E. A. WATSON.

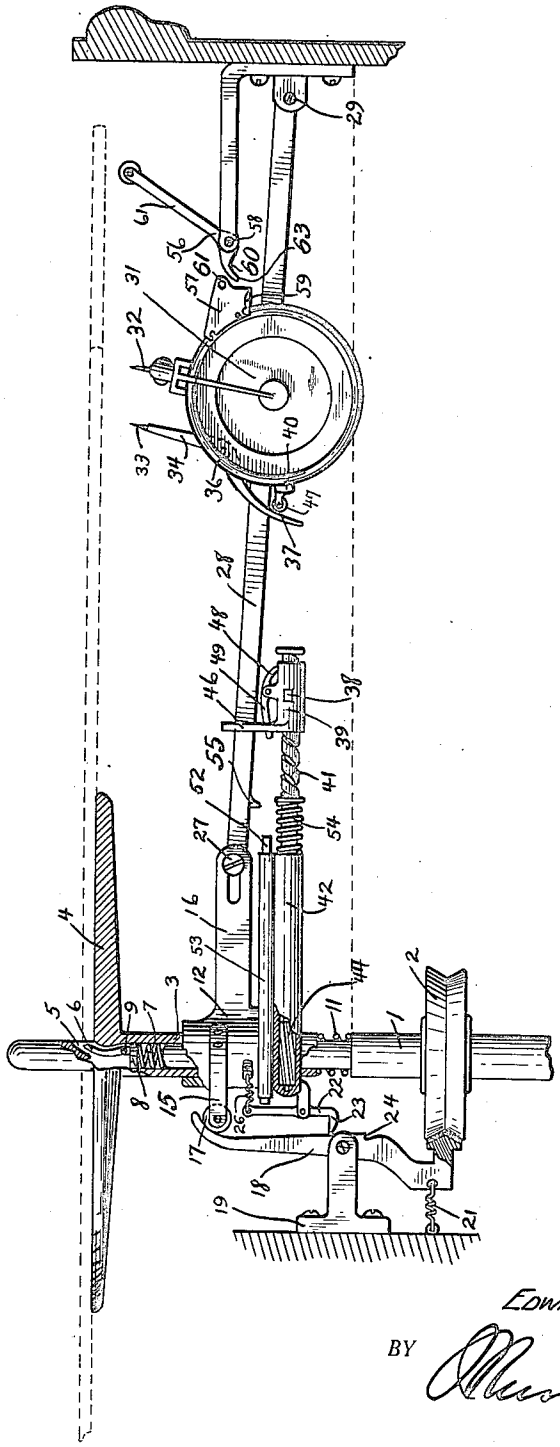
PHONOGRAPH.

APPLICATION FILED JUNE 9, 1921.

1,436,129.

Patented Nov. 21, 1922.

2 SHEETS—SHEET 1.



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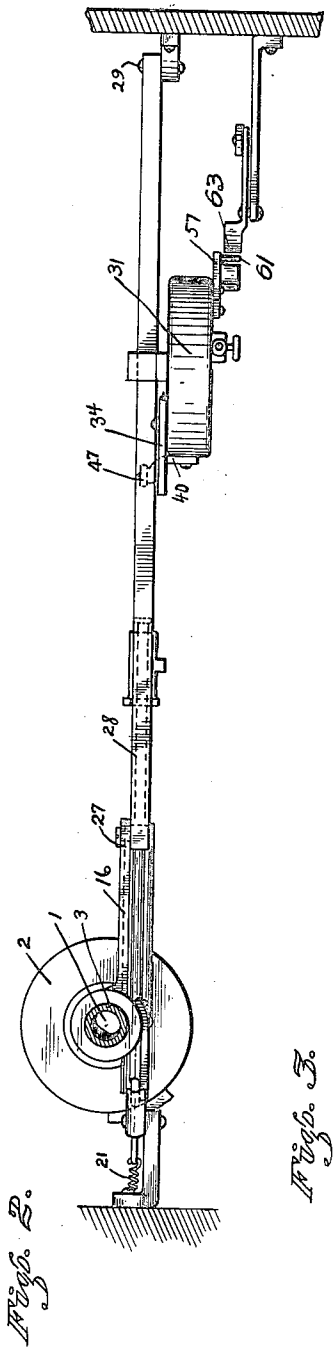


Fig. 2.

