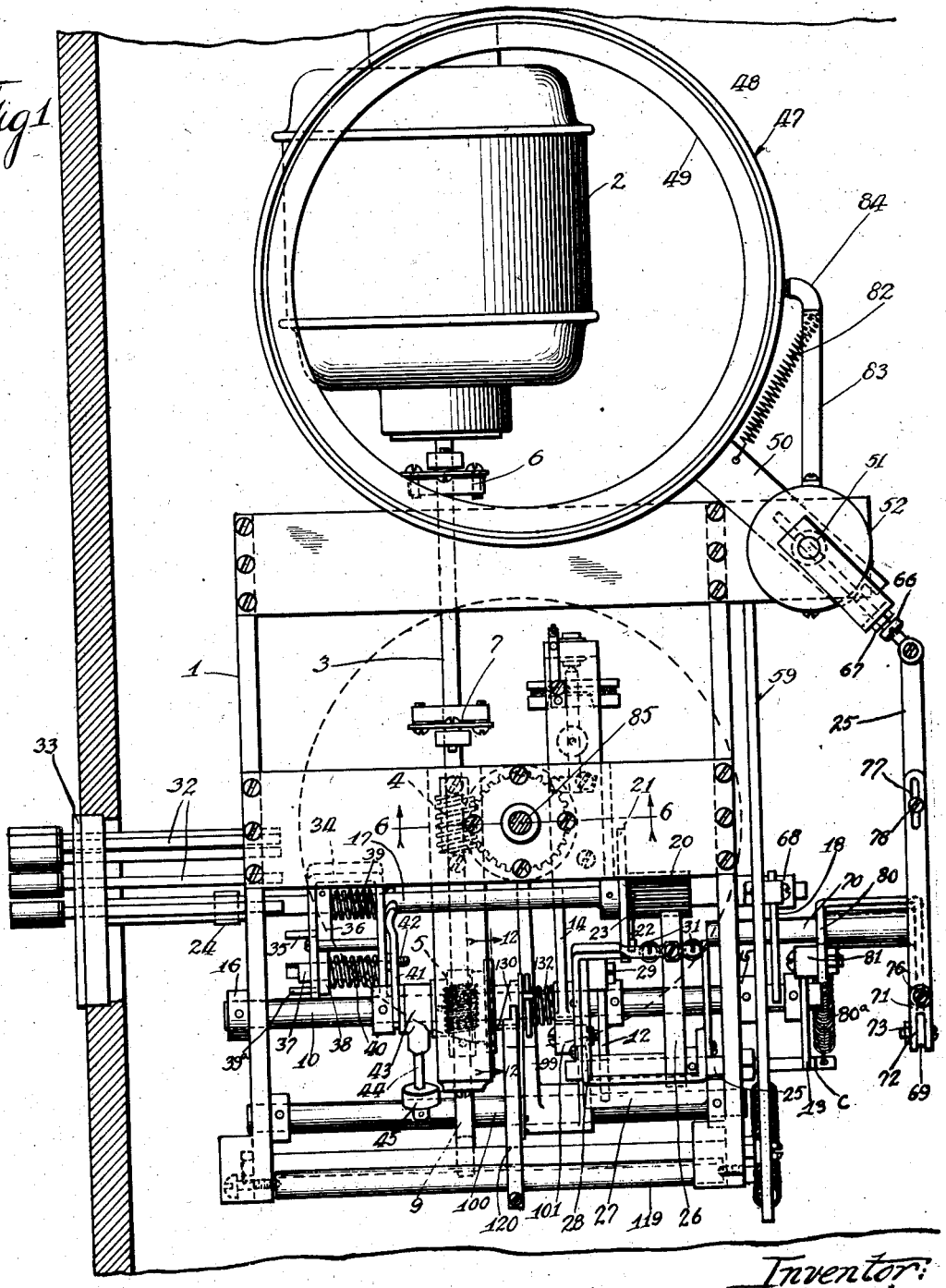
May 21, 1935. R. I. WILCOX 2,002,236

AUTOMATIC PHONOGRAPH

Filed Dec. 11, 1931 11 Sheets-Sheet 1

Fig 1



Inventor:
Russell I. Wilcox
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May 21, 1935. R. I. WILCOX 2,002,236

AUTOMATIC PHONOGRAPH

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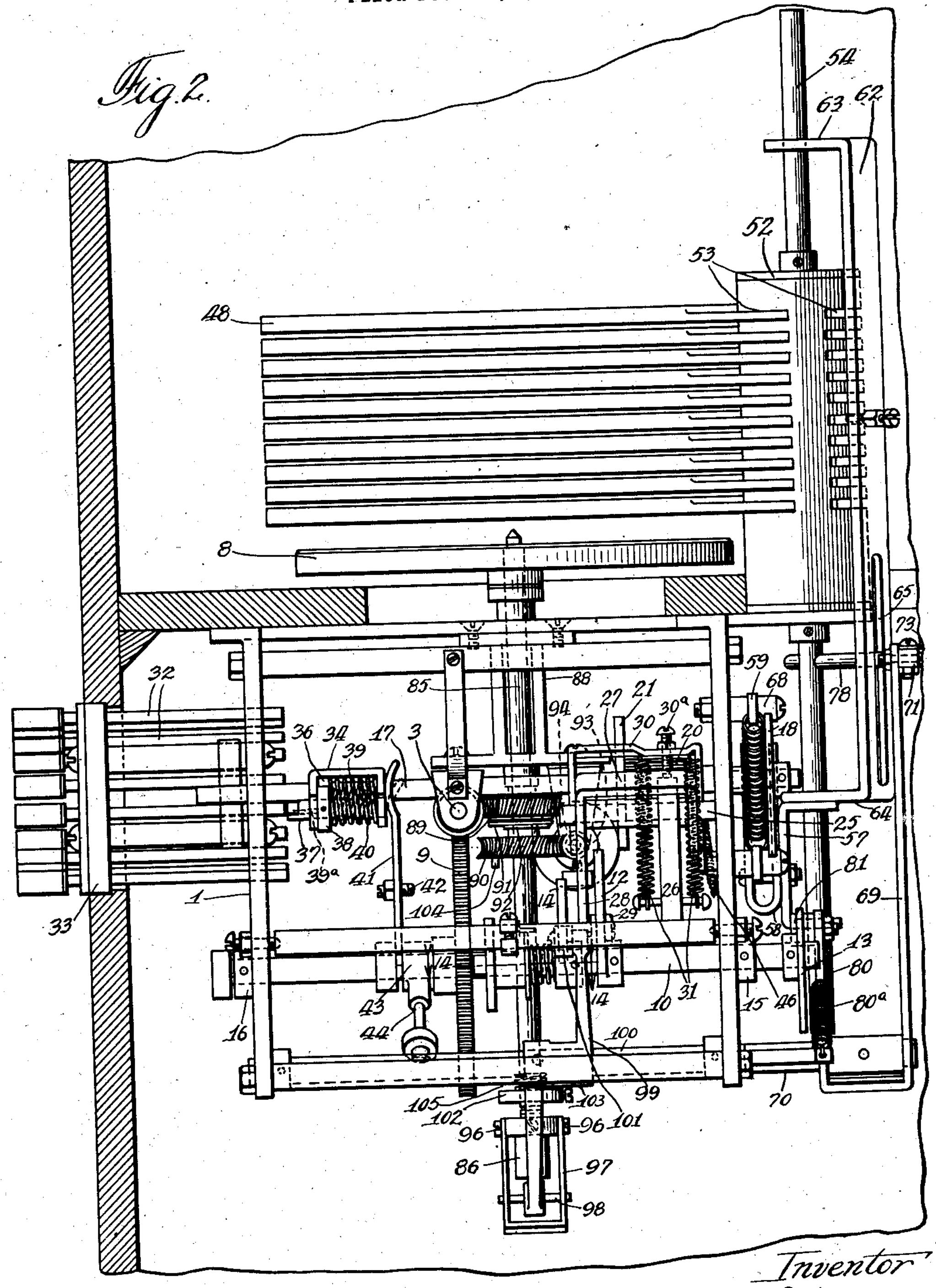
Fig. 2.



Inventor

Russell I. Wilcox

By Johnson, Addington, Amso & Schold Attys.

May 21, 1935. R. I. WILCOX 2,002,236

AUTOMATIC PHONOGRAPH

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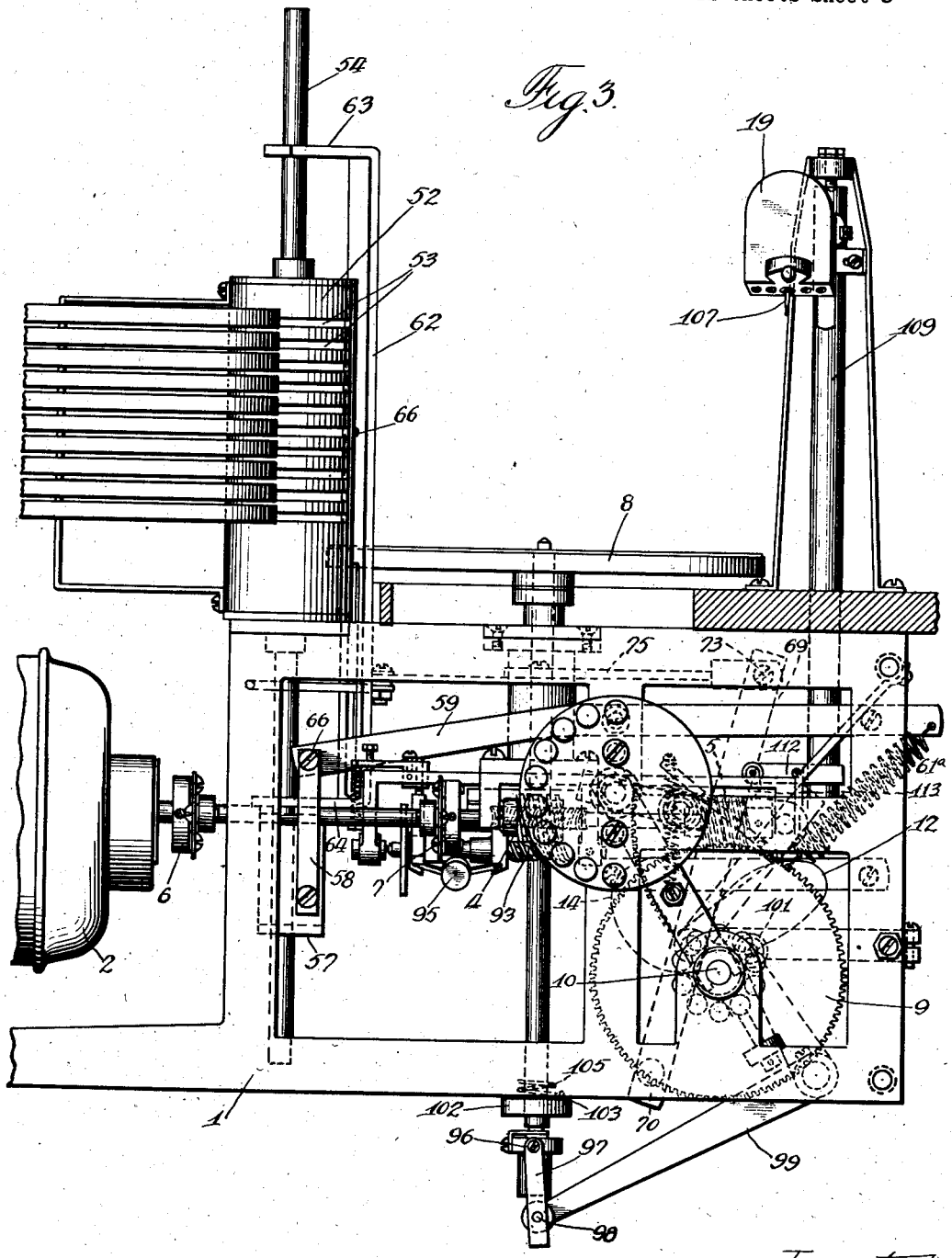
Fig. 3.



