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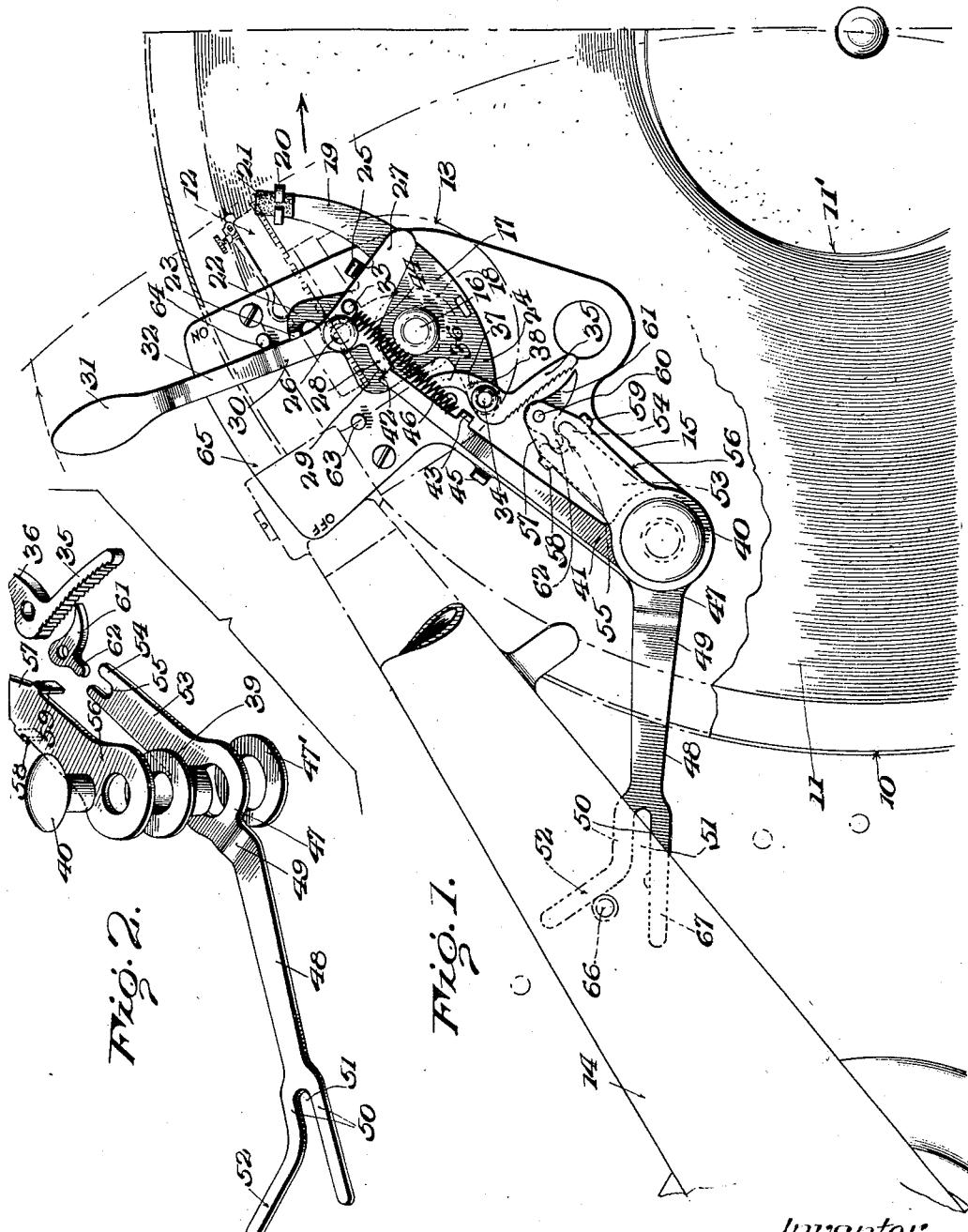
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L. Y. SQUIBB

STOP MECHANISM FOR TALKING MACHINES

Filed Dec. 9, 1924

4 Sheets-Sheet 1



Inventor
Lloyd Y. Squibb
by Morris, Cameron, Morris & Klem
Atty.

Jan. 25, 1927.

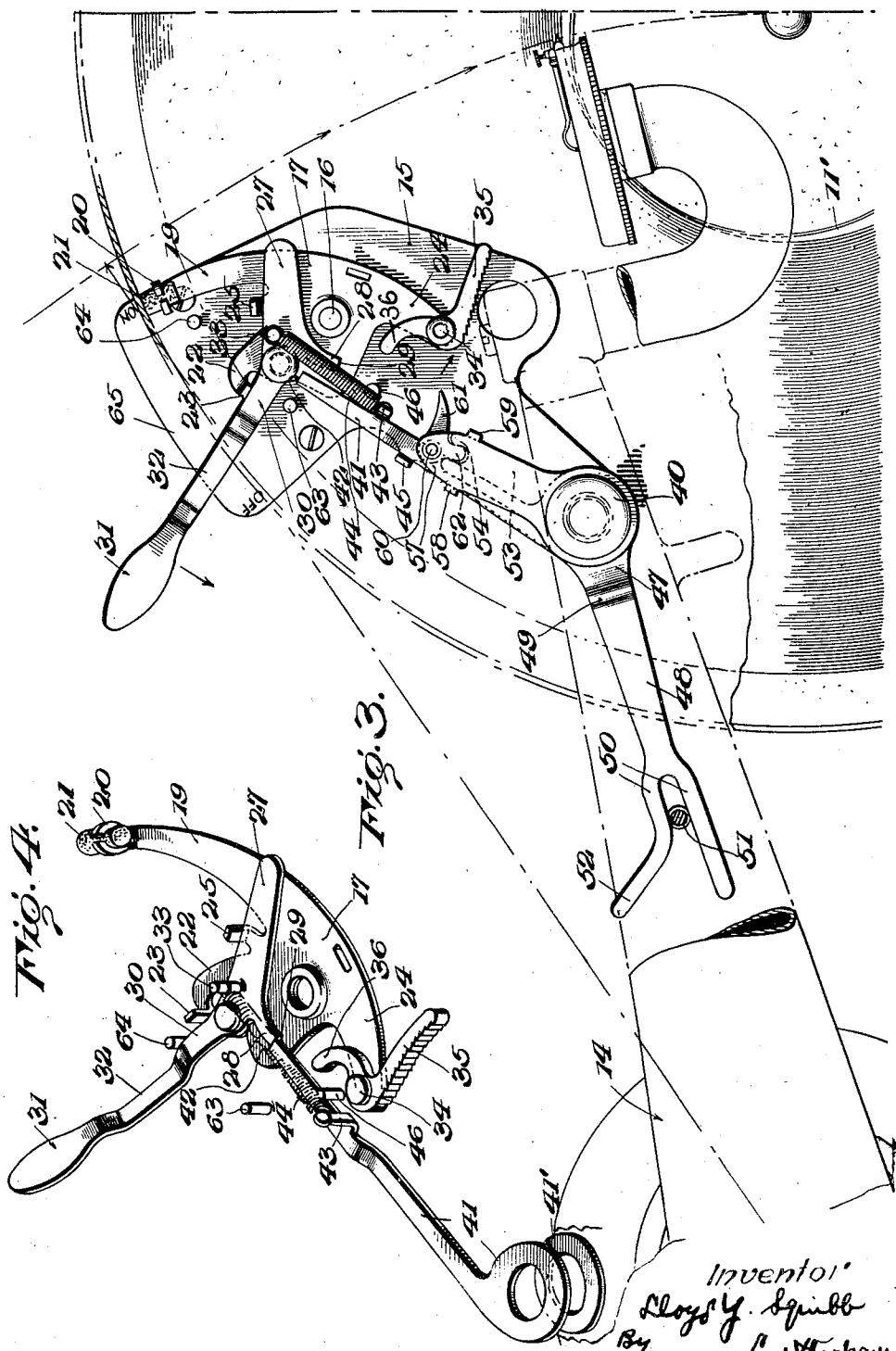
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Inventor
Lloyd Y. Squibb
By
Maurice Cameron Smith Kirkham
Atty.

