March 28, 1944. B. A. PROCTOR 2,345,148

SOUND RECORDING AND REPRODUCING MACHINE

Filed June 30, 1942 7 Sheets-Sheet 1

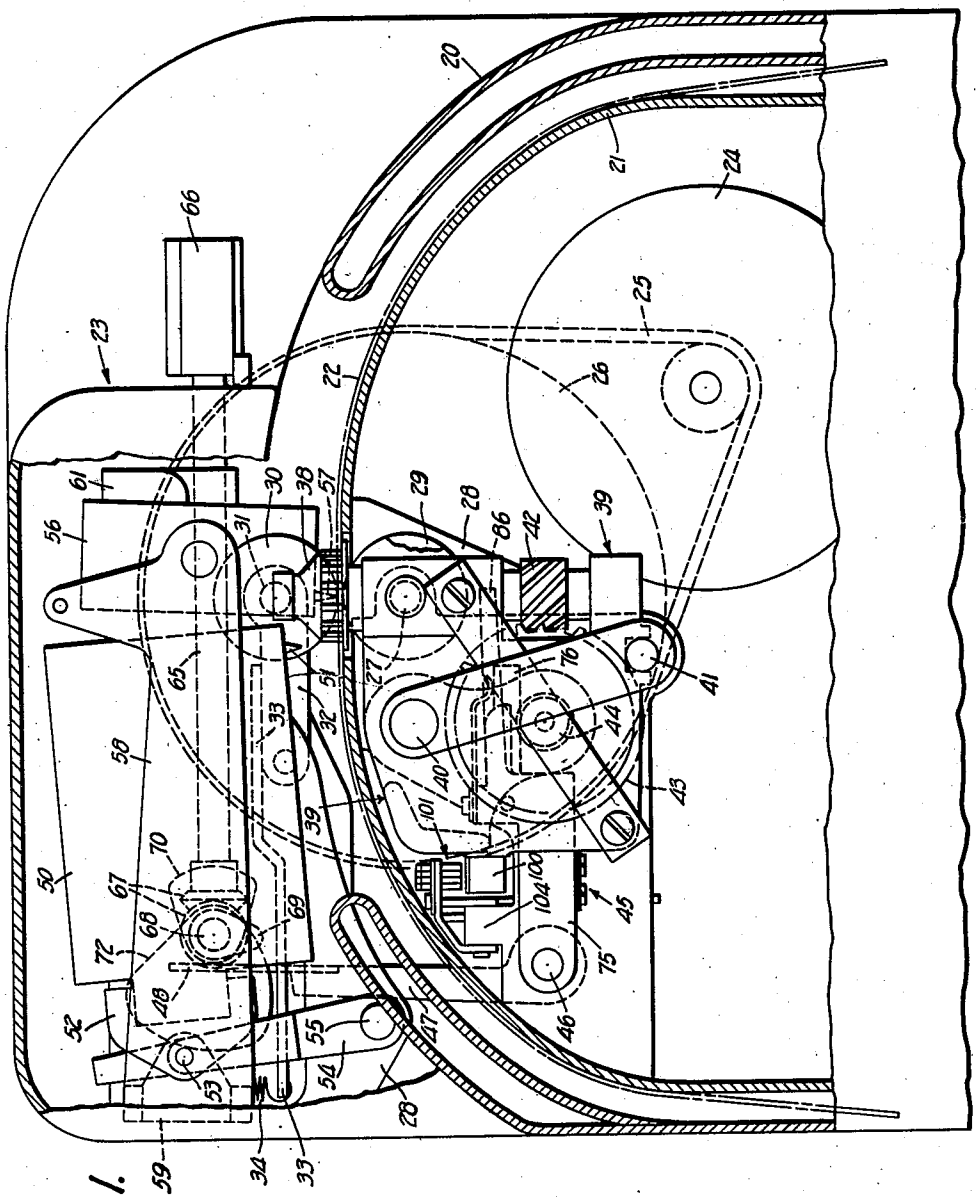


Fig. 1.

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SOUND RECORDING AND REPRODUCING MACHINE

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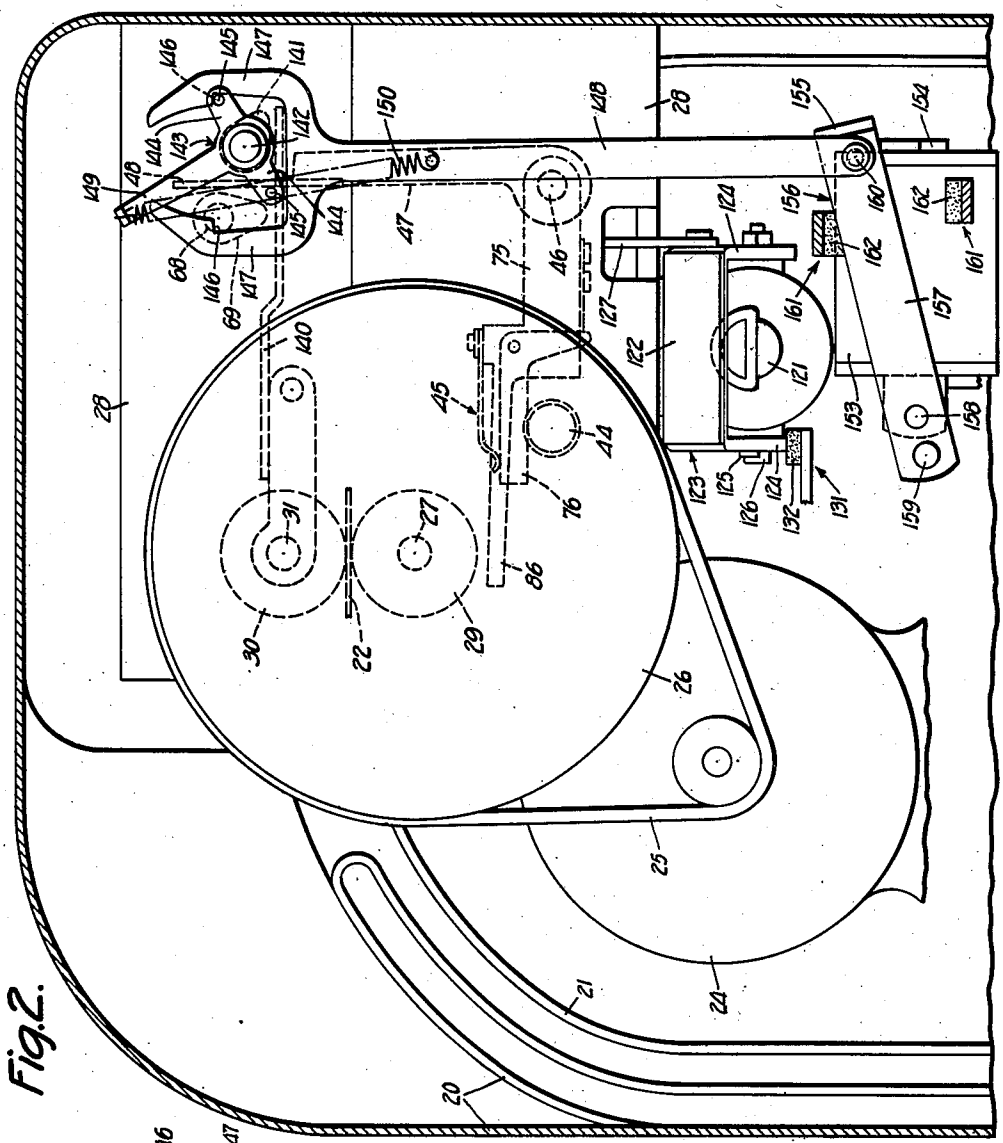


Fig. 2.

