

Oct. 19, 1943.

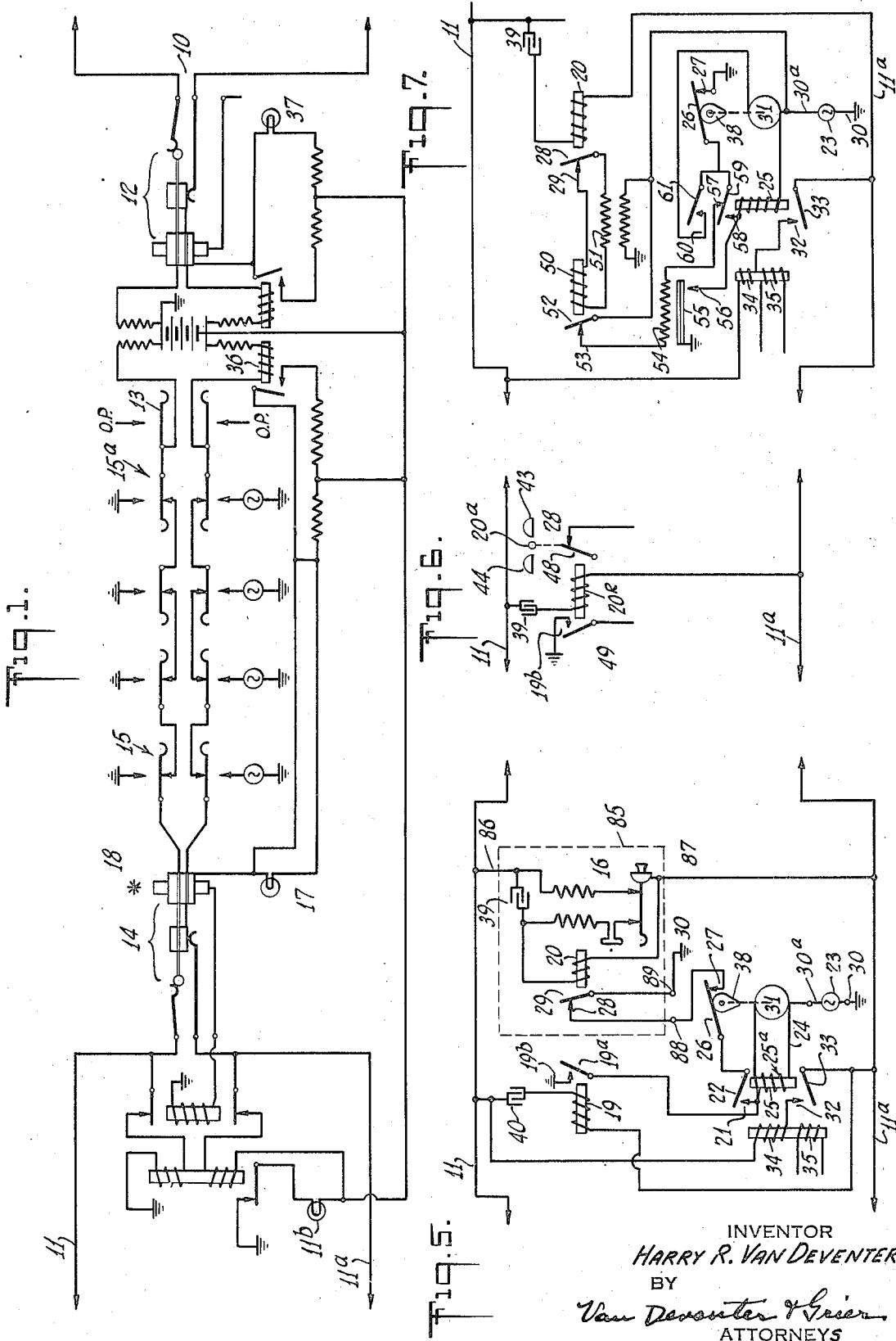
H. R. VAN DEVENTER

2,332,359

COMBINED TELEPHONE AND PHONOGRAPH

Filed Sept. 26, 1941

3 Sheets-Sheet 1



INVENTOR
HARRY R. VAN DEVENTER
BY
Van Deventer & Grier
ATTORNEYS

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H. R. VAN DEVENTER

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3 Sheets-Sheet 2

Fig. 2.

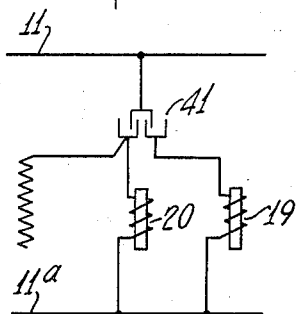


Fig. 4.

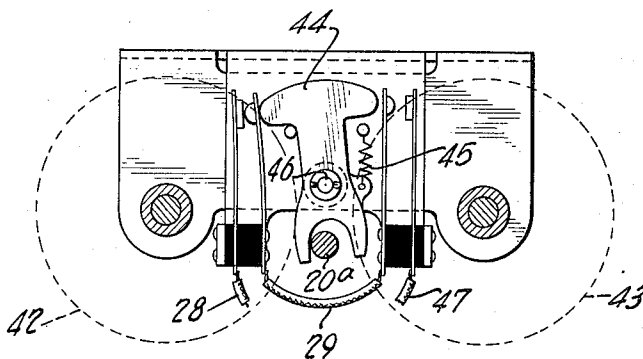


Fig. 3.

