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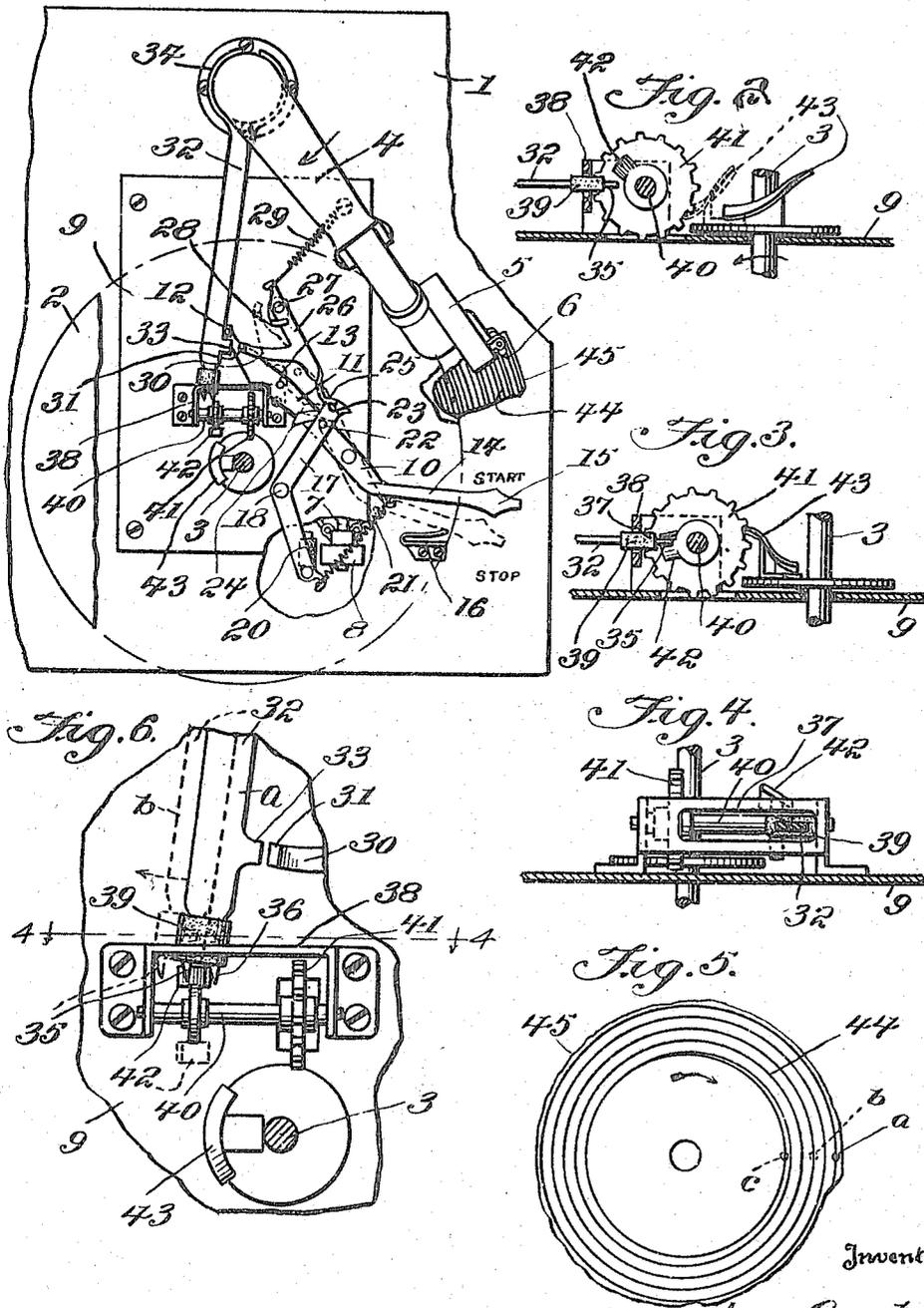
L. GANTERT

AUTOMATIC NONSET STOP FOR PHONOGRAPHS

Fig. 1.

