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C. W. ROE ET AL

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ALARM SYSTEM

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2 Sheets-Sheet 1

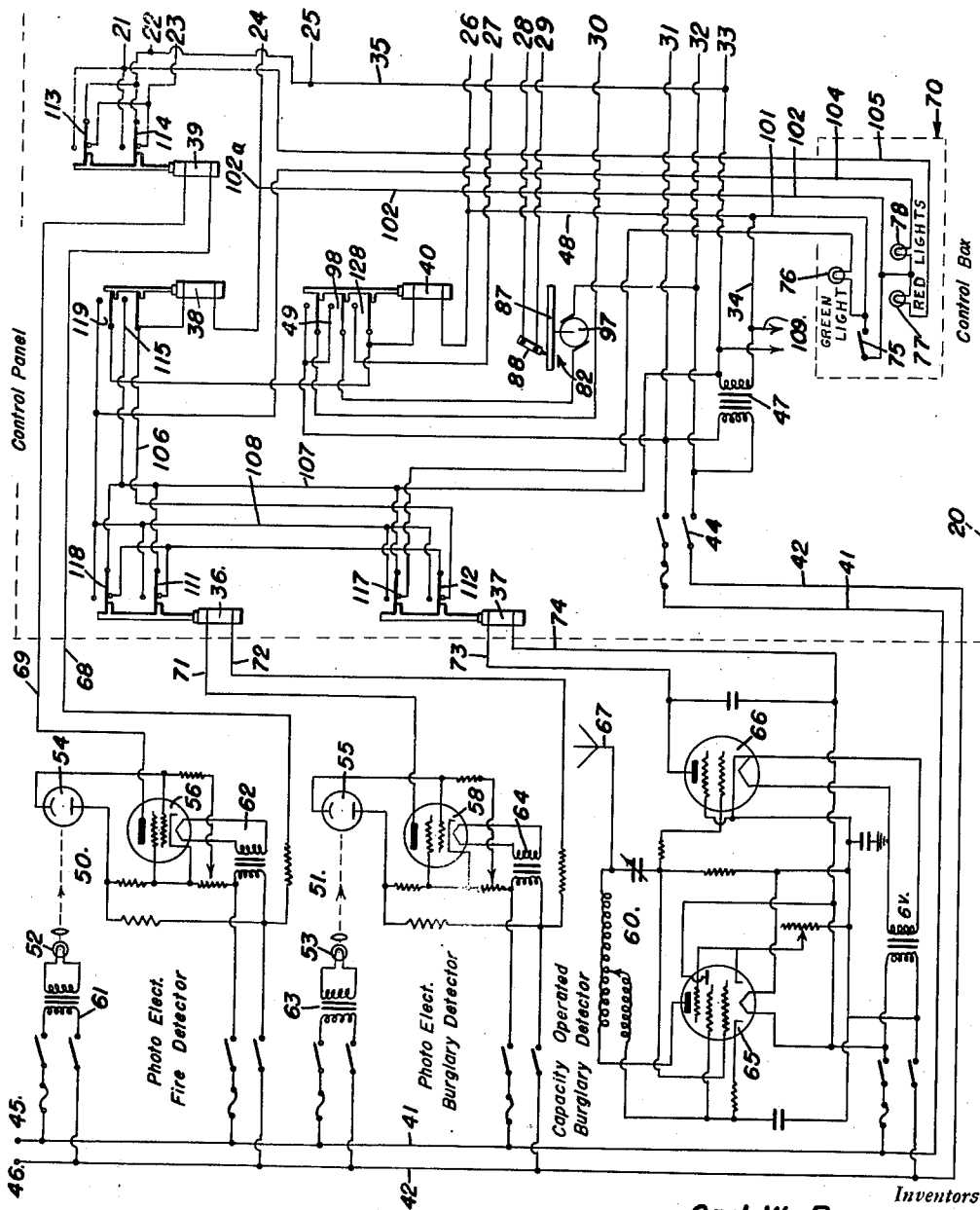


Fig. 1

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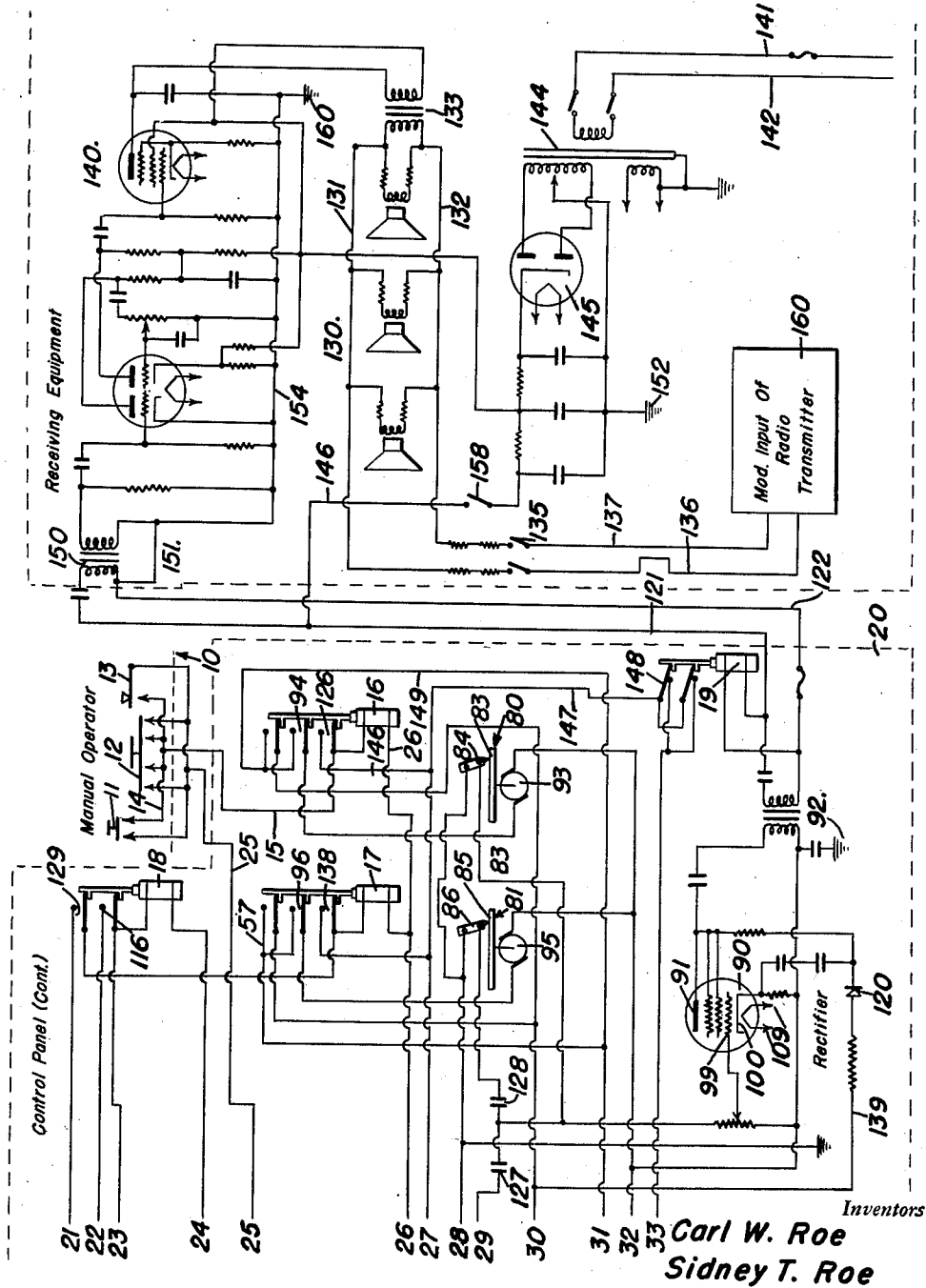
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UNITED STATES PATENT OFFICE

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ALARM SYSTEM

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7 Claims. (Cl. 340—215)

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This invention relates to alarm systems for the protection of premises of the type in which a closure of an alarm circuit releases the transmission of a suitable spoken message to a central supervising station where said message is received and where the proper steps for protecting the premises may be undertaken.

The primary object of the invention consists in providing an alarm system of the above described type in which, by relatively simple means, manual operation of the alarm system during business hours and automatic operation of the alarm system during the hours in which the premises are not occupied may be carried out alternatively, the spoken message transmitted to the central supervising station being always selected in accordance with the nature of the emergency, thus permitting an operator at the central supervising station to initiate the undertaking of suitable protective steps.

A further object of the invention consists in providing simple and effective means for changing from manual to automatic operation, which means include signals indicating the condition of the alarm detectors in the alarm circuit at the time of the switching from one type of operation to the other type of operation, said signals reporting without producing an alarm, whether the detectors are in the operative or inoperative position at the time of the switching operation.

