

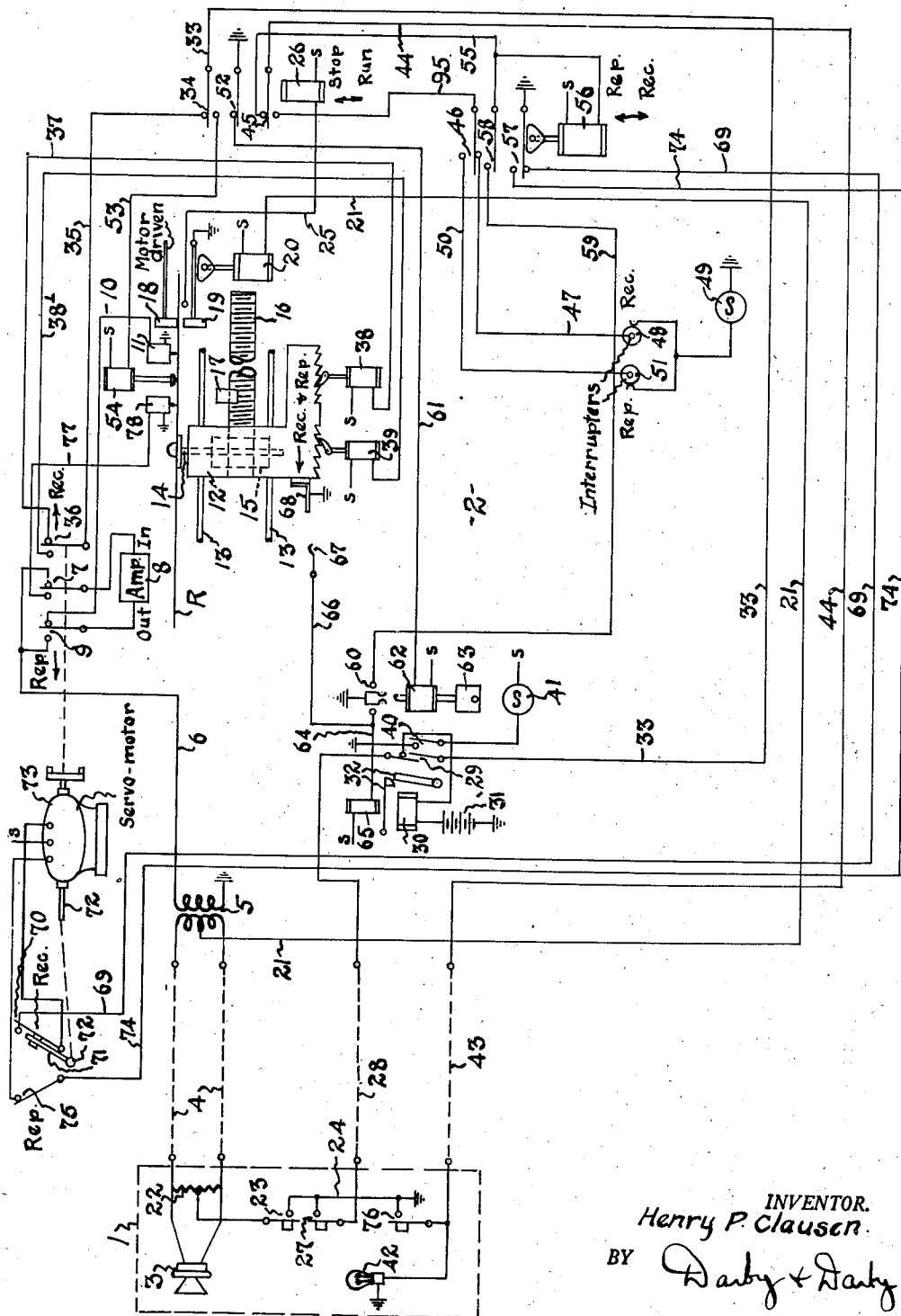
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REMOTELY CONTROLLED SOUND RECORDING AND REPRODUCING MACHINE

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REMOTELY CONTROLLED SOUND RECORD-
ING AND REPRODUCING MACHINEHenry P. Clausen, White Plains, N. Y., assignor to
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This invention relates to sound recording machines and will be described specifically in connection with a dictation recording and reproducing machine.

The general object of the invention is to provide a system comprising a dictator's station remote with respect to a central recording and reproducing station, and interconnecting controls whereby the full operation of starting, stopping, recording and reproduction may be effected from the dictator's station by means of simple controls. Likewise there is provided in this system the control features of back-spacing, forward-spacing, correction-marking, and the like, all effected from the dictator's control station.

The many and detailed objects of the invention will be as clearly presented in connection with the detailed description thereof as would be the case if they were outlined generally at the beginning of this disclosure, and for this reason no further reference will be made at this point to the objects of the invention.

