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ELEVATOR TROUBLE REPORTING SYSTEM

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2 Sheets-Sheet 2

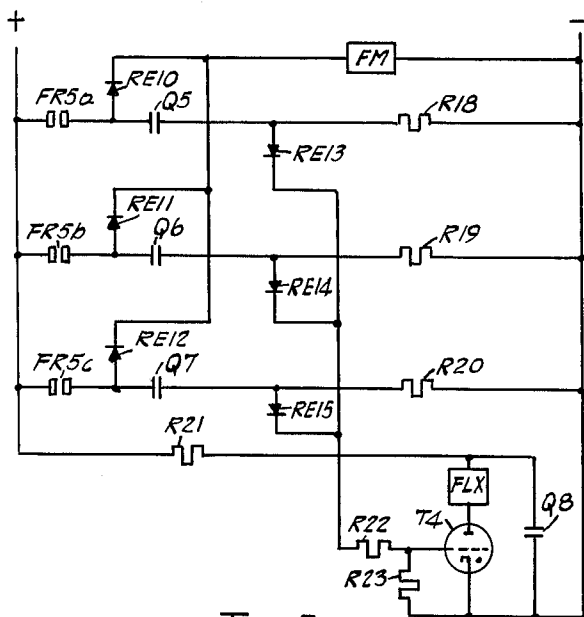


FIG. 5

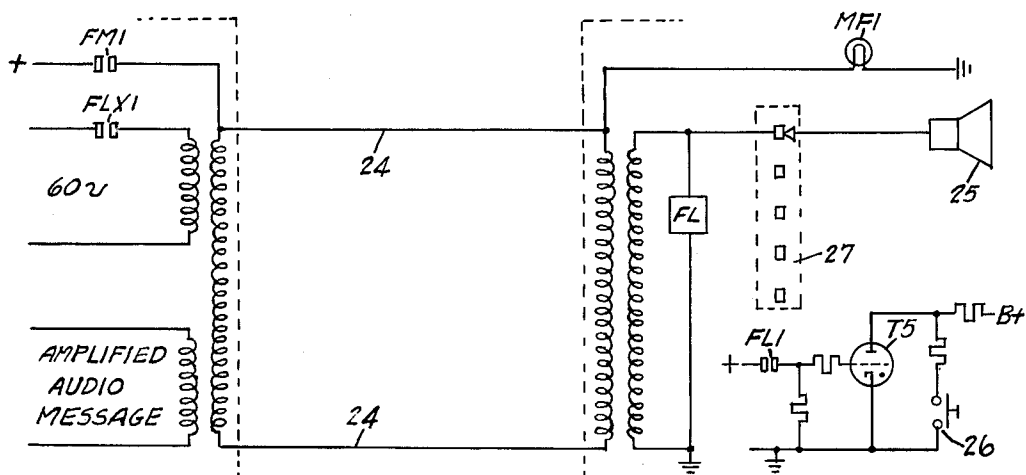


FIG. 6

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ELEVATOR TROUBLE REPORTING SYSTEM
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This invention relates to apparatus for improving the operation of elevator systems and more particularly relates to a supervisory system for the reporting of troubles experienced on such systems.

Although the invention is applicable to any type of control system, it is especially adaptable for use in conjunction with modern elevator installations. In such installations, it is highly desirable that shutdown periods for a car or a bank of cars due to some fault in the system be kept to a minimum.

Heretofore it has been customary to provide in a centralized location apparatus using lights to indicate which cars are in service, their direction of travel, their location at any instant, whether any one of them is being delayed excessively and other similar information. Because this information was customarily used by the elevator starter the apparatus became known as a starter's indicator panel. Apparatus in accordance with the invention hereof may be used to supplant this panel.

It has heretofore also been known to associate with a bank of elevators apparatus having a plurality of pre-recorded messages which, upon the occurrence of a happening unusual or undesirable in its character, may be reproduced in the car or cars in question. These usually have been used for the purpose of instructing the passengers to avoid certain actions, or, in the case of trouble, to reassure the passengers that assistance will so be forthcoming.