A further object of the invention consists in providing an alarm system in which a plurality of detectors of different types for the same emergency and also a plurality of detectors of the same type for different emergencies may be used each detector when operated selecting the spoken message corresponding to the emergency for which the detector was constructed, and each detector also giving an indication at the control center of the premises to be protected as to the condition in which it is in, such an indication being given without starting an alarm at the time when an operator at said control box is switching the alarm system from manual to automatic operation.

A further object of the invention consists in providing an arrangement controlled by relays for sending out and transmitting recorded spoken messages in the event of an alarm, which arrangement may be controlled from the receiving central supervisory station as soon as the sending out of a message has started.

A further and more specific object of the invention consists in providing an alarm system which is operable by any number of detectors of

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different types for different emergencies and which is so arranged that currents of different voltages may be used for operating the devices without interference and without danger of an invasion of the low voltage connections by currents of higher voltage.

A still further feature of the invention consists in so connecting the control relays for the message producing devices that no confusion of messages can take place and that an actuation of a plurality of message transmitting devices is prevented.

A still further object of the invention consists in a connection of the control relays of the message transmission devices which prevents the giving of an alarm in the event of power failure with subsequent return of power to the system.

Further and more specific objects of the invention will be apparent from the following detailed specification.

The invention is described with reference to the accompanying drawings illustrating one embodiment of the system by way of example. It is, however, to be understood that the alarm system according to the invention which has been illustrated serves the purpose of explaining the principle of the invention and the best mode of applying the principle. The specification does not describe and the drawing does not show the modifications of the system which are possible without modification of the essence of the invention and a departure from the example shown is therefore not necessarily a departure from the principle of the invention.

