Sept. 10, 1935. R. W. PITMAN 2,013,927

MULTIPLE RECORD PHONOGRAPH

Filed Feb. 19, 1931 6 Sheets-Sheet 1

Fig. 1.

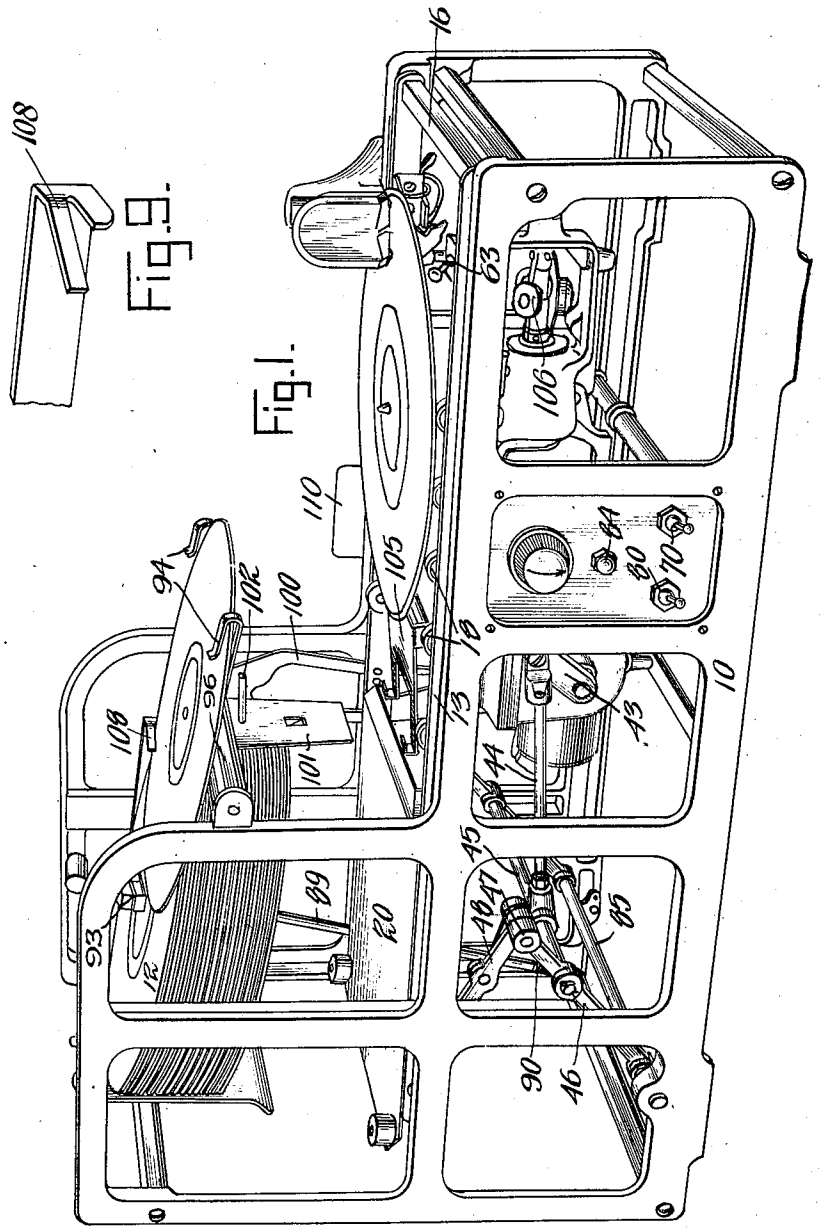


Fig. 9.

