April 20, 1943. W. J. GREEN 2,316,857

PHONOGRAPH DRIVE MECHANISM

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Fig. 1.

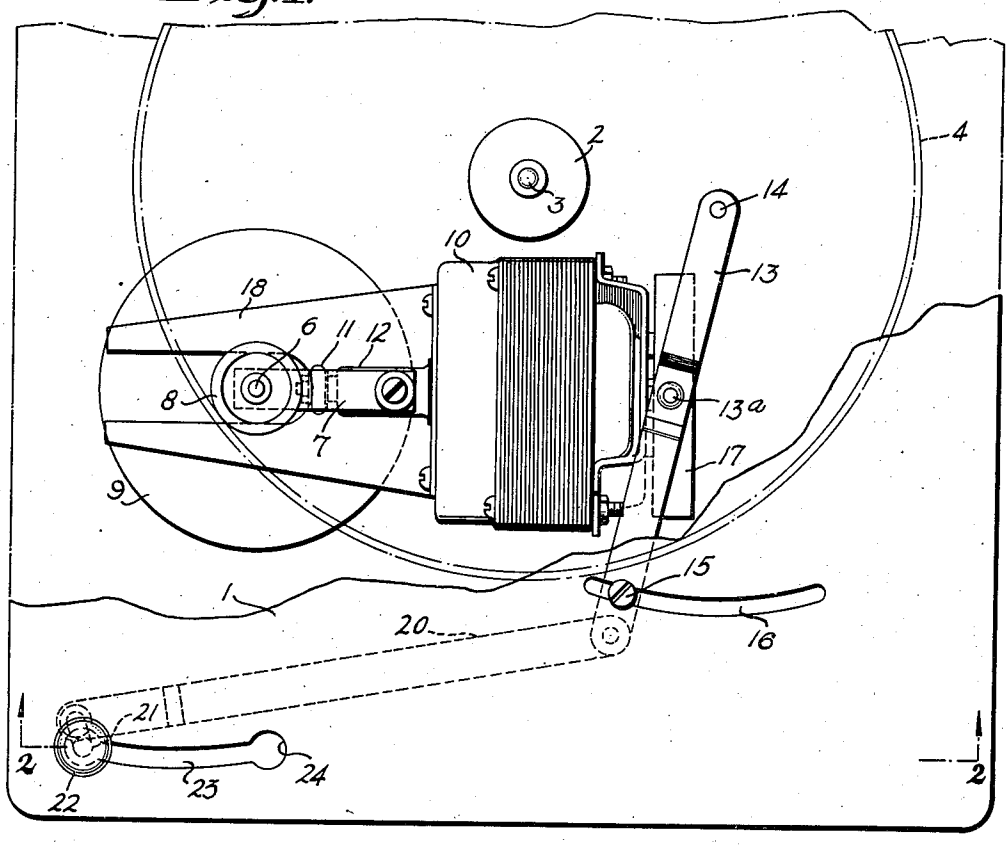
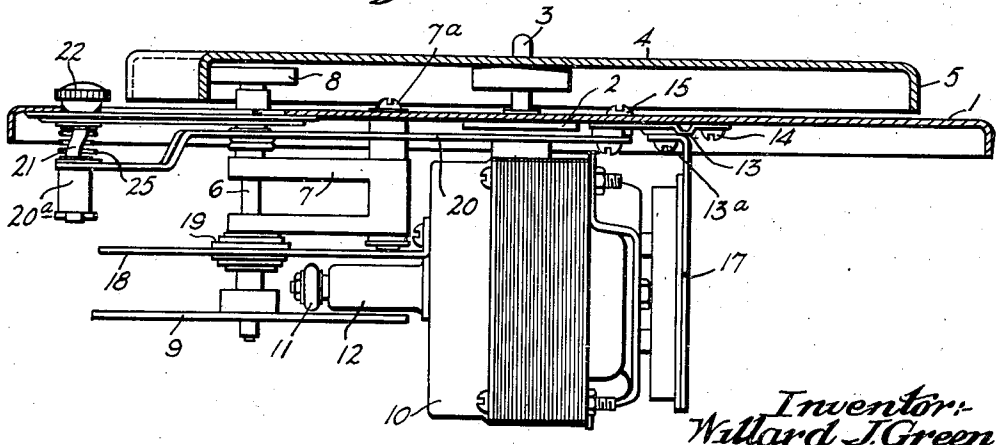


Fig. 2.



