

(No Model.)

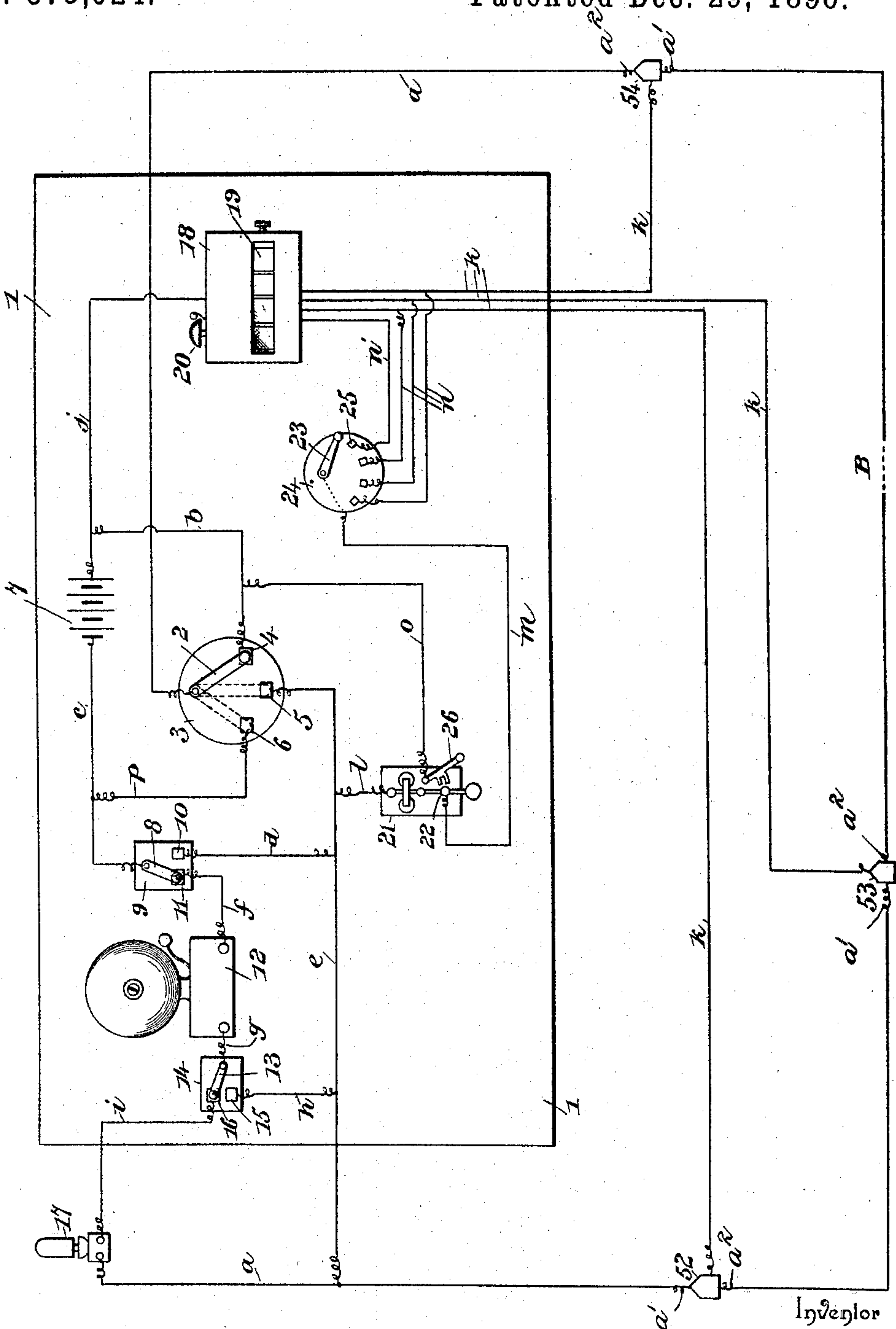
3 Sheets—Sheet 1.

A. C. ROGERS.  
FIRE ALARM SYSTEM.

No. 573,924.

Patented Dec. 29, 1896.

Fig. 1.



Witnesses

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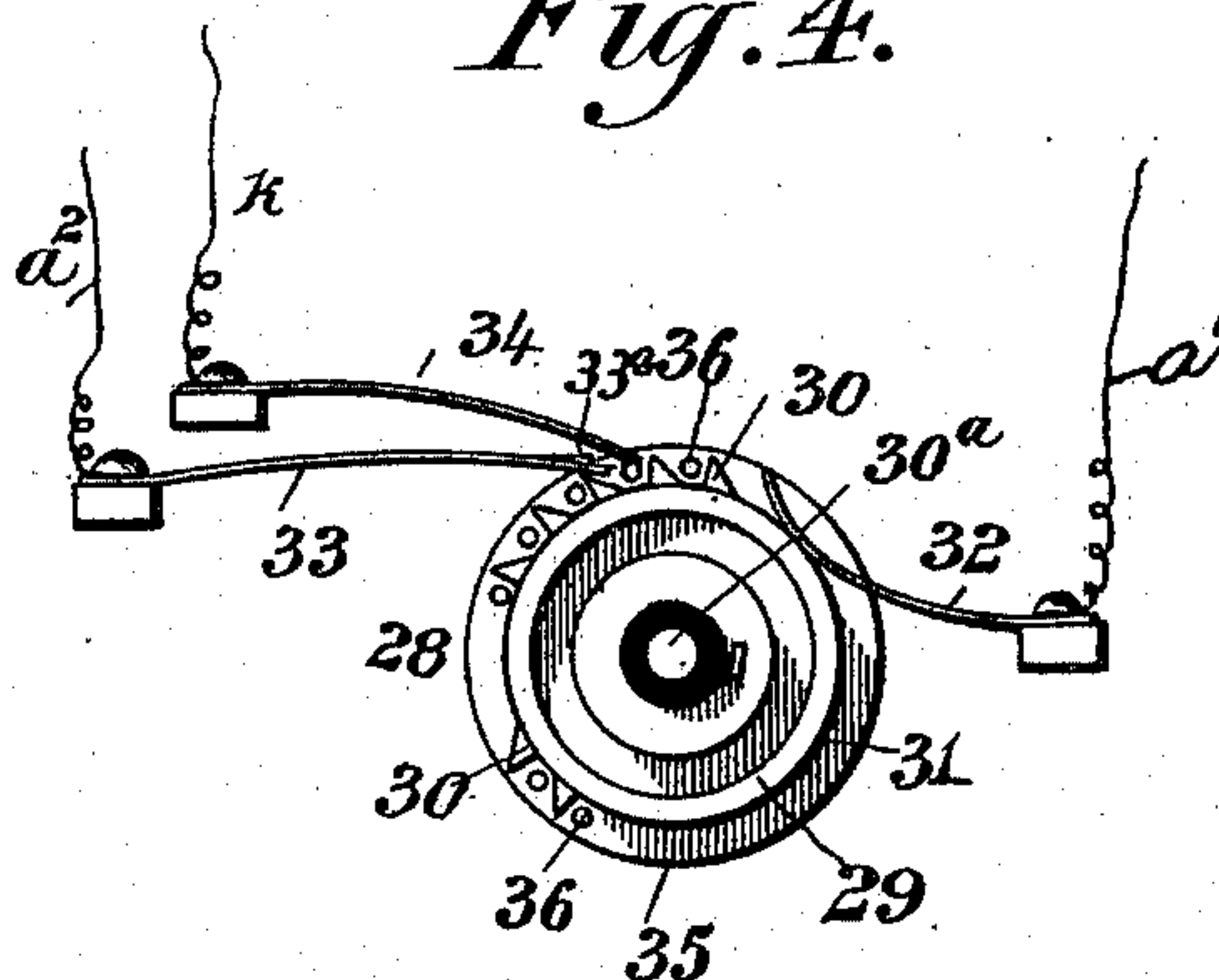
3 Sheets—Sheet 2.

