

Oct. 15, 1946.

L. THOMPSON

2,409,520

TWO-AMPLIFIER RECORDING AND REPRODUCING PHONOGRAPH

Filed Feb. 12, 1944

4 Sheets-Sheet 1

Fig. 1.

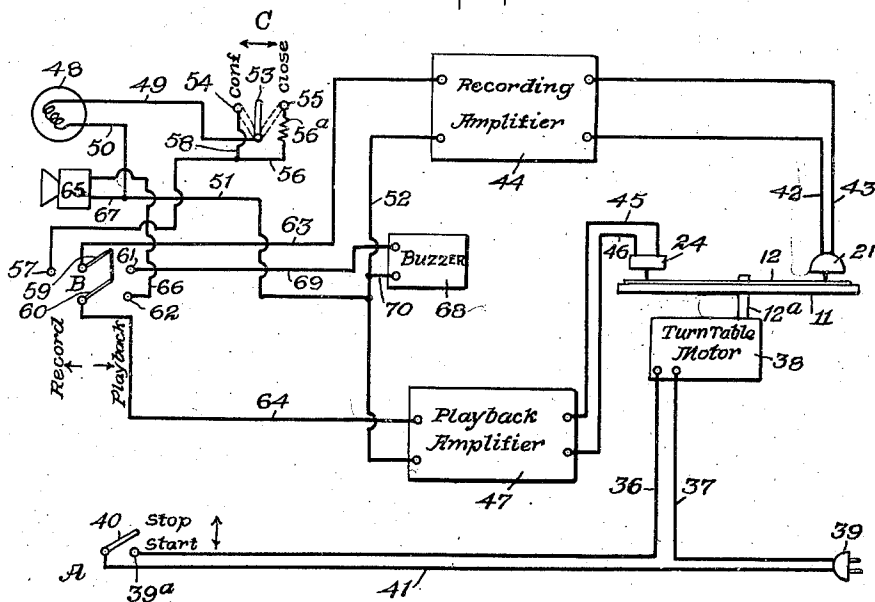


Fig. 2.

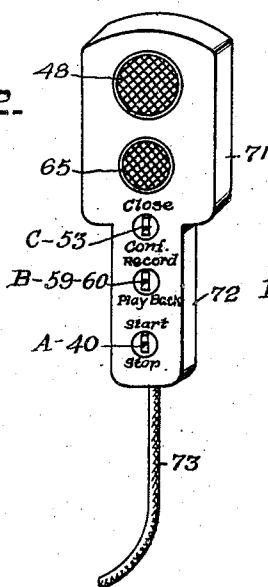
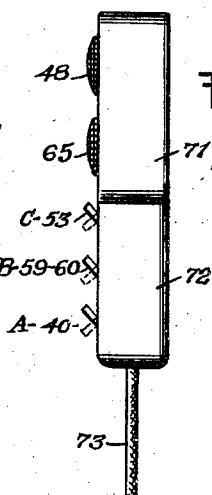


Fig. 3.



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Fig. 4.

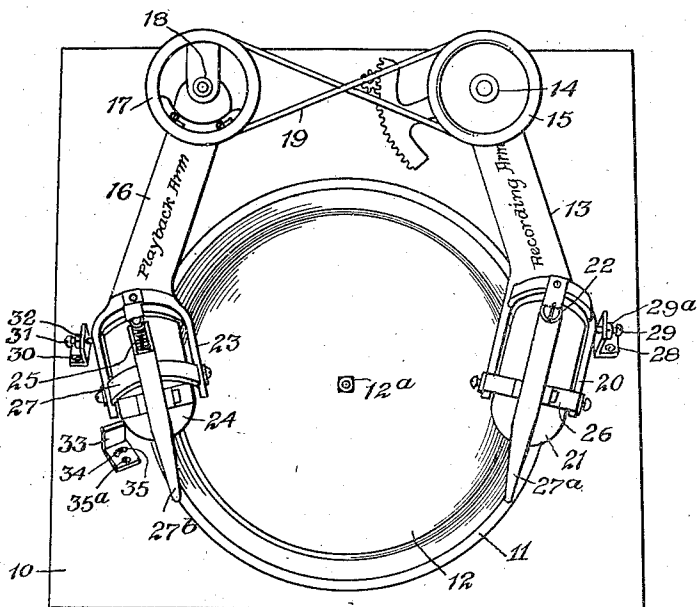


Fig. 5.

