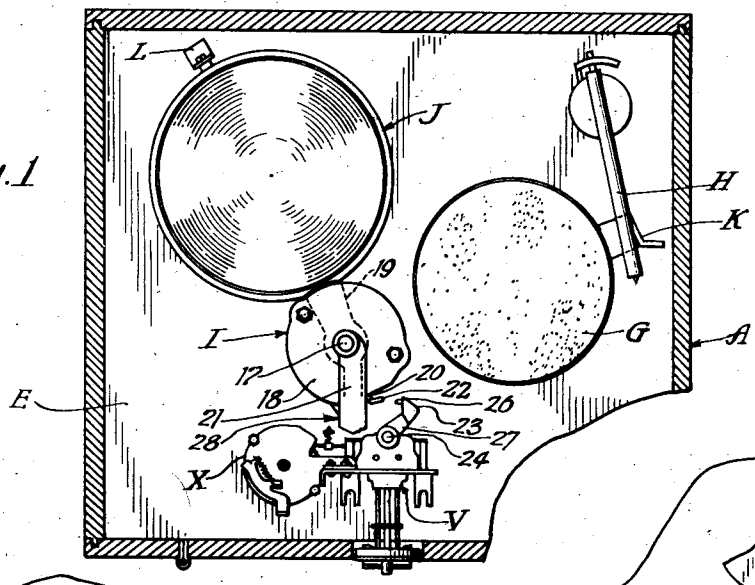
May 4, 1943. D. C. ROCKOLA 2,318,526

INDICATING DEVICE

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Fig. 1



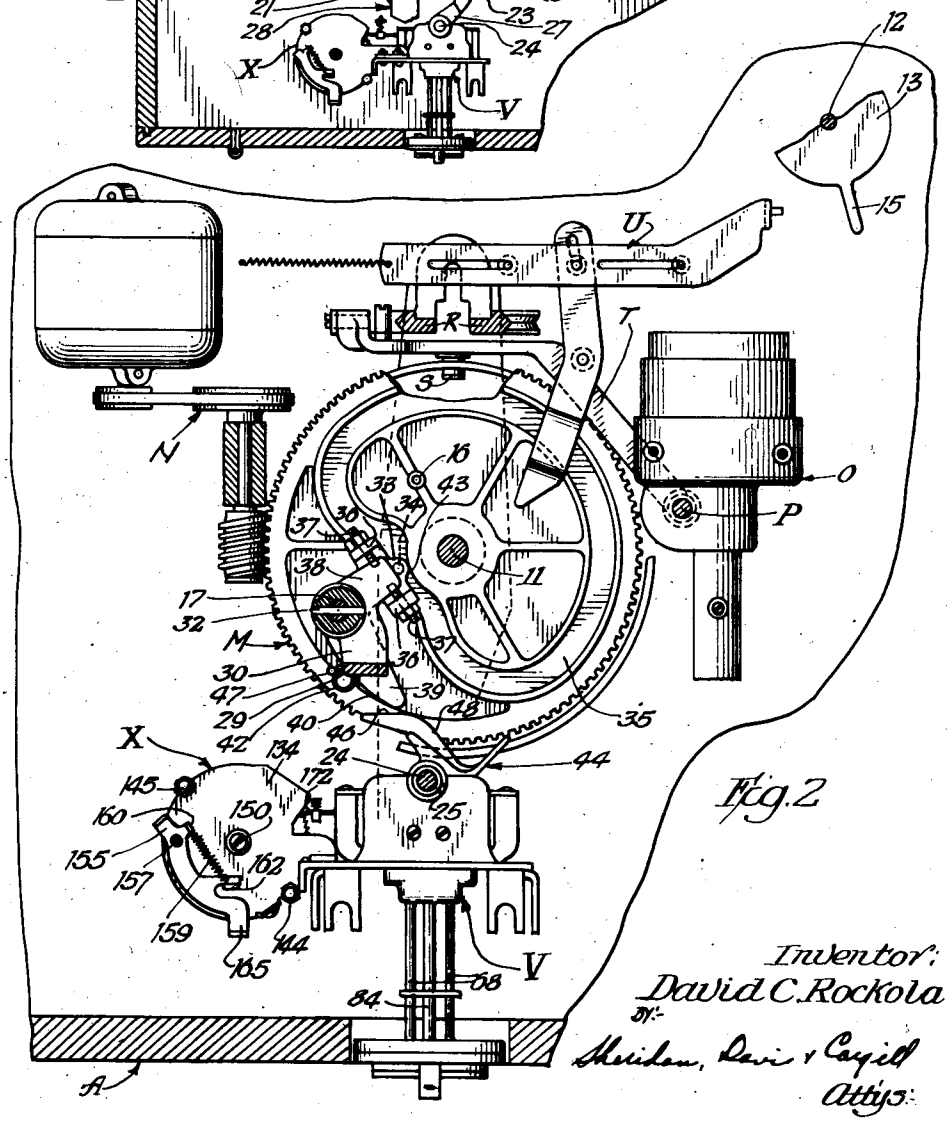


Fig. 2

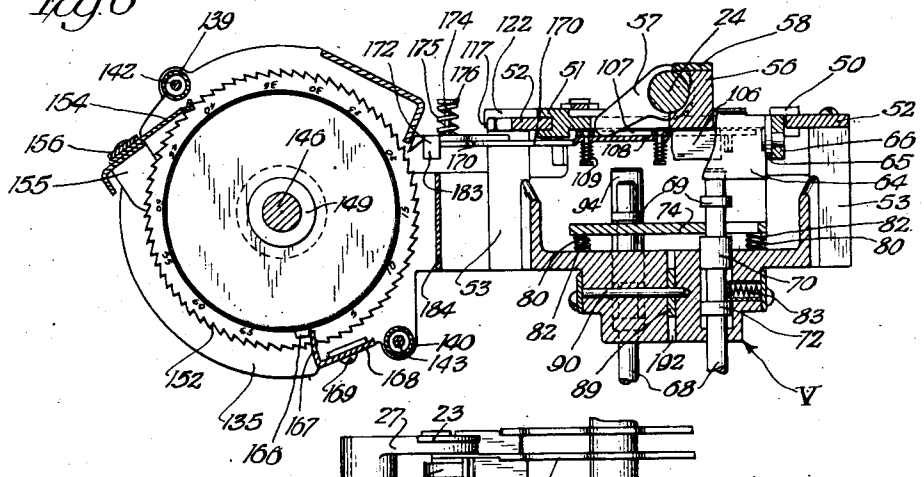
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INDICATING DEVICE