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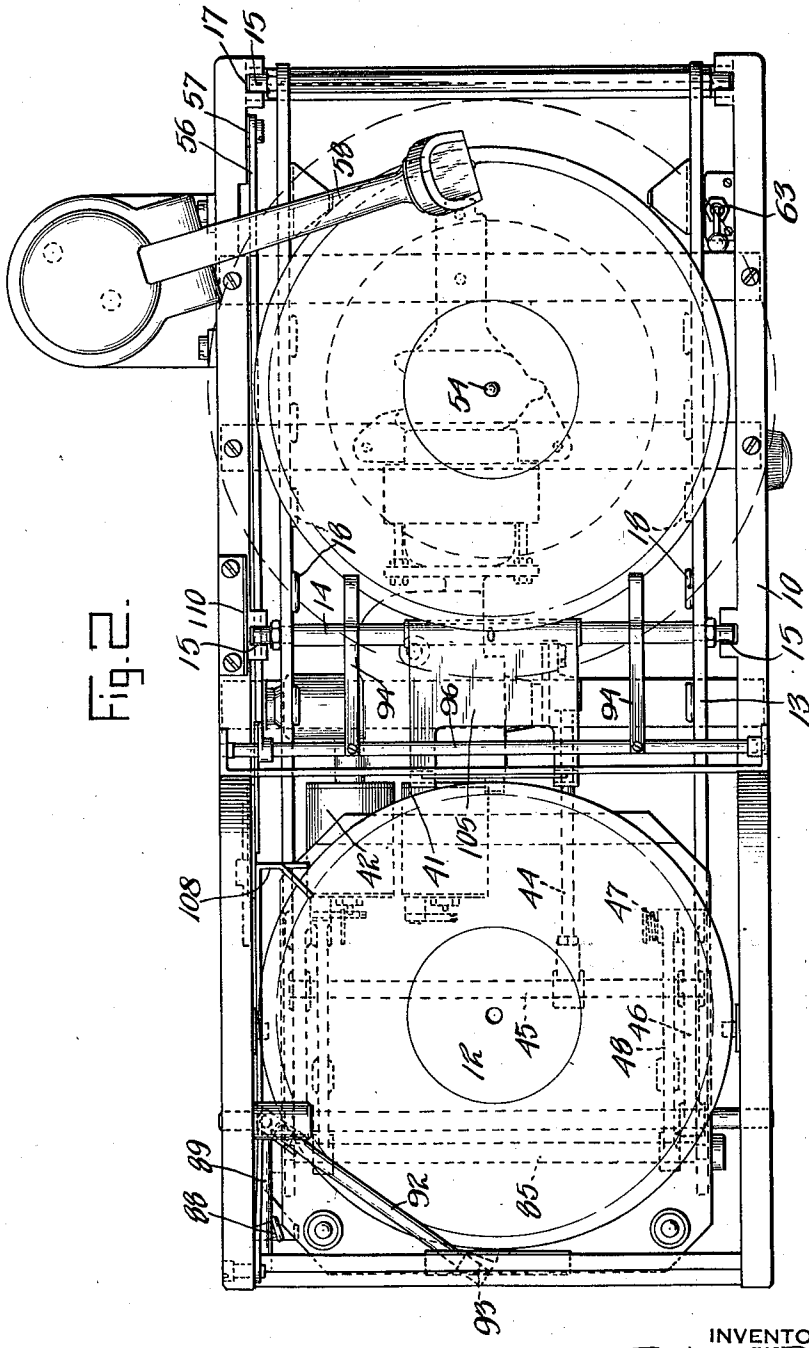


Fig. 2.

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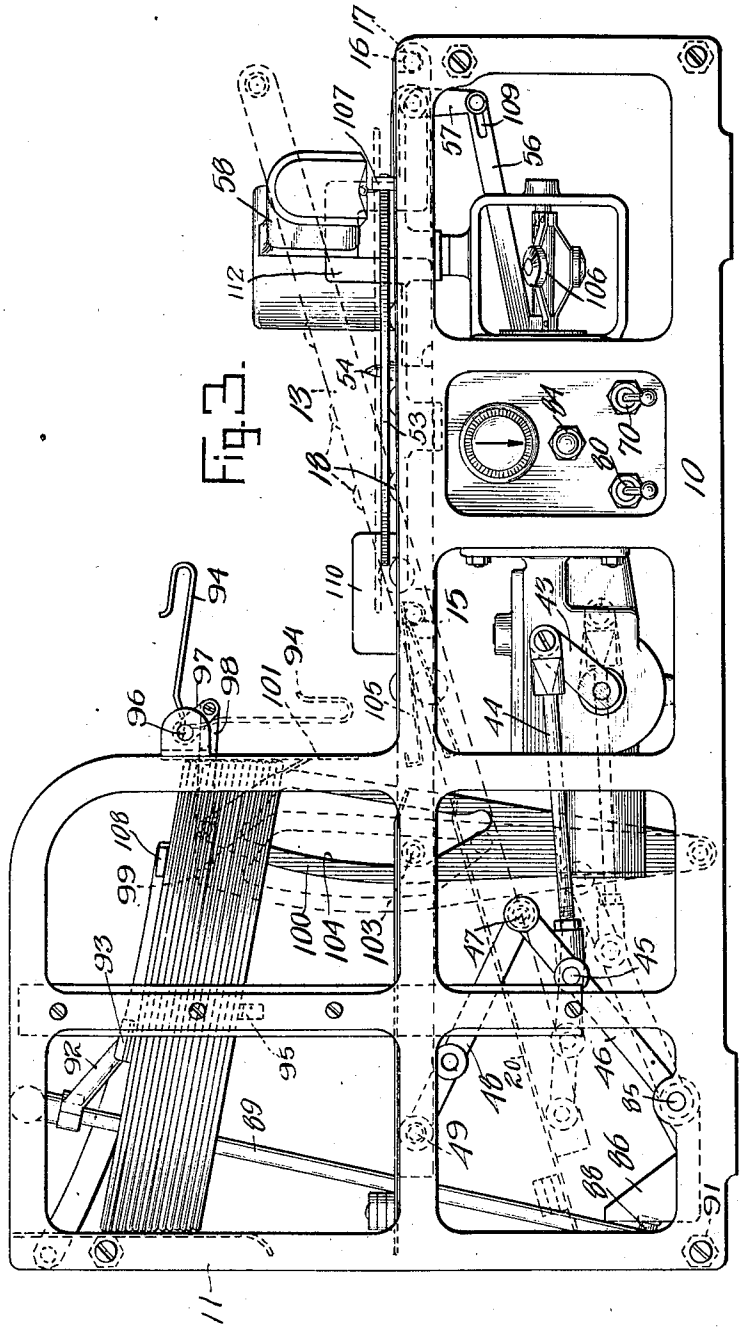


