Nov. 10, 1959 C. T. JACOBS 2,912,520

DICTATING MACHINE

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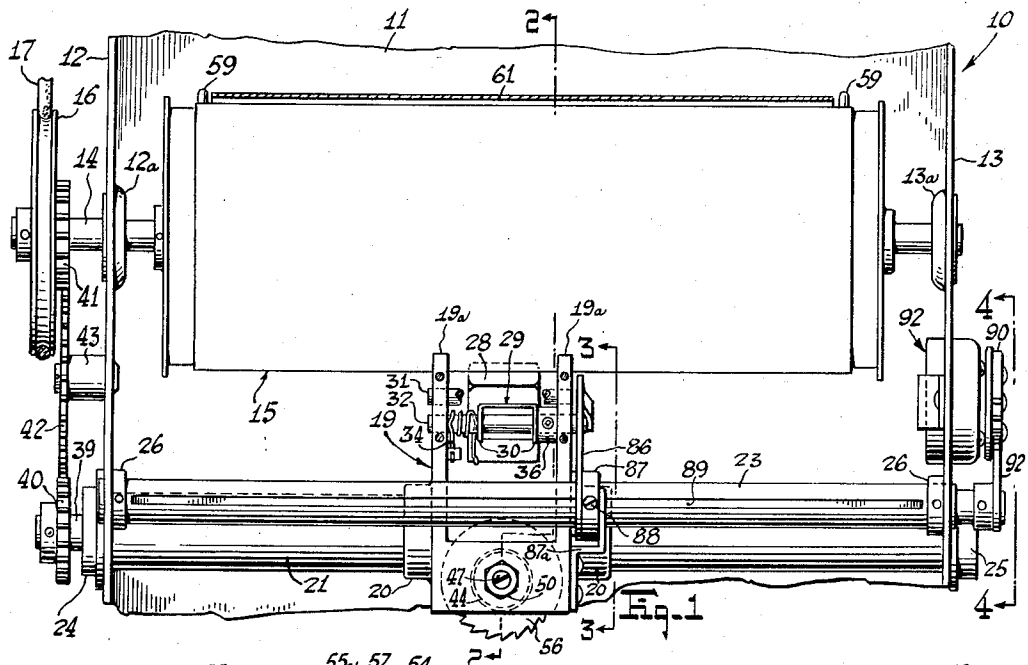


