

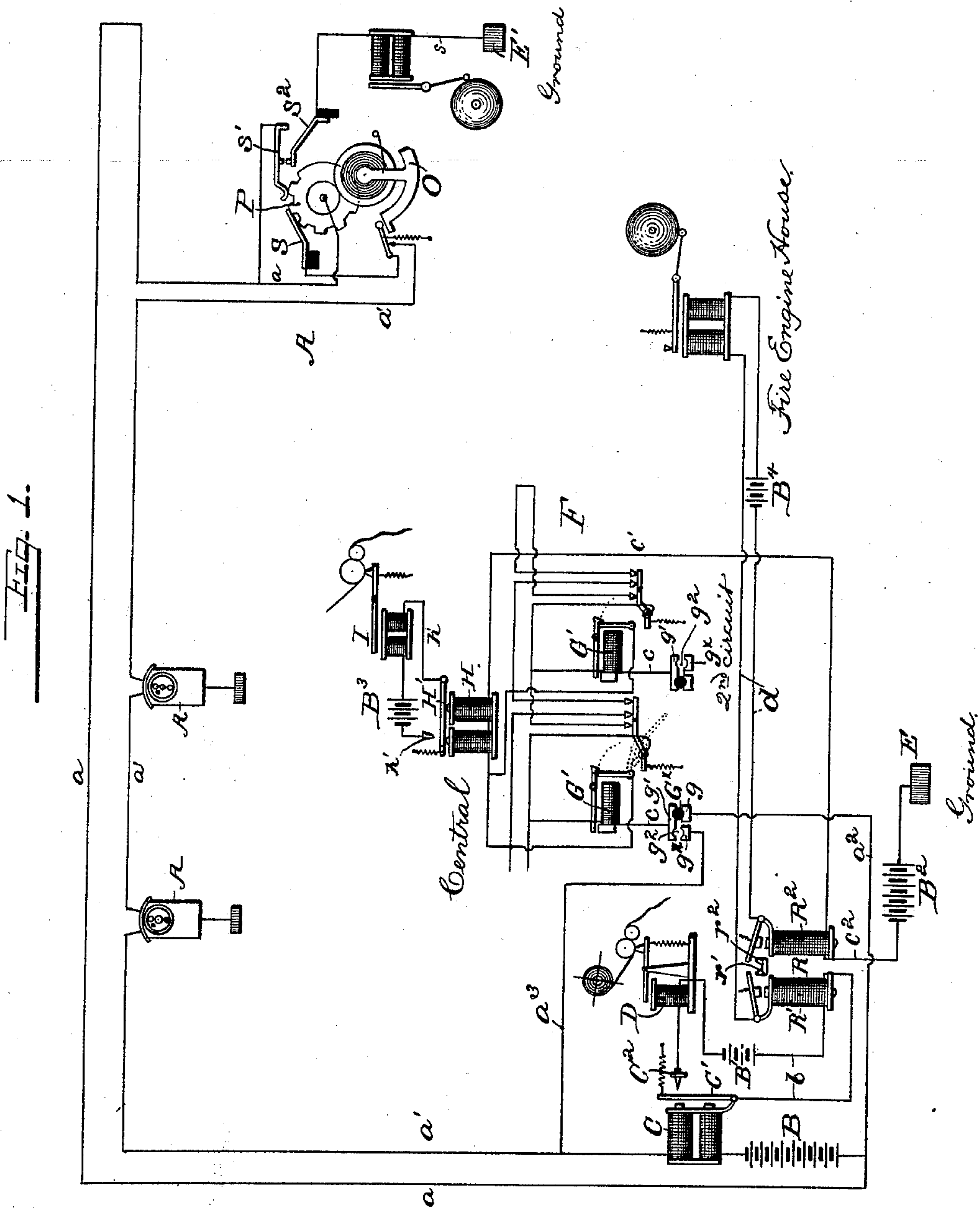
(No Model.)

3 Sheets—Sheet 1.

J. B. GILL.  
POLICE AND FIRE ALARM SYSTEM.

No. 509,524.

Patented Nov. 28, 1893.



WITNESSES;

*Wm. K. Massey*  
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3 Sheets—Sheet 2.

No. 509,524.

Patented Nov. 28, 1893.