No. 573,924.

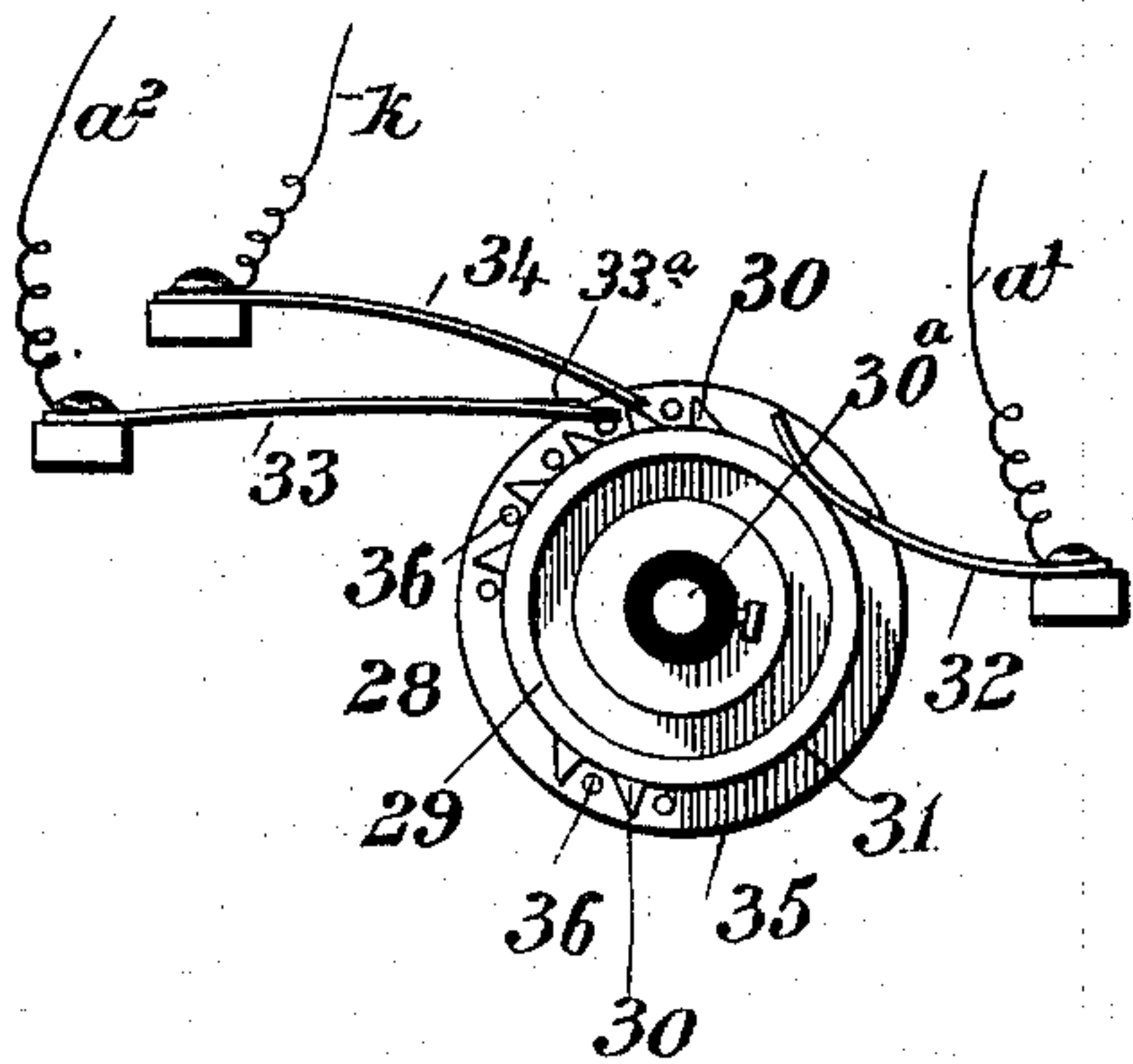
Patented Dec. 29, 1896.

Fig. 1 is a perspective view of a safe with its door open. The door is labeled 'a' and the internal mechanism is labeled 'a^2'. The dial has numbers 27, 28, 32, 33, 34, 35, 36, and 30. The door is shown in an open position, revealing the internal locking mechanism.