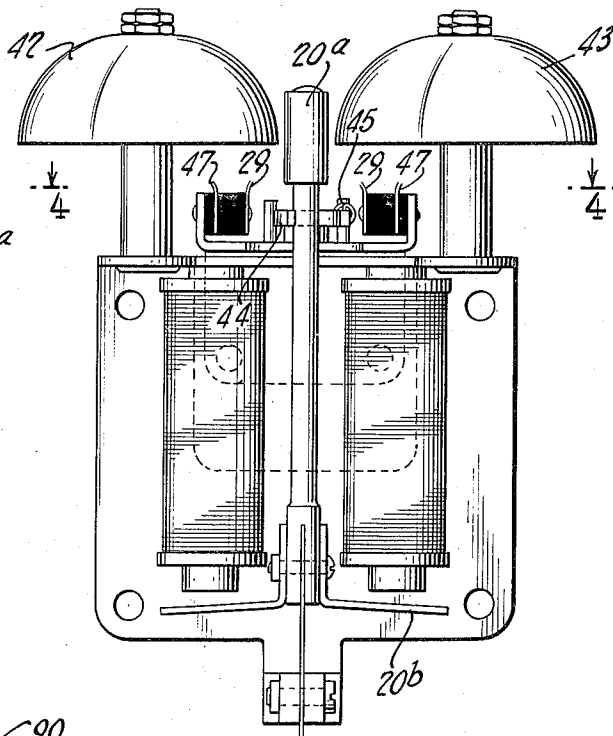
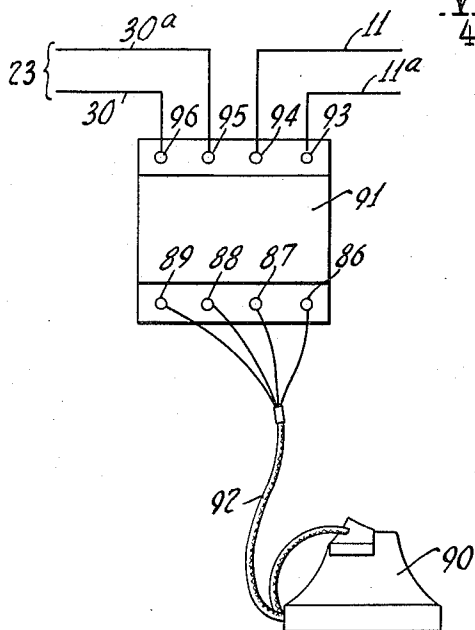


Fig. 11.



INVENTOR
HARRY R. VAN DEVENTER
BY
Van Deventer & Grier
ATTORNEYS

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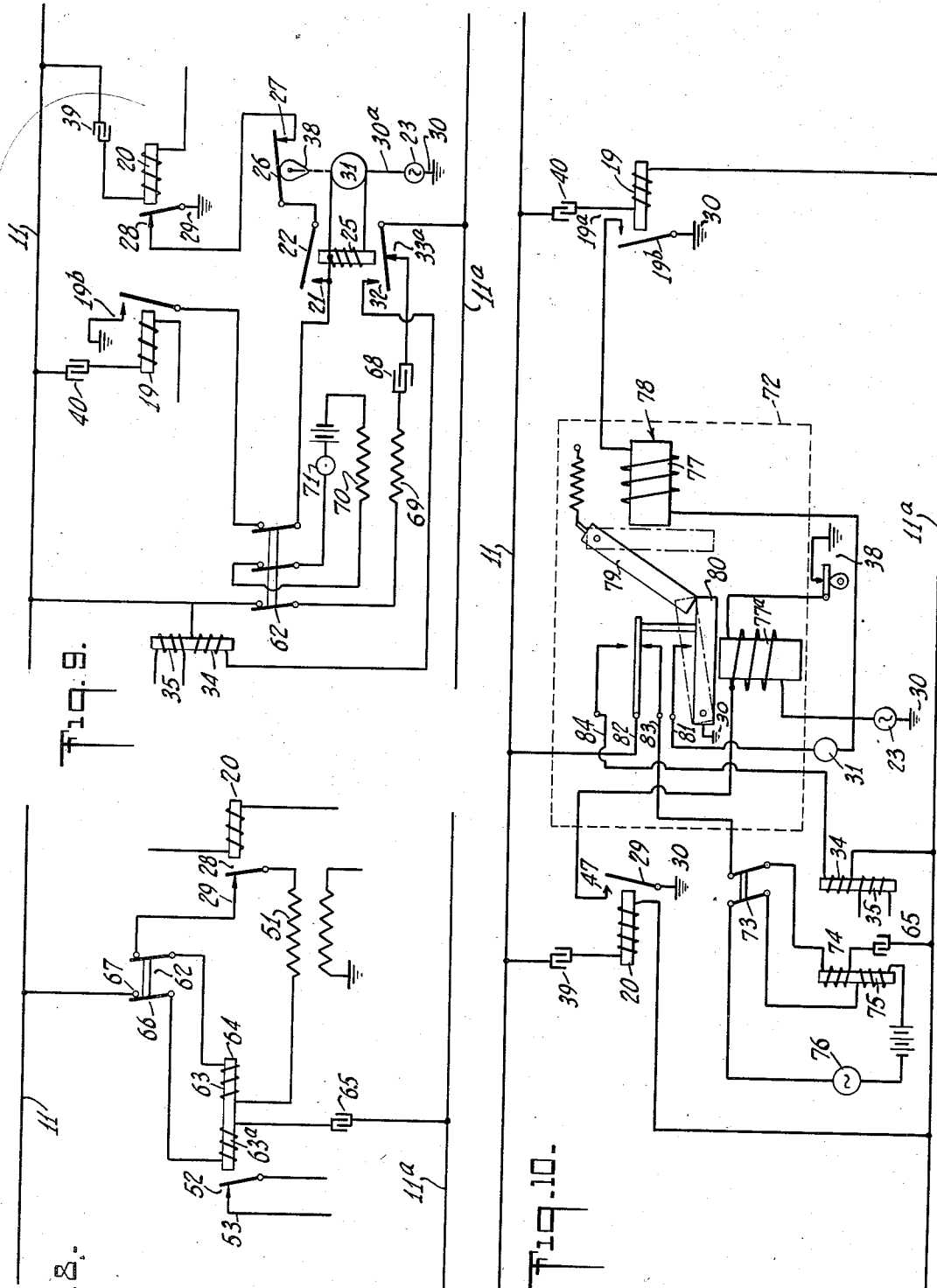
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3 Sheets-Sheet 3



