

May 26, 1942.

H. V. SLADE

2,284,305

RECORD CHANGING MECHANISM FOR PHONOGRAPHS

Filed March 2, 1940

2 Sheets-Sheet 1

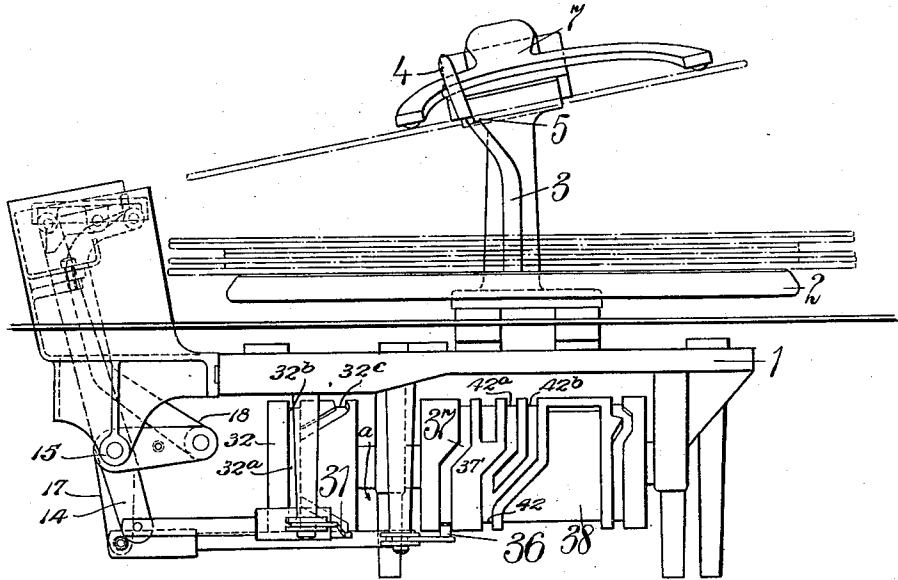


Fig. 1

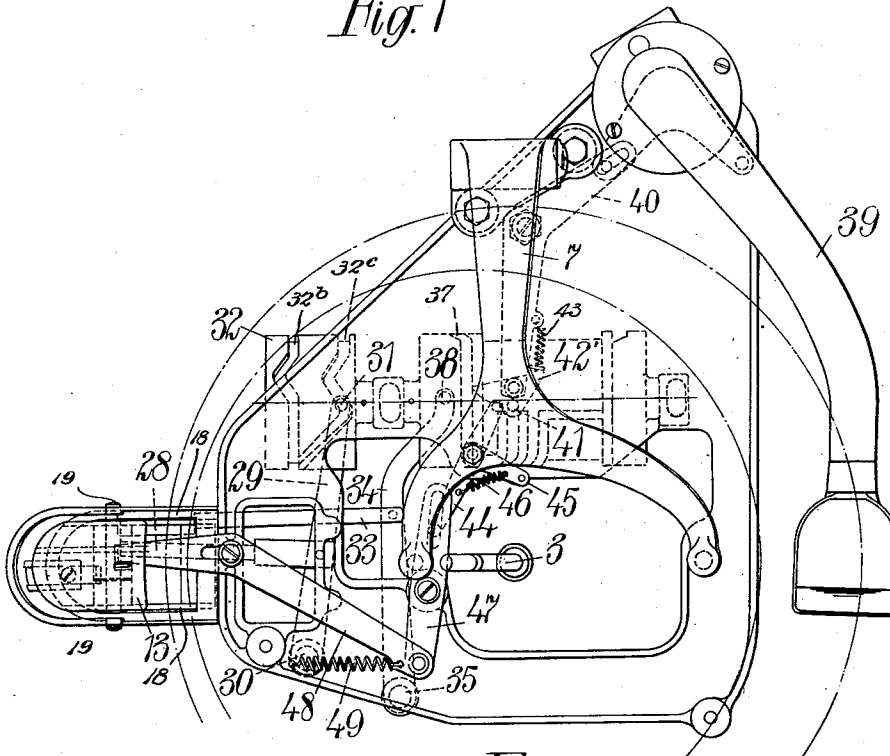


Fig. 2

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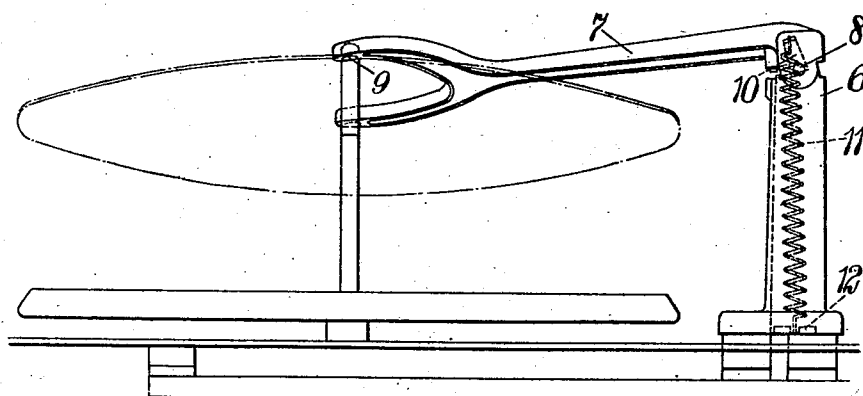
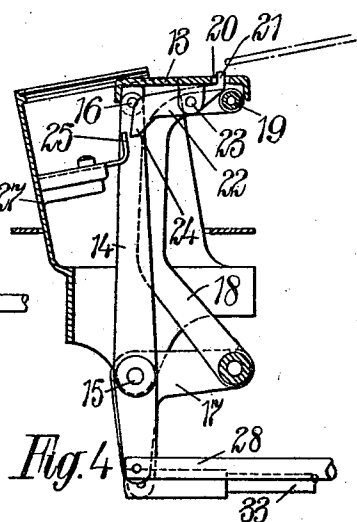
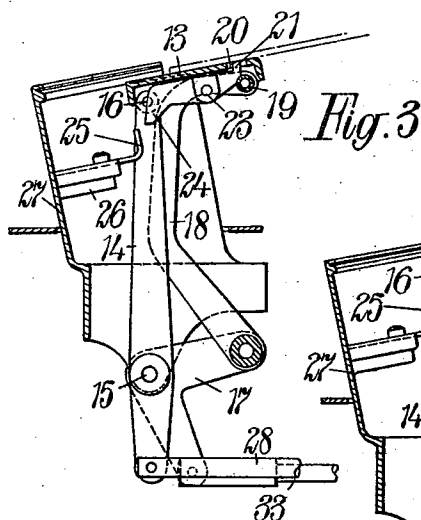


Fig. 5

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UNITED STATES PATENT OFFICE

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RECORD CHANGING MECHANISM FOR
PHONOGRAPHS

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9 Claims. (Cl. 274-10)

This invention relates to automatic record changing mechanism for phonographs or like talking machines of the type in which records are supported in stack formation at their centres upon an off-set or shouldered spindle, and are released for transfer to the turntable by means engageable with the edge of the lowermost record and movable to displace the said record laterally to effect its release from the supporting off-set or shoulder.

The main object of the invention is to provide an improved and simplified mechanism of the above type which is adapted to deal with records of different sizes in the same batch, i. e. a mechanism which will successively discharge records from a stack of indiscriminately mixed records of more than one size.

Another object is to provide an improved mechanism of the type described for delivering mixed records from a stack and adaptable to control further mechanism for actuating the pick-up or tone arm to play the record delivered.

A further object is to provide a record changing mechanism having the above features which is composed of relatively few parts and is also inexpensive to make and reliable in operation.

For a better understanding of the invention reference may be made to the following description of a preferred embodiment thereof illustrated in the accompanying drawings, in which:

Figure 1 is an elevation of a record-changing mechanism for a phonograph adapted for playing ten-inch and twelve-inch records;

Figure 2 is a plan view of the mechanism with the parts in position for playing a twelve-inch record;

Figure 3 is a sectional elevation of a part of the mechanism showing the movable platform in the forward position, which is also the loading position;

Figure 4 is a view similar to Figure 3 showing the platform in another position;

Figure 5 is a side elevation of a part of the mechanism showing the means for setting the records on the supporting spindle.

