

March 5, 1946.

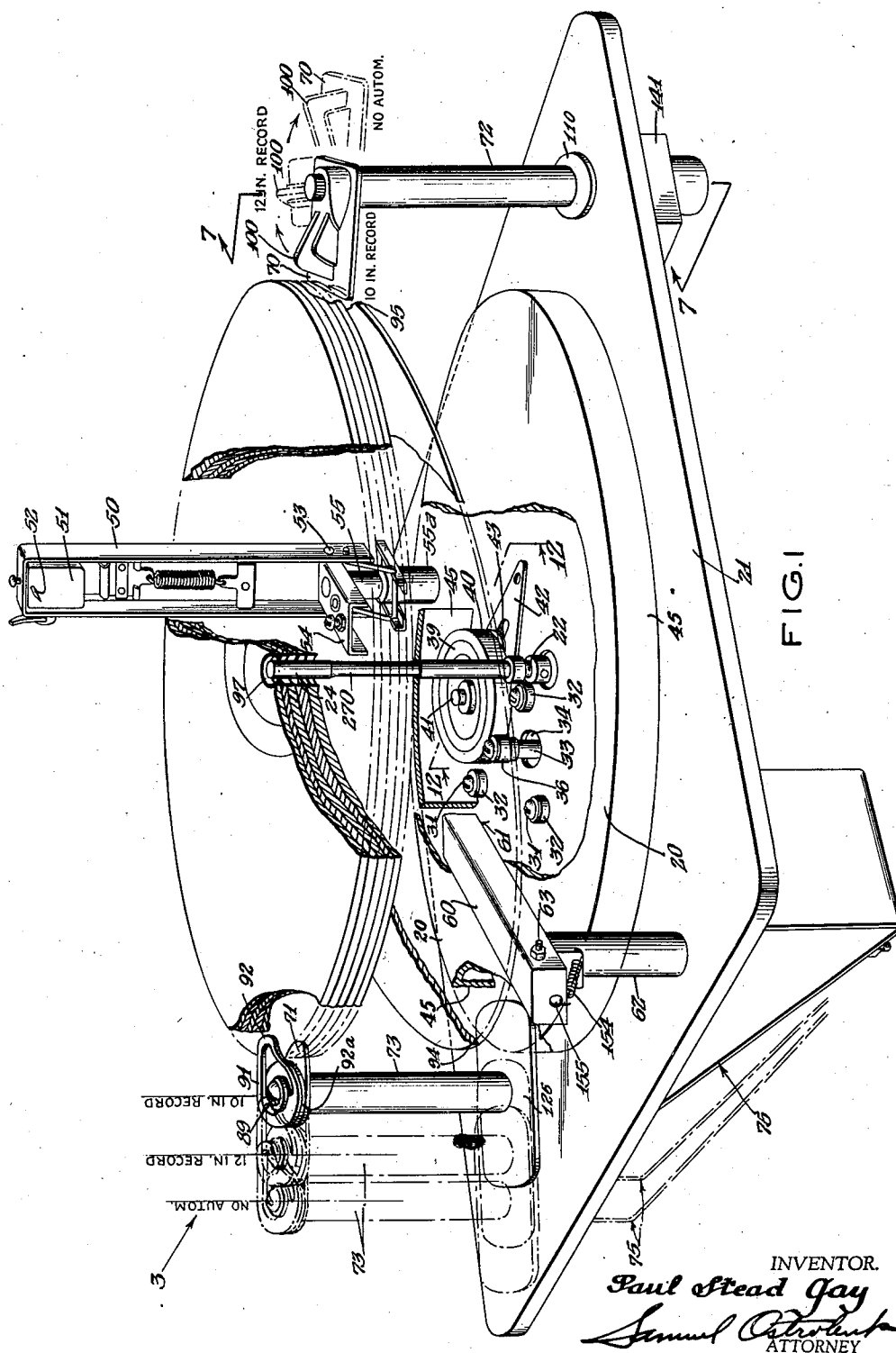
P. S. GAY

2,396,094

RECORD CHANGER

Filed May 11, 1942

7 Sheets-Sheet 1



March 5, 1946.

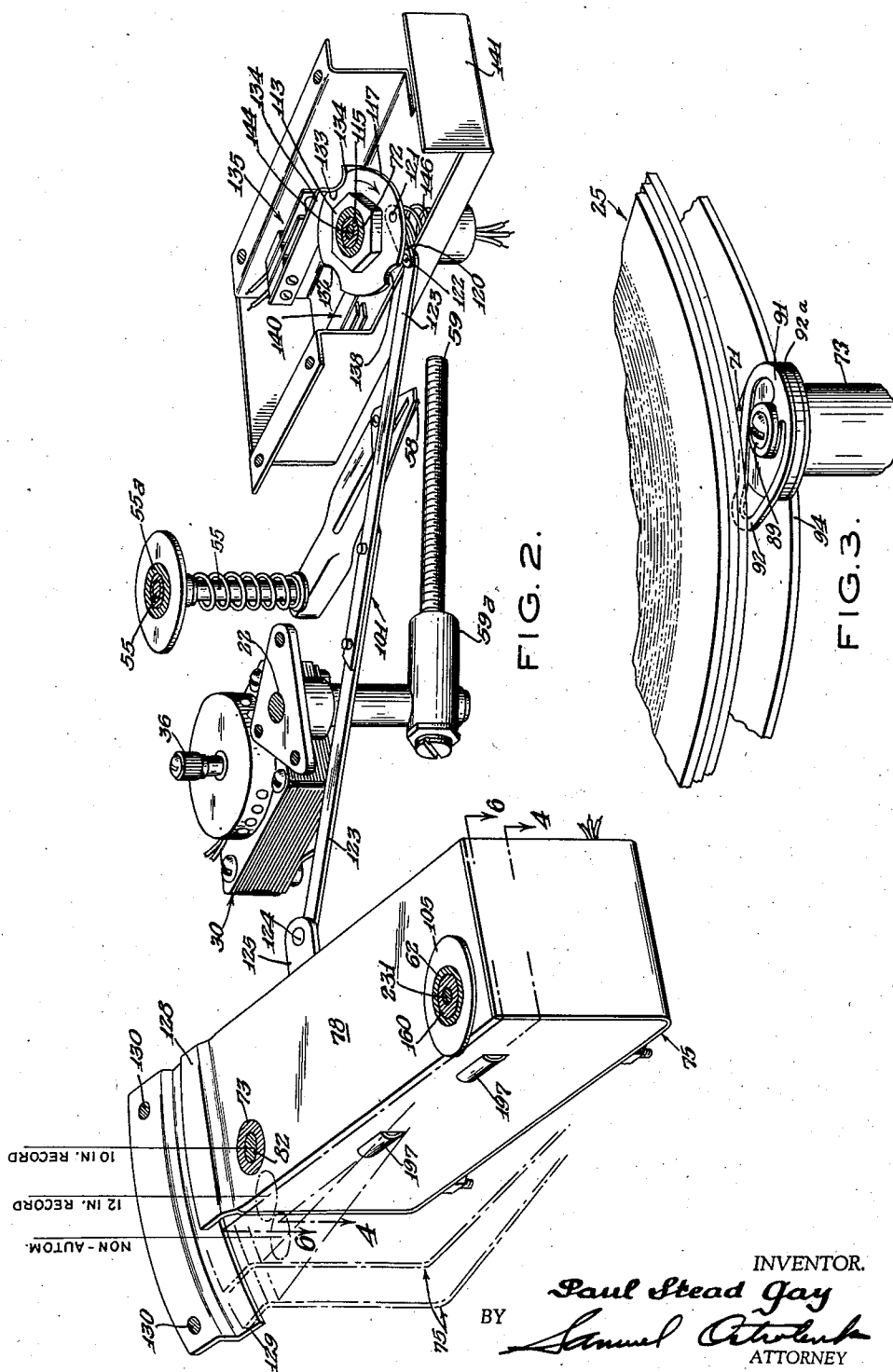
P. S. GAY

2,396,094

RECORD CHANGER

Filed May 11, 1942

7 Sheets-Sheet 2



March 5, 1946.

