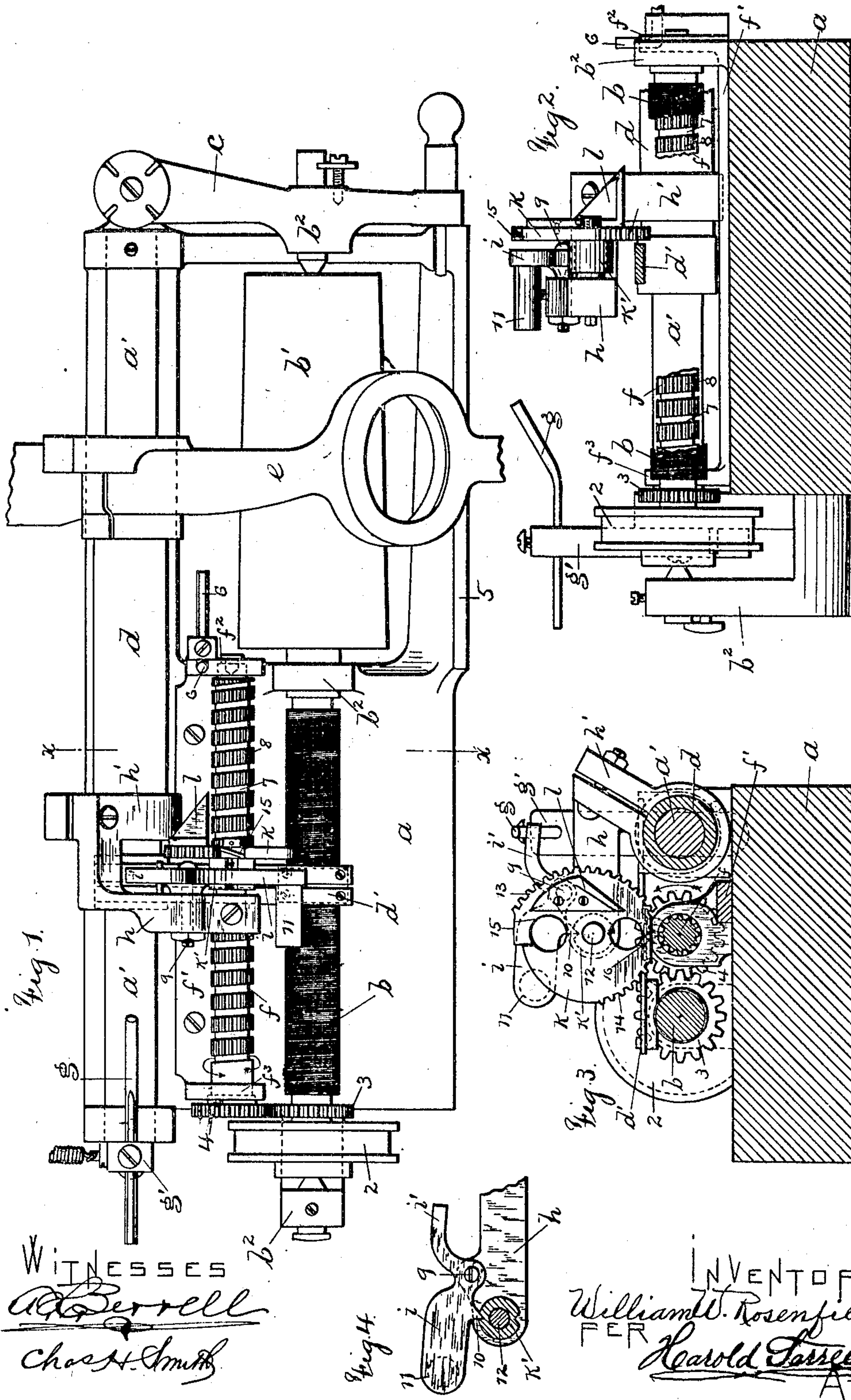


No. 831,895.

PATENTED SEPT. 25, 1906.

W. W. ROSENFELD.
PHONOGRAPH.

APPLICATION FILED NOV. 28, 1903. RENEWED FEB. 20, 1906.



UNITED STATES PATENT OFFICE.

WILLIAM W. ROSENFELD, OF NEW YORK, N. Y.

PHONOGRAPH.

No. 831,895.

Specification of Letters Patent.

Patented Sept. 25, 1906.

