May 11, 1937. J. M. JOHNSON 2,080,136

TELEPHONIC ALARM SYSTEM

Filed Dec. 21, 1934 9 Sheets-Sheet 1

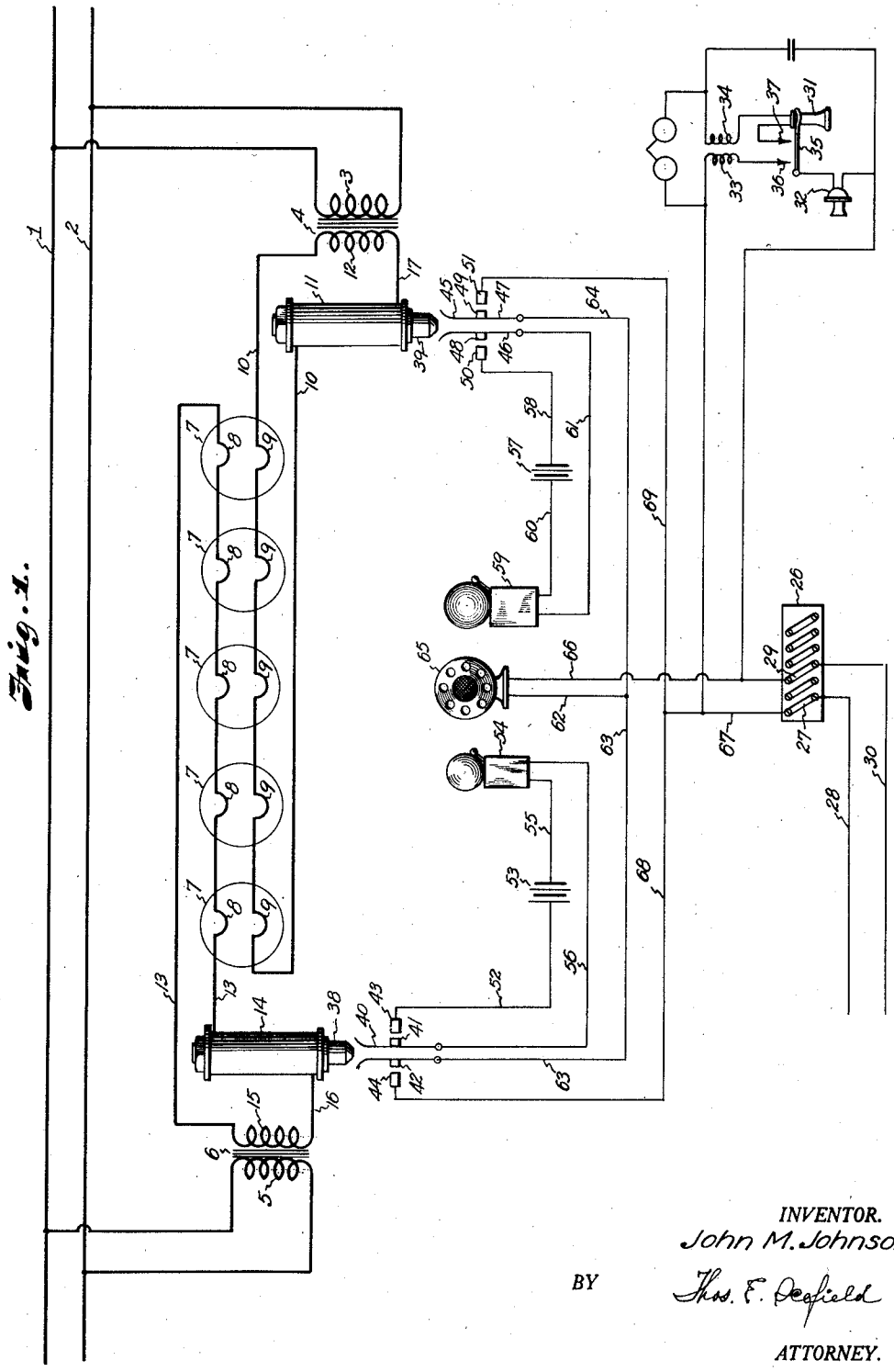


Fig. 1.

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May 11, 1937. J. M. JOHNSON 2,080,136

TELEPHONIC ALARM SYSTEM

Filed Dec. 21, 1934 9 Sheets-Sheet 2

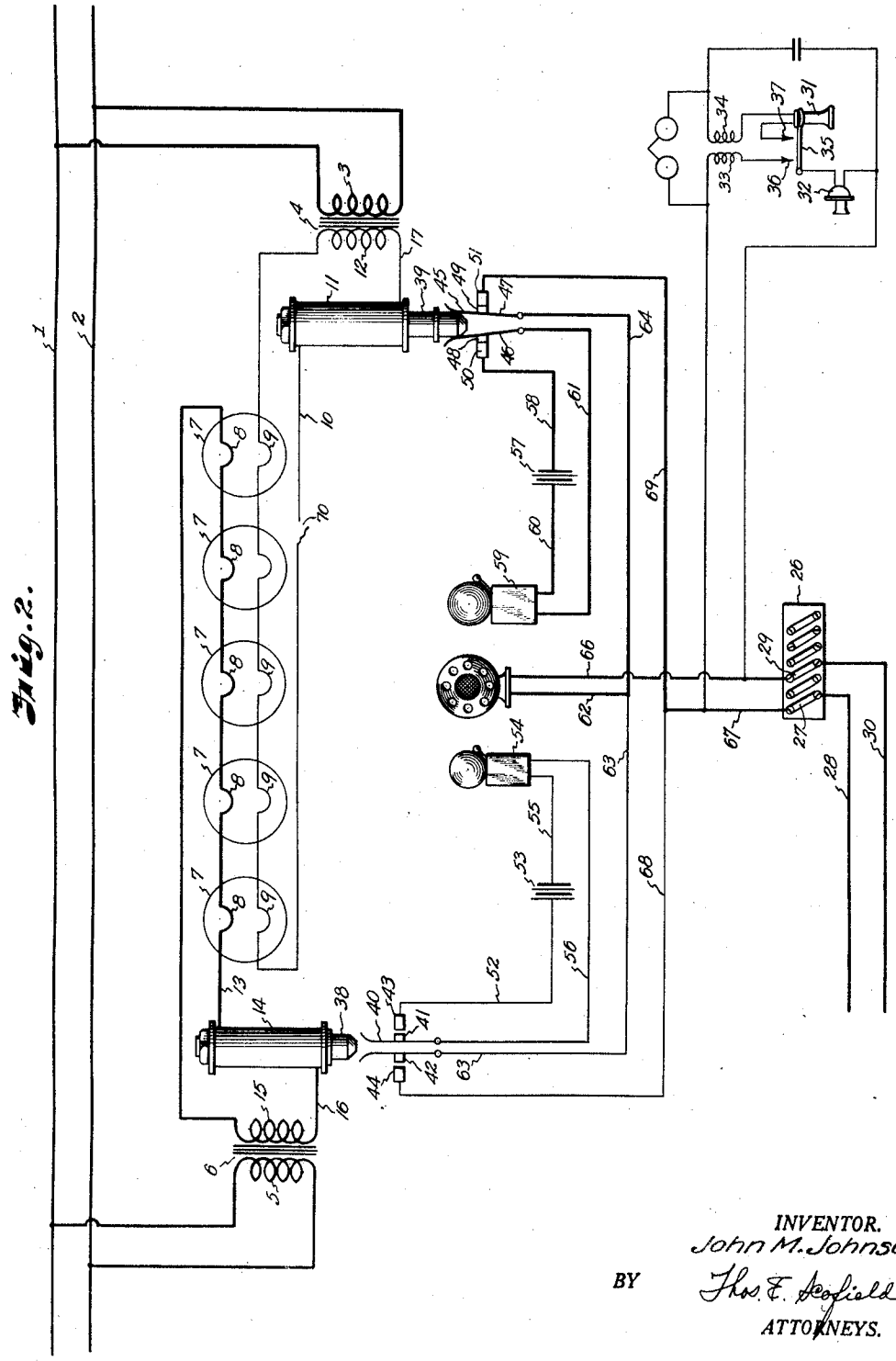


Fig. 2.