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2 Sheets-Sheet 1



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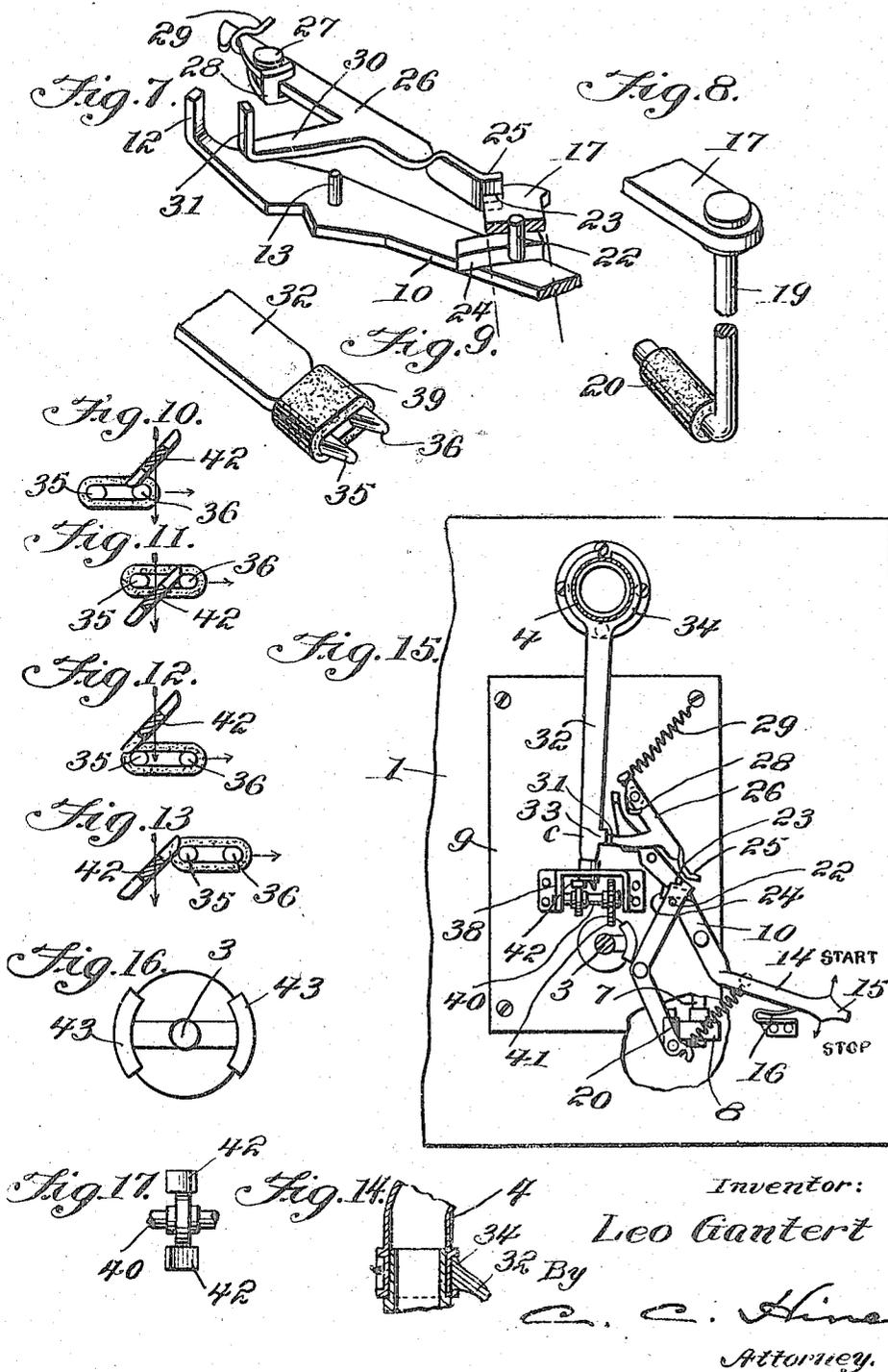
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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC NONSET STOP FOR PHONOGRAPHS.

