Oct. 7, 1958 T. L. DINSMORE 2,855,205

DICTATING MACHINE

Filed Sept. 7, 1956

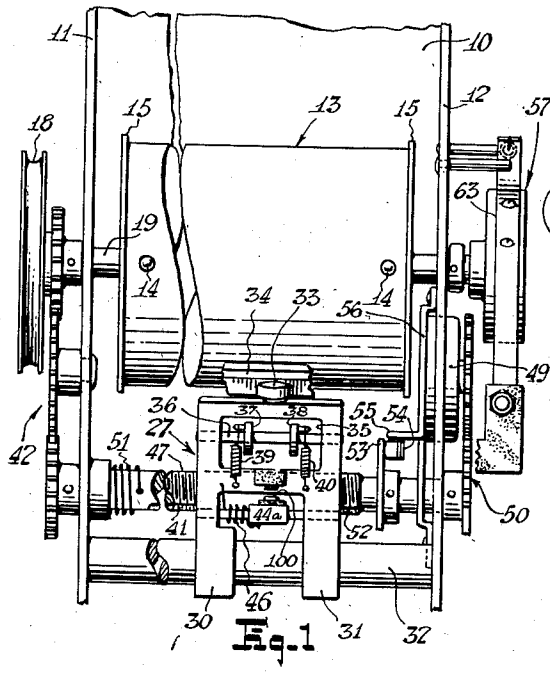


Fig. 1

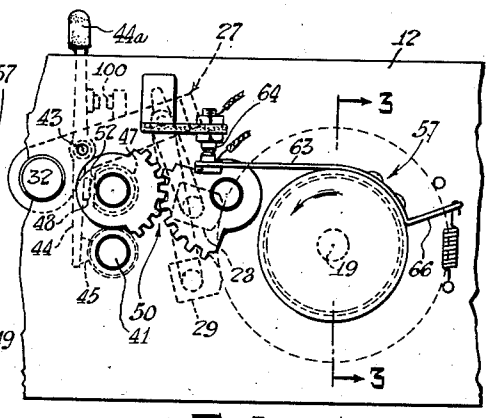


Fig. 2

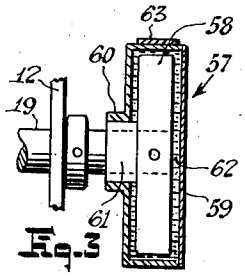


Fig. 3

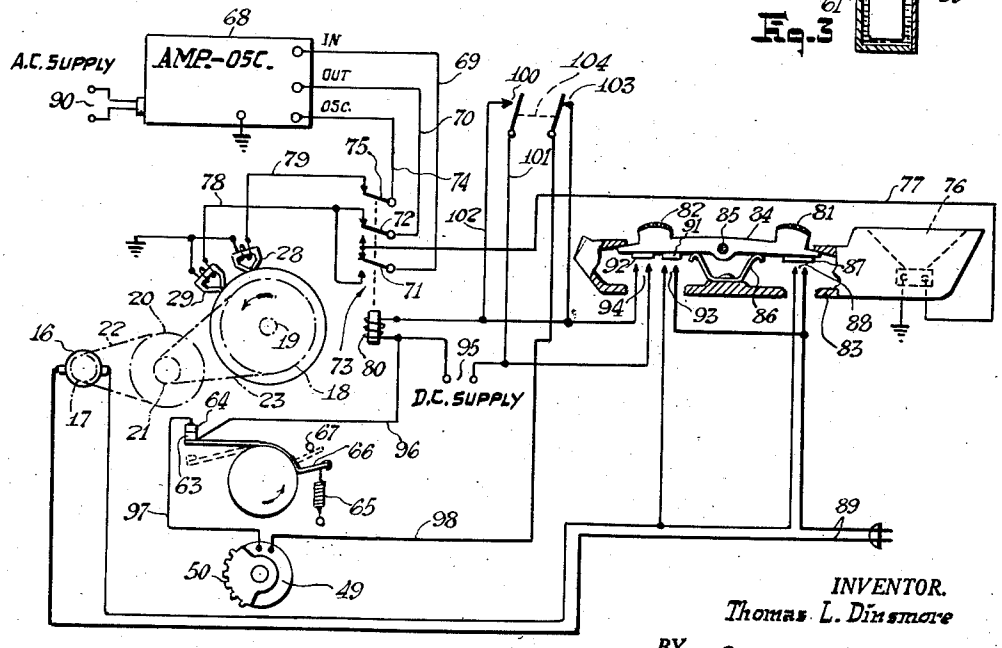


Fig. 4

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DICTATING MACHINE

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Application September 7, 1956, Serial No. 608,454

