

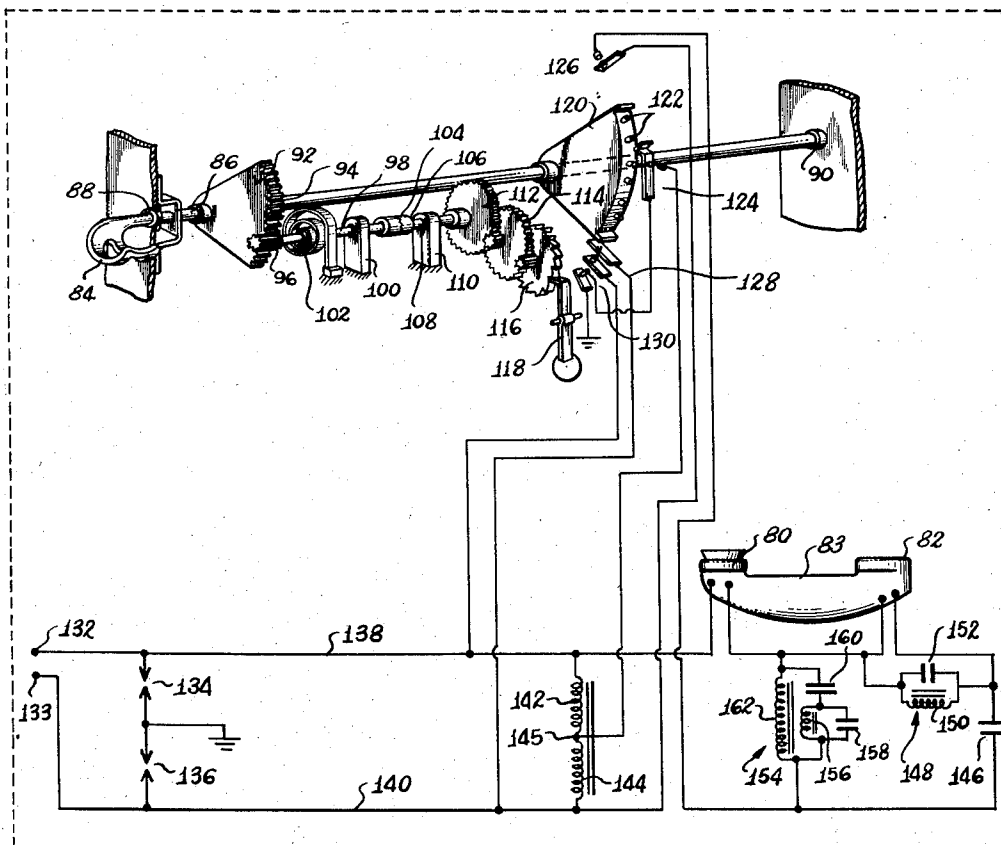
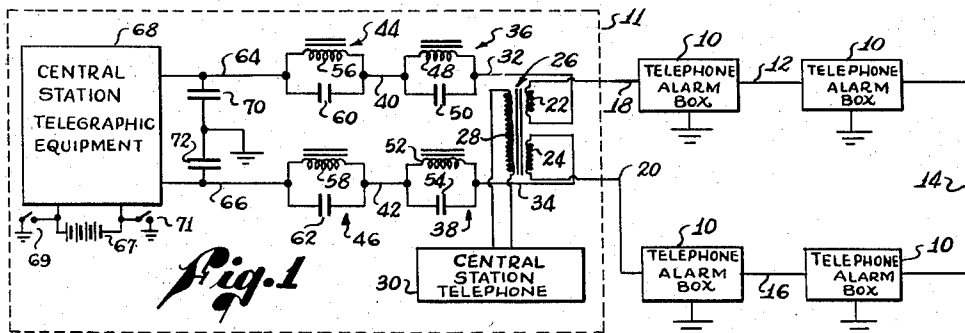
May 19, 1959

C. L. CRADDOCK

2,887,535

TELEPHONE SYSTEM FOR ALARM BOXES

Filed Jan. 22, 1957



INVENTOR.

