April 29, 1952 C. G. JOHNSON 2,594,563

AUTOMATIC PHONOGRAPH

Filed Jan. 19, 1946 4 Sheets-Sheet 1

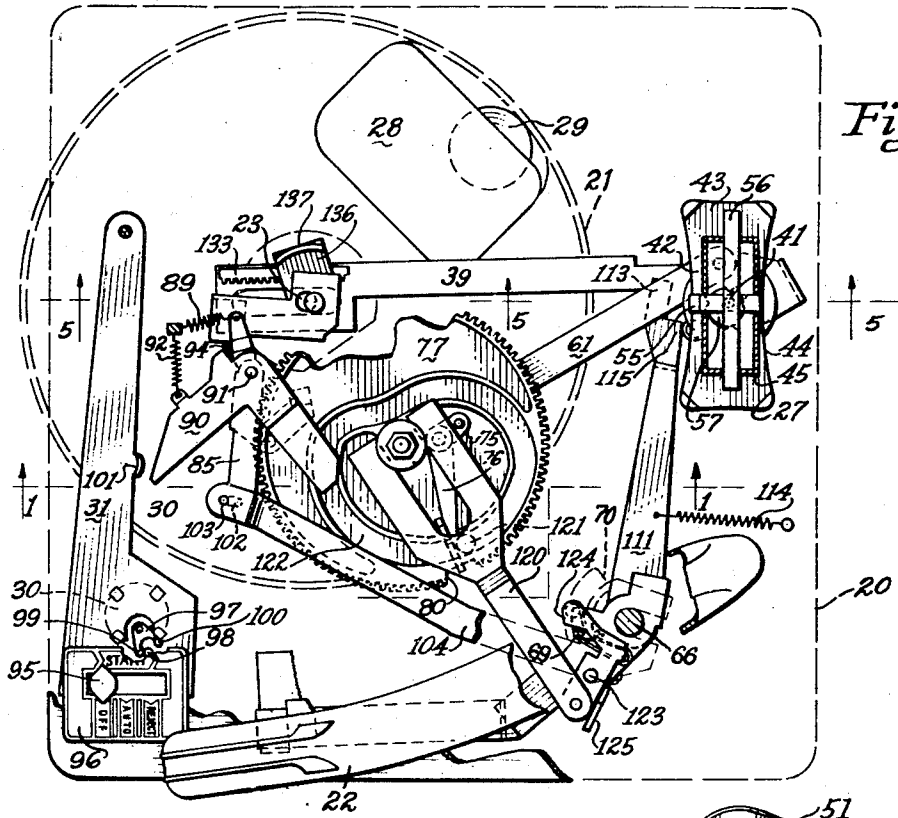


Fig. 2

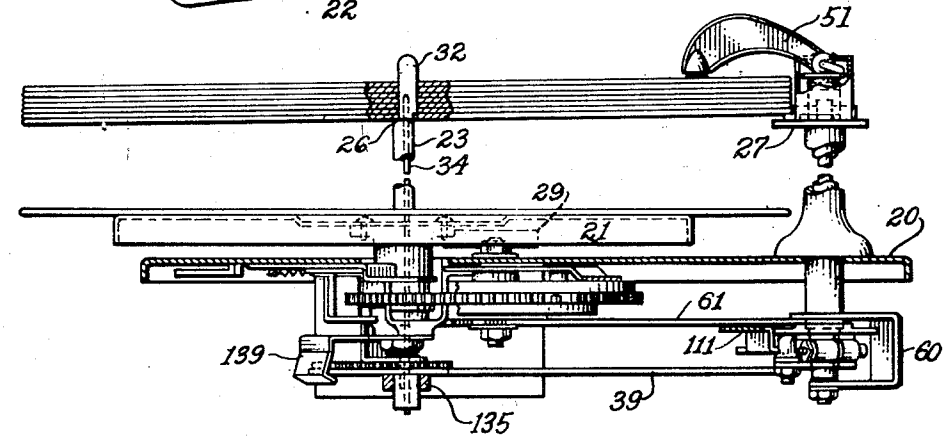


Fig. 1

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April 29, 1952 C. G. JOHNSON 2,594,563