5 Claims. (Cl. 274—21)

This invention relates to dictating machines and more particularly to the mechanisms provided in such machines for enabling the dictator to listen back to selected portions of his recorded dictation. The invention is in some respects a modification of my invention disclosed in my pending application Serial No. 541,755, filed October 20, 1955.

The apparatus described in my foregoing application for enabling a dictator to listen back to selected portions of his recorded dictation is adapted to perform all necessary operations in placing the machine into reproducing condition at a backspaced point along the record in response to a single control manipulation performed on the machine. These conditioning operations comprise shifting the machine from recording to reproducing condition, backspacing the carriage for the translating device and starting the machine. This series of conditioning operations must be performed in proper sequence. In the foregoing application the proper timing was obtained by a mechanism involving the clutch of the drive mechanism. The present invention resides in a novel listening-back control system which is adapted particularly for use with dictating machines which do not employ a drive clutch but which employ instead a so-called quick-start motor.

An object of the invention is to provide a novel control system for converting a dictating machine from a recording condition into an active listening-back condition in response to a single manipulation performed on the machine.

Another object is to provide such a novel control system which is adapted particularly for use with dictating machines employing a quick-start drive motor.

A further object is to provide such listening-back control system for a dictating machine wherein deenergization of the backspacing mechanism upon each activation of the system is accomplished in proper timing relationship by means responsive to the start of rotation of the record support.

Other objects and features of my invention will be apparent from the following description and the appended claims.

In the description of my invention reference is had to the accompanying drawings, of which:

Figure 1 is a fractional plan view of the operating mechanism of a dictating machine embodying my invention, the machine being shown without a cover and with an intermediate section cut away;

Figure 2 is a righthand elevation of the mechanism shown in Figure 1;

Figure 3 is a sectional view taken on the line 3—3 of Figure 2; and

Figure 4 is a schematic circuit diagram showing the control circuit of the dictating machine.

The dictating machine shown in Figures 1–4 comprises a base **10** having left and right side standards **11** and **12**. Journaled in these standards is a drum **13** having a peripheral layer as of resilient material for carrying

a rectangular magnetic sheet record in wrap-around relation thereto as in the manner disclosed in Roberts Patent 2,653,819, dated September 29, 1953. Such a sheet record has apertures in the leading corner portions thereof engageable by respective hooks **14** near the ends of the drum to propel the sheet record from its leading edge as the drum is advanced. The drum may have peripheral end flanges **15** or other suitable means for locating the sheet record lengthwise thereof. The drum is preferably driven by a quick-start motor **16** through a drive train comprising, for example, a pulley **17** on the shaft of the motor, a pulley **18** on a shaft **19** of the drum and an intermediate stepped pulley **20** journaled at **21** as on a stud (not shown) mounted on the side standard **11**. The drive pulley **17** is coupled to the larger section of the stepped pulley **20** by a belt **22**, and the smaller section of the stepped pulley is coupled to the driven pulley **18** by a belt **23**, as indicated in Figure 4. The motor **16** is one having a high initial starting torque to enable it to bring the drum up to normal speed in a very short time, typically within 40 milliseconds or less. The advantage of using such quick-start motor is that it eliminates the need for both a drive clutch and a clutch-operable solenoid.