P. S. GAY

2,396,094

RECORD CHANGER

Filed May 11, 1942

7 Sheets-Sheet 3

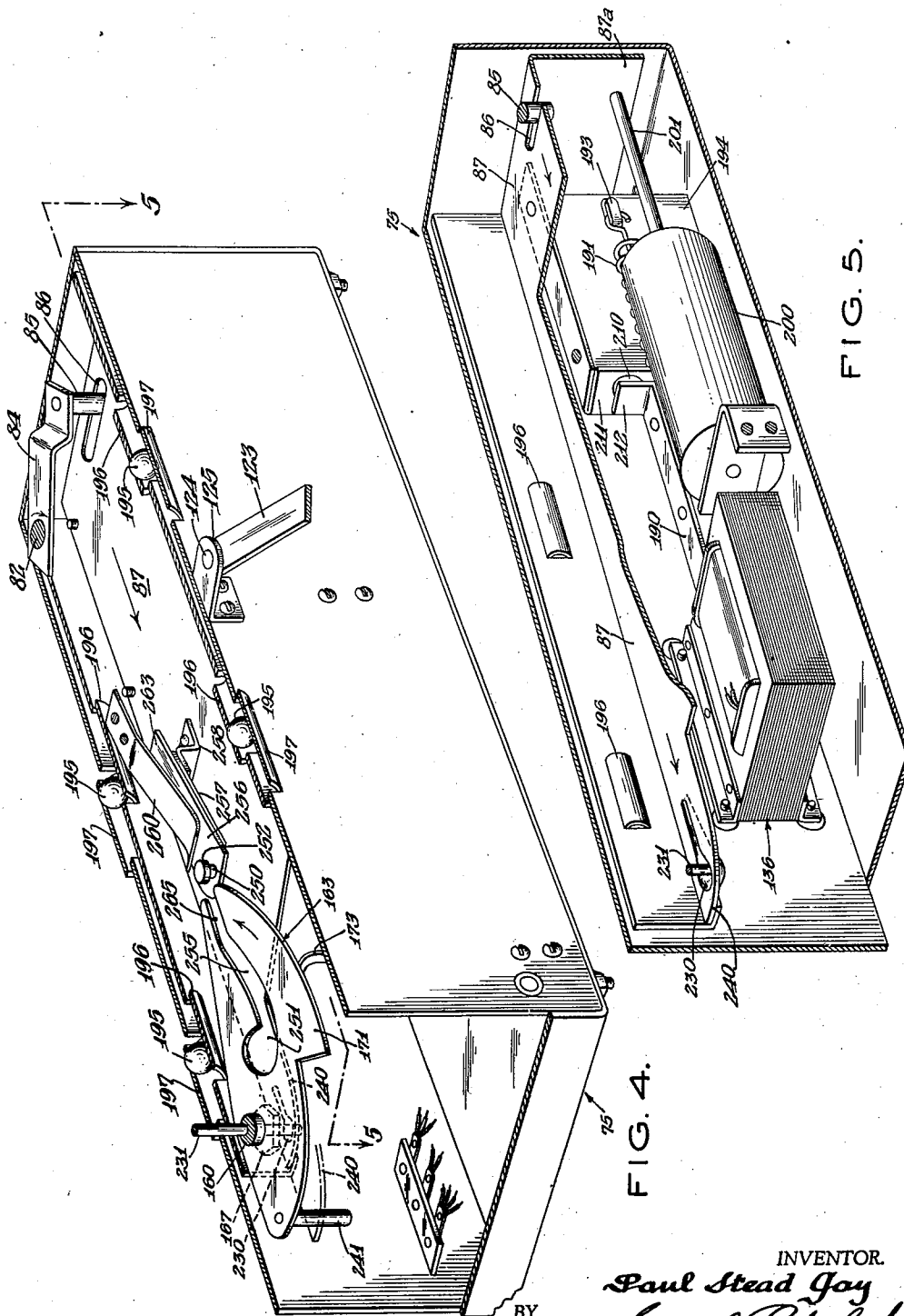


FIG. 4.

FIG. 5.

INVENTOR
Paul Stead Gay
BY *Samuel C. Stead* ATTORNEY

March 5, 1946.

P. S. GAY

2,396,094

RECORD CHANGER

Filed May 11, 1942

7 Sheets-Sheet 4

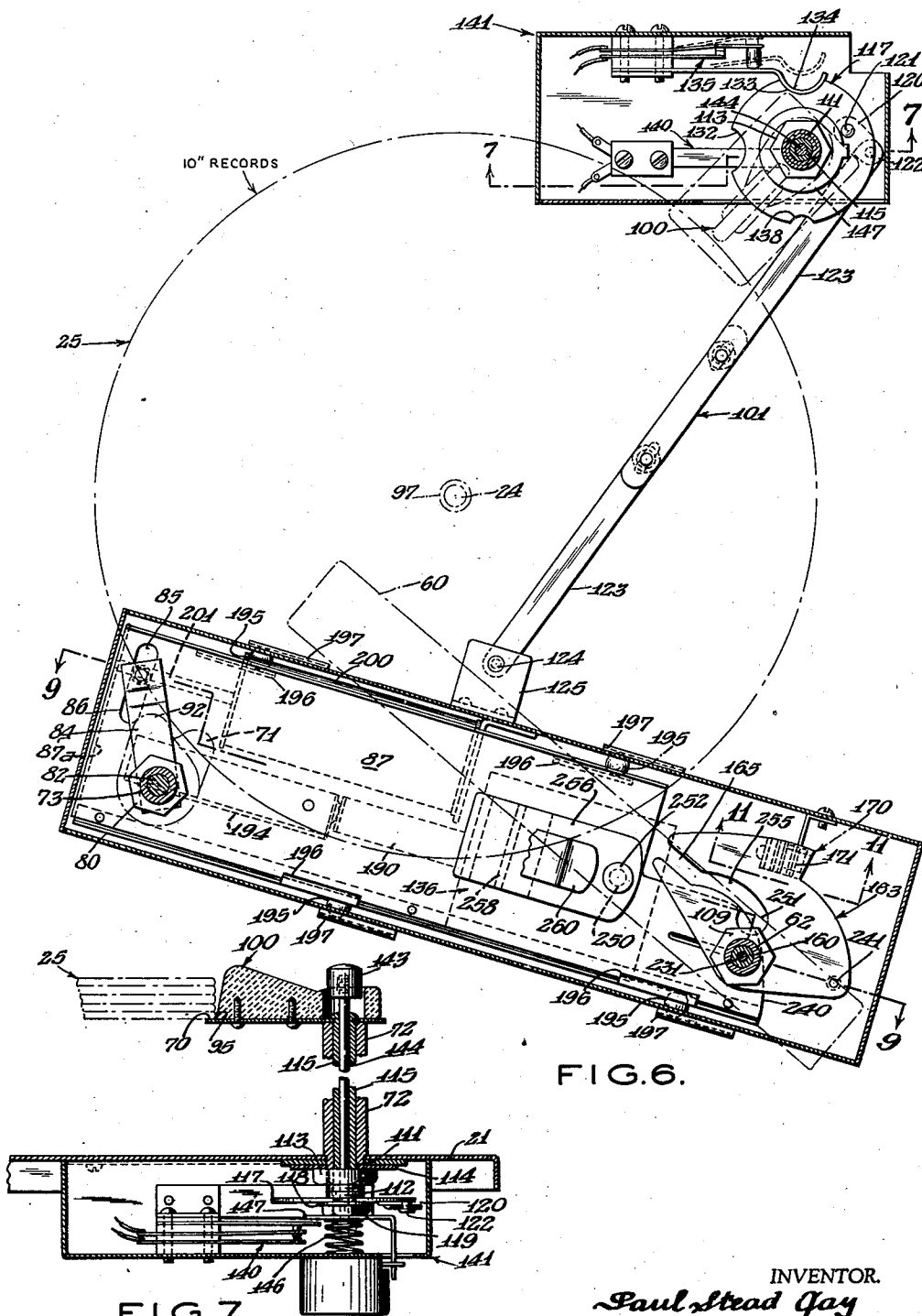


FIG. 7.

INVENTOR.

Paul Stead Gay

BY

Samuel Ostrofsky
ATTORNEY

ATTORNEY

March 5, 1946.

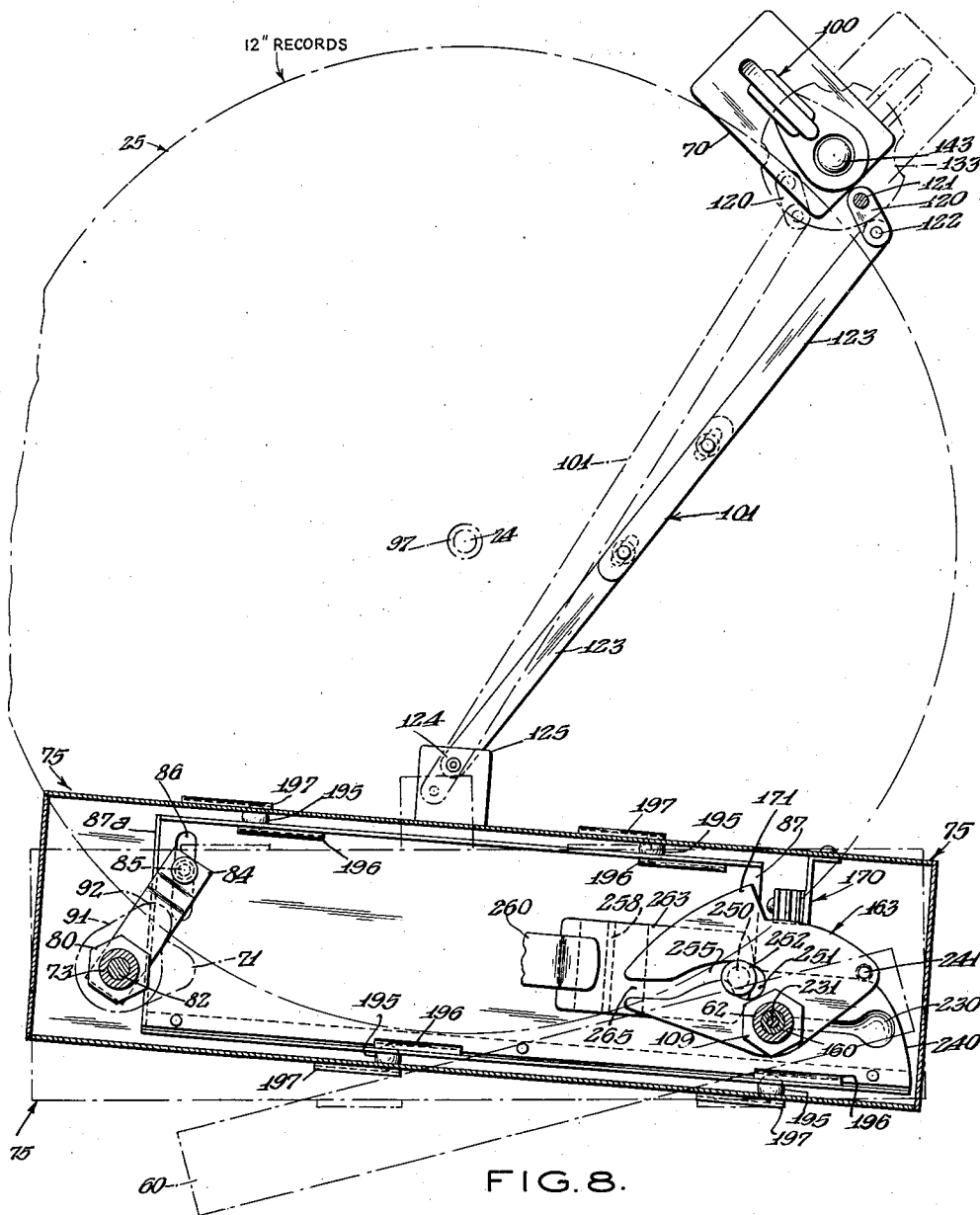
P. S. GAY

2,396,094

RECORD CHANGER

Filed May 11, 1942

7 Sheets-Sheet 5



INVENTOR.
Paul Stead Gay
BY Samuel Ostrofsky
ATTORNEY

March 5, 1946.