Inventor:
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May 21, 1935. R. I. WILCOX 2,002,236

AUTOMATIC PHONOGRAPH

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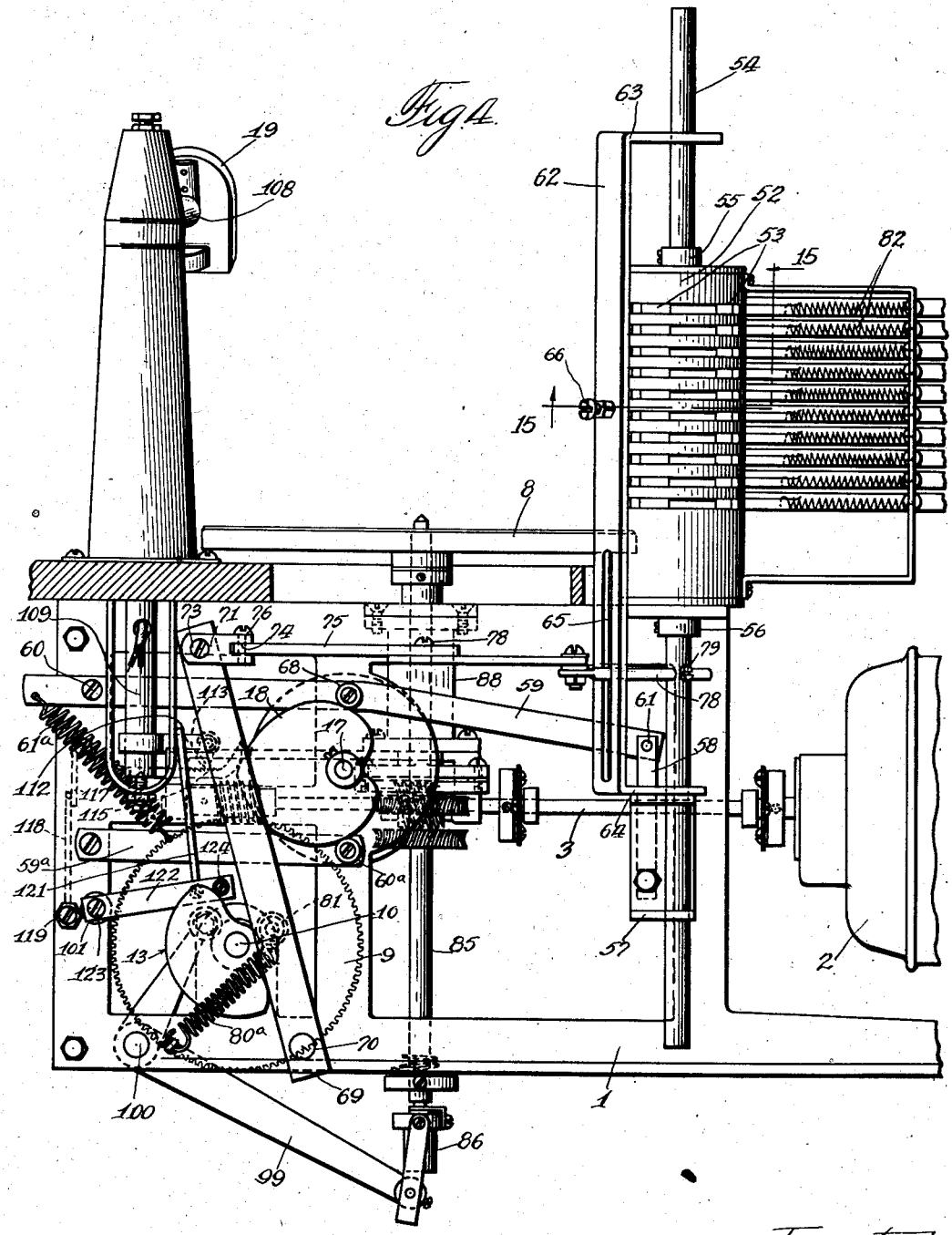
Fig 4.



Inventor:
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May 21, 1935. R. I. WILCOX 2,002,236

AUTOMATIC PHONOGRAPH

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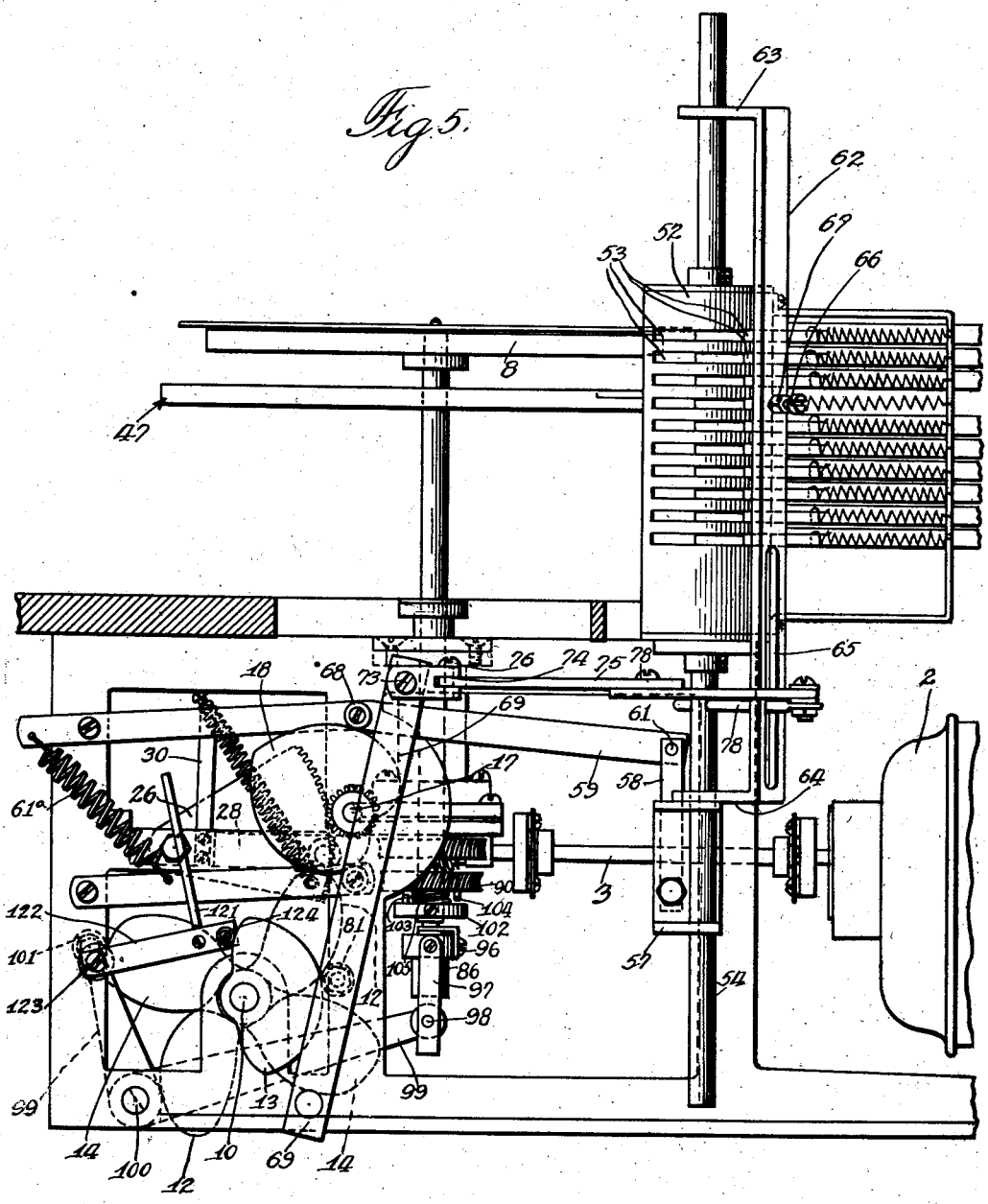
Fig. 5.



Inventor:
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May 21, 1935. R. I. WILCOX 2,002,236

AUTOMATIC PHONOGRAPH

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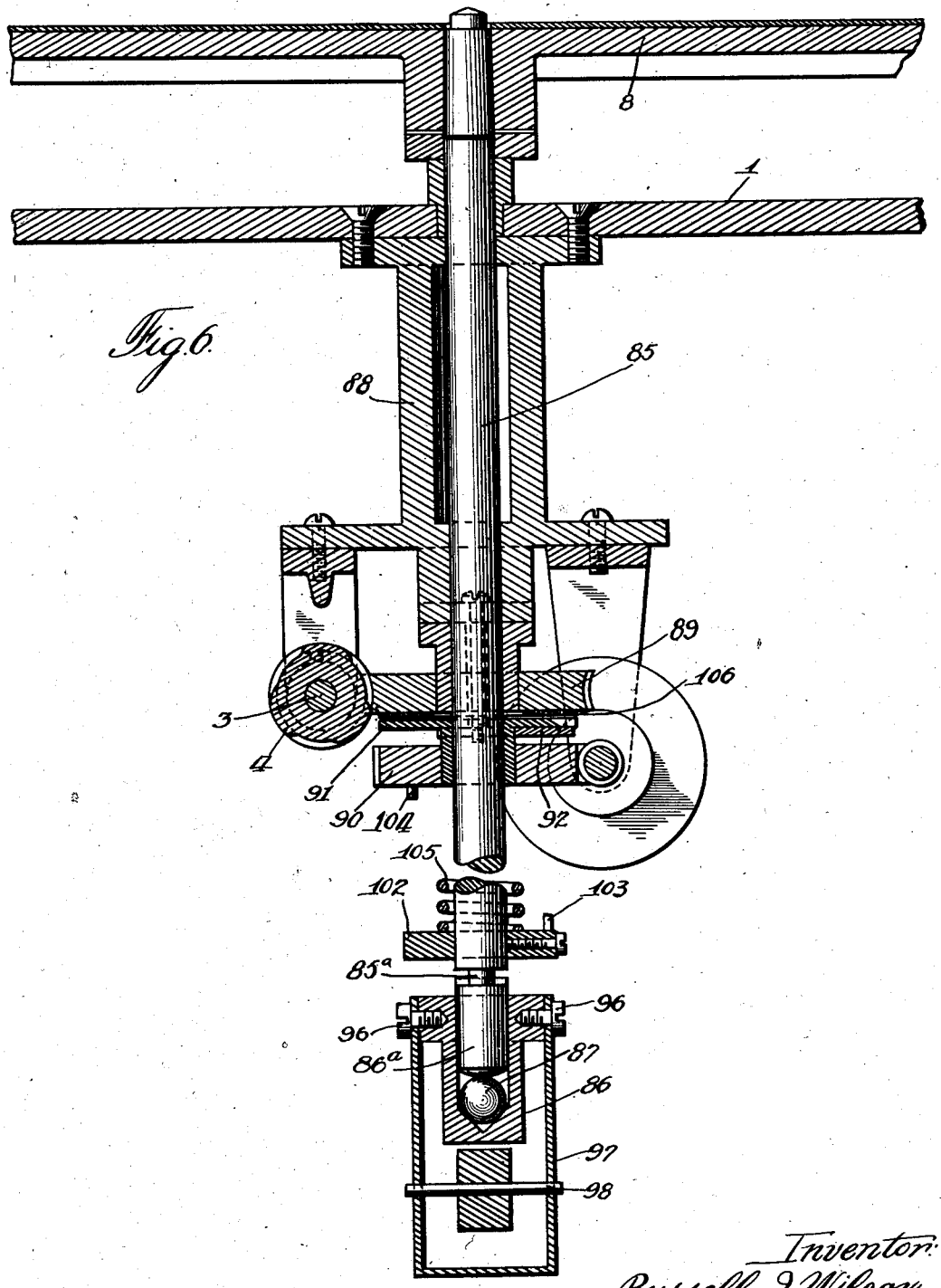
Fig. 6.



Inventor:
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May 21, 1935. R. I. WILCOX 2,002,236

AUTOMATIC PHONOGRAPH

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Fig. 10

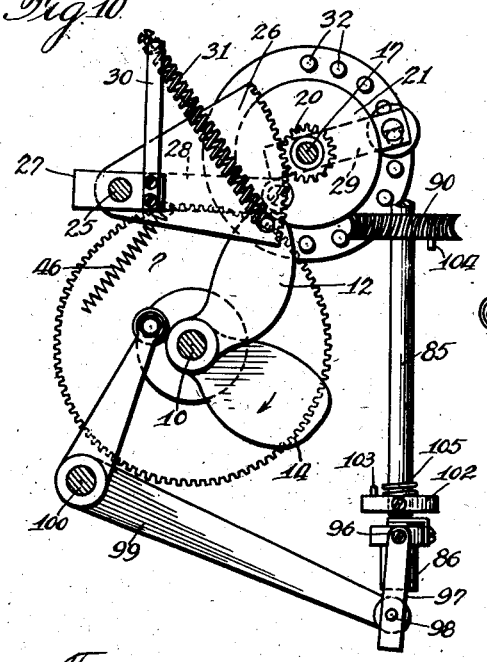


Fig. 9

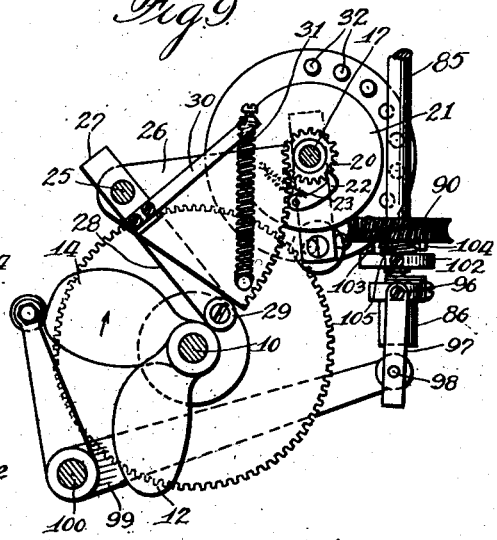


Fig. 7

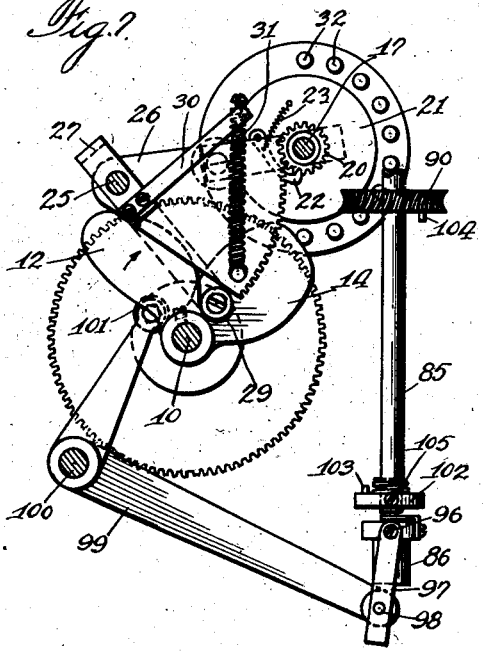
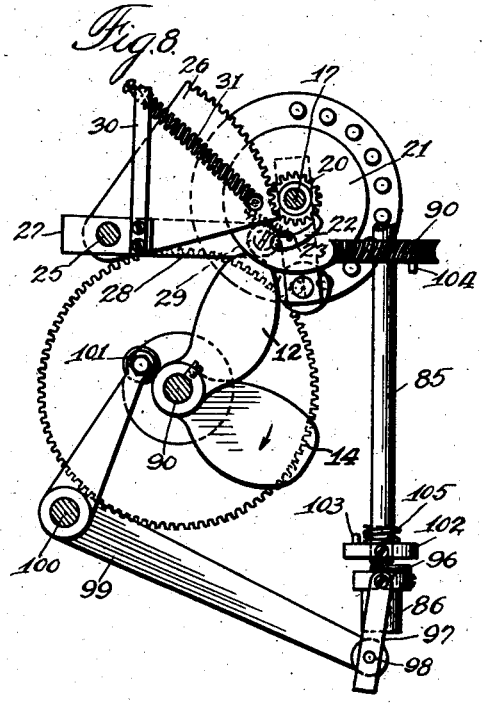


Fig. 8



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May 21, 1935. R. I. WILCOX 2,002,236

AUTOMATIC PHONOGRAPH

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Fig. 13.