At the front of the drum there is a carriage **27** for erase and record-reproduce heads. This carriage is a generally U-shaped casting having two spaced bars **30** and **31** slidably mounted on a rod **32** supported at its ends by the side standards. The carriage is inclined from the rod **32** towards the drum and on the rearward end thereof adjacent to the drum there is a stud on which is journaled a wheel **33**. This wheel rides on an angle iron **34** (fractionally shown) which is mounted at its ends on the side standards. The carriage has a central opening **35** traversed by a support rod **36** on which are pivoted levers **37** and **38**. Mounted on the lower end portions of these levers, respectively in vertically-aligned relation to each other, are an erase head **28** and a record-reproduce head **29**. The levers have short arms projecting above the carriage to which are connected respective springs **39** and **40** for biasing the heads against the drum. The carriage is advanced progressively along the drum concurrently as the drum is rotated by means of a feed screw **41** journalled at its ends in the side standards. This feed screw is rotated in fixed relation with the drum by means of a gear train **42** connecting it to the shaft **19**. Pivoted at **43** to the forepart of the carriage is a lever **44** carrying a feed nut **45** which is held normally in engagement with the feed screw **41** under influence of a torsion spring **46** connected between the lever and the carriage. Whenever it is desired to shift the carriage by hand, the lever **44** is first turned manually to disengage the feed nut **45**. For this reason the lever **44** has an upwardly-extending fingerpiece **44***a* shown in Figure 2.

Provision is made for backspacing the carriage step-by-step by remote control. This backspacing means comprises a backspacing screw **47** rotatably mounted at its end portions in the side standards, and a cooperating feed nut **48** mounted on the lever **44**. The backspacing screw is rotated during a fraction of one turn to carry out each backspacing step. This rotation is produced by a rotary solenoid **49** connected to the backspacing screw by gearing **50**. Upon each deenergization of the solenoid **49** the backspacing screw is returned to its initial position by a torsion spring **51** connected between the screw and the side standard **11** as shown in Figure 1.

The backspacing screw has a flat **52** throughout its length which confronts the feed nut **48** at a clearance spacing therefrom when the backspacing screw is in its initial position. In view of this clearance the backspacing screw **47** and feed nut **48** are normally disengaged so as not to interfere with the normal forward drive of the

carriage. When the backspacing screw is turned by the solenoid, an edge portion of the flat **52** first engages the nut **48** to cam the lever **44** to disengage the feed nut **45** from the feed screw **41**; and thereupon the thread of the backspacing screw engages the nut **48**. During the continuing rotation of the backspacing screw by the solenoid while the screw is in threaded engagement with the feed nut **48**, the backspacing screw is shifted longitudinally in a backspacing direction by means of a cam plate **53** secured to the right end portion of the screw **47** and coacting with a roller **54** journaled on an arm **55** of a bracket **56** secured to the right side standard **12**. Pressure of the cam **53** against the roller **54** is maintained by force of the spring **51** acting on the backspacing screw as a compression spring. When the solenoid **49** is deenergized, the backspacing screw **47** is returned until the feed nut **48** comes again into registration with the flat **52**, without however then advancing the carriage because of a yieldability in the mounting of the nut **48** in a forward direction. As the nut **48** comes again into registration with the flat **52** the feed nut **45** is returned into engagement with the feed screw **41**. Thus, repeated activation of the rotary solenoid **49** will backspace the carriage by successive steps.

In order to stabilize the speed of the drum **13** there is provided a vibration damper **57** comprising a cylindrical rotor **58** secured to the right end of the shaft **19** and a case **59** which encloses the rotor in closely spaced relationship thereto. The case has a central opening in its inner side wall surrounded by a circular flange **60** in which is fitted a bearing **61** traversed by the shaft **19**. The narrow space between the rotor and case is filled with a viscous fluid **62** such as a suitable oil. The case is permitted to turn within a short range for control purposes. Normally the case assumes a position shown in Figure 4 wherein a switch contact arm **63** secured to the case abuts against a stationary switch contact **64** under influence of a tension spring **65** connected to a second arm **66** on the case. When the motor starts running the case is turned counterclockwise by the frictional resistance between it and the rotor **58** until the arm **66** on the case abuts against a stop pin **67**. This limited permissible movement of the case will cause the switch **63—64** to open responsive to the starting of the drum **13**. As soon as the drum has reached normal speed the vibration damper exerts a speed-stabilizing frictional drag on the drum proportional to its velocity because of the shear resistance of the viscous fluid between the closely-spaced opposing surfaces of the rotor **58** and case **59**. When the drive motor is stopped the case is returned clockwise by the spring **65** to its former position to reclose the switch **63—64**.

