June 3, 1941. E. V. SCHNEIDER 2,244,120

COMPENSATING TURNTABLE DRIVE

Filed Feb. 8, 1941 2 Sheets-Sheet 1

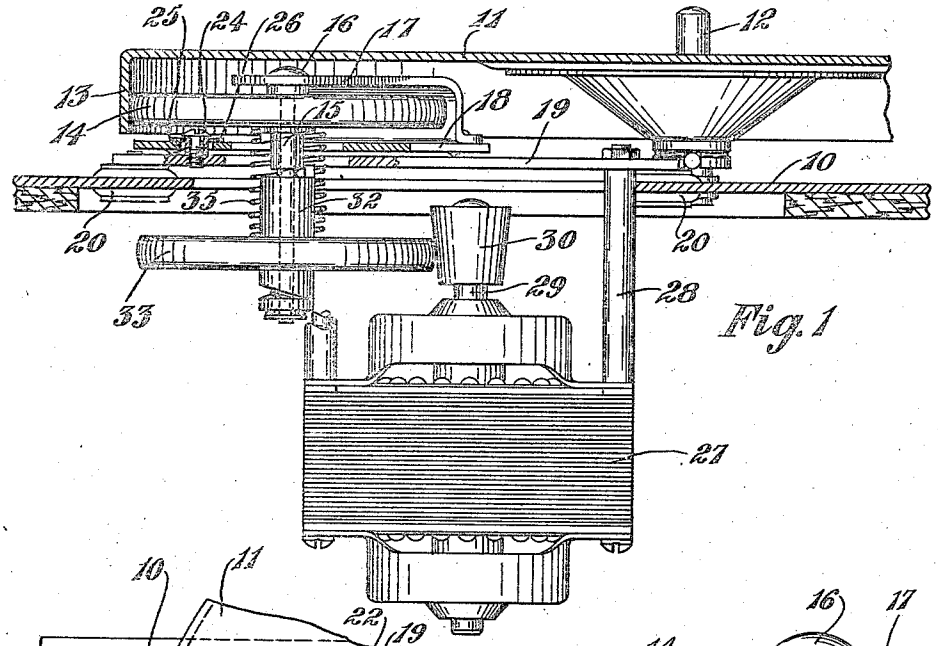


Fig. 1

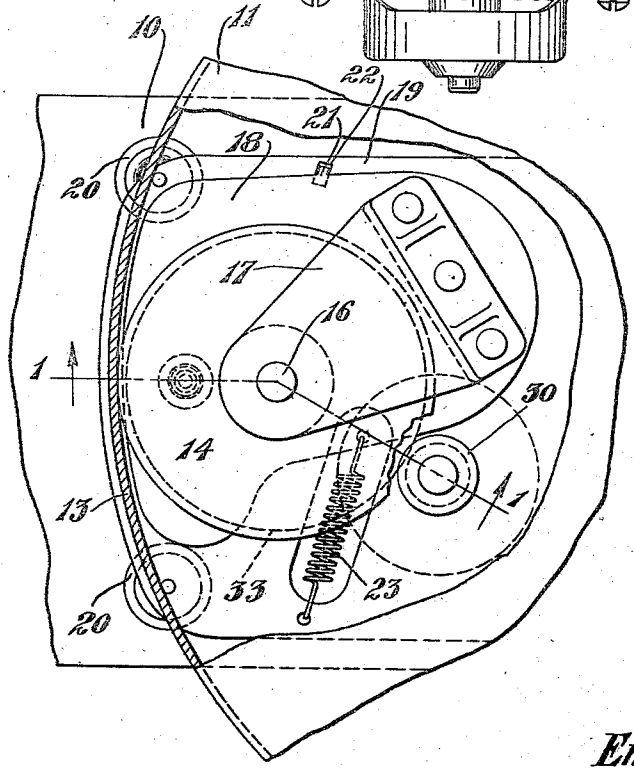


Fig. 2

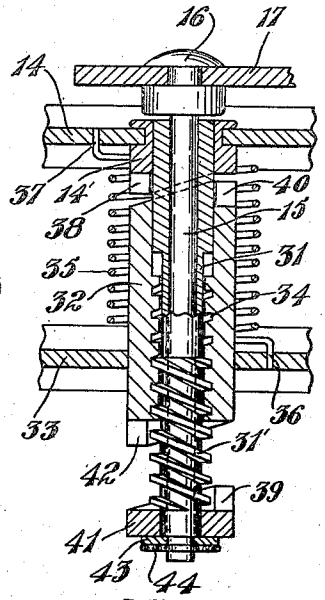


Fig. 3

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COMPENSATING TURNTABLE DRIVE

