(No Model.)

T. A. EDISON.

PHONOGRAPH FOR DOLLS OR OTHER TOYS.

No. 423,039. Patented Mar. 11, 1890.

FIG. 1.

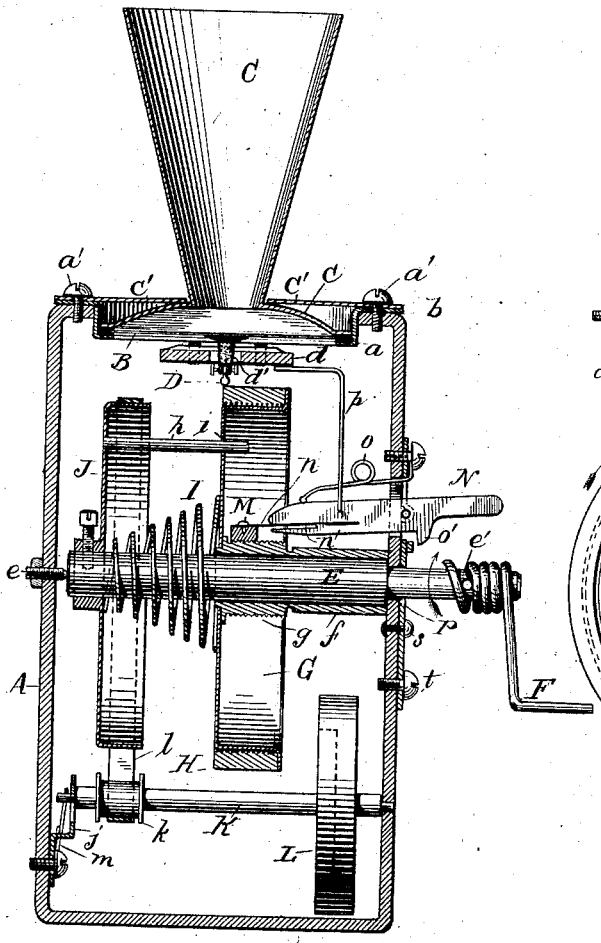
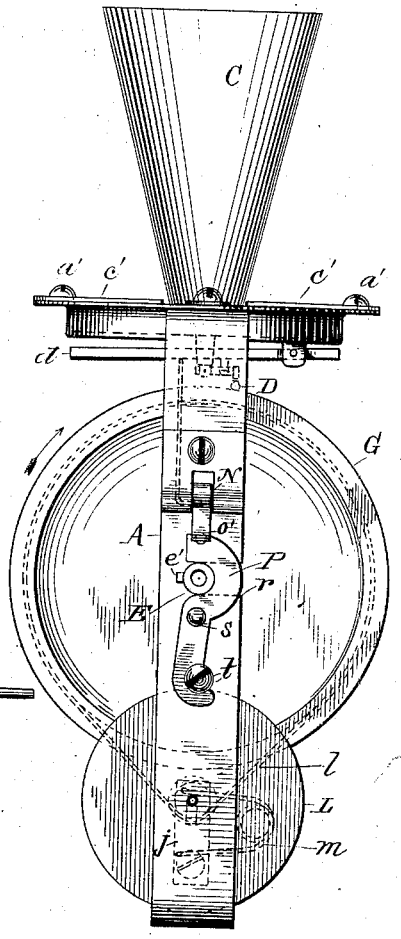


FIG. 2.



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UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

PHONOGRAPH FOR DOLLS OR OTHER TOYS.

SPECIFICATION forming part of Letters Patent No. 423,039, dated March 11, 1890.

Application filed July 2, 1889. Serial No. 316,324. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Phonographs, (Case No. 836,) of which the following is a specification.

My invention relates more especially to phonographs designed to be placed in dolls or other toys and having only a reproducing-instrument, and provided with a sound-record, which is reproduced by the operation of the phonograph.

The object I have in view is to produce a simple, cheap, and efficient construction; and my invention consists in the various novel devices and combinations, as more fully hereinafter explained, and pointed out by the claims.

