Dec. 8, 1936. R. F. MALLINA 2,063,323

TELEPHONE MESSAGE RECORDER

Filed Jan. 6, 1933 2 Sheets-Sheet 1

FIG. 2

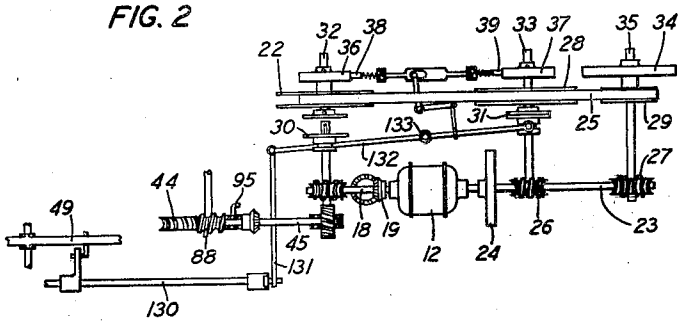
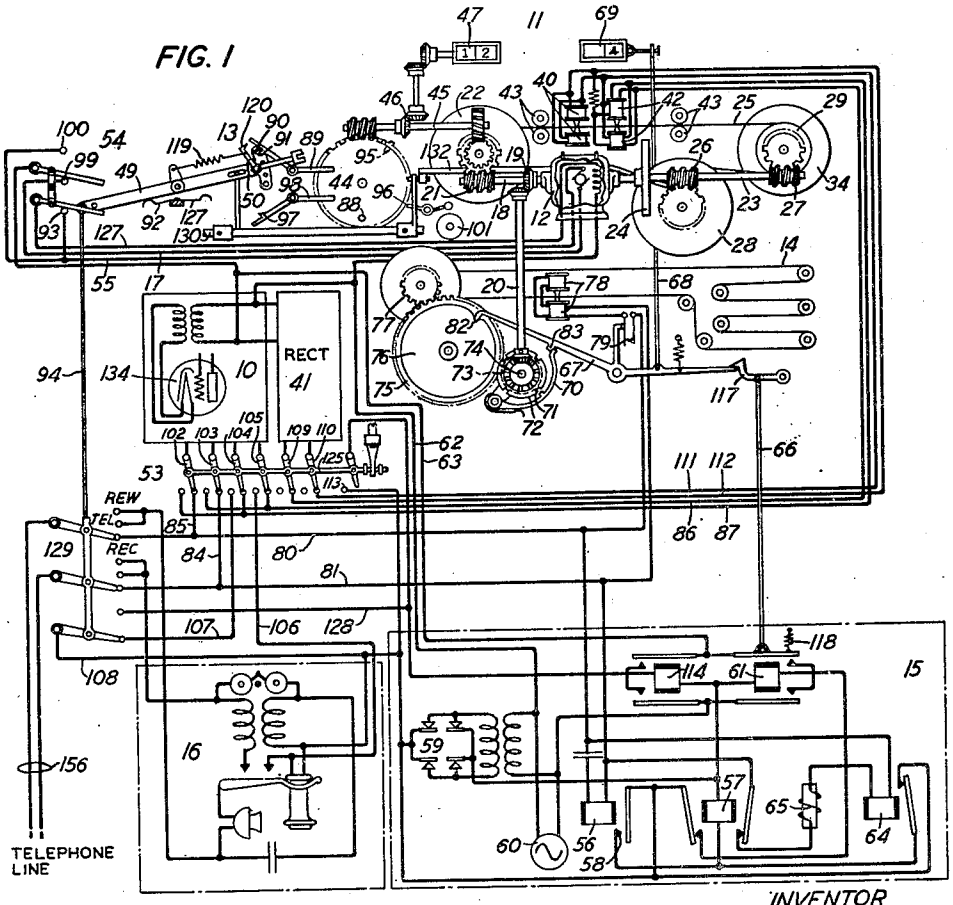


FIG. 1



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Dec. 8, 1936. R. F. MALLINA 2,063,323

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Filed Jan. 6, 1933 2 Sheets-Sheet 2

