R. G. BROWN.

MULTIRECORD PHONOGRAPH.

APPLICATION FILED APR. 30, 1917.

1,334,076.

Patented Mar. 16, 1920.

4 SHEETS—SHEET 1.

Fig. 1.

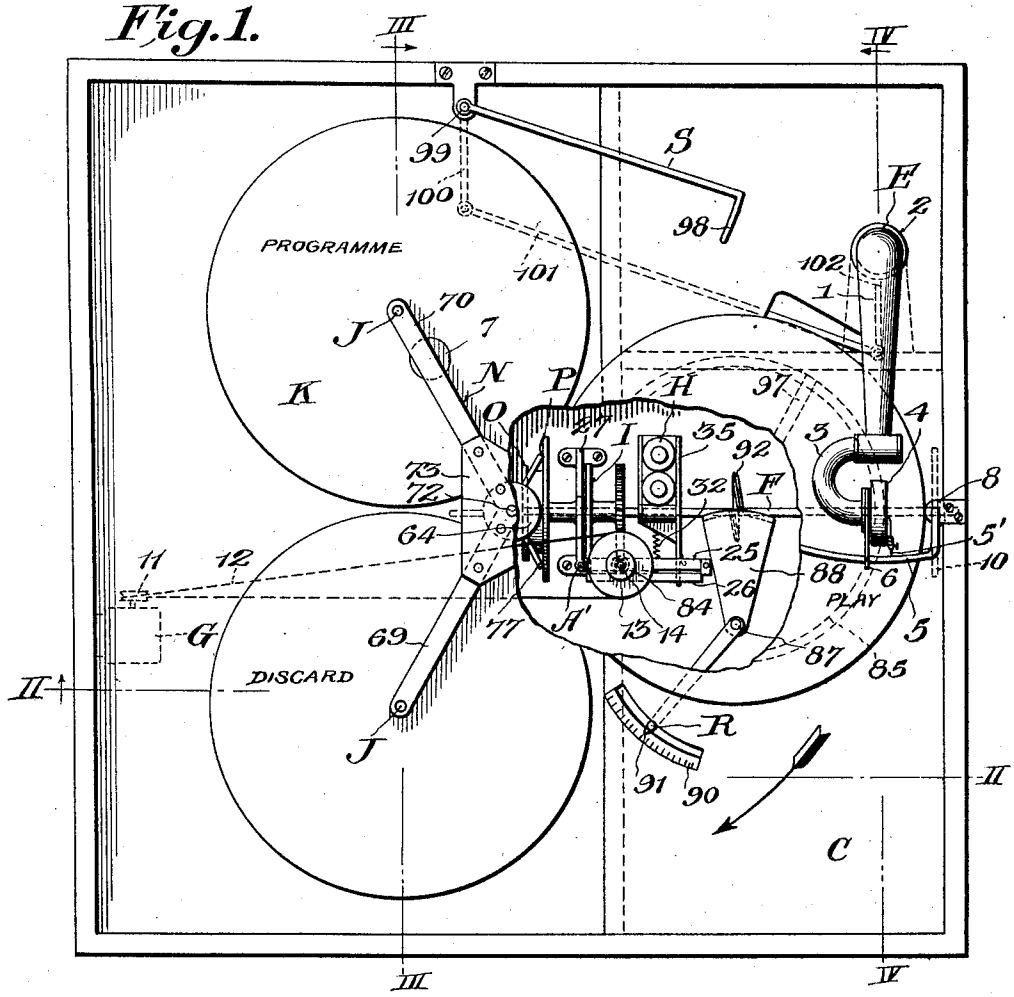


Fig. 15.

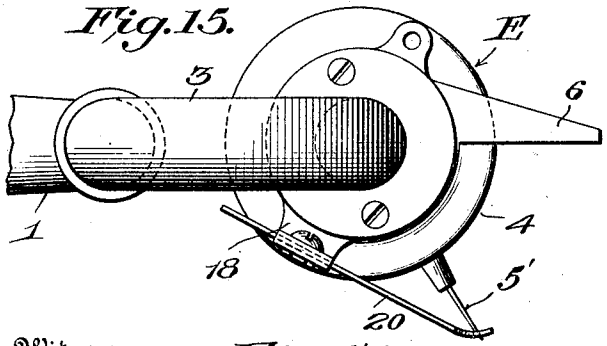
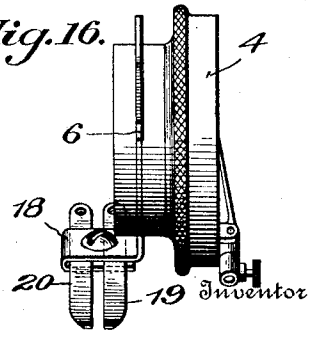


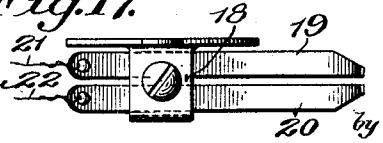
Fig. 16.



Witness

Chas. L. Grieshaum

Fig. 17.



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4 SHEETS—SHEET 2.

Fig. 2.

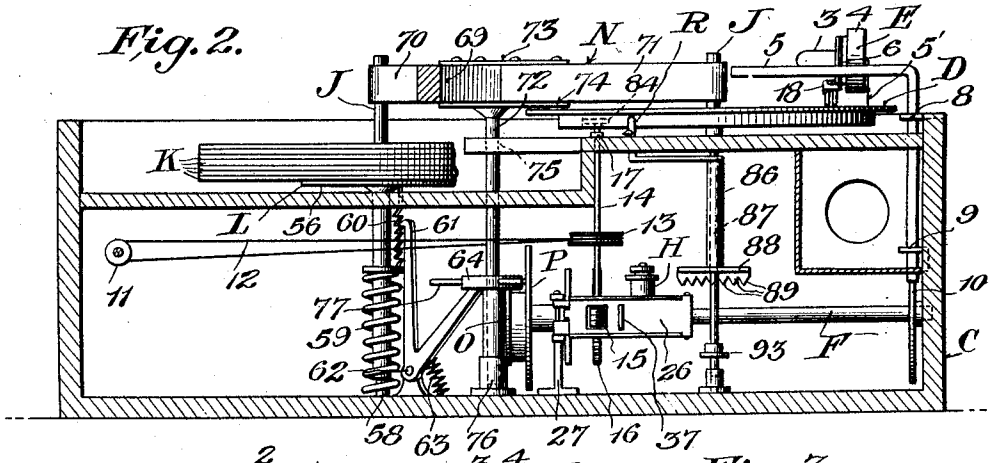


Fig. 3.

