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Golden

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[54] **REMOTE-CONTROL SYSTEM FOR INTELLIGENCE-RECORDING APPARATUS WITH CONTROL TONE ELIMINATING SWITCHING**

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[52] **U.S. Cl.**.....**179/6 E,** 179/2 A, 179/100.1 DR

[51] **Int. Cl.**.....**H04m 11/10,** G11b 19/2

[58] **Field of Search**.....179/100.1 DR, 100.2 S, 100.3 B, 179/6 C, 6 E, 2 A, 2 DP; 340/171 PF

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3,436,483	4/1969	Blane	179/6 E
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936,814	9/1963	Great Britain	179/6 E

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Attorney—Billy A. Robbins et al.

[57] **ABSTRACT**

An interface between a telephone system and dictating equipment whereby control signals and intelligence are transmitted over the telephone system and to the dictating equipment to appropriately record the intelligence while eliminating any recordation of the control signals.

12 Claims, 3 Drawing Figures

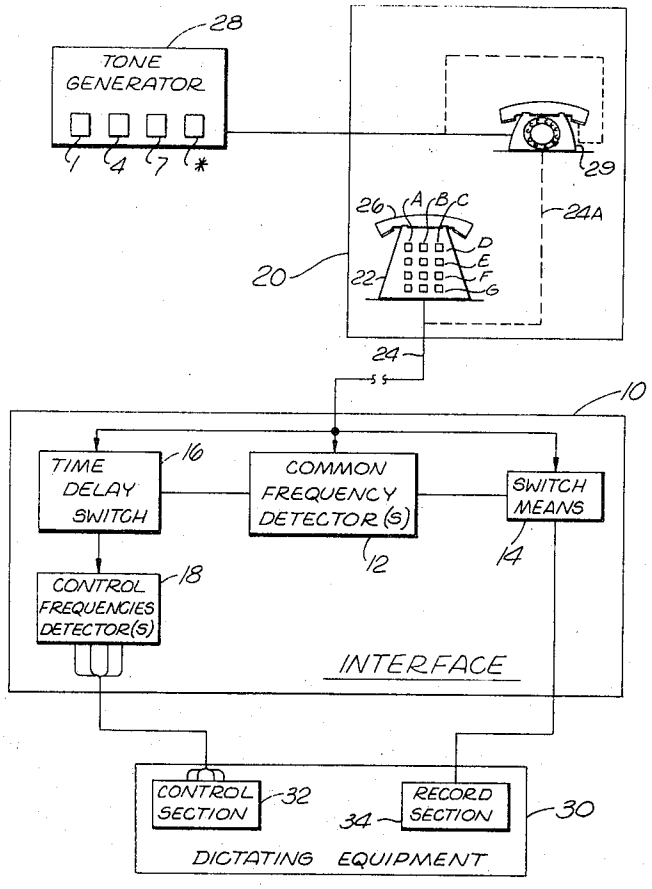


Fig. 1.