This invention resides substantially in the combination, construction, arrangement and relative location of parts, all as will be described in detail below.

In the accompanying drawing the single figure is a diagrammatic and schematic layout of one embodiment of the invention to be herein disclosed.

In the embodiment disclosed the dictator's control station has been indicated as including the equipment enclosed within the broken line box 1. The equipment at the central station 2 comprises the remainder of the figure, while the broken circuit lines indicate the remoteness of the central station from the control station.

At the control station is a combined microphone and loud speaker consisting preferably of an instrument designed to be sufficiently efficient both as a microphone and a loud speaker. This instrument is connected by the circuit wires 4 to the primary of a transformer 5 at the central station. The secondary of this transformer has one terminal grounded and the other connected through circuit wire 6 to one of the contacts of each of the fixed pair of switches 7 and 9. In the position of this switch as shown in the drawing, the circuit continues through switch 7 to the input of the grounded amplifier 8, which amplifier may be of any form suitable for the purpose such as a multi-stage vacuum tube amplifier. The output of the amplifier is connected through switch 9 and wire 10 to the grounded sound recording head 11 which

may be of any suitable form, as for example the magnetic type.

The recording and reproducing machine may be of several different forms but the disclosure herein is made in connection with the type disclosed in United States patent of Barton and Thiede, No. 2,296,870, granted Sept. 29, 1942. In this machine a flexible sound record blank of cellulose acetate for example is employed. Only so much of such a machine has been illustrated in the drawing of this case as will make possible an adequate disclosure of this invention. As diagrammatically illustrated, the machine includes a carriage 12 which is mounted for sliding movement on a pair of guide rods 13. Journaled in the carriage 12 is a vertical spindle 14 upon the upper end of which is impaled the record blank R so as to be keyed thereto for rotation with it. On the spindle is a worm 15 which meshes with a threaded rod 16 journaled in the carriage 12 for rotation on the axis of the rod while moving axially with the carriage. A fixed nut 17 is engageable with the threads of the rod 16 so that as the rod rotates it, the rod, will move axially carrying the carriage with it. The rotation of the threaded rod 16 is effected through the record blank R by means of a pair of friction driving rollers. Of this pair of rollers the roller 18 is driven by a motor, not shown, and is in contact with the record blank. Positioned opposite to the power driven friction wheel 18 is an idler friction wheel 19 which when the machine is in operation engages the opposite side of the record blank R. The idler wheel 19 is supported so that it may be moved into and out of engagement with the blank and has been illustrated in the drawing as pivotally mounted on the end of a lever and controlled by a magnet 20. When the magnet is energized from the position shown it causes the roller 19 to frictionally engage the blank which is held against the rotating wheel 18, with the result that the blank is caused to revolve at a constant circumferential speed. The rotation of the blank, of course, causes the rotation of spindle 14, worm 15, and therefore threaded shaft 16. Recording or reproduction begins near the center of the disc and continues along a spiral path of increasing radius outwardly to the periphery of the disc. Thus the record blank is transported radially at the same time as it rotates. The full details of such a machine are disclosed in the above mentioned application and patent.

At this point it may be noted that each wire marked S extends to the wire marked S of the

current source 41 which is adapted to be grounded through the power switch 40 to which reference will be made later. By this method the drawing is simplified by the omission of many unnecessary wires.

One terminal of the solenoid 20 is connected to the power source as indicated, and the other terminal is connected by wire 21 to the midpoint of the primary of transformer 5. At the control station the talking circuit wires 40 are bridged by a retardation choke coil or resistor 22 whose midpoint is connected by a wire as shown to the movable blade of switch 23. The control station is also provided with a switch 27, the movable blade of which is connected to the control circuit wire 28 and a switch 76 whose movable blade is connected to the control circuit wire 43. The fixed contacts of each of these three switches are grounded by the wire 24 as shown. The switch 23 may be termed the start-stop switch, switch 27 the marking switch, and switch 76 the shifting switch. At the control station a suitable support, not shown, will be provided for the transmitter-speaker 3 which may be in the form of a hand set upon which may be mounted the switches 23 and 27. The shifting switch 76 is preferably mounted on the support which may also include the grounded signal light 42, which is also connected to the circuit wire 43. Of course, the particular arrangement of these switches is immaterial.