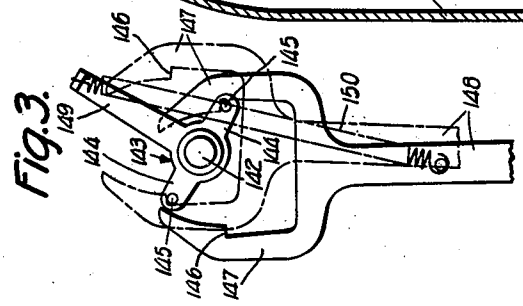


Fig. 3.

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SOUND RECORDING AND REPRODUCING MACHINE

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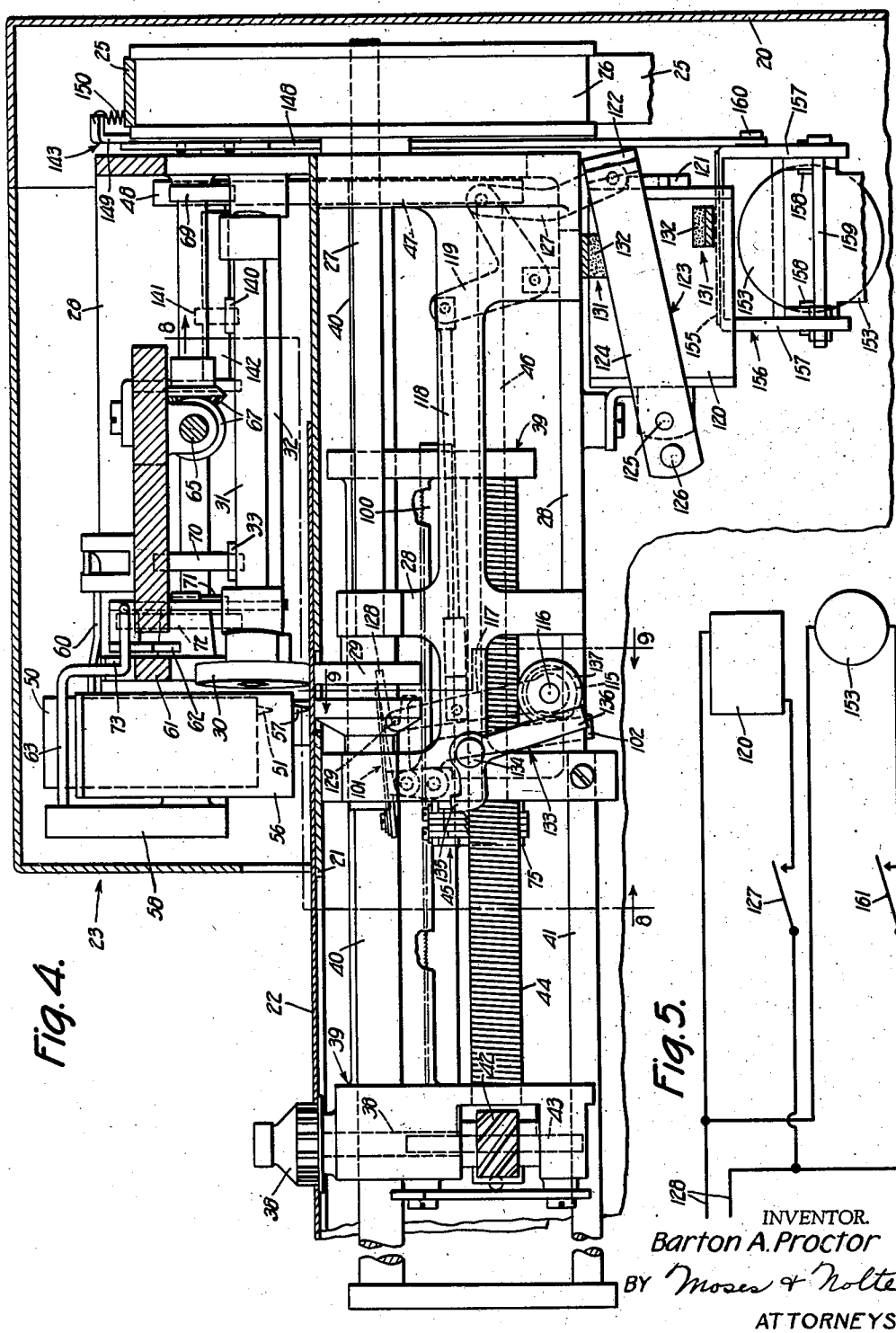


Fig. 4.

Fig. 5.

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SOUND RECORDING AND REPRODUCING MACHINE

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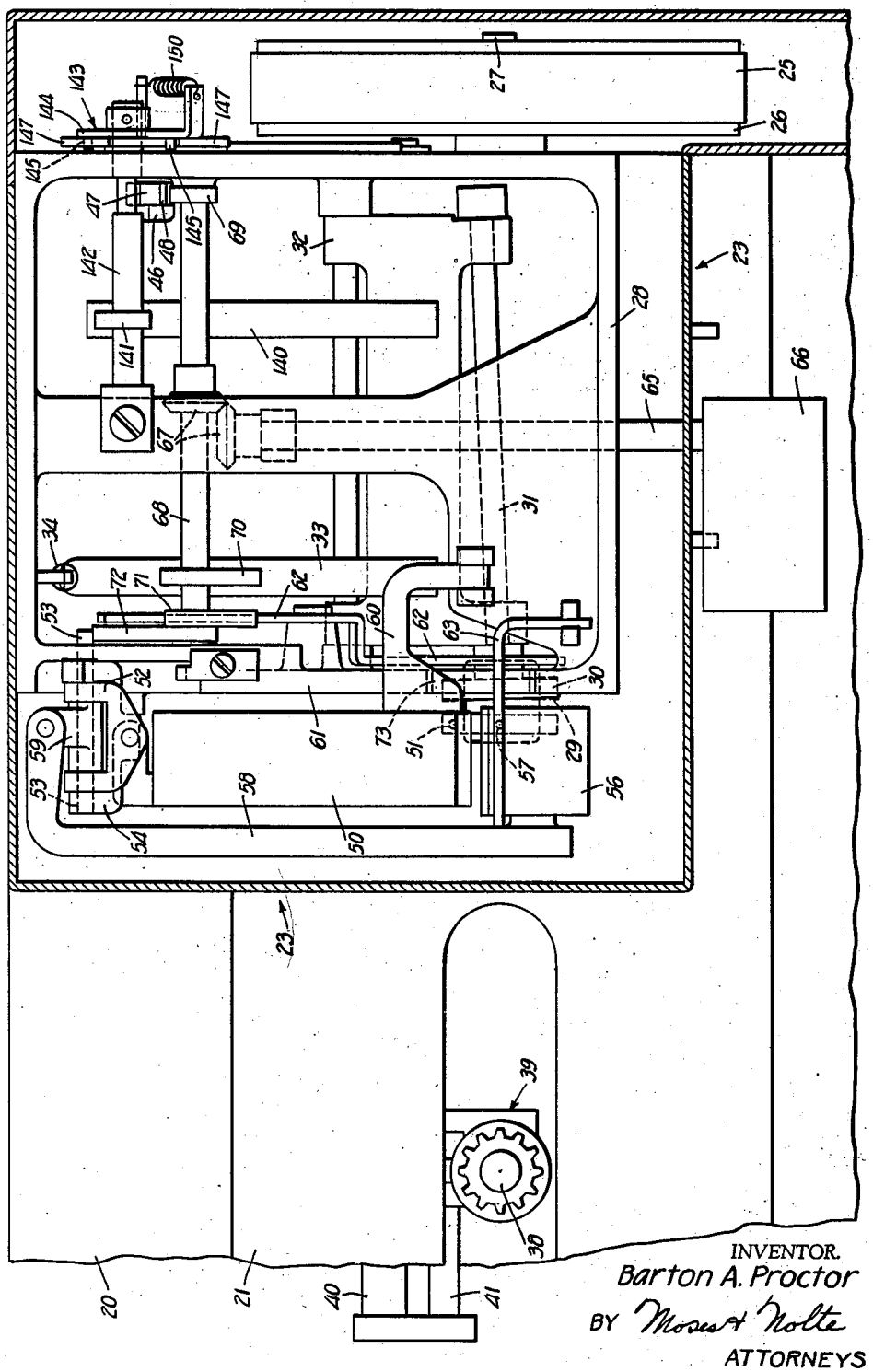