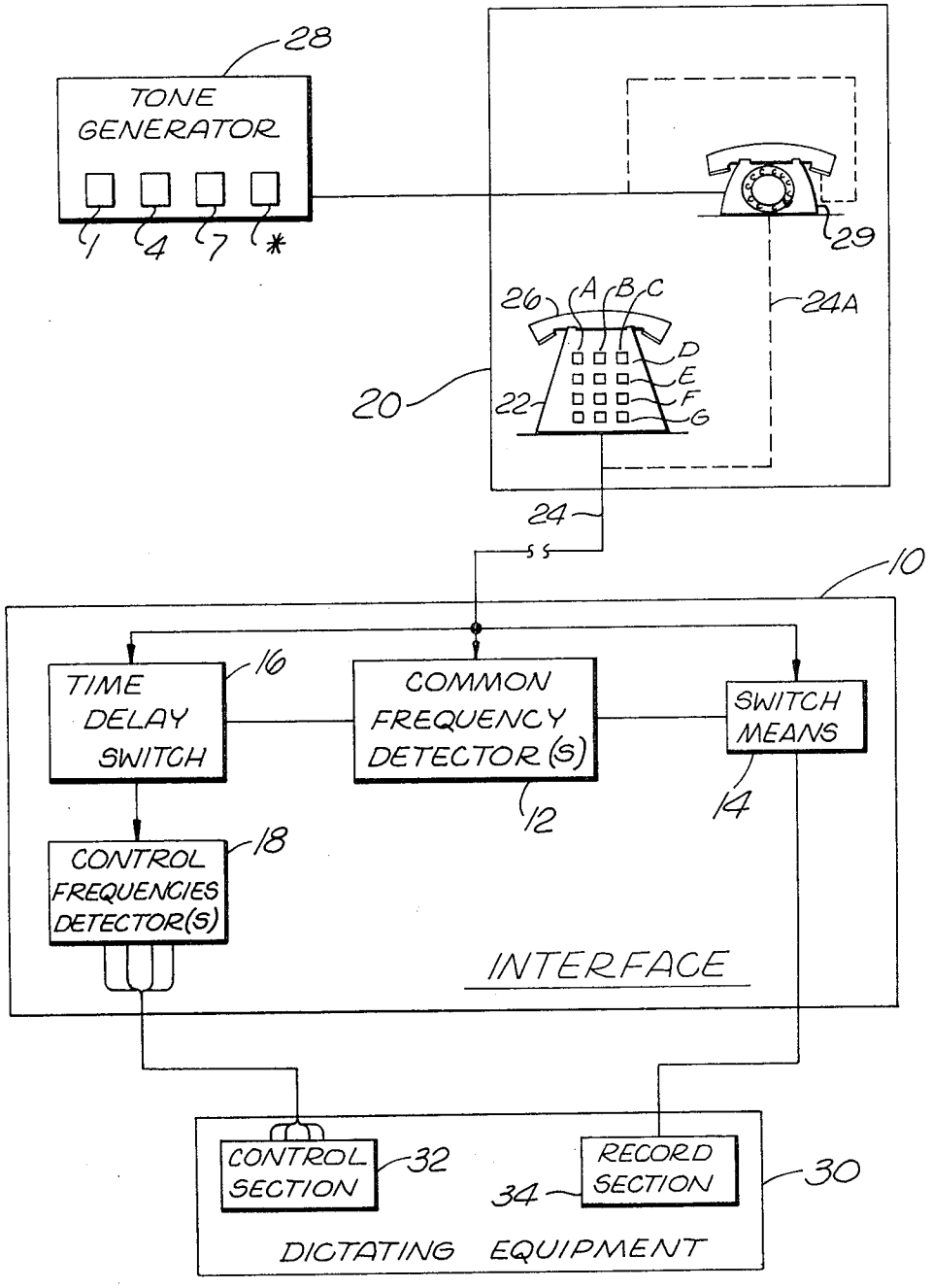
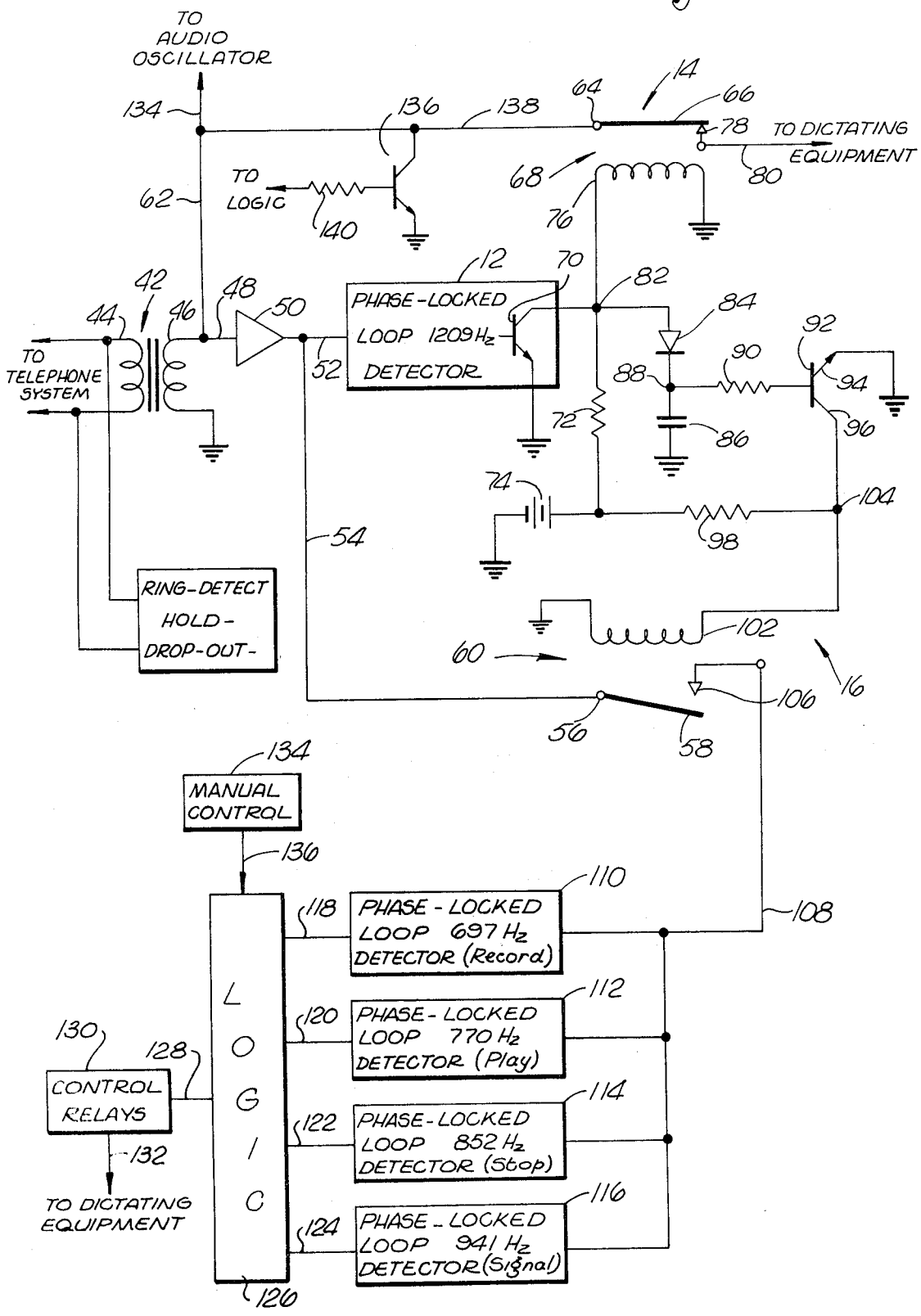

28
TONE GENERATOR
1
4
7
*
29
24A
26
A
B
C
D
E
F
G
20
22
24
10
TIME DELAY SWITCH
16
COMMON FREQUENCY DETECTOR (S)
12
SWITCH MEANS
14
CONTROL FREQUENCIES DETECTOR(S)
18
INTERFACE
CONTROL SECTION
32
RECORD SECTION
34
30
DICTATING EQUIPMENT

Fig. 2.