The lever on which the idler friction roller 19 is mounted is grounded as shown, and is adapted to engage a fixed contact when the machine is in running condition, which contact is connected by wire 25 to a relay magnet 26 whose other terminal returns to the power source 41. This magnet may be termed the control magnet. The switches of this relay will be referred to in proper sequence. A relay is provided having a latching magnet 30 which is connected at one terminal to a suitable grounded current source 31. The other terminal is connected to a make-before-break circuit which is in turn connected to the circuit wire 28. This relay includes a latching arrangement 32 so that when magnet 30 is momentarily energized the switches are latched in closed position so that power switch 40, which is a part thereof, is closed. Wire 28 is disconnected through make-before-break switch 29 from the magnet 30 and connected to the wire 33. Relays of this type are well known, and it is sufficient to say that magnet 30 remains energized long enough to effect the closing of switches 29 and 40 and the latching of them in that position. Wire 33 extends to the movable blade of switch 34, which is part of the relay 26. Switch 34 includes two fixed contacts, the uppermost of which is connected by wire 35 to the movable blade of switch 36. Switch 36 includes two contacts, one of which is connected by wire 37 to the forward spacing relay 38, the other terminal of which is connected to the source 41. The relay 38 includes a latch which is constructed to cause a step-by-step movement of the carriage 12 to the left as diagrammatically illustrated for each energization of the relay 38. Devices of this type are known in various forms, and therefore it is diagrammatically illustrated here.

By stepping the carriage 12 to the left, which may be termed forward spacing, individual units of recording may be visibly spaced on the record. A back spacing relay 39 is provided which is of a construction similar to the relay 38, and has one terminal connected to the source 41 and the other terminal connected by wire 38' to the other contact of switch 36. Switches 9, 7 and 36 are oper-

ated by a servo-motor 73 as indicated by the broken dash lines to either of the two positions of each of these switches which it will be seen are single-pole double-throw switches.

Of course when the backspacing or forward spacing magnets are operated the nut 17 must be disengaged from the rod 16.

Circuit wire 43 is connected by wire 44 to the movable blade of a single-pole double-throw switch 45 forming part of the relay 26. One of the fixed contacts of switch 45 is connected by wire 95 to the movable blade of a single-pole double-throw switch 46, which is part of the relay 56. One of the fixed contacts of switch 46 is connected by wire 47 through an interrupter 48 of any suitable form to a grounded current source 49. The other contact of switch 46 is connected by wire 50 through an interrupter 51 to the grounded source 49.

Returning to relay 26 it includes a single-pole switch 52, one terminal of which is grounded and the other terminal of which is connected by wire 61 to a solenoid winding 62, the other terminal of which is connected to the source 41. The plunger of the solenoid 62 is adapted to enter between grounded spring contacts 60 to spread them into engagement with a pair of fixed cooperating contacts as shown. The plunger of solenoid 62 is connected to the piston of a dash pot 63 which acts to retard the upward movement of the plunger when the solenoid 62 is energized so that it will take a predetermined period of time, as for example 3 or 4 minutes for the plunger to rise and close the switch 60. The dash pot and plunger are biased so that upon the energization of solenoid 62 the plunger will descend immediately, opening switch 60.

One of the fixed contacts of switch 60 is connected by wire 59 to the fixed contact of switch 58 forming part of relay 56. The movable blade of this switch is connected by wire 55 to the upper fixed contact of switch 45 of relay 26. Wire 55 is also connected to one terminal of the shifting magnet 56, the other terminal of which is connected to the source 41. The magnet 56 is part of an operating device similar to the device 20 and includes a three pointed cam, each of which is adapted to rotate one-sixth of a revolution upon each energization of the winding thereof. Devices of this type are also well known and have therefore not been shown in any further detail.

Relay 56 also includes a single-pole double-throw switch 57 the movable pole of which is grounded. The lower fixed contact of this switch is connected by wire 69 to the fixed contact of switch 70. These switches are controlled by an operator 71 mounted on the shaft 72 of the servo-motor 73. The servo-motor 73 is reversible and has one terminal connected to the source 41. Another terminal is connected by a wire as shown to the movable pole of switch 70 and the final terminal of the motor is connected by a wire to the fixed contact of switch 75.

One of the fixed contacts of switch 60 is connected by a wire to one terminal of the unlatching magnet 65 whose other terminal is connected to the source 41. This same contact is also connected by wire 66 to a contact finger 67 positioned to be engaged by the grounded contact 68 mounted on the carriage 12.

The lower contact of switch 34 is connected by wire 53 to one terminal of a magnet of a marking device 54, the other terminal of which is connected to the source 41. One of the fixed

contacts of switch 7 is connected by wire 77 to the grounded reproducing device 78, which may be of any suitable and well known form. For emphasis it may again be noted that switches 40, and 29 are operated by the latching magnet 30. Switches 34, 52 and 45 are operated by the control magnet 26. Switches 46, 58 and 57 are operated by the shifting magnet 56. In the former case the switches are only moved from the position shown to their other position during energization of the magnet 26, but in the latter case the switches are shifted from the position shown to the other position upon energization of the magnet 56 and remain in that position until the next energization of the magnet.