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PHONOGRAPH DRIVE MECHANISM

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10 Claims. (Cl. 74—194)

This invention relates to drive mechanisms for phonographs and more particularly to a phonograph turntable drive mechanism having a single control manual adapted to provide variable multispeed operation of the phonograph whereby the utility, application, and perfection of the phonograph are markedly increased.

For some time there has existed a demand for an inexpensive phonograph turntable speed control capable of simple adjustment to meet the widely different requirements of the many present-day uses of the phonograph in the home. For example, disk recordings to be played at different speeds are now available to the public, and, therefore, the phonograph should be adapted for operation at these speeds. Also, it is desirable to make recordings at home using a cutting stylus in place of the common reproducing stylus and, of course, the recording should be made and played at the same speed. This last requirement has heretofore made it necessary to provide the phonograph with a relatively powerful constant speed motor, because the cutting stylus places a greater load on the driving motor than does the reproducing stylus, and a small driving motor would be incapable of operating the turntable at the same speed under both load conditions. This makes it desirable to provide a manual turntable speed control which is adjustable to permit the motor to deliver more power to the turntable, in accordance with the load placed thereon, so as to maintain the turntable speed constant for both recording and reproducing. In some instances, it is desirable to make home recordings at different speeds. For high quality recordings, it is desirable that they be made at a relatively high speed, while recordings of reasonably good quality can be made at lower speeds which permit the recording of more material on a record of a given size. In cases where it is desirable to accompany a recording on a musical instrument such as a piano, and it is impossible to tune the instrument to the exact pitch of the recording, it is desirable to be able to adjust the pitch of the recording to that of the instrument. Further, of particular interest to the manufacture of phonographs designed for sale in localities having alternating current electric power supplies of different frequencies, it is desirable that phonographs using the same motor be adapted by a simple adjustment for use on any of the power supply frequencies within a reasonable range.

It has been found that all of the above services may be met by a phonograph having a drive mechanism adapted for operation at two substantially different principal speeds with a speed control adapted to vary the phonograph speed about each of these principal speeds as a mean. With such a control, some means for indicating when the turntable is being driven at these principal speeds may also be provided. It is also desirable that the above-noted control functions be performed by a single manually-operable member capable of various modes of operation to selectively perform each control function.

In accordance with the foregoing, it is a principal object of the present invention to provide a phonograph speed control which will permit operation of the phonograph at two substantially different speeds.

A further object of the invention is to provide a phonograph speed control adapted to vary the phonograph speed about the two principal speeds.

Still another object of the invention is to provide a single manually-operable control member for a phonograph, which member is manually adjustable to permit operation of the turntable at speeds within two different ranges, the selection of the speed range and the selection of the speed within each range being determined by a different mode of adjustment of a single control manual.

Another object of the invention is to provide a speed control capable of adjustment to permit the phonograph to be driven by the same motor at the same speed from electric power supplies of different frequencies.

Other objects and features of the invention will be apparent from the following detailed description.

In the drawing:

Fig. 1 is a top plan view of a phonograph drive mechanism embodying the invention with a portion of the base plate broken away to more clearly show the construction of the mechanism; and

Fig. 2 is a sectional view taken at section lines 2—2 of Fig. 1.

A baseplate 1 preferably of metal serves as the assembly plate on which the parts of the apparatus are mounted. A bearing 2 secured centrally of the plate 1 serves to support a rotatable spindle 3 which in turn carries a turntable 4 having a turned-down peripheral flange 5. In order to drive the turntable 4, an auxiliary shaft 6 is rotatably supported in a vertical position by a pivoted forked arm 7 so that the upper end of shaft 6 extends through an opening in plate

1 and carries a small rubber covered wheel 8 adjacent flange 5. Arm 7 is mounted on a vertical pivot 7a carried by plate 1, so that wheel 8 will frictionally engage the inner edge of the turntable flange 5, as will be made more clear hereinafter. At its lower end shaft 6 carries a driving disc 9 of relatively large diameter. The shaft 6 is driven through disc 9 by a motor 10 which has a driving wheel 11 secured to the motor shaft and supported by means of a long outboard bearing 12.