P. S. GAY

2,396,094

RECORD CHANGER

Filed May 11, 1942

7 Sheets-Sheet 6

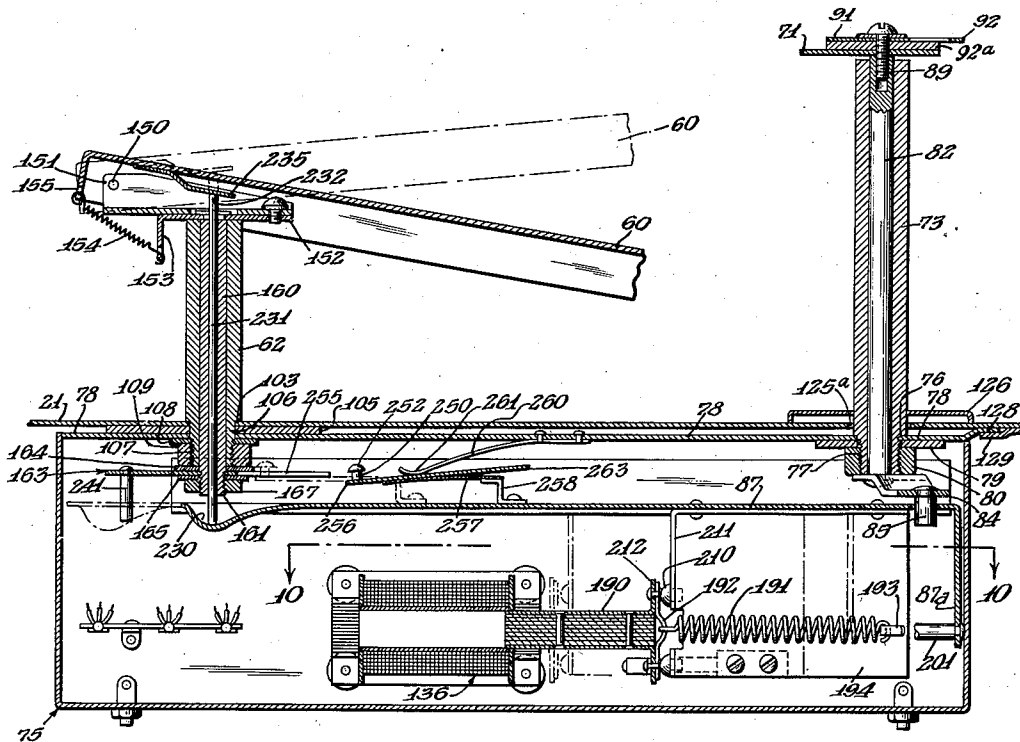


FIG. 9.

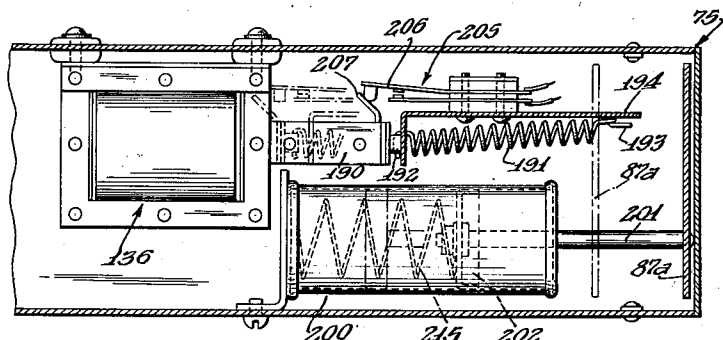
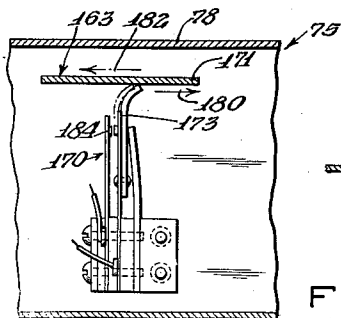


FIG. 10.



P. S. GAY

RECORD CHANGER

Filed May 11, 1942

7 Sheets-Sheet 7

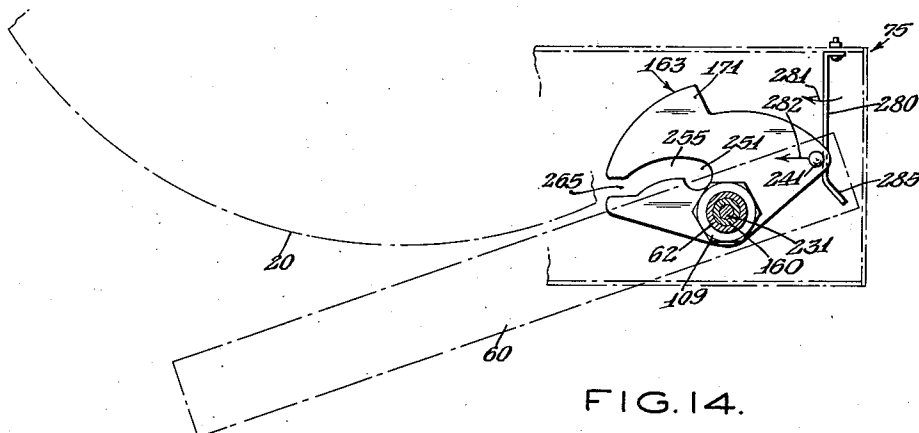


FIG. 14.

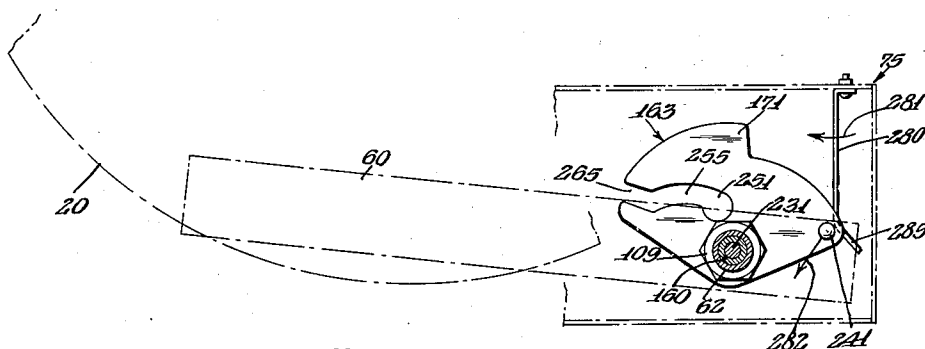


FIG. 15.

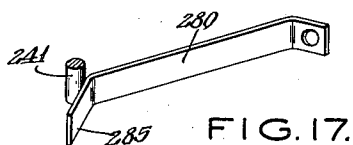


FIG. 17.

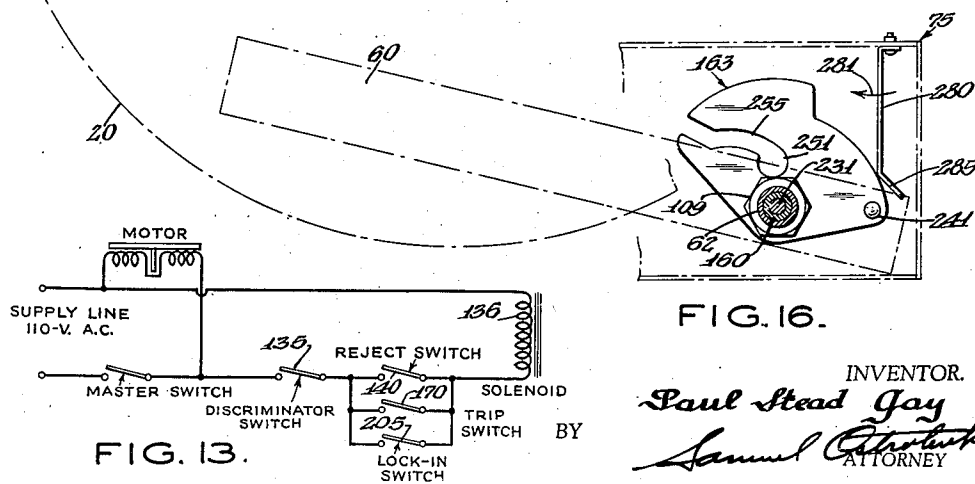


FIG. 13.

INVENTOR.

Paul Stead Gay
Samuel Strickland
ATTORNEY

UNITED STATES PATENT OFFICE

2,396,094

RECORD CHANGER

Paul Stead Gay, Charlotte, Mich., assignor to
Wilcox-Gay Corporation, Charlotte, Mich., a
corporation of Michigan

Application May 11, 1942, Serial No. 442,436

15 Claims. (Cl. 274—10)

This invention relates to record changers and more particularly to an adjustable record changer comprising a minimum of moving parts, substantially all of which are housed within a casing which may readily be suspended from the under-
side of a base plate upon which a turn-table ro-
tates.

Heretofore, in the construction of record changers, while provision has been made for adapting the changer to at least two sizes of records, the adapting means were rather complicated and sometimes inconvenient to operate.

An object of the present invention is the provision of a single adjustment handle in the record changer, the manipulation of which will selectively set the record changer for playing ten inch or twelve inch records or will, if desired, remove the record changer supporting posts out of position so that records may be played without the intervention of the record changer.

Another object of the present invention is the provision of a pair of opposed, supporting members for a plurality of records, the said members being so arranged that the automatic movement of a single member will permit a record to drop down on the turn table.