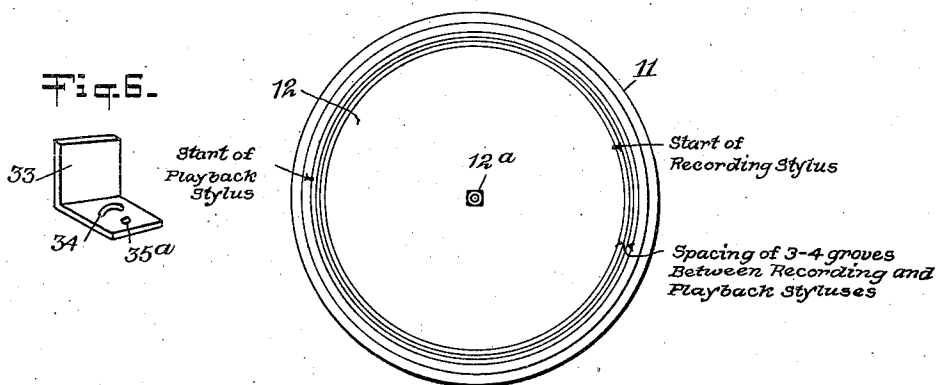
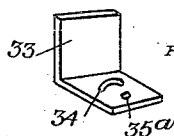


Fig. 6.



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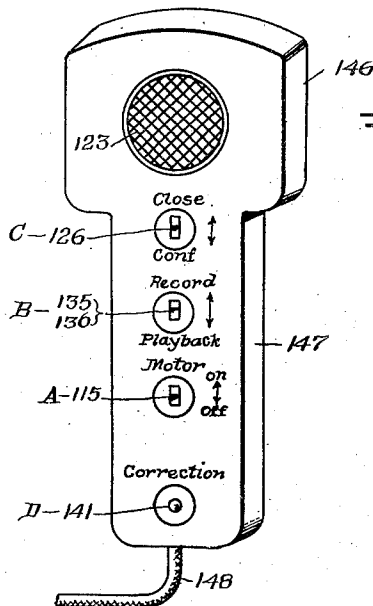
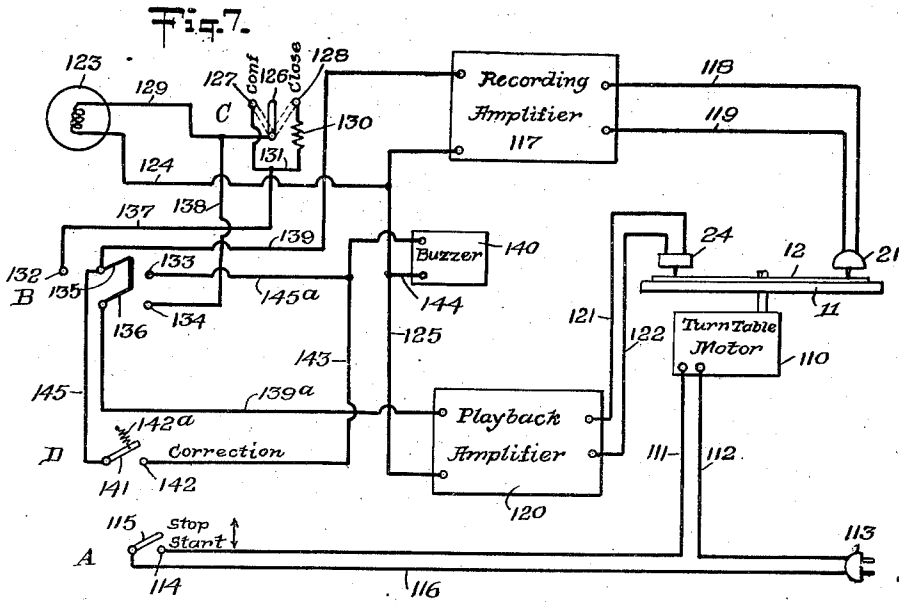
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UNITED STATES PATENT OFFICE