AUTOMATIC PHONOGRAPH

Filed Jan. 19, 1946 4 Sheets-Sheet 2

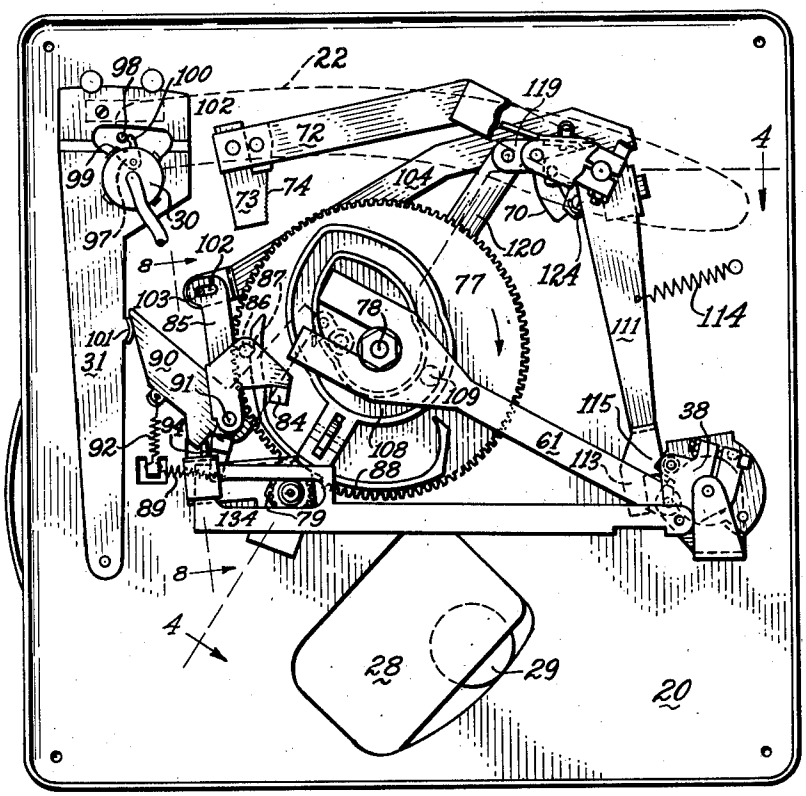


Fig. 3

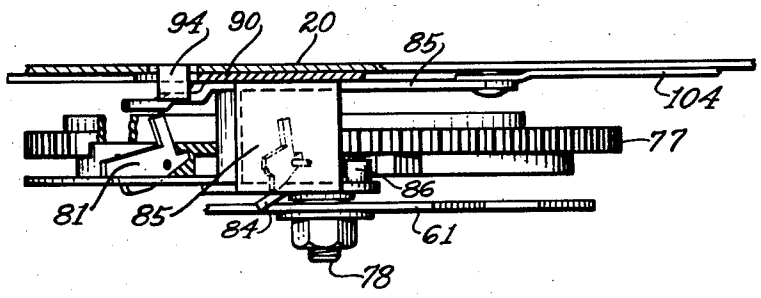


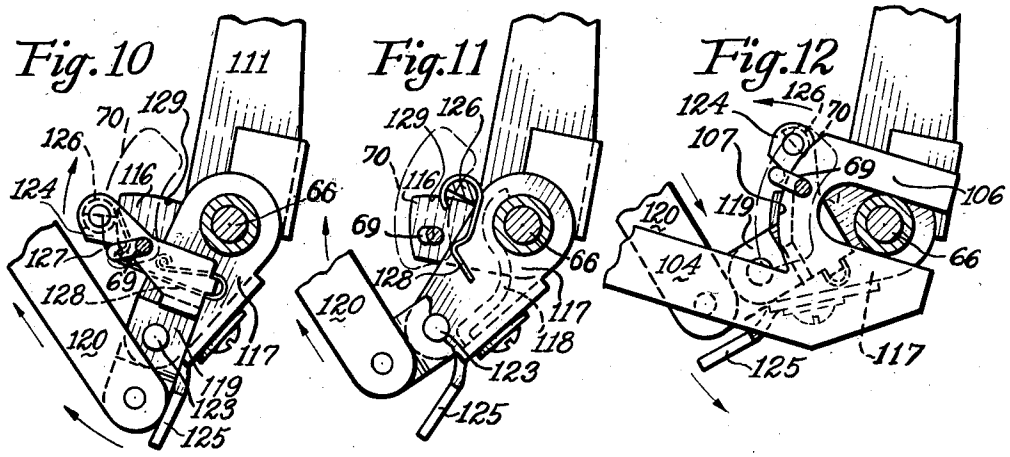
Fig. 8

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April 29, 1952 C. G. JOHNSON 2,594,563

AUTOMATIC PHONOGRAPH

Filed Jan. 19, 1946 4 Sheets-Sheet 3



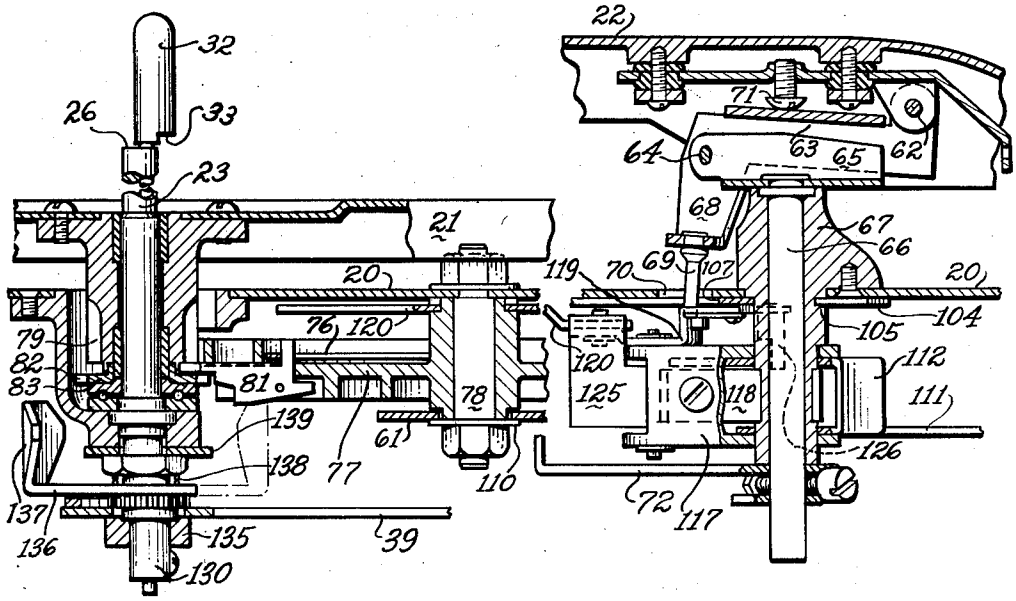


Fig. 4

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April 29, 1952 C. G. JOHNSON 2,594,563