In the drawings, Figures 1 and 2 are diagrams of the connections showing the various units used in the alarm system. The two figures are in fact parts of the same diagram, and the lines at the right end of one figure are supposed to be joined to the corresponding lines at the left end of Figure 2.

The alarm system according to the invention, as has been explained above, is of the type in which spoken messages are delivered in the event of an emergency to a police department or fire department or to any other central supervisory department capable of handling emergency calls. The system is equipped for alternative or for combined manual and automatic operation. It is also provided with appropriate means for delivering recorded messages which correspond to different types of emergencies, said means being properly selected and operated by the alarm device which has been set into operation. Moreover, in order to operate the alarm system alternatively either

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by hand or automatically supervising means are provided on the premises to be protected which indicate whether a change from manual to automatic operation finds the system ready for such automatic operation or whether the units of the system have accidentally, during the period in which no automatic operation took place, been brought into a condition which an alarm would be given without an emergency. Finally, the system is of a type in which, once an alarm has been sounded, the entire system is under the control of the operator in the police or fire department or other supervisory exchange and arrangements are made which permit the operator in the police or fire department station to switch the message directly to a radio transmitter for direct transmission to police cars or to outlying fire or police stations, etc.

The alarm system according to the invention comprises in the first place the alarm circuit provided with circuit closing devices of different types which are adapted to react either on manual operation during certain periods or, when set for automatic operation during other periods, are adapted to detect the illicit intrusion into the protected area, the moving of or the contact with objects in this area, the approach to certain points or passages, the development of high temperatures, or the development of smoke or flames and similar occurrences. Further, the alarm system consists of a control board panel with which all the alarm circuits are connected and which contains the message producing records for the different alarm circuits and the operating relays which are controlled by the alarm circuits, the energizing circuits for these relays which are interconnected so as to avoid a confusion of messages and which are specially arranged so as to avoid the giving of alarms in the event of a power failure. The system further comprises a manual controlling means on the control panel which is adapted to shift from manual alarm control to automatic alarm control, and also the supervising signals which indicate that the automatic alarm producing detecting devices are in their condition of rest, in which they are capable of producing an alarm in the event of an emergency, when the shifting from manual to automatic operation takes place. Moreover, the panel is provided with a means for amplifying and transmitting the recorded spoken messages over communication or telephone lines to police or fire department stations or to a central exchange in which the alarm messages are handled.

The alarm system further comprises the equipment in the receiving station which may be a police or fire department station, as above indicated, which equipment includes a suitable amplifier and loud-speakers, control switches for controlling the further operation of the message delivering devices and of other apparatus on the control board in the protected premises, once the alarm has been given, and said equipment further comprises switches and other means for operating a radio station and for directly using the incoming amplified signals containing the message for the modulation of the radio waves which are transmitted from said radio transmitter. The radio station may be provided with a priority control device of a well known type which permits the use of the radio station only after a previously started message has been fully delivered.

The above generally described alarm system may now be described in detail. As above stated, two kinds of alarm producing units are used, viz.

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manually operated and automatically operated alarm circuit closure units. Two kinds of circuit closing devices are used in all those cases in which the automatic supervision of the premises during business hours is unnecessary, while, on the other hand, a protection against holdups and similar occurrences is desirable during business hours. An automatic operation during business hours involves the risk of accidental and unintentional alarms given by persons not sufficiently acquainted with the function of the automatic detectors.

The device which is used for manual operation of the message transmitting devices is indicated at 10 in Figure 2. It comprises a number of switches, distributed in any appropriate manner and arranged in accordance with the conditions prevailing at the place to be protected. Standard units may be used for this purpose. These standard units may comprise push buttons 11, foot or body operated rails or bars 12 or keys or contacts 13 which are connected with certain locks. As the specific construction of these manually operated switches is not material they are neither shown nor described in detail.

All the switches are shown as being part of a manual alarm circuit 14, which is connected with the control panel by means of conductors 15 and 25.

The control panel is indicated at 20 and is shown in Figure 1 and in Figure 2, each figure showing one-half of the said control panel. The conductor 25 connecting the manually operated alarm circuit 14 with the control panel also runs through the panel and is joined to conductor 35 (Figure 1) which is connected with conductor 33 joined to the secondary coil of the transformer 47 on the panel which forms the source for low voltage currents. The primary of the transformer 47 is connected with the current supply lines 41, 42 which in their turn are connected with the power supply terminals 45, 46 of the building housing the premises. A double pole double throw switch 44 may be provided in the lines 41, 42 in order to control the power supply to the control panel.

The second conductor 15 connecting the alarm circuit 14 with the control panel 20 leads to the relay 16 on said panel which, by means of conductors 26 and 48 of the control panel is connected with conductor 34 leading to the other side of the secondary winding of the supply transformer 47.

The devices for use in connection with the automatic operation of the alarm system comprise a control box 70 and a number of photoelectric devices 50, 51 and of capacity operated units 60.

