June 12, 1934. E. E. COLLISON ET AL 1,962,858

AUTOMATIC PHONOGRAPH

Filed Sept. 12, 1930 5 Sheets-Sheet 1

FIG. 1

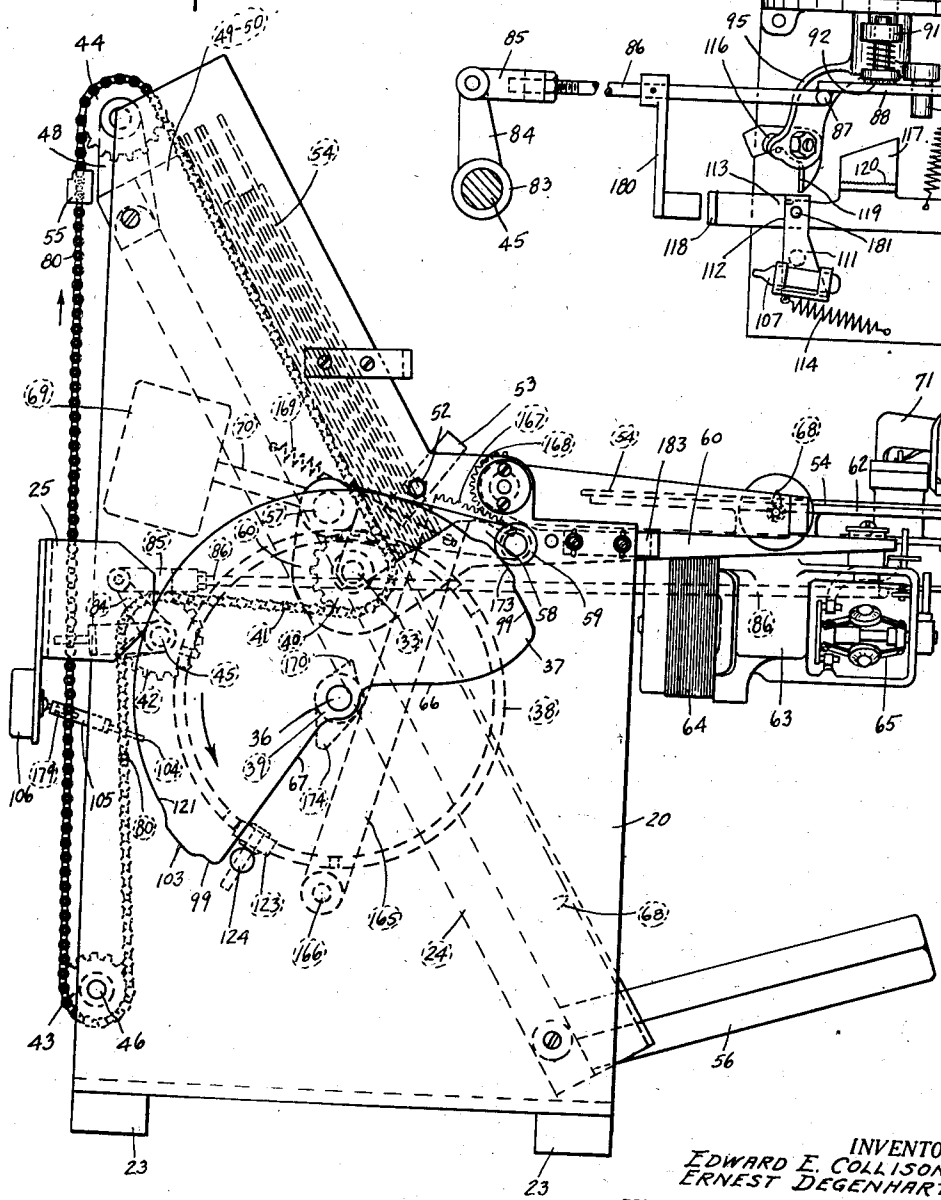


FIG. 10

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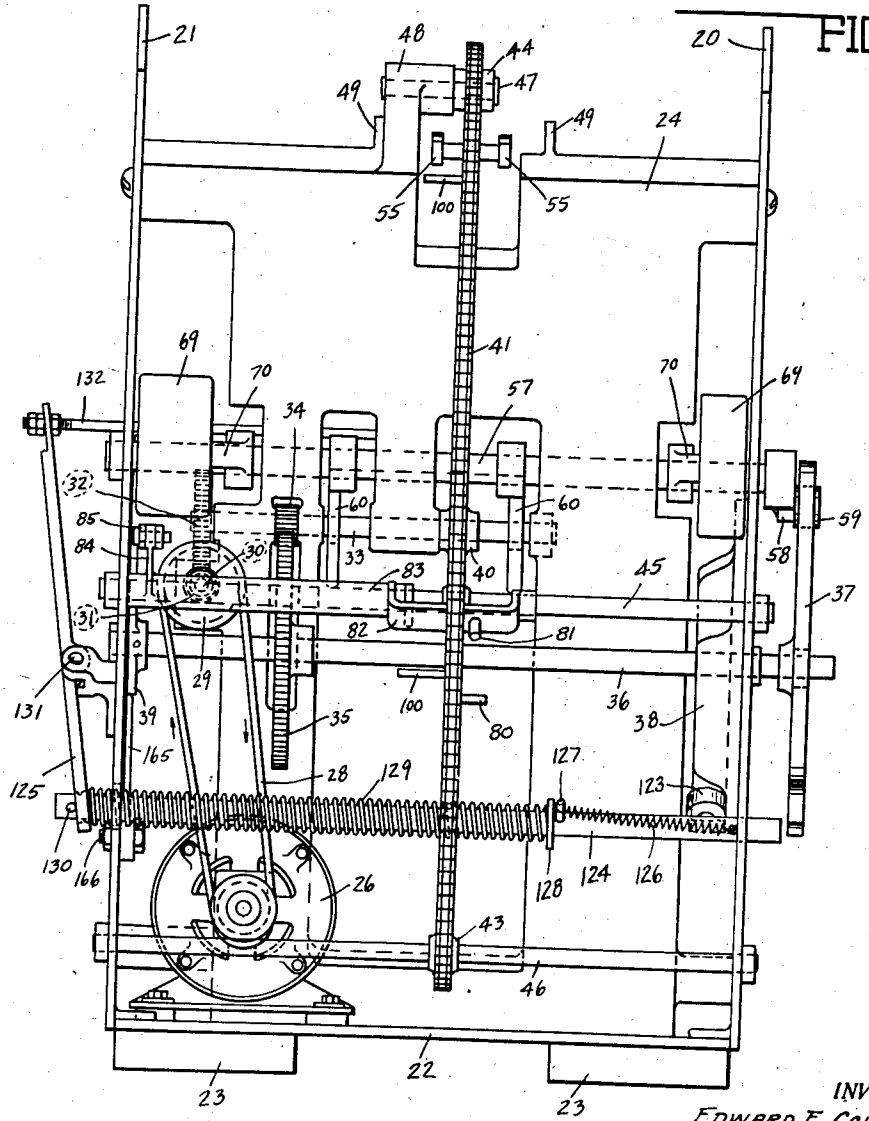
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AUTOMATIC PHONOGRAPH