Filed Feb. 8, 1941 2 Sheets-Sheet 2

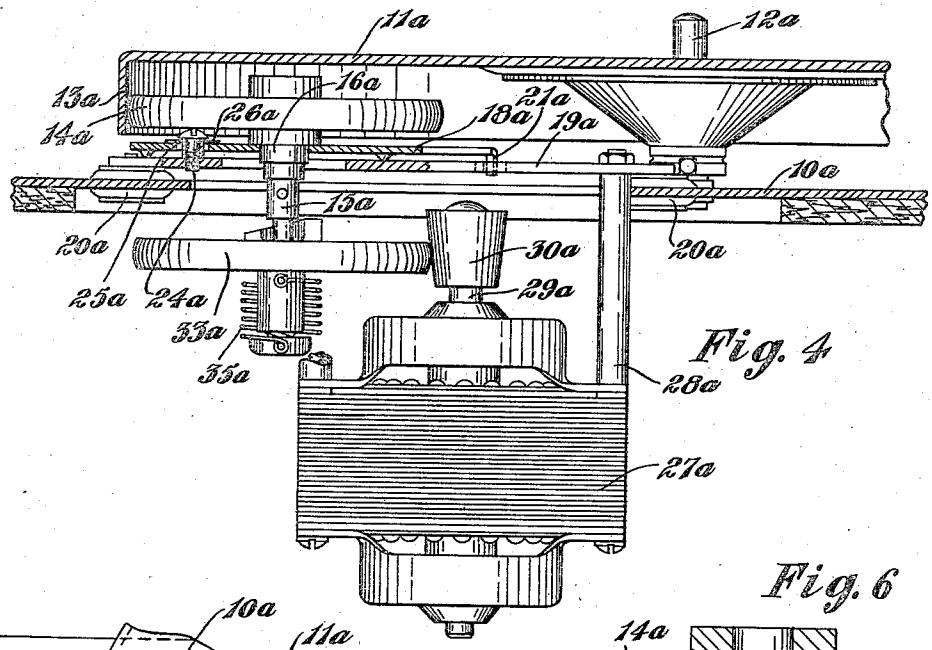


Fig. 4

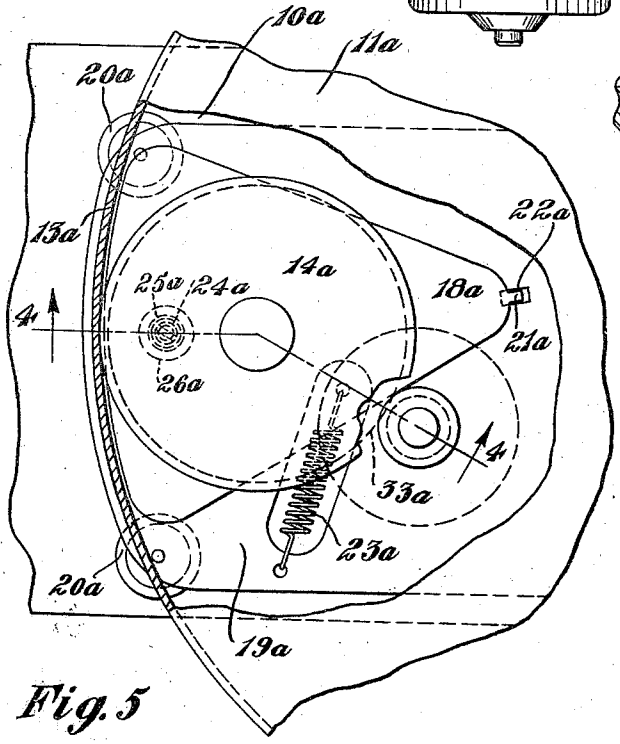
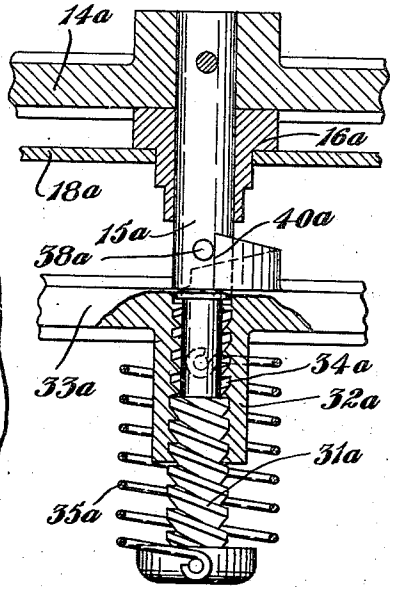