Fig. 3.

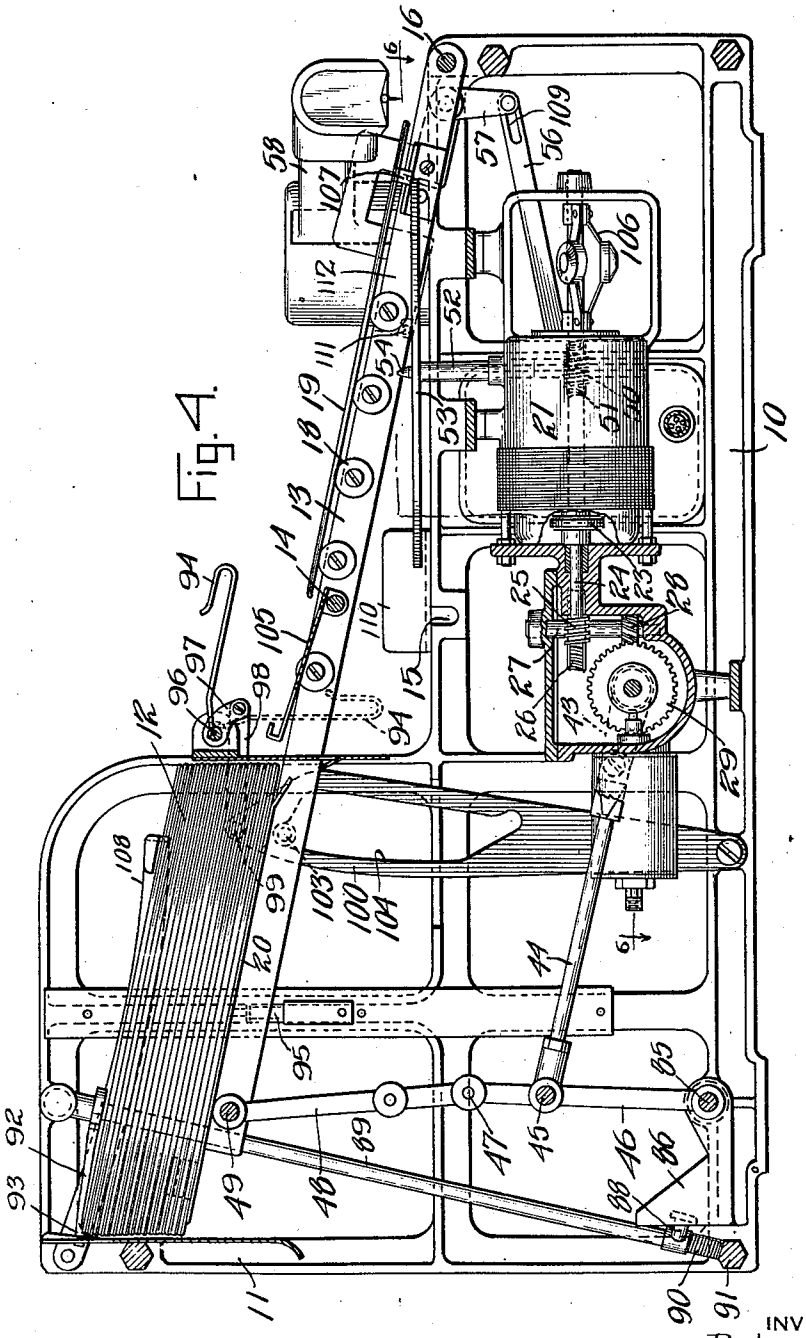
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Fig. 4.