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FIG. 2



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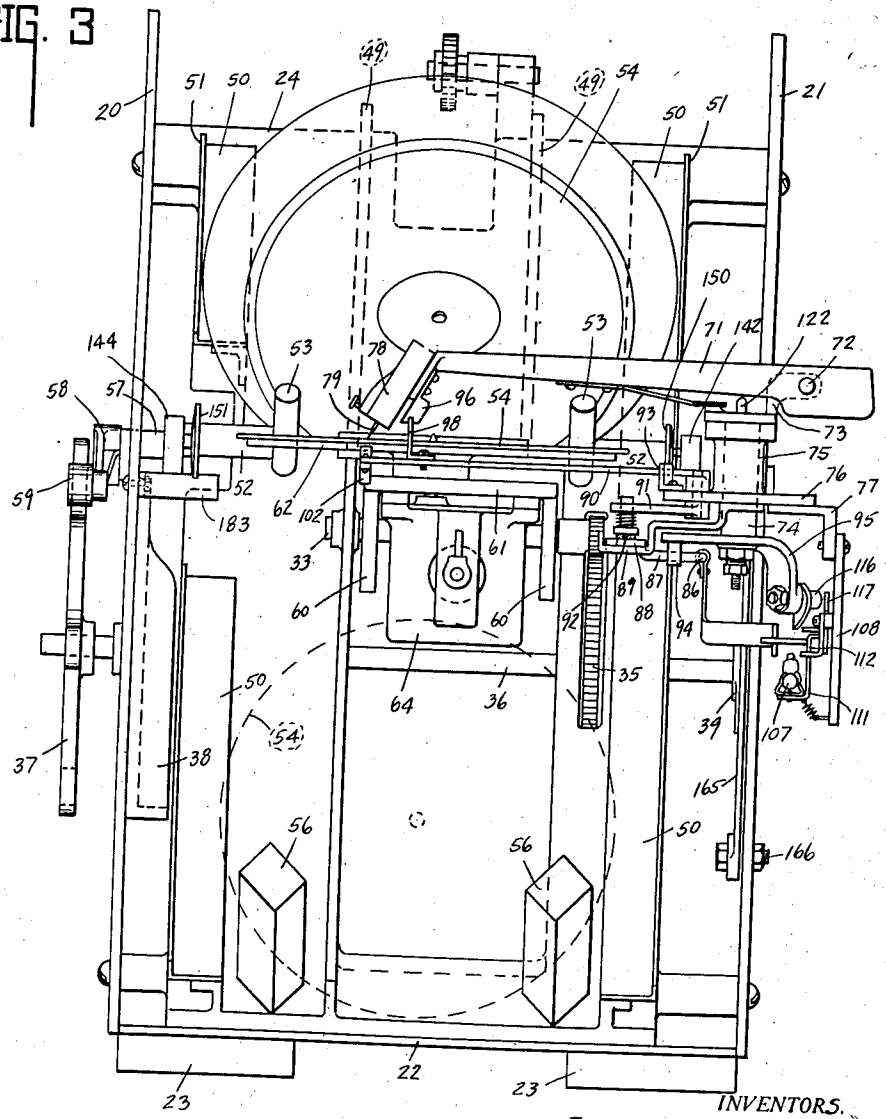
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FIG. 3