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Fig. 6



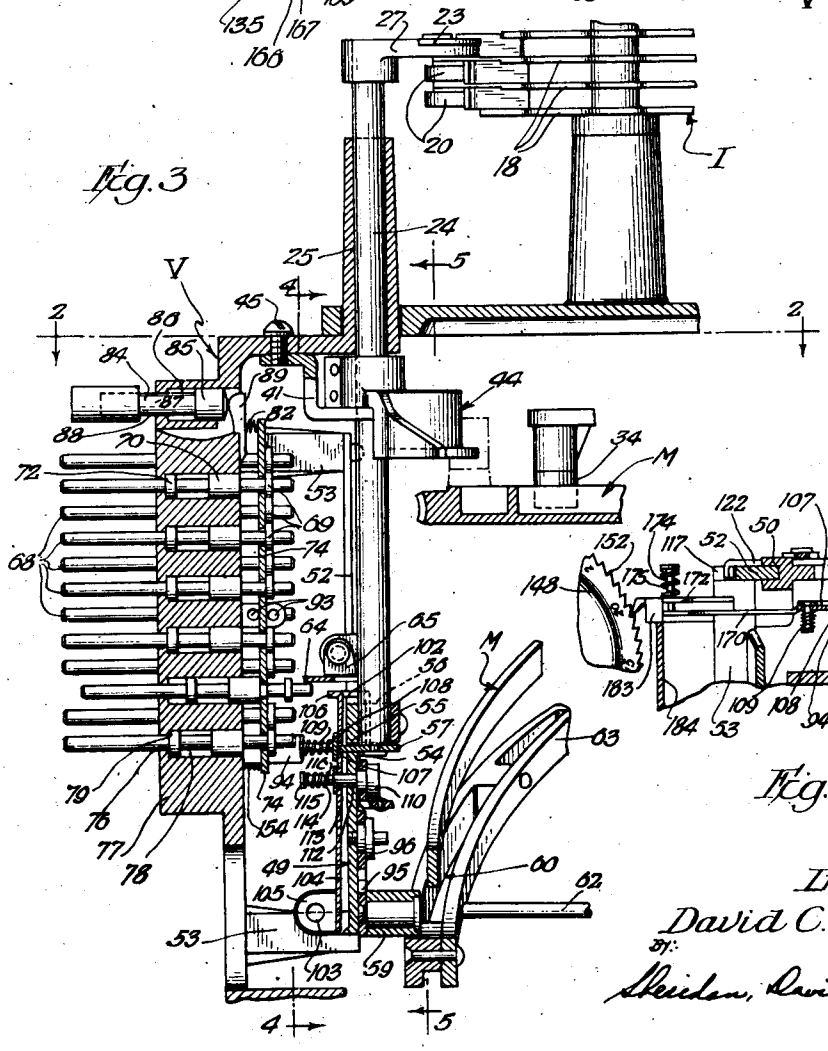


Fig. 3

Fig. 7

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INDICATING DEVICE

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Fig. 4

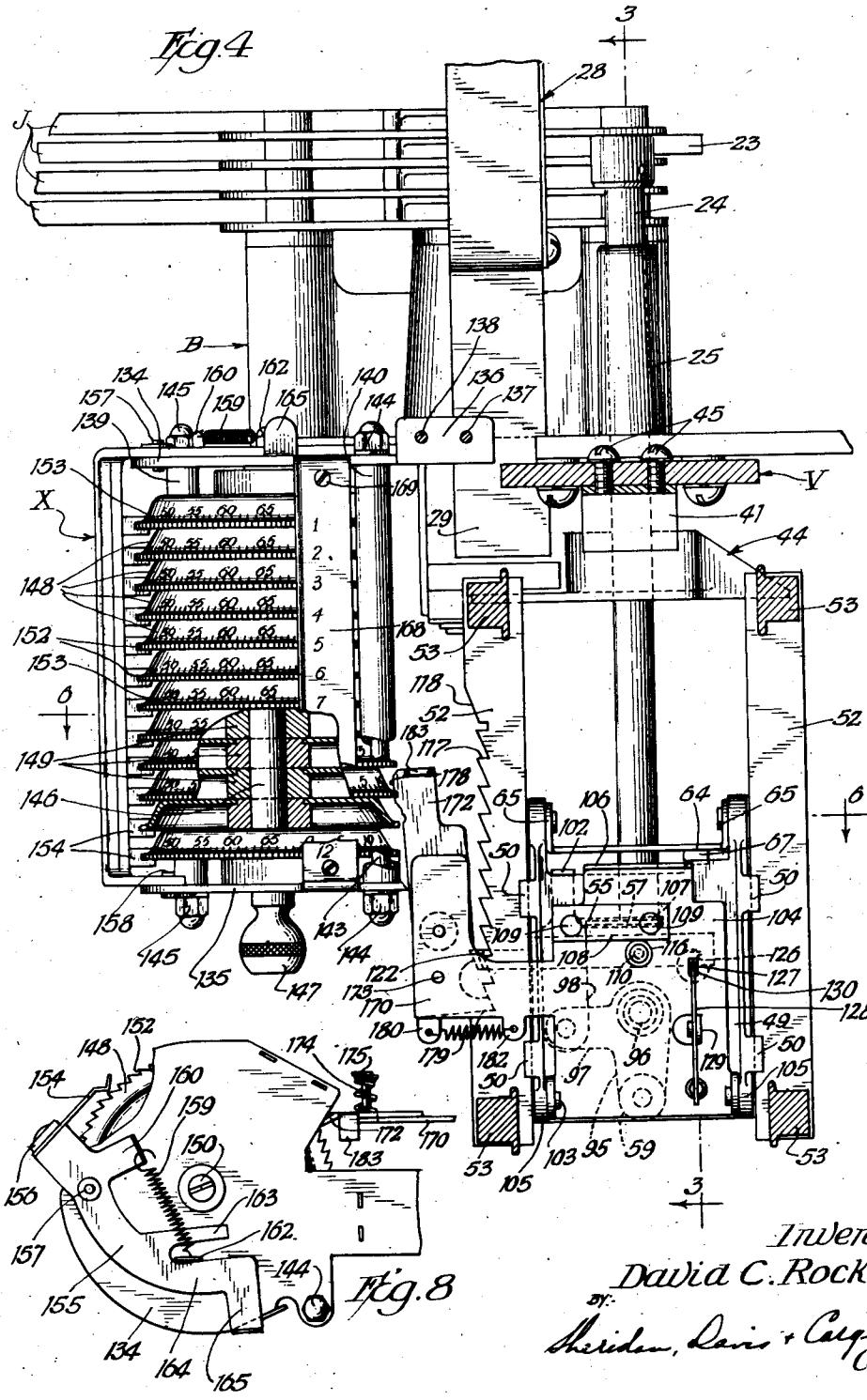


Fig. 8

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INDICATING DEVICE

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Fig. 9

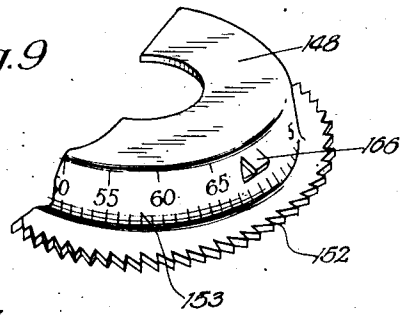


Fig. 5

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Patented May 4, 1943 2,318,526

UNITED STATES PATENT OFFICE

2,318,526

INDICATING DEVICE

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Application December 1, 1939, Serial No. 307,038

5 Claims. (Cl. 274—10)

This invention relates to indicating devices and more particularly to indicating devices of a character adapted to be utilized in connection with selective apparatus for counting and recording the number of operations of selected parts of the said apparatus.

Although not necessarily limited thereto, the indicating device disclosed herein is illustrated as applied to, and is particularly adapted for use with, a multi-record phonograph for counting and recording the number of times each of a plurality of records is selected and played.

It is an important factor in amusement and other vending apparatus to have accurate knowledge of the popularity of selected items in the locality in which the apparatus is located. This not only enables the operator of the apparatus accurately to determine the wear which has been inflicted upon certain parts, such as phonograph records, for making replacements of worn parts or records, but also very materially aids in the selection of replacement parts or records of popular type.

An object of this invention is to provide a mechanism adapted to be utilized on a selective multi-record phonograph for indicating the relative popularity of the selected records.

Another object of this invention is to provide a registering mechanism operatively associated with the record selector of a selective type of multi-record phonograph for visibly indicating the popularity of each of the records on the phonograph by indicating the number of times each record is played.

Another object of this invention is to provide a popularity indicator for a multi-record phonograph which is easily and quickly reset when the phonograph is serviced.

Another object of this invention is to provide an indicating device for indicating the popularity of the records of a selective type of multi-record phonograph which is controlled and actuated by the record selector of the phonograph and which will not interfere with the record selecting operation of the selector.

Other objects of the invention relate to various features of construction and arrangement of parts which will be apparent from a consideration of the following specification and accompanying drawings, wherein:

Fig. 1 is a horizontal cross section of a phonograph of the type with which a preferred embodiment of my invention is adapted to be utilized.

Fig. 2 is a fragmentary cross sectional view of a portion of the actuating mechanism for the phonograph shown in Fig. 1, with the section taken substantially along a line 2—2 of Fig. 3 and in the direction of the arrows.

Fig. 3 is a fragmentary side sectional view of the record selector mechanism of the phonograph shown in Figs. 1 and 2, with the section taken substantially on a line 3—3 of Fig. 4.

Figs. 4 and 5 are fragmentary front and rear sectional views taken substantially on lines 4—4 and 5—5 of Fig. 3 respectively, in the directions of the arrows and including views of a preferred embodiment of my invention.

Fig. 6 is a sectional view taken approximately on a line 6—6 of Fig. 4, in the direction of the arrows and showing the parts in one operating position.

