

Sept. 24, 1940.

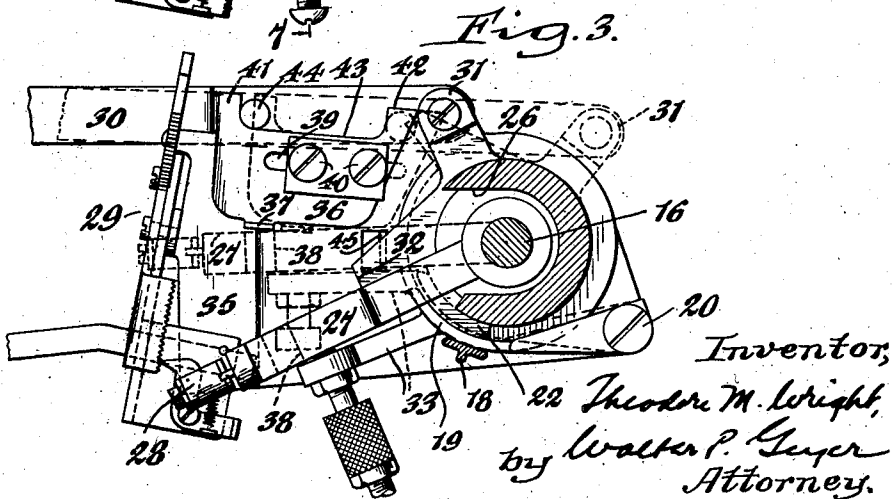
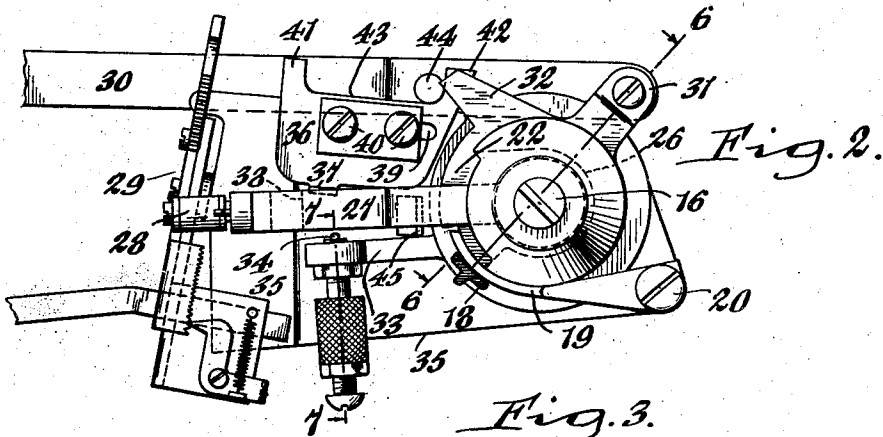
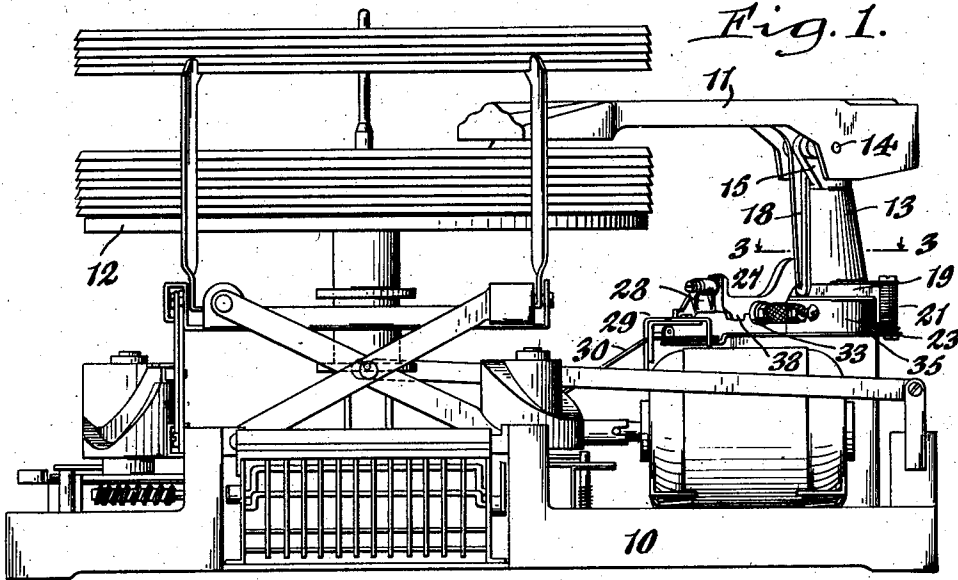
T. M. WRIGHT

2,216,029

TONE ARM SUPPORT ASSEMBLY FOR PHONOGRAPHS

Filed March 18, 1939

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 4.

