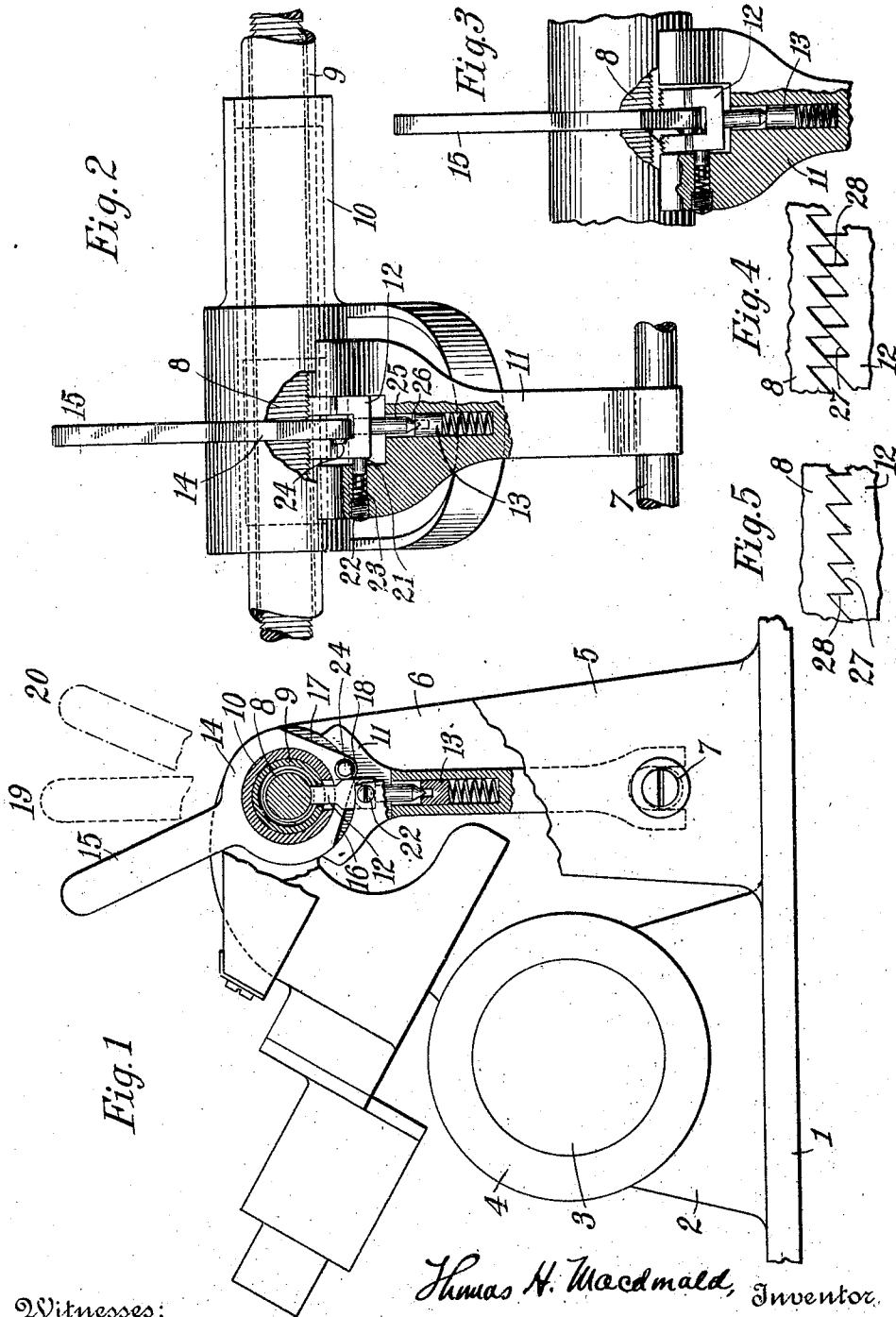


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 START AND STOP MECHANISM FOR GRAPHOPHONES.
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Witnesses:
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UNITED STATES PATENT OFFICE.

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START AND STOP MECHANISM FOR GRAPHOPHONES.

934,451.

Specification of Letters Patent. Patented Sept. 21, 1909.

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To all whom it may concern:

Be it known that I, THOMAS H. MACDONALD, a citizen of the United States of America, and a resident of Bridgeport, Fairfield county, Connecticut, have invented a new and useful Improvement in Start and Stop Mechanism for Graphophones, which improvement is fully set forth in the following specification.