2,409,520

TWO-AMPLIFIER RECORDING AND REPRODUCING PHONOGRAPH

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Application February 12, 1944, Serial No. 522,113

17 Claims. (Cl. 179—100.4)

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This invention relates to phonographs, and more particularly to a two-amplifier continuous recording dictating machine with selective playback.

One object of this invention is to provide a dictating machine of the above nature employing a microphone, and a unitary control handle provided with switches for starting and stopping the record, selecting between recording and playback, indicating corrections, and adjusting the sensitivity of the microphone.

A further object is to provide a machine of the above nature in which means are provided for automatically starting the recording stylus on the record a predetermined number of grooves ahead of the playback stylus.

A further object is to provide a machine of the above nature in which both the playback stylus and recording stylus will be in continuous contact with the record from the beginning to the end of the groove formed thereon.

A further object is to provide a machine of the above nature having means to produce a special signal on the groove for indicating to the transcribing operator when the recorded material was being played back by the person dictating.

A further object is to provide a device of the above nature which will be simple in construction, inexpensive to manufacture, easy to install and manipulate, compact, ornamental in appearance, and very efficient and durable in use.

With these and other objects in view, there have been illustrated on the accompanying drawings several forms in which the invention may conveniently be embodied in practice.

In the drawings,

Fig. 1 represents a circuit diagram of the first form of the invention.

Fig. 2 is a perspective view of a handle containing the microphone and loudspeaker, and the switches for controlling the machine.

Fig. 3 is a side view of the same.

Fig. 4 is a top plan view of the dictating machine showing the relative positions of the recording and playback arms at the beginning of the groove.

Fig. 5 is a plan view of a disk phonograph record mounted upon a turntable and showing the initial staggered relationship of the recording and playback styluses which is maintained throughout the recording.

Fig. 6 is a perspective view, on an enlarged scale, of the playback head stop member.

Fig. 7 is a circuit diagram of a second form of the invention, showing an additional switch

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for indicating corrections on the disk record, and also showing a combined microphone and loudspeaker unit.

Fig. 8 is a perspective view of the control handle for the same.

Fig. 9 is a circuit diagram of a third form of the invention, having two buzzers, one of which impresses on the record a signal indicating playback, and the other a different signal indicating corrections.

Fig. 10 is a chart illustrating an example of how the third form of the machine may be used.

The present machine is designed to employ separate playback and recording amplifiers in order to be able, selectively, to record a sound groove upon the record, or reproduce from a previously recorded groove, without removing the recording stylus or reproducing stylus from said record.

It is also a feature of the present invention to provide means to produce a characteristic tone on the record groove to warn the transcribing operator that playback has taken place so that the stenographer transcribing the record may skid the reproducing stylus forward to a point on the record where the identifying tone is absent without waste of time. A continuous groove is formed on the record by the recording stylus, and transcription is thereby facilitated because of the elimination of gaps in the groove, thus avoiding any tendency for the pickup to repeat the last grooves of previously recorded material, which would require the skidding of the pickup stylus forwardly to the next groove.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout the several views, the numeral 10 indicates the cabinet of a dictating machine having a turntable 11 upon which is mounted a flat disk record tablet 12 which is centralized thereon by means of a spindle 12a having a square upper end. Provision is made on the right side of the record 12 (as viewed in Fig. 4) of a recording arm 13 which is swung at constant speed across the tablet by means of a driving shaft 14, the latter having a pulley 15 rigidly mounted on the upper end thereof.

