

Sept. 10, 1929.

J. C. READE ET AL

1,727,731

RECORD CHANGING DEVICE FOR PHONOGRAPHS

Filed Jan. 3, 1928

6 Sheets-Sheet 1

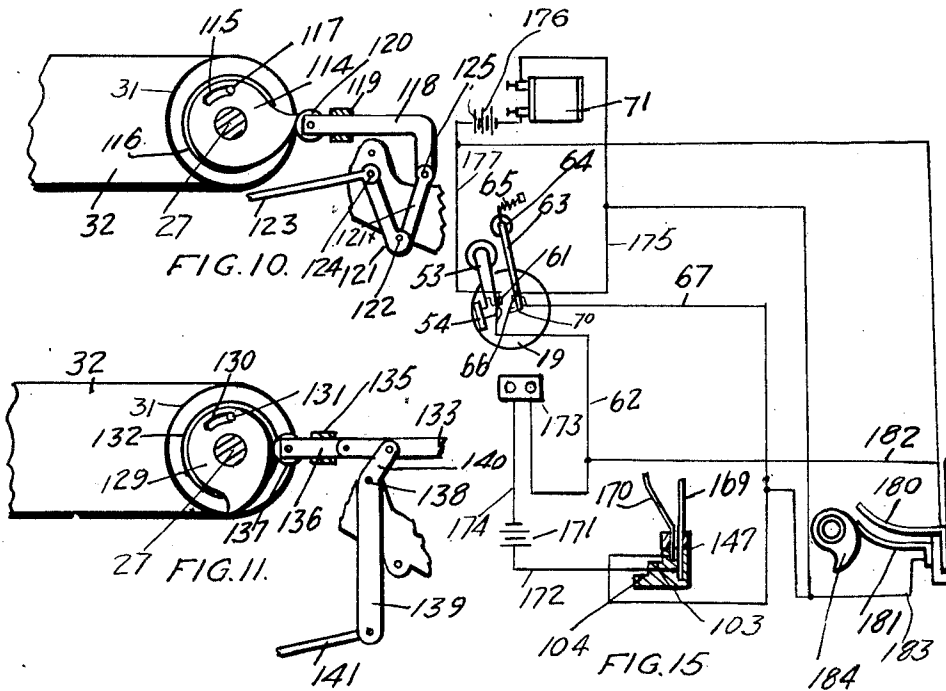
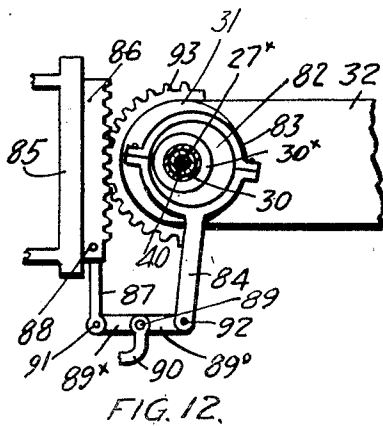
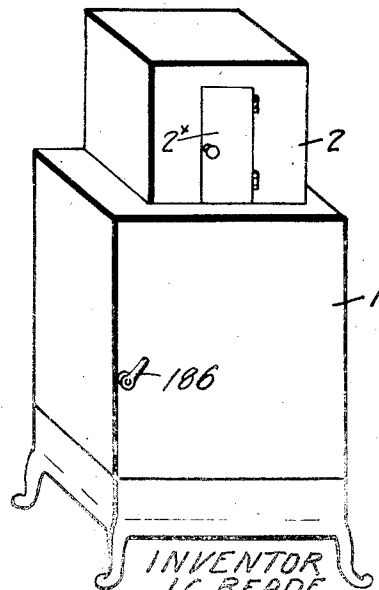


FIG. 1.



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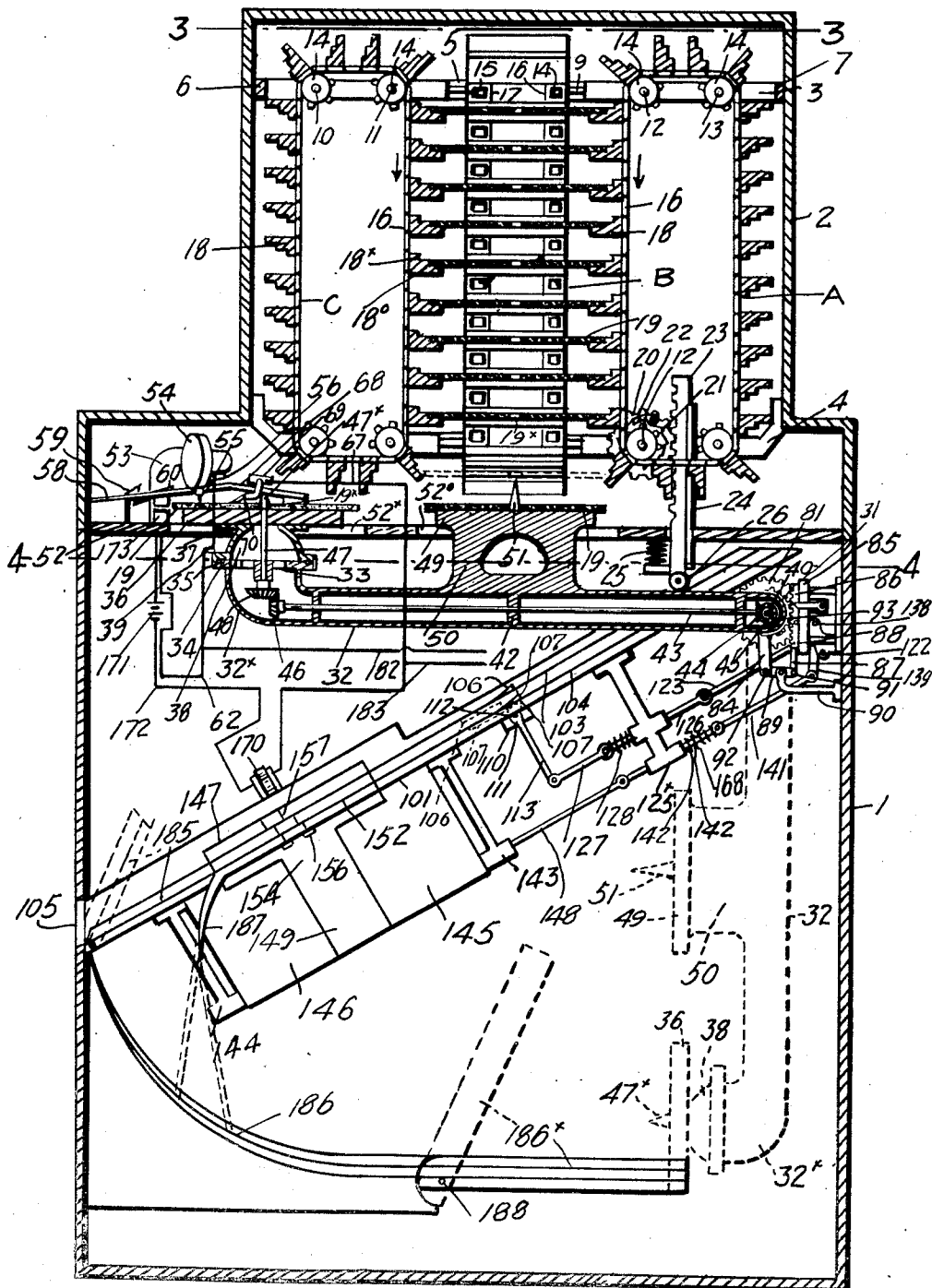


FIG. 2.

