

July 24, 1934.

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TALKING MACHINE

Filed March 12, 1930

2 Sheets-Sheet 1

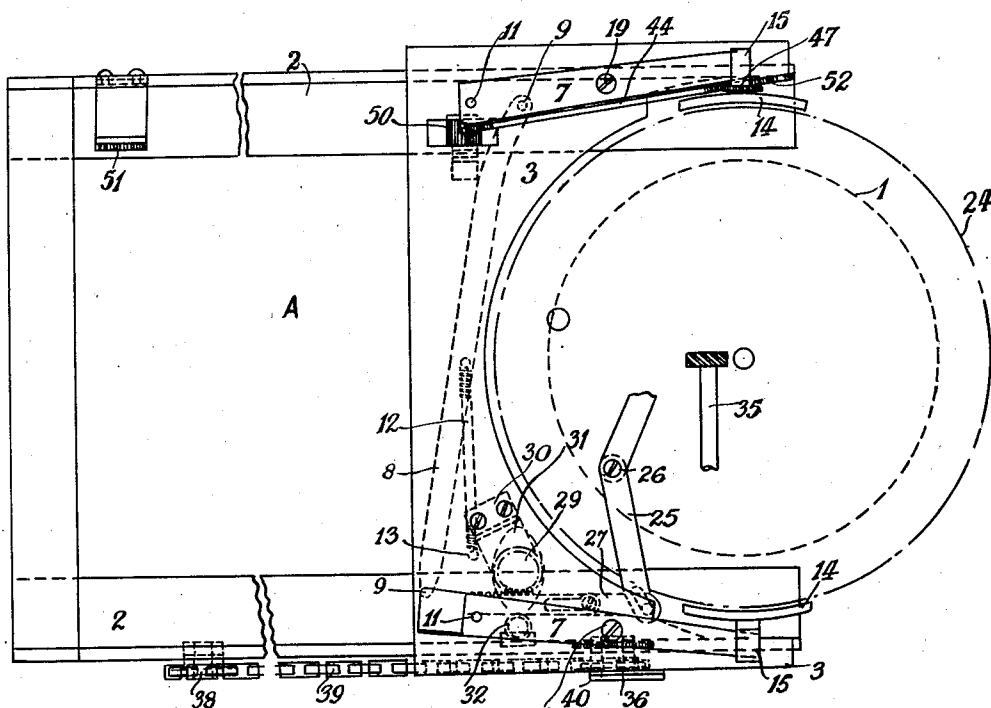


Fig. 1.

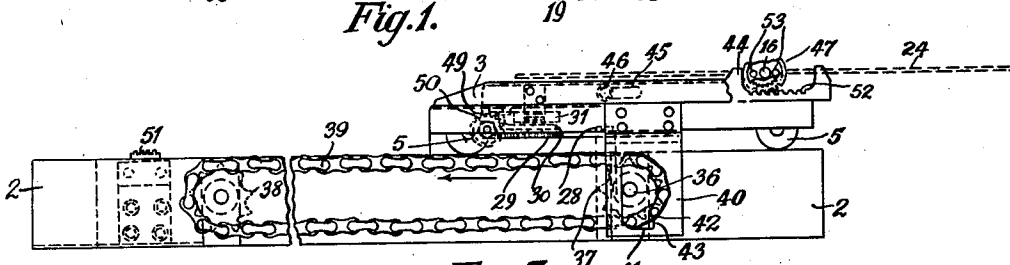


Fig. 3.