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To all whom it may concern:

Be it known that I, WILLIAM W. ROSENFELD, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented an Improvement in Phonographs, of which the following is a specification.

This invention relates to automatic return mechanism for phonographs; and the invention is an improvement on the construction shown and described in my application for Letters Patent of the United States, filed July 23, 1903, Serial No. 166,678, Renewal No. 215,180.

A full understanding of the invention can best be given by a detailed description of a preferred construction embodying the various features thereof, and such a description will now be given in connection with the accompanying drawings, showing such a construction.

In said drawings, Figure 1 is a plan view of a phonograph provided with an automatic return mechanism embodying my invention. Fig. 2 is an elevation of the return mechanism and parts of the phonograph with the feed-shaft and the auxiliary or return feed-shaft broken away so as to more clearly show other parts. Fig. 3 is a section on line xx of Fig. 1 looking toward the left. Fig. 4 is a detail view, partly in section, of parts which will be hereinafter described.

Referring to the drawings, a represents the usual bed of a phonograph or similar machine; b , the threaded feed-shaft; b' , the mandrel, which is shown as carried by the feed-shaft; b^2 , bearings for the feed-shaft and mandrel, and 2 the driving-pulley for the feed-shaft. The back bar a' carries a sliding sleeve d of usual construction, to the right-hand end of which is secured the reproducer arm or carrier e , the free end of which reproducer arm or carrier is supported during its reproducing movement by a rest 5. The drawings do not show the reproducer proper, but only the annular support for receiving the same. The sleeve d also carries a feed-arm d' , provided with the threaded feed-block of usual construction to engage the thread of the feed-shaft d , so that movement is communicated in the usual manner from the shaft b through the feed-arm d' to the sleeve d and to the reproducer-arm e , causing the same to move longitudinally of the record on the mandrel b' . c is a swinging

arm carrying the end bearing b^3 for the mandrel. The parts above described are or may be of usual construction.

An auxiliary shaft f , which serves as the return feed-shaft, is mounted parallel with the feed-shaft b in bearings $f^2 f^3$ on an auxiliary bed or plate f' , which rests upon and is secured to the bed a , and on the end of this shaft adjacent to the bearing f^3 is a gear 4, meshing with a gear 3 on the feed-shaft b . The shaft f is provided with a spiral groove or screw-thread 7, and the surface of the shaft between the convolutions of the spiral groove is provided with teeth 8.

A bracket h is carried by the sleeve d , being secured to the sleeve by means of an arm h' , split and clamped to the sleeve by a set-screw, as shown in Fig. 3. The bracket h carries a pivot pin or arbor 12, on which an eccentric or cam disk k is rotatably mounted. This eccentric or cam disk is provided with a hub k' , having opposite longitudinal notches, and the periphery of the disk is formed with two series of teeth 13 and 14, adapted to coact with the teeth of the return feed-shaft, with a rib 15 at one end of the series of teeth 13 and at a high part of the periphery adapted to enter the spiral groove 7 of the return feed-shaft to coact therewith to impart return movement to the reproducer-carrier and with a flat portion or space 16 between the series of teeth and at a low part of the periphery. The disk will thus have a portion of its periphery between the flat portion 16 and the rib 15 of progressively-increasing radius and a portion beyond the rib 15 of progressively-decreasing radius. Extending from the face of the disk k is a cam-plate l , the outer edge of which lies at an angle to the axis of the disk and is adapted to engage an abutment formed, as shown, by a post 6, having a horizontal portion which passes through a part of the bearing f^2 and is adjustably secured therein to provide for adjustment of the post longitudinally of the direction of movement of the disk k .

Pivoted to the bracket h at 9 is a latch-arm i , having a tooth 10 for engaging the notches in the hub k' , said latch-arm being weighted or overbalanced by means of a weight 11, so that its tooth 10 normally bears against the hub k' . Said arm also has an end i' , projecting on the other side of the pivot from the tooth 10 for engaging a cam rod or arm

g, which is adjustable longitudinally in a post *g'*, extending from the left-hand support of the bar *a'*.

