

Aug. 1, 1933.

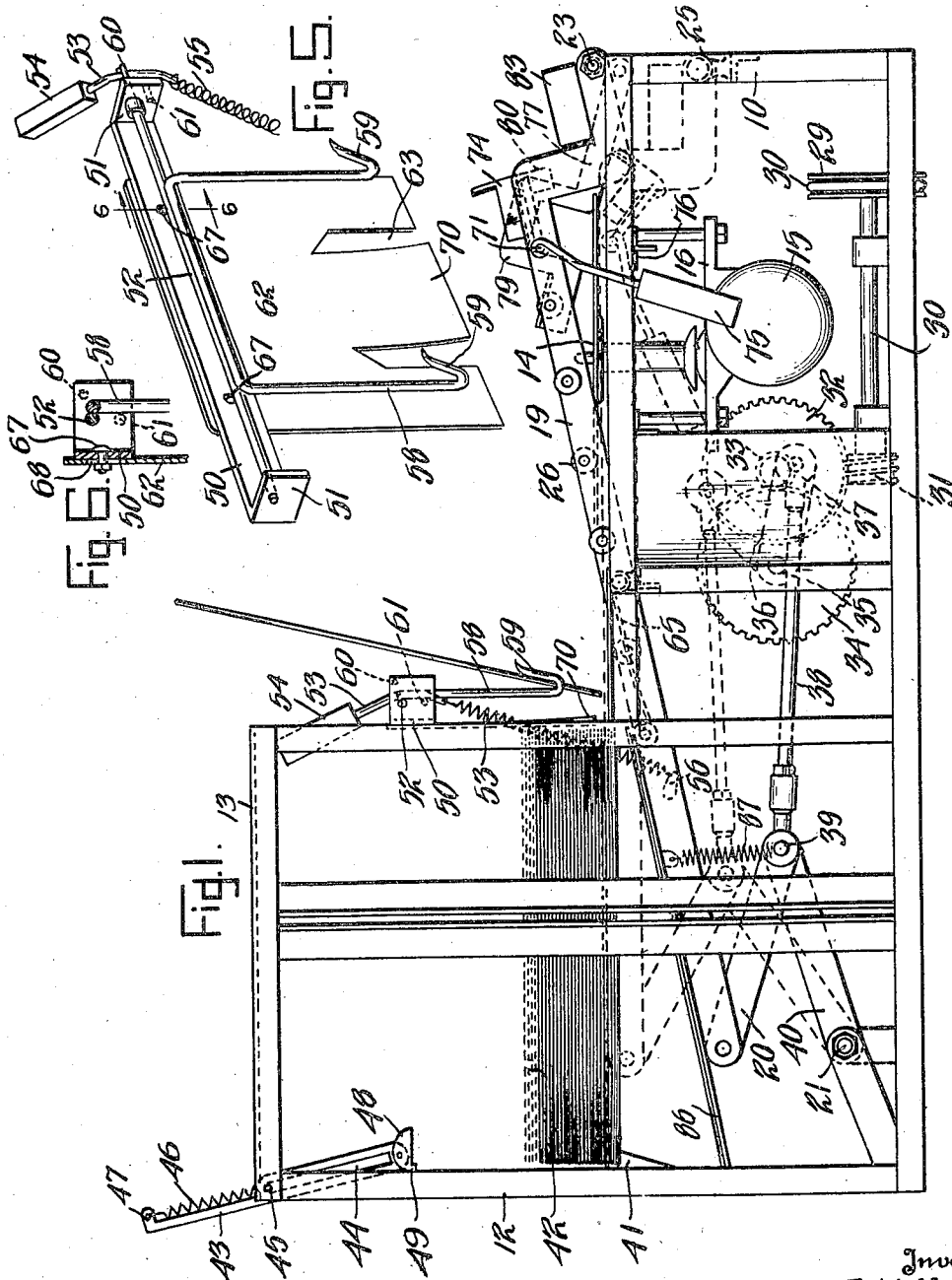
W. E. MILLER ET AL

1,920,936

PHONOGRAPH

Original Filed Nov. 7, 1929

