Nov. 14, 1933. H. L. T. BUCKLE 1,935,140

MAGAZINE TALKING MACHINE

Filed Dec. 30, 1927 5 Sheets-Sheet 1

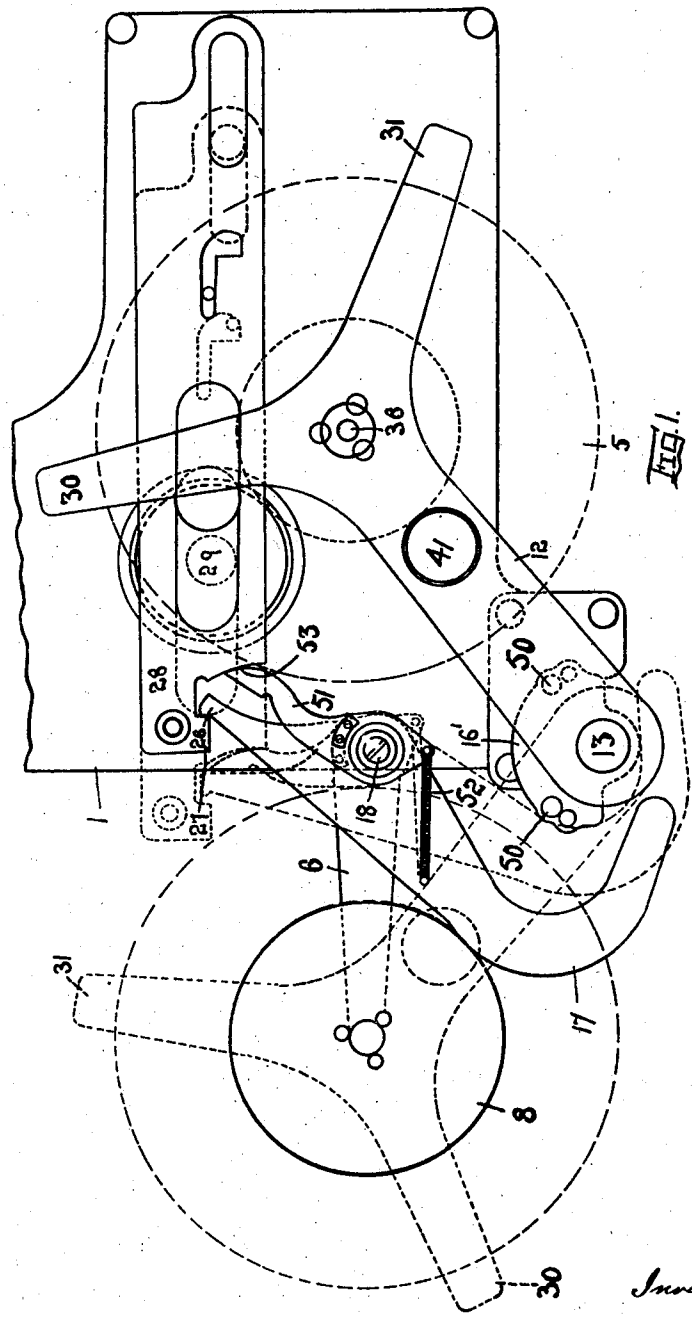


Fig. 1.