Fig. 1

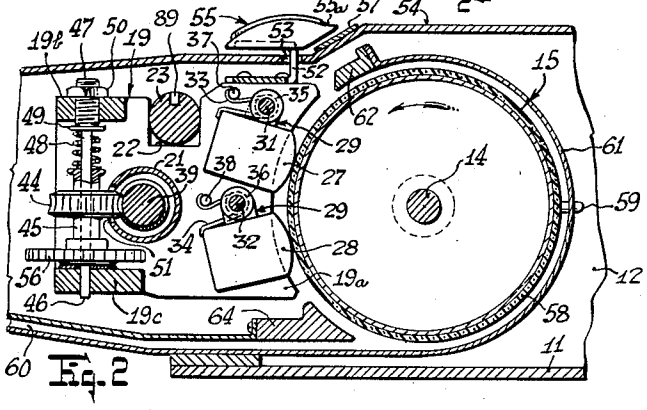


Fig. 2

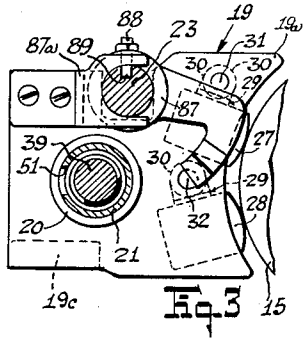


Fig. 3

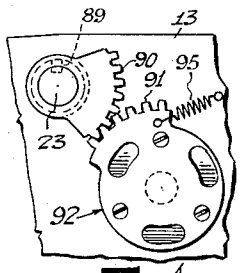


Fig. 4

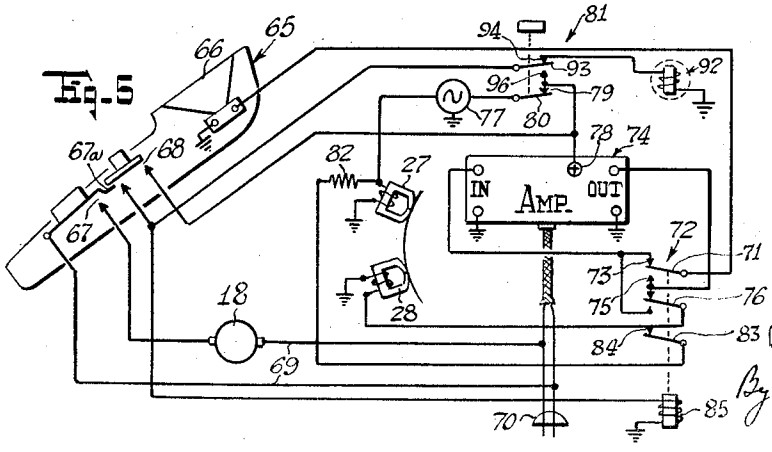


Fig. 5

INVENTOR

Charles T. Jacobs

By George H. Fritzinger

Agt.

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DICTATING MACHINE

Charles T. Jacobs, Bernardsville, N.J., assignor to McGraw-Edison Company, Elgin, Ill., a corporation of Delaware

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10 Claims. (Cl. 179—100.2)

This invention relates to dictating machines and more particularly to improvements in the means usually provided in such machines for enabling a dictator to "listen back" at will to a last portion of his recorded dictation, such means being often referred to as a means for "quick review."

Dictating machines are typically provided with a means for quick review in order that a dictator may listen back to a last portion of his dictation to pick up the line of his thoughts as after a delay or interruption in the dictating process. Such quick review is usually accomplished, as when the machine is equipped with separate record and reproduce devices, by having the reproducer mounted at a trailing distance behind the recorder and shifting the audio circuits from the recorder to the reproducer. When the machine is equipped with a combined record-reproduce device, quick review has been accomplished by backspacing the entire traveling carriage mechanism and also shifting the audio circuit as mentioned. My invention is concerned with dictating machines which use the combined form of record-reproduce device—typically exemplified in machines of the type which record on a magnetic record medium—and resides in simplification which eliminate the need for backspacing the entire carriage mechanism to accomplish the quick-review function.

As will appear, in carrying out my invention the record-reproduce head is mounted for shifting movement relative to the traveling carriage in directions of movement of the carriage. This head is normally held in an advance position in its shiftable range and the audio system is normally conditioned for recording, and the quick-review function is accomplished by backspacing only the record-reproduce head and concurrently shifting the audio system to reproducing condition. This arrangement has the advantage that it assures a gap between the point where recording is resumed and the point of farthest prior advance of the recorder to prevent any possible recording over an already-recorded track on the record.

It is accordingly an object of my invention to provide a simplified arrangement and mechanism in dictating machines which is adapted to enable a dictator to listen back at will in a very simple manner to the last portion of his recorded dictation.

Another object is to provide a simplified mechanism for quick review which assures that when recording is resumed the same will start in advance of the last prior position of the recorder on the record.

A further object is to provide a dictating machine with facility for quick review without breaking the continuity of erasure of the erase head across the record.

These and 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 a dictating machine incorporating my invention and shown with the erase head broken away;

Figure 2 is a fractional vertical section taken on the line 2—2 of Figure 1;

Figure 3 is a righthand view of the carriage mechanism as seen from the line 3—3 of Figure 1;

Figure 4 is a righthand view of a portion of the machine as seen from the line 4—4 of Figure 1; and

Figure 5 is a schematic diagram of control circuits and components of the machine.

By way of illustrative example, my invention is here shown in connection with a dictating machine 10 of the magnetic sheet-record type. This machine may have a base plate 11 provided with left and right side standards 12 and 13. These standards have bearings 12*a* and 13*a* for a transverse shaft 14 on which is mounted a record support in the form of a drum 15. The drum is rotated in a counterclockwise direction as it appears in Figure 2 by means of a drive mechanism including a drive pulley 16 secured to the left end portion of the shaft 14 and coupled by a belt 17 (fractionally shown) to a motor 18 diagrammatically shown in Figure 5. Since the motor is directly coupled to the record-supporting drum 15 it is preferably of the quick-start type having a high starting torque and low rotational inertia. At the front of the drum there is a hollow, rectangular carriage 19 comprising two vertical side plates 19*a* spaced transversely of the machine and bridged at the front by top and bottom cross bars 19*b* and 19*c*. The side plates are apertured in their front portions and provided therein with respective bearings 20 which embrace slidably a tubular cross rod 21 supported at its ends by the side standards. Also, the side walls 19*a* have rectangular notches 22 in their upper edges engaged slidably by a transverse cross rod 23 for holding the carriage in an upright position about the support rod 21. The ends of the tubular rod 21 pass through openings in the side standards and are received in left and right flanged cup members 24 and 25 having the rim flanges thereof secured as by screws (not shown) to the outer walls of the side standards. The ends of the rod 23 are secured in bearings in the side standards to permit rotation of the rod for control purposes which will appear, and the rod is held in place in directions lengthwise thereof by respective collars 26 on its end portions which abut against the inside walls of the side standards.