4 Sheets-Sheet 1



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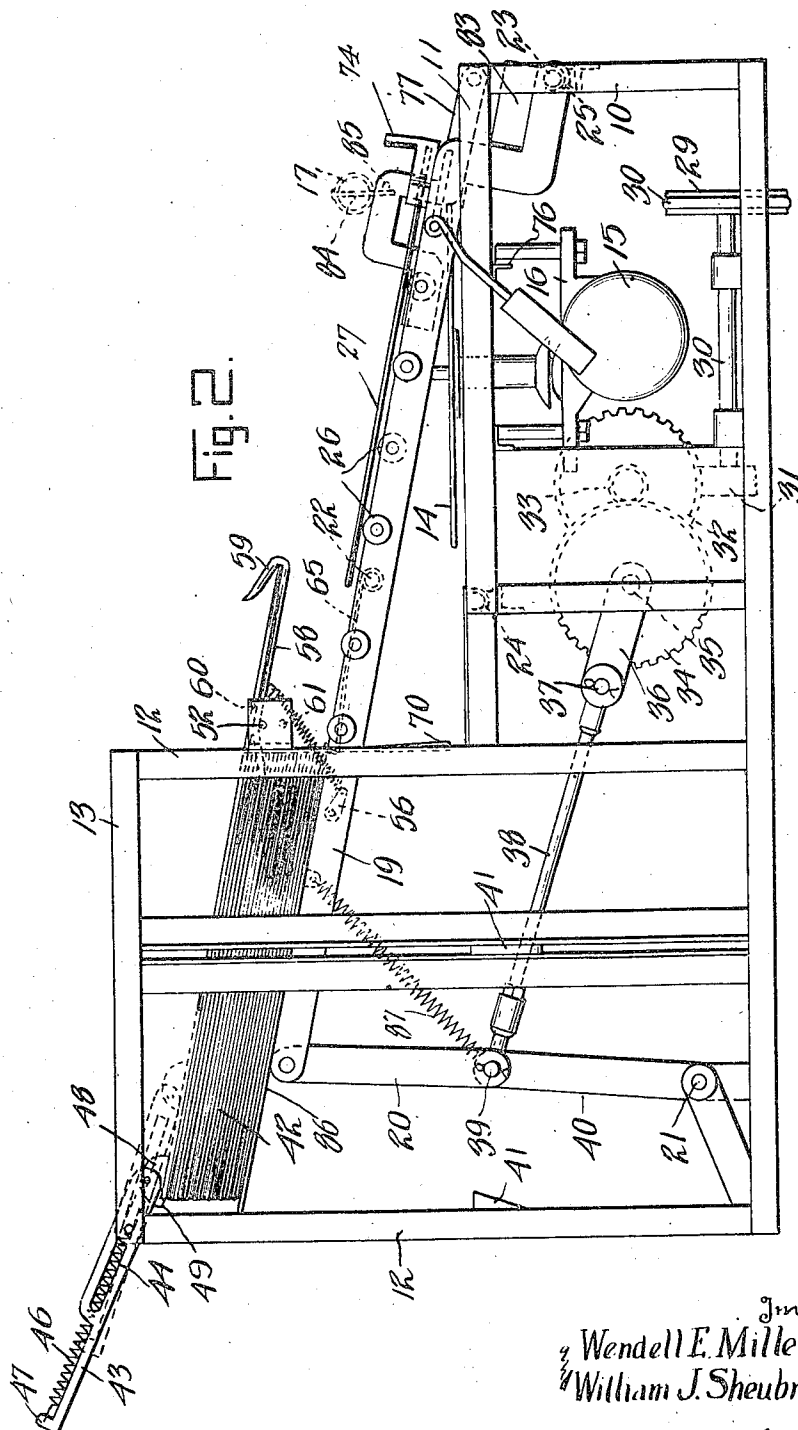