Another object of the present invention is the construction of a record changer which may readily be attached to a phonograph and in which substantially all of the mechanism is housed in a single casing.

A further object of the present invention is to provide a changer whose changing mechanism cannot be made to operate a record when the record supporting means are in other than the proper position or when the mechanism has been properly arranged for manual operation.

Still another object is to provide a changing mechanism which will not be damaged by forcefully picking up or holding the playing arm while a record is being played and one in which stopping of the mechanism or table at any point in its cycle will not be harmful.

Another object of my invention is to replace the mechanical trigger usually used by a pair of electrical contacts which may be closed by the slightest pressure of the moving pickup arm at the correct time for actuation of the record changing mechanism thus securing more reliable operation and requiring less pressure on the wall of the record groove.

A further object of my invention is to relieve the motor which drives the turntable of the phonograph from any extra power requirements for tripping or actuating the changer mechanism.

Still a further object of my invention is to eliminate variations in the mechanical relationships of important parts of the changing mechanisms as the changer is adapted to the changing of varying record sizes.

These and many other objects of my invention will be apparent, and where not apparent, will be pointed out in the following description and drawings, in which:

Figure 1 is a top view in perspective of a phonograph on which is mounted the record changer of my invention.

Figure 2 is a view in perspective of the record changer operating members and phonograph operating members with the base plate of the phonograph removed.

Figure 3 is an enlarged fragmentary view in perspective of one of the record changing elements of my invention taken from the point 3 of Figure 1, looking in the direction of the arrow.

Figure 4 is a view in perspective, partly in cross-section, taken on line 4—4 of Figure 2, looking in the direction of the arrows.

Figure 5 is a view in perspective, partly in cross-section, taken on line 5—5 of Figure 4, looking in the direction of the arrows.

Figure 6 is a top plan view of the record changing apparatus with the base plate of the phonograph removed and with the phonograph apparatus, shown in dotted lines, taken on line 6—6 of Figure 2.

Figure 7 is a cross-sectional view of one of the record supporting posts taken on line 7—7 of Figure 1, and on line 7—7 of Figure 6 looking in the direction of the arrows.

Figure 8 is a view corresponding to that of Figure 6 showing a different position of the elements thereof.

Figure 9 is a cross-sectional view taken on line 9—9 of Figure 6, looking in the direction of the arrows.

Figure 10 is a cross-sectional view taken on line 10—10 of Figure 9, looking in the direction of the arrows.

Figure 11 is a cross-sectional view taken from line 11—11 of Figure 6, looking in the direction of the arrows.

Figure 12 is a cross-sectional view taken on line 12—12 of Figure 1.

Figure 13 is a schematic circuit diagram showing the arrangement of the various switching devices in my record changer.

Figures 14, 15 and 16 are top views of the housing with the top plate removed showing a feed-in spring and the operation thereof for causing

the needle on the play-back arm to enter the first groove in the record.

Figure 17 is a view in perspective of part of the feed-in mechanism of Figures 14 to 16.

Referring now to Figure 1, I have here shown in dotted lines, a phonograph turn-table 20 mounted on the base plate 21 of the phonograph apparatus, which in turn forms at least the portion of the top of a phonograph cabinet. The turn-table 20 rotates on a spindle 22 which is journaled in the base plate 21. Spindle 22 has a vertical extension 24 which may either be integral with the spindle 22 or secured thereto in any suitable manner and which serves accurately to position the stack of records 25 with respect to the record changer elements hereinafter described.

The operation of the turn-table and the phonograph apparatus is more fully set forth in my application Serial No. 320,823, filed February 26, 1940. Briefly, however, a motor 30 (see Figure 2 as well as Figure 1) is secured to the underside of base plate 21 by bolts 31, 31 positioned in perforations in the base plate by means of rubber grommets 32, 32. The motor shaft 33 projects upwardly through an opening 34 in the base plate and carries at its upward end an arbor 36. The shaft 33 drives the idler 39 by reason of the engagement of the arbor 36 of the shaft with the rubber tire of the idler 39.

The idler 39 is mounted (for rotation on pin 41) on a plate 42, which is pivoted at 43 (see also Figure 12). When the turntable 20 is in position on the spindle 22, the idler 39 is captured between the arbor 36 of the motor shaft 33 and the flange 45 of the turntable 20. Operation of the motor, therefore, causes rotation of the shaft 33 which, through the arbor 36 and the rubber tire 40 causes rotation of the idler 39 which, in turn, by reason of the fact that it bears against and drives the dependent flange 45 of the turn-table 20, effects rotation of the turntable.

The operation of all of these elements is more particularly set forth, as above pointed out, in my application Ser. No. 320,823.

I may also provide, in connection with the phonographic apparatus, means for cutting a record blank which is placed on the turn-table. This cutting means is also shown in Figures 1 and 2 and comprises a cutting arm 50, carrying a cutting head 51 which, in turn, positions a cutting stylus 52. The cutting arm 50 is journaled for rotation in a vertical plane by the pins 53 secured to the platform 54. The platform 54 is, in turn, mounted on the rotatable post 55 which is journaled in the member 55a mounted on the base plate 21, as is described in my application Serial No. 320,823.

The movement of the cutting arm 50 to a horizontal position where the stylus 52 is in engagement with a record surface causes the post 55 to move downwardly under the influence of the compression spring 56 (see Figure 2 as well as Figure 1). A lateral feed arm 57, secured to the lower end of the post 55, carries a pawl 58 which is engaged with the threads of the screw 59 when the post 55 is lowered. Screw 59 is driven through a reduction gear arrangement in the housing 60 from the spindle 22 of the turn-table 20. Consequently, when the cutting arm 50 is lowered into position, the pawl 58 engages the screw 59a and drives the cutting arm centripetally in accordance with the rotation of the turntable.

The record cutting elements (and more particularly described in my application Serial No. 320,823) form no part of the present invention but have been generally described since they are intended to be embodied in the apparatus in connection with which the present invention is to be used.

A play-back arm 60, in which a play-back needle 61 may be mounted, is horizontally rotatable in the journal 62 so that the needle 61 may readily follow the grooves of a record for the purpose of translating variations in the grooves into sound impulses.

The play-back arm 60 is also rotatable about the pins 63 in a vertical plane, so that the play-back arm may be removed either automatically or manually from the record to permit removal or change of records.

The record stack 25 is supported in elevated position above the turn-table 20 by the opposed platforms 70 and 71, which are mounted on posts, which rotate respectively in the vertical journals 72 and 73.

Journal 73, as is seen particularly in Figures 2 and 9, as well as in Figure 1, is mounted in the top of the housing 75 in the record changing mechanism. The journal 73 has at its lower end an annular shoulder 76, which bears against a top plate 78 of the housing, and a threaded end 77 which projects into the housing. The journal 73 is securely positioned in place by means of the washer 79 and nut 80 which engage the threaded end; the portion of the top plate 78 through which the journal passes is clamped between the shoulder 76 and the washer 79, thus securely positioning the journal 73.

A rotatable post 82 is positioned in the journal 73 and projects through the bottom thereof. A lever arm 84 is secured to the projecting bottom end of the post 82 (see Figure 4 as well as Figure 9), the opposite end of the lever arm 84 being rotatably secured to the pin 85 which is captured in the slot 86 of the operating plate 87 of the record changer mechanism.

Since the link 84 is fixedly secured to the post 82, it will now be obvious that movement of the operating plate 87 longitudinally within the housing 75 will result in rotation of the post 82.

The record changer platform 71 is secured to the top end of the post 82 in any suitable manner as, for instance, by the bolt 89. There is also secured to the top end of the post 82 the record separating plate 91; the edge 92 of which is spaced from the platform 71 by the thickness of one record by the spacer 92a as seen in Figs. 1, 3 and 9.

Normally, with respect to Figure 1, the left hand side of the lowest record in the stack is supported on platform 71. When the post 82 is rotated by longitudinal movement of the plate 87, in a manner to be more specifically described, the supporting platform 71 is rotated out of supporting position so that the lowest record in the stack is no longer supported thereon. Simultaneously, since the plate 91 is also secured to the post 82, the edge 92 thereof is rotated into supporting position. But since the edge 92 of plate 91 is spaced from platform 71 by the thickness of a single record, the said edge 92 enters the record stack 25 immediately above the top surface of the lowest record in the stack and just beneath the bottom surface of the second lowest record in the stack.

11—HEINBAUGH Feb. 14 Nite Pats. — 42342
The lowest record in the stack is now released

from the supporting platform 71 by the rotation thereof, and the left hand edge 92 thereof drops down, as shown by the dotted line of Figure 1. The platform 70 at the right hand end remains stationary during this entire movement. The edge of the lowest record is supported on this platform 70.

When the edge 94 drops down, it is necessary that the vertical spindle 24, at least the portion thereof which registers with the records in the stack, be of substantially less diameter than the central perforation 97 in each of the records. This difference in diameter will permit the edge 94 of the record 25 to drop down. The distance from the perforation 97 in record 25 to the platform 70 is thus increased and the edge 95 of the record slides off the platform 70 when this distance becomes greater than the radius of the record.

When the lowest record in the stack has dropped, then the lowest remaining record in the stack is supported at its right hand end by the platform 70 and at its left hand end (see Figure 1) by the platform 91. Now, when the plate 81 moves longitudinally in the opposite direction, as hereinafter described, thus rotating the post 82 counterclockwise with respect to Figure 1, the edge 92 of platform 91 slides out from under the stack 25; while simultaneously, the platform 71 slides into position beneath the stack, and the left hand end of the stack drops down on platform 71.

The stack 25 is now ready for a repetition of the foregoing operation whereby on rotation of platforms 71 and 91 in a clockwise direction, once more the lowest record in the stack will again be permitted to drop down on the turntable 20 or on the records which are resting on the turntable.

