

No. 820,165.

PATENTED MAY 8, 1906.

E. L. AIKEN.
REPEATING ATTACHMENT FOR PHONOGRAPHS.

APPLICATION FILED OCT. 31, 1905.

2 SHEETS—SHEET 1

Fig. 1.

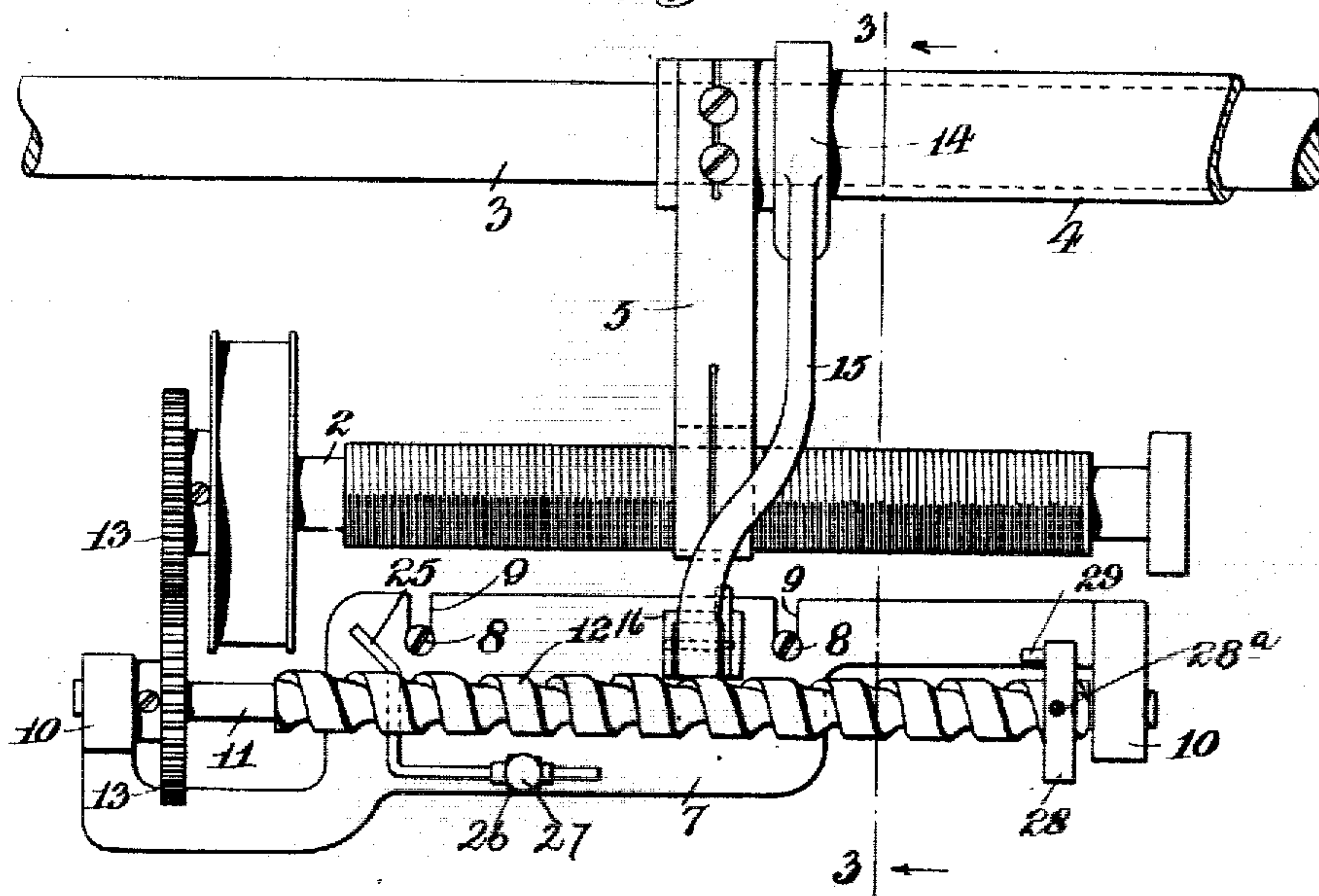
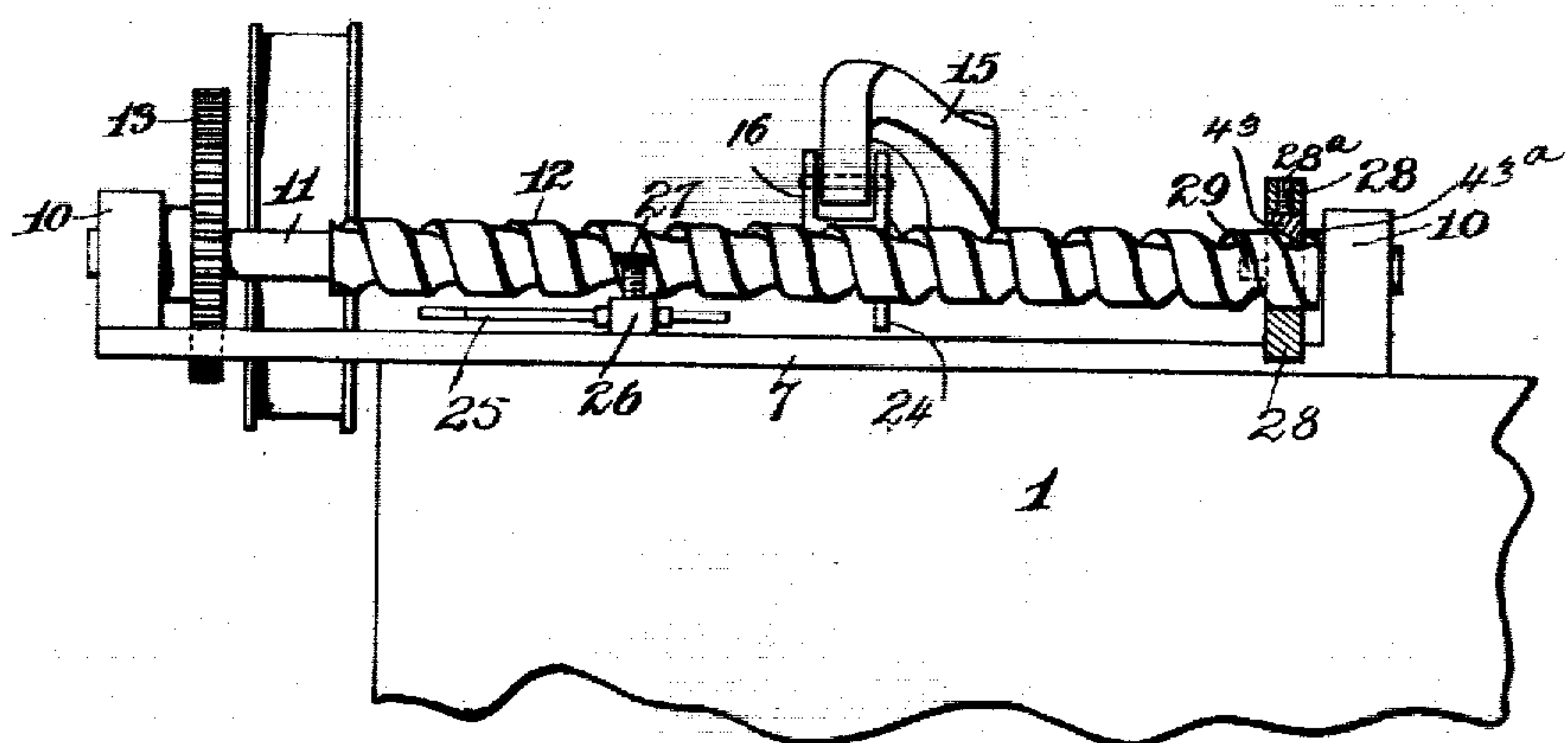