A description of the operation of this system will now be set forth in detail. It is to be assumed that this system will be used under conditions where the apparatus at the central station is under the control of an attendant who will see to it that as each record blank is filled it will be replaced by a fresh blank, and that the carriage 12 of the machine is shifted to its extreme right hand position so that the recording head 11 can begin to record near the center of the blank. It will be assumed, in view of the disclosure, that the power driving roller 18 is in operation during all periods when it is expected that the machine is to be used, although it could be started and stopped as operating conditions require. It is further to be assumed that the apparatus is in the position shown in the drawings which is the recording position, and is the position in which it is always left either by a conscious act of the dictator, or by automatic controls to be later described.

If a dictator at the control station 1 desires to dictate he picks up the transmitter-receiver and momentarily closes the marking switch 27 to complete a circuit from ground through wire 24, switch 27, wire 28, make-before-break switch 29, latching magnet 30, current source 31 to ground, magnet 30 is energized closing switches 29 and 40 pulling up the latch 32 to hold them closed. The circuit for the magnet 30 breaks at the end of the latching operation and wire 28 remains connected to wire 33 so that the current flows through wire 33, upper contact switch 34, wire 35, right hand contact of switch 36, wire 37, magnet 38 back to source 41 and through switch 40 to ground. Thus the carriage 12 is forward spaced one step to separate the new dictation which is to follow from any previous recording on the blank R. The closing of switch 40 has also placed current on the shifting magnet 56 from the source 41 through the magnet to wire 55 through the upper contact of switch 45, wire 44, wire 43 to ground through the signal light 42. It will be seen that this signal light is in series with the magnet 56 and is therefore a high resistance lamp or preferably a neon lamp as shown. This lamp 42 burns steadily at the control station signaling the dictator that the apparatus is in condition for dictation.

Also at the time switch 40 closed power was placed upon the solenoid 62 from the source 41 through the circuit including wire 61, switch 52 to ground. Thus the plunger of solenoid 62 begins its slow ascent. Thus the momentary closing of the marking switch 27 has partially prepared the machine for recording and has lit the signal lamp 42 to indicate that the dictator may proceed. The dictator may then start the machine for recording by momentarily closing the start-stop switch 23. However, if he is distracted

for any reason so that he does not begin his dictation at the end of three or four minutes the plunger of the dash pot relay 62 will rise to the point where the circuit for the unlatching magnet 35 is grounded, as will be apparent, so that the latch is released and switches 29 and 40 opened, returning the apparatus to its original condition and extinguishing the signal light.

However, in order to begin dictation the start-stop switch 23 is momentarily closed completing a circuit as follows: from ground through wire 24, switch 23, choke coil 22, circuit wires 4, primary of transformer 5, wire 21, solenoid 20 and back to the source 41. This energization of the solenoid 20 causes the cam forming part thereof to rotate one-sixth of a revolution, moving friction roller 19 into engagement with the under-surface of the record blank R. It will be remembered that the friction roller 18 is normally in continuous rotation. Thus the record blank begins to rotate and the carriage 12 to move slowly to the left through the drive previously described. The engagement of the grounded arm of roller 19 with the associated contact completes a circuit for the magnet 26 through the wire 25. The energization of magnet 26 closes switch 34 on its lower contact, opens switch 52 and closes switch 45 on its lower contact. This shifting of switch 34 connects the control circuit wire 33 with the marking device 54 through wire 53. Of course, the marking device does not operate at this time because switch 27 is open. The shifting of switch 45 shifts the control wire 44 to wire 95 so that the circuit of interrupter 48 is completed as follows: from ground through the source 40, interrupter 48, wire 47, lower contact of switch 46, wire 95, lower contact of switch 45, wire 44, wire 43 and lamp 42 to ground. Thus the signal lamp 42 at the dictator's station will flash at a rate which the dictator knows indicates that the machine is operating for recording.

At this point it may be noted that in a practical structure the reproducer 78 and the recorder 11 may be mounted on a linkage system by means of which they may be alternatively engaged with the record blank R. Thus, as in the condition under description, when the recording head 11 engages the blank R the reproducing head 78 is raised away from the record blank. An arrangement of this kind is diagrammatically illustrated in the copending application of Hayward K. Mann, Serial No. 436,975, filed March 31, 1942, for "Control means for dictation machines." In any commercial machine this linkage system may be operated manually, or by means of power control in any suitable manner.

The dictator in speaking sends voice currents from the microphone 3 over the circuit wires 4 to the repeating coil or transformer 5. The repeated currents flow between ground and the circuit wire 5 through the right hand contact of switch 7, through the amplifier 8, the right hand contact of switch 9 and circuit wire 10 to the recording head 11. Thus the spoken word is recorded. At any time during this recording should the dictator wish to indicate a correction in previously dictated matter, or to make any other relevant note he can apply a mark to the record which will give an advance warning to the transcriber of the approaching instructions. To do this the dictator need merely momentarily close switch 27 to complete a circuit as previously described to the marking device 54, which marking device may be of any form suitable for the purpose. One suitable form is that disclosed in my

compending application Serial No. 447,540, filed June 18, 1942, for "Remotely controlled dictation system," wherein a plurality of short indentations are applied across the record grooves so that the pick-up stylus during transcription will produce a series of warning clicks in the sound reproducer of the transcriber.