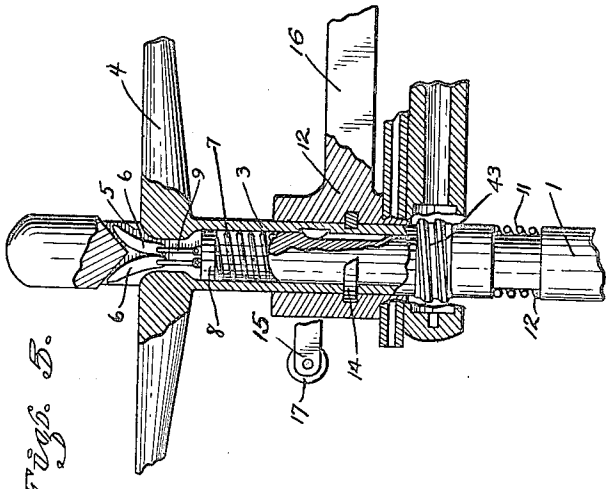


Fig. 5.

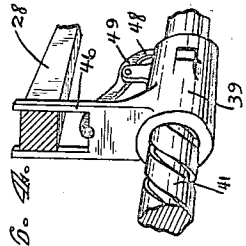


Fig. 4.

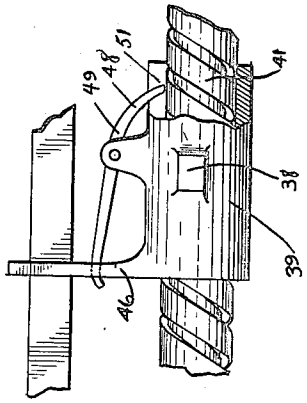


Fig. 3.

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UNITED STATES PATENT OFFICE.

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PHONOGRAPH.

Application filed June 9, 1921. Serial No. 476,199.

To all whom it may concern:

Be it known that I, EDWIN A. WATSON, a citizen of the United States, and resident of Mill Valley, county of Marin, and State of California, have invented a new and useful Phonograph, of which the following is a specification.

The present invention relates to improvements in sound reproducing machines and its principal object is to provide a machine of the character described that automatically begins to operate when the record is placed on its seat and that automatically stops when the last groove of the record has been reached. A further object of the invention is to provide a mechanism by which the sounder carrying the needle automatically finds its right place for records of different sizes. Another object is to provide a sounder that will bring the needle into operative contact with the first groove of the record only after the record has made a number of turns and has acquired its full speed. Various other objects and advantages of my machine will appear as the description proceeds.

While in the drawings and the description I confine myself to one particular embodiment of the principles involved, I do not wish to be understood as limiting my claims thereby, since I desire to be protected on the broader principles underlying the construction of the particular mechanism illustrated.

Figure 1 represents a side view of the principal working parts of my sound reproducing machine; Figure 2, a sectional view through the same along line 2—2 of Figure 1; Figure 3, an enlarged detail side elevation of a sleeve travelling on a revolving rod; Figure 4, a perspective view of the mechanism shown in Figure 3, and Figure 5 an enlarged detail view, partly in section, showing the main shaft and the parts associated with the same.

Referring to the drawing in detail, the vertical shaft 1 may receive revolving motion from any appropriate source of power not shown in the drawing. It carries a friction wheel 2 intermediate of its length, which, as will be seen later, serves the purposes of a brake. Some distance above said brake, the shaft 1 is reduced in diameter and carries a sleeve 3 which latter carries the record plate 4 and extends above the same a certain distance, this upper part being solid, with the exception that it is provided, right above the record plate, with a plurality of passages or slots 5 leading from the hollow part of the sleeve upwardly and outwardly to a place sufficiently high above the record plate so that an equal plurality of clamping pieces 6 working within the same are adapted to engage a record placed on the plate at its upper surface when they are pushed upward and outward by the spring 7 bearing on them through the disk 8 and connecting rods 9. The spring 7 rests on the top of the shaft 1 and is actuated by a downward pressure on the record plate. The latter is of smaller size than the record and only large enough to be covered by the ungrooved central part of the record.

