

G. F. NORRIS.
SOUND REPRODUCING APPARATUS.
APPLICATION FILED APR. 27, 1914.

1,120,841.

Patented Dec. 15, 1914.

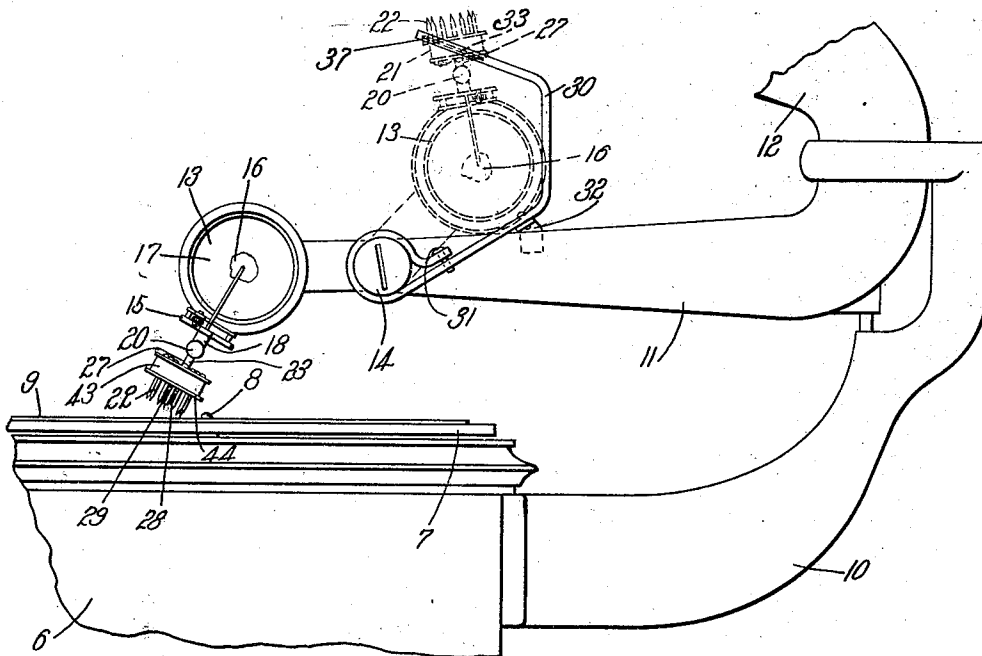


Fig. 1.

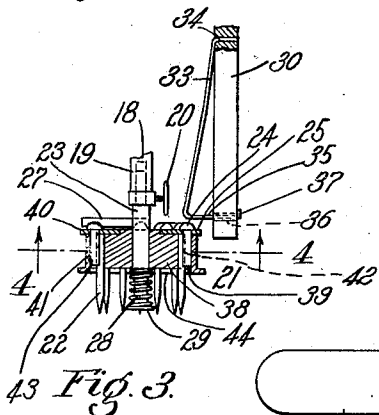


Fig. 3.

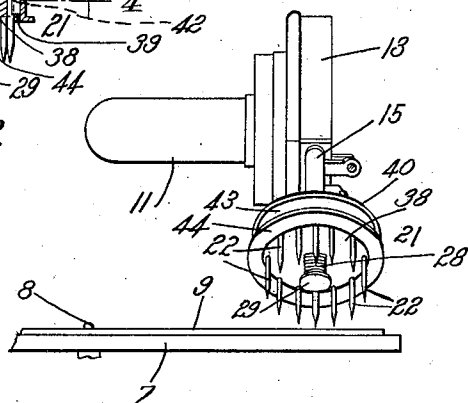


Fig. 2.

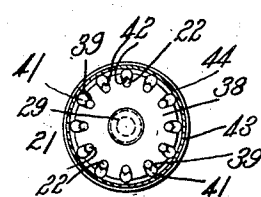


Fig. 4.

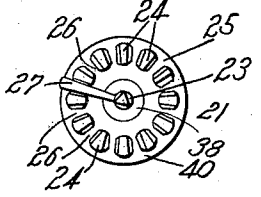


Fig. 5.

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UNITED STATES PATENT OFFICE.