The operation is as follows: During the re-
 5 producing operation of the phonograph the bracket *h*, carrying the cam or eccentric disk *k*, moves with the sleeve *d* and reproducer-arm or carrier *e* as the latter are moved to the right in Fig. 1 through the action of the feed-
 10 shaft *b* on the feed-nut carried by the feed-arm *d'*. During such movement the eccentric disk is held in the position shown in Fig. 3, with the rib 15 and the high part of the disk uppermost and with the flat space 16 of the
 15 disk adjacent to but out of contact with the return feed-shaft *f*, the disk being held in this position during the reproducing operation by the latch-arm *i*, the tooth 10 of which lies in one of the notches in the hub *k'*. As the re-
 20 producer-carrier approaches the end of its reproducing movement the cam-plate *l* on the disk *k* comes into engagement with the post 6, and as the movement continues the disk is thereby turned to bring its teeth 13 into en-
 25 gagement with the teeth 8 of the return feed-shaft *f*. The disk is then further turned or rotated by the rotation of the return feed-shaft and its toothed periphery caused to progressively engage the toothed surface of
 30 the shaft until the rib 15 is brought into position to enter the groove 7 of the shaft. This turning movement of the eccentric disk, because of its eccentric or cam form, raises the bracket *h*, and thereby rocks the sleeve *d* and
 35 elevates the reproducer-arm or carrier *e* to raise the point of the reproducer away from the record and also raises the feed-arm *d'* to disengage its threaded block from the shaft *b*, thereby interrupting the forward or repro-
 40 ducing movement of such parts. When the rotation of the disk *k* begins, the tooth 10 of the latch-arm *i* is forced out of the notch in which it has been resting in the hub *k'*, and the tooth then rests on the smooth surface of
 45 the hub as the rotation of the disk continues until the rib 15 is brought into position to enter the groove 7 of the return feed-shaft. The tooth 10 of the latch *i* then drops into the other notch of the hub *k'* and holds the disk
 50 against further turning movement, and the disk, the bracket *h*, sleeve *d*, reproducer-arm, and feed-arm are then by the continued rotation of the return feed-shaft given a return movement (toward the left in Fig. 1) until
 55 the end *i'* of the latch *i* runs under the bent end of the arm *g*, whereby the end *i'* of the latch is pressed down and the tooth 10 withdrawn from the notch in the hub *k'*. The eccentric disk is thereby released and resting
 60 on the return feed-shaft it is given a further turning movement thereby to bring successive portions of the portion of its periphery of decreasing radius into engagement with the shaft, whereby the bracket *h* and the repro-
 65 ducer-arm are gradually lowered until the re-

producer is returned to operative position and the feed-nut is again in engagement with the feed-screw *b*, and the parts are thus re-
 turned to position for another reproducing operation. The teeth 14 on the latter part 70 of the portion of the periphery of the eccentric disk of decreasing radius insure the disk being turned until the flat portion 16 is again brought opposite to the auxiliary shaft *f*.

The notches in the hub *k'* are preferably of 75 different shape in cross-section, as shown in Figs. 3 and 4, one being of flattened V shape, while the other has one wall substantially radial, and the tooth 10 has its holding side in a plane substantially radial of the hub. Dur- 80 ing the reproducing operation of the phonograph the cam-disk is held against turning by the tooth 10, extending into the flattened V-shaped notch, and the tooth is thus easily forced out of the notch by the turning of the 85 disk when the cam-plate *l* comes into engagement with the post 6, and the disk is then free to be turned until the other notch is brought into position to receive the tooth 10. When 90 the tooth enters this other notch, the disk is locked by the engagement of the radial faces of the tooth and notch, as shown in Fig. 4, and it is thus during the return movement of the reproducer-carrier and connected parts 95 held securely against the turning strain due to the engagement of the rib 15 of the disk with the rotating shaft *f* until the projecting end *i'* of the latch-arm runs under the inclined arm *g*, and the latch is thereby moved to re- 100 lease the disk and permit it to make its further partial rotation for returning the reproducer and feed-nut to operative position.

The adjustment provided for the post 6 and arm *g* is for the purpose of adapting the mechanism to records varying in length and 105 position on the mandrel, so that the reproducing devices may operate only over the length of the actual record.

The several parts are so constructed, arranged, and timed that the operations here- 110 inbefore described are automatically repeated at the end of the movements in opposite directions and without any action on the part of an operator or attendant.

It will be understood that the term "pho- 115 nograph" is used herein as a broad term to include all sound-reproducing machines to which the invention is or may be found applicable.

