G. W. LORIMER.

AUTOMATIC STOP FOR PHONOGRAPHS.

APPLICATION FILED NOV. 9, 1917.

1,396,964.

Patented Nov. 15, 1921.

2 SHEETS—SHEET 1.

Fig. 1

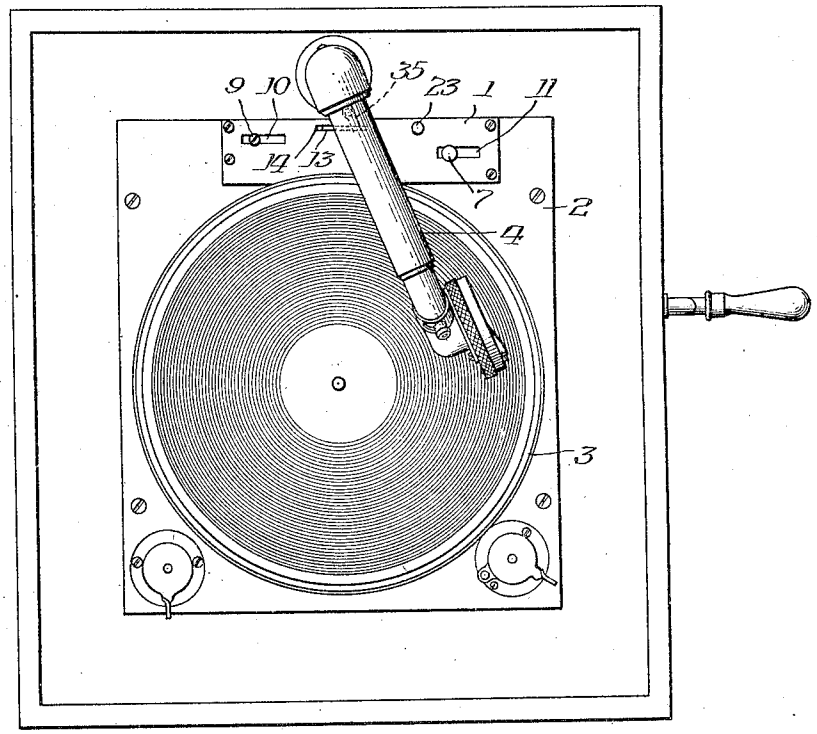
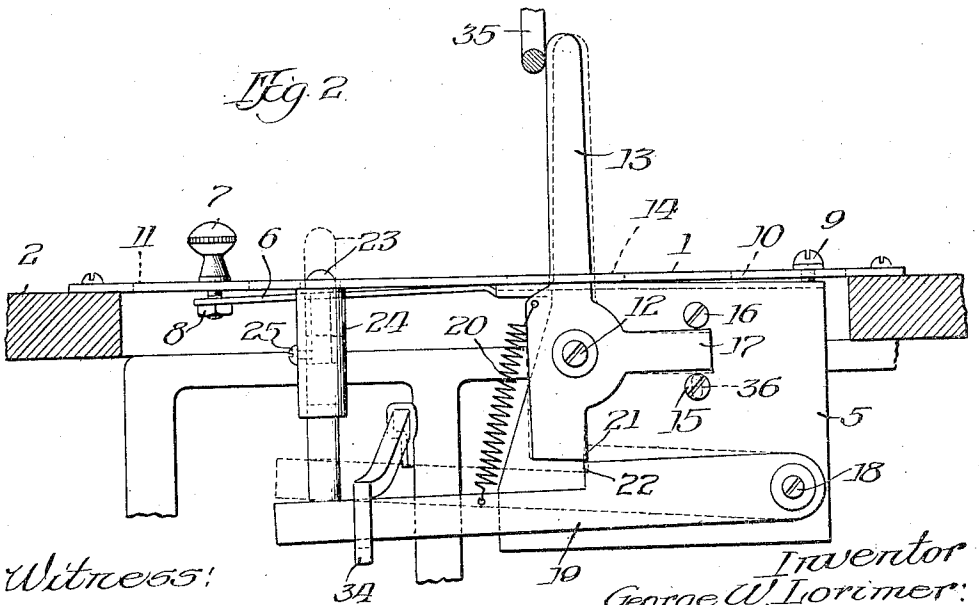


Fig. 2



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2 SHEETS—SHEET 2.