Carried between the rearward portions of the side walls 19*a* of the carriage, in upper and lower positions adjacent to the drum 15, are an erase head 27 and a record-reproduce head 28 of the magnetic type having gapped pole pieces for engaging a record on the drum 15. Each head has a rectangular housing provided with a bail 29 secured to the upper wall thereof to provide the head with spaced upright mounting lugs 30. Passing through the mounting lugs for the erase head and through the mounting lugs for the record-reproduce head are respective cross rods 31 and 32 each secured in place as by brazing or a force fit. These cross rods pivot in holes in the side walls of the carriage. Compression springs 33 and 34 are interposed between the left wall of the carriage and the mounting bails for the heads 27 and 28 respectively so as to urge the heads rightwardly against respective spacing collars 35 and 36 on the mounting rods between the bails and the right wall of the carriage. These spacing collars may be adjustably secured to the respective rods by set screws so as to locate the heads in vertical alignment with each other. The springs 33 and 34 are also of a torsional type having their upper legs hooked on respective pins 37 and 38 on the left side wall of the carriage and having their lower legs bearing against the upper wall of the respective heads (Figure 2) so as to bias the heads rearwardly against the drum 15.

The carriage is driven along the drum preferably in a rightward direction by a feed screw 39 extending axially through the tubular support rod 21. This feed screw has its end portions journaled in the flanged cup members 24 and 25, with the left end portion of the feed screw extending also through the cup 24. Secured to the left end of the feed screw is a pinion gear 40 which is coupled to a drive gear 41 on the drive pulley 16, through an intermediate gear 42 journaled on a stud 43 on the left side standard 12, to cause the feed screw to be driven in correspondence with the drum 15. On the carriage is a circular feed nut 44 having a hub 45 journaled on a vertical shaft 46 extending slidably through a bearing hole in the lower cross member 19*c* of the carriage and having a head 47 threaded into a hole in the upper cross member 19*b* of the carriage. The hub 45 is pressed frictionally against the lower cross member 19*c* under influence of a helical compression spring 48 on the shaft 46 between the hub and a washer 49 bearing against the head 47. The compression of this spring is adjusted to set the frictional restraint on the feed nut 44 by threading the head 47 inwardly or outwardly by the desired amount and then locking the same in place by a lock nut 50. The circular feed nut extends through a clearance slot 51 in the front side of the tubular support rod 21 and engages permanently the feed screw. Due to the frictional restraint on the feed nut, rotation of the feed screw will cause the carriage to be advanced progressively along the drum. However, upon exerting a force on the carriage sufficient to overcome this frictional restraint the carriage will be otherwise moved. Such other movement may be effected manually as through a bracket 52 secured to the top of the carriage and having an upstanding arm passing through a clearance slot 53 in the housing 54 of the machine and terminating in a fingerpiece 55. Also, such other movement may be effected in a step fashion as by a suitable ratchet mechanism (not shown) operating on a latch gear 56 secured to the hub 45 of the feed screw. The fingerpiece 55 may also have a pointed end 55*a* for indicating the positioning of the carriage by relation of the pointer to a scale 57 mounted on the housing 54.