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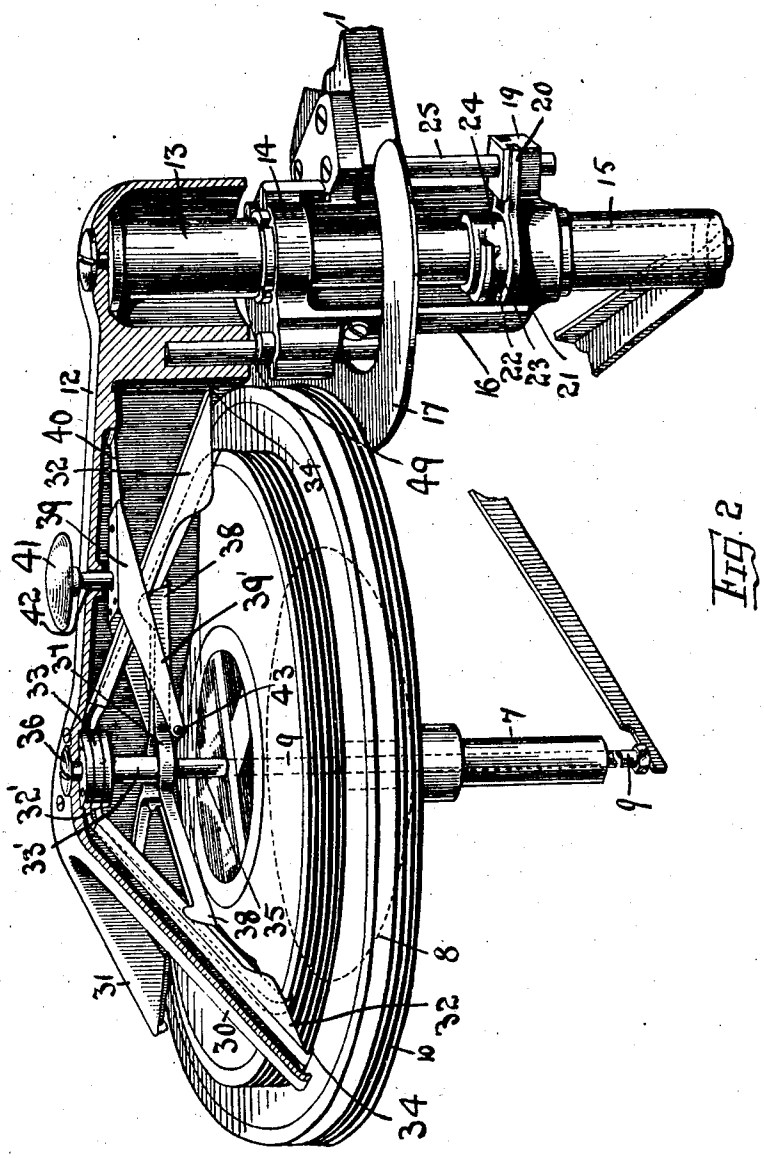


FIG. 2

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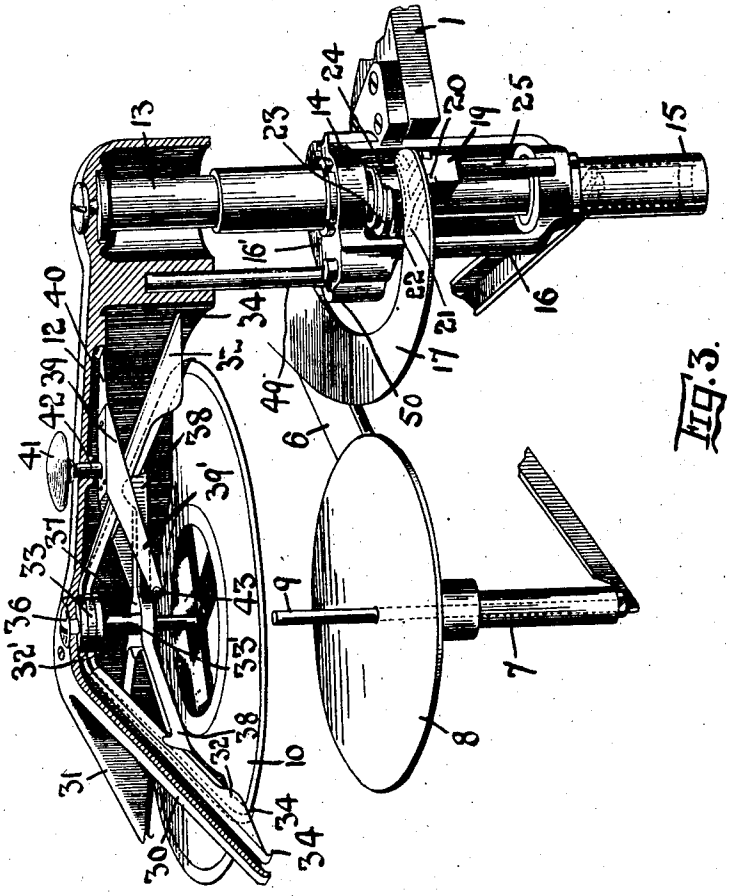


FIG. 3.