The general object of this invention is to provide for a plural elevator installation or group of such installations a system which will insure that a report of a fault or of a safety device operation will immediately be brought to the attention of persons charged with the duty of maintaining the elevators in proper operating condition. Such persons may be building attendants, such as employees of the owner of the elevators or may be employees of a separate company which has for a fee undertaken to keep the elevators in proper operating condition and to render assistance with a minimum of delay if any operating difficulty should develop. In this latter instance the servicing company's representative may be centrally but remotely located with respect to a number of installations that are to be serviced. In accordance with the invention the trouble reports are delivered to this remote location in such manner that each report is given free from interference from other reports and commands individual attention.

It is a further object of the invention to provide repetitive reports of a fault or of a safety device operation until such fault is corrected or until such safety device is restored to its non-operated condition.

Another object of the invention is to provide a plurality of reporting devices connected to a single announcing system wherein each reporting device contains a variety of pre-recorded vocal messages.

Another object of the invention is to permit the association of a plurality of reporting devices with a single announcing system in an arrangement such that each device has access to the announcing system but only one device can transmit at a time.

Another object of the invention is to provide a plurality of reporting devices, each containing a variety of vocal messages, connected to a single announcing system through a scanning device and selection switches wherein

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the same reporting device will be allowed to transmit another message after it has completed a first message or another reporting device will be allowed to transmit a message after a first reporting device has completed a message.

Various other objects and features of the invention will be understood from the explanation which follows when read in conjunction with the drawing, in which:

FIGURE 1 is a schematic representation of a double track tape recording machine connected to an announcing system.

FIGURE 2 is a straight wiring diagram showing the circuits of fault reporting relay coils and the solenoid of the tape recorder clutch.

FIGURE 3 is a simplified schematic wiring diagram of the scanning unit for a three bank installation.

FIGURE 4 is a simplified schematic wiring diagram of the circuits employed in advancing one of the stepping switches utilized in the invention.

FIGURE 5 is a straight wiring diagram of the circuits employed in one elevator installation for initiating the operation of an announcing system for a group of such elevator installations.

FIGURE 6 is a simplified schematic representation of the announcing system for a group of elevator installations.

The coils of the electromagnetic switches shown on the drawing are designated as follows:

A—First machine lock-in relay
B—Second machine lock-in relay
C—Third machine lock-in relay
D—First stepping switch relay
E—Second stepping switch relay
FR—Fault reporting relay
TDR—Time delay relay
FL—Fault light relay
FLX—Auxiliary fault light relay
FM—Memory fault relay

Throughout the description, these reference letters will be applied to the coils of these switches; with reference numerals appended thereto they will be applied to the contacts of these switches; with the lower case letters *a*, *b* and *c* appended thereto, they will differentiate between the three banks of elevators *a*, *b* and *c*.

The contacts of the switches are illustrated for the de-energized condition of their coil. The contacts designated as CSD, CBS, AB and DD with reference numerals and lower case letters appended thereto are associated with relays which are actuated as a result of faults or safety device operations occurring on a single elevator car, thus these contacts are shown individually for each car. The contacts designated as DT and HBS with reference numerals appended thereto are associated with relays that are common to a bank of elevator cars, of which cars *a*, *b* and *c* are representative. The operating circuits for the coils of these relays are not shown—it being understood they may be included in any one of a number of well known control systems—it being only necessary that the coil of the relay be energized when the fault occurs.

Resistors are designated generally as R, rectifiers as RE, tubes as T, capacitors as Q, amplifiers as A, magnetic pickup heads as P.

In FIGURE 1 there is shown the equipment of one reporting unit. Endless double track tape 2 is driven by a drum 3 connected to A.C. motor 1 by shaft 4 and solenoid clutch 5. Magnetic pickup head PAa for the message and indexing signal pickup head PIa are positioned adjacent their respective signal tracks 6 and 7, shown as dotted lines on tape 2. PAa is connected through lock-in relay contact A4 and audio amplifier AA to the announc-

ing system 8 which may be a reproducing device such as a loud speaker. PIa is connected through indexing amplifier A1a to coil D of the first stepping switch relay and thence to ground. Time Delay Relay TDR for bank a provides a predetermined time for the electron tubes T1 etc. (FIG. 3) to become conductive before drive motor 1 is connected to tape drive drum 3. It is to be noted that the apparatus of FIGURE 1 is associated with one bank a of several elevators. Thus for a three bank reporting system the equipment of FIG. 1 would be used in triplicate.