Fig. 2.



Attest:
Edgeworths
Delos Holden

Inventor:
Edward L. Aiken
by *Frank L. Aiken* Att'y

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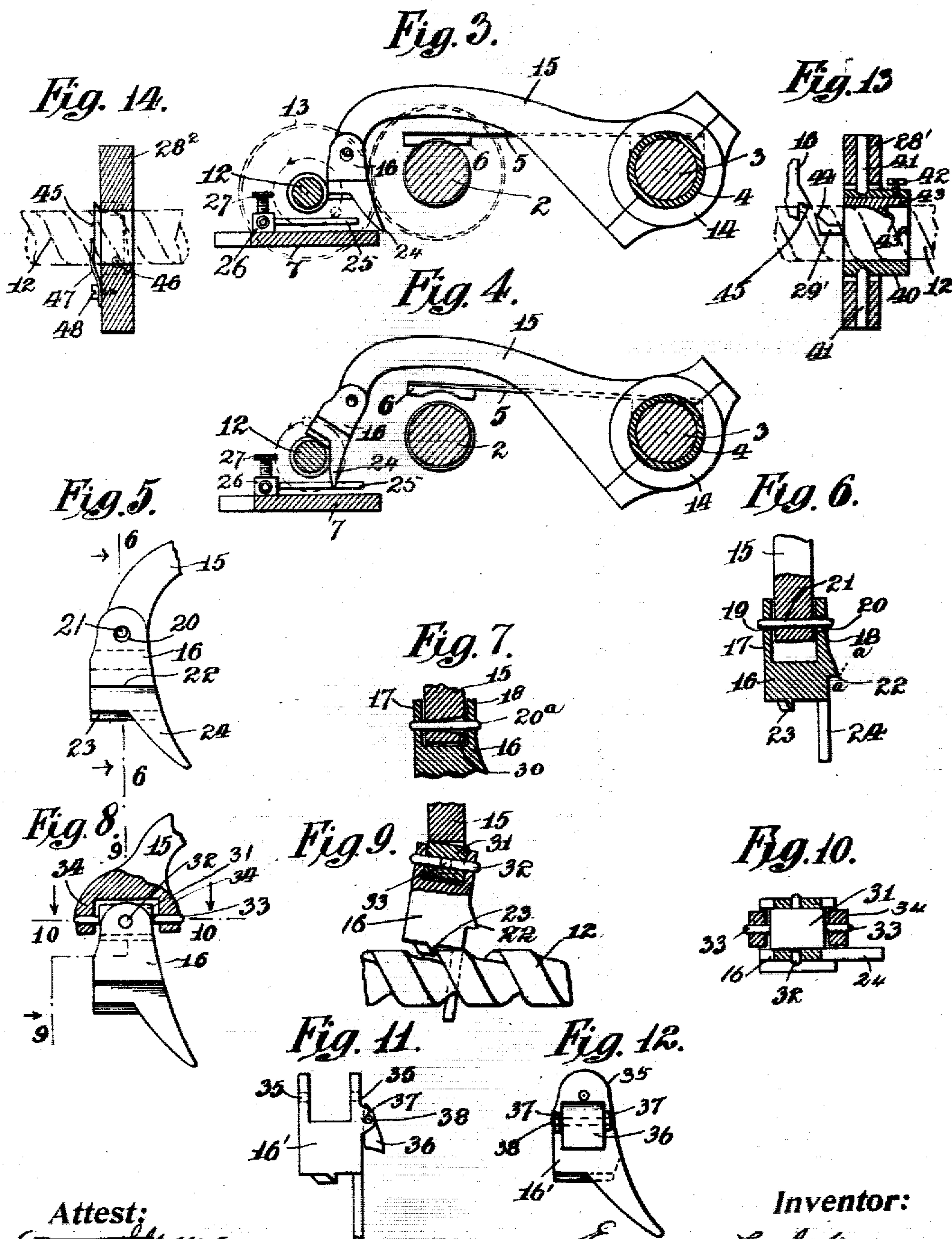
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

EDWARD L. AIKEN, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

REPEATING ATTACHMENT FOR PHONOGRAPHS.

No. 820,165.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed October 31, 1905. Serial No. 285,232

To all whom it may concern:

Be it known that I, EDWARD L. AIKEN, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Repeating Attachments for Phonographs, of which the following is a description.