In carrying the invention into effect according to one convenient mode, as applied by way of example to record-changing mechanism for ten-inch and twelve-inch records, there is provided a frame 1 having a turntable 2 and a central spindle 3 extending above the turntable and having an off-set portion 4 affording a shoulder 5 upon which the stack of records is supported. Suitable means, which may engage the topmost record of the stack, is provided for steadying the

records so that they will remain in a substantially horizontal or in an inclined position without lateral support. These means comprise a stationary column 6 at one side of the turntable carrying at its upper end an arm 7 hinged at 8 and adapted to be brought over the stack of records resting on the post. The arm has a forked end and each of the extremities carries a rubber pad 9 which engages the upper side of the topmost record. The hinge pin 8 which is secured to the arm 7 carries a short arm 10 to which is secured a spring 11 anchored at 12. When the arm 7 is in the position shown the arm 10 is to the left of the dead centre position, and the spring 11 maintains a gentle pressure upon the stack of records. On raising the arm 7 by hand the arm 10 overpasses the dead centre and the spring will then maintain the arm 7 in a raised position permitting records to be removed and replaced without hindrance.

The records are displaced laterally, to effect their successive release from the off-set supporting post, by a laterally movable member comprising a platform 13 which normally has an inclination substantially the same as that of the records in the stack; this is shown in Figure 3, where the platform is in the loading position. The platform is supported by two levers which are actuated independently. A straight lever 14, pivotally mounted on a spindle 15, is pivotally connected to the rear end of the platform at 16. A double bell-crank lever 17, also pivotally movable about the spindle 15, carries a pair of transversely spaced links 18 of identical configuration which are pivotally connected at 19 to the forward end of the platform. These levers are actuated by cams, as will be hereinafter explained.

An aperture 20 near the forward edge of the platform 13 receives a movable abutment 21 which forms part of a lever 22 pivoted at 23 beneath the platform. The tail 24 of this lever extends downwardly and is weighted so that normally the abutment 21 projects through the aperture in the platform, as is shown in Figure 4. The lever may be spring-loaded if desired. A stop member 25, lying in the path of the tail 24, is mounted on a bracket 26 forming part of a framework 27 which forms an enclosure for this part of the mechanism.

The levers which support and control the movements of the platform are actuated by a rotary cam device. The lower end of lever 14 is connected by a link 28 to an intermediate point on a lever 29 which has a fixed pivot at

30. The other end of lever 29 has a stud 31 which is engageable with a single cam path 32a and thereafter with one of two dual paths or grooves 32b or 32c in a rotary cam 32. The two cam tracks 32b and 32c diverge from the common path 32a, as indicated in Figures 1 and 2.

The double bell-crank lever 17 is connected by a link 33 to an intermediate point of a lever 34 having a fixed pivot at 35, and carrying at its further end a stud 36 engaging with a track 37 in a second rotary cam device 38.

The pick-up arm 39 is swung inwardly and outwardly by a lever 40 having a stud 41 engaged in double cam paths 42a and 42b diverging from and returning to single path 42 on the rotary cam device 38. This cam track has diverging paths which are disposed to give the appropriate lateral displacements to the tone arm for ten-inch and twelve-inch records respectively.

The stud 41 is carried by a member 42' pivotally mounted on the lever 40 and held against a stop by a spring 43. The pin 41 is guided into the appropriate cam groove or path 42a or 42b diverging from path 42 by a lever 44 carrying a double-armed lever 45 which is pulled against a stop by spring 46. Lever 44 has a pin engaging the slotted lever 47 pivoted to a sliding link 48 the further end of which engages the lever 14. A biasing spring 49 connected at one end to sliding link 48 maintains said link and lever 14 in engagement.