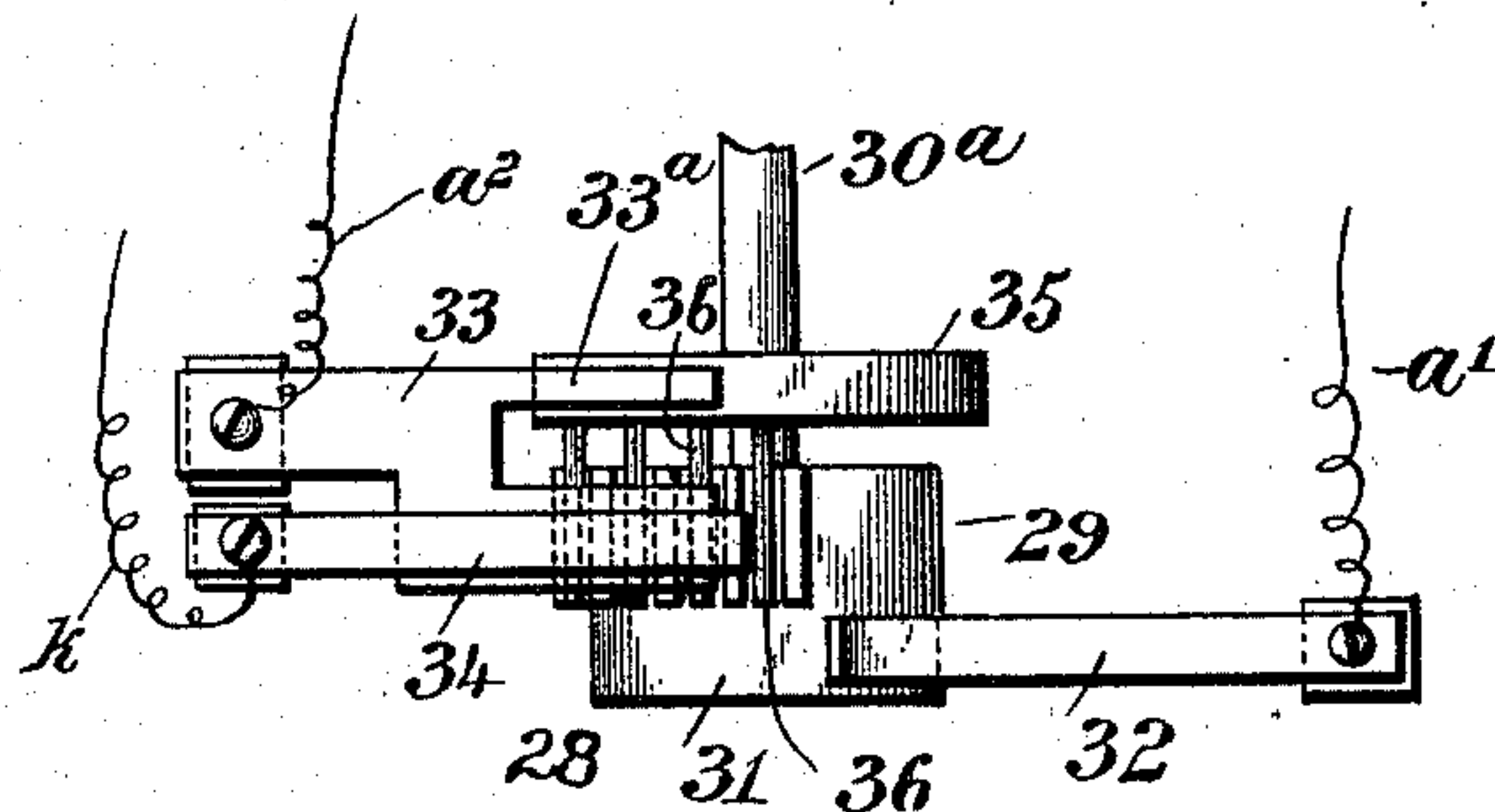
*Fig. 4.*



*Fig. 3.*



*Fig. 5.*



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Witnesses

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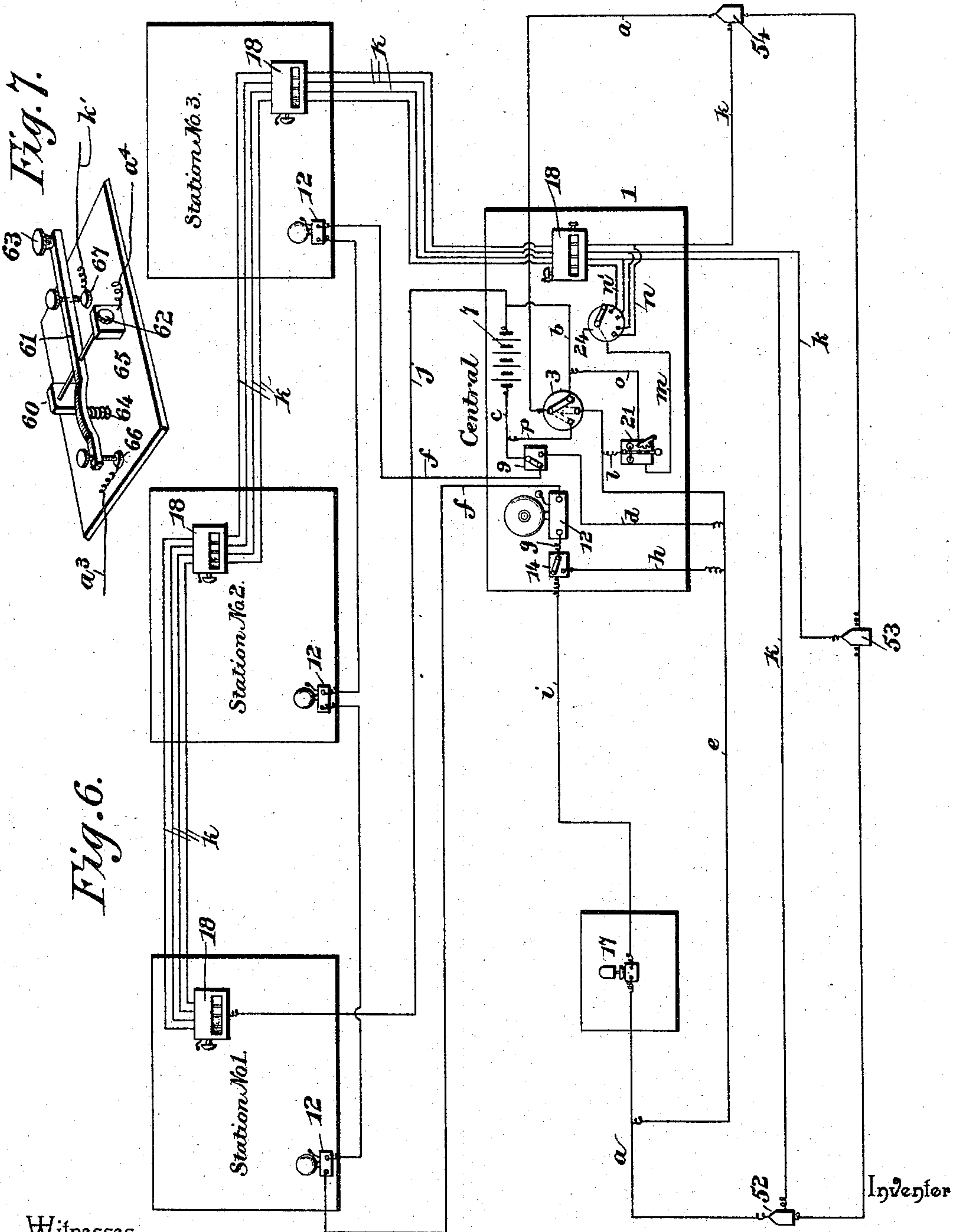
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# UNITED STATES PATENT OFFICE.