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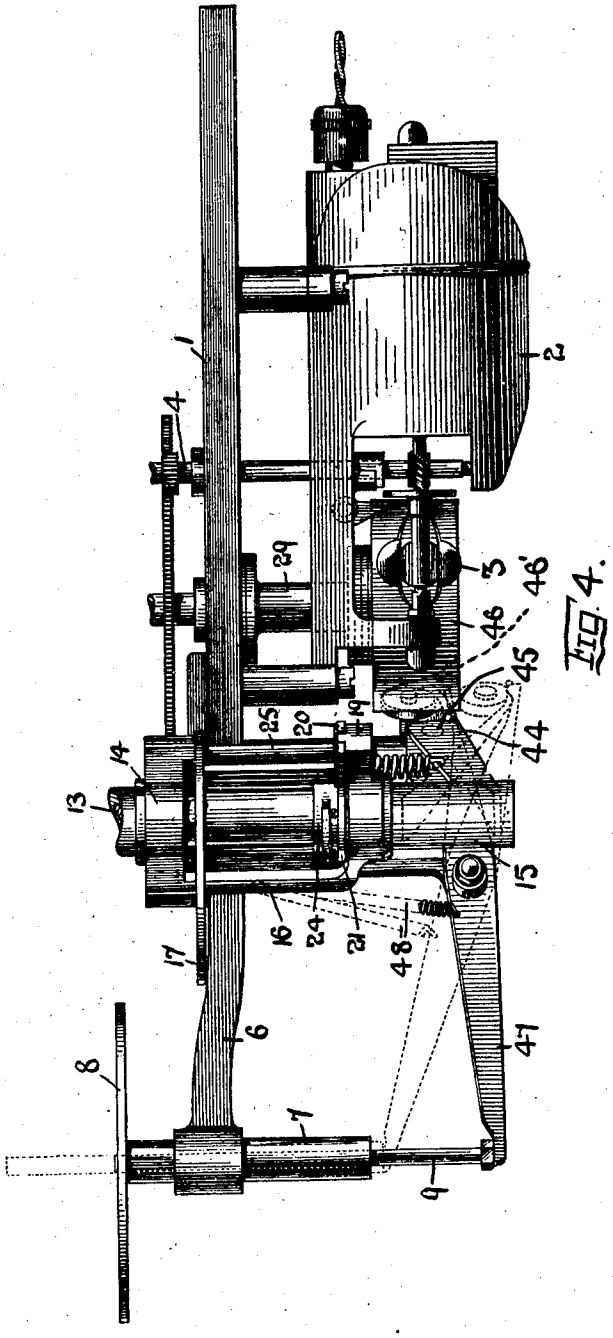


FIG. 4.

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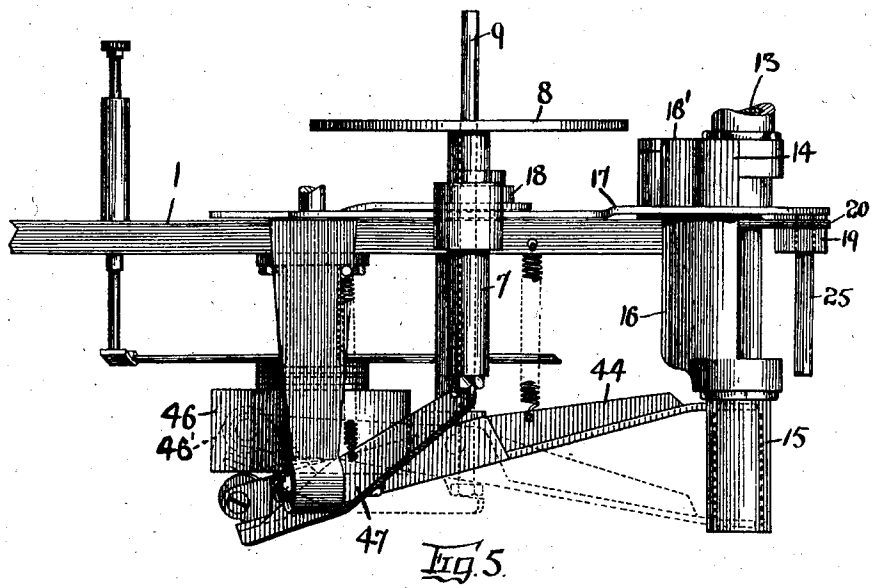


Fig. 5.

