

No. 846,729.

PATENTED MAR. 12, 1907.

M. CONNOR.  
FIRE ALARM SYSTEM.  
APPLICATION FILED JUNE 22, 1906.

3 SHEETS—SHEET 1

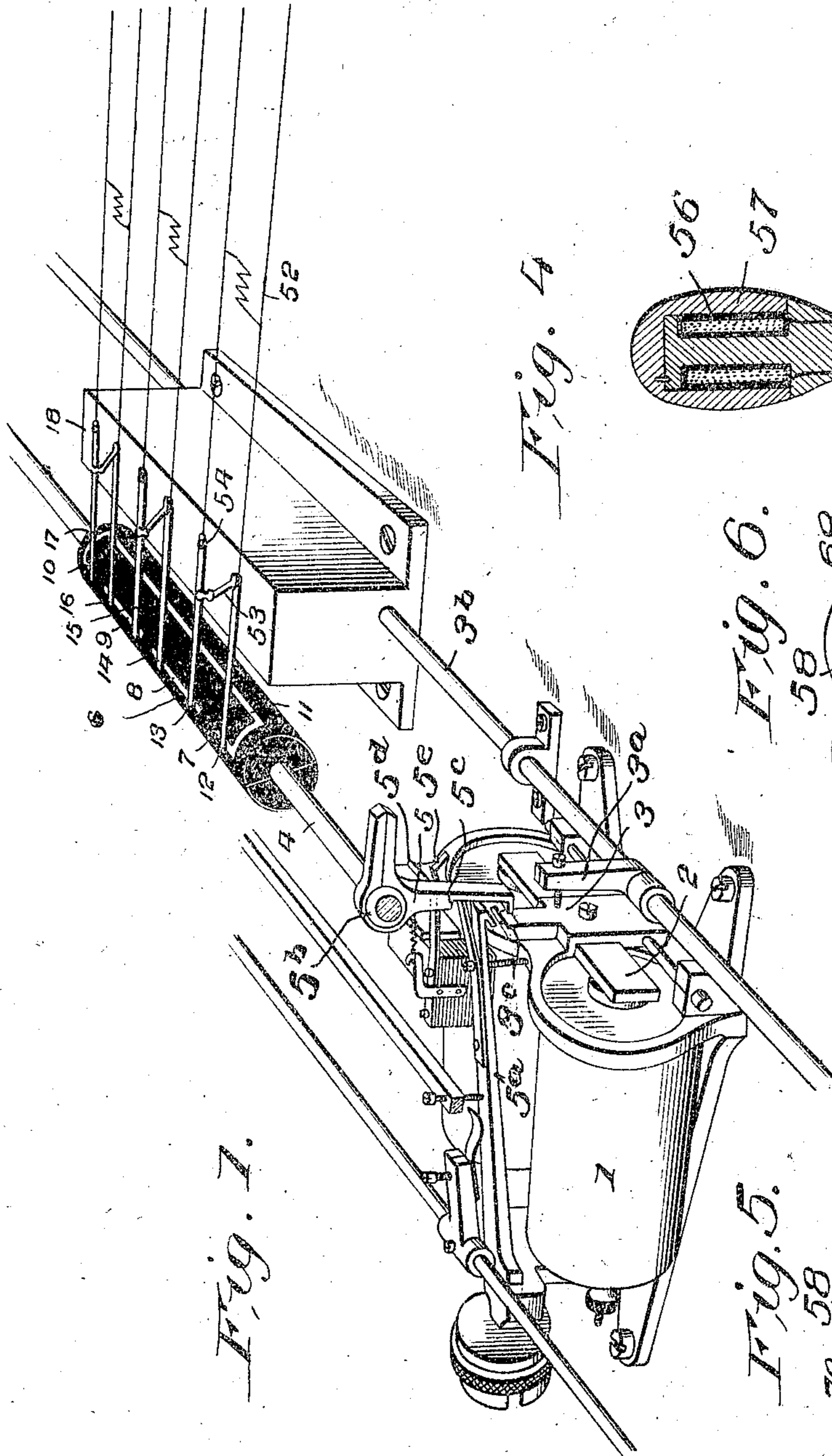


Fig. 1.