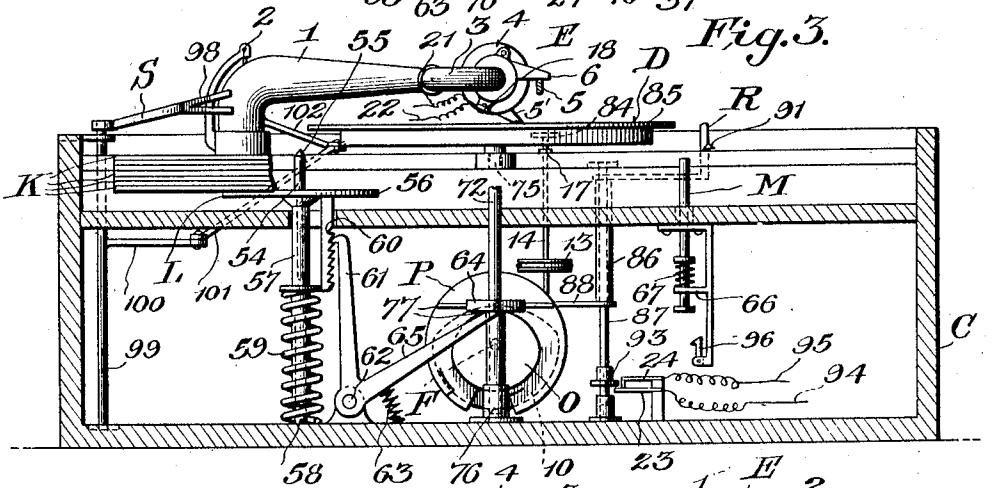
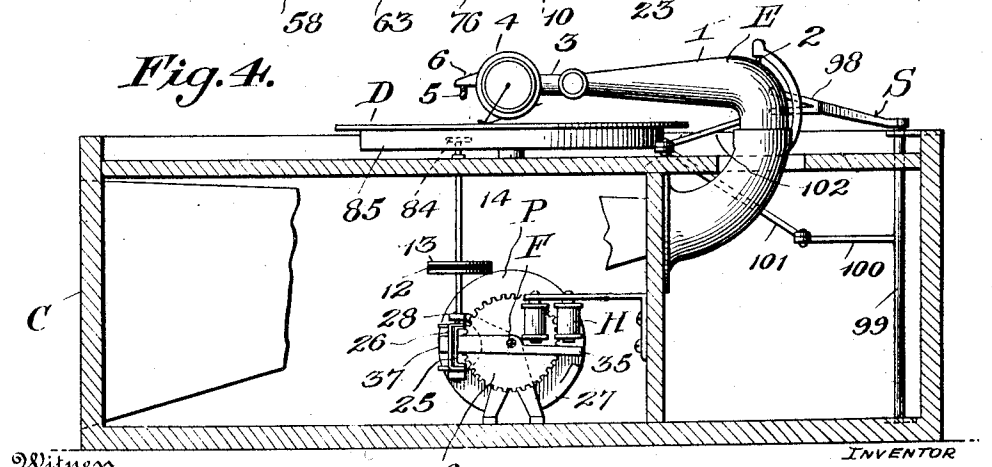


Fig. 4.



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4 SHEETS—SHEET 3.

Fig. 6.

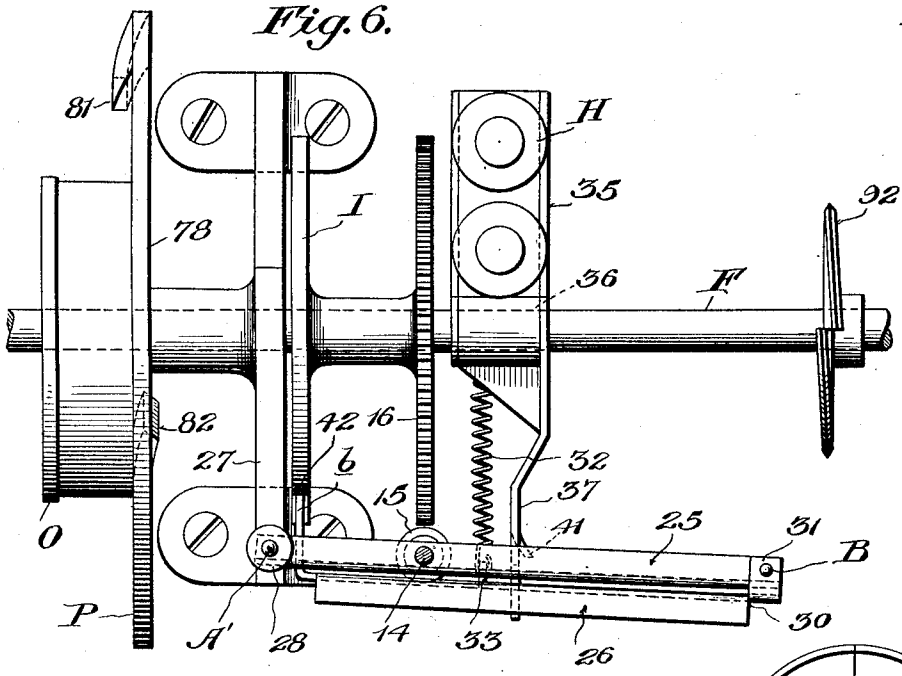


Fig. 11.