FIG. 3

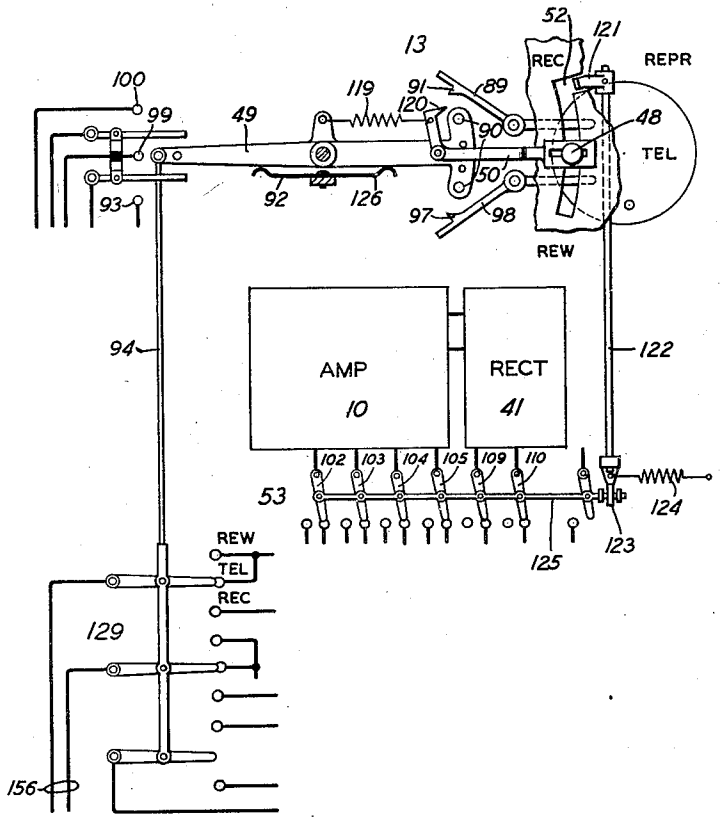
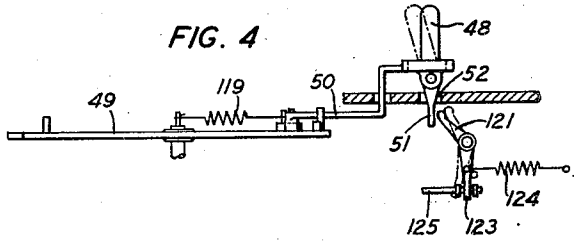


FIG. 4



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UNITED STATES PATENT OFFICE

2,063,323

TELEPHONE MESSAGE RECORDER

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Application January 6, 1933, Serial No. 650,369

5 Claims. (Cl. 179—6)

This invention relates to sound recording and reproducing systems and more particularly to telephone message recorders for receiving messages in the absence of a telephone subscriber.

The object of the invention is to provide an automatic recorder of this type which is energized only while messages are being received.

In accordance with the general features of the invention the recording system is made operative by an incoming call, the calling party is requested to proceed with the message, the message is recorded and the system then deenergized. Other incoming messages within the capacity of the record member are similarly recorded, but when the member has all been used, the system is rendered inoperative to further messages.

According to one important feature of the invention, the amplifier used in recording and reproducing the messages is energized as soon as a call is received and during the interval in which the answering message is being delivered to the calling party, the amplifier tubes which are of the indirect heater or other slow heating type are being heated to operating temperature so that the initial portion of the incoming message is not lost.

A further feature of the invention is a multiple track answering record and multipled reproducers cooperating therewith to deliver the answering message to the called party at such a level that no amplification is required.

These and other features of the invention will be more clearly understood from the following detail specification and the accompanying drawings.

In the drawings:

Fig. 1 is a general view of a system according to the invention;

Fig. 2 is a plan view of the driving mechanism;

Fig. 3 is a detail of the master control switch; and

Fig. 4 is a detail of the amplifier control on the master switch.

