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T. WOLF

3,319,965

BATTERY OPERATED PORTABLE TOY PHONOGRAPH

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Fig. 1

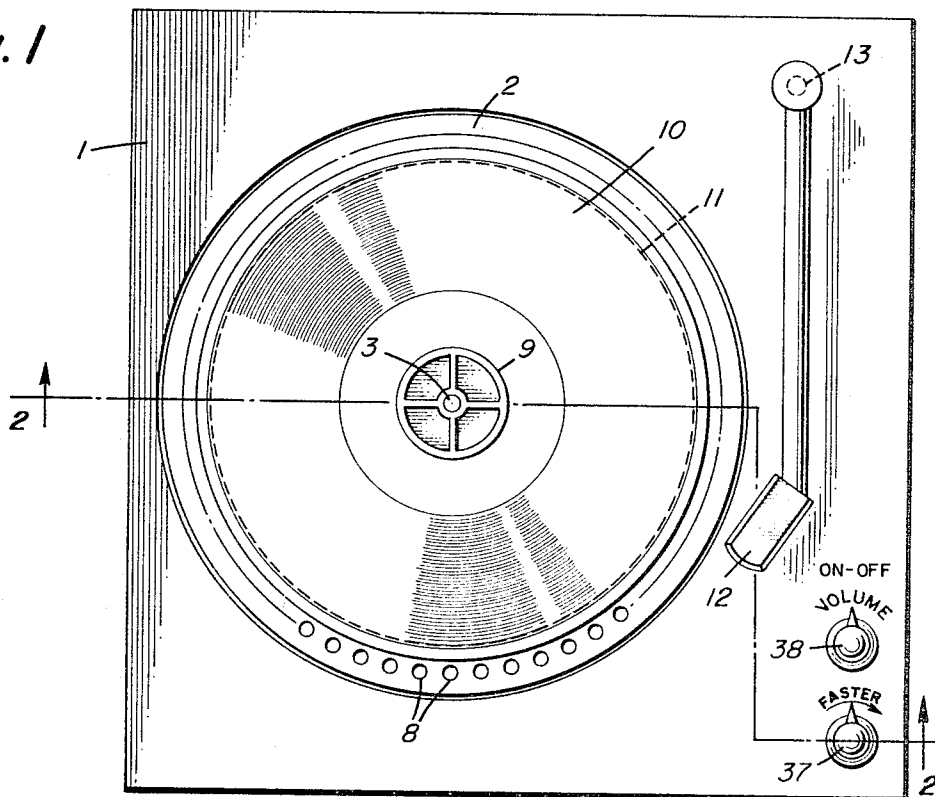


Fig. 2

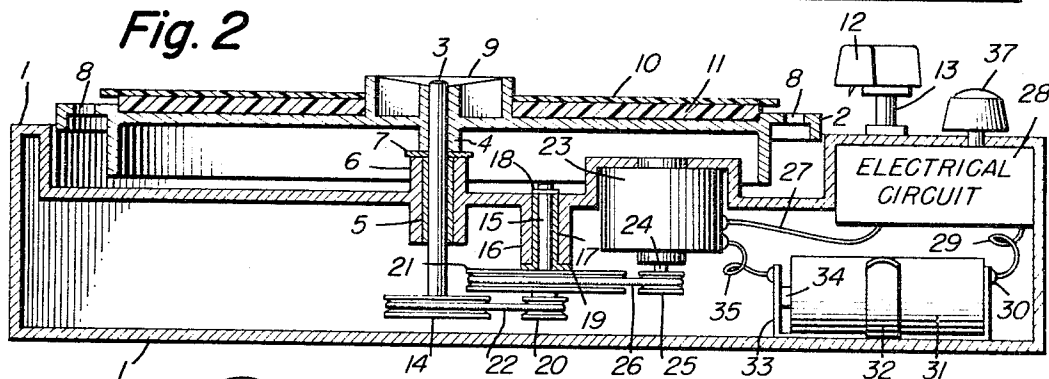
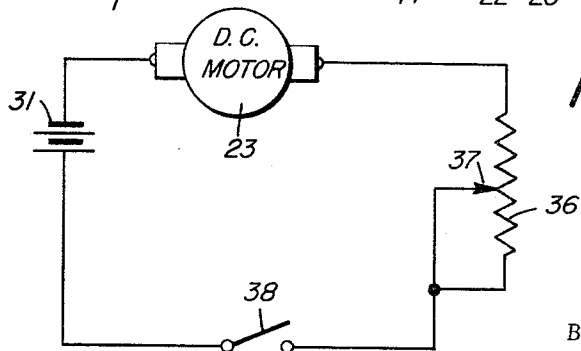


Fig. 3



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This invention relates to a battery operated portable toy phonograph and, more particularly, to a belt driven battery operated toy phonograph using a speed controlled D.C. motor and including markings or the like in the turntable body thereof for providing a stroboscopic effect whereby the motor speed can be regulated.

