

H. WOLKE.
GEARING.

APPLICATION FILED SEPT. 12, 1907.

936,264.

Patented Oct. 5, 1909.

Fig. 1

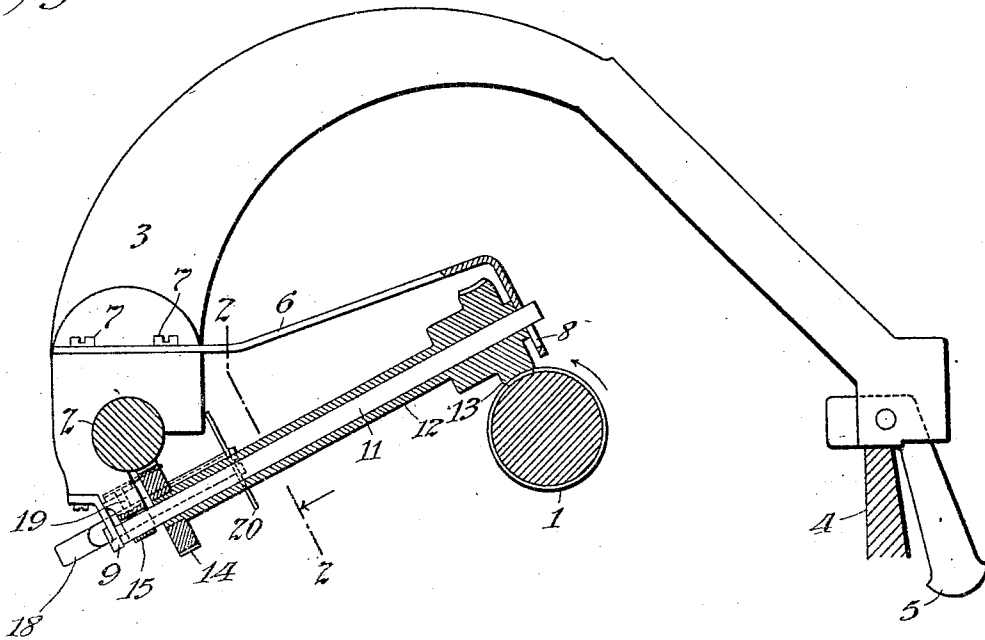


Fig. 2

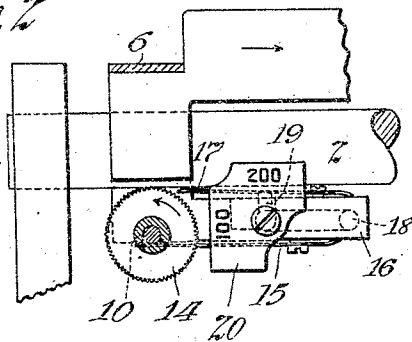
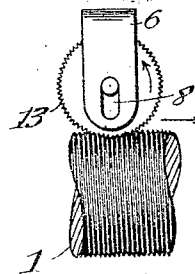


Fig. 3



Witnesses:
Frank D. Lewis
H. H. Dyke

Inventor:
Herman Wolke
by Frank L. Lewis *Atty.*

UNITED STATES PATENT OFFICE.

HERMAN WOLKE, OF ORANGE, NEW JERSEY, ASSIGNOR TO NEW JERSEY PATENT COMPANY, OF WEST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

GEARING.

936,264.

Specification of Letters Patent.

Patented Oct. 5, 1909.

Application filed September 12, 1907. Serial No. 392,480.

To all whom it may concern:

Be it known that I, HERMAN WOLKE, a citizen of the United States, and a resident of Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Gearing, of which the following is a description.

My improvement relates to phonographs and particularly to means for advancing the carriage which bears the recorder or reproducer, transversely to the direction of movement of the surface of the record, so that the stylus will traverse a spiral path on the record.