CHARLES L. CRADDOCK

BY *Fulwider Mattingly & Huntley*
Attorneys

1

2,887,535

TELEPHONE SYSTEM FOR ALARM BOXES

Charles L. Craddock, Burbank, Calif.

Application January 22, 1957, Serial No. 635,204

14 Claims. (Cl. 179—5)

My invention relates generally to alarm systems, and more particularly to fire alarm systems which include telephonic and telegraphic reporting apparatus.

To effectively combat a fire it is important that a fire department, or other fire-fighting unit, be informed as fully as possible as to the nature and details of the fire. Further, fire fighting units should know of injuries to personnel and similar matters in order to either summon assistance or adequately equip themselves to function as effective as possible at the scene of the fire. To provide a fire-fighting unit with the details of a fire and a knowledge of injured personnel, or other matters, it is necessary that a direct communication channel be established between the fire-fighting unit and the person reporting the fire. In the event that a fire is reported by telephone, the details may be communicated to the fire-fighting unit; however, if the fire is reported at a fire alarm box, then ordinarily no such details can be given. Because a large number of fires are reported at fire-alarm boxes, a need exists to incorporate a telephone system into fire alarm box systems to thereby place the person reporting the fire in direct communication with the fire-fighting unit.

Most fire-alarm box systems consist of a group of fire-alarm boxes electrically connected in a serial circuit loop which is returned to the fire-alarm control station. This serial circuit normally carries a direct current of electricity. Turning in an alarm at any of the boxes has the effect of interrupting the normal flow of current in the serial circuit and forming current pulses in a code which is identified with a particular alarm box. In this manner a telegraphic signal is provided at the central station of the fire alarm system which indicates the location from which the alarm was given.

In incorporating a telephonic system into existing fire-alarm systems there is a requirement that the telegraphic portion of the system be maintained. That is, in certain situations, a person may report a fire by means of a fire-alarm box and be in such an excited state or otherwise so incapacitated that he is incapable of reporting the details of the fire over a telephone. However, such reports should still indicate the location of the fire by telegraphic signals to enable a fire-fighting unit to be dispatched.

In many situations, the electrical conductors which interconnect fire-alarm boxes are positioned adjacent to power lines, and as a result, strong signals, normally of 60 cycle frequency, are induced in the alarm system. Electrical signals may also be induced from other sources, e.g. arc lights of public lighting systems, and electric train and streetcar systems, all of which interfere with the audio signals of telephonic communication. It is therefore necessary to provide a filtering system to combat undesired signals in a fire-alarm system incorporating telephones, yet which enables the passage of both direct current (comprising telegraphic signals) and audio or telephonic signals.

In its more general form, my invention comprises a method of incorporating a telephonic system into a tele-

2

graphic fire-alarm system, wherein the telephonic system does not interfere with the operation of the telegraphic system. Further, my invention provides a method of filtering undesired electrical signals from the fire reporting system while preserving the desired telegraphic and telephonic signals.

It is, therefore, a major object of my invention to provide an improved alarm system.

It is a further object of my invention to provide an alarm system incorporating telephonic and telegraphic communication means.

Another object of my invention is to provide such a fire-reporting system which is simple and easy to operate and requires no special training for persons using it.

Still another object of my invention is to provide a telephonic-telegraphic alarm system including an improved electrical filtering apparatus.

A still further object of my invention is to provide a fire-reporting apparatus including telegraphic apparatus which automatically operates to provide a telegraphic signal without any effort on the part of the user and which then establishes telephonic communication with the fire department message center.

These and other objects and advantages of my invention will become apparent from the following description, and from the drawings illustrating the invention, in which:

Figure 1 is a schematic and block diagram of a system constructed in accordance with the principles of my invention; and

Figure 2 is a perspective and schematic diagram of a fire-alarm box system which may be used in conjunction with the system of Figure 1.