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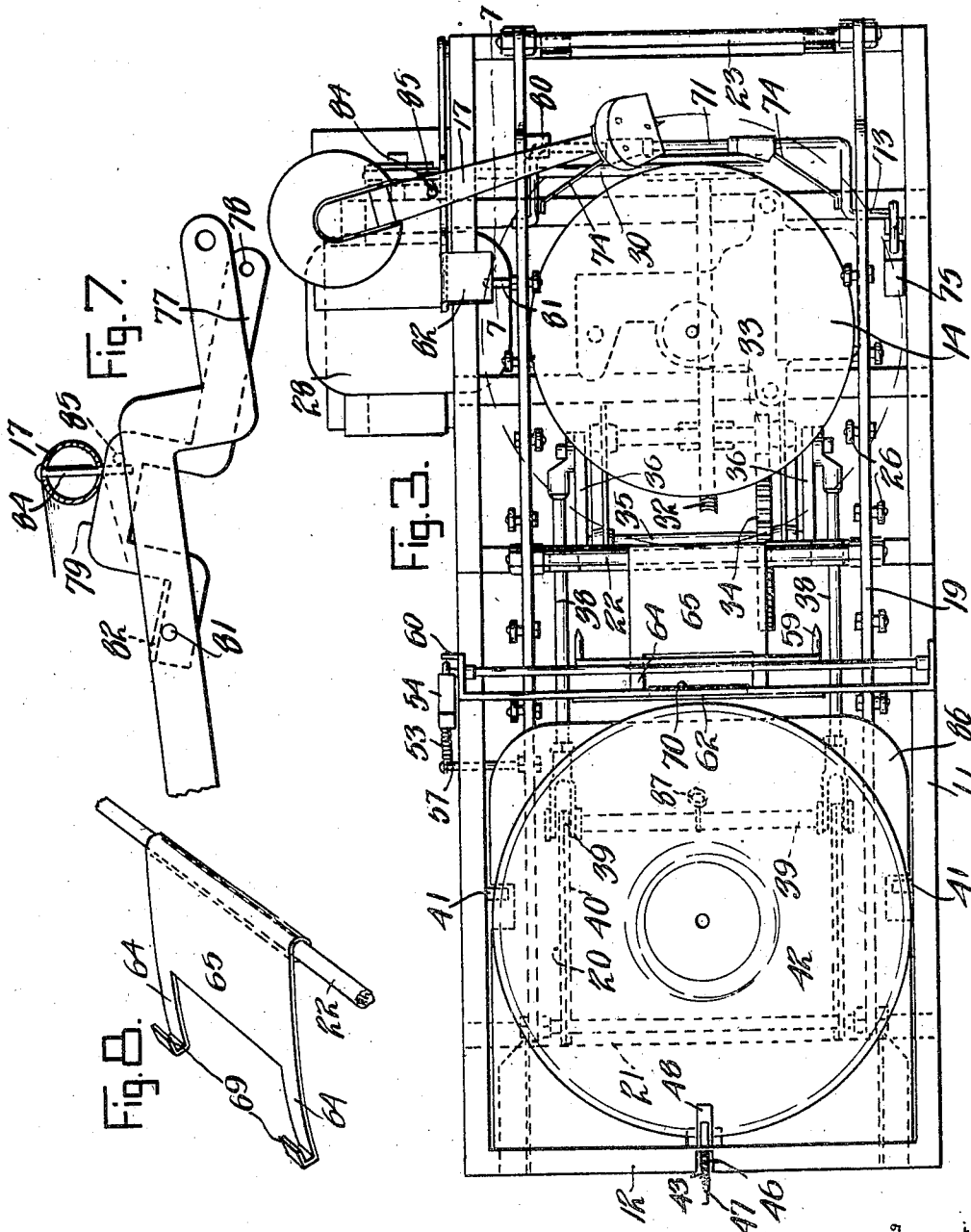
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