Jan. 25, 1927.

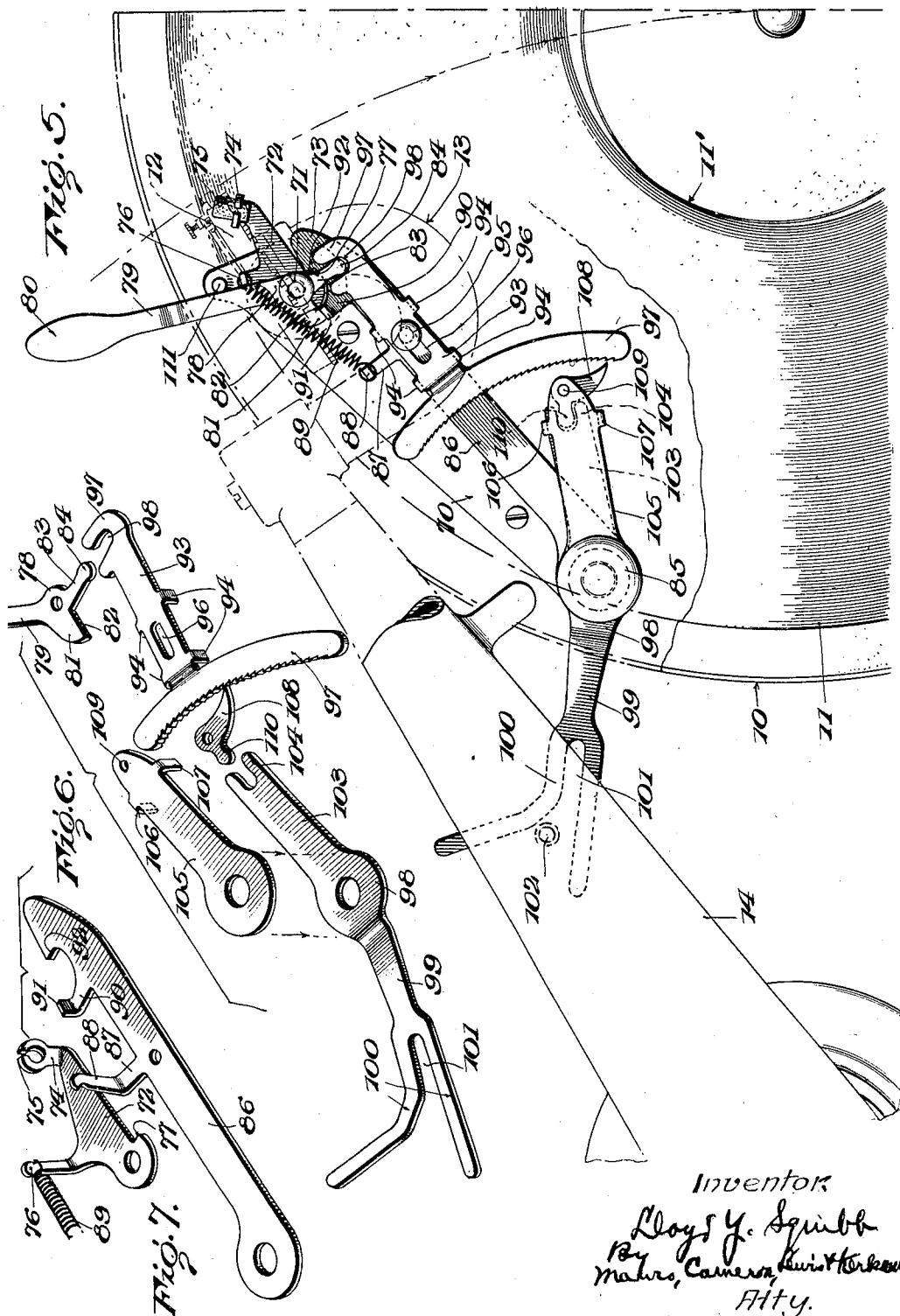
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STOP MECHANISM FOR TALKING MACHINES

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4 Sheets-Sheet 4

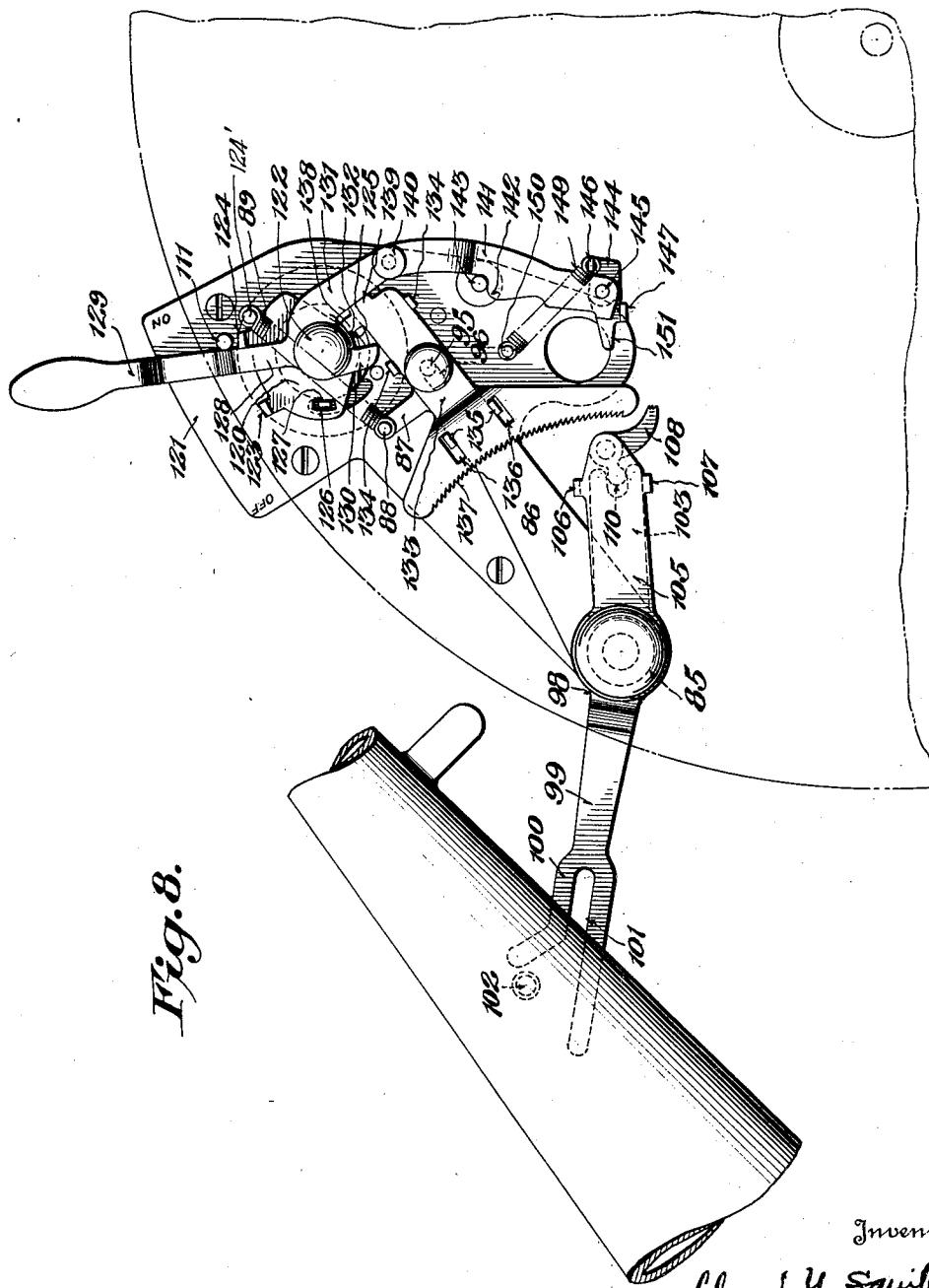


Fig. 8.