Fig. 5

Fig. 6



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UNITED STATES PATENT OFFICE

2,244,120

COMPENSATING TURNTABLE DRIVE

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Application February 8, 1941, Serial No. 377,988

6 Claims. (Cl. 74—206)

The invention relates to phonograph turntable drives of the general character disclosed in my co-pending application Serial No. 294,938, filed September 14, 1939, and more particularly to a compensating drive so constructed that it will operate the turntable at a uniform speed throughout the entire recording or reproducing of a record, the present application pertaining to a further development of the invention disclosed in my co-pending application for Compensating turntable drive, Serial No. 366,056, filed November 18, 1940.

There has developed, in recent years, a growing demand for combination recording and reproducing phonographs for home use, such phonographs being relatively inexpensive, and provided with an induction motor, for economic reasons.

It has been found by experience, however, that turntable drives operated by such inexpensive motors are not entirely satisfactory because the motor does not have sufficient power to drive the turntable at a uniform speed from the start to the end of a record, especially in recording, and the turntable is driven more rapidly when reproducing than when recording.

Experience has shown that in recording upon such phonographs as are now in general use for home recording and reproducing, there is a differential of approximately eighteen inch ounces to six inch ounces between the start and the end of the record.

This results in noticeable variations in both the tempo and pitch of recordings made upon such phonographs.

It is also well known that there is a difference of approximately four revolutions per minute between the recording and the reproducing of a record upon inexpensive phonographs now in use.

Furthermore, due to the type of motor used for the turntable drive upon such phonographs, there is another objection to present practice phonographs of this type in the pulsations or vibrations of the motor which are reproduced to a greater or less degree in the record.

It is, therefore, the object of the present improvement to provide a compensating turntable drive which will overcome the abovementioned objections and provide for a uniform speed of recording and playing of records and minimize the pulsations or vibrations of the motor.

A further object of the invention is the provision of such a turntable drive in which the turntable is frictionally driven by a friction wheel, upon the shaft of which is slidably mounted a second friction wheel contacting a tapered pulley on the motor shaft and arranged to move longitudinally relative thereto, to compensate for variations in the speed of the turntable between the start and end of a recording, or between the recording and reproducing of a record.

Another object is the provision of such a turntable drive in which the slidably mounted friction wheel is connected to the other friction wheel upon the shaft, by means of a torsion spring through which the drive is effected, whereby the pulsations and vibrations of the motor will not be reproduced in the recording or playing of a record.

A further object of the invention is the provision of a turntable drive of the character mentioned in which the slidable friction wheel is moved longitudinally, relative to the conical pulley, by means of a continuous helical rib or thread having a sufficiently steep pitch to accomplish the desired result.

The above objects together with others which will be apparent from the drawings and following description may be attained in various manners by which a slidably mounted friction pulley is moved relative to a tapered friction pulley upon the motor shaft with means for alternately moving the slidably mounted friction pulley to compensate for drag upon the turntable, and for the purpose of illustration, two forms of the invention are shown in the accompanying drawings in which—

Figure 1 is a vertical sectional view through a phonograph turntable drive embodying the invention taken as on the line 1—1, Fig. 2;

Fig. 2, a fragmentary plan section of the turntable drive shown in Fig. 1;

Fig. 3, an enlarged longitudinal sectional view through the shaft of the friction wheels and associated parts;

Fig. 4, a vertical sectional view through a phonograph turntable drive showing a slightly modified form of the invention taken as on the line 4—4, Fig. 5;

Fig. 5, a plan sectional view on the drive shown in Fig. 4; and

Fig. 6, an enlarged longitudinal sectional view of the frictional wheel shaft and associated parts shown in Figs. 4 and 5.

Similar numerals refer to similar parts throughout the several views.

The general assembly of the turntable drive may be quite similar to that disclosed in my copending application Serial No. 294,938, filed September 14, 1939.

Referring first to the form of the invention illustrated in Figs. 1 to 3, inclusive, a portion of the platform of the phonograph cabinet is indicated generally at 10 and the turntable 11 is rotatably mounted upon the spindle 12 carried by said platform and provided with the usual depending peripheral flange 13 arranged to be driven in frictional contact with the rubber or similar rim upon the friction wheel 14 which is mounted upon the stud 15 having a head 16 carried by the bracket 17 which is fixed to the slidable plate 18.