Fig. 3.

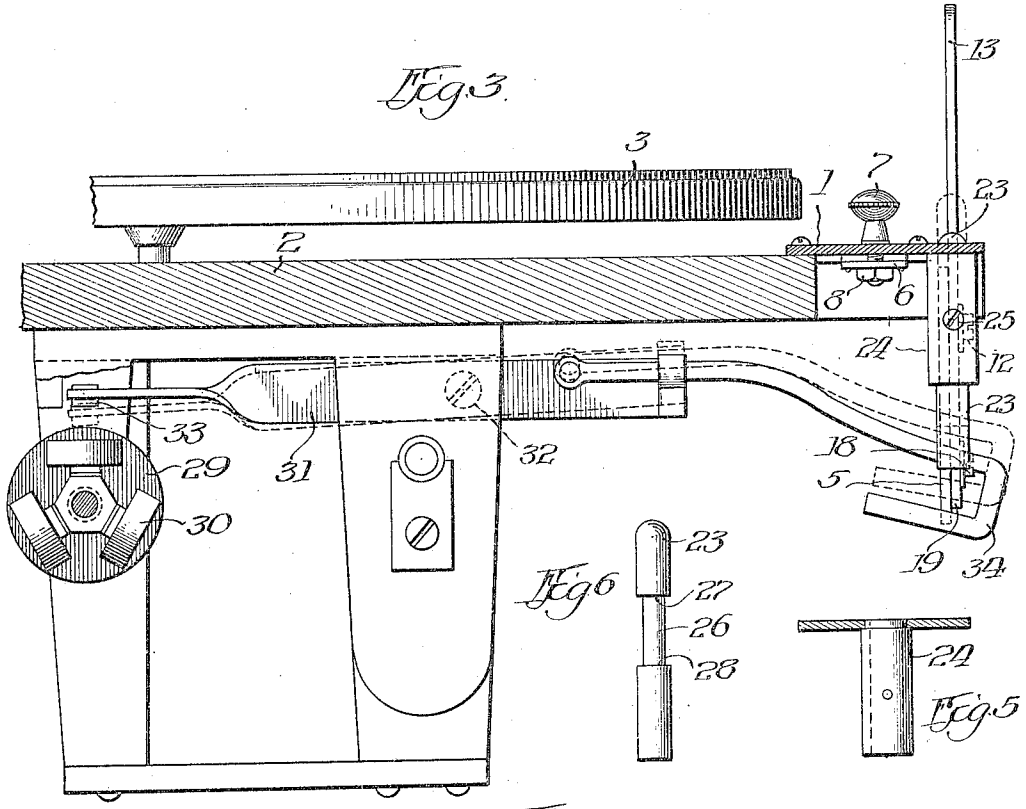


Fig. 6

Fig. 5

Fig. 4

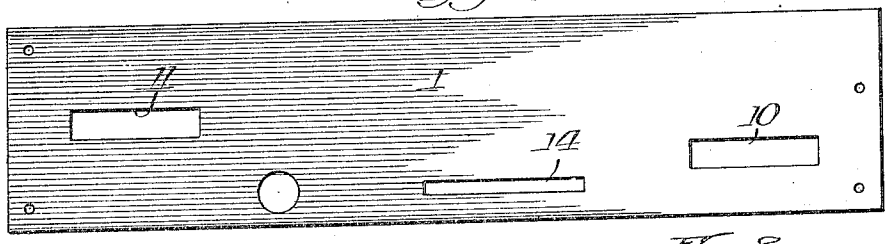


Fig. 7

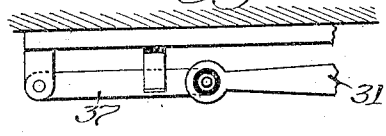
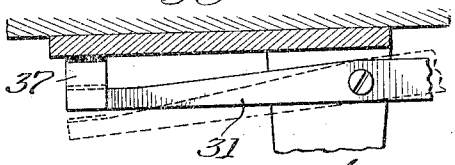


Fig. 8



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UNITED STATES PATENT OFFICE.