TO AUDIO OSCILLATOR
134
136
138
64
14
66
78
TO DICTATING EQUIPMENT
80
62
TO LOGIC
140
68
76
12
70
82
84
92
42
44
46
48
50
PHASE-LOCKED LOOP 1209 Hz DETECTOR
52
88
90
94
TO TELEPHONE SYSTEM
72
86
96
74
104
98
54
RING-DETECT HOLD-DROP-OUT-
102
60
16
106
56
58
134
MANUAL CONTROL
136
110
118
PHASE-LOCKED LOOP 697 Hz DETECTOR (Record)
108
112
120
PHASE-LOCKED LOOP 770 Hz DETECTOR (Play)
130
128
L
O
G
I
C
114
122
PHASE-LOCKED LOOP 852 Hz DETECTOR (Stop)
CONTROL RELAYS
132
116
124
PHASE-LOCKED LOOP 941 Hz DETECTOR (Signal)
TO DICTATING EQUIPMENT
120

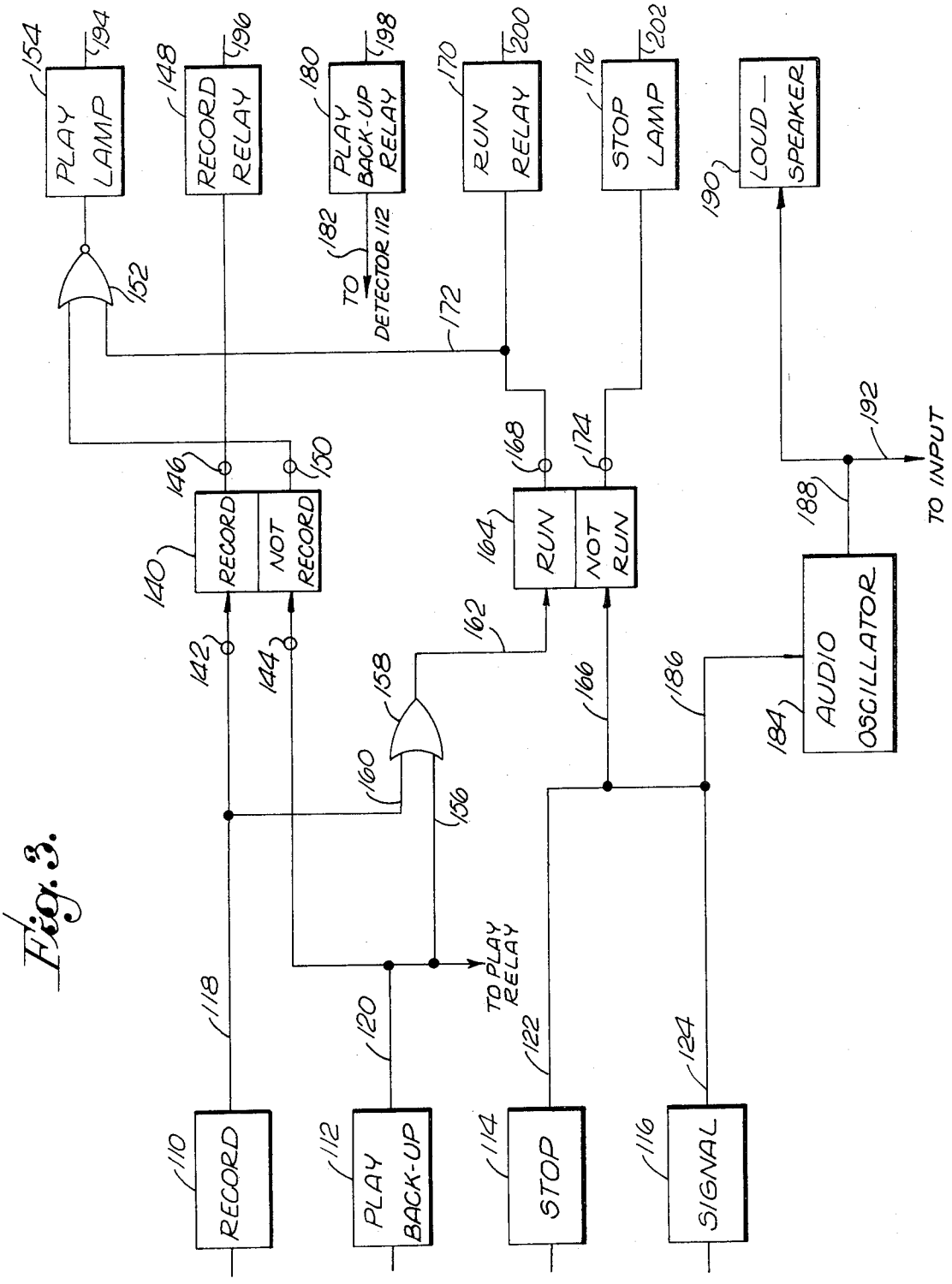

PLAY LAMP
154
194
RECORD RELAY
148
196
PLAY BACK-UP RELAY
180
198
RUN RELAY
170
200
STOP LAMP
176
202
LOUD-SPEAKER
190
152
182
TO DETECTOR 112
172
146
150
168
174
192
TO INPUT
RECORD
NOT RECORD
140
RUN
NOT RUN
164
188
142
144
158
162
AUDIO OSCILLATOR
184
160
166
186
156
TO PLAY RELAY
118
120
122
124
RECORD
110
PLAY BACK-UP
112
STOP
114
SIGNAL
116

Fig. 3.