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AUTOMATIC PHONOGRAPH

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FIG. 4

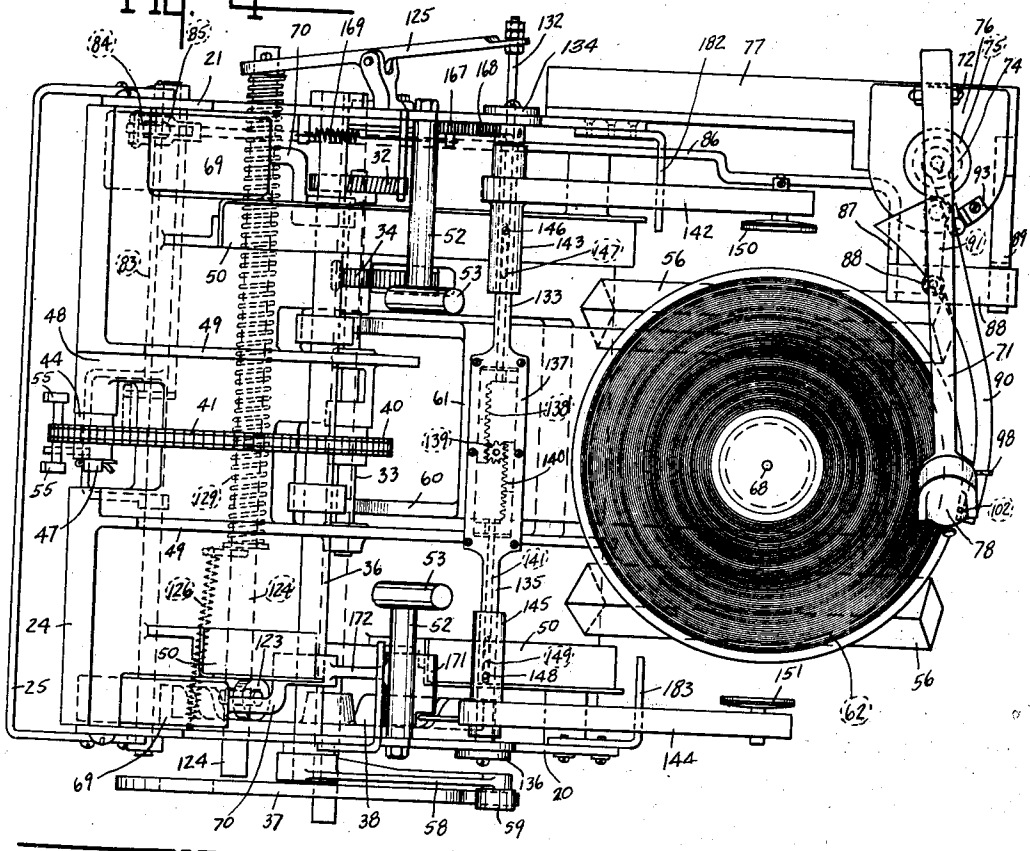


FIG. 5

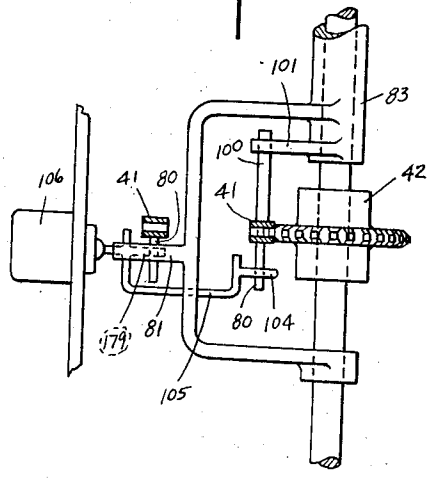


FIG. 8

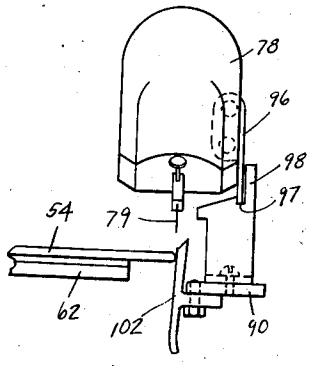
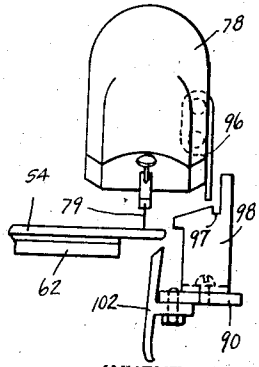


FIG. 9



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AUTOMATIC PHONOGRAPH

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FIG. 6

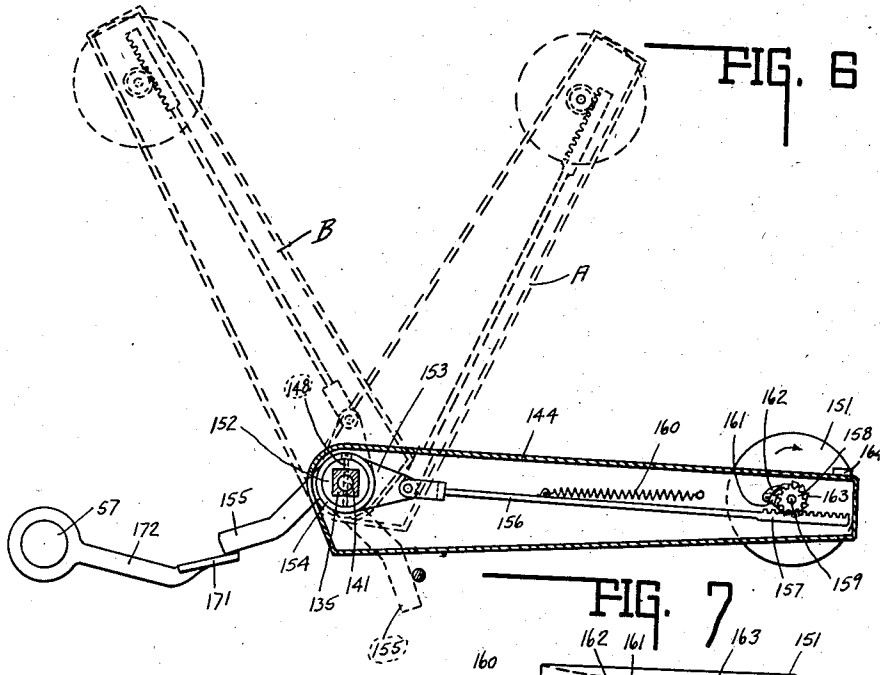


FIG. 7

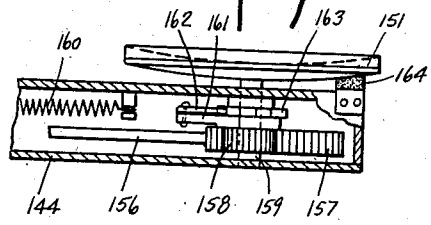


FIG. 11

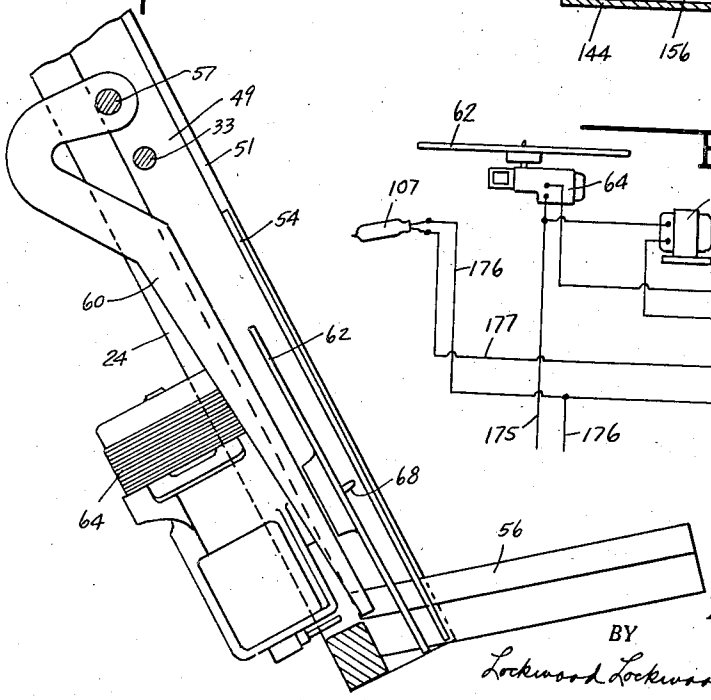


FIG. 12

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Patented June 12, 1934 1,962,858

UNITED STATES PATENT OFFICE

1,962,858

AUTOMATIC PHONOGRAPH

Edward E. Collison and Ernest Degenhart, Fort Wayne, Ind., assignors to The Capehart Corporation, Fort Wayne, Ind.