AUTOMATIC PHONOGRAPH

Filed Jan. 19, 1946 4 Sheets-Sheet 4

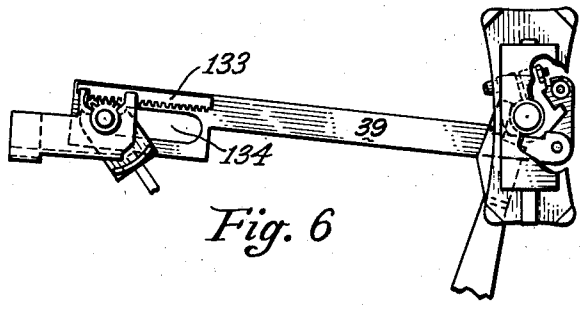


Fig. 6

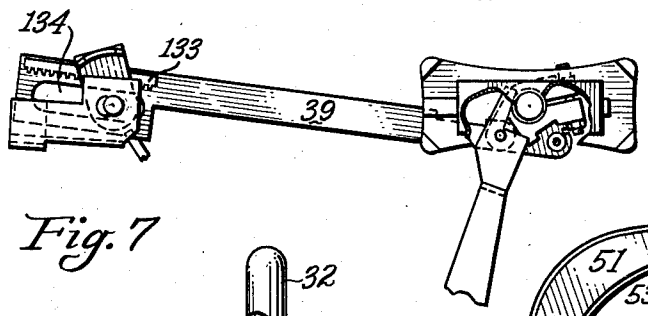


Fig. 7

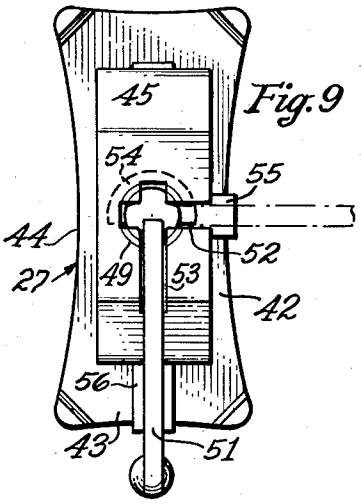


Fig. 9

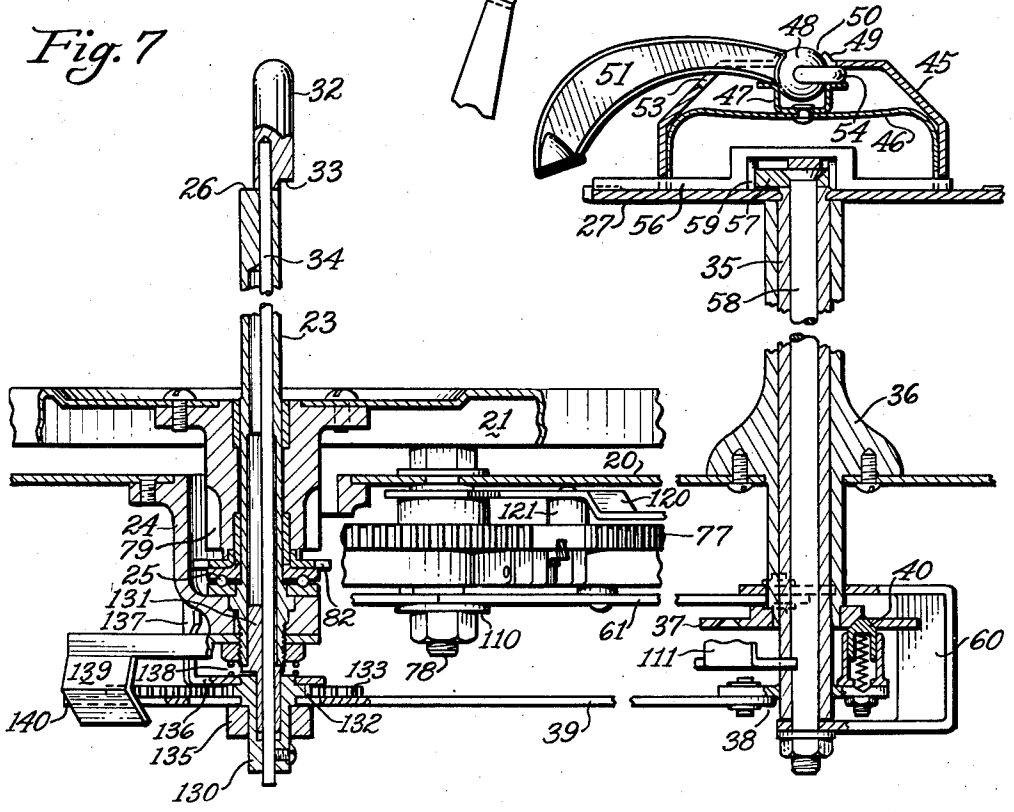


Fig. 5

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Patented Apr. 29, 1952 2,594,563

UNITED STATES PATENT OFFICE

2,594,563

AUTOMATIC PHONOGRAPH

Carl G. Johnson, Chicago, Ill., assignor to J. P. Seeburg Corporation, Chicago, Ill., a corporation of Illinois

Application January 19, 1946, Serial No. 642,141

13 Claims. (Cl. 274—10)

1

This invention relates to automatic phonographs which are arranged to play a sequence of records one after the other without manual interference after the machine has been started.

One of the objects of the invention is to provide an improved mechanism for actuating the player arm in coordination with the record changing mechanism which operates after the rendition of a record.

A further object of the invention is to provide an improved player arm actuating mechanism which is readily adjustable for the playing of records of different sizes.

A further object of the invention is to provide an improved record changing mechanism embodying a stepped spindle and a lateral support in which the spindle is operatively connected to the lateral support in such a manner that adjustment of the lateral support for records of different sizes automatically adjusts the spindle for the thickness of the records to be played.

A further object of the invention is to provide an offset spindle and a lateral support which is movable to a record discharge position, said spindle and said lateral support being operatively connected so that adjustment of the lateral support to record removing position automatically aligns the portions of the posts to facilitate vertical removal of the played records.

Other objects, advantages and capabilities of the invention will appear from the following description of a preferred embodiment thereof taken in conjunction with the accompanying drawings, in which:

Figure 1 is an elevation, partly in section of a phonograph embodying my invention, the player arm being omitted by the section which is taken on the line 1—1 of Fig. 2;

Fig. 2 is a plan view of the phonograph the motor board and turntable being shown in phantom to disclose mechanism thereunder, the mechanism being shown at an intermediate position of the record changing mechanism, the lateral support being located for playing a record of larger size;

Fig. 3 is an inverted plan view of the phonograph at the beginning of the playing of a record of larger size;

Fig. 4 is a sectional elevation taken on the line 4—4 of Fig 3, intermediate portions being broken away to enable the illustrated mechanism to be shown on a larger scale;

Fig. 5 is a similar view, the section being taken on the line 5—5 of Fig. 2;

Fig. 6 is a plan detail showing the lateral support and associated parts in record removing position;

2

Fig. 7 is a similar view showing the same mechanism in position to play a record of smaller size;

Fig. 8 is an elevational detail view on the line 8—8 of Fig. 3;

Fig. 9 is a plan view of the lateral record support;

Fig. 10 is a plan detail view of the mechanism below the motor board which manipulates the player arm, the mechanism being shown at the beginning of the inward movement of the player arm;

Fig. 11 is a similar view showing the mechanism after the player arm has been moved inwardly and allowed to engage the record; and

Fig. 12 is a similar view showing the mechanism after the player arm has been elevated and is about to be moved outwardly clear of the record.

Referring to the drawings, the phonograph comprises a motor board 20, a turntable 21, a player arm 22 and a spindle 23. The spindle 23 is rigidly mounted on a bracket 24 carried by the motor board 20 and the turntable 21 is rotatably mounted on this bracket by means of a bearing 25, the spindle 23 extending through a central opening in the hub of the turntable 21. When the machine is in operation the upper end of the spindle 23 provides a seat 26 which supports a stack of records as shown in Fig. 1 with the aid of a lateral support 27.

The turntable is driven by a motor 28 through a rubber tired wheel 29 which engages the rim of the turntable. The motor 23 is controlled by a switch 30 which is carried by the actuating lever 31.

The stationary spindle 23 is provided with a movable extension 32 which during playing operation is offset with respect to the spindle 23 as shown in Figs. 1, 4 and 5 so that the stack of records may rest upon the seat 26. The extension 32 is provided with a shoulder 33 which is spaced above the seat 26 by the thickness of a record. The part of the spindle intermediate the step 26 and shoulder 33 is located within the outlines of the lower and offset portions of the spindle. Consequently when the lowermost record is moved radially by the mechanism on the support 27, hereinafter to be described, the lowermost record of the stack is moved so that its center opening moves out of alignment with the extension 32 and into alignment with the spindle 23 so that the record may drop down on to the

turntable 21 for rendition. Means hereinafter to be described moved the player arm 22 outwardly clear of the record before it drops and into initial playing position on that record for its reproduction. At the end of the playing of the record the record changing mechanism is put into operation by a trip so that another record is dropped and played and so on.