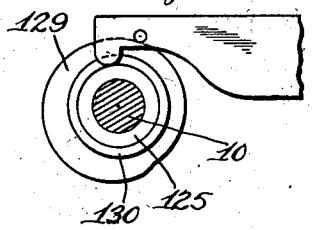


Fig. 12.

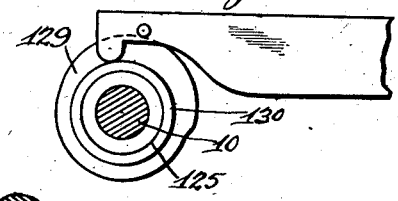


Fig. 11.

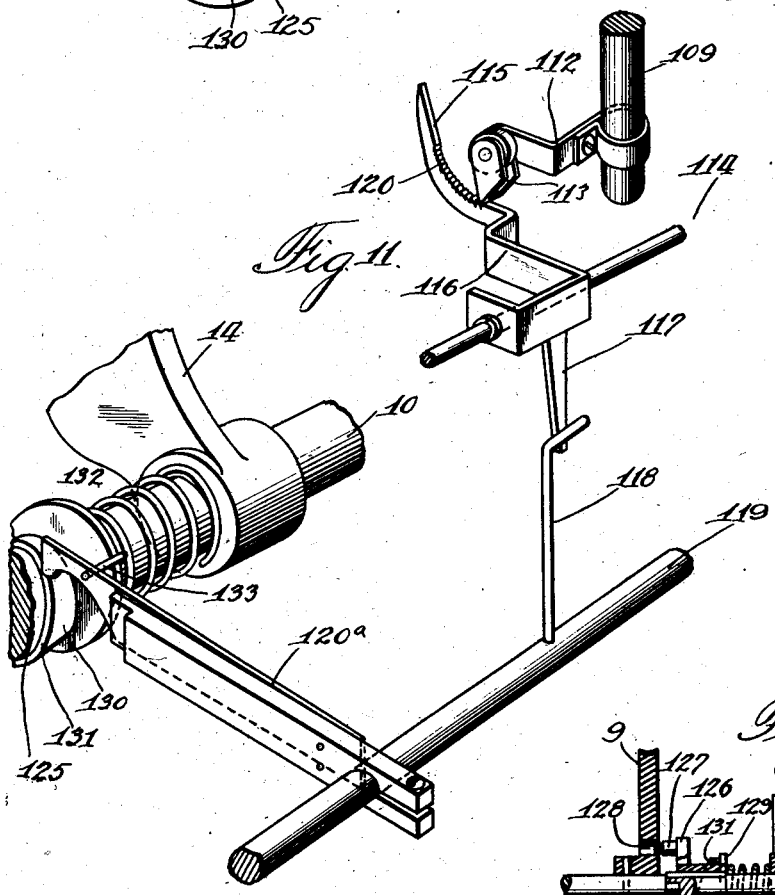
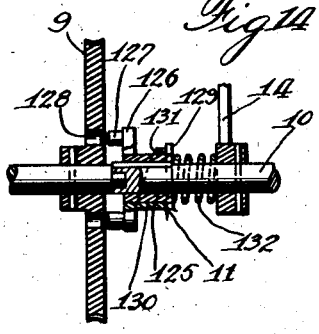


Fig. 14.



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May 21, 1935. R. I. WILCOX 2,002,236

AUTOMATIC PHONOGRAPH

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Fig. 16.

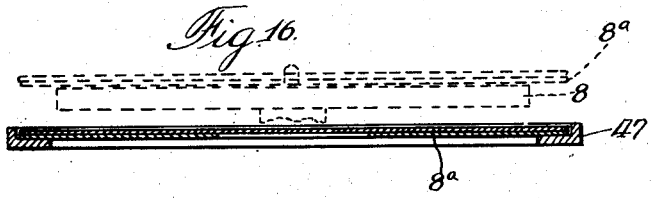


Fig. 17.

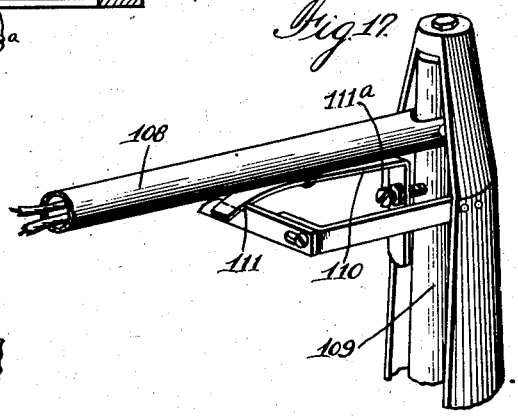


Fig. 15

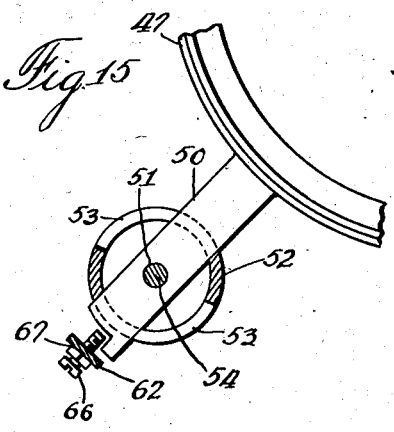
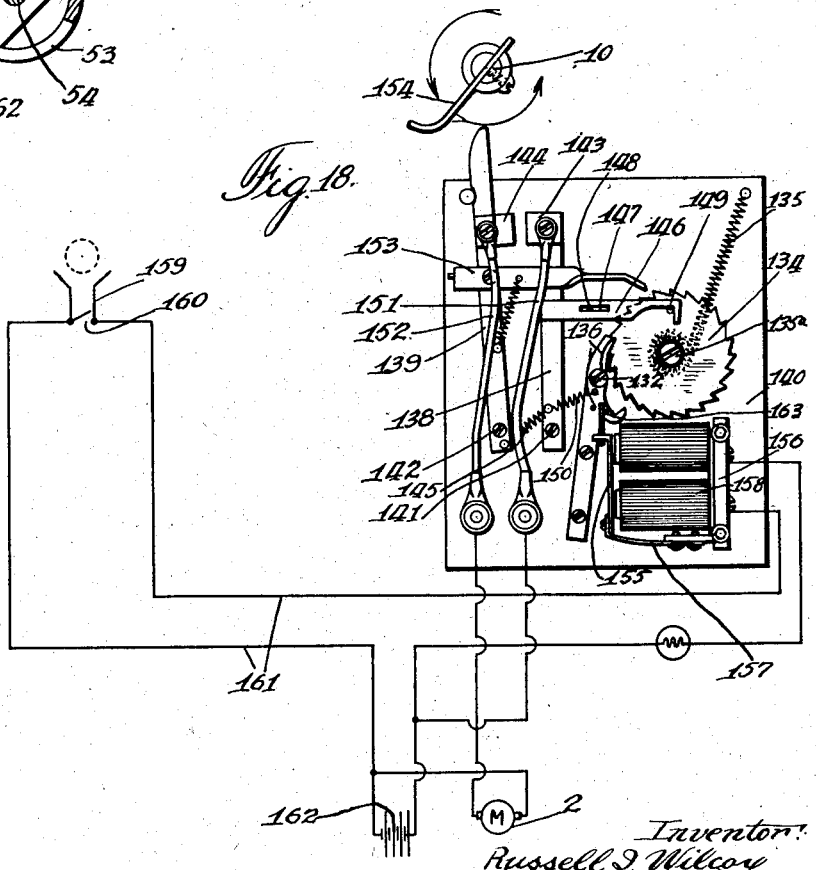


Fig. 18.



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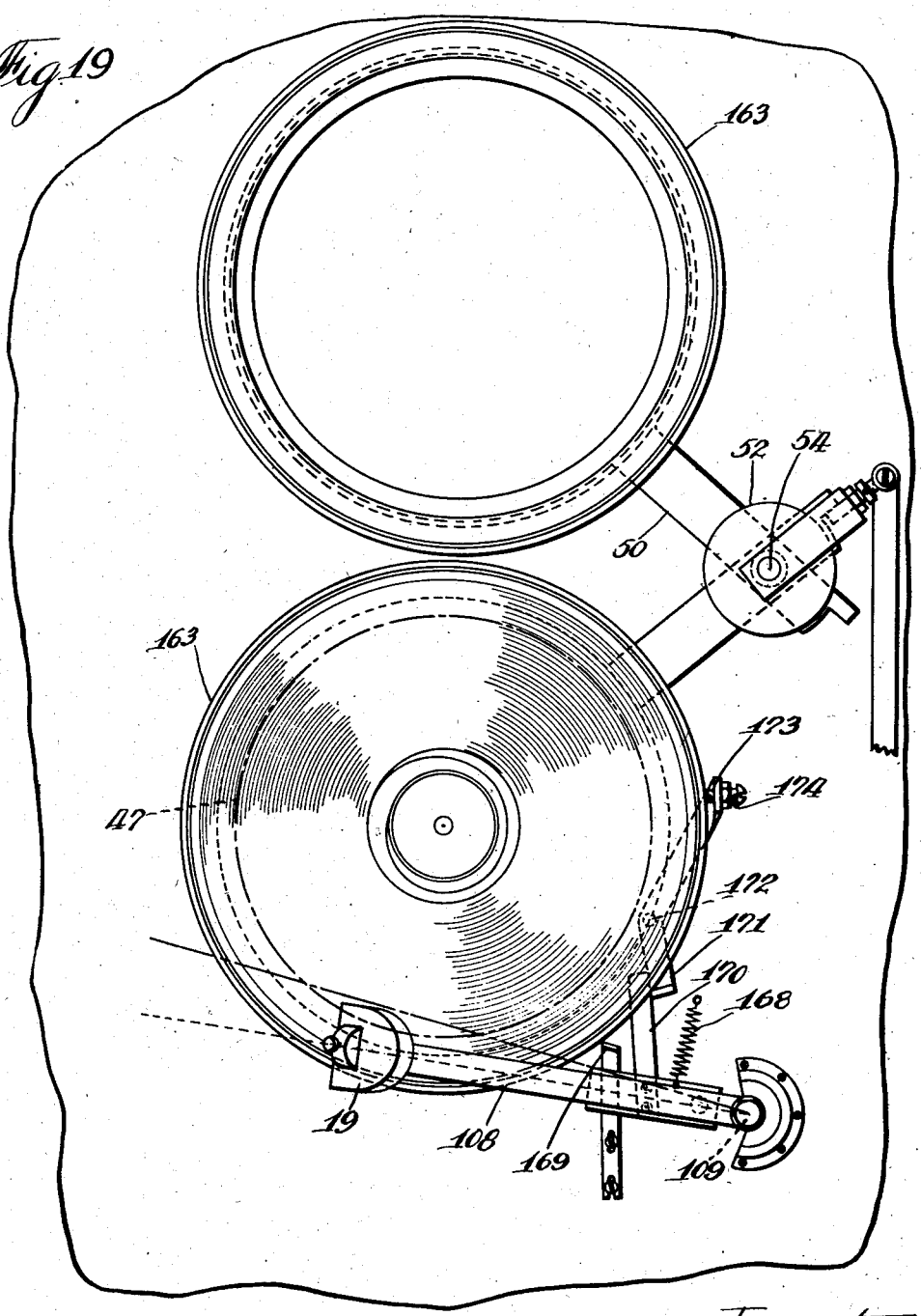
May 21, 1935. R. I. WILCOX 2,002,236