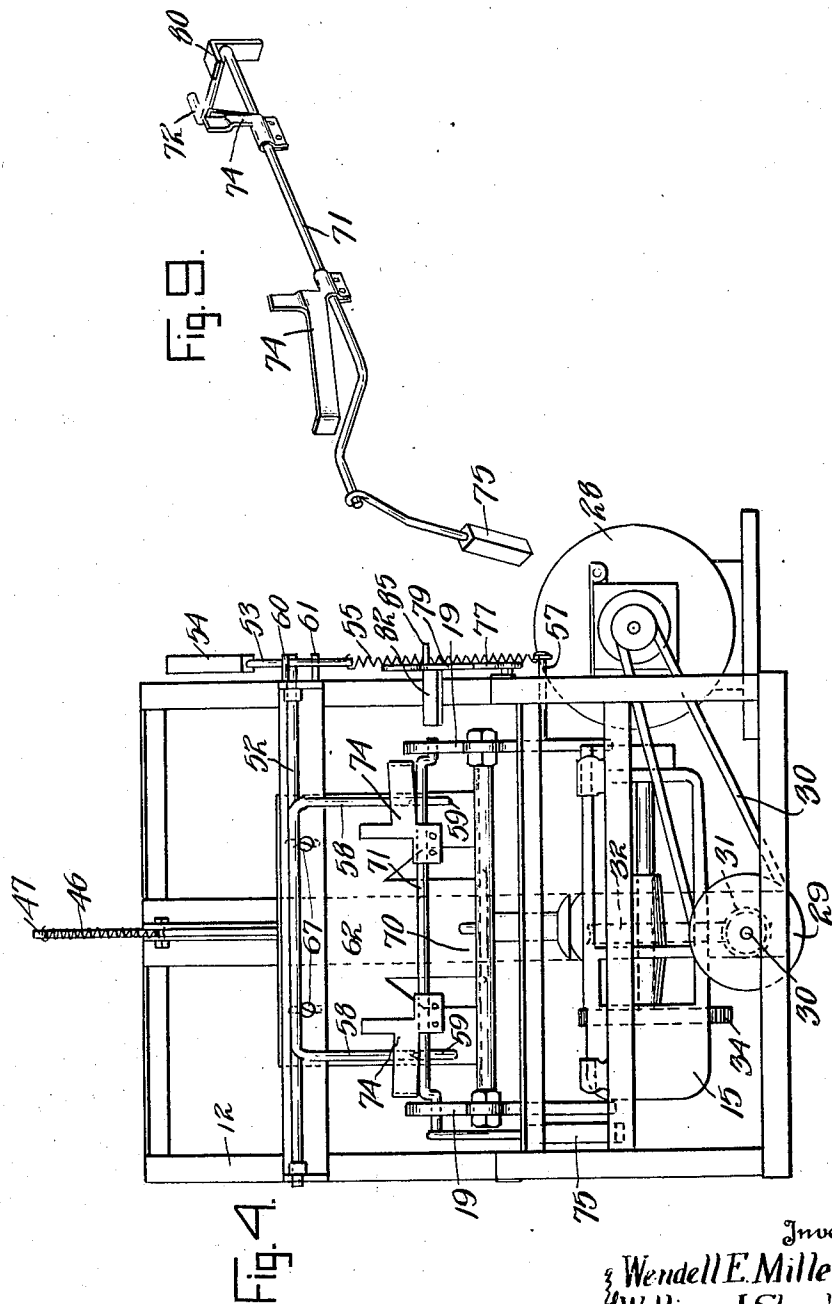
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PHONOGRAPH