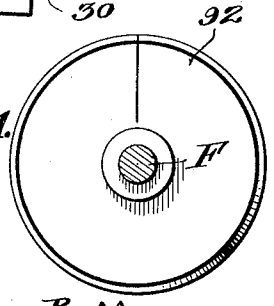
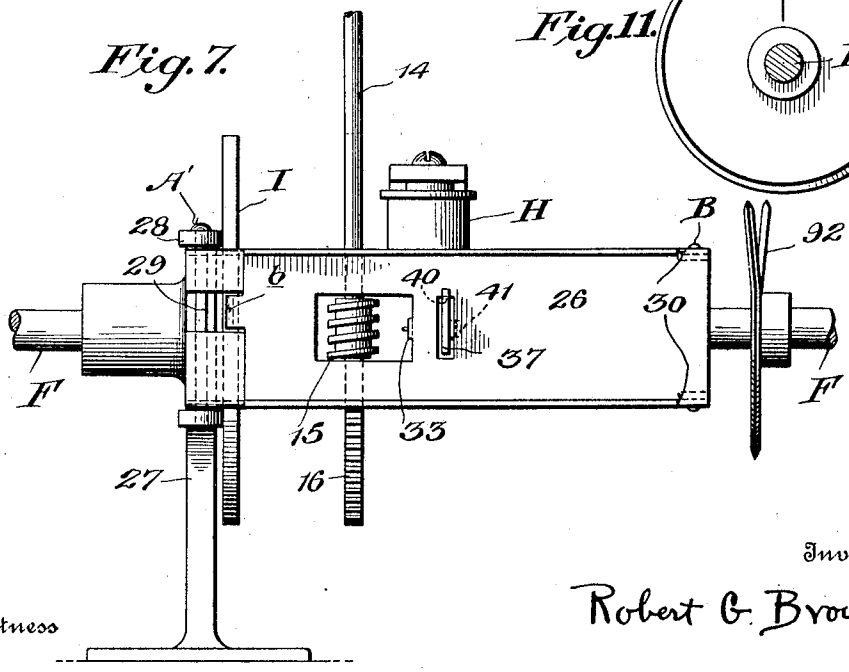


Fig. 7.



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APPLICATION FILED APR. 30, 1917.

1,334,076. Patented Mar. 16, 1920.

4 SHEETS—SHEET 4.

Fig. 8.

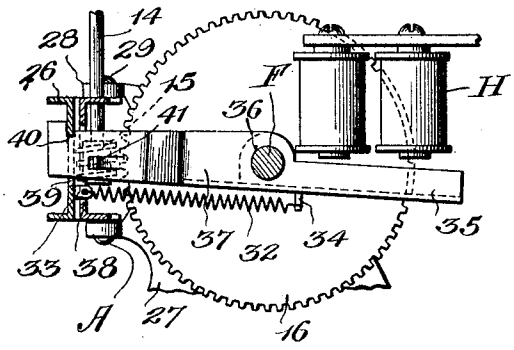


Fig. 9.

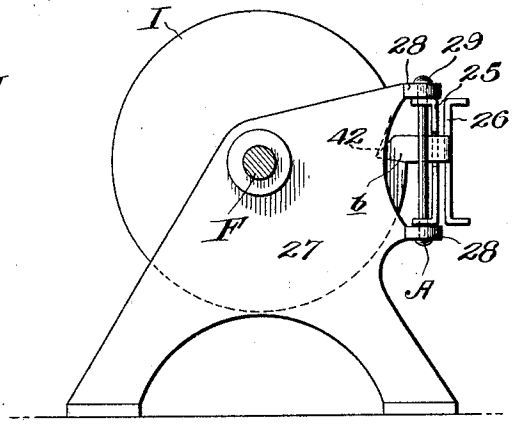


Fig. 10.

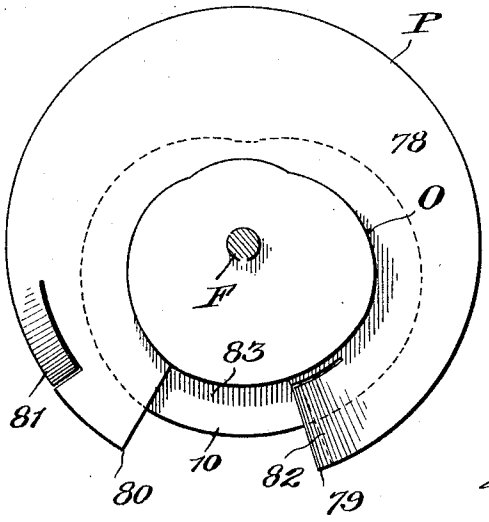


Fig. 12.

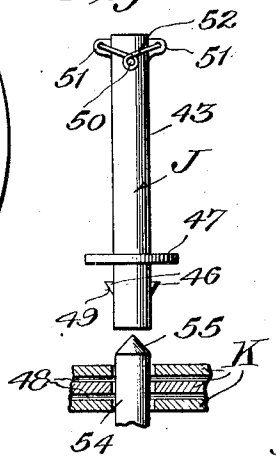


Fig. 13.

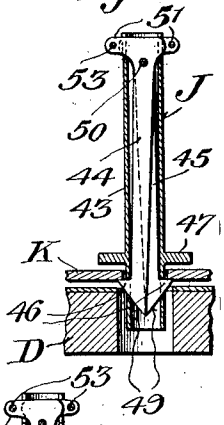


Fig. 5.

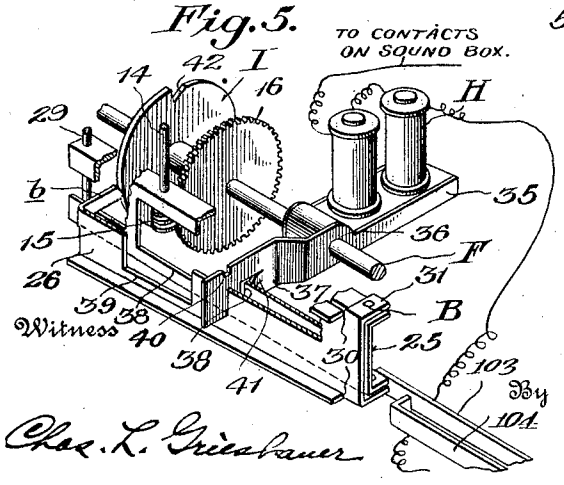
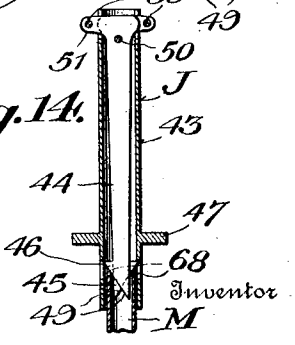


Fig. 14.



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UNITED STATES PATENT OFFICE.

ROBERT G. BROWN, OF SWARTHMORE, PENNSYLVANIA.

MULTIRECORD-PHONOGRAPH.

1,334,076. Specification of Letters Patent. Patented Mar. 16, 1920.

Application filed April 30, 1917. Serial No. 165,381.

To all whom it may concern:

Be it known that I, ROBERT G. BROWN, a citizen of the United States, and residing at Swarthmore, in the county of Delaware and State of Pennsylvania, have invented a new and Improved Multirecord-Phonograph, of which the following specification is a full disclosure.