Fig. 6.

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SOUND RECORDING AND REPRODUCING MACHINE

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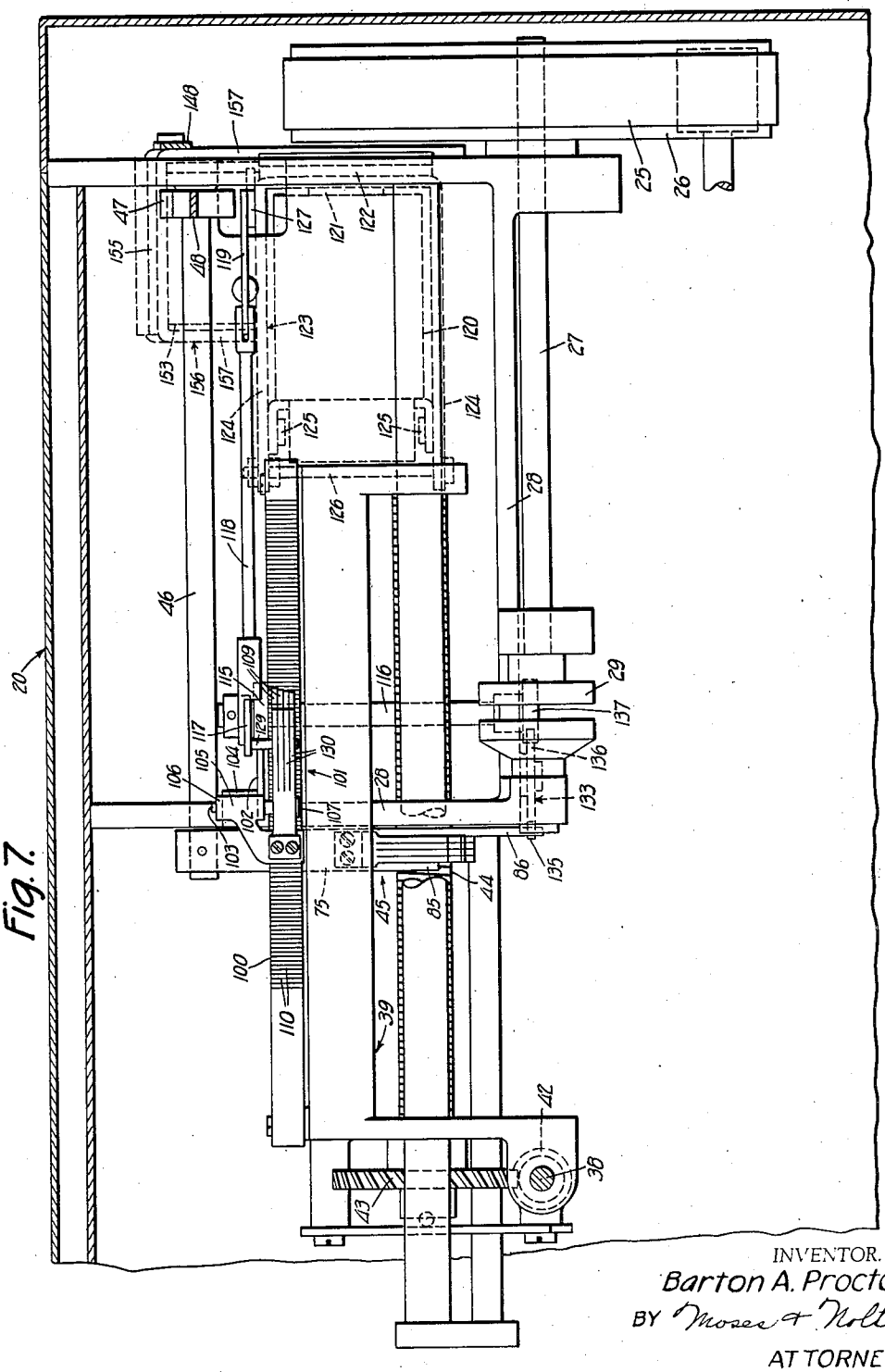


Fig. 7.

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SOUND RECORDING AND REPRODUCING MACHINE

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Fig. 8.

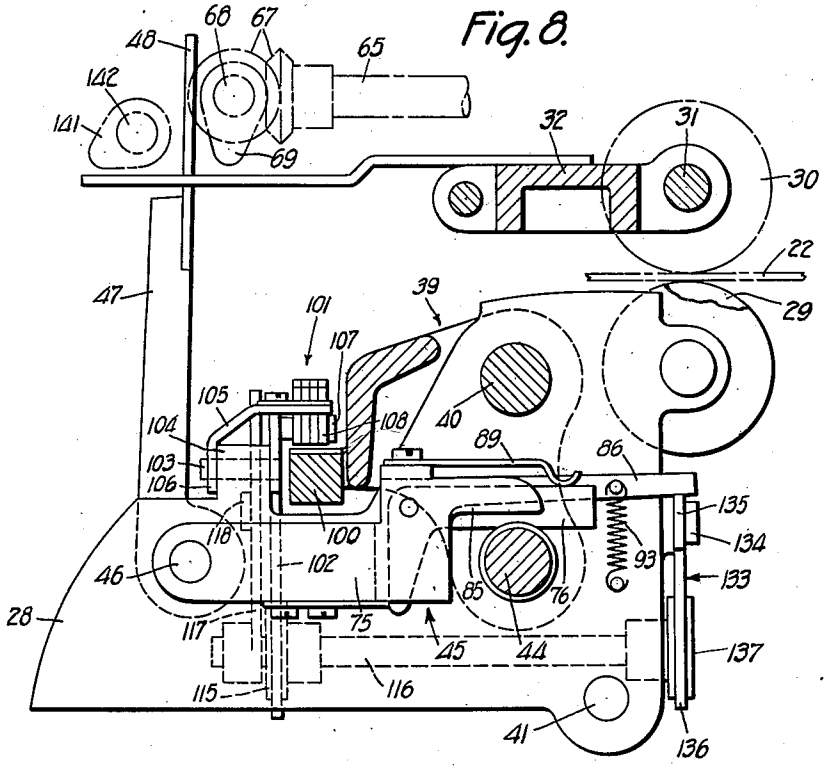
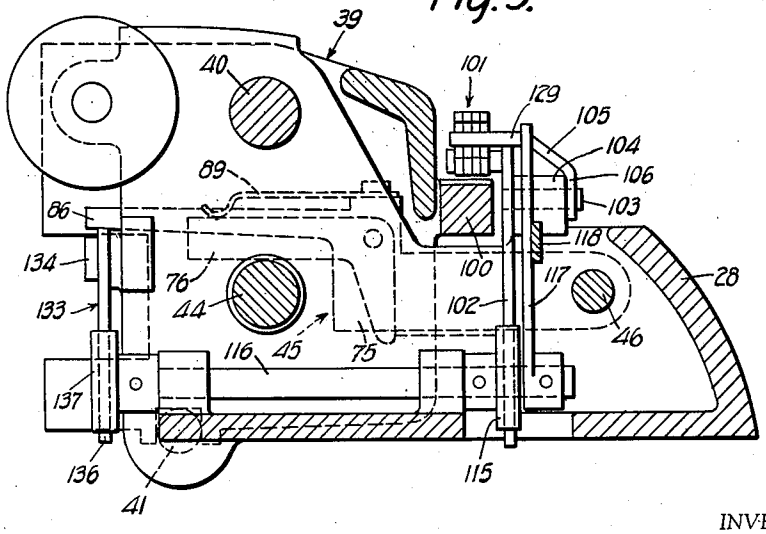