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

1,920,936

PHONOGRAPH

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Application November 7, 1929, Serial No. 405,404
Renewed December 19, 1932

17 Claims. (Cl. 274-10)

This invention relates to phonographs and particularly to means for changing the records so as to play a plurality of records in series. An object of the invention is to provide a machine of this character in which both sides of the records may be played.

A further object is to provide means for changing the record which will lessen the danger of breaking records during the changing and inverting of the records to play both sides.

Further objects and advantages will become apparent as the description proceeds.

Referring to the accompanying drawings, which are made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is a view in elevation of the machine showing the record changing frame in position right after a record has been played and showing in dotted lines the position of the transferring frame during the playing of a record,

Figure 2, a view in elevation showing the record changing frame in its elevated position just at the point of placing a new record in position to be played.

Figure 3, a plan view of the machine,

Figure 4, an end elevation of the machine,

Figure 5, a view in elevation of a detail showing the rack for inverting the records,

Figure 6, a section on line 6-6 of Fig. 5,

Figure 7, a section substantially on line 7-7 of Figure 3,

Figure 8, a plan view of a portion of the record changing frame showing the plate for assisting in inverting the records, and

Figure 9, a detail showing the stopping mechanism for locating the records in correct playing position.

In the drawings reference characters 10 and 11 indicate the supporting structure of the machine in which the record playing table and its operating mechanism are supported and 12 and 13 indicate frame mechanism in which the stack of records is supported. The record playing table may be driven in any suitable way as by a conventional motor 15 supported on a bracket 16 depending from a part of the frame 11. A tone arm 17 of any suitable sort is mounted and operated to be moved into and out of playing position by any well-known mechanism. This mechanism, since it forms no part of the invention, will not be described in detail as any well known tone arm and operating mechanism therefor may be used with our machine.

The mechanism for changing the records consists of a double fulcrumed transfer frame 19

which is pivotally attached to toggle links 20 and 40, the latter being pivoted at 21 to a part of the frame in which the stack of records is supported.

The transfer frame 19 has transverse shafts 22 and 23 on which the frame is pivoted in either of two saddle bearings 24 or 25, depending on whether the frame 19 is in the position shown in Figure 1 or that shown in Figure 2. The frame 19 is provided with a series of rollers 26 upon which a record 27 rests, the purpose of the rollers being to eliminate friction as much as possible to allow the record to freely move by gravity down the frame 19. These rollers may be placed some inside and some outside of the sides of the frame 19. When this frame is tilted to move the records beneath the stack of records on the record support or to move the records into playing position on the record table, the record frame 19 is tilted in the following manner: A motor 28 drives a pulley 29 by means of a belt 30. The pulley 29 is mounted on a shaft on which is a worm 31 which meshes with a worm wheel 32. A pinion 33 on the same shaft which supports the worm wheel 32 meshes with a larger gear 34 mounted on shaft 35. Upon the outer end of this shaft are crank arms 36 having crank pins 37 at their outer ends to which are connected links 38. The links 38 at their other ends are pivoted at 39 to the links 20 and 40. As will be seen from the mechanism just described operation of the motor 28 will rotate the chains of gears just described to rotate the arm 36 and through the toggle mechanism just described will raise and lower the end of the frame 19.

A record base plate 86 is slidably mounted on the top of the frame 19 and forms a supporting plate for the record after it has slid down the frame. A spring 87 is attached at one end to a lug on the underside of the plate 86 and at its other end to the shaft 39. The purpose of the spring 87 is to hold the plate 86 snugly on the top of the frame 19.

The record supporting frame 12 has brackets 41 positioned so as to extend within the frame and support a stack 42 of records thereon. The brackets 41, as shown in Figure 3, are spring pressed inwardly and may be moved outwardly to permit a record to be moved upwardly and positioned beneath the stack of records. Pivoted to the frame 12 near the top of the record support is a record ejecting mechanism 43 which consists of a lever slotted at 44 and having a pin 45 extending through the slot. A tension spring 46 is secured to a lug 47 on the lever

at one end and is secured to the pin 45 at the other, the spring normally tending to hold the lever 44 in a position to keep the upper end of the slot in engagement with the pin 45. The lower end of the slotted member is provided with a shoe 48 on one side of which is a small lug 49 for engaging the edge of a record to push the topmost record off the stack of records on the record support.