Referring now to the drawings, the system shown to illustrate the invention comprises (1) a magnetic telegraphone message recording unit 11 driven by the main driving motor 12 and controlled by manually operable control switch 13; (2) a call answering system including a magnetic tape 14 containing an answering message and driven by the motor 12 in response to an incoming call, and (3) a relay system 15 for controlling the operation of the answering and recording systems in proper sequence.

With the exception of the telephone set 16 which may be used independently of the recording machine, the complete system is preferably housed in a cabinet. The motor 12 has a double shaft extension. The left-hand extension 18 has a bevel gear 19 for driving the answering system drive shaft 20 and a worm 21 for driving the take-up reel 22. The right-hand extension 23 has a flywheel 24 for insuring a gradual reversal of direction of the magnetic tape 25, and worms 26 and 27 for driving the take-up reel 28 and the tape driving pulley 29. The reels 22 and 28 are alternately engaged by means of friction clutches 30 and 31 as will be more fully described and are coupled to their respective shafts 32, 33 merely by bearing friction so that the driving pulley 29 may feed the tape in either direction depending upon the rotation of the motor 12. A flywheel 34 on the pulley shaft 35 prevents fluctuations in tape speed and assists in preventing too sudden reversals in its direction of motion. The brake drums 36 and 37 are connected with their respective reels and the shoes 38 and 39 are alternately engaged therewith to prevent the tape from unwinding from whichever reel is feeding when the machine is stopped. The tape is suitably polarized by coils 40, 40 which are energized during recording by the rectifier unit 41 of the amplifier 10. The coils 42, 42 derive their depolarizing current during recording from the same source and both sets of coils are disposed between suitable guiding members 43 in the usual manner.

The machine may be adapted to have any desired recording capacity, but provision is preferably made for stopping the machine and giving a signal when the tape is full. This is conveniently accomplished by counting wheel 44 geared through a counting shaft 45 to the motor as shown to make one complete revolution during the total recording time capacity of the machine. The shaft 45 also has a gear 46 for driving the counting device 47 which is visible from the front of the cabinet and gives an indication of the total length of the messages recorded.

The operating handle 48 of the recording unit control switch 13, Fig. 3, is operable from the front of the cabinet and is mounted on a lever 49 by means of a pivoted arm 50. The handle has an extension member 51 slidably mounted in an L-shaped slot 52 in the stationary framework so that amplifier contacts 53 are normally locked in the recording position as shown, but the handle

48 may be shifted laterally to the dotted position shown in Fig. 4 to set the switch 53 for reproducing. When this is done the crank 121 turns the shaft 122 and the crank 123 against the tension of restoring spring 124 and moves the rod 125 to the left to close the amplifier contacts in the alternate position.

When the subscriber is present the handle 48 is set to "Telephone", the lever 49 is then in its horizontal position, the motor 12 is stopped, since the control switch 54 is unoperated, and the telephone line 56 is connected directly to the subset 16 so that incoming calls are received in the usual manner independently of the recording system. When the subscriber leaves he moves the handle 48 to the recording position as shown in Fig. 1. The lever 49 is locked in the position shown by pin 90 engaging detent 91 of the lever 89 so that the motor is energized over a circuit extending from the source 60, conductor 62, the series field of the motor, conductor 127, contact 93 of the switch 54, armature of the motor, conductor 17, contact 99, conductor 63, contacts of relay 61, back to the source 60. The bar 94 has operated the line switch 129 so that the line 56 is directly connected to the conductors 80, 81 with which the amplifier input and the magnets 78 of the answering system are associated. Lever 49 in operating has also turned the shaft 130 to pull the rod 131 downwardly (as viewed in Fig. 2) and cause the clutch lever 132 to turn on its pivot 133 and engage clutch 31 and the brake shoe 38 with the drum 36 preparatory to receiving the message.

The intermittent ringing current of an incoming call will then operate relay 56 to complete the circuit of the direct current relay 57 at contact 58. Relay 57 is operated by current from the rectifier 59 which is energized at all times from the alternating current source 60, and in turn operates relay 61 which starts the motor 12 and energizes the amplifier 10 over a circuit including conductors 62, 63. Since relay 56 responds only to the ringing current, direct current relay 64 is provided and connected through the choke 65 to the line so as to be operated by the line current to maintain relays 57 and 61 in their operated positions.