INVENTOR
HARRY R. VAN DEVENTER
BY
Van Deventer & Grier
ATTORNEYS

UNITED STATES PATENT OFFICE

2,332,359

COMBINED TELEPHONE AND PHONOGRAPH

Harry R. Van Deventer, New York, N. Y., assignor,
by mesne assignments, to Telephone Answering
and Recording Corporation, New York,
N. Y., a corporation of Delaware

Application September 26, 1941, Serial No. 412,409

33 Claims. (Cl. 179—6)

This invention relates to a telephone system wherein phonographs may be used at the subscribers' stations (hereinafter termed sub-set) to transmit and record messages.

An object is to provide a system of the class described wherein existing equipment commonly found at central offices can be used to control the phonographs at the substations without change in said equipment and with but slight change in the usual operative procedure now in common use in the majority of exchanges.

Another object is to provide a system of the class described wherein the phonographs may be controlled over the telephone lines to which they are connected by means located at the central office and under the control of an operator thereat.

A further object is to provide in the system of the class described a phonograph located at a sub-station and controlled by the ringer of the sub-set.

Other objects and some of the advantages of the invention will be apparent from a perusal of the following specification where, by way of illustration, a preferred embodiment of the invention is disclosed. It will be obvious, however, that once the inventive concept is understood, that various changes and modifications can be made in the type of system and the apparatus used therewith, and such changes are deemed to be within the scope of the appended claims.

A subscriber leaving his telephone unattended often desires to have some means to leave a message for callers and to record any messages that persons calling may wish to leave. This can be done by connecting a phonograph to the subscriber's line, but obviously if the subscriber is absent the starting and stopping of the phonograph must be taken care of automatically, as disclosed in pending U. S. application Serial No. 333,268, filed May 4, 1940, now Patent No. 2,261,420, dated Nov. 4, 1941. Instead, the phonograph may be controlled from the central office, in which case it is highly desirable that the standard equipment commonly found in the central office and used in connection with the operation of the telephone system can be employed. The following specification discloses how this can be accomplished.

Referring now to the drawings:

Figure 1 is a schematic diagram of the circuits in a common battery telephone exchange, to which telephone and phonograph equipment may be connected and operated;

Figure 2 is a circuit diagram of a condenser as used in the system;

Figure 3 is a front view of a ringer equipped with circuit control contacts;

Figure 4 is a sectional view of the ringer on the line 4—4 of Figure 3;

Figures 5 to 10, inclusive, are circuit diagrams of a combined telephone and phonograph sub-station equipment; and

Figure 11 is a diagram of connections of a combined telephone and phonograph equipment.

In Figure 1 no attempt has been made to show these circuits in detail, and only sufficient of the circuits and apparatus have been shown to enable one skilled in the art to properly understand the operation of said circuits in connection with operating phonographs by remote control. It will be understood that the central office equipment may be of any known character; usually in such exchanges there are a plurality of signaling devices. In the figure these comprise the usual four ringing keys commonly employed with systems of harmonic ringing where four frequencies are provided—usually of $16\frac{2}{3}$, $33\frac{1}{3}$, 50, and $66\frac{2}{3}$ cycles, respectively, these frequencies being supplied by ringing machines or interrupters so that when the operator depresses one of the ringing keys, ringing current will be applied to the called subscriber's line for a predetermined period followed by a silent period. These four currents as just described constitute a plurality of signaling means, and are hereinafter referred to as such, and for further description of such harmonic party line systems reference is made to Page 423 of *Telephonology* by H. R. Van Deventer, Published by McGraw-Hill Book Co., New York, in 1912.

It will be understood, however, that the plurality of signaling means may comprise some other signaling means than the harmonic frequencies just described. It may comprise the line-to-ground-system disclosed on page 175 of *Telephonology* above referred to, or the direct-current-pulsating-biased-bell-system referred to on page 179 of *Telephonology*, or the high and low frequency system referred to on page 185 of *Telephonology*, or in fact, any system in which there are a plurality of signaling means at the central station adapted either by difference in the characteristics of the signaling current, or a difference in the strength and/or polarity thereof, or by reason of a difference in any other manner, to enable such sources to selectively operate signal means located at the sub-sets. Therefore, the inventive concept herein disclosed comprises the utilization of whatever signaling means is present in the exchange to either ring the bell at the sub-set or operate, or start, or stop a phonograph instrument located thereat.

