Feb. 7, 1950 R. M. SOMERS ET AL 2,497,037

COMBINED DICTATING AND INTEROFFICE COMMUNICATING SYSTEM

Filed June 11, 1946 2 Sheets-Sheet 1

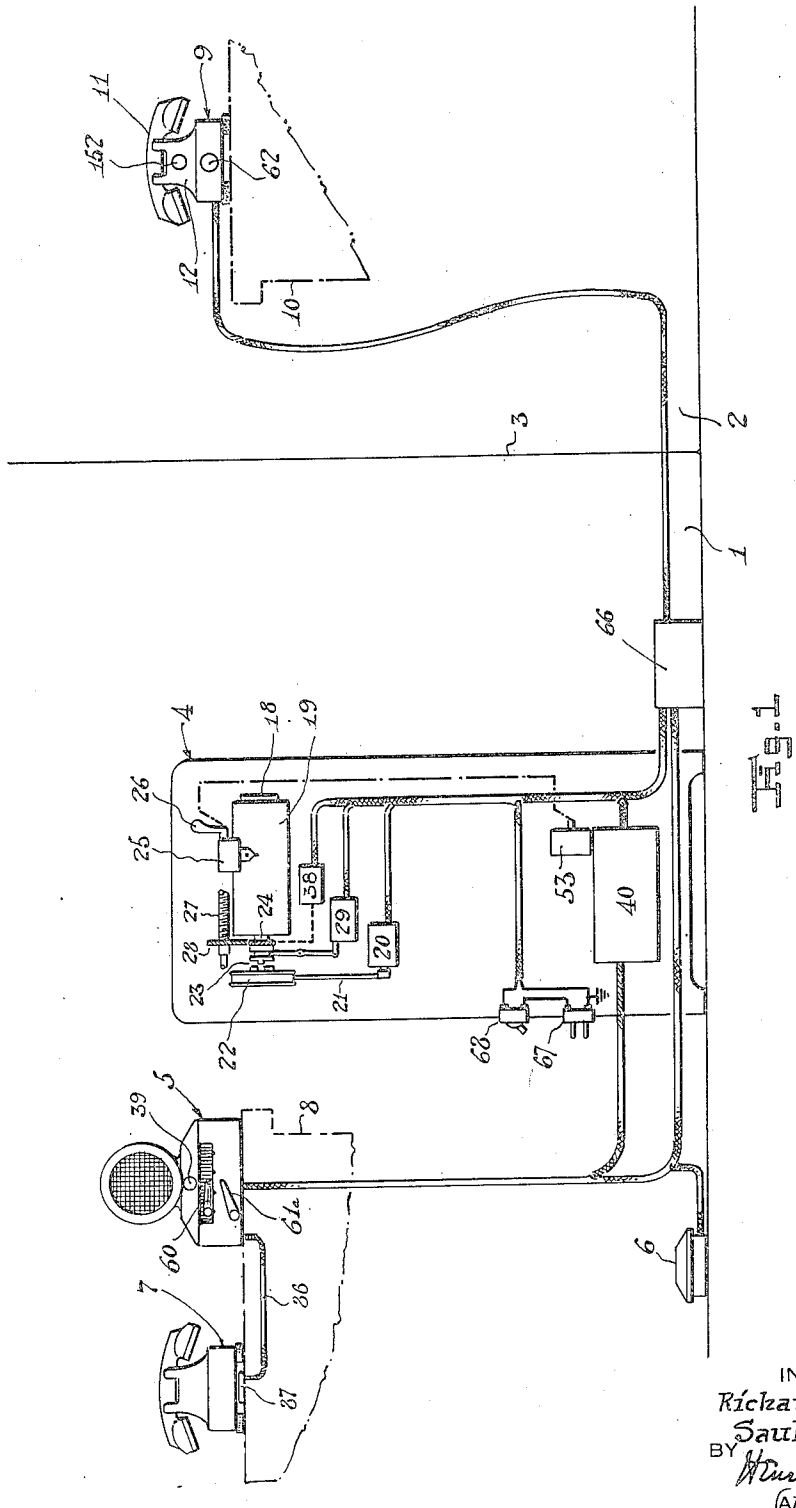


Fig. 1

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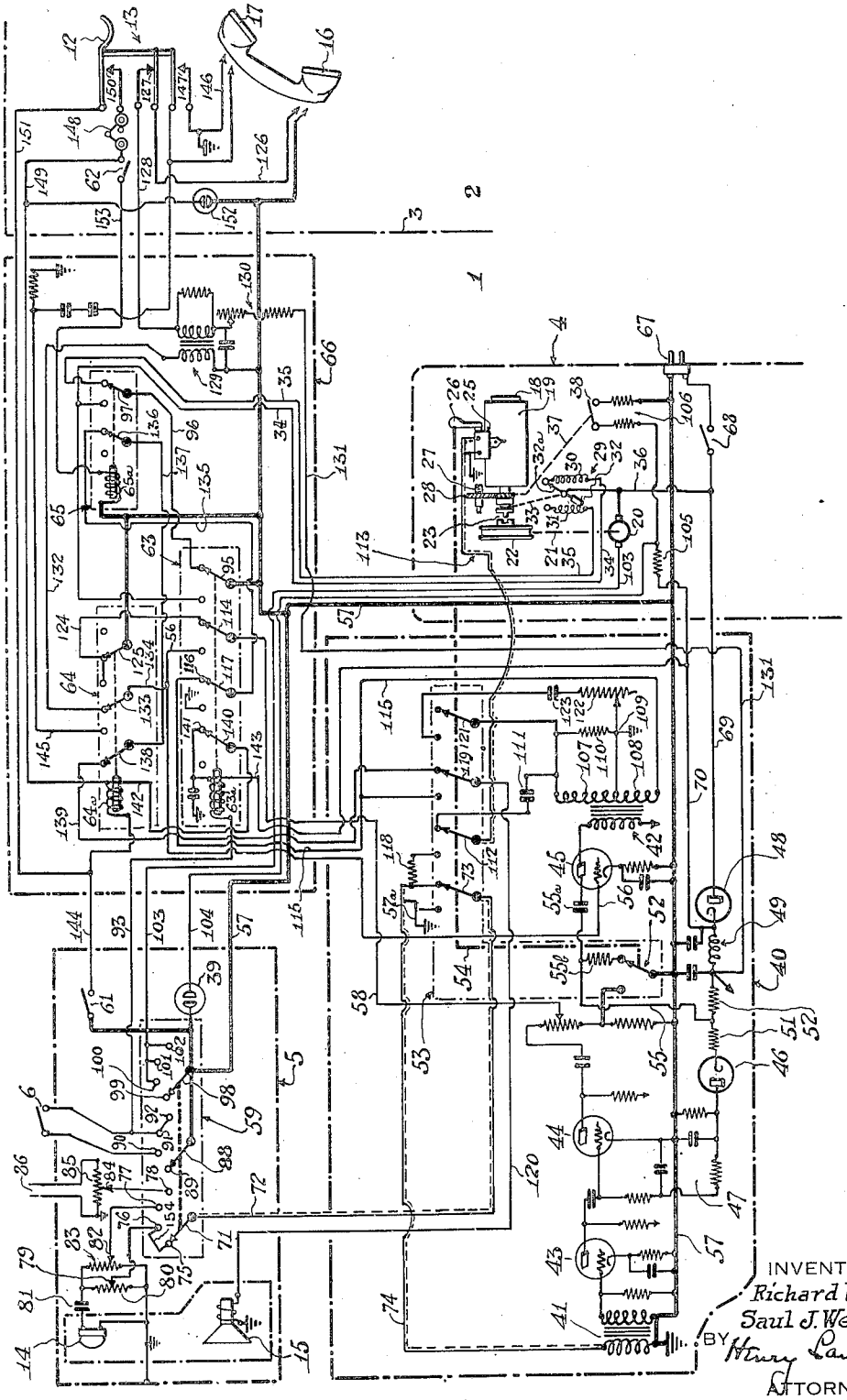


Fig. 2

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COMBINED DICTATING AND INTEROFFICE-COMMUNICATING SYSTEM

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Application June 11, 1946, Serial No. 675,850

25 Claims. (Cl. 179—6)

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This invention relates to improvements in combined dictating and interoffice-communicating systems of the general character described and claimed in the Hornor Patent No. 2,485,381 issued October 18, 1949, and having a common assignee with the present application.

The invention relates particularly to improvements in combined dictating and interoffice-communicating systems which are adapted to render the systems more flexible so that they may perform a wider range of functions.

It is an object to provide a combined system of the character mentioned which is adapted to fulfill efficiently and dependably the multiple functions of enabling a selective recordation of dictation on a single dictating machine by a plurality of operators at stations removed from each other, a selective recordation by at least one of those operators from a plurality of sources, a selective reproduction of the recorded dictation by that one operator, and an intercommunication between the operators as whenever the system is not being used for the recordation or reproduction of dictation.

It is another object to provide a dictating and interoffice-communicating system for executives which, besides providing a means for the recordation and reproduction of dictation, conversations, etc. by the executive, is adapted to enable the executive to communicate with his secretary in another office, and the secretary to record from her office on the executive's machine to relay messages, reports, etc. to the executive in conversational style without disturbing him at the moment and to relay such messages while he is out of his office, which recorded messages the executive may reproduce at his convenience.

It is another object to provide such a system of which the executive has the principal control.

It is another object to provide such a system with a novel and effective interoffice-signaling means.