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UNITED STATES PATENT OFFICE

1,935,140

MAGAZINE TALKING MACHINE

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Application December 30, 1927, Serial No. 243,713, and in Great Britain January 19, 1927

18 Claims. (Cl. 274—10)

This invention relates to improvements in and relating to talking machines and in particular to improved means whereby records may be removed in turn from a magazine, or a pile of records, and be conveyed to and deposited on the turntable of the machine for playing.

The invention relates in particular to machines of that type wherein the means for transferring records from the magazine to the turntable includes an arm swingable between a position over the magazine and a position over the turntable.

Among the objects of the invention are, to provide record transferring means which are quiet and reliable in operation, and enable the change of record to be effected in the least possible time, and to enable the record magazine to be reduced merely to a pile of records with means for centering the same. No expressly constructed container for the records is required. The improved record changing means are adapted to deal with both 10" or 12" records, and records of these different diameters can be piled one on another in any order desired and be dealt with without special adjustment of the record changer.

The invention consists in a record transferring means of the kind referred to wherein the record engaging means on the swingable arm comprises a plurality of radially arranged arms, preferably resilient, the ends of which carry means such as hooks adapted to grip the edge of the uppermost record of the pile.

The hooks lie normally upon the circumference of a circle of slightly less diameter than the record to be engaged and several sets of resilient arms may be provided, preferably super-imposed one on another so that records of another size may be transferred from the pile of records in the magazine to the turntable.

The hooks are disengaged from the edge of the record by means of a spider, the arms of which engage the under surface of the resilient arms to lift the latter when an upward movement relatively to the swinging arms is imparted to the spider.

The invention is illustrated by way of example in the accompanying drawings, as applied to an automatic magazine talking machine as described in my co-pending application Serial No. 243,712, filed December 30, 1927, Talking machines.

In the drawings:

Fig. 1 is a plan view of part of a talking machine to which the invention has been applied the record transferring means being shown in full lines in the position over the turntable and in dotted lines in the position over the magazine.

Fig. 2 is a perspective view of the transferring means in position where the uppermost record in the magazine is engaged.

Fig. 3 is a perspective view similar to Fig. 2 the transferring device having made part of its movement towards the turntable.

Figs. 4 and 5 are front and end elevations looking from beneath and the left respectively in Fig. 1.

The machine comprises a base plate 1 supporting on its underside an electric motor 2 (Fig. 4) having the usual governor 3 and geared to drive a turntable spindle 4 journalled in the base plate 1. The usual turntable 5 is provided on spindle 4 and a sound arm and sound box (not shown) are mounted in the usual manner to swing horizontally about a vertical axis so that the stylus may traverse across the record. Supporting means for a pile of records comprise an arm 6 extending from one side of base plate 1 which arm carries a sleeve 7 having a plate 8 at its upper end upon which plate the records 10 rest. Within the sleeve 7 slides a spindle 9 which also passes through the central apertures in the records 10 piled upon the plate 8 (Figs. 2 and 3) to centralize the records in the pile.

The records 10 are transferred from the pile in the magazine one at a time to the turntable by transferring means which engages and moves the uppermost record of the pile.

The transferring means comprises an arm 12 having outwardly and downwardly projecting branches 30, 31 and mounted to rotate about a fixed axis situated at a point on the base plate 1 equidistant from the centralizing spindle 9 and turntable spindle 4. The axis is formed by a spindle 13 rotatably and vertically movable in bearings 14, 15 supported by a casting 16 secured to base plate 1. The means for rotating the spindle 13 and thereby swinging the arm 12, is of the kind described in my co-pending application herein identified consisting of a curved lever 17 pivoted on the base plate 1 at 18 one end of the lever carrying a downwardly extending pin 25 which engages in an aperture in a block 19 mounted to slide between the arms of a yoke 20 fixed to the spindle 13. The yoke 20 is formed integral with a ring 21 resting upon a shoulder on the spindle 13 and the connection between said ring 21 and spindle 13 is effected by means of a spring and ball catch the ball 22 of which engages in a recess in the ring 21,

the ball 22 being pressed into the recess by a spring 23 carried on a ring 24 fixed to the spindle 13. By this means the arm 12 and spindle 13 is made capable of being moved independently of yoke 20 and lever 17, for example to permit records to be placed in or removed manually from the magazine.

The lever 17 is rocked about its pivot to swing the arm 12 between its extreme positions, by the engagement of its end 26 with a projection 27 on a horizontally moving plate 28.

