Feb. 11, 1936. A. A. JOHNSON 2,030,638

PHONOGRAPH

Original Filed Jan. 16, 1928

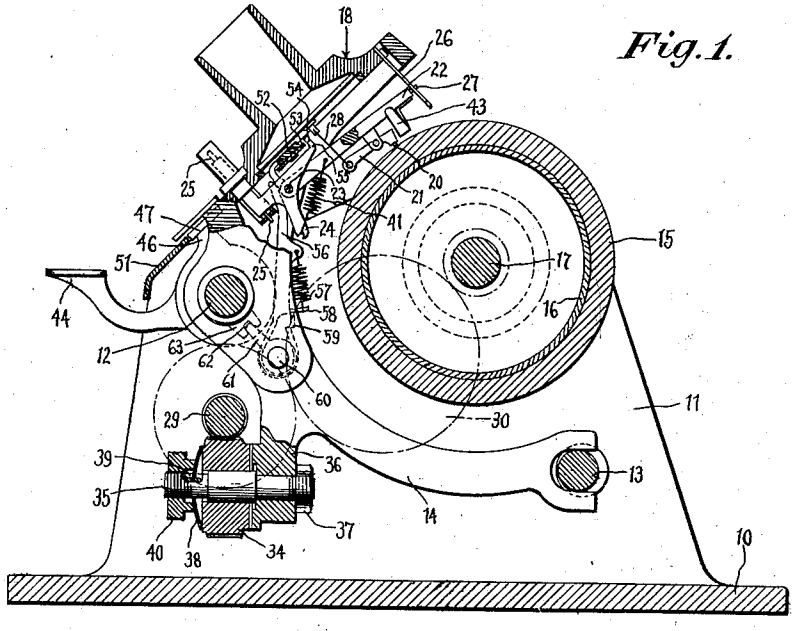


Fig. 1.

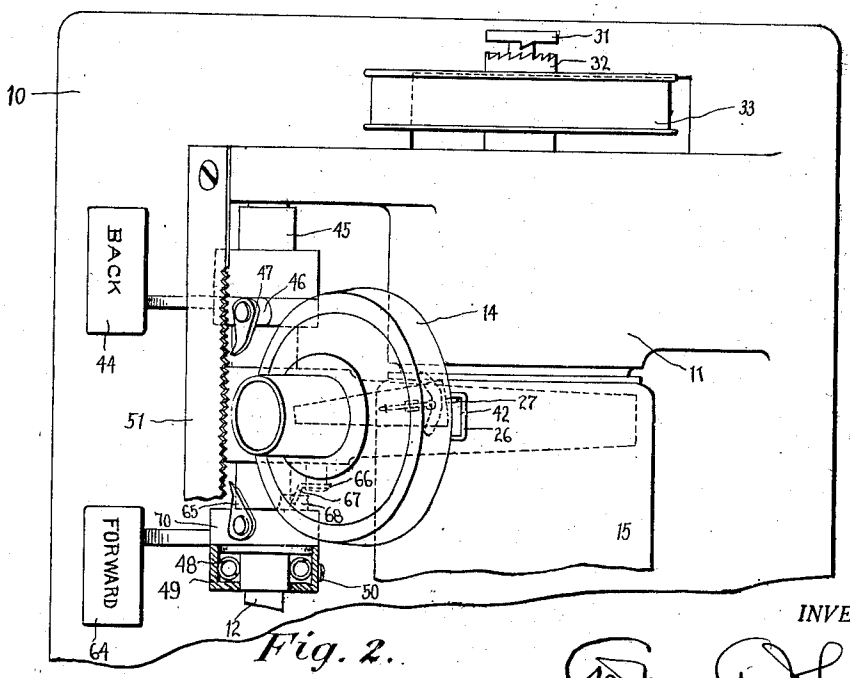


Fig. 2.

INVENTOR.

Albert A. Johnson

Patented Feb. 11, 1936

2,030,638

UNITED STATES PATENT OFFICE

2,030,638

PHONOGRAPH

Arthur A. Johnson, Bridgeport, Conn., assignor to Dictaphone Corporation, Bridgeport, Conn., a corporation of New York

Application January 16, 1928, Serial No. 246,934
Renewed September 29, 1934

6 Claims. (Cl. 274—20)

This invention relates to dictating machines, and more particularly to carriage feeding and spacing means therefor.