15 This invention relates to graphophones or other talking-machines, especially of the construction intended to operate interchangeably for recording and reproducing. In these machines there is provided a feed-screw whose thread has one side vertical and the other at an angle to the axis of the screw-shaft, and a similarly-threaded partial nut normally engaging therewith to propel the carriage longitudinally of the record; 20 the start-and-stop mechanism has means for disengaging the nut from the screw, and for causing the two to mesh together again. In order to permit the nut to have sufficient play to permit the meshing, a certain looseness of mounting sometimes occurs, there is also a "back-lash" between the threads of the nut and those of the screw, besides rattling and other objections that will be appreciated by those familiar with the use of 30 such machines.

The object of this invention is to provide means for preventing this back-lash, rattling, etc. without interfering with the efficiency of the machine. Preferably this is 35 accomplished by providing means that, while the feed-nut is being brought into engagement with the feed-screw, will force the nut sidewise to the limit of its play and into proper mesh, in order to prevent the 40 back-lash, and that will hold it there against rattle; and, in combination with this, other means for restoring the nut to its former position when disengaged from the screw.

The invention will be best understood by 45 referring to the annexed drawings that illustrate a preferred embodiment thereof.

In these drawings, Figure 1 is an end elevation, partly in vertical section, of a graphophone showing my invention; Fig. 2 50 is a partly broken away rear view of a part of the same, viewed from the right in Fig. 1; Fig. 3 is a vertical section of a detail; and Figs. 4 and 5 are details on an enlarged scale.

1 is the bed-plate of the graphophone or 55 other talking-machine; 2 is the end-standard in which is journaled the rotating mandrel 3, that carries the record-cylinder or blank cylinder 4.

5 and 6 are end-standards at the rear of 60 the graphophone, between which is secured the lower horizontal guide-rod 7 and the feed-screw 8. Surrounding this feed-screw is the usual "split-sleeve" 9 consisting of a tubular casing having in its bottom a longitudinal slot to give access to the feed-screw. 65 The carriage has sleeve 10 encircling and sliding upon the split-sleeve 9. The recorder or the reproducer (or the combined recorder and reproducer) will be connected to 70 this carriage in any approved manner. Secured to the bottom of the carriage and sleeve 10 is the depending Y-shaped guide-member 11, whose lower end straddles the lower guide-rod 7. Located within the 75 upper fork of this Y is the partial nut 12 that is normally forced upward by spring-actuated plunger 13 to enter the longitudinal slot in the split-sleeve so as to engage the threads of the feed-screw 8. This partial 80 nut has a transverse slot in its upper face so as to render it substantially U-shaped, as seen in Figs. 2 and 3. The cam-ring 14 encircles sleeve 10 of the carriage, and its lower portion lies within the slot of the nut; 85 it has the operating-handle 15 and is cut away at 16 and 17 on either side of the cam-nose 18.

In the position shown in Fig. 1 the nut 12 is forced upward by its plunger so as to 90 engage the feed-screw 8; when the handle 15 is shifted in the vertical position (at 19 in Fig. 1), the cam nose 18 on the ring forces the nut down against its spring, thereby disengaging the nut from the feed-screw, as 95 seen in Fig. 3; and when the handle is forced still farther back (into the position indicated at 20 in Fig. 1), the nut 12 becomes again engaged with the feed-screw 8. All the construction so far described is old, being 100 illustrated, for instance, in my U. S. Letters-Patent No. 569,290, dated Oct. 13, 1896.

According to my present invention, I provide near the upper end of one of the forks 105 of the Y-shaped guide-member 11, a hole parallel to the feed-screw. Located in this hole is a plunger 21 adapted to impinge upon

the adjacent face of the nut 12: in the outer end of this hole is threaded the screw 22; and between the screw and the plunger is the coil spring 23. Upon the side of the cam-nose 18 of the cam-ring is the cam-lug or boss 24. The parts are so arranged that when the handle 15 is brought into vertical position, to disengage the feed-nut, this boss 24 enters the slot in the nut (as seen in Fig. 3) and forces the nut 12 sidewise against the plunger and spring (21 and 23); and when the handle is moved to permit meshing of the nut and feed-screw, this boss 24 clears the transverse slot and permits plunger 21 to force the nut to the extreme right (as seen in Fig. 2).

When the handle 15 is thrown into vertical position it depresses the nut 12 and disengages it from the feed-screw and at the same time the nut is being forced against the plunger 21 (as seen in Fig. 3); when the handle is shifted into the position shown in Fig. 1 (or in the position at 20 in the same figure) the plunger 13 forces the nut upward, and at the same time plunger 21 forces it to the right (as seen in Fig. 2). Thus the cam-nose 18 and the cam-lug or boss 24 coact in forcing the nut downward and to the left, while the plungers 13 and 21 coact in forcing it upward and to the right. The travel of the face of the nut 12 is diagonal; and to permit of this, the lower end of its depending stem 25 is coned, preferably at about 60° (as at 26), and rests in a seat in the top of spring-pressed plunger 13.

