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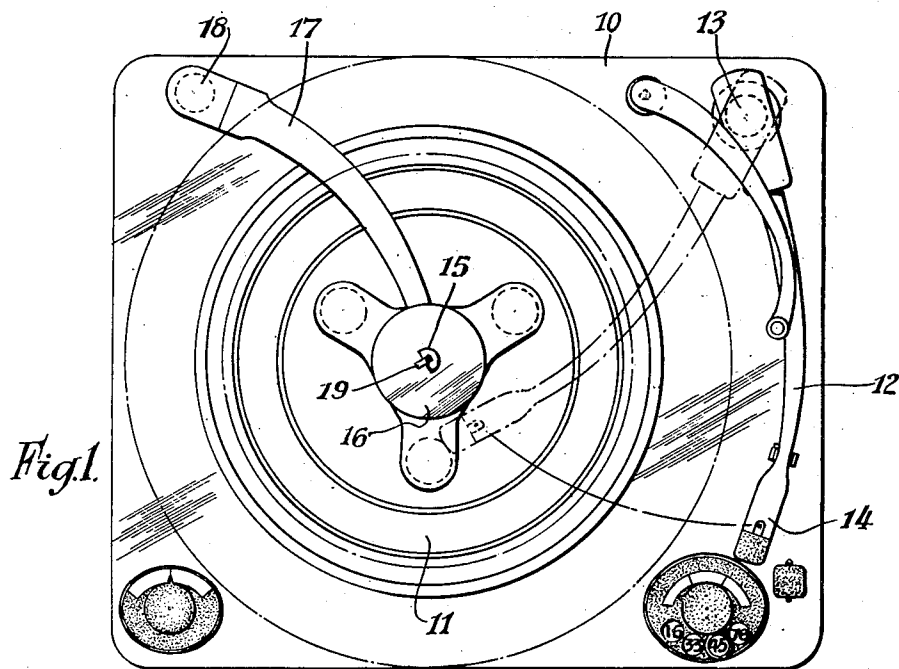
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3,129,596

SOUND REPRODUCING MACHINES

Filed May 10, 1960

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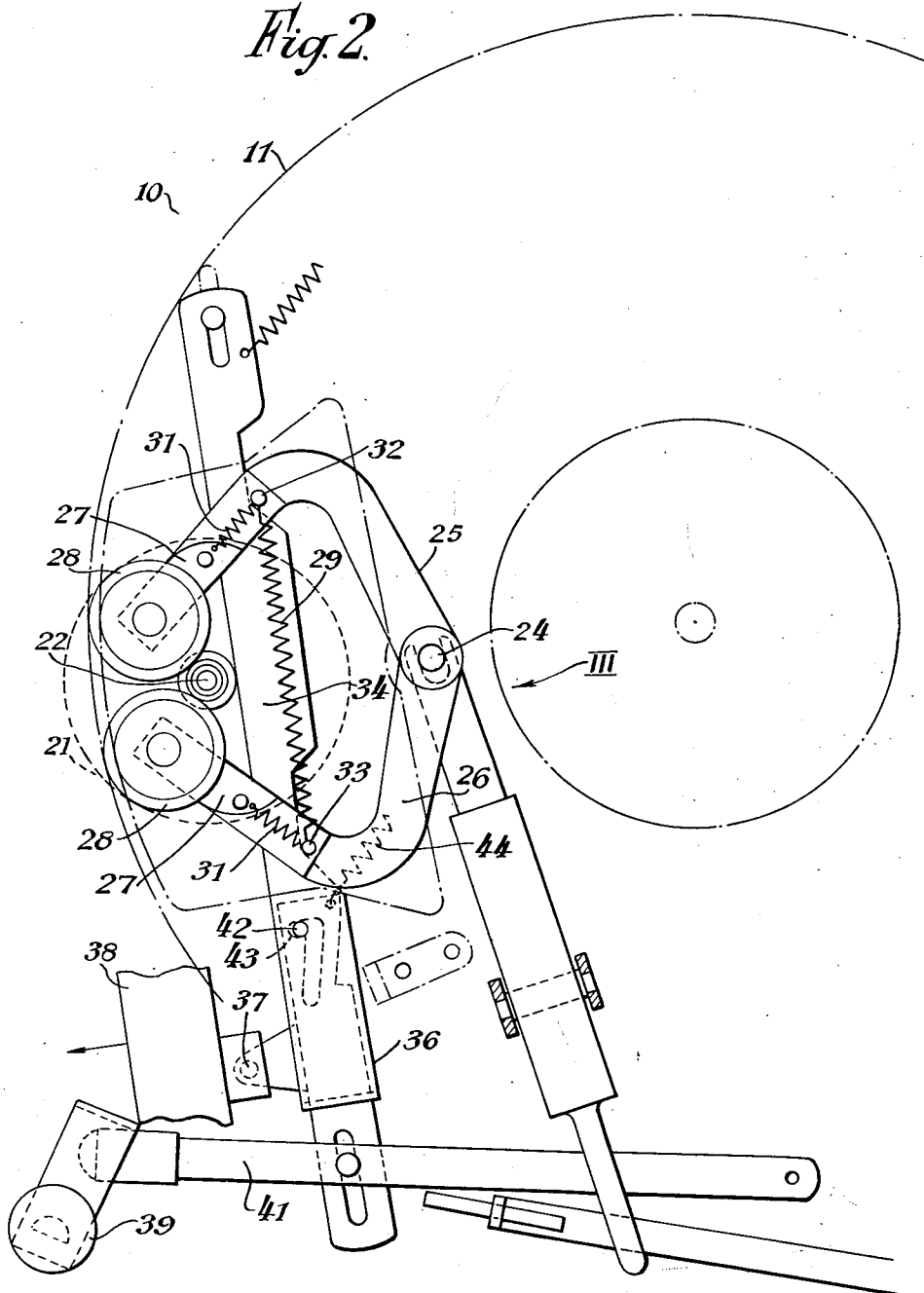
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Fig. 2.