FIGURE 2 shows a "straight" diagram of the circuits including the coils FRa, FRb and FRc of the three fault reporting relays—it being understood that one such relay is associated with each fault reporting machine. In addition there is shown the circuit of coil SNa for the solenoid clutch 5 (FIG. 1). For purposes of simplicity FIG. 2 has been shown as appropriate for three banks, or three elevators for that matter, for which four messages for individual cars are provided and two messages that are common to the operation of all of the cars are provided. Thus coil FRa is actuated by any one of four contacts that are individual to car a or bank a (depending upon whether machine a is individual to one elevator or a bank of several elevators) and by contacts DT2 and HBS2 which are associated with faults that are common to a, b and c cars. In one preferred tested embodiment of the invention each fault reporting relay coil was associated with a bank of six elevators. It responded to actuation of any of 26 contacts—there being four for each car and two for the bank or group control. For purposes of simplicity it will be assumed that each coil FRa etc. is associated with only a single elevator instead of a bank of such cars. The contacts shown are on switches or relays that are responsive to malfunctions as follows:

Individual to each car

- CBS—Failure of the power supply for car Buttons
- CSD—Failure of a car to move when it should be moving (car shut down)
- DD—Excessive delay in closing of car Door
- AB—Operation of Emergency Switch
- Common to all cars (group of bank failure)
- HBS—Failure of power supply to Hall Buttons
- DT—Failure of the dispatching mechanism

FIGURE 3 shows a schematic representation of the scanning unit 12 utilized to connect an appropriate one of the tape machines to the audio amplifier AA and the announcing system of FIGURE 1 at the time a message is to be transmitted from such machine.

As predetermined conditions for which messages are to be transmitted from the tape machines are encountered, the FR4 contacts corresponding to the car on which the fault exists close and a suitable D.C. power supply 13 will produce the designated voltages at its outputs. Gas tubes T1, T2 and T3 are in a chain circuit and fire in sequence, each firing of a succeeding tube causing the preceding tube to be extinguished, as will be explained. Stepping switch brushes 14, 16 and 18 cooperate with their respective stepping switch contacts 15, 17 and 19, respectively to connect the coil A, B or C in the cathode circuit of tubes T1, T2 or T3 to ground. This effects the connection of the proper reporting unit to the common audio system (FIG. 1).

FIGURE 4 shows the "straight" diagram of the circuitry used to advance a stepping switch for one contact to another as the indexing signals are delivered from the "bottom" track of the tape associated with that switch. These signals are of two types, a short one between intermediate audio messages and a long one at the "end of tape" between the end of what is designated the final audio message and the beginning of what is designated the first audio message. It is to be understood there will be as many equipments per FIG. 4 as there are reporting units in the system. Stepping switch coil SS causes the

brush 14, 16 or 18 to advance one contact each time the coil is energized and returns to its deenergized condition. Contacts designated 20, 21 and 22 are "homings" contacts located on stepping switch. Contact 20 is closed when the stepping switch is at the position designated as "home," i.e., the position corresponding to the first audio message on the tape. At all other positions, contact 20 is open. Contacts 21 and 22 are open when the stepping switch is at the "home" position and are closed at all other positions of the switch. These contacts 20, 21 and 22 function in the described manner in order to enable the long indexing signal located immediately subsequent the final audio message on the tape to advance the stepping switch to its "home" position after the final audio message on the tape has been transmitted.

FIGURE 5 shows the circuit of the coils of relay FM and FLX and gas discharge tube T4. The coil of relay FM is energized by a making contact FR5 of any fault relay of the elevator bank represented by cars a, b and c. The coil FLX is similarly energized but only for the interval of time during which tube T4 is conducting.

FIGURE 6 shows a simplified announcing system for delivering the amplified audio messages to a remotely located central office containing loud speaker 25 electrically connected to rotary switch 27, lamp MF1, relay FL, gas discharge tube T5 and its associated circuit components, and button 26. Telephone line 24 is provided over which are delivered to the remotely located central office a direct current potential, a 60 cycle alternating current potential and the amplified audio messages from the reporting unit.