GEORGE W. LORIMER, OF TROY, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE THOMAS MANUFACTURING COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

AUTOMATIC STOP FOR PHONOGRAPHS.

1,396,964. Specification of Letters Patent. Patented Nov. 15, 1921.

Application filed November 9, 1917. Serial No. 201,044.

To all whom it may concern:

Be it known that I, GEORGE W. LORIMER, a citizen of the United States, residing at Troy, in the county of Miami and State of Ohio, have invented a certain new and useful Improvement in Automatic Stops for Phonographs, of which the following is a full, clear, concise, and exact description.

This invention relates to improvements in automatic stops for phonographs. More particularly stated the invention relates to a stop of this general type which may be set to automatically stop the motor of a phonograph in such manner as to bring the turn table thereof to a position of rest at any desired point. Thus the machine may be stopped immediately upon the completion of a record which has been played thereon or at any desired point intermediate the beginning and end of such record.

The object of such automatic stops of this character is obvious. They avoid the necessity of stopping the machine by hand each time a record has been played and accordingly obviate the necessity of some one being near the phonograph whenever the reproduction of a record is nearing completion in order that they may properly stop the same by hand and thus prevent undue wear on the parts.

While a number of stops of this general character have been devised and are in use to some extent at the present time, they have been found to be more or less inaccurate and difficult to manipulate. Furthermore, a number of these prior devices are objectionable in that they operate directly on the turn table of the phonograph, thus producing undue strain on the governor mechanism which in time is thus rendered less effective.

One object of the present invention is to provide an automatic stop of the type described which will perform its functions in an effective manner and in a manner that will cause less jar and strain on the operating mechanism than is usual when the stopping is effected manually or by means of a stop which operates directly on the turn table.

Another object of the invention is to provide readily accessible and easily manipulated means for setting the stop.

A further object is the provision of means whereby the point at which the machine is stopped will correspond exactly with the point at which the stop device has been set.

Other objects and advantages will be apparent from the following description taken in connection with the accompanying drawings wherein two forms of the invention are illustrated.

Figure 1 is a top plan view of a phonograph showing the invention applied thereto.

Fig. 2 is a rear elevation of the stop mechanism.

Fig. 3 is an end elevation.

Fig. 4 is a top plan view of the supporting plate.

Fig. 5 is a detail view of the starting button socket.

Fig. 6 is a detail view of the starting button, and

Figs. 7 and 8 are fragmentary views illustrating the invention as applied to electrically operated phonographs.

Referring more in detail to the drawings, the reference character 1 designates the plate on which the stop mechanism is mounted, said plate being designed to fasten to the motor supporting panel 2 at the rear thereof and in such manner that said plate will be positioned intermediate the turn table 3 of the phonograph and the base of the tone arm 4. The motor supporting panel 2 is preferably cut away so that the stop mechanism suspended from the plate 1 will hang beneath said panel 2 substantially as shown. A slidable angle plate is illustrated at 5 to which is attached a metal strap 6, preferably in the form of a leaf spring. The free end of this strap is adjustably engaged by the screw threaded stem of the setting knob 7. The setting knob after it has been screwed into the strap 6 is locked in its proper adjusted position by means of a jam nut 8. The strap 6, as will be noted, has a natural bend downward and is kept under tension by means of the knob 7 and the jam nut 8. The action of the device depends in a measure on the friction established between the strap 6 and the plate 1, as will be hereinafter more fully described.

The slidable angle plate 5 is supported by and attached to the plate 1 by means of the screw-threaded engagement of the knob 7 with the free end of the strap 6 and by