Toy phonographs have been well known in the prior art. However, such toy phonographs have suffered from several disadvantages which have made them unaccepted in the past to a great degree. Specific disadvantages of prior art toy phonographs have been cost of manufacture and inability to obtain prolonged fidelity of reproduction. Toy phonographs of the prior art, when battery operated, have required elaborate mechanisms for speed control thereby materially increasing cost. When such speed control mechanisms were eliminated motor speed became erratic upon deterioration of the battery and provided poor and often unintelligible reproductions of recorded material.

In accordance with the present invention a relatively inexpensive single speed toy phonograph having true fidelity due to accurate record speed is provided by utilizing a direct current motor operated by a battery, the motor speed being controlled by adjusting the current flow to the direct current motor by means of a rheostat or the like. The rheostat is adjusted in accordance with the stroboscopic effect provided by a plurality of properly spaced holes provided directly on or in the turntable, whereby, by turning the turntable under a 60 cycle fluorescent light, for example, turntable speed can be adjusted to the predetermined r.p.m. provided by the hole spacing when such holes appear motionless to the observer. The turntable speed is maintained constant by using a plural belt drive, one belt coupled between a pulley on the motor shaft and a second pulley and a second belt coupled between the second pulley and a third pulley positioned on the turntable shaft. The third pulley is a separate device rather than the rim of the turntable, thereby providing a cheap, efficient and accurate turntable drive with essentially no slip and a high possibility of speed ratio between motor and turntable. In this manner there is provided an accurate, easily controlled battery operated, speed adjustable toy phonograph which provides relatively true fidelity reproduction over an extended period of time and usage and which is composed of cheap and easily assembled components.

It is therefore an object of this invention to provide a battery operated portable toy phonograph using a direct current motor having a rheostat speed control.

It is a further object of this invention to provide a belt driven battery operated portable toy phonograph wherein the turntable is rotated by a separate pulley mounted on the turntable drive shaft.

It is a yet further object of this invention to provide a speed control system for a portable battery operated toy phonograph whereby a plurality of holes or raised dots formed integral with and molded to form a part of a turntable are positioned about the periphery of the turntable in predetermined spaced relation to provide an indicator for operation of a motor speed controlling rheostat.

The above objects and still further objects of this invention will become readily apparent to those skilled in the art in view of the following description of preferred spe-

cific embodiments of the invention which are provided by way of illustration and not limitation wherein:

FIGURE 1 is a top view of the battery operated portable toy phonograph in accordance with the present invention;

FIGURE 2 is a cross section of the battery operated portable toy phonograph of the present invention taken along the line 2—2 of FIGURE 1; and

FIGURE 3 is an electric circuit diagram of the electric circuit of the present invention.

Referring now to the figures, there is shown a battery operated portable toy phonograph in accordance with the present invention which includes a base or frame member 1 formed of metal, molded plastic, or the like. A turntable 2, also formed of metal, molded plastic or the like is mounted in the frame 1 by passing a drive shaft 3, secured within and to a flanged portion 4 of the turntable, through a cylindrical bearing 5 positioned within a cylindrical hollow portion 6 of the frame, the flanged portion 4 resting upon a bearing surface 7 which could be of nylon or the like.

The turntable includes a plurality of spaced holes 8, or alternatively other markings spaced to provide a proper stroboscopic effect for a predetermined motor speed under predetermined light conditions. In the preferred embodiment, the holes are spaced so that they appear to stand still when the turntable is rotating at 45 r.p.m. under a fluorescent lamp operating at 60 cycles per second. The turntable also includes a wide spindle 9 to accommodate 45 r.p.m. records, though other size spindles could be provided, and a record 10 positioned above the turntable 2. A soft pliant material 11, such as foam rubber or the like is positioned between the turntable 2 and the record 10.