The drum 15 is covered with a tubular sleeve 58 of a resilient material such as of rubber to provide a yieldable backing for a rectangular sheet record to be mounted around the drum. Such sheet record may have drive holes in the leading corner portions thereof to be engaged by respective radial drive pins 59 on the end portions of the drum so as to provide for drive of the sheet record with the drum as the drum is advanced, such sheet record and mounting being shown, for example, in Dinsmore et al. application Serial No. 468,442, filed November 12, 1954, and having common ownership with the present application. The sheet record may be mounted by sliding the same, leading edge first, through a slot 60 which extends from the front of the machine along the bottom thereof to a position below the drum. When the leading corner portions of the sheet record are so placed directly below the drum and the drum is advanced, the drive pins will first flex the corner portions downwardly—made permissible by cutaways (not shown) in the sides of the lower wall of the slot 60—until the pins register with the drive holes, whereupon the corner portions will flex upwardly to cause the sheet to become attached to the drum. In order to confine the sheet record closely to the drum as it is wrapped thereon, the bottom wall of the slot 60 is extended by an arcuate wall 61 around the back side of the drum to a point above the erase head 27 whereat it is fastened to a cross bar 62 supported at its ends by the side standards 12 and 13. The opening provided at the front of the drum provides access for the heads 27 and 28 to the mounted sheet record. Below the lower head 28, however, there is a cross bar 63 at a clearance distance from the drum which has an edge 64 for engaging the under side of the trailing edge of a mounted sheet record and guiding the same outwardly through the slot 60 when the drum is turned in a reverse direction.

When the machine is operated the heads 27 and 28 are moved progressively along the drum by the carriage 19, as the drum is rotated, to scan a helical track on the mounted sheet record with repeated crossing of the trailing edge of the record and with the erase head 27 preceding the record-reproduce head 28 at a fixed distance in advance thereof. During recording the record-reproduce head 28 is used as a recorder and the erase head is energized to erase any prior signal on the record. During reproducing the head 28 is used as a reproducer and the erase head is disabled.

The dictating machine is provided with a handpiece 65 (Figure 9) having a head portion in which is mounted a transducer 66 operable as a microphone during recording and as a receiver during reproducing. In the handle portion of this handpiece there is a start-stop switch 67 and a "quick-review" switch 68. Upon pressing the start-stop switch 67 a circuit 69 for the motor 18 is completed from a power source (not shown) through a connector plug 70.

The transducer 66 is connected to one pole 71 of a double-pole record-reproduce switch 72. The pole 71 makes normally with a contact 73 to connect the transducer to the input of an amplifier 74 which is also energized from a power source through the plug connector 70. The output of the amplifier is connected to contacts 75 of the record-reproduce switch 72, one of which is engaged normally with a second pole 76 of this switch, and this pole 76 is connected to the record-reproduce head 28. For simplification of description, a single line system is shown with completion of the circuits through ground connections. A high-frequency oscillator 77 is energized from a B+ tap 78 of the amplifier 74 through a contact 79 and pole 80 of a master record-reproduce switch 81 shown in Figure 9 in its record position. This oscillator supplies energizing current to the erase head 27 and biasing current to the record-reproduce head 28, the circuit of the latter being through a resistor 82, pole 83 and contact 84 of the record-reproduce head 28. Thus, when the audio system is in its normal record condition as shown in Figure 9, dictation can be recorded at any time by pressing the start switch 67, such dictation being picked up by the transducer 66 then operating as a microphone, being amplified by the amplifier 74, and being then recorded on the record by the head 28 operating as a recorder.

When the quick-review switch 68 is pressed for the purpose of listening back to a last portion of one's recorded dictation, a circuit is closed from the B+ tap 78 through the coil of a relay 85 to operate the record-reproduce switch into its reproduce position. As this switch is so operated the connections of the transducer 66 and head 28 are reversed with respect to the input and output of the amplifier 74 to shift the audio system into reproduce condition. Involved in this conditioning is a disconnecting of the oscillator 77 from the record-reproduce head 28 effected by the breaking of the pole 83 from the contact 84. However, in accordance with the present invention, energization of the erase head 27 by the oscillator 77 is maintained during the quick-review operation so as to provide continuity of erasure across the record.

Involved in making a quick review of the last portion of one's dictation is a backspacing of the record-reproduce head 28. In accordance with the present invention only the head itself is backspaced as in contrast with the usual procedure of backspacing the whole carriage mechanism. This independent backspacing of the head 28 is achieved, for example, by a cam finger 86 extending across the right end of the cross rod 32 which carries the record-reproduce head. This cam finger has a hub 87 retained against the right side of the carriage by a bracket 87*a*