REMOTE-CONTROL SYSTEM FOR INTELLIGENCE-RECORDING APPARATUS WITH CONTROL TONE ELIMINATING SWITCHING

CROSS-REFERENCES TO KNOWN RELATED PATENTS

The following issued U.S. Pat. Nos. may be of interest: 3,381,276; 3,549,821; 2,883,866; 3,296,371; 3,222,460; 3,360,613.

BACKGROUND OF INVENTION

Remote control of electronic equipment particularly that for recording intelligence and particularly that where touch-tone telephone signals are used therefor are well known. U.S. Pat. Nos. 3,549,821 directed to dictation systems and 3,381,276 directed to computer systems are exemplary of such art. Where utilizing such systems, it has been found desirable to preclude recordation of the control signals upon the primary recording medium without interference with the recording of the intelligence transmitted to the recording medium. In the prior art solutions to this problem there has been utilized voice-controlled mechanisms such as that described in U.S. Pat. No. 2,833,866, a voice buffer with appropriate delay or an automatic motor reverse and erase such as described in U.S. Pat. No. 3,549,821 or a continuous close-looped intermediate recording media such as that shown in U.S. Pat. No. 3,360,613.

SUMMARY OF THE INVENTION

Means is provided for generating control signals each of which includes a pair of constant frequency signals. The frequency of one of the pair of signals is common to all of the control signals. Means responsive to the common signal of the dual-frequency signal-pair is provided for precluding passage of any control or intelligence signal to the recording medium during the presence of the common signal. Such common signal responsive means may also function to allow passage of control signals to appropriate portions of the apparatus only during presence of the common signal.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a remote-control apparatus in accordance with the present invention;

FIG. **2** is a schematic representation more in detail of a portion of the system as illustrated in FIG. **2**; and,

FIG. **3** is a schematic representation of the control logic of a system as illustrated in FIG. **1**.

AN EMBODIMENT OF THE INVENTION

The present invention will be described in conjunction with dictating equipment which is to be remotely controlled from a telephone which may be located anyplace and through which both control and intelligence signals are transmitted. It should, however, be understood that the present invention is not to be limited to the control of dictating equipment only by such description. The invention has utility in any system where both intelligence and control signals are to be transmitted to a remote point over lines on which voice or analog data may reasonably expect to be found at the same time for control of electronic equipment such for example, as a computer, other business machines, or lighting and appliances.

Referring now particularly to FIG. **1**, there is illustrated in block form, apparatus constructed in accordance with the present invention. As is therein shown, an interface **10** is disposed between a telephone system **20** and recording equipment **30**. The interface **10** may be utilized to couple any type of dictating equipment having the normal functions of record, stop, play and backup to any telephone system. The interface **10** may be used in a central dictating-transcribing system where a plurality of subscribers call the dictating equipment as needed. Alternatively, the interface **10** may be used as part of the dictating-transcribing system used in a typical business office. In either event, the subscriber merely places a telephone call through the normal operation of the telephone system **20** to a telephone number which has been assigned to the interface **10**. The interface **10** upon receiving the ring from the telephone system is on-line for both control of the dictating equipment **30**, by signals generated by the subscriber and transmitted through the telephone system **20**, and "clean" transmission of dictation to the recording medium thereof.

Preferably, the telephone system **20** for utilization with the interface **10** includes a "Touch-Tone" (trademark of American Telephone & Telegraph Company) telephone **22**. As is well known at the present time, the telephone **22** as presently provided the public includes **12** buttons arranged in a matrix of three columns (A, B, and C) vertically disposed and four rows (D, E, F, and G) horizontally disposed. As is also known, on special order for particular applications, an additional column of four buttons may be obtained on a telephone thus providing **16** buttons thereon. In any event, the present system is compatible with 12-button telephones, 16-button telephones, or a telephone having any number of buttons thereon. Each vertical column of buttons has a common frequency signal assigned to each of the buttons appearing therein. For example, column A is assigned a frequency of 1,209 Hz; column B 1,336 Hz and column C 1,477 Hz. Each of the horizontal rows is also assigned a common frequency, thus row D is assigned a common frequency of 697 Hz, row E 770 Hz, row F 852 Hz and row G 941 Hz. Thus, it can be seen that depression of any of the buttons appearing on a touch-tone telephone will generate a unique dual-frequency signal-pair for that particular button. Thus, if the button appearing in column A and row D is depressed, a pair of signals is generated one of which has a frequency of 697 Hz and the other of which has a frequency of 1,209 Hz. It will also be recognized that by depressing any of the buttons in column A, there will be generated a signal having a frequency of 1,209 Hz. This unique fact that a common frequency signal is generated when each of the buttons appearing in any specific column is depressed is taken advantage of by the present invention. It should be noted that the symbols **1**, **4**, **7** and * have been assigned to each of the buttons appearing in column A rows D, E, F, and G, respectively. By assigning a particular control function to each of these buttons appearing in column A, such for example when utilizing dictating equipment, as record for button **1**, play/backup for button **4**, stop for button **7**, and signal for button *, one can uniquely accomplish control of dictating equipment by utilizing only a signal column of buttons, each of which

generates its own dual-frequency signal-pair, one of which is a common signal to each of the buttons while the other of which is uniquely different from each of the other signals. As is shown, the Touch-Tone telephone **22** is connected by way of a line **24** which is illustrative of the telephone system to the interface **10**. A receiver-transmitter **26** may be used in well-known fashion for transmission of desired information by voice or data through the interface **10** to the dictating equipment **30**.

