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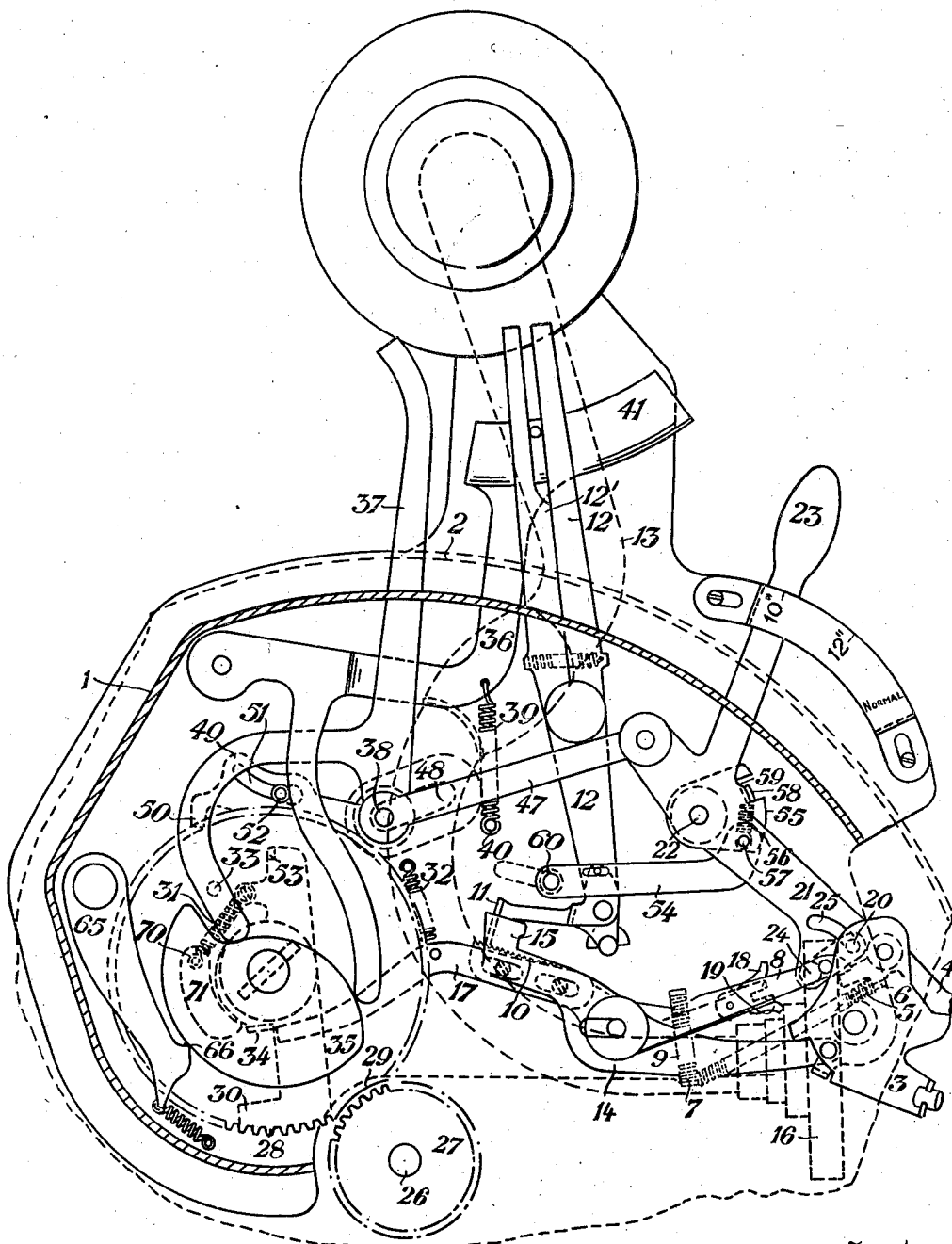
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1,926,580