Inventor

Lloyd Y. Squibb

By Mauro, Cameron, Lewis & Kirkam

Attorneys

Patented Jan. 25, 1927.

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UNITED STATES PATENT OFFICE.

LLOYD Y. SQUIBB, OF CAMDEN, NEW JERSEY, ASSIGNOR TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

STOP MECHANISM FOR TALKING MACHINES.

Application filed December 9, 1924. Serial No. 754,789.

This invention relates to stop mechanisms, and more particularly to a stop mechanism adapted to discontinue the operation of a talking machine upon completion of the reproduction of a record.

It has heretofore been proposed to provide a stop mechanism for talking machines in which, to avoid the necessity of setting a trip device in conformity with the terminus of the record trace, the stop mechanism is actuated by a predetermined movement of the sound reproducing means with respect to the record tablet at the end of the reproduction of sound, this predetermined movement in some of these devices being a movement of the sound reproducing means in a direction opposite that from which the sound reproducing means move during the reproduction of sound. In devices of this character heretofore proposed, however, the elements for effecting the actuation of the stop mechanism upon the occurrence of the aforesaid predetermined reverse movement of the sound reproducing means have been in mechanical or frictional contact during more or less of the time that the sound reproducing means are traversing the record tablet to reproduce sound. It is an object of this invention to provide a stop mechanism of the character heretofore referred to wherein the elements which are designed to cooperate to effect the actuation of the stop mechanism upon the occurrence of the predetermined movement of the sound reproducing means are maintained out of contact with each other except upon the occurrence of said predetermined movement of the sound reproducing means, whereby any additional burden on the walls of the record trace or the sound reproducing means to overcome the frictional resistance to relative movement of contacting elements is thereby avoided and the possibility of any foreign sound arising from the relative movement of contacting elements is thereby eliminated.

A further object of this invention is to provide stop mechanism of the character just referred to wherein one of the cooperating elements which effect the actuation of the stop mechanism is so mounted that upon the actuation of the stop mechanism it is positively withdrawn from cooperative relation with its associated element.

Another object of this invention is to provide a stop mechanism of the character re-

ferred to which is simple in construction, which is composed of a relatively small number of simple parts that may be inexpensively manufactured and assembled, and which is positive and certain in operation. Other objects will appear as the description of this invention proceeds.

The invention is capable of receiving a variety of mechanical expressions, three of which are shown on the accompanying drawings, but it is to be expressly understood that the drawings are for purposes of illustration only, and are not to be construed as a definition of the limits of the invention, reference being had to the appended claims for that purpose.

Referring in detail to said drawings, wherein the same reference characters are employed to designate corresponding parts in the several figures:—

Fig. 1 is a plan view of a talking machine provided with a stop mechanism embodying the present invention, the parts being shown in non-stopping position.

Fig. 2 is a perspective elevation of the trip device, the pawl and the rack, with the parts spaced for clearness of understanding.

Fig. 3 is a view corresponding to Fig. 1 with the parts shown in stopping position.

Fig. 4 is a perspective elevation of the stop member and detent member.

Fig. 5 is a plan view of another embodiment of the present invention, the parts being shown in non-stopping position.

Fig. 6 is a perspective elevation of the trip device, the pawl and the rack, with the parts spaced for clearness of understanding;

Fig. 7 is a perspective view of the stop member and detent member spaced for clearness of understanding, and

Fig. 8 is a plan view of another embodiment of the present invention wherein the stop member actuates a switch instead of a brake device as in the other structures.

The embodiments of the invention illustrated on the accompanying drawings are shown in operative association with a talking machine of any suitable construction. In the form shown a rotatable record support or turntable 10 is designed to carry a record tablet 11 of any suitable character, and mounted to move across said support and tablet are sound reproducing means of any suitable character, shown as including a

sound box 12 mounted upon a goose-neck 13 which is pivotally supported at one end of a tone-arm 14 mounted to swing about a fixed vertical axis. During the reproduction of sound, in the construction illustrated, the sound reproducing means traverse the record tablet and support from the outer toward the inner periphery thereof, this movement being effected by the coaction of the stylus of the sound reproducing means with the walls of the record groove, but it is to be expressly understood that any other suitable construction of talking machine or any other suitable manner of causing the sound reproducing means to traverse the record tablet may be employed if desired.

In conformity with the present invention, stop mechanism is provided for discontinuing the rotation of the record support 10 when or after the sound reproducing means have reached the end of the sound record trace on the tablet 11, the actuation of the stop mechanism being effected by reason of a predetermined movement given to the sound reproducing means, preferably in a direction opposite that from which the sound reproducing means have moved during the reproduction of sound. This reverse movement of the sound reproducing means may be produced in any suitable way, but is preferably obtained by an eccentric element, such as an eccentrically arranged groove 11' at the center of the record tablet 11 and leading from the terminus of the sound reproducing portion of the record trace, so that upon completion of the reproduction of sound, the sound reproducing means, owing to the entry of the stylus into said eccentric groove, will be caused to move a short distance in a reverse direction, i. e. a direction opposite the direction of movement of the sound reproducing means during sound reproduction.

In the form shown in Figs. 1 to 4, the stop mechanism includes a base plate 15, of any suitable configuration and conveniently formed of sheet metal, which may be secured in any suitable way, as by screws, to the motor board or other support beneath the turntable 10. Pivotedly mounted on the base plate 15, as by means of a headed stud 16 suitably secured thereto, is a stop member 17, a washer 18 being preferably interposed between said member and base plate to space said member above said plate. Stop member 17 is adapted to actuate either a switch or a brake device to control the starting and stopping of the machine. In the embodiment illustrated a brake device is employed, and said stop member is shown as provided with three laterally extending arms:—one of these arms, designated 19, is curved longitudinally and bent upwardly at its outer end, as

shown at 20, where it is suitably provided with a brake pad 21 of any suitable friction material such as leather; a second arm, designated 22, is likewise curved longitudinally and bent upwardly at its outer extremity, as shown at 23, to constitute a stop for a purpose hereinafter explained; the third arm, designated 24, affords a pivotal mounting for the rack hereinafter described. Said brake member is also suitably provided intermediate the arms 19 and 22 with an upstanding lug 25, shown as bent upwardly from the body of said member, to constitute a stop for a purpose hereinafter explained.

Pivotedly mounted in any suitable way, as by a headed stud 26 suitably secured to and extending upwardly from said stop member 17, is a latch member 27 provided with a curved, laterally-extending latch arm 28 which is bevelled at its end, as shown at 29. The body portion of said latch member 27 extends into adjacency to the upstanding lug 25 on the stop member 17, so that the latter constitutes a stop for limiting the extent of pivotal movement of said latch member with respect to said stop member in an anti-clockwise direction. Projecting outwardly from said latch member 27, and preferably formed integrally therewith, is a second arm 30 which extends into adjacency to the upstanding lug 23 on arm 22 of the stop member, so that this lug constitutes a stop for limiting the extent of pivotal movement of the latch member with respect to the stop member in a clockwise direction. Arm 30 is also preferably extended to provide a handle 31, and when the stop mechanism is mounted beneath the turntable so that the handle 31 projects outwardly from the periphery of said table, the intermediate portion 32 of said arm 30, 31, is depressed if necessary so as to clear the depending rim of the turntable. Latch member 27 is also provided with an upstanding lug or pin 33 for the attachment of a coil spring as hereinafter explained.