The record changing apparatus of the present invention may readily be adjusted to operate on records of various sizes. Commercial records are usually made in ten inch and twelve inch diameters. Accordingly, a record changer should readily be adjustable not merely selectively to take at least these two sizes of records, but also so that the elements thereof may be moved out of position when a non-automatic operation is desired.

This type of adjustment is readily accomplished by means of the handle 100 (Figure 1) and the interconnecting link 101 (Figures 2 and 8) and by the rotatable mounting of the housing 75 of the record changing mechanism about the journal 62 (see also Figure 9). The apparatus is so arranged that manual rotation of the handle 100 to move the platform 70 to each of the three selected positions, shown by the dotted lines of Figure 1, will result in a movement of the journal 73 and the platforms 71 and 91 to corresponding positions, also shown by dotted lines in Figure 1.

For this purpose, the journal 62 is rotatable in the base plate 21. The lower end of the journal 62 has a shoulder 103 which bears against the top surface of the base plate 21. A washer 105 surrounds the narrow extension 106 of the journal below the base plate 21 and extends between the undersurface of the base plate 21 and the top surface of the top plate 78 of the housing 75. The lower end of the journal 62 is threaded at 107, and a washer 108 and a nut 109 are placed over the threaded end so that the top plate 78 of the housing 75 is captured between the washers 105 and 108. The housing 75 and the operating mechanism of the record changer is thus rotat-

able at the journal 62, while the opposite end thereof, which carries the journal 73, thus may move in an arc as shown by the various dotted line positions of Figures 1, 2 and 8.

As shown in Figures 1, 2 and 8, the journal 72 is fixedly secured to the base plate 21 by means of a shoulder 110 thereof which rests on the top of the base plate and an extension 111 thereof of lesser diameter which passes through an opening of the base plate 21. The lower end of the journal is threaded at 112, and a lock nut 113 and washer 114 may be placed thereover, thus securing the journal accurately in position.

The handle 100 is secured to the hollow post 115 which is rotatable in the journal 72. The lower end of the post 115 projects beneath the bottom end 112 of the journal 72 and has keyed thereto a circular plate 117. Plate 117 may be locked in position by the washer 118 and nut 119, which may secure the same to a shouldered extension of the hollow post 115 beneath the journal 72.

Rotation of the handle 100 thus will result in rotation of post 115 in the journal 72 and in corresponding rotation of the plate 117.

As is seen in Figure 2, a link 120 is pivotally secured at 121 to the plate 117 and at its opposite end is pivotally secured by the pin 122 to the link 123. The opposite end of the link 123 is pivotally secured by the pin 124 to the bracket 125 which, in turn, is secured to a side wall of housing 75. It will now be clear that rotation of plate 117 will, through the links 120 and 123, result in rotation of the housing 75 about the journal 62.

When the operating elements of the record changer are in a position for operation in connection with ten inch records, all of the elements occupy the positions shown by the solid lines in Figures 1, 2 and 8.

When the handle 100 is rotated from the ten inch to the twelve inch position in a clockwise direction, the plate 117 is also rotated in a clockwise direction, thus forcing the link 123 to the left and thus also forcing the housing 75 to rotate about its pivot 62 one step in a counterclockwise direction. When the handle 100 is rotated once more in a counterclockwise direction to the non-automatic position, the link 123 is again forced one step further to the left, thus causing the housing 75 to rotate about its pivot 62 one step further in a counterclockwise direction.

By this means, the journal 73 and platform 71 are pushed outwardly one step to the twelve inch position when the handle 100 and the platform 70 are rotated to the twelve inch position and are pushed outwardly another step when the handle 100 and platform 71 are rotated to the non-automatic position.

In other words, when the handle 100 is rotated 90° clockwise from the solid line position, the platform 71 is moved one inch to the left, and when the handle 100 is rotated further in a clockwise direction, the platform 71 is moved further to the left.

The spacing at the right hand end 95 of the record stack 25 is accomplished by the variation between the width and the length of platform 70; the length of platform 70, as shown by the solid line position of Figure 1, being correct for a ten inch record, and the width of the platform 70 providing a proper support, one inch further from the spindle, for a twelve inch record.

In order that the journal 73, which positions the platform 71, may move properly when the

housing 75 rotates about pivot 62, this journal extends from the top of housing 75 through a slot 125a (Figure 9) in the base plate 21. The slot 125a may be sufficiently wide to permit movement of the journal 73, or it may be of a width which is not substantially greater than the diameter of journal 73 and have an arcuate form. The slot 125a may be concealed by the facing plate 126 secured to journal 73.

In order to provide a proper mechanical support for the housing 75 which will, nevertheless permit it to rotate about the pivot 62, the top plate 78 thereof may be extended to form a slide 128 which may move along the ledge 129 secured by the bolts 130, or in any other suitable manner, to the underside of the base plate 21.

The plate 117, which is secured to the post 115 in journal 72, may be provided with notches 132 and 133 registering with the arm 134 of the discriminator cam switch 135. This switch is so arranged, as shown in Figure 13, that the solenoid 136, which initiates the record changing operation, cannot operate when switch 135 is open. Switch 135 is arranged to be closed, as shown by the solid line position of Figures 6 and 2, when either notch 132 or 133 is in engagement with arm 134.

When the outer periphery of the plate 117, however, engages the arm 134, the switch 135 is opened, and the solenoid mechanism cannot operate. Notch 133 is so arranged that it engages the switch arm 134 in the ten inch position; notch 132 engages the switch arm 134 in the twelve inch position.

The switch 135 will be opened at any intermediate position so that the mechanism cannot accidentally operate when an improper intermediate setting has been made (see Figure 13). The switch 135 may also be opened when the relatively small notch 138 is in engagement with the arm 134. Notch 138 engages arm 134 when the non-automatic position is attained.

Accordingly, the use of discriminator switch 135 makes it impossible to trip the mechanism through the use of the tone arm or reject button while the apparatus is set for manual operation.

In addition, the engagement of the switch arm 134 with the notches 133, 132 or 138 serves to position the platform 70, and consequently the platform 71, against accidental movement out of position during operation. The arm 134 is sufficiently resilient, however, so that a manual rotating force applied to the handle 100 may cause the arm 134 to move out of the notches 133, 132 or 138 and onto the peripheral surface of the cam.

A reject switch 140, which is normally open, is mounted in the bottom of the housing 141 which carries the bottom of the journal 72, the said housing 141 being secured in any suitable manner to the underside of the base plate 21. The reject switch will cause the record changing operation to be performed at any point, whether a record has been finished or not, as shown by the circuit diagram of Figure 13. Reject switch 140 may be operated by the knob 143 at the top of handle 100. Knob 143 is mounted on the vertically slidable post 144 which slides in a longitudinal central opening in the rotatable post 115. The lower end of post 144 is engaged by the compression spring 146, which normally urges the knob 143 into raised position.

When knob 143 is depressed, post 144 is correspondingly depressed against the force of compression spring 146; and arm 147, mounted on

the lower end of post 144, engages the reject switch 140 to close the same and thus operate the solenoid mechanism 136 to operate the record changing mechanism.

Further, rotation of knob 143 to right or left will serve to operate the master switch to start and stop the entire phonograph apparatus.

It will thus be seen that all controls are centered at the top of post 72 and that no other portion of the apparatus need be manipulated.

The record changing operation is normally intended to take place when the play-back arm 60 is moved by the groove in the record in a predetermined manner as hereinafter set forth.

The play-back arm 60 is pivotally secured at 150, at either side, to vertical brackets 151 mounted on the platform 152. Platform 152 has a dependent lug 153 to which one end of the tension spring 154 is secured. The opposite end of the tension spring 154 is secured in an opening 155 at the back of the play-back arm 60 and serves properly to balance the play-back arm 60 around the pivot point 150, so that the needle carrying end of the play-back arm exerts only sufficient pressure to ensure that the play-back arm 60 will drop into place, and that the variations in the groove of the record will be translated into sound.

Platform 152 is keyed to the hollow post 160, which is rotatable in the journal 62. Rotation of the play-back arm 60, by reason of the engagement of the needle in the record groove, results consequently in rotation of the post 160.

The lower end of the post 160 is threaded at 161, and a cam plate 163 is secured thereto by the washers 164 and 165 and the lock nut 167. Rotation of the play-back arm 60 which, therefore, causes rotation of the post 160, consequently causes rotation of the cam plate 163.

The shape of the cam plate 163 may more readily be seen in Figures 4 and 6. As seen in Figures 8, 6, and 11, a trip switch 170 is mounted beneath the cam plate 163, and the cam plate has a projecting surface 171 which may engage the operating arm 173 of the trip switch 170.

During the movement of the needle carrying end of the play-back arm 60 toward the spindle, the projecting portion 171 of the cam plate 163 moves in a clockwise direction with respect to Figures 6 and 8 over the operating arm 173 and in the direction indicated by the arrow 180 of Figure 11. Switch 170 thus remains open.

Records which are to be played in connection with the record changer are so arranged, however, that when the end of the record is reached, the groove moves the needle in rather close to the spindle by an increase in the pitch of the groove and then moves the needle out, slightly away from the spindle; thus momentarily reversing the direction of movement of the needle, and thus likewise, momentarily changing the direction of the rotation of the cam plate 163 to a counter-clockwise movement with respect to Figures 6 and 8, or a movement in the direction of the arrow 182 of Figure 11.

During this slight reverse movement, which occurs only momentarily, the operating arm 173, which is frictionally engaged by the underside of the projection 171 of the cam plate 163, is moved into a position where the contacts 184 are closed, thus closing the trip switch and energizing the solenoid 136, as seen in Figure 13.

The energization of the coil 136 of the solenoid (see Figures 9, 10 and 5) causes the armature 190 thereof to move toward the left and into the coil

against the force of the tension spring 191. Spring 191 is secured at one end to an ear 192 attached to the end of the armature 190, and at the other end is secured to a lug 193 on the plate 194 which, in turn, is secured to the under-
side of operating slide plate 87.