This invention relates to automatic phonographs for playing different records and it proposes a construction adapted more especially for handling flat centrally perforated disk-like records such as are employed in machines of the "Victor" type.

Such disk-playing machines as have heretofore been commercially available are capable of playing single records only, and make no provision for automatically playing a succession of records. The entertaining capacity of a phonograph is seriously impaired by the annoyance of successively placing different records on the machine and starting the machine on each occasion. It has long been recognized that if this could be done automatically, the utility of such machines would be notably enhanced.

This invention has in contemplation a construction that will automatically play in succession any predetermined group of records, and which will automatically perform the various operations incidental thereto, such as lifting the stylus, substituting another record, returning the stylus to the proper starting point and placing it on the record so that it may play through the same.

This invention seeks to render available a mechanical organization that will automatically achieve one or more of the following objects: (*a*) to play one record once; (*b*) to play one record any number of times; (*c*) to play two selected records in succession; (*d*) to play two records successively any number of times; (*e*) to play three records successively; (*f*) to repeatedly play any number of times three records successively; (*g*) to play successively a long series of records; (*h*) to play as indicated in the foregoing and to stop automatically at any predetermined time; (*i*) to perform as indicated in the foregoing with records of miscellaneous diameters.

Other objects will be in part obvious from the annexed drawings and in part indicated in connection therewith by the following analysis of this invention.

This invention accordingly consists in the features of construction, combination of parts and in the unique relation of the members and in the relative proportioning and disposition thereof; all as more completely outlined herein.

To enable others skilled in the art so fully to comprehend the underlying features thereof that they may embody the same by the numerous modifications in structure and relation contemplated by this invention, drawings depicting a preferred form have been annexed as a part of this disclosure, and in such drawings, like characters of reference denote corresponding parts throughout all the views, of which:

Figure 1 is a plan, partly broken away of a phonograph; showing the various elements more or less diagrammatically. Fig. 2 is an elevation of the same looking in the direction of the arrow II of Fig. 1. Fig. 3 is an elevation looking in the direction of the arrow III. Fig. 4 is an elevation looking in the direction of the arrow IV of Fig. 1. Fig. 5 is a perspective detail of the power connecting and disconnecting means. Fig. 6 is an enlarged plan of the magnetic relatching and clutching mechanism. Fig. 7 is a side elevation thereof. Fig. 8 is an end elevation thereof looking in the direction of the arrow VIII of Fig. 7. Fig. 9 is an end elevation looking in the opposite direction. Fig. 10 is an enlarged plan of the cams controlling the roulette for transferring the records. Fig. 11 is a plan of the cam for determining the frequency of replaying. Figs. 12, 13 and 14 are views showing the action of the record grapple for picking up, playing and releasing the record. Fig. 15 is a detail showing in side elevation a sound-box with electrical contact means thereon. Fig. 16 is a front elevation of the sound-box, and Fig. 17 is a detail showing the electrical contact working fingers.

Continuing now by way of a more detailed analysis, it may be explained that the drawings herein are largely diagrammatic in character so that the general characteristics of this invention may be more easily explained. Suitably mounted by a case or frame C is a turn-table D which is adapted to receive records and to rotate the same for playing purposes and pivotally mounted adjacent said table is a sound-reproducer E

which may be any conventional character such as those employed on the so-called "Victor" or "Columbia" machines and which essentially embody a sound-box and a stylus therefor adapted to enter the groove of the record. In this instance this embodies a tone-arm 1 pivoted to swing about the axis 2 and carrying at its forward end a supplemental tone-arm 3 carrying a sound-box 4 provided with the usual stylus 5'. In this instance, the natural adherence of the stylus to the groove of the record is depended upon to carry the tone-arm from its initial to its finishing point.

This invention embodies means for automatically raising the stylus from the record at the conclusion of the playing so as to permit the tone-arm to be returned to its initial or starting position. This means comprehends a lifter which here assumes the form of an arm 5 which is arc-shaped and extends underneath a projection 6 so that when the arm is bodily lifted the sound-box will be lifted sufficiently to clear the record. This arm 5 extends downwardly through guides 8 and 9 carried by the case C so as to ride at its lower end on a cam 10 mounted on the control shaft F. This cam is so designed that at a predetermined point in the cycle of rotation of the shaft F, it will uplift the arm 5 through the depending portion 7 and thereby elevate the tone-arm so that it may, by means which will subsequently be described, be returned to its initial starting point.

The main shaft F is driven by a continuously running electric motor G suitably located in a case. A suitable transmission extends from the motor to said shaft and means in the nature of a clutch or the like is arranged in said transmission to connect and disconnect the same. Such means is herein instanced by a pulley 11 and a belt 12, a driven pulley 13 on the vertical shaft 14, a worm 15 on the shaft 14 and a gear 16 adapted to be meshed by said worm to drive the shaft F. In this case a clutch effect is obtained by so mounting the arm that it may be thrown out of mesh with the driving gear 16 which is permanently fast to the shaft F and to that end the shaft 14 is mounted at 17 in such a manner that its lower end can be swung toward and away from the gear 16. This is achieved by an automatic device which (as soon as the stylus reaches the end of the record) will throw the arm into mesh to cause the shaft F to rotate through one cycle, and thereby, among other things, cause the cam 10 to raise the stylus, hold it raised for a sufficient time to enable the stylus to be returned to its initial position, and then drop it slowly into the record groove. This automatic instrumentality will be operated by a mechanical or electrical contact system which is set into action at the completion of the playing of the record and as here shown this system embodies a block of insulating material 18 carried by the sound-box and supporting two contact blades 19 and 20 of flexible metal which are adapted to ride on the record so that when they reach the end of the sound groove they will both contact with a circuit closer in the nature of a thin metalic wafer indicated by 7 on Fig. 1 fastened at a proper point to said record. This closes the circuit through wires 21 and 22, deriving current from a suitably located battery or other source of electricity, and through the electro-magnet H and a circuit breaker consisting of the contact elements 103 and 104 as shown by Fig. 5 which latter is operated by an automatic stop device to be later described; the function of said circuit breaker being to prevent the accidental unmeshing of the worm 15 during the rotation of cam shaft F.