An object of the present invention is to permit the carriage to be moved independently of the operation of the feed mechanism by hand or otherwise without necessitating disconnection of the feed mechanism.

A further object is to obtain this result in a machine having a feed mechanism comprising a feed-screw, for this type of mechanism has so far proven to be the best and so far only practical form of feed mechanism for dictating machines.

An important feature of the invention is the provision of means to permit the user to move the carriage by merely pushing it by hand without performing any operation to disconnect the feed mechanism from the carriage.

A feature of the invention is the simplification of dictating machines, for the connection between the feed-screw and the carriage is, according to the present invention, not composed of the usual multiplicity of parts made necessary in a construction where the feed-nut must be moved from engagement with the feed-screw when spacing the carriage in either direction.

Another feature is the provision of a direct connection between the feed-screw and the carriage so as to avoid the possibility of back-lash, which is an important factor in dictating machine operation, and to avoid which it has been heretofore necessary to exercise extreme accuracy and care in making the parts. By providing the direct connection, the carriage is caused to advance over the record-surface immediately upon rotation of the record support and cooperating feed-screw which prevents repeating, i. e. repetitious reproducing, which occurs if the carriage is not caused to travel immediately upon the start of the record-support rotation.

These and other objects and advantages have been attained by the present invention by the provision of a circular feed-nut or worm-wheel which is rotatably mounted directly on the carriage and is constantly in engagement with the feed-screw, the mounting of which is such that the feed-nut is held against rotation while the machine regularly operates, yet is permitted to rotate while still in engagement with the feed-screw when the carriage is moved by extraneous force either by direct manual operation or through other mechanism.

A particularly important advantage of the present invention is that wear of the cooperating feed mechanism parts is reduced to a minimum, because the circular feed-nut always remains in engagement with the feed-screw and thus neither of these parts will have the thread structure crushed or damaged as is ultimately the case when these parts are frequently thrown into and out of engagement with each other. Moreover, because the periphery of the feed-nut is relatively large and all portions of the circular feed-nut are brought into use from time to time, wear is distributed over a greater surface with the result that the feed mechanism need not be replaced during the normal life of the machine.

Referring to the drawing—

Figure 1 is a side sectional view of the upper part of the dictating machine, and shows the present invention as applied thereto.

Fig. 2 is a top plan view of parts of the dictating machine shown in Fig. 1.

The phonograph shown, comprises the usual top plate 10 having formed integral therewith a housing 11 which forms a support for carriage rods 12 and 13 upon which a sound-box carriage 14 is adapted to travel longitudinally of the machine over the surface of a record 15 mounted upon a record-support 16 which is fixed on a shaft 17 having a bearing or support in the housing portion 11 of the top plate. Mounted in the carriage 14 is a sound-box 18 which, as usual, contains a diaphragm, a stylus 20 mounted on a lever 21 supported by a weighted carrier 22 pivotally mounted on a rod 23 carried by a bracket 24 mounted on trunnions 25 for movement in a plane at right angles to the plane of movement of the carrier 22 on the pivot rod 23. The pivot rod 23 and the trunnions 25 permit the stylus 20 to have free vertical and lateral movement respectively relatively to the record within limits of a guide plate 26 on the sound-box which confines a pin 27 carried by the carrier 22. In accommodating itself to records of various thicknesses and to inequalities in the record-surface, the stylus 20 with the carrier 22 moves up and down on the pivot 23 and for free tracking of the record moves horizontally about the trunnions 25. For the purpose of imparting sound impulses to the diaphragm 19 from the sound grooves on the record 15, the stylus lever 21 is connected to the diaphragm by a wire 28. While an acoustical reproducing device is herein shown and described, it should be understood that the present invention is not limited in its application to this or any particular form of sound-box.

In the embodiment of the invention herein shown, the carriage 14 and related sound-box 18

are caused to advance over the record-support 16 under the influence of a rotatable feed-screw 29 cooperating with parts on the carriage 14. This feed-screw 29 is caused to rotate coordinately with the record-support by means of a gear train 30, as shown by dotted lines in the end of the housing portion 11 of the top plate. As usual, rotation of these cooperating parts is accomplished when a toothed clutch member 31 is brought into engagement with the toothed part 32 of the rotating driving pulley 33 by means of a clutch shifting mechanism. This form of feed mechanism has been selected for the present embodiment of the invention because this feed-screw type has proven to be the most satisfactory and only practical feeding means known to the art.