Referring to Figure 1, it will be observed that no special apparatus is necessary at the exchange, the circuits shown being of the general type in extended use for many years.

Referring to Figure 1,—the numeral 10 denotes a subscriber's line hereinafter termed the calling line, and 11 and 11^a the wires of a sub-

scriber's line hereinafter termed the called line. The line and cut-off relays, line lamp and associated equipment is omitted in connection with line 10, but these parts are shown in connection with the called line 11, 11^a. It will be understood that line 10 has the same equipment and that it operates in the usual way.

The operator's cord circuit is of any type and the various parts and their operation is well known.

Assuming that the calling line 10 has called: The operator places the answering plug 12 in a jack of line 11, 11^a, depresses the listening key 13 and answers the call in the usual manner; upon being told that line 11, 11^a, is wanted, the operator then places the calling plug 14 in jack 11 and depresses the proper ringing key, say 15, thereby connecting 16 cycle ringing current to the called line via the plug 14. If machine ringing is used to operate the ringer 20 at the telephone instrument 16 connected to the called line, it will ring at intervals until the called subscriber answers, whereupon the supervisory lamp 17 in the calling cord will be extinguished.

If the called line is equipped with a phonograph, the jack or jacks connected thereto at the central office will be suitably marked as shown at 18, which the operator notes when making the connection, and should the called subscriber fail to answer, the supervisory lamp 17 so indicating, the operator may then notify the calling subscriber by depressing the listening key 13 and saying: "They do not answer, but there is a recording phonograph connected to the telephone and if you wish to leave a message, I will connect you"; and if the calling subscriber so desires, the operator then depresses one of the ringing keys, say 15^a—thereby connecting the 66 cycle ringing current to line 11 (any frequency can be used except that used to operate the ringer 20 at telephone 16, as just described). The 66 cycle current flowing in the circuit of the called line will operate the relay 19 responsive to this current only, and unaffected by the current used to operate the ringer 20.

When relay 19 closes contacts 19^a, 19^b, a circuit is established from the source of alternating current 23 (which may be the usual house lighting circuit), via conductor 24, winding 25^a of a control relay 25, contacts 21, 22, through contacts 26, 27, of cam switch 38, via contacts 28, 29, on ringer 20 to the other side 30 of the source of current 23 (one side of the A. C. source of current 23 is shown "grounded" at 30 merely to simplify the diagram).

The relay contacts 21, 22, also close a circuit through the phonograph motor 31 which begins operation.

Relay 25 has an additional pair of normally open contacts 32, 33, which complete a circuit from line 11, 11^a, through one winding 34 of a repeating coil, the other winding 35 of which is connected to the input and/or output circuits of the phonograph driven by motor 31. As the winding 34 forms a path for direct current from line 11 to 11^a, the supervisory relay 36 in the calling cord will operate and extinguish the supervisory lamp 17. The supervisory lamp 37 in the answering cord is extinguished as the calling subscriber on line 10 has the receiver off the hook. Thus both supervisory lamps in the cord circuit are extinguished during the operation of the phonograph.

The calling subscriber now speaks the message he wishes to record, and the voice currents travel

in the usual manner over line 10, through the connecting cord circuit and via line 11, 11^a, through the winding 34 of the repeating coil and via winding 35 to the talking circuit of the phonograph. These circuits (not shown) contain the usual recording and reproducing means such, for example, as an amplifier and a cutter and pickup, acting in the usual way to record and reproduce speech upon the record being driven by the motor 31. While these talking circuits could be connected directly to the line wires 11, 11^a, it is preferable to use a repeating coil so that the circuits can be properly matched for impedance, etc.

When the calling subscriber on line 10 hangs his receiver on the hook, thus operating the supervisory relay in the answering side of the cord circuit, supervisory lamp 37 will be illuminated and the operator knows the recording is completed. The operator thereupon depresses key 15, thus sending 16 cycle current out over line 11, 11^a. This operates the ringer 20 and opens contacts 28, 29, thereby opening the circuit through the winding 25^a of relay 25 which opens the two sets of contacts 21, 22 and 32, 33. The latter contacts open the circuit through the repeating coil winding 34, which releases the supervisory relay 36 in the calling side of the cord circuit and illuminates the supervisory lamp 17, thereby notifying the operator that the phonograph has been disconnected from the line 11.

The contacts 21, 22, open the circuit through the phonograph motor 31, which ceases operation.

Thus a number of short messages can be recorded on the phonograph record. Such 8" records will record a total of about five-and-one-half (5½) minutes' conversation. Should the end of the record be reached, the cam switch 38 controlling normally closed contacts 26, 27, operated at the proper time by motor 31, will open the circuits from the A. C. source 23 through the motor 31 and the winding 25^a of relay 25, thus disconnecting the motor and opening all contacts on relay 25. This opens the circuit through winding 34 on the repeating coil and operates the supervisory lamp 17.

The contacts 26, 27, may be so arranged that once opened, they will remain open until the cutter arm is moved, which it is necessary to do to place a new record blank on the phonograph. A detailed description of the operation of such a cam switch is given in the co-pending application before mentioned.