My invention relates to phonograph repeating attachments of the type wherein the lifting operation by which the feed-nut is disengaged from the feed-screw is effected by means of a rotating lifting pin or projection which engages a contact member in the form of a dog carried by and traveling with the sound-box carriage and pivoted on an axis parallel to the direction of movement of the said carriage. Devices of this character are well known in the art. (See, for example, United States Letters Patent No. 583,679, dated June 1, 1897, to Fletcher, and Patent No. 678,890, dated July 23, 1901, to Matthews.) In these patents the pivoted dog operates as a lever for effecting the elevation of the sound-box carriage. When it is attempted to effect the elevation by a direct lift of the rotating pin upon a pivoted dog, it is found that special devices are necessary to produce a structure which will be operative when applied to phonographs of the usual construction, for the reason that in such instruments the pitch of the feed-screw is only one one-hundredth of an inch, so that the first contact of the rotating member and traveling member cannot be more than one one-hundredth of an inch in width and may be anything less. This width of contact is not sufficient to accomplish the lifting of the sound-box carriage with any degree of certainty, because the rotating member moves at a high rate of speed and strikes the traveling member with considerable violence, the usual result being that the carriage is lifted sufficiently to disengage the feed-nut from the feed-screw, and the carriage is then pushed or hurled in a backward direction, so that the lifting-pin and traveling dog are separated, whereupon the carriage falls, to be again fed toward the rotary lifting member. The mechanism referred to may occasionally operate when the width of initial contact is at its maximum (one one-hundredth of an inch) and before the parts have become worn

to any appreciable extent; but even under the most favorable conditions the device will fail so often as to be worthless for any practical purpose. It is therefore necessary in designing a device of this type to provide special means for obtaining a sufficient width of overlap of the traveling dog or contact member and rotary lifting member as to make the device reliable and certain in operation. This fact was pointed out by me in Patent No. 798,087, granted August 29, 1905, and a special construction for accomplishing this result was therein disclosed and claimed. This structure, however, requires accurate setting—that is, the lifting-pin and pivoted dog cannot vary much from the relative positions shown in the drawings of the said patent.

It is the object of the present invention to produce a device in which sufficient overlap of the lifting-pin with respect to the pivoted dog can be obtained for the lifting operation, and which device will at the same time admit of a considerable variation in the relative positions of these parts without its operative-ness being impaired. In other words, it will not require accurate setting, so that unskilled persons may apply the device to phonographs, and it will also possess the same advantages as the structure of said Patent No. 789,087, in that the device will be effective and positive in its operation, of but few parts, and will not in any way affect the operation of the phonograph or prevent the reproducer from being fully raised to permit the records to be applied to or removed from the mandrel, being at the same time readily adjustable, so that the reproducer may be caused to engage and be disengaged from the record at any desired point—as, for instance, immediately before and after the selection has been reproduced.

Reference is hereby made to the accompanying drawings, in which—

Figure 1 is a plan view showing a part of the main shaft, feed-screw, back rod, sleeve, and feed-nut spring-arm of a phonograph with my present improvements applied thereto. Fig. 2 is a front view of the same. Fig. 3 is a section on line 3 3 of Fig. 1, showing the repeating mechanism out of operation, as when the reproducer is in engagement with the record. Fig. 4 is a similar section showing the repeating mechanism in op-

eration, as when the sound-box carrier is being returned to its initial position. Fig. 5 is a detail side view of the pivoted dog and the forward end of the arm by which it is carried.

5 Fig. 6 is a section on line 6 6 of Fig. 5. Fig. 7 is a section similar to Fig. 6 of a modification of the contact member. Fig. 8 is a view similar to Fig. 5, but partly in section, showing a second modification of the contact member. Fig. 9 is a section on line 9 9 of Fig. 8. Fig. 10 is a section on line 10 10 of Fig. 8. Figs. 11 and 12 are front and side elevations of a third modification of the contact member. Fig. 13 is a vertical section of a modification of the rotary lifting member, and Fig. 14 is a similar view of another modification of the same.

15 In all the above views corresponding parts are represented by the same characters of reference.

20 The phonograph is provided with the usual bed-plate 1, on which is mounted in suitable bearings (not shown) the main shaft 2, which carries the usual mandrel and which for a part of its length is cut with a fine screw-thread to feed the reproducer lengthwise of the record. The usual stationary back rod 3 is shown, upon which is mounted the usual sleeve 4, arranged to slide on said rod and carry the reproducing device. (Not shown.) This sleeve, together with the parts usually attached thereto for supporting the reproducer, may be termed the "traveling carriage." Secured to the sleeve 4 is the usual spring-arm 5, which carries the feed nut or nuts 6 for engaging the threaded portion of the main shaft 2, and thereby imparting a progressive forward movement to the traveling carriage, as is common in this art.