The loading position of the platform mechanism is shown in Figure 3. With the platform in this position and the steadying arm 7 raised, the records are threaded upon the spindle with their edges resting upon the platform, the steadying arm being afterwards replaced.

The releasing of records one by one from the supporting post is effected by the platform 13. This platform is given a series of motions which include a lateral withdrawal from the position shown in Figure 3, which motion takes place in the plane of the record until the abutment 21 is free of the edge of the record and consequently rises. The outward movement of the platform is thereupon arrested and the platform is moved inwardly with the abutment in engagement with the lowermost record, which is thereby disengaged from the shoulder 5 of the supporting post and falls by gravity upon the turntable. These operations will now be described in detail.

It will be assumed that the mechanism is in the playing position, as shown in Figures 1 and 2, with one or more records upon the turntable, and at least one remaining upon the shoulder of the supporting post. The arm 7 is in the steadying position, as shown in Figure 5. The changing operation will be initiated by the automatic engagement of the clutch on the driving motor at the conclusion of the playing of the record on the turntable, this engagement of the clutch causing the driving motor to actuate the various cams, such mechanism for initiating a record changing cycle being well-known in the art.

Rotation of cam 32 actuates the lever 29 through stud 31. The lever 29 is connected by link 28 to the lever 14 supporting the rear end of the platform, which is thereby given a forward movement i. e., towards the record centers and the spindle. During this movement the front edge of the platform is maintained in the depressed position, as shown in Figures 1 and 4, by the stud 36 which is engaged and rides in track 37 on cam 38. The forward movement brings

the projection 21 beneath the records on the supporting post, and within the area of the smallest record for which the apparatus is constructed (i. e. a ten-inch record in the present example).

At this point corresponding to point 31' in cam path 37 as seen in Figure 1 further rotation of the cam 38 in the direction of the arrow *a* actuates lever 34 through stud 36 which in turn imparts a counterclockwise movement to the bell crank lever 17 through link 33, so that the front edge of the platform is raised, bringing the abutment 21 into contact with the underside of the lowest record, whereby the abutment is depressed. This position of the mechanism is shown in Figure 3. Continued rotation of the cam 32 imparts a reverse movement to the long lever 14 which withdraws the platform horizontally. The two diverging cam paths 32b and 32c extending from the common path 32a of cam 32 in which stud 31 is engaged to ride cause upon actuation of said cam the lateral displacement of platform 13 forwardly and rearwardly through the coaction of lever 14, link 28 and pivoted lever 29 carrying the stud 31 at its free end. The further stud 31 is displaced to the right in its movement along one or the other of the cam paths, the greater the corresponding movement of platform 13 to the lever towards a position outward of the record pile. As illustrated in Figures 1 and 2 of the drawings, cam path 32c extends further to the right than cam path 32b and thereby controls the movement of the platform to its furthest position outward of the pile, cam path 32c being in correspondence with twelve inch records and cam path 32b with ten inch records. The abutment 21 will remain depressed until the edge of the lowermost record is reached, when it will spring up by virtue of gravity and as a consequence the tail 24 of the abutment lever 22 will fall. If the lowermost record is a small one, i. e. a ten-inch record, this tail will fall into a position in which it will engage the fixed stop 25 as the platform continues its rearward movement. This movement thus ceases and the arresting of the lever 29 causes the stud 31 to enter the groove or diverging path 32b from common path 32a of cam 32 which, on further movement of the cam, will give a reversed movement to the lever 14 and consequently to the platform, so that the now upwardly projecting abutment 21 will engage the record and effect its release from the centre spindle. If, on the other hand, the lowermost record is a large one (i. e. a twelve-inch record), the abutment 21 will remain depressed and the tail 24 of the abutment lever will be held clear of the stop 25 while the platform continues its rearward movement. As this rearward movement is not impeded the follower stud 31 will enter the other groove or diverging path 32c from groove or path 32a of the cam 32 which is adapted to give an appropriate forward movement to release the twelve-inch record, the said stud 31 being normally urged into diverging cam path 32c by the contraction of biasing spring 49 which during the inward movement of the platform 13 by lever 14 has been tensed by extension with the consequent inward movement of lever 48 cooperating with lever 14. From Figure 2 it will be seen that the cam 32 has a pair of diverging grooves each of which is formed to give a forward or record-releasing movement to the platform followed by a withdrawal, the grooves then re-uniting. Upon completion of this final withdrawal the platform occupies the position from which it originally started, as in-

licated by broken lines in Figure 1, and the cams are brought to rest. The playing of the record then takes place. Upon completion of the record-playing the operation is repeated.