A bar 50 is secured to the front side of the posts 12 and has its ends turned up to provide brackets 51 in which is journaled a rod 52. The outer end of this rod has a lever 53 secured to it and a weight 54 is secured on the upper end of the lever and to the lower end is connected a tension spring 55, the spring being connected at its lower end to an arm 56 on a pin 57. The pin 57 is secured to the side of the frame 19. A rod 58, bent in the form of an inverted U, is rigidly secured at its upper portion to the rod 52. The lower ends of the legs of the U are bent up to provide hooks 59 for catching and holding a record in the position shown in Fig. 1. One of the brackets 51 is provided with stop pins 60 and 61 to limit movement of the lever 53. To the rear side of the bar 50 is attached a plate 62, the purpose of the plate being to hold the stack of records within the frame as they are moved upward by the transferring frame. Plate 62 is cut away at 63 to provide slots for receiving the ends 64 of a plate 65 which plate is secured upon the shaft 22 upon which the frame 19 pivots when it is riding in the saddle 24. A tongue 70 on the plate 62 is slightly bent forward so as to avoid having the edge of the record strike the edge of the plate and prevent their moving upward. The plate 62 is preferably secured upon the bar 50 by means of bolts 67 passing through slots 68 in the plate 62, the slots 68 providing for a slight vertical adjustment of the plate 62 so that the machine may operate with a different number of records in the stack or to take care of slightly different thicknesses in the records which are to be played. The plate 65 just described has the ends 64 bent up to provide hooks 69.

Means for stopping the records in playing position are shown in detail in Figure 9, this consists of a rod 71 which has its ends 72 bent out and journaled in the frame 19 at 73. Stop brackets 74 are secured on the bar and provide means for engaging the edge of the record as it slides down the incline when the table 19 is in the position in which it is shown in Figure 2. A weighted arm 75 is secured on one end of the bent out portions 72. When the record frame 19 is moved to its horizontal position the weight 75 strikes against a stop 76 and swings the record stop brackets below the level of the frame 19. When, however, the record changing frame is tilted either into the position shown in full lines in Figure 1 or that shown in Fig. 2, the stop brackets 74 are rotated to the elevated position so as to engage the edge of a record and limit its outward movement on the frame 19. A stop 80 limits upward movement of the rod 71. A bracket 77 is pivoted at 78 to the frame of the machine and is bent into U-shape to provide an upper ledge 79 upon which the tone arm 17 rests. When the bracket 77 is raised therefore it lifts the tone arm to lift the record playing needle off the record. The bracket 77 is lifted by means of a pin 81 which extends through a side of the frame 19 and engages beneath a plate 82 on the bracket 77. When the frame 19 begins to tilt into the position shown in Figure 1 the pin 81 first engages beneath the plate 82 to lift the

tone arm off the record. The tone arm swings by gravity then to the position shown in Figure 3. A pin 84 in the tone arm strikes a lateral pin 85 on the bracket 78 so that the tone arm is limited in its outward movement and stopped in position to begin playing a record. In order to balance the weight of records and enable the machine to operate more smoothly a weight 83 is secured in the end of the frame 19.

