

Dec. 15, 1942.

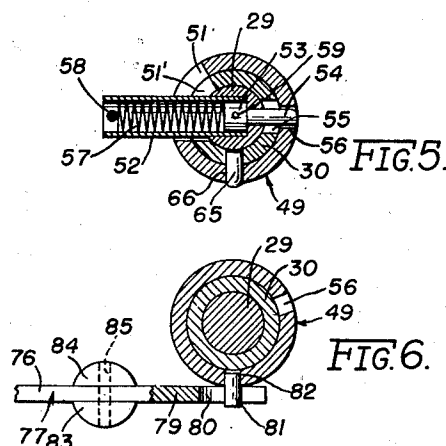
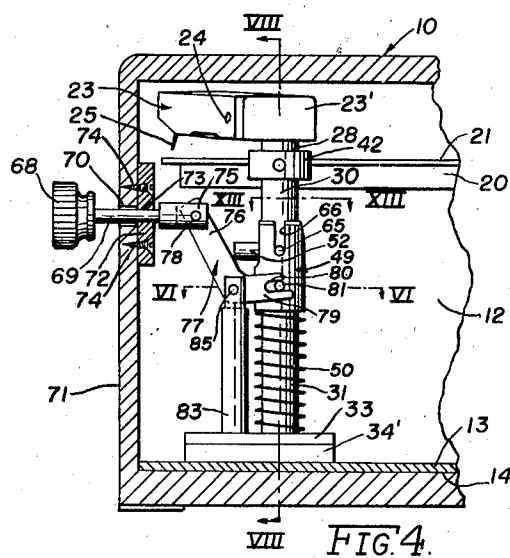
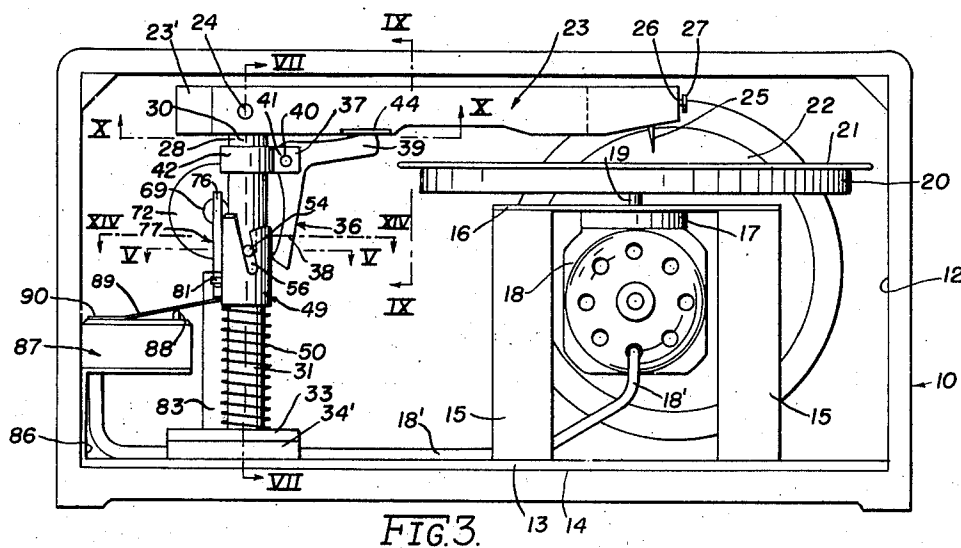
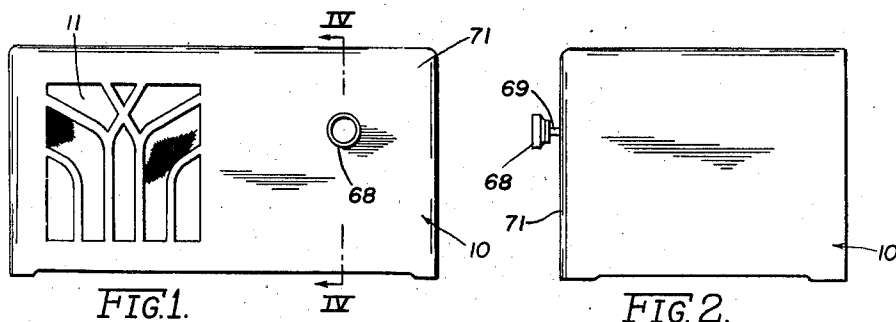
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2,305,086

