

May 18, 1948.

K. R. McKEE

2,441,893

PHONOGRAPH RECORD DEMONSTRATOR

Filed Aug. 5, 1944

4 Sheets-Sheet 1

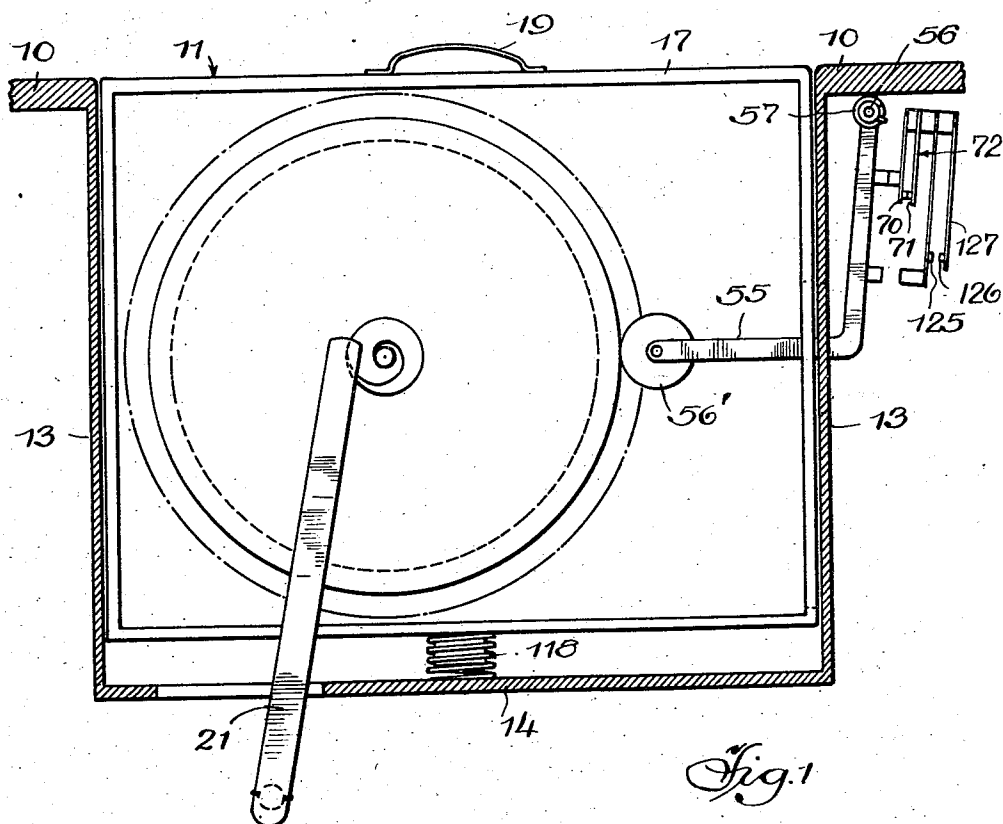


Fig. 1

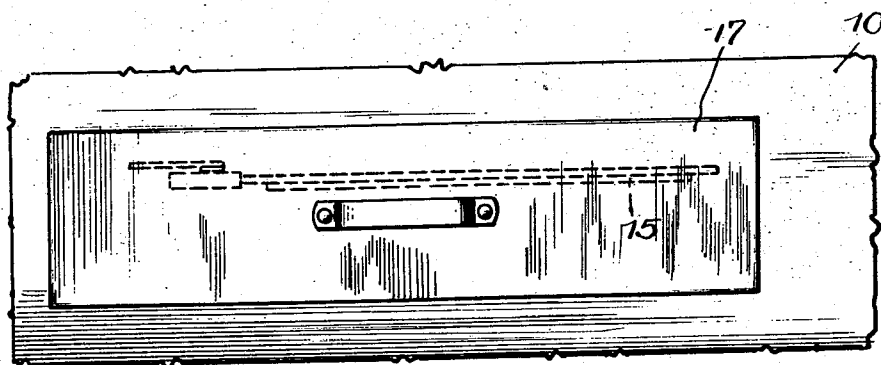


Fig. 2

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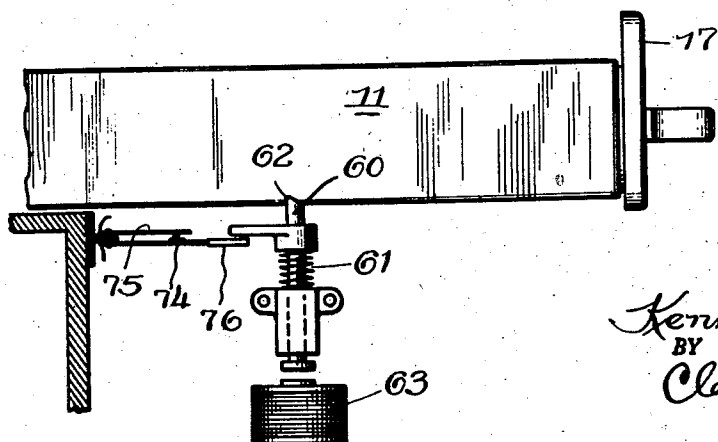
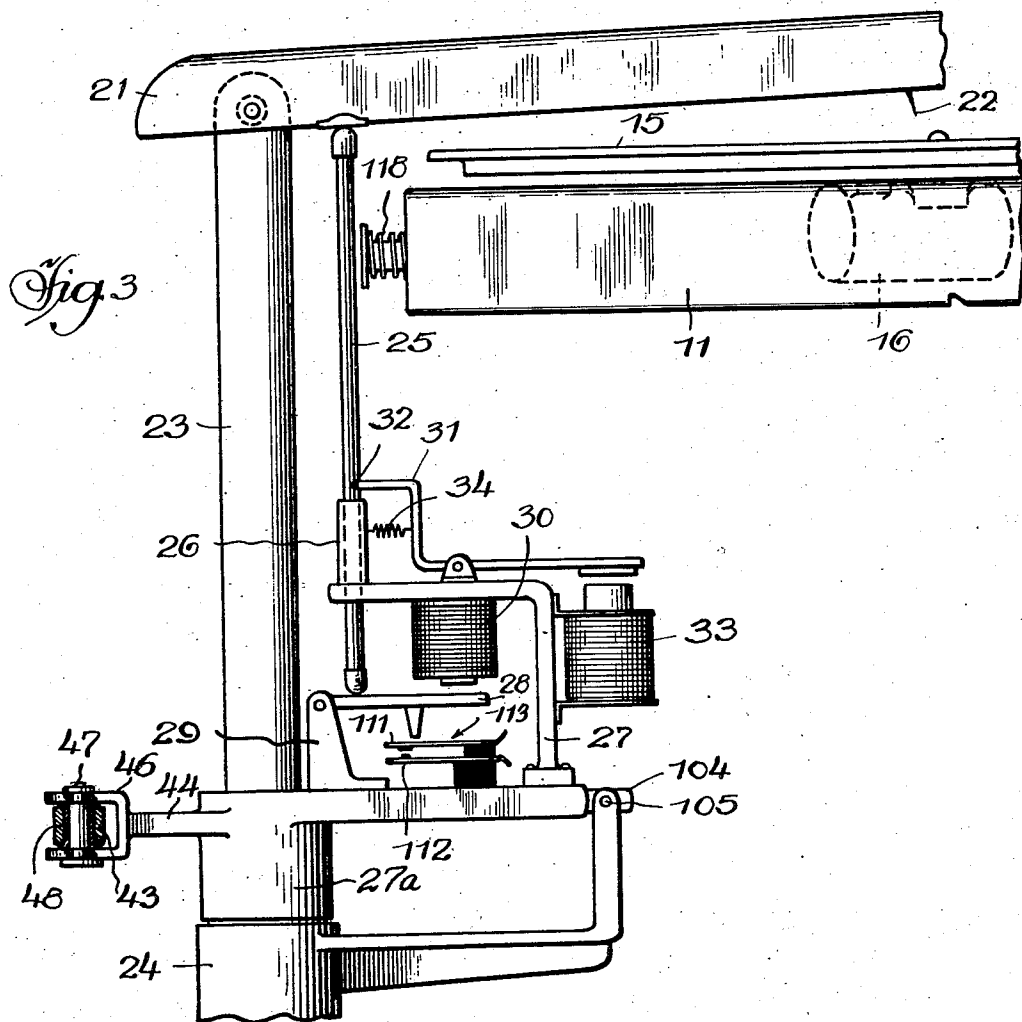
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4 Sheets-Sheet 2



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PHONOGRAPH RECORD DEMONSTRATOR