Fig. 9.



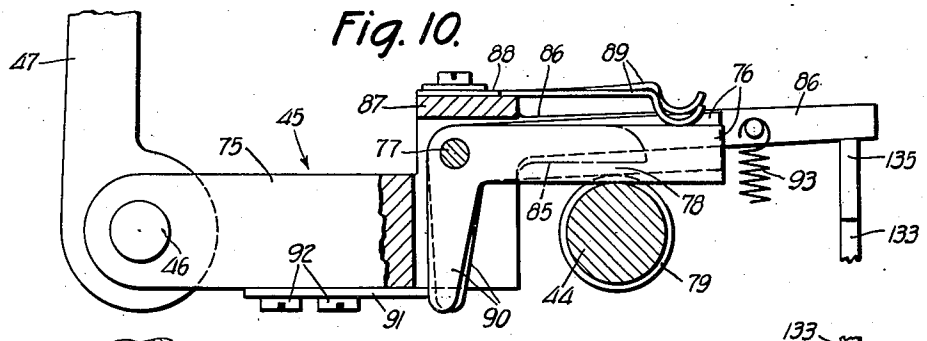
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March 28, 1944. B. A. PROCTOR 2,345,148

SOUND RECORDING AND REPRODUCING MACHINE

Filed June 30, 1942 7 Sheets-Sheet 7

Fig. 10.



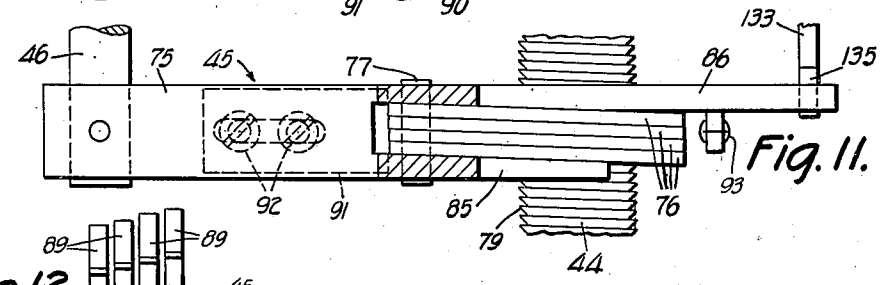


Fig. 11.

Fig. 12.

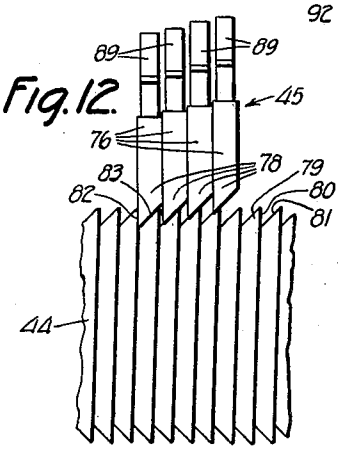


Fig. 14.

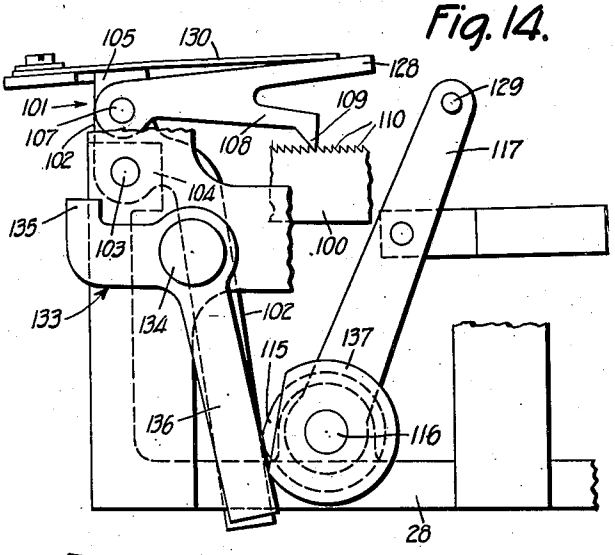
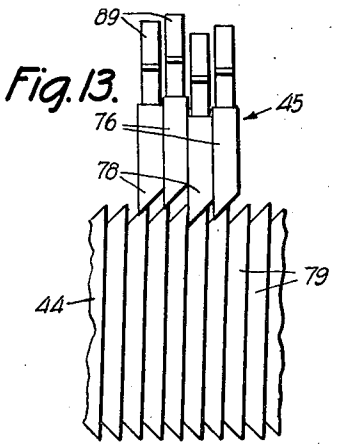


Fig. 13.



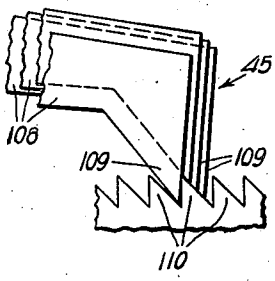


Fig. 15.

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Patented Mar. 28, 1944 2,345,148

UNITED STATES PATENT OFFICE

2,345,148

SOUND RECORDING AND REPRODUCING MACHINE

Barton A. Proctor, Larchmont, N. Y., assignor to B. A. Proctor Company, Inc., New York, N. Y., a corporation of New York

Application June 30, 1942, Serial No. 449,099

20 Claims. (Cl. 274—9)

This invention relates to sound recording and reproducing machines and particularly to the type of machine suitable for recording and reproducing dictation, generally referred to as dictation machines. It is especially applicable to dictation machines of the type in which a disk record mounted on a traveling carriage is rotated by a wheel bearing against the record, thereby rotating a spindle on which the record is mounted, translatory movement being imparted to the carriage carrying the record and spindle through gearing driven by the spindle, including a feed screw on the carriage engaged by a stationary threaded member. With this arrangement the stylus remains stationary during operation. A dictation machine constructed in this manner is disclosed in prior application No. 218,082, filed by Proctor and Thiede on July 8, 1938, Patent 2,296,870, granted Sept. 29, 1942.