Application filed July 3, 1922. Serial No. 572,681.

*To all whom it may concern:*

Be it known that I, LEO GANTERT, a citizen of the United States, residing at Yoakum, in the county of De Witt and State of Texas, have invented new and useful Improvements in Automatic Nonset Stops for Phonographs, of which the following is a specification.

This invention relates to an automatic non-set stop for phonographic machines.

One object of the invention is to provide a simple, reliable and efficient type of automatic stop mechanism which will operate in connection with a record of any size for stopping the machine when the needle or stylus reaches the final record groove, without the necessity of previously setting the stop mechanism in accordance with the size of the record (number of grooves in the record) which is being played.

Another object of the invention is to provide a stop mechanism which is set into action upon the release of the brake and automatically operates to throw the brake into action when the final record groove is reached, irrespective of the number of grooves in the record or the distance of such final groove from the center of the record.

Still another object of the invention is to provide an automatic stop device which will permit a partly played record to be removed and another substituted therefor without requiring any other than ordinary adjustments of a starting lever to adapt it for cooperation with the new record.

Still another object of the invention is to provide an automatic stop mechanism which allows the machine to be manually stopped whenever desired, and which may be readily and conveniently applied to existing types of machines for cooperation with any of the styles of brake devices working on the turntable or governor.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a top plan view of a portion of a cabinet and turntable and associated parts of a phonograph, showing the application of my improved stop mechanism, the parts appearing in record starting position.

Figures 2 and 3 are detail sections through

the controller arm shifter, showing the operation of the shifter and its actuating cam dog on the turntable shaft.

Figure 4 is a detail section on the line 4—4 of Figure 6.

Figure 5 is a diagrammatic plan view of a record showing certain positions of the stylus or needle at certain stages of operation of the stop mechanism.

Figure 6 is a view similar to and of parts shown in Figure 1, illustrating certain back and forth movements of the control arm under movements of the shifter and tone arm.

Figure 7 is a sectional perspective view of the control lever, brake lever locking and trip dog, and the associated trip cam.

Figure 8 is a perspective view of the brake device per se.

Figure 9 is a perspective view of a portion of the control arm.

Figures 10 to 13, inclusive, are views illustrating the control arm shifting movements of the shifter cam.

Figure 14 is a sectional view showing the friction clutch connection in between the tone arm and the control arm.

Figure 15 is a view similar to Figure 1, showing the parts released for the automatic stop action.

Figures 16 and 17 are views showing respectively modifications of the primary shifter cam actuating element and of the shifter cam device per se.

Referring now more particularly to the drawings, 1 designates a portion of a phonograph cabinet, 2 the turntable which supports the record, 3 the turntable shaft, 4 the swinging tone arm carrying the sound-box 5 and stylus or needle 6, 7 a brake shaft associated with the governor (not shown), and 8 a brake wheel or disk mounted on said shaft, all of which parts may be of ordinary or usual construction as embodied in well-known machines.

Arranged below the turntable is a support 9 on which is mounted a centrally pivoted setting lever 10. This lever 10 has an arm 11 terminating in a contact finger 12 and carrying a trip pin 13, and an arm 14 terminating in a finger piece 15. The finger piece 15 is movable for control motions of the lever between the "start" and "stop" positions indicated in Figure 1, appearing upon the cabinet, Figure 1 showing in full