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Fig. 5.

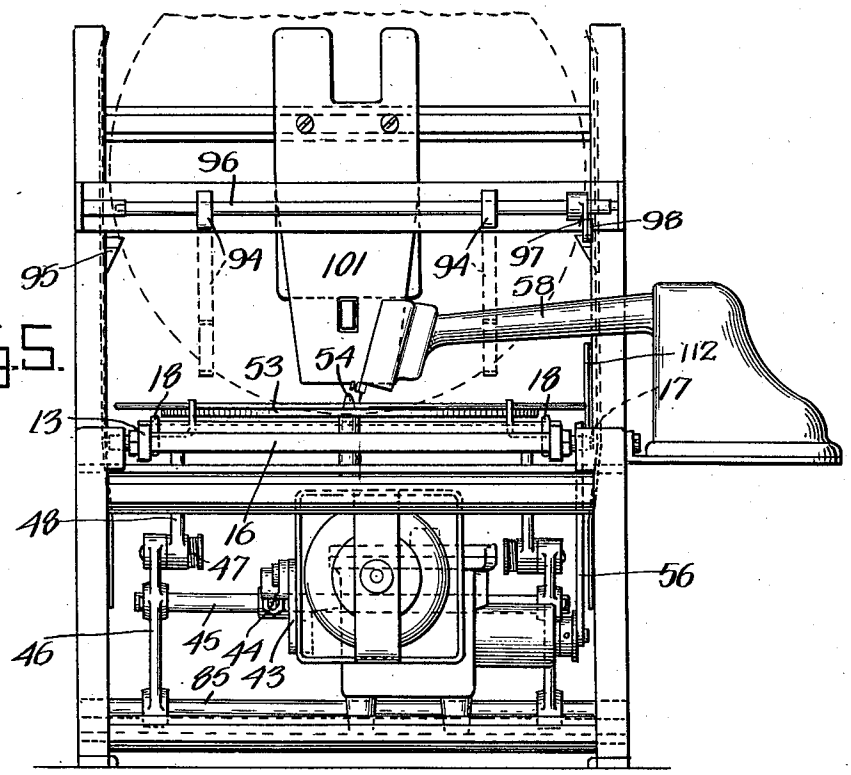
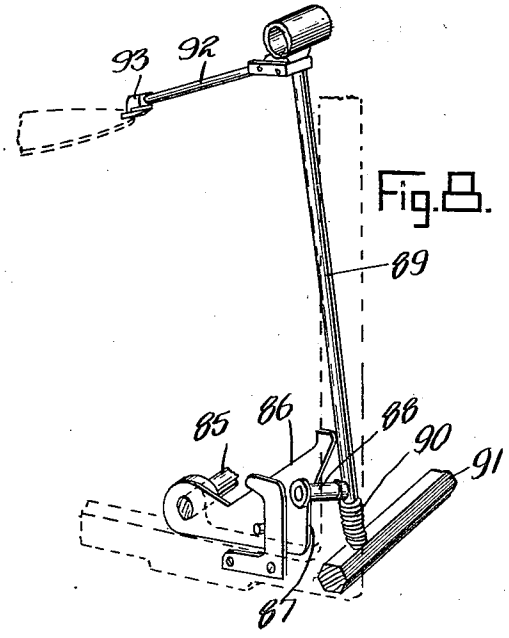


Fig. 8.