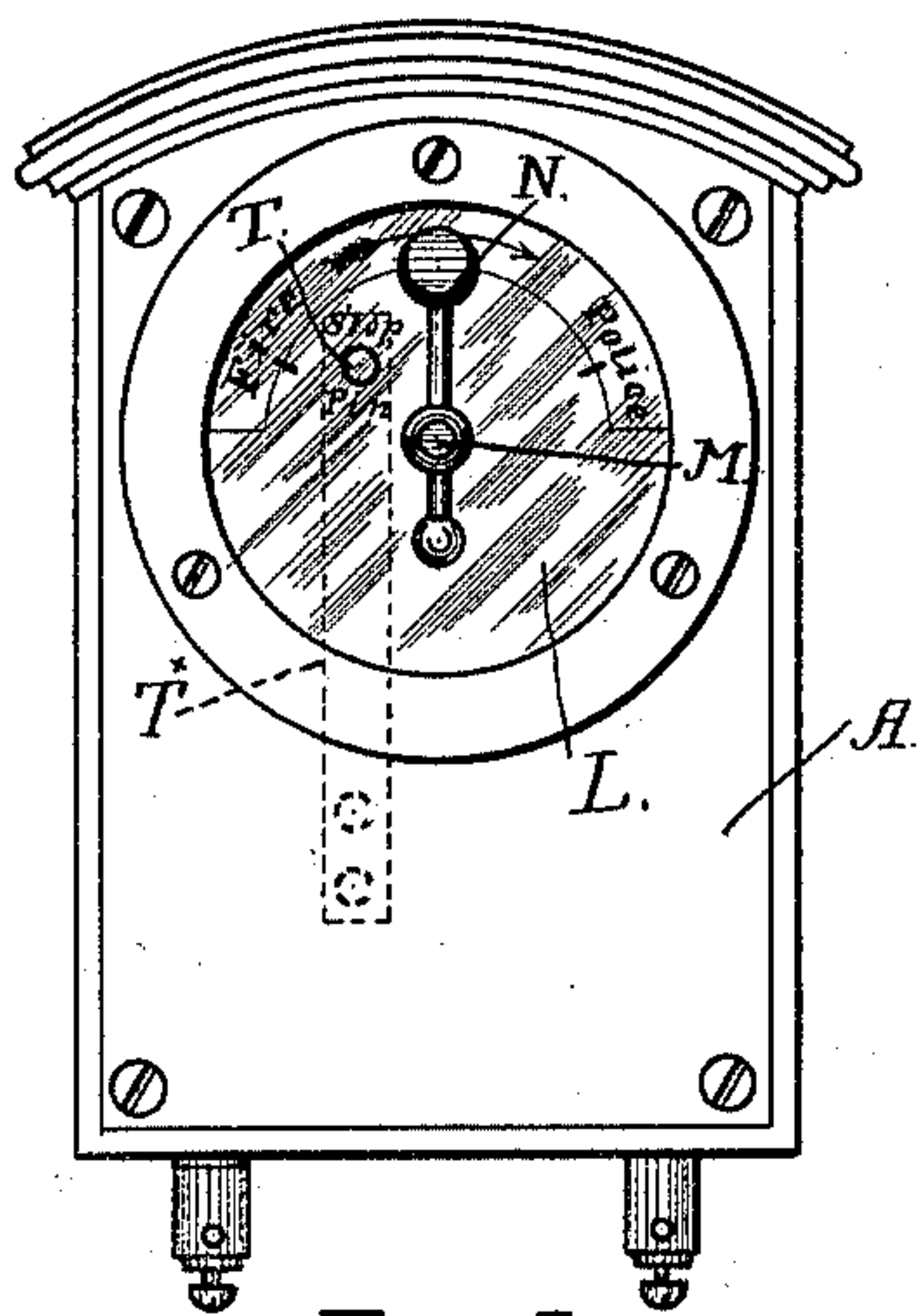