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4 Sheets-Sheet 3

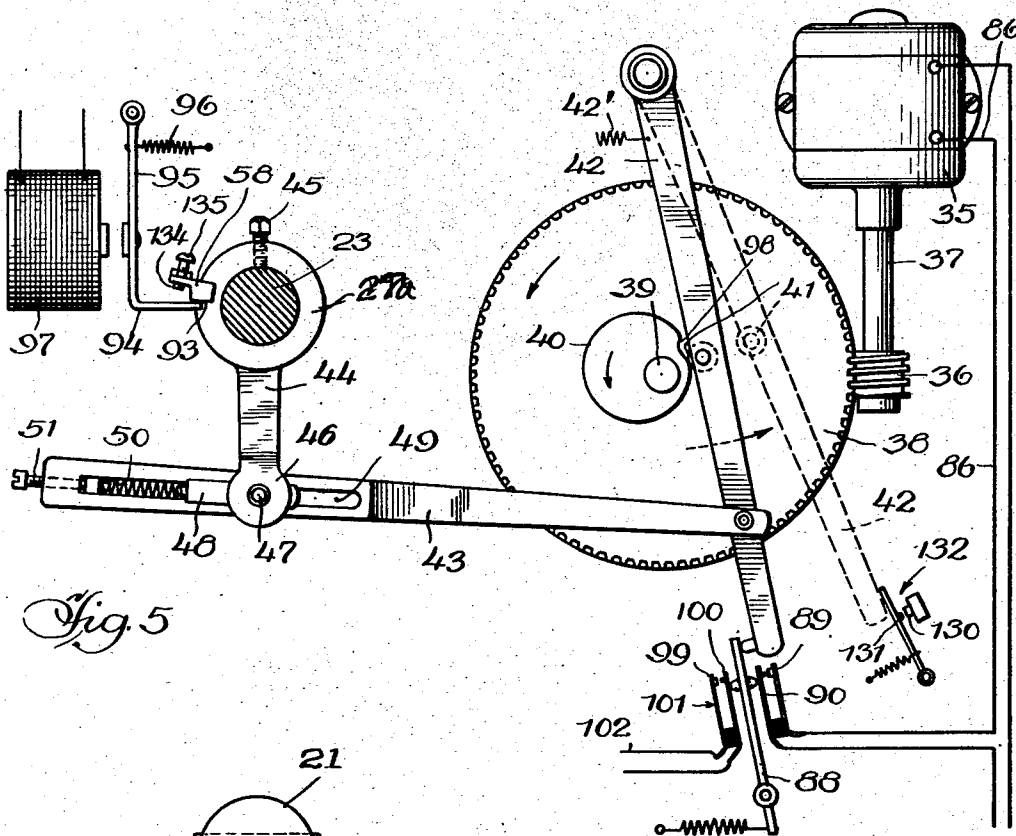


Fig. 5

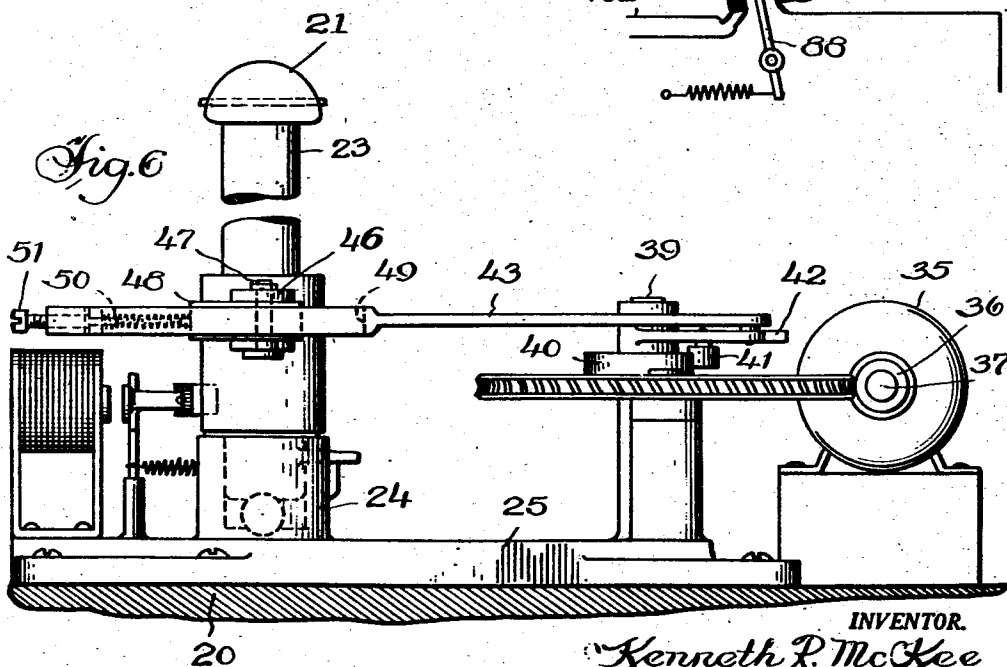


Fig. 6

