

Aug. 3, 1943.

P. S. GAY

2,325,602

POWER AND BRAKE CONTROL FOR RECORDING APPARATUS

Filed May 15, 1941

2 Sheets-Sheet 1

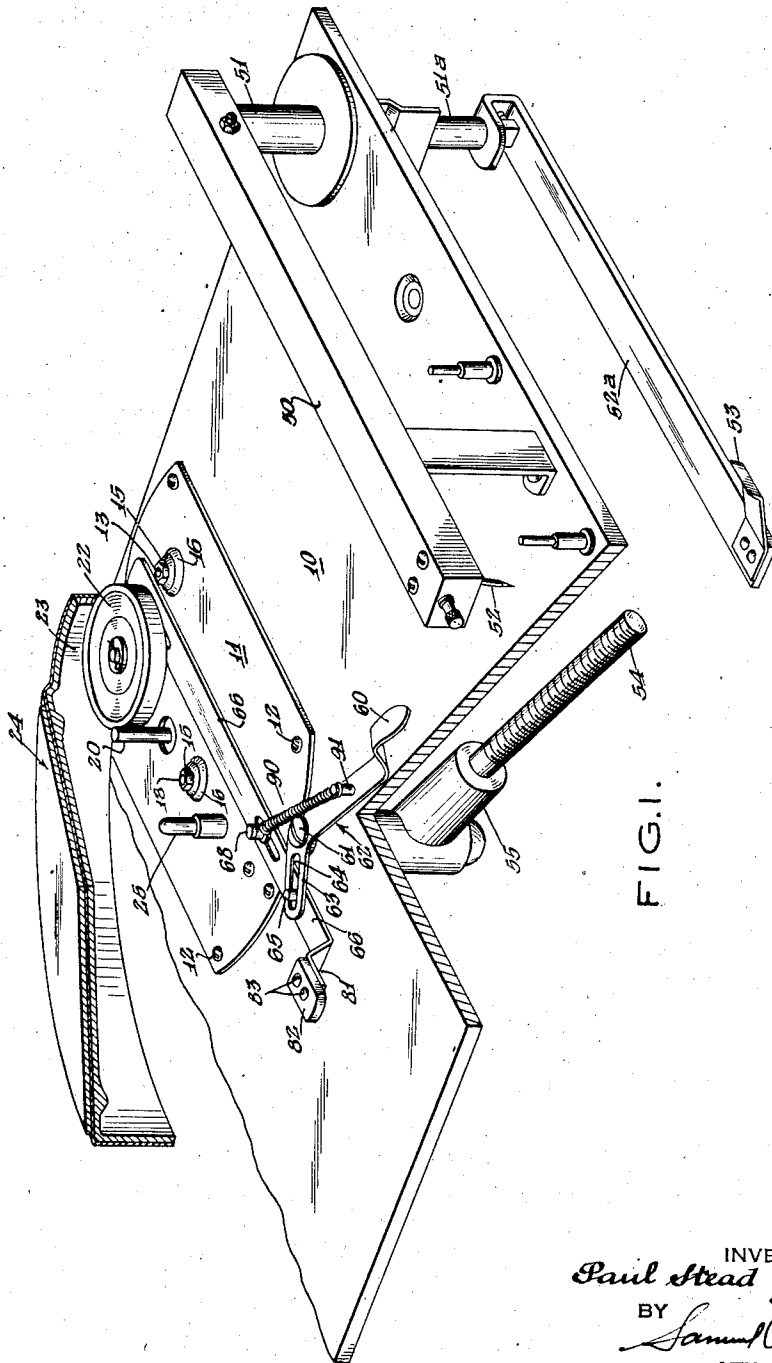


FIG. 1.

INVENTOR
Paul Stead Gay
BY *Samuel C. Crotwell*
ATTORNEY

Aug. 3, 1943.