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SOUND-REPRODUCING APPARATUS.

1,120,841.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE F. NORRIS, a citizen of the United States, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Sound-Reproducing Apparatus, of which the following is a specification.

This invention relates to improvements in sound reproducing apparatus otherwise known as talking machines in which a record is employed having a spiral or helical groove adapted to be followed or traced by an instrument commonly known in the art as a needle. The needles as used in this connection are constructed of a comparatively soft metal or fiber, in order that they may not injure or destroy the delicate surface of the records and by being soft the tracing of a single record usually suffices to wear them out or at least destroy their efficiency; consequently when it is desired to play a record the second time or to start on a new record a new needle must be supplied.

The object of the invention is to provide a device adapted to maintain a plurality of needles in readiness to be moved successively into an operative position relatively to the record of the machine thereby changing from a used to an unused needle each time a record is played until the supply has been exhausted, or if it is so desired said supply of needles may be successively presented to said record or other records placed on the machine and used the second time.

The object of the invention is further to provide a suitable holder for said needles which is capable of firmly holding said needles in their operative positions against the record, said holder being constructed to fit the usual needle socket provided in said sound box.

The invention consists in the combination and arrangement of parts whereby the above objects and certain other objects hereinafter appearing may be attained, as set forth in the following specification and particularly pointed out in the claims.

Referring to the drawings: Figure 1 is a side elevation of a portion of a sound reproducing apparatus or talking machine embodying my invention, certain parts of said apparatus being broken away to save space in the drawings. Fig. 2 is a front elevation illustrating the sound box in its operative

position against the face of a record, portions of said record and the rotatable support therefor being broken away. Fig. 3 is a detail section, partly in elevation, of the needle holder and means for rotating said holder. Fig. 4 is a section, partly in elevation, taken on line 4-4 of Fig. 3. Fig. 5 is a rear elevation of the needle holder.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 6 is a casing adapted to contain the usual type of motor used in operating talking machines and which by reason of its being so well known to those skilled in the art is omitted from the drawings. A turn table 7, which in the present case is disk shaped, is mounted upon a spindle 8 which protrudes from the casing 6 and is operated by means of the motor within said casing to rotate said turn table. A record 9 in the present case of the type known as a disk record rests upon the turn table 7 and is revolved thereby, said record having a spirally arranged laterally undulated groove formed in its face.

A bracket 10 is secured to the side of the casing 6 and has pivotally mounted thereon a tone tube 11, the free end of which is adapted to swing transversely of the face of the record 9, said tube either leading to a sounding board not shown in the drawings. A sound box 13 is pivoted at 14 to the free end of said tone tube, said sound box having a pivoted arm 15 whose inner end is secured at 16 to the center of a diaphragm 17. The opposite end 18 of said pivoted arm is provided with a socket 19 adapted to contain needles of the various well-known types, said socket being preferably triangular in shape and having a thumb screw 20 arranged to secure needles in place therein. A needle holder 21 is secured to said sound box and adapted to be rotated relatively thereto, said holder being adapted to contain a plurality of needles 22 preferably uniformly spaced about the axis of said holder 21.

As hereinbefore stated the holder 21 is arranged to rotate relatively to the sound box 13 preferably about a stud 23 the upper end of which is triangularly formed and adapted to fit the socket 19 and to be held therein by the thumb screw 20. A plurality of projections 24 are provided on the rear

face 25 of the holder 21, said projections forming recesses 26 corresponding to the number of needles contained in said holder.

The stud 23 is provided with a lateral projection or pin 27 arranged to fit the recesses 26 and to be yieldingly held therein by a spring 28, which encircles the stud 23 bearing at one end against the collar 29 on said stud and at the opposite end against the end of the rotary member 21, the relative positions of said recesses 26 and the needles 22 being such that when said projection 27 is in one of said recesses one of said needles will be in contact with the disk 9, that is, when the sound box 13 is in its operative position, said projection preventing more than one needle from contacting with said record at one time.