Plate 87 is slidable longitudinally in the housing 75 and is supported in sliding relation in respect thereto, as shown in Figure 4, by ball bearings 195, 195 which roll in race-ways 196, 197. The movement of the sliding plate 87 in either direction is, however, limited by the operating rod 201 which is connected to the flange 87a of the oper-
ating slide plate 87.

The dash-pot 200, as is seen in Figure 10, has a plunger 202 connected to its rod 201 which resists motion in either direction. Consequently, when the armature 190 is attracted into the solenoid coil 136, since the dash-pot now slows down the movement of the plate 194 and sliding plate 87, the spring 191 is thus extended. Thus, while the armature 190 snaps into the coil 136, the plate 87 moves slowly toward the coil 136 under the impetus of the tension spring 191, being slowed down by the dash-pot 200.

A lock-in switch 205 is so arranged that the switch arm 206 is maintained in open circuit position by the lug 207 on the armature 190.

Lock-in switch 205 is mounted on the plate 194 which is secured to the operating plate 87. When the armature 190 is now attracted into the solenoid coil 136, while the plate 87 is permitted to follow at a much reduced speed (owing to the dash-pot 200), the lug 207 is thus drawn away from the operating arm 206 of the lock-in switch 205, thus permitting the lock-in switch 205 to close. As is seen in the circuit diagram of Figure 13, the closing of the lock-in switch 205 maintains the energization of the solenoid coil 136. Thus, when the trip switch 170 is momentarily closed, in the manner previously described, to energize the solenoid coil 136, the solenoid coil immediately attracts its armature 190 to close the lock-in switch 205, thus making sure that the energization of the solenoid will be maintained irrespective of the opening of the trip switch 170 until the plate 87 has completed its operative movement in one direction.

When the plate 87 has moved to the left in response to the spring 191 so that the grommet 210 on the flange 211 of the plate 194 bears against the flange 212 of the armature 190, the operating arm 206 of the lock-in switch 205 is opened, thus deenergizing the solenoid coil 136 and permitting movement of the plate 87 in the opposite direction, that is, to the right.

A compression spring 215 may be provided in the dash-pot to cause the plunger 202 thereof to move to the right when the movement to the left has been completed. The spring 191 should be a much more powerful spring than the spring 215 so that it may move the plate 87 toward the solenoid coil 136 against the force of spring 215 as well as against the resistance exerted by the dash-pot plunger 202.

When the solenoid coil 136 is deenergized, then the armature 190 thereof is permitted to move to the right, thus permitting spring 191 to move as a whole to the right, and thus permitting plate 87 to move to the right. No opposition is, therefore, interposed to the expansion of compression spring 215, except the resistance of plunger 202 of the dash-pot 200. Consequently, spring 215 may, through the dash-pot plunger 202 and its

operating arm 201, cause the plate 87 to move to the right once more.

The speed of operation of the record changer is thus a function of the resistance of the dash-pot 200. The openings in plunger 202 may be made of sufficient size so that appropriate speed of operation is obtained.

Obviously, since the play-back arm is to be returned and placed once more accurately in position and since the record is to be dropped by this operation, the speed of movement of plate 87 should not be too great. But I have found that with my device, the operation may be speeded up to such an extent that the time between the closing of trip switch 170 at the end of one record and the engagement of the needle with the groove of the second record which is dropped into place may be as little as 1½ seconds.

Thus, when the cam plate 163 is rotated so that the trip switch 170 is closed momentarily, the solenoid coil 136 is energized to attract armature 190 thus closing lock-in switch 205. The solenoid coil thus remains energized even though trip switch 170 opens momentarily.

The spring 191 causes the plate 87 to follow the armature 190 toward the left, but at a reduced speed owing to the resistance offered by dash-pot 200. When the movement toward the left has been completed, lock-in switch 205 is opened, thus deenergizing solenoid coil 136. Compression spring 215 in the dash pot may now move the plate 87 to the right.

As has previously been pointed out, the movement of plate 87 to the left causes the pin 85, likewise, to move to the left thus rotating link 84 and hence rotating the post 82 which, in turn, rotates platforms 71 and 91 to permit a record to drop from beneath the stack 25 onto the turntable. Simultaneously, the cup-shaped depression 230 (Figure 9) in the operating plate 87 also moves to the left.

The sliding post 231 is so arranged that the lower end thereof normally rests in the cup-shaped depression 230.

When the operating plate 87 moves to the left, the post 231 is caused to rise onto the plane surface of plate 87 thus also raising the upper end 232 of post 231. Post 231 is slidable in the axial bore in the rotatable play-back arm 60. The upper end 232 of post 231 bears against the plate 235 which is secured in any suitable manner to the underside of the play-back arm 60.

Raising of post 231 by the movement of operating plate 87 thus causes the end 232 of the post to raise plate 235, thus causing the play-back arm 60 to rotate about its pivot 150 to the dotted line position of Figure 9. This movement thus disengages the needle in the play-back arm from the groove of the record. Likewise, during the movement of plate 87 to the left, the curved end 240 thereof engages the pin 241 mounted on the underside of the cam plate 163.

The cup-shaped depression 230 and the curved surface 240 of the operating plate 87 are so arranged that the post 231 is raised before the curved end 240 of the plate 87 engages the pin 241. Engagement of the curved surface 240 of the plate 87 with the pin 241 causes the cam plate 163 to rotate in a counterclockwise direction with respect to the view of Figure 4, thus rotating the post 160 and hence rotating the play-back arm 60 away from the spindle and beyond the outer periphery of the turntable.

To summarize, therefore, the initial movement of the plate 87 raises the post 231 to raise the

play-back arm 60 and disengages the needle from the groove. Further movement of the plate 87 to the left, with respect to Figure 4, causes the play-back arm to rotate away from the spindle and beyond the periphery of the turn-table, and likewise, beyond the periphery of any record which may be mounted above or on the turn-table.

At this time also the rotation of the post 82 of platforms 71 and 91 is completed, and platform 71 is rotated out from beneath the stack when the play-back arm has been rotated to a position beyond the periphery of the turn-table; and the lowest record in the stack 25 has begun to drop down onto the turn-table 20.

When the plate 87 has completed its movement to the left, the pin 250 is forced upwardly into the opening 251 in the cam plate 163. Pin 250 has an annular flange 252 which will enable it to engage the upper surface of the plate 163 on either side of the slot 255. Pin 250 is mounted on the plate 256 which is secured to a flexible leaf hinge 257 which, in turn, is mounted on bracket 258 secured in any suitable manner to the plate 87.

A hold-down spring 260 is secured, as shown in Figures 4 and 9, in any suitable manner to the underside of the top plate 78 of the housing. Hold-down spring 260, when its bearing surface 261 is engaged with the portion of the plate 256 to the left of bracket 258, causes the pin 250 to be depressed. As the plate 87 is moved to the left, the hold-down spring remains stationary, nevertheless, maintaining the pin 250 and its plate 256 in lowered position.

When the supporting bracket 258 passes the bearing surface 261 of the hold-down spring, then the end 261 of the spring is engaged with the end 263 of the plate 256, thus causing the plate 256 to rotate upwardly. At this time, the pin 250 has moved into registry with the opening 251 and is snapped up into this opening.

When the plate 87 commences its return movement, pin 250 enters the slot 255, and the flange 252 thereof engages the upper surface of the material surrounding slot 255, thus preventing the pin from dropping down. Slot 255 is so arranged that when the plate 87 now moves to the right during its return movement, the pin 250 will cause the cam plate 163 to rotate thus rotating the post 160 and, therefore, moving the play-back arm 60 in towards the periphery of the record on the turn-table.

Slot 255 is so curved that this rotative movement will be stopped when the needle on the play-back arm 60 registers with the outermost groove of the record on the turn-table. The pin 250, thereafter, withdraws through portion 265 of slot 255, and when it withdraws entirely from the cam plate, the hold-down spring 260 depresses it once more. Before the pin 250 has withdrawn entirely from slot 255, the play-back arm 60 is immediately above the outermost groove of the record which is now to be played.

At this time, the plate 87 in its continued movement toward the right, brings the cup-shaped depression 230 under the post 231 thus permitting the play-back arm 60 to drop down to engage the needle with the groove in the surface of the record; the pin 250 then withdraws completely. At the same time, and by this return movement of the plate 87, post 82 is rotated now in a counterclockwise direction to rotate the platform 91 out of supporting relation with respect to the remainder of the stack 25 and to move

platform 71 under the stack so that the stack drops down on the platform. The stack is now supported between platforms 71 and 70 and is ready for the next record-changing operation.

In a preferred embodiment, the spindle 24 may be of a diameter over most of its extent, which is substantially equal to the diameter of the opening 97 of the records, but slightly smaller than this opening so that records may be mounted on the spindle 24. The diameter of the spindle 24 may, however, be narrowed at 270 in the area thereof, which is in registry with the perforations in the center of the record in the stack, so that the records of the stack 25 may slide slightly to the left to permit the records to drop. That is, when the edge 94 of the lowest record in the stack is released from the platform 71 and drops down, the perforation 97 may move slightly to the left owing to the decreased diameter of the spindle at the portion 270 thereof, thus permitting the beveled edge 95 to slide off the platform 70.

All of the operations hereinbefore described take place whether the record changer is set for ten inch or twelve inch records. The initiation of the record changing operation does not depend on the completion of a particular arc of rotation by the play-back arm, but on a slight reverse movement thereof. Consequently, no change need be made in this respect when the setting of the record changer is changed from a ten inch to a twelve inch record. Likewise, the return movement of the play-back arm to engage the outermost groove in the record is integrated with the position of the housing 75 of the record changing operating members; so that when the housing 75 is rotated to the left, as previously described, to change the setting from ten inch to twelve inch record operation, the play-back arm is, during its return movement, nevertheless, moved to the same degree with respect to the operating mechanism in housing 75; and thus registry with the outermost groove in the record to be played is ensured.