Fig. 7 is a fragmentary sectional view taken on approximately the same line as Fig. 6, showing some of the parts in different operating positions.

Fig. 8 is a fragmentary top elevation of a portion of the apparatus shown in Figs. 4 and 5 and embodying a preferred form of this invention.

Fig. 9 is a fragmentary perspective view of a part of the apparatus embodied in a preferred form of this invention.

The illustrated phonograph is of the type shown and described in United States Letters Patent No. 2,159,834, issued to Paul H. Smyth, Jr., on May 23, 1939, for Phonograph. Since certain elements, assemblies and operations of the phonograph have been illustrated and described in detail in the above mentioned patent, they will be more briefly and generally described herein to emphasize the adaptation of this invention thereto.

General

As shown in Fig. 1, the phonograph comprises a casing or cabinet A of suitable construction for accommodating a chassis or frame B.

As shown in Fig. 1, the chassis B includes a mounting panel E commonly referred to as a motor board which carries above the mounting panel a turntable G; record playing or reproducing means H; a record carrier supporting or mounting assembly I; a plurality of pivoted, ring-shaped record carriers or trays J arranged one above the other in column or stack relationship, and swingable to and from cooperative relationship with the turntable G; and members K and L providing individual supports for each record carrier J at the end thereof opposite the mount-

ing assembly when the record carrier it in its position of cooperation with the turntable and when it is in the stack.

Below the mounting panel E and as shown in Figs. 2 and 3, the chassis B carries a master cam M; driving means N for driving the cam M; turntable rotating means O engaging a shaft P which carries at its upper end the turntable G, which turntable is movable toward and away from the reproducer means H; cam operable reproducer means U for returning the reproducer means H to its starting position upon the completion of the reproduction of a record; and various control devices.

Phonographs of the class to which this invention relates are usually, but not necessarily, controlled by coin operated or coin freed means. Upon being started, the turntable rotating means O is connected in circuit with a suitable source of electrical energy. Suitable control means also connects the cam driving means N in circuit with the source of energy. The master cam M is thereby rotated and effects the rotation of a shaft 11 on which the master cam M is fixed. The rotating master cam M, by engaging the cam follower S, raises the reciprocable slide R which carries with it the turntable reciprocating arm T and thereby raises the rotating turntable G. If one of the record carriers J is in the position of cooperation with the turntable, the turntable, during its last described movement, passes through the carrier J and removes the record therefrom. The turntable continues its movement to bring the record into engagement with the record reproducer means H for reproduction.

When the master cam M has rotated sufficiently to bring the turntable G into playing position, the cam shaft 11 has rotated to effect opening of the circuit, including the cam driving means N. The cam M thereupon ceases to rotate, and the reproducer means H reproduces the record which is on the turntable G. In playing the record, the reproducer means H swings inwardly toward the center of the record being played and thus rotates a shaft 12, shown in Fig. 2, which is connected with the reproducer means H and drivingly engageable with a disc 13 which is carried on the shaft 12. The disc 13 constitutes a part of the control mechanism of the phonograph and has an operating projection 15 thereon which, during the rotation of the shaft 12 by the playing movement of the reproducer means H, swings toward the reproducer return means U.