It is another object to provide systems of the character described which are arranged to be highly stable—i. e., free from feedback difficulties—without requiring stringent shielding of the circuits.

Another object is to provide such systems which have a minimum number of controls and cannot be put out of operation by unintended or improper manipulation of these controls.

These and other objects and features of our invention will be apparent from the following description and the appended claims.

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

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Figure 1 is a diagrammatic view illustrating the physical arrangement of the main components of the present system; and

Figure 2 is a schematic drawing of the circuits and apparatus of this system grouped in units according to their physical arrangement.

In Figure 1 there are shown two stations 1 and 2 remote from one another, which may be offices separated as by a wall 3. The station 1 is a main or master station as for an executive which includes a dictating machine 4, a combined microphone, receiver and control unit 5 which is considered part of the dictating machine, a start-stop control 6 adapted to be operated by the foot and a telephone 7, the unit 5 and the telephone 7 being on a table 8 fractionally shown. The station 2 is a subordinate one and comprises a microphone-receiver unit 9 of the type of a telephone hand set, which is mounted on a table 10 fractionally shown. The unit 9 comprises a handpiece 11 mounted removably in a cradle 12. With this cradle there is associated the usual push-button type of switch, indicated as 13 in Figure 2, for controlling the microphone and receiver circuits as the handpiece is removed from and put on the cradle.

The microphone-receivers of the two stations, which may be referred to generally as transducers, may each comprise a single component operable selectively as a microphone or a receiver, as is known in the art, or each may comprise separate components operable respectively as a microphone or receiver. In the present system each such transducer comprises separate microphone and receiver elements, the station 1 a microphone 14 and a speaker 15 and the station 2 a microphone 16 and receiver 17 (Figure 2), but the terms "transducer" and "microphone-receiver" are used in the specification and claims to include both the single- and double-component types.