REPEATING DEVICE FOR TALKING MACHINES

Filed May 31, 1929

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

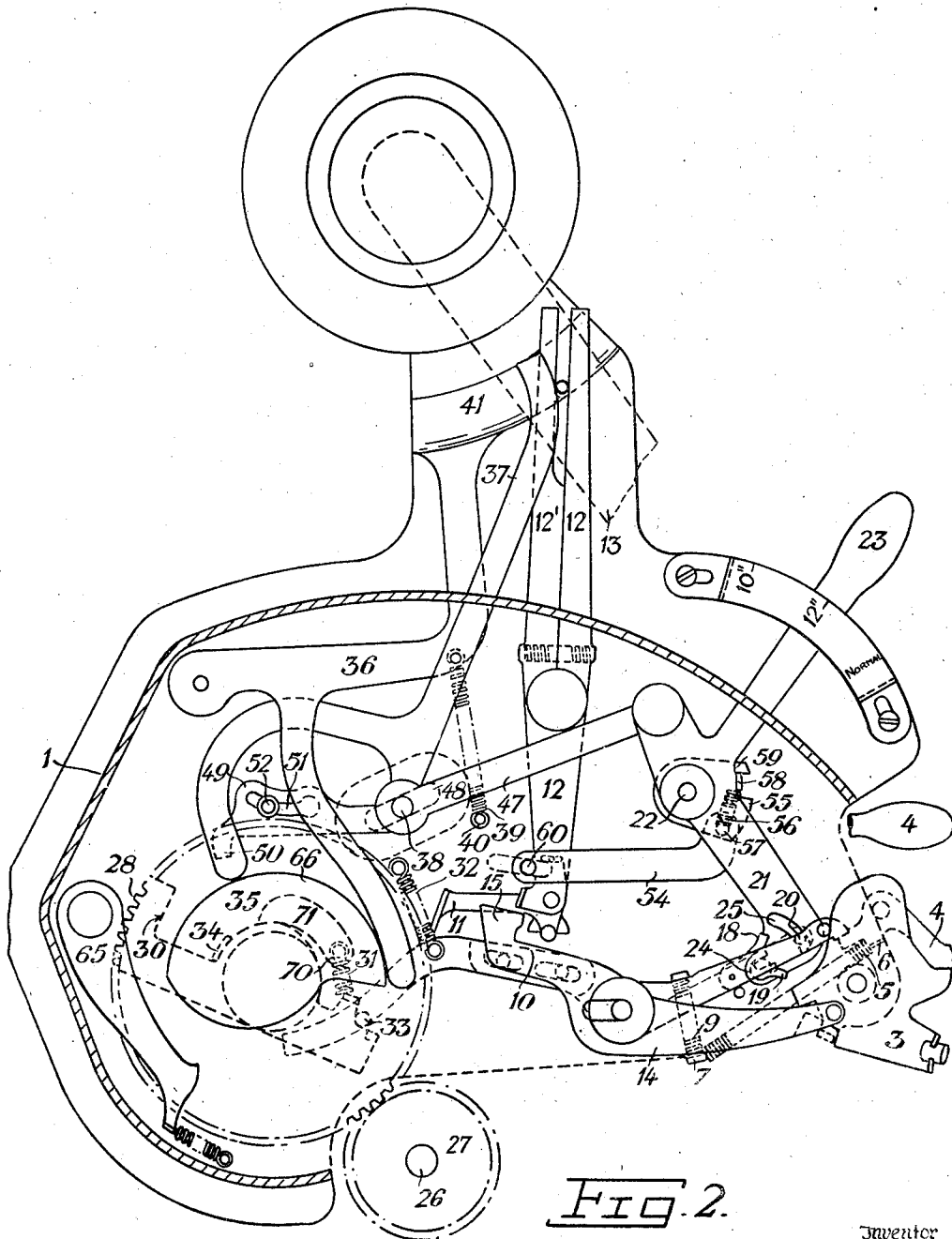


FIG. 2.