This plate (Fig. 1) is caused to move once backwards and forwards when the turntable is empty and a record is required to be fed thereto from the magazine, this movement of plate 28 being effected by cam mechanism carried on a rotating cam shaft 29 adapted to be clutched at the appropriate time to the turntable spindle 4 or some other constantly rotating part of the machine as described fully in the specification of my co-pending application No. 243,712.

The means for engaging a record to lift it from the magazine and to deposit it upon the turntable comprises three arms 32, radiating from a boss 33 fixedly mounted beneath the point of juncture of arm 12 and its branches 30 and 31 and these arms lie, one beneath the arm 12 and one beneath each of the branches 30 and 31. The arms 32 are in the form of light steel pressings connected to leaf springs 32' which in turn are connected to the boss 33 whereby the arms 32 are resiliently mounted. The arms 32 are inclined downwardly and are provided at their lower ends with hooks 34 formed by bending the ends of the arms and these hooks are adapted to engage under the edge of a record. The hooks 34 in the normal position, when no record is engaged, lie upon a circle slightly less in diameter than the record to be engaged.

The centre of the boss 33 from which the arms 32 radiate lies, when the arm 12 is in one extreme position, exactly over the record centering spindle 9 and in the other extreme position exactly over the turntable spindle 4. The boss 33 is provided with a downwardly extending sleeve 33' and with a central aperture which registers with the passage through the sleeve 33' and with an aperture in the arm 12. A spindle 35 is mounted so as to be capable of a limited vertical movement in the sleeve 33', the boss 33 and the aperture in arm 12, and the upper end of this spindle 35 is furnished with a head 36 which forms a stop to limit downward movement of the spindle 35. Near the lower end of the spindle 35 is rigidly fixed a three-armed spider 37 the arms 38 of which extend so that their ends lie beneath the arms 32. A clearance is left between spider 37 and the lower end of sleeve 33' and by raising the spindle 35 and the spider 37 carried thereon, the arms 32 may be lifted so that the hooks 34 move radially outwards until they lie upon a circle slightly greater in diameter than the record which the hooks are adapted to engage. The lifting of the spider 37 may be effected manually by means of a lever 39 secured to the underside of the arm 12 through a leaf spring 40 and connected with a knob 41 by means of a short rod 42 extending through the arm 12. This lever 39 is provided at its free end with a pair of arms 39' which extend below the spider 37 and carry a pin 43 which engages the under surface of the spider to lift it when the knob 41 is raised. The spider is also adapted to be lifted automatically in a manner yet to be described.

The hooks 34 are engaged with the uppermost record in the pile by weight of the arm 12 during a downward movement of the latter, the hooks first engaging the surface of the uppermost record and then being spread outwards until the hooks 34 pass over the edge of the record.

Vertical movements are imparted to the spindle 13 and arm 12 both before and after the movement of the arm 12 from the position over the magazine to the position over the turntable and vice versa. The first vertical movement in feeding a record from the magazine is a lifting movement to raise the uppermost record in the magazine to a plane where it can be swung to a position over the turntable without meeting any obstruction. The next vertical movement is a lowering movement over the turntable whereby the release of the record from the grip of the hooks 32 is effected in a manner yet to be described, the next is a lifting movement preparatory to the return swing of arm 12 towards the magazine and the final vertical movement is the lowering movement to permit hooks 32 to engage the edge of the next record in the magazine. The means for imparting these vertical movements to the transferring device comprise a rocking lever 44 arranged beneath the base plate 1 and pivoted intermediate its length at 45, one end of which lever 44 engages beneath and is movably secured to the lower end of the spindle 13 while the other engages a box cam 46 fixedly mounted at the lower end of the cam shaft 29. The box cam 46 is provided with depressions 46' in appropriate positions which permit the lever 44 to rock at the proper time.

The record centering spindle 9 is also capable of up and down movement and its movements take place in synchronism with those of the arm 12 through a pivoted lever 47 one end of which supports the spindle 9 by engagement with its lower end while the other end of said lever 47 rests beneath and rises and falls with that end of lever 44 adjacent the box cam 46. Springs 48 are provided between the base plate 1 and the levers 44 and 47 respectively to absorb shocks due to the falling of the transferring device.