ALBERT C. ROGERS, OF PLAINFIELD, NEW JERSEY.

## FIRE-ALARM SYSTEM.

SPECIFICATION forming part of Letters Patent No. 573,924, dated December 29, 1896.

Application filed January 25, 1896. Serial No. 576,887. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT C. ROGERS, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented a new and useful Fire-Alarm System, of which the following is a specification.

This invention relates to fire-alarm systems for town and city use; and it has for its object to provide an improved system of this character whereby the different fire-stations and central office will be immediately notified of the number of the particular fire-alarm box from which the alarm was turned in without having to wait until the gong in the station tolls off the number of the box, as is now the case in connection with most fire-alarm systems in general use.

The invention also contemplates, among other objects, an improved arrangement whereby even though a break should occur in the main line at either side of a particular fire-alarm box or in the annunciator-wire for such box the latter would not be rendered inoperative, but would still send in an alarm when manipulated in the usual way; and in the attainment of this very important object the invention also contemplates means for determining where the break is located, and also providing telegraphic communication throughout the entire system and also with the general gong or whistle, whereby an alarm may be sounded from the central station or office.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a diagrammatic view of the system shown in circuit with only the central station or office. Fig. 2 is a detail elevation of an ordinary fire-alarm box equipped with a circuit-breaker constructed in accordance with this invention. Fig. 3 is a detail elevation of the circuit-breaker, showing the parts positioned so as to close the circuit between one of the main-line terminals in the box and the annunciator-wire terminal. Fig. 4 is a similar view to Fig. 3, with the exception of showing the parts so positioned as

to close the circuit between the other of the main-line terminals in the box and the annunciator-wire terminal. Fig. 5 is a detail plan view of the circuit-breaker device. Fig. 6 is a diagrammatic view of the entire system, showing, in addition to the central station illustrated in Fig. 1, a series of fire-stations in circuit with each other and with said central station. Fig. 7 is a detail in perspective of the telegraph-key and its wire connections for each of the fire-alarm boxes.

Referring to the accompanying drawings, 52, 53, and 54 designate, respectively, ordinary fire-alarm boxes which are arranged at suitable points in a city or town, and all of which boxes are connected in series by the main-line wire *a*.

It will of course be understood that the main-line wire *a* has two terminal connections with each of the fire-alarm boxes, and it will also be understood that any number of said boxes may be included in the circuit of the main line, but for convenience in understanding the system only three of the fire-alarm boxes are illustrated and are conveniently designated by the numerals which will also represent the numbers that the particular boxes are known by in the system.

The main-line wire *a* has one of its terminals lead to the fire-station 1, which will be understood to be the central fire-station or office, and at which point this terminal of the main-line wire is suitably connected to one end of the switch-lever 2 of a three-point switch 3, provided with the three contact-points 4, 5, and 6, with each of which points the swinging end of the switch-lever 2 is designed to contact to provide for making the proper circuit connections in controlling the system. Normally when the system is in proper working condition the lever 2 is positioned to contact with the point 4, with which contact-point is connected one terminal of the battery-wire *b*, the other terminal of which wire connects to one pole of the working battery 7. The other pole of this battery has connected thereto one terminal of the battery-wire *c*, the other terminal of which wire connects with a switch-lever 8 of a two-point cut-out switch 9, having the two contact-points 10 and 11. The contact-point 10 of the switch 9 has connected thereto one terminal of the



short-circuit wire *d*, the other terminal of which connects with the wire *e*, which wire is connected with the intermediate contact-point 5 of the switch 3, and at its terminal opposite the connection with the point 5 with the main-line wire *a*, near the terminal thereof, opposite the terminal connected with the switch-lever 2.

The contact-point 11 of the switch 9 has connected thereto one terminal of the gong-wire *f*, leading to the electric station-gong 12, which is arranged at the fire-station with the other controlling apparatus and is set on a closed circuit, so as to operate and sound an alarm when the circuit in which the gong is included is broken. A gong-wire *g* leads from the station-gong 12 to the switch-lever 13 of a cut-out switch 14, provided with the two contact-points 15 and 16, respectively. The contact-points 15 and the switch 14 have connected thereto a short-circuit wire *h*, which also connects with the wire *e*, and the contact-point 16 has connected thereto one terminal of the wire *i*, the other terminal of which connects with an electrical general gong or whistle 17, to the controlling mechanism of which is also connected the terminal of the main-line wire *a* opposite the terminal connected with the switch 3. The general gong or whistle 17 is illustrated as being an ordinary steam-whistle controlled by suitably-operated mechanism which is set on a closed circuit, so as to operate and sound the whistle when the circuit in which such whistle is included is broken, and at this point it may be observed that steam-whistles of this character are isolated at some convenient point in the city or town, so that the fire-alarm can be easily heard within any reasonable distance, but it will of course be understood that the whistle may be substituted for by an ordinary electric gong intended to accomplish the same result.