It has been found practicable in machines of this type to inscribe an unusually large number of very fine grooves on the record, as many as one hundred and twenty grooves per inch having been inscribed and reproduced under commercial conditions. When the feed screw is rotated at the same rate as the record, as in prior machines, the feed screw threads would of course have to be very fine, corresponding to the record grooves; but the use of such fine feed threads is mechanically objectionable. A dictation machine constructed in this manner is disclosed in prior applications No. 218,082, filed by Proctor and Thiede on July 8, 1938, for Sound recording and reproducing, and No. 281,811, filed by Proctor on June 29, 1939, Patent 2,318,627, granted May 11, 1943, for Sound recording and reproducing.

A feature of the invention is the provision of a mechanism of the indicated type in which the feed screw threads are more widely spaced than the record grooves. This is in general accomplished by employing suitable reduction gearing between the record-carrying spindle and the feed screw.

However, the provision of such an arrangement introduces serious difficulties in the construction and operation of the machine. It is necessary in dictation machines to provide for shifting the record and its carriage while the feed mechanism and stylus are in inoperative position, for the purpose of bringing any desired record groove into register with the stylus, as in back spacing and to reproduce selected portions of the record. When the feed screw threads are spaced more widely than the record grooves, the interval between each pair of adjacent threads will correspond to a plurality of record grooves; and upon shifting the stationary threaded member into engagement with the feed screw after the record and carriage have been moved to bring a particular groove into register with the stylus, the threads of the threaded member may not register accurately with the threads of the feed screw. Consequently, rotation of the record would not produce the proper translatory movement until the threads of such member and screw come into proper register. Under these conditions the stylus would not follow the required spiral path, and the machine would be incapable of proper operation.

A further feature of the invention is the elimination of this difficulty by providing a stationary threaded member that will accurately engage a feed screw having threads more widely spaced than the record grooves and will impart the proper translatory movement to the carriage and record immediately when the record is rotated, whenever the stylus is in register with any record groove.

Another object of the invention is the provision of a novel back spacing mechanism particularly adapted for a dictation machine of the indicated construction. In the improved arrangement the carriage and record are shifted rearwardly by a pawl member engaging a rack on the carriage. However, when the record is provided with relatively fine closely spaced grooves, it would normally be necessary to provide correspondingly fine rack teeth, which likewise is mechanically objectionable.

A further feature of the invention is therefore the provision of a rack having teeth spaced substantially more widely than the record grooves, in combination with a pawl member arranged to engage the rack accurately whenever the stylus is in register with any groove, and to shift the carriage and record a distance equal to the spacing between adjacent grooves or a multiple thereof. The invention also includes an improved type of pawl member construction, mounting and actuation, and in particular an arrangement which cooperates with the stationary threaded member engaging the feed screw to disengage the member from the screw while the carriage and record are being shifted by the pawl member.

Another feature of the invention is the provision of a novel arrangement for stopping and starting the machine, adapted for operation by an electric switch which may be located at any suitable point on the machine, or on a remote

control unit. A specific feature is the location and arrangement of the stop and start mechanism with reference to other parts of the machine so that it will not require an increase in the size of the casing and will not interfere with the arrangement or operation of the other mechanisms.

A further feature is the provision of a novel arrangement for applying tension to the record at the stylus to the extent necessary for efficient operation with thin flexible records, and in particular for producing a tension greater than that obtained in prior constructions in which cooperating feed disks rotating in the same plane were utilized. This is accomplished by rotating one of the disks in a plane at a slight angle to the other disk; and the proper tension may be provided within a wide range by selecting the appropriate angle.

Other objects and advantages will appear from the following description considered in conjunction with the accompanying drawings, in which

Fig. 1 is a fragmentary elevational view from the left of the machine with part of the casing broken away and parts omitted for simplicity;

Fig. 2 is a fragmentary right end elevational view with the end of the casing removed and parts omitted, showing the stop and start mechanism in operating position;

Fig. 3 is a detail of part of the stop and start mechanism showing it in start position;

Fig. 4 is a fragmentary front elevational view with parts of the casing broken away;

Fig. 5 is a diagram of the electrical control system for the stop and start device and the back spacing device;

Fig. 6 is a fragmentary top plan view with part of the casing broken away;

Fig. 7 is a fragmentary top plan view of the record supporting and driving mechanism in the lower part of the casing;

Fig. 8 is a detail transverse vertical sectional view on line 8—8 of Fig. 4;

Fig. 9 is a similar view from the opposite side taken on line 9—9 of Fig. 4;

Fig. 10 is a fragmentary enlarged view of a portion of Fig. 8 showing details of the stationary threaded member engaging the feed screw;

Fig. 11 is a top view of Fig. 10;

Fig. 12 is a detail illustrating the engagement of the feed screw with the stationary threaded member in one position;

Fig. 13 is a similar view showing the parts in another position;

Fig. 14 is a fragmentary front elevation showing the back spacing rack and pawl construction; and

Fig. 15 is a detail showing the pawl member engaging the rack.

The invention is illustrated in its application to a dictation machine of the type described in detail in my earlier applications set forth above. A general description of this type of construction will first be given.

The machine includes a casing 20 arranged with a base 21 on which the record 22 is mounted, and a head 23 overlying part of the record path and carrying control mechanism. An electric motor 24 drives through belt 25 a pulley 26 carrying a shaft 27 journaled in the frame 28 and provided with a feed wheel 29 arranged to engage the lower face of record 22. The record is driven when pressed against feed wheel 29 by idler feed wheel 30 arranged to engage the upper face of record 22 in register with feed wheel 29. Wheel 30 is mounted on a suitable shaft 31 journaled in rocking frame 32 pivoted on frame 28 and carrying a tailpiece 33 extending rearwardly and engaged by spring 34 attached to frame 28, biasing idler feed wheel 30 normally downward into record driving position.

Record 22 is centrally mounted on spindle 38 journaled in carriage 39 slidably mounted in the casing base 21 on guide rods 40, 41 carried by frame 28. Spiral gear 42 fixed to spindle 38 meshes with spiral gear 43 fixed to feed screw 44 journaled in carriage 39. Stationary threaded member 45 engages feed screw 44 and is fixed to rock shaft 46 pivoted in frame 28 and carrying a rocking lever 47 provided with an upwardly extending tailpiece 48 which is shifted rearwardly against the action of a spring by mechanism hereafter described in order to lift threaded member 45 out of engagement with feed screw 44, thereby arresting the translatory movement of carriage 39.

The machine is provided with a recording unit and a reproducing unit each having a stylus, and the units are movable to bring either stylus into engagement with the record at the same point. For this purpose the recording unit 50, provided with a recordiing stylus 51, is mounted on a yoke 52 pivotally engaging pin 53 carried by rock arm 54 on rock shaft 55 journaled in frame 28. The reproducing unit 56, provided with a reproducing stylus 57, is mounted on arm 58 connected to knuckle 59 likewise pivoted on pin 53. The recording unit 50 is provided with an arm 60 extending across a frame member 61 and the forward portion of lifting lever 62 pivoted to frame member 61, the reproducing unit 56 being provided with a similar arm 63.