REPRODUCER ARM ACTUATOR

Filed Aug. 6, 1941

2 Sheets-Sheet 1



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REPRODUCER ARM ACTUATOR

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2 Sheets-Sheet 2

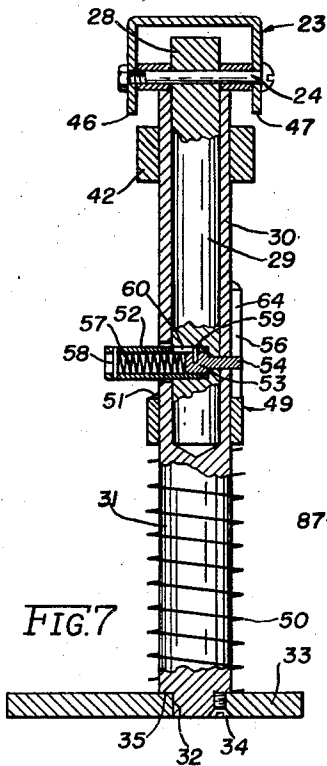


FIG. 7

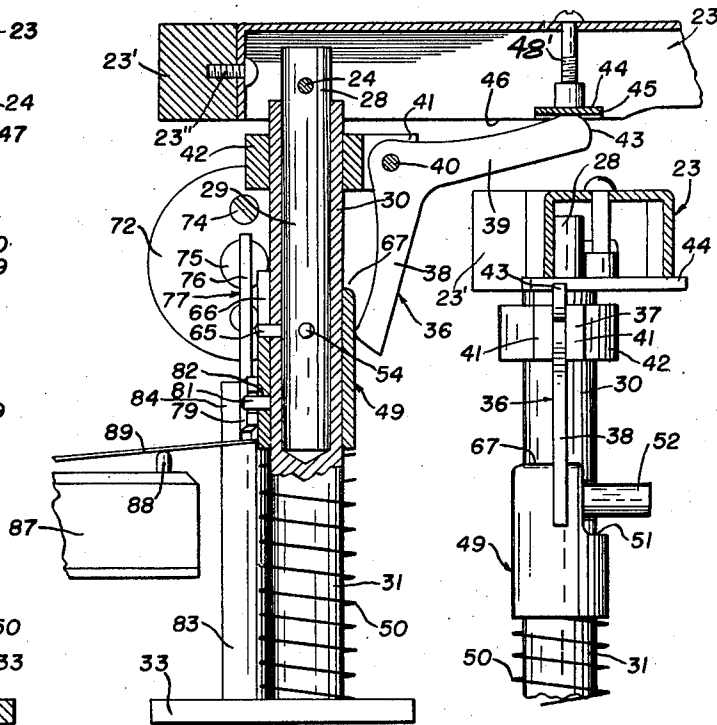


FIG. 8

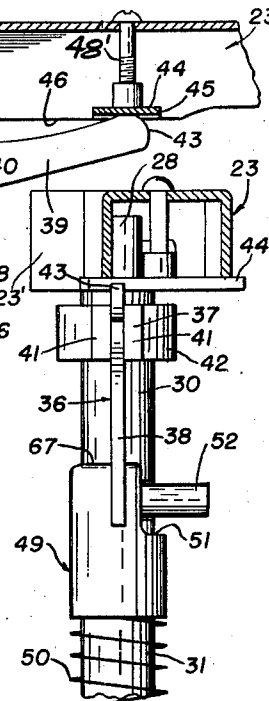


FIG. 9

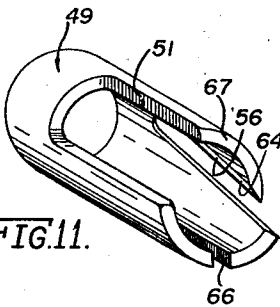


FIG. 11

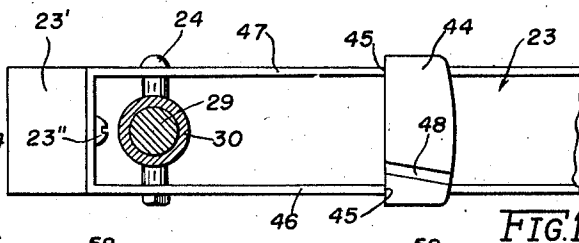


FIG. 10

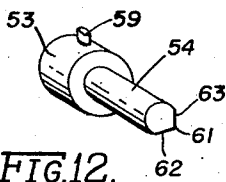


FIG. 12

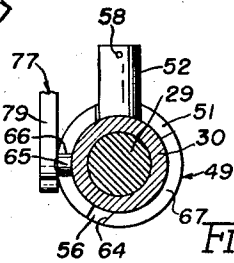


FIG. 13

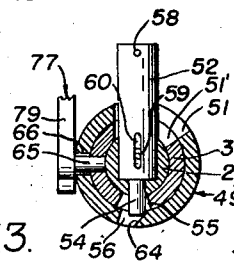


FIG. 14

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2,305,086

REPRODUCER ARM ACTUATOR

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Application August 6, 1941, Serial No. 405,613

7 Claims. (Cl. 274—14)

This invention relates to record reproducers and more particularly to controls and actuators therefor, although certain features thereof may be employed with equal advantage for other purposes.

It contemplates more especially a reproducer control of simple and inexpensive construction that will mechanically effect engagement and disengagement of a reproducer needle relative to the recordings on a record irrespective of the experience or care exercised by the operator.

Recordings of records are extensively used for entertainment and advertising purposes and reproducers are now produced and sold on a volume basis for both home and commercial use. In the commercial field, reproducers are utilized to a great extent for advertising purposes. This entails the provision of instrumentalities for enabling the reproduction of recordings at the will of the public who are invited to operate mechanical reproducers for information and advertising purposes. This field of record reproduction is normally accompanied with a large depreciation in records and reproducing instrumentalities owing to the haphazard operation or indifference exercised by the public.