AUTOMATIC PHONOGRAPH

Filed Dec. 11, 1931 11 Sheets-Sheet 10

Fig. 19



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May 21, 1935. R. I. WILCOX 2,002,236

AUTOMATIC PHONOGRAPH

Filed Dec. 11, 1931 11 Sheets-Sheet 11

Fig. 20

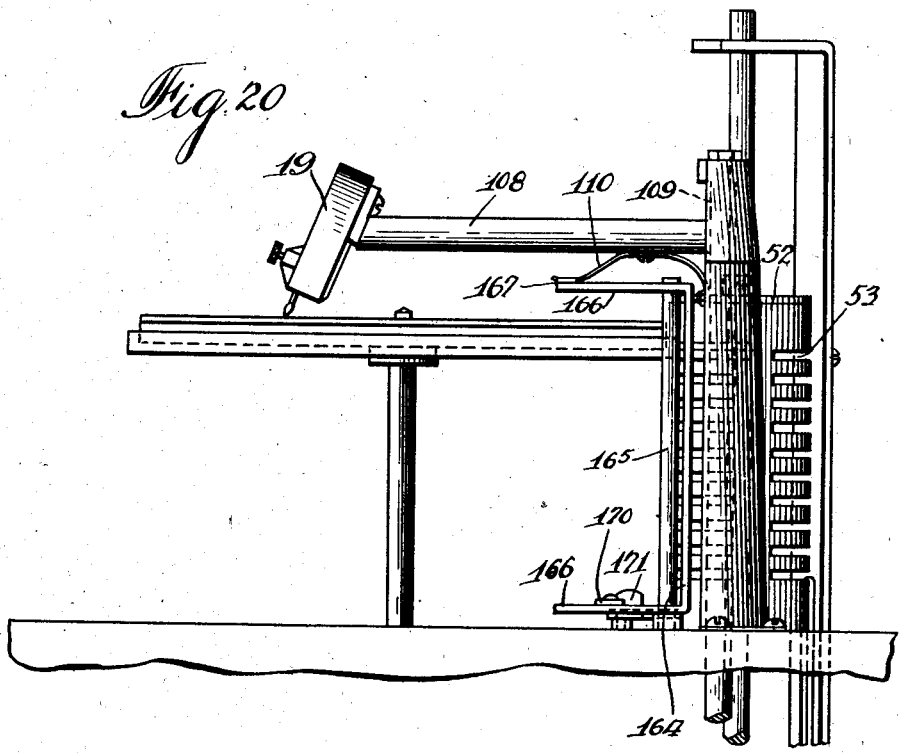


Fig. 21.

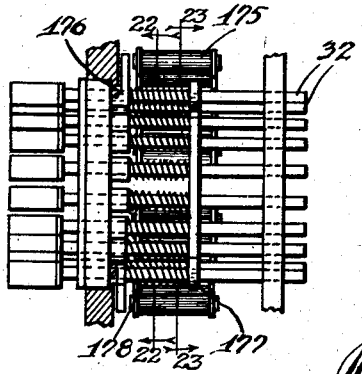


Fig. 22.

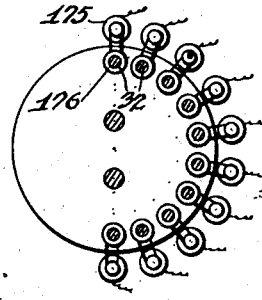


Fig. 23.

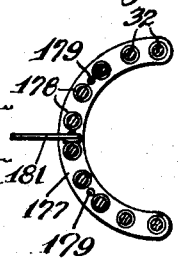
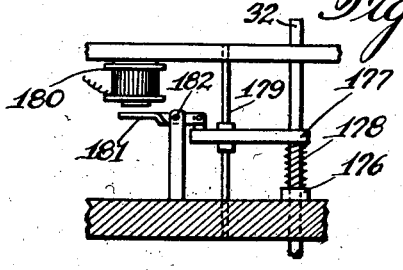


Fig. 24.



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Patented May 21, 1935 2,002,236

UNITED STATES PATENT OFFICE

2,002,236

AUTOMATIC PHONOGRAPH

Russell I. Wilcox, Bellwood, Ill., assignor, by mesne assignments, to Rudolph Wurlitzer Manufacturing Company, North Tonawanda, N. Y., a corporation of New York

Application December 11, 1931, Serial No. 580,315

53 Claims. (Cl. 274—10)

This invention relates to phonographs and has particular reference to an automatically operated phonograph.

More particularly this invention relates to an automatic phonograph, which may be coin-controlled, for playing a plurality of records in which one or more records may be automatically played in the order desired without any attention other than initially setting the selective mechanism.

The present machine in operation takes the first record selected, swings it to a position where it is picked up by the turntable, plays the record, removes the record from the turntable and returns it to inoperative position, and then continues with the next record selected and so on. If the selective mechanism is not operated, the records are played in rotation.

With the present invention, once the records desired have been selected by the means provided therefor and the machine started, it will play all the records selected without anything further being done, or, if the machine is started without selecting any particular records, they will be automatically played in rotation.

An object of this invention is to provide an automatic phonograph having provision for holding a plurality of records, and which, when the selective mechanism is set, will play the records selected in the order chosen without any further setting of the machine being necessary.

Another object of this invention is to provide a selective mechanism by which a plurality of records may be played in the order desired by setting the mechanism only once.

A further object is to provide an automatic phonograph which, when the selective mechanism has been set, swings the record selected in a position to be picked up by the turntable, and after the record has been played returns it to inoperative position and swings the next record selected to a position where it will be picked up by the turntable, and so on.

Still another object is to provide an automatic phonograph wherein, when the record has been swung out, the turntable will be automatically raised to pick up the record and raise it to a point where it engages the needle in the tone arm, and after the record is played to lower the turntable to normal inoperative position.

A further object is to provide an automatic phonograph wherein, after a record has been played, the tone arm will be automatically returned to its initial playing position.

Another object is to provide an automatic phonograph, with the accomplishment of the foregoing objects, in which a cam shaft, having cams thereon, controls the operation of the whole machine.

A further object is to provide an automatic playing machine which will play the number of records desired without stopping.

And still another object of this invention is to provide a machine of the above designated type which is operated by a single motor.

A still further object is to provide an automatic phonograph, of the type above referred to, which may be coin-controlled.

Still another object of this invention is to provide means for preventing the warping of the records therein.

Further objects and advantages will be apparent from the following description when taken together with the accompanying drawings, in which latter:

Figure 1 is a top plan view of an automatic phonograph embodying the present invention;

Fig. 2 is a side elevational view;

Fig. 3 is a front elevational view;

Fig. 4 is a rear elevational view of the machine;

Fig. 5 is a rear elevational view of the machine with a portion omitted to illustrate the cams which are shown in changed position;

Fig. 6 is a cross sectional view taken on the line 6—6 of Fig. 1;

Fig. 7 is a view of the cams for operating the selective mechanism and raising the turntable into initial position;

Fig. 8 is a view similar to Fig. 7 showing the changed position when the cam shaft has made a partial turn;

Fig. 9 is a view similar to Fig. 8 showing the arrangement when the cam shaft has rotated still farther;

Fig. 10 is a view similar to Fig. 7 showing the operation of the selective mechanism;

Fig. 11 is a perspective view of the mechanism for causing the engagement of the cam shaft clutch when a record has been played;

Fig. 12 is a cross sectional view taken on the line 12—12 of Fig. 1 showing the arm for holding the clutch disengaged;

Fig. 13 is a view similar to Fig. 12 showing the mechanism in changed position;

Fig. 14 is a cross sectional view of the clutch mechanism taken on the line 14—14 of Fig. 3;

Figure 15 is a horizontal section taken substantially in the plane of line 15—15, Figure 4.

Figure 16 is a cross section of one of the record

carriers showing the record and supporting disk for preventing the record from warping.

Figure 17 is a fragmentary perspective view of the tone arm and its associated elements.

Figure 18 is a side elevation, partly diagrammatic, of a coin-controlled starting mechanism of the apparatus.

Figure 19 is a top plan view showing the mechanism for moving the sound pick-up to play records of different sizes.

Figure 20 is a side elevation of the mechanism shown in Figure 19.

Figure 21 is a side elevation view of the remote control selector mechanism.

Figure 22 is a cross sectional view taken on line 22—22, Figure 21.

Figure 23 is a cross sectional view taken on line 23—23 of Figure 21.

Figure 24 is a plan view of the mechanism for returning the selector rods to an inoperative position by remote control.

Referring more particularly to the drawings, the present invention comprises a frame 1, preferably of metal, which may be mounted in a cabinet and which supports the rest of the structure. Mounted on the frame 1 is a motor 2 which rotates the motor shaft 3 and having worm gears 4 and 5 thereon. If desired, universal connections 6 and 7 may be inserted in the motor shaft 3.

The worm gear 4, through a series of gears and means hereinafter to be described, rotates the turntable 8 while the gear 5 meshes with a pinion 9 loosely mounted on the cam shaft 10. Clutch mechanism 11 connects the pinion 9 with the cam shaft 10.

Fixedly mounted on the cam shaft 10 are cams 12, 13 and 14 to control the operation of the machine as will be hereinafter described. The cam shaft 10 is suitably mounted in bearings 15 and 16 on the frame 1. When the machine has been started, the motor 2, drive shaft 3 and pinion 9 rotate continuously while the cam shaft 10 makes one revolution to complete the cycle of playing one record and returning the machine to initial position ready to play the next record. During one revolution of the cam shaft 10, the cams control the sequential operation of the machine in the following order:

The cam 12 operates the selective mechanism to rotate the selector shaft 17 on the outer end of which is fixedly mounted a cam 18 which controls the selection of the records. The cam 13 then causes the record selected to be swung to a position directly above the turntable 8. Cam 14 raises the turntable to pick up the record selected and raises it upwardly until it engages the needle in the sound pick-up 19 so that the record may be played. When the turntable has reached its maximum height, the clutch 11 is disengaged from the pinion 9 and the cam shaft 10 remains stationary until the record has been played; thereafter the clutch 11 automatically engages the pinion 9 and starts the cam shaft 10 again rotating. As the cam 14 is pivoted farther, the turntable is lowered depositing the record in the record holder. The cam 13 permits the record holder to be swung back into inoperative position and the machine is then ready to repeat the cycle.

Selective mechanism

A preferred form of selective mechanism embodying the present invention is shown particularly in Figs. 1, 3 and 7 to 10. The selector shaft 17 is rotatably mounted in the sides of the frame 1. A ratchet 20 is fixedly mounted on the selector shaft 17 adjacent a wheel 21. On the face of the wheel 21, adjacent the ratchet 20, is a pawl 22 held in engagement with the ratchet 20 by a spring 23 which is also connected to the wheel 21, thus when the ratchet 20 is rotated in the direction of the arrows in Figs. 7 and 8, the wheel 21 and thereby the selector shaft 17 is rotated while when the ratchet 20 is rotated in the opposite direction the pawl slides on the teeth thereof and the selector shaft is held stationary.

In order to prevent movement of the selector shaft 17 in a direction opposite to that as shown by the arrows, a drag 24 is mounted on one end of the selector shaft.

In order to rotate the ratchet 20 and thereby the selector shaft 17, the following means is provided:

A stud shaft 25 is preferably fixedly mounted in one side of the frame 1. Loosely mounted on the stud shaft 25 is a segment 26 having teeth on the outer end thereof which mesh with the teeth on the ratchet 20. Thus when the segment 26 is pivoted on the stud shaft 25, the ratchet 20 and thereby the selector shaft 17 is rotated. Also loosely mounted on the stud shaft 25, on each side of the segment 26, is a hook-shaped frame 27 having the long side 28 thereof provided with a roller 29 adjacent the outer end. A yoke 30 extends upwardly from the frame 27 and is rigidly connected thereto adjacent the shaft 25, as shown particularly in Figs. 7 to 10. Resilient members, such as springs 31, are connected at one end to the cross portion of the yoke 30 and at the other end to the segment adjacent the lower outer end thereof.

The cam 12 is so positioned on the cam shaft 10 that as it rotates it will engage the roller 29 on the side 28 of the frame 27 thereby causing the yoke 30 to be pivoted about the shaft 25 which, in turn, due to the springs 31 pivot the segment upwardly therewith. A rotation of the selector shaft 17 rotates the heart-shaped cam 18, the position of which determines the record to be played next. The ratchet 20 is so arranged that when the segment 26 is pivoted its full distance it will cause the ratchet 20 to make slightly less than one complete rotation so that every time the segment is raised upwardly its full distance, by the means hereinbefore described, the heart-shaped cam 18 makes a little less than one complete revolution and will cause the records to be played in rotation.