On the underside of the arm 12 at a point near the axis is fixed a downwardly extending pin 49 and this pin enters holes 50 in a flange 16' on the casting 16 when the arm 12 is in either of its extreme positions and serves to guide the arm 12 during the up and down movements of the latter. The pin 49 also serves to maintain the arm 12 raised when the latter is moved manually into an intermediate position such as when placing records in or removing records manually from the magazine, by resting with its lower end upon the flange 16' on casting 16. To allow the necessary time for what may be, when the magazine is nearly empty, a lifting movement of considerable extent of arm 12 before swinging movement of said arm 12 towards the turntable commences, the projection 27 on plate 28 does not contact with the end 26 of pivoted lever 17 until cam shaft 29 has rotated a part of a revolution and the plate 28 has travelled a given distance. The time occupied by arm 12 in moving vertically when over the turntable is of very short extent and it is desirable therefore that the return swing of the arm 12 shall commence almost simultaneously with the commencement of the return movement of plate 28. To this end a lever 51 is pivoted intermediate its length on the pivot 18 of lever 17 and one end of lever 51, is connected by a spring 52 with lever 17 while

the other engages a surface 53 on plate 28. As the plate 28 moves to the right in Fig. 1 the lever 51 rotates in a clockwise direction with regard to lever 17 until the latter is moved by projection 27, the end of lever 51 remaining in contact with surface 53. As soon as the direction of movement of plate 28 is reversed lever 51 is moved in a counter clockwise direction and owing to its spring connection with lever 17 the latter commences to move at once and thereby the return of arm 12 towards the magazine is commenced also.

The release of the record from the transferring device when the latter reaches its position over the turntable 5, is effected by the engagement of the lower end of spindle 35, during the lowering movement of arm 12 with the end of turntable spindle 4. This engagement results in the lifting of spider 37 with regard to arm 12 whereby arms 32 are spread outwards and the record freed to fall gently upon the turntable.

In order that the apparatus may be capable of dealing with records of various sizes a plurality of sets of flexible arms are provided.

In the drawings two sets of flexible arms 32 are illustrated, one for 10" and the other for 12" records, one set being arranged above the other, and the hooks 34 of the upper set lie upon a circle of greater radius than that upon which lie those of the lower set. The upper arms 32 may carry spacing studs (not shown) to hold the upper and lower arms spaced from one another. It will readily be seen that when it is desired to disengage a record from the hooks 34 on the upper arms 32 the spider 37 is raised as previously described to first lift the lower arms 32 which then engage the upper arms to raise these latter.

The operation is as follows:—

To charge the magazine the arm 12 is raised and swung into an intermediate position where the pin 49 rests upon the flange 16' on the casting 16. In this position the levers 44 and 47 are rocked, owing to the connection of lever 44 with the lower end of spindle 13, so that record centering spindle 9 is raised. The placing of records in the magazine is thereby facilitated and the records are correctly centralized.

The arm 12 is then returned by hand to the position over the magazine and allowed to drop. Levers 44 and 47 are permitted to return to their former position and spindle 9 is lowered so that no obstruction is offered to the downward movement of the record engaging means, the lower end of spindle 35 entering the central apertures in the records. The lower ends of the arms 32 engage the surface of the topmost record in the magazine and as the lowering movement of the arm 12 continues the arms 32 spread until hooks 34 pass over the edge of the record and grip the edge.

If the uppermost record is a 10" record the hooks 34 of the lower set of arms 32 engage the edge of the record, the hooks on the upper set spreading outwards beyond the edge of the record as shown in Fig. 3. If the uppermost record is a 12" its edge is engaged by the hooks 34 on the upper set of arms 32 the hooks on the lower set remaining in contact with the surface of the record but spreading sufficiently to permit proper engagement of the upper set of hooks.

The arm 12 remains in this position until the cam shaft 29 commences to rotate whereupon the lever 44 is rocked by box cam 46 and spindle 13 and arm 12 are raised together with the record engaged by hooks 34.