In Figure 1, I have indicated the diagram of a circuit for connecting a number of fire-alarm boxes, which include telegraphic and telephonic apparatus, to a central station at which fire-reports will be received. In the system of Figure 1, fire-alarm boxes are indicated by the numeral 10 and central station equipment is indicated generally by the numeral 11. The fire alarm boxes 10 are in both telephonic and telegraphic communication with the central station equipment 11. The fire-alarm boxes 10 are interconnected in a serial loop by means of conductors 12, 14 and 16. In addition, each of the fire-alarm boxes 10 is connected to ground. The serial loop including the fire-alarm boxes 10 has end conductors 18 and 20 which are connected respectively to windings 22 and 24 of a telephone repeater transformer 26. Audio signals in the windings 22 and 24 are induced into a winding 28 which is connected to standard central station telephone apparatus 30. The central station telephone apparatus 30 in its simplest form may consist essentially of a telephone, including microphone and earphone, serially connected to a battery for forming and reproducing audio signals. Such units for transmitting and receiving audio signals are well-known in the prior art.

The windings 22 and 24 are connected by means of conductors 32 and 34 respectively, to filter circuits 36 and 38. The filter circuits 36 and 38 are in turn connected respectively by means of conductors 40 and 42 to filter circuits 44 and 46. The filter circuits 36, 38, 44 and 46 each comprise parallel-resonance filters which are connected in a serial fashion with the serial loop including the telephone boxes 10. These filter circuits should include high-quality filter elements such as bifilar-wound inductances. The filter 36 consists of an inductance 48 and a capacitor 50. Similarly, the filter circuit 38 consists of an inductance 52 and a capacitor 54. In the same manner, the filter circuits 44 and 46 are formed respectively of inductances 56 and 58, and capacitors 60 and 62.

The filter circuits 44 and 46 are connected by means

of conductors 64 and 66 respectively to central station telegraphic equipment 68. This equipment 68 comprises a system for receiving and registering telegraphic signals to provide an indication of the location of a fire alarm box from which a fire has been reported. Such equipment is well-known in the alarm art. Additionally, the conductors 64 and 66, are connected respectively through capacitors 70 and 72 to ground potential. These capacitors 70 and 72 serve to isolate the equipment 68 from telephonic or audio signals which occur in the conductors 64 and 66. The central station telegraphic equipment is connected to a battery 67 which energizes the system. The terminals of the battery 67 are adapted to be connected to ground via switches 69 and 71.

During the normal operation of the fire-alarm system as shown in Figure 1, a direct current flows from the battery 67, through the central station telegraphic equipment 68, the conductor 64, and the inductances 56 and 48, to the conductor 32. This current then passes through the winding 22 and the conductor 18 to the first of the telephone alarm boxes 10 which normally presents essentially no resistance. The current is then passed through the boxes 10 and the interconnecting conductors 12, 14 and 16, then through the conductor 20 to the winding 24. After passing through the winding 24, the current passes through the conductor 34, through the inductances 52 and 58 to pass through the conductor 66, and return to the central station telegraphic equipment 68 and the battery 67.

As long as current continues to flow in this serial loop, no alarm signals are indicated. However, when one of the alarm boxes 10 is operated, the serial loop is altered and the direct current flowing therein, is formed into telegraphic code signals identified with the particular alarm box from which an alarm is given. These telegraphic code signals may be decoded at the central station telegraphic equipment 68 and serve to indicate the location of the box from which a fire was reported.

When an alarm is turned in at one of the boxes 10 of Figure 1, a telegraphic report will be automatically made as a telephone instrument is removed from its hanger in one of the telephone alarm boxes 10. After the telephone alarm box 10 has performed the operation of automatically sending out a telegraphic message, the system automatically operates to connect the telephone instrument in the box to operate in communication with the central station telephone 30. A full description of the telephone alarm box 10 will be given hereafter; however, generally, these boxes include a telephone instrument, i.e., handset, of the usual type.

In the operation of the system of Figure 1, it is important that direct current and audio signals be permitted to flow in the serial loop; however, it is also desirable and necessary that certain alternating currents be impeded to such an extent as to not interfere with the audio signals. The impedance to such interfering signals is provided by means of the filter circuits 36, 44, 38, and 46. Each of the filter circuits provides a parallel resonance circuit and thus presents a high impedance to signals of a particular frequency. Various of these filter circuits may be connected serially to combat and impede induced current which would otherwise interfere with the telephonic portion of the system.

