

No. 883,226.

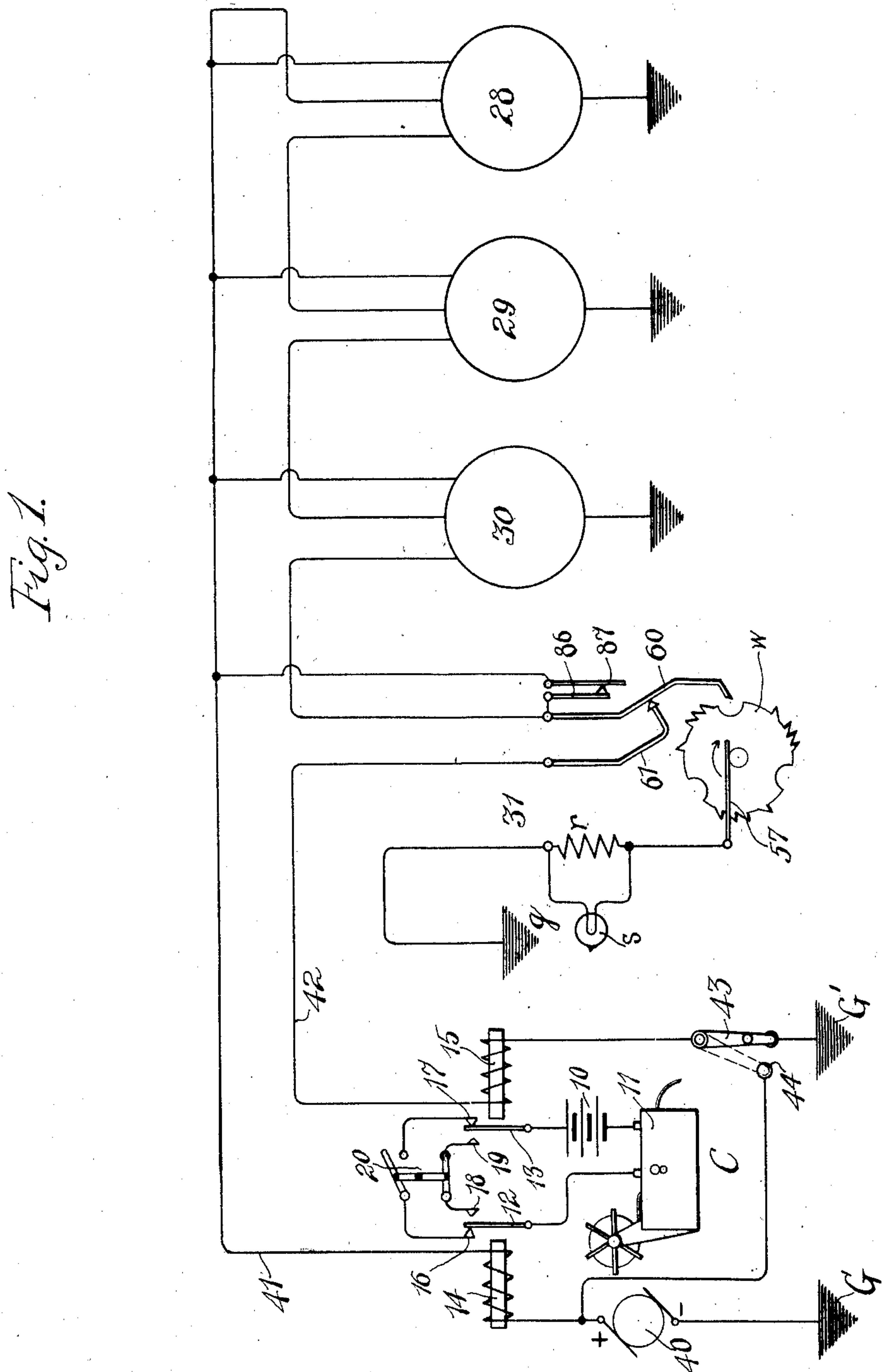
PATENTED MAR. 31, 1908.

J. D. NOLEN.

FIRE ALARM AND SIGNALING SYSTEM.

APPLICATION FILED SEPT. 15, 1905.

3 SHEETS—SHEET 1.



Witnesses:

Arthur H. Boettcher.
Charles J. Schmidt.

Inventor

John D. Nolan



John H. No
Charles A. Brown
Attorney

No. 883,226.

PATENTED MAR. 31, 1908.

J. D. NOLEN.

FIRE ALARM AND SIGNALING SYSTEM.

APPLICATION FILED SEPT. 15, 1905.

3 SHEETS—SHEET 2.

Fig. 3.