Application September 12, 1930, Serial No. 481,386

19 Claims. (Cl. 274—10)

This invention relates to an automatic phonograph and particularly to that type of phonograph which is adapted to play a series of the disk type of record in a desired sequence. This phonograph is adapted to use both of the common standard sizes of disk records either in a mixed assortment or in groups of a single size. The parts are so arranged that the records are played in the order in which they are placed in the machine and both sides of each record are played before a second record is used. By this means, a long composition, such as a symphony or an opera, may be played in its proper sequence when succeeding portions thereof are recorded on opposite sides of the same record.

The principal features of the invention reside in a novel form of mechanism by means of which the various functions of the machine are performed.

One feature of the invention resides in the novel method and mechanism used for centering the various sized records upon the playing turntable.

Another feature resides in the mechanism used for locating the tone arm and stylus for beginning the playing of the records of various sizes.

Another important feature resides in the form of mechanism used for reversing the record for playing the opposite side and for returning the record to a storage magazine.

Other objects and features and the full nature of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1 is a side elevational view of the complete machine removed from the usual ornamental housing. Fig. 2 is a rear elevational view of the same. Fig. 3 is a front elevational view. Fig. 4 is a top plan view. Fig. 5 is a plan view partly in section illustrating a portion of the mechanism used for tone arm manipulation and for control of the motors used for supplying power for the various operations. Fig. 6 is an elevational view partly in section illustrating portions of the apparatus used for reversing the records and returning the same to the magazine. Fig. 7 is a plan view partly in section of a portion of the apparatus shown in Fig. 6. Figs. 8 and 9 are elevational views of a part of the mechanism for positioning the tone arm for the start of playing of a record. Fig. 8 shows these parts in one position and Fig. 9 shows the same at another point in their cycle of operations. Fig. 10 is an elevational view of a portion of the apparatus used for tone arm manipulation and for motor control. Fig. 11 is an elevational view partly in section showing the position of the playing turntable and a record at one point in the cycle of operations of placing the record upon the turntable. Fig. 12 is a wiring diagram of electrical connections for motor control.

Framework and power mechanism

The stationary frame of the machine includes a pair of side plates 20 and 21 connected at their lower edges by a horizontal bed plate 22 to which are fastened supporting feet 23. An inclined plate 24 is fastened between the plates 20 and 21. A yoke 25 is also fastened to said plates and extends across the rear of the machine.

An electric motor 26 is mounted upon the bed plate 22 and carries a pulley 27 about which is trained a belt 28. The belt 28 also passes about a pulley 29 carried upon a horizontal shaft 30 supported upon suitable bearings attached to the plate 21. The shaft 30 also carries a worm 31 meshing with a worm wheel 32 carried upon a horizontal shaft 33 supported in suitable bearings upon the plate 24. The shaft 33 also carries a pinion 34 meshing with a gear 35 carried upon a cam shaft 36. The shaft 36 is supported in bearings carried by the plates 20 and 21 and carries cams 37, 38 and 39. The said cams are used to control the various movements of the mechanism as hereinafter set forth. The shaft 33 carries a sprocket 40 about which is trained a sprocket chain 41. The chain 41 also passes about sprockets 42, 43 and 44. The sprocket 42 runs freely upon a shaft 45 extending between the plates 20 and 21. The sprocket 43 runs freely on a similar shaft 46. The sprocket 44 is carried upon a stub shaft 47, in turn, supported upon a bearing bracket 48 formed upon the plate 24. The sizes of the various gears and sprockets so far described and the number of links in the chain 41 are so chosen that the cam shaft 36 and the chain 41 each makes one complete revolution during one cycle of operations including the playing of both sides of a single record.

Storage magazine and mechanism for removing records therefrom

The plate 24 carries a pair of ribs 49 and a pair of oppositely positioned record guideways 50 having upwardly extending outer edges 51. A horizontally extending rod 52 is fastened to each of the plates 20 and 21. Each of the said rods carries a cylindrical member 53 positioned as best shown in Figs. 1 and 4. The outer surfaces of the record guides 50 and of the ribs 49 are located in substantially the same plane and may, therefore, serve as a rest for a pile of records 54 as shown in Figs. 1 and 3. When placed in position upon the ribs 49 and guides 50, the lower edges of the records with the exception of the lowermost record, engage the members 53 and are maintained thereby in the desired position. The members 53 are of such length that the lowermost record in the stack is not engaged thereby. However, with the usual number of records used in the stack, the weight of the records produces sufficient fric-

tion to maintain the lowermost record in position beneath the stack.

As shown in Fig. 1, the portion of the chain 41 passing between sprockets 44 and 40, passes above the plate 24 and between the ribs 49. The said chain carries a pair of attachments 55, one on either side thereof, and the said attachments are adapted to engage the edge of the lowermost record in the stack in the movement of the said chain. The lowermost record is moved by the said attachments from beneath the stack and is projected downwardly along the surface of the ribs 49 and guideways 50. When the said record has cleared the bottom of the stack, it is free to slide by gravity and comes to rest upon a pair of outwardly and upwardly extending stop members 56 carried upon the plate 24. (See Fig. 11.) It is to be noted that the records in the magazine may be of any size or of mixed sizes. Since the records are supported in their final position by the stop members 56 at two points only, the centering hole of the record will always be found upon the median plane between these two points. It is also to be noted that the fact that two attachments 55 are used upon the chain 41 to remove the records from the magazine insures that the said records will be propelled from the magazine in substantially a straight line. There is, therefore, no necessity for placing special guideways for the various sizes of records.

Turntable manipulating mechanism

A horizontal shaft 57 is supported upon suitable bearings on the plates 20 and 21. Adjacent the cam 37, the said shaft 57 carries an arm 58, in turn, carrying a roller 59 engaging the irregular periphery of the said cam. By this means the shaft 57 is rocked as desired. The shaft 57 also carries a pair of arms 60 which are downwardly curved to pass beneath the shaft 33 and which thereafter extend in a substantially horizontal direction to support a shelf 61 upon which is carried a playing turntable 62. Beneath the shelf 61 there is fastened a turntable driving unit 63 including a motor 64, a governor 65 and suitable gearing for rotating the turntable at the desired speed.