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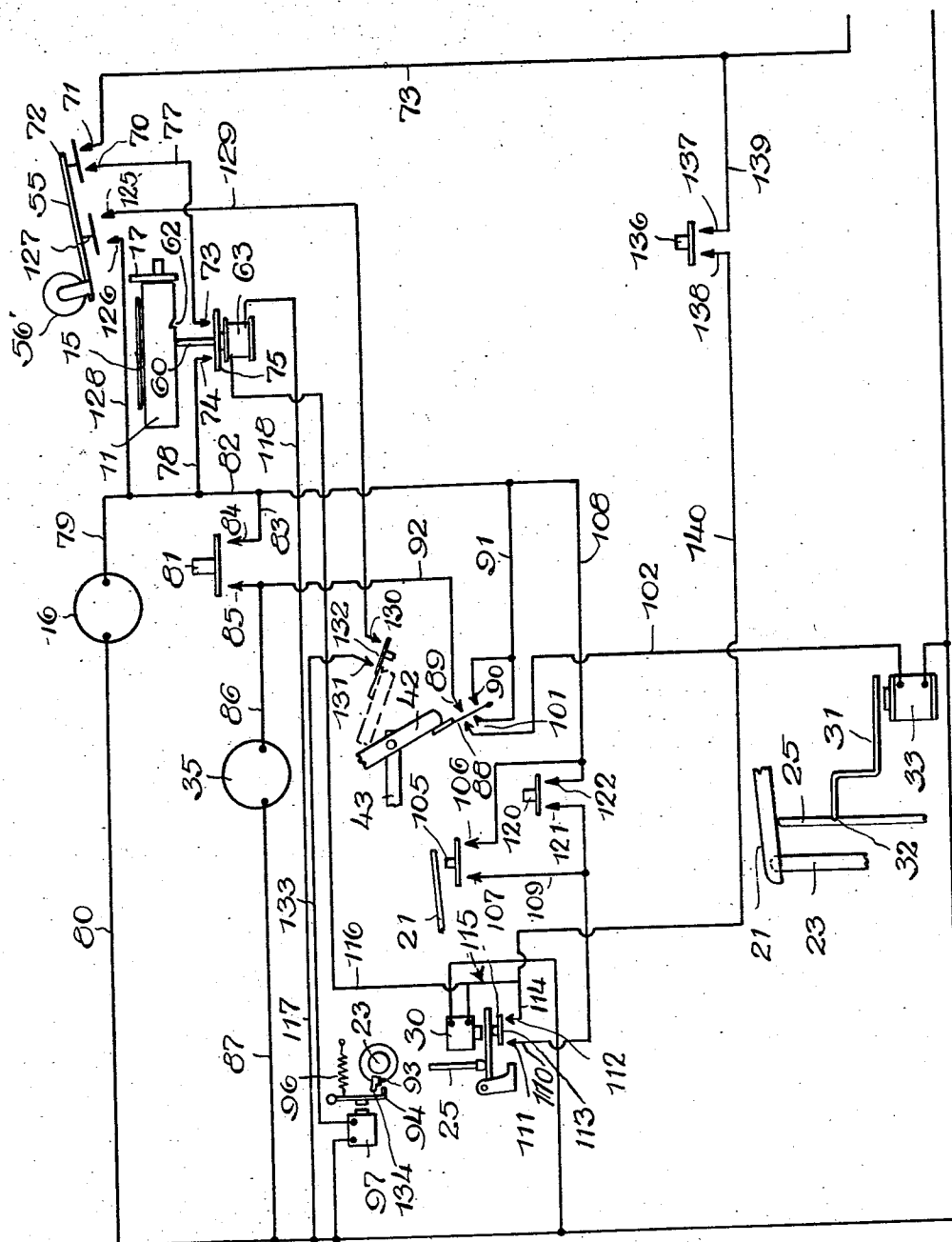
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PHONOGRAPH RECORD DEMONSTRATOR