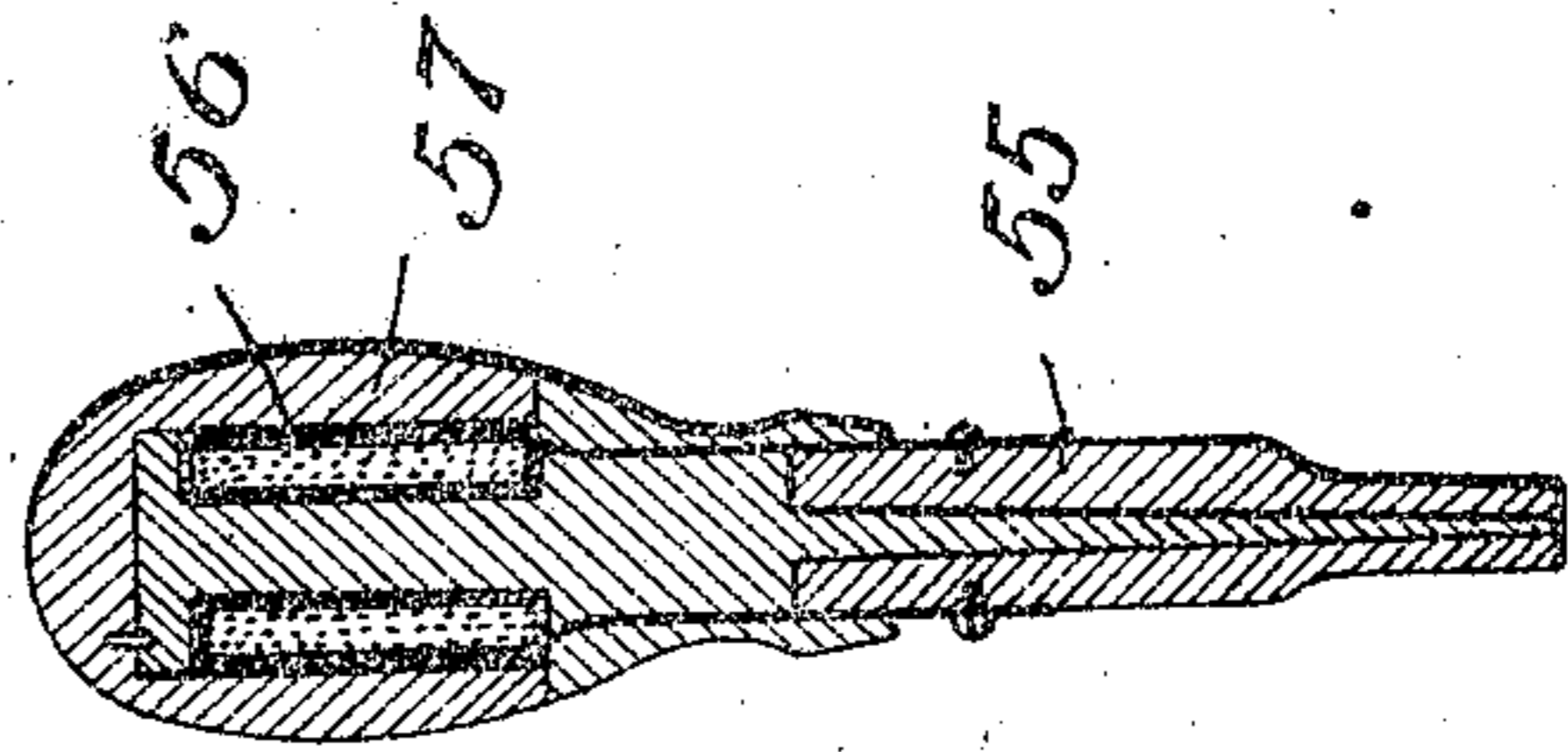


Fig. 4.