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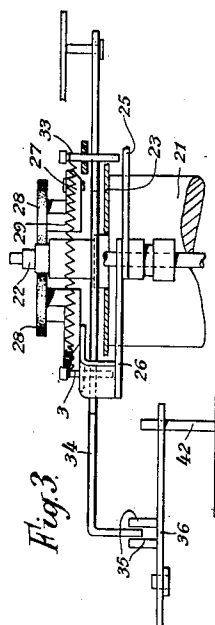
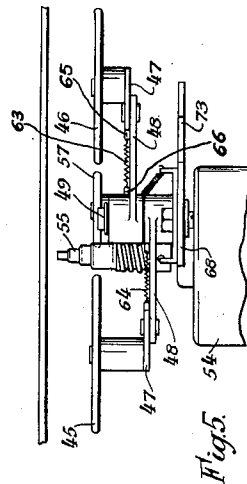
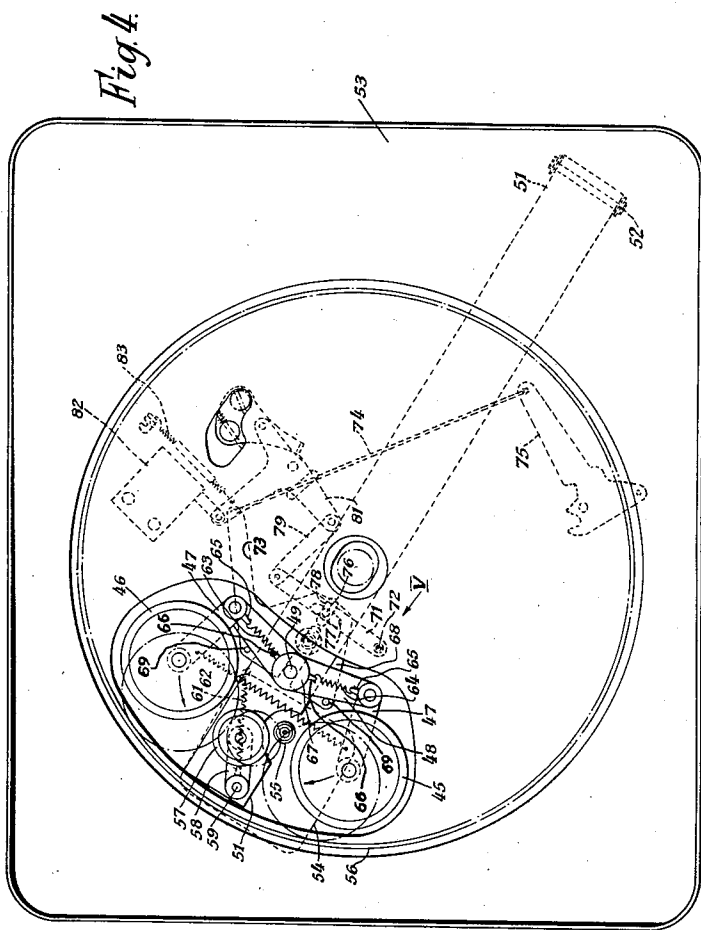
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SOUND REPRODUCING MACHINES