The phonograph further includes a tone arm 12 coupled to a sound reproducing diaphragm or cone or the like (not shown) for reproducing the information on the record. However, if desirable electronic amplification and electrical reproduction can be provided. Such mechanical or electrical reproducing systems are well known, being set forth in prior art publications available to those skilled in the art. The tone arm is rotatable laterally about a pivot 13 for travel over the record 10.

The drive shaft 3 includes a pulley 14 secured thereon at the pulley center for driving the shaft. An intermediate shaft 15, positioned within a cylindrical hollow portion 16 of the frame and held in a cylindrical bearing member 17 within the cylindrical portion 16 is secured in place by a snap ring 18 and a flange 19 on the bearing 17 affixed to the intermediate shaft 15 and securing the shaft 15 against vertical movement within the bearing 17.

A pulley 20 and a pulley 21 are positioned on and secured to intermediate shaft 15 at their centers. A belt 22 connects the pulleys 14 and 20. A direct current motor 23 is secured to the frame 1 and includes a rotatable output shaft 24 which is connected to the center of a pulley 25. A belt 26 connects the pulleys 21 and 25. Each of the pulleys 14, 20, 21 and 25 may be varied in diameter to adjust the ratio of motor speed to turntable speed. The pulley 25 secured to the motor output shaft 24 has a relatively small diameter compared to the input pulley 21 secured to the intermediate shaft 15, so that the speed of rotation of the intermediate shaft 15 will be substantially lower than the speed of the motor output shaft 24. The output pulley 20 on the intermediate shaft 15 has a substantially smaller diameter than the pulley 14 secured to the drive shaft 3, thereby providing a reduction of turntable speed well below motor speed in terms of revolutions per minute.

The motor 23 is coupled through a conductor 27 to an electrical circuit 28 (FIG. 3), the electrical circuit

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being connected by a conductor 29 to a first terminal 30 coupled to one battery electrode 31, the battery being positioned and secured within the frame by a clamp 32 attached to the frame. A second terminal 33 is coupled to the other battery electrode 34, the terminal 33 being coupled by a conductor 35 to the other terminal of motor 23.

The electrical circuit 28 includes a rheostat 36 having an adjustable tap 37 for controlling motor speed and an ON-OFF volume control 38 for supplying motor current and controlling output level, the motor 23, battery 31, switch 38 and rheostat 36 forming a series circuit.

The battery operated portable toy phonograph is operated by first placing the switch 38 in the ON position and, under a 60 cycle per second operated fluorescent lamp, adjusting the tap 37 of the rheostat 36 until the holes on the turntable appear to stand still. The turntable speed is now adjusted for proper speed and the arm 12 is then placed upon the record for reproducing the information recorded thereon through the mechanically coupled speaker or the electronic reproducing system (not shown).

While the invention has been described with respect to a 45 r.p.m. turntable and a 60 cycle per second fluorescent lamp it should be understood that the turntable can be adjusted to turn at any desired rate of speed by adjusting the diameter ratio of the pulleys and the setting of the rheostat for the D.-C. motor. Also the holes on the turntable may be arranged for any r.p.m. rate of the turntable and for operation with any lamp of predetermined frequency other than 60 cycles per second as described hereinabove.

Though the invention has been described with respect to specific embodiments, other changes and modifications which fall within the spirit and scope of this invention will immediately become obvious to those skilled in the art. It is therefore the intention that the appended claims be interpreted as broadly as possible in view of the prior art to encompass such changes and modifications.

What is claimed is:

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1. A portable battery-operated phonograph including a frame holding a direct current motor having an output shaft and a rheostat connected in series with said motor and having a manual control member secured thereto for adjusting the speed of said motor, a turntable including a drive shaft integral therewith and journaled in said frame, a first pulley of relatively large diameter secured on said drive shaft and spaced from said turntable, a second pulley of relatively small diameter secured on said motor output shaft, an intermediate shaft journaled in said frame adjacent to said drive shaft and said motor output shaft, and a third relatively large and a fourth relatively small pulley secured on said intermediate shaft to rotate therewith, a first belt connecting said first and fourth pulleys and a second belt connecting said second and third pulleys.

2. A portable battery-operated toy phonograph in accordance with claim 1, said turntable including a plurality of visible spaced stroboscopic markings on the periphery thereof spaced about said turntable by a uniform angular distance selected so that said markings are adapted during operation of said turntable at the correct speed to cooperate with a standard source of illumination fluctuating substantially in intensity when connected to power mains carrying alternating current electric power of standard utility frequencies to provide a visual impression of arresting of motion of said markings in response to appropriate adjustment of said rheostat.

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