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May 11, 1937. J. M. JOHNSON 2,080,136

TELEPHONIC ALARM SYSTEM

Filed Dec. 21, 1934 9 Sheets-Sheet 3

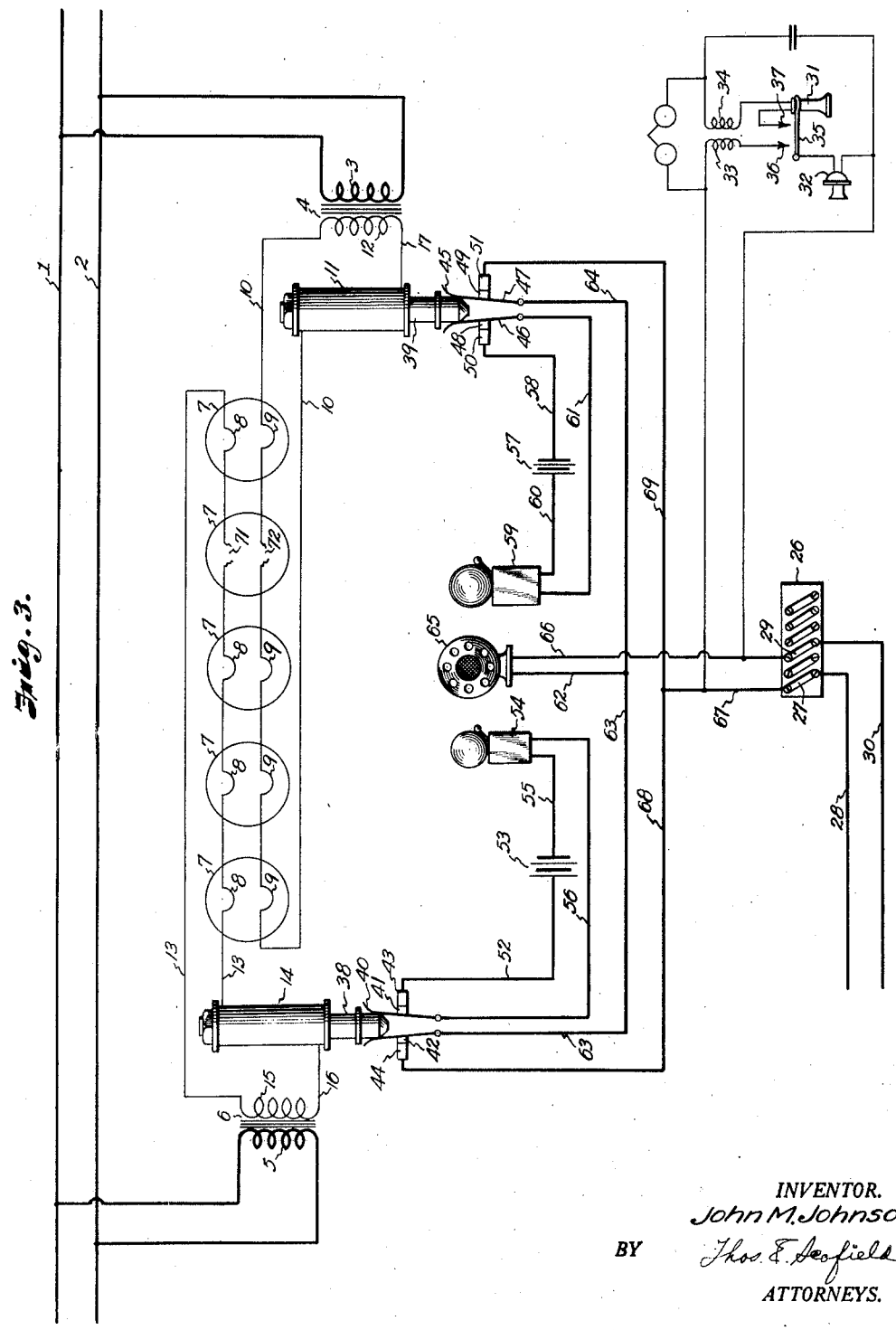


Fig. 3.

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May 11, 1937. J. M. JOHNSON 2,080,136

TELEPHONIC ALARM SYSTEM

Filed Dec. 21, 1934 9 Sheets-Sheet 4

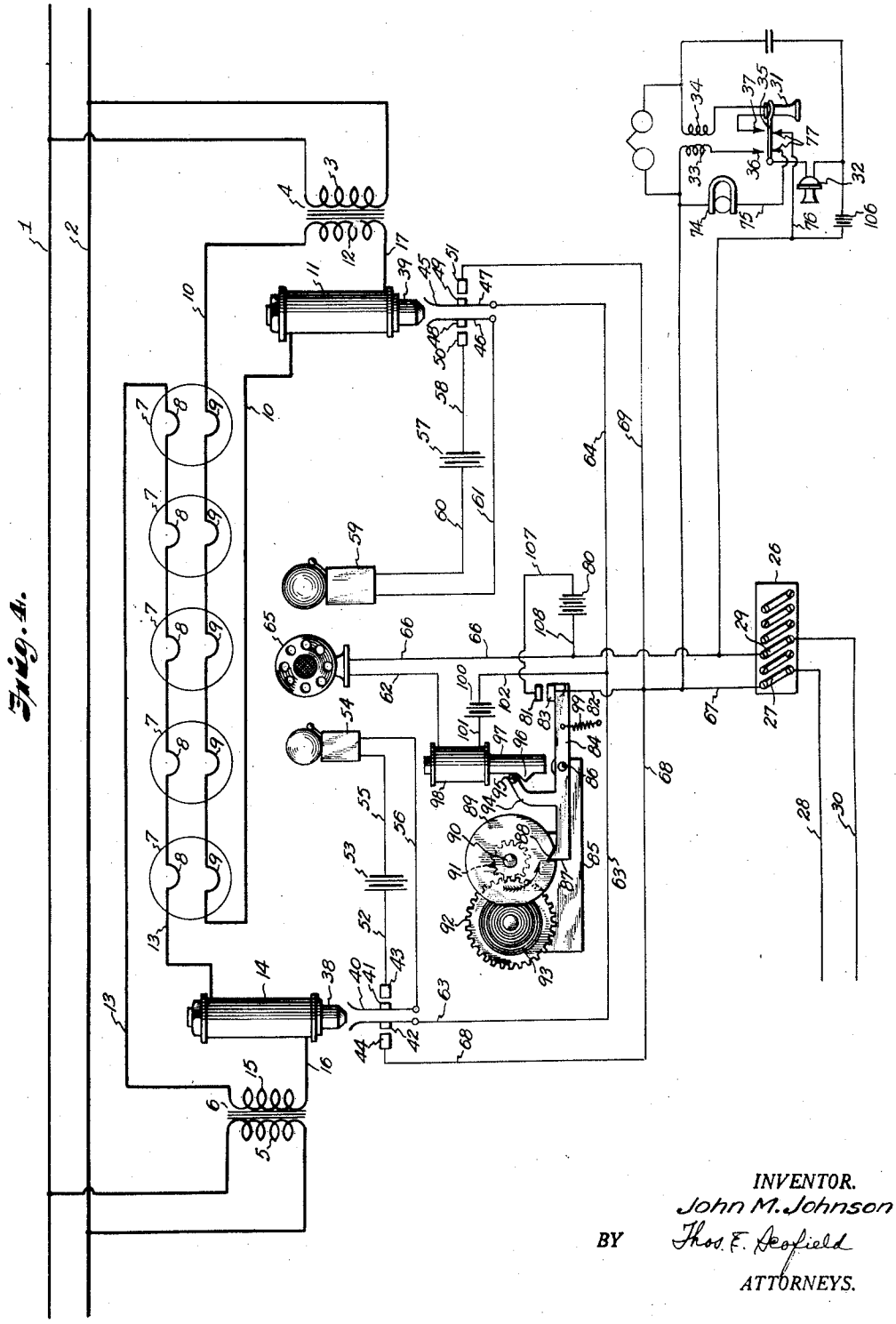


Fig. 4.