The audio system of the machine comprises a combined record-reproduce amplifier and oscillator **68** diagrammatically shown in Figure 4. For simplification purposes, the audio circuits are shown single-line with one side grounded. Signal input and output circuits of the amplifier are connected by leads **69** and **70** to respective poles **71** and **72** of a changeover switch **73**, and the auxiliary output is connected by a lead **74** to a pole **75** of this same switch. All poles are tied mechanically together for concurrent operation and are normally held in record position, as shown. In this position the pole **71** makes with its upper contact to connect a receiver-microphone **76**, acting as a microphone, to the amplifier input via a lead **77**; the pole **72** makes with its upper contact to connect the record-reproducer head **29**, acting as a recorder, to the amplifier output via a lead **78**; and the pole **75** makes with its associated contact to connect the erase head **28** through a lead **79** to the oscillator output. The changeover switch is operable by a relay coil **80** into reproduce position to cause the pole **71** to shift to its lower contact to connect the record-reproduce head **29**, acting as a reproducer, to the amplifier input, to cause the pole **72** to shift to its lower contact to connect the amplifier output to the receiver-microphone **76**, acting as a receiver, and to cause the pole **75** to break the oscillator circuit.

The change-over relay **80**, the starting of the motor **16** and the activating of the backspacing electromagnet **49** are controlled by respective record and reproduce controls **81** and **82** on a handpiece **83** having a head portion housing the receiver-microphone **76**. The record and reproduce controls may comprise extending buttons on a rocker **84** pivoted at its central portion to the handpiece as at **85**. This rocker is biased into a neutral position as by a two-pronged spring **86** shown in Figure 4.

When the record button **81** is depressed, a bridging member **87** on the rocker **84** is moved into engagement with a pair of contacts **88** connected serially in the power circuit **89** of the motor **16**. Since the change-over switch **73** is normally in record position, a starting and stopping of the motor by pressing and releasing the record button **81** is all that is required to start and stop the machine for recording, it being understood that the amplifier is already in an activated condition by connection to an A. C. power supply indicated at **90**.

In order to listen back to one's recorded dictation, as for reconstructing one's train of thoughts should the dictator be interrupted in the recording operation as by a telephone call or the like, the dictator need only press the reproduce button **82** one or more times, depending upon how far back the reproduction is to start, and then continue to hold the reproduce button down so long as it is desired that the reproducing operation is to continue. When the reproducing control is depressed, two bridging members **91** and **92** are engaged with respective pairs of contacts **93** and **94**. The closing of the contacts **93** again connects the motor to the power supply to start the machine. The closing of the contacts **94** connects the change-over relay **80** across a D. C. potential source indicated by the terminals **95** to cause the change-over switch **73** to be operated into reproduce position; also, the closing of the contacts **94** serves to connect the backspacing electromagnet **49** across the same D. C. source through a circuit comprising a lead **96**, contacts **63—64**, a lead **97**, the backspacing electromagnet **49**, a lead **98**, normally closed switch **103** and switch contacts **94**. Consequently, when the reproduce button is depressed three things occur: (1) the motor **16** is started, (2) the change-over relay **80** is operated to reproduce position, and (3) the backspacing electromagnet **49** is energized. My invention is concerned particularly with the relative timing of the starting of the motor and the operation of the backspacing electromagnet. Typically, the motor **16**, being of a quick-start type, will require from 30 to 40 milliseconds to reach normal speed because of the inertia of the driven parts of the operating mechanism, especially the drum **13**. In this respect it may be noted that the vibration damper **57** does not contribute substantially to the delay of the drive system reaching normal speed because its drive resistance, being proportional to velocity, does not impose any appreciable load on the motor at the outset. The backspacing of the electromagnet will, however, operate much faster, typically in about 10 milliseconds. By such operation, as before explained, the backspacing screw **47** is turned to disengage the feed nut **45** from the feed screw and to backspace the carriage by one step. Until the backspacing electromagnet is next deenergized the machine cannot operate because of the feed nut **45** being disengaged from the feed screw **41**. However, by my invention, the backspacing electromagnet is deenergized in response to the initial starting of the drum by the motor **16**. As a result, by the time the motor reaches substantially normal driving speed the backspacing electromagnet will have returned to its initial position and the feed nut **45** will be reengaged with the feed screw. In accordance with the broader aspects of my invention, the backspacing electromagnet may be

