Nov. 11, 1941. H. H. BEIZER 2,262,131

PHONOGRAPHIC APPARATUS

Filed Oct. 31, 1939

Fig. 1.

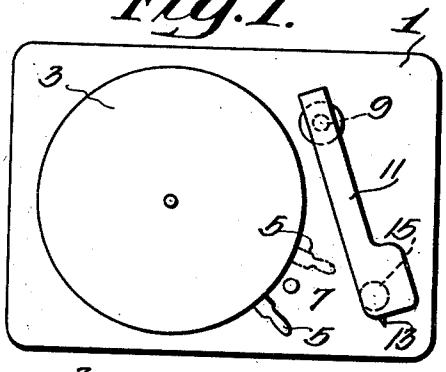


Fig. 5.

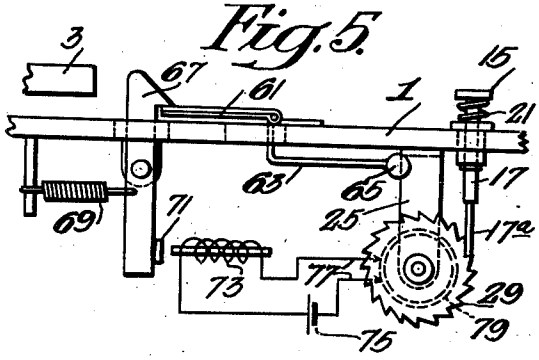


Fig. 2.

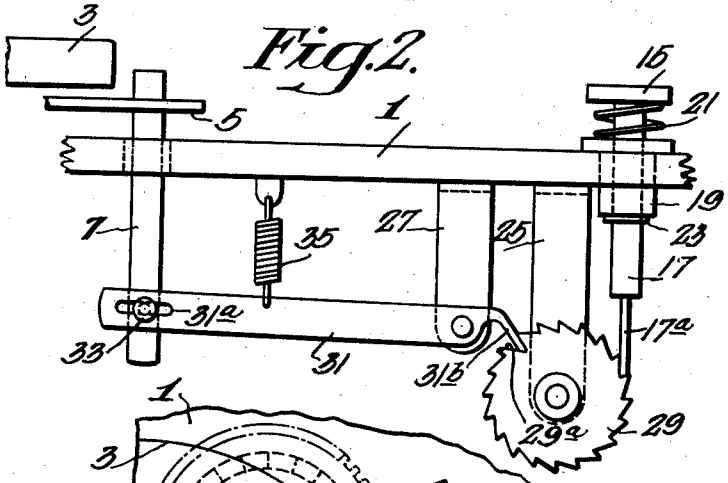
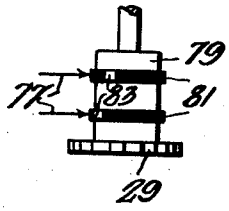


Fig. 6.



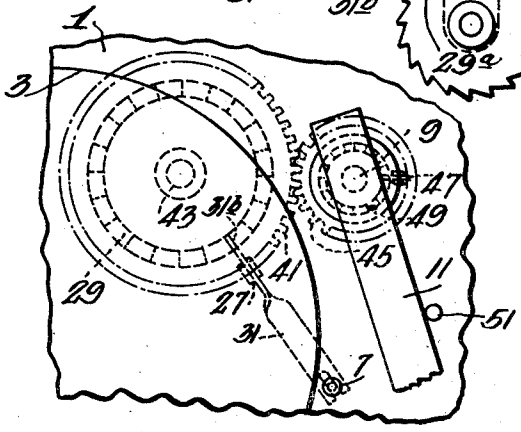


Fig. 3.

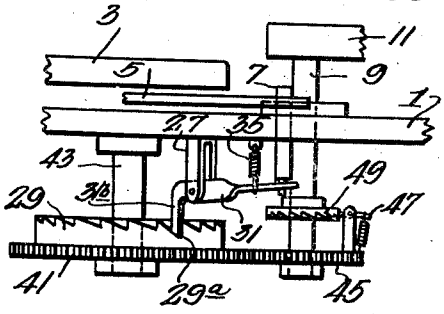


Fig. 4.

Inventor

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Patented Nov. 11, 1941

2,262,131

UNITED STATES PATENT OFFICE

2,262,131

PHONOGRAPHIC APPARATUS

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Application October 31, 1939, Serial No. 302,069

5 Claims. (Cl. 274—1)

This invention relates to phonographic apparatus, and more particularly to means therein for preventing a needle from being played more than a predetermined number of times.

It is well known that one of the most important factors in record life is the nature of the needle which is used to reproduce sound therefrom. In many cases, users of phonographs who fail to appreciate this omit changing needles as frequently as is necessary. To meet this situation, there have been developed certain needles which can be used for a number of playings. However, even in such cases, users of phonographs fail to observe the necessary precaution to change the needles after they have been used for the number of reproductions for which they have been safely designed.