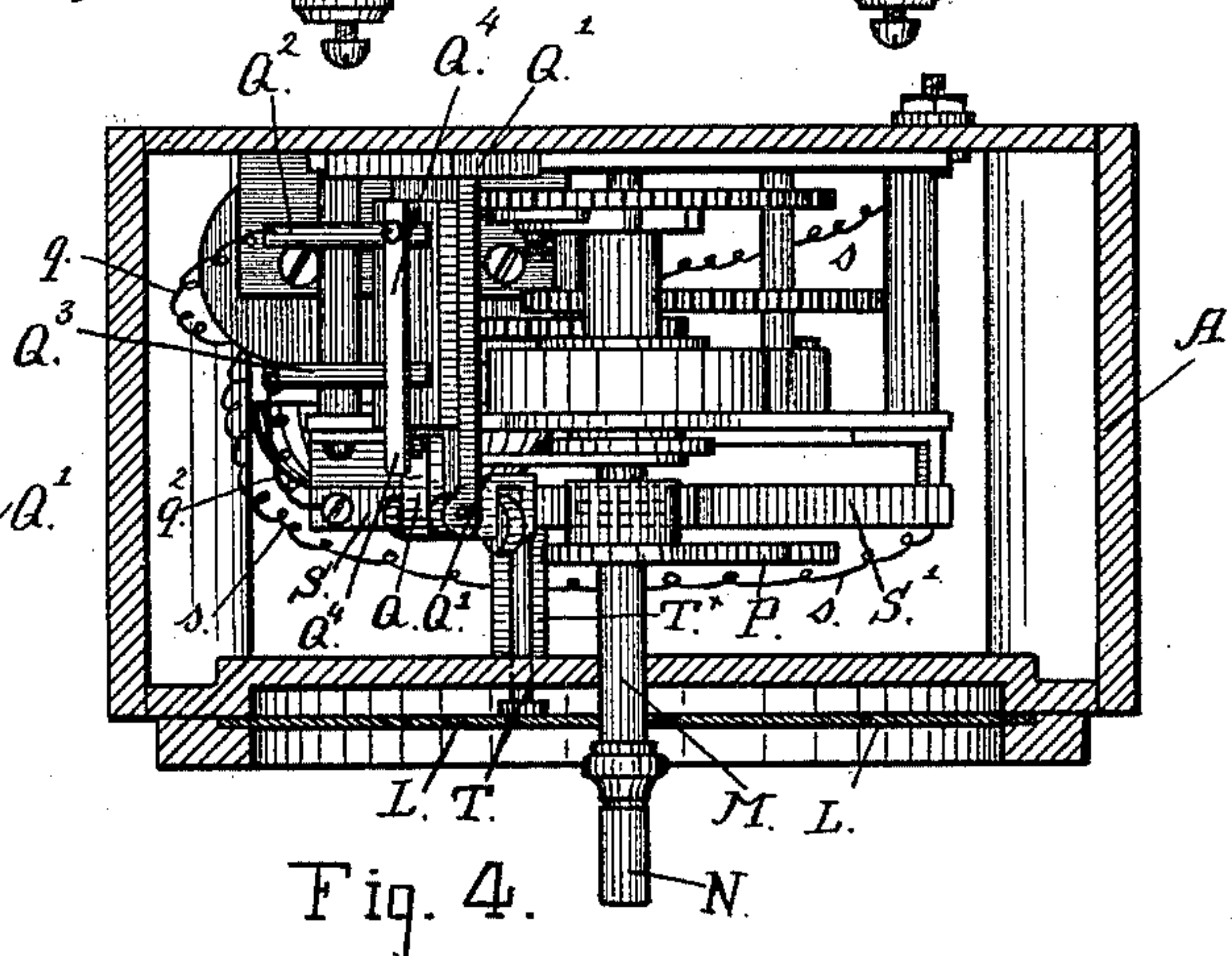
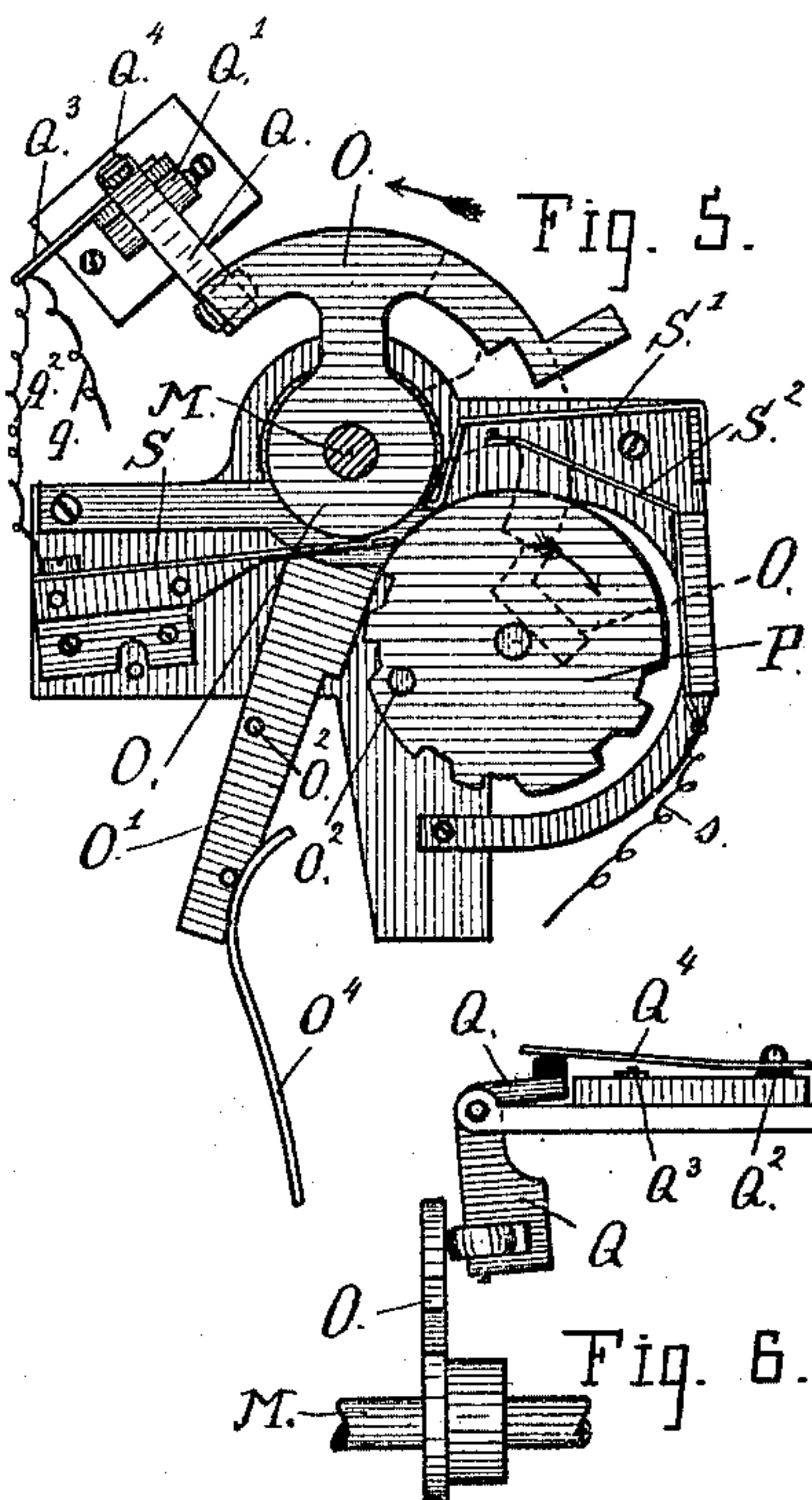