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4 Sheets-Sheet 3

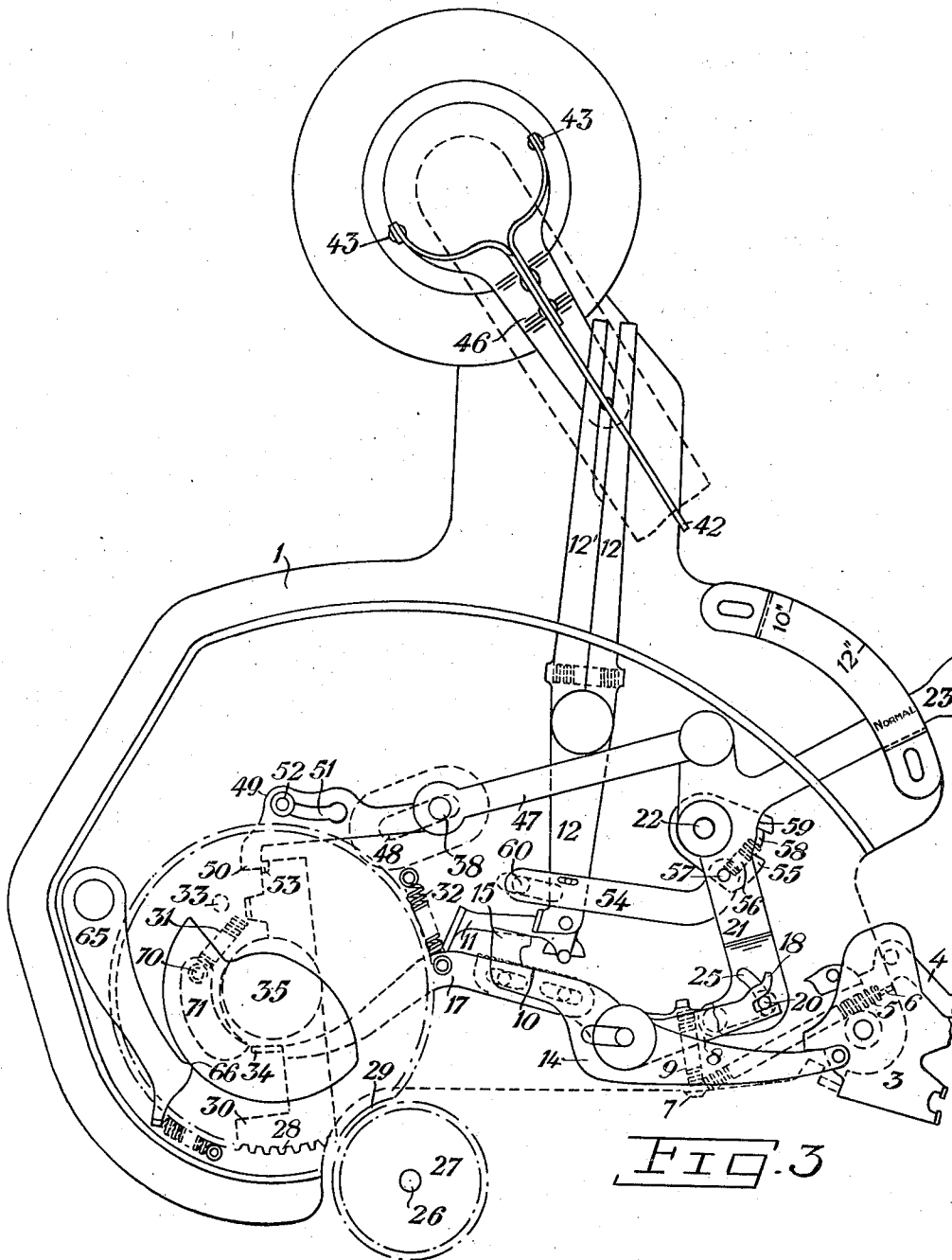


FIG. 3

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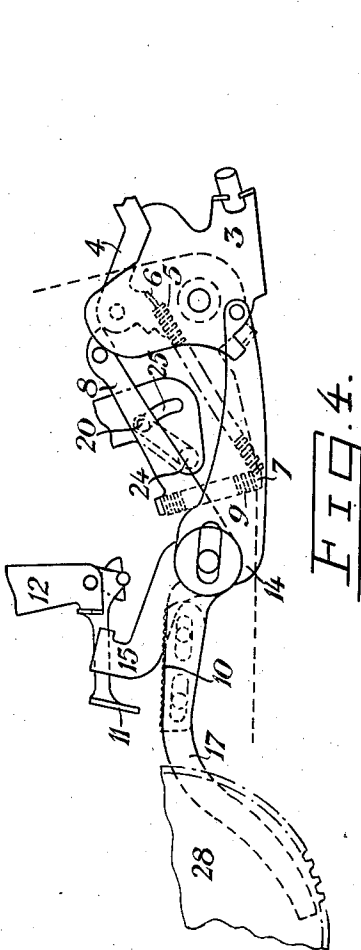
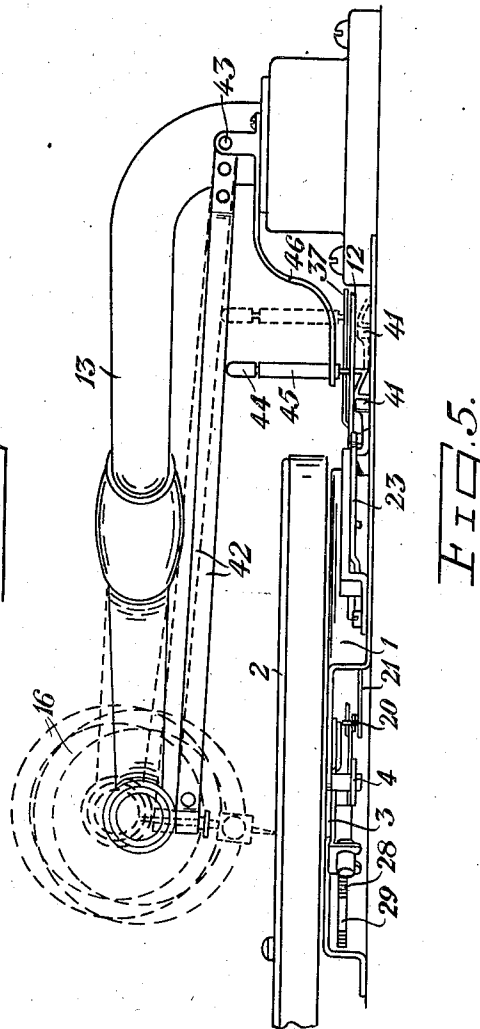
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REPEATING DEVICE FOR TALKING MACHINES

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

1,926,580

REPEATING DEVICE FOR TALKING MACHINES

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Application May 31, 1929, Serial No. 367,375, and
in Great Britain June 12, 1928

12 Claims. (Cl. 274—15)

This invention relates to improvements in repeating devices for talking machines whereby when a record has been played the sound box may be lifted to disengage the stylus from the record, swung outwards and lowered to engage the stylus with the edge of the record to replay it.

The invention is adapted for use in conjunction with a known form of automatic stopping means, the mechanism normally used for operating the brake or stopping switch being utilized, when a record is to be repeated, to set the repetition mechanism into operation to raise, return and lower the sound box. Means are provided whereby the stopping means are prevented from operating when repetition is desired, and manually operated means are also provided to permit the mechanism to be reset from the condition where repetition is effected when the end of a record is reached to the condition where the machine is automatically stopped when the end of a record is reached, and vice versa. Means are also provided whereby records of different sizes may be repeated, the sound box being moved varying distances outwards according to the size of record on the turntable.

The invention consists in a repetition device for use in repeatedly playing a talking machine record comprising a lever having an inclined surface and movable in a horizontal plane about an axis to raise the reproducer during movement of the lever in one direction about the axis and to lower the reproducer during movement of the lever in the other direction.