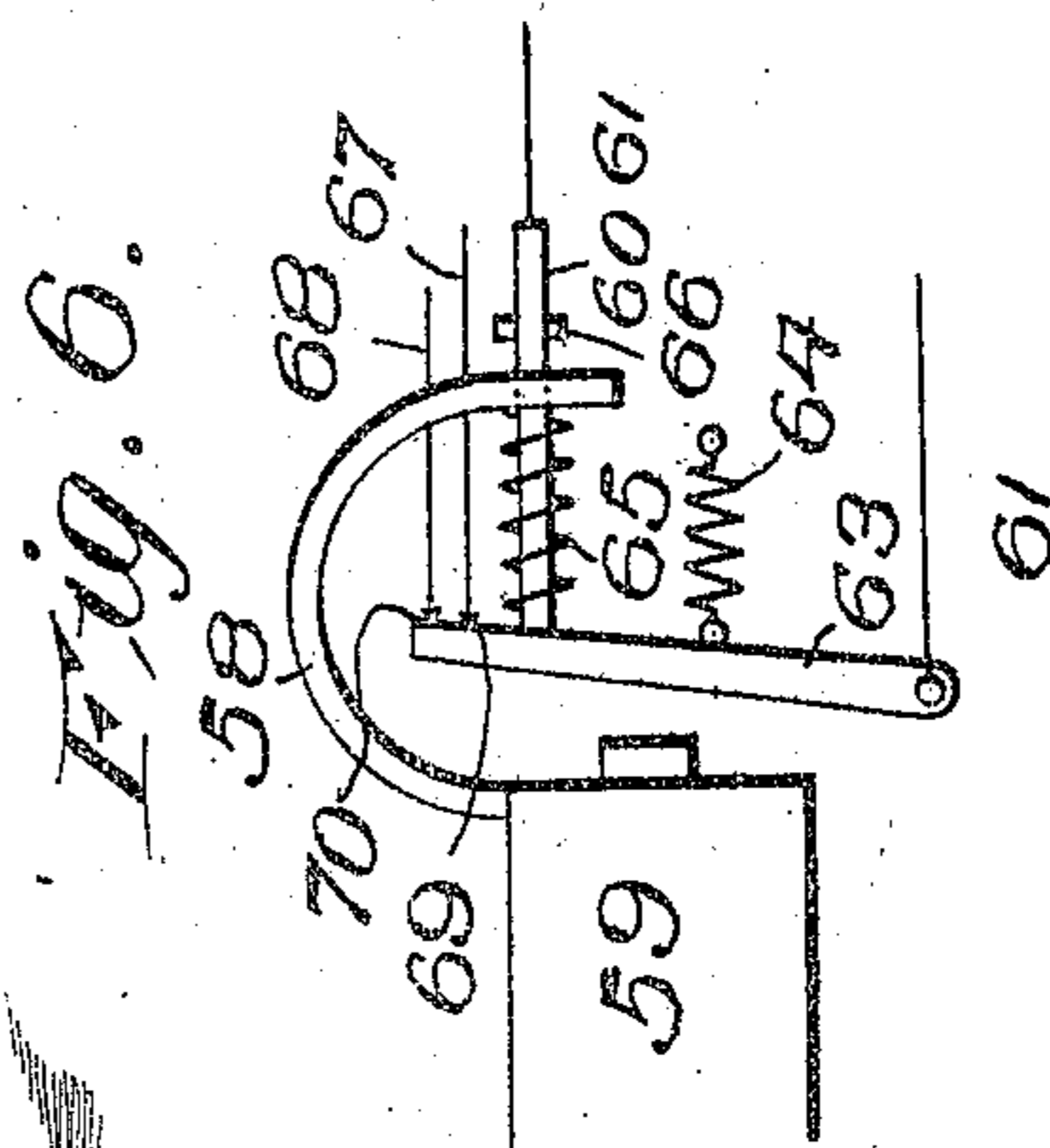


Fig. 6.

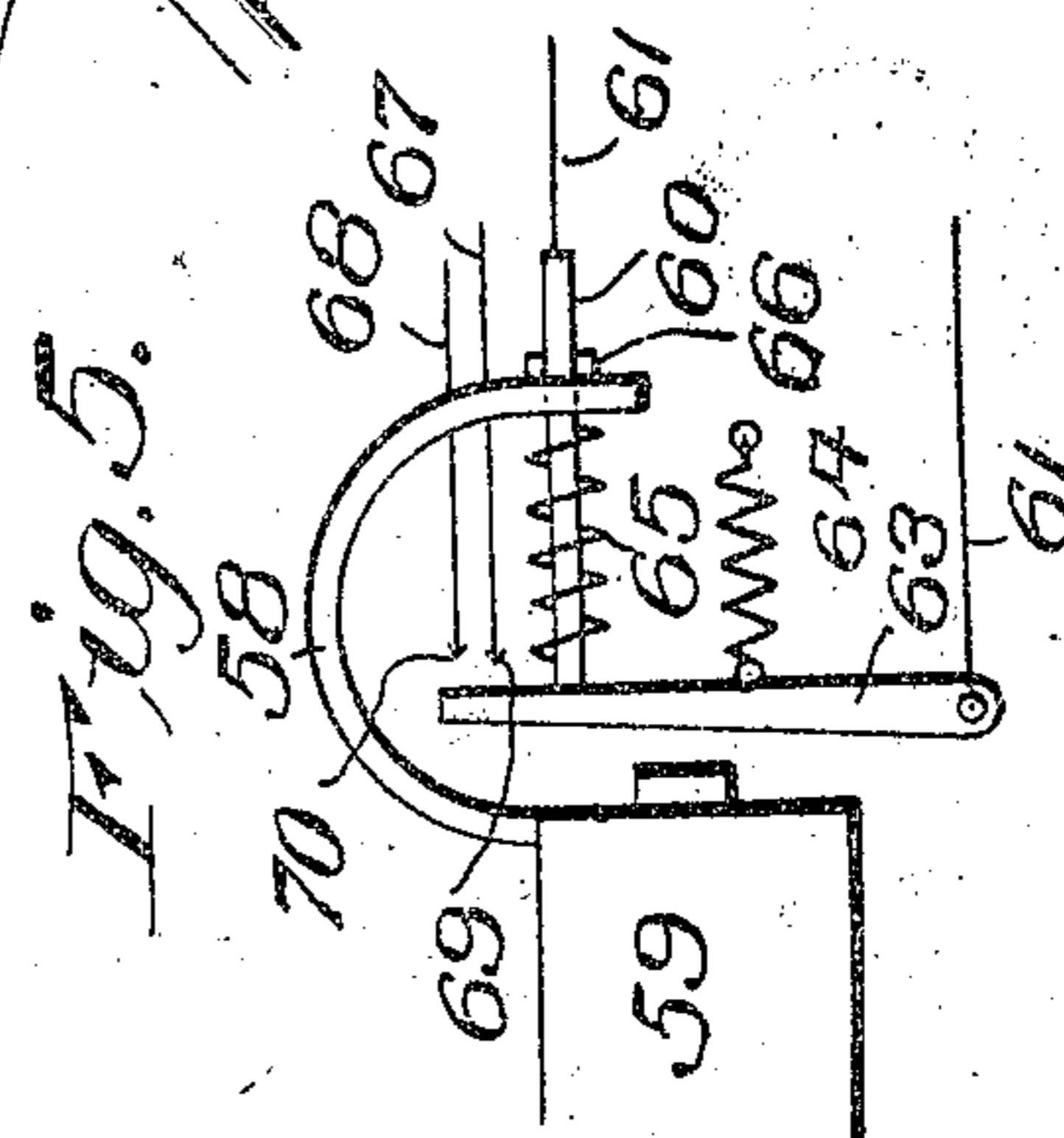


Fig. 5.