The principal object of my present invention is to provide novel mechanism, in a phonograph, which will obviate the necessity for the user of a phonograph to bear in mind how many playings a particular needle has been subjected to and when it will be necessary to change it.

More particularly, it is an object of my present invention to provide novel mechanism as aforesaid which will give some sort of indication that the needle should be changed after the needle has been used for the number of playings intended for it.

It is also an object of my present invention to provide novel mechanism as aforesaid which is very simple in construction, which requires no additional work on the part of the operator, which is inexpensive of manufacture, and which is highly efficient in use.

In accordance with this invention, I provide a step-by-step operable device which is intermittently operated, one step at a time, in response to movement of the tone arm or sound translating device to its rest position where it is placed while records are being changed. The step-by-step operable device may be in the form of a ratchet wheel, for example, which is advanced one tooth at a time after each record is played, and the ratchet wheel has associated therewith mechanism which controls the indicating means so that, after the required number of records have been played, the ratchet wheel will permit the indicating mechanism to assume an indicating position and thus give warning of the necessity to change the needle. The indicating means may be in the form of a visible indicator, an audible indicator, or a device which will render some part of the phonograph temporarily inoperative, or until the mechanism has been reset.

The novel features that I consider characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, as well as additional objects and advantages thereof, may best be understood from the following description of several embodiments thereof, when read in connection with the accompanying drawing, in which

Figure 1 is a plan view of a phonograph equipped with one form of my invention;

Figure 2 is an enlarged side elevation showing the details of this form of my invention;

Figure 3 is a plan view of a modified form of my invention;

Figure 4 is a side elevation of the latter form of my invention;

Figure 5 is a side elevation of still another form of my invention; and

Figure 6 is a detailed plan view of a portion of the mechanism employed in connection with the last named form of my invention.

Referring more particularly to the drawing, wherein similar reference numerals indicate corresponding parts throughout, I have shown, in Figs. 1 and 2, a motorboard 1 above which is rotatably mounted, in conventional manner, a motor-driven turntable 3, the rotation of the turntable 3 being controlled by suitable brake mechanism (not shown) which includes a movable operating handle 5. The handle 5 is arranged to be moved from the brake holding position shown in full lines in Figure 1 to the brake releasing position shown in dotted lines in Fig. 1, and in doing so, it must move past a post 7 which passes through the motorboard 1 and is arranged for vertical movement therethrough.

Fixed to a post 9 which is rotatably mounted in a suitable bearing on the motorboard 1 is a tone arm or pickup arm 11 which carries a suitable sound translating device provided with a needle 13, the arm 11 being arranged for movement from a rest position to one side of the turntable 3 (shown in Fig. 1) to a reproducing position over the turntable 3 wherein the needle 13 is adapted to cooperate with a record supported by the turntable 3 during reproduction, in well known manner. In its rest position, the pickup arm and its sound translating device rest upon the enlarged head 15 of a plunger 17 vertically movable in a bearing 19 on the motorboard 1 and constantly urged to an elevated position by a coil spring 21 which is interposed between the head 15 and the bearing 19. A C-washer or the like 23 on the plunger 17 acts as a stop device for limiting the upward movement of the plunger.

Fixed to the underside of the motorboard 1 are a pair of brackets 25 and 27 on the former of which is rotatably mounted a ratchet wheel 29 and on the latter of which is pivotally mounted a lever 31. The ratchet wheel 29 is provided with n teeth thereon, where n represents the number of playings for which the needle 13 has been designed, so that there will be n notches between the teeth of the ratchet wheel 29, one

of the notches 29a between a pair of adjacent teeth in the ratchet wheel 29 being made considerably deeper than all the other notches. The lever 31 is provided at one end with a slot 31a for receiving a pin 33 on the post 7, and the other end 31b of the lever 31 is formed to engage the teeth of the ratchet wheel 29.

The plunger 17 is provided with a reduced lower end 17a which is adapted to engage the teeth of the ratchet wheel 29, and each time that the plunger 17 is depressed, the wheel 29 is advanced one tooth in a clockwise direction, as viewed in Fig. 2. Thus, after each record has been played, if the pickup arm is moved over and placed on the head 15 of the plunger 17, the sound translating device will drop down into its rest position against the action of the spring 21 and will automatically advance the ratchet wheel 29 one tooth. The record is then changed and the needle is then placed upon the new record for reproduction. The spring 21 will then raise the plunger 17 to the next tooth of the ratchet wheel 29, and the ratchet wheel will be prevented from turning backwards by reason of the fact that a spring 35, connected at one end to the motorboard 1 and at its other end to the lever 31, holds the end 31b of the lever in the particular notch of the ratchet wheel with which the lever end 31b is then in engagement. This action continues until the relatively deep notch 29a has been brought under the lever end 31b, whereupon the spring 35 pulls the lever 31 clockwise sufficiently to raise the post 7 into the path of movement of the brake-handle 5. In its elevated position, therefore, the post 7 not only serves to indicate the need for changing the needle 13, but also renders the brake-handle 5 temporarily inoperative to release the turntable brake. After changing the needle, the user merely depresses the plunger 15 once with his finger to advance the ratchet wheel 29 one tooth, and since the next succeeding notch is not as deep as the notch 29a, it is clear that the post 7 thereafter will be held releasably locked in its lowered position where it is clear of the brake handle 5.