The pole of the working battery 7, to which the wire *b* leads, also has connected therewith one terminal of the return-wire *j* of an ordinary annunciator or indicator 18, provided with any suitable number of "drops" 19, according to the number of fire-alarm boxes in the system and the number of special calls desired to be indicated by the annunciator, and said annunciator is also provided with the usual bell 20, which rings an alarm whenever one of the drops is released. The annunciator 18 is illustrated as being provided with four drops, one each for the fire-alarm boxes 52, 53, and 54, and one for a special call, such as for an engine, a reel, &c.; and it will of course be understood that the annunciator will be provided with any number of drops for special calls and with the requisite number of drops for the fire-alarm boxes. The drops 19 for the fire-alarm boxes are provided with the numbers of these boxes, so that the moment a drop is released and shows its number at the fire-station it will immediately indicate the number of the fire-alarm box from which the alarm was turned

in, so that the firemen will not be compelled to wait until the gong has tolled off the number of the fire-alarm box before starting to the fire, which is an item of considerable importance in fire-alarm systems.

Each of the fire-alarm boxes has a separate annunciator-wire *k* leading thereto, which annunciator-wire also connects with the annunciator and controls the particular drop having the same number as the fire-alarm box to which the wire leads, so it will therefore be seen that there is a direct annunciator-wire connection between the annunciator at the fire-station and each fire-alarm box, although it will be understood that the entire series of annunciator-wires may be run out from the station in a cable, as is customary in stringing wires.

In connection with the apparatus that has just been described as being located at the central fire-station or office an ordinary telegraphic key 21 is employed. The key proper of the telegraphic key has a wire connection 1 with the wire *e*, and the contact-point 22 of the telegraphic key has connected thereto one terminal of the switch-wire *m*, the other terminal of which wire connects with a switch-lever 23 of a switch 24, provided with a number of separate contact-points 25, which correspond in number to the number of fire-alarm boxes and special calls which are indicated by the annunciator 18. The separate contact-points 25 of the switch 24 have separate wire connections *n*, respectively, with each of the annunciator-wires and with the special drop which the annunciator is illustrated as being provided with, and the special-wire connection between one of the contact-points of the switch 24 and the annunciator may be additionally designated by the reference-character *n'*.

The manner of employing the telegraphic key will be fully set forth; but at this point it is to be noted that the said key is provided with a pivoted circuit-closing lever 26, that is adapted to be thrown into contact with the contact-point 22 of the key, and which has connected therewith a short-circuit wire *o*, which wire also connects with the battery-wire *b*, as will be hereinafter more particularly referred to.

Referring now to the particular wire connections with each fire-alarm box, it will be understood that such fire-alarm boxes are provided with the usual mechanism for turning in an alarm, and the present invention does not contemplate the material changing of this mechanism, so Fig. 2 of the drawings simply indicates diagrammatically in dotted lines the mechanism 27, which is found in all fire-alarm boxes.

The only improvement or addition which the present invention contemplates in connection with fire-alarm boxes is a circuit-breaker 28, which circuit-breaker necessarily provides for a different arrangement of the wire-terminals leading into the boxes. The



circuit-breaker 28 essentially consists of a contact-disk 29, mounted on one of the shafts 30<sup>a</sup> of the mechanism 27, so that when the controlling lever or "hook" of the mechanism is pulled to set the latter in motion a rotation will necessarily be imparted to the contact-disk 29. The contact-disk 29 is provided on its periphery with spaced groups of contact-teeth 30, which teeth are grouped in substantially the same manner as in the circuit-breakers in common use, it being understood that the number of teeth in each group corresponds to one of the figures of the particular number of the fire-alarm box in which the circuit-breaker is arranged.

As clearly illustrated in the drawings, the disk 29 is represented as being provided with spaced groups of respectively five and two teeth, which make the number "52," which is the number of the fire-alarm box illustrated in Fig. 2 of the drawings. The rotating contact-disk 29 is suitably insulated from the shaft 30<sup>a</sup> and is provided at one side of the teeth 30 with an outer smooth contact portion 31, on which bears one end of the spring contact-brush 32, to which is connected one of the terminals  $a'$  of the line-wire leading into the box, and the other terminal  $a^2$  of the line-wire leading into the box is connected to the opposite spring contact-brush 33, one end of which is adapted to bear on and ride over the contact-teeth 30 of the disk. The wire-terminal  $a'$ , connected with the brush 32, is always the terminal of that portion of the main-line wire which leads from the general gong or whistle, in order that the proper circuit connections may be made, as will be hereinafter more fully understood, and in conjunction with the brushes 32 and 33, connected, respectively, with the wire-terminals  $a'$  and  $a^2$ , is employed an annunciator-wire brush 34, to which connects the terminal of the annunciator-wire leading into the box.

The annunciator-wire brush 34 is also adapted to ride over and contact with the contact-teeth of the disk, but does not contact with the disk between the groups of teeth. So, therefore, it will be observed by reference to Fig. 2 of the drawings that when the mechanism in the fire-alarm box is at rest the annunciator-circuit will remain open, while the main-line circuit will be closed through the medium of the metallic disk 29, which provides a metallic connection between the brushes 32 and 33 for the main-line wire, and since the main-line circuit is normally closed in the manner described both of the brushes 32 and 33 are designed to normally always contact with the disk.

At one side of the rotating contact-disk 29 is located an auxiliary contact-disk 35, which is insulated from the shaft 30<sup>a</sup> in the same manner as the disk 29, and is provided at one side with a series of offstanding contact-pins 36, which project into the spaces between the teeth 30 of the disk 29, and said auxiliary contact-disk 35 has normally contacting there-

with the supplemental contact-brush 33<sup>a</sup>, forming a part of the brush 33, which rides over the teeth 30. Now it will be observed that as the disk 29 rotates and the brush 33 rides over the teeth 30 the circuit on the main line will be broken as many times as there are teeth on the disk, which will cause an alarm to be sounded at the station and also by the general gong or whistle. The moment the brush 33 drops off of the first tooth of the disk 29 as the latter commences to rotate the annunciator-wire brush 34 will come in contact with such first tooth and immediately close the annunciator-circuit over the wire  $k$  and the main-line wire, so as to operate the annunciator and cause the drop to fall, which indicates the number of the fire-alarm box from which the alarm is turned in. As the rotation of the disk 29 continues it will therefore be seen that there is an alternate breaking of the main-line circuit and a closing of the annunciator-circuit, although the interval of time between these two operations will be scarcely noticed at the station, so that the annunciator will practically indicate the number of the fire-alarm box at the moment the alarm is turned in and when the station-gong has just commenced to toll off the number.