The object of my invention is the production of improved means whereby the carriage may be advanced, either directly by the rotating feed screw, as has hitherto been the practice, or whereby at the will of the operator, the carriage may be advanced at each revolution of the feed screw, a distance bearing any desired ratio to the pitch of the said feed screw. This is desirable in order that a single instrument may be used for the recording or reproduction of records, the record grooves whereof have different pitches. The ordinary phonographs now in use are adapted for the reproduction of the ordinary standard sound record, the grooves whereof have a pitch of substantially one one-hundredth of an inch. As records can now be produced with a very much smaller pitch, preferably one two-hundredths of an inch, and since it is impracticable to manufacture feed screws with so small a pitch, it is an object of my invention to adapt the phonograph for the recording or reproduction of records of either of the sorts above mentioned, by means of a simple adjustment and with as little change as possible from the present form of this instrument.

With this and related objects in mind, my invention consists of the features hereinafter set forth and claimed.

In order that my invention may be more fully understood, reference is hereby made to the accompanying drawings, in which the same reference characters are applied uniformly to the same parts, and wherein—

Figure 1 is a cross-sectional view of one form of device constructed in accordance with my invention; Fig. 2 is a cross-sectional view, taken at right angles to Fig. 1 and on the line 2—2 in the said figure and looking in the direction of the arrow, and Fig. 3

is a detail showing the manner in which the worm gear is journaled in the carriage.

In the drawings reference numeral 1 indicates the feed screw of the phonograph, and 2 the back guide rod upon which the carriage 3 is movable. The said carriage, at its forward portion, is slidably supported upon the track 4, and the lever 5 is provided for raising and lowering the carriage. A spring arm 6 is secured to the carriage, as by screws 7. This arm is bent slightly upward just in front of the point where it is secured to the carriage, and its free end is bent downward into a position which is almost vertical. A slot 8 is formed in this downwardly extending portion. A bracket 9 is secured to the lower portion of the carriage and a groove 10 is formed in the carriage immediately adjacent to this bracket. A cylindrical rod 11 is received within the slot 8 and the groove 10 and rests against the bracket 9. Surrounding this rod is a sleeve 12. At that end of the sleeve adjacent to the feed screw is a worm gear 13, and at the opposite end of the sleeve and secured thereto is a toothed wheel 14, the teeth whereof are extremely sharp and hard. A portion of this wheel rests within a cut-away part of the carriage 3, and the hardened teeth on its periphery contact with the guide rod 2, being held thereagainst by means of a spring 15 which is secured upon an arm 16 on the carriage 3. Opposite the spring 15, and with its end bearing against the periphery of the wheel 14, is a much more powerful spring 17. This spring is supported and its end held from contact with the toothed wheel, by means of a crank 18, the shaft whereof is provided with a stud 19. An indicator 20 is attached to the crank shaft, which serves to indicate the number of rotations which the record will make, while the carriage is being advanced through a distance of one inch. When the carriage 3 is raised by means of the lever 5, the rod 11 sliding in the slot 8, the worm wheel 13 does not immediately leave the feed screw but remains in contact therewith, until the rod 11 has reached the lower end of the said slot. The worm wheel is normally maintained in frictional contact with the feed screw by the spring 6, the parts being so adjusted that a portion of the weight of the carriage is supported by this arm.

The operation of the device is as follows:

When the crank 18 is in the position shown in Fig. 2, and the spring 17 is held in its elevated position, the worm gear 13 and the toothed wheel 14 are revolved when the feed screw 1 is actuated and the toothed wheel 14 being held forcibly against the guide rod 2 by the spring 15, the carriage will be advanced at each rotation of the feed screw a distance depending upon the ratio between the diameters of the worm gear and the toothed wheel 14. When these are of substantially the same diameter as in the form illustrated, and a feed screw having a pitch of .01 of an inch is used, the carriage will be advanced at each rotation thereof, a distance equal to one-half of the pitch of the feed screw, or .005 of an inch. If a worm gear or a toothed wheel of a different size were used, the amount of advance would of course be different, depending only upon the ratio between the diameters of these parts. The diameter of the feed screw may vary somewhat without affecting the operation of the device as the worm gear 13 rotates at a speed which depends only upon the pitch and speed of rotation of the feed screw and is independent of its diameter.