In the accompanying drawings, Figure 1 is a vertical section of the phonograph, and Fig. 2 is a side elevation.

A is a frame, which may be a metal strap bent to form a rectangle and open on its upper side, where it is connected by the reproducer-frame which rests upon it. The principal part of the reproducer-frame is a pressed or spun metal ring *a*, having its upper edge extended into a horizontal flange *b*, which rests upon the ends of the frame A and is secured thereto by screws *a'*. The ring *a* has its upper edge turned outwardly into a flange resting upon the ends of the frame A, as stated, while its lower edge is turned inwardly to form a flange, upon which rests the diaphragm B of the reproducer. The diaphragm B is held between two rings of india-rubber at its edge, and upon the upper ring rests a metal cover *c*, from the center of which rises a funnel C. Four springs *c'* are secured under the heads of the screws *a'* and project inwardly, their inner ends pressing upon the top of the cover *c* and forcing the same downwardly, so as to clamp the diaphragm at its edge. By this exceedingly simple construction the diaphragm is held in position by simple stamped or spun parts and without screw-rings or other closely-fitted parts. The reproducing-point D is connected with the diaphragm upon the principle described in my patent No. 397,280, so as to be capable of a retarded movement independent of the diaphragm. This is accomplished by securing the point D to the end of a lever, which is pivoted at its center to a swinging weight *d*, such lever being secured at one end to the post *d'*, depending from the center of the diaphragm, this construction being that specifically described in my application, (Case No. 833,) Serial No. 306,670.

The reproducing-point is preferably a ball, as described in my application last referred to.

By connecting the reproducing-point with the diaphragm so that it is capable of a retarded movement independent of the diaphragm the reproducing-point will not only accommodate itself to eccentricities in the revolving record, which are liable to be present, more especially in cheaply-constructed apparatus, but by lifting the weight *d* the reproducing-point can be raised off of the record without disturbing the diaphragm and while enabling a fixed frame for the reproducer to be employed, thus adding a very important element to the device, since in these toy phonographs some simple arrangement must be provided for disengaging the reproducing-point from the record while the record is moved back to the position of starting.

E is the operating-shaft setting against the centering-point *e*, passing through one side of the frame A and having a reduced end which passes through the other side of the frame A for the reception of a handle, the shoulder formed on the shaft E resting against the inner side of the frame A and preventing the longitudinal movement of the shaft. This is an efficient construction, while it is exceedingly simple, since by the operation of turning the shaft by hand it is given an inward thrust against the centering-point *e*, so that the friction at the shoulder is relieved. The handle F is a crank, which may be formed of a piece of wire bent into a helix where it surrounds the end of the shaft. A pin *e'* on the shaft catches the end of the helix, so that the shaft can be turned in one direction; but if it is attempted to turn it in the other direction the handle will turn back on the shaft and the pin *e'* will be released from the helix, so that the device can be turned only in one direction. Upon the shaft E is mounted a sleeve *f*, a portion of which (shown at *g*) is

screw-threaded. A drum G is secured by soldering to one end of this sleeve and may be stamped or spun from sheet metal. The drum presents a plane face with a flange at one end, and upon the face of the drum is pushed a ring H, which carries the sound-record, and may be of any suitable composition. With a spherical reproducing-point, which wears the surface but little, I have found that a sound-record made in a hard wax-like composition is quite effective for this purpose. The ring H is removable from the drum, it being held thereon simply by friction due to a slight taper of the engaging surfaces, so that when the sound-record is entirely worn out the device is capable of being repaired by the substitution of a new ring, and, indeed, a number of rings may be provided with the device, so that the rings may be changed by the user, and thus a variety in the reproduced matter be secured.