Pivotedly mounted in any suitable way on the arm 24 of stop member 17, as by a headed stud 34, is a rack member 35 of arcuate form and provided on its arcuate face with teeth which incline toward the stud 34. Said rack member 35 is also provided with a rearwardly extending curved arm 36, and to limit the extent of movement of the rack member with respect to the stop member, a downwardly extending pin 37 in said arm 36 engages in a short slot 38 formed in the arm 24 of said stop member (see Fig. 1).

Pivotedly mounted on the base plate 15 in any suitable way, as on a flanged collar 39 rotatably mounted on a headed stud 40 suitably secured to the base plate, is a detent member 41 which extends toward the latch arm 28 on latch member 27 and is beveled

at its end, as shown at 42, for cooperation with the beveled end 29 of said latch arm. Detent member 41 is suitably provided with an upstanding lug 43 intermediate its length, and a coil spring 44 is suitably attached to said lug 43 and extends therefrom to the heretofore-referred-to lug 33 on the latch member 27. Detent member 41 is preferably spaced from the base plate 15 by an interposed annular washer 41' surrounding the collar 39, and has a limited degree of oscillation around the axis of the stud 40, an upstanding lug 45 being suitably provided on the edge of the base plate 15, shown as bent upwardly therefrom, to limit the movement of said detent member in an anti-clockwise direction, and a lug or pin 46 being suitably provided on said base plate on the opposite side of said detent member for limiting the movement of said detent member in a clockwise direction. Said detent member 41 at its outer end overlies the stop member 17 and the outer end portion thereof is accordingly bent upwardly and then horizontally so as to lie in the plane of the latch member 27.

Also pivotally mounted on the flanged collar 39 surrounding the headed stud 40 is a trip lever 47 which is preferably spaced from the detent member 41 by an interposed annular washer 47' also surrounding said collar. Said trip device is provided with two arms, one of which, designated 48, is bent downwardly as shown at 49 to clear the depending rim of the turntable and projects outwardly toward the tone arm 14, where its outer end is bifurcated as shown at 50 to provide an intermediate slot 51. One of the furcations of said bifurcated portion is bent obliquely to the length of the arm 48, as shown at 52, so as to provide a flared inlet to said slot 51. The other arm 53 of said trip lever extends at an obtuse angle to the arm 48 and at its inner end is bifurcated as shown at 54 to provide an intermediate slot 55.

Also mounted on said headed stud 40, and preferably spaced from the trip lever 47 by the interposed annular flange of collar 39, is a pivotal arm 56 which overlies the arm 53 of said trip lever and projects beyond the bifurcated end thereof as shown at 57. On either side said arm 56 is suitably provided with downwardly projecting lugs 58 and 59, shown as bent downwardly from the body of said arm, said lugs embracing the arm 53 to the end that arm 56 must partake of the pivotal movement of trip lever 47, but the space between said lugs being slightly greater than the width of said arm 53 so as to permit a limited degree of lateral movement between said arms 53 and 56. Pivotally mounted on the projecting end 57 of arm 56, as by a headed stud 60 secured thereto, is a pawl 61 shaped at its

end to provide one or more teeth designed to engage in the inclined teeth of rack 35. Said pawl 61 is also provided with a lateral arm 62 which engages snugly in the slot 55 in the trip arm 53. Hence pivotal movement of the trip arm 53 within the limits afforded by the aforesaid depending lugs 58 and 59 causes a pivotal movement of the pawl 61 around its pivot 60 owing to the coaction of the arm 62 with the bifurcations 54 of the trip arm.

The base plate 15 is preferably mounted beneath the turntable or record support 10 with the arm 30, 31 on the latch member 27 and the arm 48 on the trip member 47 projecting beyond the rim of said turntable, the base plate being so positioned with respect to said rim that, when the brake pad 21 is used and stop member 17 is moved in an anti-clockwise direction by coil spring 44, said brake pad 21 will engage the inner surface of said rim and by its frictional action thereon stop the rotation of said table. In order to prevent the stop member from moving too far in an anti-clockwise direction, for example when the turntable is not in position for its rim to be engaged by the brake pad, a stop pin 63 is preferably provided on the base plate in the path of movement of the arm 30, 31 to arrest the pivotal movement of stop member 17 in a position slightly beyond that assumed by said stop member when the brake pad is in contact with the rim of the turntable, said pin 63 being so located, however, as not to interfere with the braking engagement of said pad with the rim of the turntable when the latter is in position. If desired, a second stop pin 64 may also be provided in the path of movement of said arm 30, 31 so as to limit the extent to which the stop member 17 may be moved in a clockwise direction by arm 30, 31, said pin 64, however, being so located as not to interfere with the effecting of a latching engagement between latch member 27 and detent member 41. If desired, the base plate 15 may also be provided with an extension 65, as shown in Figs. 1 and 3, projecting beyond the rim of the turntable where it may be provided with suitable markings to indicate the "on" and "off" positions of the stop member.

Coil spring 44 which connects the upstanding lugs or pins 33 and 43 on the latch member 27 and detent member 41 respectively, is designed to perform the dual functions of moving the stop member into stopping position and the detent member into latching relation with the latch member 27, although separate springs may be employed if desired. To this end, said coil spring 44 is so arranged with respect to said latch member and detent member that when the latch member is swung in a clockwise direction to tension the spring and move the stop mem-

ber to non-stopping position, the detent member 41 is also pulled in a clockwise direction so that the end of said detent member rides on the side of the latch arm 28 until the beveled end of said latch arm clears the beveled end of said detent member, whereupon the detent member 41 is further moved in a clockwise direction so that its beveled end 42 engages the beveled end 29 of latch arm 28 and prevents return of the latch member in an anti-clockwise direction. In this position, the lateral arm 30 of said latch member is in engagement with the up-standing lug 23 on the stop member 17 and retains the latter in its non-stopping position. The coacting surfaces of the beveled ends 29 and 42 of the latch member and detent member are so formed, however, as not to interfere with a manual release of the latch arm 28 from the detent member 41. Latch member 27 may rotate in an anti-clockwise direction around its pivot 26 until it engages stop lug 25, and the extent of this movement is sufficient to free the end of latch arm 28 from the end of detent member 41; hence movement of the arm 30, 31 in an anti-clockwise direction will free the latch arm 28 from detent member 41 so that the spring 44 will pull the latch member 27 and stop member 17 in an anti-clockwise direction around the pivot axis 16 until the brake pad 21 engages the rim of the turn-table.

The laterally curved arm 36 extending rearwardly from the rack 35 is of such extent that when the stop member 17 is retained in non-stopping position by engagement of latch member 27 with detent member 41, the extremity of said arm 36 engages the side of the detent member 41. A slight rotation of said rack and arm in an anti-clockwise direction about the pivotal axis 34 thereof will therefore produce a lateral thrust on the detent member 41 and move the latter in an anti-clockwise direction so as to free the end of said detent member from the end of the latch arm 28, whereupon coil spring 44 will rotate latch member 27 and stop member 17 in an anti-clockwise direction so as to engage brake pad 21 with the rim of the turntable. Whether the latch arm is moved relatively to the detent member to release the stop member, as in the manual release thereof, or whether the detent member is moved relatively to the latch member by operation of the rack 35, coil spring 44 tends to hold the arm 30, 31 on latch member 27 in engagement with the up-standing lug 23 on the stop member 17, and the tension of said spring is transmitted to said stop member to move the same into stopping position as soon as said latch member is released from the detent member.