In order to adapt the instrument to the reproduction of the ordinary sound record having one hundred threads to the inch, the crank 18 is turned downward through an angle of 90°, bringing the figures 100 on the indicator 20 to the top. This movement of the crank allows the spring 17 to descend upon the toothed wheel 14, holding the same against rotation, and pushing it away from the guide rod 2, since this spring is much stiffer and more powerful than the spring 15 which opposes it. The toothed wheel 14 being thus locked against rotation, the worm gear 13 is likewise held against rotation, and for this reason it acts, on the rotation of the feed screw, precisely like the ordinary feed nut now in common use, and the carriage is advanced at each revolution of the feed screw a distance which is the same as the pitch of the screw.

Having now described my invention, what I claim is—

1. In a device of the class described, the combination of a substantially smooth guide rod, a carriage movable thereon and sharp pointed means borne by the carriage and coöperating with the guide rod for moving the carriage on the said rod, and actuating means therefor, substantially as set forth.

2. In a device of the class described, the combination of a substantially smooth guide rod, a carriage movable thereon, a toothed wheel rotatably mounted on the said carriage and coöperating with the guide rod for moving the carriage on the said rod, and means for imparting rotation to said wheel substantially as set forth.

3. In a device of the class described, the

combination of a substantially smooth guide rod, a carriage movable thereon, a hardened toothed wheel rotatable upon said carriage and coöperating with the said guide rod for moving the said carriage on the rod, and actuating means for said wheel, substantially as set forth.

4. In a device of the class described, the combination of a substantially smooth guide rod, a carriage movable thereon, a feed screw, means borne by the carriage and coöperating with the said rod for moving the carriage on the rod, and means under the control of the feed screw for actuating the first named means, substantially as set forth.

5. In a device of the class described, the combination of a substantially smooth guide rod, a carriage movable thereon, a feed screw, a toothed wheel rotatably mounted on the said carriage and coöperating with the said guide rod for moving the said carriage on the rod, and means under the control of the feed screw for rotating said wheel, substantially as set forth.

6. In a device of the class described, the combination of a substantially smooth guide rod, a carriage movable thereon, a feed screw, a wheel having hardened teeth rotatably mounted upon the said carriage and coöperating with the guide rod for moving the carriage, and means under the control of the feed screw for rotating the said wheel, substantially as set forth.

7. In a device of the class described, the combination of a guide rod, a carriage movable thereon, friction means borne by the carriage and spring pressed against the said rod for moving the carriage along the said rod, and actuating means therefor, means for moving said friction means out of contact with said rod, substantially as set forth.

8. In a device of the class described, the combination of a guide rod, a carriage movable thereon, a feed screw, a toothed wheel rotatably mounted on the said carriage, a spring for pressing the wheel against the said rod, and means under the control of the feed screw for rotating the said toothed wheel, substantially as set forth.

9. In a device of the class described, the combination of a guide rod, a carriage movable thereon, a feed screw, a worm gear on said carriage and meshing with the said feed screw, a toothed wheel rotatable on the said carriage, spring pressed against said rod and driven from the said worm gear, substantially as set forth.

10. In a device of the class described, the combination of a stationary member, a movable carriage, a feed screw, a worm wheel on said carriage and meshing with the said feed screw, means actuated from said worm wheel and coöperating with said stationary member for moving the said carriage and releasable means for holding the said worm wheel

against rotation and disengaging the first named means from engagement with the stationary member, substantially as set forth.

11. In a device of the class described, the combination of a substantially smooth guide rod, a carriage movable thereon, a feed screw, a worm wheel movably and rotatably mounted on said carriage and meshing with said feed screw, and means actuated by the worm wheel and cooperating with the guide rod for moving the said carriage, substantially as set forth.

12. In a device of the class described, the combination of a guide rod, a carriage movable thereon, a feed screw, a worm wheel on said carriage, means actuated by the said worm wheel for moving the said carriage, a spring for pressing the said means against a guide rod, and a more powerful, releasable spring acting in opposition to the first named spring and operating when released to prevent the engagement of the said carriage moving means with the said guide rod and to hold the worm gear against rotation, substantially as set forth.