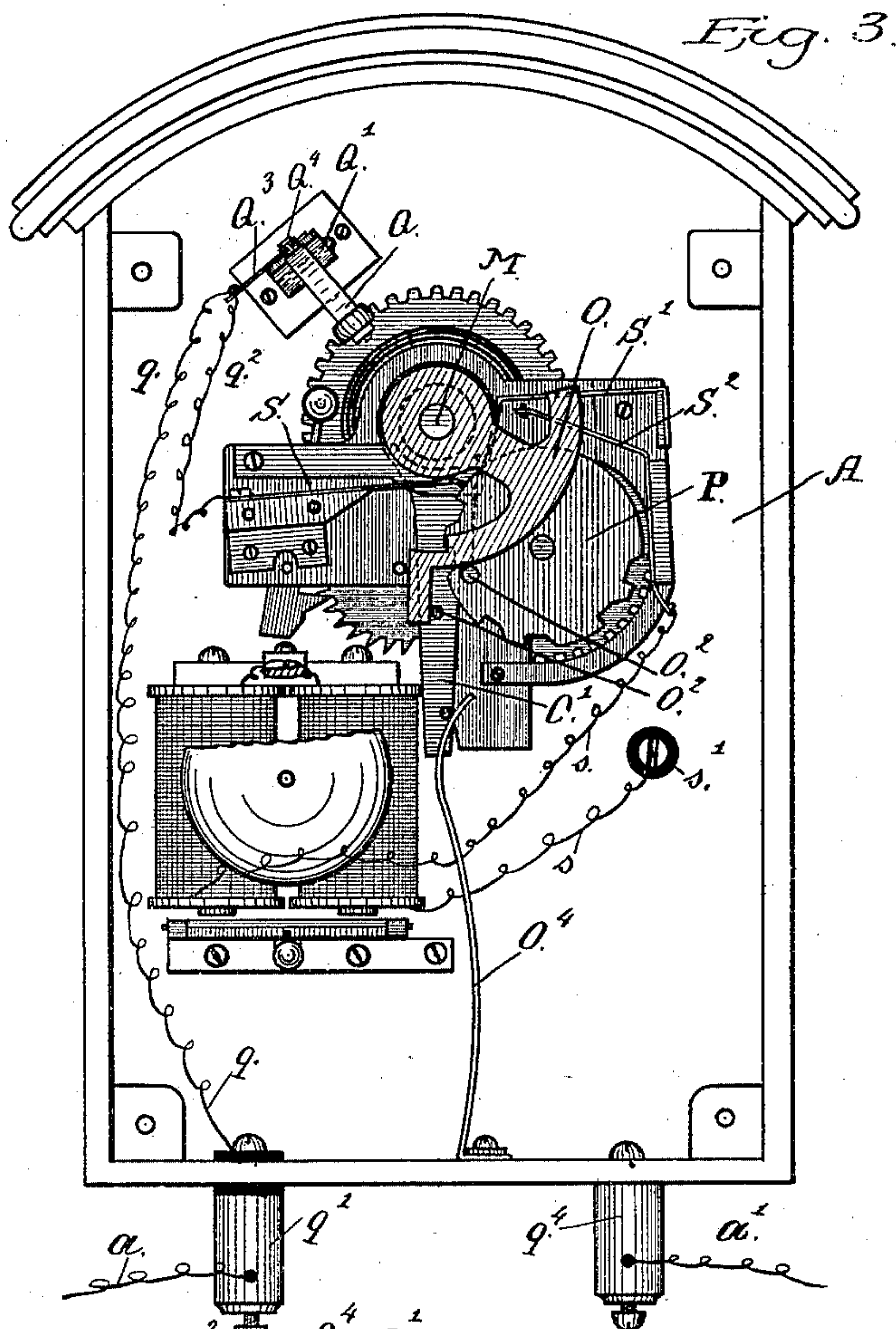