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,441,893

PHONOGRAPH RECORD DEMONSTRATOR

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Application August 5, 1944, Serial No. 548,201

13 Claims. (Cl. 274—1)

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This invention relates to improvements in phonograph record demonstrator devices particularly adapted for use in the demonstration booths of stores handling retail sales of phonograph records, although not limited to such use.

An object of the invention is to provide an improved form of reproducing apparatus including an enclosed casing wherein the customer may insert a record for audition, but is not permitted access to the main operating parts of the reproducing mechanism at any time. A further object of the invention is to provide an enclosed reproducing device of the character above described wherein the reproducing mechanism is automatically started by the closing of the casing thereof. A further object is to provide means for automatically unlocking the casing to permit withdrawal of the record therefrom after the record has been played. A still further object is to provide means for interrupting the playing of the record at any time and unlocking the casing for removal of the record at the will of the operator.

The device of the present invention is especially designed to overcome several difficulties commonly encountered in retail phonograph record shops wherein prospective customers are permitted to try out records before purchasing, usually in a booth provided with a reproducing machine. These reproducing machines may be of various types and are especially subject to damage and abuse when operated by customers who are unfamiliar with the proper manipulation of the control devices or are careless in the operation of the machines, and in handling the records. As a result, reproducing devices are frequently damaged so as to give unsatisfactory demonstrations, or are put entirely out of order. Furthermore, it is practically impossible for record shops to detect damaged records when they are returned to stock. Accordingly, record shops commonly are called upon to devote considerable time and expense in the servicing and maintenance of their demonstration booths, and suffer considerable loss by damage and injury to their stock of new records.

In carrying out my invention I provide an enclosed casing having a sliding drawer partially removable therefrom so as to expose only the turntable of the reproducing mechanism for application or removal of a record. All of the other main parts of the reproducing mechanism, particularly the tone arm and its needle, are fully enclosed within the casing so as to be inaccessible to the operator at all times. The operator may pull out the drawer so as to place a record on the turntable preparatory to playing the same, but in order to start the reproducing mechanism it is necessary to close the drawer to a fully locked position whereupon the reproducing mechanism

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will be automatically started and continued to completion of the record without further attention of the operator. Upon completion of the record, other electrical devices are provided for automatically unlocking the drawer so as to permit the latter to be withdrawn and the record taken off of the turntable, for replacement by another record if desired. I also provide a manual control member on the exterior of the casing whereby the operator may discontinue the playing of a record at any time before its completion and permit the drawer to become unlocked for withdrawal of the record.

The invention may best be understood by reference to the accompanying drawings in which:

Figure 1 is a plan view partially in section, showing parts of the enclosed cabinet for my device including the sliding drawer which carries the turntable of the reproducing mechanism.

Figure 2 is a fragmentary front view of the sliding drawer and the casing for enclosing the parts of the reproducing mechanism.

Figure 3 is a detailed view partially in elevation and partially in section, showing parts of the control mechanism for the tone arm used in conjunction with the turntable.

Figure 4 is a detailed view, partially in section, of the locking mechanism for the sliding drawer.

Figure 5 is a detailed plan view partially in section, of part of the automatic control means for the tone arm.

Figure 6 is a detailed view in elevation of the mechanism shown in Figure 4.

Figure 7 is a diagram of the electric control mechanism of the device.