The arm 12 is next swung to a position over the turntable 5 by the engagement of projection 27 on plate 28 with the end of pivoted lever 17. When the arm 12 reaches the position shown in full lines in Fig. 1 the lever 44 is again permitted to rock by the box cam 46 and the arm 12 is lowered until the lower end of spindle 35 contacts with the upper end of the turntable spindle 4. The spider 37 is thereby raised with regard to arm 12 and its arms 38 engage the undersides of resilient arms 32 to push the hooks 34 outwards and the record is released to fall upon the turntable. As previously stated the vertical movement of arm 12 in this case is of comparatively small extent. The arm 12 is next raised by cam 46 through lever 44 and is then swung back to the position over the magazine by the return movement of plate 28 towards the left in Fig. 1. When over the magazine the arm 12 is again permitted to drop and the hooks 34 pass over and engage the edge of the now uppermost record in the magazine in the manner previously described.

The means employed for removing a record from the turntable when played may be of any suitable kind such as that described in my copending application No. 243,712 previously referred to.

What I claim is:

1. Means for transferring records singly in succession from a pile of records to the turntable of a talking machine, said means comprising a swingable arm movable in a horizontal plane relatively to the turntable, a plurality of sets of radially arranged arms carried by said swingable arm, the ends of said arms being formed to grip the edge of a record, and means for controlling said swingable arm to permit engagement of said radial arms with a record, said arms being so constructed and arranged that the ends thereof are spread outwardly upon contact with the surface of the record to cause at least one set of said arms to grip the edge thereof.

2. Means for transferring records singly in succession from a pile of records to the turntable of a talking machine, said means comprising a swingable arm movable in a horizontal plane relatively to the turntable, a plurality of sets of radially arranged resilient arms carried by said swingable arm, the ends of said resilient arms being formed to engage and support the edge of a record, and means for lowering said swingable arm to connect at least one set of said resilient arms with a record.

3. Means for transferring records singly in succession from a pile of records to the turntable of a talking machine, said means comprising a swingable arm movable in a horizontal plane relatively to the turntable, a pivotal support therefor, a plurality of sets of radially arranged arms carried by said swingable arm, the ends of said radial arms being formed to engage and support the edge of a record, and means for lowering said support, said swingable arm being adapted to descend by gravity to engage said radial arms with the surface of a record and said arms being so constructed and arranged that their ends are spread outwardly whereby at least one set of said arms is caused to grip the record edge.

4. Means for transferring records from a pile of records to the turntable of a talking machine, said means comprising a swingable arm movable in a horizontal plane relatively to the turntable,

a pivotal support therefor, a plurality of radial arms of resilient material carried by said swingable arm, the ends of said resilient arms being formed to engage the edge of a record, and means for lowering said support, said swingable arm being adapted to descend with said support under the influence of gravity whereby the ends of said resilient arms are spread outwardly to engage the record edge.

5. Means for transferring records singly in succession from a pile of records to the turntable of a talking machine, said means comprising a swingable arm movable in a horizontal plane relatively to the turntable, a plurality of sets of radially arranged relatively movable arms carried by said swingable arm, the ends of said radial arms being formed to engage and support the edge of a record, means for controlling said swingable arm to permit engagement of said radial arms with a record surface whereby the ends thereof are spread outwardly to cause at least one set of said arms to grip the record edge, and means for spreading said arms to release said record.

6. Means for transferring records in succession from a pile of records to a turntable comprising a swingable arm movable in a horizontal plane relatively to the turntable, a plurality of sets of radially disposed resilient arms carried by said swingable arm, the ends of said resilient arms being formed to engage and support the edge of a record, means for controlling said swingable arm to permit engagement of said resilient arms with a record surface whereby the ends thereof are spread outwardly to cause at least one set of said arms to grip the record edge, and means for spreading said resilient arms to release said record.

7. Means for transferring records singly in succession from a pile of records to the turntable of a talking machine, said means comprising a swingable arm, a plurality of sets of radially arranged arms yieldably carried by said swingable arm, the ends of said radial arms being formed to engage and support the edge of a record, means for controlling said swingable arms to permit engagement of said radial arms with a record surface whereby said arms are spread outwardly to cause at least one set of said arms to grip the edge of the record, and a spider having arms engaging said radial arms to spread the latter and release said record.

8. Means for transferring records from a pile of records to the turntable of a talking machine, said means comprising a swingable arm movable in a horizontal plane relatively to the turntable, a plurality of sets of radially arranged resilient arms carried by said swingable arm, hooks formed on the ends of said resilient arms adapted to engage the edge of a record, means for controlling said swingable arm to permit engagement of said resilient arms with a record surface whereby said arms are spread outwardly to cause the hooks of at least one set of said arms to engage the record edge, and means for spreading said arms to release said record.