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May 11, 1937. J. M. JOHNSON 2,080,136

TELEPHONIC ALARM SYSTEM

Filed Dec. 21, 1934 9 Sheets-Sheet 5

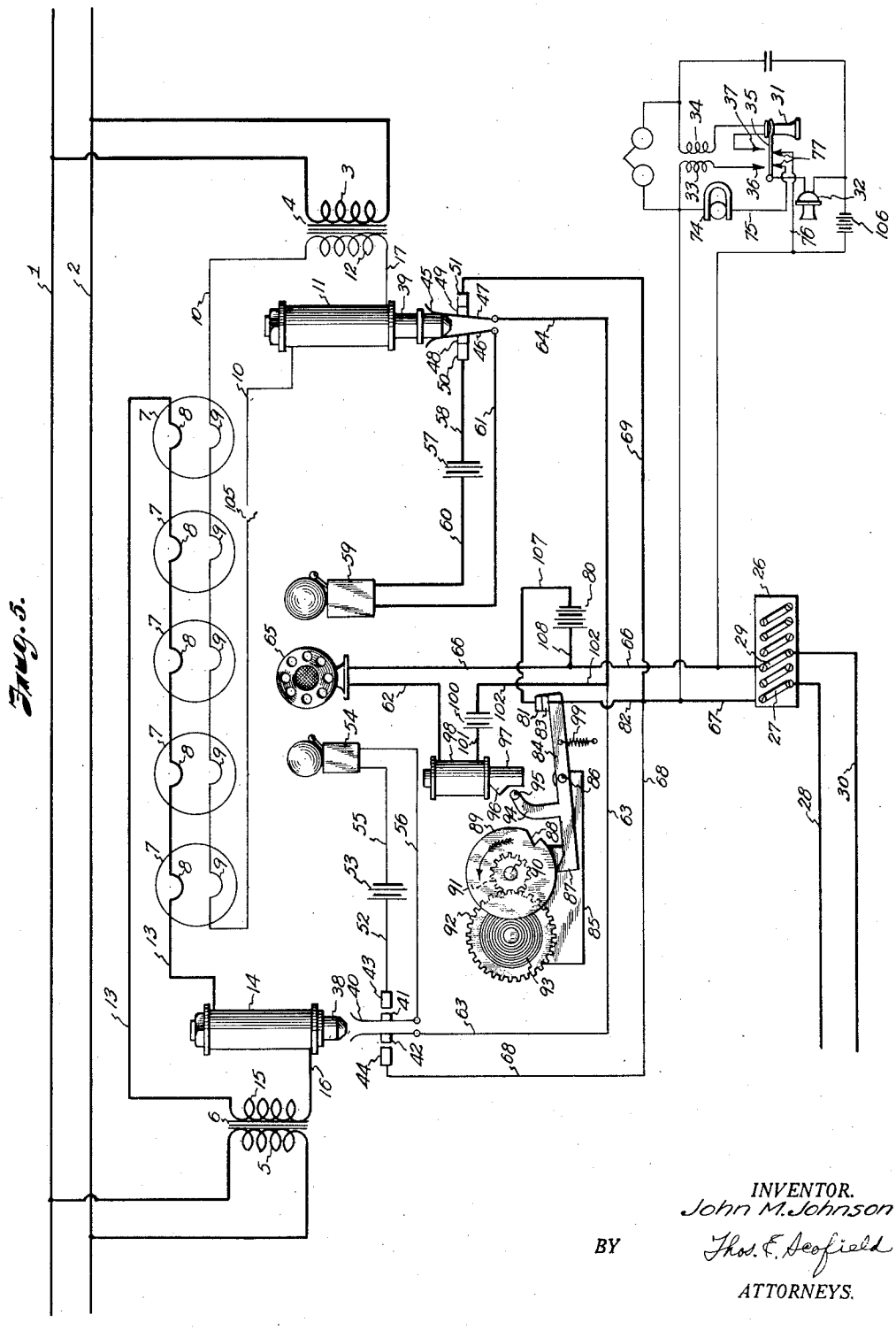


Fig. 5.

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May 11, 1937. J. M. JOHNSON 2,080,136

TELEPHONIC ALARM SYSTEM

Filed Dec. 21, 1934 9 Sheets-Sheet 6

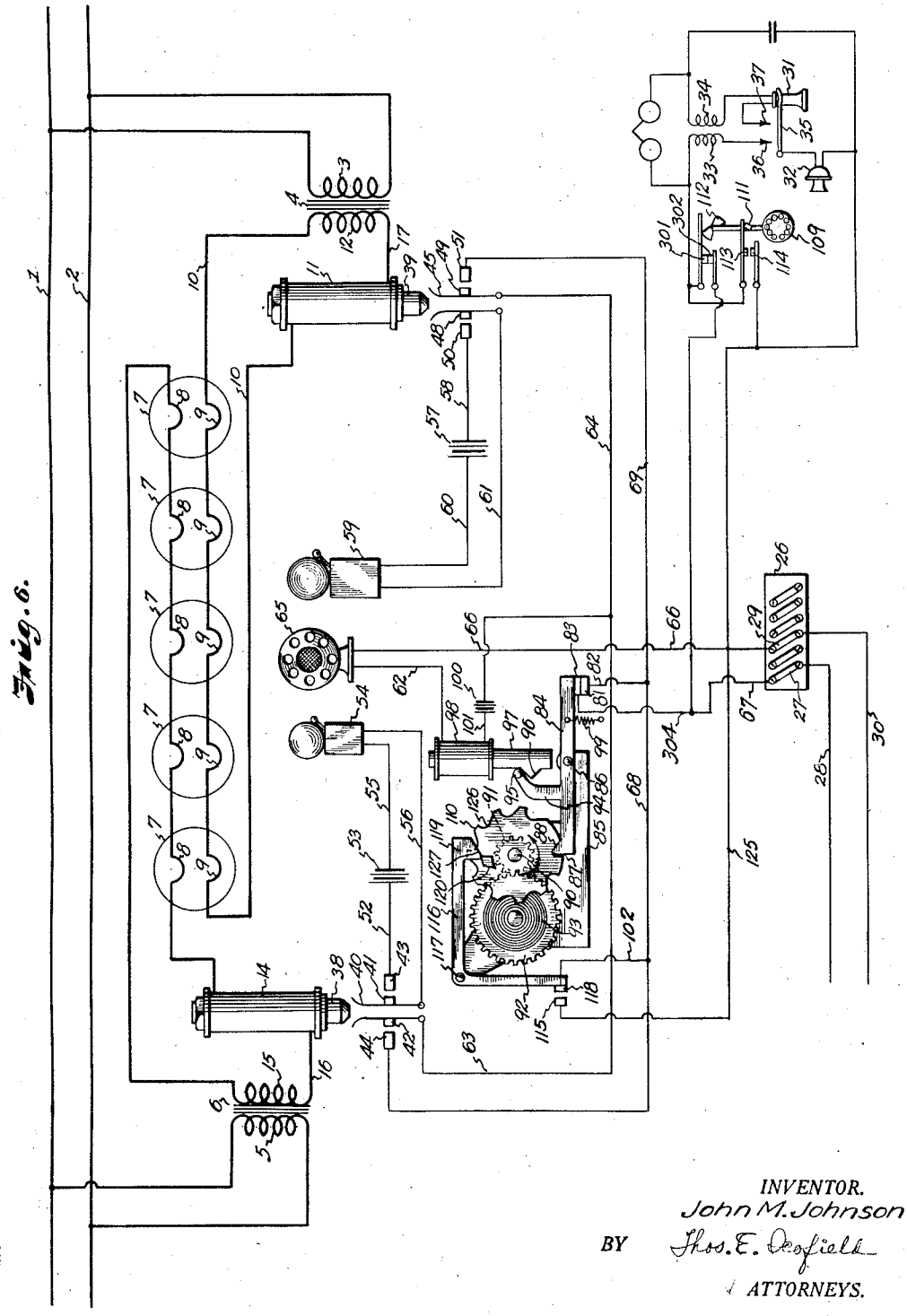


Fig. 6.

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May 11, 1937. J. M. JOHNSON 2,080,136