With this feed-screw, the present invention provides a very simple, novel and efficient cooperating mechanism on the carriage of the machine having several advantages which will hereinafter be referred to in detail.

This cooperating mechanism, in the embodiment of the invention herein shown, comprises a circular feed-nut 34, preferably in the form of a worm wheel, rotatably mounted on a stud 35 which is fixed to the arm portion 36 of the carriage frame 14 by a nut 37, said worm wheel being arranged to be always in engagement with the feed-screw 29. In order to cause the carriage to feed under the influence of the feed-screw 29, the present invention provides means for holding the worm-wheel feed-nut against normally turning. This means, however, is so arranged that the worm-wheel may rotate and roll upon the feed-screw when the carriage is moved by hand or otherwise than by the feed-screw. This is accomplished, in the present embodiment of the invention, by normally frictionally holding the worm-wheel against rotation by means of a yieldable spring spider 38 which, through a key and spline arrangement 39, is fixed against rotation on the stud. Preferably, the amount of friction is adjustable by a regulating nut 40. This frictional pressure may be regulated or adjusted by the nut 40 so as to sufficiently hold the circular feed-nut against rotation to cause the carriage to move longitudinally of the machine under the influence of the rotating feed-screw (the regular or usual function of the machine for reproducing) when no force extraneous to the feed-screw is applied to the carriage. However, this frictional pressure is such that the operator may grasp and move or merely push the carriage at will in either direction without removing the circular feed-nut from the feed-screw in order to space the same longitudinally of the record-support.

Preferably and as shown, the mounting of this circular feed-nut 34 is so arranged that the reproducer carriage may be swung about the axis of the carriage rod 12 by rotation of the eccentric carriage rod 13 to set the sound-box 18 in proper relation to the record-support 16, without changing the operative relationship of the circular feed-nut 34 to the rotatable feed-screw.

By the use of this mechanism and the device just described, several distinct advantages are obtained and a simplified construction is made possible, for it will be seen that it is not necessary to provide the usual involved means to move the feed-nut out of engagement with the feed-screw when it is desired to move the carriage in either direction longitudinally of the record and, by having the circular feed-nut continually in engagement with the feed-screw, there is no danger of topping the mating threaded members nor is there danger of crushing the thread or excessive wear of the same which usually occurs in a construction where the mating parts are thrown into engagement with each other a great number of times. Further, no separate operations or movement of controls need be performed in order to space the carriage in either direction, for the operator need merely grasp and move or push the carriage in either desired direction longitudinally of the machine and any desired extent. Further, with this arrangement, the operator need never concern himself about the condition of the machine, i. e. whether or not the feed-nut is in engagement with the feed-screw, for, according to the present invention, the feed-nut is at all times in engagement with and in operative relation to the feed-screw and, consequently, when the operator has moved the carriage to any desired point of its travel, the carriage is in condition to begin traverse of the record again under the influence of the feed-screw.

When the carriage is moved over the record by hand and if the movement is sufficient, the stylus 20, due to its engagement with the grooved record surface, causes the carrier 22 to pivot about the trunnion 25 until the pin 27 at the outer end of the carrier engages either side of the guide plate 26 depending upon the direction of movement of the carriage, one of which positions is shown in Fig. 2. However, this is not detrimental, for, as soon as the mandrel commences to rotate, the carrier 22, due to its balanced mounting and partially under the influence of a spring 41 stretched between a point on carrier 22 and bracket 24 and the natural drag of the stylus 20 on the record 15, causes it to immediately assume a substantially central position with respect to the guide plate 26 and sound-box.

The same thing occurs when a record is placed upon the mandrel or record-support 16. When a record is upon the record-support, the carrier and stylus drop until the pin 27 engages the lower stop portion 42 of the guide plate 26. However, when a record is slid over the record-support, the record end first engages the side of the stylus guard 43, which is angularly disposed, and pushes the carrier sidewise until the pin 27 engages the side of the guide plate 26, as seen in Fig. 2, after which the bevel of the record end and the angularity of the guard 43 serve, with the continued movement of the record, to force the carrier 22 and related stylus 20 up until the stylus engages the end of the record, after which the bevel of the record end engages the ball-like stylus itself to complete the raising of the stylus to the surface of the record end, after which the record is moved to its seat on the record-support. Upon completion of this operation, the position of the carrier 22 and related parts will be that shown in Fig. 2. However, immediately upon rotation of the record-support 16 and because of normal tendency for the stylus to become centralized as above stated, the carrier arm and related parts are caused to move to a position substantially central in the guide plate 26 and at a right angle to the record-support 16.