Through the utilization of a tone generator **28**, the present invention may be utilized with a standard rotary dial-type telephone **29**. As is illustrated by the dashed line **24A**, the rotary dial-type telephone **29** would be connected to the telephone system and through the interface **10** to the dictating equipment **30**. The tone generator **28** would be utilized only in those areas where a Touch-Tone telephone is not available. As is shown on the tone generator **28**, four buttons could be utilized each having the same symbol assigned thereto as does each column of buttons on the Touch-Tone telephone **22**. The tone generator would also be arranged in such a fashion that depression of each of the buttons **1**, **4**, **7** and * thereon would generate a signal-pair having frequencies identical to those generated upon depression of the buttons bearing the same symbol on the Touch-Tone telephone **22**. Obviously any number of buttons could be used dependent solely upon the particular application so long as the proper dual-frequency signal-pair is generated upon depression of a given button. The signals thus generated would be transmitted over the telephone system to the dictating equipment **30**, as above indicated.

As shown in the interface **10**, there is included a common frequency detector(s) means **12** which upon the presence on the incoming line **24** of a signal having the common frequency, for example only of 1,209 Hz, detects the same and produces an output signal. That output signal is applied to a switch means **14** and a time-delay switch means **16**. The switch means **14** is connected to the incoming line **24** and also to the dictating equipment **30**. The switch means **14** functions in response to the output signal from the common frequency detector **12** to block or preclude transmission to the dictating equipment **30** of any signals appearing on the line **24**.

The time-delay switch means **16** is connected to a control frequencies detector(s) **18** and functions in response to an output signal from the common frequency detector **12** to permit passage or transmission of any signals appearing on line **24** to the control frequencies detector **18**, which are in turn connected to the dictating equipment **30**. Thus, as will be more fully explained below, upon the occurrence of the common signal having the common frequency of the signal-pair, switch means **14** opens and after some time delay, switch means **16** closes. Thus, it may be stated that in the presence of a signal having a designated common frequency, control signals are permitted to pass to the control section **32** of the dictating equipment but no signals are permitted to pass to the record section **34** of the dictating equipment **30**. Alternatively, it may also be stated that in the absence of a signal having a designated common frequency, for example of 1,209 Hz (the common frequency to column A), information appearing on line **24** is transmitted through the switch means **14** to the record section **34** of the dictating equipment **30** but no signals are permitted to pass to the control frequencies detector(s) **18**. Through the utilization of the time-delay switch **16**, the possibility of voice simulation of a particular control frequency is substantially eliminated. That is, even though a subscriber may, in speaking, generate a tone of, for example 1,209 Hz, he will not sustain that tone for a time sufficient to activate the time-delay switch **16** and thereby the control frequencies detector(s).

Referring now more particularly to FIG. **2**, there is therein illustrated in more detail the common frequency detector **12** and the switch means **14** and **16** as previously described with reference to FIG. **1**. As is illustrated in FIG. **2**, an isolating transformer **42** is utilized to interconnect the incoming signals from the telephone system, which appear on the primary winding **44**, to the interface **10** which is connected to the secondary winding **46**.

As is well understood by those skilled in the art, also interconnected between the telephone system and the interface **10** will be ring detectors, hold and latchup circuits and dropout circuits. These circuits are well known in the prior art and enable one to call a particular telephone number which is assigned by the telephone company to the interface **10** to thereby establish communication with specific equipment, that is to be controlled and/or is to receive intelligence signals. The ringing of the telephone is detected by the ring-detector circuit and upon such detection holding relays are actuated and latched in place to retain the communication between the transmitter and the electronic equipment to be controlled. This communication is maintained typically for predetermined periods of time ascertained by timing circuits which are sensitive to the presence or lack thereof of control signals, voice signals, or the like within the interface circuits. In the absence of such signals, the timing circuits cause a signal to occur which will then effectively "hang up" or drop out the connection between the telephone system and the interface thus freeing the line for subsequent callers to utilize. The ensuing description of the present invention assumes that a subscriber has directed the appropriate telephone number to the interface **10** and that the interface **10** has detected the same and has caused the appropriate circuits to become energized to connect the telephone line to the interface and establish appropriate communication. It would also be assumed that the subscriber has received a signal returned from the interface, which indicates that the equipment is ready for utilization. At this point in time, the subscriber may depress one of the four buttons in column A of the Touch-Tone telephone **22** or on the tone generator **28** as above described to cause the dictating equipment to go into the proper operational mode for his purposes. It will be assumed that button number **1**, for record, is depressed by the subscriber.

As above pointed out, depression of button number **1** causes the simultaneous generation of a signal-pair one of which is the common frequency of 1,209 Hz and the other of which is 697 Hz. This signal-pair is transmitted through the transformer **42** and is applied by the lead

the amplifier **50** through the lead **54**, the relay **60**, and to the control frequencies detectors **110–116** by way of the lead **108**.