In order to provide reproduction facilities for the public, instrumentalities for this purpose must be injury and trouble free so that operation at the hands of inexperienced or indifferent members of the public, cannot result in improper actuation. To this end, it has been found desirable to provide simple and inexpensive reproducer actuators that mechanically effect engagement and disengagement of the recordings with the reproducer needle in a mechanically perfect manner through an accessible control that will effect the desired operation without variation.

Mechanical operation of the reproducer arm and the recording actuating needle or stylus, is mechanically effected and the attendant merely placed these instrumentalities into operation through actuation of a control. This eliminates any possible defective engagement or disengagement that would cause injury to the record or the reproducer or both so that trouble-free operation over an extended period of time without entailing any appreciable supervision or replacement is accomplished.

One object of the present invention is to simplify the construction and improve the operation of devices of the character mentioned.

Another object is to provide an improved mechanical control and actuator for a reproducer to mechanically effect engagement and disen-

agement between the reproducer stylus and recordings without variation which is accomplished irrespective of the operator.

Still another object is to provide improved means for mechanically lowering and raising a reproducer relative to a record responsive to a mechanical actuator.

A further object is to provide a mechanical control in combination with actuating instrumentalities for effecting engagement and disengagement between a reproducer and a record.

A still further object is to provide improved mechanical means for effecting engagement of a reproducer with a record and to automatically disengage after the reproduction of the recordings thereon.