TELEPHONIC ALARM SYSTEM

Filed Dec. 21, 1934 9 Sheets-Sheet 7

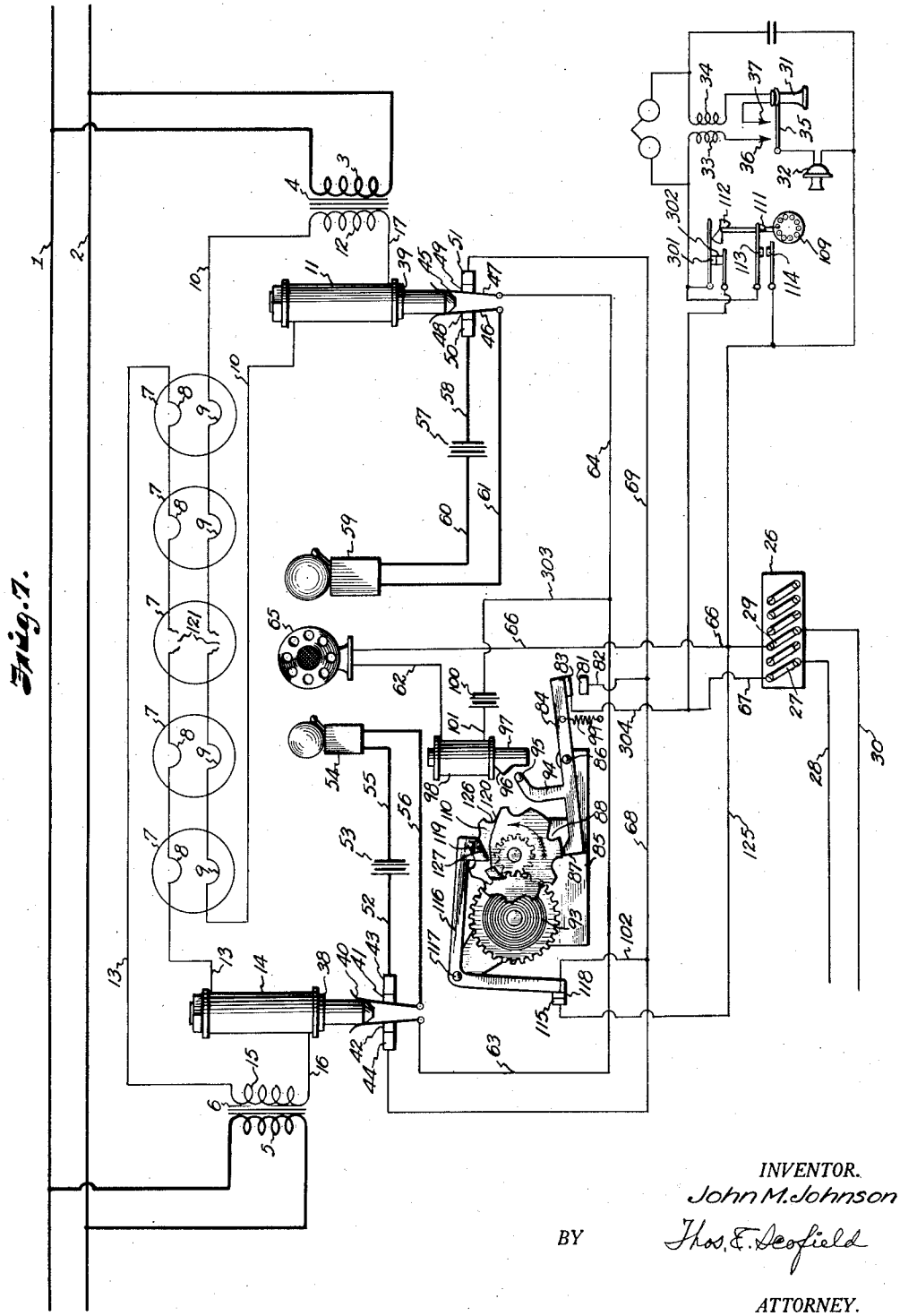


Fig. 7.

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May 11, 1937. J. M. JOHNSON 2,080,136

TELEPHONIC ALARM SYSTEM

Filed Dec. 21, 1934 9 Sheets-Sheet 8

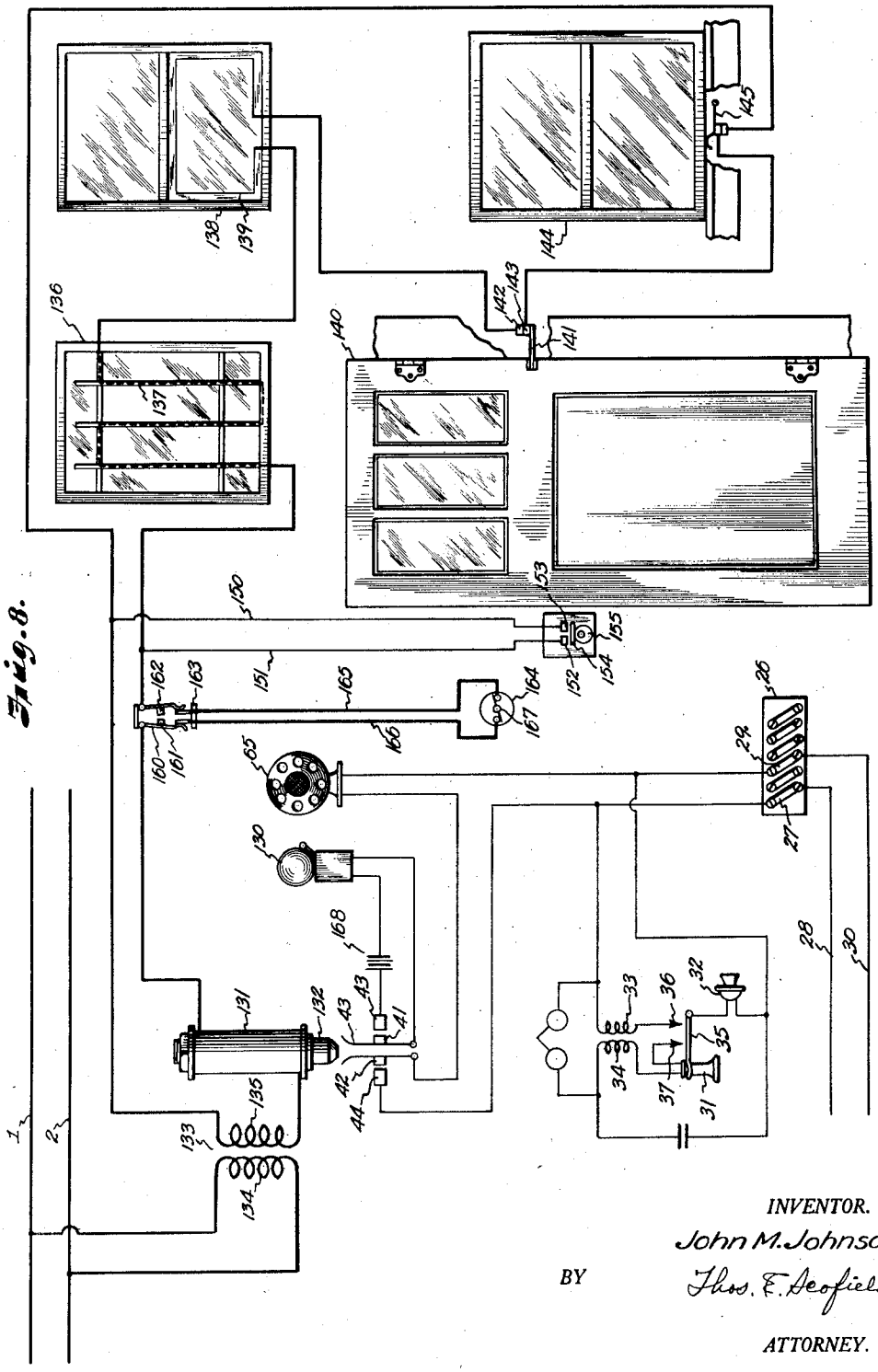


Fig. 8.

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May 11, 1937. J. M. JOHNSON 2,080,136

TELEPHONIC ALARM SYSTEM

Filed Dec. 21, 1934 9 Sheets-Sheet 9

Fig. 14.

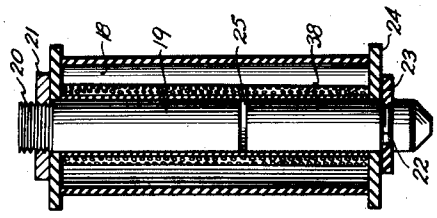


Fig. 13.

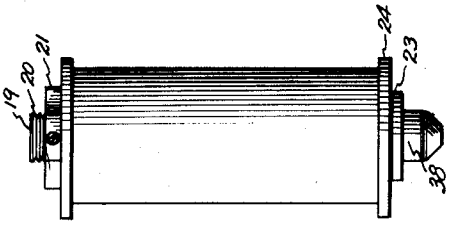


Fig. 9.

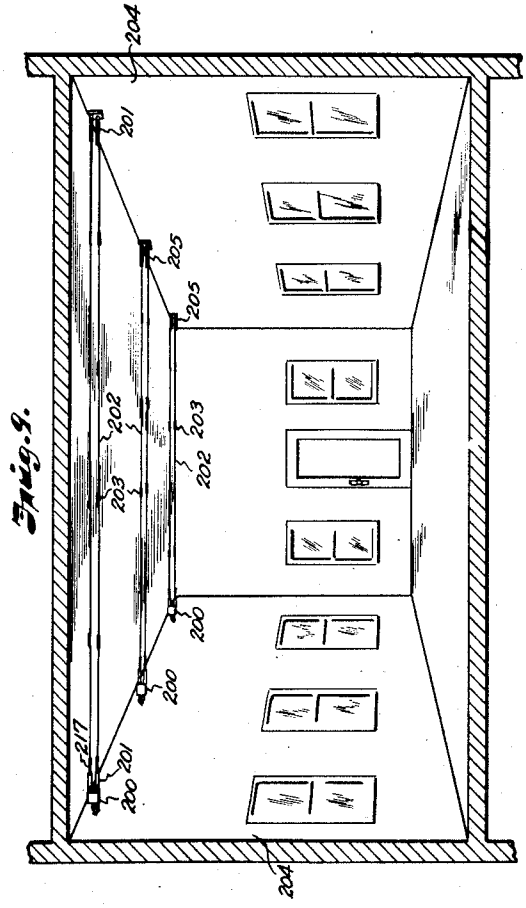


Fig. 10.