It can therefore be seen that upon the detection of the 1,209 Hz common signal by the detector **12**, and after a predetermined time period, as determined by the time constants of the capacitor **86** and resistor **90**, the relay **60** is closed. The time constant is chosen to have a time sufficient to preclude energization of the relay **60** as a result of the occurrence of the frequency of 1,209 Hz for a short period of time, as in voice signals or the like. It has been determined that a time delay of approximately 75 milliseconds is adequate to accomplish the desired results thereby precluding voice simulation of control frequencies.

When the reed relay **60** is energized, control signals generated by depressing one of buttons **1**, **4**, **7**, or * are transmitted in such a way as to be simultaneously applied to the detectors **110**, **112**, **114**, and **116**. In the event a signal having a frequency within the detection band of any one of the detectors is present on the line, that detector will provide an output signal in the same manner as described with respect to the detector **12** above. Thus, if a 697 Hz signal is the other frequency of the signal-pair being transmitted, detector **110** provides an output signal on the lead **118**. This signal is then transmitted to the logic **126** which in turn applies by way of the connection **128**, a signal to an appropriate control relay **130**. The control relay is connected by a connection **132** to the control section **32** of the dictating equipment **30**. In addition thereto, a manual control means **134** may be connected by a connection **136** into the logic **126**. Such manual control is sometimes desirable at the station where the dictating machine is located to provide minipulation for changing recording media or the like.

It has also been determined that when the dictating equipment is in a predetermined mode of operation such for example as stop, it is desirable to provide an audible signal which may be transmitted over the telephone system to the subscriber so indicating. Thus, as is illustrated also in FIG. **2**, an audio-oscillator **184** (FIG. **3**) may be connected to the lead **62** as shown at **134**. A signal from the audio-oscillator would be applied as a result of the operation of the logic **126** so as to be transmitted through the transformer **42** and back to the subscriber. It has been found that when such audio signals are transmitted, they are received by the dictating equipment and as a result of the automatic gain-control features of most dictating equipment, the audio tone causes the gain to be reduced drastically. As a result, if the subscriber then depresses the record control button and commences to dictate, the initial dictation, sometimes for several seconds, will be extremely weak because the automatic gain control (AGC) is still functioning as a result of the previous audio tone input thereto from the oscillator. To overcome this problem and as part of the present invention, a shunting transistor **136** is utilized to shunt to ground the audio signal which would normally be applied to the dictating equipment when the same is being applied to the transformer **42**. To this effect, the transistor **136** has its collector connected to the lead **138**, which is connected between the lead **62** and the terminal **64** of the reed relay **68**, the emitter thereof being connected to ground. The base of the transistor **136** is connected through a base resistor **140** to the logic **126**. The logic **126**, upon application of the audio signal to lead **134** simultaneously energizes the base of the transistor **136** causing it to conduct in saturation to thereby preclude the signal effecting the AGC circuitry of the dictating equipment.

Referring now to FIG. **3**, a simplified form of the logic **126** is illustrated. As is therein shown, a flip-flop **140** has its input terminal **142** connected to the output of the record signal detector **110** by way of the lead **118** while the other terminal **144** is connected by way of lead **120** to the output of the play backup detector **112**. The output terminal **146** of the flip-flop **140** is connected to the record relay **148** while the output terminal **150** thereof is connected as one input to NAND gate **152**, the output of which is connected to the play lamp **154**. It should also be noted that the output of the play backup detector **112** is also connected as one input **156** to the OR gate **158**, the other input **160** thereof being connected to the output of the record detector **110**. The output of the OR gate is connected by way of the lead **162** as one input to the run flip-flop **164**. The other input **166** to the flip-flop **164** is connected by way of a lead **122** to the stop signal detector **114** and also by way of the lead **124** to the output of the signal detector **116**. One output terminal **168** of the flip-flop **164** is connected to the run relay **170** and is also connected by way of the lead **172** as the other input to the NAND gate **152**. The other output terminal **174** of the flip-flop **164** is connected to the stop lamp **176**. It should also be noted that the play backup relay **180** is connected by way of the lead **182** to the output of the play backup detector **112**.

In addition, an audio-oscillator **184** is connected by way of the lead **186** to the output of the signal detector **116**, thus upon the detection of the frequency of 941 Hz, the output signal from that detector **116** energizes the audio-oscillator causing a signal to be applied therefrom to its output **188**. The output **188** may then be connected to a loud speaker **190** which is located adjacent an attendant where the dictating equipment is located indicating that some subscriber has completed dictation and is ready for the recording media to be replaced, desires transcription of the dictation, desires to speak with the attendant, or the like. In addition, appropriate circuitry may be utilized to connect an output from the audio-oscillator over the lead **192** to the input at **134** as previously described in conjunction with FIG. **2**.

From the foregoing, it will become apparent to those skilled in the art that upon the receipt of a 697 Hz signal with the common signal of 1,209 Hz, the record detector **110** detects the same and produces an output signal on the lead **118**. Such output signal causes the record flip-flop **140** to provide an output signal on the lead **146** which energizes the record relay **148** which then causes the appropriate apparatus in the dictating equipment to place the same in a record mode. Thereafter the subscriber speaks into the handpiece of the telephone and his voice is received and recorded on the recording medium of the dictating equipment. Simultaneously the record detector output signal on lead **118** is applied and passed through the OR gate **158** to the run flip-flop **164** causing an output signal to ap-

48 to the amplifier 50, the output of which is applied by the lead 52 to the common frequency detector 12 and by the lead 54 to the terminal 56 of a normally open movable contact 58 of a reed relay 60. Simultaneously, the signal-pair are also applied over the lead 62 to the terminal 64 of the movable contact 66 of the reed relay 68.