The photoelectric devices may be used for detecting burglary as well as for detecting smoke or flames. The photoelectric device 51 which is used for detecting burglary, for instance, may be placed into the path of access to the premises or may be located in some passageway which must necessarily be used in order to reach the guarded vaults or rooms. Any number of such devices may be used, but only one of these devices 51 is shown in the drawing which is acting as a burglary detector. Further photoelectric devices 50 are shown which act as detectors for smoke, fumes or flames. All these devices are conventional photoelectric devices with an exciter lamp 52, 53, respectively, and a photoelectric cell 54, 55, respectively. The photoelectric cell is connected with an amplifier 56, 58, respectively, in

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the output circuit of which a current is generated which is capable of actuating a relay. All the operating circuits are conventional and it may only be mentioned here that the exciter lamps 52, 53 as well as the cathode and grid of the amplifier are shown as being directly connected with the supply lines 41, 42 by means of suitable transformers 61, 62, 63, 64.

The photoelectric device 50 may also be replaced by a unit with a thermic element. The number of such devices used is not limited and will be chosen in accordance with the specific local conditions.

The capacity operated detecting unit 60 is also of standard construction and comprises an oscillator tube 65 which is connected with an antenna 67 or with any other feeler, the ground capacity of which is changed by the approach of a body to said antenna or feeler. The connections of the oscillator are conventional and are of the type which is usually designated by the term "free running oscillator." When a body approaches the feeler 67 the additional load on the oscillator causes a voltage drop across the grid-leak resistance, which voltage drop affects the grid of a Thyatron tube 66 which, as well known, is a tube carrying no current under normal conditions but being fired whenever the grid bias exceeds a certain limit. When a voltage drop across a grid-leak resistance occurs, the Thyatron tube 66 fires and current is flowing through the tube. Units of this type using a Thyatron are widely used commercially and no further description of this unit seems therefore to be necessary. Any number of capacity operated detecting devices may be used.

It will be understood that the units 50, 51, and 60 are arranged at suitable places on the premises and that the amplifying tubes 56, 58 and the Thyatron tube 66 which furnish the output current are connected with the control panel 20 by means of the conductors 68, 69; 71, 72 and 73, 74, respectively, leading from the plate electrodes of the respective tubes to the panel.

On the control panel 20 relays 39, 36 and 37 are arranged which are connected with the above-named conductors 68, 69; 71, 72 and 73, 74, respectively. It is preferable to arrange all the relays which are associated with detectors having the same functions, for instance, the detection of burglary, in a group, and to form separate groups for relays performing another function, such as the relay which is associated with the detectors for smoke and flames. In this way it is possible to use a single operating relay on the control panel for an entire group of detector controlled relays.

The control panel, in addition to the detector relays 36, 37 and 39, also includes an operating relay, controlling the automatic operation of the alarm system, for each group of detector relays. As there are two groups of detector relays, for fire and burglary detection, two relays are shown at 38 and 18. Moreover, the control panel includes the relays 40, 17 and 16 controlling the recording devices and the relay 19 which is a release relay controlled by the operator at the receiving station. The function of these relays will be explained below.

The control panel 20 moreover includes the transformer 47 connected with the two supply lines 41, 42 which supplies the relays on the panel and other devices with low voltage currents. Further, a switching and supervising unit or control box 10 is arranged which includes a manually

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operated switch 75 for changing from manual to automatic operation of the system, and a number of supervisory lamps 76, 77, 78. Preferably the switch is a lock switch operated when locking the box or when locking a door behind which the box is mounted.

The lamps 76, 77 and 78 are provided to indicate the state or condition of the detecting units. Lamp 76 is controlled by the relay 37 and is therefore dependent on the operation of the Thyatron 66 and, when the relay is in its normal position, also on the contacts of relay 36. This lamp, therefore, is energized if the relays of the group formed by relays 36 and 37 are in their deenergized or normal condition. The lamps 77 and 78 report on the condition of energization of the relays 36, 37 and 39, respectively. The circuits of these lamps are connected with the upper contacts of the above mentioned relays which are closed upon energization of relay 39 or of relays 36 and 37. By virtue of the connection between the movable middle contacts 118, 117 of the relays 36 and 37, lamp 78, when lighted, reports the operation of any detector and the energization of any relay in the group associated with the burglary detecting units. Likewise, lamp 77 when lighted reports the energization of a relay 39 and of any detector associated with the fire detecting group. Upon closure of the manual switch 75, connected with the secondary of the transformer 47, the set of lamps therefore inform the operator on the position of the relay contacts and thereby on the state of energization of the relays and of the detecting units, whether photoelectric or capacity controlled units. If upon closing of the switch 75 one of the two lamps 77 or 78, which may have red colored bulbs, is lighted this is an indication that one of the relays 36, 37 or 39, respectively, has been energized without an emergency calling for such operation. Such an operation may, for instance, be caused by objects which have been moved accidentally into the path of the rays or it may have been caused by the failure of the equipment, a condition which has to be investigated before the device is connected with the police department for automatic operation. No alarm is given, however, in this phase.

The control panel 20, in addition, contains the three record mechanisms 80, 81, 82, the number of record mechanisms being identical with the number of types of messages which are to be delivered. In the example shown a separate type of message is delivered in the event of a manual operation of the alarm system which may occur during business hours, for instance, in the event of an attempted holdup. In the event of an attempted burglary, during the night hours, another message is delivered and still a further message is delivered in the event that one of the fire detectors has been operated. The message may merely consist in a short description of the nature of the alarm, in the address or in the description of the location of the premises and, if necessary, in a short additional message indicating where the keys to unguarded premises are kept or indicating the address of the person in charge.