The upper portion or extension 32 of the spindle 23 is mounted eccentrically on a rod 34 which is mounted with similar eccentricity in the spindle 23. When this rod is turned through 180° from its normal playing position the extension 32 is brought into alignment with the spindle 23 so that the spindle 23 and its extension 32 constitute a straight spindle to facilitate the removal of records which have accumulated on the turntable 21. The rod 34 extends through and beyond the lower end of the spindle 23. Normally the vertical distance between the steps 26 and 33 provides for a record of smaller size. Means are provided for raising the rod 34 and the extension 32 slightly so that the distance between the steps 26 and 33 corresponds to a record of larger size. The record support 27 is manually adjustable into three positions. In one position the support is adapted to cooperate with records of larger size. In another position the support 27 is adapted to cooperate with records of smaller size. In the third position the support 27 is clear of the path of the played records being removed from the turntable 21. When the support 27 is in position for playing records of larger size, mechanism actuated by it effects the slight elevation of the rod 34 and the extension 32 to take care of the larger records. When the support 27 is in the discharge or record removing position, mechanism controlled by it has rotated the rod 34 to bring the extension 32 into longitudinal alignment with the spindle 23.

The record support 27 consists of a plate which is rigidly carried by a sleeve 35. This sleeve is rotatably mounted within a standard 36 carried by the motor board 20. At its lower end the standard 36 rigidly carries a disc 37. The sleeve 35 extends below the standard 36 and its projecting end rigidly carries a member 38 which serves as an arm to which the link 39 is pivotally connected and also serves to support a button 40 which is spring pressed upwardly so as to engage the disc 37. This disc is provided with three apertures into which the button 40 enters to define the three positions of the support 27 referred to above. The record support or plate 27 has a long and a short major dimension. Its two long sides are differentially spaced with respect to the axis 41 (Fig. 2) of the sleeve 35. When the support 27 is in position to play records of larger size (as shown in Fig. 2) its flange 42 engages and supports the lowermost record of the stack which is also being supported by the step 26. When the record support 27 is turned through 90° in the counter-clockwise direction as viewed in Fig. 2 the flange 43 is directed towards the spindle 23 and serves to support a stack of records of the smaller size. When the support 27 is rotated another 90° into its discharge position its side 44 is directed towards the spindle 23. Since this long side 44 is nearer the axis 41 than is its opposite side all the records on the turntable may be moved upwardly past it, the extension 32 being then in alignment with the spindle 23.

Upon the upper surface of the support 27 is mounted a housing 45 which is smaller than the

support 27 so as to leave the flanges 42 and 43 free for supporting stacks of records. An upwardly bowed leaf spring 46 is located in the longitudinal direction of the housing 45 as best seen in Fig. 5. At its center the spring 46 rigidly carries an upwardly directed flange cup 47 which receives a ball 48 so that this ball is forced resiliently upward on to a seat 49 provided in the upper wall of the housing 45 around an opening 50 in this wall. The ball 48 is rigidly connected to an arm 51 which is arranged to extend over and engage a stack of records supported on the step 26 and either of the flanges 42 or 43. The housing 45 is provided with two slots 52 and 53 which extend from the opening 50 towards the flanges 42 and 43 respectively. The ball 48 rigidly carries a projecting rib 54 which is engaged by the flange of the cup 47 in any of its positions. Normally the projection 54 is forced upwardly against the upper wall of the housing 45, the arm 51 being then located in either of the slots 52 or 53. It will readily be seen that the action of the spring 46 against the projection 54 biasses the arm 51 downwardly so that it applies pressure on to the upper surface of the stack of records supported on the step 26 and support 27 as best seen in Fig. 1. The arm 51 may be moved from one of its operating positions to the other by merely lifting it up out of one of the slots 52 or 53 and swinging it around through 90° so as to locate it in the other slot. The arm 51 may be raised up manually when placing a stack in position and on its release it engages the upper surface of the stack, preventing the stack from swinging on the step 26 in the counter-clockwise direction as viewed in Fig. 1.

The lowermost record is disengaged from the flange 42 or 43 of the support 27 by means of bars 55 and 56 respectively. These bars rest upon the support 27 and their ends project through openings in the housing 45. The central portions of the bars are arched one more than the other to permit them to cross. Beneath these arches is located a cam disc 57 which is eccentrically mounted on a rod 58 which extends rotatably through the sleeve 35, the disc 57 resting upon the surface of the plate 27 as best seen in Fig. 5. The inner sides of the arches of the bars 55 and 56 are tapered to a point as shown at 59 on Fig. 5 to provide accurate engagement of the bars with the cam disc 57. When the machine is playing a record the low side of the cam 57 is directed towards the spindle 23 so that the effective bar 55 or 56 is in a remote position with respect to the spindle 23, allowing the stack of records to rest upon the flange 42 or 43, as the case may be. The lower end of the bar 58 is rigidly secured to a yoke 60 which is provided with a bearing around the lower extension of the standard 36. A link 61 is pivotally connected to the yoke 60. During the record changing cycle the link 61 is oscillated and on the first movement of its oscillation the cam disc 57 is rotated through a suitable angle causing the bar 55 or 56 which is directed towards the spindle 23 to be moved towards that spindle bringing the record which was supported on the flange 42 or 43 respectively clear of that flange and bringing the center opening of the lowermost record into alignment with the spindle 23 so that this record drops on to the turntable. Upon the return movement of the link 61 the effective bar is withdrawn and the remaining stack of records stand supported on the seat 26 and on the flange 42 or 43 as the case may be.

The player arm 22 is pivotally mounted by means of a horizontal pivot 62 on an inverted channel member 63 which is pivotally mounted on the projecting ends of a pin 64 which is carried by an upwardly directed channel 65 located within the channel 63. The channel 65 is carried by a vertical shaft 66 which is rotatably mounted in a standard 67 mounted on the motor board 20. The channel 63 carries a downwardly directed member 68 which carries a downwardly directed pin 69. This pin projects through an arcuate opening 70 in the motor board 20. It will readily be understood from Fig. 4 that when the pin 69 is moved to the left the channel 63 is swung about its pivot 64 in the clockwise direction and the player arm 22 is elevated away from the record owing to its pivotal connection with the channel 63 and the engagement of the screw 71 with the upper web of the channel 63.

At its lower end the shaft 66 has rigidly mounted thereon a trip arm 72 which carries at its outer end a member 73 having a serrated arcuate edge 74. During the playing of a record the trip arm 72 moves inwardly, that is downwardly as viewed in Fig. 3 as the player arm translates inwardly on the record being played and the serrated edge 74 engages a spring pressed dog 75 which is pivotally mounted on a latch lever 76 pivotally mounted on the upper side of a cam gear 77. At the end of the playing of the record the reverse movement of the player arm provides a reverse movement for the member 73 so that the latch 76 is swung in the clockwise direction as viewed in Fig. 3.