The cam 37 is formed with a deeply indented portion 66. This portion of the cam reaches roller 59 in the rotation of shaft 36 at a time just before the engagement of the lowermost record in the magazine by the attachments 55. When this takes place, the shaft 57 is free to rock, permitting the arms 60 and the turntable and motor carried thereby to drop into the position shown in Fig. 11. Thereafter the record 54 is moved from the magazine and brought to rest upon the stop members 56 as previously described.

During this movement of the record, the cam 37 has rotated to bring an outwardly extending shoulder portion 67 thereof into engagement with the roller 59. The shaft 57 is thereby returned to its initial position carrying with it the arms 60, turntable 62 and the record 54. In Fig. 11, it will be noticed that the centering pin 68 of the turntable is in a position considerably below the center of the record. This is true no matter which size of record is being used. It will also be seen that the stop members 56 extend outwardly at an angle with the plate 24 greater than 90 degrees. In the elevation of the turntable, therefore, the record 54 will be outwardly moved upon the stop members 56. In this movement, the centering hole of the record is always maintained on the median plane between the stop members 56. The centering pin 68 travels in the said plane and, therefore, eventually engages the centering hole of the record irrespective of the size of the record.

A pair of counterbalance weights 69 are carried by the shaft 57 by means of arms 70. These weights are so positioned and adjusted as to approximately counterbalance the weight of the turntable and motor in their movement about the shaft 57.

Tone arm manipulating mechanism

A tone arm 71 is pivotally mounted by means of a pin 72 upon a lug 73. The lug 73 is formed as part of a cylindrical sleeve 74 supported within a shell 75 fixedly carried upon a platform 76. The platform 76 is supported upon a bracket 77 carried upon the plate member 21. The tone arm 71 supports at its outer end a sound box 78, in turn, carrying the usual form of stylus 79. By this form of support, the tone arm is free to oscillate about the vertical axis of the shell 75 in following the record groove of the record. It is also free for movement about the horizontal axis of the pin 72.

The chain 41 carries a pair of pins 80, each of which is adapted to engage a pin 81 at the completion of playing of one side of each record. The pin 81 is carried upon a yoke 82, in turn, forming a part of a sleeve 83 surrounding the shaft 45. The sleeve 83 is free to rock upon the said shaft and carries an upwardly extending arm 84, to which is fastened a clevis 85 attached to a horizontally extending rod 86. The rod 86 has a portion 87 turned at right angles to the main part thereof and to which is fastened a plate 88 slidably supported in a guide 89 which is supported beneath the plate 76.

An arm 90 is mounted for pivotal movement about a vertical axis upon the plate 76. A shorter arm 91 is fixedly connected to the arm 90 and is free to move therewith. The arm 91 carries a spring pressed friction pad 92 engaging the upper surface of the plate 88. By this means when either of the pins 80 engages the pin 81 to lift the yoke 82 the rod 86 and the plate 88 are moved to the left in Fig. 1. The friction pad 92 is moved thereby, moving the arms 91 and 90 until the arm 90 engages a stop 93 carried upon the upper surface of the plate 76. Thereafter the friction pad 92 slides upon the plate 88 and no further motion of the arm 90 is produced. At the same time, the portion 87 of rod 86 engages a pin 94 carried upon a bracket member 95 fastened to the lower portion of the sleeve 74. By this means, the tone arm also is moved to the right in Fig. 1 to a position clear of the record. In this position, a plate 96 upon the side of the sound box 78 engages a notch 97 in a plate 98 carried by the arm 90, as shown in Fig. 8. As previously stated, this movement of the parts takes place immediately after the playing of each side of each record. The tone arm and arm 90 are moved thereby to a position clear of the record and maintain that position during the movement of the turntable to bring the new record into playing position.

When the turntable has been elevated to bring up a new record, the roller 59 is travelling upon an arcuate portion 99 of cam 37. With the roller on this portion of the cam, the turntable assumes a position slightly below the normal playing position. With the parts in that position, a pin 100 carried upon the downwardly travelling flight of chain 41 engages an arm 101 carried upon the sleeve 83 and moves the said arm downward. This movement rocks the sleeve 83 and retracts

the rod 86, carrying with it the plate 88, friction pad 92, arm 90 and the tone arm 71. This movement proceeds until a gauge plate 102 carried upon the outer end of arm 90 engages the edge of the record upon the turntable, as shown in Fig. 8. In this position, the plate 102 acts as a gauge to position the stylus 79 accurately above the position for the start of playing of the record. Upon the engagement of the plate 102 with the record, the friction pad 92 slips upon the plate 88. By this means, the stylus 79 is accurately positioned, no matter which size of record is carried by the turntable.

When the parts have reached the position shown in Fig. 8, the roller 59 rides upon an elevated portion 103 of the cam 37. The turntable is caused thereby to move upward to the normal playing position as shown in Fig. 9. The record engages the stylus 79, lifting the plate 96 from its engagement with the notch 97. Thereafter, the tone arm is free to follow the sound track upon the record. This movement of the turntable also frees the edge of the record from the gauge plate 102. Simultaneously, with this movement one of the pins 80 engages a pin 104 carried by a yoke 105 attached to a double throw switch 106. The switch 106 by means of wiring connections, to be hereinafter described, stops the motor 26 and starts the turntable motor 64 for playing of a record. During the playing of the record, therefore, the rotation of the cam 37 is stopped and the roller 59 remains in position upon the elevated portion 103 of the said cam.

Tone arm electrical switch

Upon the completion of playing of each record, the stylus reaches the braking groove of the record and causes the actuation of a mercury switch 107 for again starting the motor 26 by mechanism now to be described.

A plate 108 is carried upon the bracket 77 and pivotally supports by means of a pin 109, a lever 110. The mercury switch 107 is supported upon a carrier 111, also pivotally carried upon the plate 108. The carrier 111 has an upwardly extending portion 112 bent at a right angle to engage a shoulder 113 upon the lever 110. A pair of tension springs 114 and 115 serve normally to maintain the said engagement as shown in Fig. 10. With the parts in this position, the mercury switch 107 is in the open circuit position.