In the modification of my invention shown in Figures 3 and 4, the ratchet wheel 29 is fixed to the upper surface of a gear 41 which is rotatably mounted on a post 43 fixed to the motorboard 1 and arranged parallel to the post 9. The gear 41 meshes with a second gear 45 which is loose on the post 9 and which is provided with a spring pressed ratchet 47 arranged to cooperate with a second ratchet wheel 49 fixed to the post 9 for rotation therewith. The ratchet 47 and the ratchet wheel 49 form a one-way clutch which permits the pickup arm 11 to be swung in a clockwise direction (as viewed in Fig. 3) from its rest position to its operating position over a record without causing rotation of the gear 45, but which is effective to cause rotation of the gear 45 when the pickup arm 11 is moved in a counter-clockwise direction back to its rest position against a stop 51 on the motorboard 1 to one side of the turntable 3. Rotation of the gear 45 effects rotation of the gear 41 and the ratchet wheel 29, and the parts are so designed that, for each movement of the pickup arm from the terminal groove of the played record back to its rest position against the stop 51, the ratchet 29 will have been advanced one notch. As in the case of the modification previously described, when the relatively deep notch 29a has moved under the lever end 31b, the lever 31 becomes free to raise the post 7 to its elevated position in the path of movement of the brake handle 5. After changing the needle, the pickup arm is first moved in toward the center of the record and then moved back to its rest position so as to advance the ratchet wheel 29 another tooth and thus reset the parts to permit further operation of the phonograph.

In the modification shown in Figures 5 and 6, I provide a flag or the like 61 which is pivotally mounted on the motorboard 1 and which is provided with an arm 63 having a weight 65 thereon tending to move the flag into an upright position. Normally, however, the flag 61 is releasably locked in a horizontal position, as shown in Fig. 5, by means of a pivoted latch 67, constrained to latching position by a spring 69. The lower end of the latch 67 is provided with an armature 71 by means of which the latch 67 can be moved in a counter-clockwise direction (as viewed in Fig. 5) to release the flag 61 when the coil of an electro-magnet 73 is energized. For energizing this coil, there are provided a source of electrical energy 75 and a pair of brush contacts 77 cooperating with a conductive drum 79 secured to and rotatable with the ratchet wheel 29, the drum 79 being provided with a pair of insulated bands 81 having conductive inserts 83 therein which permit completion of the circuit when the brushes 77 are in contact therewith. Each time the plunger 17 is depressed, the ratchet wheel 29 is advanced one tooth and the drum 79 is rotated a corresponding amount. Eventually, the conductors 83, which have an arcuate length around the drum less than the distance between two adjacent teeth of the ratchet wheel 29, will ride under the brushes 77 and momentarily energize the electro-magnet 73 to attract the armature 71. Thus, the flag 61 is released to swing to an upright position and indicate the need for changing the needle 13. When the needle has been changed, it is merely necessary to lower the flag 61 and latch it again by the latch 67 in its "non-indicating" position, after which the operation of the phonograph may continue in the usual manner. With this modification of my invention, it will be noted that it is not necessary to swing the pickup arm 11 back and forth as in the case of the modification of Figures 3 and 4, nor is it necessary to depress the plunger 17 once, as in the case of the modification of Figs. 1 and 2, in order to reset the parts, by reason of the fact that the arcuate length of the conductive inserts 83 is less than the distance between adjacent teeth of the ratchet wheel 29.

From the foregoing description, it will be apparent to those skilled in the art that I have provided a novel and simple arrangement for indicating when the needle should be changed. In all of the modifications described, the ratchet wheel is advanced one step at a time by merely moving the pickup arm from its operative position back toward rest position at one side of the turntable. Also, in all of the modifications disclosed, it will be noted that the indicating device, whether it be the post 7 or the flag 61, is releasably held in its "non-indicating" position until such time as it is to be released. If, perchance, the ratchet wheel 29 is advanced prior to the completion of playing of a record, there is no harm done because the records certainly will not be damaged by being played with a needle which has not been subjected to the full number of playings for which it has been designed.