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SOUND REPRODUCING MACHINES

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5 Claims. (Cl. 74-190)

This invention relates to sound reproducing machines of the kind in which grooved disc-shaped records are used in association with a pick-up device, means being provided to support a plurality of records in an upper position concentrically above a turntable and to rotate the said records so that the recording on the under side of each record may be played before that record is dropped onto the said turntable, using an upwardly-projecting stylus on the pick-up, the recording on the upper side of each record being played after the record has dropped, by a second stylus projecting downwardly from the pick-up.

It has been proposed to mount the records to be played in a stack on a spindle which rotates as one with the turntable, thereby making it necessary that the turntable shall be capable of being rotated in both directions, since a record, when being played on its underside, must rotate in the direction opposite to that in which it rotates for the playing of its upper side.

It is the object of the present invention to provide turntable driving means for driving the turntable in both directions.

According to the present invention, in driving mechanism for the turntable of a sound-reproducing machine of the kind referred to, the turntable is driven by an electric motor through friction gearing including two friction wheels engageable with a rim on the turntable, one of said friction wheels being effective to drive the said turntable in one direction and the other of said friction wheels being effective to drive the said turntable in the opposite direction, means for stopping and starting the electric motor being so coupled to means carrying the friction wheels that the latter are disengaged from the members between which they transmit rotation when the electric motor is stopped.

The direction of rotation of the electric motor may be reversible, both friction wheels engaging directly with a drive wheel rotating with the electric motor shaft. Alternatively, the electric motor may rotate always in the same direction, an idler wheel being provided between a drive wheel rotating with the electric motor and one of the friction wheels and the means carrying the friction wheels being movable to bring only one friction wheel at a time into engagement with the turntable rim.

The means carrying the friction wheels preferably comprise a pair of pivoted articulated arms on each of which one of the friction wheels is mounted, a tension spring extending between the said arms acting to urge the friction wheels into engagement with the turntable rim and means to move the arms against the spring load to disengage the friction wheels from the turntable rim.

The invention is hereinafter described with reference to the accompanying drawings which show only the turntable driving mechanism and other parts of the sound reproducing machine essential to the understanding of the invention, the remainder of the mechanism being omitted.

In the drawings:

FIGURE 1 is a plan view of a sound reproducing machine showing one embodiment of a turntable driving mechanism according to the invention.

FIGURE 2 is a plan view on a larger scale than FIGURE 1 with the turntable and base-plate broken away to show the turntable driving mechanism.

FIGURE 3 is a view in elevation of the driving mechanism shown in FIGURE 2, looking in the direction of the arrow III in FIGURE 2.

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FIGURE 4 is a plan view, similar to FIGURE 1 of a sound reproducing machine showing another embodiment of a turntable driving mechanism according to the invention; and

FIGURE 5 is a view in elevation looking in the direction of the arrow V in FIGURE 4.

Referring to FIGURES 1, 2 and 3, the base-plate of a sound-reproducing machine is shown at 10, and the turntable at 11. A pick-up arm 12, movable about a vertical axis at 13 to enable it to swing inwardly and outwardly across the surface of a record being played, carries a pick-up head 14 in which are mounted two styli projecting upwardly and downwardly respectively, means, not shown, being provided for controlling the movements of the pick-up arm between the playing of one record and the next. A spindle 15 which stands up from the turntable, is provided with means for supporting, concentrically above the turntable, a stack of records to be played, and for releasing them one by one to fall onto the turntable 11, and an upper turntable 16, supported by an arm 17 pivoting about a vertical axis at 18, rests on the top record of the stack to retain the said records in a horizontal attitude, the said upper turntable being keyed to the spindle 15 at 19 so as to rotate therewith and transmitting rotation from the spindle to the stacked records by friction.

An electric motor 21, suitably supported on the underside of the base-plate 10, has its spindle projecting upwardly therefrom through an opening in the said base-plate and carrying a stepped driving wheel 22 spaced inwardly from a dependent rim 23 on the turntable 11. A spindle 24, slidable in bearings in the fixed frame of the machine at a position radially inwardly of the driving wheel 22 with respect to the turntable has slidably mounted thereon a pair of bent arms 25, 26, suitably cranked in a vertical plane so that their free ends lie in a common horizontal plane. To the free end of each of the arms 25 and 26, there is pivotally attached for movement relative thereto in a horizontal plane, an auxiliary arm 27 on the free end of which is rotatably mounted a rubber tired friction wheel 28. The arms 25 and 26 are urged towards each other to draw the friction wheels 28 into engagement with the driving wheel 22 and the turntable rim by a coiled tension spring 29 anchored at its ends to the said arms, and the auxiliary arms 27 are biased to predetermined positions relative to the respective arms 25 and 26 by coiled tension springs 31.