The movement of rack 35 to release the detent member 41 from the latch arm 28 is

effected by the action of the pawl 61 on said rack 35. The tone-arm 14 is provided in any suitable way with a downwardly extending pin 66 which, as the sound reproducing means traverse the record tablet or support 70 in a sound reproducing direction, enters the flared end of the slot 51 and engages the furcation 67 of the bifurcated end of the trip lever 47. Thereafter the trip lever is rotated in an anti-clockwise direction by the sound 75 reproducing means as the latter move in the direction for reproducing sound. Arm 53 of trip lever 47 is therefore moved in an anti-clockwise direction to engage the depending lug 58 on arm 56, and owing to the co-operation of the bifurcated end 54 of said arm 53 with the arm 62 on said pawl 61, the latter is thereby rotated slightly in a clockwise direction so as to move the end of said pawl away from the rack 35. Thereafter, engagement of arm 53 with lug 58 causes the arm 56, and the pawl 61 carried thereby, to swing in an anticlockwise direction with the trip lever 47. As the rack 35 is formed on the arc of a circle concentric 80 with the axis of oscillation of arm 56 and pawl 61, the end of said pawl moves parallelly to and in close adjacency to the rack 35 but out of contact therewith so long as the sound reproducing means are moving inwardly with respect to the record support. When said sound reproducing means are moved in the opposite direction by the action of the eccentric groove 11' on the sound 85 reproducing means, however, pin 66 on tone-arm 14 has entered the narrow portion of slot 51 as shown in Fig. 3, and the movement of the tone-arm outwardly with respect to the center of the record support therefore produces a movement of the trip lever 47 90 in a clockwise direction. Arm 53 of said trip lever 47 is therefore moved from its engagement with lug 58 until it engages with lug 59 on the arm 56, and during this movement, owing to the cooperation of the bifurcated end 54 of arm 53 with the arm 62 95 on pawl 61, said pawl is given a slight rotation in an anti-clockwise direction so as to move its end into engagement with the rack 35. The clockwise rotation of the arm 53 is 100 now transmitted to the arm 56 by the engagement of said arm 53 with said lug 59, and said arm 56 with said pawl 61 is therefore given a slight movement in a clockwise direction. This movement, owing to the engagement of pawl 61 with the inclined teeth 105 of the rack 35, exerts a thrust on said rack 35, whereby said rack is rotated in an anti-clockwise direction and its arm 36 frees the detent member 41 from the end of the latch 110 arm 28 to release the stop member.

The bifurcated end of trip lever 47 is so designed that the pin 66 on the tone-arm 14 does not move into such a relation therewith as to be capable of releasing the stop mem- 115

ber until the sound reproducing means are well inside of the position in which they are placed for starting the reproduction of a record, so as to avoid accidental release of the stop member should a backward movement be given to the tone-arm in the act of engaging the sound reproducing means with the beginning of the record trace.

When the stop member 17 moves to stopping position under the action of spring 44, the rack 35, which is pivoted on said stop member, is moved entirely free of pawl 61, and owing to the separation of the pawl and rack, the tone-arm may now be swung outwardly, with a consequent clockwise rotation of the arms 53 and 56 and the pawl 61 without obstruction by said rack. When the stop member is moved to and retained in non-stopping position by the cooperation of the 20 detent member 41 with the latch member 27, the rack 35 is restored to cooperative relation with the pawl 61, the rack being moved into concentric relation with the axis of the headed stud 40 by the engagement of its 25 curved arm 36 with the side of the detent member 41.

In view of the foregoing detailed description of the construction and function of the several elements, the operation of the device may be briefly summarized.

When the stop member is in stopping position, the parts are as shown in Fig. 3, in which position the sound reproducing means may be freely moved outwardly to clear the periphery of the record support. The arm 30, 31 may then be manually operated from the "off" position shown in Fig. 3 to the "on" position shown in Fig. 1, said arm rotating in a clockwise direction and, by its 40 engagement with the upstanding lug 23 on the stop member 17, carrying the stop member in the same direction until the end of the latch arm 28 is engaged with the end of the detent member 41. During this movement of the stop member to non-stopping position the coil spring 44 is tensioned and the rack 35 is moved in the manner heretofore described into concentric relation with the axis of the pivot stud 40. The sound reproducing means may now be operatively engaged with the record tablet, without danger of releasing the stop member, but as said sound reproducing means move across the record tablet toward the center thereof, the 50 pin 66 on the tone-arm 14 moves into cooperative relation with the trip lever 47 and thereafter said trip lever is moved in an anticlockwise direction, carrying the arm 56 in the same direction and holding the pawl 61 in its extreme clockwise position with respect to the arm 56 so that the end of said pawl travels parallelly to but out of contact with said rack 35. When the sound reproducing means are given a reverse movement 60 by the action of the eccentric groove 11',

however, pawl 61 is rotated around its axis 60 into engagement with the rack 35 in the manner heretofore described, and said rack is rotated in an anti-clockwise direction around its axis 34 to operate the detent 70 member 41 and release the stop member. The coil spring 44 thereupon moves the stop member to stopping position and at the same time the stop member withdraws the rack 35 from cooperative relation with the 75 pawl 61. The thrust exerted by the pawl 61 on the rack 35, moreover, is sufficient to initiate the rotation of the stop member 17 around its axis 16 in case the parts stick when the detent member 41 is released from the latch member 27. If at any time it is desired to stop the rotation of the record support without waiting for the completion of the reproduction of sound from the record tablet, the arm 30, 31 may be moved in 80 an anti-clockwise direction to withdraw the latch arm 28 from the end of the detent member 41, and coil spring 44 similarly moves the stop member to stopping position and withdraws the rack 35 from cooperative 85 relation with the pawl 61.

In the embodiment of the invention shown in Figs. 5 to 7, the base plate 70 is similarly secured in any suitable way, as by screws, to the motor board or support beneath the 90 turntable or record support 10, and pivotally mounted thereon in any suitable way, as by a headed stud 71 suitably secured thereto, is a stop member 72, said stop member being preferably spaced from the base plate 100 70 by an annular washer 73 surrounding said stud 71. Stop member 72 may actuate either a switch or a brake device, being shown as provided with an upstanding arm 74 which carries a brake pad 75 of any suitable friction material. Stop member 72 is also provided with a second upstanding arm or lug 76, shown as bent upwardly from the body thereof, for the connection of the coil spring to be described, and with a latch face 105 77 which extends approximately radially with respect to the axis of oscillation of said stop member 72.

Also pivotally mounted on said stud 71 is a resetting and releasing member 78 provided with three laterally extending arms:—one of said arms, designated 79, extends radially outward so as to clear the periphery of the turntable, and is provided with a handle 80; a second arm, designated 81, is provided with a lateral surface 82 for a purpose to be described; the third arm, designated 83, is shaped at its outer end to provide a cam head 84.

Pivotally mounted on the base plate 70 in 125 any suitable way, as by a flanged sleeve rotatably mounted on a headed stud 85 in the manner heretofore described in connection with the embodiment of Figs. 1 to 4, and preferably spaced from the base plate 70 130

by an annular washer surrounding said sleeve and stud, is a detent member 86 which, intermediate its length, is provided with a laterally extending arm 87 bent upwardly at its outer end or otherwise suitably provided with an upstanding lug 88 to form a connection for the end of a coil spring 89 which extends from said lug 88 to the heretofore-referred-to lug 76. Intermediate said lateral arm 87 and the free end of the detent member 86 is a second laterally extending arm 90 which is also bent upwardly at its outer end or otherwise suitably provided with an upstanding lug 91 for coaction with the surface 82 of arm 81 of reset member 78. Adjacent its free end said detent member 86 is provided with a latch surface 92 which extends approximately at right angles to the axis of said detent member 86 and which is designed to cooperate with the latch surface 77 on stop member 72 and hold said stop member in non-stopping position.