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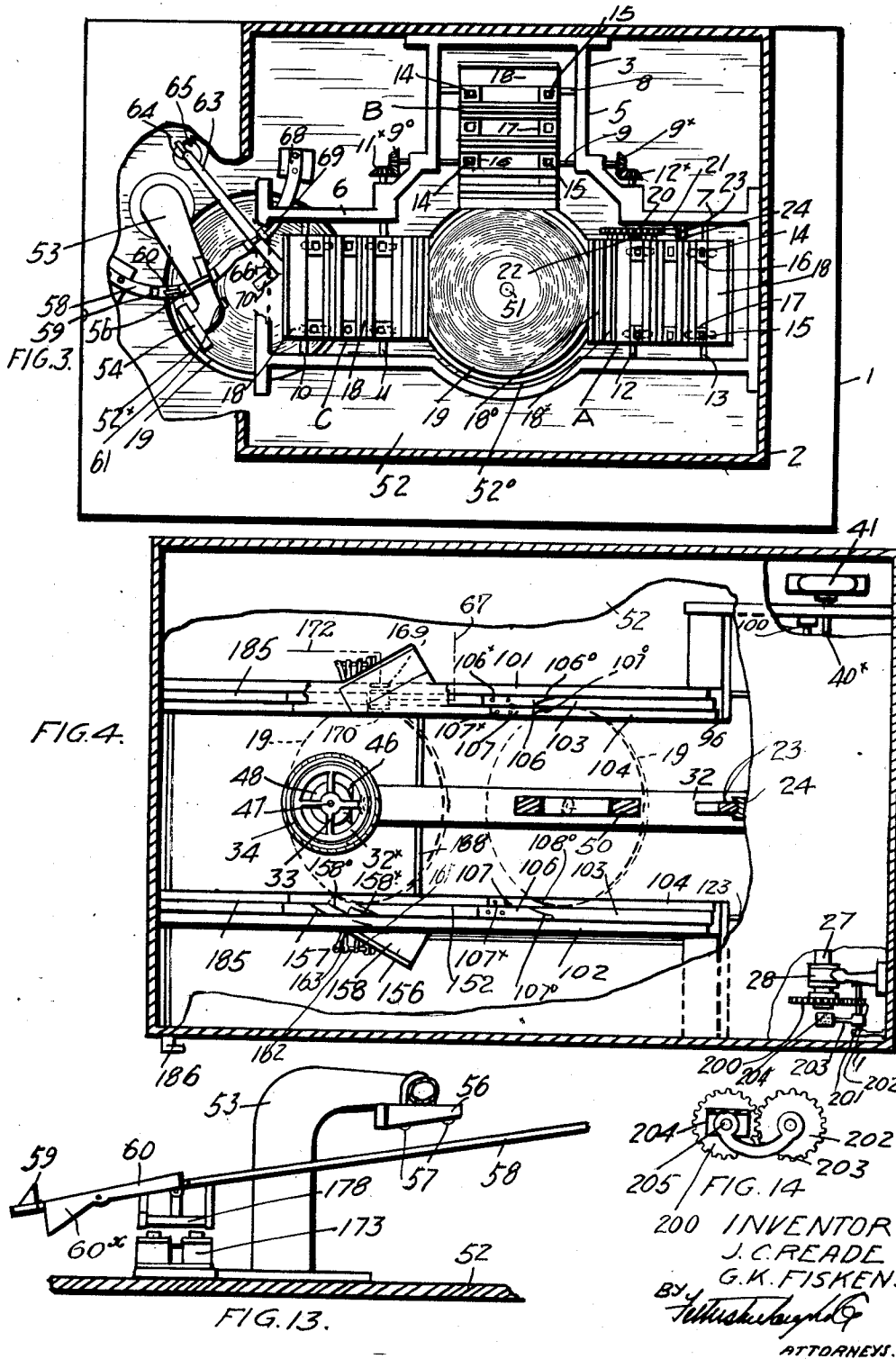
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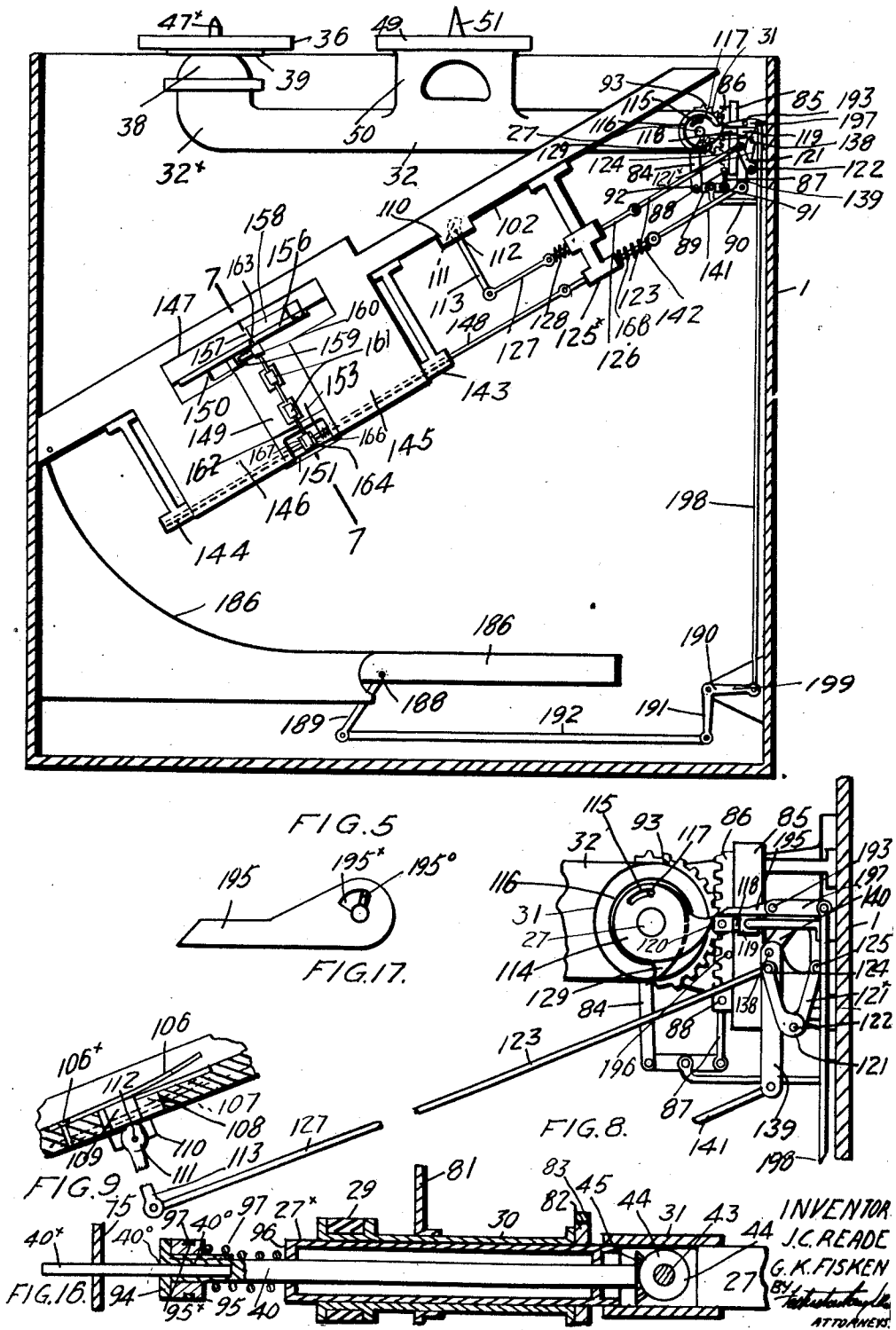
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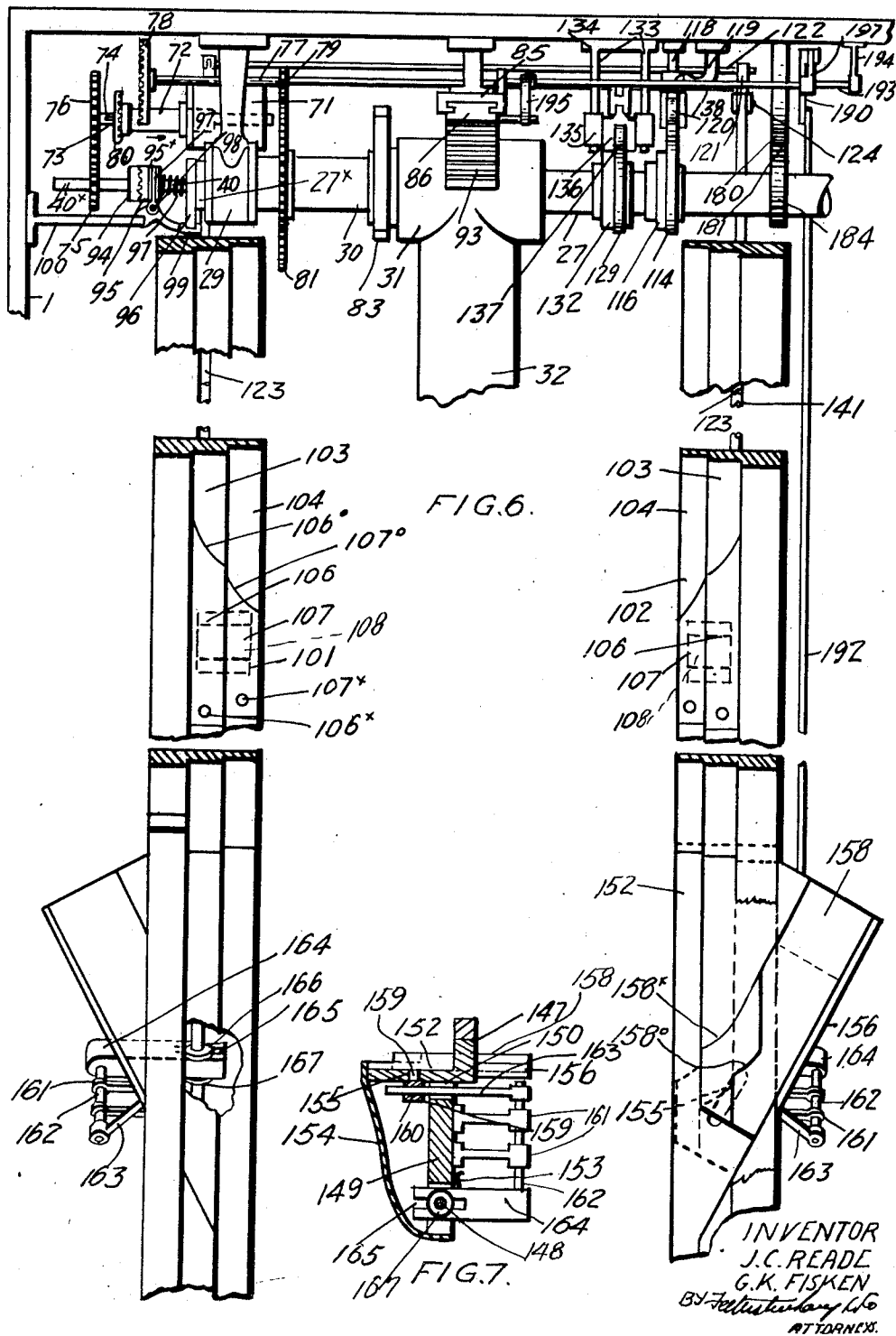
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RECORD CHANGING DEVICE FOR PHONOGRAPHS