In the system of Figure 1, two such filter circuits are shown in each leg of the serial loop. These filters may be utilized respectively to combat signals induced from power lines which will probably constitute the largest interference source. As a result, the filters 36 and 38 are designed to present a high impedance to alternating currents having a frequency of 60 cycles per second, assuming that the power lines operating adjacent this system operate at a high frequency of 60 cycles. The filters 44 and 46 may be designed to present a high impedance to a frequency of 120 cycles per second, this frequency

being the first harmonic of the power line frequency, and in all probability the frequency of additional undesired signals that must be impeded.

It is to be noted that the filter circuits 44 and 36 operate upon one leg of the serial circuit, while the filter circuits 38 and 46 operate upon the other leg. It is necessary to provide the filter circuits of each leg of the serial circuit in the event that only one of these legs is operative under conditions later described.

It is also to be noted that other interfering signals may be regularly induced in the serial circuit of the fire-alarm system of Figure 1, and therefore, similar filters constituting parallel resonance circuits may be placed in the serial loop to effectively reduce the magnitude of such signals. In addition, filtering may be performed within the telephone alarm box circuits 10, as will be later described. The provision of parallel resonance filter circuits at some point in the serial loop effectively impedes induced signals of undesirable frequency, regardless of the location of such filter circuits in the serial loop. That is, the parallel-resonance filter circuits, e.g., 36 may be placed in the circuit in such a fashion that they are not located between the telephones on the signal boxes and the central station; however, as all signals in the serial loop will have to flow through the entire loop, these filters impede signals in the loop and perform the desired function, regardless of location. The operation of the system of Figure 1 will be considered in greater detail after a discussion of the system in the alarm boxes 10.

Referring now to Figure 2, there is shown a microphone 80 and an earphone 82 which are mechanically connected to form a conventional telephone handset or instrument 83. During the time when the telephone alarm box is not in use, the telephone instrument 83 will be placed upon a hanger 84. The weight of the telephone instrument 83 will cause a shaft 86, upon which the handle 84 is mounted, to be rotated in a clockwise direction. Removal of the instrument 83 from the hanger 84 allows the shaft 86 to revolve and produce telegraphic signals which are transmitted to the central station. The instrument 83 is thereafter rendered operatively connected to the central station.

The shaft 86 is mounted in such a manner as to rotate in bores 88 and 90. Mounted upon the shaft 86 is a gear segment 92 having gear teeth 94 which engage a pinion gear 96. The pinion gear 96 is mounted upon a shaft 98 which is held in position by means of a bracket 100. Also mounted upon the shaft 98 is a clock spring 102 that tends to oppose the force exerted on the shaft 86 by the weight of the telephone instrument 83. The force exerted by the spring 102 is applied to the shaft 86 through the pinion gear 96 and the gear segment 92.

A ratchet gear 104 is connected to the shaft 98 and is adapted to engage another ratchet gear 106 which is mounted upon a shaft 108. The shaft 108 is held in position by means of a mounting bracket 110. The shaft 108 is then connected to a gear train including gears 112, 114, and 116. The gear 116 engages a pendulum retarder mechanism 118. The function of this mechanism 118 is to lower the rate of speed at which the shaft 68 will revolve when the telephone instrument 83 is removed from the hanger 84. In this manner, the rate of movement of the shaft 86 is regulated to a uniform and relatively slow movement.

Also positioned upon the shaft 86 is a code segment 120. The code segment 120 has an arcuate surface upon which are mounted risers 122 which serve to engage and close contacts 124 in accordance with a predetermined program to thereby form a telegraphic code. Positioned adjacent to the code segment 120 are contacts 126, 128 and 130. The contacts 126 are closed when the code segment 120 is at the top of its arc of travel and are open at all other times. The contacts 128 and 130 are positioned at the bottom of arc of travel of the code segment 120. The contacts 128 are normally closed while the contacts 130

5

are normally open; however, when the code segment 120 moves from the bottom of its arc of travel these contacts 128 and 130 are altered in state. The function of the contacts 126, 128 and 130 is to detect the operating period of the telephone alarm box as a telegraphic apparatus and to thereafter make the necessary connections to connect the telephone instrument 83 for communication with the central station telephone 30.

