

Jan. 7, 1958

R. C. SIEBERT

2,818,741

PHONOGRAPH TURNTABLE DRIVES

Filed May 7, 1954

3 Sheets-Sheet 1

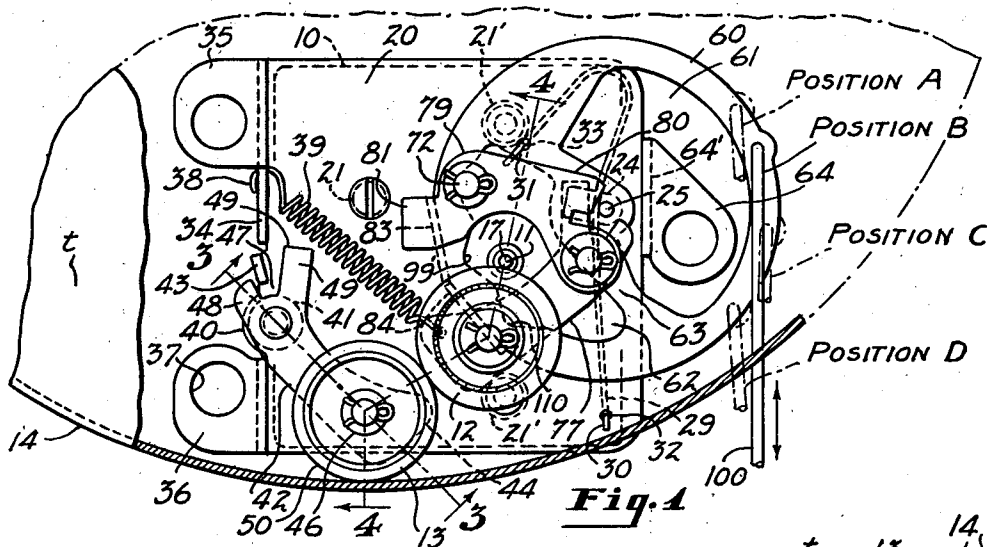
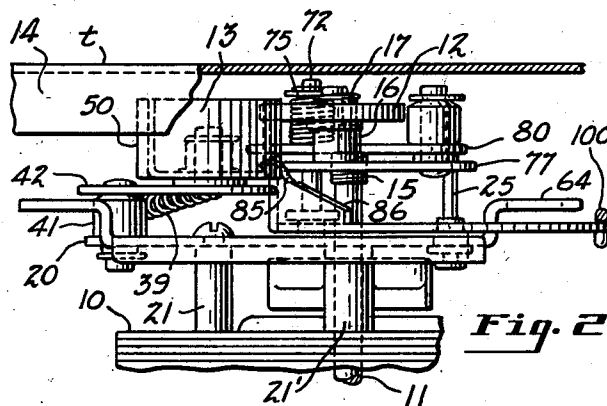
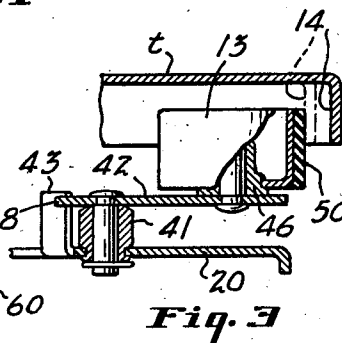
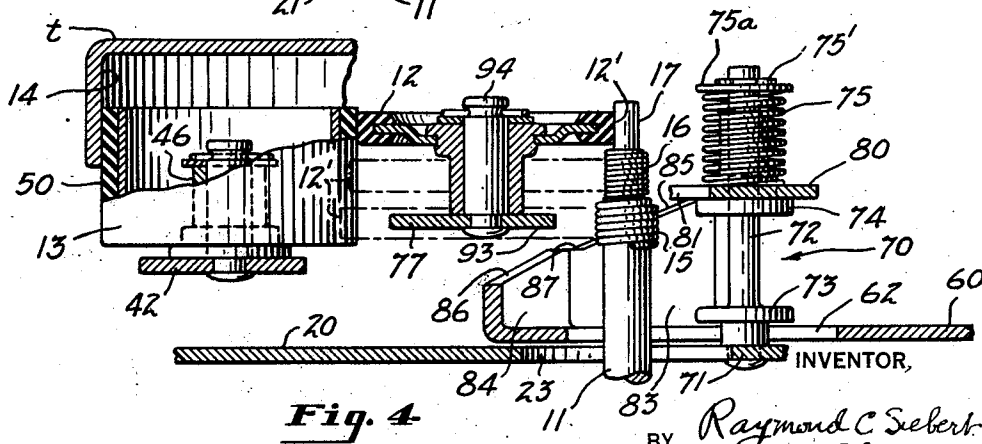