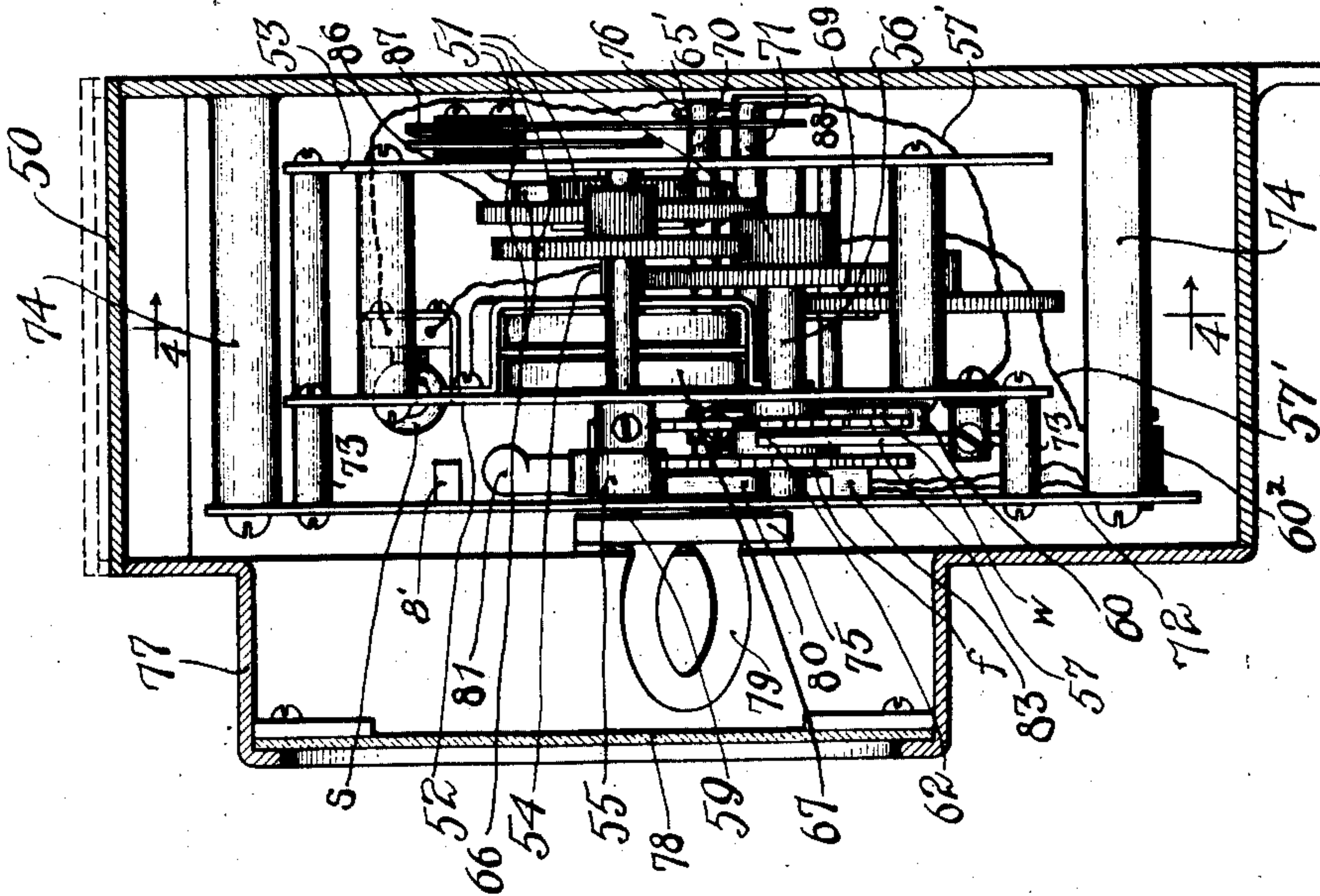
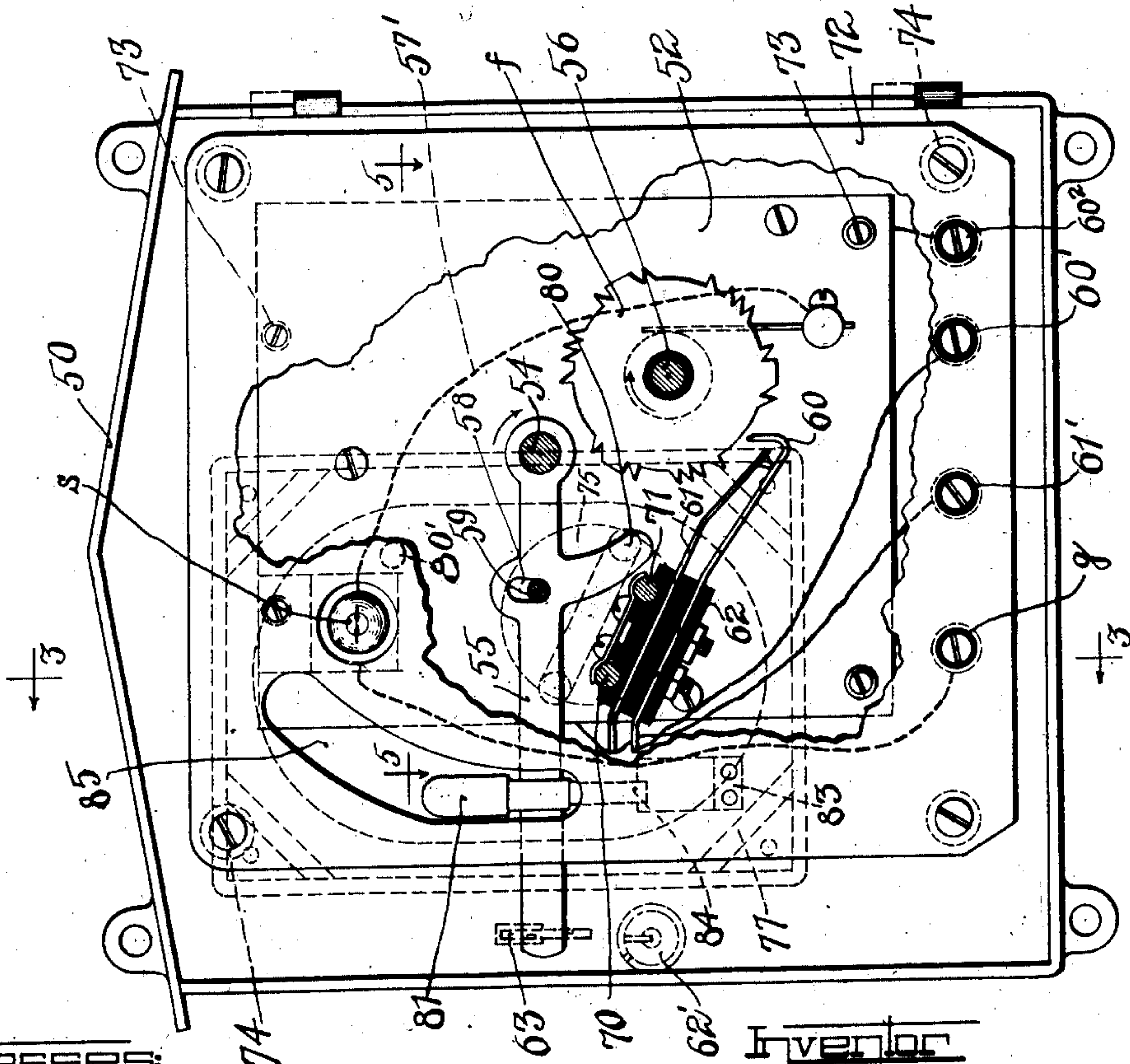


Fig. 2.



Witnesses:
Arthur H. Boettcher
Charles J. Schmidt

Inventor
John D. Nolen
Charles A. Brown
Attorney

No. 883,226.

PATENTED MAR. 31, 1908.

J. D. NOLEN.

FIRE ALARM AND SIGNALING SYSTEM.

APPLICATION FILED SEPT. 15, 1905.