The operation of relay 61 pulls down the bar 66 which turns the crank 67 in a clockwise direction and frees the escapement hook 117 from the crank. Bar 68 operates the counter 69 to indicate that a call has been received, clutch lever 70 is released and moves contra-clockwise into engagement with a recess 71 in the disc 72 which is being driven through shaft 20. A gear 73 on the shaft 74 begins to revolve thereby driving gear 75, cam 76, pinion 77 and the looped answering tap 14.

The circuit of the reproducing magnets 78 has already been completed at contact 79 so that the magnets are now connected to the line over conductors 80, 81 and the reproduced message informs the calling party that the subscriber is absent, but that he may deliver his message to the recorder. The tape 14 preferably contains several identical answering messages recorded in parallel tracks and several corresponding sets of reproducing magnets are provided and connected in parallel so that the message is reproduced at a sufficiently high level that no amplification is required. The tape and the train of gears driving it are so proportioned that the cam 76 makes one complete revolution while this message is being delivered and the length of the message is such that the amplifier tubes have time to reach emission temperature before the calling party can begin to deliver his message. Upon the completion of one revolution by the cam 76 the end of the crank 67 falls again into the recess 82, the detent 83 intercepts the clutch lever 70 disengaging the gear 73 from the shaft 74 and stopping the tape 14.

The switch 13 being set for recording, the incoming message currents are suitably amplified and conducted to the translating magnets 42 over a circuit including conductors 84, 85, the amplifier and conductors 86 and 87. As explained above the amplifier has already been energized by the operation of relay 61 and while the answering message was being given the cathodes 134 of tubes in the amplifier have been heating and are now at emission temperature. As the tape moves from left to right the magnets 40 erase previously recorded messages and polarize the tape to receive the incoming message being impressed on magnets 42. Since clutch 31 is engaged, the reel 28 is revolving contra-clockwise to take up the tape from the driving pulley. When the calling party hangs up the central office operator pulls down the connection thereby releasing relay 64 which releases relays 57 and 61 and deenergizes the system. The release of relay 61 permits spring 118 to move the bar 66 upwardly and engage the hook 117 with the end of lever 67 preparatory to answering the next call. Subsequent calls within the limits of the recording tape will be recorded in a similar manner, each call and the recording time being registered by the counters 69 and 47. When the tape has been almost all used the pin 88 on the counting wheel 44 which is moving contra-clockwise strikes the pivoted latch lever 89 and releases the pin 90 from the detent 91 and lever 49 is forced by spring 92 back to its neutral or telephone position. This opens the motor switch, disengages clutch 31 and pulls the bar 94 to connect the line with the telephone set. A pin 95 on the wheel 44 engages the lever 96 and operates a bell or other suitable signal 101 to indicate that the tape is full. This signal may be of a visual type to advise the operator that the message is incompletely recorded or it may be adapted to impress an audible signal on the line in any of the ways known to the art.

When the subscriber returns he first moves the control switch handle 48 downwardly to the "Rewind" position where it is locked by pin 98 engaging detent 97 of the latch lever 98 until the tape is fully rewound. The control switch 54 is now closed on contacts 99 and 100 thereby energizing the motor armature leads 17 and 55 in the reverse direction with respect to the series field and causing the motor 12 to drive the pulley 29 contra-clockwise. Clutch 30 is now engaged and clutch 31 disengaged by the linkages already described so that the tape is pulled from reel 28 and rewound on reel 22.

During rewind the counting wheel 44 is turning clockwise and when the tape is fully rewound the pin 88 strikes the latch lever 98 disengaging pin 90 from detent 97 and permitting the spring 126 to return switch 54 to normal and stop the motor. Just before this happens pin 95 strikes the lever 96 and operates the signal 101 to advise the subscriber that he may now reproduce the messages. It will be noted that during rewind the switch 129 is closed on the upper set of contacts so that the telephone set is connected directly to the line to receive incoming calls and that conductor 108 is connected to conductor 128 to complete a circuit for relay 114.