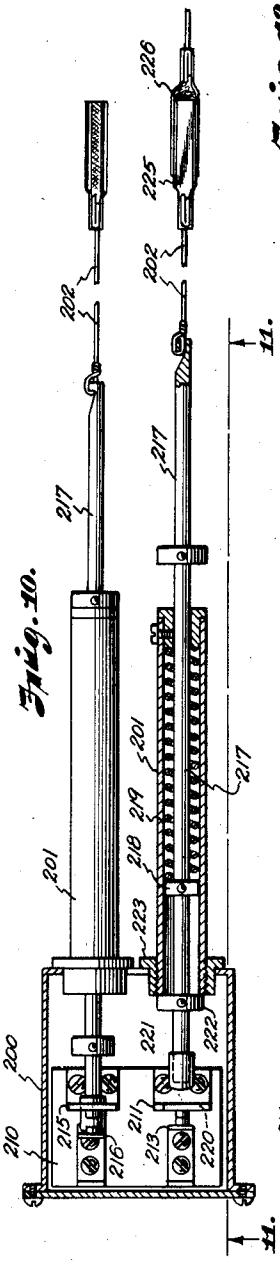


Fig. 12.

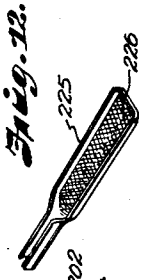
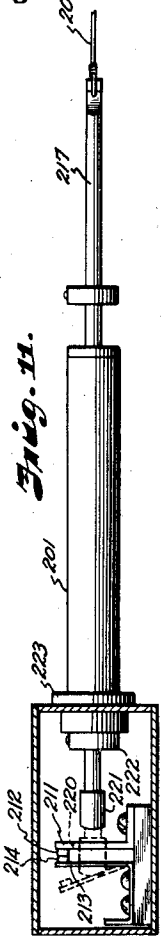


Fig. 11.



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Patented May 11, 1937 2,080,136

UNITED STATES PATENT OFFICE

2,080,136

TELEPHONIC ALARM SYSTEM

John M. Johnson, Kansas City, Mo.

Application December 21, 1934, Serial No. 758,585

4 Claims. (Cl. 179—5)

My invention relates to a telephonic alarm system.

The telephone has become a commercial and social necessity. It is found in every business house, factory, office, and in a great proportion of the homes throughout the United States. A net of telephone systems is spread throughout the country.

Despite the ubiquity of telephone systems, we find independent telegraphic fire and burglar alarm systems installed in various cities. This entails a certain amount of waste, inasmuch as there is duplication of wiring and transmission lines which might be saved if the telephone lines could be used for the transmission of fire and burglar alarms. The necessity of laying and installing separate wiring systems for fire and burglar telegraph alarm systems has made the service of such alarm systems a matter of considerable expense so that this service is not made use of as generally as it should be. That this is a fact is attested by the huge fire loss which occurs in the United States annually. This fire loss has been estimated as in excess of five hundred million dollars each year. Not only is there a loss of property as a result of fires, but it is estimated that fifteen thousand people lose their lives due to fire. The increase in the depredations occasioned by the criminal classes is noticeable within recent years. The loss of property through burglary of business establishments, warehouses and private homes is becoming larger.

It will be seen that an alarm system for protection against fires and burglars, which could use the telephone systems already existing, would enable fire and burglar alarm service to become available at much less expense than is at present the case. The extension of fire and burglar alarm systems would greatly reduce the loss of life and property through fire and burglary. Most fires start as small ones. If the fire department of a locality were notified within due season, fires could be quickly extinguished before any great damage could be done. Likewise, many homes, warehouses, and business establishments are burglarized during the absence of their owners. Due to the fact that it is now common practice in many localities to employ patrol cars, equipped with radio receivers, it is possible for police officers to arrive at a given locality within a short interval of time after being notified through a central police radio broadcasting station.

Telephone companies exist primarily for the purpose of telephonic communication. The devices and instruments used by the telephone companies are designed for this end. Any device which would interfere with the telephone service will necessitate a change in the telephone installation, per se. It cannot be used to transmit fire and burglar alarms as it would impair the primary function of the telephone system.

One object of my invention is to provide an alarm system, which may be either a burglar or fire alarm, over an ordinary telephone system.

Another object of my invention is to provide an alarm system in which no change is made in an ordinary telephone system or in any of the instruments used by telephone companies.

Another object of my invention is to provide an alarm system which is self-supervised, that is, one which will signal if the system is deranged.

Another object of my invention is to provide an alarm system which will give an alarm even though the system is deranged.

Still another object of my invention is to provide an alarm system which may be used with any of the known telephone systems such as the common battery type, the magneto type, or the automatic telephone type.

Other and further objects of my invention will appear from the following description.

In the accompanying drawings which form part of the instant specification and are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views;

Figure 1 is a diagrammatic view showing my alarm system connected as a fire alarm with a common battery type telephone system.

Figure 2 is a diagrammatic view of a system as shown in Figure 1, sending a trouble alarm.

Figure 3 is a diagrammatic view of the system shown in Figure 1 sending a fire alarm.

Figure 4 is a diagrammatic view of a fire alarm system in combination with a magneto telephone system.

Figure 5 is a diagrammatic view of the system shown in Figure 4 sending a trouble alarm.

Figure 6 is a diagrammatic view of a fire alarm system in combination with an automatic telephone system.

Figure 7 is a diagrammatic view of the alarm system shown in Figure 6 sending a fire alarm.

Figure 8 is a diagrammatic view of a burglar alarm system in combination with a battery telephone system.

Figure 9 is a perspective view of a room equipped with one form of a system of thermo-

stats designed to operate the fire alarm systems of my invention.

Figure 10 is an enlarged view partly in section, showing the circuit breaking means which are operated thermostatically.

Figure 11 is a sectional view taken on the line 11—11 of Figure 10.

Figure 12 is an enlarged perspective view of a detail.

Figure 13 is a perspective view of the relay coils used in carrying out my invention.

Figure 14 is a sectional view of the relay coil shown in Figure 13, with the winding removed.

In general, my invention contemplates the provision of a pair of switches such that, when either one of them is closed, a microphone or transmitter is connected to the main line wires of a telephone leading to the district exchange or central exchange of a telephone system. At the same time, provision is made for calling the operator's attention to the fact that a microphone or transmitter is placed across the line. In the case of a common battery system, merely placing a microphone across the line will call the operator. In the case of a magneto installation, a source of potential is provided for calling the operator's attention and, in the case of an automatic telephone system, provision is made for dialing the operator. Simultaneously with the connecting of the transmitter with the central station, a bell or buzzer is made to sound when each switch is closed. The closing of one switch only will sound one bell or buzzer. The closing of both switches will sound two bells or buzzers. The bells or buzzers are made to give different tones or sounds. The bells or buzzers are placed in proximity to the microphone so that, when the operator answers the call, she will hear either one bell or buzzer, or two bells or buzzers ringing, depending on whether or not one or both switches or relays are operated. In general, one bell or buzzer will indicate a trouble alarm, while the sounding of both bells or buzzers will indicate a fire alarm. In event it is desired to have both fire and burglar alarm systems, a gong or a different sounding instrumentality may be employed to indicate a burglar alarm. The operator is provided with a directory for the particular exchange to which the telephone equipped with the alarm system of my invention is connected. By reference to the directory, the location of the trouble, fire or burglar alarm is ascertained. The operator then calls the fire or police department, as the case may be, and gives the information.