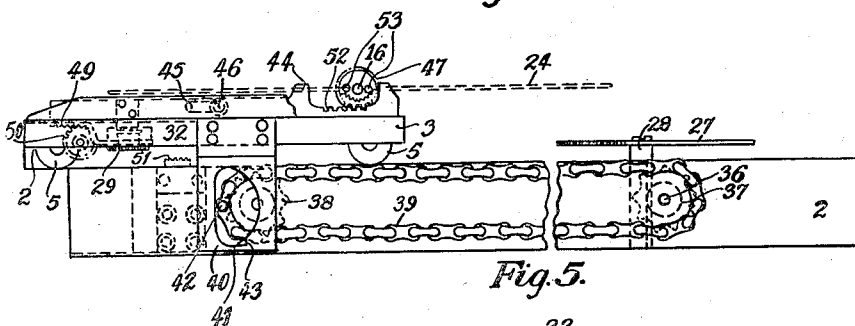


Fig. 5.



Fig. 7.

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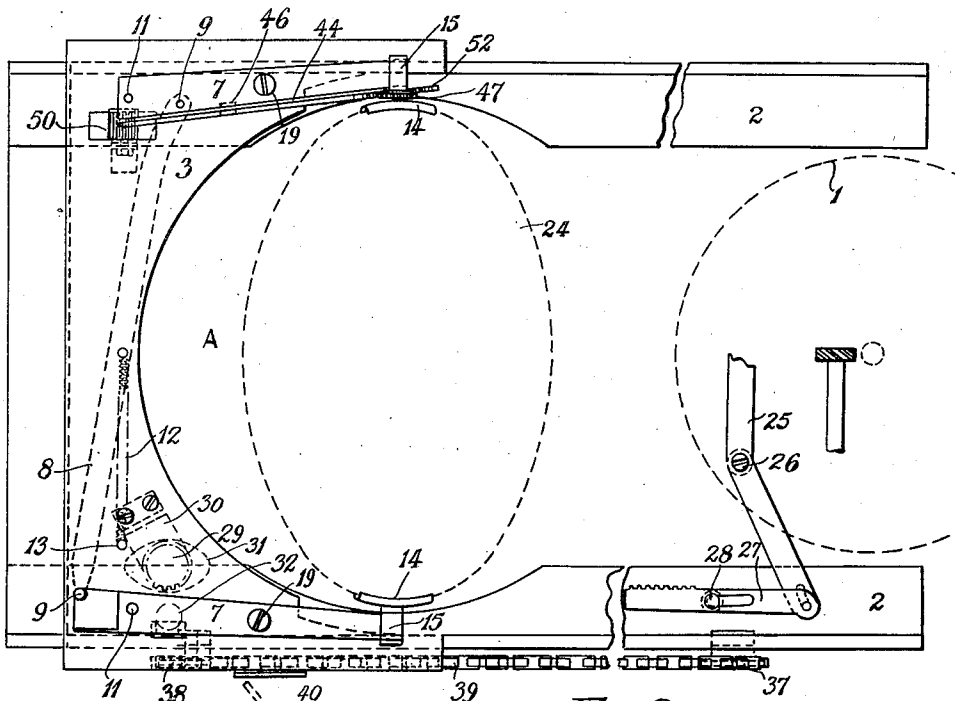


Fig. 2.

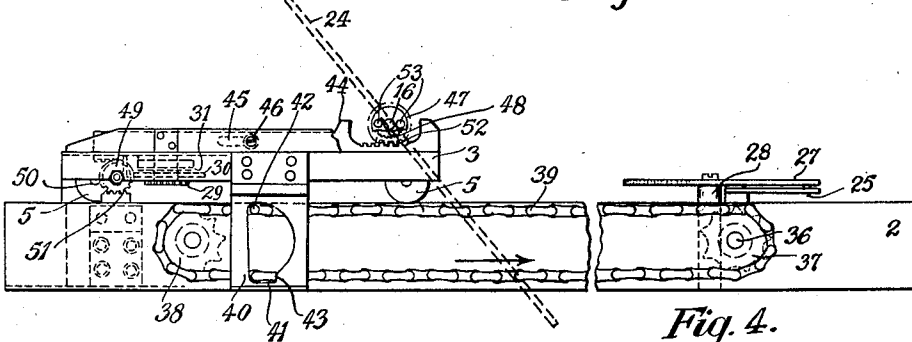


Fig. 4.