Still a further object is to provide actuating instrumentalities involving a manual control in combination with camming means to effect engagement and disengagement between a reproducer and recordings on a record.

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the drawings:

Figure 1 is a front view in elevation of a reproducer having an actuator in accordance with the teachings of the present invention.

Figure 2 is a side view in elevation of the device shown in Figure 1 showing the external control thereon.

Figure 3 is a rear view in elevation of the device shown in Figures 1 and 2.

Figure 4 is a fragmentary sectional view in elevation taken substantially along line IV—IV of Figure 1.

Figure 5 is a sectional view taken substantially along line V—V of Figure 3.

Figure 6 is a fragmentary sectional view taken substantially along line VI—VI of Figure 4.

Figure 7 is a sectional view taken substantially along line VII—VII of Figure 3.

Figure 8 is a sectional view taken substantially along line VIII—VIII of Figure 4.

Figure 9 is a sectional view taken substantially along line IX—IX of Figure 3.

Figure 10 is a sectional view taken substantially along line X—X of Figure 3.

Figure 11 is a perspective view of a tubular camming sleeve comprising an element of the actuator control shown in the preceding figures.

Figure 12 is a perspective view of a cam follower for the cam shown in Figure 11.

Figure 13 is a fragmentary sectional view taken substantially along line XIII—XIII of Figure 4.

Figure 14 is a fragmentary sectional view taken substantially along line XIV—XIV of Figure 3.

The structure selected for illustration comprises any suitable cabinet 10 having a speaker opening 11 therein. The cabinet 10 is closed on all sides except the rear through which the instrumentalities are accessible for placement in the chambered interior 12 or replacement for servicing or maintenance. A chassis comprising a base plate 13 conforms to the bottom 14 of the chambered interior 12 of the cabinet 10 to serve as a support for the instrumentalities to be hereinafter described. The base plate 13 has a plurality of standards 15 extending upwardly therefrom to support a plate 16.

The plate 16 has a bearing bracket 17 attached to the underside thereof for attachment of a vertical motor 18 that is suspended therefrom so that its shaft 19 is journaled for rotation therein and through the supporting plate 16. The upper projecting portion of the vertical armature shaft 19 has a circular record supporting disc 20 connected for rotation therewith responsive to the energization of the electric motor 18 through a cord extension 18' having a plug (not shown) serving as a complement of a standard electric light socket.

The top surface of the record supporting disc 20 is suitably lined with felt or other soft material to support a record 21 thereon for rotation owing to the frictional retention thereof without marring on the suitably lined top surface of the rotating disc 20. A loud speaker 22 of any suitable or standard construction is mounted behind the screened opening 11 in the cabinet 10 to direct the sound reproduction therethrough and emanation into the room wherein the cabinet 10 is positioned.

A reproducer 23 of any suitable or standard construction is pivotally mounted for vertical movement on a transverse pin 24 proximate to the rear end thereof. A counterweight 23' is detachably secured to the rear end of the reproducer 23 by means of a threaded stud 23' (Figure 8) so that the weight of the forward portion thereof will normally gravitate the reproducer 23 in a clockwise direction (viewed from Figure 8). The reproducer 23 is also pivotally mounted for horizontal movement so that the reproducing needle or stylus 25 proximate to the forward end 26 thereof will be in confronting or operative connection with the record 21 to traverse the recordings thereon in light frictional engagement therewith.

A set screw 27 preferably extends through the forward end 26 of the reproducer 23 to enable the removal of the reproducing needle or stylus 25 as well as effect its retention for operative frictional engagement with the recordings on the record 21. It is to be noted that the detachable counterweight 23' enables the balancing of the reproducer 23 to establish light or almost floating engagement between the stylus 25 and the recordings on the record 21. The detachable counterweight 23' enables the desired counter-balancing effect within a wide range depending upon the requirements of any particular installation or type of reproducer 23.