When the record in use has a spiral type of braking groove by means of which the stylus is brought close to the center of the record, a pin 116 carried by the bracket member 95 engages a cam 117 carried by the lever 110 at the completion of playing of the record. When this takes place, the lever 110 is forced downwardly to break the engagement between the switch carrier portion 112 and the shoulder 113. The spring 114 then pulls the carrier 111 about its pivotal mounting to bring the portion 112 thereof in contact with a stop 118 carried by the lever 110. In this position, the mercury switch 107 is in the closed circuit position and the motor 26 is started.

When the record in use is provided with the oscillating type of braking groove, the tone arm is moved rapidly backward and forward at the completion of playing of a record. When this takes place, a spring pressed dog 119 carried by bracket 95 engages one of a plurality of serrations 120 carried upon the lever 110. This engagement forces the lever 110 downwardly and operates the mercury switch 107 in the same manner as previously described.

Record reversing mechanism

When the motor 26 has been started, the rotation of cam 37 is re-commenced and the roller 59 drops from the portion 103 thereof onto the surface of an arcuate portion 121. The turntable is, therefore, lowered to bring the record out of engagement with the stylus 79, the tone arm 71 being then supported upon the upper end of a pin 122 carried by the sleeve 74. Thereupon, one of the pins 80 engages the pin 81 to move the tone arm from above the record as previously described.

The cam 38, best shown in Fig. 2, has its operating face engaged by a roller 123 carried upon a horizontal stem 124. The stem 124 is supported at one end in the plate 20 and at the opposite end is supported by a lever 125. A tension spring 126 normally maintains the roller 123 in contact with the operating surface of the cam 38. By means of the said cam the stem 124 may, therefore, be longitudinally moved as required. A pin 127 carried by the stem 124 serves as a seat for a washer 128, in turn serving as a seat for a compression spring 129. The spring 129 abuts at its opposite end against the lever 125 which, in turn, abuts against a pin 130 carried by the stem 124. By this means, when the stem is moved to the left in Fig. 2, the lever 125 may be oscillated about its pivotal support 131. However, the force is applied to lever 125 through the compression spring 129 so that when the lever meets with a predetermined resistance to movement, the said spring is compressed while the stem 124 may continue its movement.

At the upper end of the lever 125 there is connected a rod 132. The rod 132 extends through a central hole in a squared shaft 133. The shaft 133 is rotatably supported in a suitable bushing 134 carried by the plate 21. A similar squared shaft 135 is similarly supported in a similar bushing 136 carried by plate 20. The squared shafts 133 and 135 are joined by means of a housing 137. The rod 132 extends within the housing 137 and carries a rack 138 engaging a pinion 139 suitably supported within the housing. The opposite side of the pinion 139 also engages a rack 140 attached to a rod 141 extending within the squared shaft 135. By this means, the movement of the lever 125 slides the rod 132 in one direction within the shaft 133 and slides the rod 141 in the opposite direction within the shaft 135. An arm 142 having a hub 143 is carried upon the squared shaft 133 and is slidable longitudinally of said shaft but is rotatable therewith. A similar arm 144 having a hub 145 is similarly carried upon squared shaft 135. A pin 146 extending through a slotted opening 147 in the shaft 133 engages the rod 132 and the hub 143. Thus, the motion of rod 132 slides the hub 143 and arm 142 upon the shaft 133. Hub 145 is similarly fastened to the stem 141 by means of a pin 148 passing through a slotted opening 149 in the shaft 135. At the outer end of the arm 142 there is carried a rotatable friction pad 150 adapted to engage the edge of the record upon the turntable. A similar rotatable pad 151 is carried upon the outer end of arm 144. The arms 142 and 144 normally rest upon supports 182 and 183 carried by plates 21 and 20 respectively.

The arm 144 is hollow in construction, as shown in Fig. 6. Within the said arm, a bushing 152 is carried by the squared shaft 135. A lever 153 having a hub 154 is rotatably mounted upon the said bushing and has a rearwardly extending por-

tion 155 extending outside of the arm 44. The lever 153 has pivotally attached thereto a rod 156 terminating in a rack 157. The rack 157 engages a pinion 158 freely mounted upon a pin 159 extending through the arm 144 and carrying the rotatable pad 151. A tension spring 160 is fastened at one end to the rod 156 and at the opposite end to the inner wall of the arm 144 and serves normally to maintain the parts in the position shown in solid lines in Fig. 6. An arm 161 is formed integrally with the pinion 158 and carries a spring pressed pawl 162 engaging a ratchet wheel 163 fastened to the pin 159. A block 164 of rubber or other resilient material is interposed between the surface of the arm 144 and the rotatable pad 151. By this means when the rod 156 is moved to the left in Fig. 6, the pinion 158, pawl 162 and ratchet 163 operate to rotate the pad 151 against the friction applied thereto by the rubber block 164. When the rod 156 is moved to the right, the friction of the block 164 maintains the pad 151 in a relatively stationary position while the pawl 162 freely passes over the teeth of the ratchet wheel 163.

The cam 39 carried upon the shaft 36 engages a lever 165 pivotally mounted upon the plate 21 by means of a pin 166. The lever 165 carries at its upper end a plurality of gear teeth 167 engaging the teeth of a gear 168 carried upon the squared shaft 133. The lever 165 is normally maintained in engagement with the cam 39 by means of a tension spring 169 fastened at one end to the said lever and at the opposite end to the plate 21.

Upon the completion of playing of the first side of a record the tone arm is moved from above the record as previously described. The cam 38 then operates to move the pads 150 and 151 into engagement with the opposite edges of the record upon the turntable. By means of the yielding connection of spring 129 the record is engaged irrespective of its size. Upon engagement of the record a projecting portion 170 of cam 39 engages the lever 165 and by moving the same, rotates the squared shafts 133 and 135 to elevate the arms 142 and 144 to the position shown by broken lines A in Fig. 6. During this motion the projecting lever 155 engages a plate 171 carried by an arm 172 attached to the shaft 57. By means of this engagement, the lever 153 is maintained in a relatively stationary position during the lifting of the arms 142 and 144. The rack 157 is, therefore, moved as indicated in Fig. 6, a sufficient distance to rotate the record through 180 degrees.