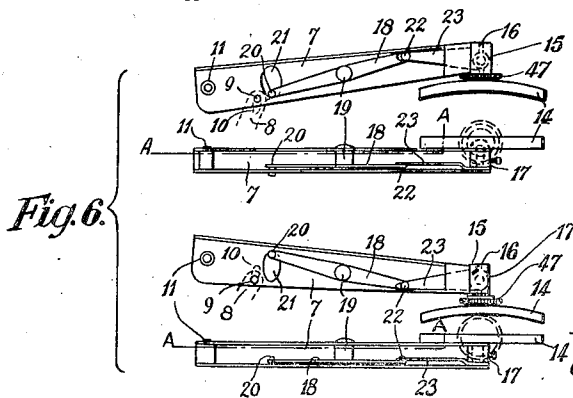


Fig. 6.

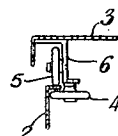


Fig. 8.

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## UNITED STATES PATENT OFFICE

1,967,599

## TALKING MACHINE

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Application March 12, 1930, Serial No. 435,348  
In Great Britain March 16, 1929

21 Claims. (Cl. 274—1)

This invention relates to improvements in talking machines of the type adapted to play disc records and the object of the invention is to provide means whereby a double sided record may be removed from the turntable, turned over and replaced upon the turntable with the unplayed side of the record uppermost.

The invention is more particularly intended for application to machines of the kind which play a series of records fed mechanically and in succession from a magazine to the playing position.

Mechanism for reversing talking machine records is known, having record engaging members which are adapted to be rotated with the record engaged thereby to reverse it.

The record reversing mechanism according to the present invention comprises record engaging members adapted to be rotated with the record engaged thereby to reverse it, the reversing rotation of the record and record engaging members being effected during the movement of a member which supports the record engaging members and is itself mounted for reciprocating movements in a plane substantially parallel with that containing the turntable.

In the preferred form, the record engaging members are mounted on a carrier member so as to be movable towards and away from one another to engage the record to be reversed and so as to be rotatable about a horizontal axis together with the engaged record during movement of the carrier horizontally.

The invention is illustrated in the accompanying drawings in which

Figs. 1 and 2 are views in plan of the apparatus with the parts in different positions and as applied to a talking machine of which only the turntable is shown, the remainder of the machine being omitted from the drawings as being unnecessary to an understanding of the invention.

Figs. 3 and 4 are views in elevation, partly in section, corresponding respectively to Figs. 1 and 2.

Fig. 5 is a further view in elevation, partly in section, with the parts in still another position.

Fig. 6 illustrates, in alternative positions in plan and in elevation, the means employed to grip the record to be reversed.

Fig. 7 is a diagrammatic view illustrating the method of disengaging a record from the turntable spindle.

Fig. 8 illustrates a detail.

Referring to the drawings, the turntable 1,

driven by the usual spring or electric motor (not shown), is of a diameter less than that of the smallest record to be manipulated by the reversing mechanism.

Within the cabinet and at each side of the turntable 1 are mounted horizontal slides or rails 2, 2 parallel to one another and each comprising a vertical web and an inwardly turned flange as shown in section in Fig. 8. Upon these rails, a carrier member 3 of substantially U-shape in plan slides to and fro, the carrier being furnished for this purpose with a pair of rollers at each of its corners. Each pair of rollers includes a horizontal roller 4 and a vertical roller 5 mounted to rotate about axes supported on a bracket 6 depending from the underside of the carrier 3, each horizontal roller 4 rolling against the vertical web of its slide 2, thus preventing lateral movement of the carrier 3, while each vertical roller 5 rolls upon the inturned flange of the slide in the manner shown in Fig. 8.

The carrier 3, during the playing of a record, rests with the limbs of the U one on each side of the turntable 1 as shown in Fig. 1. When the playing of the record is completed, mechanism in known form, not shown, is coupled in known manner with the machine motor and operates to swing the sound arm (not shown) outwardly, and afterwards to cause the played record to be moved off the turntable.