When the reproduction of the record is completed by the reproducer means H, the shaft 12 has rotated the disc 13 until the projection 15 is adjacent the reproducer means U. At this stage of the operation, the control means of the phonograph again connects the cam driving means N in circuit with the source of energy to again cause that cam driving mean to rotate the master cam M and its shaft 11. When the rotation of the master cam M is thus resumed, the cam follower S which is engaged by the cam track and the reciprocable slide R which carries the follower S are moved by the cam in a direction to cause the turntable reciprocating arm T to move the turntable G away from the reproducer means H and back through the positioned record carrier J so as to deposit the reproduced record thereon. Meanwhile, and after the reproduced record has thus been moved out of reproducing engagement with the reproducer means H, a pin or stud 16 on the rotating master cam M engages the reproducer return means U and moves it to swing the disc 13 in a direction which returns it to the starting position.

When the rotating master cam M has completed its movement of the follower S, circuit control means effects interruption of the circuit including the cam driving means N and that including the turntable rotating means O, whereupon the foregoing cycle may be repeated by subsequent operations.

In the phonograph disclosed herein, the record carriers J are pivoted on a post 17 between the successive discs 18 and the mounting assembly. Each record carrier has an arm or projection 19 extending beyond the periphery of the discs 18 at the side of the assembly I opposite the record carriers proper. The arms or projections 61 cooperate with releasable record carrier locking means for releasably locking each record carrier in stacked position.

Record carrier locking and releasing means

The latch member 20 is pivoted on each arm 61 outwardly of the discs 18. Each latch member 20 has integrally formed thereon a laterally extending finger 22. The fingers 22 are selectively operable by a selector 23 carried at an end of a rockable and longitudinally reciprocable shaft 24 which is slidably journaled as at 25 in a selector control frame V suitably secured to the front of the chassis B, as shown in Figs. 1 and 2. The selector 23 is of plate-like construction having a cam surface 26 on the outer end of an arm 27 which is rockable with the shaft 24.

Upon operation of the selector 23, the surface 26 engages the finger 22 of one of the latch members 20 to cam the latch member about its pivot. When any latch member 20 is thus released, the angularity of its finger 22 and the shape of the cam surface 26 cause the record carrier arm 19 carrying the released latch member 20 to swing about the pivot post 17 to its position in alignment with the turntable.

Record carrier swinging means

The record carrier swinging means includes a swingable yoke-like member 28 having an arm fixed on an end of the pivot post 17 at one end of the assembly I and extending radially outwardly therefrom beyond the periphery of the discs 18; a leg 29, and a leg 30 connected at one end to the leg 29 and extending therefrom to the pivot post 17 to which it is secured as shown at 32 in Fig. 2.

Loosely secured on the post 17 adjacent the leg 30 is a bell crank lever 33 provided with a cam roller or follower 34 depending therefrom into a cam groove 35 on the master cam M and with a pair of spaced upstanding lugs 36. Each lug 36 carries an adjustable screw 37 for cooperating with a crank arm 38; the crank arm 38 being connected to the angle leg 30. As the cam M is rotated, the cam groove 35 operates the bell crank lever 33 and thereby the crank arm 38 to oscillate the yoke-like member 28 to swing a selected record carrier toward the path of the turntable and to swing that record carrier away from the path of the turntable and toward the stack of record carriers. The bell crank lever 33 has a leg 39 provided with a cam surface 40 engageable by a cam stud or follower 42 on the master cam M for moving the bell crank lever to move the cam follower 34 by substantially

"dead center" position 43 in the cam groove 35. When a record carrier has been swung to its position of alignment with the turntable, it is held in that position by the yoke member 28. The screws 37 may be adjusted to adjust the record carrier in delivery position to alignment with the turntable.

Selector rocking means

For rocking the selector 23 to release one of the latch members 20, the selector shaft 24 is provided with a keyway extending longitudinally thereof for cooperation with any suitable keying means of a cam lever 44 on the shaft 24. The cam lever 44 is secured against reciprocable movement therewith at a level slightly above the master cam M by a bracket 41 secured at 45 to the selector control frame V. The keyway and the keying means permit the shaft 24 to reciprocate longitudinally thereof relative to the cam lever 44, and provide a driving connection between the cam lever and the shaft, whereby the shaft may be rocked about its longitudinal axis when the cam lever is operated.

The cam lever 44 has a cam surface 46 engageable by the cam follower 42 and a stud or pin 47 on the cam M, after the follower 42 has caused the follower 34 to move beyond the position 43 in the cam groove 35, for rotating the shaft 24 in a direction to cause the selector to release one of the latch members 20 as described, and a contiguous cam surface 48 for permitting the cam lever 44 and the shaft 24 to rotate in the opposite direction after the pin 47, in rotating with the cam M, has moved beyond the cam surface 46.

Selector reciprocating means

A reciprocable plate-like slide member 49 is provided with a plurality of bifurcated lugs 50 at its opposite sides for slidably engaging the opposite faces of a pair of spaced guide rails 52 suitably secured to rearwardly projecting studs 53 of the selector control frame V. The rear face of the slide plate 49 is formed with an outstanding transverse rib 54 at one side of a rectangular aperture or slot 55 in the plate 49 and a pair of spaced lugs 56 at the other side of the aperture 55 to facilitate rotatably securing the selector shaft 24 to the slide plate 49.

In securing the selector shaft 24 to the slide plate 49, the lower end of the shaft is positioned between the lugs 56 in such a manner that an arm 57 fixed on the shaft is positioned between the rib 54 and the lugs 56 and extends into the aperture 55 in the slide plate, whereby the shaft and slide plate will reciprocate together. The arm 57 is rockable with the shaft 24 and, during the rotation of the shaft for operating the selector 23 to release a latch member 20, the outer or free end of the arm swings through the aperture or slot 55 to a position forwardly of the slide plate 49 for a purpose which will be described. If desired, a strap 58 may be bridged between the rear ends of the spaced lugs 56 for retaining the lower end of the selector shaft between the lugs.