As the projection 170 continues to rotate, it passes the lever 165 and permits the return of the arms 142 and 144 to their lowered position, thus placing the record upon the turntable with the opposite side uppermost. Cam 38 then operates to return the pads 150 and 151 to the position shown in Fig. 4. The tone arm is then moved into playing position by the mechanism previously described. An elevated portion 173 of cam 37 then engages the roller 59 to bring the turntable into playing position and release the stylus for movement upon the record. The motor 26 is then stopped and the turntable motor 64 is started by the mechanism previously described.

Mechanism for returning record to magazine

Upon the completion of playing of the second side of the record, the mercury switch 107 is actuated to again start the motor 26 as previously described. The tone arm is again moved from above the record. The cam 38 then operates to bring the pads 150 and 151 into engagement with the record. The roller 59 reaches the portion 66 of cam 37 and permits the turntable to be lowered into position to receive a new record. A projecting portion 174 of cam 39 then engages lever 165 to elevate the arms 142 and 144. The portion 174 projects further from the center of cam 39 than portion 170. The arms 142 and 144 are, therefore, moved through a greater arc and are brought to the position shown by broken lines B in Fig. 6.

Since the shaft 57 has been moved to lower the turntable, the plate 171 has been removed from the path of the lever 155. The rubber block 164 is, therefore, able to maintain the pad 151 in a relatively stationary position with respect to arm 144. The record is, therefore, brought into position above the magazine with the side last to be played facing downward. With the record in this position, cam 38 operates to move the pads 150 and 151 from their engagement with the record and the record is dropped upon the stack in the magazine. Cam 39 then operates to permit the return of arms 142 and 144 to their horizontal position.

Motor control

In Fig. 12 is shown a diagram of electrical connections for the control of the motors 26 and 64. The wires 175 and 176 are connected to any suitable source of current supply. The wire 175 is connected to one terminal of each of the motors 64 and 26. The wire 176 is connected to one terminal of the mercury switch 107 and to the common terminal of the double throw switch 106. A wire 177 connects the opposite terminal of the mercury switch 107 with one terminal of the switch 106 and also to the opposite terminal of the motor 26. The third terminal of the double throw switch 106 is connected to the second terminal of the motor 64 by a wire 178. During the playing of the record the mercury switch 107 is normally in the open circuit position while the switch 106 is in the position shown by dotted lines in Fig. 12. The motor 64 is, therefore, in operation while the motor 26 is stopped.

Upon the completion of playing of each side of each record, the mercury switch 107 is moved to the closed circuit position to start the motor 26. At a point in the cycle of operations soon thereafter, one of the pins 80 engages the tongue 179 of the switch 106 moving the same to the position diagrammatically shown in solid lines in Fig. 12. With the switch 106 is this position, it is evident that the turntable motor 64 will be stopped and that the record changing motor 26 will continue to function even though the mercury switch 107 is thereafter moved to open circuit position.

In the movement of the tone arm from above the record, an arm 180 carried by the rod 86 engages a pin 181 carried by the mercury switch support 111. By means of this engagement the mercury switch parts are returned to the normal position shown in Fig. 10 and the mercury switch is moved to open circuit position. When the turntable and tone arm have been placed in operating position, the switch 106 is moved to the dot line position of Fig. 12 by the means previously described. The turntable motor 64 is thereupon started and the record changing motor 26 is stopped.

The invention claimed is:

1. In an automatic phonograph the combina-

tion with a record-storage magazine and a playing turn table having a centering pin, of a pair of stop members adapted to engage the edge of a record, means for effecting the transfer of a record from said magazine to a position against said stop members, and mechanism operable thereafter to move said turn table to bring the centering pin thereof into engagement with said record and for continuing said movement to move said record while still engaging said stop members, said stop members being so positioned and shaped as to maintain the centering hole of the record in the plane of movement of said centering pin and to permit relative movement between said hole and said pin, whereby said pin engages said hole regardless of the size of said record.

2. In an automatic phonograph, the combination with an inclined record track, of means for maintaining a stack of records adjacent the upper end thereof, a pair of stop members adjacent the lower end of said track, means for effecting the transfer of a record from said stack upon said track to a position engaging said stop members, a playing turn table having a centering pin, means for moving said turn table to bring the centering pin thereof into engagement with said record and for continuing said movement to slide said record along said stop members, said members being so positioned and shaped as to maintain the centering hole of said record in the plane of movement of said centering pin and to permit relative movement of said pin and said hole, whereby said pin engages said hole regardless of the size of said record.

3. In an automatic phonograph, the combination with an inclined record track, of means for maintaining a stack of records adjacent the upper end thereof, a pair of stop members adjacent the lower end of said track extending at an obtuse angle to the plane of said track, means for effecting the transfer of a record from said stack upon said track to a position engaging said stop members, a playing turn table having a centering pin, means for moving said turn table in a direction substantially perpendicular to the plane of said track to bring the centering pin thereof into engagement with said record and for continuing said movement to slide said record along said stop members, said members being so positioned as to maintain the centering hole thereof in the plane of movement of said centering pin, whereby said pin engages said hole regardless of the size of said record.

4. In an automatic phonograph, the combination with a playing turn table adapted to support records of various diameters, of a stylus, a movable support therefor, a device for engaging and moving said movable support, a gauge member carried by said device for engaging the edge of a record upon said turn table for locating said stylus above a point a predetermined distance from the edge of said record, and mechanism for moving said turn table to bring said record into engagement with said stylus when so located and for disengaging said stylus support from said device and said record from said gauge member.

5. The combination as defined by claim 4, characterized by the addition of means for moving said device including a frictional connection adapted to slip upon engagement of said gauge member and said record.

6. In an automatic phonograph, the combination with a playing turn table adapted to support records of various diameters, of a stylus, a movable support therefor, a pivotally-mounted arm, a member carried thereby adapted to engage and move said stylus support, a gauge member carried by said arm, mechanism operable upon the completion of playing of a record for moving said stylus support into engagement with said engaging member, means for removing said record from said turn table and for placing a second record thereon, mechanism operable thereafter for moving said arm to bring said gauge member into engagement with the edge of the record upon the turn table, and said stylus into a predetermined position above said record, and mechanism operable thereafter for elevating said turn table to bring said record into engagement with said stylus and for disengaging said stylus support from said engaging and moving member and said record from said gauge member.

7. The combination as defined by claim 6 characterized in that said arm-moving mechanism includes a friction connection adapted to slip when said gauge member engages said record.