Pins 32, 33 projecting from the arms 25 and 26 engage with mutually parallel oblique surfaces on one edge of a slide bar 34 guided for rectilinear movement relative to the base-plate of the machine.

The slide bar 34 has one of its ends bent downwardly through a right angle and engaged between two pins 35, 35 on another slide bar 36 which carries the moving contact 37 of an on-off switch 38 for controlling the supply of current to the electric motor, the slide bar 36 being movable by a starting control knob 39, acting through a pivoted bar 41, to a position in which the switch 38 is closed, and being retained in that position by engagement of a fixed pin 42 in a lateral notch 43 at one end of an oblique slot in the said slide bar 36. A coiled tension spring 44 acting obliquely on the slide bar 36 holds the notch in engagement with the pin, and also pulls the slide bar 36 to the switch-open position when it is displaced laterally.

The slide bar 34 moves to and fro with the slide bar 36, and, when the latter is in the switch open position, the oblique surfaces on the slide bar 34 hold the pins 32, 33 in such positions that the arms 25 and 26 are spread apart, as shown in full lines in FIGURE 2, and the friction

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tion wheels 28 are both held out of engagement with both the driving wheels 22 and the turntable rim 23, but when the slide bar 36 moves to the switch-closed position, the pins 32, 33 run down the oblique surfaces and allow the arms 25 and 26 to move towards each other, bringing the friction wheels 28 into engagement with the driving wheel 22 and the turntable rim 23 as shown in chain-dotted lines in FIGURE 2, the auxiliary arms 27, being movable relative to the arms 25 and 26, allow the friction wheels 28 to adjust themselves and engage properly with both the driving wheel and the turntable rim. Although both friction wheels are brought simultaneously into engagement with the driving wheel and turntable rim, only one of them is effective to transmit rotation from the driving wheel to the turntable, since the friction tends to drag one more firmly into engagement with the driving wheel and turntable rim whilst dragging the other out of engagement, and so each friction wheel is effective for only one direction of rotation. The arms 25 and 26 are slidable with the spindle 24 to bring the friction wheels into engagement with any selected step of the driving wheel 22, thus enabling the speed of rotation of the turntable to be varied.

Referring to FIGURES 4 and 5, the driving mechanism therein shown is incorporated in a sound reproducing machine having a turntable, a pick-up and provision for supporting records above the turntable and dropping them one by one on to the turntable, substantially as briefly described with reference to the previous embodiment.

The driving mechanism for the turntable includes a pair of friction wheels 45, 46 mounted on arms 47, 47 which are in turn pivotably mounted on arms 48, 48 pivoted at 49 on a stiff lever 51 mounted to move about a horizontal pivot at 52 below the base plate 53.

A constant-speed non-reversible electric motor 54 mounted underneath the base-plate 53 has mounted on its spindle a stepped driving wheel 55, and the friction wheel 45 is adapted to engage between the said driving wheel 55 and a dependent rim 56 on the turntable to drive the said turntable in one direction, the other friction wheel 46 being driven by the driving wheel 55 through an interposed idler wheel 57 and engaged with the rim 56 to drive the turntable in the opposite direction. The idler wheel 57 is rotatably mounted on a short arm 58 pivoted at 59 on the stiff lever 51 and is biased to a position in which it is out of contact with the driving wheel 55 by a coiled tension spring 61 acting on the short arm.

The arms 47, 47 are urged towards each other by a light tension spring 62 extending between them, but are held at a substantially constant angle to the arms 48, 48 by stronger tension springs 63, 64 each anchored at one end to a lug 65 on one of the arms 47 and at the other end to a lug 66 on a boss 67 projecting from the corresponding arm 48 at its end which is pivoted on the pivot at 49. A plate 68, mounted on the stiff lever 51 so as to be capable of both turning movement about the pivot at 49 and bodily sliding movement in the direction of the length of the said arm, carries pins 69 engaging with the edges of the arms 48, 48 and is angularly movable to rock the said arms 48, 48 about the pivot at 49 so as to bring either one of the friction wheels 45, 46 to its operative position, depending on the direction in which the turntable is required to rotate. Bodily sliding movement is imparted to the plate 68 by a lever 71, pivoted at 72 on the base plate.