The cam gear 77 is rotatably mounted on a stub shaft 78 depending from the motor board 20. The cam gear 77 is provided with peripheral teeth which are arranged to cooperate with teeth 79 formed on the hub of the turntable 21. The gear is mutilated to provide a recess 80 so that the drive of the cam gear 77 is terminated when the recess 80 is opposite the teeth 79, as best seen in Fig. 3. A bell crank dog 81 (Fig. 4) is pivotally mounted on the gear 77. This dog has one arm which projects radially into the recess 80 and a vertical arm which is adapted to be engaged by the latch 76 so that the radially directed arm of the dog is normally held elevated above teeth 82 on a member 83 which is rigidly mounted on the hub of the turntable 21. When the dog 81 is released by the latch 76, owing to the reverse movement of the member 73, the dog drops by gravity so that its projecting arm moves into the path of the teeth 82 to initiate the rotation of the cam gear 77. This initial movement of the cam gear brings its peripheral teeth into mesh with the teeth 79 so that the cam gear 77 is driven through a complete revolution. During the initial part of this revolution the lower portion of the dog 81 is engaged by a cam 84 carried by a lever 85 so that the dog is returned to its normal position into which it is latched by the latch 75. Consequently when the recess 80 comes to its normal position opposite the teeth 79 the drive of the cam gear 77 is terminated. The cam gear 77 is yieldingly held in its normal position by the entry of a cam follower 86, carried by the lever 85, into a recess 87 in a cam 88 mounted on the under side of the cam gear 77. The cam follower 86 is biassed towards the cam 88 by a spring 89. The lever 85 and a bell crank lever 90 are pivotally mounted on a pin 91 depending from the motor board 20. The bell crank lever 90 is biassed into its position in Fig. 2 by means of a spring 92, this position being defined by a stop 94 depending from the motor board. When the machine is playing a record one end of the lever 90 is adjacent the end of the latch 76 which carries the dog 75.

The actuating or control lever 31 is pivotally mounted on the under side of the motor board and carries a control button 95 which projects upwardly through aligned slots in the motor board and in an escutcheon plate 96. This escutcheon plate bears indicia to indicate the "Off" position, the "On" or "Automatic" position and the "Reject" position. The switch 30 which is bodily carried by the lever 31 has a short actuating arm 97 which engages a pin 98 projecting downwardly from the motor board. The extremity of the arm 97 comprises two horns 99 and 100. When the lever 31 is moved from "Off" position to "On" position the horn 99 engages the pin 98 and the switch arm 97 snaps into its position of Fig. 3, the switch being on. This movement of the arm 97 removes the horn 99 out of the path of the pin 98 so that the lever 31 may be moved to the "Reject" position without affecting the switch. When the lever 31 is in operating position a lug 101 bears against the other arm of the lever 90 so that the lever 31 is held in the "On" position by the opposition of the switch arm 97 to its movement in one direction and the opposition exercised by the spring 92 through the lever 90. When the lever 31 is swung into "Reject" position the lug 101 swings the lever 90 in the clockwise direction as viewed in Fig. 2 and in the counter-clockwise direction as viewed in Fig. 3 so that the latch 76 is swung into unlatching position initiating the drive of the cam gear 77 through one revolution in the manner previously described. When the lever 31 is returned to the "Off" position the horn 100 of the switch arm 97 is actuated by engagement with the pin 98 so that the switch arm snaps into the "Off" position bringing the horn 99 into alignment with the pin 98 to turn the switch on at the next actuation of the lever 31. The switch arm yieldably holds the lever 31 in the "Off" position.

When the cam gear 77 starts to rotate the cam 88 on its lower surface immediately swings the lever 85 in the counter-clockwise direction as viewed in Fig. 3. The lever 85 is provided with a slot 102 which receives a pin 103 carried by a link 104. During the latter part of its outward movement, which occurs in about the first 10° of movement of the cam gear 77 the lever 85 displaces the link 104 to the left in Fig. 2 and its displaced condition is maintained during about the next quarter revolution of the cam gear 77 whereupon the cam follower 86 rides off the cam 88 and the lever 85 and link 104 resume their normal positions. The end of the link 104 remote from its pivotal connection with the lever 85 is offset and furcated as best seen in Fig. 12. This end of the link is located immediately below the motor board 20 and is supported and guided by the furcations extending into a circular groove 105 in the standard 67 (Fig. 4). The forward end of the furcated portion 106 of the link 104 is provided with an arcuate edge 107 which conforms in curvature to the arcuate shape of the opening 70. Normally the edge 107 is located to the right of the opening 70 as viewed in Fig. 4. When however the link 104 is displaced in the manner just described the edge 107 moves to the left as viewed in Fig. 4 and engages the depending pin 69 so that the player arm is swung upwardly, raising the needle

out of engagement with a record on the turntable.

Also on the lower side of the cam gear 77 is a cam track 108 which receives a cam follower 109 which is mounted on the link 61. The free end of the link is furcated and supported on a washer 110 carried at the lower end of the stub axle 78 in the manner shown in Fig. 4. It will be understood from Fig. 3 that during the rotation of the cam gear 77 the link 61 is actuated to the right as viewed in Fig. 3 and then to the left by the cam track 108 so that the cam disc 57 is actuated during about the first 170° of movement of the cam gear 77 to cause the lowermost record to drop on to the turntable. During the remainder of the rotation the cam disc 57 retracts the effective arm 55 or 56 as the case may be.

A lever 111 having an end 112 in the form of a yoke is pivotally mounted by means of the yoke and the lower extension of the standard 67 of the player arm as shown in Fig. 4. The free end of the lever 111 is stepped to provide a reduced portion 113 which is adapted to engage the lowermost part of the sleeve 35 upon which the record support 27 is mounted. The lever 111 is biassed towards the sleeve 35 by means of a spring 114. When the plate 27 is adjusted into position for playing records of larger size, which position is shown in Fig. 2, the housing of the button 40 engages a shoulder 115 and moves the lever 111 into the position shown in Fig. 2. The lever 111 serves to control the initial playing position of the player arm, the position for larger records being shown in Fig. 2. The upper web of the yoke 112 is provided with an extension 116, best shown in Figs. 10 and 11 which directly controls the initial playing position of the player arm.