Fig. 4

BY

Raymond C. Siebert
Slough & Slough
ATTORNEYS

Jan. 7, 1958

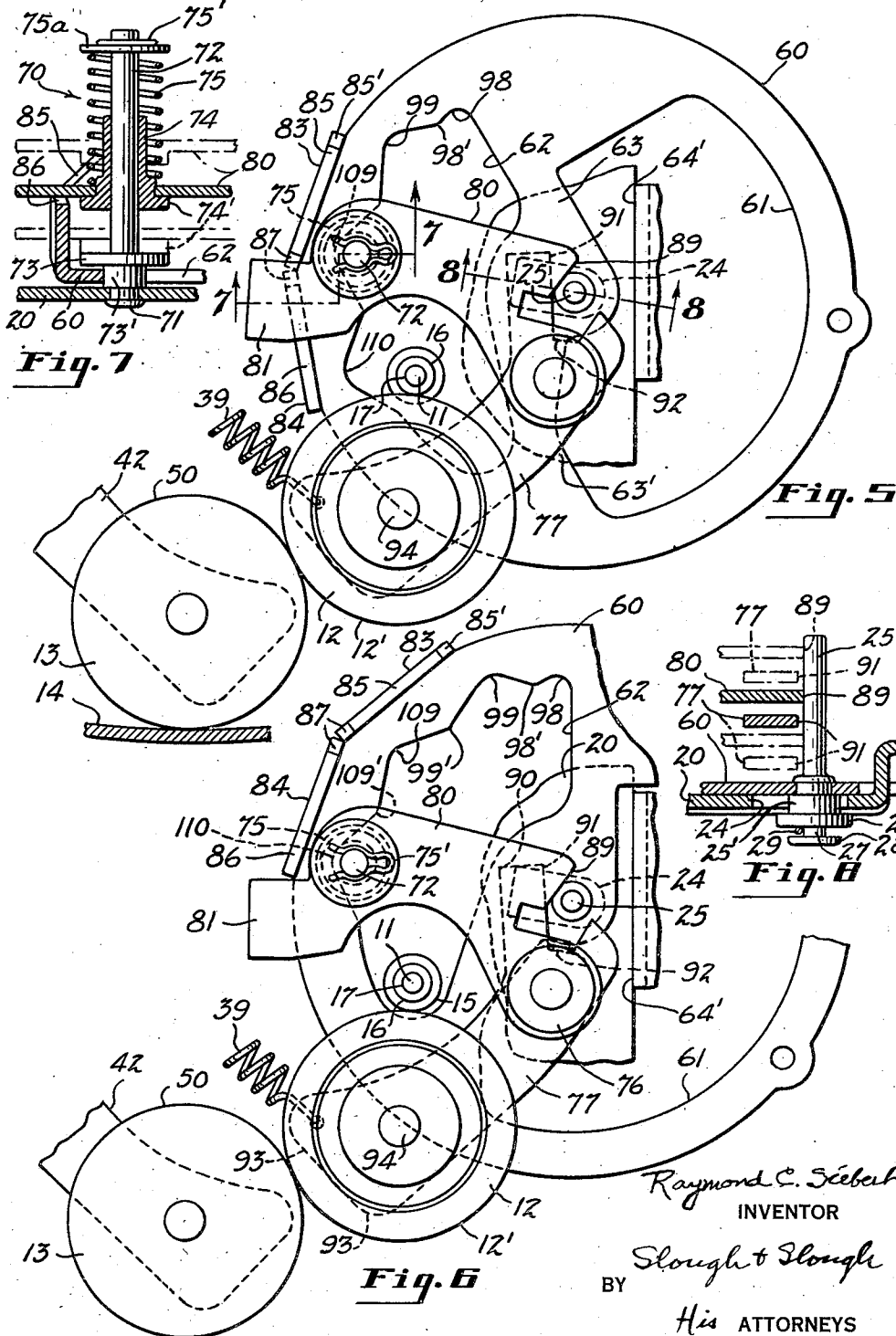
R. C. SIEBERT

2,818,741

PHONOGRAPH TURNTABLE DRIVES

Filed May 7, 1954

3 Sheets-Sheet 2



Raymond C. Siebert
INVENTOR
Slough & Slough
BY
His ATTORNEYS

Jan. 7, 1958

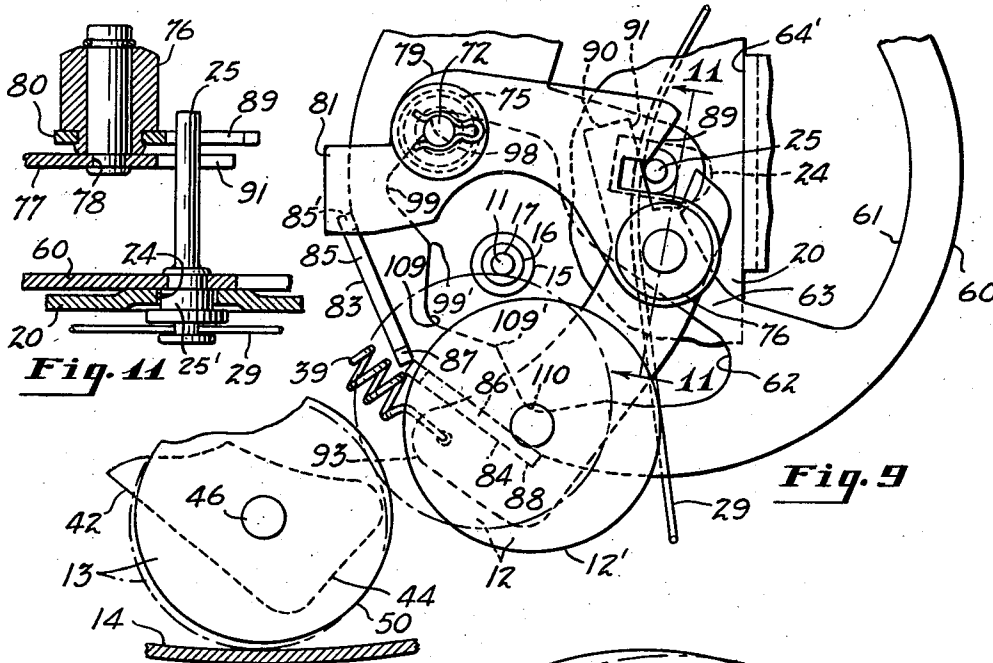
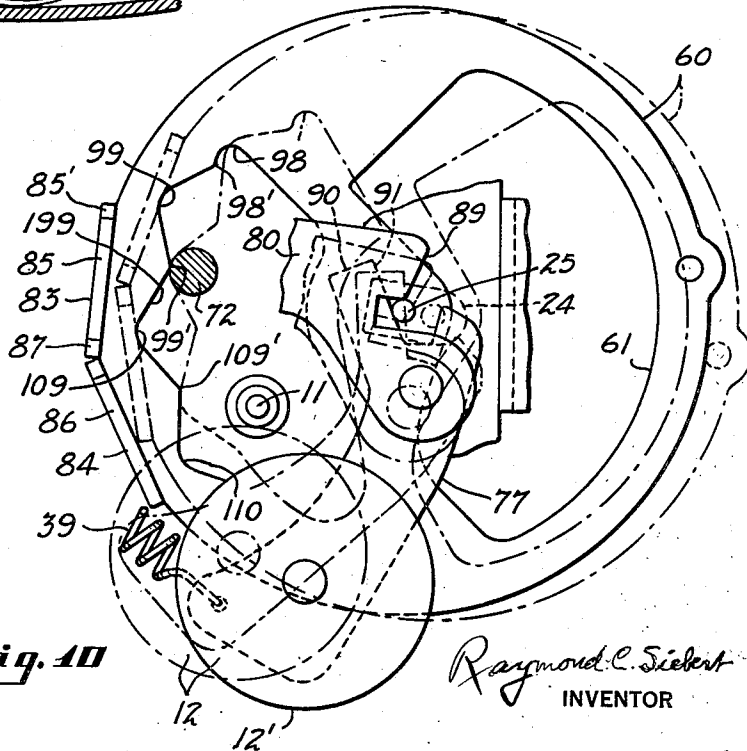
R. C. SIEBERT