During the operation of the apparatus the turn table 7 is rotated and in turn imparts a rotary motion to the record 9 during which time one of the needles, carried by the holder 21, is placed within the groove formed in the face of said record, whereupon the undulations of said groove will impart a rocking movement through said needle to the arm 15 which, in turn, vibrates the diaphragm 17, while at the same time said sound box is moving from the point near the periphery of said record toward the center thereof causing the tone tube 11 to be swung about its pivot. When the end of the groove in said record has been reached the sound box is swung upwardly about the pivot 14 into the position illustrated in dotted lines Fig. 1, with one edge of said sound box resting against the tone tube 11, while the needles 22 are elevated or moved clear of the record permitting said record to be removed and another record placed on the table, or the same record reversed as the case may be.

The swinging of the sound box as described is performed each time a record is put on or taken off, the full line position of the sound box in Fig. 1 illustrating the operative position thereof, while the dotted lines illustrate the inoperative position of said sound box. To accomplish the rotation of the holder the distance between two consecutive needles or to move a new needle into a position to engage the record 9, the needle holder 21 is rotated upon the stud 23 by hand, if desired, but preferably automatically during a predetermined pivotal movement of said sound box, or at least during the latter portion of the upward movement of said sound box, by means preferably consisting of an arm 30 secured to the tone tube 11, by a screw 31, a bracket 32 engaging said tone tube 11 and properly positioning said arm relatively to said tube.

The upper end of the arm 30 is provided with a spring 33 secured at 34 to said arm, while the opposite end 35 is bent trans-

versely of the body portion of said spring and extends through a hole 36, and again said spring is bent to form a stop 37. The body portion of the spring 32 is arranged at an angle to the arm 30 and is adapted to be moved toward said arm for a limited distance, the outward movement thereof being limited by the stop 37.

The position of the spring 33 is such that as said sound box is swung upon the pivot 14 from its operative to its inoperative position the portion 35 thereof will engage one of the projections 24 on the holder 21 and cause said holder to be moved longitudinally of the stud 23 until the projections upon opposite sides of the lateral projection 27 have been disengaged from said projection, whereupon a continued movement of said sound box will cause said holder to be rotated until the next recess is brought beneath the projection 27. The spring 28 at this time causes said holder 21 to return to its normal position, thus locking the same in the desired position.

Just as the projection 27 enters the next recess the spring 33 escapes from the projection, which it has engaged in rotating said holder, permitting said sound box to be moved into a position against the tone tube 11 without further rotating said holder. Upon the return movement of the sound box to its operative position said holder strikes the inclined body portion of said spring 33 and instead of being rotated thereby deflects said spring without affecting the position of the needles or said holder.

The capacity of the needle holder 21 may be varied as desired, in the present instance however twelve needles are shown which permit twelve consecutive operations when the needles are to be used once, or if it is desired to use the needles a second time the operation may continue until twenty-four or more records have been played after which the holder may be removed by turning the screw 20 and withdrawing the stud 23 from the socket 19, while another holder with a fresh supply of needles may be inserted or the needles in said holder removed and other needles placed therein in their stead.

It is essential that the needles be held firmly in the holder 21 in order to prevent any loss or absorption of the vibrations transmitted by the record. As a preferred means for securing the needles in the holder 21 a barrel 38 is provided, said barrel having a plurality of radially disposed recesses 39 arranged at uniform distances from the axis thereof, whose inner ends are adapted to receive the butts of the needles 22. A ring 40 is secured to the end of the barrel 38, said ring having mounted therein a plurality of pins 41 which register with the radial recesses 39, said pins being slotted at longitudinally thereof and upon the side adjacent

the needles 22 and into which said needles are adapted to project.

A second ring 43 is adapted to encircle the pins 41 and force said pins into the recesses 39 firmly against the butts of the needles, said latter ring being provided with a flange 44 which facilitates the removal of said ring from said pins when it is desired to remove and replace the needles in said holder.

In the above description I have described the preferred embodiment of my invention for illustrative purposes and have disclosed and discussed in detail the construction and arrangement incidental to the particular application. It is however to be understood that the invention is not limited to the mere details or relative arrangement of parts, neither to the specific application herein shown, but that extensive variations or deviations from the illustrated forms of the invention may be made without departing from the spirit and scope of the same.