The electrical portion of the system of the fire-alarm box as shown in Figure 2 is connected in the serial loop as discussed with reference to Figure 1 by means of terminals 132 and 133. Lightning arresters 134, 136 are connected between each of the terminals 132 and 133 and ground potential. These terminals are then connected by means of lines 138 and 140 to windings 142 and 144 respectively. The windings 142 and 144 are connected to the stationary portions of the contacts 124 via lines 145 and 147. The movable contact of the contacts 124 is then connected through the contacts 130 to ground potential. The contacts 128 are individually connected to the conductors 138 and 140 such as to effect a short circuit between conductors 138 and 140 when closed.

The conductor 138 is connected through the microphone 80 to the earphone 82 in a serial fashion. A connection from the earphone 82 is then passed through a capacitor 146, through the contacts 126 and to the conductor 140. A filter circuit 148 including an inductance 150 and a capacitor 152 is connected in parallel with the earphone 82. Connected in parallel with the earphone 82 and the capacitor 146 is a filter circuit 154. The filter circuit 154 includes a parallel circuit formed of an inductance 156 and a capacitance 158 which is serially connected to a capacitance 160. This combination is then connected in parallel with an inductance 162 to form the composite filter circuit 154. The filter circuits 148 and 154 act in conjunction with the microphone 80 and the earphone 82 to filter out undesirable induced signals.

During such times as an alarm box is inoperative the telephone 83 will be hung upon the hanger 84 thereby causing the gear segment 92 and the coding segment 120 to be at the bottom of their arc of travel. The contact 126 will therefore be open and the contacts 128 and 130 will respectively be open and closed. Due to the closed state of the contacts 128, the alarm box circuit will appear simply as a closed circuit at the terminals 132 and 133. That is, the telephone alarm-box circuit is shorted by the contacts 128. However, the lightning arresters 134 and 136 are still operatively positioned in the circuit of Figure 2; therefore, each alarm box in the serial loop as shown in Figure 1 is protected by lightning arresters.

Assume now that the telephone alarm box as shown in Figure 2 is incorporated in the system of Figure 1, and is utilized to report the occurrence of a fire. Upon opening the enclosure of the box the person reporting the fire will see the telephone instrument 83 positioned upon the hanger 84. Intuitively the person reporting the fire will lift the telephone instrument 83 from its hanger 84. As this is done, the force exerted upon the shaft 86 by the spring 102 acting through the gears 96 and the gear segment 92 will cause the shaft 86 to be rotated in a counter clockwise direction through a limited arc of rotation. As the shaft 86 is so revolved, the code segment 120 will similarly be moved through an arc of rotation. With the initial movement of the code segment 120, the contacts 130 will be closed while the contacts 128 will be opened. Upon the opening of the contacts 128, the alarm box circuit will no longer be shorted as formerly. With the closure of the contacts 130 the lines 145 and 147 will both be intermittently connected to ground potential through the contacts 124 to produce a coded signal. During this time, the circuit including the telephone instrument 83 is not operatively connected to the remainder of the system as the contacts 126 are still in an opened condition. However, the electrical current flowing in the serial loop as described with reference to Figure 1 now flows from the

6

terminal 132 through the conductor 138, and the winding 142 to line 145. This then current flows from the line 145 through the contacts 124 and 130 to ground.

As the code segment 120 moves through its arc of rotation, the risers 122 will cause the contacts 124 to be operated in accordance with the position of the risers 122 to form a telegraphic code. Each closure of the contacts 124 in a coded fashion connects the line 145 to ground. The result of this operation is to alter the flow of direct current through the conductors 138 and 140 and the serial loop to thereby provide a telegraphic code which is sensed at the central station telegraphic equipment 68 shown in Figure 1. This equipment 68 upon receiving the telegraphic signals may act to record such signals which are indicative of the location of the fire alarm box from which a signal was given. When the coding segment 120 completes its arc of travel, the contacts 124 and 126 will be closed. With the closure of the contacts 126 the telephone instrument 83 is operatively connected in the circuit.

It is to be noted, that though the person reporting the fire may be in a state of excitement or shock and incapable of speaking, a telegraphic indication as to the location of the fire will nevertheless be revealed at the fire department and enable a fire-fighting unit to be dispatched. If, however, the person reporting the fire is not in such a state, he can then provide the fire-fighting unit with information which may greatly enhance their capabilities to fight the fire. Such information may be given by means of the telephone circuit now to be described.