40 In applying my improved repeating attachment to a phonograph I make use of a small compact base 7, which by means of screws 8 engaging slots 9 is removably and adjustably secured to the bed-plate 1. The base 7 is provided with two bearings 10 10, in which is mounted a return-shaft 11, having a coarse-pitch return-screw 12. The return-shaft 11 may be driven from the main shaft 2 by any approved gearing, preferably two spur-gears 13 13, mounted on the two shafts, respectively, and in engagement with each other, as shown. Secured to the sleeve 4 by a split collar 14 is an arm 15, having a bend at its center, so that it projects over in front of and substantially in line with the spring-arm 5. The arm 15 is provided with a contact member of peculiar construction, which is adapted to be engaged by a pin or projection rotating with the return-shaft 11 and lifted and brought into engagement with the return-screw 12, whereby the feed-nut will be disengaged from the feed-screw and the traveling carriage will be rapidly returned to its initial or starting position.

65 This member in its preferred form is a dog 16,

pivotaly connected to the forward end of the arm 15, so that it is capable of oscillation in two planes—one longitudinal and one transverse with respect to the axis of said return-screw shaft—that is, the axis of the first oscillation is perpendicular to the return-screw axis and the axis of the second oscillation is parallel to the return-screw axis. The range of movement on the first axis is slight and is limited for reasons which will be subsequently pointed out. These axes of oscillation are preferably secured by forming the dog with a pair of upwardly-projecting ears 17 and 18, Fig. 6, provided with openings 19 and 20, respectively, through which passes a pin 21, rigid with the arm 15. The opening 19 is slightly greater in diameter than the pin 21 and the opening 20 is considerably greater in diameter than the said pin. Furthermore, the distance between the ears 17 and 18 is considerably greater than the width of the arm 15. The result is that the dog 16 may oscillate freely upon the pin 21 as an axis, and by reason of the large opening 20 and the looseness of the pin in the opening 19 the dog may swing through a small angle upon a fore-and-aft axis—that is, one which is perpendicular to the plane of the paper upon which Fig. 6 is drawn and which is located at or near the left end of the pin 20. The dog 16 is provided with a shoulder 22, extending entirely across the same, the metal above said shoulder being cut away. A rib 23 and a tail 24 project downward from the dog 16. The rib 23 is adapted to engage the thread of the return-screw 12 and effect the return of the traveling carriage, and the tail 24 is so located as to contact with an inclined rod 25, adjustably held by a set-screw 27 in a boss 26, which projects from the plate 7 to effect the lowering of the carriage. The elevation of the traveling carriage is effected by a rotary projection, which is preferably carried by the return-screw shaft. In its preferred form a disk 28 is mounted on said shaft and may be adjusted along the thread of the screw and held by a set-screw 28^a, which presses against a block 43, occupying a groove in the bore of the disk and having a rib 43^a, which engages the thread of the screw. The disk 28 carries a pin 29, which projects toward the dog 16.

The operation of the device is as follows: When the phonograph-reproducer is in its operative position, the feed-nut 6 engages the feed-screw 2 and imparts a progressive forward movement to the traveling carriage. During this time the dog 16 hangs upon the pin 20, as shown in Fig. 3. The forward movement of the carriage causes the dog 16 to approach the lifting-pin 29 until the shoulder 22 intersects the path of the rotating pin 29. As soon as the pin reaches that portion of its path intersected by the shoulder 22 it contacts with the same, and the extent of overlap

will obviously be something less than the pitch of the feed-screw, which in commercial machines is one one-hundredth of an inch.