The different rearward movements of the platform, which take place in accordance with the size of the lowermost record of the stack, are utilized to control the setting of the pick-up or tone arm, which is given its horizontal movement by the control arm 40. The sliding link 48 is held against the long lever 14 by the spring 49, and the link consequently follows the movements of the said lever. These movements are imparted through lever 47 to lever 44 which guides the follower stud 41 of the arm 40 into the appropriate groove of the cam in a manner well understood.

The invention has been described as applied to the changing of ten-inch and twelve-inch records, but may obviously be applied to other sizes if desired.

I claim:

1. A record changing mechanism for phonographs comprising a magazine carrying a pile of disc records of different diameters disposed one above the other a member mounted for lateral movement between a position beneath the pile of records and a position outward of the pile, a pawl on said member normally urged upwardly to project thereabove and depressible by surface contact with the lowermost record of the pile when said member is beneath the pile, a plurality of driving means of different travel, and driven means operatively connected with said member and selectively engageable with one or the other of said driving means for reciprocating said member, whereby in the outward movement of said member the depressed pawl is urged upwardly as it passes the periphery of the lowermost record of the pile and in the inward movement of said member said projecting pawl laterally displaces the lowermost record from the pile, selector means normally urging the driven means into engagement with one of said driving means for providing a lateral movement of the member to its furthest outward position, and stop means positioned to selectively engage the pawl when said pawl in the outward movement of the member has passed the periphery of a lowermost record of smaller diameter, thereby to limit the lateral movement of the member to a position intermediate the furthest outward position, said stop means upon engagement with the pawl rendering the selector means inoperative and selectively engaging the driven means with the other of said driving means.

2. A record changing mechanism for phonographs comprising a magazine carrying a pile of disc records of different diameters disposed one above the other, a member mounted for lateral movement between a position beneath the pile of records and a position outward of the pile, a pawl on said member normally urged upwardly to project thereabove, and depressible by surface contact with the lowermost record of the pile when said member is beneath the pile, a plurality of cams of different travel, and cam actuated means operatively connected with said member and selectively engageable with one or the other of said cams for reciprocating said member, whereby in the outward movement of said member the depressed pawl is urged upwardly as it passes the periphery of the lowermost record of the pile and in the inward movement of said member said projecting pawl laterally displaces

the lowermost record from the pile, selector means normally urging the cam actuated means into engagement with one of said cams for providing a lateral movement of the member to its furthest outward position, and stop means positioned to selectively engage the pawl when said pawl in the outward movement of the member has passed the periphery of a lowermost record of smaller diameter, thereby to limit the lateral movement of the member to a position intermediate the furthest outward position, said stop means upon engagement with the pawl rendering the selector means inoperative and selectively engaging the cam actuated means with the other of said cams.

3. A record changing mechanism for phonographs comprising a magazine carrying a pile of disc records of intermixed large and small diameters disposed one above the other, a member mounted for lateral movement between a position beneath the pile of records and spaced positions outward of the pile, a pawl on said member normally urged upwardly for projection thereabove and depressible by surface contact with the lowermost record of the pile when said member is beneath the pile, a plurality of driving means of different travel and driven means operatively connected with said member and selectively engageable with the respective driving means for laterally reciprocating said member between its position beneath the pile of records and one of the spaced positions outward of the pile, whereby in the outward movement of said member said depressed pawl is urged upwardly as it passes the periphery of the lowermost record of the pile and in the inward movement of said member said projecting pawl laterally displaces the lowermost record of the pile, selector means normally engaging the driven means with the driving means to provide an outward movement of the member to its furthest spaced position, and stop means positioned to selectively engage the pawl in the outward movement of said member when said pawl has passed the periphery of a lowermost record in the pile of small diameter and to limit the further outward movement of said member, said stop means rendering the selector means inoperative and selectively engaging the driven means with the other of said driving means.