Operation

The operation of the machine is as follows: When a record has played, mechanism, not shown, starts operation of the record changing motor 28. This swings the frame 19 to the position shown in full lines in Figure 1 by means of the gearing 31, 32, 33 and 34 and link toggle mechanism 20, 38, and 40. When the frame 19 is tilted toward the left the record slides down over the rollers 26 to the end of the frame, being limited in its downward movement by the frame 12. The record changing motor continuing to rotate begins to straighten out the toggle and lifts the frame 19 to position the record beneath the stack of records 42 and to lift the stack of records to the position shown in Figure 2, the edges of the records sliding upward along the inner side of the plate 62. As soon as the topmost record reaches the shoe 48 it begins to compress the spring 46 and the lug 49 engaging against the edge of the record forces the lever 43 into the position shown in Figure 2. As soon as the topmost record passes above the top of the plate 62 the spring 46 urging the lever 43 forward slides the topmost record over the top of the plate 62 until the record is caught in the hooks 59. It should be noted that as the frame 19 moves up the weight 54 is allowed to swing the hooks 59 in the position shown in Figure 2 so that the hooks are raised to the position in which they may catch the record as it is slid off the top of the record stack. The record changing motor continuing to operate restores the frame 19 to the horizontal position and the hook 59 assumes the position shown in Figure 1 having the record held in the hooks. As the frame 19 was raised to its elevated position the plate 65 on the frame 19 was moved up so that the arms 64 engaged beneath a record in the record hooks 59 and lifted this record out of the hooks to position it on the frame 19, the hooks 69 passing up in the slots 63. As the arms 64 move up, the hooks 69 engage beneath the edge of the record to lift the record out of the hooks, and by the time the frame has assumed the position shown in Figure 2 the record in the hooks will have been lifted out, inverted and placed on the frame in position to slide down to record playing position. As the record slides down to the position in which it is shown in Figure 2 its edge strikes the record stop brackets 74 so as to stop the record in exact position to be lowered upon the record table in exact playing position.

When the transfer frame 19 is in the inclined position shown in Figure 2, the portion 79 of the bracket 77 will support the tone arm in raised position so that the record may readily slide under the playing needle. When the frame 19 is restored to its horizontal position therefore the record will be placed in playing position and the needle on the bent arm will likewise be just above its playing position. As the frame 19 reaches its final level the bracket 77 will be lowered to position the needle on the record in position to play, and the playing will at once begin since the record table is allowed to rotate continuously during the record changing operation. When the frame 19

has resumed its playing position, mechanism, not shown, stops rotation of the record changing motor. Such mechanism being well known in machines for playing a multiplicity of records in succession it is deemed not necessary to describe it here as it forms no part of the invention in this case.

It should be noted that when the changing frame 19 is in record playing position, that is, when it is in the horizontal position the stops 74 are below the top of the record playing table. If therefore the operator wishes to play a larger record than those in the stack 42 he may place a record on the table and play it without interference from any mechanism on the frame 19. This record, of course, must be manually placed on the table and played and removed without the use of the record changing mechanism.

It will be obvious to those skilled in the art that various changes may be made in our device without departing from the spirit of the invention and therefore we do not limit ourselves to what is shown in the drawings and described in the specification, but only as indicated in the appended claims.

Having thus fully described our said invention, what we claim as new and desire to secure by Letters Patent, is:

1. A phonograph for playing a series of records comprising a tilting table, a stationary record support, means for tilting the table to move a record from playing position to the record support and for reversely tilting it for moving a record from the record support to playing position, and means operable by the tilting table for moving the tone arm out of playing position and restoring it to playing position as a record is placed on the table, substantially as set forth.

2. A phonograph for playing a series of records having a frame, means for tilting the frame to cause a record to slide from playing position to inactive position and for reversely tilting it to cause a record to slide from inactive to playing position, and means for inverting the record as it moves from inactive to playing position, substantially as set forth.

3. A phonograph for playing a plurality of records in series comprising a record table, a frame positioned above the record table, means for tilting the frame to lift a record off the record table and allowing it to slide by gravity to inactive position, and means to tilt the frame in the opposite direction to slide a record back to playing position, operation of the said frame serving also to move a tone arm out of playing position as a record is moved from the record table and into playing position as a new record is restored to the playing table, substantially as set forth.

4. A phonograph for playing a plurality of records in series comprising a frame for supporting the records during record changing operations, means for tilting the frame, means for supporting a stack of records in inactive position, means for positioning the played record beneath the stack of records, and means for moving the topmost record on the stack to position it on the record playing table, substantially as set forth.