More particularly referring now to Figure 1, a pair of lines 1 and 2 are connected to a source of potential which may be the ordinary house current or, if desired, to a battery. In the figure, lines 1 and 2 are connected to ordinary alternating current, 110 volt potential, such as found in most cities. The primary coil 3 of transformer 4, and the primary coil 5 of transformer 6 are connected across lines 1 and 2. Extending through an area to be protected against fire, for example, I provide a plurality of thermostats 7, each of which carries a pair of fusible links 8 and 9. All of the links 9 are connected in series with a conductor 10, the ends of which are connected respectively to the winding of relay 11 and secondary coil 12 of transformer 4. The fusible links 8 are connected in series with a conductor 13, the ends of which are connected respectively to the winding of relay 14 and the secondary coil 15 of transformer 6. The other ends of secondary coil 15 and the windings of relay 14 are connected by a conductor 16. Similarly, the other ends of the winding of relay 11 and secondary coil 12 are connected by conductor 17. The construction of relays 11 and 14 can be readily seen by reference to Figures 13 and 14 in which the winding is disposed in the space 18 around a core 19, which is screw threaded at its upper portion 20 as can readily be seen by reference to Figure 14. A nut 21 is adapted to be screwed upon threads 20 such that it will adjust the position of core 19. An armature 38 is adapted to be held in the position shown in Figure 14, when the winding is energized. The lower portion of armature 38 is provided with a groove 22 in which is adapted to be seated a rubber washer 23. The magnetic pull of the core 19 seats the washer 23 against the lower end plate 24 of the relay. It will be noted that, in the assembled position, an air gap 25 is provided to prevent humming or chattering between the core 19 and the armature 38. In practice, the alternating current relays of my invention are quiet.

The terminal block of the telephone system is indicated by the reference numeral 26. To bus bar 27 is connected one of the main line wires 28 which leads to the central station. To bus bar 29 is connected the other main line wire 30 leading to the central station. When it is desired to make a telephone call, it being remembered that Figure 1 illustrates the common battery type of telephone system, the receiver 31 is lifted from its hook, thus placing the transmitter or microphone 32 across the line in series with coil 33 of the transformer and also connecting the receiver and coil 34 in proper relationship to the primary coil 33 of the transformer. The lifting of the receiver 31 allows the hook 35 to contact terminals 36 and 37 and thus completes the circuit to the common battery through main line wires 28 and 30, which gives a signal at the central station notifying the operator. It will also be noted in Figure 1 that, while current is flowing through the winding of relay 14, armature 38 will be held in the position shown in Figure 1. Similarly, while current is flowing through the winding of relay 11, armature 39 will be held in the position shown in Figure 1. Disposed beneath armature 38 and adapted to be actuated by the weight thereof is a double contact switch 40. One of the members of the switch carries a contact point 41. The other member of the switch carries a contact point 42. These switch members may be made of light, resilient material or may, if desired, be pivoted. Contact point 41 is adapted to contact contact-point 43, while contact point 42 is adapted to contact contact-point 44. Similarly disposed under armature 39 is a double contact switch 45 having a pair of resilient members 46 and 47 carrying contact points 48 and 49 respectively. These contact points are adapted to make contact with contact points 50 and 51. Contact point 43 is connected by conductor 52 to one terminal of a battery 53, the other terminal of which is connected to a bell 54 by conductor 55. The contact point 41 is connected to bell 54 by conductor 56. Similarly, contact point 50 is connected to a battery 57 by a conductor 58. The other terminal of battery 57 is connected to a bell 59 by a conductor 60. The other terminal of the bell 59 is connected to contact point 48 by a conductor 61. Both contact points 42 and 49

are electrically connected to conductor 62 by conductors 63 and 64, respectively. Conductor 62 is connected to one terminal of a microphone or transmitter 65. The other terminal of the microphone is connected by conductor 66 to bus bar 29. Both contact points 44 and 51 are electrically connected to conductor 67 by conductors 68 and 69 respectively. Conductor 67 is connected to bus bar 27.

It will be seen by reference to Figure 1 that current always flows through both primary coils 3 and 5. It will be understood, of course, that if a battery is employed instead of transformers, that the terminals of the windings of relays 11 and 14 will be connected to the source of potential. It will be observed further that the circuit through relay winding 11 contains the fusible links 9, the conductor 10, and the secondary coil 12 in series and that normally current is flowing through this circuit. Similarly, it will be noted that there is a circuit comprising secondary coil 15 of transformer 6, conductor 13, the fusible links 8, the winding of relay 14 and conductor 16 in series. Current normally flows through this circuit. While current flows through the two circuits just mentioned as shown in heavy lines in Figure 1, armatures 38 and 39 are held in the position shown in the figure.

Referring now to Figure 2, it will be noted that the circuit comprising the fusible links 9, conductor 10, secondary coil 12, conductor 17, the winding of relay 11, and conductor 10, is broken at 70 in conductor 10, thus deenergizing the winding of relay 11. It will also be observed that the circuit through the winding of relay 14 is unbroken. The winding of relay 11, being deenergized in Figure 2, the armature 39 is shown in its dropped position, spreading members 46 and 47 and causing the contact points 49 and 51, as well as contact points 48 and 50 to touch. It will be seen that current is now permitted to flow from the common battery at the central station through conductor 28, through bus bar 27, through conductor 67, through conductor 69, through contact points 51 and 49, through conductor 64, through conductor 62, through the microphone 65, through conductor 66, through bus bar 29, through conductor 30, back to the common battery. It will be observed that this flow of current will operate a signal at the central station. The microphone 65, too, will be placed across the line wires 28 and 30. Likewise, current will flow from the battery 57 through conductor 58, through contacts 50 and 48, through conductor 61, through the windings of bell 59, through conductor 60, back to the battery causing the bell 59 to ring. Bell 59, as has been observed hereinabove, is of a different tone than bell 54. The operator, on answering the call, will instantly hear a single toned bell, which she knows is the trouble alarm. She is provided with a directory in which the telephone numbers for each particular district or exchange are listed numerically, as for example;

Main exchange

Telephone number	Owner	Address
313	Sterling Produce Co.	1427 Walnut Street.
314	Dr. O. L. Stevens	2416 Grand Avenue.
315	Robinson's Clothing	1014 Baltimore Ave.
316	B. H. Hill (residence)	1322 McGee St.
317	A. J. Johnson (residence.	1523 Wyandotte St.

The operator then calls the repair department and informs them that the alarm system at the name and address which he learns from the directory needs attention.

If, in the interim, a fire should break out at a place which has already sent in a trouble alarm, or in event a fire break out, the heat of the fire will fuse one or more pairs of links 8 and 9 as shown at 71 and 72 in Figure 3. When this occurs, both relays 11 and 14 will be deenergized, allowing both armatures 39 and 38 to drop and take the position shown in Figure 3 in which it will be observed contact 49 is closed with contact 51, contact 48 is closed with contact 50, contact 41 is closed with contact 43, and contact 42 is closed with contact 44. The placing of the microphone 65 across the line and the signaling of the operator is performed in the manner just described by either the closing of contacts 49 and 51 or the closing of contacts 42 and 44. It will be observed that, when contacts 42 and 44 touch, current flows from the common battery at the central station, through line 28, through bus bar 27, through line 67, through conductor 68, to contact point 44, through contact point 42, through line 63, to conductor 62, which leads to one terminal of the microphone 65. Current continues through the microphone 65, through conductor 66, to bus bar 29, through line 30, to the other terminal of the common battery. Likewise, current will flow from battery 53 through conductor 52, through contact point 43, through contact point 41, through conductor 56, through the winding of bell 54, through conductor 55 to the other side of battery 53, thus completing the circuit through bell 54. When the operator plugs in, in answer to the signal, she will instantly hear the ringing of two bells of different tone in unison. This she knows is the fire alarm signal. Consulting the directory, the operator ascertains the location of the fire and then calls the fire department and gives them the location of the fire.

Referring now to Figure 4, it will be noted that the magneto type of telephone switch is shown. In this system when it is desired to call, the operator must be signaled by energizing the line wires 28 and 30 by actuating a magneto 74. While the hook 35 is down, the magneto 74 is placed across the line by means of conductors 75 and 76 so that, when it is actuated with the hook down, the operator will receive the signal. When the receiver 31 is lifted from the hook 35, the transmitter 32 is placed across the line and the magneto is disconnected due to the fact that the hook 35 is lifted from contacts 77. In order to call the operator, therefore, with a magneto type system, some means must be provided for energizing the main line wires 28 and 30, which lead to the central exchange. For this purpose, I provide battery 80 having one terminal thereof connected to contact point 81 and the other terminal thereof connected to conductor 66 which leads to bus bar 29, to which line wire 30 is connected. Conductor 28 is connected to bus bar 27 to which is also connected conductor 67 which is in turn connected by conductor 82 to the contact point 83 which is carried by a non-conducting arm 84, which is pivoted to base 85 at 86. Arm 84 is provided with a foot 87, adapted to seat in a notch 88 of a cam 89 which is mounted on a shaft 90 to which is keyed a pinion 91 which meshes with a gear wheel 92 driven by a spring 93. Arm 84 is also provided with a projection 94 which carries a follower 95 which bears

against a cam 96 formed upon an armature 97 of solenoid 98. A spring 99 urges the arm 84 so that contact point 83 is separated from contact point 81. A small battery 100 has one terminal thereof connected to the winding of electromagnet 98 by conductor 101. The other terminal of the battery 100 is connected by conductor 102 to conductors 64 and 63, which are connected to contact points 49 and 42, respectively. One terminal of the microphone 65 is connected to conductor 62, which is connected to the other end of the winding of electromagnet 98.