The dictating machine comprises a rotatably-mounted record support 18 which may be of a mandrel type for carrying a cylindrical record 19. The record is driven by a motor 20 which is coupled by a belt 21 to a drive pulley 22. The drive pulley is in turn coupled, preferably through a clutch 23, to the shaft 24 of the record support, the clutch being preferred because it enables quick starting and stopping of the record but being not necessary to the invention. Associated with the mounted record 19 is a translating means 25 which may comprise a single unit adjustable selectively to function as a recorder or a reproducer or separate recorder and reproducer

units which may be selectively engaged with the record. By way of illustration, a single unit is shown having a lever 26 for selectively conditioning it to operate as a recorder or reproducer. The translating unit 25 is driven along the record during recording and repoducing by a feed screw 27 (fractionally shown) coupled by gearing 28 to the shaft 24. When the lever 26 is moved to a neutral position the unit 25 is uncoupled from the feed screw and may then be moved by hand along the record.

The clutch 23 is operated by an electrically-actuated unit 29 preferably of the type described in the Langley Patent No. 1,380,486. In its basic arrangement, this unit has start and stop coils 30 and 31, an armature 32 coupled by a link 33 (diagrammatically shown) to the clutch, and a switch pole member 32*a* on the armature which makes connection with the stop coil when the start coil is energized and vice versa with the start coil when the stop coil is energized. The current-supply circuits for this unit comprise leads 34 and 35 to the start and stop coils respectively and a common return lead 36 for the coils which runs from the pole member 32*a*.

Coupled mechanically to the gearing 28 by means generally referred to as 37 is a circuit breaker 38 for flashing a signal light 39 in the unit 5 at station 1 while the dictating machine is in operation. This breaker may be of any desired type but is preferably that disclosed in the Somers Patent No. 2,245,164, having a common assignee with the present application and which need not be herein described in detail.

The dictating machine also includes an electrical amplifier 40 which comprises input and output transformers 41 and 42 and three stages of amplification 43, 44 and 45 that are capacitance-resistance coupled. The first and last amplifier stages are self-biased; however, the intermediate stage 44, being of a variable mu type, is provided with a variable grid bias according to the output signal lever for automatic volume control purposes, the bias being supplied from the plate of the output stage 45 through a rectifier 46 and a resistance-capacity type filter generally referred to as 47. The plate sources are obtained from a power-rectifier tube 48 through an inductance-capacity filter 49. Also, a voltage is derived from this filter 49, through resistors 50 and 51, for biasing the rectifier tube 46 so that the automatic volume control is inoperative until the output signal reaches a predetermined level.

The automatic volume control is desired when the system is used for recording but not when it is used for reproducing. In order therefore to remove the automatic volume control during reproducing there is provided a single-pole double-throw switch 52 which comprises one component of a multiple-pole two-position amplifier switch 53 that is operated by the lever 26 of the translating unit 25 through a mechanical link 54 diagrammatically shown. The current-supply circuit from the plate of the output stage 45, indicated as 55, serially includes a blocking condenser 55*a* and connects to the junction between the resistors 50 and 51. When the translating unit 25 is in condition for recording, the switch 52 is in the position it occupies in Figure 2. In this position the switch connects a resistor 55*b* from the circuit 55 to the ground side 57 of the amplifier—which is also the ground lead for the system. This resistor 55*b* forms with the resistor 50 a potentiometer for limiting the bias voltage supplied to the rectifier 46 and the power-supply filter 49 to an appropriate value which the signal voltage from the stage 45 will exceed to provide an automatic volume control action. However, when the lever 26 is thrown to condition the translating unit for reproducing, the switch 52 is thrown to break the connection of the resistor 55*b* to ground. Now the full power-supply voltage is supplied as a bias voltage to the rectifier 46. This voltage is greater than any signal voltage and accordingly the rectifier tube 46 is maintained continuously non-conducting and the automatic volume control is therefore inoperative. It is to be noted that the mode of controlling the automatic volume control action here described is according to Dunning Patent No. 2,163,671 having a common assignee with the present application.

The microphone 16 of the station 2 is preferably one of the carbon-button type so that it will have a relatively high sensitivity. With such a microphone only the gain of the output stage 45 is required. Accordingly this microphone may be connected by unshielded circuits hereinafter described to a lead 56 which connects to the grid of the output stage. Because this microphone is connected to the amplifier between the second and third stages thereof, and the first and second stages are at times not used, the output lead 58 of the second stage is coupled to the third stage 45 through a series of switches which disconnect the two stages at times so as to disable the first and second stages as is hereinafter explained. A prime advantage in using the carbon-button type of microphone 16 is that the gain required between the input and output circuits is greatly reduced and, as a result, shielding requirements are relaxed and feedback tendencies are mitigated. However, it will be understood that a low-level microphone with a preamplifier might be used to simulate the sensitivity of the carbon microphone and permit the same relaxation in shielding requirements.

The manipulatable controls at the station 1 comprise a three-pole four-position selector switch 59 in the unit 5 which is operable by a lever 60 in Figure 1. The switch 59 has in the order named an "off" position wherein it puts the system in condition only for interoffice communication, a "dictating" position wherein it starts the motor 20 and conditions the system additionally for recording or reproducing dictation, a "conference" position wherein it puts the dictating machine into continuous operation for recording conference proceedings and a "telephone" position wherein it also puts the dictating machine into continuous operation for recording conversations from the telephone 7. Also, in the unit 5 there is a normally-open switch 61 controlled by a lever 61*a* (Figure 1) which is for controlling the direction of communication between the two offices and for signaling station 2 as hereinafter explained. This lever is held normally raised in a so-called "listen" position (as with respect to the operator at station 1) to condition the system for interoffice communication from station 2 to station 1. Upon depressing the lever 61*a* it is moved to a so-called "talk" position to condition the system for communication from station 1 to station 2. In short, this lever may be designated as the "T–L" lever. These controls 60 and 61*a*, together with the start-stop control 6 and the record-reproduce lever 26, constitute except for several volume controls all of the operable controls at the disposal of the operator at station 1.

The only manipulatable controls at station 2 are the switch 13 which is operated automatically as the handpiece 11 is removed from its support, and a push-button switch 62. When this push-button switch is depressed, it puts the dictating machine into operation, normally for recording purposes as will hereinafter appear, so that the operator at station 2 may record messages and reports to relay these to the operator at station 1, who may then reproduce them at his convenience.