For the purpose of removing the played record from the turntable 1, a pair of arms 7, 7, of channel section, are pivoted at 11 adjacent the rear corners of the carrier 3 with the open sides of the channels facing one another.

On the underside of the carrier 3 is arranged a link 8 which is pivotally connected to pins 9 on the pivoted arms 7, the pin 9 extending downwardly through slots 10 in the link 8. The connecting pin 9 on one of the arms is arranged at a given distance behind the pivot point 11 of that arm on the carrier, while the pin 9 on the other arm 7 is at a point which is at an equal distance from, but in front of, the pivot point 11 of that arm on carrier 3.

The slots 10 permit movement of the arms 7 with pins 9 about their pivots 11 on the carrier 3, and the link 8, connected with the pins 9 situated as described above, ensures that a movement of one arm 7 about its pivot 11 is always accompanied by a similar movement of the other arm 7 about its pivot 11 but in the opposite direction. In other words, the arms 7 move either both in the direction towards one another or both in the direction away from one another. A tension

spring 12 is connected between a point on the link 8 and a fixed point 13 on the carrier, and this spring tends to move the pivoted arms 7 into the position where they are closest together.

At the free ends of the arms 7 are carried devices for engaging a record at diametrically opposite points on its edge.

The record engaging devices comprise arc shaped members 14 of V section having a lining of felt or similar material to avoid injury to the edges of records. The record engaging devices 14 are mounted to rotate on horizontal spindles 15 carried at the upper ends of posts 17 mounted on the ends of the arms 7.

In order to obtain satisfactory engagement between members 14 and a record, it is necessary that a parallel motion be imparted to members 14 as the arms 7 move towards one another. For this purpose, the posts 17 are arranged for limited rotational movement on the arms 7 as the latter move about their pivots.

The means for effecting the movement of the posts 17 and members 14 on the arms 7 consists in a bar 18 (Fig. 6) pivoted at 19 about midway of the length of and on the inner surface of the lower wall of the channel shaped arm 7. The bar 18, at one end, carries a pin 20 which extends downwardly through a slot 21 in the lower wall of the arm 7 and into an aperture in the surface of the carrier 3. The other end of bar 18 carries an upwardly extending pin 22 which engages in a slightly elongated slot in the end of a lever 23 rigid with the vertical post 17. It will readily be seen that, as the arm 7 is moved about its pivot 11 between the alternative positions shown in Fig. 6, the end of the bar 18 carrying pin 20 will remain stationary, and that the bar 18, by virtue of its pivotal connection at 19, will be moved in the same direction about its pivot as the arms 7 but to a greater angular extent. Hence, rotational movement will be imparted to post 17 and member 14 through the connection of lever 23 with the end of bar 18.

During playing of the machine, the arms 7 occupy the position shown in Fig. 1 with the members 14 at opposite sides of and out of engagement with the record 24 on the turntable. When the record is to be engaged by members 14, the arms 7 are moved to approach one another until the edge of the record enters into the V-shaped channels of members 14 whereby the record is gripped.

The means employed for controlling the movement of the levers 7 consists of a lever 25 pivoted at 26 on a fixed part of the machine such as the motor board, this lever 25 being connected at one end through a pin and slot connection with a rack bar 27 arranged for guided reciprocating movement and being supported at the upper end of a post 28, Fig. 2, extending upwardly from the motor board. The teeth of the rack bar 27 cooperate with those of a toothed wheel 29 mounted for rotation about a vertical axis in bearings in a bracket 30 fixed to the underside of the carrier member 3. Fast on the shaft of the toothed wheel 29 is a cam 31 of oval shape which cooperates with a roller 32 mounted on a shaft rigid with and extending downwardly from one of the arms 7 and through a slot in the upper surface of the carrier 3.