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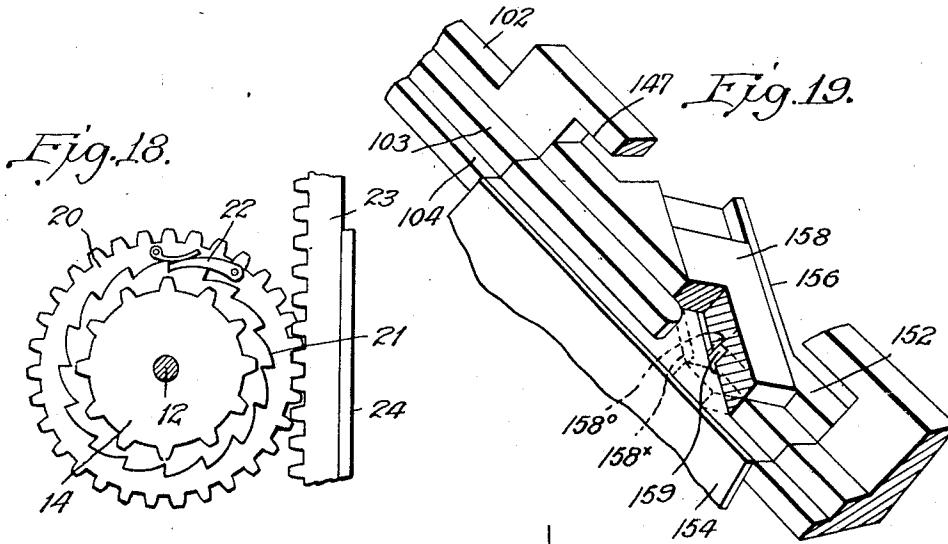
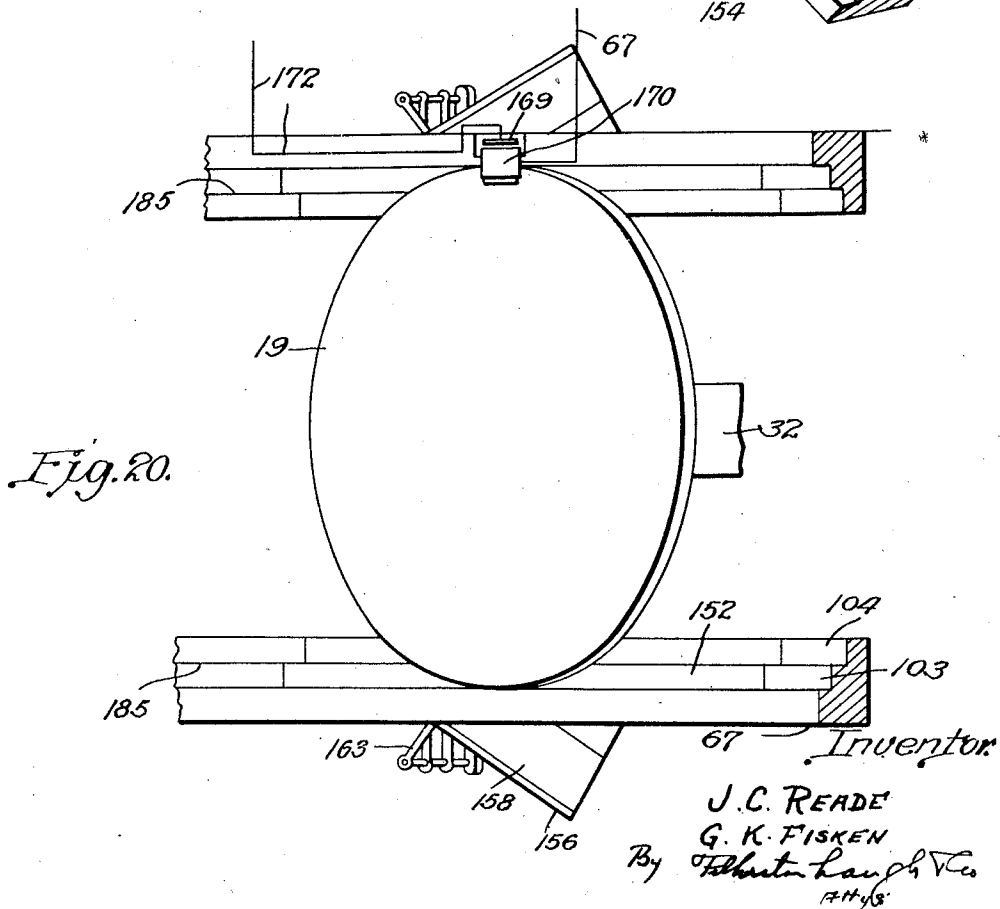
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RECORD CHANGING DEVICE FOR PHONOGRAPHS

Filed Jan. 3, 1928

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UNITED STATES PATENT OFFICE.