Fig. 2.



Witnesses:

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William Franklin

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Fig. 7.

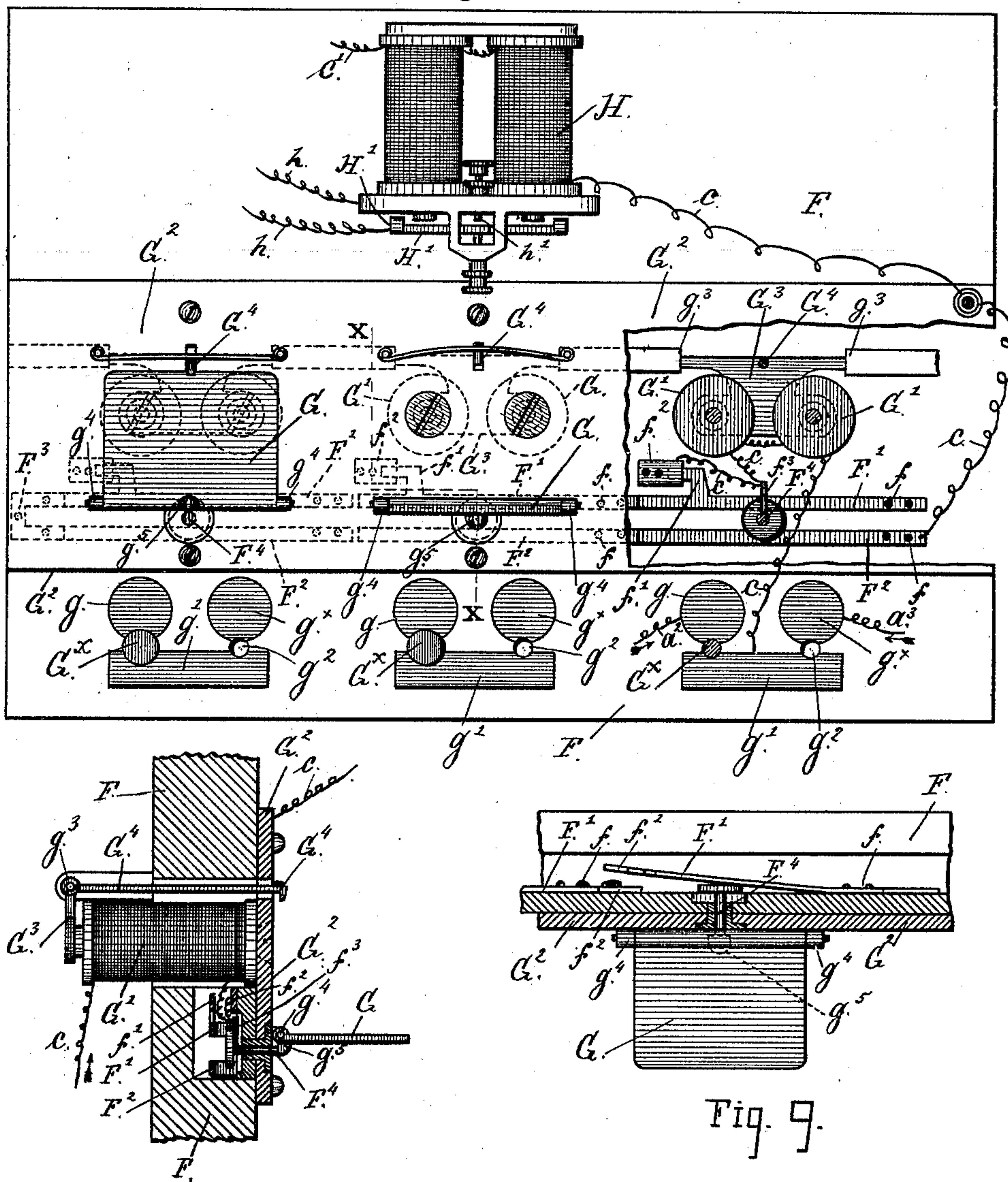


Fig. 8.