P. S. GAY

2,325,602

POWER AND BRAKE CONTROL FOR RECORDING APPARATUS

Filed May 15, 1941

2 Sheets-Sheet 2

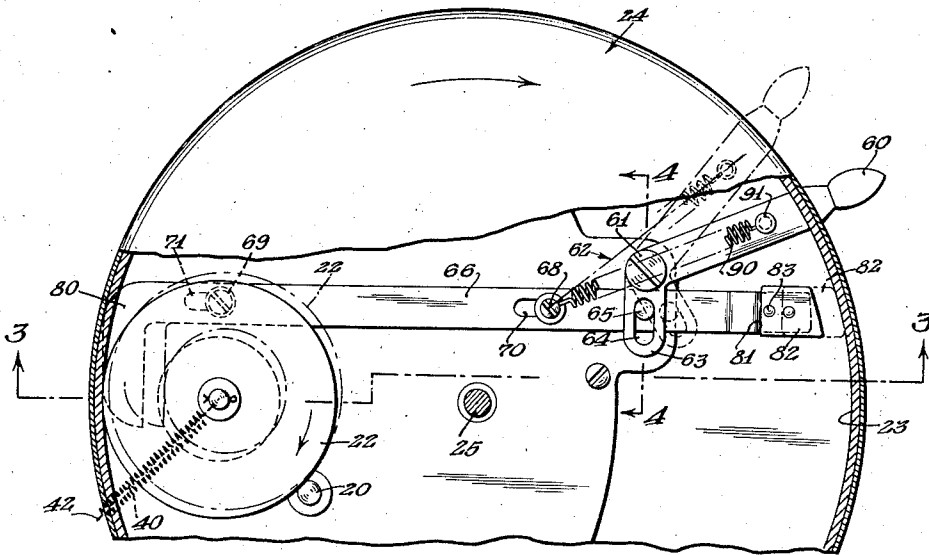


FIG. 2.

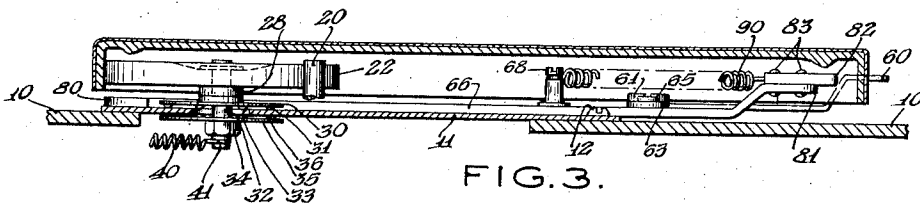


FIG. 3.

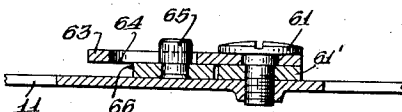


FIG. 4.

INVENTOR
Paul Stead Gay
BY *Samuel Ostrander*
ATTORNEY

UNITED STATES PATENT OFFICE

2,325,602

POWER AND BRAKE CONTROL FOR
RECORDING APPARATUS

Paul Stead Gay, Charlotte, Mich., assignor to
Wilcox-Gay Corporation, Charlotte, Mich., a
corporation of Michigan

Application May 15, 1941, Serial No. 393,563

9 Claims. (Cl. 192-4)

My invention relates to sound recording and reproducing apparatus and more particularly to a recorder and reproducer using a rotating turntable and having a simplified and novel power connecting and braking means, and more specifically relates to a turntable driving means and turntable stopping apparatus.

An important object of the present invention is the arrangement of the operating mechanism for the single rotating turntable in such a manner that the same may be disconnected from its power source and immediately brought to a stop by a simple manual operation.

Another object of the present invention is the arrangement of a power transmission mechanism for a turntable in such a manner that the same may be disconnected from operative connection with the turntable by a simple manual manipulation.

Still a further object of this invention is the arrangement of a turntable and braking means therefor in such a manner that the stopping of the turntable by means of the brake and the disconnection of the turntable from its power source may simultaneously be performed by a simple manual operation.

Another object is the provision of a simple power transmitting connection between the turntable and the motor of sound apparatus.

These and many other objects of the present invention will in part be apparent and where not apparent pointed out in the following description and drawings in which:

Figure 1 is a view in perspective, partially broken away, showing the novel apparatus of my invention.

Figure 2 is a top view of the apparatus of Figure 1, showing selective positions for the braking and power disconnecting mechanism of the present invention.

Figure 3 is a cross-sectional view taken on line 3, 3 of Figure 2 looking in the direction of the arrows.