Each record mechanism comprises a record carrier and disk 83, 85, 87, driven by an electric motor 93, 95, 97, respectively, and cooperating with an electric pick-up 84, 86, 88, respectively. All the electric pick-ups may be connected in parallel. A single circuit 28, 29 contains all these parallel branches and leads to an amplifier tube 90, the output electrode 91 of which is connected with the output transformer 92. The secondary of the

transformer is directly connected with the communication or telephone lines 121, 122.

The telephone or communication lines are preferably those provided by a local telephone company, although special communication lines may be used if necessary. It is assumed that the example shown relates to an installation in which that part of the equipment which connects the control panel with the supervising receiving station is leased from the telephone company and this part of the circuit is therefore not further described but is merely represented by the two aforesaid lines 121 and 122.

The electric motors 93, 95, 97 driving the record carriers are preferably of the type operated by the usual line voltage in order to keep the dimensions of the motors as small as possible and in this case they are connected with the supply lines 31, 32 on the panel which are continuations of the supply lines 41, 42 directly connected with the source of supply 45, 46.

These connections include the contacts 94, 96, 98 of the relays 16, 17 and 40, respectively, which must therefore be equipped for handling higher voltages.

As has already been mentioned the record relay 16 is operated upon closure of the manual alarm contact circuit 14. Contacts 94, upon energization of the relay 16, then close the circuit of the motor 93 thus starting the delivery of the message recorded on the disk 93.

The two further record relays 17, 40 are under control of two control relays 18, 38, the operation of which is dependent on the lock switch 75 of the control box 70. When switch 75 is closed a low voltage circuit is closed which runs from the secondary of the transformer 47 over lines 101 and 102 to the connection point 102a from which point connections lead both to relay 18 and to relay 38. The connection with relay 18 is made by means of conductor 24 and the circuit of this relay is closed over conductor 23, the lower contact of the contact set 114 of relay 39 and conductors 35 and 33. Likewise, the connection with relay 38 is made over the same conductor 24 and over the lower contacts of the set of contacts 112 and 111 of relays 36 and 37.

In order to energize control relays 18 and 38 the detector relays 39, 36 and 37 which are operated by the detector mechanisms must be in their position of rest.

It will be noted that the relays 38 and 18 as soon as they have been energized remain energized as they are provided with locking circuits closed by their contacts 115 and 116.

When these control relays 38 and 18 have been energized the energization of one of the detector relays 39, 36 or 37 produces an energization of one of the record mechanism operating relays 17 or 40. Record relay 17 is energized over contacts 129 of relay 18 connected with the upper contact of the contact set 114 of relay 39, which comes into contact with the movable middle contact of said set 114 connected with conductor 35 and conductor 33 leading to the secondary of the transformer 47 when detector relay 39 is energized. Likewise, when control relay 38 has been energized an energization of one of the detector relays 36 or 37 moving the central contact towards the upper relay contacts in one of the sets 112 or 111 closes the circuit of record relay 40 which is connected with conductor 34, and over the contacts 119 of relay 38 and the upper contacts of the sets 118 or 117 of one of the detector relays 36 or 37 when energized, is connected with con-

ductor 33 and with the secondary of the transformer 47.

The closure of switch 75 therefore produces an energization of the control relays 38 and 18 only when the detector relays 39, 36 and 37 are in their neutral position or position of rest, in which case also the green light 76 will be lighted as has been described above. If one of the relays 39, 36 or 37 should be energized the operation of switch 75 would not result in the energization of relay 38 or 18 as in this case the middle contacts 111, 112, 117, 118 and 114 and 113 are in their upper position. In such a case, the lamps 77 or 78 are lighted the first named lamp indicating the energization of the detector relay 39 the second named lamp indicating the energization of one of the two relays 36 or 37.

As has been above explained this interlocking of the control relays and of the detector relays prevents a shifting from manual to automatic control when one of the detector relays is accidentally energized, and therefore prevents the sending out of an alarm signal by such a switching operation. This interlocking of the relays also prevents the sending out of a false alarm in the event of power failure, as the record operating relays 17, 40 can only start to operate after the detector relays have first fallen back into their normal position and have then gone back to their energized position a sequence of operations which can only occur in the event of a power failure, if indeed one of the detectors is still detecting the presence of an object.

The control panel, moreover, contains the amplifier 90 having a cathode 100, a control grid 99 and a plate 91, the input side of said amplifier being connected with the two lines 28, 29 which lead to the electric pick-ups 84, 86, 28. One of the two lines 28, 29 may be grounded. The other line may contain condensers 127, 128. The cathode heater is operated by means of a branch connection 109 branching off from leads 33, 34 of the transformer secondary 47 which supplies the low voltage current. The plate 91, and the screen grids and other grids of the amplifier to be kept at a high potential are supplied from conductor 31 connected with the high voltage supply line 41, said connection including contact 49 and conductor 30, conductor 139 and the selenium rectifier 120.

The output of the amplifier 90 leads to a telephone transformer 92, the secondary of which is connected with the communication or telephone lines 121 and 122.