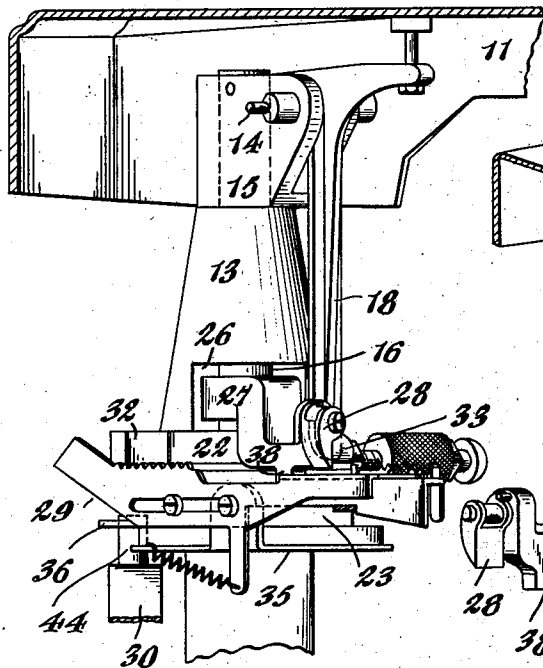


Fig. 5.

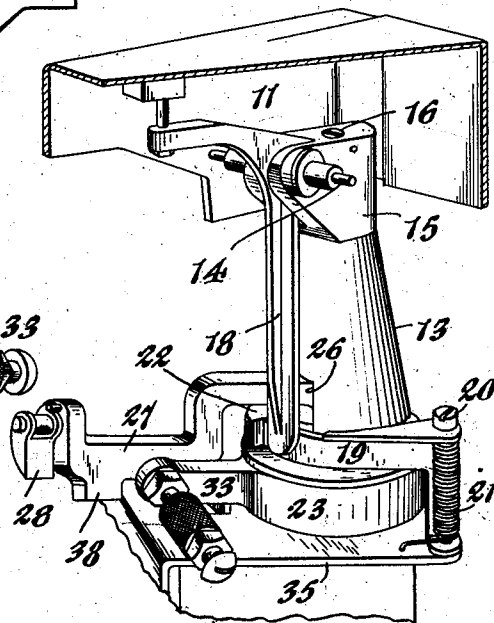


Fig. 6.

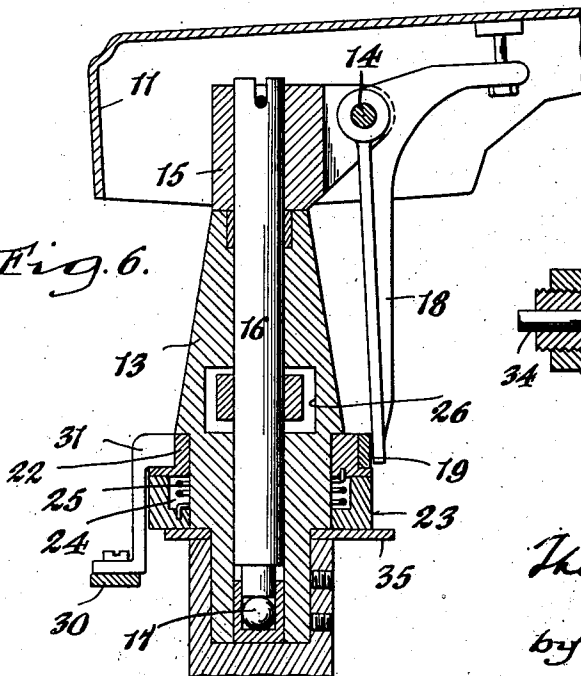
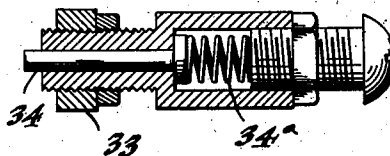


Fig. 7.



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UNITED STATES PATENT OFFICE

2,216,029

TONE ARM SUPPORT ASSEMBLY FOR
PHONOGRAPHS

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Application March 18, 1939, Serial No. 262,704

9 Claims. (Cl. 274—15)

This invention relates to certain new and useful improvements in automatic phonographs but more particularly to a support assembly for the tone arms thereof.