WITNESSES:

*Thomas W. Clegg*  
*Edna Bond*

INVENTOR

*Miles Connor*

BY

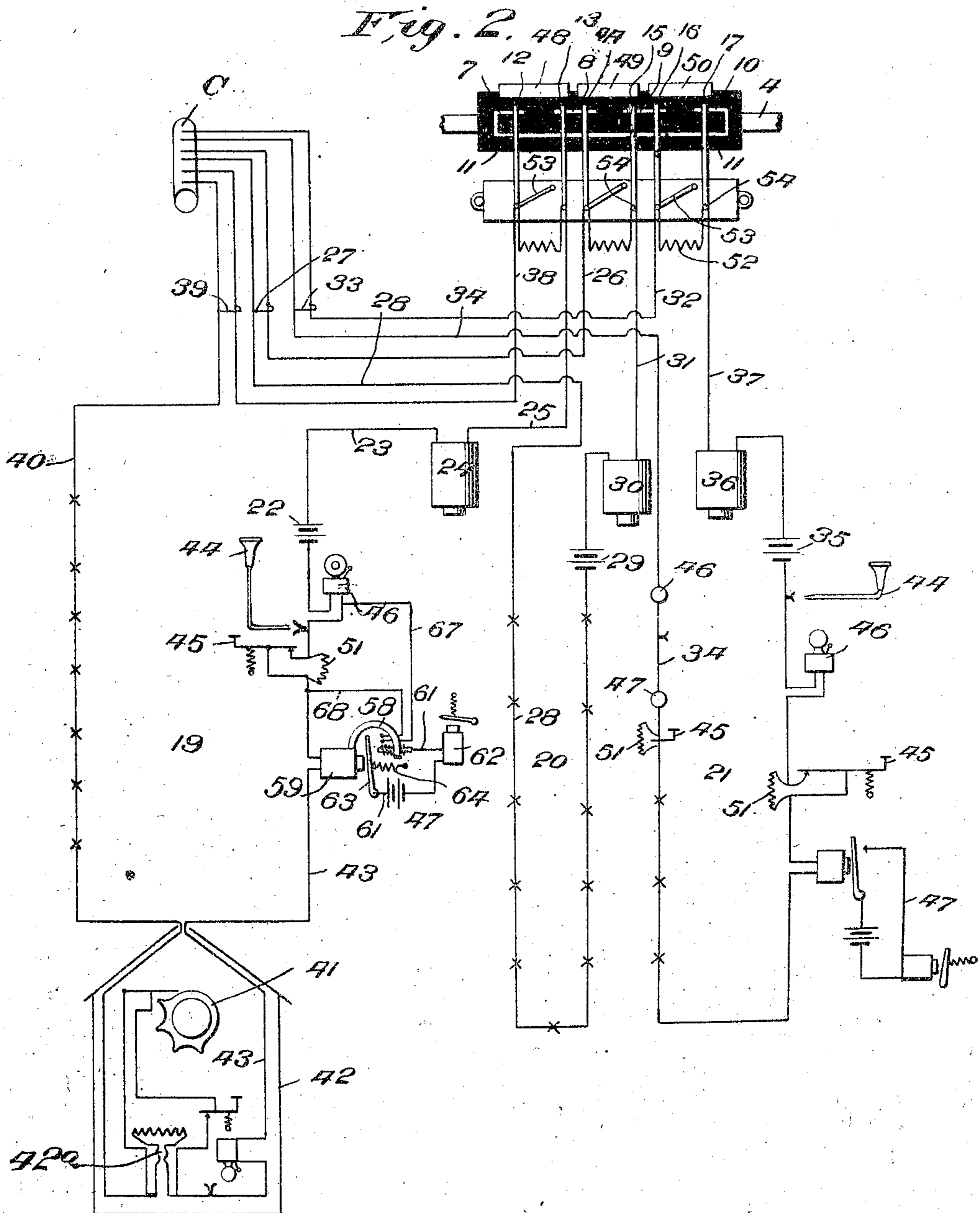
*W. J. Fitzgerald & Co.*  
Attorneys

No. 846,729.

PATENTED MAR. 12, 1907.

M. CONNOR.  
FIRE ALARM SYSTEM.  
APPLICATION FILED JUNE 22, 1906.

3 SHEETS—SHEET 2.



WITNESSES:

*Thomas W. Connors*  
*Edna Connors*

INVENTOR  
*Miles Connor*

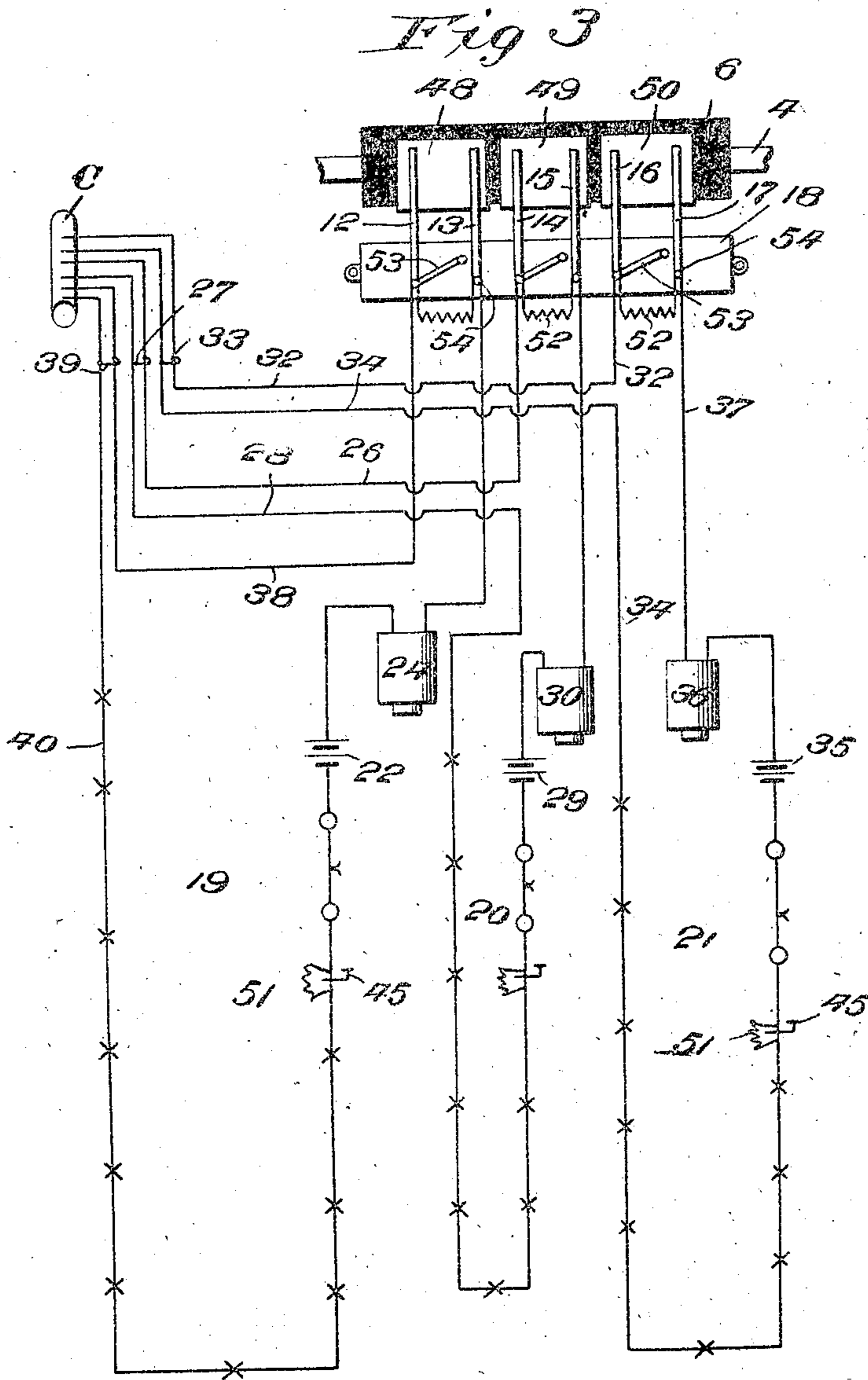
By *W. J. Fitzgerald & Co.*  
Attorneys

No. 846,729.

PATENTED MAR. 12, 1907.

M. CONNOR.  
FIRE ALARM SYSTEM.  
APPLICATION FILED JUNE 22, 1906.

3 SHEETS—SHEET 3.



WITNESSES:

*Thos. W. Riley*  
*Edwa. Bond;*

INVENTOR  
*Miles Connor*

By *W. J. Fitzgerald*  
Attorneys

# UNITED STATES PATENT OFFICE.

MILES CONNOR, OF PUEBLO, COLORADO.

## FIRE-ALARM SYSTEM.

No. 846,729.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed June 22, 1906. Serial No. 322,926.

*To all whom it may concern:*

Be it known that I, MILES CONNOR, a citizen of the United States, residing at Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Fire-Alarm Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to signaling apparatus, and more particularly to fire-alarm signals; and my object is to provide means for utilizing the wires of the signaling system for transmitting telephonic and telegraphic signals over the wires without operating the fire-signals.

A further object is to provide means for connecting the several circuits into one general circuit.

A still further object is to provide means for compensating for any permanent break in the line other than when a signal is being transmitted; and a still further object is to provide means for preventing reduction of current below a certain point when signals are being sent other than fire-alarm signals.

Other objects and advantages will be hereinafter referred to, and more particularly pointed out in the claims.

In the accompanying drawings, which are made a part of this application, Figure 1 is a perspective view of a portion of a signaling mechanism with my attachment applied thereto. Fig. 2 is a diagrammatic view of a series of alarm systems, showing my improvement attached thereto and in position to send messages over the entire system. Fig. 3 is a similar view showing the several circuits in position as when a fire-alarm signal is being sent thereover. Fig. 4 is a sectional view of an improved form of key or plug used in connection with a street-box to operate the signaling mechanism therein, and Figs. 5 and 6 are detail views showing different positions of a cut-out for the telephone and telegraph instruments.