Although I have shown and described several

forms of my invention, I am fully aware that many other modifications thereof, as well as changes in those described, are possible. For example, the post 7 may be arranged to cooperate with and to strike a bell or the like when it is elevated to give an audible warning to the user that it is time to change the needle. Also, if desired, the post 7 or the flag 61 may be arranged to control a switch in the circuit of an electric motor which may be employed for driving the turntable 3, or to control a switch in the circuit of an electrical reproducing system, such as an electric amplifier, for example, to open-circuit the amplifier and render the phonograph temporarily inoperative. Many other changes and modifications will, no doubt, readily suggest themselves to those skilled in the art. I, therefore, desire that my invention shall not be limited except insofar as is made necessary by the prior art and by the spirit of the appended claims.

I claim as my invention:

1. In phonographic apparatus, the combination of a rotatable turntable adapted to support a record during reproduction, a brake member associated with said turntable for controlling the rotation thereof, said member including a movable part, a sound translating device including a needle adapted to cooperate with the record, means adapted to be interposed in the path of movement of said movable part to prevent movement of said part into brake releasing position, and means responsive to movement of said sound translating device in a predetermined direction for interposing said first named means in the path of movement of said movable part after a predetermined number of playings have been effected by said needle, said first named means then serving to temporarily prevent further rotation of said turntable and to indicate the need for changing said needle.

2. In phonographic apparatus, the combination of a rotatable turntable adapted to support a record during reproduction, a brake member associated with said turntable for controlling the rotation thereof, said member including a movable part, a sound translating device including a needle adapted to cooperate with the record, means adapted to be interposed in the path of movement of said movable part to prevent movement of said part into brake releasing position, and means including a step-by-step operable device responsive to movement of said sound translating device in a predetermined direction for interposing said first named means in the path of movement of said movable part after a predetermined number of playings have been effected by said needle, said first named means then serving to temporarily prevent further rotation of said turntable and to indicate the need for changing said needle.

3. In phonographic apparatus, the combination of a rotatable turntable adapted to support a record during reproduction, a brake member associated with said turntable for controlling the rotation thereof, said member including a movable operating handle, a sound translating device movably mounted to occupy a rest position and a reproducing position, said device including a needle adapted to cooperate with the record when said device is in reproducing position, a ratchet wheel having a predetermined number of teeth thereon and the notch between a pair of adjacent teeth being deeper than all other notches therein, a plunger located at said rest position and having one end thereof arranged to engage said ratchet wheel, the other end of said plunger serving as a support for said device, spring means constantly urging said plunger to an elevated position, a post adapted to be interposed in the path of movement of said brake handle to prevent movement of said handle into brake releasing position, and a pivotally mounted lever having one end coupled to said post and its other end in engagement with said ratchet wheel, said ratchet wheel being arranged to be advanced one tooth at a time each time said device is placed upon said plunger to depress said plunger against the action of said spring means and into engagement with a tooth of said ratchet wheel, and said lever being so arranged that when the last named end thereof enters said relatively deep notch said lever will raise said post into the path of movement of said handle, thereby temporarily preventing further release of said brake and giving an indication for the need to change said needle.

4. In phonographic apparatus, the combination of a rotatable turntable adapted to support a record during reproduction, a brake member associated with said turntable for controlling the rotation thereof, said member including a movable part, a sound translating device movable over the record and including a needle adapted to cooperate with the record, means adapted to be interposed in the path of movement of said movable brake part to prevent movement of said part into brake releasing position, and means movable with said translating device effective to cause said first named means to be interposed in the path of movement of said movable part upon movement of said device a predetermined number of times in a predetermined direction, the interposition of said first named means in the path of movement of said movable part serving to indicate the need of changing said needle.

5. In phonographic apparatus, the combination of a rotatable turntable adapted to support a record during reproduction, a brake member associated with said turntable for controlling the rotation thereof and including a movable operating handle, a sound translating device movable between a rest position to one side of the turntable and a reproducing position over the record and including a needle adapted to cooperate with the record in said reproducing position, a post adapted to be interposed in the path of movement of said handle to prevent movement thereof into brake releasing position, a ratchet wheel having a predetermined number of teeth therein, the notch between a pair of adjacent teeth being deeper than all the other notches in said ratchet wheel, a pivoted lever having one end in engagement with said ratchet wheel and its other end coupled to said post, and means including a one way clutch coupling said sound translating device to said ratchet wheel, said clutch being so constructed and arranged that upon each movement of said sound translating device from reproducing to rest position, said ratchet wheel is advanced one tooth, and when said relatively deep notch is engaged by said lever, said lever becomes free to interpose said post in the path of movement of said handle to temporarily prevent further release of said brake and to give an indication of the need for changing said needle.

HAROLD H. BEIZER.