5 It has for one of its objects to provide a tone arm support assembly of this character which is so designed as to reliably and positively effect an automatic adjustment of the tone arm, both
10 vertically and horizontally, to a predetermined position for playing engagement with the record, as well as the restoration of the arm to its initial position after a record has been played.

15 Another object of the invention is to provide a tone arm support assembly which is simple, compact and inexpensive in construction, reliable in operation, and whose parts are not liable to get out of order.

20 Other features of the invention reside in the construction and arrangement of parts herein-after described and particularly pointed out in the appended claims.

In the accompanying drawings:

25 Figure 1 is an elevated view of an automatic selective phonograph showing my improved tone arm support assembly associated therewith. Figure 2 is an enlarged top plan view of the tone arm support assembly in record-play position, the tone arm itself being removed. Figure 3 is a horizontal section taken substantially in the
30 plane of line 3—3, Figure 1, showing the parts in non-play position. Figure 4 is a fragmentary perspective view, partly in section, of the assembly in non-play position. Figure 5 is a similar view, looking from the opposite side of the assembly with the same in record-play position.
35 Figure 6 is a transverse vertical section taken in the plane of line 6—6, Figure 2. Figure 7 is a detail longitudinal section taken on line 7—7, Figure 2.

40 Similar characters of reference indicate corresponding parts through the several views.

My improved tone arm support assembly has been shown, by way of example, in connection with an automatic phonograph of the type shown
45 in the United States Patent No. 2,096,718 granted October 26, 1927, wherein 10 indicates the supporting frame, 11 the tone arm which is mounted to swing both vertically and horizontally for movement into and out of playing engagement
50 with the records, and 12 indicates the turntable which is adapted to support the records in stack-like fashion for selective play. In the type of phonograph with which the improved tone arm assembly has been shown, the turntable is adjustable to various heights to properly position a rec-

ord in the operating plane of the tone arm, after which the record-stack is split above the record selected for play to provide an operating playing clearance for the tone arm.

In the preferred construction of the tone arm
5 assembly shown in the drawings, it consists of an upright supporting standard or column 13 about which the tone arm 11 swings in a horizontal plane while it is pivoted to swing vertically about a pivot 14 applied to a yoke 15 fixed on an
10 upright spindle 16 journaled in the standard and seated at its lower end in a step bearing 17, this vertical swinging of the tone arm being provided to bring its needle or stylus into and out of playing engagement with the record. Carried by the
15 yoke 15 and fulcrumed on its pivot 14 for governing the raising and lowering movements of the tone arm, is a laterally-swinging brace lever or lifting bar 18 which turns with the tone arm and which is in bearing contact at the lower end
20 of its inner face with a laterally-displaceable, arcuate-shaped arm 19 which extends partly around the axis of the supporting column 13 and which is fulcrumed for horizontally-swinging movement to an upright bolt 20, the latter having
25 a spring 21 applied thereto and acting on such arm to constantly urge it inwardly or toward the column. Rotatably mounted on the lower end of the column is a cam-ring or collar 22 against the periphery of which the contiguous portion of
30 the arm 19 bears to govern the inward and outward displacement of the latter at predetermined times during the turning of the cam-ring. The lower end of the lifting bar 18 overhangs and bears against the outer face of the displaceable
35 arm 19, so that the movements of the latter are correspondingly imparted to said bar to control the elevating movements of the tone arm. Mounted on the column adjoining the cam-ring is a second collar 23 having a recess 24 therein
40 for housing a torsional spring 25, one end of this spring being connected to the cam-ring and its other end being connected to the collar 23, whereby this spring tends to turn the cam-ring 22 in a counterclockwise direction, viewing Figures 2
45 and 3, and the second collar 23 in a clockwise direction.

Disposed radially of and fixed adjacent the lower end of the spindle 16 above the cam-ring 22 for moving in unison with the tone arm 11 and
50 projecting through a horizontal slot 26 in the column 13 is a trip arm 27 provided at its outer end with a trip pawl 28 which is adapted to operate a suitable trip mechanism, indicated generally at 29. This trip mechanism, when actu-

ated, at the end of play of a record, initiates and renders operative the record-changing mechanism of the phonograph to restore the record stack to normal as well as to restore the tone arm to its initial non-play position. During its restoring movement the tone arm is first lifted vertically to bring its stylus clear of the record and then swung horizontally outwardly to a position at one side of the turntable.