Figure 4 is a cross-sectional view taken on line 4, 4 of Figure 2 looking in the direction of the arrows.

Referring now to the figures, I have here shown sound recording and reproducing apparatus having the novel form of my invention mounted on a base 10 which may be supported in any suitable manner in the top of a cabinet (not shown). The base 10 has an enlarged opening therein over which is mounted the motor mounting plate 11 (see particularly Figure 1),

which plate is secured to the base by the screws 12 or in any other suitable manner.

A motor (not shown) of any suitable form may be suspended from the underside of the plate 11 by means of the bolts 13 which pass through the mounting plate 11 and are secured by the nuts 15.

Resilient rubber grommets 16 are provided between the nuts 15 and the plate 11 in order to provide a resilient mounting for the motor so that the field poles thereof may rotate to compensate the power pulses and thus prevent the creation of hum in the record. This particular mounting of the motor and the function and operation of the resilient grommets are fully described in my application Ser. No. 320,823, filed February 26, 1940; and while this mounting forms a valuable and useful part of the present apparatus, it constitutes no part of the present invention. The apparatus of the present invention may be utilized in connection with any appropriate power source and any suitable type of mounting therefor.

The motor shaft 20 extends upwardly vertically through an opening in the mounting plate 11 and hence projects on the upper side of base 10. The motor shaft 20 is in surface-to-surface engagement with the periphery of a rubber-tired idler 22 which in turn is engaged with the inner surface of a dependent flange 23 of the turntable 24.

The turntable rotates on the spindle 25 and causes the same to rotate in order to drive the tone arm in the manner hereinafter described.

The rubber-surfaced idler 22 is compressed between the flange 23 and the motor shaft 20 and thus furnishes a resilient driving connection therebetween which further serves to reduce the effect of power pulses and other motor noises in the manner more fully described in my application Ser. No. 320,823. Compression of the rubber peripheral surface of the idler, however, does not affect the speed ratio of power transmission since changes in the diameter of the idler have no effect. This is so because whatever linear movement is transmitted to the surface of the idler by the motor is transmitted in equal degree to the surface of the turntable flange irrespective of changes of diameter of the idler.

The shaft 28 on which the idler 22 rotates is rotatably mounted on a mounting plate 30. The mounting plate 30 has an annular boss 31 which bears against the base plate 11. A bolt 32 secured to the mounting plate passes through an enlarged opening 33 in the base plate 11 and car-

ries secured thereto and positioned thereon by the nut 34 the washer 35. The washer 35 also has an annular boss 36 which bears against the underside of the plate 11.

The pressure of the washer 35 against the underside of plate 11 thus serves to secure the mounting plate 30 on the plate 11. The hole 33 in the mounting plate 11, through which the bolt passes, has a larger diameter than the bolt 32 and accordingly the mounting plate is permitted some movement with respect to the plate 11.

The plate 30 is resiliently biased outwardly and away from the motor shaft 20 by the tension spring 40, one end of which is at 41 attached to the bolt 32 and the other end of which is at 42 hooked through a perforation 43 in the plate 11.

The placement of the turntable 24 upon the spindle causes the flange 23 thereof to move the idler 22 against the bias of the spring 40 into engagement with the shaft 20.

In the event that when the turntable is mounted on its spindle the distance from the flange to the shaft 20 is less than the diameter of the idler 22, then, by reason of the fact that the hole 33 is much larger than the bolt 32, the bolt 32 may be moved along an arcuate path (with the distance between the shaft 20 to the bolt 32 as a radius) until the idler has been adjusted so that both the shaft 20 and the flange 23 are in abutment therewith. Thus the shaft 20 and the point of contact of the idler 22 and the flange 23 are not diametrically opposite each other across the idler, but rather are in the relationship shown in Figure 2 when the turntable is placed on the spindle. By this means also, the rubber tire on the idler 22 is compressed between the flange 23 and the motor shaft 20 to ensure the transmission of power therethrough. The basic elements of the operation of the idler and of the mounting therefor above described have been set forth in my application Ser. No. 320,823 and I have here set forth in detail only the variation in the mounting which falls, however, within the basic principles of the idler mounting therein described.

The tone arm 50, pivoted on the post 51, may carry a needle 52 which may cooperate in any suitable manner and in a manner now well-understood in the art with a record placed on the turntable 24.