At the left hand side of the cabinet, provision is made of a playback arm 16 pivotally mounted on a shaft 18 which has on its upper end an adjustable pulley 17 of the same diameter as the pulley 15. The pulley 17 is driven positively from the pulley 15 by means of a crossed feed cable 19, whereby the speed of the playback arm 16 across the tablet 12 will be identical with that of the recording arm 13.

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A playback head 24 is loosely mounted with a small lateral backlash in a forked end 23 of the playback arm 16. A recording head 21 is mounted in a forked end 20 of the arm 13. The recording and playback heads, 21 and 24, are both pressed downwardly against the record tablet by means of coiled tension springs 22, 25 attached to the recording arm 13 and playback arm 16, respectively, as clearly shown in Fig. 4.

Provision is also made of yokes, 26, 27 surrounding the recording head 21 and the playback head 24, respectively, as clearly shown in Fig. 4. Moreover, in order to facilitate manipulation, the recording head 21 and playback head 24 are also provided with forwardly extending handles 27a, 27b respectively.

In order to provide for a definite starting position for the recording arm 13, provision is made of an adjustable angle stop member 28 located on the cabinet 10 adjacent the fork 20. The angular stop 28 is adapted to be adjusted by means of a screw 29 and a lock nut 29a.

The playback arm 16 is also provided with an adjustable angle stop 30 located outside of the fork 23, and said stop 30 has an adjusting screw 31 and lock nut 32. The stops 28 and 30 should preferably be so adjusted that when the arms 13 and 16 are swung outwardly against said stops the playback stylus will be positioned (or staggered) a definite number of grooves behind the recording stylus (three in this instance). Moreover, since the playback head 24 has a certain amount of lateral backlash in its bearings, it is necessary to provide an additional angle stop 33 to positively position said head 24. The stop 33 has a slot 34 in its base for receiving an adjusting screw 35, and a hole 35a for a screw upon which it may pivot.

Referring now to the circuit diagram shown in Fig. 1 of the drawings, the numerals 36, 37 represent a pair of conductors leading from a turntable motor 38. The conductor 37 leads directly to a two-prong power plug 39 adapted to be connected to a source of alternating current. The conductor 36 leads to a fixed contact 39a of a motor switch A, which contact is adapted to be engaged by a movable switch arm 40 connected by a conductor 41 to the power plug 39. A pair of conductors 42, 43 lead from the recording head 21 to a recording amplifier 44. A pair of conductors 45, 46 connect the playback head 24 to a playback amplifier 47.

The dictation or other sounds to be recorded are adapted to be received by a microphone 48 having conductors 49, 50 leading therefrom. The conductor 50 is connected by a conductor 51 to a conductor 52 which connects the amplifiers 44 and 47. The conductor 49 is connected to a movable contact lever 53 of a sensitivity switch C, and said lever 53 is adapted to be swung between a pair of fixed contacts 54, 55 in order to select between "conference" and "close" dictating positions. A conductor 56 leading from the contact 55 includes a resistance 56a and is connected to a fixed contact 57 of a switch B for selecting between recording and playback. A conductor 58 connects the contact 54 to the conductor 56.

A movable two-pole switch member 59—60, when closed, is adapted to engage a pair of stationary switch contacts 61, 62 of the switch B. The pole 59 is connected by a conductor 63 to the input of the recording amplifier 44, while a conductor 64 connects the pole 60 to the output of the playback amplifier 47.

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The output of the playback amplifier 47 is adapted to be emitted by a loudspeaker 65 (or headphone) which is connected by a conductor 66 to the contact 62. A conductor 67 also connects the loudspeaker to the conductor 51.