The cam 31, during playing of the machine, occupies the position shown in Fig. 1, thereby holding the arms 7 apart. When the record has been played and the mechanism previously referred to is coupled with the machine motor, the lever 25

is rocked about its pivot, through a cam or other convenient device driven through said mechanism, in an anti-clockwise direction, so that the rack bar 27 is drawn to the right in Fig. 1 and the oval cam 31 is rotated through an angle of 90°. The roller 32 follows cam 31 during rotation of the latter, under the pull of spring 12, and the arms 7 move towards one another until the members 14 engage the edge of the record. It will be understood that arms 7 will move only a short distance inwardly if the record to be engaged is of large diameter, the cam 31 in this case moving away from roller 32, but the range of movement permitted to the arms 7 is such that records of smaller diameter can also be engaged.

The movement of the members 14 into engagement with the edge of the record on the turntable is utilized to lift the record to disengage it from the turntable spindle.

For this purpose the members 14 are arranged in a position where the bottoms of the V's are in a horizontal plane slightly above the level of the top of the turntable spindle (see Fig. 7). As the members 14 approach one another, the edges of the lower walls of the V grooves engage beneath the edge of the record 33 on the turntable 1 and the continued inward pressure causes the record edge to ride up these lower walls into the bottoms of the V grooves. Thus, the record 33 is raised from the position shown in full lines in Fig. 7 to that shown in dotted lines in that figure where its central aperture is clear of the end of the turntable spindle 34.

The record now being held by the members 14 on the carrier 3, the latter is next moved horizontally to the left in Fig. 1, passing over a space provided at A and during this movement the members 14 and the record are turned through 180° to bring the unplayed side of the record uppermost.

After the reversing movement has been completed, the carrier is returned to the original position and the reversed record deposited on the turntable ready for playing.

For effecting the to and fro movements of the carrier 3, the mechanism referred to above as being coupled with the machine motor drives a shaft 35 (shown diagrammatically in Fig. 1) through suitable gearing not shown, and this shaft, in turn, is geared with the spindle 36 of a chain sprocket 37 mounted at the side of the web of one of the rails 2. A similar sprocket 38 is provided near the rear end of the rail and a chain 39 runs on the two sprockets 37 and 38, being driven by the former.

At the side of the carrier 3 nearest the chain 39 is fixed a downwardly extending plate 40 having an internal cam aperture 41 formed in it. A pin 42, fixed on the chain 39, extends through the aperture 41 in the plate 40, and it will readily be understood that movement is imparted to the plate 40 and carrier 3 as the chain is driven around the sprockets. The aperture 41 in the plate 40 is shaped as shown in the drawing with a straight edge at the left and a semi-circular edge on the right, and the radius of the latter is such that the pin 42, when moving in the direction indicated by the arrow around the right hand sprocket 37, slides on the curved semi-circular surface without moving the plate 40 or carrier 3. At the lower end of the curved edge of the aperture 41 is formed a short vertical portion 43 (Fig. 4) in the plane of the lower part of the chain 39.

In the normal or rest position, with the ma-

chine playing, the pin 42 occupies the position shown in Fig. 3 just past the vertical surface 43.

When the mechanism for effecting the various movements commences to operate, the sprockets 37, 38 rotate and the pin 42 moves along the curved edge of aperture 41. For a certain period, no movement of the plate 40 and carrier takes place and during this period, the arms 7 are moved to engage and lift the record from the turntable by the members 14. The pin 42 now moves into engagement with the upper end of the vertical edge of the aperture, and the plate 40 and carrier 3, together with the record, are moved to the left in Fig. 1. During this movement, the record is reversed.

To effect a reversal of the record, a rack bar 44 provided with a slot 45 is mounted for sliding movement on a guide pin 46 carried on the inner side of one of the arms 7. The bar 44 is furnished with rack teeth 52 on its upper edge which engage with the teeth of a toothed free-wheel 47 surrounding a boss on one of the members 14, the arrangement being such that clockwise rotation of the wheel 47 is always attended by rotation of spindle 16 and member 14, while movements of the wheel 47 in the other direction take place independently of members 14 through the use of a ratchet and spring pawl device 48, Fig. 4.