It will be further noticed that as the disk 29 continues to rotate the brush 33 when it leaves each tooth 30 drops onto one of the contact-pins 36 between the teeth, so that the main-line circuit remains broken while the annunciator-circuit is closed, and in the moment of time when the tip end of the brush 33 is passing across the space from one of the contact-pins to one of the teeth of the disk 29 the annunciator-wire brush 34 will drop in contact with one of the pins of the contact-disk 35 and will thereby close the annunciator-circuit over the wire  $k$  and that portion of the main-line wire having a terminal connection  $a^2$  with the supplemental brush 33<sup>a</sup>, contacting with the disk 35, carrying the pins 36. When the annunciator-circuit is closed by the means just described in the fire-alarm box, the annunciator will not operate, but, as will be explained in connection with the manipulation of the switch 3, this manner of closing the annunciator-circuit is important to render a fire-alarm box operative when the main line has broken at one side of the same.

With the entire system in perfect condition, without any breaks in either the main line or in any of the annunciator-wires, when the alarm is turned in from said box No. 52 the disk 29, rotating in such box, will break the main-line circuit five times and then two times in the manner which is well understood, so as to cause the station-gong 12 and the general gong or whistle 17 to sound the number "52," thereby indicating which fire-alarm box the alarm was turned in from, and the main-line circuit referred to includes the battery 7, wire  $c$ , cut-out switch 9, station-gong 12, cut-out switch 14, general gong or whistle



17, the main-line wire *a*, switch 3, and battery-wire *b*. During the operation of the mechanism in the fire-alarm box referred to the annunciator-circuit will be closed at rapid intervals through the brushes 32 and 34, wire *k*, annunciator 18, wire *j*, battery 7, wire *c*, cut-out switch 9, station-gong 12, cut-out switch 14, wire *i*, general gong or whistle 17, and wire *a*, including the box-terminal *a'* of the latter.

Since the circuit of the main line is normally closed, it will of course be understood that should any break occur in the main line at a point between any two boxes the station-gong 12 and the general gong or whistle 17 would necessarily sound one alarm, which would at once indicate at the station or central office that a break had occurred somewhere in the main line. Immediately upon receiving this knowledge at the central station the switch-lever 2 is swung in contact with the contact-point 5 of the switch 3, thereby, through the medium of the wire *e*, connecting all of the boxes at the side of the break farthest from the gong or whistle 17 with the terminal of the main-line wire which connects with such gong or whistle. Assuming the break to be at the point B between the boxes 53 and 54, or at any other point, the switching of the circuit in the manner described will provide means whereby all of the fire-alarm boxes will operate in the same manner as if no break had occurred. For instance, taking the box 53, which will operate in the same manner as the box 52, with the break B located between the boxes 53 and 54, when the alarm is turned in from the box 53, it being remembered that the switch-lever 2 contacts with the point 5, the main-line circuit will be combined with the annunciator-circuit to complete a continuous circuit, it being noted that with respect to the box 53 that portion of the main line is broken which has a terminal connection *a'* with the brush 33. Consequently as the disk 29 continues to rotate the circuit will be alternately opened and closed between the brushes 32 and 34, and this circuit will include the battery 7, wire *c*, switch 9, station-gong 12, switch 14, wire *i*, general gong or whistle 17, wire *a*, and terminal *a'* of said wire, annunciator-wire *k*, annunciator 18, and wire *j*. Now with respect to the fire-alarm box 54, which is at the opposite side of the break B to the box 53, it will be noted that that portion of the main-line wire is broken which has a terminal connection *a'* with the brush 32. It will therefore be seen that when the alarm is turned in at the box 54 the circuit will be alternately opened and closed between the brushes 33 and 34, the brush 33 having the supplemental brush 33<sup>a</sup>, as hereinbefore described. Since the circuit is opened and closed between the brushes 33 and 34 when the alarm is turned in from the box 54, at one side of the break B, the circuit will include the battery 7, wire *c*, switch 9, station-gong 12, switch 14, wire *i*, general gong or whistle

17, wire *a*, wire *e*, lever 2 of switch 3, wire *a*, terminal *a'* in box 54, annunciator-wire *k* for said box, annunciator 18, and wire *j*.

From the foregoing it will be apparent that no matter where the break in the main line occurs the entire system, including all of the fire-alarm boxes, is rendered operative by a simple manipulation of the lever 2 of the switch 3 to contact with the point 5 of said switch, and at this point attention will be directed to the means for ascertaining or testing the system to find out where the break is located.

It may be briefly noted that should an annunciator-wire break the failure of the annunciator to operate for a particular box would at once indicate that the annunciator-wire for such box is the wire which is broken and the defect can be immediately repaired; but with respect to a break in the main line the first step for determining where this break is located is to move the switch-lever 2 around to the contact-point 6, which has a wire connection *p* with the wire *c*, connected with one pole of the battery 7.

With the switch-lever 2 positioned on the contact-point 6 the operation of none of the boxes to sound an alarm is prevented, but the boxes 52 and 53, at the side of the break nearest the gong or whistle 17, will sound an alarm not only through the annunciator, but also through the gong 12 and the gong or whistle 17, while the box 54 will only sound an alarm through the annunciator. So when the operator has tested the box 53 and then comes to the box 54 and fails to hear the gong or whistle 17 he knows at once that the break in the main line is between the boxes 53 and 54. In this testing operation the circuit for the boxes 52 and 53 is completed through the battery 7, wire *c*, switch 9, gong 12, switch 14, wire *i*, gong or whistle 17, wire *a*, annunciator-wire *k*, annunciator 18, and wire *j*, while the circuit for the box 54 is completed through the battery 7, wire *c*, wire *p*, switch 3, wire *a*, box 54, wire *k*, annunciator 18, and wire *j*.

Assuming that the operator is still testing the line at the box 54 and the break remains in the main line at the point B, the annunciator will operate at the fire-station, but the operator at the box 54 will not know this, because the general gong or whistle 17 will not sound an alarm. Now before the operator at the box 54 can determine whether the break is in the annunciator-wire he must be notified from the central fire-station or office 1, and to effect this notification the telegraphic key 21 is brought into play. In the first place, however, the operator testing the line at the box 54 sends in any predetermined signal by manipulating the telegraphic key 60, which forms a part of the interior mechanism of most fire-alarm boxes, so as to indicate at the fire-station or central office that a test is being made at the box 54 and that an alarm is not being turned in. If the annunciator operates



at the central fire-station, the operator at the box 54 can be immediately notified of this by manipulating the telegraphic key 21 so as to sound a test-alarm by the gong or whistle 17, which upon being heard by the operator at the box 54 will indicate to him that the annunciator-wire is all right and that the break is therefore in the main line. In this manipulation of the telegraphic key 21 the lever 23 of the switch 24 will be on any of the points 25 and the circuit will include the battery 7, the wire *c*, switch 9, gong 12, switch 14, wire *i*, gong or whistle 17, wire *a*, wire *e*, wire *l*, telegraphic key 21, the wire *m*, switch 24, one of the wires *n*, one of the annunciator-wires *k*, the annunciator 18, and the wire *j*.