8. In an automatic phonograph, the combination with a playing turn table, of a tone arm, a stylus, mechanism for lowering said turn table from playing position to a record-receiving position, means for placing a record thereon at said receiving position, mechanism operable thereafter for lifting said turn table to a level slightly below playing position, and means for moving said tone arm to bring said stylus to a predetermined position with respect to the edge of the record upon the turn table, said mechanism thereafter raising said turn table to playing position to bring said record into engagement with said stylus and disengage said tone arm from said tone arm moving means.

9. In an automatic phonograph, the combination with an inclined record track, of means for supporting a stack of records adjacent the upper end thereof, a rock shaft, a playing turn table, means for supporting said turn table upon said rock shaft, mechanism for rocking said shaft to move said turn table to a position adjacent the lower portion of said track, means for sliding a record from said stack upon said track to a position adjacent said turn table, said mechanism thereafter bringing said turn table into engagement with said record and continuing said movement to bring said record and turn table to a position slightly below playing position, a tone arm, a stylus carried thereby, and means for moving said tone arm to bring said stylus to a predetermined position with respect to the edge of the record when so positioned, said mechanism being operable thereafter to raise said turn table to playing position to bring said record into engagement with said stylus.

10. In an automatic phonograph, the combination with an inclined record track, of means for supporting a stack of records adjacent the upper end thereof, a turn table, means for normally supporting said turn table in record-playing position, mechanism for moving said turn table support to bring said turn table to a position adjacent the lower portion of said track, means for effecting the transfer of a record from said stack upon said track to a position adjacent said turn table, mechanism operable thereafter for moving said turn table support to bring said turn table into engagement with said record and for continuing said movement to bring said record and turn table into normal playing position for playing said record, and means operable upon the completion of playing for grasping said record and returning the

same to said record stack during a movement of said turn table to receive another record.

11. In an automatic phonograph, the combination with an inclined record track, of means for storing a plurality of records adjacent the upper end of said track, a turn table, means operable upon the completion of playing of a record upon said turn table to engage the same and return it to said magazine, mechanism simultaneously operable to move said turn table to record-receiving position adjacent the lower end of said track, means operable thereafter to slide a record from said stack down said track to said record-receiving position, and mechanism operable thereafter to move said turn table to engage said last-mentioned record and carry the same to playing position.

12. In an automatic phonograph, the combination with an inclined record track, of means for supporting a stack of records adjacent the upper end thereof, a turn table, means for supporting said turn table in a substantially horizontal record-playing position, mechanism for moving said turn table support to bring said turn table to a position below and to the rear of the lower portion of said track, means for effecting the transfer of a record from said stack upon said track to a position adjacent said turn table, mechanism operable thereafter for moving said turn table support to bring said turn table into engagement with said record and for continuing said movement to bring said record and turn table into said normal horizontal position for playing said record, a pair of arms normally extending upon opposite sides of the record upon the turn table, and mechanism operable upon the completion of playing of a record to move said arms inwardly to grasp the record and upwardly to return said record to the stack during a movement of the turn table to receive another record.

13. In an automatic phonograph, the combination with an inclined record track, of a pair of stop members positioned to engage the edges of all but the lowermost of a stack of records resting upon the upper portion of said record track, the angle of inclination of said track being such that the said lowermost record is frictionally maintained upon said track by the weight of the stack of records thereupon but is free to slide upon said track by gravity when disengaged from said stack.

14. In an automatic phonograph, the combination with an inclined record track, of a pair of stop members positioned to engage the edges of all but the lowermost of a stack of records resting upon the upper portion of said record track, the angle of inclination of said track being such that the said lowermost record is frictionally maintained upon said track by the weight of the stack of records thereupon but is free to slide upon said track by gravity when disengaged from said stack, a playing turn table, means for moving the same to a record-receiving position adjacent the lower end of said track, and means for moving the lowermost record in said stack from beneath the stack to permit the same to slide by gravity to said record-receiving position.

15. In an automatic phonograph the combination with a turn table, of a magazine for retaining a plurality of records to be played, means for effecting the transfer of a record to said turntable, record-grasping elements adapted to engage a record upon said turn table at diametrically-opposed portions of its peripheral edge, mechanism automatically operable upon the completion of playing of one side of a record to move said elements to grasp said record, remove the same from the turn table, rotate said elements to reverse said record and move said elements to replace said record upon the turn table for playing the opposite side, and mechanism operable upon the completion of playing of the second side of said record to move said elements to grasp said record and return it to said magazine.

16. In an automatic phonograph, the combination with a turn table movable between playing position and record-receiving position, record-grasping elements adapted to engage a record upon said turn table when in playing position, means for moving said elements to grasp said record and move the same from said turn table operable upon completion of each record-playing operation, mechanism for rotating said elements to reverse said record when so moved, means for moving said turn table from playing position to record-receiving position operable upon the completion of each alternate record-playing operation, and a member movable with said turn table and adapted to engage said record-reversing mechanism for actuating the same when said turn table is at or near playing position and adapted to be positioned out of engagement therewith when said turn table is moved to record-receiving position.

17. In an automatic phonograph the combination with a stack of records of different sizes supported one against the other, of a turntable, means for automatically effecting the transfer of a record from one side of the stack to the turntable, rotatable grasping members adapted to engage the opposite edges of the record and rotate to cause the rotation of the record to reverse position above the turntable, and means for causing said members to replace the record on the turntable in reversed position for immediate reproduction of the opposite side thereof and thereafter return it to the other side of the stack.

18. In an automatic phonograph, the combination with a stack of records supported one against the other, a turntable, and a reproducer, of means for automatically effecting the transfer of a record from one side of the stack to the turntable, means positioned to grip the record at diametrically-opposed portions of its peripheral edge, and mechanism first operable upon reproduction of a record for actuating said means to overturn the record on the turntable, and after reproduction of its reverse side again engage the record and return it to the other side of the stack.

19. In an automatic phonograph, the combination with a stack of records supported one against the other, a turntable, and a reproducer, of means for automatically effecting the transfer of a record from one side of the stack to the turntable, rotatable gripping members positioned to grip the record at diametrically-opposed portions of its peripheral edge, and mechanism first operable upon reproduction of a record for actuating said means to overturn the record on the turntable, and after reproduction of its reverse side again engage the record and return it to the other side of the stack.

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