The operation of the system may be better understood if it is assumed that the stepping switch brushes are in the positions as shown in FIGURES 1 and 3 that this is the "home" position and that the doors on car a do not close within the predetermined maximum time that has been allotted for that function. This fault will be indicated by the closing of contacts DD1a (FIG. 3) and DD2a (FIG. 2). Contact DD1a closes without immediate effect. Contact DD2a closes to complete a circuit for the coil FRa of the fault reporting relay for car a thereby operating said relay. In FIGURE 1 contacts FR1a and FR2a close and connect the tape drive motor and the coil of time delay relay TDRa across the A.C. source through contacts FR1a, said motor, coil TDRa, closed contacts A3, FR2a, C1, B1 and A1. In FIGURE 4 contact FR3a closes causing energization of coil Ea of the second stepping switch relay through closed contacts FR3a, 20, D1a and the coil. Operation of this relay causes opening of contact E1a and closing of contacts E2a and E3a without immediate effect. At the same time capacitor Q4 is charged through closed contacts FR3a, 20, D1a and resistor R17. Contact FR4a closes in FIGURE 3 and causes D.C. power supply unit 13 to deliver the designated voltages at its output.

When 240 volt positive potential is applied to neon tube N1 through resistor R1 it conducts and raises the potential of the control grid of tube T1 to a value that causes this tube also to conduct. Conduction in tube T1 raises the potential across resistor R11 and capacitor Q1 to a value which closes the "gate" through rectifier RE3 and raises the potential of tube T2 to a point where it conducts. It should be noted that had fault contact DT1 been closed this low resistance path to ground would have prevented the buildup of firing voltage on the following grid and T2 would not have fired. This, however, is not the assumed condition. As tube T2 begins to conduct, and charge capacitor Q2 the anode voltage drops to substantially the potential drop across that tube. Tubes T1 and T2 are in parallel and this decreased voltage appears at the anode of T1. However, capacitor Q1 has a charge equal to the original anode voltage less the tube drop of T1 and this now raises the cathode of T1 to a point where that tube ceases conduction. Again, assuming that no "ground" connection exists on the coil B through brush 16, and

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contact 17 of stepping switch 2 and fault contact CSD1 of elevator "b" (or bank "b" if we are considering banks of elevators) the potential of capacitor Q2 will rise to a point closing the "gate" through rectifier RE6 and tube T3 will be forced to conduction. This process is repeated until tube T1 again conducts to repeat the cycle. When, however, one of the stepping switches moves to a position corresponding to a fault, the buildup of voltage across capacitor Q is arrested and the stepping is temporarily halted to permit the message to be given as will be explained. Simultaneously with the above described action contacts FR1a and FR2a closed in FIGURE 1 the tape drive motor started and current began to flow through coil TDRa of the time delay relay. After its time delay this relay closes to engage contact TDR1a (FIG. 2) in the circuit of coil SNa of the solenoid actuated clutch 5 of FIG. 1. This starts the tape drive 3 to move tape 2 past reproducing heads PAa and PIa. With the stepping switch, hereinafter designated, stepping switch I, represented by brush 14 and contact 15, in the position shown, i.e. with the brush on contact DTC1, the tape 2 is positioned such that the beginning of the "Dispatching" Failure Message corresponding to the condition represented by contacts DT1 and DT2 is next to pass under head PAa. As the tape continues to move, this message is picked up; however, it is not reproduced because contact A4 is open in the circuit to amplifier AA. At the end of the Dispatch Failure Message the short indexing signal on track 7 in position between it and the next fault message passes under head PIa. This signal is picked up and amplified in amplifier AIa before energizing coil Da to actuate the contacts associated with it to cause the stepping switch to step.

Contact D1a opens in the circuit of coil Ea (FIG. 4) thereby interrupting the circuit through it, however, the charge on capacitor Q4 is sufficient to retain the coil in its energized state for the period of time that relay Da is energized by the short indexing signal. Contact D2a closes to complete the circuit for the coil SNa of stepping switch I through closed contacts FR3a, E3a, D2a and E2a. The indexing signal being of short duration, coil Da soon is deenergized with the result that contact D2a opens and contact D1a closes. When contact D1a closes, coil Ea is again energized by the current passing through closed contacts FR3a, E3a and D1a and capacitor Q4 is recharged. When contact D2a opens, the circuit of coil SNa of stepping switch I is opened causing stepping switch I to advance its brush 14 one position. This advance from the "home" position causes contact 20 to open, without immediate result, it being bypassed by closed contact E3a, and contacts 21 and 22 to close, also without result at this time. Brush 14 moves to contact HBC1a as the audio message corresponding to this position of stepping switch I next passes under head PAa. This message and all audio messages located on the tape at a position intermediate this position and the position corresponding to the audio message that will report that the doors have been prevented from closing passes under head PAa without being transmitted because contact A4 remains open. Between each one of these messages a short indexing signal is picked up by indexing head PIa and causes repeated operations of relay Da thereby causing stepping switch I to advance one position for each such energization and deenergization, as has previously been described.