means of the machine screw 9 which is carried by the plate 5 at the end thereof opposite the end which carries the strap 6. The plate 1 is provided with a plurality of slots 10 and 11. The stem of the setting knob 7 and the machine screw 9 are adapted to slide in these slots and being attached to the plate 5, it is evident that when the setting knob 7 is moved back and forth in the slot 10, the plate 5 will also be moved back and forth in the same manner. Pivoted to the plate 5 by means of a pivot screw 12 is shown the set lever 13. This lever protrudes through an elongated slot 14 in the plate 5, said set lever being limited in its oscillatory movements about its pivot 12 by means of the set screws 15 and 16 which are adapted to engage the projection 17 of said set lever. Also attached to the plate 5 by means of a pivot screw 18 is a trip lever 19, which is adapted to move upwardly in a substantially vertical plane by the action of the spring 20 when the edge 21 at the lower end of said set lever 13 slips off of the shoulder 22 by virtue of said set lever being rocked to the right about its pivot 12. As will be noted, the spring 20 also tends to keep the set lever 13 in a position so that when the trip lever 19 is depressed, the edge 21 will engage with the shoulder and keep it in this set position until the top of the lever 13 is again rocked to the right as viewed in Fig. 2.

The starting button is illustrated at 23 and is adapted to reciprocate within the sleeve 24 secured to and depending from the under surface of the plate. The starting button 23 is preferably provided with a reduced portion 26 intermediate its ends, whereby suitable stops or shoulders 27 and 28 are provided. A set screw, such as shown at 25, is mounted in the wall of the sleeve 24, and is adapted to project into the reduced portion 26 of the button 23, to limit said button in its movements in either direction by coming into engagement with said stops or shoulders 27 and 28 when said button is moved up and down. In this manner the button is maintained within its sleeve at all times, and in operative relation to the stop mechanism. When the starting button 23 is depressed to its limit, the trip lever 19 will also be depressed so that the shoulder 22 will fall beneath the edge 21 of the lever 13. From this it will be noted that when the protruding end of the set lever 13 is rocked to the right, as viewed in Fig. 2, the trip lever 19 will be raised by means of the spring 20. The starting button 23 will also be raised by the trip lever 19 during this movement of the mechanism, but, it will be noted, said button is prevented from being ejected from the sleeve 24 by means of the set screw 25 striking against the shoulder 28, as above pointed out.

At 29 in Fig. 3 is illustrated the friction disk of the governor 30. In this figure a portion of the motor supporting frame which is suspended beneath and attached to the panel plate 2 is also illustrated. At 31 is illustrated a stop lever which is shown pivoted to the motor frame in any suitable manner shown in the drawings in the form of a pivot screw 32. This stop lever 31, as will be noted, is adapted to move only up and down in a substantially vertical plane. In other words, it is anchored as regards longitudinal movement. One end of the lever 31 is provided with a suitable pad 33 which may be formed of leather, fabric or any other suitable material. As will be noted, this pad 33 is adapted to engage and bear against the rim of the governor friction disk 29 when the free arm of the lever 31 is depressed or moved downwardly. Attached to the short end of the lever 31 is a suitable hook 34 which is adapted to embrace the trip lever 19 substantially as shown. Thus when the trip lever 19 is depressed by means of the starting button 23, the pad 33 by virtue of the coöperation between said trip lever 19 and the hook 34 will be raised from the rim of the friction disk 29. On the other hand, when the trip lever 19 is raised through the action of the spring 20 when a disengagement of the edge 21 and shoulder 22 is effected, the pad 33 will be brought to bear against the rim of the governor friction disk 29, thus bringing the motor and its associated mechanism to a position of rest. It will be noted from the foregoing that the plate 5 which carries the trip lever 19 may be moved at will by means of the knob 7 and that an operative engagement and coöperation between the said trip lever 19 and the stop lever 31 is maintained in whatever position the plate 5 may be set. This coöperation between the trip lever 19 and the stop lever 31, it will be noted, is maintained regardless of the set position of the plate 5 by virtue of the hook 34, which hook permits said trip lever 19 to slide longitudinally. A suitable actuating arm is illustrated at 35, said arm being attached to the under side of the tone arm 4 and being adapted to engage the protruding end of the set lever 13 at a certain predetermined point whereby the phonograph is automatically stopped.

Before describing the action of the apparatus in its entirety, the various adjustments necessary to its successful operation will be described.