In using the machine, the operator frequently desires to have repeated but a very small portion of the recording and consequently must backspace the carriage 14 and related sound-box 18 but a very small extent.

To facilitate this, dictation machines have

heretofore been, and the machine of the present invention is, provided with mechanism to back-space the carriage. The back-spacing mechanism selected for use with the present invention comprises a back-space lever 44 rotatably mounted on a tubular bearing 45 secured in the carriage 14 and is provided at its top portion with a lug 46 pivotally carrying a pawl 47 which has a limited range of movement. This lever is normally held in inoperative position as seen in Fig. 2, in any desired manner such as by the spring 48 which is enclosed in the collar 49 held on the tubular bearing 45 by a screw 50, as is shown in connection with the forward-space lever 64.

When the back-space lever 44 is operated, the pawl 47 engages a rack 51 secured to suitable supports on the frame and forces the carriage backwardly a predetermined extent. To further back-space the carriage, the back-space lever 44 may be repeatedly operated. The back-spacing mechanism above described is of usual form, such as is disclosed in the patent to Macdonald No. 1,030,740, June 25, 1912, excepting, however, that the depression of the back-space key 44 does not disengage the feed-nut from the feed-screw nor does it raise the stylus from the record.

It should be especially noted that, according to the present invention, this back-spacing operation is effected independently of the operation of the feed-screw 29 and the cooperating mechanism on the carriage 14 and without necessitating disconnections of these elements, for, upon application of the extraneous force of the back-spacing mechanism the resistance of the friction washer or spider 36 on the circular worm wheel 34 is overcome sufficiently so that the worm-wheel 34 may rotate and roll upon the feed-screw while the carriage is moving backwardly.

While obtaining these advantages, the present invention retains the previously provided advantageous means for holding the stylus against all lateral movement during the back-spacing operation, so that after backspacing it will assume the same position with relation to the sound-box which it had before the back-spacing operation commenced. Any suitable means may be employed for accomplishing this, but as shown herein, the means comprises a clamping arm 52 pivoted on the sound-box 18 and having a locking surface 53 normally adapted to be disengaged from a cooperating locking surface 54 formed on an arm 55 constituting an integral part of the bracket 24. The clamping arm 52 is adapted, when moved to operative position, to engage the arm 55 on the bracket 24 to prevent its floating movement.

The means for operating the clamping arm 52 comprises an arm 56 pivotally mounted on the carriage frame 14 and having the upper, operating end adapted to engage a depending lug on the clamping arm 52. The arm 56 is rocked when the back-space key 44 is depressed by means of a spring 57 connected to the operating end of the arm 56 and connected at the other end to an ear 58 on a lever 59 which is fixed on the shaft 60. The lever 59 is provided with a finger 61 normally located in a notch 62 in a sleeve portion 63 of the back-space key 44.

When the back-space key 44 is depressed, the sleeve 63 rocks carrying with it the finger 61 so as to rock the shaft 60. At the same time, the lever 59, by reason of its movement, tensions the spring 57 and causes the arm 56 to rock rearwardly moving the clamping arm 52 into engagement with its cooperating surface 54 on the bracket arm 55 to lock the stylus 20 against free lateral movement. The parts are so constructed that the stylus is locked against lateral movement before the back-space pawl 47 engages the rack 51 to back-space the carriage. When the back-space key 44 is released, a spring 48 causes it to return to its normal position and the arm 56 is returned to normal position under the influence of the finger 61 and slot 62 connection.

Thus it will be seen that the stylus is first clamped and then laterally moved bodily with the carriage during the back-spacing operation, and that after the back-spacing operation has been completed the stylus will be in the same position relative to the carriage that it was in before the back-spacing operation was commenced.