The bar 44 is also provided with a set of rack teeth 49 on its lower edge and near the rear end, these teeth engaging with a toothed wheel 50 mounted in the carrier 3 and projecting partly below it, as clearly shown in Figs. 3, 4 and 5. Near the rear end of one of the rails 2 is fixed a short rack 51 with upwardly projecting teeth. When the carrier 3 has been drawn a given distance to the left in Fig. 1, the toothed wheel 50 engages and rolls upon the rack 51. As a consequence, rack bar 44 is drawn to the left relatively to carrier 3 owing to the engagement of wheel 50 with rack teeth 49. During this movement of the rack bar 44, teeth 52 engage the teeth of free-wheel 47 and the latter is rotated in a clockwise direction, and in consequence, members 14 and the record are rotated. The timing is such that the record turns through 180°, spring pressed plungers 53 being provided in a head 54 on the spindle 16 about which member 14 rotates to position the reversed record horizontally.

Shortly after the reversing movement of the record is completed, the pin 42 on the chain 39 moves down around sprocket 38 and into engagement with the short vertical part 43 of the edge of the aperture and therefore the return movement of the carrier 3 towards the turntable 1 commences. During this movement, wheel 50 again passes over rack 51 and rack bar 44 is moved back into the original position ready for the next record, the ratchet device 48 described above permitting wheel 47 to rotate while members 14 and the record remain unaffected. When the carrier 3 reaches the position shown in Fig. 1, the lever 25 is again rocked to move rack bar 27 longitudinally whereby cam 31 is rotated and the arms 7 and members 14 moved apart to permit the record to fall on the turntable in readiness for the selection on the side of the record which was previously underneath to be played.

Any suitable known arrangement may be employed for automatically moving the sound arm and reproducer to engage the stylus with the record for playing and for disengaging it from the record when playing is completed.

We claim:

1. Record reversing mechanism comprising record engaging members, a support for said members, means for lineally reciprocating said support, and means for reversing said record engaging members during lineal movement of said support. 80
2. Record reversing mechanism comprising record engaging members, a support for said members, means for lineally reciprocating said support, means for causing said members to engage a record, and means for reversing said members and record during lineal movement of said support. 85
3. Record reversing mechanism comprising record engaging members, a support for said members, means for lineally reciprocating said support, means for causing said members to engage a record, and means for rotating said members and record, during lineal movement of said support, to reverse the same. 90
4. Record reversing mechanism comprising record engaging members, a support for said members, means for lineally reciprocating said support, means for reversing said record engaging members, during lineal movement of said support, and means for causing said members to engage a record before said support reciprocates and to release said record after completion of reciprocal movement of said support. 95
5. Record reversing mechanism comprising a supporting carriage, means for lineally reciprocating said carriage, record engaging members pivotally connected to said carriage, means for reversing said members, during lineal movement of said carriage, and means for moving said members toward a record to engage the same prior to reciprocation of said carriage and for moving said members away from said record to release the same upon completion of reciprocal movement of said carriage. 100
6. Record reversing mechanism comprising a supporting carriage, means for lineally reciprocating said carriage, record engaging members pivotally connected to said carriage, means for reversing said members, during lineal movement of said carriage, and cam means for moving said members toward a record to engage the same prior to reciprocation of said carriage and for moving said members away from said record to release the same upon completion of reciprocal movement of said carriage. 105
7. Record reversing mechanism comprising a supporting carriage, means for lineally reciprocating said carriage, record engaging members pivotally connected to said carriage, means for reversing said members during lineal movement of said carriage, means for moving said members toward a record to engage the same prior to reciprocation of said carriage and for moving said members away from said record to release the same upon completion of reciprocal movement of said carriage, and means for maintaining said record engaging members at all times parallel to their original position during movement toward and away from said record. 110
8. Record reversing mechanism comprising record engaging members, a support for said members, means for causing said members to engage a record, cam means on said support, means for engaging said cam means to reciprocate said support, and means to reverse said record engaging members during movement of said support. 115
9. Record reversing mechanism comprising record engaging members, a support for said mem- 120

bers, means for causing said members to engage a record, a plate on said support having a slot therein, a pin for engaging said slot to reciprocally move said support, and means to reverse said record engaging members during movement of said support.