When the dictator completes a particular bit of dictation and passes on to some other subject he will first stop the machine by momentarily closing switch 23 to again energize the solenoid 20 through the circuit previously described to cause the cam to take another step so that the roller 19 moves away from the blank R. The machine stops and at the same time the circuit to magnet 26 is broken so that its switches reestablish the circuit as shown. To forward space the record blank the dictator then closes switch 27 to complete a circuit from ground through wire 24, switch 27, wire 28, switch 29, wire 33, upper contact of switch 34, right hand contact of switch 36, wire 37, solenoid 38, and back to the source 41. This energization of solenoid 38 causes the pawl and ratchet arrangement to move the carriage 12 to the left one step. Repeated closings of switch 27 will produce the desired amount of forward spacing in a step-by-step manner.

If the dictator wishes to reproduce some of the recorded matter he momentarily closes the shift control switch 76 completing a circuit from ground through switch 76, wire 43, wire 44, upper contact of switch 45, wire 55, solenoid 56 and back to the source 41. This energization of solenoid 56 closes switch 46 on its upper contact, closes switch 48, and closes switch 57 on its upper contact. These three switches are all moved by the cam moving one-sixth of a revolution as previously described. The closing of switch 46 on its upper contact completes a circuit from ground through the source 49, interrupter 51, wire 50, switch 46, wire 55 to the lower contact of switch 45. Completion of this circuit will be described later. The closing of switch 57 on its upper contact completes a circuit from ground through switch 57, wire 74, switch 75 to the servo-motor 73 to energize it in a direction to cause it to rotate until arm 71 moves over to open switch 75. In the meantime switch 70 has closed, but no circuit is completed. The movement of the servo-motor 73 has also shifted switches 9, 7 and 36 to the left hand contacts. This movement of switch 9 connects the output of amplifier 8 to wire 6 and the input to wire 17 of the reproducing head 78. The shifting of switch 36 is connected by wire 35 to wire 38. The dictator may now back space the machine in a step-by-step movement by repeatedly closing switch 27 to complete a circuit as follows: from ground through wire 24, switch 27, wire 28, switch 29, wire 33 through contact of switch 34, wire 36, left hand contact of switch 36, wire 38, solenoid 38 and back to the source 41. Thus the carriage 12 is shifted step-by-step to the right.

During this operation it is preferable to have shifted the recording head 11 out of contact with the record blank, although no serious damage would have been done since the stylus is a smooth jewel. In order to reproduce this portion of the record the dictator then momentarily closes switch 23 to complete a circuit as previously described to the solenoid 20 to move roller 19 into engagement with the record blank. At this time magnet 26 is again energized to shift the circuits to their other position, one effect of which is to now continue the circuit from wire 55

through the lower contact of switch 45, wire 44, wire 43 and lamp 42 to ground. At this time interrupter 51 is in circuit which will cause the lamp 42 to flash in a manner different from the manner in which it flashes during recording, to indicate to the dictator that the machine is operating for reproduction.

The currents from the reproducer 78 flow between ground and wire 77, left hand contact of switch 7, input of amplifier 8, output to left hand contact of switch 9, and wire 6 to what has been termed the secondary of the repeating coil or transcriber 5. A corresponding current is induced in the other winding which flows over the circuit wires 4 to the loud speaker where the dictator may hear it. Any time that the dictator wishes to set the machine he again only momentarily closes switch 23 to again energize the solenoid 20 to effect stopping as previously described.

To shift the machine back to recording the operator momentarily closes switch 76 to again energize solenoid 56 and thereby shift its switches back to the position shown. The only new operation to note upon this shift is that the closing of switch 57 on its lower contact completes a circuit from ground through switch 57, wire 69, switch 70 to the other terminal of servo-motor 73 to energize it in the reverse direction, causing the switches 9, 7 and 36 to shift back to the position shown, and arm 71 to swing back to the position shown until switch 70 opens, when the servo-motor 73 stops.