As soon as the pin presses against the shoulder 22 it tends to turn the dog 16 upon its fore-and-aft axis. There is no tendency to lift the sound-box carrier until the limit of this range of movement is reached. It is obvious, however, that such oscillation of the dog 16 will increase the overlap of the shoulder 22 with respect to the pin 29, since the path of the shoulder is along the arc *a a* of Fig. 6. At the end of this movement a comparatively wide overlap of the contacting surfaces has been obtained, and the lifting operation begins. The dog 16 and arm 15 are lifted by the engagement of the pin 29 with the shoulder 22, and by reason of the weight of the carriage and frictional engagement of the parts the pin 29 carries the dog 16 forward until its lower surface rests upon the return-screw 12, as shown in Fig. 4. As soon as the screw revolves into the proper position the rib 23 drops into engagement with the thread of the screw, and thereby causes the sound-box carrier to be moved toward its initial position. As soon as the tail 24 reaches the inclined rod 25 the dog 16 is thrown from engagement with the return-screw, and the carriage falls into its operative position, with the feed-nut 6 in engagement with the feed-screw. The operations described may then be repeated indefinitely.

It should be noted that the thread of the return-screw pressing against the rib 23 of the dog 16 tends to turn the dog on its fore-and-aft axis; but since the range of such movement is limited the rib 23 will remain in engagement with the thread of the screw and the carriage will be moved along by the said screw. By reason of the metal above the shoulder 22 being cut away it is impossible for the face of the dog 16 to be carried against the end of the pin 29 to thereby cause the parts to jam and stop the machine.

The device of Fig. 7 is similar in all respects to the structure heretofore described, except that the dog 16 is connected to the arm 15 by means of a pin 20^a, rigid with the ears 17 and 18 and journaled in a conical bearing 30, formed in the arm 15, said bearing permitting a limited oscillation of the pin 20^a therein on a fore-and-aft axis situated near the left-hand end of the pin and perpendicular to the plane of the paper upon which Fig. 7 is drawn.

In the device of Figs. 8, 9, and 10 the dog 16 is pivotally connected to a rectangular block 31 by means of a pivot-pin 32. The block 31 is pivotally connected to the arm 15 by trunnions 33, which turn in lugs 34, depending from the end of the arm 15. The oscillation of the block 31 upon its trunnions 33 is limited by the engagement of the block 33 with the under surface of the arm 15, as

shown in Fig. 9, which shows the parts in the positions to which they will be carried by reason of the force imparted to the rib 23 by the thread of the return-screw 12.

In Figs. 11 and 12 the dog 16' is adapted to be secured to the arm 15 by a pivot-pin passing through bearings 35 35. The dog in this case is not capable of oscillation on a fore-and-aft axis. The increase of overlap is obtained, however, by substituting for the contact-shoulder 22 of the dog 16 a pawl 36, pivoted to ears 37, integral with the dog 16', by a pivot-pin 38. It should be noted that that edge of the pawl 36 which will be nearest the lifting-pin 29 is not situated directly below the center of the pin 38, but is located considerably in advance thereof. Therefore the engagement of the pin 29 with the pawl 36 will turn the same on its pivot 38 until the upper end of the pawl abuts against the side of the dog 16, thereby preventing further pivotal motion. The lifting-pin 29 will thereupon lift the dog 16' and will deposit the same upon the return-screw 12, thereby causing the return movement of the parts to take place.

It is obvious that instead of pivoting the contact-dog 16' of the traveling carriage on two axes it may be pivoted on a single axis parallel to the return-screw, as the dog 16' of Fig. 11, and the increase of overlap obtained by pivoting the lifting projection on an axis perpendicular to the axis of the return-screw, as in Figs. 13 and 14.

In Fig. 13 the disk 28', which carries the lifting-pin 29', is pivoted to a sleeve 40 by pins or trunnions 41, the axis of which is perpendicular to the axis of the return-screw 12. The sleeve 40 is secured to the screw by a set-screw 42, which bears against the block 43 and locks the same to the screw. The pin 29' is provided with a sloping surface 44, which is adapted to cooperate with a similar surface 45, formed on the shoulder 22' of the dog 16, and thereby turn the disk or ring 28' upon its trunnions 41, thereby increasing the overlap of the pin 29' with respect to the shoulder 22'.