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RECORD-CHANGING DEVICE FOR PHONOGRAPHS.

Application filed January 2, 1928. Serial No. 244,213.

Our invention relates to improvements in record changing devices for phonographs, and the object of the invention is to devise a simple inexpensive construction whereby a series of disc records can be successively changed after the playing of each piece and in the case of two faced records such record can be inverted and replaced on the playing table for use, and it consists essentially of the arrangement and construction of parts as hereinafter more particularly explained.

Fig. 1 is a perspective view of a phonograph cabinet constructed in accordance with our invention in which is contained our operating mechanism.

Fig. 2 is a vertical section through Fig. 1.

Fig. 3 is a plan view on line 3—3 Fig. 2 and showing the parts broken away to exhibit the interior construction.

Fig. 4 is a sectional plan view on line 4—4 Fig. 2.

Fig. 5 is a sectional view through the main casing showing the interior mechanism in elevation.

Fig. 6 is an enlarged detail plan view of parts of Fig. 4 showing the main operating mechanism and the disc slides and stops.

Fig. 7 is an enlarged sectional view on line 7—7 Fig. 5.

Fig. 8 is an enlarged sectional detail elevation of the mechanism for operating the stops.

Fig. 9 is a sectional detail showing the upper stops, and means for actuating the same operating from the mechanism shown in Fig. 8.

Fig. 10 is a detail view of the upper stop cam and the adjacent parts coacting therewith.

Fig. 11 is a detail view of the lower stop cam and the adjacent parts coacting therewith.

Fig. 12 is a sectional detail of the mechanism for controlling the swinging of the table arm.

Fig. 13 is an enlarged detail view of the means for returning the tone arm to its initial position and the stops coacting therewith.

Fig. 14 is a detail view of the table arm counter weight.

Fig. 15 is a wiring diagram whereby the tone arm adjustable stop is controlled by the record fed into the machine.

Fig. 16 is a sectional plan view extending longitudinally through the table arm supporting shaft.

Fig. 17 is a detail of the latch arm employed in connection with our disc turning device.

Fig. 18 is an enlarged detail of the gear wheel 20 and adjacent parts.

Fig. 19 is a perspective detail of one of the lower stops 158 and the parts carrying the same.

In the drawings like characters of reference indicate corresponding parts in each figure.

1 indicates the main cabinet containing the playing table, tone arm and record interchanging mechanism coacting therewith. 2 is an upward extension to the cabinet containing the record feeding mechanism provided with a door 2* through which the records are inserted. 3 and 4 are upper and lower frames secured within the extension 2 of the cabinet and in which are supported our record feeding mechanism.

Each frame 3 and 4 is substantially T-shaped in form, the vertical and horizontal arm of the T being formed by U-shaped portions 5, 6 and 7. In the portion 5 of the upper frame 3 are journaled shafts 8 and 9, corresponding shafts being journaled in the corresponding portion of the lower frame 4.

10 and 11 are shafts journaled in the frame portion 6 and 12 and 13 are shafts journaled in the frame portion 7, the frame 4 being provided with corresponding shafts. The shaft 12 of the lower frame is the main actuating shaft of the feed mechanism. The shaft 12 and shaft 9 of the frame 3 are connected together by intermeshing bevelled gears 12* and 9* and the opposite end of the shaft 9 and shaft 11 by intermeshing bevelled gears 9° and 11*. Each shaft 8, 9, 10, 11, 12 and 13 of the upper and lower frames 3 and 4 is each provided with spaced apart sprocket gears 14 and 15 on

which are carried endless sprocket chains 16 and 17, the chains assuming a rectangular formation as clearly indicated in Figure 2 and thereby providing a pair of oppositely disposed vertical runs between which the records are held as hereinafter described.

To each pair of spaced apart chains 16 and 17 are secured cross bars 18 equally spaced apart around the chain and forming three endless conveyors A, B and C. Each bar 18 is provided with a pair of parallel ledges 18^a and 18^b, the ledges 18^a of the conveyors A, B and C being spaced apart a required distance to receive a 12" record and the ledges 18^b a 10" record.

From the foregoing it will be seen that when the door 2^a is opened a record receiving rack formed by the bars 18 is directly to the inside of the door which will hold a series of disc records 19 in vertical series so that as the ratchet mechanism of the conveyors A, B and C is rotated in unison by a step by step movement the records 19 are successively carried down to be discharged at the lower end of the conveyors to drop onto a record receiving table hereinafter described.

The shaft 12 of the lower frame 4 is provided with a sprocket gear 20 which is freely mounted thereon and with a ratchet gear 21 which is secured thereto. 22 is a ratchet dog pivoted upon the sprocket wheel 20 so as to engage with the ratchet wheel 21, being spring pressed in engagement therewith by a suitable spring. 23 is a vertically movable rack held in guides 24 and spring pressed in its downward position by a spring 25, the lower end being provided with a friction roller 26 bearing against the table arm hereinafter described.

27 and 27^a are tubular table arm supporting shafts. The outer end of the shaft 27 is mounted in a bearing standard 28. The outer end of the shaft 27^a extends through a bearing standard 29. 30 is a sleeve shaft mounted freely upon the shaft 27^a, the sleeve shaft 30 being journaled in the bearing 29. The shafts 27 and 27^a form two portions of one shaft, the abutting ends of such portions being spaced apart and connected together by a connecting sleeve 31 forming the hub portion of the tubular table supporting arm 32 which extends radially therefrom and is provided at its outer end with an upturned portion 32^a provided at its upper end with a spider 33 in the outer periphery of which is formed a concentric ball race 34 in which the balls 35 of a ball bearing run.

36 is the playing table provided with a central orifice 37. 38 is a hollow supporting member secured centrally to the lower face of the table 36 and is provided with an annular flange 39 provided with a ball race

opposing the ball race 34 hereinbefore described.

It will thus be seen that the playing table is free to revolve upon the upwardly extending portion 32^a of the table supporting arm 32.

40 is the main shaft from which the playing table is rotated, such shaft being driven from a motor 41 or other suitable source of power and motor shaft 40^a. The shaft 40 extends longitudinally centrally through the shaft 27^a into the sleeve portion 31 of the table arm 32. 42 are bearings formed in the table arm 32 in which is journaled a shaft 43 extending longitudinally through the table arm and provided at its inner end with a bevelled gear 44 meshing with a bevelled gear 45 secured to the main shaft 40. 46 is a bevelled gear secured to the opposite end of the shaft 43. 47 is a vertical shaft journaled in the spider 33 and secured at its upper end in the playing table 36 and projecting upwardly therefrom as indicated at 47^a so as to pass through the central orifice 19^a of the disc record supported upon the playing table. 48 is a bevelled gear secured to the lower end of the shaft 47 and meshing with the bevelled gear 46. It will thus be seen that the playing table 36 may be continuously revolved so as to play the record.

49 is the record receiving table located intermediately of the length of the table supporting arm 32 and connected rigidly therewith by a suitably formed base or stem 50. The record receiving table is provided with a spicular projection 51 adapted to pass through the central orifice of the record received upon the table when discharged from the feed mechanism hereinbefore described.

The endless conveyors of the feed mechanism travel in the direction of arrow, see Fig. 2, and as the lowermost record of the series is brought to the dotted position it is freed from its support so as to drop vertically onto the record receiving table 49 carried by the table supporting arm 32 which at this point in the operation is in the horizontal position.

52 is a horizontal wall located in the upper portion of the main cabinet and provided with orifices 52^a and 52^b from which the playing table 36 and record receiving table 39 respectively project when the table supporting arm is in its normal or horizontal position. 53 is a tone arm of any usual construction supported upon the wall 52 and provided with the usual sound box 54 and playing needle 55. 56 is a carriage clamped or otherwise suitably secured to the tone arm as indicated in Figure 13. The carriage is provided with roller supports 57. 58 is an inclined runway provided at its lower end with a permanent stop 59 and an

adjustable stop 60 which is controlled by mechanism which we will hereinafter describe.