For reciprocating the slide plate 49 so as to reciprocate the selector shaft 24, the slide plate is provided with a cam roller or follower 59 projecting rearwardly from its rear face. The roller 59 is adapted to cooperate with a cam shaped rail 60 which is preferably integral with the barrel cam M, and is carried peripherally outwardly thereof by a radial arm 62 and a turntable raising rail 63 of the cam M.

After the turntable has been lowered and while the record carrier is being returned to the stack by the cam M, the cam rail 60 is adapted to raise the slide plate 49 and the selector shaft 24 sufficiently to move the selector 23 above the level of the uppermost latch member releasing finger 22, where the selector is normally held during inoperative periods of the phonograph by engagement between the cam follower 59 and the cam rail 60. Upon starting the phonograph, the cam rail 60 permits rapid and silent lowering of the cam follower 59 and hence the slide plate 49, the selector shaft 24, and the selector 23 before the selector 23 is rotated in a latch member releasing direction by the rollers or pins 42 and 47 and the cam lever 44.

Selector control

The selector control comprises operable means for stopping the selector 23 at the elevation of a desired latch member releasing finger 22, automatically operating means for restoring the operable means during the operation of the latch member releasing finger 22 by the selector 23 at that elevation, automatically operating means for supporting the selector at that elevation after the operable means is restored, and the selector frame V including the selector shaft journal 25 and the studs 53 and, as already explained, suitably secured to the main frame B.

As operable means for stopping the selector 23 at the elevation of a desired latch member releasing finger 22, the horizontal pivoted plate 64 is swingably carried at the upper end of the slide plate 49 by upstanding arms 65 at opposite ends of the plate 64, pivoted to upstanding lugs 66 at opposite sides of the slide plate 49. A depending finger 67 at the rear side of the plate 64 is engageable with the upper portion of the slide plate 49 for limiting the rotation of the plate 64 in one direction.

A plurality of reciprocable rods 68, one for each record carrier J, are reciprocable one or more at a time to and from a position in the path of the pivoted plate 64 as that plate moves with the slide plate 49. Each rod 68 intermediate its ends is provided with three spaced flanges 69, 70 and 72, and the rear end of each rod is inserted through an aperture 73, in a rectangular plate 74 until the flange 69 has passed through that aperture, whereupon each rod is moved bodily transversely of the plate 74 into a smaller aperture 75 in the plate adjacent the aperture 73, and providing a bayonet type of aperture therewith. The rods are slidable in that position between positions of engagement between the rear face of the plate 74 and the flange 69 and between the front face of the plate 74 and the flange 70.

For each rod 68, there is an aperture 76 in a front selector frame member 77 and that aperture 76 is enlarged as at 78 rearwardly of the front face of the frame member 77 to provide an internal shoulder 79. The rods 68 assembled to the plate 74 may be inserted in the respective enlarged portions 78 of the apertures 76, and moved forwardly until the flanges 72 abut the shoulders 79. In that position the forward ends of the rods 68 extend forwardly of the selector frame member 77 to provide push buttons for operating the rods. The plate is movably carried rearwardly of the frame member 77 by pins 80 projecting forwardly from the plate at its cor-

ners and slidably receivable in sockets in the frame member 77. A coil spring 82 is placed on each pin 80 between the plate 74 and the frame member 77 for yieldably holding the plate spaced rearwardly of the frame member 77 and between the flanges 69 and 70 of the respective rods 68. A spring urged pin 83 extends into each enlarged portion 78 of each aperture 76 between the flanges 70 and 72 for limiting the reciprocable movement of the rods 68.

The rods 68 may be individually moved into the path of the pivoted plate 64 by pushing them inwardly with respect to the frame member 77. For restoring the rods to their outer positions, the cancellation rod 84 is provided which has a flange portion 85 reciprocable in a passage 86 in the frame member 77 and which has a shank portion 87 extending forwardly through an aperture 88 outside and forwardly of the frame member 77 where the shank portion is equipped with an operating push button handle. The shank portion 87 is engageable with one end of a lever 89 which is pivoted intermediate its ends as at 90 in a rectangular aperture 92 in and longitudinally of the frame member 77 and which has another end secured as at 93 to and centrally of the plate 74. When the cancellation rod 84 is pushed inwardly, it pivots the lever 89 causing the lever through the connection 93 to move the plate 74 forwardly against the action of the springs 82 whereby the plate 74 will engage the flange 70 of any operated rod or rods 68 and return it or them to the outer position. Upon release of the cancellation rod, the springs 82 return the plate 74 to its initial position causing the plate through the connection 93 to restore the lever 89 and the cancellation rod 84 to their initial positions. A plurality of rods 68 may be moved simultaneously into the path of the pivoted plate 64 by pushing outwardly on a pin 94.

As the slide plate 49 moves upwardly, the pivoted plate 64 will engage the inner end or ends of any of the rods 68 which may have been pushed inwardly as described above, and will be swung downwardly from a horizontal position by such engagement. The assure its return to the horizontal position, at which the finger 67 engaging with the upper end of the slide plate 49 serves as a limiting stop, the cam follower 59 is preferably mounted on a depending arm 95 of a bell crank lever. The bell crank lever is pivoted as at 96 on the inner face of the slide plate 49 and has another arm 97 pivotally connected to a bar 98 which is reciprocably secured to the rear face of the slide plate 49 by a pin 99 passing through an elongated aperture 100 in the bar 98 and into the slide plate. The upper end of the bar 98 is turned outwardly into the space between the slide plate 49 and the pivoted plate 64 to provide a horizontal arm 102. As the slide plate is moved upwardly, the cam rail 60 engages the cam follower 59 so as to hold the bell crank lever in a position at which the arm 102 permits the downward swinging of the pivoted plate 64 when it engages one of the operated rods 68. As the follower 59 starts down, it is cammed about the pivot 96 causing the arm 97 of the bell crank lever to raise the bar 98 until the horizontal arm 102 levels the pivoted plate 64.

Thus, when the slide plate 49, and hence the selector, are moving downwardly, the pivoted plate 64 is in a horizontal position and the plate 64 will engage and be arrested by the rod 68 that is operated, or by the uppermost operated rod 68, if more than one of the rods has been operated. Such stopping of the plate 64 stops the downward movement of the slide plate 49, thus stopping the selector 23 at the elevation of the latch member releasing finger 22 controlling the record carrier corresponding to the effective push rod 68. If none of the rods 68 has been operated, the plate 64 in its downward movement will be stopped just above the pin 94 at the lower end of the travel of the slide plate 49.