Across this line the release relay 49 is connected which also forms part of the control panel and which may be operated by current impulses sent over the telephone lines so that the relay is under the control of the operator in the police or fire department station at the other end of the telephone or communication lines. The relay 49 controls the connection of line 33 with line 27 which is part of the locking circuits of the relays 16, 17 and 40. The locking circuits of these relays are therefore interrupted as soon as relay 49 is operated and the above-named relays are thus restored to their normal or deenergized positions. Upon deenergization of these relays no further transmission of signals takes place.

In all other respects the connections of the control panel follow known principles so that a further description of them seems to be unnecessary.

The receiving station will in most cases be a police station or a branch station of a fire de-

partment or a special alarm station of the communication system. This receiving station comprises an input transformer 150 connected with the telephone or communication lines 121 and 122 which transformer is directly connected with an amplifier 140. Said amplifier may be of any suitable type and need not be described, in detail. The amplifier merely serves to amplify the audio currents corresponding to the incoming recorded message. The output of the amplifier 140 feeds a further or audio transformer 133 which is connected with a loud-speaker arrangement 130, consisting either of one loud-speaker or of a plurality of speakers to be used either alternatively or in different parts of a building simultaneously. The receiving station has its own current supply indicated at 142 and 141 which leads to a supply transformer 144 supplying a rectifier 145 which is connected with one of the communication lines 121 by means of the line 146. A release switch 158 is inserted in the line 146 in order to be able to send an impulse over the telephone or communication lines to the release relay 19. The said rectifier 145 also provides an amplifier 140 and other units which may need direct currents with D. C. energy.

The supply lines 131 and 132 for the loud-speakers 130 may, by means of a further switch 135 be connected with the branches of the circuit 136, 137 which forms part of or leads to a radio transmitter and which permits to modulate the carrier waves emitted by the transmitter with the amplified message transmitted from the control panel of the alarm system. In a police station where such a transmitter is permanently running in order to transmit messages to cruising police cars it is therefore only necessary, if an alarm is to be given, to modulate the modulator tube of the transmitter with the speech currents which have been transmitted over the lines 121 and 122. The operator, in the receiving station therefore, may directly cause the transmission of the alarm to the cruising police cars. A suitable priority device is in this case arranged in the transmitter in order to secure orderly delivery of the message without interrupting other messages.

As above stated a release switch 158 is arranged which controls the line 146 connected with one of the communication lines 121. When the switch is closed an impulse from the source of rectified currents 145 is sent over the line 121 to the release relay 19, the operation of which interrupts the circuit of the electric motors of the recorders so that a further transmission of messages may cease under the control of the operator in the receiving station.

The operation of the above described device in detail will be as follows.

Let it be assumed that the switch 75 of the control board is open so that the alarm system therefore is set for manual operation. If in this case one of the three manually operated switches 11, 12 or 13 is closed a low voltage current will flow from the secondary of transformer 47 over lines 34 and 48 to line 26 and over line 26 to relay 16, conductor 15 and to the closed alarm circuit 14 and over conductor 25 to conductors 35 and 33 back to the secondary of transformer 47. Therefore relay 16 will close its contacts 126 and 94. The closure of contact 126 closes a locking circuit of the relay 16 over line 146 and line 147 and the contacts 148 of relay 19 which are connected with line 33, leading back to the secondary of transformer 47. The locking circuit does not in-

clude the alarm circuit 14 of the manual operator and it is therefore immaterial once the relay has been operated whether the switches 11, 12 or 13 remain closed or opened after operation. The switches may therefore be closed only for a moment and may be released thereafter without interfering with the operation of the alarm system.

The closure of the contacts 94 of the relay 16 sends a current of network voltage over the lines 42 and 32 to the motor 93 of the recording device 83 and from the motor over the contacts 94 and conductor 149 to line 31 which is connected with the supply line 41. The motor therefore starts to run and to rotate the record disk 83. The record disk must carry a record on which a suitable message has been inscribed which preferably always repeats itself and which is therefore sent out during a predetermined length of time. The message must state in addition to the location of the protected premises the nature of the emergency which caused the operation of the system, for instance the recorded message may state: "Hold-up in progress at _____ bank, _____ floor, No. _____ of _____ Street, Borough of _____."

The recorded message is picked up from the record disk by the electric pick-up 84 which is connected with the circuit 28, 29 and with the amplifier 90. The electric currents produced in the electric pick-up are therefore amplified in the amplifier 90 and are sent over the output circuit 91 of the amplifier to the transformer 92.

From the secondary of transformer 92 the message is transmitted to the receiving station over lines 121, 122 and is received in this station in the primary of transformer 150. The message is then transmitted from the secondary of the transformer 150, after amplification in amplifier 140 to the loud-speaker 130. The operator after having received the message may either initiate suitable protective steps in a manner not connected with this invention or, if he thinks that the message is of a type which is best transmitted to a cruising police car he may close switch 135 and thus cause the modulation of the radio transmitter 160 by the amplified currents. After a suitable time interval which permits the message to be radiated, he closes the release switch 158, thus transmitting a current impulse to be sent from rectifier 145 (grounded at 152) over switch 158 and line 146, line 121, relay 19, line 122, conductors 151 and 154 to ground 160.