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# UNITED STATES PATENT OFFICE.

JAMES B. GILL, OF SAN FRANCISCO, CALIFORNIA.

## POLICE AND FIRE ALARM SYSTEM.

SPECIFICATION forming part of Letters Patent No. 509,524, dated November 28, 1893.

Application filed December 9, 1892. Serial No. 454,563. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES B. GILL, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Police and Fire Alarm Systems, of which the following is a full, clear, and exact description, reference being had to the drawings that accompany and form a part of this specification.

The main feature of my invention consists in the disposition, arrangement and connection of certain mechanical and electrical appliances, hereinafter more fully described which enable me to send a police alarm to the central office independently of the fire alarm, that is, without actuating the fire alarm appliances.

My invention also consists in improvements and novel construction of the alarm, transmitting mechanism or call box and of the switch-board at the central office, also hereinafter more fully described.

Referring to the accompanying drawings:—  
Figure 1 represents a diagram showing a number of police and fire alarm boxes and their connection by wire with the different alarm registering appliances at the central office. Fig. 2 shows on a small scale an elevation or front view of my police and fire alarm box. Fig. 3 shows an enlarged elevation of the alarm box with the front removed. Fig. 4 represents a horizontal section through the box, showing the mechanism in plan view. Figs. 5 and 6 are detail views. Fig. 7 represents an elevation of my switch-board with parts broken off to show more clearly the position of switch bars and the electro magnets. Fig. 8 shows a vertical section through line  $x x$  Fig. 7. Fig. 9 represents a horizontal section through part of the switch-board.

In representing the alarm system in the drawings I have shown a single circuit and two alarm transmitting boxes or call boxes in outline and one in detailed diagram connected by wire with the central office, though it is evident that as many circuits and as many boxes in one circuit as may be found necessary for a complete system can be used and I therefore designate corresponding parts of both series with the same letters. The call boxes A connect with the central office by the

usual closed or metallic circuit  $a, a, a' a'$ , comprising main battery B and relay C and also by a ground circuit using the same wires and having a separate battery at the central. I prefer to call this a "compound system" as will be understood by the following description: A local circuit  $b, b, b, b$  comprising battery B', police alarm register D, and magnetic coils R' of fire alarm repeater R connect with the armature C' of relay C and contact point C<sup>2</sup>. A switch board F carries a number of annunciators G as many as there are circuits of call boxes. Each annunciator has two contact points  $g, g^x$  and a short contact bar  $g'$ . Contact is made between points and bar on one side by the plug G<sup>x</sup> on the other side by an extra plug (not shown in the drawings) which when necessary, as will hereinafter be described can be inserted into opening  $g^2$  to make contact between  $g^x$  and  $g'$ . The contact points  $g$  and  $g^x$  connect by wires  $a^2$  and  $a^3$  respectively with the closed circuit  $a, a, a', a'$ . A wire  $c$  runs from the bar  $g'$  to the annunciator G (connection thereto will be afterward more fully described) and therefrom to the switch board relay H. The relay connects by wire  $c'$  with magnetic coils R<sup>2</sup> of fire-alarm repeater R, and the repeater connects farther on by wire  $r^2$  with striking battery B<sup>2</sup> wherefrom the wire runs to the ground at E thus establishing one end of the ground circuit which in course of the description will be also fully explained.

A circuit  $h, h, h$ , comprises the switch-board register I and battery B<sup>3</sup> and connects to armature H' of relay H and to contact-point  $h'$ . A circuit  $d, d$ , of battery B<sup>4</sup> connects with the armatures of the coils R' and R<sup>2</sup> of repeater R and comprises the alarm-gong mechanism.

By the foregoing description the wire connections of the call boxes with the electrical appliances at the central office will be clearly understood.

The construction of the call box A consists in the main part of the usual mechanism common to all the district telegraph boxes, but the novel features and parts of mechanism essential to my invention will be understood by the following description. The circular part of the front cover of my call box incloses a circular glass and face L as shown



in Fig. 2. On it the nature of the alarm, police and fire, together with a stopping mark for the crank or handle, is described: The spindle brackets M which as in all call boxes actuates the operating mechanism brackets carries outside the front glass of the box the usual crank or handle N and in the interior of the box the segment O which latter by the turning of the crank to the proper mark is carried along revolving around the spindle and allows thereby, through the medium of the lever O' the stop pins O<sup>2</sup>, O<sup>2</sup> and the spring O<sup>4</sup>, the notched disk or character wheel P to revolve around its axis as soon as the handle on the lever is released.