To mount the motor on the baseplate 1 so as to provide a variable speed drive, there is provided a pivoted lever 13 which is pivotally supported at 14 immediately below the baseplate 1. Near its outer end, lever 13 has a stud 15 which extends through an arcuate opening 16 in the baseplate 1 so as to support the outer end of lever 13. Intermediate its ends, at 13a, lever 13 swingably supports a depending bracket 17 which, in turn, supports one end of the motor 10. With this arrangement, the disc 9 serves to support the other end of the motor by virtue of wheel 11 bearing on disc 9, and the weight of the motor serves to maintain frictional engagement between the wheel 11 and the disc 9. In order that wheel 8 will frictionally engage the flange 5, the arm 7 is so pivoted with relation to the turntable spindle and the motor mounting brackets that the driving thrust of the motor will tend to rotate arm 7 about its pivot to maintain the engagement of wheel 8 and the turntable flange 5.

To provide variable speed operation of the turntable, the wheel 11 is adapted to be adjusted radially of the disc 9. This may be accomplished by swinging the arm 13 about its pivot 14 as will be clear from Fig. 1, the motor shaft being maintained in radial alignment with the disc 9 by means of a forked bracket 18 which slidably engages a bushing 19 on the shaft 6, as shown. Thus, adjustment of the arm 13 about its pivot will move the motor 10 and wheel 11 with respect to the disc 9 so as to vary the driving radius of the disc 9 to provide any desired turntable speed. To provide convenient control of the adjustment of the arm 13, a linkage 20 is pivotally secured to the outer end of the arm 13. A rotatable control member 21 is secured to the free end of lever 20 by a bushing 20a, and has its end portions laterally offset to provide a crank arm. A knob 22 is secured to the upper end of member 21 to facilitate the manual adjustment of the same. Member 21 extends through a slot 23 in the baseplate 1, the slot having enlarged circular end portions as at 24, and a spring 25 serves to seat knob 22 in the slot ends 24.

The above-described linkages make possible the easy control of the turntable speed. For example, when knob 22 is positioned at the left-hand end of slot 23, as shown in Fig. 1, the motor will be adjusted to drive the turntable at relatively high speed. Knob 22 may now be rotated to provide a small range of speed adjustment due to the crank arm formation of member 21. Knob 22 may be moved to the right-hand end of slot 23 by raising the knob out of the left-hand enlarged slot end and moving the knob laterally, whereupon the motor will be conditioned to drive the turntable at slow speed. Rotation of the knob 22 will again provide a small range speed adjustment. Preferably, the linkage 20 and slot 23 will be constructed so that movement of knob 22 from one end of the slot 23 to the other will result in a 2:1 speed change, while the member 21 is preferably constructed with an offset such that rotation of knob 22 will permit a reasonable range of vernier speed adjustment, as for example, twenty per cent of the mean speed in each range.

From the above it will be seen that the invention provides a desirable phonograph control capable of simple and accurate adjustment throughout a considerable range, the control being achieved by manipulation of a single control knob. In the special case where phonographs having alternating current motors are to be operated from power supplies of slightly different frequencies, the slot 23 may be made in the form of a removable escutcheon which may be replaced by another escutcheon having a slot of different size to provide the proper initial adjustment of the transmission system for different motor speeds. Other modifications, such as the use of a stroboscope, in connection with the speed control of the present invention may be desirable to facilitate adjustment of the phonograph for operation at predetermined speeds.

I claim:

1. In a variable speed phonograph drive mechanism including a transmission system having a continuously variable transmission ratio, a control means for said system including a single control member movable into either of two positions, said member extending through a plate having a slot with enlarged ends determining said positions, said member having laterally offset end portions, an operating linkage secured to one end of said member perpendicular thereto and generally longitudinally movable thereby, a driving wheel and a driven wheel in said transmission system, said linkage being adapted upon actuation to move one of said wheels radially across the face of the other of said wheels, said control member when in each of said positions controlling said linkage to adjust said drive system for operation within a different range of drive ratios, said member being rotatable while in each of said positions to adjust by reason of its offset ends the transmission ratio of said system to any desired ratio within the corresponding one of said ranges.