It is to be noted that many of the functions performed by the control 60—which are hereinafter described in detail—are in accordance with Dunning Patent No. 2,305,681, having a common assignee with the present application.

The abovementioned control elements at the stations 1 and 2 control three relays 63, 64 and 65 which are grouped in the unit 66. The relay 63 is a so-called "master selector" relay comprising a four-pole two-position switch which is normally in a so-called "interoffice-communicating" position—the position it occupies in Figure 2. This relay has a coil 63 which when energized throws the relay into its so-called "dictating" position. The relay 63 is controlled solely by the selector lever 60 and the start-stop control 6 of station 1 as is hereinafter described. The relay 64 is a so-called "talk-listen" relay referred to simply as the T–L relay, and comprises a three-pole two-position switch. This relay is normally in "listen" position—the position it occupies in Figure 2—and has a coil 64*a* which when energized throws the relay into its "talk" position. This relay is controlled solely by the T–L lever 61*a* at station 1. The relay 65 is a so-called "remote" relay comprising a two-pole two-position switch. This relay is normally in the position it occupies in Figure 2 but has a coil 65*a* which when energized throws the relay into a so-called "record" position. This relay is controlled solely by the push-button switch 62 at station 2.

The power supply for the system is obtained from an A.-C. outlet (not shown) by way of a two-connector plug 67 mounted on the cabinet of the dictating machine. One connector pin of this plug is connected to the grounded line 57 which is indicated by a heavy line. The other or "live" connector of this plug is connected through an on-off switch 68 for the system, to the line 36 which runs to the clutch-operating unit 29 of the motor 20 and to a line 69 which runs to the plate of the rectifier tube 48 of the amplifier 40. It is the rectified voltage from this tube 48, taken from the cathode thereof by a lead 70, that supplies the energizing current for the coils of the relays abovementioned.

The leftward section of the three-pole selector switch 59 (Figure 2) is for selectively connecting the several signal sources to the input of the amplifier 40. This section comprises a pole 71 connected by a shielded lead 72 to a pole member 73 of the amplifier switch 53; when the amplifier switch is in "record" position, the pole member 73 connects to the amplifier input through a lead 74. Associated with the pole 71 are successive contacts 75, 76, 77 and 78. The contact 75 is engaged by the pole 71 when the selector switch is in "off" position, but is connected to the next contact 76, which represents the "dictating" position. This contact is connected to an adjustable contact 79 of a volume control 80 that is connected through a condenser 81 across the microphone 14. The next contact 77—which

represents the "conference" position—is connected to an adjustable contact 82 of a volume control 83 which is connected also across the microphone 14. The next and last contact 78—which represents the "telephone" position—is connected to an adjustable contact 84 of a volume control 85 that is connected across a line 86. This line is connected by any suitable means to the telephone 7 as, for example, to a telephone pick-up coil 87 (Figure 1).

The next section of the selector switch 59 controls the relay 63 and is particularly, among other things, a control for the clutch 23. This section has a pole 88 connected to the ground line 57 and has successive contacts 89 through 92. The contact 89, representing the "off" position, is idle. Contacts 90 and 91 are connected to the start-stop foot switch 6 and contacts 91 and 92 are bridged together and connected by a lead 93 to one side of the relay coil 63*a*. The other side of this coil is connected to the unfiltered rectified power supply through the lead 70 aforementioned. Thus, when the selector switch 59 is in "dictating" position and the foot switch 6 is closed, or when the selector switch is in either "conference" or "telephone" position irrespective of the position of the foot switch, the coil 63*a* is energized and the relay 63 is held in its "dictating" position. This relay includes a pole 95 connected to the ground line 57. When the relay is unactuated—i. e., in "interoffice-comunicating" position—this pole connects to a lead 96 which runs to a pole 97 of the remote relay 75. Normally the pole 97 makes contact with the lead 35 of the stop coil 31 of the clutch-actuating unit 29. When the relay 63 is thrown to "dictating" position the pole 95 makes contact directly with the lead 34 that runs to the start coil 30 and closes the circuit of this coil with the power supply by way of the pole 32*a* of the unit 29 and the lead 36. When the coil 30 is energized the armature is thrown to engage the clutch and to move the pole 32*a* of the contact to the stop coil 31 so as to break the start circuit and to prepare the stop circuit for subsequent operation. When the relay coil 63*a* is next deenergized the pole 95 makes contact with the lead 96 to complete the circuit through the stop coil 31 by way of the pole 97, lead 35, pole 32*a* and lead 36. When the stop coil is energized the armature is thrown to break the stop circuit, prepare the start circuit and disengage the clutch.

The last section of the selector switch 59 controls the motor 20. This section has a pole 98 connected to the ground line 57 and has four successive contacts 99 through 102. Contact 99, representing the "off" position, is idle, but contacts 100 through 102 are bridged together and connected by a lead 103 to the motor 20. Thus, whenever the selector switch is in "dictating," "conference" or "telephone" position the motor is energized.

One side of the signal light 39 is connected to the ground line 57 but the other side is connected by way of a lead 104 and a resistor 105 to the lead 70 that runs to the cathode of the rectifier tube 48. This signal light thus receives its power from the amplifier of power-rectifier tube 48 and is lit only when this tube is conducting to indicate when the amplifier is in operating condition. Additionally, this signal light may be used to inform the operator at station 1 when the dictating machine is in operation. This is accomplished by connecting the circuit breaker 38 from the junction of line 104 with the resistor 105

through resistors 105 to the ground line 57. When the circuit breaker is closed the voltage supplied to the lamp is reduced to extinguish the light because the resistors 105 and 106 then cooperate to form a potentiometer. Since the breaker 38 is operated when the dictating machine is in operation, or alternatively if desired when the machine is in operation and conditioned for recording as described in the aforementioned Somers Patent No. 2,245,164, the operator is signaled by the light 39 also as to the particular operating condition of the dictating machine.