9. Means for transferring records from a pile of records to a turntable comprising a swingable arm, a plurality of sets of radially arranged arms carried by said swingable arm, the arms of respective sets being of different radial lengths, the ends of said radially arranged arms being formed to engage the edge of a record, and means for controlling said swingable arm to permit engagement of said radial arms with a record, said arms being so constructed and arranged that the ends thereof are spread outwardly upon contact with the surface of the record to engage the edge thereof.

10. Means for transferring records from a pile of records to a turntable comprising a swingable arm, a plurality of sets of radially arranged arms carried by said swingable arm, the arms of respective sets being of different radial lengths, the ends of said radially arranged arms being formed to engage the edge of a record, means for controlling said swingable arm to permit engagement of said radial arms with a record, said arms being so constructed and arranged that the ends thereof are spread outwardly to engage the record edge, and means for spreading said arms to release said record.

11. Means for transferring records from a pile of records to a turntable comprising a swingable arm, a plurality of sets of radially arranged resilient arms carried by said swingable arm, the arms of one of said sets being of different radial length and the ends of all of said arms lying in substantially the same plane, said ends being formed to engage the edge of a record, means for controlling said swingable arm to permit engagement of said resilient arms with a record whereby said ends are spread outwardly to cause at least one set of said arms to grip the record edge, and means for spreading said arms to release said record.

12. Means for transferring records from a pile of records to the turntable comprising a swingable arm, a plurality of radially arranged resilient arms being formed to engage the edge of a record, means for controlling said swingable arm to permit engagement of said resilient arms with a record whereby the ends thereof are spread outwardly to engage the record edge, and a spider carried by said swingable arm and having arms engaging said resilient arms to spread the latter and release said record, said spider being axially displaceable relative to said radial arms.

13. In combination with a talking machine having a magazine for supporting a pile of records and a turntable, a swingable arm, a plurality of inclined radially arranged arms carried thereby, the ends of said arms being formed to engage the edge of a record, a longitudinally displaceable spindle positioned axially relative to said radial arms, a plurality of arms carried by said spindle and engaging the underside of said radial arms, and means for raising and controlling said swinging arm.

14. In combination with a talking machine having a magazine for supporting a pile of records and a turntable, a swingable arm, a plurality of inclined radially arranged arms carried thereby, the ends of said arms being formed to engage the edge of a record, a longitudinally displaceable spindle positioned axially relative to said radial arms, a spider carried by said spindle and engaging the underside of said radial arms, means for raising and lowering said swinging arm, and manually operable means for raising said spindle relative to said swingable arm.

15. In a talking machine having a turntable and a magazine for supporting a pile of records, means for transferring records from said magazine to said turntable comprising a swingable arm, a plurality of sets of inclined radially arranged resilient arms carried thereby, the arms of respective sets being of different radial length and having ends formed to engage the edge of a record, a

longitudinally displaceable spindle carried by said swingable arm and positioned axially relative to said radial arms, a spider carried by said spindle and engaging the underside of said radial arms, and means for raising and lowering said swingable arm.

16. Means for transferring records singly in succession from a pile of records to the turntable of a talking machine, said means comprising a swingable arm movable in a plane with, but relative to the turntable, a plurality of sets of radially arranged resilient arms carried by said swingable arm in superposed relation, the ends of said resilient arms being formed to grip the edge of a record, and means for controlling said swingable arm whereby to cause at least one set of said resilient arms to grip the edge of a record.

17. In an automatic phonograph having a turntable operable in a fixed plane, means for transferring records singly in succession from a pile of records of different diameters to said turntable comprising a swingable arm movable relatively to the turntable, a plurality of sets of radially arranged resilient arms carried by said swingable arm in superposed relation, the ends of said resilient arms being formed to grip the edge of a record, and means whereby said swingable arm is placed in a position where at least one set of said resilient arms is free to grip a record about its periphery.

18. In an automatic phonograph having a turntable operable in a fixed plane, means for transferring records singly in succession from a pile of records of different diameters to said turntable comprising an arm movable in a horizontal plane relatively to the turntable, two superposed sets of radially arranged yieldable arms carried by said arm, the ends of said resilient arms being formed to grip the edge of a record, and means whereby said arm is placed in a position where either one or the other of said sets of arms is free to grip a record about its periphery.

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