This operation continues until stepping switch I is advanced to the position where brush 14 is located on contact DDC1a. At this time, the audio message corresponding to this position of the stepping switch will next pass under head PAa. This audio message is the one that will report the doors are being prevented from closing and thus it must now be transmitted.

During this time the scanning unit 12 has been repetitively stepping by firing and extinguishing its tubes T1, T2, and T3 as has been described. In one tested em-

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bodiment using General Elec. Co. type GL-5727 thyratron tubes, resistors R11, R12 and R13 each of 10,000 ohms and .5 mf. capacitors for Q1, Q2 and Q3 a sufficiently rapid repetition rate was secured such that each stepping switch was scanned several times while its brush rested on each individual contact. As brush 14 comes to rest on contact DDC1a and before the beginning of the audio message corresponding to that position of stepping switch I has been picked up by head PAa, tube T1 conducts again and energizes the coil A which is now in a parallel path with capacitors Q1 and resistor R11. The circuit of this parallel path is from cathode of T1, through RE2, coil A, brush 14, contact DDC1a and closed contact DD1a to ground. This completed circuit allows sufficient current to pass through the coil A to cause it to be energized and the relay to be operated. At the same time the parallel path produced by the completed circuit reduces the effective resistance from cathode to ground sufficiently to prevent capacitor Q1 from charging to its previously mentioned value. The potential across Q1 due to this charge is insufficient to close the RE3 gate and insufficient to fire tube T2, thus tube T1 is not extinguished. The scanning unit remains locked in this condition as long as the completed circuit through the coil A provides a path to ground in parallel with capacitor Q1 and resistor R11. The operation of relay A causes contacts A1 and A3 (FIG. 1) to open and contacts A2 and A4 to close. The opening of contacts A1 and A3 prevents the tape drive motors of other reporting machines in the system to be energized. Contacts A2 and A4 in closing continue the drive for this "A" machine and connect its head PAa to the reproducing network.

Assume that while machine A is so connected a fault now occurs in the power supply to the car buttons of car b thereby causing the control circuit for car b, not shown, to close its contacts CBS1b, CBS2b and CBS3b. CBS1b and CBS3b close without immediate effect; however, the closing of CBS2b causes energization of coil FRb to cause operation of that fault reporting relay. This relay closes its contacts FR1b, FR2b, FR3b and FR4b. The closing of contacts FR1b and FR2b prepares a circuit for the energization of the tape drive motor of the B tape recorder associated with car b and the coil TDRb (not shown) in the same manner as the tape drive motor and coil TDRa shown in FIGURE 1 were energized. In closing FR3b prepares a circuit for the energization of the stepping switch coil SSb of the stepping switch II associated with car b in a manner similar to that previously explained in connection with FIGURE 4. Contact FR4b when closed provides a second circuit for energization of the scanning unit 12 after it is released from its present locked position. It can be assumed that stepping switch II has been advanced, in the manner described for stepping switch I, to the position as shown in FIGURE 3 and that the audio message corresponding to this position of stepping switch II will next pass under head PAb in the circuit corresponding to FIG. 1 for the B machine.