10 The numeral 30 indicates a link adapted to be actuated at predetermined times in the cycle of operations of the record-changing mechanism, such link being connected to a radial lug 31 projecting from the cam-ring 22 so that when such link is actuated in one direction it turns the cam-ring in a clockwise direction for adjusting the tone arm into playing engagement with the record, and when such link is actuated in the opposite direction it turns the cam-ring in a counter-clockwise direction for adjustably governing the movements of the tone arm to its initial or non-play position at one side of the turntable. Projecting from the cam-ring and substantially in a radial plane between the trip arm 27 and the link-attaching lug 31, is a tappet arm 32 which, during the counter-clockwise movement imparted to the cam-ring, is adapted to abut the inner side of the trip arm and cause the tone arm to be swung outwardly therewith to its initial non-play position. As shown in Figures 1, 4 and 5, the trip arm 27 is downwardly offset so that it is disposed in the path or plane of movement of the tappet arm 32.

Projecting from the collar 23 and disposed at the outer side of the trip arm 27 is a substantially radial arm 33 having a spring-pressed pin or plunger 34 therein with which the trip arm abuts in the non-play position of the tone arm, and which pin functions at a predetermined time during the movement of the tone arm to play position to impart a given inward movement to both the trip arm and tone arm. In the non-play position of the parts shown in Figure 3, the plunger 34 is in its inward position and its spring 34^a is under compression and in readiness to impart a given inward movement to the tone arm when called upon to do so. Likewise, in this position of the parts, it will be noted that the tappet arm 32 abuts against one side of the trip arm 27 while the spring-pressed plunger 34 of the arm 33 abuts against the other side of the trip arm, all of these parts, when so disposed, being capable of a unitary movement during predetermined times in the adjusting movements of the tone arm to and from play positions. This relative position of the parts is maintained by the spring 25 acting to urge the cam-ring and collar toward opposite sides of the trip arm.

Mounted on a supporting platform 35 disposed below the collar 23, is an adjustable gauge plate 36 which is provided at its inner edge with a stop lug 37 disposed in the path of a companion depending lug 38 formed on the trip arm 27, so that when the tone arm is swung inwardly from non-play position the stop lug on the trip arm encounters the stop lug on the gauge plate to arrest the tone arm in a predetermined position relative to the record to be played, such position being substantially one wherein the tone arm stylus or needle is disposed over the marginal ungrooved portion of the record but not in position for proper register with the record sound-groove. This gauge plate has a longitudinal slot 39 therein and is freely connected to the platform by screws 40, whereby such plate is adjustably mov-

able within certain limits in a direction generally toward and from the supporting column 13. Projecting from the inner edge of this plate are longitudinally-spaced lugs 41 and 42, providing a resulting recess 43 between them, and rising from the actuating link 30 is a stud 44 which is adapted to travel in such recess for abutting engagement with one or the other of the plate lugs 41, 42 to shift the plate in one direction or the other. During the movement of the operating link 30 to the right, viewing Figures 2 and 3, in which direction the link moves when the record-changing mechanism is set in operation for playing a record, its stud 44 travels in the recess 43, during which time the tone arm 11, trip arm 27, tappet lug 32, and arm 33 are moved inwardly or clockwise, with the movement of these parts being temporarily arrested by the trip arm stop lug 38 encountering the companion stop 37 on the gauge plate 36. Also rising from the platform 35 in the plane of movement of the plunger-bearing arm 33, is a stop lug 45 which is so positioned that when the trip arm is arrested during its inward movement by the gauge plate stop 37, the arm 33 at the same time abuts against said stop lug 45. At a predetermined time in the movement of the link 30 the stud 44 encounters the lug 42 and shifts the gauge plate inwardly to bring its stop lug 37 clear of the trip arm lug 38 and allow the trip arm to swing inwardly and at the same time swing the tone arm over the marginal edge of the record. When the gauge plate is moved to its aforesaid released position from the trip arm stop 38, the necessary further inward movement of the trip arm and tone arm is effected by the spring-pressed plunger 34, the latter being properly adjusted to impart a final, predetermined movement to such parts which will bring the tone arm stylus from a position over the marginal edge of the record to a position in register with the starting point of the sound groove of the record. At such time, the cam-ring 22 reaches a position to cause the displaceable arm 19 to rock inwardly and accordingly displace the lifting bar 18 to effect the lowering of the tone arm into playing engagement with the record.