In systems of this class it is customary to have the alarm system divided into independent circuits and to utilize a repeating mechanism to transmit the signal from one circuit to the remainder of the circuits, thereby normally separating the several circuits when not in use, but is my intentions to dis-

pose the several circuits into one common circuit when not in use for transmitting fire-alarm signals and employ the common circuit for transmitting telephonic and telegraphic signals, and to this end apply the improvements herein disclosed in connection with that form of repeaters shown and described in Patents No. 223,248, of January 6, 1880, and No. 596,250, of December 28, 1897; but as the devices therein shown form no part of my invention I do not deem it necessary to show more of said inventions than is necessary to disclose the operation of my improved device.

Referring to the drawings, in which similar reference-numerals designate corresponding parts throughout the several views, 1 indicates one of a system of magnets, the number of said magnets depending upon the number of circuits in the system, said magnets being provided with an armature 2, which is carried by a pivoted lever 3, said lever having a notch or hook at its upper end adapted to cooperate with certain interlocking mechanism carried by the magnets. A shaft 4 is disposed above the magnet 1 and at one end thereof, said shaft being adapted to be partially rotated by the repeating mechanism, (not shown,) said shaft also having mounted thereon suitable mechanism 5, which is adapted to cooperate with the lever 3 while a fire-alarm is being transmitted over the system.

In applying my invention to a system of this class I dispose upon the shaft 4 at any convenient point a drum 6, said drum being preferably cylindrical and made in sections, so that it can be readily disposed upon the shaft, and consists of any suitable insulating material. Disposed upon the drum 6 are contact-plates 7, 8, 9, 10, and 11, the plates 7, 8, 9, and 10 being disposed above the surface of the drum 6 and adapted to engage the contact-fingers 12, 13, 14, 15, 16, and 17, said fingers being mounted upon a suitable insulating-block 18 and disposed over the drum 6, so that when the repeating mechanism is not transmitting a fire-alarm said fingers will rest upon said plates and dispose the several circuits into one common circuit. The plate 11 extends from the plate 7 to the plate 10 and is disposed below the surface of the drum 6, so that when the drum is rotated the fingers will not engage said contact-plate.

For convenience of illustration I have shown a system of this class employing three separate circuits, (numbered, respectively, 19, 20, and 21,) and when these circuits are used for transmitting fire-alarm signals the signal coming in over one circuit is transmitted over the remainder of the circuits through the medium of a repeater; but it is my intention to dispose the independent circuits into an universal circuit for the purpose of transmitting signals over all of the circuits simultaneously and independently of the repeating mechanism.

In tracing the passage of a telephonic or telegraphic message through the various circuits for convenience a starting-point will be made with the line-battery 22 in the circuit 19, thence through the wire 23, repeater-magnet 24, wire 25, to the finger 13, thence through the contact-plate 8 into the finger 14, through the wire 26 to the circuit-breaker 27, thence through the wire 28 of the circuit 20, through the line-battery 29, repeater-magnet 30, wire 31, and into the finger 15, thence through the contact-plate 9 into the finger 16, through the wire 32 to the circuit-breaker 33, thence through the wire 34 of the circuit 21, through the line-battery 35, repeater-magnet 36, wire 37, and into the finger 17, thence through the contact-plates 10, 11, and 7 to the contact-finger 12, thence through the wire 38 to the circuit-breaker 39, into the wire 40 of the circuit 19, to the signaling-wheel 41 in the street-box 42, thence through the wire 43 to the line-battery 22. It will be understood of course, that the magnets 24, 30, and 36, above alluded to, correspond to the magnets 1, as shown in Fig. 1 of the drawings. It will therefore be seen that a signal sent in from any one of the telephones 44 or telegraph-keys 45, placed at suitable points along the line of the circuits or in the street-boxes, will be transmitted through all of the several circuits without interruption.

At various points or stations along the line of the circuits I provide suitable signaling devices—such as registers, bells, or gongs 46—said devices serving to announce the fire-alarm signal, while at the same station I have provided suitable devices 47 for receiving the telegraph and telephone signals, both signals being operated when a fire-alarm is being made, but the devices 47 only being operated when a telegraph or telephone signal is being transmitted.

To obtain the various signals over the same circuit, it is necessary that a comparatively strong retractile spring be employed for telephonic and telegraphic purposes, so that a reduction of current strength in the circuit will operate the armatures on the magnets employed in connection with the relays or sounders, and a retractile spring of

less strength should be used on the magnets to operate the fire-alarm signal, thus requiring a complete break in the circuit before the fire-alarm signal will operate.

When one of the telephones 44 or telegraph instruments 45 is operated, all the receiving devices 47 in the several circuits are signaled, and by having a predetermined signal for each separate station any particular station upon the various circuits may be called by giving their respective call.

In order to reduce the current in the various lines when telephoning or telegraphing, a resistance 51 is disposed around the telegraph-keys and telephoning instruments, so that when the keys are opened the resistance will choke the current passing through the circuit-wire, and weaken the same sufficiently to allow the magnets having a strong retractile spring to operate.

When a complete break occurs in any one of the circuits, as when a fire-alarm is sent in, the shaft 4 is rotated sufficiently to dispose the contact-fingers from off their respective plates and into engagement with auxiliary contact-plates 48, 49, and 50, the fingers 12 and 13 engaging the plate 48, the fingers 14 and 15 engaging the plate 49, and the fingers 16 and 17 engaging the plate 50, thereby confining the current in the circuits 19, 20, and 21 to their own individual circuit, the alarm being sent through the respective circuits other than that in which the alarm is given through the medium of the repeating mechanism.