Upon the completion of the Door Delay message indexing head PIa picks up its long "end of tape" indexing signal. As previously explained, this signal is substantially four times the length of the intermediate indexing signals—and this is of sufficient duration to hold contacts D1a (FIG. 4) open long enough for capacitor Q4 to dissipate its charge through coil Ea to a point below its "hold in" value. As contacts E1a close there is established a circuit for coil SNa of the stepping switch to return it to its home position. This circuit extends from B+ over contacts 21 and D3a in parallel, contacts 22, E1a, interrupting spring contact 23 and coil SNa. As is well known concerning stepping switches, contact 23 opens each time coil SNa is energized to cause repeated stepping of the switch to reach its home position, at which point homing contact 20 closes and contacts 21

and 22 open. Contacts $D1a$ are opened by this time as the end of tape indexing signal is of about 1 second duration. Thus, the stepping switch stops on its home position ready to start a new stepping operation to close contacts $D1C1$, $HBC1$ etc. in the same order as the progression of messages on the tape occurs.

Also, as stepping switch I advances for the first time under this just described automatic stepping procedure, brush 14 is disengaged from contact $DDC1a$ thereby disconnecting coil A from ground and deenergizing the A reporting relay. When this occurs, contact A2 opens, disconnecting the tape drive motor of the A machine associated with car a. Contacts A1 and A3 close restoring the circuits for the tape drive motors for machines b and c. As brush 14 leaves contact $DDC1a$ the parallel path around capacitor Q1 is interrupted and the voltage across R11 rises sufficiently to fire tube T2. This restarts the scanning unit to operating in the previously described manner.

As there now exists uncleared troubles on both the a and b elevator banks and coils FRa and FRb of the fault reporting relays are energized, A.C. power is supplied to the tape drive motors and coils $TDRa$ and $TDRb$ (not shown) of the two machines. Both motors are clutched to their tape drive drums 3 to start movement of tapes past their respective heads. It will be recalled that elevator or bank b has its own FIG. 1 and FIG. 4 equipment though it is not shown in the drawing. Therefore, as the tape of the B machine moves the first message (car shutdown) under message head PAb it is not reproduced because the head is not connected to the amplifier—the circuit being open at contacts B4. The following indexing signal causes stepping switch II to move its brush 16 to contact $CBC1$ where it encounters ground potential through now closed contacts $CBS1b$. In the manner previously described for machine A, this places coil B of the reporting relay for B machine in a circuit to ground in parallel with resistor R12 and capacitor Q2 with the result that the scanner again stops stepping and the reporting apparatus for the B machine is connected to the announcing system.

At the conclusion of the B machine report the system renews its stepping and scanning operation until it again stops at the position corresponding to the Door Delayed Message of machine A—after the giving of which the process is repeated until the troubles are cleared or the system is deactivated.

Although the foregoing has described the message reproduction branch of the system as an amplifier and loud speaker arrangement for purposes of simplicity such an arrangement need not necessarily be used. If it is desired to associate a number of such reporting systems from a group of installations in different buildings to a reproductions center at one central office, the following type of arrangement may be used.

Assume that several reporting systems of the type described herein are furnished, one in each of several separate buildings, to report fault conditions on the elevators of such buildings. Although in the previous description only a limited number of faults were indicated as being detectable it is to be understood that in each of such buildings it is possible to measure as many faults on as many elevators as may be desired, each one of the fault messages being transmitted over one reproducing device such as a loud speaker to inform the building personnel of the existence of such condition. Moreover, in order to have such information reported to service or maintenance people located at some remote point central to many buildings containing such systems, it is desirable to employ an announcing system such as is shown in FIGURES 5 and 6 utilizing a telephone line from each building so reporting to the remote central point.

Assume that the audio message reporting that the doors of car a were being prevented from closing is to be transmitted to the remote central point. When fault reporting

relay FRa is energized, as previously described, contact $FR5a$ (FIG. 5) closes to energize coil FM of the memory relay causing contact FM1 to close. This completes the circuit for a suitable D.C. voltage signal to be transmitted over telephone lines 24 (FIG. 6) to the central office where it lights lamp MF1, the memory fault light for that building. This lamp when lighted informs an attendant at the central office of the continued existence of a fault in that building. It remains lighted until all fault conditions in that building have been remedied.