2,818,741

PHONOGRAPH TURNTABLE DRIVES

Filed May 7, 1954

3 Sheets-Sheet 3



Raymond C. Siebert
INVENTOR

BY *Slough & Slough*
His ATTORNEYS

1

2,818,741

PHONOGRAPH TURNTABLE DRIVES

Raymond C. Siebert, Avon, N. Y., assignor, by mesne assignments, to The General Industries Company, Elyria, Ohio

Application May 7, 1954, Serial No. 428,191

6 Claims. (Cl. 74—200)

My invention relates to drives for phonograph turntables and relates more particularly to an improved drive mechanism employing a multi-step motor shaft adapted to drive through a pair of idler wheels a phonograph record supporting turntable at any of a plurality of different rotational speeds.

A currently common type of motor driving mechanism for selectively driving a turntable at any of multiple rotational speeds requires that a rubber-treaded idler wheel whose tread is disposed in frictional driving relation to an inner annular surface of a pendant peripheral flange of the phonograph turntable be selectively vertically adjusted to also frictionally engage one or the other of three or more steps of a driving pulley, said steps being of different diameters.

In order to accommodate the increased length of vertical movement of the idler wheel employed to interchangeably make peripheral contact with each of the plurality of drive pulley steps, the turntable flange is required to be made much wider, such requirement resulting in it being heavier, and as a result more expensive.

Efforts have been made to solve the problem, thus presented, by forming the motor-driven pulley with shorter steps, and resultantly to make the idler pulley thinner, but such a solution of the problem presented has not been found practical and the above said structural changes have been found unreliable in practice.

An object, therefore, of the present invention is to provide a solution for the above problem, by virtue of which the level of drive mechanism may be lowered and the turntable may be of that inexpensive type having a relatively narrow peripheral rim.

Another object of my invention is to provide a plural speed turntable driving mechanism wherein a turntable having a relatively narrow turntable flange may be driven at three or more different speeds by torque transmitted to said flange from different of three or more vertically successive pulley portions of a driving pulley through idler pulley means interposed between said flange and said pulley, and which means may comprise an idler wheel adjustable to the three or more different levels of said pulley portions, certain of which may be located at a lower level than any portion of said flange.

It is also an object of my invention to provide a drive mechanism of the character described which will be simple in operation, inexpensive to manufacture and highly efficient in use.

It is a further object of my invention to provide a drive mechanism of the character described which may be used with a turntable of the usual type having a relatively narrow peripheral flange.

A still further object of my invention is to provide improved driving mechanism of the character described for a phonograph record supporting turntable, which is durable, reliably operative and can be produced at relatively low cost.

Further objects of my invention and the invention itself will become more readily apparent from a review of

2

the accompanying drawings, to which reference will be made in the following description.

In the drawings:

Fig. 1 is a top plan view of an embodiment of my invention showing a three-speed phonograph driving mechanism, showing a portion of a phonograph turntable associated therewith, portions being broken away, and showing the change speed mechanism in a low speed position, as for example 33 R. P. M.;

Fig. 2 is a front elevational view of the driving mechanism of Fig. 1;

Fig. 3 is a vertical section taken on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged sectional view taken on the line 4—4 of Fig. 1, with parts broken away for greater clarity;

Fig. 5 is an enlarged fragmentary plan view of the driving mechanism of the foregoing figures showing a lever index ring, idler lift mechanism and idler pulleys in an intermediate position, as for example 45 R. P. M.;

Fig. 6 is an enlarged fragmentary plan view of the parts shown in Fig. 5 in a so-called "high" position, as for example 78 R. P. M.;

Fig. 7 is an enlarged vertical section taken on the line 7—7 of Fig. 5;

Fig. 8 is an enlarged vertical section taken on the line 8—8 of Fig. 5;

Fig. 9 is an enlarged fragmentary plan view of the parts shown in Fig. 5 showing the lever index ring and associated parts so disposed that the turntable is completely disengaged from the drive;

Fig. 10 is an enlarged fragmentary plan view of the lever index ring and idler supporting arms illustrating the entire driven mechanism disengaged from the motor drive shaft during the speed changing operation; and

Fig. 11 is an enlarged vertical section taken on the line 11—11 of Fig. 9.

Referring now to the drawings, in all of which like parts are designated by like reference characters, at 10 I show a fractional horse-power electric motor having an upwardly directed vertical drive shaft 11, the upper portion of said shaft being successively reduced in diameter to provide friction pulley portions 15, 16 and 17, which are of successively reduced diameters, with any of which the narrow rubber friction rim of an idler wheel 12 may be, at different times, peripherally engaged, as at 12'.

A mounting plate 20 pendantly supports the motor 10 in a well known manner, the motor being interspaced from said plate by conventional spacing means such as at 21 and 21'. The motor drive shaft 11 extends upwardly through the large circular aperture 23 of said mounting plate, to dispose all said pulley portions substantially above said plate.