The automatic means for connecting the worm 15 with the gear 16 operates by a single impulse of the electro-magnet H first to establish a power-transmitting connection and then, at an appropriate time to automatically disconnect same and to position the parts automatically so as again to be capable of being similarly functioned as a result of the next impulse of the magnet. This is attained by means of a combined lever system having a shifting fulcrum. The compound lever comprises the worm-controlling lever 25 and the relatching lever 26. These two levers are pivoted together at B, which is a floating pivot, and the lever 25 is pivoted to a fixed pivot A' which is formed by a bracket 27 secured to the base of the case and has a bifurcated wing 28 carrying the pivot pin 29. The levers 25 and 26 may conveniently be made of sheet metal and to that end they are both preferably channel-shaped; the flanges of the lever 25 being used to pivot it to the standard 27 and also to carry the pin which pivots it to the component lever 26. The flange of the latter is cut away at the point 30 forming lugs 31 which are turned over the lever 25 and pivotally connected thereto. A spring 32 is attached at the point 33 to the lever 26 and at the point 34 to the armature 35 of the electro-magnet which is formed of a piece of channel iron loosely pivoted at 36 to the shaft F so as to be supported thereby and this armature has a part 37 extending forwardly therefrom to pass through a window 38 in the lever 25 and a window 39 in the lever 26; said windows being sufficiently elongated to permit of an oscillation of the armature about said shaft to a slight extent under the pull of the magnet. The extension 37 of said armature is provided with a notch 40 whereby it may be interlocked with the relatching lever 26 and it is also provided

with a stop 41 whereby it may abut against the side of the worm-carrying lever 25 to limit its movement and thus prevent the worm from being too deeply meshed with the driving gear 16. The operation of this device is as follows; the magnet is energized when the stylus reaches the end of the record and it thereupon lifts the armature 35 and frees the notch 40 from the relatching lever 26. The spring 32 is thus enabled to pull the lever 26 against the lever 25 so that to all intents and purposes they act as one with the effect that the lever 25 swings anti-clockwise about the fixed pivot A′ and thus brings the worm 15 into mesh with the wheel 16; the motion being limited by the stop 41 on the armature extension 37. The worm now rotates the shaft F with the effect that a cam 10 lifts the stylus and the shaft continues to rotate (and, among other things, returns the stylus to its starting point) but shortly will come to a stop automatically through the action of a relatching cam I. When the shaft starts to rotate this cam I soon operates against a finger *b* extending from the relatching lever 26 and this swings said lever about the now stationary pivot B thereby increasing the tension on the spring 32 and returning the lever 26 to a position such that it will be reëngaged by the notch 40 in the armature extension 37; said armature being returned to its normal position in the meantime through the breaking of the circuit caused by the elevation of the stylus. Thus far the worm is still driving the shaft F, but soon the finger *b* comes opposite a notch 42 in the cam I thereby shifting the fulcrum of the lever 26 from the cam wheel I (or in effect from the pivot A′) to the point A at which the notch 40 is located. This immediately changes the effect of the spring 32 on the lever 26. Formerly, said spring tended to rotate the lever 26 anti-clockwise about the cam I as a fulcrum (thereby exerting pressure) in such direction against the pivot B as to hold the worm in engagement. Now, however, as a result of the withdrawal of the cam I, the fulcrum is shifted to the point A and the spring tends to move the lever 26 clockwise about the point A. This changes the direction of pressure on the pivot B with the effect that the lever 25 now starts to swing clockwise also. The levers 25 and 26 have been opened scissors-like by the cam I and they now close up and the worm is withdrawn from the wheel 16. This has the effect of stopping the rotation of the shaft F, but before this happens, the stylus has been lowered into the sound groove and starts again to play.

The means for automatically transporting records from a reservoir and placing them in playing position on the turn-table, will now be described. This mechanism comprises a grapple or claw J which is characteristically designed to seize the record at its center hole and to transport it to the turn-table; to enable it to be rotated by the turn-table; to convey it away from the turn-table after it has been played the desired number of times, and finally to deposit it. This grapple J in the form here shown consists of a tubular or split post 43 which extends in a vertical direction and which carries one or more pawls 44 and 45 provided with hooks 46 adapted to engage the record K at the rim of its center hole when the post 43 of the grapple J has been thrust downwardly through said hole. A collar or shoulder 47 on the post 43 prevents the grapple J from being thrust downwardly (or conversely the records from being thrust upwardly) more than the thickness of a single record; thereby preventing the grapple from picking up more than one record at a time. It may be noted that most standard records are so configurated as to leave a slight space 48 (see Fig. 12) between the same when they are piled up, and this space is sufficient to enable the hooks or points 46 of the pawls 44 and 45 to engage the uppermost record at the rim of the hole. These pawls are normally pressed outwardly so as to expose the points 46 through apertures or slots in the side of the post 43, and said pawls are yieldably urged into position so that when the post is thrust downwardly through the center hole of a record, the points 46 which have angular faces 49 will be caused to yield before the advancing rim of the hole, and will then snap back to engage the record. The pawls may be urged apart either by gravity or by spring action or by both. In this form, each pawl is pivoted at 50 to the upper end of the post and has portions 51 extended outwardly so as to be exposed. A spring 52 enters holes 53 in said extensions and is backed by the pivot pin 50 so as to exert upward pressure on the extensions 51 and throw apart the points 46 at the lower ends of the pawls 44 and 45.

The records are stacked up in co-axial alinement irrespective of their diameters and in accordance with whatever program is desired. To insure that the records will all be co-axial (which is essential in order that the grapple may accurately enter the center hole) this invention proposes a depressible spring-actuated centering-pin upon which the records may be transfixed. This centering pin is shown best by Figs. 3 and 12 and is indicated by 54. It is provided with a conical upper end 55 which is adapted to enter the open lower end of the tubular post 43 so as to accurately aline the post and the pin. The records K are stacked up on this post as indicated by Figs. 3 and 12, and to compensate for the heights of the different