lines the starting position and in dotted lines the neutral condition of said lever between starting and stopping positions. The arm 14 is movable beyond the neutral position to the stop position in contact with a spring stop member 16, which limits its stop or brake applying motion, and which spring stop serves, upon the release of the finger piece 15, to turn said lever to the neutral position. A bell-crank lever 17 is pivotally mounted on support 9 at the angle of intersection of its arms, as indicated at 18, and one arm of this lever is provided with a brake rod 19 carrying a brake shoe 20 for engagement with the brake wheel 8, and said end of the lever is connected by a coiled spring 21 with the arm 14 of the lever 10, which spring serves to move said brake lever 17 to brake applying position under certain conditions, as hereinafter described. The other end of the lever 17 carries a contact pin 22 and is formed with a locking notch or recess 23. The pin 22 is adapted for cooperation with a cam member 24 on the arm 11 of the setting lever 10, whereby said lever 17 may be actuated directly from the lever 10 to throw the brake into operation whenever it is desired to manually apply the brake and stop the motion of the record. The recess 23 is adapted for engagement with a locking projection 25 upon one end of a locking dog 26, pivoted at its opposite end upon the support 9, as indicated at 27. This pivot member 27 carries a stop member 28 which limits the swinging motion of the dog 26 in one direction while permitting it to swing freely in the opposite direction. The dog 26 is connected at its pivoted end to the support 9 by a spring 29 normally acting to hold it in locking position, and said dog is provided with a lateral trip arm or projection 30 terminating in a contact finger 31.

The contact 12 of the lever 10 is adapted for engagement with an oscillatory control lever 32, and the finger 31 of the trip arm 30 of the dog 26 is adapted for engagement with a contact lug 33 on said lever 32. The lever 32 is mounted at one end for swinging movements on the tone arm 4 and for such purpose is connected with such tone arm by a resilient or other suitable friction band 34, which friction band connects it with the tone arm tightly enough for movements therewith, while at the same time permitting said control lever to be swung on the tone arm independently thereof.

The opposite or free end of the control lever 32 is forked to provide a pair of spaced contact pins 35 and 36, the forked portion of said lever being reduced to a substantially flat condition and movable in a guide slot 37 in a supporting and guide bracket 38 mounted upon the supporting

member 9. This end of the lever 32 is also preferably provided with a collar or band 39 of felt, rubber or other suitable cushioning and sound deadening material, which adapts it to have motion substantially without vibration and without rattling or other noises. This lever 32 is movable in one direction by and with the tone arm 4 and movable in the reverse direction by means of automatic shifting mechanism controlled by the rotation of the shaft 3 whereby the lever 32 is adapted, at a proper time, to trip the dog 26 and release the brake lever 17 for a brake applying application to stop the motion of the record being played.

The automatic shifting mechanism referred to comprises a transverse shaft 40 journaled in the bracket 38 and carrying a toothed shifter wheel 41 and a shifter cam 42. The wheel 41 is provided with suitably formed teeth for engagement by a cam or worm blade 43 connected to and rotatable with the table drive shaft 3, said blade or plate being more or less spirally curved and arranged at such an angle as to move, as it rotates with shaft 3, between adjacent teeth of the wheel 41 and turn said wheel a predetermined distance, such as the distance of two teeth. The arrangement may be such that the wheel 41 may be revolved once on each eight revolutions of the shaft 3, corresponding to the traverse of the stylus or needle 6 along eight grooves 44 of a record 45 resting on the table 2, but this range of motion may vary as may be required according to circumstances or conditions or the number of shifting movements to be imparted to the lever 32 during an automatic record stopping action. The wheel 41 may, and preferably is, as shown, provided with an odd number of teeth embracing one less or one more than double the number required for the motion described, so that the worm 43 will engage every other tooth in its successive rotations, and skip the intervening tooth, and engage the teeth in such manner as to reduce wear and tear on the wheel. The cam 42 comprises a blade set at an angle to its path of revolution and so arranged that, when the control lever 32 is shifted in one direction or the other, it may pass down between the teeth 35 and 36 and operatively engage the tooth 36, as shown in Figures 10 and 11, or it may pass down upon the outer side of the tooth 35 and operatively engage said tooth, as shown in Figures 12 and 13.