The telegraphic key 60 within each fire-alarm box is of the usual construction, but is employed in connection with the system in the simplest possible form, such as illustrated in Fig. 7 of the drawings. In this figure the key 60 essentially comprises an oscillating key-lever 61, pivotally supported intermediate of its ends between a pair of metallic pivot-posts 62 and provided at one end with a finger-piece 63. At one side of its pivotal support the key-lever 61 of the telegraphic key 60 has attached thereto one end of a retractile spring 64, the other end of which is fastened to the base 65 of the key and normally holds one end of the key-lever in contact with the contact-point 66, and at the same time normally holds the opposite end of the key-lever above and out of contact with the oppositely-located contact-point 67. The contact-point 66 and the metallic pivotal support of the key-lever, respectively, have connected therewith the branch wires  $a^3$  and  $a^4$ , leading from the main-line terminals  $a'$  and  $a^2$  within the fire-alarm boxes, the wire  $a^3$  being illustrated as branched from the terminal  $a'$  and the wire  $a^4$  is branched from the terminal  $a^2$  within each fire-alarm box. The other contact-point 67 for the key-lever 61 is designed to have connected thereto one end of a branch wire connection  $k'$ , which connects with the terminal of the annunciator-wire *k* within each box.

By reason of the branch wire connections described it will be observed that the telegraphic key 60 within each fire-alarm box has precisely the same three-wire connection therewith as the circuit-breaker within the box, and in its normal condition the telegraphic key allows the main-line circuit to be normally closed, as contemplated by the invention, and the annunciator-circuit to be normally open. During the manipulation of the lever 61 of the telegraphic key 60 within each box it will be obvious that the main-line and annunciator circuits are alternately opened and closed on the same principle as the circuit-breaker within the box, so that by operating the telegraphic key 60 the operator testing the line can readily send any predetermined signal to the operator at the central fire-station 1, whether there is a break in the line or not.

After the test in the line has been made the switch-lever 2 is returned to the contact-point 5, for the reasons hereinbefore given, until the break has been repaired, and after this repair has been made the switch-lever is returned to the contact-point 4 of the switch 3, which again sets the entire system in its normal working condition. Now should an alarm be sent in to the central fire-station or office 1 by telephone the alarm for the box nearest the fire can be sounded by manipulating the key 21. It is first necessary, however, to move the switch-lever 23 to the contact-point 25 having a wire connection with the particular drop carrying the number of the fire-alarm box nearest the fire. When this portion of the circuit has been closed, the next step necessary is to swing the circuit-closing lever 26 in contact with the contact-point 22 of the key 21, which cuts out all of the fire-alarm boxes and short-circuits the main line by providing the short circuit, which includes the battery 7, wire *c*, switch 9, gong 12, switch 14, wire *i*, gong or whistle 17, wire *a*, wire *e*, wire *l*, key 21, wire *o*, and battery-wire *b*. This short-circuiting of the main line is absolutely necessary in this operation, so that an alarm will not be sounded when the main-line circuit is broken by shifting the lever 2 from the point 4 to the point 5, which is necessary to make the proper circuit connection so that the alarm can be telegraphed to the general gong or whistle. Now, assuming that the lever 2 has been thrown to the point 5, the operator depresses the key of the telegraphic instrument 21 at the same moment he throws the lever 26 out of contact with the point 22, so that on the first sound of the gong or whistle 17 the annunciator 18 will work, and by continuing to manipulate the key of the telegraphic instrument the number of the fire-alarm box nearest the fire will be sounded by the annunciator 18, the station-gong 12, and also the general gong or whistle.

When it is desired to send a special call for assistance, the telegraphic instrument 21 is again brought into play, but the general gong or whistle 17 is cut out of use to avoid confusion of signals by moving the lever 13 of the switch 14 onto the contact-point 15, which closes the circuit over the wires *h* and *e*. Now should the special call be for an extra reel the lever 23 of the switch 24 is turned onto the contact-point 25, having a special-wire connection *n'* with the particular drop of the annunciator, which when released would indicate that an extra reel was needed. Now when this indication has been made by depressing the key of the telegraphic instrument to close the circuit the lever 23 is next moved to the contact-point 25, having a wire connection with the particular drop of the annunciator indicating the number of the fire-alarm box nearest the fire where the extra reel is needed, so it is therefore simply necessary after a readjustment of the lever 23 to again depress the key of the telegraphic in-



strument to indicate the number of the fire-alarm box. In this manipulation of the telegraphic instrument the working circuit includes the battery 7, the wire *c*, switch 9, gong 12, switch 14, wire *h*, wire *e*, wire *l*, telegraphic instrument 21, wire *m*, switch 24, annunciator 18, and wire *j*, and after the telegraphic instrument has been used for the purpose indicated the general gong or whistle 17 is again brought into the circuit by moving the lever 13 back to the point 16.

On Sundays and holidays it is sometimes desirable that simply a "still" alarm be sounded at the fire-station by the annunciator and station-gong, and to secure this result it is only necessary to cut out the general gong or whistle 17 by means of the switch 14 in the manner already described, and if there should be any defect in the line or apparatus between the switch 9 and the point where the wire *e* connects with the wire *a* both the station-gong 12 and the general gong or whistle are cut out of the main circuit by moving the lever 8 of the switch 9 onto the point 10, and the circuit will then be completed over the wires *d* and *e* in connection with the main-line wire *a*.

For the purpose of making the operation of the system perfectly clear, and particularly the manner of testing the system, the detail description has been directed especially to the system as illustrated in Fig. 1 of the drawings inasmuch as this figure of the drawings illustrates the central fire-station having all the apparatus necessary to provide for testing the system and for special calls and the other fire-stations at the same time having the same apparatus as the other fire-stations. Therefore the central station 1 is illustrated with the same apparatus as the other fire-stations it will be understood from the description of the manner of using the system that turning in an alarm will announce the fire-stations included in the entire system has all of the same apparatus connected up in series, as shown in the diagrammatic view, Fig. 1.