10. Record reversing mechanism comprising record engaging members, a support for said members, means for causing said members to engage a record, a plate on said support having a slot therein, a pin engaging said slot, means for moving said pin in said slot to reciprocally move said support, said pin operating to reciprocate said support only during a portion of its travel in said slot, and means to reverse said record engaging members during movement of said support.

11. Record reversing mechanism comprising record engaging members, a support for said members, means for lineally reciprocating said support, means for causing said members to engage a record, a pinion associated with at least one of said record engaging members, and a rack bar for engaging said pinion to turn said pinion and record engaging members during movement of said support, whereby to reverse said record engaging members.

12. Record reversing mechanism comprising record engaging members, a support for said members, means for lineally reciprocating said support, means for causing said members to engage a record, a pinion associated with at least one of said record engaging members, a rack bar for engaging said pinion, and means for moving said rack bar relative to said support during movement thereof, whereby said rack bar reverses said record engaging members.

13. Record reversing mechanism comprising record engaging members, a support for said members, means for lineally reciprocating said support, means for causing said members to engage a record, a pinion associated with at least one of said record engaging members, a rack bar for engaging said pinion, and means for moving said rack bar longitudinally of said support during movement thereof, whereby said rack bar reverses said record engaging members.

14. In a talking machine, the combination with a turntable of record reversing mechanism comprising record gripping means, a supporting carriage for said gripping means, means for lineally moving said carriage away from and toward said turntable, and means for rotating said record gripping means, during movement of said carriage, to reverse the same.

15. In a talking machine, the combination with a turntable of record reversing mechanism comprising record gripping means, a supporting carriage for said gripping means, means for lineally moving said carriage away from and toward said

turntable, means for causing said gripping means to grip a record on said turntable, and means for rotating said record gripping means, during movement of said carriage, to reverse the same.

16. In a talking machine, the combination with a turntable of record reversing mechanism comprising record gripping means, a supporting carriage for said gripping means, means for lineally moving said carriage away from and toward said turntable in a plane parallel to the plane of said turntable, and means for rotating said record gripping means, during movement of said carriage, to reverse the same.

17. Record reversing mechanism comprising record engaging members, a support for said members, means for lineally reciprocating said support, means for causing said members to engage a record, and means for rotating said members and record in a plane at right angles to the plane of movement of said support during lineal movement thereof whereby to reverse the same.

18. Record reversing mechanism comprising record engaging members, a support for said members, means for lineally reciprocating said support, means for causing said members to engage a record, a pinion associated with at least one of said record engaging members, and a rack bar for engaging said pinion to turn said pinion and record engaging members in a plane at right angles to the plane of movement of said support, whereby to reverse said record engaging members.

19. Record reversing mechanism comprising record engaging members, a support for said members, means for lineally reciprocating said support, and means effective during movement of said support in one direction only to rotate said members and reverse the same.

20. Record reversing mechanism comprising record engaging members, a support for said members, means for lineally reciprocating said support, and means for rotating said members to reverse the same, said last-named means being effective to rotate said members when said support moves in one direction but being ineffective to rotate said members when said support moves in the opposite direction.

21. Record reversing mechanism comprising record engaging members, a support for said members, means for lineally reciprocating said support away from and back to the turntable, and means for rotating said members to reverse the same, said last-named means being effective to rotate said members when said support moves away from the turntable but being ineffective to rotate said members when said support moves back to the turntable.

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