Mounted on said detent member 86 in any suitable way is a reciprocating member 93, shown as provided with depending lugs 94 on either side thereof to embrace the parallel sides of said detent member and insure rectilinear movement of said member 93 with respect to said detent member. Said reciprocating member 93 is secured to said detent member 86, and the extent of relative reciprocation between the two is limited, by means of a headed stud 95 which extends through a slot 96 in said member 93 and which is suitably secured to said detent member 86. The outer end of said reciprocating member 93 is bifurcated as shown at 97 so as to provide a slot 98 which extends at approximately right angles to the direction of length of said detent member 86 and which receives the cam head 84 on arm 83 of reset member 78. The opposite end of said member 93 is bent upwardly and carries, shown as integrally therewith, an arcuate rack 97, said rack having a toothed surface which is concentric with the axis of pivot stud 85 when in operative position.

Also mounted on the flanged sleeve carried by said pivot stud 85, and preferably spaced therefrom by an annular washer surrounding said pivot sleeve and stud, is a trip lever 98 of substantially the same construction as the trip lever 47 heretofore described. Said trip lever includes an arm 99 which is bent downwardly so as to clear the rim of the turntable 10, and its outer end is bifurcated as shown at 100 to provide a slot 101 for cooperation with a pin 102 on the tone-arm 14. The second arm 103 of said trip lever is bifurcated at 104 and, as in the embodiment of Figs. 1 to 4, inclusive, said arm 103 underlies a second arm 105 pivoted co-axially therewith on said stud 85, and preferably separated therefrom by the annular head of the flanged sleeve hereto-

fore referred to. Said arm 105 is provided with depending lugs 106, 107 for cooperation with said arm 103 and also carries a pawl 108 of substantially the same construction as pawl 61, said pawl being pivotally mounted on arm 105 at 109 and having a lateral arm 110 which enters the slot between the bifurcations 104.

As in the prior construction the base plate 70 may be provided with a stop pin 111 for engagement with the stop member 72 to prevent excessive movement of the stop member in an anti-clockwise direction, said pin 111 also constituting a stop for engagement with the arm 79 to prevent excessive movement of the stop member in a clockwise direction.

As in the prior construction the coil spring 89 performs the dual function of moving the detent member 86 into latching relation with the stop member 72 and of moving the stop member into stopping position when released from said detent member, although separate springs may be employed if desired. The coacting latch faces 77 and 92 are so disposed with respect to the line of action of the coil spring 89 that when said faces are in contact the tension of the spring tends to maintain them engaged, but without unduly opposing the disengagement of said faces by an oscillation of the detent member 86 about the axis of stud 85.

Assuming that the stop member is in stopping position, when the arm 79 on reset member 78 is moved in a clockwise direction, it engages the upstanding lug 76 on said stop member and rotates the latter in a clockwise direction. This rotation of the stop member tensions the spring 89 and, owing to the angularity of the line of action of said spring with respect to the detent member 86, tends to pull said detent member in an anti-clockwise direction around its axis of oscillation at 85. During the first portion of the rotation of the stop member 72, the end of the detent member 86 is merely urged against the edge of the stop member, but when the latch face 77 rotates past the latch face 92, the detent member 86 is rotated in an anti-clockwise direction until its latch face is in the path of movement of the latch face 77. In this position the stop member 72 is latched in non-stopping position and the latch faces are maintained in contact by the action of the coil spring 89. Lateral face 82 on arm 81 of the reset member 78 is so located that it is now in contact with the lug 91 on lateral arm 90 projecting from the detent member 86. Hence if member 78 be rotated in an anti-clockwise direction by arm 79 said member, moving relatively to the stop member 72, will cause the lateral face 82 to act on lug 91 and rotate detent member 86 in a clockwise direction around its axis 85, thereby disengaging the latch faces 92 and 130

77. Thereupon, coil spring 89 will rotate the stop member in an anti-clockwise direction to engage its brake pad 75 with the rim of the record support. Therefore the stop mechanism may be manually released at any time by merely exerting a light thrust on the arm 79 in an anti-clockwise direction.

When the stop member 72 is moved to non-stopping position in the manner heretofore described, the cam head 84 on member 78, by engagement in the slot 98 in the bifurcated end 97 of the reciprocating member 93, moves said member rectilinearly toward the headed stud 85 until the rack 97 is in cooperative relation with the pawl 108. As the sound reproducing means move inwardly with respect to the record support, the depending pin 102 moves into cooperative relation with trip lever 98 and thereafter rotates said trip lever in an anti-clockwise direction, and the arm 103 of said trip lever, cooperating with the arm 110 on the pawl 108, rotates the latter in a clockwise direction to maintain the end of the pawl out of engagement with the teeth of said rack in the manner heretofore described in connection with the embodiment of Figs. 1 to 4 inclusive. Arm 103 of said trip lever, by its engagement with lug 106 on arm 105, causes said latter arm to also swing in an anti-clockwise direction, carrying the pawl 108 therewith, so that the latter swings adjacent and parallel to the rack 97 but with its end out of contact with the teeth of said rack. When the sound reproducing means are given a reverse movement in the opposite direction, as by the action of the eccentric groove heretofore described, pin 102 on tone-arm 14 causes trip lever 98 to move in a clockwise direction, and the bifurcated end of the arm 103 acts on pawl 108 to move the end of said pawl into engagement with the rack 97 as heretofore described in connection with the embodiment of Figs. 1 to 4. Arm 103 then engages lug 107 on arm 105, rotating the latter in a clockwise direction and similarly carrying pawl 108 in a clockwise direction, to exert a thrust on rack 97 and rotate the rack, and the detent member 86 upon which said rack is mounted, in a clockwise direction. This movement of detent member 86 frees the latch face 92 on said detent member from the latch face 77 on the stop member, whereupon said stop member is rotated by the spring 89 to engage its brake pad 75 with the rim of the turntable. The thrust exerted by the pawl 108 on the rack 97, moreover, is sufficient to move the reciprocating member 93 and through the engagement of its slot 98 with the arm 83, also the member 78 in a direction to initiate their movement to stopping position in case the parts should at first stick when the detent member releases the stop member.

As said stop member moves to stopping position lug 76 thereon, engaging arm 79 on the reset member 78, rotates the latter member in an anti-clockwise direction, and cam head 84 on arm 83, by its engagement in the slot 98 in the reciprocating member 93, causes said reciprocating member to move lengthwise of the detent member 86 toward the free end thereof, thereby withdrawing the rack 97 from cooperative relation with the pawl 108. Conversely, when the arm 79 is actuated to move the stop member 72 to non-stopping position, cam head 84 on arm 83 slides reciprocating member 93 inwardly on said detent member to position rack 97 in cooperative relation with the pawl 108 as heretofore described.

The operation of this embodiment of Figs. 5 to 7 has been sufficiently indicated in the description of the construction and function of the several elements. In this embodiment the rack is mounted on and relatively movable with respect to the detent member, rather than the stop member, but otherwise the functions performed and the sequences of operations are substantially the same as in the embodiment of Figs. 1 to 4 inclusive.

The embodiment shown in Fig. 8 is in many respects very similar to the embodiment shown in Figs. 5 to 7, but illustrates the application of the present invention to the actuation of a switch device of any suitable construction for opening and closing an electric circuit, as in the circuit of an electric motor when such is employed for driving the talking machine. It is to be expressly understood, however, that the embodiment shown in Figs. 1 to 4 inclusive, and other embodiments of this invention, may be similarly modified to include a switch device if desired.