To one side of the center line of the call box and in a suitable position above the spindle I place a small crank Q pivoted between the arms of a bracket Q' secured to the back part of the box. On top of said bracket and upon a block of insulating material two thin metal pieces or contact bars Q<sup>2</sup>, Q<sup>3</sup> are fastened; a spring Q<sup>4</sup> fixed to the metal bar Q<sup>2</sup> rests in contact with the bar Q<sup>3</sup> and extends directly over the upper arm of the small crank Q which arm at the point of contact with the spring carries a block of insulating material; it will thus be seen that both metal bars and the spring Q<sup>4</sup> are completely insulated from the metallic parts of the mechanism of the box. The lower arm of the small crank extends into the path of the segment O and is pushed back by the same as soon as the segment reaches the arm; it is at that point provided with a small roller to prevent or reduce the friction between the segment and the crank. A wire q connects the insulated binding post q' with the bar Q<sup>2</sup> while a wire q<sup>2</sup> connects the bar Q<sup>3</sup> with the contact spring S one end of which rests on the peripheral surface of the character wheel P. Thus it will be seen that the closed circuit a, a', a' is established by means of the above described parts, from a to a' through insulated binding post q', wire q, bar Q<sup>2</sup>, spring Q<sup>4</sup>, bar Q<sup>3</sup>, wire q<sup>2</sup>, spring S to character wheel P and through the mechanism and the box to the binding post q<sup>4</sup>.

S' is a contact spring one end of which also rests on and is in contact with the wheel P and S<sup>2</sup> is another spring standing underneath and a short distance from the spring S'; both of which are insulated from their metallic supports in the box. The spring S<sup>2</sup> connects by wire s with the magnetic coils of the electric bell contained in the box from which the wire s runs to the insulated binding post s' on the back of the box and thence to the ground at E'.

To prevent the segment O from being turned too far around the spindle M, to fire call when police is desired a stop pin T is inserted in the metallic part of the circular front and extends into the box across the path of the segment, which pin is held against the glass face by the spring T<sup>x</sup>.

On the switch-board F (see Fig. 7) a number

of annunciators are placed, which chiefly consist of the following parts: a magnetic coil G' firmly secured to the back of the metallic plate G<sup>2</sup> in front of the board; the armature G<sup>3</sup> pivoted at g<sup>3</sup> has at right angle an arm or locking bar or rod G<sup>4</sup> which in the non-magnetic state of the coil holds the annunciator plate G in a vertical position being pressed against the plate by a spring or rubber band on top of the bar or rod G<sup>4</sup>. The plate G is pivoted to the metal plate G<sup>2</sup> at g<sup>4</sup> and provided in the middle of the lower edge with a projection or knob g<sup>5</sup>. The switch bars F', F', F<sup>2</sup>, F<sup>2</sup>, fastened at one end to the board F as at f butt against each other forming thereby a continuous length of bars. They are connected together by an end piece F<sup>3</sup>. The upper bars F' are provided with lateral projections f' which rest on and are in contact with plates f<sup>2</sup> fastened to the board. A pin F<sup>4</sup> has at one end a button or wedge of insulating material and an upwardly reaching arm f<sup>3</sup>; it extends through the board and metal front plate G<sup>2</sup> and is held against the board by the bars F' F<sup>2</sup> being insulated from the plate G<sup>2</sup>. Connection by wire between the aforementioned contact bar g' and these parts of the annunciator is accomplished in the following manner:—The wire c connects the bar g' with the magnetic coils G' wherefrom it runs to the arm f<sup>3</sup> of the pin F<sup>4</sup> and thence to the plate f<sup>2</sup>. The right hand end of the lower switch bars F<sup>2</sup> connects by wire c with a binding post on the switch board and runs farther on to the relay H, connecting by wire c' with the repeater coil R<sup>2</sup> hereinbefore mentioned. The metal plate G<sup>2</sup> also connects by wire with the binding post on the switch-board and therefore with the relay H. By this it will be clearly seen that there are two ways for a current through these parts of the annunciator, first from wire a<sup>2</sup> to g, through plug G<sup>x</sup> to g' to coils G' to f<sup>3</sup> to f<sup>2</sup> to f' along the length of bars F' to bars F<sup>2</sup> by wire c to binding post and relay H; secondly (see Figs. 7 and 8)—if the annunciator or plate G should be in a horizontal position from g' to G' to f<sup>3</sup> to F<sup>4</sup> to g<sup>5</sup> to G to G<sup>2</sup> and connect by wire to binding post and relay H.