Many modifications and variations of the device hereinabove described may, of course, be made. One such modification which has been found commercially acceptable is shown in Figures 14, 15, 16 and 17.

A leaf spring 280 may be secured in any suitable manner as, for instance, by the bolt 281 to the side of the housing 75. The leaf spring bears against the pin 241 on the cam plate 163. The spring action of the spring 280 is shown in each of the figures by the arrows 281 and 282.

When a record is not being played, or while a record is made, the spring bears against the pin 241 so that the force exerted thereon, as shown in Figure 14, tends to move the pin 241 counterclockwise with respect to the post 160, thus tending to move the play-back arm 60 away from the turn-table 20.

When the record changer is used for automatically changing records, then, after the apparatus hereinbefore described has rotated the cam plate 163 to the position shown in Figure 15 by the engagement of the pin 250, previously mentioned, with the slot 255 and has caused the needle in the play-back arm to set down on the record edge, then the end 285 of the leaf spring 281 bears against pin 241 in the manner shown in Figure 15, causing the pin 241 to rotate in the direction indicated by the arrow 292 in a clockwise direction around the post 160, thus rotating the post 160 and the play-back arm 60 until the needle encounters the first groove. By this

means, therefore, the apparatus is made fool-proof.

While pin 250 with the slot 255 in cam plate 163 returns the play-back arm 60 to the record and causes the needle to drop down, there is a possibility in certain records that the needle will drop down on the edge of the record at a very slight distance from the first groove. This may occur either owing to slight variations in the diameter of the records, or owing to variations in the spacing of the first groove from the edge of the record.

The leaf spring 281 and its projection 285 ensures that the play-back arm 60 will then be rotated inwardly until the needle carried thereby engages the first groove. Thereafter, when the play-back arm 60 has played one-fourth to one-half inch in the record, the pin 241 moves out of engagement with the end 285 of the leaf spring and side pressure on the operating arm 60 and, therefore, side pressure of the needle in the groove is eliminated.

In prior record changing devices where feed-in springs are outlined, the feed-in springs usually are designed to exert a continual pull on the play-back arm toward the center of the turntable during the entire playing of the record. With such devices, it has been very difficult to play home recordings, since the arm skips the grooves, and inherent in this design is a tendency to distort due to the unequal needle pressure on one side of the groove. In the present device, the feed-in spring 280 serves to ensure that the needle on the play-back arm 60 will definitely engage the first groove in the record. The spring 281 is, however, very quickly disassociated from the play-back arm 60 as the play-back arm 60 moves slightly inwardly on the record, thus removing any possibility of distortion from this cause. Furthermore, the tendency imparted by the device, shown in Figures 14 to 17, to hold the play-back arm away from the turn-table when not actually playing is also a distinct advantage.

The members of Figures 14 to 17 inclusive may, of course, be used in the apparatus described in connection with Figures 1-13 and are not intended as a substitute for any of the elements of Figures 1 to 13.

The operation of each of the elements of my invention has been described in connection with the description of the various parts thereof. In actual use, where, for instance, ten inch records are to be played, the operator will rotate the handle 100 of Figure 1 so that the platform 70 is set for the ten inch position. This will automatically set the platform 71 for the ten inch position in the manner previously described, by reason of the link arrangement 101.

A stack of records 25 may then be placed on the spindle 24 so that the lowest record rests on platforms 70 and 71. The needle of the play-back arm 60 may be brought into engagement with a record on the turn-table, or the reject button 143 may be pressed to initiate the operation. Pressing the reject button 143 energizes the solenoid coil 136 to draw the plate 87 to the left. Movement of plate 87 to the left causes rotation of platforms 71 and 91 in the manner previously described.

Platform 71 rotates out of engagement with the left hand end of the lowest record in the stack, while platform 91 simultaneously moves into engagement with the lower edge of the record immediately above the lowest record. The edge 94 of the lowest record drops down, and perfora-

tion 97 thereof consequently moves slightly to the left by reason of the narrow diameter 270 of the vertical spindle 24. The right hand edge 95 of the lowest record then slides out from under the stack 25 and off the platform 70 into position to be played.

The return movement of plate 87 returns the play-back arm to the outermost edge of the record now on the turn-table and causes the arm to drop down. The needle of the arm either drops into the outermost groove or is pushed into the outermost groove by the leaf spring 280. When the record on the turn-table is completed, the groove thereof is so designed as to create a momentary reverse movement of the play-back arm 60. This causes a slight reverse movement of portion 171 of cam plate 163, thus closing trip switch 170 and thereby energizing the solenoid coil 136.

Movement of plate 87 to the left occurs on the energization of solenoid coil 136 in the manner previously pointed out, thus, first raising the play-back arm 60 and then rotating it out beyond the periphery of the turn-table.

When rotation of the play-back arm 60 beyond the periphery of the turn-table has been completed, the platforms 71 and 91 have rotated to a position where the lowest remaining record in the stack drops down again in the manner previously pointed out, and the operation is repeated once more.

At any time during the playing of a record, the depressing of the reject button 143 will, in the manner previously pointed out, initiate the record-changing operation once more.

In the foregoing, I have described my invention in connection with the various portions thereof in connection with preferred commercially acceptable embodiments. Many variations may be made in each of the individual elements without departing from the spirit of my invention. Since such variations should now be obvious to those skilled in the art, I prefer to be bound not by the specific disclosure herein, but only by the appended claims.

I claim:

1. In a phonograph having a turn table rotating about a spindle and an arm carrying a needle engageable with a record disc on said turn table, said record disc having an opening through which said spindle passes; a record changer comprising a pair of supporting members on opposite sides of said turn table, said supporting members including platforms extending in a plane substantially above said turn table and spaced to support a stack of records at the edges of the lowest record in the stack; said spindle extending vertically above said turn table to a point substantially above the plane of said platforms; one of said platforms being operable to non-supporting position to release an edge of the lowest record in the stack, and means carried by said platform engageable with the edge of the next record to support the same when said platform is operated to non-supporting position; said spindle having a diameter substantially less than the diameter of the openings in the record along a section thereof extending from a point substantially in the plane of the lowest record in the stack to a point below the plane of the platforms; and means for varying the spacing between said platforms to accommodate records of different sizes; said means including a slidable mount for the support of one of said platforms and a rotatable mount for the other of said platforms; said other

platform having a plurality of boundaries at different distances from said rotatable mount and extending from its support toward said turn table for different distances at different angular positions thereof; and members interconnecting the rotatable mount for said other platform with the slidable mount for the first platform whereby movement of a platform to vary its setting for a specific record size will move the other platform to a corresponding setting.

2. In a phonograph having a turn table rotating about a spindle and an arm carrying a needle engageable with a record disc on said turn table, said record disc having an opening through which said spindle passes; a record changer comprising a pair of supporting members on opposite sides of said turn table, said supporting members including platforms extending in a plane substantially above said turn table and spaced to support a stack of records at the edges of the lowest record in the stack; one of said platforms being operable to non-supporting position to release an edge of the lowest record in the stack, and means carried by said platform engageable with the edge of the next record to support the same when said platform is operated to non-supporting position; and means for varying the spacing between said platforms to accommodate records of different sizes; said means including a slidable mount for the support of one of said platforms and a rotatable mount for the other of said platforms; said other platform having a plurality of boundaries at different distances from said rotatable mount and extending from its support toward said turn table for different distances at different angular positions thereof; a connecting member between the mounts of said platforms; a shift handle mounted on said other platform; rotation of said shift handle causing longitudinal movement of said connecting member and varying the spacing of said platforms.

3. In a phonograph having a rotatable turn table and a tone arm carrying a needle; said tone arm being mounted on a rotatable post; a record changer including operating mechanism therefor; said operating mechanism comprising a main cam plate; means for initially moving said plate longitudinally in one direction, and means for effecting a return of said plate; means interconnecting said main cam plate, and said rotatable post carrying said tone arm for rotating said post in one direction during movement of said plate in said initial direction and for rotating said post in an opposite direction during return movement of said plate; and means for raising said tone arm during operation of said main cam plate; said means comprising a depression in said plate; and a rod centrally supported in said rotatable post and extending vertically from the base of said depression to said tone arm; movement of said plate in said initial direction causing said rod to rise out of said depression onto the main surface of said plate and raising said tone arm; said rod registering with and descending into said depression upon completion of said return movement of said plate.

4. In a phonograph having a rotatable turn table and a tone arm carrying a needle; said tone arm being mounted on a rotatable post; a record changer including operating mechanism therefor; said operating mechanism comprising a main cam plate; means for initially moving said plate longitudinally in one direction, and means for effecting a return of said plate; means for causing said rotatable post to rotate in a

first direction on movement of said main cam plate in said initial direction; and means for effecting rotation of said post in an opposite direction on return movement of said main cam plate; said last mentioned means comprising a cam secured to the lower end of said post and rotatable therewith from a first position to a second position on rotation of said post in said first direction; a slot in said cam; a pin on said main cam plate introducible into said slot on completion of the movement of said main cam plate in said initial direction and when the cam carried by said rotatable post is in the second position; said pin by its entry into and movement in said slot effecting rotation of said cam from said second position to said first position during return movement of said main cam plate; said pin being biased to a position out of engagement with said cam; means urging said pin against said bias into registry with said slot on completion of movement of said main cam plate in said initial direction; and means for maintaining said pin within with said slot during return movement of said main cam plate.

5. In a phonograph, a rotatable turn table having a spindle and adapted to carry a grooved record disc; a tone arm carrying a needle and mounted on a rotatable post; a record changer including operating mechanism for rotating said post in one direction to carry said tone arm away from said spindle and beyond the edge of a record disc mounted on said turn table, and for thereafter rotating said post in an opposite direction to carry said tone arm toward the edge of a record disc to permit the needle carried by said tone arm to engage the groove of said disc in proximity to the edge of said disc; and additional means urging said post toward rotative movement in said opposite direction beyond the movement imparted thereto by the operating mechanism of the record changer; said additional means being rendered inoperative after the needle carried by the tone arm engages the groove of the record disc; said additional means including a member secured to said rotatable post and extending therefrom at a distance from the center of rotation thereof; a stationarily mounted spring engageable with said member when said post has approached the limit of rotation thereof in said one direction; said spring bearing against said member and urging continued rotation of said post in said opposite direction when said operating mechanism has completed the movement of the post in said opposite direction; said member being thereafter disengaged from said spring on continued movement of said tone arm toward the spindle of said turn table.