The sleeve 3 is supported on the shaft by means of a second spring 11 which rests on the shoulder 12 formed where the shaft is reduced in diameter. On the sleeve the carriage 12 is rotatably supported by means of the ring 14 engaging both the sleeve and the carriage. The latter is provided with two arms 15 and 16 extending into opposite directions. The arm 15 carries at its end a roller 17, adapted to frictionally engage one arm of the lever 18 pivoted on a stationary support 19. The other arm of the lever makes frictional contact with the brake wheel 2 mentioned hereinbefore. The lever is actuated to engage the brake by the carriage, the upper arm of the lever being curved so that an upward motion of the carriage forces that arm of the lever outward and the other arm into contact with the brake wheel. The brake is released by the spring 21 pulling the lower lever arm away from the brake wheel when the carriage ceases to bear on the upper arm. The lever at the same time is adapted to lock the carriage in its downward position through a second lever 22 secured to the carriage having a hook 23 which may be forced into engagement with a notch 24 in the lever 18 by a spring 26 when the carriage is in its lowermost position.

The mechanism thus far described works as follows: To start the apparatus a record is laid on the record plate and pressed downward. This forces the sleeve 3 and its carriage downward. The shaft 1 being incapable of vertical motion, the spring 7 presses the clamping pieces 6 upward to rise above the record and to firmly hold the same by their wedging action. The carriage which has come down with the sleeve 3, has in the

meantime released the brake by releasing the lever 18 and has become locked in its lowermost position by the lever 22 engaging the notch in the lever 18. Thus, the record is firmly held on the record plate, the shaft is free to rotate and the carriage is in its lowermost position.

The arm 16 of the carriage has a slot at its outer end which engages, through the pin 27, one end of a guide rod 28, the other end of which is pivotally secured in a stationary support, as shown at 29, in such a manner that the guide rod is substantially horizontal when the carriage is in its lowermost position. On this guide rod the sounder 31 is adapted to travel back and forth, which latter may be secured to a tone arm in any desired manner not shown in the drawing. The sounder is provided with two needles, one of which, 32, is similar in every respect to the needle ordinarily used in phonographs, while the second one, 33, differs from the former in the fact that it is made of some material like wood, that does not scratch the record when engaging the grooves of the same. The latter needle, hereinafter referred to as the guide needle, is secured to the end of a lever 34 somewhat elbow-shaped, pivoted in the sounder as at 36. The object of this lever is two-fold. It draws the sounding needle into engagement with the grooves of the record and it sets the brake when the sounding needle has arrived at the end of the record.

In describing the action of the sounder we have to distinguish between records of different sizes, say, a 10 inch and a 12 inch record.

Commencing with the 10 inch record we assume, that the latter has been placed on the plate and pressed downward. The sounder is in such a position that its guide needle 33 engages the first groove of the record, which, as we have seen before, starts to rotate immediately upon being pressed down.