The plate 20 is mounted upon a turntable supporting frame by means of three upwardly and outwardly directed lugs 35, 36 and 64. The lugs 35 and 36 project outwardly from the edge 34 of said plate, and the lug 64 projects outwardly from the edge 64'. All of said lugs are apertured at 37 whereby they are adapted to receive resilient annular grommets and bolts for mounting in a well-known manner.

The edge 34 of the plate 20 is further provided with an upstruck lug 38 to which spring means 39 later to be described herein may be secured. Intermediate the two ends of the edge, a semi-circular extension 40 is provided upon which a bearing 41 for an idler support arm 42 may be mounted.

The edge 34 is also provided with an upstruck lug portion 43, which is provided for a use hereinafter described. The lug 64 of the plate 20, disposed opposite the edge 34, is adapted to be projected through the opening 61

3

in an indexing element 60, which is preferably in the form of a ring.

The indexing ring 60, rotary and laterally shifting movements of which are effective to vertically and laterally adjust an idler wheel 12 to different positions shown in the drawing, is preferably, as shown, substantially circular in form, and provided with a pair of relatively large apertures 61 and 62, separated by a relatively narrow strap means 63 interconnecting the opposite sides of said ring.

Stud lift apparatus shown at 70 in Figs. 4 and 7, comprises a coiled compression spring 75, telescoped over the stem of a post 72, a tubular externally stepped sleeve 74 whose upper end portion is telescoped over said post 72 and within the convolutions of said spring 75 so as to be vertically slidable on said post, the lower portion of said sleeve 74 affording a horizontal flange 74' upon which the upper annular surface of a primary support arm 80 for said wheel 12 rests, by virtue of said arm 80 being suitably apertured to permit the upper portion of said sleeve to be telescopably fitted in said aperture. The support arm 80 by a hinged connection at 76, hingedly carries a second idler wheel supporting arm 77, the said primary arm being biased toward a lowermost position, by said spring 75.

The post 72, is anchored on the plate 20 between the post flanges 73', 71 the latter being formed on the bottom end of the post by a "heading-over" operation. The annular radial flange 73 of said post 72 overlies a border portion of the upper surface of the index ring 60, to provide a guide element for preventing undue upward displacement movement of said ring portion, during operative movements thereof.

The cylindrical portion 73' of said post 72, provides a fixed cam element against which the horizontally facing edges of the generally toothed cam follower surfaces, such as those at 98, 98', 99, 99', 109, 109' and 110 of the cam follower portion of the ring 60, may be resiliently pressed by the wire spring 29, to impart lateral cam follower movements to said ring as said ring is rotated as later herein further described.

The spring means for resiliently biasing the indexing ring 60 against said post portion 73' is, preferably in my invention, in the form of a piano wire spring shown at 29 in Figs. 1, 9 and 11, the terminals 30 and 31 of which, are anchored in apertures 32 and 33 of the main supporting plate 20 at points which are relatively inter-spaced, an intermediate portion of said spring engaging a lowermost groove of an end portion of a post 25, as best shown in Figs. 8 and 9 which is mounted centrally of the indexing disc 60. A lowermost portion 25' of said post 25 projects through an elongated aperture 24 of said main support plate 20, the walls of said aperture affording stops to limit lateral movements of said ring.

The post 25 extends vertically upwardly beyond the highest level to which the relatively interhinged idler supporting arms 77 and 80 are elevated, when these are in any of their operative adjustment positions. The horizontally facing camming edge portions 98', 99' and 109' of the ring 60, in response to engagement therewith, of the portion 73' of the post 72, are effective to laterally slide said disc bodily in that horizontal direction which is effective to project the ring 60 laterally, with its central post 25 caused to move in the approximate direction of the post 72, in response to rotational movements imparted by longitudinal movements of the control rod 100 (Fig. 1) to said disc 60. Such movement of the ring 60 is in opposition to the resilient effort of the spring 29 which is otherwise effective to bodily restore the ring with its said post, to the operative positions shown in Figs. 1, 4, 5 and 6.

The support arms 80 and 77 of which a free end 93 of the latter carries the idler wheel 12, constitutes an arm assembly hinged together in such a manner as to simulate the elbow connection between the upper and

4

lower portions of a human arm, but additionally each of said arms provide portions in the region of the "elbow hinge" at 76 to respectively afford the surfaces 89 and 91 which are engageable by the upper end portion of the camming pin 25, to differentially angularly dispose said arms in such a manner as to laterally shift said idler wheel 12 in opposite lateral directions to respectively cause the wheel rim 12' to engage with, or be disengaged from any of the driving pulley portions 15, 16 and 17, at whose level said idler wheel is then elevated.

Movement of said idler wheel 12 separating the periphery of said wheel from a pre-engaged one of the motor driven shaft portions 15, 16 or 17 occurs whenever the disc 60 is rotated toward any position wherein any of the radially inwardly extending apices 98', 99', 109', or the edge portion 98, of the camming edge portion of said disc 60, is in engagement with the portion 73' of the post 72, thus a camming lateral thrust on said ring or disc 60 is effected whereby the combined effects of such rotational movement of the disc, and of the cam-follower movement thereof, is such as to cause it to move to the position indicated by the solid lines which represent the disc in Fig. 10, from such an initial position as is indicated in said figure, by the dot-and-dash lines which respectively indicate the position of said disc prior to said rotational movement. Although said disc may be rotated by any means to effect the longitudinal movements of the invention herein disclosed, it is preferably effected by longitudinal movements of the controlling rod 100 shown in Fig. 1, which shows different adjustment position A, B, C and D, therefor.