For automatically restoring each rod 68 to its outer or non-selecting position after it has been effective to stop the selector at the desired elevation, a plate 104 is pivoted as at 103 at its lower end to forwardly extending lugs 105 at opposite sides of the forward face of the slide plate 49. That plate 104 extends upwardly along the slide plate to the upper end thereof, where the plate is provided with a forwardly extending ledge or other projection 106 spaced below the pivoted plate 64 such a distance that when the plate 64 engages a rod 68, the projection 106 is at the same level as the end of the rod and is engageable therewith when the plate 104 is swung forwardly about its pivot 103. At the lower end of its travel with the plate 49, the projection 106 is engageable with the pin 94. The plate 104 is provided with a rectangular aperture 107 which registers with the rectangular aperture 55 in the slide plate 49 and which is covered by strip 108 resiliently secured on the forward face of the plate 104 by the pin-and-spring construction illustrated at 109 in Figs. 3 and 4. Just below the strip 108, the plate 104 is resiliently secured to the slide plate 49 by a shouldered pin 110 passing through apertures 112 and 113 in the respective plates 49 and 104 and a coil spring 114 on the pin forwardly of the plate 104 between a fixed abutment 115 at the forward end of the pin and a slidable abutment 116 adjacent the plate 104.

Rotation of the selector shaft 24 in a direction to move the selector 23 for operating a latch member releasing finger 22 causes the arm 57 at the lower end of the selector shaft to swing through the registering apertures 55 and 107 in the slide plate 49 and the plate 104 into engagement with the resiliently held strip 108 and to swing the plate 104 forwardly about its pivot 103 against the action of the spring 114. The forward swinging of the plate 104 causes the projection 106 at the upper end thereof to engage the inner end of any rod 68 on which the pivoted plate 64 is resting and to move the rod 68 forwardly out of the path of the pivoted plate 64, or as the case may be, to engage the inner end of the pin 94 and to move that pin in a direction to move a plurality of rods 68 into the path of the pivoted plate 64. The spring 114 is adapted automatically to return the plate 104, the arm 57, and the selector shaft 24 to their initial positions.

For supporting the selector at any of its elevations after the rod 68 is thus restored, and until the selector is subsequently actuated by the cam rail 60, there is formed along an edge of one of the guide rails 52 a rack 117, a cam surface 118 at the upper end of the rack 117, and a cam surface 119 at the lower end of the rack 117 at the edge of the guide rail. Cooperating with the rack is a reciprocable pawl 122 slidably mounted on the rear face of the slide plate 49 by the pins 99 and 110 passing through elongated apertures 123 and 124, respectively, in the pawl. A spring 125 resiliently urges the pawl toward engagement with the rack 117. The pawl is provided with a slot 126 at its lower side for releasable engage-

ment with a finger 127 of a spring urged lever 128. The lever 128 is pivoted as at 129 on the forward face of the pivoted plate 104 in such a position that the finger 127 extends rearwardly through apertures 130 in the plates 104 and 49.

During the elevation of the slide plate 49, the selector shaft and the selector, the pawl slides over the teeth of the rack 117. At the upper portion of the slide plate 49, the pawl 122 engages the cam 118 and is cammed longitudinally to a position at which the slot 126 registers with the finger 127 of the spring urged lever 128. The finger 127 thereupon springs rearwardly into latching engagement, in the slot 126, for holding the pawl in a position such that the pawl is beyond the extremities of the teeth of the rack 117.

During the lowering of the slide plate 49, the pawl 122 does not engage the rack 117. When the pivoted plate 104 is, however, swung rearwardly, as already described, for restoring the rod 68 which is engaging the plate 64, the lever 128 moves rearwardly, disengaging the pawl 122, whereupon the spring 125 draws the pawl 122 into supporting engagement with the rack 117 to hold the slide plate 49, the selector shaft and the selector in their respective positions after the rod 68, which has been effective to arrest them in those positions, is restored.

Phonograph operation

In the normal non-playing position of the phonograph, the record carriers J are in stack; the turntable G is down; the reproducer H is in the starting position shown in Fig. 1; the slide plate 49 is raised to such an elevation that the selector 23 is at a level above that of the uppermost finger 22, and the pawl 122 has been cammed out beyond the teeth of the rack 117 where it is latched by the finger 127 engaging in the slot 126; and the cam followers 42 and 47 are in the position shown in Fig. 2.

The phonograph may be started by a suitable coin or token operated apparatus such as that disclosed in the Patent No. 2,159,834. The rods 68 may be operated before or after starting. One or more rods 68 are moved inwardly into the path of the pivoted plate 64, or to the selecting position. When the driving means N is energized, it causes the rotation of the master cam M which carries the cam followers 42 and 47, and the driving means O is energized to rotate the turntable G.

The cam rail 60 cooperating with the cam followers 59 lowers the slide plate 49, and with it the selector shaft 24 and the selector 23 until the pivoted plate 64 engages the uppermost rod 68 which has been moved to the selecting position. If no rod 68 is in a selecting position, or if the rod 68 corresponding to the lowermost record carrier J is in a selecting position, the slide plate 49 is lowered to its lowermost position. In that manner, the slide plate 49 is brought to rest with the selector 23 at the level of the latch member releasing finger 22 corresponding to the rod 68 engaged by the pivoted plate 64 and to the record carrier J releasably latched in stack by the latch member controlled by that finger 22 When the slide plate 49 descends to its lowermost position, the selector 23 is lowered to the level of the lowermost latch member releasing finger 22.

The cam followers 42 and 47 on the master cam M, after the positioning of the selector 23, as just described, engage the cam lever 44 and thereby rock the selector shaft 24 sufficiently to cause the selector 23 to operate the latch member releasing finger 22 at the same level. In that manner, the selected record carrier J is disengaged from the disc 18. The rocking movement of the selector shaft 24 causes the arm 57 to swing the plate 104 forwardly so that the projection 106 restores the rod 68 which has arrested the slide plate 49, the selector shaft 24, and the selector 23.

If none of the upper rods 68 has been moved to a selecting position so that the slide plate 49 descends to its lowermost position, the rocking movement of the selector shaft 24 causes the selector to operate the latch member releasing finger 22 corresponding to the lowermost record carrier J to disengage that record carrier from the disc 18. In addition, such rocking movement of the selector shaft 24 in its lowermost position causes the arm 57 to swing the plate 104 forwardly so that the projection 106 restores the lowermost rod 68, if it is in the selecting position, and operates the pin 94 for moving a plurality of rods 68 to their selecting positions.