61 is a contact carried by the tone arm from which extends a circuit wire 62 forming part of a circuit hereinafter referred to. 63 is an arm coacting with the contact 6 and pivotally mounted at 64 and spring held in position by a light spring 65. The coacting arm 63 is provided with a contact 66 adapted to engage with the contact 61 when the tone arm and coacting arm are brought into an adjacent position. 67 is a circuit wire leading from the contact 66. 68 is an inclined runway similar to the inclined runway 58 hereinbefore described, but sloping in the opposite direction.

The coacting arm 63 is provided with a carriage 69 similar to the carriage 56 carried by the tone arm. The coacting arm is provided at its free end with a record groove engaging finger 70 which is swung upon the end of the coacting arm and adapted to slide over the central or smooth portion of the record into engagement with the inner convolution of the playing groove of the record. When the playing table and disc 19 carried by the table arm is raised so as to lift the finger 70 and the record needle 55, the respective carriages 56 and 69 are carried out of engagement with the slideways 58 and 68, the spring 65 having just sufficient strength to carry the end of the finger 70 engaging the smooth surface of the record over such smooth surface into engagement with the playing groove. When the playing of the record on the playing table is completed the needle 55 is carried to the inner convolution of the playing groove and consequently carries the contact 61 of the tone arm into engagement with the contact 66 of the coacting arm when in the groove engaging position so as to complete a circuit which will hereinafter be referred to.

71 is a solenoid provided with a solenoid core 72 through which extends a shaft 73 which is connected to the core 72 by a feather key 74. 75 is a gear secured to a supplemental or motor shaft 40* in longitudinal alignment with the main shaft 40 and mounted in a longitudinal orifice 40° in the end of the main shaft. 76 is a gear secured to the shaft 73 and meshing with the gear 75. 77 is a short shaft journaled in the standard of the bearing 29 and provided at its outer end with a gear 78 and at its opposite end with a gear pinion 79. 80 is a gear secured to the core 72 so as to be carried by the core in and out of engagement with the gear 78. 81 is a gear secured to the sleeve 30 and meshing with the pinion 79. 82 is an eccentric to which the flanged inner end 30* of the sleeve shaft 30 is secured. 83 is a strap extending around the eccentric 82 and provided with an arm

84. 85 is a vertical stationary guideway secured to the wall of the cabinet. 86 is a gear rack slidable within the guideway 85 and provided at its lower end with a link 87 pivotally connected thereto at 88. 89 is a rod journaled in suitable bearings and provided at one end with an arm 89* pivotally connected at 91 to the link 87 and at the opposite end with an arm 89° pivotally connected at 92 to the arm 84.

The lever 89 is pivotally connected at one end as indicated at 91 to the link 87 and at the opposite end as indicated at 92 to the arm 84. 93 is a gear segment secured to the sleeve portion 31 forming the base of the table supporting arm and meshing with the gear rack 86.

When the solenoid 71 is energized by the completion of the circuit therethrough due to the engagement of the contacts 61 and 66 of the tone and coacting arms respectively, the solenoid core 72 is drawn in the direction of arrow (Fig. 6) carrying the gear 80 into engagement with the gear 78 and thereby producing a driving engagement from the motor shaft 40* through the gears 75 and 76 to the shaft 74 rotating the gear 80 connected thereto by the feather key connection, and thereby driving the gear 78 and shaft 77 and gear pinion 79 meshing with the gear 81 secured to the shaft sleeve 30 to which the eccentric 82 is secured. By this means the eccentric is revolved thereby tilting the lever 89 connected to the arm 84 so as to carry the link 87 and the rack 86 upward and thereby swing the table supporting arm downward by means of the intermeshing connection between the rack 86 and the gear segment 93.

We will now describe the means by which the drive to the main shaft of the playing table drive is broken during the downward swing of the table supporting arm.

94 is a clutch member secured to the supplemental shaft 40*. 95 is a longitudinally movable clutch member provided with a feather key connection to the main shaft 40. 96 is a cam secured to the end of the tubular shaft 27. 97 is a spring extending between the cam and the clutch member 95. The clutch member 95 is provided with an annular groove 95* in which freely fits a ring 97 connected as indicated at 98 to a cam lever 99, one arm of which bears against the periphery of the cam 96 and the other portion fulcrums against the standard 100.

It will thus be seen that when the table supporting arm is swung downward the cam 96 operates against the lever 99 so as to draw the clutch member 95 out of engagement with the clutch member 94 and thus break the drive between the gear 75 and the main shaft 40.

101 and 102 are parallel guides which extend downwardly from the top of the main

cabinet in an inclined direction preferably at about 40 degrees and each are provided with rabbet grooves 103 and 104 forming slideways respectively for a 10" or 12" record.

When the disc record is dropped onto the receiving table 49 as hereinbefore described and the table supporting arm swung downwardly the received record on the table 49 and the played record on the playing table 36 engage in either the grooves 103 or 104 according to the size of the record. The played record is free when engaged by the slideways 103 or 104 to slide downward and discharge through a discharge orifice 105 in the wall of the cabinet into a suitable receptacle. The received record is held by upwardly extending spring stop fingers 106 or 107, the table arm swinging down into the dotted position shown in Figure 2.

When the table supporting arm is again swung upward the lower stops 158 are first projected forward into the slideways 103 and 104 by mechanism which will hereinafter be described and the stops 106 and 107 depressed by mechanism which will also be hereinafter described. This will permit the received record to slide down the slideways until engaged by the stops 158 which will hold the record in such a position that when the table supporting arm swings upwardly the playing table 36 will engage the lower face of the record and the projecting portion 47* of the shaft 47 will pass through the central portion of the record and pick it off the slideways and carry it up to the playing position.

We will now describe the mechanism by which the upper and lower stops are actuated.

The base of the grooves forming the slideways 103 and 104 are recessed so as to receive the stops 106 and 107 which consist of strips of spring band secured at their lower ends within the recess by rivets 106* and 107* and cut at their opposite ends as indicated at 106° and 107° to fit the periphery of the disc record.

108 is an orifice extending through the slideways in alignment with each of the grooves and from which projecting portions 109 secured to the stops 106 and 107 extend. 110 is a bearing piece secured beneath each slideway. 111 is a cam member pivoted at 112 to the bearing piece 110, the peripheral portion of the cam member bearing against the downwardly projecting portion 109 of each finger 106 and 107. The cam member 111 is provided with an arm 113. 114 is an operating cam mounted freely upon the shaft 27. The cam 114 is provided with a concentric slot 115. 116 is a flange member secured to the shaft 27 and from which extends a pin 117 into the slot 115. 118 is a slide bar held in a bearing 119 and provided

with a cam roller 120 bearing against the periphery of the cam 114. 121 is an arm secured to a rod 122 journaled in a suitable support such as a portion of one of the standards of the bearings 28 and 29 or any other suitable support. 123 is a rod pivoted at 124 to the arm 121. 121* is an arm also secured to the rod 122 and pivotally connected at 125 to the rear end of the slide bar 118. 125* is a bearing member depending from each of the parallel slideways 102 and 103. 126 is a rod portion slidable longitudinally with the bearing 125* and pivotally connected at its upper end to the rod 123. The opposite end of the rod 126 is connected by a link 127 to the lower end of the cam arm 113. 128 is a compression spring extending between the bearing member 125* and the enlargement forming the pivotal connection between the rod 126 and the link 127 to exert a downward pressure longitudinally of the rod 126.

It will of course be understood the opposite end of the rod 122 is provided with an arm for actuating the rods similar to that above described beneath the other guideway 101.

It will thus be seen that when the table supporting arm is swung downwardly the cam 114 will be carried upwardly when the pin 117 has travelled into engagement with the opposite end of the slot 115. It will also be seen that when the table supporting arm is swung downwardly the stop mechanism above referred to will not be operated until the pin 117 has reached the opposite end of the slot 115 so as to permit the table supporting arm to pass between the guideways 101 and 102 to leave the record in the guideways and support it thereon and against the upwardly projecting stops 106 or 107 retaining the record in position in the slideways.