The idler wheel supporting arm assembly 80-77 and the idler wheel 12 which is rotatably mounted on an upstanding vertical journal post 94 whose lower end is secured on an end portion 93 of the secondary arm 77, is adjustably elevated or lowered as a result of elevational or lowering movements imparted to the primary support arm 80, as a result of rotating the disc 60 to cause the rim extension 81 of the arm 80 to be engaged by any of the upwardly inclined edge surfaces 86, 87, 85 or 85', of upstanding cam elements which are provided by the flange portions 83 and/or 84 of the ring 60, said cam elements and the different portions thereof being shown in Figs. 4, 5, 6 and 7. The cam elements in the present invention generally comprise a pair of upwardly extending flanges of the disc, being located at a peripheral portion thereof, and which are provided with inclined surfaces as indicated at 85 and 86. Horizontal lands are provided at the portions 85', and 87 of the surfaces of said cam flanges.

With the idler wheel 12 initially positioned with a rim 12' in peripheral engagement with the lowermost pulley portion 15 of the drive pulley, the next counter-clockwise rotational movement of the disc 60, which in the present embodiment is effected by pushing the rod 100, causes the arm 80 to be cammingly lifted to the next higher level of the pulley portion 16, as a result of engagement of the arm 80 with the first upwardly directed cam surface 86 of the cam element 84, until the portion 81 of the arm 80 rests upon the first land 87, which comprises adjacent portions of each said cam elements.

At this time, the idler wheel, is elevated to the level of the second said pulley portion 16. Further counter-clockwise rotational movement of the disc will cause the portion 81 of the arm 80 to ascend to an uppermost level wherein the idler pulley 12 will be at the level of the uppermost motor-driven pulley portion 17, as shown in Fig. 4.

Meanwhile, during each increment of rotational movement of the disc 60 to afford step-by-step upward or downward movement of the idler wheel 12, the idler wheel 12 is moved laterally to displace its peripheral rim 12' laterally outwardly from engagement with a pre-engaged one of the pulley portions 15, 16 or 17, of the pulley shaft 11 as indicated. Displacement of the pe-

riphery of said wheel from an initial operative position, such as that illustrated in Fig. 4, to a laterally displaced position is shown in Fig. 9 by the respective broken and solid line circles applied thereto.

Such outward movement of said wheel is resisted by the spring 39 which extends from an end portion of the wheel supporting arm 77 to a fixed end 38 which is anchored in a portion of the frame 20, as shown in Fig. 1, said spring biasing said wheel 12 towards the pulley shaft 11. Such outward and inward movements of the wheel periphery 12' is effected by the stationary portion 73' of the post 72 traversing the tooth-like laterally facing cam-follower surfaces of the ring 60, previously described, under the effect of pressure exerted by the spring 39 exerting a resilient effort to cause said cam-follower edge surfaces to be pressed against the said portion of the post 72 and the result of such engagement being to effect reciprocatory lateral movements of the post 25, whose upper end makes camming engagement with the edges 89 and 91 of the respective arms 80 and 77, which cooperatively support the idler wheel 12.

Inward movement of the post 25 along the edge 89 of the arm 80 and the edge 91 of the extension arm 90 of the arm 77 is effective in both cases to swing the respective arms in a counter-clockwise direction and oppositely directed movement of the post 25 permits the spring 39 to exert a resilient effort on said arms to restore them in a clockwise direction about their respective journals to such a position, as illustrated in Figs. 1 and 6.

The relative positions of the two sets of cam and cam follower elements, which respectively effect vertical and horizontal movements of the idler wheel 12, are so relatively timed during any rotational movement of the disc to provide such a sequence of movements of the idler wheel periphery that whenever the ring 60 is rotated in either direction the idler wheel rim will first be moved radially outwardly from the pre-engaged pulley portion, followed by vertical movement in the desired direction determined by the direction of rotation imparted to the ring 60, until the said wheel periphery is at the level of the next succeeding pulley portion, whereupon the post 25 will be removed from engagement with the above related engagement with portions of the arms 80 and 77 to permit the spring 39 to retractively move said wheel laterally into engagement with the shaft pulley portion at whose level the wheel had been positioned.

The adjustment apparatus previously described is adaptable to permanently displace the idler wheel 12 laterally outwardly from the shaft 11, this being effected by imparting counter-clockwise rotational movement to the ring 60 to place it in position A, Fig. 1; this being done after the idler wheel 12 has been adjusted to its uppermost adjustment position and in peripheral contact with the uppermost pulley portion 17 of the pulley shaft 11.

Such counter-clockwise rotation is effective to move the idler wheel 12 laterally outwardly as above stated but is not effective to further elevate the said wheel, since in such ultimate adjustment position the portion 73' operating as a cam element has become engaged with the surface 98, which is a continuation of the horizontally facing cam surfaces previously described.

The post portion 73' being laterally immovable will permit no further rotation of the ring 60 in the counter-clockwise direction, so that to place the wheel 12 once more in operative position, it will be necessary to rotate the ring in the clockwise direction one step to disengage said edge portion 98 of the ring from said post portion 73' and to place it in engagement with any other portion of the horizontal cam follower edges 98' and 99 etc. as may be desired to effect engagement of the wheel rim 12 with a desired one of the pulley portions 15, 16 or 17 according to the speed at which it is desired to keep the turntable rotated.

The "idle" position A is provided for removing pressure from the rubber rimmed wheels, as when the phono-

graph mechanism is intended to remain unused for a considerable period of time and thus to prevent possible indentation of said rubber surfaces.

The idler pulley wheel 13, which as best shown in Figs. 2 and 4 has a rim of rubber or like friction material, has an outer cylindrical surface many times wider than the surface of the idler wheel 12. Said wheel 13 is journaled at 46 on a laterally swingable support 42 which in turn is journaled at 40 on an upwardly extending support 41 rigidly secured by a bottom portion to the main mounting plate 20, as best shown in Fig. 3. A rearward extension of the arm 42 is provided with a notch 47, the two sides of the notch 47 being disposed on opposite sides of and in laterally interspaced relation to an upward extension 43 of the main supporting plate 20, for the purpose of limiting swinging movement of the arm 42 within desired practical limits as later more fully described herein.