The diagrammatic view, Fig. 6 of the drawings illustrates the different fire-stations are described, as station No. 1, 2, and 3, and these separate fire-stations is shown with an annunciator 18 and a station-gong 12 at the central fire-station. The annunciators and station-gongs are included in series circuits, so that an alarm will be sounded at the fire-stations of the different fire-stations. The apparatus of all the stations is substantially the same, and no material change is made in the apparatus of the stations illustrated in Fig. 7 because all of the stations are included in the same circuit, making a "loop" of the gong or whistle at the central station, so as to include the station-gongs at the different sta-

tions, as clearly illustrated in Fig. 6 of the drawings. The annunciators 18 throughout the system are similarly connected together by branching or looping the wire *j* from the central fire-station to the last annunciator on the line of the annunciator-wire *k*.

From the foregoing it is thought the construction and operation of the herein-described fire-alarm system will be readily apparent to those skilled in the art, and I would have it understood that various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a fire-alarm system, a normally-closed main-line circuit including therein in series the fire-boxes, a station-gong and a general gong or whistle, a normally open annunciator-circuit including the main line and an annunciator having a wire connection with each box and with the main line, and a circuit-breaker arranged in each box and adapted to alternately break the main-line circuit and close the annunciator-circuit, substantially as set forth.

2. In a fire-alarm system, a main-line circuit, normally closed, and including in series the fire-alarm boxes, a station-gong and a general gong or whistle, a normally open annunciator-circuit including the main line and an annunciator having separate wire connections with each box and a single wire connection with the main line, and means for alternately breaking the main-line circuit in each box, and closing the annunciator-circuit with either of the main-line terminals which enter the box, substantially as set forth.

3. In a fire-alarm system, a normally-closed main-line circuit including in series the fire-alarm boxes, a station-gong and a general gong or whistle, an annunciator-circuit including the main line and an annunciator having a connection with the main line and separate wire connections with each box, and a circuit-breaker arranged in each box and having suitable connections with the wire-terminals in the boxes to provide for alternately breaking the main-line circuit in each box, and closing the annunciator-circuit with either of the main-line terminals which enter the box, substantially as set forth.

4. In a fire-alarm system, a normally-closed main-line circuit including therein in series the fire-boxes, an annunciator-circuit having a separate wire connection for each box, and a circuit-breaker arranged in each box and suitably connected with the main line and the annunciator-wire terminals to provide for alternately breaking the main-line circuit in each box and closing the annunciator-circuit with either of the main-line terminals which enter the box, substantially as set forth.

5. The combination with a signaling-box;



of a main-line signal-circuit having two wire-terminals entering said box, an annunciator-circuit having a single wire-terminal entering said box, and a circuit-breaker consisting  
 5 of a suitably-rotated contact-disk arranged in said box and provided on its periphery with spaced groups of contact-teeth and an outer smooth contact portion at one side of said teeth, an auxiliary contact-disk arranged  
 10 to rotate with and at one side of the toothed contact-disk, said auxiliary contact-disk being provided at one side with a series of off-standing contact-pins projecting into the spaces between the teeth of the main contact-  
 15 disk, a contact-brush connected with one of said main-line-wire terminals and normally bearing on the smooth contact portion of the main contact-disk, an oppositely-located contact-brush connected with the other of the  
 20 said main-line-wire terminals and adapted to ride over the contact-teeth of the main contact-disk and provided with a supplemental brush normally contacting with said auxiliary contact-disk, and an annunciator-wire brush  
 25 connected with the annunciator-wire terminal and also adapted to ride over said contact-teeth and said contact-pins, substantially as set forth.

6. In a fire-alarm system, a normally-closed  
 30 main-line circuit including therein in series the fire-boxes, and station-gong, a normally open annunciator-circuit including a portion of the main line and an annunciator having a connection with the main line and separate  
 35 wire connections with each box a circuit-breaker arranged in each box and having suitable connections with the wire-terminals therein to provide for alternately breaking the main-line circuit and closing the annun-  
 40 ciator-circuit with either of the main-line terminals which enter the box, and a switch having a lever connected directly with the main line and separate contact-points respectively connected with one pole of the working bat-  
 45 tery, and with a continuation of the main line, so as to complete the circuit through the gong, substantially as set forth.

7. In a fire-alarm system, a normally-closed  
 50 main-line circuit including therein in series, the fire-boxes, a working battery, and a station-gong, a normally open annunciator-circuit including a portion of the main line and an annunciator having a connection with the  
 55 main line and separate wire connections with each box, a circuit-breaker arranged in each box and suitably connected with the wire-

terminals therein to provide for alternately breaking the main-line circuit and closing the annunciator-circuit with either of the main-  
 line terminals which enter the box, a switch 60 having a lever directly connected with the main line and three separate contact-points respectively having wire connections with one pole of the battery, with the portion of the main line between the station-gong and 65 the first fire-box, and with the portion of the main line between the battery and the station-gong, a telegraphic instrument having a wire connection with the connection between the intermediate contact-point of the three- 70 point switch and the main line, and a switch having a separate wire connection with each drop of the annunciator, and a single wire connection with the telegraphic instrument, substantially as set forth. 75

8. In a fire-alarm system, a normally-closed  
 main-line circuit including therein in series the fire-boxes, a station-gong, and a general gong or whistle, a normally open annunciator-  
 circuit including a portion of the main line 80 and an annunciator having a connection with the main line and separate wire connections with each box, a circuit-breaker arranged in each box and having suitable connections with the wire-terminals therein, a switch hav- 85 ing a lever connected directly with the main line and separate contact-points respectively connected with one pole of the working bat- tery, and with the portion of the main line 90 between the general gong or whistle and the first box, a telegraphic instrument having a wire connection with the connection between the main line and one of the points of said switch, said telegraphic instrument being provided with a circuit-closing lever adapted 95 to be thrown into contact with the point of the telegraphic instrument and having a short-circuit wire connection with the wire leading from one pole of the battery to one point of the switch whose lever is connected with the 100 main line, and a switch having a separate wire connection with each drop of the annunciator and a single wire connection with the telegraphic instrument, substantially as set forth. 105

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ALBERT C. ROGERS.

Witnesses:

JOHN H. SIGGERS,  
 G. C. SHOEMAKER.