We will now describe the mechanism by which the lower stops 108 and 109 are operated.

129 is a cam similar to the cam 114 and set 90 degrees from the cam 114 and mounted freely upon the shaft 27. The cam 129 is provided with a concentric slot 130 similar to the slot 115 and into which projects a pin 131 from a carrying member 132 secured to the shaft 127. 133 are stationary guide rods forming part of a bracket 134 secured to the wall of the cabinet. 135 are sleeves slidable upon the guide rods 133 and connected together by an interposed portion 136 carrying a cam roller 137 coacting with the cam 129. 138 is a rod journaled in suitable bearings and provided at each end with arms 139 and with an arm 140. A link rod 141 is pivotally connected to each arm 140. 142 is a slide rod similar to the slide rod 126, the upper end of the slide rod 142 being pivotally connected to the rod 130

141. 143 and 144 are supplemental bearing standards depending from each of the guideways 101 and 102 in proximity to their lower ends and between which extends depending web portions 145 and 146, such web portions extending above the guideways and forming a T-shaped opening 147. 148 is a rod pivotally connected at its upper end to the rod member 142 and slidably held within the bearing members 143 and 144 and the web portions 145 and 146. 149 is a T-shaped slide member fitting the T-shaped orifice 147, the vertical arm of the T being provided at its upper end with a slotted opening 150, and at its lower end with a notched opening 151 through which the rod 148 extends. The upper or horizontal head of the T is formed by guideway sections 152. The T-shaped member 149 is held in position by a tension spring 153. The inner face of the T-shaped member is provided with a sheet metal covering forming a curved surface 154 for a purpose which will hereinafter appear.

155 is a slot formed in the base of the guide section 152 and set in a diagonal direction as indicated by dotted lines in Figure 6. 156 is a slideway extending in a diagonal direction outwardly from the guideways 101 and 102. 157 is an opening formed in each guideway section 152 set in the direction of the slideways 156. 158 are the lower stop members which are slidable within the slideways 156 through the orifice 157 and provided with curved edge portions 158^a and 158^b which extend into the slides 103 and 104 to form the lower stops. 159 is a swivel mounted in the stop member 158 so as to extend through the slot 155 and provided at its lower end with an orifice 160. 161 are bearing members extending outwardly from the vertical portion of the T-shaped member 149. 162 is a rocking rod journaled in such bearing members and provided at its upper end with an arm 163 extending through the slot 150 and through the orifice 160 of the swivel 159. 164 is an arm secured to the lower end of the rod 162 and provided at its opposite end with an orifice 165 through which the rod 148 extends. 166 and 167 are collars secured to the rod 148 at each side of the arm 164 a sufficient distance apart to allow of a free movement of the arm 164 as it is swung in one direction or the other by the longitudinal movement of the rod 148.

When the table supporting arm 32 is swung downwardly the cam 129 is carried upward by the engagement of the pin 131 with the opposite end of the slot 130. When this movement of the cam takes place the cam roller 137 and the member 136 and sleeves 135 are carried rearwardly so as to swing the arm 140 a corresponding direction rocking the rod 138 and thereby carry-

ing the arm 139 forwardly and the rod 141 connected thereto longitudinally in the same direction against the pressure of the spring 168.

It will thus be seen that the collars 166 and 167 are carried in the same direction so as to swing the arm 164 and thereby rock the rod 162 swinging the arm 163 in a corresponding direction to carry the stop members 158 into position to intercept the record sliding down the slideways 103 and 104 when the upper stops 106 and 107 are depressed to free the record.

As the table supporting arm is swung upwardly the playing table, when the record is positioned by the lower stops, engages the lower face of the record, the projecting portion 47^a passing through the central orifice of the record, the record being thereby lifted and carried to its playing position.

As has been previously described the tone arm and needle have been carried by the inclined slideways to their normal position or initial playing position and therefore when the playing table with the new record carried thereon is raised to its playing position the needle enters the groove to start the playing of the piece. Similarly the co-acting arm 63 as soon as it is lifted from its slideway 68 is carried by the tension spring 65 to its initial position to engage the inner end of the record groove. When the table supporting arm is carried back to its normal or horizontal position it engages the roller 26 forcing the rack bar 23 vertically upwardly so as to rotate the gear 20 and thereby rotate the ratchet wheel 21 by means of the pawl 22, and thereby rotate the shaft 12 to operate the feed mechanism to carry the next succeeding disc downward to discharge onto the receiving table. When the table supporting arm is swung downwardly to change the records the rack 23 is carried downward by the spring 25, the gear 20 revolving freely by reason of the pawl 22 slipping over the teeth of the ratchet 21.

In order that the playing needle may be stopped in the correct position for playing either a 10" or 12" record we have provided the adjustable supplemental stop 60 hereinbefore referred to.

We will now describe the means by which this stop is operated.

In the slideway 103 we have provided a stationary contact 169 extending upwardly therefrom, and a spring contact 170 normally out of engagement with the contact 169 and which is engaged by the periphery of the 12" record at diametrically opposite points as the record is carried upward along the slideway to the playing position forcing the spring contact 170 into engagement with the stationary contact so as to close a circuit.

171 is a battery or other source of energy for the foregoing circuit. 172 is a wire connecting one terminal of the battery to the stationary contact 169.

5 The wire 67 leading from the contact 66 of the coacting arm 63 extends at its opposite end to the spring contacts 170. The wire 62 also hereinbefore described extends from the contact 61 of the tone arm to an
10 electro-magnet 173, a wire 174 extending from the other terminal of the magnet to the other terminal of the battery 171. A circuit wire 175 also extends from the contact 66 through the solenoid 71 to the terminal of a battery 176, the other terminal of
15 the battery being connected by a wire 177 to the contact 61 of the tone arm.

178 is the armature of the electro-magnet 173 which is connected at its upper end to
20 the stop member 60 suitably counterweighted as indicated at 60*.

It will be readily seen that when a 12" record passes from the slideway to close the contacts 169 and 179 that the circuit from
25 the battery passes through the electro-magnet 173 drawing down the armature 178 and the stop 60 so as to permit the tone arm to pass further outwardly to engage the stop 59 so as to carry the needle to engage
30 the greater diameter of the record groove of the 12" record.

In order to insure that the circuit is maintained closed during the downward swing of the table supporting arm we have provided a pair of contacts 180 and 181, the circuit wires 182 and 183 connecting into the circuit of the electro-magnet 173 so as to
35 short circuit the contacts 66 and 61 and thereby maintain the circuit closed from the battery 171 through the electro-magnet 173 when the contacts 180 and 181 are forced
40 into contact by the contact closing cam 184 secured to the shaft 27 to swing therewith when the table supporting arm 32 is swung
45 downward.

We will now describe the mechanism by which a two faced record is reversed so that the record groove at one side of the record
50 may be first used and then the record groove on the other side or face used.

The guideways 101 and 102 at their lower ends are provided with a hinge section 185 which may be swung upwardly into the dotted position by means of a handle 186
55 located at the outside of the machine, and thereby provide an opening through which the record, freed from the lower stops 108 and 109, will pass instead of through the ordinary discharge opening 105.

60 A downwardly curved guideway 186 is located beneath each guideway 101 and 102 with which the lower peripheral portion of the descending record engages. The upper portion of the record is supported by a lip
65 187, the record successively assuming the

positions indicated by dotted lines in Figure 2 so as to turn over and then slide down the slide grooves of the guides 186* into the lower guide extensions 186* which are pivotally mounted upon a cross rod 188
70 which is provided at its outer end with a crank arm 189. 190 is a bell crank, the lower arm 191 of which is connected by a link 192 to the crank arm 189. 193 is a rod journaled in a bearing 194 at one end and in the standard of the bearing 29 at the opposite end. 195 is an arm swung upon a rod 193 and is provided with a segmental orifice 195* into which a pin 195° extends radially from the rod. 196 is a pin which extends
75 laterally from the rack 86 travelling upwardly and downwardly therewith.