The slidable plate 18 is mounted for sliding or swinging movement upon the motor mounting plate 19, which is supported upon the platform 10 as by the rubber grommets 20.

A downturned lug 21 may be formed upon the slidable plate for sliding movement within the slot 22 in the motor mounting plate 19.

A spring 23 being connected to the slidable plate 18 and the motor mounting plate 19 at opposite ends to urge the tire of the friction wheel 14 into frictional contact with the rim 13 of the turntable.

Sliding movement of the plate 18 is limited by means of the screw 24 threaded into the motor mounting plate 19 and located through the enlarged aperture 25 in the slidable plate 18, a flanged washer 26 spacing the head of the screw so as not to bind the slidable plate 18 and at the same time covering the enlarged opening 25.

The motor may be of the usual induction type as indicated generally at 27 and is suspended as by the rods 28 from the motor mounting plate 19. The motor shaft 29 has an inverted conical pulley 30 fixed thereon.

The tubular shaft 31 is journaled upon the stud 15, and the hub 14' of the upper or fixed friction wheel is shrunk or otherwise fixed upon said tubular shaft, and swedged in the wheel 33.

The lower portion of the tubular shaft 31 is screw threaded or provided with a helical rib 31', and the elongated hub 32 of the lower or movable friction wheel 33 is internally threaded, as at 34, to receive said helical rib or thread, so that the wheel 33 may be moved longitudinally upon the shaft.

The movable friction pulley 33 contacts the conical friction pulley 30 upon the motor shaft, and a torsion spring 35 is connected at one end to the wheel 33 as indicated at 36 and at its other end to the tubular shaft 31 or wheel 14 as indicated at 37 whereby the friction wheel 33 will drive the tubular shaft and wheel 14 through the torsion spring 35.

An upper stop 38 is formed upon the hub 14' of the upper or fixed friction wheel, for engagement with the stop face 40, upon the upper end of the elongated hub 32, and the lower stop 39 is formed upon the collar 41 for engagement with the stop face 42 at the lower end of the hub 32.

The collar 41 is shrunk or otherwise fixed upon the lower end of the tubular shaft 31, and the entire assembly is held upon the stud 15 by means of a washer 43 and a hair pin cotter pin 44 on the lower end portion of the stud.

In the normal position of the parts, as shown in Figure 1, the spring 35 holds the friction wheel 33 at the lower end of the shaft 31, the lower stop 42 upon the hub 32 contacting the lower stop 39 upon the collar 41, the friction wheel 33 being in frictional contact with the smaller or lower end of the conical pulley 30.

In the operation of the phonograph, as the pressure of the needle upon the record offers resistance to the rotation of the turntable, the spring 35 will be wound up rotating the movable friction wheel 33 upon the tubular shaft 31 in a direction whereby the screw threads 31' cause the friction wheel 33 to move upward upon the shaft bringing the periphery thereof into contact with a large diameter of the conical pulley 30.

As this action takes place the slidable plate 18 may move, upon the motor mounting plate 19, against the pull of the spring 23 permitting the axis of the shaft 31 to shift in order to compensate for the larger diameter of the conical pulley contacting the periphery of the friction wheel 33.

The device thus compensates for changes in torque upon the turntable and provides for a smooth uniform rotation of the turntable throughout the entire recording or playing of a record, and furthermore, the torsion spring connection between the friction pulleys 14 and 33 absorb the pulsations or vibrations of the induction motor causing a smooth continuous rotation of the turntable.

In the slight modification of the invention shown in Figs. 4 to 6, inclusive, the general assembly is similar to that above described and illustrated in Figs. 1 to 3, inclusive.

The platform of the phonograph cabinet is shown at 10_a and the turntable 11_a is rotatably mounted upon the spindle 12_a carried by the platform, the turntable being provided with the usual depending peripheral flange 13_a arranged to be driven by frictional contact with the rubber or similar rim of the friction wheel 14_a which is fixed upon the shaft 15_a journaled in a suitable bearing 16_a carried by the slidable plate 18_a.

This slidable plate is mounted for sliding or swinging movement upon the motor mounting plate 19_a which is supported upon the platform 10_a as by the rubber grommets 20_a, and a downturned lug 21_a may be formed upon the slidable plate for sliding movement within the slot 22_a in the motor mounting plate, a spring 23_a being connected to the slidable plate and to the motor mounting plate to urge the tire of the friction wheel 14_a into frictional contact with the rim 13_a of the turntable.