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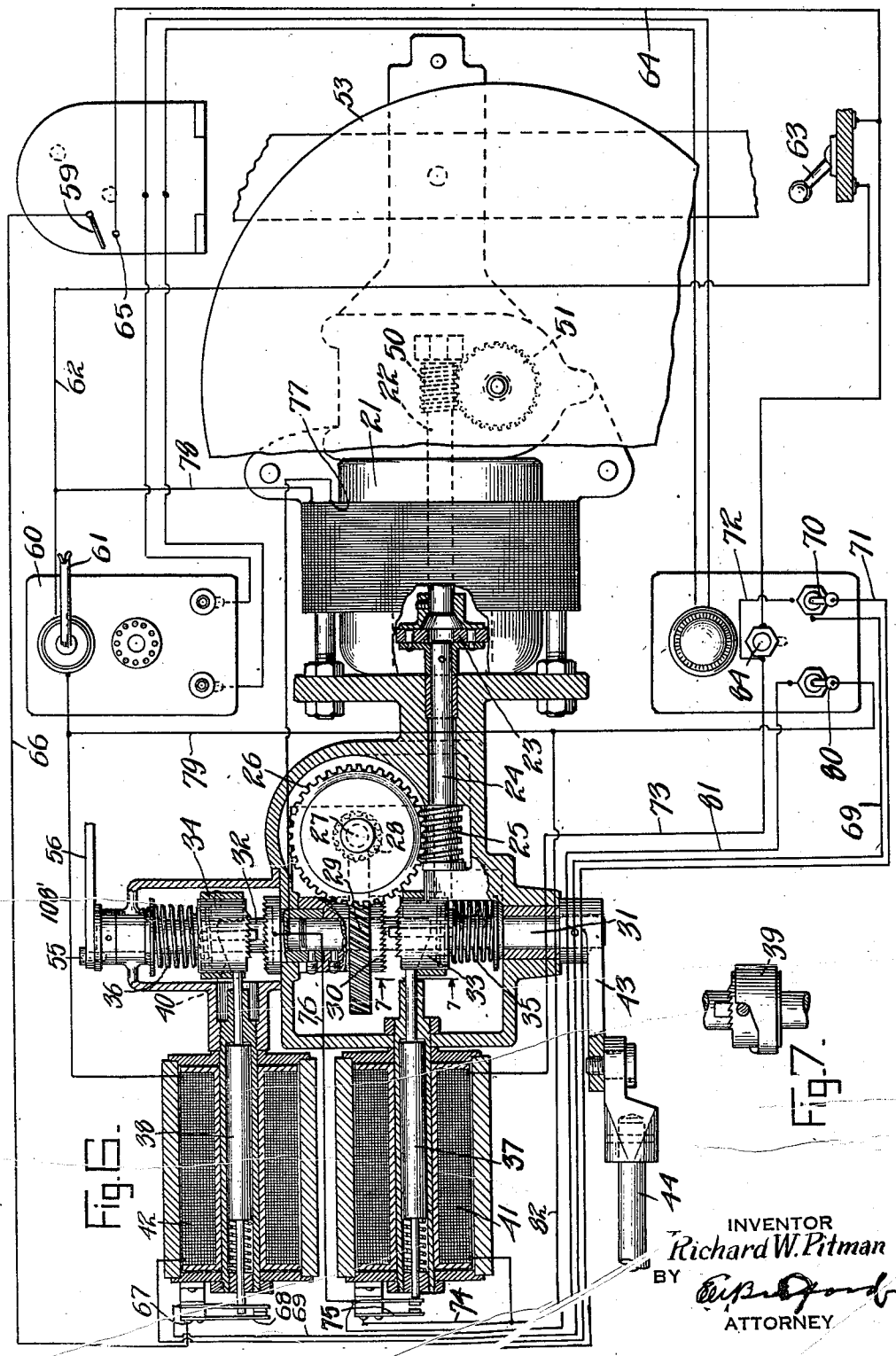


Fig. 6.

Fig. 7.

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Patented Sept. 10, 1935 2,013,927

UNITED STATES PATENT OFFICE

2,013,927

MULTIPLE RECORD PHONOGRAPH

Richard W. Pitman, Westfield, N. Y., assignor to Automatic Phonograph Corporation, Newark, N. J., a corporation of Delaware

Application February 19, 1931, Serial No. 517,050

4 Claims. (Cl. 274—10)

This invention relates to phonographs and particularly to automatically operated machines for playing records in series.

An object of the invention is to provide a machine of this type in which both sides of the record may be played.

A further object is to provide a machine of this type which will be simple in construction, easily operated and in which means are provided for playing the records in series with selective control mechanism for playing any single record continuously.

In its general aspects the machine is similar to and is an improvement on the patent of Wendell E. Miller and William J. Sheubrooks, No. 1,920,936, granted August 1st, 1933, for Phonographs.

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

Figure 1 is a perspective view of the machine,

Figure 2, a plan view,

Figure 3, a side elevation showing the parts in record playing position,

Figure 4, a side elevation with parts broken away showing the position of the parts just after a new record has been moved to position it in playing position.