Referring now to details of the embodiment of my invention illustrated in the several figures, 10 indicates the upright front wall of a casing in which is slidably mounted a drawer 11. In the form shown the drawer is fitted in a compartment having side walls 13, 13 and a rear wall 14 as shown in Figure 1. The drawer has mounted thereon a turntable 15 of the kind commonly used for disc type sound records. The turntable is driven by an electric motor 16 through gearing of any suitable form well known to the art, details of which need not be shown or described herein excepting to point out the location of the motor 16 which is mounted on the drawer 11 beneath the turntable 15.

The front end of the drawer 11 includes an upright panel 17 projecting above the top level of the turntable so that the turntable will be entirely enclosed within the casing 10 and the record on said turntable will be inaccessible from the exterior of the latter when the drawer is in closed and locked position as shown in Figures 1 and 2.

Reproducing mechanism is also enclosed within the casing 10 and mounted on a fixed portion

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thereof such as a base panel 20 shown in Figure 6. The reproducing mechanism includes a tone arm 21 of any suitable form provided with a reproducing needle 22. Said tone arm is pivotally mounted for vertical swinging movement on an upright supporting shaft 23 having its lower end pivoted for lateral swinging in a bearing support 24 on a base plate 25 suitably mounted on the base panel 20 of the casing. The arrangement is such that the tone arm 21 overhangs the turntable 15 when the drawer is in fully closed position in proper relation with said turntable for engagement with a phonograph record. However, the drawer 11 is slidably mounted in the casing 10 independently of the tone arm and its associated parts, so that the turntable with its disc will be fully withdrawn from beneath the tone arm when the drawer is moved into open position.

Since the tone arm is inaccessible from the exterior of the casing at all times, means are provided for automatically raising and lowering the tone arm during the playing of the record and for swinging and locating the tone arm in its starting position relative to the turntable. The mechanism for this purpose, operated by electrical control devices to be hereinafter more fully described, consists essentially of an upright elevating rod 25 slidably mounted in a guide 26 carried on the inner end of a bracket 27, preferably fixed on the tone arm support 23, as by means of member 27a secured to support 23 by set screw 45. The elevating rod is actuated to raise the tone arm 21 from the record by an armature member 28 pivotally connected at one end on bracket 29 and having its free end in cooperative relation with relay 30 also mounted on the bracket 27 as shown in Figure 3.

The elevating rod 25 is adapted to be locked in its raised position by a latch member 31 pivotally mounted on the bracket 27 and having one end adapted to engage in a detent 32 formed in the elevating rod and with its other end in cooperative relation with a relay 33 mounted on the side of the bracket 27. In the form shown the latch member is normally urged toward the elevating rod 25 by a coil spring 34. The arrangement is such that when the relay 30 is energized and the relay 33 is de-energized the elevating rod 25 will be raised to a position shown in Figure 3 where the latch member 31 becomes engaged in the detent 32 in said elevating rod to hold the tone arm in elevated position. Upon de-energization of the relay 30, and the energization of relay 33, the latch member 31 will be withdrawn from the detent 32 to permit the tone arm to drop by gravity toward the record.

The mechanism for swinging the tone arm laterally into its starting position is shown in detail in Figures 5 and 6. This mechanism consists essentially of an electric motor 35 having a worm 36 on drive shaft 37 engaging a worm gear 38 on an upright shaft 39 spaced horizontally from the tone arm support 23. The worm gear 38 carries a cam 40 normally engaged by a roller 41 on a horizontally disposed spring pressed rocking arm 42. The free end of the rocking arm 42 is operatively connected by a link 43 to a lever arm 44 extending horizontally from member 27a and fixed to the tone arm support 23 as by the set screw 45. The outer end of the lever arm 44 is bifurcated at 46 and has an upright pin 47 extending between the bifurcations and passing through a block 48 slidably mounted in an elongated slot 49 and engaging a tension spring

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50 which yieldingly limits movement of the sliding block 48 toward the outer end of the link 43. The tension of the spring 50 may be adjusted by a set screw 51 extending through the outer end of the link 43 in an abutting engagement with the spring 50 as clearly shown in Figures 5 and 6.

The cam operated tone arm swing mechanism just described is provided with means for controlling the starting position of the tone arm relative to the record, depending upon the size of the record being used, and for automatically starting the reproducing mechanism when the drawer is closed with a record on the turntable. This control means includes a swinging arm 55 having one end pivotally mounted at 56 within the casing 10 adjacent the drawer 11 and having a roller 55' on its free end projecting laterally into the drawer, in position to engage the outer periphery of a record when the latter is placed on the turntable and the drawer is in fully closed position, as shown in Figure 1. In the form shown herein the arm 55 is designed to be yieldably engaged with records of two different sizes such as standard 10 and 12-inch records in common use today. The arm 55 is normally urged toward the axis of the turntable as by a coil spring 57 surrounding the pivot 56. The arm 55 is electrically connected with a stop device indicated generally at 58 in Figure 5 to control the amount of throw or outward movement of the tone arm, depending upon the size of the record being played, as will more fully appear in connection with the description of the control circuit of the device.

An electric controlled latch mechanism for the drawer is also provided as shown in Figure 4 which consists of a latch member 60 normally urged toward the drawer by a coil spring 61 so as to lock the same by engagement in a detent 62 on the drawer when the latter is in fully closed position. The latch member is automatically unlocked by energization of a relay 63 adapted to retract the lower end of the latch member 60.