In order to control the amount of rotation of the selector shaft 17 so that certain records may be selected, means are provided for stopping the rotation of the shaft at the proper point. Rods 32 which correspond to the number of records held in the machine are provided on the front of the machine and extend through the face plate 33 and through the front side of the frame 1, as shown in Figs. 1 and 2. These rods are longitudinally movable so that they may be shoved inwardly. Loosely mounted on the selector shaft 17, adjacent the inner ends of the rods 32, is a preferably U-shaped member 34 with the shaft 17 extending therethrough adjacent the transverse member thereof. An opening is provided in the outer side of the member 34 through which extends a pin 35 which projects outwardly from a plate 36, fixedly mounted on the selector shaft 17 so that the U-shaped member 34 may be moved horizontally with respect to the plate 36. A stop 37 extends through the outer ends of the U-shaped

member 34 and is provided with a collar 38 having a pin 39a extending through an aperture in the outer side of the U-shaped member 34. A spring 39 is positioned about the selector shaft 17 between the inner side of the plate 36 and the inner side of the U-shaped member 34, and a second spring 40 is positioned about the stop 37 between the inner side of the U-shaped member 34 and the collar 38. The spring 39 tends to hold the U-shaped member 34 in this inward position on the selector shaft 17 and the spring 40 tends to hold the stop member 37 extended outwardly through the outer side of the U-shaped member 34. The stop member is so positioned that the outer end thereof is slightly inwardly of the inner ends of the rods 32 when they are in normal position, as shown in Figs. 2 and 3. When, however, one or more of the rods 32 are pushed inwardly, the outer end of the stop 37 engages the inner end of the rods 32 pushed inwardly and prevents further rotation of the selector shaft 17.

As the rotation of the shaft 17 with the heart-shaped cam 18 thereon serves to select the records to be played, a selection for a plurality of records may be made at one time by shoving a plurality of the rods 32 through to their inner position. If, for instance, the rods corresponding to records 1, 3 and 5 are shoved in, the selector shaft 17 will be rotated by the means hereinbefore described until the stop member 37 engages the first of the rods 32 in its path. A further movement of the selector shaft is thereupon prevented and the record corresponding to the rod 32 which is engaged by the stop 37 is then played. In order to return the rod engaged by the stop 37 to normal position, a resilient arm 41 is loosely mounted on the cam shaft 10 and is provided with a bifurcated outer end, which fits about the selector shaft 17 and holds the arm 41 in a fixed position. The outer surface of the arm 41 engages the inner face of the U-shaped member 34. A projecting member 42 extends inwardly from the arm 41.

Fixedly mounted on the cam shaft 10 is a collar 43 having a rod 44 extending outwardly therefrom with a roller or annular member 45 preferably made of metal, adjacent the outer end thereof and spaced from the cam shaft a distance equal to that of the projecting member 42, so that when the cam shaft 10 rotates, the roller 45 engages the projecting member 42 to move the free end thereof outwardly which, in turn, slides the U-shaped member 34 along the shaft 17 and pushes the rod engaged by the stop 37 outwardly to normal position. Thereafter when the selector shaft 17 is further rotated, the stop member 37 engages the next of the rods 32 which has been pushed in and causes the record corresponding thereto to be played after which the process is repeated.

If the rod 32 which is engaged by the stop 37 is held against movement when the arm 41 is moved outwardly, the U-shaped member 34 will be moved outwardly but the stop member 37 will be held stationary against the action of the spring 40 and there will be no possibility of any damage being done to the apparatus. This will cause the record to be repeated.

Referring now particularly to Fig. 10, there is shown the position of the segment 26 with respect to the yoke 30 and the frame 27 when the stop member 37 engages one of the pins 32 to prevent further rotation of the selector shaft 17. The frame 27 and the yoke 30 move upwardly to the same position, as shown in Fig. 8, when none of the rods are pushed in but the segment is stopped after moving only part way up, against the action of the springs 31, due to the fact that the selector shaft 17 can rotate no further. Thereafter the frame 27 and yoke 30 are returned to normal inoperative position, due to the action of the resilient means, such as the spring 46 which is attached at one end to the frame 1 and at the other end to the frame 27. As the yoke 30 moves downwardly, a projecting member, such as an adjustable screw 30a, shown in Figure 2, engages the upper side of the segment 26 and also returns that to normal position.

Record holder

The records to be used in the device are placed in the record carriers 47 which comprise an annular ring 48 having a flange 49 extending inwardly therefrom to form a shelf. Extending from one side of each of the record carriers 47 (see Fig. 15) is an arm 50 having an opening 51 therein and which extends through the horizontal slots 53 in the cylindrical casing 52. The slots 53 are arranged in pairs on opposite sides of the cylindrical casing 52, one pair of slots being provided for each of the record carriers 47. The casing 52 is fixedly mounted on the top of the frame 1. A shaft 54 extends down through the center of the cylindrical casing and through the apertures 51 in the arms 50, and is rotatably mounted in the frame 1, being supported by the collars 55 and 56 attached to the shaft 54 adjacent the top and bottom, respectively, of the cylindrical casing 52.

As shown in Fig. 16, a thin plate 8a of metal, plastics or other suitable material, having a central opening may be placed on the record carrier 47 under the record so as to prevent warping of the record.

A U-shaped member 57 is slidably mounted on the shaft 54 which extends through the sides thereof. A link member 58, having a forked end, is fastened to the U-shaped member 57 and is pivotally connected at the upper ends thereof to a lever 59 which is pivotally mounted at 60 to the frame 1. A pin 61 may extend through the sides of the forked portion of the link 58 and the end of the lever 59 therebetween to form the pivotal connection, although any other form of pivotal connection may be used.

A bar 62, having inwardly extending arms 63 and 64 with perforations therein, is slidably mounted on the shaft 54 with the shaft extending through the perforations in the arms. The arm 64 rests on the upper side of the U-shaped member 57 so that as the U-shaped member 57 is raised and lowered the arm 62 will be carried up and down therewith. A longitudinal slot 65 is provided adjacent the lower end of the arm 62 and a projecting member, such as a screw 66 is threaded into the arm 62, as shown particularly in Figs. 2, 5 and 15, and extends a distance therebeyond being held in position by a nut 67. The inner end of the screw 66 is adapted to engage the outer ends of the arms 50 which extend beyond the cylindrical casing 52 and are provided with a cut-out portion for engagement with the inner end of the screw 66. This is shown particularly in Figs. 2 and 15.

The vertical movement of the arm 62 on the shaft 54 determines the record to be played by bringing the screw 66 adjacent the outer end of the record carrier 47 which holds the record selected. The vertical movement of the arm 62 is controlled by the rotation of the cam 18 which,

at all times, abuts the roller 68 on the lever 59. The cam 18 is heart-shaped and is so formed that for each division of a complete rotation thereof, the lever 59 will be raised or lowered a definite distance to thereby raise and lower the U-shaped member 57 and the arm 62 to bring the screw 66 directly opposite the outer ends of the arms 50 of the record carriers 47.

In the particular embodiment of the invention shown, the heart-shaped cam 18 is divided into 18 divisions, and the segment 26 is so formed that with each full movement thereof the selector shaft 17 will make 17/18ths of a complete rotation so that if none of the rods 32 are pushed in the records will be played in rotation. Thus for each full movement of the segment 26, the arm 62 will be moved to carry the pin 66 from its initial position to its extreme upper position, then back to its extremely lower position and then back upwardly again to a position just beneath its initial position. However, when the selector mechanism is used, by pushing in the rods 32 the cam 18 will make less than 17/18ths of its regular rotation depending upon the rods pushed in and will thereby control the position of the pin 66 to play the record selected.

In order to offset the pressure exerted against cam 18 by the lever 59, and to balance cam 18 at each point in its rotation, an arm 59*a* having a roller 60*a* at one end is pivotally mounted on the frame 1. A spring 61*a* connected to arm 59*a*, intermediate its ends and to the outer end of the lever 59, urges the roller against the lower side of cam 18 to exert a pressure thereagainst.

Means for operating record carriers

After the pin 66 has been properly positioned to play the record selected, the next step is to swing the record carrier, with the record therein, out over the turntable so that it may be picked up and deposited thereon. To accomplish this, a J-shaped lever 69, shown particularly in Figs. 2, 3, 4 and 5, is pivotally mounted adjacent its lower end on the stud shaft 70. Attached to the upper end of the lever 69 is a universal connection which is shown in the form of a yoke 71. This yoke is provided with a vertical slot 72 in which the upper end of the lever 69 is pivoted, being held therein by a pin or screw 73 or any other desirable means. The other end of the yoke 71 is provided with a horizontal slot 74 in which one end of a link 75 may be pivotally held by a screw or pin 76. The link 75 is made in two pieces with slots 77 adjacent the inner ends through which a screw 78 extends so that the length of the link 75 may be adjusted. The other end of the link 75 is pivotally connected to the arm 78 which extends through the slot 65 and through the shaft 54 in which latter it is held fixedly by a set-screw 79. Thus when the upper end of the lever 69 is pivoted back and forth the arm 62 is pivoted about the shaft 54 and the screw 66 being in engagement with the outer end of the arm 50 of the record carrier 47 causes the record carrier to be pivoted about the shaft 54 to the dotted position shown in Fig. 1, which is directly above the turntable 8. As the link 75 is adjustable, the movement of the record carrier may be controlled to bring the opening in the center of the record directly above the spindle in the turntable 8.

The short side 80 of the J-shaped lever 69 is provided with a roller 81 adjacent the outer end thereof. This roller at all times abuts the substantially semicircular cam 13 on the outer end of the cam shaft 10, being held thereagainst by the spring 80*a* which is between the end of the side 80 and the frame 1. As the cam shaft rotates, the cam 13 pivots lever 69 to swing the record carrier out and holds the same in this position until the record has been played. After the turn table is then lowered to deposit the record played in the record carrier, and the cam 13 is rotated farther, the record carrier 47 is brought back into normal inoperative position, as shown particularly in Figs. 1, 2 and 5, by means of springs 82 which extend between the arm 50 of the record carrier 47 and the outer side of the frame 83 which is attached to the cylindrical casing 52. As the record carrier 47 swings back into normal inoperative position, its movement may be limited by one side of the slots 53 in the cylindrical casing 52. However, it has been found preferable to mount a resilient stop member 84 (Fig. 1) on the frame 83 against which the record carriers abut, being held there by the action of the springs 82 except when swung out by the means heretofore described.

Means for operating turntable

Referring particularly to Figs. 3, 4, 6 and 7 to 10, the turntable 8 is mounted on a shaft 85 which extends down through the top of the frame 1, being slidable therein. It is supported by a cup bearing member 86, the lower end of the shaft resting on the ball bearing 87 which is positioned in the bottom of the bearing member 86 so that the shaft may be freely rotated in the bearing. A slotted collar 86*a*, shown in Figure 6, attached to the bearing member 86 engages the reduced portion 85*a* of the shaft 85 to hold the lower end of the shaft in the bearing member. Extending downwardly from the upper side of the frame 1 is a supporting member 88. Loosely mounted on the shaft 85 is a pinion 89 which is held adjacent the lower surface of a supporting member 88. The pinion 89 meshes with the worm gear 4 on the motor shaft 3 and is therefore constantly rotating when the machine is in operation. Directly below the pinion 89 is a second pinion 90 also loosely mounted on this shaft and having a collar portion 91 attached thereto and spaced upwardly therefrom.

In order to maintain the gears 89 and 90 properly positioned, a yoke member 92, connected to the supporting member 88, fits about the reduced portion of the gear 90 between the gear proper and the collar member 91. Thus the gears are properly positioned and are freely rotatable with respect to the shaft 85 and the yoke 92.

The gear 90, as shown particularly in Figs. 2 and 3, meshes with a worm gear 93 on the governor shaft 94 having a governor 95 thereon of usual construction.

Pivotally attached to the bearing member 86, by means of screws 96, is a yoke 97 having a pivot member, such as a pin 98 connecting the sides thereof adjacent the lower portion of the yoke. A bell crank lever 99, mounted on the shaft 100, is provided with an opening in one end through which the pin 98 extends to form a pivotal connection with the yoke 97. The other end of the lever 99 is provided with a roller 101 for engagement with the cam 14. As the cam 14 rotates with the cam shaft 10, the bell crank lever 99 is pivoted to raise the shaft 85 up through the frame 1. Fixedly mounted on the shaft 85, above the bearing member 86, is a wheel 102 having a pin 103 extending upwardly therefrom for engagement with a pin 104 on the lower side of the gear 90. A spiral spring 105 is preferably

positioned about the shaft 85 above the wheel 102, thus when the shaft 85 is raised, the wheel 102 is raised with it until the pin 103 engages the adjustable pin 104, which, in turn, rotates the turntable 8. The spring 105 holds the wheel 102 spaced a little from the gear 90 and also absorbs the shock of the two coming together when the shaft 85 is raised. The action of the spring 105 against the lower surface of the gear 90 urges the gear 90 closely against the lower surface of the gear 89 which may be provided with a felt washer 106 or any other suitable means to form a friction drive. As the turntable is raised, it passes up through the record carrier 47, which has been swung out into proper position, and picks up the record thereon raising it to a position to strike the needle 107 in the sound pick-up 19 which is preferably of an electrical pick-up type.

The tone arm 108 is secured to the rotatable shaft 109. Secured to the lower side of the tone arm is a strip of resilient material 110 with one end abutting the shaft 109 to give the tone arm desired resiliency. To form a resilient support for the tone arm, the other end is bent downwardly away from the tone arm and engages in a latch 111 to hold the tone arm in inoperative position ready to start playing a record. An adjusting screw 111a, shown in Figure 17, is provided in the resilient strip 110 for abutment against shaft 109.

When the record is raised by the turntable so as to pick up the needle 107, it disengages the strip 110 from the latch 111 and thereafter the tone arm is swung inwardly toward the center of the record while the same is being played.