The operation of the several parts of my device when a fire-alarm is transmitted thereover is as follows: When a complete break occurs in one of the circuits, the armature 2 of that particular circuit is withdrawn from the magnet 1 and is moved outwardly, the upper portion thereof engaging a trip upon a shaft 3<sup>b</sup>, thereby unlocking the repeating mechanism, (not shown,) while the extreme upper end of the lever 3 will engage the depending end of the bell-crank lever 5, the outer movement of the lever swinging the bell-crank lever outwardly and disposing the same out of the path of a locking-hook 5<sup>a</sup>. As soon as the repeating mechanism has been unlocked the shaft 4 is immediately rotated, and as the bell-crank levers 5 are mounted upon an eccentric 5<sup>b</sup> the rotation of the shaft will cause the bell-crank levers to descend, and as all the bell-crank levers except the one in the circuit over which the alarm is coming in will be held in the path of the locking-hook 5<sup>a</sup> a shoulder 5<sup>c</sup> on the bell-crank lever 5 will engage the outer end of the locking-hook 5<sup>a</sup> and move the same downwardly into engagement with a hook 3<sup>c</sup> on the extreme upper end of the lever 3, thereby preventing the armatures on the remainder of the magnets from oper-

ating or falling off. Each of the bell-crank levers 5 is provided with a laterally-extending pin 5<sup>d</sup>, which is adapted to engage and operate a shunt-contact 5<sup>e</sup>, and by this construction it will be seen that when the bell-crank lever corresponding to the circuit over which the fire-alarm is being transmitted is swung outwardly the pin 5<sup>d</sup> will be out of the path of the contact 5<sup>e</sup>, so that the circuit on this particular battery will not be shunted, but the remainder of the circuits other than the one over which the alarm is being transmitted will be shunted, the shunt-contacts 5<sup>e</sup> corresponding to the circuit-breakers 27, 33, and 39 shown in the diagrammatic views. As soon as the circuits are shunted they pass under the control of a cylinder C, which is shown in Figs. 2 and 3, and this cylinder is provided with a contact-strip (not shown) and makes a revolution every time the repeater is operated and closes the circuit once for every impulse received on the active magnet. As soon, however, as the fire-alarm has been completed the shaft 4 is returned to its normal position and the contact-fingers disposed into engagement with their respective contact-plates and the various circuits again disposed into a common circuit, in which position a signal other than a fire-alarm signal will be transmitted through all of the various circuits at the same time. The reduction of the current through the various lines is produced by disposing resistance-wires 51 around the telegraphic keys and telephoning instruments, so that when the keys are opened the resistance will choke the current passing therethrough and weaken the current sufficiently to allow the magnets having a strong retractile spring to operate.

As shown in the several figures of the drawings, I have provided a resistance 52, which is disposed between the terminals of each individual circuit, so that when an alarm is sent in over any one circuit the resistance between the terminals of the remainder of the circuits will be choked and prevent an entire removal of current strength, so that the armatures on these circuits will be held into engagement with their respective magnets until such time as the repeating mechanism will direct the locking-hooks into engagement with the armature-levers and the drum rotated to cut out resistance, and thereby hold these armatures against operation.

When a permanent break is made in any of the line-wires, as by said wires being severed or the like, the circuit will be completed between the respective terminals through the medium of the resistance 52 until such time as a permanent connection can be made between the terminals, and to accomplish this result I have provided suitable cut-out

switches 53, said switches being permanently connected to one of the terminals of each circuit and adapted to be disposed into engagement with contact-points 54 in the opposite terminal, thereby directing the current through said switches instead of through the resistance-wires, and said switches are maintained in this position until the wire has been repaired and the circuit therethrough restored.

In Fig. 4 of the drawings I have shown a suitable device for use in connection with the street-boxes for reducing current in the circuit, and thereby causing a signal to be made, said device comprising a split plug 55, the upper end of said plug being wound with suitable resistance material 56, said resistance being covered with insulating material and that end of the plug containing the resistance provided with a handle-section 57. The plug 55 is applied to use in the street-boxes 42 by inserting the plug in a suitable circuit-breaking mechanism 42<sup>a</sup>, as into engagement with the usual form of lightning-plate or in connection with the usual form of spring-jack.

To prevent the accidental opening of the circuit, and thereby sound an alarm of fire, as when the current is weakened by several persons attempting to use the wire for telegraphic or telephonic signals at the same time, I have provided a cut-out around each telegraph-key and telephone-jack, which is best shown in Figs. 5 and 6 and diagrammatically illustrated as applied to use in Fig. 2 of the drawings. As shown, the cut-out consists of a curved arm 58, which is secured in any preferred manner to a relay-magnet 59; the free end of said arm forming a support for a longitudinally-movable plunger 60, said plunger being in contact with the local circuit-wire 61, said local wire extending from the plunger through the sounder-magnet 62 to the armature-lever 63, said armature-lever being provided with a retractile spring 64, so that when the current in the main line has been reduced the armature-lever 63 will be drawn away from the relay-magnet 59 and into engagement with the plunger 60, so that the sounder-magnet will be operated, the position of the several parts while operating the sounder-magnet being illustrated in Fig. 5 of the drawings. A spring 65 is disposed around the plunger 60, one end thereof being secured to the plunger, while the opposite end engages the arm 58, thereby assisting the reduced current in overcoming the retractile spring and holding the armature-lever in the position illustrated in Fig. 5, while the plunger 60 is prevented from moving too far in the opposite direction by means of a stop or pin 66, disposed through the plunger 60 at the opposite side of the curved arm 58. Disposed at each side of the telephone 44 and

telegraph-key 45 are wires 67 and 68, respectively, said wires terminating in contact-points 69 and 70, respectively, which are located in the path of the armature-lever 63.