Referring now to the electric diagram in Figure 7 showing the various electric control connections for the devices hereinbefore described, it will be observed that the various connections are initially controlled by the closing of the drawer 11 and the movement of the latch member 60 into the detent 62 of the drawer to lock the same.

Assuming that a 10-inch record has been placed on the turntable while the drawer is open, the act of closing of the drawer will cause the periphery of the record to engage the roller 55' on control arm 55 and move said control arm outwardly a sufficient distance to close the contacts 70 and 71 of switch member 72 in the main line conductor 73. Final latching of the drawer by movement of the latch member 60 will also close contacts 74 and 75 by movement of the switch member 76 carried by the latch member 60 so as to connect lines 77 and 78 with the main line conductor 73. This will complete a circuit through line 79, turntable motor 46 and the main return line 80, thus starting the turntable motor to rotate.

To start the reproducing mechanism, a pushbutton 81 suitably located on the exterior of the casing and under the control of the operator is momentarily depressed so as to establish a contact through lines 82 and 83, contacts 84 and 85 of the pushbutton 81, line 86, tone arm swing motor 35 and line 87 to the main return line 80. As soon as the swing motor 35 is started it will rotate the worm gear 38 and cam 40 in a counter-

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clockwise direction as seen in Figure 5. As said cam turns it forces the rocking arm 42 outwardly against the tension of spring 42'. Initial movement of arm 42 will release pressure on a spring-pressed switch arm 88 at the outer end of said arm, and cause switch members 89 and 90 to close so as to complete a circuit through lines 91 and 92 to line 86 and permit a continuous current through the swing arm motor 35 when the starting push-button 81 is released. As the rocking arm 42 travels to the right as seen in Figure 5 it pulls the link 43 to the right and causes the lever 44 fixed to the tone arm support to swing to the right against the yielding action of spring 50. Said tone arm support shaft will thereupon be rotated to swing the tone arm outwardly from adjacent the axis of the turntable until further movement of said arm is stopped by engagement of the abutment 93 on stop member 58 carried on lever 44, with a finger 94 carried by a pivoted stop arm 95. Said stop arm is normally urged by a spring 96 into position to engage the abutment 93, but is capable of being displaced outwardly by a relay 97 when a larger record is mounted on the turntable as will presently appear.

The spring 50, during rotation of cam 40, is yieldable so as to permit continued movement of the link 43 to the right after swinging movement of the tone arm support 23 has been stopped by engagement of the abutment 93 with the finger 94 of the stop arm 95. As the motor 35 continues to rotate the cam 40 over its highest point, the arm 42 is permitted to return toward the left, urged by the spring 42', thus releasing the tone arm 21 and its support 23 so that they may swing freely due to the slotted connection of arm 44 and link 43.

When the roller 41 on arm 42 reaches the pocket 98 on the face of the cam 40 the arm 42 again engages the spring pressed lever 88 to open the switch members 89 and 90 and cut off the current through the swing motor 35, and at the same time, to close contacts 99 and 100 of a switch 101. Closing of the latter switch establishes a circuit through line 102 and relay 33 so as to release the latch member 31 from the elevating rod 25 thus permitting the tone arm 21 to be lowered by gravity so that the reproducing needle will follow the spiral tone groove inwardly of the record in the usual manner, carrying the tone arm and its supporting shaft 23 with it.

When the tone arm 21 reaches the end of the transcription on the record, a stop member 104, herein carried by bracket 27 engages a switch member 105 to close contacts 106 and 107 and establish a current through lines 108, 109 and 110 and normally closed contacts 111 and 112 of a switch member 113. The contact 112 of said switch member is connected by lines 114 and 115 with the relay 30 so as to energize the same and raise the elevating rod 25 which in turn lifts the tone arm from the record and permits the locking member 31 to engage the detent 32 in said elevating arm to hold the tone arm in elevated position. It will also be noted that the circuit through the relay 30 just described is completed through line 116, relay 63 and line 117 to the main return line 80 so as to withdraw the locking member 60 from the detent 62 on the turntable drawer 11 and permit the drawer to spring open under the tension of the spring 118 which engages the inner wall 14 of the drawer compartment as shown in Figure 1. As will be

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noted in Figure 4, withdrawal of the locking member 60 causes the switch member 76 to open the contacts 74 and 75 controlling the main line circuit through both motors 16 and 35 so as to discontinue all circuit connections to the electrical parts as long as the drawer remains open and the latch member 60 of the latter is disengaged. The recording apparatus is therefore completely shut off and the drawer may now be pulled open to remove the record and replace with another record if desired.

In the event that it is desired to reject the record before it is completely finished the operator may depress a push-button switch 120 located on the exterior of the casing so as to close contacts 121 and 122 in parallel with the tone arm operating switch 105 so as to establish current through the relays 30 and 63 and cause the tone arm to be raised and the drawer automatically unlatched in the same manner as in the case of the operation of the tone arm switch 105.