3 SHEETS—SHEET 3.

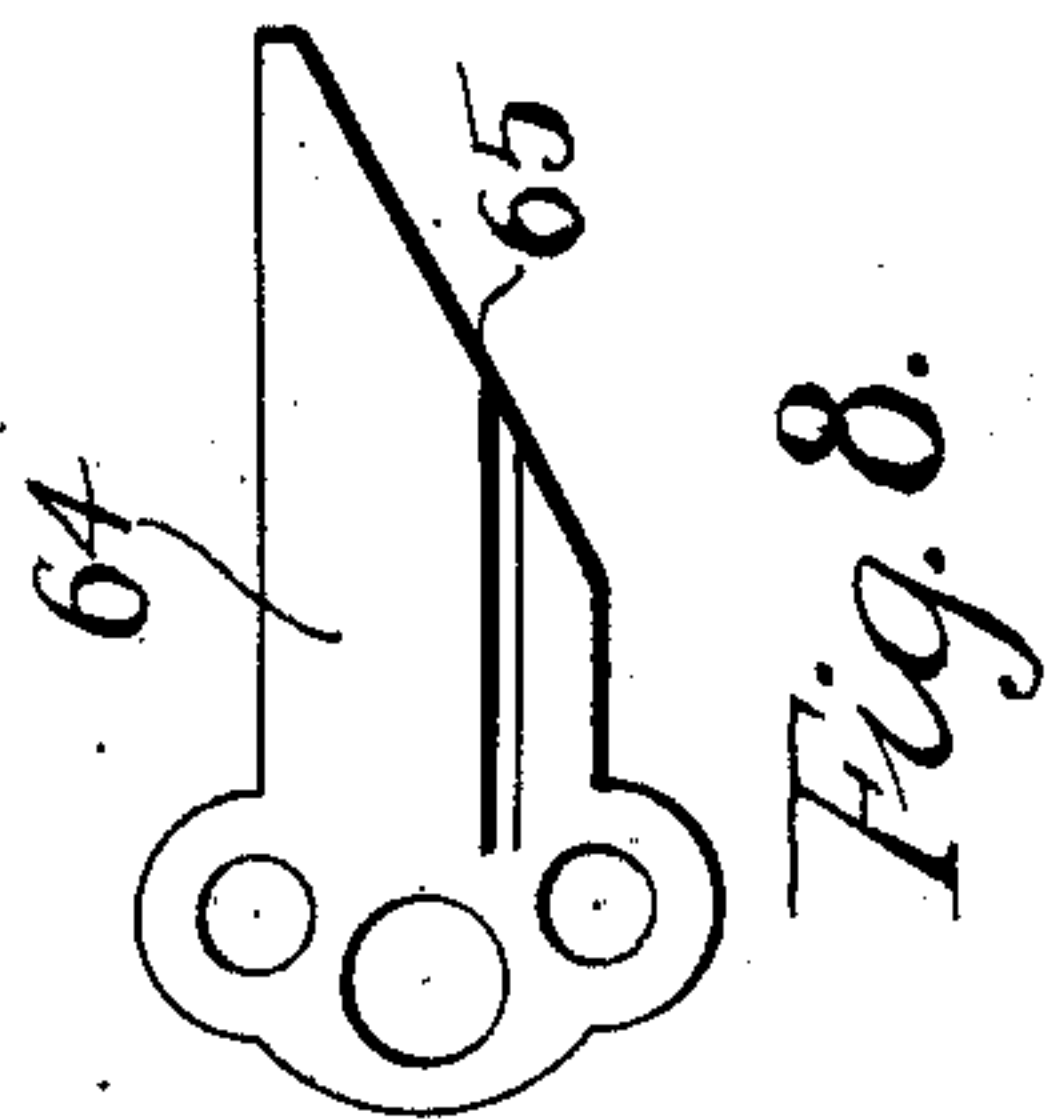


Fig. 8.