Figure 5, an end elevation looking from the right in Figure 1,

Figure 6, a section on line 6—6 of Figure 4,

Figure 7, a detail showing one of the clutch operating cams,

Figure 8, a detail showing the device for pushing off a record from the stack of records, and

Figure 9, a detail view of the arm 108.

In the drawings numeral 10 indicates the frame of the machine having a number of posts 11 in which a stack of records 12 is mounted. A record changing frame 13 is provided with bearings or pivots 14 which rest in saddles 15 in the upper portion of the frame 10. One end of the frame 13 is provided with pins 16 which rest in suitable bearings 17 at the end of the frame 10. From the construction defined it should be apparent that the frame 13 may pivot on either of the bearings 14 or 16. When pivoting on the bearings 16 the frame occupies the position shown in Figure 4 and when pivoting on the bearing 14 the frame is in the dotted line position shown in Figure 3.

The frame 13 is provided with a number of rollers 18 upon which the record 19 rides as it passes from the playing position to a table 20 on that portion of the frame which is beneath the stack of records 12. Means for tilting the frame 13 will now be described. This consists of a motor 21 having a shaft 22 connected by means of a universal joint 23 to a shaft 24. The shaft 24 has on its end a worm 25 which meshes with a worm wheel 26, the whole being mounted on a shaft 27. On the lower end of the shaft 27 is a worm 28 which meshes with a worm wheel 29 which latter worm wheel is mounted on a clutch 30 loosely mounted on shafts 31 and 32. The clutch 30 is free to rotate on the shafts 31 and 32 except when keyed thereto by clutch elements 33 and 34 which are axially slidable upon the shafts 31 and 32 but keyed thereto. Compression springs 35 and 36 tend to move their respective clutches into engagement with the clutch 30. Clutches 33 and 34 are held out of engagement with the clutch 30 by means of pins 37 and 38. The small ends of these pins engage cams 39 and 40 respectively. When the pins 37 and 38 are withdrawn, the respective clutches which are held by them are urged into engagement with the clutch 30 to key this clutch to the shaft to cause the shaft to rotate since the clutch 30 is continuously driven by the motor. The pins 37 and 38 are operated by solenoids 41 and 42, these solenoids being energized at the completion of the playing of a record as will be later described. On the other end of the shaft 31 is an arm 43 to which is attached a connecting rod 44, the connecting rod being attached at its other end to a rod 45 which rod is connected at its ends to lower toggle links 46. Toggle links 46 are pivoted at 47 to upper toggle links 48 which latter links are pivoted at 49 to the end of the transfer frame 13. From the description given it will be apparent that one rotation of the shaft 31 from the position shown in Figure 1 through the several positions shown in Figures 3 and 4 return the frame back to the position shown in Figure 1 in which position the record is played. The motor shaft 22 is also provided with a worm 50 meshing with a worm wheel 51 on a shaft 52. On the upper end of this shaft is mounted the record supporting and record rotating table 53, the shaft having a pointed end 54 for centering the record in a manner well-known. The shaft 32 has on its outer end an eccentric pin 55 to which is attached a connecting rod 56, this rod being connected at its other end to a depending arm 57 which operates mechanism for swinging the tone arm 58 to restore it to record playing position after the completion of a record. The arm 57 is rigidly attached to a bent arm 112 which extends under the tone arm. When the link 56 is pulled to the

left the arm 112 engages the under side of the tone arm and moves the tone arm back as shown in Figure 4. A slot 109 in the link 56 permits the arm 112 to be moved by the tilting table independently of the operation of the link 56. This latter movement is brought about by a pin 111 engaging the end of the arm 112 as shown in Figure 4. The details of the mechanism for restoring the tone arm to playing position are more fully shown and described in the copending application referred to and since these form no part of the present invention they will not be further described.