The present invention also provides a forward spacer on the carriage of the machine for the purpose of advancing the carriage predetermined extents longitudinally of the record in order to return the carriage after back-spacing or to listen to matter which is still to be transcribed. This forward spacer is similar in construction and operation to the back-spacer hereinbefore described but acts in the opposite direction. In the disclosed embodiment of this feature of the invention, it comprises a forward spacer lever 64 which is rotatably mounted on the bearing 45 and is provided with a pawl 65 on its upper portion which is adapted to engage the rack 51 when the lever 64 is depressed, and thus effect a forward spacing of the carriage a predetermined extent. In this forward spacing operation, the stylus and related carrier are held in position relative to the carriage by the same means and same parts as are used for this function in the back-spacing operation, the shaft 60 being moved to actuate the arm 56 and clamping frame 52 to lock the stylus against a lateral movement; in this case the shaft is rocked by means of an arm 66 located at the opposite end of shaft 60 from arm 61, but having an offset portion 67 which cooperates with the sleeve of the forward-space key 64 in the same way that the arm 61 cooperates with the sleeve of the back-space key 44.

This operation, like the back-spacing operation, is accomplished while the stylus engages or slides over the record-surface independently of the operation of the feed-screw and without necessitating disconnection of these cooperating parts.

While the operation for back or forward spacing the carriage and related parts small and predetermined extents which has just been described is occasionally performed, the previously described operation, namely that of simply grasping and moving or merely pushing the carriage, is in most instances performed, especially when it is desired to space the carriage a large extent. This latter procedure is a particularly important feature made possible by the present invention, for it results in a saving of both effort and time and simplifies machine operation.

Further, the semi-fixed connection of the driving mechanism comprising a feed-screw and related parts on the carriage provided by the present invention prevents damage to these related parts should the carriage be inadvertently struck or forcefully moved, for then the cooperating parts of the driving mechanism will regularly roll or operate in the same manner as if pushed by hand.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

Having thus described the invention, what is

claimed as new and for which it is desired to obtain Letters Patent, is:—

1. In a dictating machine, the combination of a frame, a carriage movable on the frame, carriage-driving means comprising a feed screw on the frame and screw-engaging means on the carriage, means to back-space the carriage step by step, and means associated with said screw-engaging means for permitting operation of said back-space means while the feed screw and screw-engaging means remain engaged.

2. In a dictating machine, the combination of a frame, a carriage movable on the frame, carriage driving means comprising a feed screw on the frame, and screw-engaging means on the carriage, means to forward-space the carriage step by step, and means associated with said screw-engaging means for permitting the operation of said forward-spacing means while the carriage driving means remain engaged.

3. In a dictating machine, in combination, a carriage, a rotatable feed-screw for driving said carriage, a rotatable feed-nut mounted on said carriage in engagement with said feed-screw, a member frictionally engaging said feed-nut for enabling the latter to drive said carriage, means to backspace the carriage step by step, and means for regulating the frictional engagement of said member with said feed-nut for permitting operation of the backspace means while the feed-screw and feed-nut remain engaged.

4. In a dictating machine, in combination, a carriage, a rotatable feed-screw for driving said carriage, a rotatable feed-nut mounted on said carriage in engagement with said feed-screw, a member frictionally engaging said feed-nut for enabling the latter to drive said carriage, means to forward-space the carriage step by step, and means for regulating the frictional engagement of said member with said feed-nut for permitting operation of the forward-space means while the feed-screw and feed-nut remain engaged.

5. In a dictating machine, the combination of a frame, a carriage movable on the frame, carriage driving means comprising an element on the frame and an element on the carriage arranged to cooperate with said element on the frame, means independent of said cooperating elements to backspace the carriage, and means associated with said carriage driving means for permitting operation of said backspacing means while said element on the frame and said element on the carriage are in cooperation with each other, whereby the backspacing means may be operated without disturbing the interrelationship of said elements.

6. In a dictating machine, the combination of a frame, a carriage movable on the frame, carriage driving means comprising an element on the frame and an element on the carriage arranged to cooperate with said element on the frame, means independent of said cooperating elements to forward-space the carriage, and means associated with said carriage driving means for permitting operation of said forward-spacing means while said element on the frame and said element on the carriage are in cooperation with each other, whereby the forward-spacing means may be operated without disturbing the interrelationship of said elements.

ARTHUR A. JOHNSON.