Reference to the dash pot arrangement will now be made to indicate its use. When the machine was first turned on by momentarily closing switch 27 it will be recalled that the solenoid 62 was energized so that its plunger slowly ascended and at the end of about three minutes if nothing further was done with the machine it would complete a circuit at switch 60 for the magnet 65 to unlatch the latch 32 and permit switch 40 to open, switch 29 to open, and the upper blade thereof engage the associated contact to prepare the circuit for the magnet 30 for its next operation. However, should the dictator begin to dictate the ascent of the plunger of solenoid 62 would be arrested immediately upon the opening of switch 52, which it will be recalled occurs at the time the machine is started. If the dictator is distracted or called away and he forgets to stop the machine it will continue to run until the end of the full normal movement of carriage 12, at which time contact 68 will engage contact 67 and complete a circuit in an obvious manner to the unlatching magnet 65 to shut the entire machine off. If the dictator abandons the machine when the shift magnet is in a position to move switches 46, 58 and 57 to their up positions and the machine is not running at the end of three or four minutes, the plunger of solenoid 62 will move up to close switch 60. This will complete a circuit from ground through switch 60, wire 59, switch 57 to solenoid 56, and back to the source 41. Thus the shift magnet 56 will be energized and its cam operated to open the three associated switches. By this arrangement the machine will always stop of its own accord at recording position.

In practice the right hand finger of switch 60 may be made longer than the left hand finger, so that the circuit to wire 59 will be closed sufficiently in advance of the closing of the circuit to magnet 65 so that the servo-motor will have a chance to complete its return stroke to record-

ing position. However, even if these fingers were of the same length and the servo-motor only partially completed the return stroke, the various switches would be in a position so that upon the first closing of the start switch 23, the servo-motor would complete its stroke to complete the circuits controlled by the switches 9, 7 and 36 for recording.

From the above description of operations it will be apparent that by means of the combination disclosed a sound recording and reproducing machine with all primary adjuncts such as marking devices, forward-spacing and back-spacing devices and the like may be entirely controlled from the dictator's station. It is only necessary that the central station attendant replace the record blanks when filled with new blanks and shift the carriage 12 to the extreme right to begin recording. The only additional requirement is that the power driven friction drive roller 18 be in motion or placed in motion as required.

For the purpose of aiding in applying the claims to the disclosure the following language, used heretofore in the disclosure to some extent, will be used in the claims. Magnet 20 is the start-stop magnet, and switch 23 is the start-stop switch. Magnet 26 and its switches are the control magnet and control switches. Magnet 56 and its switches are the shift control magnet and the shift control switches. Switches 9, 7 and 36 are the shift switches. Magnet 38 is the forward-spacing magnet and magnet 39 is the back-spacing magnet. Magnet 54 is the marking magnet. Switch 27 will be called the marking control switch. Switch 76 will be called the shift control switch. It is believed that the other elements have been sufficiently identified heretofore.

From the above description it will be apparent to those skilled in the art that the principles and subject matter of this invention may take physical embodiments which are variants of that herein disclosed, which would occur to those skilled in the art in view of this disclosure. I do not, therefore, desire to be strictly limited to the disclosure as given for purposes of illustration, but rather to the scope of the claims granted me.

What is claimed is:

1. In an electro-acoustic system the combination including a recording machine having a rotatable record support, a recording head for cooperating with the record when mounted on said support, driving means for causing relative movement between said support and recording head, a power circuit for said driving means, a control station remote with respect to said recording machine, a microphone, circuits interconnecting the microphone with the recording head, a marking control switch at the control station for partially completing said power circuit, and a start-stop switch at the control station for completing the power circuit to said driving means.

2. In an electro-acoustic system the combination including a recording machine having a rotatable record support, a recording head for cooperating with the record when mounted on said support, driving means for causing relative movement between said support and recording head, a power circuit for said driving means, a control station remote with respect to said recording machine, a microphone, circuits interconnecting the microphone with the recording head, a marking control switch at the control station for partially completing said power circuit, a start-stop switch at the control station

for completing the power circuit to the said driving means, and means energized when the marking control switch is actuated for interrupting the power circuit at the point of partial completion at the end of a predetermined period of time in the event the start-stop switch is not actuated.

3. In an electro-acoustic system the combination including a recording machine having a rotatable record support, a recording head for cooperating with the record when mounted on said support, driving means for causing relative movement between said support and recording head, a power circuit for said driving means, a control station remote with respect to said recording machine, a microphone, circuits interconnecting the microphone with the recording head, a marking control switch at the control station for partially completing said power circuit, a start-stop switch at the control station for completing the power circuit to the said driving means, and a forward spacing magnet actuable by said marking control switch to cause relative forward movement between the support and recording head.

4. In an electro-acoustic system the combination including a recording machine having a rotatable record support, a recording head for cooperating with the record when mounted on said support, driving means for causing relative movement between said support and recording head, a power circuit for said driving means, a control station remote with respect to said recording machine, a microphone, circuits interconnecting the microphone with the recording head, a marking control switch at the control station for partially completing said power circuit, a start-stop switch at the control station for completing the power circuit to said driving means, a signal lamp at the control station, and a circuit completed by the operation of the marking control switch to indicate that the machine is ready for recording.