stacks so that the uppermost disk will be normally and approximately on the same plane as the face of the turn-table, a yieldable platform L in the nature of an elevator will preferably be provided. This elevator embodies a platform proper 56 on which the records rest and a sleeve 57 that slides vertically upon an upright post or guide 58. A coiled spring 59 urges the elevator L upwardly and is so proportioned that it will approximately counterbalance the weight of the stack of records, acting like an ordinary spring balance. That is to say, the more records in a stack, the more it will weigh and the further it will depress the spring 59; but the further the spring 59 is depressed it will resist proportionally greater and thus approximately compensate for the increased weight of the records and the increased thickness thereof. In order that the spring 59 will not be enabled to discharge records all at once; and for the purpose of controlling the engagement of the uppermost record by the grapple J, this invention proposes a restrainer for the elevator L in conjunction with means for automatically controlling the action of said restrainer at appropriate periods. Thus, a ratchet 60 is connected with the elevator and a pawl 61 pivoted at 62 normally engages the ratchet; it being yieldably urged thereagainst by a suitable means such as the spring 63. Now, when a stack of records is placed on the platform 56, it may be depressed manually against the spring 59 in accordance with the height of the stack, and the pawl 61 will hold it in its depressed position. When the grapple J, however, is brought into alinement with the pin 54, and is ready to receive a record, the restrainer 61 is withdrawn by the downward pressure of a shoulder 64 against the end of the arm 65 connected with the pawl 61. The shoulder 64 is in the nature of a collar on the shaft 72 which is moved up and down to raise and lower the roulette by the action of a cam O. Its weight suffices to move it down when not restrained by the cam O. This releases the elevator, and the spring urges it upwardly until the uppermost record of the stack is pressed against the shoulder 47; whereupon the teeth or points 46 will engage the record and hold it on the grapple. Before the grapple rises, the pawl 61 again engages the elevator and restrains its upward movement so that it may not follow up when the grapple is elevated and then move laterally to deposit the record on the turn-table.

Having thus engaged a record and lifted it from the stack the grapple is now transported laterally until it is in co-axial alinement with the turn-table, and it then descends into the relation with the turn-table shown by Fig. 13 until the record K rests on the turn-table and is loose on the post 43 which now acts as a pivot, so to speak, permitting the record to be freely rotated by the turn-table. This position continues until the completion of the song; whereupon the grapple now rises and is then transported to a depository for the records, and there it releases the record. This may consist of a post or spindle M which is preferably arranged to yield slightly before the downcoming grapple, as by being slidably mounted in the guide 66. An expansile spring 67 operates to keep this post in its elevated position, so that its upper end may be exposed and in position to transfix the records as they are successively deposited on it. At its uppermost extremity, this post or pintle is open so as to provide a rim 68 which may enter the lower end of the tubular post 43 (see Fig. 14) and engage the inclined edges 49 of the record-holding claws 44 and 45 to squeeze the same together and release the record so that it may drop down on and along the pin M. The grapple J can now rise free of any record and will be bodily shifted to the reservoir and will then be caused to aline co-axially therewith and take up a new record; and the cycle will be repeated as often as desired.

The foregoing description has, for the sake of brevity and clearness, been given in connection with a single grapple only; but in accordance with this invention a number of grapples will be employed to act simultaneously and thus reduce the length of the pauses between successive playings. With a single grapple, the time consumed in removing the record, dropping it, engaging a new record, transporting it to the turn-table, and positioning it thereon, will necessarily consume considerable time. If, however, a number of grapples be caused to act simultaneously, so that while one is transporting the old record away from the turn-table, the other will be conveying the new record to the turn-table, a very considerable saving of time will be effected and the pauses between different records will be reduced proportionately. Preferably three grapples will be employed, and as a result of experience, it has been found that the intervening pause need not consume more than about ten seconds. This will be found to be a very agreeable interval.

Accordingly, three grapples are shown together with the mechanism for manipulating the same; thereby revealing the principles of this invention by way of its preferred embodiment. A roulette N is preferably used to handle the grapples so that all the movements will be pivotal in nature, although sliding means could be employed. This roulette N comprises three arms 69, 70 and 71 radiating from a common center shaft 72 and suitably secured thereto as by means of the clamp plates 73 and 74. The

shaft 72 is mounted in a bearing 75 and a step bearing 76 so as to be capable not only of rotating in said bearings but also of being lifted up and down therein in an axial direction to effect a corresponding movement of the roulette. At the extremity of each arm of the roulette, a grapple J of the character already described, is mounted and these arms are disposed in an equi-angular manner so as to cause all of the grapples to travel around the same circumference and so that they are entirely symmetrical to one another. The axes of the turn-table, of the depository and of the reservoir are all symmetrically related to the axis of the roulette and are the same distance therefrom as the grapples so that when one grapple is co-axial with, say the turn-table, the others will be respectively co-axial with the reservoir and the depository. The means for rotating the roulette step-by-step and for periodically raising and lowering it will now be described.

The roulette is periodically raised and lowered by a cam O; and it is rotated step-by-step by another cam P. These two cams are so related to one another that the lowering cam functions only after the rotating cam has positioned the grapples on the roulette in co-axial alinement with the turn-table, depository and reservoir, respectively. The raising and lowering cam O bears against the under side of a collar or shoulder 64 secured to the shaft 72 of the roulette so as to permit the lowering of the same. Radiating from this collar are a number of pins or teeth 77 which bear in pairs against the flat face 78 of the cam P which latter is constructed as shown best by Figs. 6 and 10. Between the points 79 and 80 this cam is cut away and is provided with inclined portions 81 and 82 leading to the cut away opening. During the rotation of the cam, one of the pins 77 will be brought over the opening 83 and it will be impacted by the inclined lip 81 and caused gradually to enter said opening. This will start the roulette in revolution in a gradually increasing manner and will swing it through one hundred and twenty degrees; bringing it to a stop by the action of the next pin against the flat face 78 of the cam P. This is a species of star-wheel movement and it is found that it works very satisfactorily. The effect of this step-by-step rotation of the roulette, accompanied by an intervening rise and fall thereof serves to keep a train of records moving toward and from the turn-table yielding a simultaneous action which, as before stated involves about a ten-second interval between the successive playings. It is found in practice that this operation is effected smoothly and noiselessly. It will be recalled that a metallic wafer on the record operated the electro-magnet to start and stop the main controlling shaft F upon which the cams O and P are mounted. Accordingly, the aforesaid movements are synchronized in relation to the end of a record. The turn-table may be kept continuously in operation by means of a driving wheel 84 secured to the upper end of the shaft 14 and bearing against the inner periphery of the rim or flange 85 of the turn-table. By means of an adjustable automatic counter, the main driving motor may be caused to stop after any predetermined number of records have been played; and in this way an entire series of records may be played, or only a part of the series, or either one, two or three records may be played successively over and over again as many times as desired.