Figure 1 shows the parts as set to start the record and for an automatic stop action, Figure 6 shows in full and dotted lines the back and forth or oscillating motions of the control lever 32 when in action, and Figure 15 shows the parts at the time the lever 32 operates to trip the dog 26 and release the brake lever 17 for a brake applying and rec-

ord stopping action. In Figure 5 *a*, *b* and *c* indicate diagrammatic positions of the stylus or needle 6 corresponding to the correspondingly lettered positions *a*, *b* and *c* of the control lever 32 at different points in the travel of the stylus or needle in the sound grooves of the record and corresponding points or positions of the lever 32 at such periods.

Referring to Figure 1, when the needle 6 is engaged with the first or starting convolution of groove 44 of the record, the setting lever 14 is moved to the starting position to set the automatic stop mechanism for operation, after which said mechanism is entirely automatic in operation irrespective of the size of the record or number of sound grooves therein. Such movement of lever 14 causes the control arm 32 to be shifted from the right hand position *a* to the left hand position *b* in Figure 6 by pressure of the contact finger 12 thereon, in which movement the friction band 34 turns on the tone arm 4. This movement of lever 10 shifts its brake lever applying cam 24 to brake lever setting position, said cam engaging the pin 22 and swinging the lever 17 to brake releasing position, in which position the notched portion 23 thereof slides under and into engagement with the finger 25 of the dog 26, whereby said lever 17 is locked in retracted position. The dog 26 is thus so set that it is held by its spring 29 in locking engagement with lever 17, with the contact finger 31 of its trip arm 30 lying in line with the lug 33 of lever 32 but spaced therefrom and out of contact therewith. The release of the lever 10, at the end of the setting movement, in which spring 21 is tensioned, causes it to be brought by the action of the spring 21 back to the neutral position indicated in dotted lines in Figure 1 without interfering with the set position of the parts mentioned. The record 45 being set into operation it will be understood that as the needle 6 travels in the grooves 44 toward the center of the record, the tone arm 4 will move therewith toward the left or in the direction of the arrow shown in Figure 1, thus shifting the lever 32 from the normal or set position *a* to the dotted line position *b* shown in Figure 6 before and during the time interval while the cam or worm 43 on the shaft 3 successively engages and turns the wheel 41 through one complete revolution, on travel of the needle 6 through successive grooves 44, to turn the shaft 40 one complete revolution. At this time the cam 42 comes into play and moves downwardly between the prongs 35 and 36 and engages the prong 36 to shift the lever 32 back from dotted line position *b* in Figure 6 to full line position *a* in said figure. As the needle continues its motion along the record, and the lever 32 is released by the travel of plate 42 through and beyond the pins 35 and 36, the tone arm 4 again transmits motion to move the control lever 32 from position *a* to position *b*, and this operation is repeated during the rotation of the record and travel of the stylus therein, the control lever 32 being alternately shifted back and forth by the alternate motion of the sound arm 4 and operation of the cam 42, for bringing the contact lug 33 of lever 32 into and out of engagement with the finger 31 of trip 30 of dog 26, until the final groove of the record is reached as indicated by position *c* in Figure 5, at which time the travel of the tone arm 4 is arrested since the needle 6 has no lateral motion or travel toward the center of the record, but simply continues to turn in the final sound groove in a circle concentric with the axis of rotation of the record. Hence it will be understood that as the tone arm 4 is no longer operative to move the control lever 32 to the left the cam member 42 will shift the lever 32 to the right successively from position *b* to position *a* and finally to the far right position indicated by position *c* in Figure 15, in which final position the lug 33 of lever 32 engages the finger 31 of trip arm 30 of dog 26 and swings said dog to the right, so that its latch member 25 will be thrown out of engagement with the recess 23. When this occurs, the expanded and tensioned spring 21 will contract and operate to draw the lever 10 to the stop position and the lever 17 to the braking position shown in Figure 15, thereby moving the brake shoe 20 so as to stop the motion of the turntable 2. It will be understood from the foregoing description that this operation of the control mechanism described will be automatic irrespective of the size of the record or number of sound grooves therein, the back and forth shifting of the lever 32 continuing only to a greater or less extent under the operation of the tone arm and cam 42 dependent upon the number of grooves in the record, the stoppage of motion of the tone arm 4, when the stylus 6 reaches the final groove, determining the automatic stopping action, the cam 42 being permitted at this time to shift the lever 32 continuously to the right until it engages and releases the dog 26 to throw the brake device into action. As will be apparent to those versed in the art the parts constituting my invention may be applied for use in connection with a brake mechanism of the well known type disclosed or any other type of brake mechanism in general use or any arranged to be operated in the described manner or any equivalent manner.