In my application 381,555, filed March 3, 1941, I have shown a construction wherein the tone arm 50 may be elevated so that the post 51a thereof may be drawn upwardly in order that the operating arm 52 carrying the pawl 53 may engage the screw 54 which in turn is driven by the worm gear mechanism housed in the housing 55 from the spindle 25. Thus when the tone arm 50 is raised, a cutting needle may be used as needle 52 while the rotation of the turntable will, through the spindle 25, housing 55, screw 54 and pawl 53, drive the operating arm 52a and hence, through the post 51a, cause the tone arm 50 to rotate on its journal 51. When the tone arm 50 is lowered to the position shown in Figure 1 and an ordinary play-back needle is used as the needle 52, then the tone arm is in the position to follow the annular groove in any record disc placed on the turntable 24. In the first case the apparatus functions as a sound recorder; and in the second case the apparatus functions as a play-back unit.

These elements are more particularly described in my application above mentioned and do not necessarily form a part of the present invention.

The prime function of the present invention is the power connecting and disconnecting apparatus and the braking apparatus which is operated by means of the manual lever 60 and serves to disconnect the turntable from the power source without the necessity for turning off current to the power source, and serves simultaneously to apply a brake to the turntable in order to cause the same to stop.

The movement of the handle 60 to another selective position will reconnect the turntable to the power source and will simultaneously remove the turntable from the influence of the brake so that the same may continue to operate.

Accordingly the braking disclosure of the present invention may be utilized in connection with the turntable disclosed in my application Serial No. 320,823. The operation of the braking apparatus of the present invention does not depend on the use of a single tone arm 50 for both recording and reproducing functions, but may be utilized in apparatus where separate arms are used for recording and reproducing or in many other types of sound apparatus. The present tone arm and the function thereof has been described in order, however, to set forth the general environment in which the present operation occurs.

As is seen in Figures 1, 2, and 3, the manual operating arm 60 is pivoted by means of the screw 61, the shaft of which serves as a pivot on the base 10. The manual operating arm 60 is one arm of a bell crank lever 62, the opposite arm 63 of which has a slot 64. Slot 64 engages and surrounds the pin 65 which is mounted on the link 66.

Link 66 is slidably mounted on the base plate 11 by means of the screws 68 and 69 which engage the mounting plate 11. The shafts of the screws 68 and 69 pass through the longitudinal slots 70 and 71 of the link 66 and serve to guide the same and confine the movement thereof to a longitudinal one. One end of the link 66 is formed into a hook 80 which embraces one side of the mounting plate 30 of the idler 22 as seen in Figures 2 and 3. The opposite end of the link 66 has a reentrant angular member 81 elevated above the plane of the mounting plate 11 in such a manner that a brake block 82 carried thereby may be in registry with the inner surface of the flange 23 of the turntable 24.

The brake block 82 may be formed of any suitable frictional material adapted to be used as a braking member and may be secured to the member 81 of the link 66 in any suitable manner, as for instance by the rivets 83, 83.

A tension spring 90 connects the pin 91 of the manual operating lever 60 with the stationary pin 68 which also serves as a guide for the link 66. The tension spring 90 is so arranged and the pins 91 and 68 are also so arranged that the spring 90 passes beyond the center 61 during each of the two selective movements of the operating lever 60. Thus when the manual operating lever 60 is in the position shown by the solid lines of Figure 2, the spring 90 has passed slightly beyond the center 61 and thus tends to bias the operating lever 60 toward clockwise rotation about its pivot 61 with respect to the showing of Figure 2 in such a manner that the link 66 is biased toward the left with respect to Figure 2 and so that the slots 70 and 71 are moved so that the right hand ends of the slots engage the pins 68 and 69, thus limiting the movements of the link 66 and of the operating lever 60.

The movement of the operating lever 60 to the position shown by the solid lines of Fig. 2 is translated into corresponding movement of the link 66 to the position shown by the solid lines by reason of the connection between the slot 64 of the arm 63 and the pin 65 on link 66. In this position, it will be noted from an inspection of Fig. 2, the hook 80 is out of engagement with the mounting plate 30 of the idler, the brake block 82 is out of engagement with the flange 23 of the turntable.