This automatic stop is here instanced as an indicator or pointer R which is secured to a sleeve 86 capable of sliding up and down on a shaft 87 secured at its ends to the case. This sleeve carries a counting segment 88 (see Fig. 1) having as many teeth 89 as there would be records in the maximum number that it might be desired to play over as a series. Thus as shown by Fig. 2 there are seven teeth, and this device is therefore adapted to admit seven records to be played before stopping the motor. A scale 90 is arranged on an exposed portion of the case and by setting the pointer 91 of the indicator R at an appropriate point on this scale, a corresponding series of records may be played. The effect of so setting this pointer is to lift up the segment 88 and engage the predetermined tooth thereof with a spiral 92 having one convolution adapted to advance the segment one tooth for each revolution of the shaft F. When the last tooth has been passed by the spiral 92, the sleeve 86 is permitted to drop and this brings the shoulder 93 against the lower blade 23 of the contact members 23 and 24 thereby opening the circuit in the wires 94 and 95 which control the supply of electricity to the main driving motor G with the consequence that the machine will forthwith cease its operations.

The various special operations of which the machine is capable proceed as follows: Assuming that it is desired to play three records repeatedly in series, they will be placed in the reservoir, and the releasing shaft M will be depressed and held down by a catch 96 so as to be rendered inoperative. The normal stopping position of the roulette is one-sixth of a revolution out of co-axial alinement with the turn-table. The motor is now started by lifting the indicator R and replacing it opposite the third division of the scale, or opposite the sixth division in case it is desired to play the series twice. Forthwith, the turn-table starts, and the electrical contact blades shown in Fig. 16 will close the circuit through a metallic strip 97 secured to the turn-table. This

throws the worm 15 into action and the roulette rotates a sixth of a revolution and then drops to engage the first record in the reservoir. It then rises and carries said record toward the turn-table. On its way, the edge of the record hits the edge 98 of a swinging arm S which is pivoted at 99 and by means of this short arm 100 and link 101 is connected with a short arm 102 extending from the tone-arm. This swings the tone-arm toward the starting point a distance in proportion to the diameter of the record. The roulette continues to carry the record toward the turn-table and places it thereupon; whereupon the stylus is lowered and the playing begins. At the conclusion of the record the stylus is raised and the record is also raised lifting up the record which has been played and also lifting up a new record from the reservoir. The cycle is then repeated and the series may be replayed as many times as desired. Owing to the fact that the releaser M has been rendered inoperative, no records will be deposited but will be carried around by the roulette. In case but two records are placed in the reservoir, the operation will be as above described, but when an empty arm of the roulette comes over the turn-table the metallic strip 97 will immediately close the circuit and start the roulette again in rotation without waiting for the time ordinarily required in replaying any record. This increment is slight and will hardly be noticed. In case but one record is carried by the roulette the last mentioned operation will be twice repeated in each continuous cycle. In case four or more records are placed in the reservoir the releaser M will be placed in action so as to deposit records in the depository.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can by applying current knowledge readily adapt it for various applications without omitting certain features that, from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and therefore such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims.

Having thus revealed this invention, I claim as new the following combination of steps and elements, or equivalents thereof, and desire to secure the same by Letters Patent of the United States:—

1. A phonograph for automatically playing different records in succession, combining a turn-table; a conveying arm embodying means for seizing a disk record at the center hole thereof; and automatic mechanism for enabling said conveying arm to grasp a record at a supply station and to lift it bodily and convey it to and deposit it on said turn-table.

2. A phonograph for automatically playing different records in succession, combining a turn-table; a lifting arm; a grapple depending therefrom; means for depressing said grapple to engage a disk record at the center hole thereof; and means for causing said arm to swing to deposit a record centrally on said turn-table.

3. A phonograph for automatically playing different records in succession, combining a turn-table; an elevator adapted to support a stack of records; means for automatically conveying only the uppermost record from said stack to said turn-table; and mechanism for regulating the uplift of said elevator.

4. A phonograph for automatically playing different records in succession, combining a turn-table; a conveyer adapted to be rotated about a vertical axis; a number of grapples depending from said conveyer; an elevator for supporting a stack of records; and means for actuating said elevator and grapples to seize the uppermost record by its center hole and convey it from said stack to said turn-table.

5. A phonograph for automatically playing different records in succession, combining a turn-table; a plurality of grapples symmetrically related to a vertical axis; an elevator for supporting a stack of records; means for simultaneously swinging said grapples step by step about said axis and for intermittently raising and lowering said grapples to seize a record and convey it from said stack to said turn-table; a tone-arm; and means for automatically determining the position of said tone-arm during the transit of each record.

6. A phonograph for automatically playing different records in succession, combining a turn-table; a horizontal spider; a number of grapples arranged thereon equidistantly from its axis and from each other; and pivotal means for rotating said spider to enable said grapples to uplift the records, and for rotating said uplifted spider to convey said records automatically to and from said turn-table.

7. A phonograph for automatically playing different records in succession, combining a turn-table; a centrally perforated record thereon; an automatic grapple engaging said record at its center hole; means for lifting said grapple to uplift said record from said turn-table at the conclusion of its playing, and for carrying it to a deposit station; and means for automatically releasing said grapple from said record at said station.

8. A phonograph for automatically play-

ing different records in succession, combining a turn-table; a grapple formed of a dependent post and a pawl automatically projecting laterally therefrom to engage a record at its center hole; and means for moving said grapple to remove records from said turn-table or to deposit records on said turn-table.

9. A phonograph for automatically playing different records in succession, combining a turn-table; an elevator; a stack of records thereon; a spindle for receiving records; said turn-table, elevator and spindle being symmetrically related; a spider pivoted centrally of said three elements and adapted to be rotated and bodily uplifted; a number of automatic grapples symmetrically related to the pivot of said spider; and means for intermittently actuating said spider.

10. A phonograph for automatically playing different records in succession, combining a turn-table; an elevator for supporting a pile of record disks; a spring for counterbalancing the weight of the disks on said elevator; ratchet mechanism for causing said elevator to rise to compensate for the removal of a record; and automatic mechanism for successively transporting disks from said elevator to said turn-table.

11. A phonograph for automatically playing different records in succession, combining a turn-table; a spring-uplifted elevator; a depressible center pin for co-axially alining disks thereon; a roulette; a grapple carried thereby; means for alining said grapple with said center pin and for simultaneously causing an uplift of said elevator to affix the uppermost record disk to said grapple; and means for actuating said roulette to deposit said disk on said turn-table.