The output transformer 42 of the amplifier 40 has two output circuits leading from an intermediate tap 109 that is grounded: a circuit 107 for feeding into the translating unit 25 when operated as a recorder and a circuit 108 for feeding into the receivers 15 and 17. Across the recorder output circuit 107 there may be permanently connected a load-stabilizing resistor 110. When the amplifier switch 53 is in "recording" position, the recorder output circuit is connected through a condenser 111, pole 112 of the switch 53 and a shielded lead 113 to the translating unit 25.

As so far described, the operation of recording dictation is as follows: The on-off switch 68 is closed to supply power to the system. When the amplifier 40 is in operating condition the signal light 39 gives a steady light. Upon next throwing the selector switch to "dictating" position the motor 20 is started. Upon next depressing the start-stop switch 6 the relay 63 is thrown to "dictating" position to engage the clutch and start the record rotating. Also, as the relay 63 is thrown a pole 114 thereof, which is connected to the output lead 58 of the amplifier stage 44, makes contact with the lead 56 runing to the grid of the output stage to couple the amplifier from its input to output transformers. Upon the lever 26 being in "record" position to condition the translating unit 25 for recording and to put the amplifier switch 53 in its so-called "record" position, the signal currents from the microphone 14 are fed through the amplifier and to the translating unit 25 where they are recorded on the record 19.

It will be noted that the output circuit 108 of the output transformer 42 is connected by a lead 115 to a contact 116 of the selector relay 63. However, the associated pole 117 of this relay contact breaks connection therewith, when the relay is thrown to "dictating" position, to break the circuit 108 during recording.

It will be understood that when the selector switch 59 is thrown to "conference" and "telephone" positions the amplifier input transformer is connected to the microphone 14 and telephone 7 respectively and, at the same time, the motor 20 is started and the clutch 23 is engaged to put the dictating machine into continuous operation.

Whenever the lever 26 is thrown to "reproduce" position the amplifier switch 53 is thrown to the left as it appears in Figure 2. The pole 73 of the switch is now connected to ground at 57*a* so as to ground the signal circuits of station 1. The pole 112, which is connected to the translating unit 25, is now connected through a resistor 118 to the lead 74 running to the amplifier input. At the same time, a pole 119 of the amplifier switch 53 connects the output 108 of the amplifier to a lead 120 that leads to the speaker 15. Also, another pole 121 of the amplifier switch 53 now connects a "scratch" filter, comprising a resistor 122 and condenser 123, across the recorder output 107 to filter out the record surface noises. Additionally, as heretofore explained, the switch 52, which is part of the multiple switch 53, is now in position to cut out the automatic volume control. Thus it will be noted that upon placing the selector relay 63 into "dictating" position (to couple the amplifier stages 44 and 45 as heretofore explained) while the lever 26 is in "reproduce" position, the translating unit 25 is coupled through the amplifier 40 to the speaker 15 for reproducing the recorded matter on the record 19.

The present system is adapted to enable the operator at station 1 to talk to the operator at station 2, and to enable the operator at station 2 to talk to station 1 and to record on the record 19 as whenever the operator at station 1 is not using the dictating machine. The system is set up so that normally it is conditioned for communication from station 2 to station 1. To reverse this direction of communication it is necessary for the operator at station 1 to depress the T–L lever 61*a*. However, this reverse communication from station 1 to station 2 is made contingent upon the dictating machine being in condition for recording—i. e., the lever 26 being in "record" position. This is done so that the operator at station 1—who has the primary control of the dictating machine—will normally leave the machine in condition for recording so that the operator at station 2 may record as whenever the operator at station 1 is not using the dictating machine.

The T–L relay is normally in "listen" position shown in Figure 2. When the selector relay 63 is concurrently in "interoffice-communicating" position the output lead of the second amplifier stage 44 is grounded, to disable the first two stages of the amplifier, by a lead 124 running from the pole 114 of the relay 63 through a pole 125 of the relay 64 to the ground lead 57. Also, if the handpiece 11 at station 2 is now removed from the cradle 12, the carbon-button microphone 16 is coupled to the grid of the output stage 45. This coupling comprises a primary circuit running from ground through the microphone 16 and then by way of a lead 126, switch contacts 127 of the cradle switch 13, a lead 128, the primary of an audio transformer 129, a volume control 130 and a lead 131 to the rectified plate supply of the amplifier 40. The secondary circuit of this coupling runs from ground through the secondary of the audio transformer 129 and then by way of a lead 132, pole 133 of the T–L relay 64, a lead 134 and the lead 56 to the grid of the output stage 45. Additionally the output circuit 108 is now connected to the speaker 15 of station 1 by the lead 115, pole 117 of selector relay 63, lead 135, pole 136 of remote relay 65, lead 137, pole 138 of T-L relay 64, lead 139, pole 119 of amplifier switch 53 and lead 120 to the speaker 15. Accordingly, when the relays 64 and 63 are in their normal positions, and the amplifier switch 53 is in "record" position, the carbon-button microphone of station 2 is connected automatically as the handpiece 11 is raised from the cradle 12 through the amplifier output stage 45 to the speaker 15 to enable communication from station 2 to station 1.

In order for the operator at station 1 to talk to the operator at station 2 he must as a first requirement have the amplifier switch 53 in "record" position for only then is the microphone 14 connected to the input of the amplifier; addi-

tionally, he must throw the relay 64 to its "talk" position. He can put the relay 64 in "talk" position, by depressing the T–L lever 61*a*, only when the selector relay 63 is in interoffice-communicating position because the energizing circuit of the relay coil 64*a* includes a pole 140 and contact 141 of the selector relay 63 and this pole and contact are closed only when the selector relay is in its interoffice-communicating position. For instance, one side of relay coil 64*a* is connected by a lead 142 to the pole 140 and the contact 141 is connected by a lead 143 to the lead 70 that leads to the unfiltered rectified voltage supply of the amplifier 40. The other side of the relay coil 64*a* is connected by way of a lead 144 and the T–L switch 61 to the ground line 57. Thus upon depressing the T–L lever 61*a* while the selector relay is in its normal position, the relay 64 is thrown to "talk" position.