At 59 is shown a switch which is closed by the tone arm upon the completion of the playing of a record. When this switch is closed a circuit is closed as follows: Beginning with the panel 60 into which current is brought through line 61 a wire 62 leads to a switch 63 to which a wire 64 is connected, this wire being connected at 65 to one contact of the switch 59. From 59 a wire 66 leads to and is connected to a contact 67 on a switch 68. A wire 69 connected to one element of switch 68 leads to a switch 70. The switch 70 has an arm operable to connect the wire 69 with either wire 71 or wire 72 depending on whether it is desired to continue playing a single record or to change records in series. Wire 72 is connected to a wire 73 which latter is connected to one terminal of the solenoid 41. A wire 74 connects the other terminal of the solenoid to a contact on switch 75. The other element of this switch is connected by means of a wire 76 to a terminal 77 on the motor 21, the opposite terminal of the motor being connected by a wire 78 to the wire 62. A wire 79 is connected also to the source of current 60 and to a switch 80, the other contact of the switch being connected by means of a wire 81 to the wire 76. A wire 82 connects the wire 74 with the wire 79. A push button switch 84 is provided for changing records independent of the switch 59 so that it is not necessary to await the completion of a record before setting in motion the record changing mechanism. Pin 37 has its outer end engaging one element of the switch 75 so that when the coil 41 is energized to pull the pin back the switch 75 is closed. Switch 68 is normally closed. The outer end of the pin 38 is in engagement with one element of the switch 68 so that when this pin is retracted as the coil 42 is energized the switch 68 is opened to break the circuit between wires 69 and 66.

The toggles 46 are rigidly secured at their lower ends to a shaft 85. Upon one end of this shaft is rigidly secured a cam 86 shown in detail in Figure 8. The edge 87 of this cam engages a roller 88 on a pin extending laterally from a post 89. A torsion spring 90 surrounds the post 89 and tends to hold the roller 88 in engagement with the cam surface 87. The post 89 is journaled in a bar 91. The upper end of the post 89 is likewise rotatably journaled and has secured thereto an arm 92 upon the outer end of which is a shoe 93 adapted to engage the edge of the topmost record on the stack of records. A slotted arm 108 prevents more than one record from being pushed off the stack.

In operation when a record has been positioned beneath the stack of records and the tilting frame starts back to its horizontal position the cam 86 operated by shaft 85 rises and the cam surface 87 rotates the post 89 to cause the shoe 93 to slide the topmost record off the stack of records and into record receiving hooks 94. As in the copending application referred to the posts 11 are provided with radially movable catches 95 for supporting the stack of records. The stack of records are supported in an inclined position. It should be apparent also that the toggles are almost in their straight position when the record is placed beneath the stack of records. When in this position the maximum load can be lifted with little load on the motor. The hooks 94 are secured upon a bar 96 to which bar is attached an arm 97. A link 98 is attached at one end to the arm 97 and is pivoted at 99 at its other end to the upper end of a rock lever 100. A plate 101 is secured to the frame 11 beneath the bar 96 and this plate has a laterally extending pin 102, the purpose of which is to force the record into an inclined position ready to be picked up by the transfer plate. In the copending application referred to the record moved by gravity from the hooks 94 whereas in the present application it is positively tilted into the proper position in which it may be picked up by the transfer frame. The lever 100 is pivoted at its lower end to the frame 10. A pin 103 in the tilting frame 13 engages within a cam slot 104 in the member 100 so that vertical tilting of the frame 13 will swing the lever 100 through the positions shown in full and dotted lines in Figure 3. A plate 105 is pivoted at 14 to the tilting frame and has hooks on its free end to receive the record as described in the copending application. The hooks on this plate engage the edge of the record and assist in inverting it as the tilting table approaches the position shown in Figure 4. A governor 106 is provided for controlling the speed of the motor 21.

The operation of the machine is as follows:

To start the motor 21 the switch 80 is closed. This closes a circuit from source of current 60 through wires 79, switch 80, wire 81, wire 76, motor 21 and wire 78 back to 60. When playing a record the parts are in the position in which they are shown in Figure 1. Upon the completion of a record the tone arm 58 travels in a well known manner and by means of any well known construction closes a switch at 59. Assume that the switch 70 is in the position to close circuit through lines 69 and 72 then a circuit will be closed from the source of current 60 as follows: Passing from 60 through line 62 current passes through switch 63, line 64, contact 65, switch 59, line 66, switch 68, line 69, switch 70, line 72, line 73, through coil 41, line 74, line 82 and line 79 to the source of current 60. This energizes solenoid 41 and retracts the pin 37. As soon as this pin is withdrawn clutch 33 is moved to engage clutch 30 so that the former is driven by the latter and the shaft is rotated breaking the toggle 46, 48 to move the tilting table to the position shown in dotted lines in Figure 3. As soon as moved to this position the record 19 slides down to the lower end of the transfer table. A plate 110 prevents the record from sliding off the frame. The shaft 31 continuing to operate straightens out the toggle to move the table to the position shown in Figure 4. This positions the played record beneath the stack of records and leaves the stack in the position shown in Figure 4. It should be noted that at the beginning of the record changing movement a record was resting in the hooks 94. As the table moved up to the position shown in Figure 4 this record was swung down by the hooks