The outward movement of the sound reproducer to the point of commencement of the record is effected by a lever pivoted to move in a horizontal plane, the point of pivotation of said lever being adjustable to permit the throw of the operative end of said lever and distance moved by the sound arm to be varied.

The invention is illustrated by way of example in the accompanying drawings in which

Figs. 1 and 2 are views in plan showing the parts in different positions for the repetition of different size records.

Fig. 3 is a plan view with the parts in the position for automatic stopping of the machine when the end of a record is reached, parts of the repetition mechanism being omitted for the sake of clearness.

Fig. 4 is a detail and
Fig. 5 is a view in elevation.

The parts of the mechanism are carried on the underside of a plate having a downwardly extending flange 1 to permit the apparatus to be

fixed upon the motor board of a talking machine and beneath the turntable 2 (Fig. 1). For the sake of convenience in illustration the supporting plate is cut away. The stopping mechanism preferably comprises a brake pad carrying member 3, mounted for rotation about a pin supported by the plate; a hand lever 4 pivotally mounted on the member 3 and having a tension spring 5 connected between a lug 6 on the hand lever 4 and a lug 7 on the base plate, a pivoted detent lever 8 urged by a spring 9 connected between said detent 8 and the lug 7 on the base plate into a position where it engages the hand lever 4 to hold the brake member in the "off" position, a toothed segment 10 operatively connected with the detent member 8, a pawl 11 carried by a lever 12 movable with the sound arm 13 said pawl engaging with the toothed segment 10 when lever 12 is rocked by the needle being given a reverse movement at the end of a record (as by riding in an eccentric groove on the record) to rock the detent 8 and permit the brake member 3 to move into the "on" position, and a link 14 pivotally connected with member 3 and having a hook 15 which engages with the end of lever 12 to move the member 3 into the "off" position as the sound box 16 is moved outwards by hand towards the edge of the record.

In applying this form of brake to the apparatus forming the subject of the present application, the toothed segment 10 is not rigidly connected with the detent 8 but is mounted upon a lever 17 which is movable about the same axis as the detent and means are provided to couple the detent 8 and the lever 17 together when the automatic brake is required to operate. For this purpose the end 18 of lever 17 which lies beneath detent 8 (shown broken away in Fig. 3) is provided with an open ended slot and upon the under surface of the detent 8 is rigidly mounted a slotted plate 19 and when it is desired that lever 17 and detent 8 shall move together, a pin 20 is inserted in the two slots. To permit the pin 20 to be inserted in and withdrawn from the slots a change over lever 21 is pivotally mounted on the base plate at 22 being connected with a hand lever 23 operable in a manner commonly employed in connection with the stopping means of talking machines. The change over lever 21 carries at one end a pivotally mounted member 24 and on the free end of this member is carried the pin 20.

To facilitate entry of the pin 20 into the slots in members 18 and 19 the open ends are flared outwards and the pin 20 also projects through the pivoted member 24 into an arcuate slot 25 formed

in the lever 21 so that while it is capable of movement with detent 8 and lever 17 it is always retained in such a position that it can enter the slots.

5 When the pin 20 is in the slots (Fig. 3) movement of the toothed segment 10 will be transmitted to the detent 8 and the stopping devices 3 operated. When the pin 20 is out of the slots i. e. when it is in the position shown in Figs. 1 or 2, the detent 8 is not moved when the segment 10 is rocked and consequently the stopping device is not operated.

When the apparatus is required to operate to repeat the playing of a record the pin 20 is out of the slots and the movements of segment 10 are utilized to operate a clutch device so that drive of the machine motor is transmitted through a train of gearing to the repositioning mechanism for the sound arm 13.