Assuming now that a 12-inch record has been placed on the turntable instead of a 10-inch record. The roller 56' will engage the periphery of the record as the latter is pushed in with the drawer and the arm 55 will be swung outwardly somewhat farther than in the case with a 10-inch record so as to close not only the contacts 70 and 71 but also close contacts 125 and 126 of switch member 127 adjacent the switch member 72 (see Figure 1). This will establish a circuit from line 79 after the drawer is closed, through lines 128 and 129 to contacts 130 and 131 of switch member 132. The switch member 132 is adapted to be closed by engagement of the free end of the rocking arm 42 as it approaches its extreme limit of movement toward the right in Figures 5 and 7. Closing of the switch 132 will therefore establish a circuit through line 133 and relay 97 so as to pull the stop arm 95 against the tension of spring 96 and move the stop finger 94 of said arm out of registering position with the abutment 93 carried by the tone arm support 23 and into registering position with a second abutment 134 carried by the stop member 58. As a result, the tone arm support 23 is permitted to swing through a slightly greater arc than when its movement was stopped against the abutment 93. In the form shown the abutment 134 is provided by means of an adjustable screw 135 which may be regulated so as to limit the swinging movement of the tone arm and its support 23 precisely at the proper point to drop the reproducing needle at the starting position of a 12-inch record instead of a 10-inch record as previously described. The operation of the remainder of the control mechanism will be the same as for a 10-inch record whereby the electrical connections will be automatically cut off either at the completion of the record, or by operation of the rejection switch 120.

In the event that the drawer should be closed when there is no record on the turntable, arm 55 will not be moved into position to close the switch member 72 so that it is impossible to start the machine and the drawer will be maintained in locked position. Means are provided for unlocking the drawer under this condition which consists of an emergency button switch 136 which closes contacts 137 and 138 to connect the main line 73 through lines 139 and 140 to line 116 leading through the drawer unlocking relay 63. In practice it may be found preferable to locate the emergency button switch 136 at some secret place.

where it can be operated only by an attendant in the record selling shop. In this manner the drawer can be maintained in locked position at all times under the control of the attendant except at such times as it is desired to permit authorized use of the demonstrating machine.

Although I have shown and described certain embodiments of my invention, it will be understood that I do not wish to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. In a phonograph record reproducing device, an enclosed casing having a withdrawable wall portion, a rotatable record holding member and a drive motor therefor mounted on and movable with said wall portion, so that said record holding member may be withdrawn from said casing for application or removal of a record, reproducing mechanism including a tone arm enclosed in said casing in cooperative relation with said record holding member when said wall portion is in fully closed position, and electric control means in cooperative relation with said wall portion and with a record on said record holding member for starting the operation of said record drive motor, when said wall portion is moved to said position.

2. In a phonograph record reproducing device, an enclosed casing having a withdrawable wall portion, a rotatable record holding member and a drive motor therefor mounted on and movable with said wall portion, so that said record holding member may be withdrawn from said casing for application or removal of a record, reproducing mechanism including a tone arm enclosed in said casing in cooperative relation with said record holding member when said wall portion is in fully closed position, and electric control means in cooperative relation with said wall portion and with a record on said record holding member for positioning said tone arm in starting relation to said record and for starting the operation of said record drive motor, when said wall portion is moved to said position.

3. In a phonograph record reproducing device, an enclosed casing having a withdrawable wall portion with latch mechanism for locking the same, a rotatable record holding member and a drive motor therefor mounted on and movable with said wall portion so that said record holding member may be temporarily withdrawn from said casing for application or removal of a record, reproducing mechanism including a tone arm enclosed within said casing in cooperative relation with said record holding member when said wall portion is in locked position, electric control means in cooperative relation with said wall portion and with a record on said record holding member, and responsive to the moving of said record holding member with a record thereon and to movement of said wall portion into locked position in said casing for starting the operation of said record drive motor in operation, and for positioning said tone arm in starting position relative to said record holding member, and other electric control means responsive to the position of said tone arm at the completion of a record transcription for cutting off the current to said drive motor and for unlocking said latch means.

4. In a phonograph record reproducing device, an enclosed casing having a withdrawable wall portion with a latch mechanism for locking the same, switch means responsive to said latch

mechanism, a rotatable record holding member and a drive motor therefor mounted on and movable with said wall portion so that said record holding member may be temporarily withdrawn from said casing for application or removal of a record, a tone arm wholly enclosed within said casing in cooperative relation with said record holding member when the latter is in fully closed and locked position in said casing, and electric control means in said casing including a contact member adapted to extend into the path of movement of a record mounted on said record holding member as it is moved into fully closed position, and responsive to a record on said holding member for permitting circuit connections through said switch means to said drive motor only when said latch mechanism is in locked position.

5. In a phonograph record reproducing device, an enclosed casing having a withdrawable wall portion with a latch mechanism for locking the same, a rotatable record holding member and a drive motor therefor mounted on and movable with said wall portion so that said record holding member may be temporarily withdrawn from said casing for application or removal of a record, a tone arm wholly enclosed within said casing in cooperative relation with said record holding member when said wall portion is in fully closed and locked position in said casing, electrically operated means in said casing for automatically positioning said tone arm in starting relation to said record holding member, electric control means cooperatively associated with said record holding member including a contact member adapted to extend into the path of movement of a record mounted on said record holding member as it is moved into fully closed position, and responsive to a record on said holding member for starting the operation of said record drive motor, and manual switch means accessible from the exterior of said casing for starting said automatic positioning means in operation.