In the "talk" position of the relay 64 the output lead 58 of the amplifier stage 44 is connected to the output stage 45 by way of the pole 114 of the selector relay 63, lead 124, pole 133 of the T–L relay 64 and lead 56 that runs to the grid of the output stage. Also, the output circuit 108 of the amplifier is now connected to the circuit of the receiver 17 of station 2 by the lead 115, pole 117 of selector relay 63, lead 135, pole 136 of remote relay 65, lead 137, pole 138 of T–L relay 64 and lead 145 to one side of the receiver 17. The other side of the receiver 17 is connected to ground by a lead 146 so as to complete the circuit. However, unless the handpiece 11 is off the cradle 12 the receiver is shorted by contacts 147 of the cradle switch 13. Accordingly if the operator at station 1 is the one initiating the interoffice communication, he must first signal the operator at station 2 to remove the handpiece 11 from the cradle.

In the present system, this signaling is effected automatically by depressing the T–L lever 61*a* to "talk" position. The signaling means may suitably be a polarized bell 148 which will give one clang when energized and another when deenergized. One terminal of this bell is connected by a lead 149 to the lead 142 which leads to the rectified power supply as hereinbefore described. The other terminal of the bell is connected by normally-closed contacts 150 of the cradle switch 13 and lead 151 to the lead 144 which runs to the T–L switch 61. Thus, upon depressing the T–L lever 61*a* the bell 148 is energized to signal the operator at station 2. If the operator does not at first hear the signal, it may be repeated by alternately releasing and depressing the lever 61*a*. However, when the operator at station 2 lifts the handpiece 11 from the cradle 12 the contacts 150 are broken and the signaling means is put out of operation. At the station 2 there is a signal light 152 for informing the operator at that station when the system is operative for calling station 1. Also, this signal light normally serves to inform the operator at station 2 when she may record. This signal light has one side connected to the ground line 57 and has the other connected to the lead 149 which is connected to the unfiltered rectified voltage supply of the amplifier 40 provided the selector relay 63 is in interoffice-communicating position, as is hereinbefore explained. Thus, as soon as the amplifier is in operating condition the signal 152 is lit, unless however the dictating machine is being used by the operator at station 1. If the dictating machine is being so used, the pole 140 and contact 141 are broken and the signal light 152 is out.

The push-button switch 62 at station 2 controls the "remote" relay 65 as follows: One side of the relay is connected to the ground line 57 and the other side is connected by a lead 153 and the switch 62 to the lead 149 which connects to the rectified power supply when the selector switch is in interoffice-communicating position. Thus, the condition under which the relay 65 may be actuated is the same as that under which the signal light is lit—which is that the dictating machine be not used by the operator of station 1. When the relay 65 is actuated into "record" position, one side of the start coil 30 of the unit 29 is connected to the "live" side of the power supply by the pole 32*a* and lead 36, and the other side is connected to ground by lead 34, pole 97 of remote relay 65, lead 96 and pole 95 of the selector relay 63. Thus the clutch is engaged for starting the record rotating. At the same time the circuit connection from the output 108 of the amplifier to the speaker 15 at station 1 is broken by the pole 136 of the relay 65 breaking contact with the lead 135. This is done so that the matter which is being recorded by the operator at station 2 will not be reproduced by the speaker 15 to the annoyance of the operator at station 1. However, when the switch button 62 is released, the relay 65 is restored to normal position. Now the stop coil 31 is energized, to disengage the clutch, because one side thereof is connected to the power supply by the pole 32*a* and lead 36 and the other side is connected to the ground line 57 by the lead 35, pole 97 of relay 65, lead 96 and pole 95 of the selector relay 63. At the same time the pole 136 makes contact with the lead 135 to reconnect the speaker 15 to the amplifier output 108 whereby to restore the system for interoffice communication from station 2 to station 1.

Whenever neither operator intends to record dictation, the system may be left in its stand-by condition effective only for interoffice communication by closing the on-off switch 68 while leaving the selector switch 59 in "off" position, but on the condition that the amplifier switch 53 is left in "record" position. The motor 29 is now at standstill and all relays are in their normal positions. The operator at station 2 may at any time call station 1 simply by lifting the handpiece 11 from the cradle 12, and the operator at station 1 may call station 2, through the bridge connection 154 between the contacts 75 and 76 of the selector switch 59, by depressing the T–L lever 61*a* to "talk" position.

It will be apparent from the foregoing detailed description that the present system is adapted particularly to fulfill efficiently and dependably the multiple functions of a recording system for use selectively by a plurality of operators, a complete dictating system (recording and reproducing) for one of the operators, and an interoffice-communicating system for use by all the operators. It is intended that this particular system be illustrative and not necessarily limitative of our invention, because changes and modifications may be made by those skilled in the art without departure from the scope of our invention, which we endeavor to express according to the following claims.

We claim:

1. In a combined dictating and interoffice-communicating system: the combination of a first station including a dictating machine having a motor, a record support, a clutch for coupling the motor to said support and a start-stop control for engaging and disengaging said

clutch; a second station having a signal light; means for energizing said light while said motor is running; and means controlled by said start-stop means for causing said light to be deenergized when said clutch is engaged.

2. In a combined dictating and interoffice-communicating system: the combination of a first station including a dictating machine having an electrical amplifier, transducer means operable as a microphone-receiver, and start-stop means for putting said machine into and out of operation; a second station including a microphone; means for connecting the microphone of said second station by way of said amplifier to the receiver of said first station to enable communication from said second to said first station; and means controlled by said start-stop means for disabling said connecting means while said machine is in operation.