If desired, I may reduce the number of revolutions of the wheel 41 required to oscillate lever 32 by providing shaft 3 with a plurality (two or more) of the worm blades 43 as shown in Figure 16. I may also fur-

ther reduce the number of revolutions of shaft 40 to produce the oscillating motions of lever 32 by providing a plurality (two or more) of the cams 42 on shaft 40, as shown in Figure 17.

Having thus fully described my invention, I claim:

1. In an automatic non-set stop mechanism for phonographs, the combination of record supporting and rotating means including a shaft, a brake device, a sound reproducing means including a movable tone arm, an oscillating controller having frictional engagement with said tone arm, a shaft between the first-named shaft and said controller, a wheel on said shaft, a rotary element actuated by the first-named shaft for engagement with said wheel for periodically turning the second-named shaft, and means actuated by the second-named shaft for periodically moving the controller in a direction reverse to its movement by the tone arm.

2. In an automatic non-set stop mechanism for phonographs, the combination of record supporting and rotating means including a shaft, a brake device, a sound reproducing means including a movable tone arm, an oscillating controller for said brake device having frictional engagement with said tone arm, a shaft between the first-named shaft and said controller, a toothed wheel upon the second-named shaft, a rotary cam upon the first-named shaft actuated thereby to engage the teeth of said wheel for periodically turning the second-named shaft, and means actuated by the second-named shaft for periodically moving the controller in a direction reverse to its movement by the tone arm.

3. In an automatic non-set stop for phonographs, the combination of record supporting and rotating means including a shaft, a brake device, a sound reproducing means including a movable tone arm, an oscillating controller having frictional engagement with said tone arm and provided with a pair of spaced contacts, a shaft between the first-named shaft and said controller, means actuated by the first-named shaft for periodically turning the second-named shaft, and a rotary cam actuated by the second-named shaft for alternately engaging said spaced contacts for periodically moving the controller in a direction reverse to its movement by the tone arm.

4. In an automatic non-set stop mechanism for phonographs, the combination of record supporting and rotating means including a shaft, a brake device, a sound reproducing means including a movable tone arm, an oscillating controller for said brake device having frictional engagement with said tone arm and provided with a pair of spaced contacts, and a rotary cam actuated

from said shaft for alternately engaging said spaced contacts and periodically moving the controller in a direction reverse to its movement by the tone arm.

5. In an automatic non-set stop mechanism for phonographs, the combination of record supporting and rotating means including a shaft, a brake device, a sound reproducing means including a movable tone arm, an oscillating controller for said brake device having frictional engagement with said tone arm, a shaft between the first-named shaft and said controller, a toothed wheel on said second-named shaft, a rotary cam actuated by the first-named shaft for engagement with the teeth of said wheel for periodically turning the second-named shaft, and a rotary cam actuated by the second-named shaft for alternately engaging the spaced contacts of the oscillating controller for periodically moving the controller in a direction reverse to its movement by the tone arm.