Also pivotally mounted upon the lower extension of the standard 67 of the player arm and in embracing relation to the yoke 112 is another yoke 117 which carries a spring 118 which frictionally engages a reduced portion of the standard 67 as best seen in Fig. 4. The engagement of the spring 118 with the circumferential recess in the standard 67 maintains both yokes 112 and 117 against longitudinal movement on the standard 67. The spring 118 also serves as a brake or friction member which opposes movement of the yoke 117 about the standard 67. On the upper web of the yoke 117 is pivotally mounted a lever 119 one end of which is pivotally connected to a link 120. The link 120 extends over the top of the cam gear 77 as shown in Fig. 2. Its end remote from its pivotal connection is furcated and guided and is supported on the hub of the cam gear 77 in the manner shown in Fig. 5. The link 120 carries a cam follower 121 which rides in a cam track 122 on the upper surface of the cam gear 77. When a record is playing the cam follower 121 is located near the center of the cam gear 77. During somewhat less than the first half revolution of the cam gear the link 120 is moved radially outwardly to its fullest extent. During the next quarter of a revolution of the cam gear 77 this displacement of the link 120 is maintained and thereafter the link 120 moves inwardly to its initial position. The lever 119 is pivotally mounted on the yoke 117 at 123 and it is provided with an extension 124 which is arranged to cooperate with the depending rod 69. Normally the extension 124 is located beyond the inner end of the slot 70 as shown in Fig. 3. At the end of the playing of a record the cam gear 77 starts to operate and the link 104 is actuated so that the arcuate edge 107 engages the pin 69 and raises the stylus off the record. The link 120 moving outwardly, the lever 119 swings about its pivot 123 so that its extension 124 is brought into engagement with the pin 69 thus moving the player arm outwardly. Initially the lever 119 swings on the yoke 117 because the yoke is held immovable by the friction of the spring 118 against the standard 67. After a certain movement of the link 120 the lever 119 engages a stop 125 carried by the yoke 117 so that continued outward movement of the link 120 swings the yoke 117 and the lever 119 in unison. The stop 125 may suitably be provided by an extension of the spring 118. The extension 124 of the lever 119 carries a depending pin 126 the lower portion of which is half cut away to provide an edge which cooperates with the extension or plate 116. During the outward movement of the link 120 the pin 126 clears the plate 116 owing to the initial movement of the lever 119 relative to the yoke 117. The outward movement of the link 120 and the resulting outward movement of the extension 124 carry the pin 69 outwardly to the outer end of the slot 70, during which time the player arm is held elevated by the displaced position of the edge 107. The extension 124 is provided with a recess 127 into which extends a spring 128 which serves as a resilient detent to grip the pin 69. When the pin 69 engages the outer end of the slot 70 continued outward movement of the extension 124 carries the detent portion of the spring 128 partially around the pin 69, which is being held in the outer portion of the slot 70 by the edge 107. Consequently the pin 69 is resiliently grasped by the spring 128. The edge 107 now moves away from the pin 69 owing to the cam follower 68 running off the cam 88, and after a pause the link 120 starts to move inwardly. During this pause the cam 57 is actuated to release the lowermost record of the stack. After this record has dropped on to the turntable the link 120 moves inwardly to bring the player arm into initial playing position. The initial return movement of the link 120 swings the lever 119 relative to the yoke 117 in the clockwise direction as viewed from above, bringing the edge of the pin 126 into engagement with the arcuate surface of the plate 116. Continued inward movement of the link 120 moves the lever 119 and the yoke 117 as a unit. The pin 69 being grasped by the detent spring 128, the player arm moves inwardly in elevated condition until the edge of the pin 126 arrives at the edge 129 of the plate 116 whereupon the inward movement of the link 120 causes the lever 119 to swing on the yoke 117 which becomes stationary owing to the friction of the spring 118 with the standard 67. The detent spring 128 is consequently moved inwardly towards the shaft 66 so that the player arm moves downwardly into engagement with the topmost record on the turntable in its initial playing position. This position is determined for records of different sizes by the location of the plate 116 which is determined by the position of adjustment of the support 27 as has been previously described. Continued inward movement of the link 120 carries the extension 124 into its position of Fig. 3 and it remains in this position until the cam gear 77 is again put into operation.

At its lower end the rod 34 has rigidly mounted thereon a thimble 130 which is guided on the outside of the stationary bushing 131 which is rigidly carried by the bracket 24. The thimble 130 comprises an integral pinion 132 which meshes with a rack 133 carried on the end of the link 39 remote from the member 38. This

end of the link 39 is provided with a slot 134 through which the thimble 130 extends. This end of the link is supported immediately below the pinion 132 by a collar 135 mounted on the thimble 130. Above the pinion 132, the thimble 130 rigidly carries a radial arm 136 which has an upwardly projecting portion 137. The thimble 130 and the elements associated therewith are biased downwardly by a light spring 138 so that the lower end of the portion 32 of the spindle tends to seat on the upper end of the stationary part of the spindle 23. A slight clearance is provided between the upper end of the thimble 130 and a shoulder on the bushing 131 so that the thimble may be moved upwardly slightly so as to elevate the offset portion 32 of the spindle and provide a vertical spacing between the seat 26 and the shoulder 33 to accommodate records of larger size.

An arm 139 rigidly mounted on the bracket 24 is located so that an inclined cam 140 integral therewith is located so as to cooperate with the end of the link 39 which is associated with the spindle. When the record support 27 is set for playing records of larger size as shown in Fig. 2 or for records of smaller size as shown in Fig. 7 the link 39 is sloped in opposite directions and to substantially the same degree with respect to the line joining the axes of the spindle and the axis of the support 27. In both these positions the rack 133 locates the offset portion 32 of the spindle in its nearest position to the record support 27 thus uncovering the seat 26 for the support of a stack of records. When the support 27 is set for records of the smaller size the link 39 is clear of the cam 140 so that the spring 138 holds the spindle extension 32 seated on the upper end of the spindle 23 as shown in Fig. 5. When the record support 27 is set for records of larger size the obliquity of the link 39 as shown in Fig. 2 brings the end of the link into engagement with the cam 140 so that the thimble 130, the rod 34 and the spindle extension 32 are moved upwardly, providing a slightly greater vertical distance between the step 26 and the shoulder 33 for cooperation with the records of larger diameter, which are also somewhat thicker than the records of smaller diameter.

When the record support 27 is set in its third position for the removal of records from the turntable (Fig. 6) the rack 133 rotates the offset portion 132 of the spindle into alignment with the major portion of the spindle 23 so that the spindle is an effectively straight spindle which facilitates the removal of records from the turntable. In this position, also, the upstanding end 137 of the arm 136 is brought into position below the dog 81 so that this dog is prevented from dropping to initiate the operation of the cam gear 77. Consequently this position of the record support 27 adapts the phonograph for operation as a manually operated phonograph. Individual records can very readily be applied to and removed from the turntable since the record suport 27 is out of the path of such records and the spindle is effectively a straight spindle.

Although the invention has been described in connection with the specific details of a preferred embodiment thereof, it must be understood that such details are not intended to be limitative of the invention except in so far as set forth in the accompanying claims.

Having thus described my invention, I declare that what I claim is:

1. In an automatic phonograph, in combination, a spindle comprising a main portion, an offset portion and an intermediate portion, said spindle including a record supporting step and a vertically movable shoulder in vertically spaced relation at the lower and upper ends of said intermediate portion, said intermediate portion being conformed to permit the lowermost record of a stack of records resting on the step with the intermediate portion and offset portion extending through their central openings, to be moved out of alignment with the offset portion and into alignment with the main portion, said shoulder preventing displacement of the record above the lowermost record, and an operable element extending upwardly through the main portion of the spindle and operatively engaging said shoulder for moving the shoulder vertically into a plurality of positions to adapt the spindle for records of different thickness.