The operation of this relay, which has its contacts in parallel with those of relay 61 completes the power supply circuit for the amplifier and motor since during rewind relay 61 is not operated.

The operator then operates the handle 48 so that the lever 49 is in the recording position and then moves the handle laterally to the dotted reproducing position (Fig. 4) thereby moving the amplifier output switch from the position shown to its alternate position so that as the tape again moves forward between the magnets 42 the reproduced message currents will traverse a circuit including conductors 86, 87, amplifier input terminals 102, 103, output terminals 104, 105, conductors 106, 107, 108 to the receiver in the subset 16. The operation of the switch 53 has already disconnected the rectifier output terminals 109 and 110 from the conductors 111, 112 to prevent the message from being erased by the magnets 40 before reproduction. Since relay 61 is not operated during reproduction contact 113 is provided on the switch 53 to complete a circuit for relay 114 from the rectifier 59, conductor 115, contact 113, conductor 116 through the relay winding to the other terminal of the rectifier. The operation of this relay connects the power source 60 to the amplifier and motor independently of the relay 61.

When the subscriber has listened to the message he again rewinds the tape and then sets the switch 13 either to "Telephone" or "Recording" as desired. When set for recording or reproducing the operation of the machine may be interrupted at any time and set to "Telephone" or to "Rewind" as for example when a reproduced message is not understood. In such a case pin 90 will be held by detent 91 as shown in Fig. 2 and referring to Fig. 3 it will be seen that if the handle 48 is pulled down the arm 50 will pivot against the tension of its spring 119 and the extension 120 will force the latch lever to rotate and release pin 90 so that lever 49 returns to its neutral or telephone position and stops the machine.

What is claimed is:

1. In a message recorder, a calling line, a moving record member and translating devices cooperating therewith, an amplifier, means energized over the calling line for connecting the amplifier to the devices for recording and reproducing, and a reproducing system for impressing an answering message on the calling line independently of the amplifier comprising a plurality of records of an answering message, individual reproducers therefor, and means for connecting said reproducers with the calling line to engage the line while the amplifier is being conditioned for operation.

2. In a message recording system the combination with a telephone set, a telephone line normally connected to the set, a reversible moving record member, a translating device cooperating therewith, and an amplifier having its output circuit normally connected to the translating device, of a control lever operable in one direction to move the tape and connect the line to the input circuit of the amplifier, an amplifier switch, and means associated with the lever and operable only when the lever is so operated for connecting the amplifier input to the device and the output to the telephone set.

3. In a message recording system the combination with a telephone line, a telephone set, a message recording and reproducing unit including a tape record member, a control lever for reversing the direction of motion of the tape and for disconnecting the telephone line from the recording system and connecting it to the telephone set, of means for locking the lever in its operated position, means associated with the recording system for automatically releasing the lever from either operated position, and manually operable lever releasing means effective only when the lever is in one of its operated positions.

4. In a message recording and reproducing system the combination with a telephone set, a telephone line and a recording system including a main record member, feed and take-up reels therefor, a driving motor, individual connecting clutches for the reels, a translating device cooperating with the member, an amplifier normally deenergized, a switch controlling the input and output circuits of the amplifier, and a timing element associated with the main record member, of unitary control mechanism comprising a lever, linkages for operating the clutches, a switch for connecting the line to either the set or the amplifier input circuit controlled by the lever, means for locking the lever in alternate recording and rewinding positions, an operating handle for the lever, means operable when the lever is in the recording position for operating the amplifier switch, and means responsive to the action of the timing element for releasing the lever from either of its operated positions.

5. In a message recorder, a calling line, a moving record member and translating devices cooperating therewith, an amplifier having tubes with slow heating cathodes associated with the devices, a source of power for the amplifier, a reproducing system including a plurality of recordings of an answering message each having a time of reproduction at least equal to the time required to heat the cathodes of the tubes to operative temperature, and means operated by current over the calling line for reproducing said recordings simultaneously directly into the line and for connecting the source of power to the amplifier to heat the cathodes of the tubes to operative temperature while the line is engaged in transmitting the answering message.

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