The pin 24 serving as a vertical pivotal mount of the reproducer 23, is carried by the upper extremity 28 of a post 29 that is telescopically mounted for reciprocation and rotation in a tubular upper portion 30 of a post 31. The solid post portion 31 terminates in a lower reduced

extension 32 that is fitted in a correspondingly apertured plate 33. A set screw 34 projects through the bottom of the plate 33 to engage an angular shoulder 35 defined by the reduced lower post extremity 32 (Figure 7). The plate 33 is fixed to another plate 34' comprising a part of the plate 13 (Figure 3).

So that the reproducer 23 may be lowered or elevated for engagement or disengagement between its stylus 25 and the recordings on the record 21, a bell crank lever 35 is pivoted as at 37 intermediate its arms 38 and 39. To this end, a pin 40 is carried between radially extending furcations 41 (Figure 8) comprising a part of a collar 42 which is pressed onto the upper tubular portion 30 of the post 31 to pivotally support the crank lever 35 therebetween. The crank lever arm 39 terminates in a rounded extremity 43 to engage a plate 44 extending transversely through correspondingly sized notches 45 provided in the lower edges 46—47 (Figures 8 and 10) of the reproducer 23.

As shown, the lever arm engaging plate 44 has an inclined slot 48 (Figure 10) therein so that registry will be effected with the lever arm engaging extremity 43 when the reproducer 23 is in its extreme initial position of rotation at the terminus of the recording on the record 21, this position of registry corresponding to the extreme pivotal horizontal displacement of the reproducer 23 in its starting position. As a result, the inclined slot 48 will serve as an indexing expedient for the reproducer 23. The plate 44 is adjustably retained in the slot 45 by a threaded stud 48' which projects through the reproducer 23 for threaded engagement therewith. This permits the plate 44 to be raised or lowered within the limit of the slot 45 to control the extent of co-action with the camming edge 43 of the bell crank lever arm 39.

In order to control the vertical and horizontal movement of the reproducer 23 responsive to manual actuation, a tubular cam or sleeve 49 is telescoped over the upper tubular portion 30 of the post 31 for slidable movement relative thereto. It should be noted that the tubular cam or sleeve 49 is vertically supported by a coil spring 50 that envelops the lower solid portion of the post 31. The coil spring 50 is supported on the plate 33 serving as a base for the post 31, and the spring 50 in turn supports the tubular cam or sleeve 49 so that it will be normally urged upwardly.

The tubular cam or sleeve 49 is provided, in this instance, with a substantially U-shaped cut-out 51 in the wall thereof to accommodate a transversely extending tubular pin 52 which receives an annular enlarged portion 53 and a pin detent 54 that extends radially through the post 28 and through a radial aperture 55 in the upper tubular portion 30 of the post 31 (Figure 5). The pin detent 54 normally projects into an inclined slot 56 (Figures 5 and 11) provided in the tubular cam or sleeve 49.

The pin detent 54 is normally urged outwardly from the center of the post 28, and to return the reproducer 23 is in registry with the inclined camming slot 56 by virtue of a coil spring 57 that is confined within the transverse tubular pin 52 (Figure 5). The spring 57 is retained in the tubular transverse pin 52 by a rod 58 which diametrically extends through the free extremity thereof. The other end of the spring 57 engages the enlarged shoulder 53 of the pin detent 54 to normally urge the latter outwardly. The pin de-

tent 54 is retained against rotary movement within the tubular pin 52 by means of a radially projecting stud 59 that is anchored in the enlarged annular shoulder 53 (Figure 12) to register with a correspondingly sized elongated slot 60 provided in the tubular pin 52 to prevent relative rotation therebetween and serve as a limit for the reciprocally mounted pin detent 54 therein.

The pin detent 54 has a longitudinal ridge 61 provided thereon, it being formed by converging flat sides 62—63 (Figure 12) milled or otherwise formed on the pin detent 54 to provide a proper camming edge in cooperation with the tapered longitudinal edge 64 of the inclined slot 56 provided in the tubular cam 49. Another pin 65 projects laterally from the lower portion of the post 29 at substantially right angles to the pin detent 54 and in the plane thereof to register with a vertical slot 66 provided in the tubular cam 49.