It will be noted that the normal operation of ringer 20 does not affect the operation of the phonograph which does not operate until relay 25 is operated. After the phonograph is started by relay 25, it may then be stopped by the actuation of the ringer 20. Thus the operator at the central office can stop and start the phonograph at will except when the record is exhausted and cam switch 38 is operated, at which time it would be impossible to start the phonograph until a record blank is placed thereon.

Also it will be observed that the operation of the phonograph does not affect the telephone 16. Should the subscriber here wish to answer while the phonograph is operating, he may do so, in which event the phonograph will record the two-way conversation. However, in this case the supervisory lamp 17 will be controlled by the hook switch of the telephone 16, or by the operation of relay 19, or cam switch 38—which ever is last in sequence.

Condensers 39, 40, are placed in series with relay 19 and ringer 20 to render these opaque to direct current. If desired, these condensers can be combined into one three-plate condenser as shown at 41 in Figure 2, thus saving in space and equipment.

The contacts 28, 29, may be built into the usual telephone ringer, or can be applied thereto by means of an attachment constituting a circuit controlling device, as shown in Figures 3 and 4, wherein 20^a denotes the hammer of a ringer adapted to strike gongs 42, 43.

Suitably mounted on the frame of the ringer is the yoke 44 which is biased, as shown by spring 45 and operates the contacts 28, 29, 47. When the hammer is operated, the yoke is moved about the pivot 46 to cause one of the contact springs 29 to leave the contact 28, thus opening the circuit between 28 and 29, which circuit is normally closed.

If a "make" contact is desired, it is provided at 47 and then when the ringer operates, a circuit is made between 29 and 47 for purposes hereinafter described in connection with Figure 10. The contacts can, of course, be operated by the armature 20^b of the ringer, or in any other manner by the operation thereof, the showing in Figures 3 and 4 being merely illustrative of the broad idea.

Figure 6 shows an alternate form of operating circuit for the phonograph. Here the ringer 20R has two armatures 48, 49, the former carrying the bell hammer 20^a and being responsive to a certain frequency—say 16 cycles—and the other responsive to some other frequency—say 66 cycles. The operation of this circuit is in all respects identical with that shown in Figure 5, except relay 19 in said figure is omitted.

Figure 7 shows an alternate form of operating circuit for the phonograph. Here the ringer 20 has in a normally closed circuit with its contacts, the winding of a holding relay 50 and the low-voltage winding 51 of a transformer, the other winding of which is connected to a source of A. C. current as shown. When the ringer 20 is operated, opening its contacts 28, 29, the relay 50 closes its contacts 52, 53. This completes a circuit from the A. C. current source 23 through the heater coil 54 of a thermal relay having the normally open contacts 55, 56. This relay is so adjusted that it will not close its contacts except after a predetermined number of machine ringing periods of current application have been made to ringer 20, which controls the circuit therethrough. In other words, this comprises a time delay mechanism and the operator can operate the ringer 20 in the usual manner for a period of—say one-half ($\frac{1}{2}$) minute, without it applying sufficient current to the coil 54 to cause contacts 55, 56, to close. This enables the operator to operate the ringer 20 in the sub-set in the usual way.

But if the called subscriber does not answer, the operator may so inform the calling subscriber, and then if he desires to record, the operator again applies ringing current to ringer 20 for a sufficient time to cause coil 54 to heat up and close its contacts. This operates the relay 25 which via contact 57 opens the circuit through coil 54. Relay 25 locks itself in circuit with the current supply 23 as shown, via contact 58; armature 59 and contacts 60 and 61 and the contacts 26, 27, of cam switch 38, thus starting the motor 31.

Contacts 32, 33, on relay 25 also close the cir-

cuit from line 11, 11^a, through repeating coil winding 34, so that the supervisory lamp 17 in the cord circuit is extinguished. With this circuit the cam switch 38 is so arranged that it is momentarily opened after some suitable interval, say 30 seconds, thereby releasing relay 25. Also switch 38 can be arranged to remain open at the end of the record, as previously described.

With this circuit, the operator only starts the phonograph. It may stop itself by the operation of cam switch 38 controlled by motor 31, at the end of a predetermined period, and then is automatically re-set in position awaiting the next call.

Any other suitable time-delay device can be employed other than that described here by way of illustration.

Figure 8 shows an alternative form of operating circuit for the phonograph. Here the ringer 20 has in series with its normally closed contacts 28, 29, a manually operated switch 62 in series in the circuit through the winding 63 of relay 64. A second winding 63^a on this relay is connected to line 11 via the condenser 65 and contacts 66, 67, on key 62. As the windings 63, and 63^a, are in inductive relation, the hum of the 60 cycle current from transformer winding 51 will be reproduced in the winding 63^a and imposed on the line 11, 11^a, so that the operator plugging into this line is immediately informed by the hum (the listening key 13 being thrown) that the subscriber is not at the telephone but has thrown switch 62 and, therefore, the phonograph is ready to receive a message. In all other respects this circuit may be like the ones previously described, the inventive concept here being the provision of the signal tone thrown on the line via switch key 62 (without operating the line lamp 11^b) to notify the operator that the subscriber is away from the telephone and the phonograph is connected to receive messages.