2. In a variable speed phonograph drive mechanism, variable speed drive means, a crank-like control member having a knob arranged for translational movement between two positions and for rotational movement while in either of said positions, guiding and seating means for said member having a slot with enlarged ends in which said knob may seat, and means operable by said member to adjust said drive means, said last-named means serving to adjust said drive means for operation at two principal speeds in response to translational movement of said member, and serving to adjust said drive means for operation at speeds within predetermined ranges about the principal speeds in response to rotation of said member while its knob is seated in either enlarged end of said slot.

3. In a variable speed phonograph drive mechanism, variable speed drive means, control member having a knob arranged for translational movement between two positions and for rotational movement while in either of said positions, guiding and seating means for said member having a slot with enlarged ends in which said knob may seat, and means operable by said member to adjust said drive means, said last-named means serving to adjust said drive means for operation at two principal speeds in response to translational movement of said member, and

serving to adjust said drive means for operation at speeds within predetermined ranges about the principal speeds in response to rotation of said member while its knob is seated in either enlarged end of said slot.

4. In a variable speed phonograph drive mechanism, variable speed drive means, a crank-like control member arranged for translational movement between two positions and for rotational movement while in either of said positions, means for retaining said member in either of said positions, and means operable by said member to adjust said drive means, said last-named means serving to adjust said drive means for operation at two principal speeds in response to translational movement of said member, and serving to adjust said drive means for operation at speeds within predetermined ranges about the principal speeds in response to rotation of said member while it is disposed in either of said positions.

5. In a variable speed phonograph drive mechanism, variable speed drive means, a crank-like control member arranged for translational movement between two positions and for rotational movement while in either of said positions, and means for adjusting said drive means in response to either movement of said member, whereby said drive means may be operated at two principal speeds corresponding to said positions and may also be operated at speeds within predetermined ranges about the principal speeds.

6. A drive mechanism for a phonograph which it is desired to operate at different speeds, said mechanism comprising variable speed drive means, a control member movable translationally between different predetermined positions corresponding to different principal speeds and also rotatable while in any one of said positions, an actuating connection between said member and said drive means for adjusting the latter in response to translational movement of said member, whereby said drive mechanism may be quickly changed from one principal speed to another, and means for effecting vernier adjustment of said connection in response to rotational movement of said member while in one of said positions, thereby to effect fine speed adjustments of said drive means about said principal speeds.

7. A drive mechanism for a phonograph which it is desired to operate at different speeds, said mechanism comprising variable speed drive means, a control member movable translationally between different predetermined positions corresponding to different principal speeds and also rotatable while in any one of said positions, means for establishing the said positions of said control member, an actuating connection between said member and said drive means for adjusting the latter in response to translational movement of said member, whereby said drive mechanism may be quickly changed from one principal speed to another, and means for effecting vernier adjustment of said connection in response to rotational movement of said member while in one of said positions, thereby to effect fine speed adjustments of said drive means about said principal speeds.

8. In a turntable speed control device for a phonograph, a control panel having an aperture therein, a rotatable control manual seatable in said aperture, a rotatably mounted adjusting member, means actuated by said member for varying the speed of rotation of the turntable, means extending longitudinally from the base of said manual eccentrically of the center thereof, said last means and said member being operatively connected and arranged to cause rotation of said member upon rotation of said manual, whereby rotation of said manual will cause adjustment of said member to control the speed of the turntable.

9. In a drive mechanism for a phonograph, variable speed drive means, a manual control element arranged for translational movement between different positions and for rotary movement about its axis when disposed in one of said positions, a member attached to said control element eccentrically of the axis of said element, means for maintaining the axis of said element stationary while it is in one of said positions, and means operable by said member for effecting relatively large adjustment of said drive means in response to translational movement of said control element, and for effecting relatively small adjustment of said drive means in response to rotary movement of said control element.

10. In a drive mechanism for a phonograph, variable speed drive means, a manual control element arranged for translational movement between different positions and for rotary movement about its axis when disposed in one of said positions, a rod attached to said control element eccentrically of the axis of said element, guiding and seating means for said element having a slot and apertures for defining the translational movement of said element and the said positions, means including said rod for firmly seating said element in said apertures to maintain its axis stationary while it is in one of said positions, and means operable by said rod for adjusting said drive means in response to the different movements of said control element.

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