It will thus be seen that when the pin 196 is carried upwardly it will engage the arm 195 which will swing freely upwardly, the pin 195° permitting of this movement. When, however, the pin 196 is carried downwardly or in the reverse direction, it engages the arm 195 swinging such arm downwardly and rocking the rod 193 in the same direction.
80 90

197 is an arm extending from the opposite end of the rod 193, such arm being connected by a link 198 to the other arm 199 of the bell crank 190. By this means the guide section 186* is swung upwardly to the angular position indicated by dotted lines in Figure 2 with the record supported thereon, the record being thereby held in such a position that when the table supporting arm is again swung upwardly from its dotted position it will engage the turned record carrying it upwardly between the guideways 101 and 102. As it passes between such guideways the diametrically opposite portions of the record will engage the opposing cam faces 154 so as to force the guide sections outwardly in opposite directions against the pressure of the springs 153 enabling the record to pass upwardly to its playing position.
95 100 105 110

In order to counterweight the shaft 27 we have provided the following mechanism.

200 is a gear secured to such shaft 27. 201 is a countershaft journaled in bearings on which is secured a gear 202 meshing with the gear 200. Secured to the countershaft 201 is a curved arm 203 carrying a counterweight 204 which is freely swung upon a pin 205 carried by the arm 203. By this means as the table supporting arm 32 is swung upwardly the counteracting effect of the counterweight increases as the arm travels upwardly towards its vertical center.
115 120

In order to make the general operation clearer we will give a short resumé of the operation of our device.
125

The table supporting arm 32 is swung successively downwardly and upwardly, the played record being engaged by the inclined
130

slideways 101 and 102 and discharged through the orifice 105. By the preceeding upward movement of the table arm 32 the rack 23 is operated so as to simultaneously rotate the conveyors A, B and C to feed a new record onto the supplemental table 49. This new record as the table supporting arm is swung downwardly is also received in the guideways 101 and 102 and held in position by the upper stops 106 and 107 until the lower stops 158* and 158° are brought into the stop position, such operation being effected through the cams 114 and 129 which hold the upper stops 106 and 107 in the stop position and the lower stops 158* and 158° in the withdrawn position during the downward swing of the table supporting arm and the upper stops in the withdrawn position and the lower stops in the stop position during the upward swing of the table supporting arm.

As the table supporting arm and the playing table are carried downwardly the tone arm and coacting arm are dropped into engagement with the inclined slideways 58 and 68 which carry the tone arm and coacting arm apart and the needle of the tone arm into position to engage a new record. As the table supporting arm is swung upwardly the lower stops are first carried into the stop position and then the upper stops are depressed so as to release the new record which slides down the slideways 103 or 104 into engagement with the lower stops and into position to be engaged by the playing table as the table supporting arm swings upwardly. The table supporting arm with the playing table then swings upwardly to the normal position engaging the playing needle and finger of the coacting arm carrying their respective carriages free of the inclined slideways 58 and 68.

In order to reverse a two faced record all it is necessary to do is to operate the handle 186 to carry the swinging section 185 upward to the dotted position shown in Figure 2 and to lock the feed device from operation by any suitable means such as a withdrawable pin 206 engaging a projection 206* extending from the gear rack 23 and thereby preventing the downward movement of such gear rack when the swinging arm 32 travels downwardly and also to lock the upper stops in the closed position so as to prevent another record passing down the slideway during the inverting operation, such locking operation being accomplished by any suitable means such as a withdrawable pin 207 engaging a projection 208 on the slide bar 118. The played record when received by the guideways instead of sliding through the orifice 105 passes through the orifice formed by the raised portion of the guideways 185 to pass downwardly and be inverted as it slides onto the lower guideway

section 187, which guideway section is swung upwardly to the dotted position automatically by the operation of the descending table supporting arm 32 and its coacting rack 36 so as to hold the record at such an incline that when the table supporting arm returns on its upward swing the central projecting portion of the shaft passes through the orifice of the record and such record is received on the face of the playing table and carried upwardly inverted to the playing position.

As the inverted record is carried upward to the guides it engages cam faces 145 at diametrically opposite points spreading the guide sections carrying such cam faces outwardly against the spring pressure to allow the record to pass. As soon as the record has passed the guide sections spring back into position.

From this description it will be seen that we have devised a very simple device whereby a series of records may be carried to the playing table and such record removed as it is played to permit the receiving of a new record on the playing table, and at the same time we have devised simple means whereby a two faced record may be inverted so that the groove on one face may be utilized and then the groove on the other face.

What we claim as our invention is:—

1. In a record changing device for phonographs, the combination with the playing table, of a record receiver, means for feeding a series of records successively to the receiver, means for discharging the played record by gravity from the table and for carrying the received record from the receiver to a position to be received by the playing table.

2. In a record changing device for phonographs, the combination with the playing table, and tone arm, of a record receiver, means for feeding a series of records successively to the receiver, means for discharging the played record by gravity from the table and for carrying the received record from the receiver to a position to be received by the playing table, and means coacting with the gravity means and actuated by the tone arm when brought to the final playing position for carrying the playing table away from the played record and into engagement with the received record.

3. In a record changing device for phonographs, the combination with the playing table and tone arm, of a record receiver, means for feeding a series of records successively to the receiver, means for discharging the played record by gravity from the table and for carrying the received record from the receiver to a position to be received by the playing table, means coacting with the gravity means and actuated by the tone arm when brought to the

final playing position for carrying the playing table away from the played record and into engagement with the received record, and means for automatically returning the tone arm from the final to the initial playing position.

4. In a record changing device for phonographs, the combination with the playing table, of a record receiver, means for feeding a series of records successively to the receiver, gravity means for discharging the played record from the table and for carrying the received record from the receiver to a position to be received by the playing table, and means for automatically inverting a two faced record as it is carried to the position to be received by the playing table.

5. In a record changing device for phonographs, the combination with the playing table, of a record receiver, conveyor mechanism adapted to hold a series of records one above the other over the receiver, means for automatically operating the conveyor mechanism to successively discharge such records onto the receiver, and means for automatically removing the played record from the playing table and for transferring the received record from the receiver to the playing table.

6. In a device of the class described, a record feeding device comprising a plurality of endless chains having opposing vertical parallel runs, record supporting means carried by such chains and spaced suitable distances apart, and means for revolving the chains in unison to carry the record downwardly to discharge at their lower ends.

7. In a device of the class described, a record feeding device comprising a plurality of endless chains having opposing vertical parallel runs, record supporting means carried by such chains and spaced suitable distances apart and adapted to support records of a plurality of sizes, and means for revolving the chains in unison to carry the record downwardly to discharge at their lower ends.

8. In a device of the class described, a record feeding device comprising a plurality of endless chains having opposing vertical parallel runs, horizontal bars supported by the chains and spaced suitable distances apart, and record receiving grooves at the edges of such bars.

9. In a device of the class described, a record feeding device comprising a plurality of endless chains having opposing vertical parallel runs, horizontal bars supported by the chains and spaced suitable distances apart, and a plurality of parallel record receiving grooves in stepped relation one to the other formed in the edges of the bars.

10. In a record changing device, a table supporting arm, a receiving table and a play-

ing table carried by the arm, means for swinging the arm automatically downwardly and upwardly after the playing of each record, means for feeding a record onto the receiving table when the table supporting arm is in its raised position, and means coacting with the arm during its swinging movement for discharging the played record by gravity from the playing table and for transferring the received record from the receiving table to the playing table after the discharge of each record from the playing table.

11. In a record changing device, the combination with the tone arm, of a table supporting arm pivotally mounted at one end and a receiving table and playing table carried by the arm, means for swinging the arm automatically downwardly and upwardly after the playing of each record, means for feeding a record onto the receiving table when the table supporting arm is in its raised position, means coacting with the arm during its swinging movement for discharging the played record by gravity from the playing table and for transferring the received record from the receiving table to the playing table after the discharge of each record from the playing table, means for imparting a swinging movement to the arm, and means controlled by the position of the tone arm for setting in operation the arm swinging mechanism.