In the form here shown the stop member 120 is pivotally mounted on the base plate 121 in any suitable way, as by a headed stud 122, and is provided with three upstanding lugs 123, 124 and 124', shown as bent upwardly from the body of said stop member. Said stop member is also provided with a latch face 125, as in the embodiment last described, and with a slot 126 which engages an upstanding pin or other member 127 on a switch arm constituting a part of a circuit maker and breaker of any suitable construction disposed beneath the base plate 121. Pivotally mounted on said stop member 120, preferably by means of said headed stud 122, is a resetting and releasing member 128 provided with an arm 129 which is extended to form a handle, and also with arms 130 and 131 for purposes to be described.

A detent member 86 is pivotally mounted on a headed stud 85, as in the embodiment last described, and adjacent its free end is provided with a latch face 132 for coaction

with the latch face 125 heretofore referred to. As in the embodiment last described, 5 detent member 86 is provided with a lateral arm 87 provided with or formed into an up-standing lug 88 from which extends a coil spring 89 to the lug 124' on the stop member 120. Mounted on said detent member 86 is a reciprocating member 133, said member 133 being secured to said detent member 86 10 by a headed stud 95 which extends through a slot 96 in said member 133 and is suitably secured to said detent member 86, as in an embodiment last described. Member 133 is restrained to, and guided in its rectilinear 15 movements by a pair of upstanding lugs 134, shown as bent upwardly from the detent member 86 and engaging the opposite sides of member 133, and also by a pair of up-standing lugs 135 which engage in a pair 20 of elongated slots 136 in that portion of member 133 which is enlarged to provide the rack 137. Said reciprocating member 133 is also provided with a laterally extending arm 138 for coaction with arm 130 on member 128, and at its free end has a small projection 139 for a purpose to be described.

Also pivotally mounted on the headed stud 85 is a trip lever 98, pawl carrying arm 103 and pawl 108 of the same construction as 25 described in conjunction with the embodiments shown in Figs. 5 to 7, the same reference characters being employed to designate corresponding parts, with the exception that the end of the pawl 108 is illustrated as 30 provided with a plurality of fine teeth to reduce the lost motion when the end of said pawl engages the teeth of rack 137. It is to be understood that the ends of pawls 61 and 108 in the embodiments previously described 35 may be similarly provided with a plurality of teeth, if desired.

Pivotally mounted at 140 on the end of arm 131 of member 128 is a link 141 provided with a cam face 142 for coaction with 40 a fixed pin 143 projecting upwardly from the base plate 121, said link 141 carrying at its outer end a trip member 144 pivoted on said arm at 145 and provided with upstanding lugs 146 and 147. A coil spring 149 extends from lug 146 to an upstanding pin 150 45 on the base plate 121 and normally retains the member 144 with its lug 146 in engagement with the side of link 141 and, through the pull thus exerted on said link, the cam face 142 in cooperative relation with the pin 141. The free end 151 of said trip member 144 is designed to cooperate with any suitable timing wheel (not shown to avoid complication of the drawing) of the character 50 disclosed in my prior Patent No. 1,477,295 granted December 11, 1923, and entitled Automatic stopping mechanism, so that in the remote contingency that the automatic switch heretofore described does not operate 55 to open the electric circuit, the member 144

will be rotated to engage its lugs 147 with the end of link 141 and thereafter exert a positive thrust through said link to arm 131 on member 128 and thereby positively move the switch mechanism to stopping position. 70

When member 128 is rotated from its non-stopping position to stopping position, as shown in Fig. 8, arm 129 through its engagement with lug 124 rotates stop member 120 around its pivotal axis 122 to move the 75 switch arm carrying pin 27 to closed position, at the same time moving the latch face 125 into a position to be engaged by latch face 132 on detent member 86 as the latter is rotated in an anti-clockwise direction by 80 coil spring 89. When the pawl 108 is engaged with the rack 137 in the manner heretofore described in conjunction with the embodiment of Figs. 1 to 7 inclusive, the thrust on said rack is transmitted to rotate detent 85 member 86 in a clockwise direction about its axis 85 so as to free the latch face 132 from the latch face 125, whereupon coil spring 89 will rotate stop member 120 in an anti-clockwise direction around its pivotal axis 122 90 and, through its engagement with the pin 127, the switch arm will be moved to open the electric circuit.

When the stop member 120 with the member 128 carried thereby is rotated in an anti-clockwise direction from non-stopping position to stopping position, the arm 130 on said member 128 engages the lateral arm 138 on reciprocating member 133 and positively moves said member 133 so as to withdraw 100 the rack 137 from the path of movement of the end of pawl 108. When the stop member 120 and the member 128 are rotated in a clockwise direction to non-stopping position, arm 131 on said member 128 engages the 105 projection 139 on the free end of member 133 and reciprocates said member so as to position the rack 137 for coaction with the pawl 108. When pawl 108 actuates the rack 137 to release the latch faces in the manner heretofore described, it also exerts a thrust through member 133 on arm 131 of member 128 so that, in the event that the parts should stick when the latch faces are released, the rotation of the stop member to stopping position will be initiated. In the remote contingency that the stop mechanism should fail to operate in the manner heretofore described member 144, cooperatively engaged 110 with the timing wheel by the action of cam surface 142, will be actuated by said timing wheel to exert a thrust through link 141 on arm 131 and thereby positively move the stop member to stopping position in the manner well understood in the art. As in 115 the embodiments heretofore described, the stop member may also be moved to stopping position by manual actuation of arm 129 of member 128, arm 130 on said member 128 engaging the side of member 133 to exert a lat- 120

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eral thrust thereon, and through said member to detent member 86, to aid in the disengagement of the latch faces 125 and 132.

It will therefore be perceived that a stop mechanism has been provided which is especially adapted for use on talking machines and which is actuated by a predetermined movement of the sound reproducing means

10 stop mechanism includes relatively movable cooperating elements, specifically illustrated as a pawl and a rack, which are maintained out of contact with each other except upon the occurrence of the aforesaid predetermined movement, at which time said cooperating elements are engaged to actuate the stop mechanism. Means have also been provided whereby these cooperating elements are positively separated upon actuation of

20 the stop mechanism so as not to interfere with movement of the sound reproducing means to starting position. It will also be perceived that the stop mechanism is positive and certain in operation, simple in construction, and composed of parts which may be stamped and bent up from sheet metal with a minimum amount of machining, and therefore a device is provided which can be manufactured at a minimum cost.

30 While the embodiments of the invention illustrated on the drawings have been described with considerable particularity, it is to be expressly understood that the invention is not restricted thereto, as the same is capable of receiving a variety of mechanical expressiors, some of which will now readily suggest themselves to those skilled in the art, while changes may be made in the details of construction, arrangement and proportion of parts, and certain features used without other features, without departing from the spirit of this invention. While an eccentric groove has been illustrated for the purpose of giving the sound reproducing means a predetermined movement to actuate the stop mechanism it is to be expressly understood that any suitable means may be employed for giving the sound reproducing means any suitable predetermined movement substantially simultaneous with or subsequent to the completion of the reproduction of sound to effect the actuation of the stop mechanism simultaneously with or at a predetermined interval after the completion of the sound reproduction. Also, while the stop mechanisms illustrated have been of that form employing a brake pad for engaging the rim of the turntable or an electric switch for opening an electric circuit, the invention is not limited thereto, as any suitable stop mechanism may be employed, and it is therefore to be expressly understood that the terms "stop mechanism" and "stop member" are to be construed as generic not only to brake devices and switch devices, but also to

any other suitable mechanism or member adapted to effect the stopping of the record support or talking machine. Reference is therefore to be had to the appended claims for a definition of this invention.