In the device of Fig. 14 the lifting member comprises a disk 28², provided with a pawl 45, set in the body thereof, and pivoted on an axis 46, which is perpendicular to the axis of the screw 12. The pawl is normally held in the position shown by a spring 47, secured to the disk 28² by a screw 48. Obviously the pawl 45 upon striking the shoulder 22 of the dog 16, carried by the arm 15, will be turned on its pivot 46, thereby increasing the overlap of the contacting parts.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a phonograph, the combination of the traveling carriage and means for progressively moving the same when in its operative position, of a rotary lifting member, and a

contact member carried by said carriage for engaging the lifting member, said contact member being capable of oscillation on a universal joint, substantially as set forth.

5 2. In a phonograph, the combination of the traveling carriage and means for progressively moving the same when in its operative position, of a rotary lifting member, and a
10 contact member carried by said carriage for engaging the lifting member, said contact member being capable of oscillation on two axes, one of which is substantially perpendicular to the axis of rotation of the lifting member and the other of which is substantially
15 parallel thereto, substantially as set forth.

3. In a phonograph, the combination of the traveling carriage, and means for progressively moving the same when in its operative
20 position, of a rotary lifting member for effecting the elevation of said carriage, and a contact member traveling with said carriage toward said lifting member, said contact member being capable of oscillation on two axes
25 substantially at right angles to each other, substantially as set forth.

4. In a phonograph, the combination of the traveling carriage and means for progressively moving the same when in its operative
30 position, of a lifting member for effecting the elevation of said carriage, and a contact member traveling with said carriage toward said lifting member, one of said members being mounted to turn on two axes which are substantially at right angles to each other, and
35 the other member being mounted to turn on an axis substantially parallel to one of said first axes, substantially as set forth.

5. In a phonograph, the combination of the traveling carriage and means for progressively
40 moving the same when in its operative position, of the return-screw and lifting member carried thereby for effecting the elevation of said carriage, and a contact member traveling with said carriage toward said lifting
45 member, one of said members being mounted to turn on two axes which are substantially at right angles to each other and the other member being mounted to turn on an axis substantially parallel to one of said first axes,
50 substantially as set forth.

6. In a phonograph, the combination of the traveling carriage and means for progressively moving the same when in its operative
55 position, of the return-screw and lifting member carried thereby and adjustable along the thread thereof for effecting the elevation of said carriage, and a contact member traveling with said carriage toward said lifting
60 member, one of said members being mounted to turn on two axes which are substantially

at right angles to each other and the other member being mounted to turn on an axis substantially parallel to one of said first axes, substantially as set forth.

7. In a phonograph, the combination with 65 the traveling carriage and means for progressively moving the same when in its operative position, of an arm extending from said carriage and provided with a pivot-pin the axis of which is parallel to the direction of move- 70 ment of the carriage, and a contact-dog provided with upwardly-extending ears loosely fitting on said pin, the bearing-aperture of one of the ears being considerably greater than the diameter of the pin, whereby the dog is 75 capable of a limited oscillation on an axis at right angles to the axis of the pin, substantially as set forth.

8. In a phonograph, the combination with 80 the traveling carriage and means for progressively moving the same when in its operative position, of a contact member carried by said carriage and capable of oscillation on two axes at substantially right angles to each other, said contact member being provided with a 85 shoulder projecting in the direction of travel of said carriage, the material above said shoulder being cut away, substantially as set forth.

9. In a phonograph, the combination with 90 the traveling carriage and means for progressively moving the same when in its operative position, of a rotary lifting member for effecting the elevation of said carriage and a contact member traveling with said carriage to- 95 ward said lifting member, said contact member being capable of oscillation on two axes substantially at right angles to each other, and said lifting member being adjustable toward and away from said contact member, 100 substantially as set forth.

10. In a phonograph, the combination with the traveling carriage and means for progressively moving the same when in its operative position, of a return-screw and projection car- 105 ried thereby for effecting the elevation of said carriage, said projection being adjustable along the line of the thread of said return-screw, and a contact member traveling with said carriage toward said lifting member, said 110 contact member being capable of oscillation on two axes substantially at right angles to each other, substantially as set forth.

This specification signed and witnessed this 30th day of October, 1905.

EDWARD L. AIKEN.

Witnesses:

DELOS HOLDEN,
FRANK L. DYER.