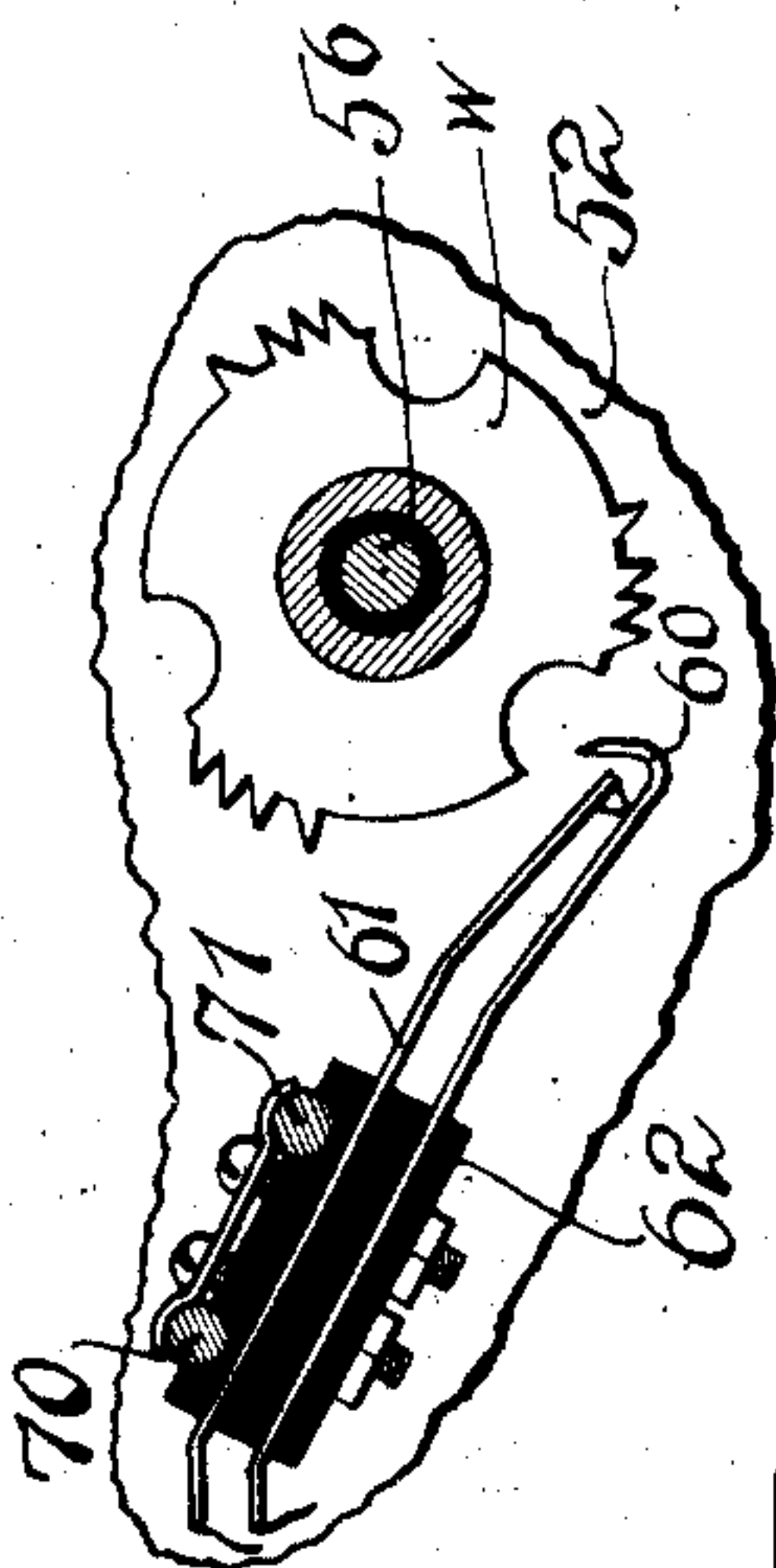


Fig. 7.

Fig. 4.

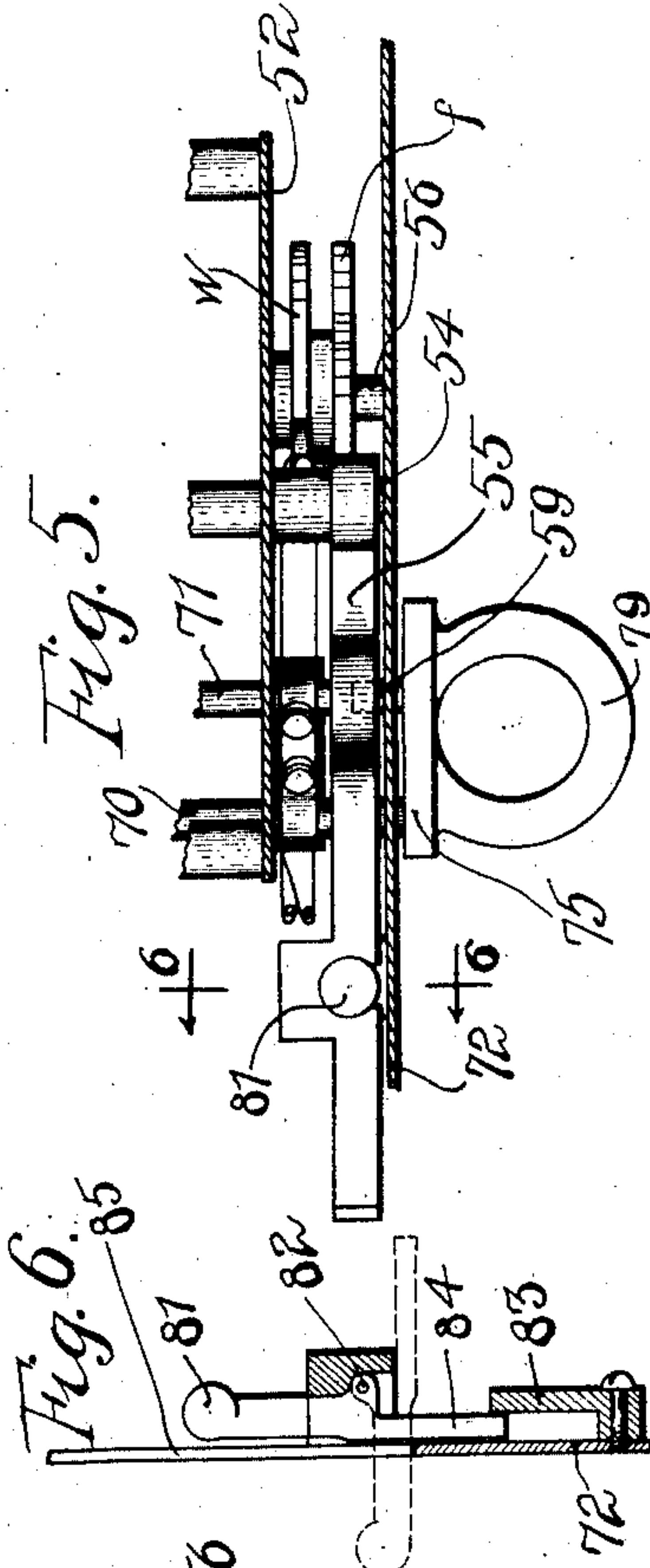
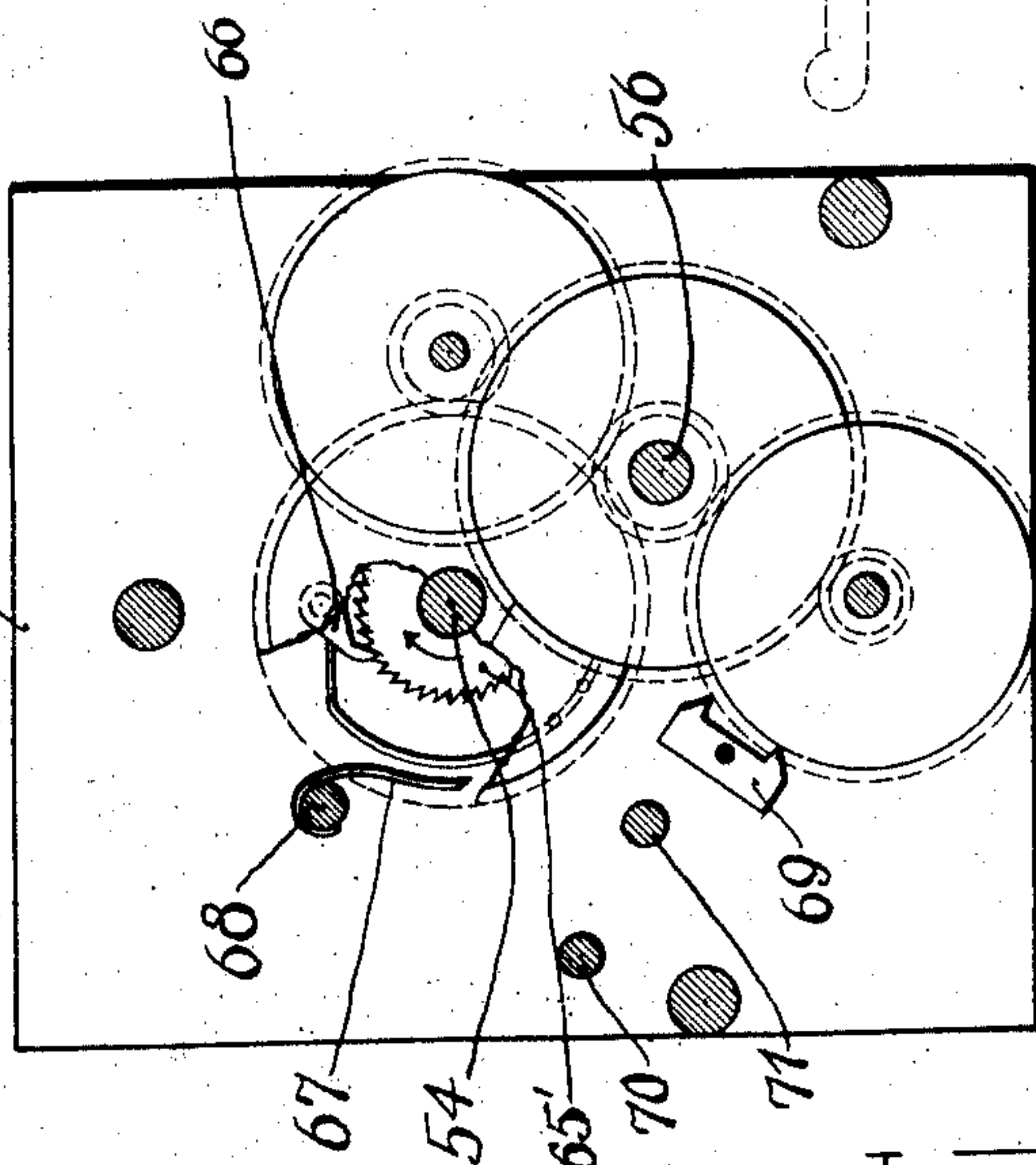