The sleeve *f*, with its screw-threaded extension *g*, is not as long as the shaft E, but it is capable of a longitudinal movement thereon against the pressure of a spiral spring I, which forces the sleeve *f* against the side piece of the frame A at the handle end of the shaft. At the centered end of the shaft is a drum J, which may be stamped or spun from sheet metal, and is soldered to a suitable hub which is secured by a set-screw to the end of the shaft. A pin *h* projects from the drum J and enters a hole *i* in the cylinder G. The drum J being secured to the shaft E while the cylinder G is loose thereon, the cylinder G will be turned with the shaft through the pin *h*. At the same time the pin will permit of the free longitudinal movement of the sleeve *f* upon the shaft.

A counter-shaft K extends across between the side pieces of the frame A beneath the main shaft E. It is journaled directly in the frame on one side, and at its other end is carried by a slotted stirrup *j*. The shaft K carries a balance-wheel L on one end, while near its other end, directly below the drum J, it has a small spool *k*, around which a belt *l* passes, which also encircles the drum J, thus connecting the shafts E and K together, so that the balance-wheel L will steady the revolving movement of the main shaft. A U-shaped wire spring *m* is secured at one end to the screw which holds the stirrup *j* to the side piece of the frame, and at its other end it rests above the shaft K, exerting thereon a downward pressure so as to keep a definite tension upon the belt *l*, which will be sufficient to take up the stretch of the belt *l* and insure the continued driving of the balance-wheel when the main shaft is turned. The feed-block M, which engages with the screw-thread *g* upon its upper side, is secured to the end of a plate-spring *n*, which is attached to and projects from a lever N. This lever is pivoted in the side of the frame by a strap held by a screw at the handle end of the shaft. It passes through the frame, and at its inner end is slotted to form a fork *n'*, which embraces the plate-spring *n*. A wire spring *o* throws the inner end of the lever N downwardly. The outer end of the lever N, where it projects through the frame, forms a finger-piece by which it can be depressed, and it has a projection *o'*, which limits its movement by striking against the frame or a projection therefrom. From the lever N, within the frame, rises a wire *p*, which is bent laterally at its upper end and projects under the swinging weight *d* of the reproducer. The effect of depressing the outer end of the lever N is to first raise the weight *d* through the rod *p*, disengaging the reproducing-point from the sound-record, and then when the lower side of the fork *n'* strikes the under side of the plate-spring *n* to disengage the feed-block M from the screw *g* and allow the spring I to throw the sleeve *f*, and with it the cylinder G of the sound-record H, back upon the shaft.

To operate the instrument, the parts being in the position shown in Fig. 1, the handle F is turned, revolving the sound-record beneath the reproducing-point and at the same time advancing the sound-record by reason of the contact of the stationary feed-block M with the screw *g*. This advancing movement will continue until the screw *g* runs entirely out from beneath the block M, when the entire record will have been reproduced. In this traveling movement of the cylinder along the shaft the spring I is compressed. To carry the sound-record back to the point of starting, so that it can be again reproduced, the lever N is depressed, first lifting the weight *d* through the rod *p*, disengaging the reproducing-point from the record, and then lifting the block M off of the screw *g*, whereupon the spring I forces the cylinder G back upon the shaft until the sleeve *f* strikes the side piece of the frame, when the parts are again in the position shown in Fig. 1.

To provide for the removal of the shaft from the frame, the side piece of the frame A, through which the reduced end of the shaft passes, is slotted on one side, as shown in Fig. 2 at *r*, and the shaft is swung laterally into this slot, it being held by a pivoted locking-plate P, which is pivoted at the point *s* to the side piece of the frame and is locked in position by the screw *t*. By loosening the screw *t* the plate P can be swung over into a horizontal position and the shaft E moved laterally out of the frame. This not only permits the device to be readily taken apart for putting a new ring on the cylinder, but provides for the easy and cheap assembling of the machine in the first instance.

It is evident that many of the features of construction involved in this instrument may be employed with a recorder in place of a reproducer, or with either a recorder or reproducer, the one being substituted for the other in its position in the frame.

What I claim is—

1. In a phonograph, the combination, with a stationary reproducer, of a driving-shaft without longitudinal movement, and a phonogram-cylinder sleeved upon the driving-shaft and rotating therewith and having an advancing movement thereon, substantially as set forth.