The numeral 68 indicates a buzzer which is connected by a conductor 69 to the contact 61. The numeral 70 indicates a conductor leading from the buzzer 68 to the conductor 52.

As clearly shown in Figs. 2 and 3 of the drawings, a control handle 71 is provided having a reduced bottom section 72 containing switch arms 53, 59—60, and 49, and said section 72 is connected to a cord 73 leading to the circuits of the apparatus.

Operation

In the operation of the first form of the invention, the dictator's procedure in starting to record, is to lower the recording head 21 upon the record 12 and press said head outwardly against the stop 28. The playback arm 16 and head 24 will then be lowered upon the record and also pressed against the stops 30 and 33, so as to position the playback stylus a predetermined number of grooves behind the recording stylus (herein shown as three grooves, see Fig. 5). The dictator then proceeds to talk and if he is interrupted and wishes to refresh his mind with the material he has already dictated, it will be merely necessary for him to press the movable poles 59—60 of the switch B against the fixed contacts 61, 62, which will cause said material to be played back through the loudspeaker 65.

During the playback the recording stylus will merely form a continuous groove in the record without undulations.

It will also be understood that during playback periods, the buzzer 68 will actuate the recording stylus to produce a characteristic buzzing tone in the record groove. This will permit the transcribing operator to "skid" the reproducing stylus forward across the record, until the buzzing tone disappears.

Second form of invention

In the second form of the invention illustrated in Figs. 7 and 8, the numeral 110 indicates a turntable motor which is connected by a conductor 111 to a fixed contact 114 of a motor switch A, having a movable contact 115 for engaging said contact 114.

The numeral 112 indicates a conductor connecting the turntable motor 110 to a two-prong plug 113, which is adapted to be connected to a source of alternating current.

A conductor 116 connects the movable contact 115 with the two-prong plug 113.

In this form of the invention, provision is made of a recording amplifier 117 which is connected by a pair of conductors 118, 119 to the recording head 21 so as to apply the output of the recording amplifier 117 upon the recording stylus. A playback amplifier 120 is also employed, and is connected by a pair of conductors 121, 122 to the playback head 24, the stylus of which (as in the first form of the invention), is adapted to be spaced three grooves behind the recording stylus.

A combined interchangeable microphone and loudspeaker 123 is employed in this form of the invention, and is connected by a conductor 124 to a conductor 125 which connects the recording amplifier 117 to the playback amplifier 120.

In order to control the sensitivity of the microphone, so as to permit "conference" recording or "close" recording, as desired, provision is made

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of a control switch C having a movable contact 126 which is adapted to be swung between a pair of fixed contacts 127, 128. The combination microphone and loudspeaker 123 is connected by a conductor 129 to the contact 126 of the control switch C.

The numeral 130 indicates a resistance connected to the fixed contact 128 and said resistance is connected by a conductor 131 to the fixed contact 127.

In order to permit the apparatus to be instantly shifted from "recording" to "playback," and vice versa, provision is made of a selective switch B, having three fixed contacts 132, 133, 134, which are adapted to be engaged by a manually-operated mechanically connected two-pole movable switch contact member 135—136, as shown in Fig. 7.

The following connections are also provided in the circuits: The contact 132 is connected to the conductor 131 by a conductor 137. The conductor 129 is connected to the contact 134 by a conductor 138. The movable contact 135 is connected to the input of the recording amplifier 117 by a conductor 139. The movable contact 136 is connected by a conductor 139a to the output of the playback amplifier 120.

The numeral 140 indicates a buzzer which is adapted to be impressed automatically upon the recording head, through the recording amplifier, whenever the switch B has been manually closed for "playback."

The buzzer 140 may also be employed to produce a momentary characteristic tone in the groove being recorded for indicating corrections. For this purpose, provision is made of a switch D having a movable contact arm 141 which is urged by a spring 142a to open position. When the switch 141 is manually closed, it will engage a fixed contact 142, which is connected to the buzzer 140 by means of a conductor 143.