The grooves being arranged spirally, the guide needle moves slowly toward the center of the record along a radial line and turns the lever (34) on its pivot (36) until its lower end comes in contact with a projection (40) secured to the sounder. Thereby the lever (34) is prevented from turning any further on its pivot (36) and now forces the pivot, and with it the sounder, to partake of its motion in radial direction along the guide rod (28) so that after a number of revolutions, when the record has attained full speed, the sounding needle (32) will engage the first groove. When approaching the end of the record, the guide needle is the first to reach the last groove and continues to travel in the same, while the sounding needle approaches it, carrying the sounder with it. As the sounder moves and the guide needle remains stationary, the lever 34 carrying the later begins to pivot on its supporting point, whereby the end of its other arm 37 rotating on the pivot 36 is brought in contact with a projection 38 on a sleeve 39 which is slidably mounted on a threaded shaft 41, the sleeve itself not being threaded. This shaft is supported in a casing 42 being an integral part of the carriage and is rotated by means of a worm 43 on the sleeve 3 engaging a worm gear 44 at the end of the shaft. The sleeve 39 is prevented from rotating on the shaft 41 by a fork 46 extending upwardly from the sleeve and engaging the guide rod. When the arm 37 comes in contact with the projection 38, it forces the sleeve forward towards the carrier. But it will be remembered that the lower end of the arm 37 moves along a substantially circular path around the pivot 36 so that when reaching a certain point on its path it escapes the projection. At that time the roller 47 at the end of the projection 40 begins to bear against the curved end 48 of a lever 49 pivoted on the sleeve, the end being adapted to be forced into the bottom of one of the threads on the shaft 41 through a slot 51 in the sleeve by said roller. As soon as this lever thus engages the thread the sleeve travels forward again on the revolving shaft 41 until its fork 46 comes in contact with a push rod 52 sliding in a sleeve 53 rigidly secured to the carriage, and pushes the other end of said push rod against the upper arm of the lever 22, thereby disengaging the latter from the lever 18 over the resistance of the spring 26. As soon as this lever is released, the carriage is forced upward by the spring 11 and the roller on the arm 15 forces the upper arm of the lever 18 outward and the lower arm in contact with the brake wheel, thereby stopping the rotory motion of the shaft.

The rising of the carriage brings the guide rod 28 into closer proximity with the shaft 41, so that a projection 55 below the guide rod, which just cleared the lever 49 on the sleeve 39 when the carriage was in its lowermost position, bears down on said lever when the carriage rises and thereby forces the arm 48 of said lever from its engagement with the threads on the shaft 41, so that now the spring 54 can force the sleeve 39 back again to its original position. At the same time the sounder 31 slides back on the slanting guide rod until stopped by the lever 56.

The lever 56 is introduced in my mechanism in order to make the same adjustable for larger, for instance 12 inch records. It is elbow-shaped and its elbow pivots on a stationary support arranged outside the path of the sounder so that the latter would pass the lever and its support if it was not for a catch 57 which extends sideways from the sounder and is so constructed that it engages one arm 60 of the lever 56, which latter arm

is curved downwardly. When the transverse pin 61 of the catch comes in contact with the upper face of the lever arm, it presses the same downward so that the latter slides into the catch until its point or toe 63 strikes the stop 59 in the bottom of the catch. Being in this position, it effectively stops any further movement of the sounder.

While the said arm of the lever was brought down, the other arm 61 of the same lever was thrown upward sufficiently high to come in contact with and be pressed downward by a large record placed on the plate. Such pressure releases the point or toe 63 of the arm 60 from its engagement with the stop 59 in the catch and allows the sounder to travel further on the guide rod until it is in the proper position for a 12 inch record.

It will thus be seen that my device automatically adjusts itself to the size of the record, automatically releases the brake, automatically brings the record up to its full speed before the sounding needle is engaged, then engages the sounding needle, automatically stops the rotation of the record, returns the needle to its original position and sets the brake, leaving for the operator only the one operation of placing the record on the plate and pressing down on it.

I claim:

1. A sound reproducing machine comprising a rotary shaft, a brake for said shaft and means for releasing the same, a sleeve carrying a plate slidably secured on said shaft, a record adapted to be pressed on said plate and to thereby actuate the brake release, a carriage rotatably mounted on said sleeve, a guide rod pivoted in a stationary support pivotally associated with said carriage, a sounder slidable on said guide rod, a needle associated with said sounder adapted to operatively engage the record and to cause the sounder to travel on the guide rod, means actuated by the needle at the end of its travel adapted to set the brake, and means for returning the plate to its original position.

2. In a sound reproducing machine of the character described, a rotary shaft, a brake for said shaft, and means for releasing the same, a sleeve carrying a plate slidably secured on said shaft, and means associated with said sleeve adapted to actuate said brake releasing means when said plate is being pressed upon.

3. In a sound reproducing machine of the character described, a rotary shaft, a brake for said shaft, a sleeve slidably secured on said shaft, and an operative connection between said sleeve and said brake, including spring means for setting the brake and spring means for releasing the same when the sleeve is pressed downward.