and splined to the cross rod **23** as by a set screw **88** in the hub engaging slidably a slot **89** in the rod **23** lengthwise thereof. Secured to the right end of the cross rod **23** is a sector gear **90** meshing with another sector gear **91** secured to the armature of a rotary solenoid **92** mounted on the outer side of the right standard **13**. The circuit of this solenoid is connected via a pole **93** and contact **94** of the master record-reproduce switch **81** in parallel with the record-reproduce relay **85** so that when the quick-review switch **68** is pressed the rotary solenoid will be also energized. Activation of this solenoid turns the cross rod **23** clockwise as it appears in Figure 3 to shift the cam finger **86** across the end of the cross rod **32** to cam the record-reproduce head **28** backwardly an integral number of track convolutions on the record. Since the audio system is at the same time shifted into reproduce condition with the bias current to the head **28** then cut off by the switch **83—84**, the machine becomes ready for reproducing from the backspaced position of the head **28**. In order that the pressing of the quick-review switch **68** may also start the machine, the pole of the start-stop switch **67** has an extending finger **67***a* underlying the pushbutton of the quick-review switch. Since the backspacing of the head **28** responsive to pressing the quick-review switch **68** is accomplished without shifting the carriage **19** or the erase head **27**, the progressive advance of the carriage and erase head is not interrupted. After the dictator has listened to the desired amount of the last portion of his recorded dictation, he will release the quick-review switch **68** to deactivate the record-reproduce relay **85** causing it to return to record position and to deactivate the rotary solenoid **92** to cause it to return to its initial position under influence of a tension spring **95** connected to the sector gear **91** as shown in Figure 4, the effect of this return being to remove the cam finger **86** from the end of the cross rod **32** and allow the record-reproduce head to return to its advance position under influence of the compression spring **34**. Whether or not he has listened to the end of his recording, the record-reproduce head will be advanced ahead of its prior position of farthest advance to prevent any possible re-recording over the same track on the record.

When the machine is to be used only for reproducing, the master record-reproduce switch **81** is shifted downwardly from the position it occupies in Figure 9. As this switch is so shifted downwardly the pole **80** breaks from the contact **79** to remove operating current from the high-frequency oscillator **77** both to disable the erase head **27** and to remove bias current from the record-reproduce head **28**. Also, the pole **93** breaks from the contact **94** to disable the backspacing solenoid **92** and is made with a contact **96** joined to the contact **79** to cause power to be supplied from the B+ tap **78** to the record-reproduce relay **85**, causing this relay to be shifted to reproduce position. The machine is then in condition for reproducing the recorded dictation from any point on the record depending on the positioning of the carriage.

Although my invention has especially useful application to dictating machines of the type which operate in connection with a magnetic record medium, many features of the invention are useful also in connection with other modes of recording and no unnecessary limitation thereof to magnetic recording is intended. Also, it will be understood that my invention is not limited to machines wherein the record-cooperating heads are mounted on the traveling carriage but is applicable as well to machines which have a traveling carriage for the rotating record support. Such and other changes and modifications may be made without departing from the scope of my invention, which I endeavor to express according to the following claims.

I claim:

1. In a phonographic recording machine including a revolvable supporting device for a record: the combination of a record-reproduce device; a carriage for one of said devices mounted for traveling movement; drive means for rotating said support and concurrently advancing said carriage; a movable mounting for said record-reproduce device adapted to permit the device to be shifted back and forth relative to said carriage in directions of movement of the carriage; spring means for normally holding said record-reproduce device at the advance end of its shiftable range; and means operable to backspace said record-reproduce device relative to said carriage within said range.

2. In a phonographic recording machine including a revolvable support for a record: the combination of a record-reproduce device; a carriage for said device mounted for traveling movement; drive means for rotating said support and concurrently advancing said carriage; a mounting on said carriage for said record-reproduce device shiftable in directions of movement of the carriage; spring means biasing said device relative to the carriage in the direction of advance of the device on the record; and electromagnetic means energizable to shift said device into a backspaced position, said spring means being adapted to return said device to its advance position upon deenergization of said electromagnetic means.

3. In a phonographic recording machine: the combination of a revolvable supporting device for a record; a record-cooperable record-reproduce device; a carriage for one of said devices mounted for traveling movement; drive means for revolving said support and concurrently advancing said carriage to cause the record-reproduce device to scan the record; means mounting said record-reproduce device for shifting movement independently of said carriage in directions of movement of the carriage; position shifting means for said record-reproduce device; an audio system including said record-reproduce device and conditioning means shiftable selectively to place the audio system into record and reproduce conditions; and means operatively interconnecting said position shifting means and said system conditioning means for shifting said record-reproduce device relative to said carriage and concurrently shifting said audio system between record and reproduce conditions.