Upon the completion of its movement, the coding segment 120 closes the contacts 124. Therefore, the lines 147 and 145 are connected through contacts 124 and contacts 130 to ground. The circuit of the system is thus placed in a state in which the telephone instrument 83 is in communication with the central station telephone 30. In this state, the windings 142 and 144 are serially connected in the serial loop circuit interconnecting the telephone alarm boxes 10. The windings 142 and 144, however, present a certain amount of resistance and therefore a portion of the direct current flowing in the serial loop will also pass through the inductance 162 and the microphone 80 of the telephone instrument 83. As the microphone 80 is spoken into, its resistance will vary to thereby modulate the current passing therethrough. As a result, audio signals will be formed in the serial loop which are representative of the words spoken into the microphone 80. These audio signals will be passed through the windings 22 and 24 as shown in Figure 1, to be transferred into the winding 26. Signals from the windings 26 are then applied to the central station telephone to reproduce audible sounds.

In a similar fashion, the central station telephone 30 includes a microphone which is serially connected with a battery or other source of current and may modulate the current flowing through the windings 28 to form audio signals. These audio signals will be transferred into the windings 22 and 24 by induction, and be passed to the alarm box from which an alarm is given. Upon being applied to such an alarm box, these signals will pass from the terminal 132, through the microphone 80, the earphone 82, the capacitor 146 and back to the terminal 133. It is to be noted, that the capacitor 146 serves to prevent direct current from passing through the earphone 82; however, this capacitor is of such magnitude as to provide a low impedance path for voice signals. It may therefore be seen, that the telephone instrument 83 and the central station telephone 30 are connected and persons using them are placed in direct communication.

In the operation of the above described telephone circuit, it is necessary that the serial loop including the telephone alarm boxes 10 be maintained; however, the system of this invention incorporates an arrangement for enabling

communication to be continued in the event of a break in the serial loop.

A consideration of Figure 1 will indicate that each of the telephone alarm boxes 10 is connected to the central station 11 by means of two electrical current paths. In general, in the event one such path is broken both telegraphic and telephonic communications may be maintained by utilizing the other electrical path with a ground-return circuit. Assume for example, that an open circuit occurs in a portion of the electrical circuit connecting the terminal 133 in Figure 2 to the line 20 in Figure 1. With the occurrence of such an open, telephone communication between the instrument 83 and the central station telephone 30 will fail. The operator of the central station telephone will then close one of the switches 69 or 71. Closure of one of these switches 69 or 71 will serve to connect either the line 64 or the line 66 to ground. The operator may have to try individually closing both the switches 69 and 71 to ascertain which of the conductors 64 or 66 should be grounded to maintain communication with the telephone alarm box from which a fire is being reported. The one of the conductors 64 and 66 which is still connected to the operative fire-alarm box 10 is not connected to ground. However, the other of the conductors 64 and 66, connected to an open circuit, must be connected to ground. For example, assume that the conductor 66 is grounded and that the conductor 64 is connected to the terminal 132 of the alarm box from which a fire is being reported. The terminal 132 is connected through the conductor 138 and the winding 142 to the junction point 145 which is in turn connected to ground. Under such conditions, that system is connected as a ground-return telephone circuit utilizing only a single electrical conductor.

In the operation of the system in a ground-return mode, electrical current will flow from the battery 67, one terminal of which is grounded through the switch 71, to the conductor 64, then through the filter circuits 44 and 36, winding 22, and the conductor 18 to the terminal 132 (shown in Figure 2). The current will then flow through the conductor 138 and the winding 142 to the line 145. From the line 145, current will flow through the contacts 124 and the contacts 130 to ground potential. Current flowing through this path will form a voltage across the winding 142 which will provide an operating voltage for the microphone 80. Variation in the resistance of the microphone 80 will serve to vary the current flowing in the above described path to thereby form audio signals. Of course, the central station telephone 30 may similarly be utilized to vary such electrical current by inducing audio signals from the windings 28 into the winding 22. These audio signals will pass to the terminal 132 and be applied to the earphone 82 and the telephone instrument 83 through the capacitor 146 just as previously explained.