The control mechanism for the machine comprises a control shaft 65 (Figs. 1 and 6) journaled in frame 28 and projecting through the front of the casing head 23, where it is provided with a suitable finger piece 66. Control shaft 65 is connected through miter gears 67 to cam shaft 68 likewise journaled in frame 28. Cam 69 on cam shaft 68 engages tailpiece 48 of rocking lever 47, serving to lift the threaded member 45 and arrest translatory movement of the record. Cam 70 on cam shaft 68 is arranged to engage tailpiece 33 of the upper feed wheel frame 32 and to lift said wheel 30, thereby arresting the rotary movement of the record. Cam 71 on cam shaft 68 engages the rear end of lifting lever 62, lifting the recording unit 50 and reproducing unit 56 through engagement with arms 60 and 63 into upper position free of frame member 61 and with their styluses 51 and 57 clear of the record. Cam 72 on shaft 68 engages the projecting end of pin 53 and rocks arm 54 rearwardly against the action of a suitable spring (not shown), or allows it to move forwardly, thereby bringing either the recording unit 50 or the reproducing unit 56 into position for operation. The frame member 61 is provided with a suitable notch or depression 73 which will register with the arm 60 or 63 of the unit that is selected for operation, permitting that unit to descend into operative position with its stylus engaging the record when continued rotation of cam 71 releases lifting lever 62, the other unit being held in elevated position by the engagement of its corresponding arm with the top of frame member 61.

The mechanism as thus far described has been disclosed in my prior applications mentioned above. The novel features incorporated therein will now be described. In the prior construc-

tions spiral gears 42 and 43 were constructed to rotate feed screw 44 at the same rate as the record 22; and the pitch of screw 44 was therefore necessarily the same as the spacing of the grooves on the record. In order to provide a strong, positive engagement between member 45 and screw 44, regardless of the fineness of the record grooves, the diameter and pitch of spiral gears 43 and 42 are designed to provide an appropriate reduction in the rate of rotation of the feed screw 44 relative to that of the record, sufficient to provide screw threads of sufficient size for accurate, positive operation. In the illustrated embodiment a reduction ratio of 4 to 1 is utilized, though obviously other ratios can be used. In this arrangement, with a record having 120 grooves to the inch, feed screw 44 will have 30 threads to the inch, which is adequate for the provision of teeth having sufficient depth to assure adequate engagement by the threaded member 45.

In this arrangement the space between adjacent threads on feed screw 44 will correspond to a predetermined number of record grooves, four in the present instance. Therefore, when the carriage 39 is shifted by a distance equal to the width of one record groove, as in back spacing, the feed screw will be moved one-fourth of the distance between its threads relative to member 45. If the latter is a half nut of the type disclosed in my above mentioned prior applications, its threads would then be out of register with those of the feed screw whenever carriage 39 is shifted, unless the shift corresponded to four record grooves or a multiple thereof.

To avoid this difficulty the threaded member 45 includes a plurality of thread elements arranged so that one of said elements will accurately engage a thread of feed screw 44 whenever a record groove is in register with a stylus. This is in general accomplished by spacing the thread elements by a distance equal to the spacing of the threads on screw 44 plus successive increments equal to the spacing between adjacent record grooves, so that one of the thread elements will always be in register with a screw thread whenever a stylus is in register with a record groove.

A threaded member of this type is illustrated, particularly in Figs. 10–13. It comprises an arm 75 fixed to rock shaft 46 and carrying a series of thread elements or blades 76 pivotally mounted on pin 77. Each thread blade 76 extends across feed screw 44 and is provided with a lower marginal portion 78 which is positioned and contoured to fit accurately into the space between successive turns of thread 79 on screw 44. Since pressure between the threaded member 45 and feed screw 44 is exerted only against one side of thread 79, the latter is advantageously contoured with a substantially radial face 80 on the side against which pressure is exerted, and a sloping face 81 on the opposite side, the threaded blade margins 78 being correspondingly contoured, having a straight face 82 engaging thread face 80 and a sloping face 83 appropriately parallel to thread face 81. Moreover, blades 76 are arranged at a slight angle to the axis of screw 44 (Fig. 11) corresponding to the pitch of thread 79 to assure maximum contact between the blade margins 78 and said threads.

The distance between drive faces 82 of adjacent thread blade margins 78 is equal to the distance between adjacent thread faces 80 plus the distance between adjacent grooves on the record 22. Where the distance between turns of thread 79 is equal to the width of four record grooves, as in the illustrated embodiment, at least four blades 76 will be required. With this arrangement, whenever a record groove is in register with a stylus, one of the blade margins 78 will fit accurately against the radial face 80 of a turn of feed screw thread 79, and will impart translatory movement to the carriage 39 immediately when screw 44 is rotated, the remaining blades 76 being inoperative.

This arrangement provides for accurate translatory feed with any ratio between the record groove spacing and the feed screw pitch by providing the appropriate number of thread elements or blades 76. Moreover, while the illustrated arrangement discloses only one of said blades in operative position at any time, this showing is not restrictive, since any number of blades engaging the screw 44 may be provided by employing a suitable multiple of the minimum number of blades illustrated.

Blades 76 are provided with an appropriate yieldable mounting. In the form illustrated the arm 75 is constructed with a bifurcated outer end formed with side plates 85 and 86 fitting against the outer blades 76 and carrying pin 77. A top plate 87 carries a leaf spring 88 having separate blades 89 with downturned ends bearing against a thread blade 76. A suitable stop limiting downward movement of thread blades 76 is also provided, the illustrated construction including a downwardly extending tailpiece 90 on each blade bearing against the margin of a stop plate 91 adjustably attached to the bottom of arm 75 as by screws 92 passing through a suitable slot in plate 91. The threaded member 45 is suitably biased toward feed screw 44, as by spring 93 attached to the projecting end of side plate 86 and to the frame 28.

An arrangement is provided for back spacing, and includes a construction adapted for use where the feed screw pitch is substantially greater than the record groove spacing. In the illustrated embodiment the construction includes a rack 100 (Figs. 1, 4, 7–9, 14, 15) mounted on carriage 39 and extending lengthwise in the direction of carriage movement. A cooperating pawl member 101 is mounted on rock arm 102 oscillating about pivot pin 103 carried by ear 104 on the frame 28. Arm 102 is fixed to bracket 105 having a tailpiece 106 likewise pivoted on pin 103 at the other side of ear 104. Rock arm 102, bracket 105 and tailpiece 106 are designed so that they may be constructed from an integral piece of sheet metal.

Pawl pivot pin 107 is mounted on rock arm 102 and extends above rack 100. A suitable pawl construction is carried by pin 107; and in the present instance a construction similar in principle to that already described in connection with the feed screw arrangement is employed in order to provide single back spacing although the teeth of rack 100 are spaced by a multiple of the distance between record grooves. In the illustrated embodiment the rack tooth spacing is four times that of the record grooves, and four back spacing pawls 108 are pivotally mounted on pin 107, each having a downwardly extending tip 109 fitting between adjacent teeth 110 of rack 100. For maximum efficiency the rack teeth 110 are advantageously constructed with a vertical operative face, and the pawl tips 109 are similarly contoured (Fig. 15).

The operative vertical faces 111 of pawl tips

109 are offset successively by a distance equal to the spacing of the record grooves, which in this instance is one-quarter of the distance between rack teeth 110. Consequently, whenever a record groove is in register with a stylus, one of the pawl tips 109 will be in register with a rack tooth 110.