The purpose and advantage of imparting the diagonal movement to the feed-nut 12, when engaging and disengaging the feed-screw, is shown by reference to Figs. 4 and 5. If the nut be moved directly upward, the relation shown in Fig. 4 occurs; in this view, the sloping faces 27 of the nut 12 rest against the corresponding faces of the screw 8, while the vertical faces 28 of the respective threads are not in contact; and the screw must make a half revolution or more before it properly engages the nut to propel it. As the result the cylinder 4 is being rotated, and the recorder or reproducer is acting upon it without being immediately propelled longitudinally as it should be. The disadvantage of this will be appreciated by persons familiar with this art. But when the nut 12 is moved up in a diagonal direction, as provided by my present invention, it at once meshes properly with the threads of the feed-screw, as seen in Fig. 5. The plunger 21 provides this diagonal upward movement to cause the proper mesh; and the object of the cam-lug 24 is to restore the nut into the position from which it can subsequently receive diagonal upward movement from the plunger 21 (and the plunger 13).

I have described my invention with some particularity, but only for the sake of clear-

ness, since it is not limited to the precise details of construction and arrangements shown, and modifications may be employed without departing from the spirit of the invention, which consists of providing means to insure that the feed-nut shall be brought promptly and immediately into proper meshing relation with the feed-screw, in order to avoid any back-lash and prevent rattle, and preferably means for imparting diagonal movement to the feed-nut.

Having thus described my invention, I claim:

1. In a talking-machine, the combination with the feed-screw having threads with one side thereof vertical and the other side slanting, and the feed-nut therefor having correspondingly-shaped threads, of start-and-stop mechanism comprising means for moving the nut diagonally into mesh with the screw.

2. In a talking-machine, the combination with the feed-screw having threads with one side thereof vertical and the other side slanting, and the feed-nut therefor having correspondingly-shaped threads, of start-and-stop mechanism comprising means for moving the nut diagonally in disengaging it from the screw.

3. In a talking-machine, the combination with the feed-screw having threads with one side thereof vertical and the other side slanting, and the feed-nut therefor having correspondingly-shaped threads, of start-and-stop mechanism comprising means for moving the nut diagonally to throw it into and out of mesh with the screw.

4. In a start-and-stop mechanism for talking-machines, the combination with the feed-screw and the feed-nut and the cam-ring for forcing the same downward, of a cone-bearing depending from said nut, a spring-pressed plunger receiving said bearing and operating to move the nut upward when permitted by the cam-ring, a spring-pressed plunger impinging against the side of said nut and co-acting with the first-named plunger to move the nut diagonally upward, and a lug on the side of said cam-ring co-acting with the same to move the nut diagonally downward.

5. In a talking-machine, the combination with the feed-screw and the feed-nut, and the cam-ring and plunger for engaging and disengaging the two, said ring extending through a transverse slot in the upper face of said nut, of a lug on the side of said cam-ring adapted when entering said slot to force the nut sidewise, and an opposing spring-pressed plunger bearing against the side of said nut and adapted to force it in the opposite direction to that imparted by said lug.

6. In a start-and-stop mechanism for talking-machines, the combination with the feed-screw and the feed-nut and means for

engaging and disengaging the two, of automatic means for imparting a sidewise movement to the nut while being engaged, and automatic means for imparting a reverse sidewise movement to the nut while being disengaged.

7. In a start-and-stop mechanism for talking-machines, the combination with the feed-screw and the feed-nut and means for engaging the two, of automatic means for imparting a sidewise movement to the nut while being engaged.

8. In a start-and-stop mechanism for talking-machines, the combination with the feed-screw and the feed-nut and means for engaging and disengaging the two, of automatic means for imparting a sidewise movement to the nut while being disengaged.

9. In a talking-machine, the combination

with the feed-screw and the feed-nut and the cam-ring for engaging and disengaging the two, said ring extending through a transverse slot in the upper face of said nut, of a lug located upon the side of said ring and adapted when entering said slot to force said nut sidewise.

10. In a talking-machine, the combination with the feed-screw, and the feed-nut and means for engaging and disengaging the two, of a spring-pressed plunger adapted to bear against the side of said nut.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THOMAS H. MACDONALD.

Witnesses:

L. B. NICHOLSON,
A. B. KEOUGH.