It may therefore be seen, that in the event an open circuit occurs in the serial loop of the system, communication will not fail. It is to be understood, of course, that in the event the open circuit occurs in the portion of the system connecting the line 138 to the central station then closure of the switch 69 at the central station will serve to form a communication channel over the other portion of the serial loop from that described above.

It is to be understood that the system of my invention is compatible with existing fire alarm systems and alarm boxes embodying it may usually be incorporated with only minor alterations in the system. As a result fire alarm boxes of existing systems may be replaced a few at a time without necessitating immediate replacement of an entire system.

While I have shown herein what is considered to be the preferred embodiment of the present invention, it will be apparent that various modifications and changes may be made with respect to the foregoing description without departing from the spirit of my invention or the scope of the following claims.

I claim:

1. An alarm system, comprising: a plurality of alarm boxes including automatic telegraph transmitters and telephones; means coupling both said telegraph transmitters and said telephones of said fires alarm boxes in a single serial circuit; and central office equipment including a telegraph receiver and a telephone connected to said single serial circuit.

2. An alarm system, comprising: a plurality of alarm boxes including automatic telegraph transmitters and telephones; means coupling both said telegraph transmitters and said telephones of said alarm boxes in a single serial circuit; a parallel resonant filter circuit connected in said serial circuit to present a high impedance to electrical signals of certain frequencies in said serial circuit; and central office equipment including a telegraph receiver and a telephone instrument connected to said serial circuit.

3. An alarm system, comprising: a plurality of alarm boxes including automatic telegraph transmitters and telephone instruments; means coupling both said telegraph transmitters and said telephones of said alarm boxes in a single serial circuit; at least one parallel-resonant filter circuit connected in said serial circuit to present a high impedance to electrical signals of certain frequencies in said serial circuit; central office equipment including a telegraph receiver and telephone means connected to said serial circuit; and means for electrically isolating said telegraph receiver from telephone-operating signals.

4. An alarm box, comprising: an automatic telegraph mechanism; a telephone; a movably-mounted hanger for said telephone; and spring means for exerting a force upon said hanger which is opposed to, and less than the force exerted upon said hanger by the weight of said telephone, said hanger being mechanically connected to said automatic telegraph whereby when said telephone is removed from said hanger said automatic telegraph is motivated by the energy stored in said spring.

5. An alarm box, comprising: an automatic telegraph mechanism; a telephone; a movably-mounted hanger for said telephone; spring means for exerting a force upon said hanger which is opposed to, and less than the force exerted upon said hanger by the weight of said telephone, said hanger being connected to said automatic telegraph whereby when said telephone is removed from said hanger said automatic telegraph is motivated by the energy stored in said spring; and switching means for rendering said telephone operative after said automatic telegraph mechanism completes a cycle of operation.

6. An alarm box, comprising: an automatic telegraph mechanism; a telephone; a movably-mounted hanger for said telephone; spring means for exerting a force upon said hanger which is opposed to, and less than the force exerted upon said hanger by the weight of said telephone, said hanger being connected to said automatic telegraph whereby when said telephone is removed from said hanger said automatic telegraph is motivated by the energy stored in said spring; and speed control means for regulating the speed of said automatic telegraph mechanism.

7. An alarm system comprising: a plurality of alarm boxes each including: an automatic telegraph mechanism; a telephone; a filter circuit incorporating said telephone for impeding electrical signals of certain frequencies; a hanger for said telephone; spring means for exerting a force on said hanger which force is less than the force exerted by the weight of said telephone and opposed thereto, said hanger being mechanically connected to said automatic telegraph mechanism whereby when said telephone is removed from said hanger, said telegraph mechanism is motivated, said alarm system further including: means coupling said alarm boxes in a serial circuit; central office equipment including a telegraph receiver and a telephone connected to said serial circuit; and a filter connected in said serial circuit to impede electrical signals of certain frequencies from said serial circuit.