Means for operating clutch mechanism

As the cam shaft 10 only makes one complete rotation while the record is being selected, played and returned to inoperative position so the machine is ready to play another, it is necessary to provide clutch means for disengaging the cam shaft 10 from the pinion 9 as soon as the turntable reaches its maximum height so that the parts will remain in playing position until a record has been played. Clutch means to disengage the cam shaft 10 from the pinion 9 are therefore provided which automatically disengage the cam shaft 10 from the pinion 9 at this point. As soon as the record is played, the clutch again connects the cam shaft 10 with the pinion 9 to return the parts to initial position ready to start again.

To accomplish this, an arm 112 is mounted on the shaft 109 and has a pawl 113 pivotally mounted on the end thereof. This is shown in Fig. 11. Pivotally mounted on a shaft 114 is a ratchet member 115, the outer end of which extends upwardly to engage the end of the arm 112. The inner end of the ratchet 115 is offset as shown at 116. An arm 117 extends downwardly from the ratchet 115 and engages the rod 118 extending upwardly from the shaft 119, rotatably mounted in the frame 1, on which shaft is an arm 120 which acts to engage and disengage the clutch 11. As the record is played, the arm 112 is pivoted about the shaft 109 until at the end of the record it strikes the outer end of the ratchet 115 thereby pivoting the same and causing the shaft 119 to be rotated to permit the clutch to again connect the cam shaft 10 and the pinion 9. This only will operate when the records are provided with a spiral groove at the inner side. However, if the record groove ends in an eccentric oval, the arm 112 will not swing far enough to strike the outer end of the ratchet 115 to pivot the same, therefore, teeth 120 are provided adjacent the outer end of the ratchet 115 so that as the shaft 109 swings, due to the eccentric groove in the record, the pawl 113 will slowly work along the teeth 120 until the ratchet 115 is pivoted. To return the tone arm to normal inoperative position, an arm 121 (Figs. 4 and 5) is connected to a lever 122 which is pivoted to the frame 1 at 123. The lever 122 is provided with a roller 124 which, as the cam 13 again rotates, is engaged by the cam so as to strike the arm 112 and return it to inoperative position where the resilient strip 110 engages the latch 111. As the arm 112 is swung back, the pawl 113, due to the offset portion 116, slides off the ratchet so that when the shaft 109 is again rotated while the record is playing the pawl 113 may engage the teeth 120.

Clutch mechanism

As the cam shaft 10 only makes one revolution during the complete cycle of the machine, it is necessary that it be disengaged from the pinion 9 during a portion of the time. For this purpose, the clutch mechanism 11 is provided. This is shown particularly in Figs. 11 and 14.

Keyed to the cam shaft 10 is a sleeve 125 so as to be slidable therelong. A collar 126, having pins 127 for engagement with the openings 128 in the pinion 9, is provided at one end of the sleeve 125. At the opposite end of the sleeve is an eccentric collar 129 which is shown in Figs. 12 and 13. Positioned about the sleeve 125 is a cam member 130 having a spiral cam surface 131. The outer end of the arm 120a, mounted on the shaft 119, engages the cam surface 131 as the cam shaft rotates and thereby urges the sleeve 125 away from the pinion 9 against the action of the spring 132 which is positioned between the collar 129 and the cam 14, and thereby removes the pins 127 from the apertures 128 in the pinion 9.

When the ratchet 115 has been pivoted on the shaft 114, due to the action of the pawl 113, the shaft 119 is rotated to raise the outer end of the arm 120a from engagement with the cam surface 131, which then permits the spring 132 to slide the sleeve 125 along the cam shaft until the pins 127 engage the openings 128. In order that the arm 120a may be held in upper position, separated from the cam 130, with the ratchet 115 pivoted downwardly on the shaft 114 until the arm 112 is swung back to initial position, a pin 133 is provided adjacent the outer end of the arm 120a, which pin rides on the periphery of the eccentric collar 129 during part of the rotation thereof.

As shown in Figs. 12 and 13, due to the shape of the collar 129, the arm 120a is held in this upper position until the arm 112 is swung back to slide the pawl 113 off the ratchet 115; thereafter the outer end of the arm 120a rides on the outer surface of the cam member 130 until it again engages the cam surface 131 as the cam shaft rotates.

Operation of the machine

In operating the machine, if it is not desired to play the records in rotation but to select the records to play in a definite order, certain of the rods 32 may be pushed inwardly. The machine is then started by the operation of an electrical switch which may be coin-controlled, as will hereinafter be described, whereupon the motor is started and runs until the machine is shut off.

Through the motor shaft 3 and the pinion 9,

the cam shaft 10 then begins to rotate as the clutch 11 is engaged in initial position of the machine. As the cam shaft begins to rotate, the cams 12 and 14 are in the position shown in Fig. 7 with the roller 29 adjacent the inner end of the cam 12. As the cam shaft 10 rotates, the roller 29 is moved outwardly by the cam 12 thereby pivoting the frame 27 and the yoke 30 to move the segment 26 to its upper position which is shown in Fig. 8 and the dotted position in Fig. 5. As the segment 26 is pivoted upwardly, the pawl 20 rotates to rotate the selector shaft 17 and thereby the heart-shaped cam 18 which raises the arm 62 with the screw 66 therein to a position to select the first record. Fig. 8 shows the segment in its upper position which it will only attain when none of the rods 32 are pushed inwardly. If one of the rods 32 is pushed inwardly, the stop 37 on the yoke member 34 engages the first rod in its path and prevents further rotation of the selector shaft 17 and thereby movement of the segment 26, but does not prevent the frame 27 and yoke 30 from moving a full distance against the action of the spring 31 as shown in Fig. 10 and the dotted line position of Fig. 5.

As soon as the screw 66 has been raised to proper height, the cam 13 engages the roller 81 on the lever 69 and pivots the lever to swing the record carrier 47 outwardly over the turntable 8. Next the cam 14 engages the roller 101 on the bell crank lever 99 to pivot the same and raise the turntable 8 to its upper position. The position of cams 12, 13 and 14 at this point is shown in Fig. 5. The turntable picks up the record as it passes up to the record carrier 47 and raises the sound pick-up with the needle therein from the latch 111. As soon as the record starts to play, the clutch 11 is disengaged from the pinion 9 by the pressure of the outer end of the arm 120a against the cam surface 131. When the record has been played, the ratchet 115 is tilted thereby disengaging the arm 120a from the cam surface 131 and allowing the clutch member 11 to again engage with the pinion 9, which, in turn, again causes the cam shaft 10 to rotate and rotates the cam 14 so that the roller 101 gradually rides down the rear side of the cam allowing the turntable 8 to gradually return to normal position. Cam 13 has, in the meantime, held the record carrier out over the turntable and now allows the roller 81 to slide down the rear surface thereof to permit the springs 82 to return the record carrier 47 with the record to normal inoperative position. As the cam 13 rotates further, it strikes the roller 124 (Fig. 4) pivoting the arm 121 upwardly to return the arm 112 and thereby the tone arm 108 to a position where it will again engage the latch 111. The machine is now in initial position ready to begin the next cycle.

Starting mechanism

One form of starting mechanism which has been found very satisfactory is shown in Fig. 18, as well as the wiring diagram therefor. This starting device comprises an escapement mechanism consisting of a ratchet wheel 134, having a spring 135 wound around the shaft 135a thereof, which tends to rotate the wheel in the direction of the arrow. A pawl 136 which is pivotally mounted at 137 engages the teeth in the ratchet wheel 134 to prevent rotation thereof except when the pawl is actuated.

Arms 138 and 139 are pivoted to the base 140 at 141 and 142. Contacts 143 and 144, which may be of carbon or any other suitable material, are secured adjacent the free ends of the arms 138 and 139. A spring 145 normally tends to hold the arms 138 and 139 together in outer position. A hook member 146, having a slot 147 therein through which extends the pin 148, is connected to the arm 138. The outer end of the member 146 is in a position to engage the pin 149, which extends outwardly from the ratchet wheel 134, so that when the ratchet wheel 134 is in initial position, with the spring 135 in extended position, the arm 138 with the contact 143 will be held separated from the contact 144, as shown in Fig. 18.

A spring 150 normally holds the pawl 136 in engagement with the teeth of the ratchet wheel 134 to prevent rotation thereof. When the pawl 136 is pivoted, the ratchet wheel 134 moves counterclockwise one notch, due to the action of the spring 135. This permits the spring 145 to pivot the arm 138 so that the contact 143 engages the contact 144.

Wires 151 and 152 connect the contacts 143 and 144 in the motor circuit so that as soon as contact is made the motor is started.

Mounted on the arm 139 is a pawl 153 which engages the teeth on the ratchet wheel 134 whenever the arm 139 is pivoted. A resilient arm 154, which may be a thin metal strip, is mounted on the cam shaft 10 which arm, after the cam shaft has made one rotation, strikes the outer end of the arm 139 and rotates the ratchet wheel 134 in a clockwise direction one notch so that the arm 146 is again engaged by the pin 149 and the two contacts are separated. If the pawl 136 is actuated more than once, when the arm 154 and the cam shaft engages the outer end of the arm 139 to rotate the ratchet wheel against the action of the spring, the pin will not engage the arm 146 and, consequently, contact 143 will remain against the contact 144 until the arm 139 has been pivoted a number of times equal to the number of times the pawl 136 was originally actuated. Although the pawl 136 may be actuated manually, it is shown as being magnetically operated in the drawings. For this purpose the armature 155 may be resiliently connected to the terminal plate 156 by a resilient strip 157 which normally tends to hold the armature 155 spaced from the magnet 158.

A coin-slot 159 is provided, with a switch 160 therein, which is connected with the terminals of the electro-magnet 158 and is connected in series with the circuit 161 which serves to energize the magnet.

A source of electrical energy 162 supplies the current for the whole device. When a coin is deposited in the coin-slot 159, the switch 160 is momentarily closed energizing the magnet to move the armature 155 thereagainst. As the armature is moved, the outer end thereof strikes the pin 163 on the pawl 136 and allows the ratchet wheel 134 to move one notch in the direction shown by the arrow, thus permitting the arm 138 to pivot and bring contact 143 against contact 144.

A plurality of coins up to a number equal to the number of teeth on the ratchet wheel 134 may be inserted one after another. This causes the ratchet wheel 134 to make one rotation until the pin 149 engages the outer end of the member 146. Upon the insertion of the first coin which moves the ratchet wheel 134 one notch, the motor circuit is closed causing the machine to start operating. The machine will then operate until the cam shaft 10, with the arm 154 thereon, has made rotations equal in number to the number of coins

dropped down the coin chute and the machine will play, without stopping, records equal in number to the number of coins deposited.

When the last record has been played, the pin 149 will again engage the outer end of the member 146 and move the contact 143 away from the contact 144.

The present machine may be equipped to play records of various sizes, such as both 10" and 12" records, by having some of the record carriers 163 sufficiently large to hold 12" records thereon and the rest being of the size to hold 10".

When carriers for both 10" and 12" records are employed, it is necessary that the distance from the center of the shaft 54 to the center of the carriers 47 and 163 be the same so that when the carriers are swung to a position over the turntable 8 the center aperture in the record will be directly above the center of the turntable 8, and the means for swinging the record carriers may operate both the 10" and 12" record carriers without any alteration.

As the grooved playing surface in a 12" record extends further from the center than does the groove in a 10" record, it is necessary to provide means for moving the pick-up 19 to a position to engage the outer end of the groove in a 12" record when one of them is selected. To accomplish this, a U-shaped member 164, as shown in Fig. 20, is pivotally mounted on a stud shaft 165 which is positioned adjacent the tone arm support 109 so that the opposite ends 166 of the member 164 extend horizontally.

A latch 167 is provided adjacent the outer end of the upper arm 166 for engaging the resilient strip 110 attached to the underside of the tone arm 108. Resilient means, such as a spring 168, is connected to the lower arm 166 and to the top of the frame so as to resiliently hold the U-shaped member 164 in its inner position so that the needle in the pick-up will be in position to play a 10" record. In order to limit the inward movement of the member 164, a stop 169 is provided.

Extending inwardly from the lower arm 166 is an arm 170 which engages one end of a bell crank lever 171 pivotally mounted at 172. At the opposite end of the bell crank lever is an upwardly extending portion 173 which extends up high enough to engage the uppermost 12" record carrier.

A series of adjustable screws 174 or other similar means may be inserted in the upwardly extending portion 173 of the bell crank lever 171 and are positioned to engage the 12" record carriers when they are swung out over the turntable 8. When this is done, the periphery of the 12" record carrier engages one of the screws 174 and pivots the bell crank lever 171 to move the arm 170 and thereby the U-shaped member 164 and the tone arm 108 which pivots about the shaft 109. Thereafter when the turntable 8 picks up the 12" record from the record carrier and raises it upwardly, it strikes the needle in the pick-up 19 and disengages the resilient strip 110 from the latch 167 and permits the record to be played. As soon as the record has been played and the 12" record carrier swung back to inoperative position, the resilient member 168 returns the tone arm 108 and sound pick-up 19 to normal position ready to play a 10" record. This whole arrangement is automatic and no adjustment is necessary in order to play either a 10" or 12" record.

If desired, a machine embodying the present invention may be equipped with remote control apparatus for operating the selective mechanism at a distance from the machine. This is shown in Figs. 21 to 24.