5 The object in providing the cut-out is that after the current has been reduced to a certain point or until the armature 63 engages the plunger 60 any attempt at a further reduction of the current, as by other parties attempting to use the line, would result in the  
10 retractile spring 64 overcoming the spring 65 upon the plunger and disposing the armature-lever into engagement with the contact-points 69 and 70, which would result in the  
15 current being shunted or directed around the telephone and telegraph-key through the wires 67 and 68, thereby cutting this telephone and telegraph-key completely out of the circuit and preventing a further reduction of the current, the position of the several  
20 parts of the device when shunting being clearly illustrated in Fig. 6 of the drawing.

What I claim is—

1. The combination with a plurality of circuits having alarms and a repeating mechanism in said circuits, of a drum secured to a  
25 portion of said repeating mechanism and means disposed in coöperative relation with said drum and circuits whereby a signal will be transmitted through all of said circuits simultaneously.

2. The combination with a plurality of electric circuits having signaling mechanism at various points and a repeating mechanism  
35 for said circuits, of a drum on said repeating mechanism, contact-plates on said drum and means to dispose said circuits into engagement with said plates whereby the individual circuits will be disposed into one common  
40 circuit.

3. The combination with a repeating mechanism for alarm systems, of a drum secured to said repeating mechanism, contact-plates on said drum, contact-fingers disposed  
45 over said drum and adapted to engage said contact-plates, auxiliary plates secured to said drum and adapted to engage said fingers when the drum is rotated and a plurality of circuits connected to said fingers.

50 4. An attachment for a plurality of signaling-circuits having a repeating mechanism, comprising a drum, contact-plates on said drum, fingers disposed over said drum and adapted to engage said contact-plates whereby individual circuits will be disposed into a  
55 common circuit, when said fingers engage said contact-plates and auxiliary plates on said drum adapted to engage said fingers when the drum is rotated thereby disposing said common circuit into individual circuits.

5. An attachment for alarm systems comprising a drum, contact-plates on said drum, fingers to engage said contact-plates to dis-

pose said individual circuits into a common circuit, and auxiliary plates on said drum  
65 adapted to engage said fingers and dispose said common circuit into individual circuits.

6. The herein-described signaling system comprising a plurality of individual circuits, a repeater disposed into coöperation with  
70 said individual circuits, a drum disposed on said repeater, means to rotate said drum, contact-plates on said drum, fingers disposed into coöperation with said plates whereby individual circuits will be disposed into a  
75 common circuit, signaling mechanism at various points in said circuits, means carried by said drum to dispose said common circuit into individual circuits and additional means to operate said circuits whereby various  
80 alarms will be sounded.

7. The combination with a plurality of independent circuits having alarms and a repeating mechanism in said circuits; of a drum  
85 secured to a portion of said repeating mechanism and adapted to be operated thereby, a plurality of contact-plates on said drum, contact-fingers in said circuits adapted to coöperate with said plates and switches in said  
90 circuits adjacent said fingers whereby the circuit may be shunted from said fingers.

8. The combination with a plurality of independent circuits having alarms and signaling mechanism thereon and means to dispose  
95 said independent circuits into a common circuit, of a resistance between the poles of each independent circuit whereby when an alarm is transmitted over one of the circuits an entire removal of current in the remainder of  
100 the circuits will be prevented.

9. In a combined alarm and signaling system having a plurality of individual circuits and alarm and signaling instruments in said  
105 circuits, of means to dispose all of said circuits into a common circuit and means to automatically cut out a portion of said signaling instruments when the current in the common circuit is reduced to a predetermined point.

10. The combination with a plurality of individual circuits and means to dispose said  
110 individual circuits into a common circuit, of telephonic and telegraphic signaling devices in said circuits adapted to be operated by a reduction of current strength in said circuits, and shunting devices in said circuits adapted  
115 to be automatically operated when the current is reduced to a predetermined point whereby a further reduction of current strength will be prevented.

11. The combination with a plurality of independent circuits adapted to transmit fire-alarm signals when the circuit is broken and  
120 to transmit telegraphic and telephonic signals when the current strength is reduced, of means to dispose all of said individual cir-

cuits into a common circuit, signaling devices  
on said circuits and means to shunt the cur-  
rent around said signaling devices when the  
current strength has been reduced to a prede-  
5 terminated point whereby preventing the acci-  
dental operation of the fire-alarm instru-  
ments.

In testimony whereof I have signed my  
name to this specification in the presence of  
two subscribing witnesses.

MILES CONNOR.

Witnesses:

D. H. RYAN,  
GEO. E. BALDWIN.