A suitable construction is provided for rocking the arm 102. In the illustrated embodiment this is accomplished by cam 115 (Figs. 9, 14) mounted on rock shaft 116 journaled in frame 28 and carrying rock arm 117 connected through link 118 (Fig. 4) to one arm of bell crank 119 pivoted on frame 28. The other arm of the bell crank is connected to suitable actuating mechanism.

It is advantageous to provide magnetic means for actuating bell crank 119 to operate the back spacing mechanism. Such an arrangement makes it possible to locate the operating switch at any desired point either on the machine itself or in a remote control. Moreover, the magnetic means can be arranged to provide a suitable actuating pressure rather than a positive mechanical shift, resulting in smoother operation. In the form illustrated this is accomplished by an electromagnet 120 mounted beneath frame 28 and provided with a pole piece 121 registering with an armature 122 mounted on a yoke frame 123 having rearwardly extending arms 124 oscillating on pivot pin 125 mounted on magnet 120, the rear ends of arms 124 being connected by tie rods 126. Link 127 connects one of the arms 124 with bell crank 119, the parts being arranged so that armature 122, normally held in position above pole piece 121 by a suitable spring (not shown) connected to the back spacing mechanism. The armature 122 is drawn downwardly when magnet 120 is energized. Suitable stops 131 provided with cushions 132 are mounted on frame 28 in register with an arm 124 to limit the throw of the back spacing mechanism. Magnet 120 is connected through switch 127 (Fig. 5) to power lines 128.

An arrangement is provided for holding the pawl member 101 normally in inoperative position out of engagement with rack 100, releasing said member for operation only when the back spacing mechanism is actuated. In the illustrated construction each back spacing pawl is provided with a lifting arm 128 extending forwardly into position for engagement by lifting pin 129 on the upper end of rock arm 117. The parts are arranged so that the pawls 108 will be held out of operative engagement with rack 100, as in Fig. 4, by pin 129 against the downward pressure of spring blades 130 mounted on bracket 105 except during back spacing, at which time the initial movement of rock arm 117 will swing pin 129 beyond the ends of lifting arms 128, permitting the back spacing pawls 108 to drop into engagement with rack 100 (Fig. 14). Return movement of rock arm 117 after back spacing will lift pawls 108 and permit the carriage to travel without interference.

A construction is provided for lifting the threaded member 45 out of engagement with feed screw 44 during back spacing. For this purpose lifting lever 133, mounted on pivot stud 134 on the front of frame 28, carries a lifting arm 135 positioned to engage the projecting end of side plate 86 on arm 75 carrying the threaded member. Tailpiece 136 of lever 133 extends downwardly into register with cam 137 on rock shaft 116, arranged so that the initial movement of said shaft during back spacing will lift the threaded member 45 out of engagement with screw 44 before the back spacing lever 102 is actuated.

An electrically actuated construction for stopping and starting the record drive is provided. This is in general accomplished by elevating the upper feed wheel 30 by rocking the frame 32. For this purpose an auxiliary tailpiece 140 on frame 32, located adjacent the drive end of the machine, is arranged for engagement by a cam 141 on auxiliary cam shaft 142 journaled in frame 28 and carrying a rocker 143 adjacent the outer face of said frame. Rocker 143 includes oppositely arranged pin arms 144, each carrying a pin 145 in register with a notch 146 in blade 147 of a bifurcated trip arm 148. Rocker 143 is provided with an upwardly extending rocking arm 149, the upper end of which is connected by spring 150 with trip arm 148.

The parts are arranged so that the tension of spring 150 in the position shown in Fig. 2 will tend both to rock the shaft 142 to the left and to draw the upper part of trip arm 148 to the left, bringing the right hand pin 145 against the right hand blade 147, and likewise holding trip arm 148 in uppermost position in which said pin will enter the registering notch. When arm 148 is drawn downwardly, cam shaft 142 will be rocked to the right, swinging arm 149 and spring 150 across the center of the cam shaft into the position shown in full lines in Fig. 3, the spring then operating to shift the upper end of arm 148 to the right, bringing the left hand blade 147 against the left hand pin 145 as soon as the engagement with the right hand pin 145 is released. Upward movement of arm 148 will slide the left hand blade 147 along the corresponding pin 145 until the latter enters the notch 146 in the latter blade. The next depression of arm 148 will reverse this operation. Since cam 141 is arranged so that in one of said positions of cam shaft 142 it will raise the upper feed wheel 30 and in the other position it will permit said wheel to bear against the record, successive depressions of arm 148 will serve to stop and start the record drive in alternation.

Electrically operated means for depressing arm 148 is provided. In the form illustrated the arrangement includes an electromagnet 153 mounted on frame 28, having a pole piece 154 registering with an armature 155 carried by a frame 156 having arms 157 extending along the sides of electromagnet 153 and pivotally mounted on pivot pin 158 carried by the magnet, the rear ends of arms 157 being connected by tie rod 159. The lower end of trip arm 148 is pivotally connected by pin 160 to an arm 157 (Fig. 2), the arrangement being such that when electromagnet 153 is energized and armature 155 is depressed arm 148 will be drawn downwardly. Suitable stops 161 provided with cushions 162 in register with a side arm 157 are carried by electromagnet 153.

The operation of electromagnet 153 is controlled by a suitable switch 161 (Fig. 5) in the circuit connecting electromagnet 153 with power lines 128, the preferred arrangement employing the same power line connections as those utilized for energizing magnet 120. This arrangement of circuits, and the juxtaposition of the electromagnets 120 and 153, permit the use of simplified wiring and the location of the switches 127, 161 in juxtaposition either on the casing 20 or on a separate control unit which may be located at some distance from the dictating machine.

The requisite tension on the record in the recording and reproducing zone is obtained by

mounting shaft 31 of the upper feed wheel 30 with its axis at a slight angle to the radius from the center of spindle 38 through the point where each stylus engages the record 22, the zone of engagement between wheels 29, 30 and the record being substantially on said radius. Wheel 30 will rotate in a plane diverging outwardly from the direction of travel of the record at the point of engagement thereof with the wheel, exerting an outward pull on the record. An angle of about two degrees has been found suitable. It has been found that with this arrangement the requisite tension is obtained without damage to the record.

The mode of operation of each novel feature has been indicated in connection with the description of the feature and only a general summary of operation will therefore be given. After the record 22 is placed in position while finger piece 66 is set at neutral, operation is commenced by swinging the finger piece into either recording or reproducing position. This movement rotates cam shaft 68, cam 69 releasing arm 75 which descends to bring a thread blade 76 into engagement with feed screw 44. At the same time cam 70 releases tailpiece 33 and the upper feed wheel 30 is lowered by spring 34 into engagement with the record 22, pressing it against lower feed wheel 29, thereby starting the rotation of the record, the angular position of wheel 30 maintaining the record under tension beneath the stylus 51 or 57, which has been lowered into engagement with the record by cam 71. The resulting rotation of spindle 38 drives feed screw 44 through the reduction gearing 42, 43 so that the screw rotates once for every four rotations of the record in the particular form illustrated. The record drive can be stopped at any moment by closing switch 127, and started again by successive operation of the same switch.