5. In an electro-acoustic system the combination including a recording machine having a rotatable record support, a recording head for cooperating with the record when mounted on said support, driving means for causing relative movement between said support and recording head, a power circuit for said driving means, a control station remote with respect to said recording machine, a microphone, circuits interconnecting the microphone with the recording head, a marking control switch at the control station for partially completing said power circuit, a start-stop switch at the control station for completing the power circuit to said driving means, a signal lamp at the control station, a circuit completed by the operation of the marking control switch to indicate that the machine is ready for recording, and means energized when the machine is started for causing said signal lamp to flash intermittently.

6. In an electro-acoustic machine of the type described the combination including a rotatable record support, a sound recording head, driving means for causing relative movement between said support and head, drive control means for controlling the starting and stopping of said driving means including a start-stop switch, a power circuit for said drive control means, and a marking control switch for partially completing said power circuit, successive operation of said start-stop switch causing successive energization of

said driving control means to cause the starting and stopping of the machine.

7. In an electro-acoustic machine of the type described the combination including a rotatable record support, a sound recording head, driving means for causing relative movement between said support and head, drive control means for controlling the starting and stopping of said driving means including a start-stop switch, a power circuit for said drive control means, a marking control switch for partially completing said power circuit, successive operation of said start-stop switch causing successive energization of said driving control means to cause the starting and stopping of the machine, and means energized at the time the power circuit is partially completed for again interrupting the power circuit at the end of a predetermined period of time in the event that the machine is not started.

8. In an electro-acoustic machine of the type described the combination including a rotatable record support, a sound recording head, driving means for causing relative movement between said support and head, drive control means for controlling the starting and stopping of said driving means including a start-stop switch, a power circuit for said drive control means, a marking control switch for partially completing said power circuit, successive operation of said start-stop switch causing successive energization of said drive control means to cause the starting and stopping of the machine, a signal lamp, and a power circuit for said lamp completed when said marking control switch is first operated.

9. In an electro-acoustic machine of the type described the combination including a rotatable record support, a sound recording head, driving means for causing relative movement between said support and head, drive control means for controlling the starting and stopping of said driving means including a start-stop switch, a power circuit for said drive control means, a marking control switch for partially completing said power circuit, successive operation of said start-stop switch causing successive energization of said drive control means to cause the starting and stopping of the machine, a signal lamp, a power circuit for said lamp completed when said marking control switch is first operated, and means energized upon the starting of said machine for causing intermittent flashing of said signal lamp.

10. In an electro-acoustic machine of the type described the combination including a rotatable record support, a sound recording head, driving means for causing relative movement between said support and head, drive control means for controlling the starting and stopping of said driving means including a start-stop switch, a power circuit for said drive control means, a marking control switch for partially completing said power circuit, successive operation of said start-stop switch causing successive energization of said drive control means to cause the starting and stopping of the machine, a signal lamp, a power circuit for said lamp completed when said marking control switch is first operated, means energized upon the starting of said machine for causing intermittent flashing of said signal lamp, and means operating automatically in the event that the machine is not turned off to stop the machine and interrupt the power circuit at the end of the relative movement between said support and recording head.

11. In an electro-acoustic machine of the type described the combination including a movable record support, a recording head and a reproducing head individually engageable with the record on said support, a microphone-loud speaker unit, circuits including an amplifier and shift switches for alternatively connecting the recording head to the output of the amplifier and the microphone loud speaker unit to the input of the amplifier and the reproducer to the input of the amplifier and the microphone loud speaker to the output of the amplifier, control means for causing the operation of the shift switches, driving means for the record support, and a start-stop device for controlling the driving means.

12. In a system for controlling the operation of a dictation machine including a movable record support, a recording head and a reproducing head, driving means for said record support, driving control means including a magnet, a power source, and means including a single manual for controlling the power source to successively energize said magnet to start and stop said machine.

13. In a system for controlling the operation of a dictation machine including a movable record support, a recording head and a reproducing head, driving means for said record support, driving control means, a power source, means for controlling the power source to successively energize said driving control means to start and stop said machine, a signal lamp, and means for causing said signal lamp to flash intermittently at different rates depending upon the operation of said machine to record or reproduce.

14. In a dictation machine having a driving means, a drive control means, a power circuit for said drive control means including a relay, means for energizing said relay to partially complete said circuit, and means upon successive operations for completing said circuit to energize the drive control means whereby the driving means is alternatively operative and inoperative.

15. In a dictation machine having a driving means, a drive control means, a power circuit for said drive control means including a relay, means for energizing said relay to partially complete said circuit, means for completing said circuit by successive operation thereof to operate the drive control means to render the driving means alternatively operative and inoperative, and means actuated upon the partial completion of said circuit for interrupting it at the end of a predetermined period of time in the event said driving means remains inactive.

