 1.

The construction illustrated in the drawings is in its general feature that now in use.

Diaphragm 6 is mounted on carriage 7 mounted to slide as usual on tube 8, within which is the feed-screw 9. Friction-wheel 10 is carried by the sliding telescopic shaft 11, of usual construction, which rotates in the direction of arrow Fig. 1. This shaft is supported at one end in bearing 12 in the frame, and at the other in a swinging arm 14, pivoted at 15 to an arm 16 which is fixed to carriage 7. At the end of shaft 11 is a weight 17. The friction shoe 18 is attached by a link 19 to the diaphragm 6, and is in contact with friction-wheel 10, the normal pressure of the friction devices being thus automatically regulated and adjusted in the manner described in my Patent No. 783,750, aforesaid. As thus far described, the mechanism does not differ materially from the construction now in common use.

The reproducing point or stylus 20 is carried by a lever 21, which lever is pivoted at 22 to a block 23, which is pivoted on pin 24 to a projection 25 of the arm 16. Stylus-lever 21 is connected by a link 27 with friction-shoe 18. It will thus be seen that the stylus is not carried by a floating weight but by an arm rigidly attached to the carriage. The stylus-support as a whole, consisting of the parts 21 and 23, has two joints, 22 and 24, the axes of which are relatively so disposed that the stylus can be moved (turning on pivot 22) towards and from the sound-record 30, and can have also a lateral movement (on pivot 24) to compensate for irregularities in the sound-groove.

The machine is provided with the usual lifting lever 31, which serves to engage and disengage the carriage with the feed-screw in the well-known manner. This lever is provided with the usual projection or lug 32, for disengaging the stylus from the sound-record. Swinging arm 14 which carries the movable bearing of shaft 11 has a finger 33 extending downwards into the path of lug 32. Fig. 1 shows the parts in their operative position. When lifting lever 31 is depressed, as shown in Fig. 2, contact of lug 32 with finger 33 raises arm 14 and shaft 11. This movement turns lever 21 on its pivot 22 and disengages the stylus from the sound-record. When the parts are in their operative position, the stylus is held against the record by the yielding pressure of swinging shaft 11 and its weight 17.

It is important that the swiveled block 23, to which the lever 21 is pivoted, should have an elongated bearing, and should have appreciable inertia. If the lever were simply pivoted on a narrow bearing to swing laterally, it would not accurately track the record. The inertia of the block is sufficient to prevent the lever 21 from being readily thrown aside. In order that the lever 21 may pull itself to a central position when the stylus is lowered onto the smooth part of the record, the line 5—5 of the axis of the tilting block 23 is such that it passes close to the point 29 at which link 27 is attached to lever 21.

The construction illustrated and described tracks the record very accurately, even when the sound-record rotates against the point of the stylus (as indicated by arrow 38) contrary to the usual practice.

When the swinging shaft 11 is lifted by means of lever 31, the face 34 of tilting block 23 comes in contact with circular flanges 36, 37 on shaft 11 (see Fig. 5) whereby the block and stylus-lever are brought to central position before the stylus is again lowered. The dotted lines of Fig. 5 indicate a tilted position which these parts may have assumed.

What is claimed is:

1. In a phonic apparatus, the combination of the diaphragm, a carriage therefor, sound-amplifying friction means on said carriage, a swinging shaft by which one of the friction members is carried, a stylus connected with said diaphragm through said friction means, and pressed against the sound-record by the weight of said shaft, said stylus being pivoted to a tilting block.

2. In a phonic apparatus, the combination of the diaphragm, a carriage therefor, sound-amplifying friction means on said carriage, a swinging shaft by which one of the friction members is carried, a stylus connected with said diaphragm through said friction means, and pressed against the sound-record by the weight of said shaft, said stylus being pivoted to a tilting block having appreciable inertia.

3. In a phonic apparatus, the combination of the diaphragm, a carriage therefor, sound-amplifying friction means on said carriage, a swinging shaft by which one of the friction members is carried, a stylus connected with said diaphragm through said friction means, and pressed against the sound-record by the weight of said shaft, and means for lifting said shaft and thereby disengaging said stylus from the sound-record.

4. In a phonic apparatus, the combination of the diaphragm, a carriage therefor, sound-amplifying friction means on said carriage, a swinging shaft by which one of the friction members is carried, a stylus connected with said diaphragm through said friction means, and pressed against the sound-record by the weight of said shaft, means for lifting said shaft, thereby disengaging the stylus from the sound-record, and means for bringing the stylus, when raised, to a central position.

5. In a phonic apparatus, the combination with a diaphragm, of two co-acting elements constituting a friction device, a sound record, a rocking member, a stylus lever pivoted to said rocking member to swing in a plane substantially parallel with the axis of the rocking member, a stylus supported by said lever to contact with said record, connections between one of the friction elements and said stylus lever, and connections between the said friction element and said diaphragm.

6. In a phonic apparatus, the combination with a diaphragm, of a sound record, a stylus-lever bearing a stylus coacting with said record, a friction device, one member of which normally presses the stylus-lever towards the record, means connecting the other member of the friction device to said stylus-lever and said diaphragm, and a rocking member to which said stylus-lever is fulcrumed.

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

DANIEL HIGHAM.

Witnesses:
A. B. KEOUGH,
C. A. GIBNER.