9

10

8. An alarm system comprising: a plurality of alarm boxes each including: a rotatable shaft mounting a plurality of riser devices; electrical contacts adapted to be closed by said riser devices as said shaft is rotated to thereby form telegraphic signals; a telephone; a filter circuit incorporating said telephone for impeding electrical signals of certain frequencies; a hanger for said telephone, said hanger being connected to said rotatable shaft whereby when said telephone is removed from said hanger, said shaft is rotated, said alarm system further including: means coupling said alarm boxes in a serial circuit; central office equipment including a telegraph receiver and a telephone connected to said serial circuit; and a filter connected in said serial circuit to impede electrical signals of certain frequencies from said serial circuit.

9. An alarm system comprising: a plurality of alarm boxes each including: a rotatable shaft mounting a plurality of riser devices; electrical contacts adapted to be closed by said riser devices as said shaft is rotated to thereby form telegraphic signals; a telephone; a filter circuit incorporating said telephone for impeding electrical signals of certain frequencies; a hanger for said telephone, said hanger being connected to said rotatable shaft whereby when said telephone is removed from said hanger, said shaft is rotated; a speed regulating device to limit the speed of rotation of said shaft; said alarm system further including: means coupling said alarm boxes in a serial circuit; central office equipment including a telegraph receiver and a telephone connected to said serial circuit; and a filter connected in said serial circuit to impede electrical signals of certain frequencies from said serial circuit.

10. An alarm system comprising: a plurality of alarm boxes each including: a rotatable shaft mounting a plurality of riser devices; electrical contacts adapted to be closed by said riser devices as said shaft is rotated to thereby form telegraphic signals; a telephone; a filter circuit incorporating said telephone for impeding electrical signals of certain frequencies; a hanger for said telephone, said hanger being connected to said rotatable shaft whereby when said telephone is removed from said hanger, said shaft is rotated; switching means for rendering said telephone operative after said shaft is rotated; a speed regulating device to limit the speed of rotation of said shaft; said alarm system further including: means coupling said alarm boxes in a serial circuit; central office equipment including a telegraph receiver and a telephone connected to said serial circuit; and a filter connected in said serial circuit to impede electrical signals of certain frequencies from said serial circuit.

11. An alarm system comprising: a plurality of alarm boxes each including: a rotatable shaft mounting a plurality of riser devices; electrical contacts adapted to be closed by said riser devices as said shaft is rotated to

thereby form telegraphic signals; a telephone; a filter circuit incorporating said telephone for impeding electrical signals of certain frequencies; a hanger for said telephone, said hanger being connected to said rotatable shaft whereby when said telephone is removed from said hanger, said shaft is rotated; switching means for rendering said telephone operative after said shaft is rotated; said alarm system further including: means coupling said alarm boxes in a serial circuit; central office equipment including a telegraph receiver and a telephone connected to said serial circuit; a filter connected in said serial circuit to impede electrical signals of certain frequencies from said serial circuit; and means for isolating said telegraph receiver from telephonic signals.

12. An alarm system, comprising: a plurality of alarm boxes including automatic telegraph transmitters and telephones, movably mounted hangers in each box for said telephones, spring means for exerting a force upon said hangers which is opposed to, and less than the force exerted upon said hangers by the weight of said telephones, said hangers being connected mechanically to said automatic telegraphs whereby when said telephones are removed from said hangers said automatic telegraphs are motivated by the energy stored in said springs; means coupling both the automatic telegraph transmitters and the telephones of said fire alarm boxes in a single metallic line serial circuit; and central office equipment including a telegraph receiver and a telephone connected to said serial circuit.

13. An alarm system substantially as described in claim 12 and including means for connecting said alarm boxes to ground and switching means for switching said central office equipment to ground to thereby enable both telegraph and telephone communications between said alarm boxes and said central office equipment in a ground return fashion.

14. An alarm system, comprising: a plurality of alarm boxes including automatic telegraph transmitters and telephones; means coupling both said telegraph transmitters and said telephones of said fire alarm boxes in a single serial circuit; central office equipment including a telegraph receiver and a telephone connected to said single serial circuit; and means for connecting said alarm boxes to ground and switching means for switching said central office equipment to ground to thereby enable both telegraph and telephone communications between said alarm boxes and said central office equipment in a ground return fashion.

References Cited in the file of this patent

UNITED STATES PATENTS

669,832	Hibbard	Mar. 12, 1901
2,071,060	Bridges	Feb. 16, 1937