Fig. 5.

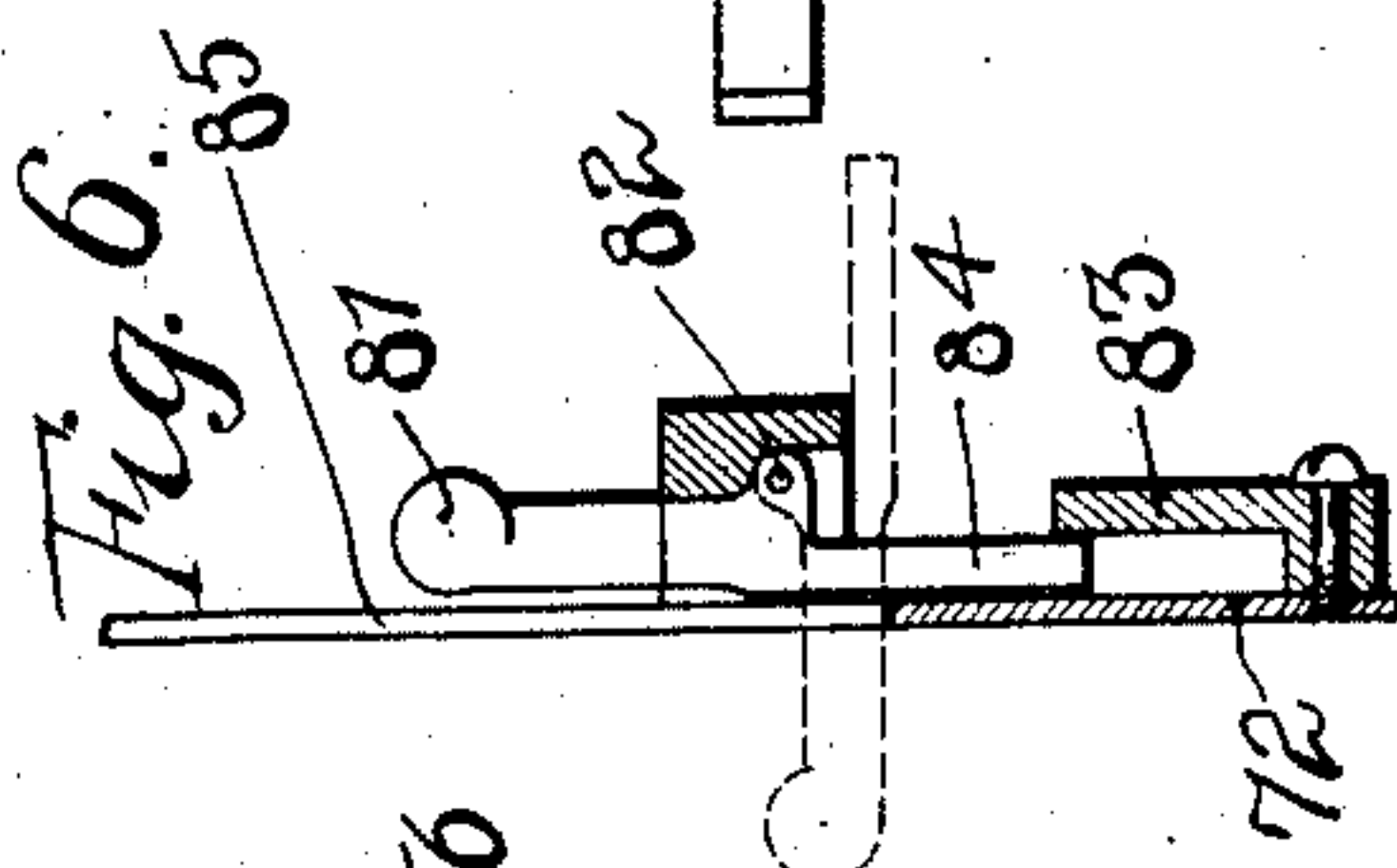


Fig. 6.

WITNESSES:

Arthur H. Boettcher,
Charles J. Schmidt,

Inventor
John D. Nolen
By Charles A. Brown
Attorney

UNITED STATES PATENT OFFICE.

JOHN D. NOLEN, OF TOLEDO, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO JOHN E. SHEPHERD, OF CHICAGO, ILLINOIS.

FIRE-ALARM AND SIGNALING SYSTEM.

No. 883,226

Specification of Letters Patent.

Patented March 31, 1908.

Application filed September 15, 1905. Serial No. 278,683.

To all whom it may concern:

Be it known that I, JOHN D. NOLEN, citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Improvement in Fire-Alarm and Signaling Systems, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to an improved fire alarm and watchman's signaling system, and more particularly to the district boxes or stations which are used in connection with systems of this kind.