6. In a phonograph, a turn table adapted to carry a record disc, a rotatably mounted tone arm engageable with a record on said turn table, and a record changer including record supporting and releasing elements; operating mechanism for said record changer including a main cam plate operable on movement in one direction to rotate said tone arm out of engagement with a record disc on said turn table and to initiate the operation of said record releasing elements and operable on return movement to rotate said tone arm into engagement with a record disc on said turn table and complete the operation of said record releasing elements, and a solenoid for moving said main cam plate in said one direction; said solenoid having an armature; a flange on said cam plate; a spring connecting said flange and said armature; said armature, upon

energization of said solenoid, moving in a predetermined direction to increase the bias of said spring, the said spring thereafter drawing said cam plate in the direction determined by the bias of the spring; and means connected to said cam plate for predetermining the speed of movement of said cam plate in response to the bias of the spring.

7. In a phonograph, a turn table adapted to carry a record disc, a rotatably mounted tone arm engageable with a record on said turn table, and a record changer including record supporting and releasing elements; operating mechanism for said record changer including a main cam plate operable on movement in one direction to rotate said tone arm out of engagement with a record disc on said turn table and to initiate the operation of said record releasing elements and operable on return movement to rotate said tone arm into engagement with a record disc on said turn table and complete the operation of said record releasing elements, and a solenoid for moving said main cam plate in said one direction; said solenoid having an armature; a flange on said cam plate; a spring connecting said flange and said armature; said armature, upon energization of said solenoid, moving in a predetermined direction to increase the bias of said spring, the said spring thereafter drawing said cam plate in the direction determined by the bias of the spring; said solenoid being denenergized upon completion of said movement of the cam plate in said one direction, and means for returning said cam plate to its original position upon de-energization of said solenoid, and additional means connected to said cam plate for predetermining the speed of the movement of said cam plate in either direction.

8. In a phonograph, a turn table adapted to carry a record disc, a rotatably mounted tone arm engageable with a record on said turn table, and a record changer including record supporting and releasing elements; operating mechanism for said record changer including a main cam plate operable on movement in one direction to rotate said tone arm out of engagement with a record disc on said turn table and to initiate the operation of said record releasing elements and operable on return movement to rotate said tone arm into engagement with a record disc on said turn table and complete the operation of said record releasing elements, and a solenoid for moving said main cam plate in said one direction; said solenoid having an armature; a flange on said cam plate; a spring connecting said flange and said armature; said armature, upon energization of said solenoid, moving in a predetermined direction to increase the bias of said spring, the said spring thereafter drawing said cam plate in the direction determined by the bias of the spring; said solenoid being de-energized upon completion of said movement of the cam plate in said one direction, and a spring for returning said cam plate to its original position upon de-energization of said solenoid, and a dash-pot connected to said cam plate for controlling the speed of movement of said cam plate in either direction.

9. In a phonograph, a turn table adapted to carry a record disc, a rotatably mounted tone arm engageable with a record on said turn table, and a record changer including record supporting and releasing elements; operating mechanism for said record changer including a main cam plate operable on movement in one direction to rotate said

tone arm out of engagement with a record disc on said turn table and to initiate the operation of said record releasing elements and operable on return movement to rotate said tone arm into engagement with a record disc on said turn table and complete the operation of said record releasing elements, and a solenoid for moving said main cam plate in said one direction; said solenoid having an armature; a flange on said cam plate; a spring connecting said flange and said armature; said armature, upon energization of said solenoid, moving in a predetermined direction to increase the bias of said spring, the said spring thereafter drawing said cam plate in the direction determined by the bias of the spring; a switch mounted on said cam plate for controlling the energization of said solenoid, said switch being maintained in an open position by said armature, being closed upon movement of said armature; said switch engaging said armature once more and being opened on completion of the movement of said cam plate in said one direction.

10. In a phonograph, a rotatable horizontal turn table mounted on a spindle and adapted to carry a grooved record disc; a tone arm carrying a needle at one end and mounted on a vertical rotatable post, said tone arm extending substantially horizontally; said tone arm being rotatable above said turn table between two limiting positions, the first of said positions being that wherein the needle carrying end of the tone arm projects to a point substantially outside the periphery of a record disc mounted on the turn table, the other position being that wherein the needle carrying end of the tone arm is in proximity to the center of a record disc mounted on the turn table; said tone arm being mounted on a rotatable post; a projection on said post; a member engaging said projection and biasing said tone arm toward said first position when said tone arm is moved outwardly beyond the periphery of a record disc on the turn table; and biasing said tone arm inwardly toward the periphery of said record disc on the occurrence of an initial inward rotational movement of said tone arm, said member being disengaged from said projection on the continuance of said inward rotational movement.

11. In a phonograph, a rotatable horizontal turn table mounted on a spindle and adapted to carry a grooved record disc; a tone arm carrying a needle at one end and mounted on a vertical rotatable post, said tone arm extending substantially horizontally; said tone arm being rotatable above said turn table between two limiting positions, the first of said positions being that wherein the needle carrying end of the tone arm projects to a point substantially outside the periphery of a record disc mounted on the turn table, the other position being that wherein the needle carrying end of the tone arm is in proximity to the center of a record disc mounted on the turn table; said tone arm being mounted on a rotatable post; a projection on said post; a member engaging said projection and biasing said tone arm toward said first position when said tone arm is moved outwardly beyond the periphery of a record disc on the turn table; and biasing said tone arm inwardly toward the periphery of said record disc on the occurrence of an initial inward rotational movement of said tone arm, said member being disengaged from said projection on the continuance of said inward rotational movement, said projection comprising an arm secured to said post, said member comprising a stationary

spring metal arm fixed at one end; the other end engageable with said post arm.

12. In a phonograph having a turn table rotating about a spindle and an arm carrying a needle engageable with a record disc on said turn table, said record disc having an opening through which said spindle passes; a record changer comprising a pair of supporting members on opposite sides of said turn table, said supporting members including platforms extending in a plane substantially above said turn table and spaced to support a stack of records at the edges of the lowest record in the stack; said spindle extending vertically above said turn table to a point substantially above the plane of said platforms; one of said platforms being operable to non-supporting position to release an edge of the lowest record in the stack, and means carried by said platform engageable with the edge of the next record to support the same when said platform is operated to non-supporting position; and means for varying the spacing between said platforms to accommodate records of different sizes; said means including a slidable mount for the support of one of said platforms and a rotatable mount for the other of said platforms; said other platform having a plurality of boundaries at different distances from said rotatable mount and extending from its support toward said turn table for different distances at different angular positions thereof; and members interconnecting the rotatable mount for said other platform with the slidable mount for the first platform whereby movement of a platform to vary its setting for a specific record size will move the other platform to a corresponding setting.

13. In a phonograph having a turn table rotating about a spindle and an arm carrying a needle engageable with a record disc on said turn table, said record disc having an opening through which said spindle passes; a record changer comprising a pair of supporting members on opposite sides of said turn table, said supporting members including platforms extending in a plane substantially above said turn table and spaced to support a stack of records at the edges of the lowest record in the stack; and means for varying the spacing between said platforms to accommodate records of different sizes; said means including a slidable mount for the support of one of said platforms and a rotatable mount for the other of said platforms; said other platform having a plurality of boundaries at different distances from said rotatable mount and extending from its support toward said turn table for different distances at different angular positions thereof; and members interconnecting the rotatable mount for said other platform with the slidable mount for the first platform whereby movement of a platform to vary its setting for a specific record size will move the other platform to a corresponding setting.

14. In a phonograph having a turn table ro-

tating about a spindle and an arm carrying a needle engageable with a record disc on said turn table; said record disc having an opening through which said spindle passes; a record changer comprising a pair of supporting members on opposite sides of said turn table, said supporting members including platforms extending in a plane substantially above said turn table and spaced to support a stack of records at the edges of the lowest record in the stack; record changer operating mechanism connected to one of said supporting members, one of said platforms being movable by said operating mechanism to non-supporting position to release an edge of the lowest record in the stack, and means carried by said platform engageable with the edge of the next record to support the same when said platform is operated to non-supporting position; and means for varying the spacing between platforms to accommodate records of different sizes; said means including a slidable mount for one of said platforms; and a rotatable mount for the other of said platforms; said other platform having a plurality of boundaries at different distances from said rotatable mount and extending from its support toward said turn table for different distances at different angular positions thereof.

15. In a phonograph having a turn table rotating about a spindle and an arm carrying a needle engageable with a record disc on said turn table, said record disc having an opening through which said spindle passes; a record changer comprising a pair of supporting members on opposite sides of said turn table, said supporting members including platforms extending in a plane substantially above said turn table and spaced to support a stack of records at the edges of the lowest record in the stack; record changer operating mechanism connected to one of said supporting members, one of said platforms being movable by said operating mechanism to non-supporting position to release an edge of the lowest record in the stack, and means carried by said platform engageable with the edge of the next record to support the same when said platform is operated to non-supporting position; and means for varying the spacing between said platforms to accommodate records of different sizes; said means including a slidable mount for one of said platforms, and a rotatable mount for the other of said platforms; said other platform having a plurality of boundaries at different distances from said rotatable mount and extending from its support toward said turn table for different distances at different angular positions thereof; an arm extending from said rotatable mount of said other platform, and a link interconnecting said arm and operating mechanism of said first platform, whereby rotation of said rotatable support of said other platform will cause a movement of the operating mechanism and sliding of the platform connected thereto.

PAUL STEAD GAY.