20 On the turntable spindle 26 driven in usual manner by the machine motor, not shown, or on the boss of the turntable is rigidly mounted a gear wheel 27 which engages with a second and larger gear wheel 28 mounted to rotate about an axis on the base plate and a gap 29 (Fig. 1) is provided in the teeth of gear wheel 28 which during playing of the machine rests opposite the teeth of rotating gear wheel 27, so that gear wheel 28 is not driven. On the same axis as and beneath gear wheel 28 is mounted a toothed segment 30 and this segment is adapted for limited rotation with regard to gear 28 under the pull of a spring 31 connected between said segment and a pin 70 on wheel 28 into a position against a stop 33 on wheel 28 where the teeth of the segment complete the teeth of gear wheel 28 so that the latter will be driven by wheel 27. During playing of the machine however, the segment 30 is held in the position shown in Fig. 1 against the pull of spring 31 by the engagement of a lug 34 on the segment 30 with the end of lever 17.

When therefore lever 17 is rocked as described above, the segment 30 is released for movement under the pull of spring 31 into the position where it completes gear wheel 28 so that the latter is driven by the gear wheel 27. When gear wheel 28 has made one complete revolution, the lug 34 again engages with the end of lever 17, the latter being pulled into the appropriate position by a spring 32, so that segment 30 is held stationary while gear wheel 28 moves on a short distance until its teeth are disengaged from those of wheel 27 through the gap 29, in which position a tooth on a spring catch 65 engages in a notch 66 on the cam 35 to retain the latter in the position shown in Fig. 1 until lever 17 is again rocked.

During rotation of wheel 28 a cam 71 engages the end of lever 17 to move it against spring 32, so that segment 10 remains out of reach of pawl 11 as the latter moves with the sound arm 13.

During one complete revolution of the gear wheel 28 the various steps necessary to reposition the sound arm 13 preparatory to replaying the record on the turntable are carried out.

65 The means for effecting these steps will now be described. Upon the upper surface of wheel 28 is provided a cam 35 rotatable with said wheel 28 and with this cam engages a lever 36 pivoted at 36' to the base plate and a lever 37 pivoted at a point 38 which is movable with regard to the base plate.

The lever 36 which is rocked in one direction by the cam 35 and in the other direction by a spring 39 connected between said lever 36 and a pin 40 on the base plate, is mounted for movement

in a horizontal plane only and it carries at its free end an arc shaped extension 41 having an inclined surface which co-operates with lifting means to disengage the reproducer from the record when lever 36 is moved in a counter-clockwise direction from the position shown in Fig. 1 to that shown in Fig. 2.

The lifting means comprises an arm 42 (Fig. 5) mounted to rock vertically in bearings 43 on the rotatable portion of the sound arm, and extending beneath the neck of the sound box 16, and this arm 42 is raised to lift the sound box 16 by means of a pin 44 engaging beneath the arm 42 and movable vertically within a sleeve 45 carried by an arm 46 rigid with the movable portion of the sound arm. The lower end of pin 44 rests upon the inclined surface of arc shaped member 41 and is raised as the latter moves with lever 36 into the position shown in Fig. 2 and in dotted lines in Fig. 5, whereupon the arm 42 and the sound box 16 are raised.

The lower end of pin 44 slides over the surface of arc-shaped member 41 as the sound arm is swung outwards in a manner yet to be described and the sound box 16 is therefore held raised throughout its swinging movement.

The lower end of pin 44 may also serve for the usual connection between the swinging sound arm 13 and the operating lever 12, said pin being capable of sliding vertically between the spring connected members 12 and 12'.

The swinging movement of the sound arm 13 outwards is effected by means of lever 37, which during rotation of the cam 35 is caused to rock about its pivot 38 in a clockwise direction and its free end engages the pin 44 to swing the sound arm outwards.

The extent of the outward throw of lever 37 may be varied in accordance with the size of the record to be played by moving the position of the pivot 38. For this purpose said pivot is carried upon a link 47 connected with the adjusting lever 23 previously referred to, whereby said pivot is movable in a slot 48 formed in the base plate. Thus the extent of the outward movement of the sound arm is determined by means of the same lever 23, which sets the apparatus for repetition or automatic stopping. In the case illustrated, the apparatus is shown as set to repeat say 10" records in Fig. 1, to repeat 12" records in Fig. 2 and for automatic stopping of the machine when the end of the record is reached, in Fig. 3.