12. A phonograph for automatically playing different records in succession, combining a turn-table; a stationary center pin adapted to hold a stack of record disks; a roulette; a pin-like grapple mounted on said roulette and adapted to be alined with the upper end of said center pin; means for uplifting the disks to affix the uppermost one to said grapple; and means for raising and rotating said roulette to register the disk carried by said grapple co-axially with the turn-table, said means being thereupon adapted to deposit said record disk on said turn-table to permit it to be rotated thereby.

13. A phonograph for automatically playing different records in succession, combining a roulette comprising three symmetrically arranged arms; a grapple on each arm located equi-distant from the axis of said roulette; a depository; a reservoir for records; a turn-table symmetrically related to the axis of said roulette; and means for periodically operating said roulette to transfer records from said reservoir to said turn-table and then to said depository.

14. A phonograph for automatically playing different records in succession, combining a turn-table; a sound-box having a stylus; table-rotating means; and mechanism actuated by contact with the turn-table for automatically limiting the rotation of the turn-table in the absence of a record thereon.

15. A phonograph for automatically playing different records in succession, combining a turn-table; a sound-box having a stylus; table-rotating means; a contact on said turn-table coöperating with said stylus in the absence of a record on said turn-table to automatically limit the rotation thereof; a record reservoir; and mechanism for automatically lifting said stylus and thereafter placing a record on said turn-table to render said contact inoperative.

16. A phonograph for automatically playing different records in succession, combining a turn-table; a sound-box having a stylus; a reservoir for records; means for raising and lowering said stylus; mechanism for transferring a record from said reservoir to said turn-table between the raising and lowering of said stylus; a spring-actuated brake for stopping the turn-table; means restraining the brake from acting; and mechanism by which the brake will be freed from restraint at the end of either of several actuations of said repeating mechanism.

17. A phonograph for automatically playing different records in succession, combining a turn-table; a sound-box having a stylus; a receiver for a stack of records; a roulette for transferring a record from said stack to said turn-table, and for removing a record from said turn-table; and means for automatically stopping said roulette in an intermediate position between said turn-table and said receiver to enable records to be manually added to or removed from said receiver without interference of said roulette.

18. A phonograph for automatically playing different records in succession, combining a turn-table; a sound-box having a stylus; a depressible pilot-pin; a stack of centrally apertured records thereon; a roulette; a grapple positioned on said roulette to depress said pilot-pin and having a shoulder for determining its relation with the uppermost record disk to enable it to grapple the same; and means for actuating said roulette to deposit said record on said turn-table.

19. A phonograph for automatically playing different records in succession, combining a turn-table; a sound-box having a stylus; a member having a depending pin adapted to enter the center hole of a record

and having a catch for enabling it to suspend the record; and means for moving said member to axially aline said pin with the axis of said turn-table and enable it to rotate said record about said pin.

20. A phonograph for automatically playing different records in succession, combining a turn-table; a sound-box having a stylus; a member having a depending pin adapted to enter the center hole of a record and having a catch for enabling it to suspend the record; means for moving said member to axially aline said pin with the axis of said turn-table and enable it to rotate said record about said pin; and means for releasing said catch after said pin has carried said record away from said turn-table.

21. A phonograph for automatically playing different records in succession, combining a turn-table; a sound-box having a stylus; a depository for records; a reservoir for records; mechanism for lifting, turning and lowering said stylus; a roulette; a first and a second grapple actuated by said roulette, one for transferring a record from the reservoir to the turn-table, and the other for simultaneously conveying a record from the turn-table to the depository; and means for operating said roulette during the interval between the raising and lowering of the stylus.

22. A phonograph for automatically playing different records in succession, combining a turn-table; a sound-box having a stylus; a depository for records; a reservoir for records; mechanism for lifting, turning and lowering said stylus; a roulette; a first and a second grapple actuated by said roulette, one for transferring a record from the reservoir to the turn-table, and the other for simultaneously conveying a record from the turn-table to the depository; means for operating said roulette during the interval between the raising and lowering of the stylus; and an instrumentality for automatically determining the initial setting of the stylus on each record in succession to compensate for variations in the sizes thereof.

23. A phonograph for automatically playing different records in succession, combining a turn-table; a sound-box having a stylus; a depository for records; a reservoir for records; mechanism for lifting, shifting and lowering said stylus; a roulette; a first and second grapple actuated by said roulette, one for transferring a record from the reservoir to the turn-table, and the other for simultaneously conveying a record from the turn-table to the depository; means for operating said roulette during the interval between the raising and lowering of the stylus; an instrumentality for automatically determining the initial setting of the stylus on each record in succession to compensate for variations in the sizes thereof; and means for automatically stopping said roulette at one side of said reservoir after the last record therefrom has been played.

24. A phonograph for automatically playing different records in succession, combining a turn-table; a reservoir for records; a depository for records; means for transferring the records from the reservoir to the turn-table and from said turn-table to said depository; means for releasing said record to deposit it; and means for rendering said last-mentioned means inoperative to insure a repeated playing of said record.

25. An automatic phonograph combining a turn-table; a depository; a swinging arm for conveying a record from said turn-table to said depository; a mechanism for releasing said record; and means for rendering said mechanism inoperative.

26. In an attachment for talking-machines a carrier, means to attach revolubly a disk record to said carrier, and means to swing said carrier horizontally with a record attached in a horizontal position thereto, and lower such record into playing position, and to elevate such record and swing said carrier and record horizontally out of such position.

27. In an attachment for talking machines, horizontally and vertically-movable means adapted to carry a disk record, and to permit the same to revolve without being detached from such means.

28. In an attachment for talking machines, horizontally and vertically-movable means adapted to carry a disk record, and to permit the same to revolve without being detached from such means, and automatically-controlled operating means for said first named means.

29. The combination, in an attachment for talking-machines, with the sound-box with its stylus, and the turntable of a talking-machine, of a disk-record carrier provided with means to hold a record above the level of said turntable, and to permit said record to descend onto said turntable to be played and then raised therefrom without becoming disconnected from said means, means to swing said carrier on a horizontal plane over said turntable, means to lower said sound-box with its stylus on such record, when the latter is lowered onto said turntable, means to elevate said sound-box, means to raise said record from said turntable, and means to swing said carrier on a horizontal plane outwardly.

In witness whereof, I hereunto subscribe my name, as attested by the two subscribing witnesses.

ROBERT G. BROWN.

Witnesses:
LEON MINTZ,
B. COOKE.