When the remote control is used, a series of electro-magnets 175 are positioned adjacent the rods 32. Each of these magnets is electrically connected to a remote control switch mechanism (not shown) which may be of a form similar to the selector mechanism of the regular machine with the buttons arranged in a semi-circle, one for each record carrier, so that as each button on the switch is pressed inwardly, it will energize the corresponding electro-magnet 175. When this is done, the magnet operated will attract its corresponding ear member 176 fixedly connected to the rods 32, one being provided for each magnet just outwardly thereof.

Iron, steel or other suitable material affected by a magnet may be used for the ear members 176. By this means, one or any plurality of rods 32 may be moved inwardly to stop the rotation of the selector shaft 17 to play the records desired, and this may be done at a distance from the machine.

In order to return all the rods 32 to normal position before selecting records by the remote control mechanism, a semi-circular collar 177 is positioned over the rods 32 and is slidable thereon. Coil springs or other resilient means 178 are positioned between the collar 177 and the inner ends of the ear members 176 so that when the collar 177 is moved outwardly the action of the springs against the ears will cause all the rods 32 to be returned to normal inoperative position. Pins 179 extend through the collar 177 which is slidable thereon and serve to guide the collar in its movement.

A master control, shown in Fig. 24, is provided to return all the rods to normal inoperative position. This comprises an electro-magnet 180, which is also connected to the remote control switch, and an armature 181 which is pivoted at 182 and is connected to the collar 177, so that when the magnet is energized the armature 181 is attracted thereto which moves the collar 177 outwardly and returns the rods 32 to normal inoperative position.

Coin slots, not shown, may be provided adjacent the remote control switch so that the selector rods 32 may be operated to select certain records, and the coin inserted in the coin slot so as to start the machine operating, all at a point remote from the machine.

Obviously, any number of remote controls may be used by having the switch of each one electrically connected to magnets 175 and 180.

While I have shown and described a preferred embodiment of the present invention, it will be apparent to those skilled in the art that various modifications thereof may be made without departing from the spirit and scope of the present invention, and, therefore, I wish to be limited only by the prior art and the scope of the appended claims.

I claim:

1. In an automatic phonograph, a plurality of record carriers, a turntable, means for simultaneously selecting a plurality of records to be played, means governed by said selecting means for successively moving said record carriers with the records selected to a position above said turntable, means for raising said turntable to pick up the records on said record carriers to play the same, means for rotating said turntable, and means for actuating said foregoing means.

2. In an automatic phonograph, a plurality of record carriers, a turntable, a sound pick-up, means for causing the records on said record carriers normally to be played in rotation, means for simultaneously selecting a plurality of records to be played, means governed in part by said selecting means for successively moving the selected record carriers to a position above said turntable, means for raising said turntable to pick-up the records on said record carriers to move them into playing engagement with said sound pick-up, means for rotating said turntable, automatically operating means for returning said sound pick-up to original position, and means for controlling the operation of said foregoing means.

3. In an automatic phonograph, a plurality of record carriers, a turntable, means for simultaneously selecting a plurality of records to be played, means governed in part by said selecting means for successively moving said record carriers with the records selected to a position above said turntable, a cam shaft having a plurality of cams thereon, one of said cams operating said means for moving said record carriers and another of said cams operating said means for raising and lowering said turntable, and means for rotating said cam shaft.

4. In an automatic phonograph, a plurality of record carriers, a turntable, means for selecting the records to be played, means governed in part by said selecting means for successively moving said record carriers with the records selected to a position above said turntable, a cam shaft having a plurality of cams thereon, one of said cams operating said means for moving said record carriers and another of said cams operating said means for raising and lowering said turntable, means for rotating said cam shaft, clutch mechanism for disengaging said cam shaft from said means for rotating the same, and an automatically operating means for actuating said clutch mechanism.

5. In an automatic phonograph, a plurality of record carriers, a turntable, a sound pick-up, means for successively moving said record carriers holding the records selected to a position above said turntable, said means including a rotatable selector shaft, means for selecting at will a plurality of records to be played successively, said selecting means governing the selector shaft, means for rotating said turntable, means for raising said turntable to pick up one of the records on said record carriers and move it into playing engagement with the said sound pick-up, a cam shaft having a plurality of cams thereon, one of said cams controlling the actuation of said selector shaft, another of said cams controlling the means for moving said record carriers, and a third of said cams controlling the operation of the means for raising said turntable, and means for rotating said cam shaft.

6. In an automatic phonograph, a plurality of record carriers, a turntable, a sound pick-up, means for successively moving said record carriers holding the records selected to a position above said turntable, said means including a rotatable selector shaft, means for selecting at will a plurality of records to be played successively, said selecting means governing said selector shaft, means for rotating said turntable, means for raising said turntable to pick up one of the records on said record carriers and move it into playing engagement with the said sound pick-up, a cam shaft having a plurality of cams thereon, one of said cams controlling the actuation of said selector shaft, another of said cams controlling the means for moving said record carriers, and a third of said cams controlling the operation of the means for raising said turntable, a motor for rotating said cam shaft, clutch mechanism for operatively connecting said motor and said cam shaft, and automatically acting means for throwing out said clutch mechanism to prevent further rotation of said cam shaft when said turntable reaches its upper position and throwing in said clutch mechanism after the record has been played to return the machine to initial position.

7. In an automatic phonograph, a plurality of superposed, laterally-swinging record carriers, a turntable, means pivoted to swing horizontally and adjustable to a plurality of elevations to engage each of said record carriers, and means for moving said last means about its pivot to move a record carrier to a position above the turntable.

8. In an automatic phonograph, a plurality of superposed record carriers pivoted on a common axis to swing horizontally, a turntable, automatically operable means disposed alongside the carriers and having a combined vertical and lateral movement and adjustable to a plurality of elevations to engage one or another of said record carriers, and automatically operable means for moving said last means laterally about the record-carrier axis to move a record carrier to a position above the turntable.

9. In an automatic phonograph, a plurality of pivotally mounted, substantially vertically aligned record carriers, means for supporting said carriers against axial displacement, a turntable, means disposed alongside the pivoted ends of the carriers and adjustable vertically to a plurality of elevations to engage with one or another of said carriers, and automatic means for actuating said last-named means to swing a record carrier to a position above the turntable.

10. In an automatic phonograph, a plurality of pivotally mounted, substantially vertically aligned record carriers, a turntable, vertically adjustable means hinged to swing about the pivotal axis of the carriers and adjustable to a plurality of elevations to engage each of said record carriers, automatically operable means for moving said last means to swing a record carrier to a position above the turntable, and spring means for returning each record carrier to normal position.

11. In an automatic phonograph, a plurality of pivotally mounted, substantially vertically aligned record carriers, a turntable, vertically adjustable means adjustable to a plurality of positions to engage each of said record carriers, automatically operable means for moving said last means to swing a record carrier to a position above the turntable, automatic means for returning said record carrier to normal position, and means for supporting said carriers against vertical displacement and for limiting the pivotal movement of said record carriers in each direction.

12. In an automatic phonograph, a turntable, a substantially vertical shaft, a plurality of record carriers loosely mounted on said shaft to swing about the same, means for holding the carriers against individual and bodily displacement axially of the shaft, adjustable selective means slidable along said shaft to a plurality of positions for engaging each of said record carriers to select the record to be played, and means for rotating said selective means to swing the record carrier selected to a position above the turntable.

13. In an automatic phonograph, a turntable, a substantially vertical shaft, a plurality of record

carriers loosely mounted on said shaft, adjustable selective means slidable along said shaft to a plurality of positions for engaging each of said record carriers to select the record to be played, means for rotating said selective means to swing the record carrier selected to a position above the turntable, a cam shaft having a plurality of cams thereon, one of said cams controlling said adjustable selective means and another of said cams for rotating the same.

14. In an automatic phonograph, a turntable, a substantially vertically mounted casing having slots therein, a shaft extending longitudinally through said casing, a plurality of record carriers each loosely mounted on said shaft having a portion extending through and supported in the slots in said casing, vertically adjustable selective means disposed alongside the casing and movable to a plurality of positions for engaging each of said record carriers to select the record to be played, and means for moving said selective means to swing the record carrier selected to a position above the turntable.

15. In an automatic phonograph, a turntable, a plurality of superposed, laterally-movable record carriers, laterally-shiftable means adjustable vertically to a plurality of positions to engage each of said record carriers to selectively move them to an operative position over the turntable, means for effecting the selection of records to be played, rotatable means operatively associated with and governed by said selection means for controlling the selective position and the lateral movement of said shiftable means, and means for rotating said rotatable means.

16. In an automatic phonograph, a plurality of superposed, movable record carriers pivoted on a common axis for selective movement to and from an operative playing position, movable means adjustable to a plurality of elevations in line with and adapted to engage one or another of said record carriers to move them to playing position, cam means for controlling the position of said movable means to a given elevation, and means for rotating said cam means.

17. In an automatic phonograph, a plurality of individually selectable record carriers movable into and out of a record-playing position, and means for controlling the selection of the record carriers to playing position comprising a selected shaft, means controlled by said shaft for actuating said carriers, means for rotating said shaft including a gear loosely mounted on said shaft, means connecting said shaft with said gear to rotate said shaft when said gear is rotated in one direction, and means for rotating said gear a definite distance in a direction to rotate said shaft.

18. In an automatic phonograph, a shaft for controlling the selection of records, means for rotating said shaft comprising a gear loosely mounted on said shaft, means connecting said shaft with said gear to rotate said shaft when said gear is rotated in one direction, a segment for rotating said gear a definite distance in a direction to rotate said shaft, a member movable a definite distance, and resilient means connecting said movable member to said segment to move the latter to rotate said shaft.

19. In an automatic phonograph, a shaft for controlling the selection of records, means for rotating said shaft comprising a gear loosely mounted on said shaft, means connecting said shaft with said gear to rotate said shaft when said gear is rotated in one direction, a segment for rotating said gear a definite distance in a direction to rotate said shaft, a movable frame member, means for moving said frame member a definite distance, and resilient means connecting said segment to said movable frame member whereby the frame member will move its full distance even if said segment is stopped before moving its full distance.

20. In an automatic phonograph, a shaft for controlling the selection of records, means for rotating said shaft comprising a gear loosely mounted on said shaft, means connecting said shaft with said gear to rotate said shaft when said gear is rotated in one direction, a segment for rotating said gear a definite distance in a direction to rotate said shaft, adjustable means for stopping the rotation of said shaft at certain points, a movable frame member, means for moving said frame member a definite distance, and resilient means connecting said segment to said movable frame whereby the frame member will move its full distance even if the movement of the shaft and thereby the segment is stopped before moving its full distance.

21. In an automatic phonograph, a plurality of selective record carriers, a turntable, means for controlling the selection of records in operative relation with the turntable comprising a selector shaft, means for rotating said shaft, means governed by said shaft for actuating the record carriers to a selective position, and means for stopping the rotation of said shaft at certain points corresponding to the records selected consisting of means rotatable with the selector shaft and individual, adjustable annularly arranged means corresponding in number to the record-carriers for simultaneously selecting at will a plurality of records to be played and movable to a position in the path of said means rotatable with said shaft.

22. In an automatic phonograph, a plurality of selective record carriers, a turntable, means for controlling the selection of records in operative relation with the turn table comprising a selector shaft, means for rotating said shaft, means governed by said shaft for actuating the record carriers to a selective position, means for stopping the rotation of said shaft at certain points corresponding to the records selected, and a plurality of members disposed radially about the axis of the selector shaft and each movable to a position in the path of said means for stopping the rotation of said shaft.

23. In an automatic phonograph, a plurality of selective record carriers, a turntable, means for controlling the selection of records in operative relation with the turntable comprising a selector shaft, means for rotating said shaft, means governed by said shaft for actuating the record carriers to a selective position, means for stopping the rotation of said shaft at certain points corresponding to the records selected, a plurality of members disposed radially about the axis of the selector shaft and each movable to a position in the path of said means for stopping the rotation of said shaft, and automatically acting means for returning each of said members to normal position after it has engaged said means rotatable with said shaft.

24. In an automatic phonograph, a shaft for controlling the selection of records, means for rotating said shaft, means for stopping the rotation of said shaft at certain points comprising means rotatable with said shaft and slidable therealong having a portion projecting therefrom, a plurality of stop members each movable to a position in the path of said projecting por-

tion, and automatically acting means to slide said means rotatable with said shaft for returning each of said members to normal position after it has engaged said projecting portion.

25. In an automatic phonograph, a shaft for controlling the selection of records, means for rotating said shaft, means for stopping the rotation of said shaft at certain points comprising a yoke member rotatable with said shaft and slidable therealong, a member mounted in said yoke member and extending outwardly therefrom, a plurality of stop members each movable to a position in the path of said member mounted in said yoke, and automatically acting means to slide said yoke towards said stop members to return each to normal position after it has engaged said member in said yoke, said yoke being slidable relatively to said member whereby, when one of said stop members is held against movement, said member will remain stationary while said yoke member is slid along said shaft.

26. In an automatic phonograph, a shaft for controlling the selection of records, means for rotating said shaft, means for stopping the rotation of said shaft at certain points comprising a yoke member rotatable with said shaft and slidable therealong, a member mounted in said yoke member and extending outwardly therefrom, a plurality of stop members each movable to a position in the path of said member mounted in said yoke, an automatically acting means to slide said yoke towards said stop members to return each to normal position after it has engaged said member in said yoke, said yoke being slidable relatively to said member whereby, when one of said stop members is held against movement, said member will remain stationary while said yoke member is slid along said shaft, and resilient means for normally holding said yoke and said member as a unit against relative sliding movement.