Upon the pivot 38 is also carried a lever 49 having a hook 50 on its end and a slot 51 formed in its length, which slot co-operates with a fixed guide pin 52 on the base plate to guide the lever 49 and hook 50 as the pivot 38 is moved by lever 23, so that when the latter is operated to set the apparatus to stop automatically, the hook 50 lies in the path of a lug 53 formed on the segment 30, so that said segment is held against movement, under the pull of spring 31 when lever 17 is rocked by lever 12 and pawl 11, into the position where the teeth of wheel 28 are completed. Thus the repetition mechanism cannot be set in operation. When lever 23 is reset for repetition hook 50 is moved from the path of lug 53.

Means are also provided to feed the reproducer gently inwards after the outward swinging movement has been effected during repetition operation, to lead the stylus into the commencing groove of the record. Such means comprises a link 54 pivotally connected at one end with a

plate 55 mounted for limited rotation about the pivot 22 of lever 23 against a spring 56 connected between a pin 57 on the link 54 and a lug 58 on the lever 23, which lug extends upwardly through a slot 59 of limited length formed in the plate 55. The other end of link 54 carries a pin 60, one end of which slides in a slot 61 in the base plate, while the other end of the pin 60 lies in the path of the end of the lever 12 and the arrangement is such that the link 54 and plate 55 are moved slightly to stretch spring 56 when lever 12 reaches the limit of its swinging movement in conjunction with the sound arm 13 under the urge of lever 37 and contacts with pin 60.

The sound box 16 having been lowered, through the withdrawal of arc shaped member 41 from beneath post 44, to engage the stylus with the smooth surface of the record outside the grooves, the outward pressure of lever 37 upon post 45 ceases, the shape of the cam 35 permitting lever 37 to return first very slowly for a short distance and then freely, and during the first slow return movement of lever 37 the sound box 16 is fed gently inwards through sound arm 13, post 44, lever 12, pin 60, link 54, plate 55 and spring 56. It will be understood that the initial position of plate 55 and link 54 is adjusted as lever 23 is moved, so that contact between lever 12 and pin 60 takes place at the appropriate time according to the size of the record to be repeated.

The strength of the spring 56 is such that the stylus will not under any circumstances be caused to jump inwards past a groove.

I claim:

1. A repeating device for talking machines comprising a pivoted lever carrying at one end a curved track having a radially inclined surface, a post operatively connected with the reproducer and positioned in the path of movement of said track, and means for swinging said lever about its pivot, whereby the reproducer is raised during movement of the lever in one direction and lowered during movement of the lever in the other direction.

2. In a repeating device for talking machines, in combination with means for raising and lowering the reproducer, means for swinging the reproducer outwardly to the point of commencement of the record comprising a lever pivoted to move in a horizontal plane, means connected with the reproducer and engaged by said lever to swing said reproducer, and means for so adjusting the pivotal point of the lever in said plane that the throw thereof and, consequently, the distance moved by the sound arm may be varied.

3. In a repeating device for talking machines, in combination with means for raising and lowering the reproducer, means for swinging the reproducer outwardly to the point of commencement of the record comprising a lever pivoted to move in a horizontal plane, means connected with the reproducer and engaged by said lever to swing the reproducer, the point of pivotation of said lever being adjustable to permit the throw of said lever to be varied, a control member, and means operatively connecting said control member and lever for adjusting the point of pivotation of said lever.

4. A repeating device for talking machines comprising a pair of levers pivoted to swing in horizontal planes, one of said levers having an inclined surface, means connected with the reproducer and engaged by said inclined surface to raise the reproducer during movement of said

one lever in one direction and to lower the reproducer during movement of said one lever in the other direction, and means connected with the reproducer and engaged by said other lever to swing the reproducer outwardly to the point of commencement of the record.

5. A repeating device for talking machines comprising a pair of levers pivoted to swing in horizontal planes, one of said levers having an inclined surface, means connected with the reproducer and engaged by said inclined surface to raise the reproducer during movement of said one lever in one direction and to lower the reproducer during movement of said one lever in the other direction, means connected with the reproducer and engaged by said other lever to swing the reproducer outwardly to the point of commencement of the record, and means for so adjusting the pivotal point of said other lever in said plane that the throw thereof and, consequently, the distance moved by the sound arm, may be varied.