The object of my invention is to provide a normally wound box so constructed as to be available at all times for use in sending in a fire alarm and so arranged that the manipulation of the box by a watchman in reporting his rounds cannot send in a fire alarm signal.

My invention provides also a system which is continually under test and subject to immediate discovery in case of accidental derangement of any sort.

My invention will be clearly understood by reference to the accompanying drawings, in which

Figure 1 illustrates in diagrammatic fashion a circuit arrangement which may be employed, Fig. 2 illustrates one of the boxes of my improved invention, parts being broken away in order to more clearly reveal the construction and mode of operation, Fig. 3 is a partial cross-sectional view taken on line 3—3 of Fig. 2, Fig. 4 is a cross-sectional view of the clock mechanism shown in Fig. 3, the cross-section being taken on line 4—4 of Fig. 3, Fig. 5 is a sectional view of part of the mechanism taken on line 5—5 of Fig. 2, Fig. 6 is a cross-sectional view taken on line 6—6 of Fig. 5, and Figs. 7 and 8 are views of details not clearly shown in the other figures.

The central station equipment employed in connection with my invention need not be essentially different from that in use on other systems of the present day.

At the central office C I have shown a local circuit comprising the battery 10, a recording telegraph instrument 11 and the armatures 12 and 13 of the relays 14 and 15, respectively. The relays are provided with front contacts 16 and 17 and with back contacts 18 and 19. A switching device 20 serves to connect together either the front

contacts or the back contacts, the figure illustrating the condition in which the two back contacts 18 and 19 are electrically connected. With the switching device in this position, the retraction of the armatures 12 and 13 closes the local circuit to actuate the recording telegraph instrument 11. When the relay armatures are in their forward or attracted position, the local circuit is open. The main circuit leads from the ground G through a source of current such as the generator 40, thence through the winding of the relay 14 and the line limb 41 to the various stations on the line. These stations are indicated diagrammatically and may be of any reasonable number. Each is provided with a code number, the stations shown in the drawing being numbered 28 to 31, inclusive. Returning from the last station the line limb 42 leads through the winding of the relay 15 and thence through a switch arm 43 which is normally connected with the ground at G'. An alternative contact 44 is connected with the positive side of the generator 40 and the switch arm 43 may be thrown into connection with this contact if desired. This is in accordance with well known practice. The district boxes are of a type which signal the central office by making and breaking the line circuit and at the same time causing corresponding connections and disconnections between one of the line limbs and ground. With the switch 43 in the normal position shown in the full line in the drawing, the breaking and making of the line circuit causes corresponding deenergizations of the relays 14 and 15 to close the local circuit at the central office, in accordance with the code signal sent in from the box. At the time of each break in the line circuit one of the line limbs is connected with ground. In case of a cross upon the line, or in the event of a break in the line, the switch arm 43 is thrown to its alternative contact 44 whereby the entire line is connected with the positive side of the generator, the negative side of which is connected with ground. At the same time the switching device 20 is thrown into its alternative position so that the local circuit will be closed only upon the energization of the relays 14 and 15. These relays then are deenergized except when the line is connected with ground. Under these conditions, therefore, the operation of any one of the district boxes in alternately making and break-

ing a connection between the line and ground causes corresponding energizations of the relays 14 and 15 to actuate the recording telegraph instrument as before. The above description of the line circuit and the central station equipment serves merely to illustrate one kind of a circuit to which my invention may be adapted and I do not wish in any manner to limit myself to this precise arrangement of line and central station equipment.

To describe now the boxes themselves, I shall refer first to Fig. 2, which shows in outline a box or casing 50, the door of which is removed in order to show the interior arrangement. Fig. 3, the cross-sectional view of the box, shows normally wound clock mechanism 51 mounted between the front plate 52 and the back plate 53. A main shaft 54 extends forward through the front plate and upon this shaft is mounted the actuating lever 55. The break wheel shaft 56 also extends forward through the front plate 52. Side by side upon this shaft are mounted the break wheels *w* and *f*. These wheels are preferably insulated from the clock mechanism and connected by means of the brush 57 and conductor 57' with the binding screw *g* which, as shown in Fig. 1, is connected with the ground. The connection between the brush 57 and the binding post *g* includes a signaling device, which, in this instance, consists of a small incandescent lamp *s*. Normally the permissible motion of the actuating lever 55 is limited by the length of a slot 58 which engages a detent 59. The contact springs 60 and 61 are mounted in a block of insulating material 62, the spring 60 being connected with the binding screw 60' and the spring 61 with the binding screw 61'. The break wheel *f* being in front of the break wheel *w* prevents one from seeing the break wheel *w* in Fig. 2. The position of the springs 60 and 61 is normally such, however, that the springs are actuated by the break wheel *w* rather than by the break wheel *f* upon the rotation of the break wheel shaft 56. The springs are shown in their normal position in Figs. 3 and 5, Fig. 5 being a top view of these essential parts of my invention. Fig. 7 also shows the normal association of these parts.

A system constructed in accordance with my invention serves the purpose, first, of enabling a watchman or patrolman to signal the central office to indicate that he is making the rounds of the various stations on his beat. The watchman is expected on passing each of the district boxes to actuate the same to send a watchman's signal to the central office. This is accomplished by depressing the actuating lever 55 through such a distance as is permitted by the detent 59 and the slot 58 in the lever itself. Such depression of the lever might be accomplished