3. In a combined dictating and interoffice-communicating system: the combination of a first station including a dictating machine having record-rotating means, an electrical amplifier and a transducer means; a second station including a start-stop control for rendering said record-rotating means effective and ineffective, and a microphone for feeding into said amplifier; means connecting the output of said amplifier to said translating means and to said transducer means; and means associated with said start-stop control and operative when said record-rotating means is in effective condition for disabling said connecting means as to said transducer means.

4. In a combined dictating and interoffice-communicating system: the combination of first and second stations each including a microphone-receiver; means interconnecting said microphone-receivers for enabling communication between said stations, said means including a directional control at the first of said stations normally in a position to enable communication from the second to the first of said stations; a signaling means at the second of said stations controllable at the first of said stations; and mean controlled by said directional control for rendering said signaling means operative.

5. In a combined dictating and interoffice-communicating system: the combination of first and second stations each including a microphone-receiver; means interconnecting said microphone-receivers for enabling communication between said stations, said means including a directional control at the first of said stations normally in a "listen" position to enable communication from the second to the first of said stations and operable into a "talk" position to enable communication from the first to the second of said stations; and means responsive to throwing said directional control to "talk" position for signaling the second of said stations.

6. In a combined dictating and interoffice-communicating system: the combination of first and second stations each having a microphone-receiver; a support at the second of said stations for the receiver of said station; means interconnecting said microphone-receivers to enable communication between said stations, said means including a directional control at the first of said stations normally in a "listen" position to enable one-way communication from the second to the first of said stations and a switch at the second of said stations responsive to placing the microphone-receiver of said second station on said support for disabling communication from the first to the second of said stations, said directional control being operable into a "talk" position to enable one-way communication from the first to the second of said stations; a sound-signaling means at the second of said stations; means responsive to operating said directional control to "talk" position for putting said sound-signaling means into operation; and means responsive to removing the receiver of said second station from said support for rendering said signaling means inoperative.

7. In a combined dictating and interoffice-communicating system: the combination of a first station including a dictating machine having a support for a record, a record-cooperating translating means, a microphone, an electrical amplifier and means for selectively conditioning said translating means for recording and reproducing; a second station including a receiver; and means controlled by said conditioning means and effective only when said translating means is conditioned for recording for connecting said microphone to said receiver by way of said amplifier to enable communication from the first to the second of said stations.

8. In a combined dictating and interoffice-communicating system: the combination of a first station including a dictating machine having a support for a record, a record-cooperating translating means, a microphone, an electrical amplifier and means for selectively conditioning said translating means for recording and reproducing; a second station including a receiver; means for connecting said microphone to said receiver by way of said amplifier to enable communication from the first to the second of said stations; and means controlled by said conditioning means and effective when said translating means is in reproducing condition for disabling said connecting means.

9. In combination, an electrical multistage amplifier having a switch operable to uncouple two successive stages thereof from each other, a record-rotating means, control means for rendering said record-rotating means effective and ineffective, and means operatively connected to said control means for intercoupling said two amplifier stages as said record-rotating means is rendered effective and uncoupling said stages as said record-rotating means is rendered ineffective.

10. In a combined dictating and interoffice-communicating system: the combination of a first station including a dictating machine having record-rotating means, a start-stop means for rendering said record-rotating means effective and ineffective, and an electrical amplifier having successive stages thereof uncoupled and a microphone connected to the input of said amplifier; a second station including means for generating sound-representing oscillations of a substantially higher level than are the oscillations generated by said microphone, and means for operatively connecting said transducer means to the input of the second of said amplifier stages; and means, controlled by said start-stop means and operative when said record-rotating means is in effective condition, for coupling said amplifier stages.

11. In a combined dictating and interoffice-communicating system: the combination of a first station comprising a dictating machine having an electrical amplifier, a microphone-re-

ceiver and control means for putting said machine into and out of operation; a second station including a microphone-receiver; a directional-control relay normally in a "listen" position to enable communication from said second station to said first station by way of said amplifier and operable into a "talk" position to enable communication from said first station to said second station; and means operatively coupled to said control means and effective when said dictating machine is in operation for disabling said relay.

12. In a combined dictating and interoffice-communicating system: the combination of a first station including a dictating machine having a multistage electrical amplifier with uncoupled successive stages, a microphone-receiver, a record-rotating means, and a start-stop means for rendering said record-rotating means effective and ineffective; a second station including a receiver and a carbon-button microphone; a directional-control relay normally in a "listen" position wherein it connects the microphone of said second station to the input of the second of said successive amplifier stages and the output of said amplifier to the receiver of said first station, said relay being adapted when energized to connect the microphone of said first station to the input of said amplifier, to couple said successive stages and to connect the output of said amplifier to the receiver of said second station; a circuit for supplying energizing current to said relay; and means controlled by said start-stop means for disabling said current-supply circuit when said dictating machine is in operation.

13. In a combined dictating and interoffice-communicating system including a dictating machine having an electrical amplifier, a record-rotating means and a record-cooperating recorder: the combination of first and second stations, a microphone at said first station, a microphone-receiver at said second station, a recording circuit for connecting the microphone of said second station by way of said amplifier to said recorder, start-stop means at said second station for rendering said record-rotating means effective and ineffective, and a control at said first station operable to break said recording circuit and to connect the microphone of said first station to the receiver of said second station through said amplifier to condition the system for communication from said first to said second station.

14. In a combined dictating and interoffice-communicating system including a dictating machine having record-rotating means, a record-cooperating recording means, an electrical amplifier for feeding into said recording means, and a transducer adapted to function as a microphone and as a receiver: the combination of first and second stations, means at said first station for connecting said transducer to the input of said amplifier, a start-stop control at said first station for rendering said record-rotating means effective and ineffective, a microphone at said second station, and means controlled by said start-stop means and effective when said record-rotating means in ineffective for connecting the microphone of said second station by way of said amplifier to said transducer to enable communication from said second to said first station.