What I claim is— 120

1. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a lifting device movable with the reproducer-carrier, means for holding said 125 device during either longitudinal movement, means at one end of the return feed-shaft adapted to turn said device in one direction to lift the reproducer from the record, and means at the other end of the return feed- 130 shaft adapted to operate the holding means

to release said device to permit it to return to an initial position.

2. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft provided with a spiral groove and with teeth on the surface between the convolutions of said groove, an abutment, a revoluble device movable with the reproducer-carrier and adapted to be turned by said abutment to engage the return feed-shaft, parts connected with said revoluble device and adapted to progressively engage the teeth and the groove of the return feed-shaft to lift the reproducer from the record and to return the reproducer-carrier by the rotation of the return feed-shaft to an initial position, means for holding the revoluble device against turning, and a device at the opposite end of the return feed-shaft from the abutment for moving the holding means to release said revoluble device to permit it to complete its rotary movement for returning the reproducer to operative position.

3. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a revoluble device mounted to move with the reproducer-carrier, a hub with oppositely-located notches forming a part of said revoluble device, a latch adapted to engage the notches of said hub to hold the revoluble device in its respective positions, means for turning said revoluble device at the end of the reproducing movement of the reproducer-carrier to lift the reproducer from the record, and a device for moving said latch to release the revoluble device to permit the parts to return to operative position at the end of the return movement of the reproducer-carrier.

4. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a support mounted to move with the reproducer-carrier, an eccentric disk pivotally mounted on said support, a latch-arm mounted on said support to coact with the eccentric disk for holding the same during its respective movements, means for turning the eccentric disk at the end of the reproducing movement of the reproducer-carrier to lift the reproducer from the record, and an adjustable arm for engaging the latch-arm to release the eccentric disk at the end of the return movement of the reproducer-carrier to permit the disk to make a further turning movement for returning the reproducer to operative position.

5. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, an eccentric disk mounted to move with the reproducer-carrier, a hub secured to turn with the eccentric disk and having opposite axial notches, a pivoted latch-arm also mounted to move with the reproducer-carrier and having a part adapted to engage the notches of said hub and also

having a rearward projection, a cam-plate on the face of the eccentric disk, an abutment for engaging said cam-plate at the end of the reproducing movement of the reproducer-carrier to turn the disk into engagement with the return feed-shaft whereby the disk is turned to raise the reproducer from the record, and an adjustable arm for engaging the rearward projection of the latch-arm to move the latch-arm so as to release the hub and eccentric disk to permit the eccentric disk to make a further turning movement for returning the reproducer to operative position.

6. The combination with the reproducer-carrier of a phonograph, of a return feed-shaft having a spiral groove and teeth on its surface between the convolutions of the groove, an eccentric disk mounted to move with the reproducer-carrier and to turn at substantially right angles to the line of the return feed-shaft and having two series of peripheral teeth 13 and 14 and an intermediate flat space 16 at a low portion of its periphery and a rib 15 at the end of the series of teeth 13 at a high portion of its periphery, a hub secured to turn with the eccentric disk having opposite axial notches, a latch-arm adapted to engage the notches of the hub to hold the disk in either one of two positions and having a rearward projection *i'*, means for turning the disk at the end of the reproducing movement of the reproducer-carrier to bring its series of peripheral teeth 13 into engagement with the teeth of the return feed-shaft whereby the disk is then turned to lift the reproducer from the record and to bring its rib 15 into engagement with the spiral groove of the shaft for imparting a return movement to the reproducer-carrier, and an arm *g* for engaging the projection *i'* to move the latch-arm at the end of the return movement of the reproducer-carrier for releasing the eccentric disk to permit it to be given a further rotation by the return feed-shaft for returning the reproducer to operative position.

7. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, an eccentric disk movable with the reproducer-carrier, means for holding the eccentric disk against turning; means for bringing said disk into engagement with the return feed-shaft at the end of the reproducing movement of the reproducer-carrier whereby the disk is then turned by engagement with the return feed-shaft to lift the reproducer from the record, and means for releasing the disk from the holding means at the end of the return movement of the reproducer-carrier to permit said disk to be given a further turning movement by the return feed-shaft for returning the reproducer to operative position.