27. In an automatic phonograph, a plurality of movable record carriers individually mounted for selective movement to and from an operative record-playing position, movable means adjustable to a plurality of positions to selectively engage each of said record carriers to move them to playing position, means for causing the movement of said first means to selectively position the same for engagement with a record-carrier, comprising a cam member operatively connected with said movable means to position the same according to the position of said cam member, and means for moving said cam member.

28. In an automatic phonograph, a plurality of movable record carriers individually mounted for selective movement to and from an operative record-playing position, movable means adjustable to a plurality of positions to selectively engage each of said record carriers to move them to playing position, means for causing the movement of said first means to selectively position the same for engagement with a record-carrier, comprising a shaft having means thereon operatively connected with said movable means to position the same according to the position of the means on said shaft, and a motor for rotating said shaft.

29. In an automatic phonograph, a plurality of movable record carriers individually mounted for selective movement to and from an operative record-playing position, movable means adjustable to a plurality of positions to selectively engage each of said record carriers to move them to playing position, means for causing the movement of said first means to selectively position the same for engagement with a record-carrier, comprising a rotatable member operatively connected with said movable means to position the same, a motor for rotating said rotatable means, and means movable to a record-selective position for limiting the rotation of said rotatable member to position said movable means to engage the record carriers desired.

30. In an automatic phonograph, a plurality of movable record carriers individually mounted for selective movement to and from an operative record-playing position, movable means adjustable to a plurality of positions to selectively engage each of said record carriers to move them to playing position, means for causing the movement of said first means to selectively position the same for engagement with a record-carrier, comprising a rotatable member operatively connected with said movable means, a projecting member rotatable with said rotatable member, and adjustable means movable to a position to engage said projecting member to stop the rotation of said rotatable member at certain points in its rotation to position said movable means.

31. In an automatic phonograph, a plurality of movable record carriers individually mounted for selective movement to and from an operative record-playing position, movable means adjustable to a plurality of positions to selectively engage each of said record carriers to move them to playing position, means for causing the movement of said first means to selectively position the same for engagement with a record-carrier, comprising a cam member operatively connected to said movable means, means for moving said cam member, and means corresponding in number to the carriers and movable to a record-selecting position for stopping the movement of said cam member at desired points to position said movable means.

32. In an automatic phonograph, a plurality of movable record carriers individually mounted for selective movement to and from an operative record-playing position, movable means adjustable to a plurality of selective positions to selectively engage one or another of said record carriers to move them to playing position, means for causing the movement of said first means to selectively position the same for engagement with a record-carrier, comprising a rotatable member operatively connected to said movable means to control the same, a plurality of individual means corresponding in number to the record carriers and selectively movable to positions to stop the rotation of said rotatable member to predetermine the selective position of said adjustable means, and means for returning each of said plurality of means to normal position after it has stopped the rotation of said rotatable means.

33. In an automatic phonograph, a plurality of movable record carriers individually mounted for selective movement to and from an operative record-playing position, movable means adjustable to a plurality of positions to selectively engage each of said record carriers to move them to playing position, means for causing the movement of said first means to selectively position the same for engagement with a record-carrier, comprising a rotatable shaft having a means thereon operatively connected to said movable means for controlling the position thereof, a projecting member on said shaft, means for rotating said shaft, stop members selectively movable to a position to engage said projecting mem-

ber and stop said shaft at certain points to position said movable means with respect to said record carriers.

34. In an automatic phonograph, a plurality of movable record carriers individually mounted for selective movement to and from an operative record-playing position, movable means adjustable to a plurality of positions to selectively engage each of said record carriers to move them to playing position, means for causing the movement of said first means to selectively position the same for engagement with a record-carrier, comprising a shaft having means thereon operatively connected with said movable means, said means on said shaft being formed to cause said movable means to engage said record carriers in succession when said shaft is rotated slightly less than a full turn each time a record is played, and automatically acting means for rotating said shaft slightly less than a full turn.

35. In an automatic phonograph, a plurality of movable record carriers individually mounted for selective movement to and from an operative record-playing position, movable means adjustable to a plurality of positions to selectively engage each of said record carriers to move them to playing position, means for causing the movement of said first means to selectively position the same for engagement with a record-carrier, comprising a shaft having a cam thereon operatively connected with said movable means, said cam being shaped to cause said movable means to engage said record carriers in succession when said shaft is rotated slightly less than a full turn each time a record is played, and means for rotating said shaft.

36. In an automatic phonograph, a plurality of movable record carriers individually mounted for selective movement to and from an operative record-playing position, movable means adjustable to a plurality of positions to selectively engage each of said record carriers to move them to playing position, means for causing the movement of said first means to selectively position the same for engagement with a record-carrier, comprising a shaft having a cam thereon operatively connected with said movable means, said cam being shaped to cause said movable means to engage said record carriers in succession when said shaft is rotated slightly less than a full turn each time a record is played, means for rotating said shaft, and automatically operating means for intermittently rotating said shaft to cause the record carriers to be engaged in rotation.

37. In an automatic phonograph, a turntable, a shaft thereon, a movable bearing member for supporting said shaft, means for moving said bearing member to raise said shaft, means for rotating said shaft comprising a pinion loosely mounted on said shaft for connection with a motor, a second pinion loosely mounted on said shaft for connection with a governor, friction connecting means between said pinions, stationary means for supporting said pinions, and means fixedly mounted on said shaft for engaging said second pinion to transmit motion thereto when said shaft is raised.

38. In an automatic phonograph, a plurality of movable record carriers individually and pivotally mounted on a common axis for selective movement to and from an operative record-playing position, vertically movable means adjustable to a plurality of positions to engage each of said record carriers to move them to playing position, motor-driven means operatively connected to said movable means, an electric circuit including said motor, a coin-controlled mechanism included in said circuit for controlling the same, and means independent of the coin-control mechanism for controlling the movement of said movable means to a given record-selecting position including individually movable pre-selection elements corresponding in number to said carriers and a member operatively connected with said motor-driven means and disposed for cooperative engagement with one or another of said pre-selection elements.

39. In an automatic phonograph having a turntable, a plurality of movable record carriers, said record carriers being of different diameters to hold records of different sizes, means for moving each of said record carriers to a position above said turntable, a pick-up, means tending to maintain said pick-up in position to play said smaller records, and means for automatically moving said pick-up to a position to play said larger records when a record carrier holding one of the same is moved to a position above said turntable.

40. In an automatic phonograph having a turntable, a plurality of movable record carriers, said record carriers being of different diameters to hold records of different sizes, means for moving each of said record carriers to a position above said turntable, a pick-up, means tending to maintain said pick-up in position to play said smaller records, and means for automatically moving said pick-up to a position to play said larger records when a record carrier holding one of the same is moved to a position above said turntable, comprising a member operatively connected to said pick-up and a second member for engagement with said first member, said second member being positioned to be moved by said larger record carriers when one of them is moved to a position above said turntable to thereby move said pick-up to proper position to play said larger records.

41. In an automatic phonograph having a turntable and a tone arm having a pick-up thereon, a plurality of movable record carriers, said record carriers being of different diameters to hold records of different sizes, means for moving said record carriers to a position above said turntable, means tending to maintain said pick-up in position to play said small records, and means for automatically moving said tone arm and pick-up to a position to play said larger records when a record carrier holding one of the same is moved to a position over said turntable, comprising a member operatively connected to said tone arm, and a bell crank lever engaging said first member and having an extension for engagement by said larger record carriers when the same have moved to a position over said turntable to thereby move said pick-up to proper position to play said larger records.

42. In an automatic phonograph, a shaft for controlling the selection of records, means for rotating said shaft, means projecting from said shaft, a plurality of members each movable to a position in the path of said means projecting from said shaft for stopping the rotation of said shaft at certain points, and means for moving said members to stop the rotation of said shaft, comprising a plurality of electro-magnets, one for each of said members, and means fixedly mounted on each of said members for actuation by its corresponding electro-magnet when the same is energized.

43. In an automatic phonograph, a shaft for controlling the selection of records, means for rotating said shaft, means for stopping the rotation of said shaft, a plurality of members each movable to a position in the path of said means for stopping the rotation of said shaft, and means for moving said members to stop the rotation of said shaft comprising a plurality of electro-magnets, one for each of said members, means fixedly mounted on each of said members for actuation by its corresponding electro-magnet when the same is energized, and magnetically controlled means for returning all said members to normal inoperative position at a distance therefrom.

44. In an automatic phonograph, a shaft for controlling the selection of records, means for rotating said shaft, means rotatable with said shaft for stopping the rotation thereof, a plurality of rods each movable to a position in the path of said means rotatable with said shaft, and means for moving said rods to stop the rotation of said shaft comprising a plurality of electro-magnets, one for each of said rods and adjacent thereto, a member mounted on each of said rods and positioned to be actuated upon energization of its co-operating magnet whereby when said magnets are energized the corresponding rod is moved to a position in the path of said means rotatable with said shaft to stop the rotation of the same.

45. In an automatic phonograph, a shaft for controlling the selection of records, means for rotating said shaft, means rotatable with said shaft for stopping the rotation thereof, a plurality of rods each movable to a position in the path of said means rotatable with said shaft, and means for moving said members to stop the rotation of said shaft comprising a plurality of electro-magnets, one for each of said rods and adjacent thereto, a member mounted on each of said rods and positioned to be actuated upon energization of its co-operating magnet whereby when said magnets are energized the corresponding rod is moved to a position in the path of said means rotatable with said shaft to stop the rotation of the same, a collar through which each of said rods extends and being slidable thereon, resilient means between said members and said collar, and means controlled by an electro-magnet for moving said collar to return said rods to normal inoperative position.

46. In an automatic phonograph, a reproducing means, a turntable vertically movable toward and from said reproducing means, means for raising and lowering the turntable into and out of operative relation with the reproducing means, a plurality of superposed record carriers, pivoted to selectively swing laterally to and from an operative position relative to the turntable, whereby in the operative position of a carrier its record is adapted to be picked up and deposited upon the turntable during the vertical movement of the latter toward the reproducing means, means movable about the carrier-axis and adjustable to a plurality of elevated positions to engage one or another of the carriers, and means for actuating said movable means to selectively swing a carrier to a position over the turntable.

47. In an automatic phonograph, a plurality of record-carriers individually mounted for selective movement to and from operative record-playing position, individually movable selector means corresponding in number to the record-carriers for simultaneously selecting at will a plurality of records to be played, a motor-driven shaft, coin-control means independent of the selecting means for initiating the operation of the motor-driven shaft, and means operatively connected to said shaft and correlated with said selecting means for successively and automatically moving the pre-selected record-carriers into and out of playing position, said last-named means having a part thereon engageable with one or another of said selecting means for controlling the movement of the automatically moving means to bring into play the corresponding records selected.

48. In an automatic phonograph, a plurality of record-carriers individually mounted for selective movement to and from an operative record-playing position, rotatable means including a driven member for successively actuating said record carriers to a record-playing position, and projectable means corresponding in number to the carriers for simultaneously selecting at will a plurality of records to be played, said rotatable means having a stop thereon engageable with the selecting means when projected for predetermining and governing said driven member to correspondingly actuate said record-carriers in accordance with the selections made.

49. In an automatic phonograph, a plurality of record-carriers individually mounted for selective movement to and from an operative record-playing position, means for successively actuating said record carriers to a record-playing position and including a rotatable member having a stop element thereon, and means for simultaneously selecting a plurality of records to be played, said means including a plurality of push rods corresponding in number to the record carriers and projectable to a position into and out of the path of said stop element to control the automatic selection of the records.

50. In an automatic phonograph, a plurality of record-carriers individually mounted for selective movement to and from an operative record-playing position, means for successively actuating said record carriers to a record-playing position and including a rotatable member having a stop element thereon, means for simultaneously selecting a plurality of records to be played, said means including a plurality of push rods corresponding in number to the record carriers and projectable to a position into and out of the path of said stop element to control the automatic selection of the records, and means for successively retracting the push rods to their initial position after the selection of the corresponding record-carrier has been effected.

51. In an automatic phonograph, a plurality of record carriers, a movable turntable, individually movable means corresponding in number to the carriers for simultaneously selecting a plurality of records to be played, means governed in part by said selecting means for successively moving said record carriers with the records selected to a position above said turntable, a shaft, and cam means on said shaft for operating said means for moving said record carriers and for operating said means for raising and lowering the turntable.

52. In a mechanism of the character described, the combination of a turntable, a plurality of record carriers mounted to swing into and out of an operative position relative to the turntable, a selector member adjustable to a plurality of positions for engagement with one or another of said carriers for swinging a carrier from an in-

operative position to a playing position over the turntable, means for positioning the selector member to actuate a pre-selected record carrier, and means for actuating said selector member to swing the pre-selected carrier to a position over the turntable.

53. In an automatic phonograph, a turntable, a plurality of record carriers mounted to swing into and out of an operative position relative to the turntable, means for supporting said carriers against vertical displacement, adjustable selective means for coupling engagement with each of said carriers to select the record to be played, and means for actuating said selective means to swing the record carrier selected to a position over the turntable.

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