As the set lever 13 must be moved by means of the setting knob 7 to a position where it will be tripped by the actuating arm 35, it follows that the friction between the spring strap 6 and the plate 1 must be greater than the power required to cause a disengagement of the edge 21 and the shoulder and at the same time the friction thus

produced between the strap 6 and the plate 1 must be so adjusted as to permit of a free and smooth movement of the mechanism in setting the same. This adjustment is provided by screwing the stem of the setting knob 7 to a greater or lesser degree into the strap 6 which, as above stated, has a natural bend downward and is in effect a spring. The jam nut 8, as above described, serves to lock the strap 6 and the knob 7 in their predetermined adjusted positions. It is obvious from the foregoing that screwing the stem of the setting knob 7 into the strap 6 to a greater degree than illustrated in the drawings will increase the friction between said strap and the plate 1 and that accordingly an adjustment of the screw within the strap to a lesser degree than illustrated will cause less friction to be exerted as the mechanism is moved back and forth to various stopping positions.

As the set lever 13 is the medium by which the position for stopping the motor is determined, it is obviously essential that the position in which said lever 13 is set shall coincide exactly with the stopping position. It follows, therefore, that when the actuating arm 35 is pressed against the set lever 13 to fix the setting position that said lever 13 should trip the lever 19 at the same position as when set. This is accomplished by means of the screw 15 which is adjustably mounted within a suitable slot 36 in the plate 5. In this manner, it will be noted that the screw 15 may be set in any desired position with relation to the projection 17 of the lever 13 and thus control the point at which the mechanism is tripped. In setting the mechanism, the trip lever 19 is always in its raised position, as shown in dotted lines in Fig. 2 and when the set lever 13 is brought against the actuating rod 35, the projecting end of said lever 13 should rest firmly against the adjusting screw 15. When properly adjusted, the screw 15 is set in such a position that when the projecting arm 17 of the lever 13 is resting against it, the edge 21 will just pass over the shoulder 22. In this adjustment the setting position will coincide exactly with the tripping position.

The operation of the apparatus in its complete function of setting, starting and stopping will now be described.

When it is desired to set the mechanism, the setting knob 7 is pushed to the left (Fig. 1) to its full extent carrying with it the set lever 13. The needle or stylus is then set in the groove of the record at which it is desired to stop the revolution of the turn table. The setting knob 7 is then moved to the right (Fig. 1) until the actuating arm 35 attached to the tone arm is firmly pressed against the set lever 13. This action brings the projection 17 of said lever 13 temporarily against the adjustable screw 15. The reproducer and its needle is then lifted from the record and the starting button 23 is depressed. Upon the depression of the button 23, the trip lever 19 is also depressed, which depression of said trip lever 19, by virtue of its coöperation with the stop lever 31 through the medium of the hook 34, causes the pad 33, which presses against the rim of the friction disk when the mechanism is in its tripped position, to be raised and the motor, therefore, is allowed to start. In depressing the starting button 23, it will be noted that the trip lever 19 is brought to its lowermost position and through the influence of the spring 20, the edge 21 of the set lever 13 is engaged by and held against the shoulder 22. The trip lever 19 is held in this position until the tone arm which carries the actuating arm 35 in its progression toward the center of the record comes into contact with the protruding end of the set lever 13 and after coming into contact therewith, gradually rocks said set lever 13 about its pivot 12 until the disengagement of the edge 21 and the shoulder 22 is effected, at which time the action of the spring 20 raises the trip lever 19 and in turn operates the lever 31 and causes the pad 33 to be pressed firmly against the rim of the governor disk 29, thus stopping the motor. It will be noted that when the edge 21 disengages the shoulder 22 that the lever 13 is in exactly the same position as when the setting was accomplished.

It is the usual practice to have automatic stops operate on the rim of the turn table of the phonograph but with disastrous results to the motor. The governor usually runs at the rate of 1500–1800 R. P. M. and the sudden stopping of the turn table shaft tends to break the governor springs or render them otherwise inoperative. By applying the stop to the governor friction disk, as set forth herein, the motor is brought to a stop gently thereby obviating the possibility of damaging the same.