2. In an automatic phonograph, in combination, a spindle comprising a main portion, an offset portion and an intermediate portion, said spindle including a record supporting step and a vertically movable shoulder in vertically spaced relation at the lower and upper ends of said intermediate portion, said intermediate portion being conformed to permit the lowermost record of a stack of records resting on the step with the intermediate portion and offset portion extending through their central openings, to be moved out of alignment with the offset portion and into alignment with the main portion, said shoulder preventing displacement of the record above the lowermost record, a lateral support located relatively to said spindle to provide marginal support for the stack of records resting on said step, and adjustable to a plurality of positions for records of different sizes, and elements operatively connected to the lateral record support and said shoulder for raising and lowering the shoulder to adjust the shoulder for the thickness of the records for which the lateral support is set.

3. In an automatic phonograph, in combination, a spindle comprising a main portion, an offset portion and an intermediate portion, said spindle including a record supporting step and a vertically movable shoulder in vertically spaced relation at the lower and upper ends of said intermediate portion, said intermediate portion being conformed to permit the lowermost record of a stack of records resting on the step with the intermediate portion and offset portion extending through their central openings, to be moved out of alignment with the offset portion and into alignment with the main portion, said shoulder preventing displacement of the record above the lowermost record, a lateral support located relatively to said spindle to provide marginal support for the stack of records resting on said step, and adjustable to a plurality of positions for records of different sizes, elements operatively connected to the lateral record support and said shoulder for raising and lowering the shoulder to adjust the shoulder for the thickness of the records for which the lateral support is set, and a pusher associated with the lateral record support for displacing the lowermost record of the stack off the lateral support and off the step.

4. In an automatic phonograph, a record supporting spindle comprising a lower portion, a vertically movable upper offset portion, said lower portion having a step to support a stack of records through whose central openings the

offset portion extends, said offset portion being provided with a shoulder located at a higher level than the step so that the lowermost record of the stack may be moved to bring its central opening out of alignment with the offset portion and into alignment with the lower portion, said shoulder being located to prevent displacement of the record positioned above the lowermost record, and an operable element extending through the lower portion of the spindle and operatively engaging said offset portion for effecting longitudinal movement of the upper offset portion to locate said shoulder at a height for cooperation with records of different thickness.

5. In an automatic phonograph, a record supporting spindle comprising a lower portion, an upper offset portion, said lower portion having a step to support a stack of records through whose central openings the offset portion extends, said offset portion being provided with a shoulder located at a higher level than the step so that the lowermost record of the stack may be moved to bring its central opening out of alignment with the offset portion and into alignment with the lower portion, said shoulder being located to prevent displacement of the record positioned above the lowermost record, said offset portion being movable in the vertical direction, a lateral support located relatively to said spindle to provide marginal support for the stack of records resting on said step, and adjustable into positions for records of smaller and larger size, and operating elements connected to the lateral support and said shoulder, to elevate the offset portion to adapt the spindle for cooperation with records of greater thickness when the lateral support is in position for cooperating with records of larger size.

6. In an automatic phonograph, a record supporting spindle comprising a lower portion, an upper offset portion, said lower portion having a step to support a stack of records through whose central openings the offset portion extends, said offset portion being provided with a shoulder located at a higher level than the step so that the lowermost record of the stack may be moved to bring its central opening out of alignment with the offset portion and into alignment with the lower portion, said shoulder being located to prevent displacement of the record positioned above the lowermost record, said offset portion being movable in the vertical direction, a lateral support located relatively to said spindle to provide marginal support for the stack of records resting on said step, and adjustable into positions for records of smaller and larger size, operating elements connected to the lateral support and said shoulder, to elevate the offset portion to adapt the spindle for cooperation with records of greater thickness when the lateral support is in position for cooperating with records of larger size, and a pusher associated with said lateral support for displacing the lowermost record of the stack off the lateral support and off the step, movement of the record above the lowermost record being prevented by said shoulder.

7. In an automatic phonograph, in combination, a turntable, a record supporting spindle located in substantially co-axial relation to the turntable, and having a main portion and a normally offset rotatable portion carried by the main portion, a record supporting step on said spindle, a lateral record support located relatively to said spindle to provide marginal support for a stack of records resting on said step with the offset portion extending through their central openings, said spindle being normally conformed to permit the lowermost record only of the stack to be displaced out of alignment with the offset portion into alignment with the main portion and clear of the step and lateral support whereby the lowermost record is freed to drop on the turntable, said lateral support being adjustable into a position clear of records to be removed from the turntable, and operable elements operatively connected to said lateral support and to the offset portion of the spindle whereby the offset portion is rotated into substantially axial alignment with the main portion of the spindle when the lateral support is adjusted into record removing position.

8. In an automatic phonograph, in combination, a turntable, a record supporting spindle located in substantially co-axial relation to the turntable, and having a main portion providing a record supporting step and an offset portion providing a shoulder in vertically spaced relation to said step, a lateral record support located relatively to said spindle to provide marginal support for a stack of records resting on said step with the offset portion extending through their central openings, said shoulder being normally located to permit the lowermost record only of the stack to be displaced out of alignment with the offset portion into alignment with the main portion and clear of the step and lateral support whereby the lowermost record is freed to drop on the turntable, said lateral support being adjustable into a position for cooperating with records of smaller size, into a position for cooperating with records of larger size and into a position clear of records to be removed from the turntable, said shoulder being adjustable laterally effectively to locate it within the contour of a continuous spindle for easy removal of records from the turntable and being adjustable vertically to adapt it for cooperation with records of different thickness, operating elements connecting the lateral support to the shoulder to move said shoulder into a lower position for cooperation with records of lesser thickness when the lateral support is adjusted into position for records of smaller size, and for moving the shoulder to a higher position for cooperation with records of greater thickness when the lateral support is adjusted into position for cooperation with records of larger size, and operating elements connecting the lateral support to said shoulder for moving said shoulder into the contour of a continuous spindle when the lateral support is adjusted into record removing position.

9. In an automatic phonograph, in combination, a turntable, a record supporting spindle located in substantially co-axial relation to the turntable, and having a main portion providing a record supporting step and an offset portion providing a shoulder in vertically spaced relation to said step, a lateral record support located relatively to said spindle to provide marginal support for a stack of records resting on said step with the offset portion extending through their central openings, said shoulder being normally located to permit the lowermost record only of the stack to be displaced out of alignment with the offset portion into alignment with the main portion and clear of the step and lateral support whereby the lowermost record is freed to drop on the turntable, said lateral support being

adjustable into a position for cooperating with records of smaller size, into a position for cooperating with records of larger size and into a position clear of records to be removed from the turntable, the offset portion of the spindle being rotatably mounted on the main portion so that it can be rotated from its normal position into alignment with the main portion and being adjustable in the vertical direction to locate said shoulder for cooperation with records of different thickness, operating means connecting the lateral support to the offset portion of the spindle whereby said offset portion is elevated from its normal position when the lateral support is adjusted into position for records of larger size and vice versa, and operating means connecting the lateral support to the offset portion for rotating the offset portion into alignment with the main portion of the spindle when the lateral support is adjusted into record removing position.