8. The combination with the reproducer-carrier of a phonograph, of a return feed-shaft having a spiral groove and gear-teeth

on the surface of the shaft between the convolutions of the groove, an eccentric disk mounted to move with the reproducer-carrier and having teeth on its periphery adapted to engage the teeth of the return feed-shaft and having a part adapted to engage the spiral groove of the return feed-shaft for imparting a return movement to the reproducer-carrier, means for causing the eccentric disk to be turned by engagement of its peripheral teeth with the gear-teeth of the return feed-shaft at the end of the return movement of the reproducer-carrier to lift the reproducer from the record and to bring the groove-engaging part of the disk into engagement with the spiral groove of the shaft, means for holding the disk against turning during the return movement, and means for releasing the disk from the holding means at the end of the return movement of the reproducer-carrier to permit the disk to be given a further turning movement by the return feed-shaft for returning the reproducer to operative position.

9. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a lifting device movable with the reproducer-carrier for lifting the reproducer from the record and adapted to engage the return feed-shaft, a counterweighted latch-arm also movable with the reproducer-carrier and adapted to hold said lifting device against turning, and means for moving said latch-arm for releasing said lifting device.

10. In a phonograph, the combination with the feed-shaft, the reproducer-arm, its sleeve and the feed-arm connected thereto for engaging the feed-shaft, of a return feed-shaft provided with a spiral groove and with teeth on the surface between the convolutions of said groove, an abutment, a revoluble device movable with the reproducer-arm and adapted to be turned by said abutment to engage the return feed-shaft, parts connected with said revoluble device and adapted to progressively engage the teeth and the groove of the return feed-shaft to lift the reproducer-arm and to return the same by the rotation of the feed-shaft to an initial position, means for holding the revoluble device against turning, and a device at the opposite end of the return feed-shaft from the abutment for moving the holding means to release the revoluble device to permit it to complete its rotary movement for returning the parts to operative position.

11. In combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a revoluble member mounted to move with the reproducer-carrier and to turn at substantially right angles to the line of the return feed-shaft and having a part for engaging the thread of the return feed-shaft to impart a return movement to the reproducer-carrier, means for moving said member into

engagement with the return feed-shaft at the end of the reproducing movement of the reproducer-carrier whereby said member is then turned to lift the reproducer from the record and to bring the thread-engaging part thereof into engagement with the thread of the return feed-shaft, means for holding said member against turning during the return movement of the reproducer-carrier, and means for releasing said member from the holding means at the end of the return movement of the reproducer-carrier to permit said member to be given a further turning movement by the return feed-shaft to return the reproducer to operative position.

12. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a revoluble lifting device mounted to turn at substantially right angles to the line of the return feed-shaft, means for causing said device to be given a partial rotation by engagement with the return feed-shaft for lifting the reproducer from the record, means for holding said device in the position to which it has been turned, and means for releasing said device from the holding means to permit said device to be given a further rotation for returning the reproducer to operative position.

13. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a revoluble member mounted to move with the reproducer-carrier and having an eccentric or cam periphery and having a thread-engaging part at a high portion of its periphery, means for holding said member in position with a low portion of its periphery toward the return feed-shaft during the reproducing movement of the reproducer-carrier, means for causing said member to engage the return feed-shaft at the end of the reproducing movement of the reproducer-carrier whereby said member is given a partial rotation to lift the reproducer from the record and to bring its thread-engaging part into engagement with the thread of the return feed-shaft for imparting a return movement to the reproducer-carrier, means for holding said member against turning during the return movement of the reproducer-carrier, and means for releasing said member from the holding means at the end of the return movement of the reproducer-carrier to permit said member to be given a further turning movement by the return feed-shaft for returning the reproducer to operative position.

14. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a cam-disk mounted to move with the reproducer-carrier and to turn at substantially right angles to the line of the return feed-shaft, said disk having a portion of its periphery of progressively-increasing radius and having a part at a high portion of its periphery formed to coact with the thread of

the return feed-shaft and having a portion of progressively-decreasing radius extending from said thread-coacting portion, means for holding said disk in position with a low portion of its cam periphery toward the return feed-shaft during the reproducing movement of the reproducer-carrier and for holding the disk against rotation during the return movement of the reproducer-carrier, means for causing the disk to engage the return feed-shaft at the end of the reproducing movement of the reproducer-carrier whereby the disk is given a partial rotation to lift the reproducer from the record and to bring its thread-coacting part into engagement with the thread of the return feed-shaft for imparting a return movement to the reproducer-carrier, and means for releasing the disk from the holding means at the end of the return movement to permit the disk to be given a further rotation by the return feed-shaft for returning the reproducer to operative position.

15. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft having gear-teeth at and near one end thereof, a cam-disk mounted to move with the reproducer-carrier and to turn at substantially right angles to the lines of the return feed-shaft, said disk having a portion of its periphery of progressively-increasing radius provided with gear-teeth to coact with the teeth of the return feed-shaft and having a part beyond the toothed portion formed to coact with the thread of the return feed-shaft and having a portion of progressively-decreasing radius extending from said thread-coacting part, means for holding said disk in position with a low portion of its cam periphery toward the return feed-shaft during the reproducing movement of the reproducer-carrier and for holding the disk against rotation during the return movement of the reproducer-carrier, means for causing the disk to engage the return feed-shaft at the end of the reproducing movement of the reproducer-carrier whereby the disk is given a partial rotation to lift the reproducer from the record and to bring its thread-coacting part into engagement with the thread of the return feed-shaft for imparting return movement to the reproducer-carrier, and means for releasing the disk from the holding means at the end of the return movement to permit the disk to be given a further rotation by the return feed shaft for returning the reproducer to operative position.

16. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a member mounted to move with the reproducer-carrier and to turn at substantially right angles to the line of the return feed-shaft and having a part for engaging the thread of the return feed-shaft to impart a return movement to the reproducer-carrier and to support the reproducer during

its return movement, means for turning said member at the end of the reproducing movement of the reproducer-carrier to lift the reproducer from the record and to bring its thread-engaging part into engagement with the thread of the return feed-shaft and for giving said member a further turning movement at the end of the return movement of the reproducer-carrier for returning the reproducer to operative position.

17. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a cam-disk mounted to move with the reproducer-carrier and to turn at substantially right angles to the line of the return feed-shaft and having a part for engaging the thread of said shaft to impart a return movement to the reproducer-carrier and to support the reproducer during its return movement, means for turning said disk to lift the reproducer from the record and to bring its thread-engaging part into engagement with the thread of the return feed-shaft at the end of the reproducing movement of the reproducer-carrier, means for holding said disk against turning during the return movement of the reproducer-carrier, and means for releasing said disk from the holding means at the end of the return movement of the reproducer-carrier to permit the disk to make a further turning movement to return the reproducer to operative position.

18. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a member mounted to move with the reproducer-carrier and to move independently of its movement with the reproducer-carrier in a direction at substantially right angles to the line of the return feed-shaft and having a part for engaging the thread of said shaft to impart a return movement to the reproducer-carrier and to support the reproducer during its return movement, means for moving said member to lift the reproducer from the record at the end of the reproducing movement of the reproducer-carrier and to bring its thread-engaging part into engagement with the thread of the return feed-shaft, means for holding said member during the return movement of the reproducer-carrier, and means for releasing said member from the holding means at the end of the return movement of the reproducer-carrier to permit said member to make a further movement for the return of the reproducer to operative position.

19. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a revoluble lifting device mounted to move with the reproducer-carrier and to turn at substantially right angles to the line of the return feed-shaft and having an eccentric or cam periphery and having a part at a high portion of its cam periphery for engaging the thread of said shaft to impart a re-

turn movement to the reproducer-carrier, means for turning said device to bring successive portions of its cam periphery into supporting engagement with the return feed-shaft to lift the reproducer from the record and to bring the thread-engaging portion thereof into engagement with the thread of the return feed-shaft, means for holding said device against further turning movement during the return movement of the reproducer-carrier, and means for releasing said device from the holding means to permit said device to be given a further turning movement by the return feed-shaft to return the reproducer to operative position.

20. The combination with the reproducer-carrier of a phonograph, of a threaded return feed-shaft, a revoluble lifting device mounted to move with the reproducer-carrier and to turn at substantially right angles to the line of the return feed-shaft and having a part for engaging the thread of said shaft to im-

part a return movement to the reproducer-carrier, means for turning said device to bring successive portions thereof into supporting engagement with the return feed-shaft to lift the reproducer from the record and to bring the thread-engaging part of said device into engagement with the thread of the return feed-shaft, means for holding said device against further turning movement during the return movement of the reproducer-carrier, and means for releasing said device from the holding means to permit said device to be given a further turning movement by the return feed-shaft to return the reproducer to operative position.

Signed by me this 18th day of November, 1903.

WM. W. ROSENFELD.

Witnesses:

GEO. T. PINCKNEY,
S. T. HAVILAND.