4. In a sound reproducing machine of the character described, a rotary vertical shaft, a sleeve carrying a plate slidably secured on said shaft, said plate being adapted to carry a record, and spring-actuated clamping means within said sleeve adapted to extend through the wall of the sleeve, when the latter is pressed downwardly so as to grip the record and bind the same to the plate.

5. In a sound reproducing machine of the character described, a vertical rotary shaft, a brake for said shaft, a sleeve carrying a plate slidably secured on said shaft, said plate being adapted to carry a record, an operative connection between said sleeve and said brake, including spring means for setting the brake, spring means for releasing the same when the plate is pressed downward, and spring-actuated clamping means within said sleeve adapted to simultaneously extend through the wall of the sleeve, so as to grip the record and bind the same to the plate.

6. In a sound reproducing machine of the character described, a vertical rotary shaft, a brake for said shaft, a sleeve carrying a plate slidably secured on said shaft, said plate being adapted to carry a record, an operative connection between said sleeve and said brake, including spring means for setting and spring means for releasing the brake, locking means for maintaining the brake released, a sounder, and means associated with the sounder for releasing said locking means at predetermined times.

7. In a sound reproducing machine of the character described, a vertical rotary shaft, a brake for said shaft, a sleeve carrying a plate slidably secured on said shaft, said plate being adapted to carry a record, an operative connection between said sleeve and said brake, including spring means for setting and spring means for releasing the brake, spring actuated clamping means within said sleeve adapted to simultaneously extend through the wall of the sleeve so as to grip the record and bind the same to the plate, locking means for holding said sleeve in its seat, a sounder, and means associated with the sounder, for releasing the locking means at predetermined times.

8. In a sound reproducing machine, a record, means for rotating the same, a guide rod in operative proximity to said record, a sounder slidable thereon, a guiding needle and a sounding needle associated with said sounder, said guiding needle being adapted to engage a groove in the record, to draw the sounding needle into engagement with the grooves of the record and to stop the rotating means when the sounding needle arrives at the end of the record.

9. In a sound reproducing machine, a record, means for rotating the same, a brake associated with said rotating means for stopping said record, a guide rod in operative

proximity to said record, a sounder slidable thereon, a guiding needle and a sounding needle associated with said sounder, said guiding needle being adapted to engage a groove in the record, to draw the sounding needle into engagement with the grooves of the record and to set the brake when the sounding needle arrives at the end of the record.

10. In a sound reproducing machine, a rotary shaft, a record secured thereto, a brake for said shaft, a sleeve vertically slidable on said shaft adapted to normaly set the brake but to release the same upon being pressed downward. means for locking said sleeve in its downward position, a carriage rotatably secured on said sleeve, a guide rod having one end pivoted in a stationary support and one end in the carriage, a sounder slidable on the guide rod adapted to engage the record and to release the sleeve locking means so as to set the brake when arriving at the end of the record.

11. In a sound reproducing machine, a rotary shaft, a record secured thereto, a brake for said shaft, a sleeve vertically slidable on said shaft adapted to normally set the brake but to release the same upon being pressed downward, means for locking said sleeve in its downward position, a carriage rotatably secured on said sleeve, a guide rod having one end pivoted in a stationary support and one end in the carriage, a sounder slidable on the guide rod, a guiding needle and a sounding needle associated with said sounder, said guiding needle being adapted to engage a groove in the record, to draw the sounding needle into engagement with the grooves of the record and to release the sleeve locking means so as to set the brake when arriving at the end of the record.

12. In a sound reproducing machine, a rotating record, a guide rod in operative proximity thereto, a sounder slidable on said record, the grooves on the record being adapted to cause the sounder to travel towards the center of the record, automatic means for causing the sounder to travel in the opposite direction and an automatic stop for said sounder adapted to be actuated by a larger record placed on the machine to allow the sounder to pass so as to adjust itself to the larger record.

13. In a sound reproducing machine, a rotating record, a guide rod in operative proximity thereto, a sounder slidable on said record, the grooves on the record being adapted to cause the sounder to travel towards the center of the record, automatic means for causing the sounder to travel in the opposite direction and a lever pivotally supported adapted to stop said sounder and to be actuated by a larger record placed on the machine to allow the sounder to pass so as to adjust itself to the larger record.

EDWIN A. WATSON.