Sliding movement of the plate 18_a is limited by means of the screw 24_a threaded into the motor mounting plate 19_a and located through the enlarged aperture 25_a in the slidable plate 18_a, a flanged washer 26_a spacing the head of the screw so as not to bind the slidable plate and at the same time covering the enlarged opening.

The motor 27_a may be of the usual induction type and is suspended from the motor mounting plate as by the rods 28_a, and the motor shaft 29_a has an inverted conical pulley 30_a fixed thereon.

The lower end portion of the shaft 15_a may be provided with the helical rib or thread 31_a upon which the elongated hub 32_a of the movable friction wheel 33_a is internally threaded as at 34_a.

The movable friction wheel 33_a contacts the conical friction pulley 30_a and a torsion spring 35_a is connected at one end to the wheel 33_a and at the other end to the shaft 15_a whereby the friction wheel 33_a will drive the shaft 15_a and 14_a through said torsion spring.

A stop pin 38_a may be fixed upon the shaft for engagement with the stop face 40_a upon the upper end of the hub 32_a.

The operation of this form of the invention is substantially the same as above described.

I claim:

1. A transmission including a driving means, a tapered friction roller operatively connected to said driving means, a yieldable mounting member, a shaft journaled upon said mounting member, a driven means operatively connected to said shaft, a friction wheel movably mounted upon said shaft and frictionally associated with the tapered roller, and torsion spring and screw means connecting the friction wheel and the shaft for moving the friction wheel axially relative to the tapered roller to compensate for variations in drag and resultant speed changes of the driven means.

2. A transmission including a driving means, a tapered friction roller operatively connected to said driving means, a yieldable mounting member, a shaft journaled upon said mounting member, a friction wheel fixed upon said shaft, a driven means operatively associated with said friction wheel, a friction wheel movably mounted upon said shaft and frictionally associated with the tapered roller and torsion spring and screw means connecting the movable friction wheel and the shaft for moving the movable friction wheel axially relative to the tapered roller to compensate for variations in drag and resultant speed changes of the driven means.

3. A transmission including a driving means, a tapered friction roller operatively connected to said driving means, a yieldable mounting member, a shaft journaled upon said mounting member, a friction wheel fixed upon said shaft, a driven means operatively associated with said friction wheel, a friction wheel movably mounted upon said shaft and frictionally associated with the tapered roller, and torsion spring and screw means connecting the movable friction wheel and the shaft and controlled by torque upon the driven means for moving the movable friction wheel axially relative to the tapered roller to compensate for variations in drag and resultant speed changes of the driven means.

4. A transmission including a driving means, a tapered friction roller operatively connected to said driving means, a yieldable mounting member, a shaft journaled upon said mounting member, a friction wheel fixed upon said shaft, a driven means operatively associated with said friction wheel, a friction wheel movably mounted upon said shaft and frictionally associated with the tapered roller and torsion spring and screw means connecting the movable friction wheel and the shaft for moving the movable friction wheel axially relative to the tapered roller to compensate for variations in drag and resultant speed changes of the driven means, and means for limiting the axial movement of said movable friction wheel in each direction.

5. A transmission including a driving means, a tapered friction roller operatively connected to said driving means, a yieldable mounting member, a shaft journaled upon said mounting member, a friction wheel fixed upon the shaft, a driven means operatively associated with the friction wheel, a second friction wheel threaded upon the shaft and frictionally associated with the tapered roller, stop means upon the shaft for limiting the movement of the second friction wheel in one direction, and torsion spring means connecting the second friction wheel and the shaft for urging said second friction wheel toward the stop means, so that said second friction wheel is moved axially relative to the tapered pulley by variations in drag to compensate for resultant variations in speed of the driven means.

6. A transmission including a driving means, a tapered friction roller operatively connected to said driving means, a yieldable mounting member, a shaft journaled upon said mounting member, a friction wheel fixed upon the shaft, a driven means operatively associated with the friction wheel, a second friction wheel threaded upon the shaft and frictionally associated with the tapered roller, stop means upon the shaft for limiting the movement of the second friction wheel in one direction, and torsion spring means interposed between and connected to the two friction wheels for urging said second friction wheel toward the stop means, so that said second friction wheel is moved axially relative to the tapered pulley by variations in drag to compensate for resultant variations in speed of the driven means.

EMMOR V. SCHNEIDER.