The common frequency detector 12 may be any type of frequency detector desired which is capable of receiving and detecting the presence of the common signal 1,209 Hz and providing an output signal in response thereto. Preferably, the common frequency detector in accordance with the present invention is a phase-locked loop integrated semiconductor circuit having appropriate external components connected thereto to cause it to be sensitive to a signal of 1,209 Hz. Such integrated circuits are well known in the art and one such circuit which has been found to be appropriate is manufactured by Signetics Corporation, Sunnyvale, California and is identified by the number NE567V and is described in a bulletin entitled "Tone Decoder," copyright 1970 by Signetics Corporation. Such a device is constructed on a 57 × 61 mil semiconductor chip and contains 62 transistors and 50 resistors interconnected in such a fashion as to provide a phase-locked loop together with a lock detector and output amplifier. When a signal within the capture range of the loop is present, the loop locks to that signal. Once lock has occurred, the lock-detector voltage responds driving the output amplifier. The output amplifier applies base current to the output transistor, the collector of which may be externally connected to the desired load. The center frequency of the detection band is determined by the free-running frequency of the controlled oscillator in the loop. The width of the detection band, which is equal to the loop-capture range is a predictable function of the internal and external connected components and the input signal amplitude.

From the foregoing description, it will now be apparent that the incoming control signal comprising the signal-pair having frequencies of 697 Hz and 1,209 Hz, amplified by the amplifier 50 to provide the proper amplitude signal, is applied to the input of the common frequency detector 12 by lead 52. Since the integrated circuit and external components connected thereto are sensitive to 1,209 Hz, the detector 12 drives the output transistor 70 (which is included as part of the integrated circuit) to saturation. As is illustrated, the collector of the transistor 70 is connected through load resistor 72 to the positive terminal of the voltage source 74. Also connected to the positive terminal of the voltage source 74 through the load resistor 72 is the coil 76 of the reed relay 68 the other terminal of which is connected to ground or common as shown.

Prior to the transistor 70 being driven to saturation, it was cut off and therefore the full potential of the voltage source 74 was applied to the coil 76 thus energizing the reed relay 68 and causing the movable contact 66 to be in contact with the stationary contact 78 which is connected by the lead 80 to the dictating equipment. Thus any signals appearing upon the line 62 which were transmitted by way of the telephone system above described would be applied through the reed relay 68 closed contacts to the dictating equipment record section 34. However, upon detection of the 1,209 Hz common signal and the transistor 70 going to saturation, the collector of the transistor 70 is effectively connected to ground through the transistor thus causing the point 82 to be effectively connected to ground. Such saturated conduction of the transistor 70 thus removes the potential from the coil 76 which opens the movable contact 66 of the reed relay 68 thereby precluding transmission of any information to the dictating equipment over the lead 80. Upon cessation of the common signal of the signal-pair, the transistor 70 again becomes nonconducting and the voltage from the source 74 is applied to the coil 76 and the reed relay is again energized thus completing the circuit through the closed contacts thereof. It can thus be seen that the reed relay 68 effectively functions as a gate which is closed at all times except during the presence of the common signal of the signal-pair, in this example having the frequency 1,209 Hz. During the presence of such common signal, the gate is the open. The opening of the gate thus prevents the recording on the recording medium of the dictating equipment of any of the control frequencies which are transmitted over the telephone system.

Also connected to the point 82 is a series connection of a diode 84 and capacitor 86 having the common point 88 therebetween, the capacitor 86 also being connected to ground. A base resistor 90 is connected between the common point 88 and the base of transistor 92. The emitter 94 of the transistor 92 is connected to ground while the collector 96 thereof is connected to a common point 104. A load resistor 98 is connected from point 104 to the positive terminal of the source of potential 74. One terminal of the coil 102 of the reed relay 60 is also connected to the common point 104, the other terminal being connected to ground as shown. When there is no common frequency signal being detected by the detector 12 and thus the transistor 70 is nonconducting, the positive terminal of the source 74 is connected through the resistor 72 to the anode of the diode 84 thereby causing the diode 84 to be forward-biased and thus conducting. Current flow through the diode 84 results in a charge being assumed by the capacitor 86, positive with respect to ground, thereby to forward-bias the emitter-base diode of the transistor 92 causing the transistor 92 to become conducting in a saturated state. As a result, since the emitter 94 is connected to ground, the point 104 is effectively connected to ground through the transistor 92 and thus the coil 102 of the reed relay 60 is de-energized thereby causing the movable contact 58 to be separated from the stationary contact 106 as shown.

Upon detection of the 1,209 Hz common signal and the transistor 70 becoming conducting, thus causing the point 82 to be effectively connected to ground, the diode 84 becomes reverse-biased from the charge on capacitor 86. The charge on the capacitor 86 retains the transistor 92 conducting until the capacitor 86 is substantially discharged through the resistor 90 and the emitter-base diode of the transistor 92 which causes the transistor 92 to become nonconducting. When the transistor 92 becomes nonconducting, the positive terminal of the voltage source 74 is then connected through the resistor 98 to the coil 102 of the reed relay 60 thereby energizing the same and causing the movable contact 58 to move into engagement with the stationary contact 106 thus completing the circuit from

pear and energize the run relay. Thus, the appropriate mechanism in the dictating equipment is caused to move the magnetic recording medium relative the record head as is well known.