It will be readily observed that the invention herein described is not limited to the ordinary spring motor of the type commonly used in phonographs, but that on the other hand, it may readily be applied to electrically driven phonographs. In Figs. 7 and 8 two ways of applying the invention to electrically driven phonographs are illustrated. In Fig. 7 the free end of the stop lever 31, instead of being provided with a brake shoe, is shown loosely connected to the outer end of a movable element of a knife switch 37, whereby the oscillation of said lever 31 will make or break the motor circuit, thus starting or stopping the rotation of the turn table at the point at which the stop mechanism has been set; while in Fig. 8 the outer end of the stop lever 31 provides

the movable element of the switch 37, and is adapted to move into and out of engagement therewith when said lever is rocked up and down in the manner hereinabove set out. It is obvious that the construction and operation of the mechanism illustrated in the other figures of the drawing need not be otherwise changed to render it adaptable for use with electrically driven phonographs. It is also obvious that various other arrangements may be devised in rendering the invention applicable to electrically operated phonographs without departing from the spirit of the invention.

It is not desired to limit the invention illustrated and described herein, except where limitations appear in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A stop for phonographs comprising a brake lever, actuating means therefor, a movable element on which said actuating means is mounted, a stationary supporting plate for said movable element, and adjustable means for maintaining said movable element in frictional engagement with said supporting plate.

2. An automatic stop for phonographs comprising a stationary plate, a movable plate, a vertical set lever pivoted to said movable plate and projecting through and above said stationary plate, a plurality of stops, a projection carried by said set lever and extending between said stops whereby said lever is limited in its movements in both directions, a substantially horizontal trip lever pivoted to said movable plate below said set lever, a shoulder on said trip lever adapted to engage the end of said set lever, a stop lever loosely engaging said trip lever, a spring attached to said trip lever at one end and to said set lever at its other end, and means whereby when said projection engages one of said stops by virtue of the movement of said set lever in one direction, said shoulder disengages the lower end of said set lever thereby permitting said spring to raise said trip lever and cause said stop lever to be actuated.

3. In an automatic stop for phonographs, the combination of a pivoted brake lever, a trip lever connected thereto and adapted to operate the same, a latch for engaging said trip lever, a stop for limiting the extent of such engagement, and resilient means adapted to maintain said latch in operative position when set and to actuate said trip lever to apply said brake upon disengagement of said trip lever with said latch.

4. In an automatic stop for phonographs, the combination of a stop lever having a loop at one end thereof, a longitudinally movable trip lever pivoted at one end and extending loosely through said loop at the other, whereby movements of said trip lever in either direction will be transmitted to said stop lever, and means for operating said trip lever at a predetermined time.

5. An automatic stop for phonographs comprising a stop lever, latch mechanism for operating said stop lever, means for actuating said latch mechanism at a predetermined point, a stationary plate, a movable plate slidably engaging said stationary plate and adapted to support said latch mechanism whereby the latter may be moved into various stop positions, and adjustable means for maintaining sufficient pressure between said plates to prevent accidental displacement of said movable plate.

6. A stop for phonographs comprising a brake lever, actuating means therefor, a movable element on which said actuating means is mounted, a stationary supporting plate for said movable element, and resilient means carried by said movable element and frictionally engaging said plate for maintaining said element against accidental displacement.

7. A stop for phonographs comprising a brake lever, actuating means therefor, a movable element on which said actuating means is mounted, a stationary supporting plate for said movable element, resilient means carried by said movable element and frictionally engaging said plate for maintaining said element against accidental displacement, and means for adjusting the tension of said resilient means.

8. An automatic stop for phonographs comprising a stationary support, a movable element, a set lever pivoted to said movable element and projecting through said support to be engaged by the tone arm of said phonograph, means for limiting the movements of said set lever, a trip lever pivotally mounted on said movable element and adapted to engage said set lever, the extent of such engagement being controlled by said limiting means, a stop lever loosely engaging said trip lever, resilient means attached to said trip lever at one end and to said set lever at its other end, and means whereby upon movement of said set lever in one direction by said tone arm said trip lever is disengaged, thereby permitting said resilient means to operate the latter and said stop lever.

In witness whereof I hereunto subscribe my name this 29th day of October, A. D., 1917.

GEORGE W. LORIMER.

Witnesses:
LEO H. WAMMES,
FRANK GEHLE.