manually by opening the door of the box and grasping the lever. I prefer, however, to lock the inclosing box 50 with the lock which, if the cover were in place, would occupy the position which is indicated by dotted lines at 62'. Through the front of the cover there is provided a slot or opening 63 into which the wedge shaped key 64 may be inserted. The key is so formed that its lower edge 65 will engage the upper surface of the actuating lever 55 to depress the same as the key is inserted into the slot. The limited depression of the actuating lever which is permitted by the detent 59 is just sufficient to move the ratchet wheel 65' the space of one ratchet tooth. This ratchet wheel is mounted upon the main shaft 54. Upon the withdrawal of the key from the slot the actuating lever is released and the ratchet wheel 65' engages the pawl 66, which is mounted upon the first wheel of the gear train to rotate the break wheel shaft 56, the gear train being driven by the main springs 67 which are attached at one end to the main shaft 54 and at the other to the post 68, and being controlled in its movement by the escapement 69. The ratio of gearing between the main shaft 54 and the break wheel shaft 56 is such that a return of the actuating lever to its normal position causes the break wheels *f* and *w* to rotate a third of a revolution. The break wheel *w* which sends in the watchman's signal is divided into three parts, each of the segments being provided with projections or teeth identical with those on each of the other two segments. As the break wheel *w*, therefore, turns through a third of a revolution, the teeth upon its periphery engage the contact spring 60 to break its electrical connection with the contact spring 61, as each tooth passes the end of the spring 60. It will be noted that the spacing of the teeth on the break wheel of the boxes shown in the drawings is such that three breaks followed by a closure for a short interval and then followed by another single break is adapted to send into the central office the code number 31, it being observed that the main circuit includes a connection between the springs 60 and 61 of each box and that this circuit will be broken each time a tooth of a break wheel engages the end of the spring 60. Each time a watchman in reaching this particular box No. 31 and wishing to report to the central office inserts his key within the slot to depress the lever 55 and thereupon withdraws the key, the break wheels will be caused to rotate through a third of a revolution and the code number 31 will be sent into the central station and recorded by the telegraph instrument 11. I may perhaps call special attention to the fact that the break wheel *f* takes no part in this operation but is brought into play only when a fire alarm is to be sent in to the central office. Each time, however,

that a tooth of the break wheel *w* makes contact with the spring 60 the main line will be connected to ground by way of the brush 57, the signal lamp *s* and the binding screw *g* which is connected directly to earth. As indicated in Fig. 1, the lamp *s* may be shunted by a resistance *r* in order that the current may be adjusted to the current carrying capacity of the lamp *s*. The current traversing this lamp each time that a tooth engages a contact spring will cause the lamp to glow or flash, thus indicating to the watchman that the system is in proper working order. If he finds that the lamp does not flash the code number of the particular box, he will at once report to the central station that the system is out of order when, of course, it may be promptly repaired.

My invention contemplates also the provision of a box which may be used for the purpose of sending in a fire alarm as distinguished from a watchman's signal. To this end the contact springs 60 and 61 and the block 62 upon which they are mounted, and also the detent 59 are carried upon a slide consisting of the rods 70 and 71 which pass through holes in the front plate 52 and the back plate 53, as well as through a cover plate 72, upon which the clock mechanism is mounted by means of the studs or columns 73. This front plate in turn is mounted upon the pillars 74 which are secured to the rear of the inclosing casing 50. It is this cover plate 72 which is broken away in Fig. 2 to show the various parts which are placed between the front plate 52 and the cover 72. The rods 70 and 71 are provided at their forward end with a ring plate 75 to which the detent 59 is also secured. The pin 76 serves to limit the forward motion of the slide. The front of the case 50 is preferably provided with an extension 77 having a thin glass window or front 78. In case of fire this glass is to be broken, whereby access to the ring 79 is obtained, and upon drawing this forward, together with the slide in which it is attached, the detent 59 is drawn from the slot 58 in the actuating lever 55, whereupon the clock mechanism is released and the gear train is set in motion to rotate the break wheels *w* and *f*. The upward motion of the actuating lever 55 may be limited by means of a stop 80' extending from the plate 72. While the actuating lever travels upward to the end of its stroke, the break wheels are rotated through two complete revolutions. The extension 80 from the lower side of the lever 55 prevents an operator from pushing the slide back into its initial position because the detent engages with this extension 80 to prevent any further movement of the slide, it being understood, of course, that the lever commences its forward movement the instant the detent disengages the lower side of the

slot 58, the springs of the clock mechanism being of course under tension at all times.

The forward movement of the ring 79 and its slide in order to release the mechanism to send in a fire alarm serves also to shift the position of the contact springs 60 and 61, bringing them forward into such position that they will be actuated by the break wheel *f* instead of by the break wheel *w*. The break wheel *f* contains a signal code which, for example, may be the telegraphic letter *f*, dot, dash, dot, followed by the code number 31. In the drawings this signal is repeated three times on the periphery of the break wheel so that for two revolutions it would be repeated six times on the telegraphic register at the central office. As in the case of a watchman's signal, the break wheel *f* causes a series of breaks between the contact springs 60 and 61 and for each break in the line circuit a deenergization of the relays at the central office causes the closure of the local circuit, including the registering telegraph instrument. The drawings illustrate an auxiliary handle 81 which may be used to actuate the box a second time, even after the ring 79 has been pulled forward, as above described. To send in a second fire alarm, the handle 81 is grasped and pulled downward until the lever reaches its initial position, whereupon the handle 81 is released and the actuating lever can return to its alternative position. The downward stroke of the lever 55 may be limited by the length of the slot 85. The handle 81, however, is normally not accessible for this use. As best illustrated in Figs. 3 and 6, it normally occupies an upright position just back of the cover plate 72. This handle is hinged at 82 upon the actuating lever 55, it being retained in its normal upright position by the detent 83. This detent is so arranged that it does not interfere with the slight depression of the lever 55 which is necessary in order to send in the watchman's signal. When, however, the ring 79 is pulled forward to send in a fire alarm and the actuating lever 55 moves into its upward position, the projection 84 which extends below the handle 81 is released from the detent 83, whereupon the handle 81 falls forward through the slot 85 in the cover plate 72, thus making the handle accessible for the purpose of drawing the actuating lever 55 downward to send in a second or a third fire alarm. After the box has been used for sending in a fire alarm in this way, it is restored to its initial position by someone connected with the fire department, who has access to the interior of the box, by means of the lock 62'. In Fig. 2 I have indicated the case 77 by dotted lines, this box being upon the front of the cover which is not shown in this figure.

There is another feature associated with

my invention for the purpose of preventing a clash between fire signals sent from different boxes. It is a frequent practice in providing fire alarm service of this nature to equip a building or industrial establishment with a number of alarm boxes, such, for instance, as those having the code numbers 28 to 31, inclusive, on Fig. 1 of the drawings. These boxes may all be located on a single loop of the main circuit, as there indicated. In the event of a fire in such an establishment it is not infrequent that more than one of the boxes shall be pulled at about the same time and in order to prevent a clashing of the signals through these boxes at the central office, the following means is provided. A pair of insulated electrical contacts 86 and 87, as best illustrated in Fig. 3, is mounted upon an insulating block secured to the back plate 53. A projection 88 extending outward from the slide rod 71 engages the spring 87 when the ring 79 is pulled forward, thereby bringing the springs into electrical contact one with the other. These springs are connected across the loop on the side of the box away from the central office so that when a slide in any one box is pulled forward to send in a fire alarm all the other boxes on the same loop, but more distant from the central office, are short circuited out and the box nearest the central office controls the signal which is being sent in. If, therefore, box 29 were pulled and it had only commenced to send in its signal when box 31 were pulled, then box 29 would be immediately short circuited out of service by the connection of the contact springs 86 and 87 and box 31 would send in its complete signal to the central office. The most distant box on the loop, is not provided with such connections for there is no more distant box which need at any time be short circuited out of use.