The buzzer 140 is also connected to the conductor 125 by a conductor 144. The movable contact 135 of the switch B is connected by a conductor 145 to the movable contact 141 of switch D, and the fixed contact 133 of switch B is connected to the conductor 143 by a conductor 145a.

As shown in Fig. 8, a control handle 146 is employed having a reduced lower end 147 connected to the circuits of the apparatus by a cord 148.

In the operation of the second form of the invention, it will be understood that a prolonged buzzing will be impressed in the groove during playback periods when the switch B is closed, while a short buzzing signal will be impressed on said groove to indicate corrections, when the switch D is momentarily actuated.

Third form of invention

In the third form of dictating machine illustrated by the circuit diagram of Fig. 9, the numeral 210 indicates a turntable motor which is connected by a conductor 211 to a stationary switch contact 214 of the motor switch A. The turntable motor 210 is also connected by a conductor 212 to a two-prong plug 213 adapted to be connected to a source of alternating current.

The numeral 215 indicates a manually-operated movable switch contact which is connected by a conductor 216 to the two-prong plug 213.

The third form of dictating machine is provided with a recording amplifier 217 having output terminals connected by conductors 218, 219

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to the recording head 21. A playback amplifier 220 is also provided, being connected by a conductor 221 to the playback head 24, as clearly shown. Provision is also made of a combination interchangeable microphone and loudspeaker unit 222, similar to the unit 123 of the second form.

In order to control the sensitivity of recording, provision is made of a switch C containing a movable contact 224 and a pair of fixed contacts 225, 226, respectively, located on either side of said movable contact 224. Provision is also made of a resistance 227 connected to the fixed contact 226, and a conductor 228 for connecting the resistance 227 with the contact 225. The movable contact 224 is also connected by a conductor 229 to the combination microphone and loudspeaker unit 222.

A conductor 230 is also provided to connect the recording amplifier 217 to the playback amplifier 220. A conductor 231 connects the unit 222 to the conductor 230.

Provision is made of a selective switch B to permit rapid shifting between "recording" and "playback" as desired, which includes three fixed contacts 232, 233, 234 and a two-pole movable contact member 235—236, the poles of which are mechanically joined so that they will move in unison when manually operated.

The contact 232 is connected to the conductor 228 by means of a conductor 237. The conductor 229 is connected to the contact 234 by a conductor 238. The pole 235 of the switch B is connected by a conductor 239 to the input of the recording amplifier 217, while the pole 236 of said switch is connected by a conductor 239a to the output of the playback amplifier 220.

In order to indicate corrections upon the recorded groove, provision is made of a correction switch D—E which employs a movable two-pole contact member 241—242, the poles of which are joined together mechanically so as to swing in unison, and the movable poles 241—242 are maintained normally in open position by means of a spring 242a. The poles 241—242 are adapted to engage fixed contacts 243, 244, when manually swung to closed position. The fixed contact 233 is connected to a buzzer 240 (B₁) by means of a connector 245, and the conductor 230 is connected to said buzzer by means of a conductor 246.

Other circuit connections are as follows: The fixed contact 243 of the switch D—E is connected to a high-pitched buzzer 247 (B₂) by means of a conductor 248. The conductor 230 is connected to the buzzer 247 by a conductor 249. The movable contact 242 of the switch D—E is connected to the input of the playback amplifier 220 by a conductor 250. The fixed contact 244 of the switch D—E is connected by a conductor 251 to the conductor 218. The playback head 24 is connected by a conductor 252 to the movable pole 242 of the switch D—E.

The operation of the third form of the invention is indicated by the chart shown in Fig. 10. In this chart, the numeral 253 indicates the continuous spiral groove formed in the record, and the numeral 254 the numbers of the successive grooves—forty of which are herein shown.