Upon the restoration of one of the rods 68 to its non-selecting position, out of the path of the pivoted plate 64, as described above, the slide plate 49 does not lower the selector 23, for the reason that upon the forward swinging of the plate 104 to restore a rod 68 and/or to operate the pin 94, the finger 127 is withdrawn from the slot 126 in the pawl 122, which is thereupon moved into supporting engagement with the rack 117 by the spring 125. In that manner, the slide plate 49, the selector shaft 24, and the selector 23 are latched at the elevations at which they were last effective until the cam rail 60 next actuates the follower 59 to elevate the selector 23 to its level above the uppermost finger 22.

After the release of the selected record carrier J and after it is engaged with the swingable member 28, that member is swung in a delivery direction by the cam groove 35 in the rotating master cam M and the cam follower 34, so as to swing the released record carrier to its delivery position in alignment with the rotating turntable G. The master cam M now actuates the cam follower S to raise the reciprocable slide R, which carries with it the turntable raising arm T, so as to raise the rotating turntable G through the selected record carrier J. The turntable is thus raised to remove the selected record from the record carrier in alignment with the turntable and to present that record for reproduction by the reproducer means H. In that reproducing position, means de-energizes the cam driving means N to cause the cam M to cease rotating.

When the reproducer means H reaches the end of a record or groove in reproducing that record, means again connects the cam driving means N in circuit with its energy supply source and again causes the driving means N to rotate the master cam M. When the cam M thus resumes its rotation, it actuates the cam follower S and the slide R to lower the turntable G. After the turntable has thus been moved away from the reproducer means H, the reproducer return means U returns the reproducer means H to its starting position, and the turntable deposits the reproduced record on the record carrier from which it was originally removed and which has been held in delivery position during the reproduction of the record by the engagement of the cam follower 34 in the cam groove 35 of the master cam M.

After the reproduced record is deposited on the record carrier, the cam groove 35 actuates the cam follower 34 to swing the swingable mem-

ber 28 away from its delivery position. In thus swinging, the member 28 swings the arm in a direction to return the record carrier to the stack. In that position, the latch member 20 releasably latches the record carrier to the disc 18.

During that return movement of the record carrier bearing the reproduced record, the cam rail 60 rotating with the master cam M engages the cam follower 59 on the slide plate 49 and raises the slide plate to a position at which the cam surface 118 of the rack 117 cams the pawl 122 longitudinally to its position beyond the extremities of the rack teeth. At that position of the pawl 122, the slot 126 in the pawl registers with the finger 127 of the spring urged lever 128 and the finger enters the slot to latch the pawl at the position at which it will not engage the teeth of the rack 117 until the plate 104 is again operated for restoring a rod 68 or for operating the pin 49 as already described. The slide plate 49 is held in that raised position by the engagement of the cam follower 59 on the cam rail 60. In that position of the slide plate 49, the selector 23 is at its level above the uppermost latch member releasing finger 22.

When the selector 23 has been elevated, as just described, after the return of the reproduced record to the stack, control means stops the phonograph when the pre-selected number of records has been reproduced. If fewer than that number of records has been reproduced, the foregoing cycle is repeated until the pre-selected number is fully reproduced.

Popularity indicator structure

In the preferred embodiment of this invention, a popularity indicator X is secured to the selector control frame V and actuated by the record selecting means. A plate 132 is secured to the selector control frame V by screws such as 133, or other suitable fastening means. The popularity indicator X has end plates 134 and 135 at opposite ends thereof, which end plates have integral brackets such as 136 thereon secured to the plate 132 by bolts such as 137 and 138, or other suitable fastening means. The end plates 134 and 135 are secured together in spaced relation by tubular spacers 139 and 140, which have shafts such as 142 and 143 extending therethrough, with nuts 144 and 145 threaded on to the ends thereof to hold the end plates in position against the ends of the spacers 139 and 140. A shaft 146 is rotatably supported by the end plates 134 and 135 and has a knob 147 on one end thereof for manual rotation of the shaft. A number of individual indicating elements 148, which is preferably equal to the number of record carriers or trays J, is rotatably mounted on the shaft 146. The indicating elements 148 are preferably substantially dish shaped and are mounted one adjacent the other for individual rotation about the shaft 146. The spacing of the indicating elements 148 along the shaft 146 is accomplished by a plurality of spacing washers 149, one of which is secured to each of the indicating elements, and is such that it corresponds to the spacing of the record carriers J and the spacing of the steps of the selector shaft for selecting the various record carriers J. The shaft 146 is held in position with respect to the end plates 134 and 135 by a screw 150, which extends through the end of plate 134 and is threaded into the shaft 146.

Each of the indicating elements has integral ratchet teeth 152 on the edge thereof. For each of the ratchet teeth the indicating elements preferably have indicating or calibration marks and corresponding counter numbers such as those indicated at 153. A plurality of spring fingers 154 are clamped between a yoke 155 and a clamping strip 156; the spring fingers being spaced so that they are adjacent each of the indicating elements. The yoke 155 is rotatably secured to the end plates 134 and 135 by rivets such as 157 and 158, or other suitable means. A tension spring 159 has one end secured to a lug 160 on the yoke 155 and the other end anchored to a lug 162 on the end plate 134, so that the spring 159 normally biases the spring fingers 154 into engagement with the ratchet teeth 152. Integral portions 163 and 164 of the yoke 155 cooperate with the lug 162 to provide stops for limiting the movement of the yoke 155 with or against the biasing force of the spring 159. An extension 165 on the yoke 155 provides a manual actuating handle for the yoke to facilitate the movement of the yoke against the biasing force of the spring 159, which movement releases the indicating elements from engagement by the spring fingers 154. Each of the indicating elements 148 has an integral lug 166 projecting outwardly on one side thereof. These lugs on the indicating elements cooperate with inwardly projecting fingers 167 on a strip 168 which is secured to the end plates 134 and 135 by screws such as 169. The lugs 166 are adapted to strike the fingers 167 to limit the movement of the indicating elements in either direction to an amount somewhat less than one complete revolution.