While I have herein shown and described a preferred embodiment of my invention, many modifications thereof will occur to those skilled in the art and I do not wish to limit myself to the precise arrangement herein shown, many of the features being illustrated in diagrammatic fashion only, it being understood that in commercial practice other forms of apparatus may well be used.

What I claim as new and desire to secure by Letters Patent is:

1. In a signaling system, the combination with a line circuit leading from a central office to a series of circuit controlling substations, of two sets of make and break mechanism at each station, means at each station for limiting the movement of the associated make and break mechanism, and means for removing said limiting means and effectively changing the control of the circuit

from one of said make and break mechanisms to the other simultaneously.

2. In a signaling system, the combination with a main line circuit leading from a central office to a series of circuit controlling stations, of switch mechanism at each substation, two break mechanisms at each substation associated with said switch mechanisms, a detent at each station serving to limit the movement of the associated make and break mechanism, and means for simultaneously removing said detent and changing the control of said switch mechanism from one break mechanism to the other.

3. In a signaling system, the combination with a main line extending from a central office to a series of circuit controlling stations, of switch mechanism controlling said circuit, two break wheels at each station for controlling said circuit, normally wound mechanism for actuating said break wheels, a detent at each station for limiting the movement of said normally wound mechanism, and means which, when actuated, simultaneously causes the removal of said detent and the transfer of the control of said switch mechanism from one break wheel to the other.

4. In an alarm box of the class described, the combination with normally wound clock work, of an actuating lever associated therewith, two break wheels adapted to be driven by said clock work, switching mechanism associated with one of said break wheels, a detent to limit the movement of said actuating lever, means for controlling said detent, and means whereby an actuation of said controlling means to release said detent transfers the operative control of said switching mechanism from one of said break wheels to the other.

5. In a fire alarm and signaling system, the combination with a line leading from a central office through a series of stations, of a pair of switch contacts at each station included in the main line circuit, two sets of switch controlling mechanisms at each substation for actuating said switch contacts, means for transferring the control of said switch contacts from one of said switch mechanism sets to the other, an auxiliary pair of switch contacts controlling a circuit in shunt of the other stations on the line, and means whereby the actuation of said transferring means causes the actuation of said auxiliary pair of switch contacts.

6. In a signaling box of the class described, the combination with normally wound clock mechanism, of a make and break mechanism actuated thereby, a detent for maintaining the clock mechanism in a wound condition, means for actuating said detent to release the clock work and cause the actuation of said make and break mechanism, normally

inaccessible auxiliary actuating means for restoring said clock work to its normally wound condition, and means whereby the release of said clock work renders said auxiliary actuating means accessible for winding said clock work and releasing the same.

7. In a device of the class described, the combination with two break wheels provided with projections corresponding with different code signals of clock work for driving said break wheels, switching mechanism adapted for control by either one break wheel or the other, detent means for limiting the motion of said break wheels when said switching mechanism is controlled by one break wheel, and means for simultaneously removing said detent means and transferring the control of said switching mechanism to the other break wheel.

8. In combination, an actuating lever, clock work adapted to be wound thereby, two break wheels having different code signal controlling projections driven by said clock work, switch contacts adapted to be actuated by either one break wheel or the other, a detent serving normally to limit the motion of said actuating lever when said switch contacts are actuated by one break wheel, and mechanism for simultaneously releasing said lever and shifting the control of said switching mechanism to the other break wheel.

9. In a signaling box of the class described, the combination with normally wound clock mechanism, of two break wheels having different code signal controlling projections driven by said clock mechanism, switch springs controlling a line circuit adapted to be controlled by either one of said break wheels, an actuating lever for winding said clock mechanism, detent means for normally limiting the motion of said lever, this motion being sufficient to actuate said clock mechanism to drive said break wheels to actuate said switch mechanism whereby a signal of certain characteristics is sent over the line, and means whereby said detent may be removed from said lever and the control of said switch mechanism may be transferred from one break wheel to the other simultaneously to allow prolonged actuation of said lever and to send a signal of different characteristics over the line.

10. In a signaling box of the class described, the combination with normally wound clock mechanism, of two break wheels having different code signal controlling projections driven by said clock mechanism, switch springs controlling a line circuit adapted to be controlled by either one of said break

wheels, an actuating lever for winding said clock mechanism, detent means for normally limiting the motion of said lever, this motion being sufficient to actuate said clock mechanism to drive said break wheels to actuate said switch mechanism whereby a signal of certain characteristics is sent over the line, normally inaccessible auxiliary actuating means for winding said clock work, and means whereby the release of said clock work renders said auxiliary actuating means accessible.

11. In a signaling box of the class described, the combination with normally wound clock mechanism, of two break wheels driven thereby, switch springs controlling a line circuit adapted to be actuated by either of said break wheels, a lever for winding said clock mechanism, detent means for normally limiting the movement of said lever, a wedged shaped key for insertion through the box to produce actuation of said lever, while release of said lever causes the rotation of said break wheels whereby a signal may be sent over the line, and means for simultaneously removing said detent to release said lever and transferring the control of said switch springs to the other break wheel to allow the prolonged actuation of said lever and the sending of a signal of different characteristics over the line.

12. In a signal box of the class described, the combination with normally wound clock mechanism, of two break wheels driven thereby, one of said break wheels being provided with code signal controlling projections for sending a watchman's signal over the line, the other of said break wheels being provided with projections to send a fire alarm signal over the line, an actuating lever for winding said clock mechanism, detent means for normally limiting the motion of said lever, switch springs controlling the line normally controlled by said watchman's signal break wheel, actuation of said lever through said limited movement being adapted to further wind said clock mechanism and upon release to allow rotation of said break wheels to send the watchman's signal over the line, and means for releasing said actuating lever and transferring the control of said switch springs to the fire alarm break wheels simultaneously to allow prolonged actuation of said lever and to send the fire alarm signal over the line.

In witness whereof I hereunto subscribe my name this 28th day of August A. D., 1905.

JOHN D. NOLEN.

Witnesses:

CARL A. HUEBNER,
BERT H. THOMPSON.