As soon as the trip arm 27 and pin-bearing arm 33 are arrested by the companion stops 37 and 45, respectively, the continued movement of the link 30 imparts a further turning movement to the cam-ring 22 and moves its lug 32 to the position shown in Figure 2 where it will not interfere with the normal inward swing of the trip arm and the tone arm during the playing of the record. In this position of the cam-ring, it will be observed that the displaceable arm 19 is in register with the low face of the cam and with its free edge immediately adjoining the high spot of the cam, so that upon the initial inward swing of the cam-ring imparted by the link 30, such arm is rocked outwardly to elevate the tone arm clear of the record. The continued movement of the cam-ring causes its tappet lug 32 to abut the trip arm 27 and swing it and the tone arm horizontally to their initial non-play position. At a predetermined time in this restoring movement, the trip arm encounters the pin-bearing arm 33 and turns it in a like direction to the position shown in Figure 3, during which time the spring 25 is strained or pre-set for the next playing cycle.

I claim as my invention:

1. In an automatic phonograph, a reproducing means including a tone arm, a standard on which said tone arm is mounted to swing horizontally

and pivoted to swing vertically into and out of playing engagement with a record, a cam member mounted on said standard for oscillating movement about the swinging axis of the tone arm, means operatively connecting the cam member with an operating part of the phonograph for actuating said cam member at predetermined times in one direction or the other, an operative connection between said cam member and the tone arm for governing the vertical swinging movements of the latter into and out of playing engagement with a record, means operatively connected to and governed by the movements of the cam member for imparting at predetermined times a full restoring stroke to the tone arm in one direction and a partial play-positioning stroke thereto in the opposite direction, releasable means disposed in the path of travel of and for arresting the swinging movement of the tone arm during such partial stroke at a point substantially over the marginal edge of the record, means operatively engageable with said arresting means and governed by the cam member actuating means for controlling the movement of said arresting means to and from its released position, and means in bearing contact with and for automatically swinging the tone arm from said partial stroke position, upon the movement of said arresting means to its released position, to a position wherein its stylus is in registration with the record sound groove.

2. A tone arm mounting for automatic phonographs, comprising a standard on which the tone arm is mounted to swing horizontally and pivoted to swing vertically into and out of playing engagement with a record, a second arm movable horizontally with the tone arm, oscillatory means mounted on said standard for movement about the turning axis of the tone arm, means operatively connecting the oscillatory means with an operating part of the phonograph for actuating said oscillatory means at predetermined times in one direction or the other, an operative connection between said oscillatory means and the tone arm for governing the vertically-swinging movements of the latter into and out of playing engagement with a record, and complementary members operatively associated with the oscillatory means and engageable with opposite sides of said second arm for controlling the horizontal movements of the tone arm to and from playing position.

3. A tone arm mounting for automatic phonographs, comprising a standard on which the tone arm is mounted to swing horizontally and pivoted to swing vertically into and out of playing engagement with a record, a second arm movable horizontally with the tone arm, oscillatory means mounted on said standard for movement about the turning axis of the tone arm, means operatively connecting the oscillatory means with an operating part of the phonograph for actuating said oscillatory means at predetermined times in one direction or the other, an operative connection between said oscillatory means and the tone arm for governing the vertically-swinging movements of the latter into and out of playing engagement with a record, and complementary members operatively associated with the oscillatory means and engageable with opposite sides of said second arm for controlling the horizontal movements of the tone arm to and from playing position, one of said arm-engaging members being movable into operative engagement with said arm when the oscillatory means is actuated

in a direction to swing the tone arm to a non-play position and receding from engagement with such arm when the oscillatory means is actuated in the opposite direction, the companion arm-engaging member including a relatively movable motion-transmitting element for predetermining the movement of such second arm in a direction to position the tone arm for starting playing engagement with the record.

4. A tone arm mounting for automatic phonographs, comprising a standard on which the tone arm is mounted to swing horizontally and pivoted to swing vertically into and out of playing engagement with a record, a second arm movable horizontally with the tone arm, relatively movable oscillatory members mounted on said standard for movement about the turning axis of the tone arm and having companion elements radiating therefrom for abutting engagement with opposite sides of said second arm, means adapted for connection to an actuatable part of the phonograph and operatively connected to one of said oscillating members for actuating it in one direction or the other to bring its companion element to and from abutting engagement with said second arm to swing the tone arm from the end of its play position to non-play position and permit its movement to play position, respectively, and means connected to the other of said oscillatory members for yieldingly urging it in a direction to bring its companion element into abutting engagement with said second arm and to swing the tone arm from non-play to play position.