15. In a combined dictating and interoffice-communicating system including a dictating machine having record-rotating means, a record-cooperating translating means, means for selectively conditioning said translating means for recording and reproducing, and an electrical amplifier: the combiation of a first station; a transducer at said first station adapted to function as a microphone and as a receiver; a start-stop control at said first station for rendering said record-rotating means effective and ineffective; a dictating-control means at said first station operable into a "record" position to connect said transducer to said translating means by way of said amplifier with the translating means conditioned to operate as a recorder, and operable into a "reproduce" position to connect said translating means to said transducer by way of said amplifier with the translating means conditioned to operate as a reproducer; a second station including a microphone, a support for said microphone and means for disabling the microphone when it is on said support; and means for causing the microphone of said second station to be connected by way of said amplifier to said transducer when said microphone is off said support, said dictating-control means is in "record" position and said start-stop means is concurrently in "stop" position.

16. In a combined dictating and interoffice-communicating system including a dictating machine having an electrical amplifier: the combination of a first station including a receiver normally connected to the output of said amplifier, a second station having start-stop means for putting said dictating machine into and out of operation, and means controlled by said start-stop means for disconnecting said receiver from said amplifier as the dictating machine is put into operation.

17. In a combined dictating and interoffice-communicating system including a dictating machine having a record-rotating means, a record-cooperating translating means and an electrical amplifier: the combination of a first station including a receiver normally connected to the output of said amplifier; a second station including a microphone normally connected by way of said amplifier to the receiver of said first station; and a control at said second station operable to connect the microphone of said second station by way of said amplifier to said translating means, to render said record-rotating means effective and to break the connection of said microphone to said receiver.

18. In a combined dictating and interoffice-communicating system including a dictating machine comprising an electrical multistage amplifier, record-rotating means, record-cooperating translating means and a first station including a microphone for feeding into said amplifier: the combination of a second station including a microphone connected to the input of a later one of the stages of said amplifier, a switch for uncoupling said one stage from the next preceding stage, start-stop means at said first station for rendering said record-rotating means effective and ineffective, and means coupled to said start-stop means for operating said switch to intercouple said stages as said record-rotating means is rendered effective and to uncouple said stages as said record-rotating means is rendered ineffective.

19. In a combined dictating and interoffice-communicating system comprising a dictating machine including a rotatable record support,

a drive means, a clutch for coupling said drive means to said support, a record-cooperable translating device and an electrical amplifier: the combination of first and second stations each having a receiver-microphone; a selector control at said first station having an "interoffice-communicating" position for interconnecting said receiver microphones by way of said amplifier to enable communication between said stations, said selector control being movable from said interoffice-communicating position to a "dictating" position; means coupled to said selector control for connecting the receiver-microphone of said first station to said translating device by way of said amplifier and concurrently engaging said clutch as said selector control is moved to dictating position; and a dictation control at said second station operatively connected to said selector control so that it is operable only when the latter is in interoffice-communicating position, said dictation control being adapted when operated to connect the receiver-microphone of said second station to said translating device by way of said amplifier and concurrently to engage said clutch.

20. In a combined dictating and interoffice-communicating system: the combination of a first station including a dictating machine having a motor, a record support, a clutch for coupling the motor to said support and a start-stop control for engaging and disengaging said clutch; a second station having a signaling means; means rendered operable by said start-stop means as the same is moved to "stop" position for enabling communication between the said stations and means controlled by said start-stop means at said first station for controlling said signaling means at said second station.

21. In a combined dictating-interoffice-communicating system comprising a dictating machine having an electrical amplifier and control means for putting said machine into and out of operation: the combination of first and second stations each including a microphone-receiver; a directional control at said first station normally in a "listen" position to connect the microphone-receiver of said second and first stations to the input and output respectively of said amplifier, said directional control being movable into a "talk" position to reverse the connections of said microphone-receivers as to said amplifier; a selector device at said first station operable to break the communication circuits between said stations and place said dictating machine into operation; and means controlled by said selector device for causing said directional control to be retained in said listen position while said selector device is in operated condition.

22. In a combined dictating and interoffice-communicating system: the combination of a first station including a dictating machine having a support for a record, a record-cooperating translating means, a microphone-receiver and means for selectively conditioning said translating means for recording and reproducing; a second station including a microphone-receiver; means for interconnecting said microphone-receivers to enable communication between said stations, including a directional control at said first station having "talk" and "listen" positions and biased into "listen" position for conditioning said system for communication only from the second to the first of said stations; and means effective only when said directional control is in "talk" position and said translating means is in "record" condition for conditioning said system for communication from said first to said second station.

23. In a combined dictating and interoffice-communicating system: the combination of a first station including a dictating machine having a support for a record, a record-cooperating translating means, a microphone-receiver and means for selectively conditioning said translating means for recording and reproducing; a second station including a microphone-receiver; a selector control movable into a "dictating position" to enable operation of said dictating machine from and to said microphone-receiver of said first station, and movable into an "interoffice-communicating" position for enabling communication between said stations; a directional control at said first station having "talk" and "listen" positions and effective when in "listen" position for enabling communication only from said second to said first station; and means responsive to said directional control only upon the same being moved to "talk" position while said selector control is in "interoffice-communicating" position for conditioning said system for communication from said first to said second station.

24. In a combined dictating and interoffice-communicating system: the combination of a first station including a dictating machine having record-rotating means and a record-cooperable recorder, a second station including a microphone connected to said machine and a start-stop means for rendering said record-rotating means effective and ineffective whereby the operator of said second station may use said machine for recording dictation, and a control for said first station operable to disable said start-stop control at said second station.

25. In a combined dictating and interoffice-communicating system: the combination of a first station including a dictating machine having record-rotating means and start-stop means operable to render said record-rotating means effective and ineffective, a second station having a start-stop control for rendering said record-rotating means effective and ineffective, and means rendered effective by the start-stop control of said first station as the same is moved to "start" position for disabling the start-stop control of said second station.

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