The turntable flange 14 is of the usual narrow type as shown in Figs. 3, 4 and 6, the interior surface 14 of the turntable "T" being engageable solely by an uppermost part of the peripheral surface of the rim 50 for the wheel 13. As best shown in Figs. 1-4 inclusive, positioned by its mount, the wheel 13 is not vertically adjustable and is not independently biased in any direction, but is interposed between the inner annular surface 14 of the turntable "T" and the periphery of the idler wheel 12 which, however, is movable vertically to any of the three levels indicated in Fig. 4, the two lowermost levels for engagement respectively of the wheel rim with the intermediate and lowermost pulley portions 16 and 15 of the shaft 11 being indicated by broken lines, as shown in Fig. 4. However, in any vertical position engagement between the respective rims of the wheel 12 and the wheel 13 is achieved.

The biasing spring 39 for the wheel 12 is effective to maintain partial wedging engagement by the wheel 12 with one of the shaft pulley portions while concurrently making engagement with the periphery of the wheel 13. The diameter of the turntable "T" is such as to cause the turntable flange to engage the more upwardly disposed portion of the rim 50 of the wheel 13, to press the wheel 13 inwardly in a direction toward the shaft 11, thus exerting opposition to the wedging effect of the wheel 12 under the biasing pull of the spring 39.

The transfer of driving torque from the shaft 11 to the turntable is transmitted by any one of the pulley portions 15, 16 and 17, which at the time is engaged by the periphery of the wheel 12, through said wheel 12 to the periphery of the wheel 13, and thence from the rim of said wheel 13 to the turntable flange 14.

Although only an upper portion of the longitudinal extent of the rim 50 of the wheel 13 engages the turntable flange, effective frictional contact is had therewith because of the relatively great width of said engaging upper portion of said wheel 13, said upper portion being much wider than the usual idler wheel of the type shown at 12, commonly relied upon to transfer torque directly to said turntable flange. At the same time, the relatively great variance of operative levels of the wheel 12 is accommodated for the transfer of torque therefrom to the turntable flange as a result of the considerable vertical extent of the rim of said wheel 13 with which the wheel rim 12 may engage. The two wheels 12 and 13 engage each other through rubber surfaces which provide efficient frictional traction.

A resume of the manner in which the mechanism previously described is operated is as follows:

In Fig. 1 the position indicated at "A" is the idle or so-called "Off" position of the drive mechanism of my invention, "B," the "low" or 33 1/3 R. P. M. position, "C" the medium or 45 R. P. M. position, and "D" the high or 75 R. P. M. position.

In the "idle" or "A" position the rotor shaft 11 is spaced from and is not in engagement with the pulley 12. In

this position as best shown in Fig. 9, the rear end 81 of the lift lever 80 rests upon the land 85', the spring 75 is compressed and the post 72 contacts and is seated within a cam notch 98 in the ring 60 adjacent the V-shaped notch 99. The spring 39 is expanded and the pulley 12 is spaced from the pulley 13, the pin 25 contacts the tapered camming surfaces 89 and 91 of both the lift lever 80 and the idler support arm 77.

When the operator desires operation at "low" speed or 33 1/3 R. P. M., known as position "B," he simply moves the lever clockwise a slight distance with the lift stud 70 in engagement with the notch 99, and the lever 80 moves inwardly advancing the pivotally associated support arm 77 carrying the tread portion of its associated pulley 12 into engagement with the upper rim portion of the tread 50 of the pulley 13, as best illustrated in Figs. 1 and 4, and into engagement with the uppermost and least diameter step 17 of the rotor shaft 11.

The idler support arm 42 is moved to the position best shown in Figs. 1 and 3 by means of the engagement of the pulley 12 with the pulley 13 and the pulley 13 contacts the flange 14, as best shown in Figs. 1 and 4.

To operate the device at "medium" speed or 45 R. P. M. referred to herein as the "C" position, the lever is moved clockwise, the end 81 of the arm 80 moved over the tapered portion 85 and being seated thereafter upon the land 87. During this change of position the pin 25 is moved inwardly in the slot 24 against the pressure of the spring 29 and cammed against the tapered ends 89 and 91 of the lift lever 80 and the idler support arm 77 respectively and the pulley 12 carried thereby is lowered to bring the tread thereof into engagement with the middle step 16 of the rotor shaft 11. The pulley 12 is first moved away from engagement with both the upper step 17 of the rotor shaft and the pulley 13 against the action of the spring 39 by means of the movement of the lift lever 80 occasioned by the engagement of stud or post 72 with the inwardly extending portion of the recess 99 adjacent the recess 99' while the end 81 is moved into engagement with the land 87. The pulley 12 is then brought into engagement again with the tread surface of the pulley 13 at a medial portion thereof, as best shown in Fig. 8 in solid line representation, by the movement outwardly of the lift lever 80 as the stud 72 rides against the leading leg of the recess 99' adjacent the recess 99. When the end 81 is securely seated upon the land 87 the spring 39 is restored to its initial contractive position and the tread surface of the pulley 12 is now in engagement with a middle portion of the relatively wide tread surface of the pulley 13.

The pulley 13 is, however, still in the position with the turntable flange of driving contact which it had in position "B." In other words, regardless of the position of the intermediate pulley 12, which will engage any of the steps of the rotor shaft and drives different portions of the pulley 13 tread surfaces according to the position of the said pulley 12, the pulley 13 always drives the turntable flange as shown in Fig. 1.

To operate the device at high speed or 78 R. P. M. or as referred to herein the "D" position, the ring is moved by the manual or automatic means 100 from the position shown in Fig. 5 which indicates the medium position just described to the position shown in Fig. 6.