6. A repeating device for talking machines comprising a pair of levers pivoted to swing in horizontal planes, one of said levers having an inclined surface, means connected with the reproducer and engaged by said inclined surface to raise the reproducer during movement of said one lever in one direction and to lower the reproducer during movement of said one lever in the other direction, means connected with the reproducer and engaged by said other lever to swing the reproducer outwardly to the point of commencement of the record, the point of pivotation of said other lever being adjustable to permit the throw of said lever to be varied, a control member, and means operatively connecting said control member and said other lever to adjust the point of pivotation.

7. A repeating device for talking machines comprising a pair of levers pivoted to swing in horizontal planes, one of said levers having an inclined surface, means connected with the reproducer and engaged by said inclined surface to raise the reproducer during movement of said one lever in one direction and to lower the reproducer during movement of said one lever in the other direction, said means connected with the reproducer being also engaged by said other lever to swing the reproducer outwardly to the point of commencement of the record, a cam for operating both of said levers, a machine motor, and means operative on completion of a record for drivingly engaging said cam with the machine motor.

8. In a repeating device for talking machines, in combination with means for raising and lowering the reproducer, means for swinging the reproducer outwardly to the point of commencement of the record comprising a lever pivoted to move in a horizontal plane, means connected with the reproducer and engaged by said lever to swing the reproducer, the point of pivotation of said lever being adjustable to permit the throw of said lever to be varied, a control member, means operatively connecting said control member and lever for adjusting the point of pivotation of said lever, a member adapted to be moved when the sound arm reaches its outermost position over the edge of a record, said last named member being resiliently urged against such movement, and means connecting said last named member with said control member whereby said reproducer is positioned at the edge of records of different diameters.

9. A record repeating device for phonographs

- including a cam-actuated lever pivotally mounted for rotation in a horizontal plane, one end of said lever being provided with an integral cam surface inclined with respect to said plane, a sound arm, a sound box carried by said sound arm, lifting means pivotally connected to said sound arm and extending beneath said sound box, and motion conveying means extending between said cam surface and said lifting means whereby, when said lever is rotated in one direction, the sound box is raised and, when it is rotated in the opposite direction, the reproducer is lowered.
10. A record repeating device for phonographs including a cam-actuated lever pivotally mounted for rotation in a horizontal plane, one end of said lever being provided with an integral cam surface inclined with respect to said plane, a reproducer, a pivoted arm cooperating with and adapted to raise and lower said reproducer, and motion conveying means extending between said cam surface and said arm whereby, when said lever is rotated in one direction, the reproducer is raised and, when it is rotated in the opposite direction, the reproducer is lowered.
11. In combination with a phonograph including a turntable, a brake for said turntable, a sound arm and a reproducer carried thereby, of a repeating device comprising a cam-actuated lever, means carried by said sound arm for raising and lowering said sound arm in response to movement of said lever, a second cam-actuated lever coacting with said first named means for swinging said sound arm outwardly beyond the periphery of said turntable, and means coacting with said brake and said second cam-actuated lever for maintaining said brake inoperative during successive operations of said repeating device.
12. In combination with a talking machine including a sound arm and a reproducer carried thereby of a repeating device comprising a cam-actuated lever pivotally mounted for movement in a horizontal plane, one end of said lever having a surface inclined with respect to said plane, a supporting arm pivotally connected to said sound arm and extending beneath said sound box, means carried by said sound arm and operating between said inclined surface and said supporting arm for raising and lowering said sound box upon movement of said lever in each of two directions, a second cam-actuated lever pivotally mounted on an adjustable pivot pin and adapted for coaction with said second named means for swinging said sound arm outwardly to the point of commencement of a record, and manually controlled means connected to said pivot pin for setting the same to vary the throw of said lever and the distance moved by said sound arm.

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