16. In a dictation machine, a movable record support, driving means for said support, a recording head, a reproducing head, driving control means, a power circuit for said driving control means, a control switch for partially completing said circuit, shift control means including a single switch for successively rendering the recording head and the reproducing head operative upon successive operations, means for completing the circuit for said driving control means, and means for controlling said shift control means.

17. In a system for controlling the operation of a dictation machine including a movable record support, a recording head, a reproducing head, driving means for said record support, driving control means, a power circuit, marking control means for preparing said power circuit for completion, start-stop control means for completing the power circuit to said driving con-

trol means to start and stop the machine, and means operated by said support at the end of its stroke for energizing said driving control means to stop the machine and to return the power circuit to its original condition.

18. In a system for controlling the operation of a dictation machine including a movable record support, a recording head, a reproducing head, driving means for said record support, driving control means, a power circuit, marking control means for preparing said power circuit for completion, start-stop control means for completing the power circuit to said driving control means to start and stop the machine, means operated by said support at the end of its stroke for energizing said driving control means to stop the machine and to return the power circuit to its original condition, and a marking device energized at will by said marking control means.

19. A system for controlling the operation of a dictation machine, including a movable record support, a recording head, a reproducing head, said heads being independently engageable with the record on said support, driving means for said record support, driving control means for rendering said driving means operative, a power circuit, marking control means for preparing said power circuit for completion, a forward spacing device for moving said support forwardly independently of said driving means, and a circuit for said forward spacing device also completed by said marking device.

20. A system for controlling the operation of a dictation machine, including a movable record support, a recording head, a reproducing head, said heads being independently engageable with the record on said support, driving means for said record support, driving control means for rendering said driving means operative, a power circuit, marking control means for preparing said power circuit for completion, a forward spacing device for moving said support forwardly independently of said driving means, a circuit for said forward spacing device also completed by said marking device, automatic stopping means energized also at the time of the operation of said marking device for returning said power circuit to normal position at the end of a predetermined period of time if said driving means is not energized, said marking device upon its next second operation energizing said driving control means, and means energized by said driving control means for rendering said automatic stop device inoperative.

21. A system for controlling the operation of a dictation machine, including a movable record support, a recording head, a reproducing head, said heads being independently engageable with a record on said support, a single manual means remote with respect to said machine for starting and stopping it, and a single manual means at the remote point for rendering either the recording head or the reproducing head operative.

22. A system for controlling the operation of a dictation machine including a movable record support, a recording head, a reproducing head, said heads being independently engageable with a record on said support, means remote with respect to said machine for starting and stopping it, means at the remote point for rendering either the recording head or the reproducing head operative, means for rendering the recording head operative whenever the machine is stopped, and

signal means at the remote point controlled by said last means to indicate either the recording or the reproducing condition of the machine.

23. A system for controlling the operation of a dictation machine including a movable record support, a recording head, a reproducing head, said heads being independently engageable with a record on said support, means remote with respect to said machine for starting and stopping it, means at the remote point for rendering either the recording head or the reproducing head operative, signal means at the remote point controlled by said last means to indicate either the recording or the reproducing condition of the machine, and means actuated by said support for stopping the machine at the end of the movement of said support.

24. In an electro-acoustic machine of the type described means for recording and reproducing sound, power means for said machine, means for conditioning said power means for controlled operation of said machine and means energized by said last means for returning said power means to its previous condition at the end of a fixed period of time if the machine is not operated.

25. In an electro-acoustic machine of the type described means for recording sound on a permanent record and for reproducing sound therefrom, power means for operating said machine and means for applying a signal mark to said record, said last means being controlled by said power means whereby a signal mark may be applied during recording and reproduction only.

26. In an electro-acoustic machine of the type described means for reproducing sound from a sound record, power means for operating said machine and means for applying a signal mark to the record during reproduction only.

27. In an electro-acoustic machine of the type described means for reproducing sound from a sound record, power means for operating said reproducing means, back-spacing means for said reproducing means and means controlled with said power means for rendering said back-spacing means operative only during reproduction.

28. In an electro-acoustic machine of the type described the combination including means for recording sound on a record, means for reproducing sound from said record, power driven means, means for controlling said power driven means to condition the machine either for recording or reproduction and means for automatically conditioning the machine for recording at the end of each use for reproduction.

29. In an electro-acoustic machine of the type described the combination including means for recording sound on a record, means for reproducing sound from said record, power driven means, means for controlling said power driven means to condition the machine either for recording or reproduction and means for conditioning the machine at the end of a predetermined period of time for recording after each use for reproduction.

30. In an electro-acoustic machine of the type described means for recording sound on a permanent record, means for reproducing sounds from a record, means including a power drive for selectively conditioning either of said first two means to effect recording or reproduction as required and means for automatically conditioning the machine for recording after reproduction while the machine is inoperative.

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