It should be noted that the lower arm 38 of the bell crank lever 36 cooperates with the tubular cam 49 so that the top rounded peripheral edge 67 thereof will ride below the bell crank lever 36 with its lower arm 38 displaced in a counterclockwise direction (viewed from Figure 8) responsive to the upward vertical movement of the tubular cam 49. The bell crank lever arm 39 is correspondingly displaced to elevate the reproducer 23 from engagement with the recordings on the record 21. This normally takes place through the influence of the spring 50 that elevates the tubular cam 49 unless the latter is depressed downwardly responsive to a mechanical actuator which will be presently described.

The mechanical actuator comprises, in this instance, a button 68 secured to the extremity of the elongated rod 69 that projects through a somewhat larger aperture 70 in the front face board 71 of the cabinet 10. A circular plate 72 having an axial bore 73 therethrough to reciprocally receive the actuator rod 69, is secured to the inner surface of the cabinet face board 71 so that the bore 73 thereof is in axial alignment with the opening 70 in the baseboard 71 of the cabinet 10. Suitable fasteners such as a plurality of screws 74 are utilized to attach the circular plate 72 to the inner surface of the face board 71 in order to serve as a reciprocal guide for the actuator rod 69.

The actuator rod 69 terminates inwardly in a furcated collar member 75 to receive therebetween an arm 76 of a bell crank lever 77. A pivot 78 projects through the furcated collar 75 to pivotally connect the bell crank lever arm 76 therewith. The bell crank lever 77 has an angularly offset arm 79 extending therefrom so that a substantially U-shaped slot 80 in the extremity thereof will register with a transverse pin 81 anchored in the tubular cam or sleeve 49 (Figure 6). The transverse pin 81 preferably is in press-fitted engagement with a somewhat smaller aperture 82 provided in the tubular cam or sleeve 49 to rigidly project into the U-shaped slot 80 in the extremity of the crank lever arm 79. The crank lever 77 is pivotally supported intermediate its arms 76—79 by a post 83 having a reduced upper furcated extremity 84 through which the crank lever 77 extends.

A pivot pin 85 extends through the furcated extremity 84 to engage the crank lever 77 in order to effect its pivotal support relative to the base plate 33 wherein the supporting post 83 is anchored. As a result, inward displacement of the actuator rod 69 responsive to finger de-

pression of the knob 68 will pivot the bell crank lever 77 in a clockwise direction (viewed from Figure 4) to effect the descent of the tubular cam 49 against the urge of the spring 50. This will cause the bell crank lever 36 to ride off of the tubular cam 49 and permit the reproducer 23 to gravitate downwardly toward the record 21 in a clockwise direction (viewed from Figures 3 and 8) so that the stylus 25 will lightly engage the recordings on the record 21 at the outer starting convolution thereof proximate to the periphery thereof.

The reproducer 23 will follow the convolute recordings on the record 21 and thus horizontally pivot about its post 29 which will rotate therewith in a counterclockwise direction (viewed from Figure 14) relative to the tubular cam 49. This pivotal movement proceeds until the inward traverse of the reproducer 23 and its stylus 25 reaches the terminus of the recordings proximate to the axis of the record 21. This will cause the pin detent 54 to recede within its tubular sleeve 52 against the urge of the spring 57 owing to the camming of the detent edge 61 with the tapered surface 64 of the inclined slot 56.

The post pin 65 rides the vertical tubular cam slot 66 during this operation and relative movement of the coating elements to preclude rotation of the tubular cam 49 and its inner post 30 relative to the reproducer supporting post 29. The angular openings 51 and 51' in the tubular cam 49 and the post 30 (Figures 5 and 14) provide for the rotary movement of the detent spring confining spring 52 with the reproducer supporting post 29.