5. A tone arm mounting for automatic phonograph comprising a standard on which the tone arm is mounted to swing horizontally and pivoted to swing vertically into and out of playing engagement with a record, a second arm movable horizontally with the tone arm, relatively movable oscillatory members mounted on said standard for movement about the turning axis of the tone arm and having companion elements radiating therefrom for abutting engagement with opposite sides of said second arm, means adapted for connection to an actuatable part of the phonograph and operatively connected to one of said oscillating members for actuating it in one direction or the other to bring its companion element to and from abutting engagement with said second arm to swing the tone arm from the end of its play position to non-play position and permit its movement to play position, respectively, means connected to the other of said oscillatory members for yieldingly urging it in a direction to bring its companion element into abutting engagement with said second arm and to swing the tone arm from non-play to play position, and an operative connection between one of said oscillatory members and the tone arm for governing the vertical swinging movements of the latter at predetermined times in the oscillating strokes of such member.

6. A tone arm mounting for automatic phonographs, comprising a standard on which the tone arm is mounted to swing horizontally and pivoted to swing vertically into and out of playing engagement with a record, a second arm movable horizontally with the tone arm, yieldingly-connected oscillatory members mounted on said standard for relative movement about the turning axis of the tone arm and having companion elements radiating therefrom for abutting engagement with opposite sides of said second arm, means adapted for connection to an actuatable

part of the phonograph and operatively connected to one of said oscillatory members for actuating it in one direction or the other and for governing the swinging movements of the tone arm, means disposed in the path of movement of said second arm for releasably limiting its movement and that of the tone arm in a predetermined position over the marginal edge of the record, and means applied to the companion element of the other oscillatory member and engageable with said second arm for automatically swinging it in a direction, when released, to bring the tone arm to a position wherein its stylus registers with the starting playing groove of the record.

7. A tone arm mounting for automatic phonographs, comprising a standard on which the tone arm is mounted to swing horizontally and pivoted to swing vertically into and out of playing engagement with a record, a second arm movable horizontally with the tone arm, yieldingly-connected oscillatory members mounted on said standard for relative movement about the turning axis of the tone arm and having companion elements radiating therefrom for abutting engagement with opposite sides of said second arm, means adapted for connection to an actuatable part of the phonograph and operatively connected to one of said oscillatory members for actuating it in one direction or the other for governing at predetermined times a full restoring stroke to the tone arm in one direction and a partial play-positioning stroke thereto in the opposite direction, adjustably-movable means disposed in the path of movement of said second arm for releasably arresting the swinging of the tone arm during such partial stroke at a point substantially over the marginal edge of the record, means governed by said actuating means and operatively connected to said arresting means for controlling its movement to and from released position, and spring-urged means applied to the companion element of the other oscillatory member and engageable with said second arm for automatically swinging it in a direction, when released, to bring the tone arm in a position wherein its stylus registers with the starting playing groove of the record.

8. A tone arm mounting for automatic phonographs, comprising a standard on which the tone arm is mounted to swing horizontally and pivoted

to swing vertically into and out of playing engagement with a record, a second arm movable horizontally with the tone arm, oscillatory members mounted on said standard for relative movement about the turning axis of the tone arm and having companion elements radiating therefrom for abutting engagement with opposite sides of said second arm, a spring connected to said members and normally urging them in opposite directions to bring their companion elements toward opposite sides of said second arm, means operatively connected to one of said oscillatory members for actuating it in one direction or the other, shiftable stop means disposed in the path of movement of said second arm for arresting it at a predetermined position during the inward swing of the tone arm to play position, means operatively engageable with said arresting means and governed by said actuating means for controlling the shifting of said stop means to and from its released position, a stop disposed in the path of movement of the radial element of the other oscillating member for limiting its movement during the inward swing of the tone arm, and a spring-pressed follower mounted in said last-named radial element and engageable with said second arm for automatically swinging the latter inwardly, upon the release of said arresting means, to bring the tone arm into a radial position wherein its stylus registers with the starting playing groove of the record.

9. A tone arm mounting for automatic phonographs, comprising a standard on which the tone arm is mounted to swing horizontally and pivoted to swing vertically into and out of playing engagement with a record, a cam member mounted on said standard for oscillating movement about the swinging axis of the tone arm, means for actuating said cam member at predetermined times in one direction or the other, a horizontally-swinging arm disposed alongside said cam member and having a spring applied thereto for constantly urging it in operative bearing engagement with said cam member, and a vertically-swinging brace bar operatively connected at one end with the tone arm and at its other end in overhanging bearing contact with said cam-engaging arm.

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