The plate 68 has projecting from it an arm 73 which is connected by a link 74 to a two-way selector member 75 which is rocked to and fro by a control unit set in motion by the completion of the playing of each record side, being moved in one direction after the playing of the underside of a record and in the opposite direction after the playing of the top side of a record, so that the plate 68 is also rocked to and fro, taking the arms 48, 48 with it and thus moving one of the friction wheels 45, 46 towards the rim of the turntable and moving the other

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of said friction wheels away from the rim of the turntable. When the friction wheel 45 is moved towards the turntable rim it is brought into engagement with the driving wheel 55 and the frictional drag applied to it by the said driving wheel tends to draw it firmly into engagement with the turntable rim so that it transmits rotation thereto. When the friction wheel 46 is moved towards the turntable rim it engages with the idler wheel 57 and moves that wheel towards the driving wheel 55, the frictional drag of the idler wheel tending to draw the friction wheel 46 into firm engagement with the turntable rim so that it transmits rotation thereto. Owing to the interposition of the idler wheel 57, the friction wheel 46 is rotated in the opposite direction to the friction wheel 45, and consequently it reversely rotates the turntable. The parts are shown in this position in chain-dotted lines in FIGURE 4. The friction wheel assembly therefore serves as a reversing mechanism for the turntable.

The lever 71 carries a pin 76 which extends through an arcuate slot 77 in the plate 68, thus allowing the said plate to rock without movement of the lever 71. The pin 76 also passes through a longitudinal slot 78 in the stiff lever 51. The lever 71 is coupled by a link 79 to one arm of a pivoted member 81 another arm of which is arranged to actuate an on-off switch 82 controlling the electric motor, the said pivoted member 81 being urged by a tension spring 83 to a position in which the switch 82 is closed and the lever 71 holds the plate 68 in a position such that one or other of the friction wheels 45, 46 can engage the turntable rim depending on the direction in which the plate 68 is rocked. The pivoted member 81 has associated with it a member (not shown) which when brought to an operative position by the control mechanism of the machine, moves the pivoted member 81 against the load of the spring 83 to open the switch 82 and move the lever 71 to a position in which neither of the friction wheels 45, 46 can engage with the turntable rim, the arms 48, 48 being moved in opposite directions about their pivot against the resistance of the spring 62 to move the friction wheels away from the turntable rim, as shown in full lines in FIGURE 5. The pivoted member 81 is tripped from this latter position by manual control means to start the machine.

The stiff lever 51 is movable about its pivot at 52 to move the friction wheels vertically relative to the driving wheel 55 and bring the friction wheels opposite to any desired step of the driving wheel, thus selecting the speed at which the turntable is driven.

I claim:

1. Driving mechanism for the turntable of a sound reproducing machine of the character described wherein the turntable has a rim and is driven by an electric motor provided with a shaft; said mechanism comprising friction gearing including two friction wheels engageable with said rim, one of said friction wheels being effective to drive said turntable in one direction and the other of said friction wheels being effective to drive said turntable in the opposite direction, means for stopping and starting said electric motor, means carrying said friction wheels, said rim and said shaft constituting the members between which said wheels transmit motion, both said means being so coupled that said friction wheels are disengaged from said members when said motor is stopped, a drive wheel rotatable with said shaft, both said friction wheels engaging directly with said drive wheel, said means carrying said friction wheels comprising a pair of pivoted articulate arms on each of which one of said friction wheels is mounted, a tension spring extending between said arms acting to urge said friction wheels into engagement with said turntable rim, and means to move said arms against the spring load of said spring to disengage said friction wheel from said rim.

2. Driving mechanism according to claim 1, wherein means to move said arms against said spring load comprise

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a slide bar having oblique edge portions engaging pins carried by said arms.

3. Driving mechanism according to claim 1 wherein the means to move said arms against said spring load comprise a slidable and rockable plate carrying pins engaging 5 said arms.

4. Driving mechanism according to claim 1 wherein said motor is adapted to rotate always in the same direction and an idler wheel is provided between the drive wheel rotatable with said shaft and one of said friction wheels, 10 said means carrying said friction wheels being movable to bring only one friction wheel at a time into engagement with said rim.

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5. Driving mechanism according to claim 4 wherein the means to move said arms against said spring load comprise a slidable and a rockable plate carrying pins engaging said arms.

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