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What I claim is:—

1. The combination with a talking machine having a rotatable record support and sound reproducing means adapted to move across said support, of stop mechanism for stopping said support including a stop member and relatively movable elements adjacent to but out of contact with each other during movement of said sound reproducing means in a direction to reproduce sound and operatively engaged to actuate said stop member upon movement of said sound reproducing means in the opposite direction.

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2. The combination with a talking machine having a rotatable record support and sound reproducing means adapted to move across said support, of stop mechanism for stopping said support including a stop member, relatively movable elements for actuating said stop member, said elements being brought into engagement only upon a movement of said sound reproducing means in a direction opposite that to reproduce sound, and means whereby one of said elements is withdrawn from cooperative relation with the other of said elements when said stop member moves to stopping position.

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3. In a stop mechanism for talking machines having a rotatable record support and sound reproducing means adapted to move across said support, the combination of a stop member, a pawl and rack for actuating said stop member to stop the machine, and means for maintaining said pawl and rack out of contact with each other during the reproduction of sound.

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4. In a stop mechanism for talking machines having a rotatable record support and sound reproducing means adapted to move across said support, the combination of a stop member, a pawl and rack for actuating said stop member to stop the machine, means for maintaining said pawl and rack out of contact with each other during the reproduction of sound, and means whereby said pawl and rack are separated when said stop member moves to stopping position.

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5. In a stop mechanism for talking machines having a rotatable record support and sound reproducing means adapted to move across said support, the combination of a stop member, a detent for said stop member, a rack for operating said detent to release said stop member, a pawl movable in adjacency to said rack as said sound reproducing means moves across said support and adapted to actuate said rack upon a predetermined movement of said sound reproducing means, and means cooperating with said pawl whereby said pawl is maintained out

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of contact with said rack except during said predetermined movement of said sound reproducing means.

6. In a stop mechanism for talking machines, the combination of relatively movable members, a rack carried by one of said members, a pawl carried by the other member, means whereby said pawl and rack are maintained out of contact with each other during relative movement of said members in one direction and whereby said pawl and rack are engaged during relative movement of said members in the opposite direction, and a stop member actuated by the engagement of said pawl and rack.

7. In a stop mechanism for talking machines, the combination of a stop member, a detent cooperating therewith, a pawl, a rack cooperating with said pawl to operate said detent and release said stop member, and means cooperating with said pawl for maintaining said pawl out of engagement with said rack except during a predetermined movement of said pawl.

8. In a stop mechanism for talking machines, the combination of a stop member, a detent therefor, a trip member, a pawl actuated by said trip member, a rack cooperating with said pawl to operate said detent and release said stop member, and means for moving said pawl relatively to said rack and operable to engage said pawl with said rack only upon a predetermined movement of said trip member.

9. In a stop mechanism for talking machines, the combination of a stop member, a detent member, a rack carried by one of said members, a pawl, and means cooperating with said pawl to move the same adjacent to but out of contact with said rack in one direction and upon movement in the opposite direction to engage said pawl with said rack to operate said detent member and release said stop member.

10. In a stop mechanism for talking machines having a rotatable record support and sound reproducing means adapted to move across said support, the combination of a stop member, a detent member, a rack carried by one of said members, a pawl, and means whereby said pawl is moved adjacent to but out of contact with said rack during movement of said sound reproducing means in a sound reproducing direction but is engaged with said rack to operate said detent and release said stop member upon movement of said sound reproducing means in the opposite direction.

11. In a stop mechanism for talking machines having a rotatable record support and sound reproducing means adapted to move across said support, the combination of a stop member, a detent member, a pawl, a rack carried by one of said members and movable into and out of cooperative rela-

tion with said pawl as said stop member respectively moves out of and into stopping position, and means for engaging said pawl with said rack only when said sound reproducing means moves in a direction opposite of that to reproduce sound.

12. In a stop mechanism for talking machines having a rotatable record support and a sound reproducing means adapted to move across said support, the combination of a stop member, a detent member, a rack carried by one of said members and movable relative thereto, a pawl for engaging said rack to operate said detent member and release said stop member, and means cooperating with said sound reproducing means for moving said pawl to engage said rack.

13. In a stop mechanism for talking machines, the combination of a stop member, a rack and a pivotally mounted pawl for actuating said stop member, and means for bodily moving said pawl in a path adjacent to said rack, said means cooperating with said pawl to turn the same about its pivotal axis into or out of engagement with said rack as said means moves said pawl in one direction or the other.

14. In a stop mechanism for talking machines, the combination of a stop member, a pawl, and a rack for actuating said stop member, and means for moving said pawl parallelly to but out of contact with said rack in one direction and operable to engage said pawl with said rack when moving in the opposite direction.

15. In a stop mechanism for talking machines, the combination of a stop member, a detent therefor, a rack adapted to operate said detent and release said stop member, a pawl for actuating said rack, a movable arm on which said pawl is pivoted, and means for moving said arm and cooperating with said pawl to move the same out of or into engagement with said rack as said means moves in one direction or the other.

16. In a stop mechanism for talking machines having a rotatable record support and sound reproducing means adapted to move across said support, the combination of a stop member, means for actuating said stop member including a rack, a pawl, a movable arm on which said pawl is pivoted, and means moved by said sound reproducing means for moving said arm, said means cooperating with said pawl to turn the same about its pivot out of contact with said rack during movement of said sound reproducing means to reproduce sound and to turn said pawl into engagement with said rack and operate the same upon movement of said sound reproducing means in the opposite direction.

17. In a stop mechanism for talking machines having a rotatable record support and sound reproducing means adapted to move

across said support, the combination of a stop member, a detent, cooperating elements for operating said detent to release said stop member, and means actuated by said sound reproducing means whereby said cooperating elements have relative movement adjacent to but out of contact with each other during the reproduction of sound and are engaged to operate said detent upon movement of the sound reproducing means in the opposite direction.

18. In a stop mechanism for talking machines, the combination of a stop member, a rack for actuating said stop member, a pawl for actuating said rack, a movable arm on which said pawl is pivoted, and a second arm cooperating with said first-named arm for moving said arm and pawl adjacent said rack, said second-named arm cooperating with said pawl to turn the same about its pivot into or out of engagement with said rack as said second-named arm moves in one direction or the other.

19. In a stop mechanism for talking machines, the combination of a stop member, a detent member, a rack carried by one of said members for operating said detent member and releasing said stop member, a pawl, a pivoted arm on which said pawl is pivotally mounted, a second arm pivotally mounted coaxially with said first-named arm and engaging the same for moving said arm and pawl adjacent to said rack, and connections between said pawl and second-named arm whereby said pawl is urged toward or away from said rack according to the direction of movement of said arms.

20. In a stop mechanism for talking machines having a rotatable record support and sound reproducing means adapted to move across said support, the combination

of a stop member, relatively movable elements for actuating said stop member, means cooperating with said sound reproducing means whereby one of said elements is moved with respect to the other of said elements as said sound reproducing means moves with respect to said support, and connections between said means and said movable element whereby said elements are maintained out of engagement during sound reproduction and are engaged by movement of the sound reproducing means in the opposite direction.

21. In a stop mechanism for talking machines, the combination of a stop member, a detent cooperating therewith, a pawl, a rack cooperating with said pawl to operate said detent and release said stop member, means cooperating with said pawl for maintaining said pawl out of engagement with said rack except during a predetermined movement of said pawl, and means whereby said rack is withdrawn from cooperative relationship to said pawl when said stop member is in stopping position.

22. In a stop mechanism for talking machines having a rotatable record support and sound reproducing means adapted to move across said support, the combination of a stop member, a detent for said stop member, a rack for operating said detent to release said stop member, a pawl, and means whereby said pawl is moved adjacent to but out of contact with said rack, and into a rack actuating position upon a predetermined movement of said sound reproducing means.

In testimony whereof I have signed this specification.

LLOYD Y. SQUIBB.