5. A phonograph for playing a plurality of records in series comprising a frame for supporting the records during record changing operations, means for tilting the frame, means for supporting a stack of records in inactive position, means for positioning the played record beneath

the stack of records, means for moving the topmost record on the stack to position it on the record playing table, and means for inverting the record during its movement from the stack of records to the record playing table, substantially as set forth.

6. A phonograph for playing a plurality of records in series comprising a tilting table for moving the records from playing position to inactive position and for moving the records from inactive position to playing position, and adjustable means for varying the number of records constituting a series, said last named means comprising a plate adjustable vertically to position its upper edge at a predetermined height, substantially as set forth.

7. A phonograph for playing a plurality of records in series comprising a frame, a record playing table mounted in the frame, recording supporting means, a tiltable table for moving the records from the playing table to the record support and from the record support back to the playing table, means for supporting a stack of records in the record supports, and means on the record supports for sliding the topmost record off the stack of records to the tiltable table when the table has moved the stack of records to its uppermost position, substantially as set forth.

8. A phonograph for playing a plurality of records in series comprising a frame, a record playing table mounted in the frame, record supporting means, a tiltable table for moving the records from the playing table to the record support and from the record support back to the playing table, means for supporting a stack of records in the record supports, means on the record supports for sliding the topmost record off the stack of records to the tiltable table when the tiltable table has moved the stack of records to its uppermost position, and a plate secured to the said record support and adjustable vertically to bring the topmost record of any predetermined number of records to the level at which it may be shoved off whereby any predetermined number of records may constitute a series in the cycle of operations, substantially as set forth.

9. A phonograph for playing a plurality of records in series, comprising a frame, a record playing table mounted in the frame, record supporting means mounted in the frame, a table pivotally mounted on either of two points on the frame having means for tilting it in either of two directions to slide a record from the record playing table to the stack of records and from the stack of records back to the record playing table, and means mounted on the record supporting means for inverting the record as it is moved from the record supporting means to the tiltable table, and means on the tiltable table for assisting in inverting the records so that the record may be gently laid on the table to prevent injury to the record, substantially as set forth.

10. A phonograph for playing a series of records comprising a stationary record support, a record rotating table, a tiltable record changing frame, means for tilting the frame to move a record from the record playing table to the record support and for moving a record from the record support to the record playing table, substantially as set forth.

11. A phonograph for playing a series of records comprising a record support, a record rotating table, a tiltable record changing frame, means

for tilting the frame to move a record from the record playing table to the record support and for moving a record from the record support to the record playing table, and means for inverting the record as it is moved from the record support to the record playing table, substantially as set forth.

12. A phonograph for playing a plurality of records in series comprising a support for a stack of records, a record changing frame, a record playing table, means for selecting a record from the stack of records and positioning it on the record playing table, and means for restoring the played record and positioning it beneath the stack of records on the record support, said record being inverted when it moves again in series with the record playing table, substantially as set forth.

13. In a sound reproducing machine, the combination with a record support, of means inclinable from either of two fulcrums to convey a record by gravity to or from said record support, substantially as set forth.

14. In a sound reproducing machine, the combination with a rotatable record support, of a magazine, a double-fulcrumed transfer frame operable to convey a record between said maga-

zine and said record support, substantially as set forth.

15. In a sound reproducing machine, the combination with a rotatable record support, of a magazine, a double-fulcrumed transfer frame operable to convey a record between said magazine and said record support by the attraction of gravity for said record, substantially as set forth.

16. In a sound reproducing machine, the combination with a rotatable record support, of a magazine, a double-fulcrumed transfer frame having friction-reducing elements mounted thereon and operable to convey a record between said magazine and said record support, substantially as set forth.

17. In a sound reproducing machine, the combination with a rotatable record support, of a magazine, a transfer frame having two fulcrums, means for tilting said frame on one of said fulcrums to convey a record from said magazine to the record support, and means for tilting said frame on the other fulcrum to convey a record from the record support to the magazine, substantially as set forth.

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