4. A record changing mechanism for phonographs comprising a magazine carrying a pile of disc records of intermixed large and small diameters disposed one above the other, a member mounted for lateral movement between a position beneath the pile of records and spaced positions outward of the pile, a pawl on said member normally urged upwardly for projection thereabove and depressible by surface contact with the lowermost record of the pile when said member is beneath the pile, a plurality of cams of different travel and cam actuated means operatively connected with said member and selectively engageable with the respective cams for laterally reciprocating said member between its position beneath the pile of records and one of the spaced positions outward of the pile, whereby in the outward movement of said member said depressed pawl is urged upwardly as it passes the periphery of the lowermost record of the pile and in the inward movement of said member said projecting pawl laterally displaces the lowermost record of the pile, selector means normally engaging the cam actuated means with the cam to provide an outward movement of the member to its further-

most spaced position and stop means positioned to selectively engage the pawl in the outward movement of said member when said pawl has passed the periphery of a lowermost record in the pile of small diameter and to limit the further outward movement of said member, said stop means rendering the selector means inoperative and selectively engaging the cam actuated means with the other of said cams.

5. A record changing mechanism for phonographs comprising a magazine carrying a pile of intermixed disc records of twelve and ten inch diameter disposed one above the other, a member mounted for lateral movement between a position beneath the pile of records and spaced positions outward of the pile, a pawl on said member normally upwardly urged to project thereabove and depressible by surface contact with the lowermost record of the pile when said member is beneath the pile, a plurality of cams of different travel corresponding to records of twelve and ten inch diameter and cam actuated means operatively connected with said member and selectively engageable with one or the other of said cams for reciprocating said member, whereby in the outward movement of the member said depressed pawl will be urged upwardly as it passes the periphery of the lowermost record of the pile and in the inward movement of the member said projecting pawl will laterally displace the lowermost record from the pile, selector means normally urging the cam actuated means into engagement with the cam corresponding to the records of twelve inch diameter for providing a lateral movement of the member to its furthestmost outward position, and stop means positioned to selectively engage the pawl in the outward movement of said member when said pawl has passed the periphery of a lowermost record of the pile of ten inch diameter, and to limit the outward movement of the member to a position intermediate its furthestmost outward position, said stop means upon engagement with the pawl rendering the selector means inoperative and selectively engaging the cam actuated means with the cam corresponding to records of ten inch diameter.

6. A record changing mechanism for phonographs comprising a magazine carrying a pile of intermixed disc records of different diameters disposed one above the other, a member mounted for lateral movement between a position beneath the pile of records and spaced positions outward of the pile, a pawl on said member normally upwardly urged to project thereabove and depressible by surface contact with the lowermost record of the pile when said member is beneath the pile, a cam having multiple paths and cam actuated means operatively connected with said member and selectively engageable with one or the other of said cam paths for reciprocating said member, whereby in the outward movement of the member said depressed pawl will be urged upwardly as it passes the periphery of the lowermost record of the pile and in the inward movement of the member said projecting pawl will laterally displace the lowermost record from the pile, selector means normally urging the cam actuated means into engagement with the cam path corresponding to the records of large diameter for providing a lateral movement of the member to its furthestmost outward position, and stop means positioned to selectively engage the pawl in the outward movement of said member when said pawl has passed the periphery of a lowermost record of the pile of small diameter, and

to limit the outward movement of the member to a position intermediate its furthestmost outward position, said stop means upon engagement with the pawl rendering the selector means inoperative and selectively engaging the cam actuated means with the cam path corresponding to records of small diameter.