6. In a phonograph record reproducing device, an enclosed casing having a withdrawable wall portion with a latch mechanism for locking the same, a rotatable record holding member and a drive motor therefor mounted on and movable with said wall portion so that said record holding member may be temporarily withdrawn from said casing for the application or removal of a record, a tone arm wholly enclosed within said casing in cooperative relation with said record holding member when the latter is in fully closed and locked position in said casing, electrically operated means in said casing for automatically positioning said tone arm in starting relation to said record holding member, electric control means cooperatively associated with said record holding member including a contact member adapted to extend into the path of movement of a record mounted on said record holding member as they are moved into fully closed position, for starting the operation of said record drive motor, manual switch means accessible from the exterior of said casing for starting said automatic positioning means in operation, and other electric control means in cooperative relation to said tone arm and responsive to the position of said tone arm at the completion of a record transcription, for raising said tone arm from the record, for cutting off the current to said drive motor, and for unlocking said latch means.

7. In a phonograph record reproducing device, an enclosed casing having a withdrawable wall portion, a rotatable record holding member

mounted on and movable with said wall portion so that said record holding member may be temporarily withdrawn from said casing for the application or removal of a record, a movable tone arm wholly enclosed within said casing in cooperative relation with said record holding member when the latter is in fully closed position in said casing, and means in said casing for automatically positioning said tone arm in starting relation to said record holding member depending upon the size of the record placed thereon including a yielding contact member adapted to extend into the path of movement of a record mounted on said record holding member as they are moved into fully closed position in said casing and stop means in cooperative relation to said contact member and responsive to the position of said contact member for automatically limiting the movement of said tone arm positioning means to a predetermined starting position depending upon the size of the record on said record holding member.

8. In a phonograph apparatus, an enclosure, a movable pick-up device permanently confined within said enclosure, a drawer movable into and out of said enclosure, a turntable mounted on and movable with the drawer, so that the turntable may be withdrawn from the enclosure for the insertion and removal of a record and may be returned into the enclosure to bring an inserted record into cooperative relation with said pick-up device, an electric motor operable to drive said turntable, switch means for controlling said motor, and means in cooperative relation with said drawer and with a record on said turntable for effecting closure of said switch means in response to closure of said drawer and to movement of said record into cooperative relationship with the pick-up device.

9. In a phonograph apparatus, a casing or housing having a member movable to opened and closed positions to enable the insertion and removal of records to be played, a turntable for supporting a record in playing position within said casing, a pick-up device arranged within said casing for engagement with a record supported in playing position, an electric motor operable to drive said turntable, an energizing circuit for said motor, and a pair of switches serially included in said circuit and controlled respectively by said member and by an inserted record as it moves to playing position, whereby the operation of said motor is dependent upon the closure of said member and the presence of the inserted record.

10. In a phonograph apparatus, a casing or housing having a member movable to opened and closed positions to enable the insertion and removal of records to be played, a turntable for supporting a record in playing position within said casing, a movable pick-up device within said casing adapted to be brought into starting relation to a record supported in playing position, an electric motor operable to drive said turntable, an energizing circuit for said motor, a switch included in said circuit and controlled by an inserted record as it moves to playing position, whereby the operation of said motor is dependent upon the presence of the inserted record, and means dependent upon the closure of said member for positioning said pick-up device in starting relation to a record in playing position.

11. In a phonograph apparatus, a casing or housing having a member movable to opened and closed positions to enable the insertion and re-

moval of records to be played, a turntable for supporting a record in playing position within said casing, a movable pick-up device within said casing adapted to be brought into starting relation to a record supported in playing position, an electric motor operable to drive said turntable, an energizing circuit for said motor, a switch included in said circuit and controlled by an inserted record as it moves to playing position, whereby the operation of said motor is dependent upon the presence of the inserted record, means dependent upon the closure of said member for positioning said pick-up device in starting relation to a record in playing position, and means controlled by the inserted record for adjusting said last-named means to effect positioning of said pick-up device according to the size of the record.

12. In a phonograph apparatus, a casing or housing having a member movable to opened and closed positions to enable the insertion and removal of records to be played, a turntable for supporting a record in playing position within said casing, a movable pick-up device within said casing adapted to be brought into starting relation to a record supported in playing position, an electric motor operable to drive said turntable, an energizing circuit for said motor, a pair of switches serially included in said circuit and controlled respectively by said member and by an inserted record as it moves to playing position, whereby the operation of said motor is dependent upon the closure of said member and the presence of the inserted record, and means dependent upon the closure of said member for positioning said pick-up device in starting relation to a record in playing position.

13. In a phonograph apparatus, a casing or housing having a member movable to opened and closed positions to enable the insertion and removal of records to be played, a turntable for supporting a record in playing position within said casing, a movable pick-up device within said casing adapted to be brought into starting relation to a record supported in playing position, an electric motor operable to drive said turntable, an energizing circuit for said motor, a pair of switches serially included in said circuit and controlled respectively by said member and by an inserted record as it moves to playing position, whereby the operation of said motor is dependent upon the closure of said member and the presence of the inserted record, means dependent upon the closure of said member for positioning said pick-up device in starting relation to a record in playing position, and means controlled by the inserted record for adjusting said last-named means to effect positioning of said pick-up device according to the size of the record.

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