It will be noted that the cam element 73' is now positioned in the third recess and the arm 80 and the idler support arm 77 are moved inwardly and then outwardly again by virtue of the camming contact of the pin 25 and tapered ends 89 and 91 of the arms 80 and 77 respectively, and that the end 81 of the arm 80 is, at the conclusion of such movement of the ring, lowered to the position where the flange contacts the portion 73 of the post 72, the spring 75 is in its free expanded position, and as best shown in Fig. 7 in dotted lines, the arm 80 and its associated end are disposed adjacent the free end of the cam surface 84.

In this "high speed" position of the drive mechanism, Fig. 6, the tread surface of the pulley 12 engages the pulley portion 15 of the shaft 11, and the lowermost portion of the tread surface of the idler pulley 13.

As the ring 60 is moved from one position to the other as from position "A" to position "D" through intermediate positions "B" and "C," the movement of the post 25 through its camming engagement with the lift lever 80 and idler support arm 77 disposes the ring 60 in successively different indexing positions from the "idle" position "A" to the "high speed" position "D" and as provided by the engagement of the stud 70 carried by the arm 80 with recesses 98, 99, 99' and 99'' the free end of the lever 81 is seated successively upon the lands 85', 87 and in the last position adjacent the tapered end 86, as shown in Fig. 6.

This successively moves the intermediate pulley 12 out of engagement with both its associated position with the rotor shaft 11 and the pulley 13 and disposes the same, as best shown in Fig. 4, at three different levels of contact, the first affording engagement with the uppermost surfaces of the tread 50 of the pulley 12 and with the portion of least diameter of the rotor shaft, viz. 17; the second being with an intermediate position of the tread surface 50 of the pulley 13 and the intermediate step of relatively greater diameter, 16, of the shaft 11; and the third being with the lower surface of the pulley 13 and the portion of greatest diameter of the 3-step portions of the rotor shaft, viz. 15.

Throughout the movement inwardly and outwardly of the pulley 12, and its optional engagement in any of the locations mentioned with the tread surfaces of pulley 13, and with the various steps of the rotor shaft, the engagement of the driving pulley 13 with the turntable flange is the same. Also the turntable flange 14 always contacts the same upper portion of the rim of the pulley 13, as shown.

In pursuance to a first object of this invention, I have described and do claim a transmission mechanism employing the stepped pulley shaft 11 having three or more relatively superposed stepped pulley portions, such as 15, 16 and 17, to the levels of which the narrow treaded idler wheel 12 may be adjusted by the adjustment mechanism which includes the rotatable ring 60 and since the vertical space occupied by the said three pulley portions is greater than the depth of the turntable flange 14, the idler pulley 12 when adjusted to its uppermost and lowermost positions is required to move vertically a greater distance than will permit its rim 12' to engage said flange at the lowermost adjusted position of said idler wheel and, therefore, the idler wheel 13 having a very wide tread 50 is interposed between the inner surfaces of said flange 14 and the periphery of the wheel 13 and during driving of the turntable only the uppermost portion of the rim 50 is engaged with the surface of said flange, although the wheel 12 is movable to the successive positions indicated by dotted lines in Fig. 4 to interchangeably engage the motor driven pulleys 15, 16 or 17.

While in these three adjusted positions, the rim of the wheel 12 engages portions of the wide rim 50 which are above the lower edge of the turntable flange 14 and at other times engages a portion of the said rim 50 which is below the level of the lower edge of said turntable flange.

The drive mechanism as described when installed in the container for the phonograph mechanism, may be readily lowered in such container, while the degree of elevation of its uppermost parts is limited by the position of the turntable.

I have described certain instrumentalities associated with the speed adjustment mechanism which I prefer, although I am fully aware that my invention may be employed in association with other equivalent instrumentalities, which combined, achieve the same general purpose; and the first object of my invention is therefore achieved

whether or not such instrumentalities as shown and described are employed in connection with the adjustment mechanism.

The essential instrumentalities to satisfy this object being the stepped motor-driven pulley 11, the idler wheel 12 and the idler wheel 13 with means to relatively adjust the wheel 12 into operative friction drive relation to the different steps of the pulley 11.

At the same time, I claim as my invention the arrangement of the specific instrumentalities as set forth in certain of the appended claims as being a novel arrangement of efficiently formed and related parts to achieve the adjustment of the idler wheel 12 and the final drive wheel 13 with respect to the pulley steps 15, 16 and 17.

I claim:

1. A power driven transmission for selectively driving a phonograph turntable of the type having a pendant annular peripheral flange at any of a plurality of different speeds comprising a stepped motor-driven pulley journaled to rotate on a vertical axis and provided with a plurality of pulley portions of different diameters distributed at different levels thereof, a first idler wheel journaled to rotate on a vertical axis having a substantially cylindrical friction rim portion, whose width is substantially greater than the depth of the inner annular surface of a said flange, and is peripherally engageable therewith solely by an upwardly disposed portion of its said width, a relatively lower portion of its said width being disposed at the level of the lowermost of said pulley portions, a second idler wheel having a friction rim which is substantially narrower than the rim of said first wheel and is rotatable on a vertical axis and mounted for lateral and vertical adjustment movements, spring means operative to bias said wheel in such a direction as to cause its said rim to be peripherally and substantially wedgingly interposed between said first wheel rim and any of said pulley portions at whose level said second wheel rim is disposed and an adjustment member movable from any one to any other of a plurality of adjustment positions and operative when moved from one to another of such positions to selectively move said second wheel laterally outwardly from engagement with a pre-engaged pulley portion to vertically shift the position of said wheel to the level of a different of said pulley portions and finally to release said wheel to permit said spring means to cause the said second wheel rim to concurrently peripherally engage a selected other pulley portion and a portion of said first wheel rim which is at the level of said selected pulley portion.