Contacts $FR5a$, in closing, complete a circuit for charging capacitor Q5 through resistor R18. This creates a transient pulse which through rectifier RE13 and resistors R22, R23 momentarily raises the grid of thyatron T4 sufficiently to initiate conduction. As T4 begins to conduct capacitor Q8, previously charged through resistor R21, now discharges through coil FLX of the auxiliary fault light relay and the tube, thereby operating that relay. When the charge on Q8 is sufficiently reduced, the tube is extinguished, since the voltage drop across resistor R21 and coil FLX reduces the voltage across tube T4 to a value less than its sustaining value. Relay FLX is then deenergized and capacitor Q8 is again charged through resistor R21 to the value of the D.C. supply. Contact FLX1 is closed momentarily to connect a source of 60 cycle alternating current to line 24 for transmission to the central office, the signal being a magnitude sufficient to cause about one milliwatt of power to appear across the 600 ohm termination point load. This signal energizes the coil FL of the fault light relay at the central office, closing contact FL1 to impress a suitable D.C. voltage on the control grid of gas discharge tube T5. Direct voltage B+ is impressed on the anode of tube T5. It is of such magnitude that it will not alone cause tube T5 to conduct but when combined with a suitable grid voltage will cause conduction and will maintain conduction after the grid voltage is removed. Tube T5 is individual to a building, as is memory fault light MF1. Thus, when the 60 cycle alternating current signal from a building causes the fault light tube T5 for that building to conduct and glow the central office attendant is informed that a trouble report from the indicated building is about to be transmitted. By manipulation of rotary switch 27 the loud speaker 25 may be connected to the telephone line 24 from the building corresponding to such tube. After receiving such information the attendant, by pressing button 26, places a low resistance parallel path around tube T5 to drop the potential at its anode to a value incapable of maintaining the tube conducting.

The short duration of the 60 cycle signal and the ability to extinguish tube T5 provides a means whereby a later occurring fault in that same building informs the attendant of such occurrence by referring tube T5, whether or not the first measured condition has been corrected. Thus when the hereinbefore mentioned fault on car b is measured and relay FRb is energized, contact $FR5b$ in closing causes another 60 cycle signal to be transmitted in the previously described manner. This signal then refires tube T5 and thus informs the attendant that another measured condition is being reported from the building corresponding to the glowing tube.

Although the invention has been described as being incorporated in a trouble reporting system using a leased wire circuit from each building to the centrally located trouble report receiving office it should be appreciated that this is not a necessary arrangement as any other form of transmission path will serve equally well. Thus, if desired, the actuation of the fault reporting relay FR for any trouble reporting unit may be caused to actuate an automatic dialing unit to connect the reporting building to the report receiving office using the apparatus shown in FIGS. 5 and 6 or any desired equivalent of it of which a number are known to those versed in the communication art.

As the practice of the described invention lends itself to the optional use of variations of the described apparatus it is to be understood that the preceding description is to be taken as being explanatory and not as being limiting in its nature.

What is claimed is:

1. In an elevator system, including a plurality of elevators arranged in first and second groups of several elevators each, an arrangement for reporting automatically the occurrence of faulty operation of any of said elevators said arrangement comprising first and second sources of prerecorded fault messages associated respectively with said first and second groups, each said source containing a plurality of messages arranged sequentially and individual to each elevator of that group, means individual to each elevator and responsive to faulty operation of that elevator for producing an indicia of such faulty operation, message reproducing means individual to said first and second groups of elevators, means responsive to the operation of any of said indicia producing means for progressively scanning each such indicia producing means to select one producing such indicia and to halt said scanning operation, means responsive to said selection to activate said message reproducing means associated with the group of elevators containing said operated indicia producing means at the start of reproduction of the prerecorded message corresponding to the fault to be reported and for deactivating said reproducing means at the conclusion of that message, said scanning means thereafter being operative to select other such operated indicia means of either bank of elevators and to cause reproduction of the prerecorded message individual to such indicia means.

2. A trouble reporting system for use with a plurality of elevators arranged in two or more groups of several elevators per group, said system comprising a plurality of trouble indicia producing means individual to each elevator, one such means for each trouble to be reported, a source of prerecorded messages, individual to each group of elevators, each said source containing a plurality of messages one each of which corresponds to a different one of said trouble indicia producing means, normally inactive message reproducing means individual to each source of messages, scanning means operative in response to activation of any of said indicia producing means to progressively sample each such indicia means and to select therefrom the first encountered activated one, said scanning means in response to such selection thereafter halting further sampling operations, means responsive to said selection for activating the message reproducing means of the group containing the selected indicia means and for preventing the activation of the remaining message reproducing means at a time corresponding to the start of reproduction of the message individual to the activated indicia means, and means responsive to the conclusion of said reproduced message for returning said reproducing means to its inactivated state, for again making possible the activation of any one of the message reproducing means and for resuming the scanning of said indicia producing means to again select an activated one for reproduction of the prerecorded message associated with it.