10. In an automatic phonograph, in combination, a turntable, a player arm located adjacent said turntable, and arranged to cooperate with records on the turntable and pivotally mounted about two axes to permit the player arm to be elevated from the record and to swing outwardly and inwardly, a depending element movable with the player arm in both its movements, a movable arcuate member located and arranged to engage said element to elevate the player arm, a frictionally mounted swinging member provided with a stop, an arm pivotally mounted thereon located and arranged to engage said element to swing the player arm outwardly, a gripper on the element engaging arm arranged to grasp the element whereby the arm is carried inwardly in elevated condition towards initial playing position by reverse movement of the arm, a second arcuate member for controlling the descent of the player arm at initial playing position, a contact on the element engaging arm arranged to engage the second arcuate member during said reverse movement and to clear the second arcuate member during its outward movement, and a driven member for oscillating said element engaging arm, rotating said element engaging arm relative to the frictionally mounted swinging member until it engages the stop and positions the contact clear of the second arcuate member after which the element engaging arm and the frictionally mounted swinging member move as a unit with the contact clear of the second arcuate member, the reverse movement of the element engaging arm bringing said contact into engagement with the second arcuate member whereupon the element engaging arm and the frictionally mounted member swing as a unit until the contact clears the second arcuate member, whereupon the element engaging arm pivots on the swinging arm to withdraw the element engaging arm away from the element thereby permitting the player arm to descend in its initial playing position.

11. In an automatic phonograph, in combination, a turntable, a player arm located adjacent said turntable, and arranged to cooperate with records on the turntable and pivotally mounted about two axes to permit the player arm to be elevated from the record and to swing outwardly and inwardly, a depending element movable with the player arm in both its movements, a movable arcuate member located and arranged to engage said element to elevate the player arm, a frictionally mounted swinging member provided with a stop, an arm pivotally mounted thereon located and arranged to engage said element to swing the player arm outwardly, a gripper on the element engaging arm arranged to grasp the element whereby the arm is carried inwardly in elevated condition towards initial playing position by reverse movement of the arm, a second arcuate member for controlling the descent of the player arm at initial playing position, a contact on the element engaging arm arranged to engage the second arcuate member during said reverse movement and to clear the second arcuate member during its outward movement, a driven member for oscillating said element engaging arm, rotating said element engaging arm relative to the frictionally mounted swinging member until it engages the stop and positions the contact clear of the second arcuate member after which the element engaging arm and the frictionally mounted swinging member move as a unit with the contact clear of the second arcuate member, the reverse movement of the element engaging arm bringing said contact into engagement with the second arcuate member whereupon the element engaging arm and the frictionally mounted member swing as a unit until the contact clears the second arcuate member, whereupon the element engaging arm pivots on the swinging arm to withdraw the element engaging arm away from the element thereby permitting the player arm to descend in its initial playing position, and operating elements for moving the second arcuate member into any of a plurality of positions to determine a plurality of initial playing positions for the player arm.

12. In an automatic phonograph, in combination, a turntable, a player arm located adjacent said turntable, and arranged to cooperate with records on the turntable and pivotally mounted about two axes to permit the player arm to be elevated from the record and to swing outwardly and inwardly, a depending element movable with the player arm in both its movements, a movable arcuate member located and arranged to engage said element to elevate the player arm, a frictionally mounted swinging member provided with a stop, an arm pivotally mounted thereon located and arranged to engage said element to swing the player arm outwardly, a gripper on the element engaging arm arranged to grasp the element whereby the arm is carried inwardly in elevated condition towards initial playing position by reverse movement of the arm, a second arcuate member for controlling the descent of the player arm at initial playing position, a contact on the element engaging arm arranged to engage the second arcuate member during said reverse movement and to clear the second arcuate member during its outward movement, a driven member for oscillating said element engaging arm, rotating said element engaging arm relative to the frictionally mounted swinging member until it engages the stop and positions the contact clear of the second arcuate member after which the element engaging arm and the frictionally mounted swinging member move as a unit with the contact clear of the second arcuate member, the reverse movement of the element engaging arm bringing said contact into engagement with the second arcuate member whereupon the element engaging arm and the frictionally mounted member swing as a unit until the contact clears the second arcuate member, whereupon the element engaging arm pivots on

the swinging arm to withdraw the element engaging arm away from the element thereby permitting the player arm to descend in its initial playing position, a record support located and arranged to support a stack of records above the turntable, a record releasing element for removing the lowermost record of the stack from the support to permit it to drop onto the turntable for reproduction, said record support being adjustable to a plurality of positions to adapt it for cooperation with records of different sizes, and operating elements connecting the record support to the second arcuate member whereby said second arcuate member is moved into position to determine the initial playing position of the player arm for records of the size for which the record support is set.

13. In an automatic phonograph, in combination, a turntable, a player arm located adjacent the turntable and arranged to cooperate with records on the turntable and pivotally mounted about two axes to permit the player arm to be elevated from the record and to swing outwardly and inwardly, an element carried by the player arm and movable with the player arm in both its movements, an arcuate elevating member movable into engagement with said element to elevate the player arm, a frictionally mounted swinging member provided with a stop, an arm pivotally mounted thereon located and arranged to engage said element to swing the player arm outwardly while elevated, a gripper on the element engaging arm arranged to grasp the element whereby the arm is carried inwardly in elevated condition towards initial playing position by return movement of the arm, a second arcuate member for controlling the descent of the player arm at initial playing position, a contact on the element engaging arm arranged to engage the second arcuate member during its return movement and to clear the second arcuate member during its outward movement, drive mechanism for oscillating said element engaging arm rotating said element engaging arm relative to the frictionally mounted swinging member until it engages the stop and positions the contact clear of the second arcuate member after which the element engaging arm and the frictionally mounted swinging member move as a unit with the contact clear of the second arcuate member, the reverse movement of the element engaging arm bringing said contact into engagement with the second arcuate member whereupon the element engaging arm and the frictionally mounted member swing as a unit until the contact clears the second arcuate member, whereupon the element engaging arm pivots on the swinging arm to withdraw the element engaging arm away from the element thereby permitting the player arm to descend in its initial playing position, means for moving the second arcuate member into any of a plurality of positions to determine a plurality of initial playing positions for the player arm, a spindle located in substantially co-axial relation to the turntable, and having an offset portion including a step on the lower part of the spindle and a shoulder at a higher level on the offset portion, said offset portion being movable vertically to adapt the spindle for cooperation with records of different sizes, a record support located relatively to said spindle to provide marginal support for a stack of records resting on said step and above the turntable, a pusher associated with said support for discharging the lowermost record from said support and said step to permit it to drop on the turntable for reproduction, said record support being adjustable into a plurality of positions to adapt it for the support and discharge of records of a plurality of diameters, operable elements operatively connecting said record support to the second arcuate member to define the initial playing position of the player arm for records of the diameter for which the record support is set, and operable elements operatively connecting said record support to said offset portion of the spindle whereby the offset portion of the spindle is adjusted vertically for cooperation with records of the thickness for which the record supporting member is set.

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