94 to the position in which these hooks are shown in dotted lines in Figures 3 and 4 and as the table moved to the position shown in Figure 4 the record was inverted and positioned on the table at which it rolled down to the position which it occupies in Figure 4, being stopped in playing position by stops 107. The hooks on the plate 105 engage the lower edge of the record and assist in lifting the record out of the hooks 94 and turn the record over to position it on the frame 13. The structure defined is more fully disclosed in the copending application referred to above. As the transfer table begins to return to its playing position the cam 86 operates to rotate the shaft 89 to push another record from the stack of records into the hooks 94. As soon as pin 37 is withdrawn from the cam 39 it remains with its inner end engaging the periphery of the cam until the shaft 31 has almost completed its revolution. As soon as the inner end of the pin 37 reaches the cam edge it drops off and continued rotation of the shaft 31 causes the pin 37 to disengage clutch 33 from clutch 30 so that the record changing mechanism will be stopped after having completed one cycle. It is desirable that the parts complete the cycle even though the starting switch 80 should be opened for any reason. If this starting switch is open during the operation of changing a record circuit will be closed through switch 75 since this switch is closed so long as the pin 37 is retracted and this pin is retracted so long as its inner end is in engagement with the periphery of the cam 39. If the operator desires to cut out the record changing mechanism so as to repeat the records which are played he may do this by operating the switch 70 so as to close circuit from the line 71 to the line 69. When in this position at the completion of the playing of a record switch 59 is closed, circuit is then closed through the following course: Beginning with line 62 it passes through switch 63, line 64, switch 59, line 66, contact 67, switch 68, line 69, switch 70, line 71 to terminal of coil 42 through line 108' back to 60. This energizes the coil 42 and retracts the pin 38 so that clutch 34 is moved into engagement with clutch 30. This causes rotation of shaft 32 and through the link 56 and arm 57 the tone arm is swung to operative position without operation of the tilting frame 13. The connecting rod or link 56 is slotted as shown at 109 to permit operation of the tone arm when the tilting table is operated irrespective of movement of the link 56. It is desirable that circuit through the solenoid shall be opened as soon as possible after being energized to prevent heating of the coil unduly and to eliminate unnecessary hum due to the alternating current. This is done by breaking the switch 68 as soon as the pin 38 is retracted. The outer end of the pin 38 engages one element of the switch 68.

It may be desirable at times to play 12 inch records since each machine will have the frame 11 adapted for a single size of records, usually 10 inch records. This frame will not accommodate a 12 inch record. Before playing a 12 inch record therefore the switch 63 is opened so as to cut out all circuit with the record changing mechanism. The switch 63 moreover is so placed on the frame of the machine that it must be opened before a 12 inch record can be placed on the record playing table.

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

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

1. A phonograph for playing a plurality of records in series comprising a frame, a record playing table mounted in the frame, a record changing frame, a motor for operating the playing table and the record changing frame, a clutch for connecting and disconnecting said motor with said record changing frame, a solenoid for operating said clutch, a switch operated by the tone arm of the machine for energizing said solenoid, a manually operable starting and stopping switch, and means operated by the said solenoid for continuing operation of said record changing means for a predetermined time irrespective of the position of the said manually operable switch, substantially as set forth.

2. A phonograph for playing a plurality of records in series comprising a frame, a record playing table mounted in the frame, a record changing frame, a motor for operating the record changing frame and the record playing table, a clutch connecting the said motor to the operating mechanism for the record changing frame, electrical means for operating said clutch, a manually operable starting and stopping switch for operating the said motor, and an auxiliary switch, said auxiliary switch being closed during operation of the record changing mechanism to complete a cycle of operations to restore the record changing mechanism to a fixed position irrespective of the position of the starting and stopping switch, substantially as set forth.

3. In a phonograph having means for playing and for inverting records having a tilting table for changing records, means for supporting the stack of records, means for removing the topmost record from the stack comprising a push arm engageable with an edge of the record, a cam operating said push arm, said cam being operated by the said tilting frame, substantially as set forth.

4. In a phonograph for playing records of different sizes, a record playing table, an electric motor for operating said table, a record changing table, electrically operated means for operating said record changing table, a cut-out switch in circuit with said electrically operated means, such switch being positioned adjacent the record playing table and being so positioned as to render the record changing mechanism inoperative when records of larger than a predetermined diameter are played, substantially as set forth.

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