When now the manual operating lever 60 is rotated counterclockwise with respect to the showing of Fig. 2, to the position shown by the dotted lines thereof, then the spring 90 passes over center 61 and tends to bias the manual operating lever toward the position shown by the dotted lines.

The arm 63 now rotates, also in a counterclockwise direction and thus through the connection between the slot 64 and the pin 65 moves the link 66 toward the right with respect to Fig. 2.

The link 66 may now move to a position where the left hand ends of the slots 71 and 70 engage the screws 68 and 69 and where it now occupies the position shown by the dotted lines of Fig. 2. The hook 80 now engages the mounting plate 30 of the idler 22 and moves it toward the left, thus pulling the idler slightly away from the flange 23 of the turntable. Simultaneously, the movement of the link forces the opposite end 81 of the link which carries the brake block 82 into the position shown by the dotted lines where the brake block abuts the inner surface of flange 23.

Since the mounting plate 30 of the idler is only resiliently biased by the spring 40 into engagement with the flange 23, and since the opening 33 of the mounting plate through which the shaft 32 supporting the mounting plate thereof passes is relatively large, the shaft 32 of the idler may move sufficiently in response to the influence of the hook 80 to clear the periphery of the idler from the shaft 23 and cause the idler to move slightly around the motor shaft 20 in the manner shown by the dotted lines of Fig. 2 in order to effect the disengagement described.

The abutment of the brake 82 against the inner surface of the flange 23 immediately stops the turntable.

Since the idler 22 is now rotating free of the turntable flange 23, the turntable immediately is brought to a stop. A reverse movement of the manual operating lever 60 from the position shown by the dotted lines of Fig. 2 to the position shown by the solid lines thereof will now disengage the brake lock 82 from the flange 23 in the manner previously described and will remove the hook 80 to a position where the idler 22 may be reengaged between the motor shaft 20 and the flange 23 in order to reestablish the driving connection.

By this simplified apparatus, which includes a single link carrying the motor disconnecting apparatus at one end and the braking apparatus at the other end and a simple over center manual operating toggle for operating the link, it is possible immediately to bring the turntable to a stop or immediately to reengage the turntable in order to start the rotation thereof once more. The incorporation of this braking member and power disconnecting member in the sound recording and reproducing apparatus above-described permits the use of the same for intermittent record-

ing or intermittent playing back at the option of the user.

Thus apparatus embodying the principles herein described may be utilized for office dictation purposes where it may be desired to halt the flow of dictation several times during a single recording; and where during transcribing it may be necessary to halt the play back operation continually in order to maintain appropriate transcribing speed.

The braking apparatus may be used in connection with other types of recorders and other types of play back machines and is not necessarily limited to the particular type of apparatus herein described. Many variations of the braking and power disconnecting apparatus herein described should now be obvious to those skilled in the art. Accordingly, I prefer to be bound not by the specific disclosures herein, but only by the appended claims.

I claim:

1. In sound apparatus, a motor having a shaft, and a turntable having a flange, an idler between said shaft and said flange; said idler being mounted on a sliding mount, means biasing said mount to a position where said idler is in power transmitting position between said flange and said shaft, and a member selectively engageable with said mount and movable to a position where it moves said mount and said idler out of power transmitting engagement with said flange and shaft, and a brake mounted on said member and movable thereby into engagement with said flange.

2. In sound apparatus, a motor having a shaft, and a turntable having a flange, an idler between said shaft and said flange; said idler being mounted on a sliding mount, means biasing said mount to a position where said idler is in power transmitting position between said flange and said shaft, and a sliding link having a hook at one end and a brake at the other said link being slidable to two opposite limiting positions; said hook engaging said mount and moving said idler out of power transmitting position, and said brake engaging said flange in one position of said link; said hook being disengaged from said mount and said brake being disengaged from said flange in the other position of said link.

3. In sound apparatus, a motor having a shaft, and a turntable having a flange, an idler between said shaft and said flange; said idler being mounted on a sliding mount, means biasing said mount to a position where said idler is in power transmitting position between said flange and said shaft, and a link carrying a member engageable with said mount and a brake; said link being movable to two limiting positions; said member moving said mount and its idler out of power transmitting position and said brake engaging said turntable in one position of said link; said brake disengaging said turntable and said idler being reengaged between said shaft and flange in the other position of said link.