deenergized by any suitable coupling with the record-supporting drum or other similar driven parts. However, I preferably open the circuit of the backspacing electromagnet by the movement of the case of the vibration damper **57**. For this purpose, as before described, the case of the vibration damper is shiftable from the full-line positioning to the dash-line positioning of the parts shown in Figure 4 as the drum is started. By suitable selection of the tensioning of the spring **65**, this shifting will occur to open the switch **63—64** when the drum has reached about one-half normal speed, which will be typically in about 15 to 20 milliseconds. Thus, upon depressing the reproduce button the sequence of operation of the drive and backspacing mechanisms is as follows: (1) both the motor **16** and the backspacing electromagnet **49** are at first simultaneously energized, (2) the backspacing electromagnet is operated to backspace the carriage by one step within approximately 10 milliseconds (3) the drum **13** will reach approximately half normal speed in about 20 milliseconds and in response thereto the switch contacts **63—64** are opened to cause deenergization of the back spacing electromagnet and immediate return of the backspacing feed screw **47** with reengagement of the feed nut **45** with the feed screw **41**, and (4) in about 30 to 40 milliseconds the drum will reach normal speed and forward drive of the carriage will have been resumed for reproducing the recorded dictation at the backspaced position. If the reproducing button is depressed several times in succession, the backspacing electromagnet will be operated successively to step the carriage back by successive steps so that when the reproducing button is retained in operated position the machine will start to reproduce the recorded matter from such farther backspaced position.

In order that the machine will be shifted automatically into reproducing condition when the carriage is backspaced manually, a switch **100** is provided in the circuit of the change-over solenoid **80** which is operable by the lever **44** as the lever is shifted to disengage the feed nut **45** from the feed screw **41**. As shown in Figure 4, this operating circuit for the change-over relay comprises the D. C. source **95**, a lead **101**, the switch **100**, a lead **102** and the relay **80**. A second switch **103** is coupled mechanically to the switch **100**, as represented by the tie line **104**, to open the circuit of the backspacing electromagnet **49** so that this electromagnet will not be operated when the carriage is manually shifted.

The particular embodiment of my invention herein shown and described is intended only as being illustrative and not limitative of my invention since the same is subject to many changes and modifications without departure from the scope of my invention, which I endeavor to express according to the following claims.

I claim:

1. In a dictating machine including a rotatable support for a record, a record-cooperable translating means and a movable carriage therefor: the combination of a

first electrically-energizable means for starting rotation of said record support and advancing movement of said carriage; a second electrically-energizable means for backspacing said carriage, said first means being characterized as having a greater delay in starting than said second means; means for concurrently energizing said first and second means; and means responsive to rotation of said support for deenergizing said second means.

2. The combination set forth in claim 1 wherein said last-stated means comprises a switch connected in the energizing circuit of said second means; and operating means for said switch frictionally coupled to said record support to operate the switch in response to a rotation of said support.

3. In a dictating machine including a rotatable support for a record, a record-cooperable translating means and a carriage therefor: the combination of a drive motor coupled to said record support and carriage for rotating said support and advancing said carriage; an electrically-energizable means for backspacing said carriage; a start-stop control operable into start position to energize concurrently said drive motor and backspacing means, said drive motor requiring a predetermined period following the energization thereof to bring said record support to normal speed and said backspacing means being adapted to come into full operation in substantially less than said predetermined period; and means responsive to rotation of said record support for deenergizing said backspacing means independently of the positioning of said start-stop control.

4. The combination set forth in claim 3 wherein said last-stated means comprises a vibration damper adapted to stabilize the speed of said record support and comprising a rotor coupled to said record support, an angularly-shiftable case surrounding said rotor and containing a viscous fluid, spring means normally holding said case in one position and yieldable to frictional forces transmitted to the case through said viscous fluid when said rotor is started to cause said case to assume a displaced position, and a switch in circuit with said backspacing means operated by the displacement of said case.

5. In a dictating machine including a rotatable supporting device for a record, a record-cooperable translating device and a movable carriage for one of said devices: the combination of electrically-energizable drive means for said record support and carriage; a start-stop switch for said drive means; electrically-operable backspacing means for said carriage effective upon each energization thereof to backspace said carriage by one step; a circuit for said backspacing means; means for energizing said backspacing means as said start-stop switch is operated to start position; and means operable by said drive means before the same reaches normal speed for deenergizing said backspacing means.

No references cited.