6. In an automatic non-set stop mechanism for phonographs, the combination of a record supporting and rotating means, an automatically movable brake device, a sound reproducing mechanism including a movable tone arm, an oscillatory control device for said brake device connected to the tone arm for movement thereby in one direction and movable independently thereof in the reverse direction, means for conjointly moving said control device to starting position and the brake device to retracted position and locking the latter-named device in such position, and means operative in the rotation of the record for shifting the control device independently of the tone arm between intervals of its motion by the latter in the opposite direction and operating on a cessation of motion of the tone arm to release the brake device for action.

7. In an automatic non-set stop mechanism for phonographs, the combination of record supporting and rotating means including a shaft, a brake device, a sound reproducing means including a movable tone arm, an oscillating controller having frictional engagement with said tone arm, a shaft between the first-named shaft and said controller, means actuated by the first-named shaft for periodically turning the second-named shaft, and means actuated by the second-named shaft for periodically moving the controller in a direction reverse to its movement by the tone arm.

8. In an automatic non-set stop mechanism for phonographs, the combination of a record supporting and rotating means including a shaft, a brake device, a sound reproducing mechanism including a movable tone arm, an oscillating controller having frictional engagement at one end with the

tone arm and provided with a pair of spaced contacts, a shaft between said controller and the first-named shaft, means operative for periodically turning the second-named shaft from the first-named shaft in the rotation of the latter, and means upon the second-named shaft engageable alternately with the spaced contacts on the controller for periodically shifting said controller in a direction opposite to its movement by the tone arm.

9. In an automatic non-set stop mechanism for phonographs, the combination of a record supporting and rotating means including a shaft, an automatically operable brake device, means for manually setting and holding said brake device in retracted position, a sound reproducing mechanism including a movable tone arm, a controller movable in one direction with the tone arm and in the reverse direction independently thereof, said controller having spaced fork arms, and a rotary cam actuated by the shaft of the record supporting and rotating means alternately engageable with said fork arms for periodically shifting the controller in brake releasing direction between intervals of its motion in the opposite direction by the tone arm and releasing said brake device for action when the motion of the tone arm is arrested.

10. In an automatic non-set stop mechanism for phonographs, the combination of a record supporting and rotating means, a spring actuated brake device, a sound reproducing mechanism including a movable tone arm, an oscillatory control device connected to the tone arm for movement thereby in one direction and movement independently thereof in the reverse direction, means for conjointly moving said controller to starting position and the brake device to retracted position and locking the latter-named device in such position, and means actuated by the shaft of the record supporting and rotating means for shifting the controller independently of the tone arm between intervals of its motion by the latter in the opposite direction and operating on

a cessation of motion of the tone arm to release the brake device for action.

11. In an automatic non-set stop mechanism for phonographs, the combination of a record supporting and rotating means, an automatically operable brake device, a sound reproducing mechanism including a movable tone arm, an oscillatory control device connected to the tone arm for movement thereby in one direction and movable independently thereof in the reverse direction, said arm having spaced contacts, a rotary cam actuated by a part of the record supporting and rotating means, a toothed wheel adapted to be intermittently actuated by said cam, said wheel having an odd number of teeth embodying one more or one less than double the number required in relation to a given number of convolutions of the sound groove of a phonographic record, and a rotary cam receiving motion from said toothed wheel for alternately engaging the spaced contacts of the control device and shifting said control device periodically in a direction reverse to its movement by the tone arm.

12. In an automatic non-set stop mechanism for phonographs, the combination of a record supporting and rotating means including a shaft, an automatically operable brake device, a sound reproducing mechanism including a movable tone arm, a controller movable in one direction with the tone arm and in the reverse direction independently thereof, said controller having spaced contacts, a locking device for locking the brake device in released position, a setting lever for simultaneously moving said controller to starting position and the brake device to released position and setting said locking device to hold said brake device in such position, and means actuated by said shaft for intermittently moving the controller in a direction reverse to its movement by the tone arm and finally adjusting said controller to trip and release said locking device.

In testimony whereof I affix my signature.

LEO GANTERT.