4. In sound apparatus, a motor having a shaft, and a turntable having a flange, an idler between said shaft and said flange; said idler being mounted on a sliding mount, means biasing said mount to a position where said idler is in power transmitting position between said flange and said shaft, and a link carrying a member engageable with said mount and a brake; said link being movable to two limiting positions; said member moving said mount and its idler out of power

transmitting position and said brake engaging said turntable in one position of said link; said brake disengaging said turntable and said idler being reengaged between said shaft and flange in the other position of said link and means for sliding said link between said two limiting positions.

5. In sound apparatus, a motor having a shaft, and a turntable having a flange, an idler between said shaft and said flange; said idler being mounted on a sliding mount, means biasing said mount to a position where said idler is in power transmitting position between said flange and said shaft, and a link carrying a member engageable with said mount and a brake; said link being movable to two limiting positions; said member moving said mount and its idler out of power transmitting position and said brake engaging said turntable in one position of said link; said brake disengaging said turntable and said idler being reengaged between said shaft and flange in the other position of said link and means for sliding said link between said two limiting positions; said means comprising a pivotally mounted lever, one end of said lever engaging said link and the other end of said lever forming a handle.

6. In sound apparatus, a motor having a shaft, and a turntable having a flange, an idler between said shaft and said flange; said idler being mounted on a sliding mount, means biasing said mount to a position where said idler is in power transmitting position between said flange and said shaft, and a link carrying a member engageable with said mount and a brake; said link being movable to two limiting positions; said member moving said mount and its idler out of power transmitting position and said brake engaging said turntable in one position of said link; said brake disengaging said turntable and said idler being reengaged between said shaft and flange in the other position of said link and means for sliding said link between said two limiting positions, and additional means for maintaining said link in selected position.

7. In sound apparatus, a motor having a shaft, and a turntable having a flange, an idler between said shaft and said flange; said idler being mounted on a sliding mount, means biasing said mount to a position where said idler is in power transmitting position between said flange and said shaft; and a link carrying a member engageable with said mount and a brake; said link being movable to two limiting positions; said member moving said mount and its idler out of power transmitting position and said brake engaging said turntable in one position of said link; said brake disengaging said turntable and

said idler being reengaged between said shaft and flange in the other position of said link and means for sliding said link between said two limiting positions; said means comprising a pivotally mounted lever, one end of said lever engaging said link and the other end of said lever forming a handle and additional means for maintaining said link and said lever in selected position.

8. In sound apparatus, a motor having a shaft, and a turntable having a flange, an idler between said shaft and said flange; said idler being mounted on a sliding mount, means biasing said mount to a position where said idler is in power transmitting position between said flange and said shaft, and a link carrying a member engageable with said mount and a brake; said link being movable to two limiting positions; said member moving said mount and its idler out of power transmitting position and said brake engaging said turntable in one position of said link; said brake disengaging said turntable and said idler being reengaged between said shaft and flange in the other position of said link and means for sliding said link between said two limiting positions; said means comprising a pivotally mounted lever, one end of said lever engaging said link and the other end of said lever forming a handle; and a tension spring connected at one end to the handle portion of said lever and at the other end to a fixed point, said spring passing through the center of rotation of said lever at each complete movement thereof.

9. In sound apparatus, a motor having a shaft, and a turntable having a flange, an idler between said shaft and said flange; said idler being mounted on a sliding mount, means biasing said mount to a position where said idler is in power transmitting position between said flange and said shaft, and a link carrying a member engageable with said mount and a brake; said link being movable to two limiting positions; said member moving said mount and its idler out of power transmitting position and said brake engaging said turntable in one position of said link; said brake disengaging said turntable and said idler being reengaged between said shaft and flange in the other position of said link and means for sliding said link between said two limiting positions; said means comprising a pivotally mounted lever, one end of said lever engaging said link and the other end of said lever forming a handle; and an over center spring connected at one end to the lever and at the other end to a fixed point said spring passing through the center of rotation of said lever at each complete movement of said lever and said link.

PAUL STEAD GAY.