Coincident with the arrival of the reproducer 23 and the stylus 25 at the terminus of the convolutions of the records 21, the pin detent 54 will reach the top edge 67 of the tubular cam 49 at its juncture with the inclined slot 56, and then the tubular cam supporting spring 50 will become operative to raise the tubular cam 49 which will effect the displacement of the pin detent 54 along the inclined cam slot 56 and thus return the reproducer 23 and the stylus 25 to its initial elevated inoperative position.

It should be observed that as the tubular cam 49 is elevated, the arm 38 of the bell crank lever 36 again rides thereover to raise the reproducer 23 so that its stylus 25 will be disengaged from the recordings on the record 21 just prior to the return pivotal movement of the reproducer 23 occasioned by the urge of the pin detent 54 and the inclined slot 56. During this return movement of the reproducer 23, the pin detent 54 is free to move outwardly under the urge of its spring 57 to project within the inclined slot 56 to accomplish the return movement simultaneous with the vertical displacement of the tubular cam 49 under the urge of its supporting spring 50.

The electric motor 18 is energized simultaneous with the descent of the tubular cam 49 which is effected by the depression of the manual control knobs 68. To this end, the chassis 13 curves upwardly as at 86 to support an electric switch casing 87. The electric switch casing 87 covers confronting terminals which are actuated by a contact button 88 projecting therefrom in the path of a flat spring 89 that is anchored at one extremity 90 to the switch casing 87. As shown, the flat spring switch actuator 89 projects beyond the contact button 88 to extend into the path of the crank lever arm 79.

Consequently, the depression of the manual

control knob 68 displaces the bell crank lever 77 in a clockwise direction (viewed from Figure 4) to simultaneously depress the flat spring switch 39 and correspondingly effect the descent of the contact switch button 88 to close the circuit to the motor 18 through the lead wires 18' that places the switch 87 in series with the motor 18. Coincident with the elevated displacement of the tubular cam 49 responsive to its supporting spring 53, the flat spring 89 will recede to its original position and permit the switch contact button 88 to move to its inoperative position to break the circuit to the motor 18.

It should be appreciated, therefore, that the motor 18 is energized and de-energized simultaneously with the actuation of the control button 68 and the return of the reproducer 23 to its initial inoperative position, respectively. With the arrangement of parts above described, the chassis 13 supports all of the operating instrumentalities so that the entire unit can be removed for replacement or repair depending upon the dictates of commercial practice or the requirements of operation over an extended period.

Then, too, the reproducer 23 and stylus 25 is placed in operative engagement with the record 21 through the mechanical instrumentalities responsive to the actuation of the control button 68 that merely initiates rather than determines the extent of contact or engagement between the reproducer stylus 25 and the recordings on the record 21. Consequently, the degree of engagement will be determined by the counter-balanced reproducer 23 which can be controlled within a fine degree of operative contact to either establish light or floating engagement without impairment to the record 21 irrespective of the number of times the control button 68 is actuated.

Various changes may be made in the embodiment of the invention herein specifically described without departing from the invention or sacrificing any of the advantages or features thereof, and nothing herein shall be construed as limitations of the invention, its concept or structural embodiment as to the whole or any part thereof except as defined in the appended claims.

I claim:

1. In a record reproducer mount, the combination with a rotatively mounted supporting member, of a reproducer pivotally connected to said supporting member for free vertical movement toward and from a record, a spring impelled member carried by said rotatively mounted support, a tubular camming member associated with said rotatively mounted support for reciprocable association therewith, there being an inclined slot in said tubular camming member to cooperate with said spring impelled member to horizontally rotate said reproducer supporting member to effect its return to an initial position after being displaced for a predetermined horizontal extent along a record groove, spring means for normally urging said camming member upwardly along said support, and means for displacing said camming member downwardly against the urge of said last named spring means.