Figure 9, an alternate form of circuit, shows the signal tone impressed on the line via a separate coil, the winding 63^a of Figure 8 being omitted. Here relay 25 is provided with a normally closed contact 33^a in circuit across lines 11, 11^a, with the condenser 68 and a winding 69 of a repeating coil having another winding 70 adapted to produce a distinctive signal tone produced by any suitable means such as interrupter 71, the local circuit of which is controlled by contacts on switch 62 as shown.

With the circuit Figure 9, when the operator plugs in the line, the signal tone will be heard and this may be different from the 60 cycle tone occurring with the circuit shown in Figure 8, which tone may be confusing to the operator, as it could be caused by induction or from other causes.

Upon hearing the signal tone, and learning that the calling subscriber desires to record, the operator depresses the 66 cycle key 15^a and operates relay 19 which starts the operation of the phonograph as previously described in connection with preceding figures. When relay 25 operates the signal tone circuit across lines 11, 11^a, is opened.

The phonograph is stopped by the operator operating ringer 20, or by the cam switch 38, as previously described.

Manual switch 62 is opened when it is not desired to use the phonograph.

Figure 10 shows an alternate form of circuit using a commercial form of interlocking relay, shown within the dotted line 72 in position

awaiting a call. When in this position, the sub-set is used in the ordinary manner.

Upon leaving the telephone, the subscriber closes switch 73 which completes a circuit from line 11 to line 11a through the winding 74 of the signal-tone repeating coil, said winding being in inductive relation with winding 75 containing a suitable interrupter 76 for producing the tone. When the operator plugs into the line, this tone will be heard, thereby notifying the operator that the instrument has been set to record.

The operator now depresses key 15a thereby operating the relay 19 which closes its contacts momentarily, thereby completing a circuit from the A. C. source 23 through winding 77 of the release magnet 78 of relay 72. This draws the locking armature 79 of the right and releases the operating armature 80. Armature 80 contacts with 81 and completes a circuit from the A. C. source 23 through motor 31 of the phonograph.

Contact 82 leaves contact 83, thereby opening the circuit from line 11 to 11a through winding 74, and re-establishing a circuit from line 11 via contact 84 through the winding 34 of the repeating coil, and the recording proceeds as previously described.

At the termination of the recording, the phonograph either stops itself via the action of cam switch 38 under the control of motor 31, or the operator stops the motor by depressing key 15 thereby operating ringer 20 which closes contacts 29-47 thereby completing a circuit from the A. C. source 23 through winding 77a. This pulls armature 80 downward and same is held down by the locking armature 79. The contacts 80-87, 82-83-84, are thus operated and the circuits are restored to waiting position, as shown in the figure.

While the telephone instrument 16 is shown only in Figure 5, it will be understood that this telephone instrument comprises the usual transmitter, receiver, hook-switch, induction coil, ringer 20, and condenser 39, may be connected across the line circuit shown in any of the other figures and that the talking circuits of this instrument may be varied within wide limits.

However, it will be noted that in many installations the telephone instrument is portable and of the so-called French phone or Monophone type, in which the ringer is located in the cradle or base of the instrument on which the hand-piece comprising the transmitter and receiver is supported, and in connection with the operation of the phonograph instrument, some of the circuits Figures 5 to 10 inclusive, it is necessary that the circuits to the contacts on the ringer be brought out of the Monophone. In Figure 5, dotted line 85 encloses the parts of the telephone instrument proper and it will be seen that a four conductor cord is necessary in order to bring out the necessary circuit connections. The four conductors of this cord are indicated by the numerals 86 to 89 inclusive. Eighty-nine (89) is shown as a ground connection for the sake of clarity, but it will be understood that it connects to one side 30 of the A. C. source of current 23. It will be apparent from a study of the diagram that an ordinary four conductor cord can be used and that existing sub-sets equipped with two or three conductor cords can have their ringers equipped with contacts to operate in the manner herein described, using an ordinary four conductor cord to complete the circuits into the Monophone and that this conversion is easily

done without removing the sub-set from the subscriber's premises. Such telephones may, therefore, be connected without changing their external appearance, and when so converted their regular use and portability is not impaired. They may still be used on a table or desk in the usual manner, as they do not have to be physically associated or positioned in any particular way in respect to the associated phonograph.

Figure 11 shows how the sub-sets, generally indicated by the numeral 90, may be connected to the phonograph instrument, generally denoted by the numeral 91, the four conductor cord 92 of a proper length being employed, the phonograph instrument 91 being equipped with suitable binding posts or terminals for the four conductors 86 to 89 inclusive of the cord 92 as well as the terminals 93, 94, for the incoming telephone line wires 11 and 11a and the terminals 95, 96, for the line wires 30, 30a leading to the local A. C. current source which may be the usual 110 volt lighting circuit commonly found in residences.

It will be seen from the foregoing that the installation of a phonograph to be associated with a telephone instrument is comparatively easy. It is customary to place the two instruments within easy reach of each other as the subscriber must manipulate the switches on the phonograph instrument such as the switch 62 and must also place record blanks thereon from time to time; although, it is obvious that the phonograph instrument 91 could be located, for example, in one room and the telephone instrument 90 in another, the instruments being connected together by suitable circuit wires, as shown in Figure 11.