Referring now to Figure 5, if the alarm system should become deranged, as for example by the breaking of conductor 10 at 105, so that the circuit through the winding of relay 11 is broken, permitting armature 39 to drop, contact will be made between the contact points 49 and 51, and contact points 48 and 50. When this occurs, battery 57 will be placed across bell 59, as previously described, thus ringing it. Current will also flow from battery 100 through the winding of electromagnet 98, through conductor 62, through microphone 65, through conductor 66, through bus bar 29, through line wire 30, to the central station, through the central station, through line wire 28, through bus bar 27, through conductor 67, through conductor 69, through contact point 51, through contact point 49, through conductor 64, through conductor 102, to the other side of battery 100. This current flow is no greater than that occasioned by the usual cells 106 of the magnetophone system, and is not sufficient to operate the signal at the central station. The current flow, however, is sufficient to energize the electromagnet 98 such that the armature 97 thereof is raised. The upward motion of the armature 97 moves cam projection 96 past follower 95, thus pivoting the arm 84 around its pivot 86 against the action of spring 99. This motion lifts the foot 87 out of notch 88 and permits the spring 93 to actuate gear wheel 92 to rotate pinion 91, to turn shaft 90 and cam 89 in the direction of the arrow. At the same time, it will be observed that contact point 83 will touch contact point 81, completing the circuit from battery 80 through conductor 107, through contact 81, contact 83, conductor 82, conductor 67, bus bar 27, line wire 28, to the signal at the central station which is operated by the current flow, through line wire 30, through bus bar 29, through conductor 66, through conductor 108, to the other side of battery 80. As soon as the notch 88 again comes in contact with foot 87, the spring 99 will urge the foot into the notch, thus stopping the rotation of cam 89 and, at the same time, permitting the contacts 81 and 83 to separate, thus breaking the circuit of battery 80. It will be observed that battery 80 is directly across the microphone as well as the line, while battery 100 is in series with the microphone. The operator, on answering the signal, will hear the tone of bell 59 which is being transmitted through microphone 65. Hearing only one tone, the operator will know that there is a derangement in the alarm system at the particular location which is found from the directory hereinabove described. It will be understood, of course, that each district exchange has its own directory.

If a fire should break out, such that fusible links 8 and 9 are melted to interrupt the circuits through both relays, the operator will hear the ringing of bells of different tones and will know that a fire alarm is being sent, the operation of relay 14 being the same as hereinbefore described. The action of either relay 14 or 11 is such that the operation just described will take place. If relay 38 operates instead of relay 39 to send a trouble alarm, the current flow will be through conductors 63 and 68 instead of conductors 64 and 69.

Referring now to Figure 6, in which a diagrammatic representation of the alarm system of my invention in combination with an automatic telephone system is shown, it will be observed that, in an automatic telephone, when the receiver 31 is lifted from its hook 35, the transmitter 32 is placed across the line. This completes the circuit through line wires 28 and 30 to the district exchange and energizes a line relay which closes circuits in the central exchange as is well known to the art. Upon dialing, the first movement of the dial moves a cam 111, permitting contacts 113 and 114 to close, thus shunting the transmitter 32 and the receiver from the line. Upon dialing a number, the cam 112 makes and breaks the circuit by opening and closing contact points 301 and 302. The making and breaking of the circuit actuates the selector switches or other selecting devices at the central exchange, thus connecting the subscriber with the desired station.

It will be seen, therefore, that, in order to accomplish one of the objects of my invention, namely to provide an alarm system which may be installed without in any way changing the existing telephone system, the dialing action just described must be automatically duplicated by my alarm system.

Referring now to Figure 6, the circuits through relays 11 and 14 are the same as those used in connection with the common battery telephone system and the magneto telephone system. The relays operate double contact switches as in the modifications described hereinbefore. One pair of contacts of the switches close the bell circuits. It is universal in automatic telephone systems that, when the number 0 is dialed, the operator is connected with the instrument. The dialing of number 0 involves ten impulses occasioned by the making and breaking of the circuit. In the automatic telephone modification of my invention, I employ solenoid 98, having an armature 97, a cam projection 96, a pivoted arm 84, carrying a contact point 83, which is normally held in contact with contact point 81 by spring 99. The arm 84 carries a foot 87 and the arm 94 carries a follower 95, as in the construction used with the magneto telephone system described above. Likewise, a gear wheel 92 is adapted to be actuated by spring motor 93 to drive a pinion 91, which is keyed to shaft 90. A cam 110 is keyed to shaft 90 to be driven therefrom, which cam is adapted to make and break the circuit ten times which it will be obvious is equivalent to dialing the operator. Provision is made for short circuiting the transmitter of my alarm system so that the dialing circuit will not have included therein the resistance thereof. For this purpose, I provide a bell crank lever 116, pivoted at 117 to framework 85. In the position shown in Figure 6, in which both armatures 38 and 39 are in raised position, the bell crank lever 116 is in position so that contact point 118 is separated from contact point 115. One arm of the bell crank lever 116 carries a toe 119 adapted to be supported by lug 120, which is carried by the cam 110.

Referring now to Figure 7, if a fire breaks out in the vicinity of one of the thermostats so as to melt one pair of fusible links 8 and 9, as for example at 121, the circuit through relays 11 and 14 will be broken. This permits the armatures 38 and 39 to drop as hereinbefore described. Four contacts will be made, namely, contact point 41 with contact point 43, contact point 44 with contact point 42, contact point 48 with contact point 50, and contact point 49 with contact point 51. The contacting of points 41 and 43, and of points 48 and 50 will complete the circuits through the bells 54 and 59, as heretofore described, the batteries 53 and 57 furnishing the current for the ringing of the bells. When contact point 49 touches contact point 51 or when contact point 42 touches contact point 44, it being remembered that at this instant the position of the parts is that shown in Figure 6, with contact point 81 in contact with contact point 83, current will flow from the battery 100 through line 101, through the winding of electromagnet 98, through conductor 62, through microphone 65, through conductor 66, through bus bar 29, through line wire 30, through the district exchange, through the line wire 28, through bus bar 27, through conductor 67, through contact point 83, through contact point 81, through line 82, through conductor 68, through contact point 44, through contact point 42, through conductor 63, through conductor 303, to the other side of battery 100. It will be seen that the current flow just described is that which takes place when contact point 42 contacts contact point 44. If contact point 49 contacts contact point 51, the return circuit is as described except that the current will flow from conductor 82, through conductor 69, through contact point 51, through contact point 49, through conductor 64, and then through conductor 303 to the other side of battery 100.

The current flow just described is sufficient to actuate electromagnet 98 to lift armature 97, enabling the cam 96, acting through follower 95 and arm 94, to pivot arm 84 around its pivot 86 to lift the toe 87 out of the notch 88, thus allowing the spring motor to rotate cam 110. As soon as the cam turns through a small angle, the lug 120 will move from under toe 119, allowing the bell crank lever 116 to pivot around its pivot 117 through the force of gravity to make contact between contact points 115 and 118. When this occurs, the line will be shunted when contacts 83 and 81 again touch, at which time current will flow from the battery at the central exchange through line 30, through bus bar 29, through conductor 66, through conductor 125, through contact point 115, through contact point 118, through conductor 102, through conductor 68, through conductor 82, through contact point 81, through contact point 83, through line 304, through conductor 67, through bus bar 27, through line wire 28, to the central exchange, allowing the selecting devices to be operated by the breaking of the current as contact points 81 and 83 separate. It will be observed that the circuit is broken by the cam notches 126 the requisite number of times to dial the operator. When the notch 88 is again in alignment with toe 87, the spring 99 will cause it to drop into notch 88, thus stopping the cam 110. Just before this occurs, however. cam surface 127, formed on toe 119 of bell crank lever 116, will ride upon lug 120 so that it will again assume the position shown in Figure 6. The movement to this position, it will be observed, will separate contact points 115 and 118, thus breaking the short circuit of microphone 65, freeing the line for the transmission of the alarm signal to the operator, who plugs in in response to the call. On answering the call, the operator instantly will hear the ringing of the alarm bells being transmitted by microphone 65, and will proceed as before.