13. In a device of the class described, the combination of a movable carriage, a feed screw, rotatable means on the said carriage for advancing the same at a different rate of advance from that imparted directly by the feed screw, and means for locking the said means against rotation, substantially as set forth.

14. In a device of the class described, the combination of a movable carriage, a member relatively stationary thereto, a feed screw, a worm gear normally rotatable on said carriage and meshing with the said feed screw, means actuated by the said worm gear and cooperating with said relatively stationary member for moving the said carriage, and means for locking the worm gear against rotation, substantially as set forth.

15. In a device of the class described, the combination of a guide rod, a carriage movable thereon, a feed screw, a spring arm on the said carriage, a worm wheel and a toothed wheel journaled between the said carriage and the spring arm, the former meshing with the feed screw and the latter contacting with the guide rod, and a spring for holding the toothed wheel in contact with the guide rod, substantially as set forth.

16. In a device of the class described, the combination of a guide rod, a carriage movable thereon, a feed screw, a spring arm on the said carriage, a worm wheel and a toothed wheel journaled between the said carriage and the spring arm, the former meshing with the feed screw and the latter contacting with the guide rod, a spring for holding the toothed wheel in contact with the guide rod, a more powerful spring in opposition to the first spring, a crank and means under the control of the crank for releasing the

said last named spring to bear against the toothed wheel and hold it away from the guide rod and maintain the worm gear against rotation, substantially as set forth.

17. In a device of the class described, the combination of a guide rod, a carriage movable thereon, a feed screw, a spring arm on said carriage, a shaft, a worm gear and a toothed wheel mounted thereon between the said spring arm and the said carriage, the worm gear meshing with the said feed screw, a spring for holding the toothed wheel against the guide rod and a stronger spring for holding it away therefrom, rotatable means for releasing or supporting the last named spring and an indicator connected to the said rotatable means, substantially as set forth.

18. In a device of the class described, the combination of a movable carriage, a feed screw, a worm wheel rotatably mounted on said carriage in engagement with said feed screw, means actuated by the rotation of said worm wheel for imparting a progressive movement to the carriage and means for locking the said worm wheel against rotation, substantially as set forth.

19. In a device of the class described, the combination of a movable carriage, a rotatable feed screw, a spring secured to the said carriage, a worm wheel engaging said feed screw, and a support for said worm wheel the end of which engages a slot formed in the free end of said spring, substantially as set forth.

20. In a device of the class described, the combination of the feed screw, traveling carriage, rotating worm wheel, and means for locking the same against rotation, and an indicator movable with said locking means for designating the rate of feed of said carriage, substantially as set forth.

21. In a device of the class described, the combination of a movable carriage, a feed screw, rotatable means on said carriage in engagement with said feed screw, means actuated by the rotation of the rotatable means for imparting a progressive movement to the carriage, and means for locking said rotatable means against rotation, and an indicator movable with said locking means for designating the rate of feed of the carriage, substantially as set forth.

22. In a device of the class described, the combination with the feed screw and traveling carriage, of a worm wheel rotatably mounted on said carriage, a stationary member, means rotated by said worm wheel and cooperating with said stationary member, and means for severing the operative connection between the stationary member and worm wheel, substantially as set forth.

23. In a device of the class described, the combination with the feed screw and traveling carriage, of a worm wheel rotatably

mounted on said carriage in engagement with said feed screw, and means operating through said worm wheel for feeding said carriage at a plurality of different speeds, substantially as set forth.

24. In a device of the class described, the combination with a movable carriage and a feed screw, of a worm wheel on said carriage and meshing with the said feed screw, a fixed abutment with which the worm wheel coöperates to advance the carriage by a differential movement, and a single means for

locking the worm wheel against rotation and for simultaneously destroying the coöperative relation between the worm wheel and the abutment to permit the worm wheel to be fed as a nut by the feed screw, substantially as set forth.

This specification signed and witnessed this 11th day of September 1907.

HERMAN WOLKE.

Witnesses:

H. H. DYKE,

CHARLES F. ROBSON.