In the event a 770 Hz signal is received with the common signal of 1,209 Hz, the play backup detector **112** provides an output signal which is connected to the terminal **144** of the record flip-flop **140** causing a signal to appear on the terminal **150** thereof which is applied to the NAND gate **152**. Simultaneously the signal is applied to the OR gate **158** and is applied in turn to the terminal **162** of the run flip-flop **164** causing an output signal to appear on terminal **168** thereof which energizes the run relay **170**. The signals appearing at the terminals **150** and **168** of the flip-flops **140** and **164** respectively energize and pass through the NAND gate **152** causing the play lamp **154** to become energized. Simultaneously, the play backup relay **180** is energized thus setting in motion in the dictating equipment the appropriate apparatus to cause the dictating equipment to respond to the desires of the subscriber. If the button **4** on the Touch-Tone telephone or the tone generator **28** is depressed momentarily, the magnetic recording medium will back up momentarily and then play so that a review of the immediately preceding recorded material on the tape can be had. If a further review is desired, the subscriber depresses button **4** and holds the same depressed for the desired period of time all during which the magnetic recording medium is rewound. Upon release of the button, the dictating equipment goes into the play mode and the subscriber is able to hear over the telephone system what has been recorded on the recording medium. When it is desired to stop, button **7** is depressed and the detector **114** detects the 852 Hz signal received with the common signal of 1,209 Hz and provides an output signal on lead **122** which is connected to terminal **166** of the run flip-flop **164** thus causing an output signal to appear on the terminal **174** which illuminates the stop lamp **176**. Simultaneously the signal appearing at the terminal **168** of the run flip-flop **164** is removed thus deenergizing the run relay **170**. This causes the dictating equipment to stop moving the recording medium and an audible signal is then heard by the subscriber indicating that the dictating equipment has stopped and any additional instructions he desires to give such as record or the like may then be imparted to the dictating equipment as above described. Depression of the * button generates a 941 Hz signal with the common signal of 1,209 Hz which is detected by the detector **116** and energizes the not-run section of the run flip-flop **164** precisely as did depression of button **7** or the stop signal. The same results flow but in addition the audible signals are generated as above described.

The interconnection of the various lamps and relays to the dictating equipment may be accomplished by utilization of the leads **194**, **196**, **198**, **200** and **202** which may be interconnected to appropriate cabling or jumpers as would be well recognized by those skilled in the art. In addition thereto, additional logic operations will become apparent to those skilled in the art such as providing various options for system control so as to cause the dictating equipment to come on to the line in various desired modes such as automatically come on in stop or record or play back or the like.

What is claimed is:

1. Apparatus for effecting remote control of electronic equipment where intelligence and control signals are transmitted over the same transmission path comprising:

generator means remote from said equipment for generating a plurality of control signals each having a constant frequency pair of signals, one of said signal-pair being common to all of said plurality of signals;

interface means interconnecting said generator means and said equipment for transmitting intelligence and control signals to said equipment, said interface means including:

1. first means responsive only to said one of said signal-pair for precluding application of any control or intelligence signals to any recording media during the presence of said one of said signal-pair,
2. a plurality of second means each responsive only to the other of said signal-pair of said control signals for effecting desired control of said equipment.

2. Apparatus as defined in claim **1** which further includes time-delay means responsive to said first means for precluding application of said other of said signal-pair to said second means for a predetermined period of time after application of said common one of said signal-pair.

3. Apparatus as defined in claim **1** wherein said generator means is a portable means connectable to a telephone system.

4. Apparatus as defined in claim **1** wherein said generator means is at least one Touch-Tone telephone.

5. Apparatus as defined in claim **1** wherein said first means includes a first detector for said one of said signal-pair, switch means connected in the transmission path to said recording media, said switch means being connected to said first detector for opening said switch means during the presence of said one of said frequency pair.

6. Apparatus as defined in claim **5** wherein said first detector is a phase-locked loop.

7. Apparatus as defined in claim **1** wherein each of said plurality of second means includes a second detector, each said second detector being sensitive only to a signal having a predetermined frequency which is different from each of said other of said signal-pairs.

8. Apparatus as defined in claim **7** wherein each of said plurality of second detectors is a phase-locked loop.

9. Apparatus as defined in claim **1** wherein said interface means further includes second switch means in the transmission path to the control section of said equipment for controlling application of said other of said signal-pairs to said second means only during the presence of said common one of said signal-pair.

10. Apparatus as defined in claim **9** which further includes time-delay means precluding operation of said second switch means until said common one of said signal-pair is present for a predetermined period of time.

11. Apparatus for effecting remote control of electronic equipment for receiving and recording information and control signals transmitted over telephone lines said control signals each including first and second signals of different frequencies with one of said first and second signals having a constant frequency

common to each of said control signals, said apparatus comprising:

first switch means connected between said telephone line and the recording medium of said equipment;

a plurality of signal detectors, each sensitive to a predetermined different frequency;

second switch means;

means connecting said second switch means to said telephone line and the input terminals of each of said plurality of signal detectors;

a common frequency signal detector;

means connecting the input terminal of said common frequency signal detector to said telephone line for receiving all signals applied thereto; and

means connecting the output terminal of said common frequency signal detector to said first and second switch means for opening said first switch means and closing said second switch means during the presence of said common frequency signal.

12. Apparatus as defined in claim **11** wherein said first and second switch means are reed relays.

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