Referring now to Figure 8, I have shown the alarm system of my invention connected as a burglar alarm. It will be understood, of course, that the bell or gong 130 of the burglar alarm system will have a distinctive tone entirely different from either of the fire alarm signals. It will be understood, of course, that the relay 131 is of the same type and similarly connected as relays 11 and 14, heretofore described. The relay 131 is provided with a transformer 133 having a primary 134 connected to the lines 1 and 2 of a source of potential which, as hereinbefore pointed out, may be the alternating house current. The secondary 135 of the transformer 133 is connected in series with the winding of relay 131 by an external circuit in which is interposed one or a number of various burglar alarm wirings known to the art. For example, the window 136 may have a wire screen work shown diagrammatically at 137. Likewise, window 138 will have the tape wiring shown diagrammatically at 139, such that, if the window was broken, the circuit would be interrupted. The door 140 is provided with the known, hinged switch 141 such that, if the door be opened, the circuit is broken by the separation of contact points 142 and 143. The window 144 may have a window switch 145 such that, if the window be opened, the circuit is broken. These devices are well known to the art. Across the protective circuit I provide a shunt circuit comprising a pair of wires 150 and 151, terminating in contacts 152 and 153. The circuit is adapted to be completed by a switch 154 which is operated by a cam 155. The arrangement is such that cam 155 is adapted to be turned by a key. If it is desired to have the burglar alarm in operation, the position of the parts is such as shown in Figure 8. If the key be turned so that cam 155 raises switch 154 to complete the circuit through contact points 152 and 153, it will be obvious that the door or the windows may be opened without setting off the burglar alarms, inasmuch as the current now flows through the shunt circuit just described. As an additional feature, I provide a jack 160 such that contact points 161 and 162 are touching when the plug 163 is removed. When the plug is inserted, it will be seen that the switch 164 is placed in the circuit through conductors 165 and 166. The switch 164 is mounted on an extension cord in which conductors 165 and 166 are housed. The arrangement is such that, when the alarm is used in a residence, the plug 163 may be inserted in a wall socket at night, the extension cord allowing the switch 164 to be placed under one's pillow. If one should hear an intruder who was successful in gaining entrance without setting off the burglar alarm, operation of the switch 164 would break the circuit through the switch member 167, thus turning in the burglar alarm. The alarm operates in the manner hereinbefore described in connection with the fire alarm systems. The armature 132 drops when the circuit through the winding of relay 131 is broken, connecting the battery 168 across bell or gong 130 and con-

necting the transmitter 65 across the lines 28 and 30, which go to the central exchange. The result is, as before, that the operator instantly hears the ringing of the burglar alarm gong and informs the police department. If the police department is equipped with a police broadcasting station, a police scout car will obviously arrive at the scene of the entry within a short time.

Referring now to Figure 9, there is shown a perspective sectional view of a room equipped with a novel thermostat system. Along one wall of the room 204, near the top thereof, I secure switch members 200, the switches normally being in closed position. The switches are shown in greater detail in Figures 10 and 11. Spring actuated plungers, housed in cylinders 201, tend to open the circuit. They are restrained from this action by wires 202 which have interposed at a plurality of places in their length fusible connections 203, which are shown in greater detail in Figures 10, 11, and 12. The other ends of the wires 202 are secured to the wall 204 of the room by springs 205 which serve to hold the wires taut. It will be observed that the wires may be of small diameter and that the fusible connections may be small so that the assembly is unobtrusive.

Referring now to Figure 10, mounted upon a suitable insulating base 210, housed within casing 200, I provide a conducting post 211 which carries a contact point 212. An inherently resilient post 213 carries a contact point 214. Another stationary post 215 and another resilient post 216 are also mounted upon the base 210. The two switches thus formed are the equivalent of fusible links 8 and 9, heretofore described. Connected to the housing 200 are a pair of cylinders 201 in which are housed movable rods or plungers 217. The rods 217 carry collars 218 against which a spring 219 is adapted to act, tending to move the rods to the left as viewed in the drawings. The stationary posts 211 and 215 are provided with openings 220, through which the end 221 of the rod 217 is adapted to pass. Normally, the end of the rod 221 is held in retracted position with collar 222 against the bushing 223 by which the cylinder 201 is attached to the housing 200. In this position the contact points carried by the stationary and resilient posts respectively, are in contact so that the circuit is completed therethrough. The rods 217 are thus held in retracted position against the action of springs 219 by wires 202. Wires 202 are built up of a series of sections, each of which is suitably secured to a metallic strip 225 which can be best seen by reference to Figure 12. The terminal ends of the wire are connected respectively to rod 217 and spring 202 as can be readily seen by reference to Figure 9. The metallic strips 225 are joined by soldering with a fusible alloy indicated at 226. If a fire should break out within the room, the fusible alloy will melt, allowing the pair of metallic strips 25 to separate. When this occurs, the spring 219 will move the rod 217 to the left as shown by the dotted lines in Figure 11. The end of the rod will pass through the opening 220 and contact the fusible member, causing the contact points to separate, thus breaking the circuit. In use in my system, one loop of the circuit is completed through connecting a plurality of posts 213 and 211 in series, while the other loop of the circuit is completed by connecting a plurality of posts 216 and 215 in series. It will be seen that, if any one of the wires breaks, that a trouble alarm will be turned in, while it requires the breaking or melting of one pair of wires to turn in a fire alarm. The elongated metallic conductor or wire 202 thus formed, makes a very sensitive thermostatic rod, inasmuch as the wires act as an antenna with respect to radiant heat and conduct the heat therealong, raising the temperature of the entire assembly so that any additional heat by convection directly over a point in flames will quickly cause a fusible alloy to melt, thus breaking the circuits through relays of my system, thus turning in a fire alarm.

It will be observed that I have accomplished the objects of my invention. I have provided an alarm system in combination with a telephone system such that a trouble alarm, a fire alarm, or a burglar alarm may be automatically transmitted over any of the existing known telephone systems without the necessity of disturbing the system with respect to telephonic communication. The assembly may be quickly and cheaply installed and makes fire and burglar alarm protection available to any subscriber to telephone service.

It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and sub-combinations. This is contemplated by and is within the scope of my claims. It is further obvious that various changes may be made in details within the scope of my claims without departing from the spirit of my invention. It is, therefore, to be understood that my invention is not to be limited to the specific details shown and described.

Having thus described my invention, what I claim is:

1. In a telephone system having a central exchange, a pair of protective circuits extending through an area to be protected, a telephone transmitter, means actuated by the interruption of one of said protective circuits for giving an audible indication and for electrically connecting said transmitter with said central exchange and means actuated by the interruption of the other of said protective circuits for connecting said transmitter with said central exchange independently of said first connecting means and for giving a different audible indication.

2. In an automatic telephone system having a central station and subscribers' stations, each of said subscribers' stations having a dial which may be operated to call another subscriber's station or the central station, a protective circuit extending through an area to be protected, means independently of the subscribers' station dial for dialing the central station, a microphone, an audible alarm signal in proximity to said microphone, and means actuated by the interruption of said protective circuit for operating said independent dialing means, for connecting said microphone with said central station and for operating said audible signal.

3. In an automatic telephone system having a central station and subscribers' stations, each of said subscribers' stations having a dial which may be operated to call another subscriber's station or the central station, a pair of protective circuits extending through an area to be protected, a microphone, an audible alarm signal in proximity to said microphone, a second audible alarm signal for giving a different audible alarm

in proximity to said microphone, dialing means independent of the subscriber's dial, and means actuated by the interruption of one of said protective circuits for actuating said independent dialing means, connecting said microphone with said central station and for operating one of said audible signals and means actuated by the interruption of the other of said protective circuits for operating said independent dialing means, for connecting said microphone with said central station, and for operating the other of said audible signals.

4. In a telephone system having a central station, a microphone, a protective circuit extending through an area to be protected, thermostatic means in said circuit adapted to open the same when a predetermined temperature is reached, window and door switches in said circuit for opening the same when a window or door is opened, said protective circuit containing a jack normally adapted to complete the circuit, an extension loop containing a switch normally completing an electric circuit therethrough, means for placing said extension loop in said jack whereby said protective circuit is broken through said jack and completed through said switch in said extension loop, means actuated by the interruption of said circuit for electrically connecting said microphone with said central exchange for giving an audible alarm signal adapted to be transmitted over said microphone, the arrangement being such that said protective circuit may be interrupted thermostatically due to fire, or manually in response to the opening of a window or door leading into the area protected, or manually by opening the switch in said extention loop.

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