7. A record changing mechanism for phonographs comprising a pile of intermixed disc records of large and small diameters disposed one above the other, a member mounted for lateral movement between a position beneath the pile of records and spaced positions outward of the pile, a pawl on said member normally upwardly urged to project thereabove and depressible by surface contact with the lowermost record of the pile when said member is beneath the pile, a cam having dual paths operable respectively in relation to large and small records and cam actuated means operatively connected with said member and selectively engageable with one or the other of said cam paths for reciprocating said member, whereby in the outward movement of the member said depressed pawl will be urged upwardly as it passes the periphery of the lowermost record of the pile and in the inward movement of the member said projecting pawl will laterally displace the lowermost record from the pile, selector means normally urging the cam actuated means into engagement with the cam path corresponding to the records of larger diameter for providing a lateral movement of the member to its furthestmost outward position, and stop means positioned to selectively engage the pawl in the outward movement of said member when said pawl has passed the periphery of a lowermost record of the pile of smaller diameter, and to limit the outward movement of the member to a position intermediate its furthestmost outward position, said stop means upon engagement with the pawl rendering the selector means inoperative and selectively engaging the cam actuated means with the cam path corresponding to records of smaller diameter.

8. A record changing mechanism for phonographs comprising a magazine carrying a pile of intermixed disc records of twelve and ten inch diameters disposed one above the other, a member mounted for lateral movement between a position beneath the pile of records and spaced positions outward of the pile, a pawl on said member normally upwardly urged to project thereabove and depressible by surface contact with the lowermost record of the pile when said member is beneath the pile, a cam having dual paths operative respectively in relation to ten and twelve inch records and cam actuated means operatively connected with said member and selectively engageable with one or the other of said cam paths for reciprocating said member, whereby in the outward movement of the member said depressed pawl will be urged upwardly as it passes the periphery of the lowermost record of the pile and in the inward movement of the member said projecting pawl will laterally displace the lowermost record from the pile, selector means normally urging the cam actuated means into engagement with the cam path corresponding to the records of twelve inch diameter for providing a lateral movement of the member to its furthestmost outward position, and stop means positioned to selectively engage the pawl in the outward movement of said member when said pawl has passed the periphery of a lowermost record of the pile of

ten inch diameter, and to limit the outward movement of the member to a position intermediate its furthestmost outward position, said stop means upon engagement with the pawl rendering the selector means inoperative and selectively engaging the cam actuated means with the cam path corresponding to records of ten inch diameter.

9. In a record changing mechanism for phonographs comprising a shouldered element mounted above a turntable and supporting at their centers and flatwise one above the other, a pile of records of different diameters, a member mounted for lateral movement between a position beneath the pile of records and a position outward of the pile, a pawl on said member normally urged upwardly to project thereabove, and depressible by surface contact with the lowermost record of the pile when said member is beneath the pile, a plurality of cams of different travel, and cam actuated means operatively connected with said member and selectively engageable with one or the other of said cams for reciprocating said member, whereby in the outward movement of said member the depressed pawl is urged upwardly as it passes the periphery of the lowermost record of the pile and in the inward movement of said member said projecting pawl laterally displaces the lowermost record of the pile from the shouldered element onto the turntable, selector means normally urging the cam actuated means into engagement with one of

said cams for providing a lateral movement of the member to its furthestmost outward position, and stop means positioned to selectively engage the pawl when said pawl in the outward movement of the member has passed the periphery of a lowermost record of smaller size, thereby to limit the outward movement of the member to a position intermediate the furthestmost outward position, said stop means upon engagement with the pawl rendering the selector means inoperative and selectively engaging the cam actuated means with the other of said cams, a pickup arm mounted for lateral movement from a position outward of the turntable to a position above the turntable into playing contact with the outermost groove of the lowermost record displaced from the pile onto the turntable, a second plurality of cams of different travel and a second cam actuated means operatively connected with said pickup arm and selectively engageable with one or the other of said second named cams for moving said pickup arm, means operatively connecting said first named cam actuated means with said second named cam actuated means, whereby upon selective engagement of the first named cam actuated means with the one of said first named cams for reciprocating said member, the second named cam actuating means is selectively engaged with a corresponding cam of the second named cams for moving the pickup arm into playing position.

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