2. In a phonograph, the combination, with a stationary reproducer and a driving-shaft without longitudinal movement, of a phonogram-cylinder sleeved upon the driving-shaft and rotating therewith, a stationary feed-block engaging a screw-thread on the cylinder-sleeve for advancing the cylinder on the shaft, the said feed-block being adapted to be disengaged from said screw-thread to permit the reverse movement of the cylinder on the shaft, substantially as set forth.

3. In a phonograph, the combination, with a stationary reproducer and a driving-shaft without longitudinal movement, of a phonogram-cylinder sleeved on the shaft and revolving therewith, a feed-block engaging a screw-thread on the sleeve of the cylinder for advancing said cylinder on the shaft, said block being adapted to be disengaged from the screw-thread, and a spring for sliding the cylinder back on the shaft when the feed-block is disengaged, substantially as set forth.

4. In a phonograph, the combination, with the stationary reproducer and a driving-shaft without longitudinal movement, of a phonogram-cylinder sleeved on the shaft and revolving therewith and having an advancing movement on said shaft, a driving-drum secured to the shaft, a counterbalance-wheel shaft with which the driving-drum is connected, and a pin on the driving-drum passing through a hole in the phonogram-cylinder for turning the latter with the shaft, substantially as set forth.

5. In a phonograph, the combination, with the stationary reproducer having a reproducing-point capable of a retarded movement independent of the diaphragm, and a lever acting to lift the reproducing-point to disengage it from the sound-record without moving the reproducer-diaphragm, substantially as set forth.

6. In a phonograph, the combination, with the stationary reproducer having a reproducing-point capable of a retarded movement independent of the diaphragm, of a revolving and advancing phonogram-cylinder carrying a sound-record, a feed-block for advancing the phonogram-cylinder and adapted to be disengaged from the feeding-screw, and a lever acting both upon the reproducing-point and upon said feed-block, disengaging the former from the sound-record without moving the diaphragm and disengaging the latter from the feed-screw, substantially as set forth.

7. In a phonograph, the combination, with the stationary reproducer having a reproducing-point movable independent of the diaphragm and a lifting feeding-block, of a lever connected with the reproducing-point and adapted to lift it, and also connected with the feeding-block through a spring-fork, so as to disengage the block from the feed-screw after the reproducing-point is disengaged from the record, substantially as set forth.

8. In a phonograph, the combination, with the main shaft E, of the phonogram-cylinder sleeved on said shaft, the driving-drum secured to the shaft and having a pin for turning the phonogram-cylinder, the counter-shaft with balance-wheel, a spool on the counter-shaft belted to the driving-drum on the main shaft, and a spring for maintaining the belt under tension, substantially as set forth.

9. In a phonograph, the combination, with a stationary reproducer, of a main driving-shaft without longitudinal movement, a phonogram-cylinder mounted on said shaft and revolving therewith, and also having an advancing movement thereon, said shaft being centered at one end and held in a slot in the frame at the other end, so that by swinging it laterally it can be removed from the frame, substantially as set forth.

10. In a phonograph, the phonogram-cylinder made from sheet metal and formed as a disk, with its edge turned laterally to form a cylindrical surface, and again turned vertically to form a flange at one end of said cylindrical surface, substantially as set forth.

11. In a phonograph, the reproducer-frame made of a ring of sheet metal having an inwardly-turned flange at one end, the diaphragm resting on the inwardly-turned flange, and a clamping-cover securing the diaphragm and held in place by springs, substantially as set forth.

12. In a phonograph, the reproducer-frame made of a sheet-metal ring having an inwardly-turned flange at one end to support the diaphragm and an outwardly-turned flange at the other end for securing the reproducer-frame to a supporting-frame, the diaphragm resting upon the inwardly-turned flange, a cover resting upon the diaphragm, and springs pressing the cover upon the diaphragm to hold it in place, substantially as set forth.

This specification signed and witnessed this 15th day of June, 1889.

THOS. A. EDISON.

Witnesses:
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