When back spacing is desired the closing of switch 161 will lift arm 75, releasing the feed screw and dropping the back spacing pawls 193 into engagement with rack 100, continued movement of the pawls shifting the rack and carriage rearwardly one space. The opening of switch 161 will permit rock arm 117 to return to running position, raising pawls 108 and lowering arm 75 to bring a thread blade 76 again into engagement with feed screw 44. Since the carriage has been shifted a distance equal to one record groove, a thread 79 of the feed screw 44 will be accurately engaged by a thread blade 76 spaced by the width of a record groove from the blade previously in operative engagement with the screw.

The introduction of the auxiliary mechanisms described herein without substantial rearrangement of the various mechanisms set forth in prior applications above mentioned has been a principal problem; and it will be apparent that the described construction and arrangement have solved this problem. In particular, the electromagnet elements have been located in a vacant space beneath the frame 28 and the mechanisms actuated thereby have been conveniently arranged in register with the electromagnets without interfering with other parts of the record supporting, driving and control mechanisms previously employed.

I have described what I believe to be the best embodiments of my invention. I do not wish, however, to be confined to the embodiments shown, but what I desire to cover by Letters Patent is set forth in the appended claims.

I claim:

1. In a dictation machine comprising a record-supporting carriage, and mechanism for imparting translatory movement to the carriage including a feed screw; the novel structure which comprises a feed unit associated with the feed screw and including a plurality of thread members movable into and out of engagement with the feed screw, said thread members extending into spaced thread grooves on the screw with one member in operative register with a groove and other members offset from operative register with other grooves by progressively increasing distances equal to an aliquot part of the screw pitch and successive multiples thereof up to the full pitch distance, the arrangement being such that when one of the feed screw grooves and a thread member are in operative register, and said screw and the feed unit are axially shifted relative to each other by a distance equal to said pitch fraction or any multiple thereof, one of the thread members will be brought thereby into operative register with a groove of the screw.

2. A structure as claimed in claim 1 in which each thread member is a blade having a thread-fitting marginal portion and the feed unit includes a common support on which the individual blades are yieldably mounted.

3. A structure as claimed in claim 1 including a common support on which the individual thread members are yieldably mounted, and mechanism for shifting the support to move the members into and out of engagement with the screw.

4. A structure as claimed in claim 1 including a support on which the thread members are movably mounted, spring means on the support for biasing the members individually toward the feed screw, and an adjustable stop for the feed members on the support.

5. In a dictation machine adapted for use with a disk record having a predetermined spacing between grooves comprising record rotating means, a record carriage, and a record support on the carriage rotated by the record; the novel structure which comprises mechanism for shifting the carriage including a feed screw on the carriage having a pitch equal to a whole multiple of the distance between adjacent record grooves, a stationary threaded member engaging the feed screw and adapted to have driving register therewith at intervals which are an aliquot part of said pitch, and drive connections between the record support and the feed screw including reduction gearing rotating the feed screw through an aliquot part of a revolution equal to the inverse of said multiple for each revolution of the record support.

6. A structure as claimed in claim 5 in which the stationary threaded member comprises a plurality of separate yieldable thread elements for engaging grooves of said screw with one element registering with a groove center and other elements spaced at equal intervals between groove centers, each interval being an aliquot part of the feed screw pitch equal to said aliquot part of a feed screw revolution.

7. In a dictation machine comprising a record-supporting carriage, mechanism for shifting the carriage including a feed screw, and a feed member engaging the screw; the novel structure which comprises an auxiliary mechanism for shifting the carriage including a rack having the same pitch as the feed screw, and an associated pawl construction comprising a plurality of pawls engaging the rack teeth with one pawl registering with a tooth and other pawls positioned at

a series of points equally spaced across the intervals between the teeth.

8. A structure as set forth in claim 7 in which the feed member comprises a plurality of feed elements yieldably engaging the feed screw and spaced along said screw relative to the associated screw threads at intervals corresponding to the spacing of the pawls relative to the rack teeth.

9. In a dictation machine comprising a record-supporting carriage, means for rotating the record on the carriage, and means for imparting translatory movement to the carriage including a feed screw, in combination, mechanism for rotating the feed screw at an aliquot part of the rotation rate of the record, and means for imparting translatory movement to the carriage by steps equal to the same aliquot part of the pitch of the feed screw.

10. A structure as claimed in claim 9 in which the means for imparting step translatory movement to the carriage comprises a rack and a multiple pawl construction engaging the rack at each step interval.

11. In a dictation machine comprising a record-supporting carriage, and means for imparting translatory movement to the carriage comprising a feed screw and a threaded member releasably engaging said screw; the novel structure which comprises an auxiliary mechanism for imparting translatory movement to the carriage comprising a rack and an associated pawl construction, and mechanism for alternatively shifting the threaded member into engagement with the feed screw and shifting the pawl construction into engagement with the rack.

12. A structure as set forth in claim 11 which comprises a rock shaft, a device operatively connected to the shaft for normally holding the pawl construction out of engagement with the rack, actuated by initial shaft movement to release the pawl construction, a device actuated by said initial rock shaft movement for separating the threaded member from the feed screw, and mechanism actuated by subsequent rock shaft movement for actuating the pawl construction and thereby shifting the rack and carriage.

13. In a dictation machine comprising a record-supporting carriage and means for imparting translatory movement to the carriage including a feed screw, and an associated threaded member, the novel structure which comprises a device for separating the threaded member and feed screw to arrest said translatory movement and an auxiliary mechanism for imparting translatory movement to the carriage including a device for separating the threaded member and feed screw during operating of the auxiliary mechanism.

14. A structure as claimed in claim 13 which includes an electromagnet and actuating connections between the electromagnet and said auxiliary mechanism.

15. In a dictation machine comprising record drive mechanism, apparatus for stopping and starting the record including a rocking member, means actuated by the rocking member for stopping the record drive when the member is rocked into stop position and for starting said drive when the member is rocked into start position, and means for rocking the member into said positions alternately comprising an actuating member, two elements connected to the rock shaft each arranged to rock said shaft into one of said positions when engaged and shifted by the actuating member, and means effective after each shift of one of said elements to move the actuating member out of engagement with the latter element and into engagement with the other of said elements.

16. Apparatus as set forth in claim 15 in which the actuating member moving means includes a spring device engaging the rock shaft and the actuating member and shifted into position by said rocking of the shaft.

17. Apparatus as set forth in claim 15 comprising electrical apparatus for operating the actuating member including an electromagnet, an armature associated with the electromagnet and shifted thereby when the electromagnet is energized, and drive connections between the armature and the actuating member.

18. A dictation machine adapted for use with thin flexible disk records comprising a disk record support, means controlling the direction of travel of the support, means for driving the support, a stylus, and means for placing the record under radial tension at the stylus.

19. A dictation machine adapted for use with thin flexible disk records comprising a disk record support, means for driving the support, means controlling the direction of travel of the support, a stylus, and means for placing the record under radial tension at the stylus, comprising a rotating member in rolling engagement with the record, and means supporting said member for rotation about an axis which diverges slightly from the direction of travel of the record at the point of engagement with said member.

20. A dictation machine adapted for use with thin flexible disk records comprising a disk record support, means for driving the support, means controlling the direction of travel of the support, a stylus, and means for placing the record under radial tension at the stylus, comprising registering rotary members engaging opposite sides of the record, and means supporting one of said members for rotation about an axis which diverges slightly from the direction of travel of the record at the point of engagement with the latter member.

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