Having thus described my invention what I claim and desire by Letters Patent to secure is:

1. A sound reproducing apparatus having, in combination, a tone tube, a sound box pivotally mounted on said tone tube, a multiple needle holder secured to said sound box, means to position said holder on said sound box with one of said needles in an operative position, and means on said tone tube adapted to be engaged by said holder during a portion of the pivotal movement of said sound box in one direction adapted to move one needle out of and another needle into said operative position.

2. A sound reproducing apparatus having, in combination, a pivotally mounted sound box adapted to be swung from an operative to an inoperative position, a needle holder secured to said sound box, said holder adapted to contain a plurality of needles, means to position said holder with one of said needles in an operative position when said sound box is in its operative position, and means rendered operative by the movement of said sound box from one of said positions to the other adapted to move said needle holder to present another needle to said operative position.

3. A sound reproducing apparatus having, in combination, a pivoted sound box adapted to be swung from an operative into an inoperative position, a stud detachably secured to said sound box, a needle holder rotatably mounted on said stud, a plurality of needles arranged about the axis of said holder, means adapted to yieldingly retain said holder in nonrotatable relation to said stud, and means rendered operative by the swinging of said sound box from one of its positions to the other adapted to rotate said needle holder the distance between two consecutive needles.

4. A sound reproducing apparatus having, in combination, a tone tube, a sound box pivotally connected with said tone tube adapted to be swung thereon from an operative to an inoperative position, a needle holder secured to said sound box, said holder adapted to contain a plurality of needles, means to position said holder with one of said needles in an operative position, and an arm secured to said tone tube adapted to be engaged by said needle holder during the movement of said sound box from one of said positions to the other and to rotate said holder the distance between two consecutive needles.

5. A sound reproducing apparatus having, in combination, a tone tube, a sound box pivotally connected to said tone tube adapted to be swung thereon from an operative to an inoperative position, a needle holder secured to said sound box, said holder adapted to contain a plurality of needles, means to position said holder with one of said needles in an operative position, an arm secured to said tone tube, a spring on said arm, and means on said holder adapted to engage said spring during the movement of said sound box in one direction from one of said positions to the other and rotate said holder a distance equal to the distance between consecutive needles.

6. A sound reproducing apparatus having, in combination, a pivoted sound box, a needle holder arranged beneath and adapted to be rotated relatively to said sound box, said holder adapted to contain a plurality of needles disposed about the axis thereof, means to secure said needles in said holder, and means rendered operative by a predetermined pivotal movement of said sound box adapted to successively present the needles in said holder to the operative position thereof.

7. A sound reproducing apparatus having, in combination, a pivoted sound box adapted to be swung from an operative into an inoperative position, a stud detachably secured to said sound box, a needle holder rotatably mounted on said stud, a plurality of needles arranged about the axis of said holder, means adapted to retain said holder in nonrotatable relation to said stud, and means rendered operative by the swinging of said sound box from one of its positions to the other adapted to rotate said needle holder the distance between two consecutive needles.

8. A sound reproducing apparatus having, in combination, a pivotal sound box, a stud detachably secured to said sound box, a needle holder rotatably arranged on said stud adapted to contain a plurality of needles, a projection on said stud, means on said holder adapted to engage said projection to prevent rotation of said holder, a spring adapted to yieldingly retain said

holder in contact with said projection and means rendered operative by a pivotal movement of said sound box adapted to rotate said holder.

- 5 9. A sound reproducing apparatus having, in combination, a pivotal sound box, a stud detachably secured to said sound box, a holder rotatably mounted on said stud adapted to contain a plurality of needles, means
10 to secure said needles in said holder, a projection on said stud, means on said holder adapted to engage said projection and prevent the rotation of said holder, a spring

adapted to retain said holder in contact with said projection and means rendered operative by a pivotal movement of said sound box to disconnect said holder from said projection and rotate said holder a predetermined amount on said stud. 15

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses. 20

GEORGE F. NORRIS.

Witnesses:

SYDNEY E. TAFT,
MARGARET E. HORN.

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