The impulse thus transmitted over the communication lines energizes relay 19, which relay interrupts the holding circuit of relay 16 at the contacts 148. Relay 16 thus falls back and the further operation of motor 93 of the recording device 83 is thus stopped.

The system is now again in a condition of rest.

Let it now be assumed that the operator in the protected premises wants to switch on the automatic protecting means. If such a switching over to automatic operation is intended the operator first inspects lamp 76 which should give a green light when the detector relays are at rest. If such a green light appears he may switch over to automatic operation by closing switch 75. Let it now be assumed that indeed no detector is in operative position in which case the closing of the switch 75 closes the circuit of relays 38 and 18, the circuit of relay 38 being closed over 34, 101, 75, 102, 102a, relay 38, 106, lower contact of set 112, lower contact of set 111, 107, 33; the latter circuit being closed over the same section of the above

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described circuit up to point 102a and then over 24, relay 18, 23, lower contact of contact set 114, 35, 33. The two relays 28 and 18 are thus both energized and the system is ready for automatic operation.

If, however, the relay 36, 37, or 39 should be energized at this time one of the two red lights 77, 78, will go on. The red light 77 indicates energization of a fire detector and of a relay 39, the circuit of said light 77 running from 34 over 101, 75, 10

11, the upper contact of set 113, 35, 33. The red light 78 indicates energization of a burglary detector and therefore of one of the relays 36 or 37. The circuit of light 78 runs from 34 over 101, 75, 78, 104, the upper contact of set 118 (if relay 36 is energized) 107, 33. If relay 37 is energized the circuit is closed at the upper contact of set 112 and lower contact of set 111 by means of conductors 107 and 33. No energization of relays 38 and 18 occurs, however, upon closing of switch 75 and therefore no alarm signal is given. The operator has now to find out what caused the relays to be energized and has to remove the obstacles, if any, which caused the operation of the detectors.

If, however, the system is ready for operation the operation of a fire detector, for example, will operate the relay 39 over the circuit 68, 69 connected with the cathode in the plate of the amplifier 56 respectively. The relay 39 moves its middle contact to the upper position and energizes relay 17, the circuit running from 34, 48, 26, 17, contacts 129 of relay 18 (previously energized as above described) 21, contacts 114, 35, 33.

Closing of contacts 96 of relay 17 energizes the electric motor 95 of the recording mechanism 81, the circuit running from 41 to 31, contacts 96, electric motor 95, 32 back to 42. This circuit is a high voltage circuit. Relay 17 also closes the holding circuit for itself at contacts 138 running from conductor 34 to 48, 26, 138, 27, 148 (at relay 19), 33. This circuit is again under the control of relay 19 which is operated by the operator at the receiving station.

A message is now delivered by the rotating disk 85 which message may contain a statement that a fire has been detected on the protected premises. This message is picked up by the pick-up 86 and is amplified over the circuit 28, 29 by means of amplifier 90 in the way already described. It is then transmitted to the receiving station exactly as described in connection with the message the delivery of which was indicated by the manual operator. Likewise, the operation in the receiving station which follows the transmission of the message is identical with the operation already described.

The operation of a detector unit 60 for detecting burglary, for instance, operates the Thyatron 66 and the relay 37 in the Thyatron circuit. The operation of this relay starts the operation of the relay 40, the circuit of this relay running from 34 over 48, 26, relay 40, contacts 119 of relay 38, 108, contacts 112 (the middle contact of which is in the upper position) 118, 107, 33. Relay 40, thus energized, closes the low voltage holding circuit running from 34 to 48, 26, relay 40, 128, 27, 148 (at relay 19), 33. Moreover, a high voltage energizing circuit for motor 97 of the recording device 82 is closed this circuit running from 41 over 31, 98, 97 and 32 to 42.

The record disk now starts to rotate and to operate pick-up 88 connected with line 28, 29 in the manner as described. The message which is now delivered is a message announcing a bur-

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glary in the protected premises. The remainder of the operation is identical with the operation already described.

The same operation which has been described above will also take place upon interruption of the ray of the photoelectric device 51. In this case the relay 36 will be energized and the energization of relay 40 will take place over a circuit starting at 34 and running over 48, 26, 40, contacts 119, contacts 118, 107, 33. The remainder of the operation is identical with the operation which has been described above.

It will be clear from the above description that many changes in the individual connections may occur without in anyway departing from the essence of the invention as defined in the annexed claims.

Having described the invention, what is claimed as new is:

1. A protective alarm system comprising a number of substations, each arranged in one of the premises to be protected, a manually operated alarm circuit and further alarm circuits operated automatically by different types of alarm producing emergencies in each substation, said alarm circuits being divided into groups, operated under the same emergency conditions, a control panel arrangement in each substation including a detector relay for each alarm circuit, a number of recording mechanisms each provided with a sound record carrier, with means for translating the said recording into talking currents and with electric driving means for said record, each recording mechanism being allotted to one of the alarm circuit types, one of said recording mechanisms being provided with a spoken record announcing an emergency occurring only during manual operation of an alarm circuit, other recording mechanisms being provided with records of spoken messages, each message being associated with one of the groups of automatically operated alarm circuits, an operating relay for each recording mechanism, one of said operating relays being operable by said manually operated alarm circuit, further operating relays operable by the automatically operated alarm circuits, one operating relay being associated with each group of alarm circuits, an energizing circuit for each operating relay, a control relay controlling the energizing circuit of each operating relay, said energizing circuit being further controlled by one of the detector relays, energizing circuits for each of said control relays, and a manually operated switch for controlling the alternative operation of the manually operated alarm circuit and the automatically operated alarm circuit, said manually operated means controlling simultaneously all the energizing circuits of all of said control relays, and in addition, a holding circuit for each operating relay, closed whenever the relay is operated, and a release relay controlling said holding circuits.