2. A transmission mechanism for selectively driving a phonograph record supporting turntable, of the type having a pendant annular flange, at any of a plurality of rotational speeds, said mechanism comprising a motor-driven pulley of stepped formation and rotatable on a vertical axis to provide a plurality of pulley portions of relatively different diameters, a pair of idler pulley wheels, each of said wheels being provided with a friction rim, the rim of a first of said wheels being much wider than a relatively narrower and substantially cylindrical rim of a second of said wheels, a vertical and laterally movable mount upon which said second wheel is journaled for rotation on a vertical axis, a laterally movable mount upon which said first wheel is journaled for rotation on a vertical axis, spring means laterally biasing said second wheel toward peripheral engagement with said pulley and also laterally biasing said first wheel towards peripheral engagement with both said second wheel and the inner surface of said turntable flange to cause torque to be frictionally transferred from said stepped pulley through said second wheel to said first wheel, for transfer of torque from said pulley portion to said turntable, and a control member adjustably movable from any one to any other of a plurality of adjustment positions and operable to first move said second wheel rim laterally out of engagement with a pre-engaged said pulley portion, then

to maintain such disengagement during a following portion of its movement and finally, at the end portion of such movement to release said second wheel to permit said spring means to cause said second wheel rim to engage another said pulley portion which is selected by the final adjustment position of said member, only an upwardly disposed portion of the rim of said first wheel being so disposed as to make peripheral engagement with the inner surface of said turntable flange, and said second wheel rim during different of its adjusted positions making engagement with said first wheel rim at portions of its periphery which are disposed at vertically interspaced levels.

3. A motor transmission mechanism for selectively driving a phonograph turntable of the type having a pendant peripheral flange at any of a plurality of different speeds, comprising the combination of a motor-driven pulley rotatable on a vertical axis and which is provided with a plurality of friction drive pulley portions of successively smaller diameters proceeding upwardly of its length, a pair of idler wheels each having a friction rim, the outer surface of the rim of a first of said wheels being substantially cylindrical and of substantially greater vertical extent than that of a second of said wheels, vertically and horizontally movable mount means providing separate journals upon which respective of said wheels may be mounted for rotation on different of a pair of relatively laterally interspaced vertical axes, an adjustment member adjustably movable to any of a plurality of successively disposed adjustment positions to effect vertical movement of the journal for said second wheel in either direction to dispose it at any predetermined one of a plurality of levels each of which corresponds to the level of a different one of said pulley portions, spring means exerting a resilient effort on said second wheel to tend to laterally thrust its rim into frictional-driven engagement with any said pulley portion at whose level said second wheel has been positioned by said first wheel rim being peripherally engaged with both said flange and said second wheel rim, and said first wheel rim having an upwardly disposed portion which alone is engageable with said flange, and said second wheel rim, when adjusted to engage a lowermost of said pulley portions making engagement with a portion of said first wheel rim which is at a level below the lowermost edge of said flange.

4. A motor transmission mechanism for selectively driving a phonograph turntable of the type having a pendant peripheral flange at any of a plurality of different speeds, comprising the combination of a motor-driven pulley rotatable on a vertical axis and which is provided with a plurality of friction drive pulley portions of successively smaller diameters proceeding upwardly of its length, a support member, a rotatable friction wheel floatingly carried by said support member, a spring biasing said wheel towards said pulley, said support member being mounted for vertical and horizontal movements from and to any position such that said spring will bias said friction wheel laterally to cause it to make torque transmission engagement with the periphery of any of said pulley portions at whose level said wheel is disposed, a rotatable adjustment member, horizontally operative camming means operable in response to rotative movement of said member in either opposite direction to respectively so move said support as to cause said wheel rim to be moved laterally out of engagement with any pre-engaged pulley portion, vertically operative cam means operable in response to said rotative movement of said member to laterally displace said wheel rim from a pre-engaged one of said pulley portions, said cam means and said camming means being relatively so timed that said wheel rim is moved from engagement with any said pulley portion during all vertical adjustment movements of said wheel and means for effecting transmission of driving torque from said wheel to said turntable.

5. The mechanism substantially as set forth in claim 4

11

characterized by said cam means comprising vertically facing camming surfaces disposed arcuately in spaced relation to the center of rotation of said member and a cam follower therefor transmitting vertical movements to said support, said camming means comprising a plurality of successive horizontally facing teeth and a fixed cam successively engageable by successive of said teeth during rotational movements of said member to cause said member to constitute a laterally shiftable cam follower of said camming means, said support being moved laterally by said member during cam follower movements thereof to laterally displace the rim of said wheel from any of said pulley portions during vertical movements of said wheel imparted by the cam follower of said vertically operative camming means.

6. A motor transmission mechanism for selectively driving a phonograph turntable of the type having a pendant peripheral flange at any of a plurality of different speeds, comprising the combination of a motor-driven pulley rotatable on a vertical axis and which is provided with a plurality of friction drive pulley portions of suc-

12

cessively smaller diameters proceeding upwardly of its length, an idler wheel, a support for said wheel, a rotatable adjustment member, horizontally operative camming means operable in response to corresponding rotative movement of said member in either opposite direction to respectively so move said support as to move said idler wheel laterally out of engagement with any pre-engaged pulley portion, vertically operative cam means operative in response to said rotative movement of said member to laterally displace said wheel from a pre-engaged one of said pulley portions, and means for effecting transmission of driving torque from said idler wheel to said turntable.

References Cited in the file of this patent

UNITED STATES PATENTS

2,584,580	Hardy	Feb. 5, 1952
2,621,527	Guest	Dec. 16, 1952
2,650,504	Tateishi	Sept. 1, 1953
2,655,812	Morrison	Oct. 20, 1953

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,818,741

January 7, 1958

Raymond C. Siebert

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 10, line 68, and column 12, line 10, for "laterally", each occurrence, read -- vertically --.

Signed and sealed this 3rd day of November 1959. .

(SEAL)

Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,818,741

January 7, 1958

Raymond C. Siebert

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 9, for "33 R.P.M." read -- 33 1/3 R.P.M. --; column 5, line 47, for "apapratus" read -- apparatus --; column 6, line 73, for "75 R.P.M." read -- 78 R.P.M. --; column 10, line 72, for "durirng" read -- during --.

Signed and sealed this 25th day of November 1958.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON
Commissioner of Patents