3. A reporting system transmitting to a remote location vocal messages pertaining to measured predetermined conditions in a control system, said reporting system comprising; a reproducing device; double track endless tape recorders storing a plurality of vocal messages on the first track of each of the tapes of said recorders for delivery to said reproducing device upon measurement of said predetermined conditions; stepping switches selecting for delivery to said reproducing device the proper vocal messages corresponding to the measured predetermined conditions; indexing signals stored on the second track of said double track endless tapes located to follow each vocal message on said first track advancing said stepping switches; and a scanning unit operable during the con-

tinued existence of a measured predetermined condition to scan progressively said predetermined conditions until it encounters a measured one of said conditions whereupon it ceases scanning and operates to lock-in the connection of the tape recorder storing the vocal message corresponding to the measured one of said conditions encountered to said reproducing device at the time said tape recorder is to deliver that vocal message and to lock-out the connection to said reproducing device of all other tape recorders of said reporting system, said scanning unit being responsive to said stepping switch being advanced by the indexing signal at the conclusion of a delivered message for resuming scanning.

4. Means for reporting measured predetermined conditions in a system at a remote location, said means comprising; an audio amplifier and loud speaker; double track tape recording machines each including message reproduction means and storing a plurality of prerecorded messages on the first of said tracks and a plurality of prerecorded indexing signals on the second of said tracks, said indexing signals on the said second track being intermediate said prerecorded messages on said first track; motors for driving each of said tape recording machines; stepping switches, one for each of said recording machines, each of said stepping switches being operable by said indexing signals stored on its corresponding tape recording machines and having a brush for electrical engagement with a plurality of contact points each of said contact points corresponding to one of said plurality of prerecorded messages; a scanning device operable upon the occurrence of measured predetermined conditions selecting a tape recording machine for connection to said audio amplifier and loud speaker enabling said tape recording machine to transmit a prerecorded vocal message corresponding to a measured predetermined condition, whereby upon the measurement of a predetermined condition for which a message has been stored upon a tape recording machine, said tape recording machine is driven by energization of its motor, said indexing signal stored upon the second track of said driven machine causing advancement of the brush of said stepping switch corresponding to said driven machine until the contact corresponding to said measured condition is engaged by said brush thereby causing said scanning unit to cease operating and to complete the connection of the audio amplifier and loud speaker to the driven tape recording machine so that the predetermined measured condition may be reported by delivery of the prerecorded vocal message to said audio amplifier and loud speaker.

5. A system for reporting to a central office troubles experienced on a plurality of groups of elevators installed in a number of diverse buildings said system comprising a plurality of trouble indicia producing means individual to each elevator in each of said buildings one such indicia means for each trouble that is to be reported on each elevator, a source of prerecorded messages individual to each group of elevators in each building, each said source containing a plurality of messages one each of which corresponds to a different one of said trouble indicia producing means, normally inactive message reproducing means individual to each source of messages, scanning means common to the groups of elevators in any individual building said scanning means being operative in response to activation of any of said indicia producing means in that building progressively to sample each such indicia means and to select therefrom the first encountered activated one, said scanning means in response to such selection thereafter halting further sampling operations, means responsive to said selection for activating the message reproducing means of the group containing the selected indicia means and for preventing the activation of the remaining message reproducing means of that building at a time corresponding to the start of reproduction of the message individual to the activated indicia means, a communication path between each diverse building location and said central office,

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means responsive to the activation of said indicia producing means and effective to connect said reproducing means to said communication path individual to the reporting office, means responsive to said activated indicia means for impressing on said communication path a first signal indicative of the activated state of said indicia means and also momentarily impressing upon said communication path a second signal indicative of the operation of said indicia producing means, visual indicating means individual to each reporting building at said central office said means being activated by said first signal as long as any indicia means is activated at said reporting building and

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a second visual indicating means at said central office responsive to the momentary second signal impressed by the activation of said indicia producing means as an indication that a trouble report is being impressed upon said communication path.

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