While throughout this specification the phonograph has been described as used for recording only, it will be obvious that if the phonograph is equipped with a talkout record—that is to say, arranged to first deliver a message before recording one—that upon the operation of the phonograph, it would first deliver to the calling subscriber any message that the called subscriber has left on the record in the instrument, and then, after having delivered said message, the phonograph would record any message the calling subscriber would care to leave. Such a phonograph instrument is described in detail in the co-pending application hereinbefore mentioned, and as the instant application is limited to the circuits and instrumentalities necessary to control the phonograph the construction of that instrument per se is not described in detail.

Obviously, the ringer 20, or 20r, or the relay 64 of Figure 8, with their associated condensers such as 39 or 65, can be made part of the phonograph equipment 91, in which event the conductors 88 and 89 coming out of the Monophone are dispensed with and the Monophone would have the ordinary two conductor cord containing conductors 86, 87, in which event the Monophone would be equipped with an ordinary ringer and the functions herein described in connection with 20 or 20r would then be performed by equivalent relays. These relays, of course, would have the necessary resistance and impedance to be opaque to the voice currents flowing in the telephone line and would have no effect thereon.

In the event that the ringer of the sub-set is not used to control the phonograph instrument, then obviously when a phonograph instrument is placed alongside an existing sub-set no changes whatever need be made in the latter as the phonograph instrument is merely bridged across

the telephone line. All of the equipment necessary to operate the phonograph is then mounted in one cabinet such as that indicated at 91.

What is claimed is:

1. In a telephone system having a central office, a telephone line circuit connected thereto, a telephone instrument connected to said line circuit, a sound device associated with said telephone instrument, means connected to said line circuit and controllable from said central office for connecting said device to said line circuit, and means controllable from said central office associated with said device for disconnecting same from said line circuit.
2. In a telephone system having a central office equipped with a plurality of signaling means having differing characteristics, a telephone line connected to said office, said line having a telephone instrument connected thereto including signal receiving means responsive to one of said signaling means, a sound device, means under control of another of said signaling means for connecting said device to said line, said device being thereafter disconnectable by the operation of said signal receiving means.
3. In a telephone system including a central office having a plurality of signaling means, a telephone line connected to said central office, said line having a telephone instrument connected thereto, a sound device, means connected to said line and under the control of one of the signaling means at the central office for connecting said sound device to said telephone line, and means forming part of said telephone instrument for disconnecting said sound device from said line, said last means being operable by another of said plurality of signaling means at said central office.
4. In combination with a telephone line, a signaling device connected thereto, a condenser in series with said device, a circuit controlling device connected to said condenser, and a sound device controlled by said last device.
5. In combination with a telephone line, a signaling device connected thereto, a condenser in series with said device, a circuit controlling device connected to said condenser, and a sound device controlled by said devices.
6. In combination with a telephone line, a circuit controlling device connected thereto, a condenser having a plate connected to said line and another plate connected to said device, a second circuit controlling device connected to said line, a third plate in said condenser connected to said last device, and a sound recording device controlled thereby.
7. In combination with a sub-set having a ringer, a circuit controlling device associated with said ringer and actuated thereby, and a sound recording device having a motor serially included in circuit with a source of current and said circuit controlling device.
8. In combination with a sub-set having a ringer, a circuit and a circuit controlling device therein associated with said ringer and actuated thereby, a sound recording device having a motor serially included in circuit with a source of current and said first device, and a second circuit controlling means operable independently of said first means connected to said first circuit to control the same.
9. In combination with a telephone line, means including a telephone ringer connected to said line and having contacts mechanically actuated by the movement of said ringer, a circuit including said contacts, a source of current and means for operating a phonograph, a phonograph including a motor driven from said current source and controlled by said last means, and means controlled by said phonograph for disconnecting said motor from said current source.
10. In a telephone system, a central office having sub-set signaling means thereat, a telephone line connected to said office, a phonograph connected to said line, means adapted to be operated by said signaling means for starting said phonograph, and means for stopping said phonograph including a source of current independent of said signaling means and operable independently thereof.
11. In a telephone system, the combination with a telephone line, of a sub-set having a ringer, contacts controlled by said ringer, a phonograph instrument spaced apart from said sub-set, and circuit connections extending between said sub-set and said phonograph instrument whereby the latter is controlled by the operation of said ringer.
12. The combination as claimed in claim 11 wherein the sub-set is of the portable type having the ringer in the base of the set, and the latter is connected to the phonograph instrument via a flexible conducting cord, whereby the sub-set is movable independently of the phonograph instrument and usable independently thereof while remaining electrically connected thereto.
13. In a telephone system, a telephone line circuit, a phonograph connected to said line circuit, a telephone instrument connected to said line circuit, and means in said phonograph and telephone instrument for conjointly controlling the operation of said phonograph by means of current received via said telephone line circuit.
14. The combination as claimed in claim 13 wherein the means in the telephone instrument for controlling the operation of the phonograph instrument includes a telephone ringer.
15. The combination as claimed in claim 13 wherein the means in the phonograph instrument for controlling the same includes a relay, the contacts of which control the driving motor of said phonograph.
16. In a telephone system, a telephone line, a relay device connected thereto having two separate armatures responsive to currents of differing characteristics, a sub-set signal operated by one of said armatures, and a phonograph controlled by the operation of the other armature.
17. The combination as claimed in claim 16 wherein the armature operating the sub-set signal also controls the operation of the phonograph.
18. In a telephone system, a telephone line, a telephone instrument connected to said line, a phonograph instrument, a repeating coil having a winding connected to said phonograph instrument, said coil having a second winding, and means responsive to incoming current over said line for connecting said second winding thereto.
19. The combination as claimed in claim 18 including means responsive to incoming current over said line for disconnecting said second winding therefrom.
20. In combination with a telephone line, a condenser and a relay having a winding in series with said line, a pair of contacts adapted to be operated by said relay, a control relay having a pair of normally open contacts in series with said first relay contacts, said control relay contacts adapted when closed to complete a circuit