2. A protective alarm system comprising a number of substations, each arranged in one of the premises to be protected, a manually operated alarm circuit and further alarm circuits operated automatically by different types of alarm producing emergencies in each substation, said alarm circuits being divided into groups, operated under the same emergency conditions, a control panel arrangement in each substation including a detector relay operated by each alarm circuit, a number of recording mechanisms each provided with a sound record carrier, with means for translating the said recording into talking cur-

rents and with electric driving means for said record, one of said recording mechanisms being provided with a spoken record announcing an emergency occurring only during manual operation of an alarm circuit, other recording mechanisms being provided with records of spoken messages, each message being associated with one of the groups of automatically operated alarm circuits, an operating relay for each recording mechanism, one of said operating relays being operable by said manually operated alarm circuit, further operating relays operable by the automatically operated alarm circuits, one operating relay being associated with each group of alarm circuits, an energizing circuit for each operating relay, a control relay controlling the energizing circuit of each operating relay, said energizing circuit being further controlled by each of the detector relays of the group of automatically operated alarm circuits with which the operating relay is associated, an energizing circuit for each of the control relays, said energizing circuit being controlled by all the detector relays of the aforesaid group, a manually operated switch for controlling the alternative operation of the manually operated alarm circuit and the automatically operated alarm circuits, said manually operated switch controlling simultaneously all the energizing circuits of all said control relays, indicator signals associated with the said energizing circuits, said signals being operated upon closure of the manually operated switch indicating the state of the alarm circuit, said connection however preventing the energization of the operating relays upon throwing of the switch, when a detector relay is energized while operating the indicator signal associated with the control relay allotted to the said detector relay.

3. A protective alarm system comprising a number of substations, each arranged in one of the premises to be protected, a manually operated alarm circuit and further alarm circuits operated automatically by different types of alarm producing emergencies in each substation, a control panel arrangement including a number of sound recording mechanisms, each provided with a sound record carrier and with means for translating the sound recording into talking currents, an operating relay for each recording mechanism, controlling relays for the operating relays of the recording mechanisms operated by the automatically operating alarm circuits, a manually operated switch for controlling the controlling relays of the aforesaid operating relays associated with the automatically operated alarm circuits, a central alarm call receiving station, communication lines connecting said control panel arrangement with said central receiving station, a holding circuit for each operating relay on the control panel, a release relay controlling all the holding circuits, and means in the central exchange for controlling said release relay.

4. A protective alarm system comprising a number of substations, each arranged in one of the premises to be protected, a manually operated alarm circuit and further alarm circuits operated automatically by different types of alarm producing emergencies in each substation, said alarm circuits being divided into groups, operated under the same emergency conditions, a control panel arrangement in each substation including a detector relay for each alarm circuit, a number of recording mechanisms each provided with a sound record carrier and with means for translating the said recording into talking currents

each record carrier carrying a spoken message associated with one of the groups of automatically operated alarm circuits and with the manually operated alarm circuit respectively, an operating relay for each recording mechanism, an energizing circuit for each operating relay, a control relay controlling the energizing circuit of each operating relay associated with an automatically operated alarm circuit, a manually operated switch for controlling simultaneously all the energizing circuits of the said control relays, a holding circuit for each operating relay, closed whenever the relay is operated, a release relay controlling all the holding circuits of all the operating relays, a central alarm call receiving station, communication lines connecting said control panel arrangement with said central receiving station, an energizing circuit for the release relay on the control panel connected with the communication lines and an impulse circuit, in the central alarm call receiving station for operating the release relay of the control panel arrangement from the said station.

5. An alarm system comprising a number of substations, a manually operated alarm circuit and automatic alarm circuits, a control panel including a plurality of sound recording means and sound translating means, an operating relay for each sound recording means, controlling relays for the operating relays of the sound recording means operated by the automatic alarm circuits, a manually operated switch for controlling said controlling relays, a central station connected to said control panel, a holding circuit for each operating relay, a release relay controlling all holding circuits, and means in said central station controlling said release relay.

6. The structure of claim 3 wherein there is provided a plurality of indicator signals connected to said operating relays, each of said indicator signals indicating the condition of one of said automatic alarm circuits at the time when said manually operated switch is operated.

7. An alarm system comprising a number of substations, a manually operated alarm circuit and automatic alarm circuits, a control panel including a plurality of sound recording means and sound translating means, an operating relay for each sound recording means, controlling relays for the operating relays of the sound recording means operated by the automatic alarm circuits, a manually operated switch for controlling said controlling relays, a central station connected to said control panel, a holding circuit for each operating relay, a release relay controlling all holding circuits, and means in said central station controlling said release relay, and a plurality of indicator signals connected to said operating relays, each of said indicator signals indicating the condition of one of said automatic alarm circuits at the time when said manually operated switch is operated.

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