12. In a record changing device, the combination with the tone arm, of a table supporting arm pivotally mounted at one end, a receiving table and a playing table carried by the arm, means for automatically reciprocating the arm on its pivot, means for feeding a record onto the receiving table during each reciprocating movement of the arm, means coacting with the arm during its downward swinging movement and for discharging the record by gravity from the playing table and for transferring the received record from the receiving table to the playing table, an arm coacting with the tone arm, a finger carried by the coacting arm normally spring held in engagement with the inner convolution of the record groove, and means actuated by the engagement of the tone arm with the coacting arm for actuating the table arm swinging mechanism.

13. In a device of the class described, the combination with the tone arm and a main shaft operated from a suitable source, of a table supporting arm swung at one end, a record receiving table and a playing table carried by the arm, and actuated gear train between the main shaft and the swinging arm, a clutch interposed in such train, a solenoid core carrying the movable clutch member, a contact on the tone arm, a coacting contact, means for supporting the co-

acting contact normally in spaced relation with the contact of the tone arm and a suitably energized solenoid circuit adapted to be closed by the engagement with the aforesaid contacts as the tone arm is carried to its final playing position.

14. In a device of the class described, a table supporting arm swung at one end to travel in a vertical plane, a segmental gear secured to the arm at one end and concentric with its centre of swing, a stationary guide, a rack slidable therein and meshing with the gear segment, means for reciprocating the rack, a tone arm, a contact thereon, a coacting stationary contact, a normally opened circuit leading from such contact, and means operated by the closing of the circuit for operating the rack.

15. In a device of the class described, a table supporting arm swung at one end to travel in a vertical plane, a segmental gear secured to the arm at one end and concentric with its centre of swing, a stationary guide, a rack slidable therein and meshing with the gear segment, an eccentric mounted to move independently of the table supporting arm, a strap for the eccentric, an arm extending from the strap, a lever mounted intermediately of its length and connected to the arm at one end, and a link connecting the opposite end of the lever to the rack.

16. In a device of the class described, the combination with a tone arm and a table supporting arm swung at one end to reciprocate in a vertical plane, of a receiving table and a playing table carried by the arm, an operating main shaft, mechanism for reciprocating the table supporting arm including a driven shaft, a clutch for connecting the main shaft and the driven shaft, a contact carried by the tone arm, a coacting contact, a suitable support for the coacting contact, a circuit leading from such contacts, means operated by the closing of the circuit for engaging the clutch, means for automatically returning the tone arm back to normal as the playing table descends, and means for maintaining the circuit closed after the tone arm and coacting contacts are separated by the return movement of the tone arm.

17. In a device of the class described, the combination with a tone arm and a table supporting arm swung at one end to reciprocate in a vertical plane, of a receiving table and a playing table carried by the arm, an operating main shaft, mechanism for reciprocating the table arm including a driven shaft, a clutch for connecting the main shaft and the driven shaft, a contact carried by the tone arm, a coacting contact, a suitable support for the coacting contact, a circuit leading from such contacts, means operated by the closing of the circuit for engaging the clutch, means for auto-

matically returning the tone arm back to normal as the playing table descends, a pair of supplemental contacts, a cam connected to the table supporting arm to open and close said contacts, and wires connecting the supplemental contacts to the main circuit to maintain the main circuit closed after the separating of the tone arm and coacting contacts.

18. In a record changing device, the combination with a table supporting arm swung at one end to move in a vertical plane, of a record receiving table and a playing table carried by the table arm, means for feeding a record onto the receiving table at each reciprocating movement of the arm, parallel inclined guideways between which the table arm is mounted and with which the edge portions of the record carried on the playing and receiving table engage to lift the records from such tables as the arm passes downwardly and down which the played record is adapted to slide to a suitable discharge, upper stops in the guideways adapted to hold the received record in the upper position in the guideways during the discharge of the played record, and means for withdrawing the upper stops as the arm returns upwardly, lower stops, means for projecting the lower stops into the guideways to engage the record freed by the upper stops and to position the same in the upward path of the playing table.

19. In a device of the class described the combination with a rocking shaft, a table supporting arm carried by the shaft, a receiving and playing table carried by the arm, parallel inclined guides between which the arm swings, upper and lower record stops in the guides, and means for positioning the upper stops in the guide closing position and the lower stops in the guide opening position during the downward swing of the arm and the upper stops in the guide opening position and the lower stops in the guide closing position during the upward swing of the arm to and through the guides.

20. In a device of the class described, the combination with a table supporting arm mounted to swing in a vertical plane, of a playing table carried by the arm, a tone arm adapted to carry a needle engaging the record grooves, an inclined slideway extending upwardly over the playing table, a carriage carried by the upper portion of the tone arm and engaging the slideway when the playing table is lowered.

21. In a record changing device for phonographs, the combination with a main operating shaft and a tubular rocking shaft mounted in suitable bearings, of a table supporting arm secured to the rocking shaft, an inner shaft journaled in the tubular shaft driven from the driving shaft,

- a clutch connection between the driving shaft and the inner shaft, a shaft journaled within the table supporting arm, a playing table suitably mounted on the end of the table supporting arm, a vertical shaft to which the playing table is secured, a gear connection between the vertical shaft and the shaft within the table supporting arm, a gear connection between the shaft within the table supporting arm and the shaft extending through the tubular rocking shaft, and means operated by the downward movement of the table supporting arm for throwing out the clutch.
22. In a record changing device for phonographs, the combination with a main operating shaft and a tubular rocking shaft mounted in suitable bearings, of a table supporting arm secured to the rocking shaft, an inner shaft journaled in the tubular shaft driven from the driving shaft, a clutch connection between the driving shaft and the inner shaft, a shaft journaled within the table supporting arm, a playing table suitably mounted on the end of the table supporting arm, a vertical shaft to which the playing table is secured, a gear connection between the vertical shaft and the shaft within the table supporting arm, a gear connection between the shaft within the table supporting arm and the shaft extending through the tubular rocking shaft, a cam secured to the tubular rocking shaft, and a lever fulcrumed against a suitable support and adapted to throw out the movable clutch member by the depression of the table arm.
23. In a record changing device for phonographs, the combination with a table supporting arm and a playing table carried thereby adapted to swing in a vertical plane, of inclined guideways having a hinged section at the lower end thereof forming an opening through which the discharged record is adapted to pass, downwardly and inwardly curved guides forming extensions of the inclined guides, a lip located at the opposite side of the aforesaid opening and adapted to engage the discharged record to coact with the inwardly curved guide to invert a record as it passes downward, a pivoted extension to each of the curved guideways onto which the discharged record finally passes, and means operated by the downward swing of the table supporting arm for swinging the extension upwardly to hold the record in position to be engaged by the playing table as the table supporting arm swings upward on its return movement.
24. In a record changing device for phonographs, the combination with a table supporting arm adapted to swing in a vertical plane, of a playing table carried by the arm, mechanism for reciprocating the table arm including a vertically movable rack, a pin extending laterally from the rack, a rocking shaft, an arm swung thereon adapted to swing freely upward and to engage the shaft during its downward swing, an arm secured to the opposite end of the shaft, a bell crank mounted adjacent the guide extension, a link rod connecting one arm of the bell crank to the aforesaid arm of the shaft, an arm connected to the guide extension at its pivot point, and a link rod connecting the other arm of the bell crank with the arm of the guide extension.
25. In a record changing device for phonographs, the combination with a main operating shaft and a tubular rocking shaft mounted in suitable bearings, of a table supporting arm secured to the rocking shaft, a playing table revolvably mounted upon the arm, means for driving the playing table on the main shaft, a clutch device for connecting the table drive to the main shaft, and means operated by the rocking movement of the rocking shaft for opening and closing the connecting clutch.
26. In a record changing device for phonographs, the combination with a table supporting arm of a playing table carried thereby and adapted to swing in a vertical plane, of means operated during the downward swing of the arm for inverting a played record during the downward swing of the arm and carrying it into position to be received by the playing table during the upward swing of the arm.

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