4. In a phonographic recording machine: the combination of a revolvable supporting device for a record; a record-cooperable record-reproduce device; a carriage for one of said devices mounted for traveling movement; drive means for revolving said support and concurrently advancing said carriage to cause the record-reproduce device to scan the record; means mounting said record-reproduce device for shifting movement independently of said carriage in directions of movement of the carriage; spring means biasing said record-reproduce device in the direction of advance of the record-reproduce device across the record; an audio system including said record-reproduce device and shiftable from a record into a reproduce condition; and electrically-operable means for backspacing said record-reproduce device against the opposing force of said spring means and for concurrently shifting said audio system into reproduce condition.

5. In a phonographic recording machine: the combination of a revolvable supporting device for a record; a record-cooperable record-reproduce device; a carriage for one of said devices mounted for traveling movement; drive means for revolving said support and concurrently advancing said carriage to cause the record-reproduce device to scan the record; means mounting said record-reproduce device for shifting movement independently of said carriage in directions of movement of the carriage; spring means biasing said record-reproduce device into the advance end of its shiftable range; electromagnetic means for backspacing said record-reproduce device within said range against the force of said spring means; an audio circuit connected to said record-reproduce device and including a record-reproduce relay biased into record position; and common control means for con-

currently activating said backspacing means and said relay.

6. In a phonographic recording machine including a revolvable supporting device for a record: the combination of an audio system including a record-reproduce device and means for conditioning said system selectively for recording and reproducing; a carriage for one of said devices mounted for traveling movement; drive means for revolving said supporting device and progressively advancing said carriage; means mounting said record-reproduce device for shifting movement relative to said carriage in directions of movement of the carriage; means normally conditioning said audio system for recording with said record-reproduce device operating as a recorder; and a common control means operable for (1) shifting said record-reproduce device relative to the carriage to place the device in a backspaced position on the record, (2) shifting said audio system into reproduce condition with the record-reproduce device operating as a reproducer, and (3) starting said drive means in one operation.

7. In a magnetic dictating machine including a revolvable supporting device for a magnetic record: the combination of a record-reproduce head device; an audio system including said head device and a record-reproduce control means normally in record position and operable to place the audio system in reproduce condition; a carriage for one of said devices mounted for traveling movement; drive means for revolving said supporting device and concurrently advancing said carriage; an erase head positioned to engage the record in advance of said record-reproduce head; an oscillator for energizing said erase head and supplying bias current to said record-reproduce head; means for backspacing said record-reproduce head with respect to said carriage and said erase head; and control means operable to activate said backspacing means, disconnect said oscillator from said record-reproduce head and condition said audio system for reproducing.

8. The dictating machine set forth in claim 7 including a master record-reproduce control means operable (1) to disconnect said oscillator from both said erase head and said record-reproduce head device, (2) shift said audio system control means into reproduce position, and (3) disable said backspacing means.

9. In a magnetic dictating machine including a revolvable supporting device for a magnetic record, a record-reproduce head device, a carriage for one of said devices mounted for traveling movement, and drive means for revolving said supporting device and concurrently advancing said carriage to cause said record-reproduce device to scan a supported record: the combination of an erase head supported for normally engaging a mounted record at a fixed distance in advance of said record-reproduce head device; a shiftable mounting for said record-reproduce head device adapted to enable the same to be backspaced within a given range both with respect to said carriage and said erase head; and means operable for backspacing said record-reproduce head device within said shiftable range.

10. In a magnetic dictating machine including a revolvable supporting device for a magnetic record: the combination of a record-reproduce head device; an erase head; a source of high-frequency oscillations for energizing said erase head and supplying biasing current to said record-reproduce head device; drive means for producing a progressive scanning movement of said record-reproduce head device and of said erase head across a supported record with the erase head normally engaging the record at a fixed distance in advance of the record-reproduce head device; means for backspacing said record-reproduce head device along the record and in relation to said erase head; an audio circuit connected to said record-reproduce head device and including a record-reproduce conditioning means normally in record position; a quick-review control means operable (1) to activate said backspacing means, (2) operate said record-reproduce conditioning means to reproduce position, and (3) disconnect said high-frequency source from said record-reproduce head device; and a master record-reproduce control means operable (1) to disable said backspacing means, (2) shift said record-reproduce conditioning means to reproduce position, and (3) operatively disconnect said high-frequency source from both said erase head and from said record-reproduce head device.

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