The strip 108 has an outwardly projecting portion 170, which is preferably somewhat offset with respect to the rest of the strip. A pawl 172 is pivotally supported on a stud 173, which stud is secured to the projecting portion 170 of the strip 108. A second pin 174 is secured to the projecting portion 170 of the strip 108 and extends through a slot in the pawl 172. A compression spring 175 is held in place around the pin 174 by a washer 176 and cooperating cotter pin 177. This compression spring 175 urges the pawl 172 toward the projecting portion 170 of the strip 108. The slot through which the pin 174 extends is sufficiently wide to permit some movement of the pawl 172 about the pivot stud 173. The pawl 172 has an edge 178 which is adapted to engage the ratchet teeth 152 of the indicating elements 148. A tension spring 179 has one end secured to a lug 180 on the end of the pawl 172 and the other end anchored to a lug 182 on the slide plate 49. This spring 179 biases the edge 178 of the pawl 172 into engagement with the ratchet teeth 152 on the indicating elements 148. The movement of the pawl 172 against the biasing force of the spring 179 and about the pivot stud 173, which is permitted by the slot through which the pin 174 extends, is sufficient to allow the pawl 172 to return past the ratchet teeth 152.

The position of the popularity indicator X with respect to the selector frame V is determined by the length of the pawl 172. The length of that pawl is such that when the selector shaft 24 is in a position for selecting the lowermost record carrier J, the edge 178 engages the lowermost indicating element 148. As the selector shaft 24 and the slide plate 49 move to positions for the selection of other record carriers J, the

edge 178 of the pawl 172 engages other predetermined indicating elements 148.

Operation of the popularity indicator

When the selector shaft 24 moves longitudinally and then rotates to select a predetermined record carrier corresponding to a selected record, as has been previously described, the arm 57 moves the strip 108 and the integral extension 170 thereon. The movement of the strip 108 and the projecting portion 170 is away from the shaft 24. This movement actuates the pawl 172 to rotate the indicating element corresponding to the selected record, which is engaged by the edge 178 of the pawl. A lug 183 on the pawl 172 cooperates with a stop strip 184, which is anchored between the brackets 136 to limit the movement of the pawl 172 so that the actuated indicating element is moved only one digit or tooth. The spring fingers 154 hold the indicating elements in the positions to which they were last moved. It is a feature of the popularity indicator disclosed that, if for any reason one of the indicating elements 148 fails to move in response to actuation by the pawl 172, the failure of operation of the indicating element does not interfere with the selection and reproduction of a record. In such an instance the compression spring 175 gives to allow movement of the strip 108 and the projecting portion 170, though the movement of the pawl 172 is stopped. When any one of the indicating elements 148 is moved to a position corresponding to the highest number that can be registered on the element, the lug 166 engages one of the fingers 167 to stop further movement of the indicating element in the same direction. This indicates that the record corresponding to the indicating element has been played as many or more times than the indicating element is capable of registering, while if movement of the indicating element were not stopped by the lug 166, that indicating element would start a recount and would not show the first revolution.

To facilitate resetting of the indicating elements to their zero position, when the phonograph is serviced, the indicating elements 148 are freed from engagement by the spring fingers 154 by manual movement of the yoke 155 and all of the indicating elements are turned to their zero position by manual rotation of the shaft 146 which is effected by the rotation of the knob 147. The indicating elements 148 are stopped in their zero position by the engagement of the lugs 166 with their cooperating fingers 167. The normal positions of rest of the projecting portion 170 of the strip 108 and the pawl 172 are indicated in Figure 6; while the positions of the projecting portion 170 and pawl 172 at the limit of their movement for selecting a record and operating an indicating element are indicated in Figure 7. The release of the indicating elements from the spring fingers 154 is indicated in Figure 8.

While I have shown and described a specific embodiment of the invention for the purpose of illustration, it will be apparent that changes may be made therein without departing from the spirit of the invention.

I claim:

1. In a multi-record phonograph of the type adapted for selective reproduction of the records, the combination comprising a part of the phonograph mechanism movable linearly to predetermined positions in the selection of records for reproduction, means rotating said part upon reaching one of the predetermined positions, indicating means having individually rotatable counting elements linearly spaced in positions corresponding to said predetermined positions, said counting elements having ratchet teeth thereon, and a pawl actuated by rotary movement of said part for moving a predetermined one of said counting elements a predetermined amount upon rotary movement of said part, said pawl being resiliently supported to prevent failure of movement of said counting element from interfering with rotary movement of said pawl.

2. In a multi-record phonograph of the type including a plurality of spaced record carriers and a movable selector element movable to a position corresponding to the position of the selected record carrier comprising, in combination, a rotatably supported indicator shaft, a number of indicating elements corresponding to the number of record carriers mounted on said shaft for individual rotation with respect thereto and spaced to correspond to the spacing of the record carriers, a single pawl movable with the movable selector element and adapted to be actuated thereby to individually rotate one of the indicating elements a predetermined amount, means for holding the indicating elements in positions to which they are actuated by the pawl, means for simultaneously manually releasing said means for holding the indicating elements, and means for simultaneously returning the indicating elements to predetermined corresponding positions upon manual release of the said means for holding them.

3. In a multi-record phonograph of the type adapted for selective reproduction of records the combination comprising means carrying a plurality of records, record selector means including automatically driven elements for selecting records and delivering them for reproduction, indicating means including an actuated element and actuated by an automatically driven element of the record selector means for indicating the relative popularity of the phonograph records carried by the carrying means by indicating the number of times each of the records is selected by the selector means, and resilient means comprising a part of said actuated element for preventing the failure of operation of the indicating means from interfering with the operation of the selector means.

4. In a multi-record phonograph of the type adapted for selective reproduction of records, the combination comprising means carrying a plurality of phonograph records, record selector means including automatically driven elements for selecting records for reproduction, indicating means including a plurality of independently movable indicating elements and movable pawl means actuated by a driven element of the record selector means for indicating the relative popularity of the phonograph records carried by the carrying means by indicating the number of times each of the records is selected by the selector means, and resilient means comprising a part of said movable pawl means for preventing failure of operation of any of the indicating elements from interfering with the operation of the selector means.

5. In a multi-record phonograph of the type adapted for selective reproduction of records, the combination comprising means carrying a plu-

rality of phonograph records, record selector means comprising movable parts for selecting and delivering records for reproduction, indicating means including a plurality of substantially circular indicating elements maintained for independent rotation on a common shaft, and movable pawl means actuated by the record selector means to rotate the indicating elements and thereby indicate the relative popularity of the phonograph records carried by the carrying means by indicating the number of times each of the records is selected by the selector means, means comprising a resilient element included in said pawl means and adapted to give to prevent failure of rotation of an indicating element from interfering with the operation of the selector means, and means for stopping the indicating elements at predetermined positions for resetting said elements to said predetermined positions by rotation of said common shaft.

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