2. In a record reproducer mount, the combination with a rotatively mounted supporting member, of a reproducer pivotally connected to said supporting member for free vertical movement toward and from a record, a spring impelled member carried by said rotatively mounted sup-

port, a tubular camming member associated with said rotatively mounted support, spring means for supporting said tubular camming member relative to said reproducer support for reciprocable association therewith to cooperate with said spring impelled member to horizontally rotate said reproducer supporting member to effect its return to an initial position after being displaced for a predetermined horizontal extent, and a cam follower lever interposed between said reproducer and said tubular camming member for controlling the vertical position of said reproducer.

3. In a record reproducer mount, the combination with a rotatively mounted supporting member, of a reproducer pivotally connected to said supporting member for free vertical movement toward and from a record, a spring impelled member carried by said rotatively mounted support, a tubular camming member associated with said rotatively mounted support, spring means for supporting said tubular camming member relative to said reproducer support for reciprocable association therewith, there being an inclined slot in said tubular camming member to cooperate with said spring impelled member to horizontally rotate said reproducer supporting member to effect its return to an initial position after being displaced for a predetermined horizontal extent, and a cam follower lever interposed between said reproducer and said tubular camming member for controlling the vertical position of said reproducer.

4. In a record reproducer mount, the combination with a rotatively mounted supporting member, of a reproducer pivotally connected to said supporting member for free vertical movement toward and from a record, a spring impelled member carried by said rotatively mounted support, a tubular camming member associated with said rotatively mounted support, spring means for supporting said tubular member relative to said reproducer support for reciprocable association therewith, there being an inclined slot in said tubular camming member to cooperate with said spring impelled member to horizontally rotate said reproducer supporting member to effect its return to an initial position after being displaced for a predetermined horizontal extent, a telescopic mount for said rotary reproducer support, means to prevent relative rotation between said telescopic mount and said tubular camming member, and means for manually displacing said camming member against the urge of said spring means to lower said reproducer to playing position.

5. In a record reproducer mount, the combination with a rotatively mounted supporting member, of a reproducer pivotally connected to said supporting member for free vertical movement toward and from a record, a spring impelled member carried by said rotatively mounted support, a tubular camming member associated with said rotatively mounted support, spring means for supporting said tubular member relative to said reproducer support for reciprocable association therewith, there being an inclined slot in said tubular camming member to cooperate with said spring impelled member to horizontally rotate said reproducer supporting member to effect its return to an initial position after being displaced for a predetermined horizontal extent, a telescopic mount for said rotary reproducer support, means to prevent relative rotation between said telescopic mount and said tubular camming member, a lever pivoted to said sup-

porting member to extend between said reproducer and said camming member, and manual control means for depressing said tubular camming member relative to said telescopic mount against the urge of said camming member spring supporting means.

6. In a control for a reproducer and the like, the combination with a record support, of a reproducer to cooperate therewith, power means for rotating said record support, a rotary mount for said reproducer, a vertical pivotal connection between said reproducer and said rotary mount, counterbalancing means detachably associated with said reproducer to provide for light gravity engagement with the record on said support, manual control means to permit the gravitation of said reproducer into engagement with a record on said support, spring impelled cam actuator means for returning said reproducer to its initial inoperative position responsive to traversing a record for a predetermined extent, means responsive to said manual control means to energize and de-energize said power means depend-

ing upon the position of said reproducer, and a double arm lever pivotally interposed between said reproducer and said cam actuator to lower said reproducer to playing position.

7. In a control for a reproducer and the like, the combination with a record support, of a reproducer to cooperate therewith, power means for rotating said record support, a rotary mount for said reproducer, a vertical pivotal connection between said reproducer and said rotary mount, manual control means to permit the gravitation of said reproducer into engagement with a record on said support, spring impelled cam actuator means for returning said reproducer to its initial inoperative position responsive to traversing a record for a predetermined extent, means responsive to the position of said cam actuator to energize and de-energize said power means depending upon the position of said reproducer, and a double arm lever pivotally interposed between said reproducer and said cam actuator to lower said reproducer to playing position.

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