through the winding thereof, the contacts of said first relay and a source of current, a third relay and condenser in series with said line, said third relay having a pair of normally open contacts serially included in circuit with said control relay winding and said source of current, and a repeating coil having a winding in series with a second pair of normally open contacts on said control relay and said line, and a phonograph inductively coupled to said repeating coil winding.

21. In combination with a telephone line, a condenser and a relay having a winding in series with said line, a pair of contacts adapted to be operated by said relay, a second relay having a winding in series with said contacts and a source of current, a circuit including a pair of contacts on said second relay, a heater coil and said source of current, a pair of contacts thermostatically controlled by contacts operated by said heater coil, a circuit including said last contacts, said source of current and the winding of a control relay, and a phonograph controlled by contacts on said last relay.

22. In combination with a telephone line, a condenser and a relay having a winding in series with said line, a pair of contacts adapted to be operated by said relay, a second relay having a winding in series with said contacts and a source of current, a circuit including a pair of contacts on said second relay, a heater coil and said source of current, a pair of contacts thermostatically controlled by contacts operated by said heater coil, a circuit including said last contacts, said source of current and the winding of a control relay, a phonograph controlled by contacts on said last relay, and a repeating coil having a winding in series with said telephone line and a contact on said last relay.

23. In a telephone system having a central office, a telephone line, a phonograph, and means partly at said central office and partly at said phonograph for physically connecting the talking circuits of said phonograph to said line and starting the operation of said phonograph.

24. In a telephone system having a central office, a telephone line, a phonograph, means partly at said central office and partly at said phonograph for physically connecting the talking circuits of said phonograph to said line and starting the operation of said phonograph, and means controlled by the operation of said phonograph for disconnecting the same from said line after a predetermined time interval.

25. In a telephone system having a central office, a telephone line, a phonograph, means partly at said central office and partly at said phonograph for physically connecting the talking circuits of said phonograph to said line and starting the operation of said phonograph, and means partly at said central office and partly at said phonograph for stopping the phonograph and disconnecting the circuits of same from said line.

26. In a telephone system having a central office and operator, a telephone line, a phonograph, and means under the control of said operator for physically connecting the talking circuits of said phonograph to said line and starting the operation thereof including time delay means at the phonograph.

27. In a telephone system having a central office and operator, a telephone line, a phonograph, means under the control of said operator for physically connecting the talking circuits of said phonograph to said line and starting the operation thereof including time delay means at

the phonograph, and means controlled by the operation of said phonograph for stopping and disconnecting the same from said line after a predetermined time period.

28. In combination with a line circuit, a phonograph, means for connecting said phonograph to said line circuit operable by current flowing in said line circuit, a power circuit including a motor for driving said phonograph controlled by said means, and means at the phonograph for impressing a signal tone on said line circuit when said phonograph is not in operation.

29. In combination with a line circuit, a phonograph, means for connecting said phonograph to said line circuit operable by current flowing in said line circuit, a power circuit including a motor for driving said phonograph controlled by said means, and means at the phonograph for impressing a signal tone on said line circuit when said phonograph is not in operation, said last means being under the control of said first means.

30. In combination with a line circuit, a phonograph, means for connecting said phonograph to said line circuit operable by current flowing in said line circuit, a power circuit including a motor for driving said phonograph controlled by said means, means at the phonograph for impressing a signal tone on said line circuit when said phonograph is not in operation, and means for disconnecting said phonograph from said line and connecting said signal tone thereto.

31. In combination, an interlocking relay having an actuating winding and a release winding and having an operating armature and a holding armature, a source of current connected to both said windings, contacts adapted to be actuated by said operating armature when said actuating winding is energized, control means in circuit with said current source and said actuating winding for completing a circuit to cause said winding to operate said contacts, a repeating coil, a first circuit serially including a line circuit, some of said contacts and a winding of said coil, a second circuit including other of said contacts and a motor, means for actuating said control means including current flowing in said line circuit to cause said actuating armature to move thereby operating said contacts, said armature being held locked, once current has been applied to its coil, said first and second circuits being held open by said contacts when said armature is in locked position, a second control means serially included in circuit with said source of current and said release winding, and means for actuating said second control means to close a circuit through said release winding and withdraw said holding armature to release and permit said operating armature to close the contacts in said first and second circuits.

32. The combination as claimed in claim 31 wherein said operating armature acts to close contacts and establish a signal tone circuit to impress a signal tone on the line circuit when the contacts controlling said first and second circuits are open.

33. In combination, a line circuit, a control relay having a winding connected to said line circuit, contacts on said relay adapted to control a motor circuit, a second winding in inductive relation to said first winding, means for impressing a signal tone on said second winding, a second control relay having a winding connected to said line, and contacts on said last relay for controlling said signal tone.

HARRY R. VAN DEVENTER.