The numeral 255 indicates that "talk" occurred in the first five grooves (Nos. 1—5). The numeral 256 indicates that the first five grooves were then played back to refresh the memory of the dictator, as shown on the chart by means of a wide vibratory band produced by the buzzer 240 (B₁), a prolonged characteristic tone extending from

grooves Nos. 6-10 being thus produced. The numeral 257 indicates the groove 11, at which further dictation occurred. The numeral 258 indicates a correction signal (at groove No. 12) from the lower pitch buzzer 240 (B₁) produced by the recording stylus 21, and the numeral 259 indicates a weaker correction signal produced by the playback stylus three grooves behind the signal 258 (groove No. 9) from energy supplied to the playback head 24 from the recording amplifier 217, which causes said stylus to act to some extent as a recording stylus. The signal 259 will, of course, be superimposed upon the buzzer tone 256 previously recorded.

The numeral 260 indicates eight grooves (Nos. 13-20) of further dictation. The numerals 261, 262 indicate correction signals produced simultaneously from the buzzer 247 (B₂) by the recording head 21 and the playback head 24, respectively, at grooves Nos. 21 and 18, said signals being spaced three grooves apart, as before. The numeral 263 indicates nine grooves of dictation (Nos. 22-30). The numeral 264 indicates four grooves (Nos. 31-34) of playback signal from the buzzer 240 (B₁), and the numeral 265 indicates the final dictation of six grooves (Nos. 35-40) as made by the recording head 21.

In the operation of the third form of the invention it will be seen that three different types of signals are given. First; the low pitched buzzer 240 (B₁) will be impressed upon the spiral groove by the recording head 21 by the switch B during playback periods, when playing back previous dictation. Second; the higher pitched buzzer 247 (B₂) will be impressed upon the groove by the recording head 21 momentarily by the switch D during short pauses in the dictation. Third; at the same time that the second signal is given, the playback head 24 will be energized momentarily by the recording amplifier 217 to indent a fainter buzzer signal three grooves behind the recording stylus.

While there have been disclosed in this specification several forms in which the invention may be embodied, it is to be understood that these forms are shown for the purpose of illustration only and that the invention is not to be limited to the specific disclosures, but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new and for which it is desired to secure Letters Patent is:

1. In a dictating machine, a moving record, a microphone, an amplifier connected with said microphone, a stylus-carrying recording head connected to the output of said amplifier for producing a continuous groove on said record, a stylus-carrying playback head resting in said groove, an amplifier for the energy received by said playback head, a loudspeaker connected to the output of said playback amplifier, means to switch the connections of said machine selectively from "recording" to "playback," and means to automatically record a prolonged characteristic signal in said groove during playback periods.

2. A dictating machine as defined in claim 1, in which provision is made of a control handle having the microphone, the loudspeaker, and the selective switch located therein.

3. A dictating machine as set forth in claim 1, in which means are provided to automatically

start the recording stylus a predetermined number of grooves ahead of the playback stylus.

4. A dictating machine as set forth in claim 1, in which stop means are provided to position the recording stylus a predetermined number of grooves ahead of the playback stylus when the respective recording arm and playback arm are swung against said stop means.

5. In a dictating machine, a cabinet, a moving disk record mounted in said cabinet, a recording means and a playback means mounted to move across said record, and individual stop members mounted on said cabinet adjacent the opposite edges of said record against which each of said means are adapted to be swung at the start of the recording to fix the position of said playback means a predetermined number of grooves behind the position of said recording means.

6. In a dictating machine, a moving record, a microphone, an amplifier connected with said microphone, a stylus-carrying recording head connected to the output of said amplifier for producing a continuous groove on said record, a stylus-carrying playback head resting in said groove, an amplifier for the energy received by said playback head, a loudspeaker connected to the output of said playback amplifier, means to switch the connections of said machine selectively from "recording" to "playback," means to automatically record a prolonged characteristic tone in said groove during playback periods, and manually-operated means to record a characteristic tone in said groove to indicate when a correction is needed.

7. The invention as defined in claim 6, in which a buzzer is provided for producing said characteristic tone.

8. In a dictating machine, a moving record, a microphone, an amplifier connected with said microphone, a stylus-carrying recording head connected to the output of said amplifier for producing a continuous groove on said record, a stylus-carrying playback head resting in said groove, an amplifier for the energy received by said playback head, a loudspeaker connected to the output of said playback amplifier, means to switch the connections of said machine selectively from "recording" to "playback," means to automatically record a prolonged characteristic tone in said groove during playback periods, and manually-operated means to cause said recording stylus to produce a characteristic tone in said groove to indicate when a correction is needed.

9. In a dictating machine, a moving record, a microphone, an amplifier connected with said microphone, a stylus-carrying recording head connected to the output of said amplifier for producing a continuous groove on said record, a stylus-carrying playback head resting in said groove, an amplifier for the energy received by said playback head, a loudspeaker connected to the output of said playback amplifier, means to switch the connections of said machine selectively from "recording" to "playback," means to automatically record a prolonged characteristic tone in said groove during playback periods, and manually-operated means to cause said playback stylus to record a characteristic tone in said groove to indicate when a correction is needed.

10. In a dictating machine, a moving record, a stylus-carrying recording head, and a stylus-carrying playback head mounted to move across said record, means to cause both of said styluses to remain in continuous contact with said record and to be spaced a predetermined number of

grooves apart throughout the length of the groove formed thereon, and means to cause both of said styluses to record signals in said groove simultaneously to indicate when a correction is needed.

11. In a dictating machine, a moving record, a microphone, an amplifier connected with said microphone, a stylus-carrying recording head connected to the output of said amplifier for producing a continuous groove on said record, a stylus-carrying playback head resting in said groove, an amplifier for the energy received by said playback head, a loudspeaker connected to the out put of said playback amplifier, means to switch the connections of said machine selectively from "recording" to "playback," means to automatically record a prolonged characteristic tone in said groove during playback periods, and manually-operated means to cause said recording stylus to produce a different characteristic tone in said groove to indicate when a correction is needed.

12. In a dictating machine, a moving record, a stylus-carrying recording head and a stylus-carrying playback head mounted to move across said record, means to cause both of said styluses to remain in continuous contact with said record and to be spaced a predetermined number of grooves apart throughout the length of the groove formed thereon, and means to cause both of said styluses to record signals in said groove simultaneously to indicate when a correction is needed, both of said correction signals being actuated by a single buzzer connected to said recording amplifier.

13. The invention as defined in claim 6, in which the playback signal and the correction signal are energized by two separate buzzers which produce different tones.

14. In a dictating machine, a moving record, a microphone, an amplifier connected with said microphone, a holder for said microphone, a recording head connected to the output of said amplifier for producing a continuous groove on said record, a pickup head also resting in said groove, a listening device also carried by said holder and electrically connected with said pickup, means on said holder to switch the connection of said machine selectively from "recording" to "playback," and means to cause said recording head to automatically record a characteristic signal in said groove during playback periods.

15. The invention as defined in claim 14, in which said recording head is adjusted to continuously record on said record at a point spaced a predetermined number of grooves ahead of said pickup head.

16. In a dictating machine, a moving record, a microphone, an amplifier connected with said microphone, a stylus-carrying recording head connected to the output of said amplifier for producing a continuous groove on said record, a stylus-carrying playback head resting in said groove, an amplifier for the energy received by said playback head, a loudspeaker connected to the output of said playback amplifier, means to switch the connections of said machine selectively from "recording" to "playback," means to automatically record a prolonged characteristic tone in said groove during playback periods, and manually-operated means to record a signal in said groove to indicate when a correction is needed.

17. The invention as defined in claim 6, in which the playback signal and the correction signal are energized by two separate signals which produce different tones.

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