Having thus fully described all the essential parts of my invention I shall endeavor to give a clear and full description of the practical operation of the same.

It will be observed that there are two circuits from the call boxes to the central office the closed circuit a, a', a', and the ground or open circuit E', a', a<sup>2</sup>, c, c', c<sup>2</sup>, E. In order to send a police alarm to the central office the manipulator turns the crank or handle N of the call box in the direction indicated by the arrow in Fig. 2 until the movement is arrested by the segment O coming in contact with the stop pin T when by releasing the hand from the pointer a revolving motion of two turns will be imparted to the character wheel P which rotates in the direction of the arrow shown in Fig. 5. The end of the contact spring



S coming over the first notch of the wheel P loses contact with the wheel and thereby opens the closed circuit  $a, a, a' a'$ . This action releases the armature of relay C and closes circuit  $b, b$ , which records a short dash on the police alarm register D and at the same time causes the magnet of coil  $R'$  to attract the armature thereof. Continuing, the spring S again makes contact with the wheel P thereby restoring the closed circuit  $a a'$  and the inaction register D and repeater  $R'$ . Afterward the spring  $S'$  falls into the first notch keeping contact with the wheel P and makes connection with spring  $S^2$  thus closing the ground circuit  $E' s', s, S^2, S', P, A, q^4, a' a^2 c c' c^2 E$ . This action causes the annunciator plate G to drop and closes the switch-board register circuit  $h, h$  thereby recording a dash on register I and causes the magnet of coil  $R^2$  to attract the armature thereof. The wheel continues to rotate restoring again the inaction of register I and coil  $R^2$  opening main circuit  $a a'$  and so on until the wheel stops, after all the notches have brought about the above mentioned result. By this it will be seen that during the operation of recording a police alarm the armature of the coils  $R'$  and  $R^2$  of the repeater are attracted alternately to the contact points  $r'$  and  $r^2$  thus preventing a closing of the circuit of the fire alarm battery  $B^4$  and therewith a sounding of the alarm gong while the police alarm is recorded by a number of dashes on both registers. The ground circuit in going through the annunciator runs as follows:—from contact bar  $g'$  to coils  $G'$  to arm  $f^3$  to plate  $f^2$  to  $f'$  and to switch bars  $F'$  along their entire length through  $P^3$  to bars  $F^2$  and by wire  $c$  to binding post and relay H. As this current attracts the armature  $G^3$  of the magnetic coil the end of the locking bar  $G^4$  disengages the annunciator plate G which falls down to a horizontal position, the knob  $g^5$  pushes the pin  $F^4$  inwardly and the latter through the medium of the wedge or button separates the free ends of the switch bars  $F' F^2$  from the remaining bars  $F' F^2$  thus breaking contact of the bars. The current then goes from the coils  $G'$  to arm  $f^3$  pin  $F^4$  plate G and through plate  $G^2$  and wire to binding post and relay H.

By the above it will be clearly understood that as soon as an alarm is sent in the annunciator indicates the circuit of boxes in which the operated one is situated and directs the attention of the operator at the central office thereto. It will also be seen that as the dropping of plate G interrupts the continuity of switch bars  $F' F^2$  it will be impossible to send in an alarm from any other circuit as long as the first one is in operation. To prepare for other alarms plate G has to be returned to its original position.

The procedure of a fire alarm is as follows:—  
65 Break the front glass plate thereby releasing the stop pin T which will fly out of the box by the action of the spring T' and remove the

obstruction in the path of the segment O. Turn the crank N to mark indicating fire alarm which movement turns the segment in the same direction. During this action the segment O strikes the small crank Q and pushes it backward causing the spring  $Q^4$  to be lifted out of contact with metal strip  $Q^3$  (see Fig. 6) thereby opening the metallic circuit  $a, a'$  as long as the segment is in contact with the small crank, and causing a long dash to be recorded on the police alarm register D wherewith a warning is given at central office, that a fire alarm is coming in. The segment turns farther on to the position shown in dotted lines Fig. 5 when the operator's hand on the lever or handle is removed and the box mechanism started. The segment O begins the return movement but before it reaches the small crank  $Q^3$  one revolution of the character wheel P will be completed thereby recording the character of the wheel on both registers in the manner of the police alarm as described above. During the time the segment O however remains in contact with the small crank two revolutions of the wheel P will take place and the metallic circuit  $a a'$  will be open thereby recording a long dash on register D and keeping the armature of coil  $R'$  in contact with point  $r'$ . While the wheel P is making the two revolutions each notch closes the before mentioned ground circuit,  $E' a' a^2 c' c^2 E$  by means of the springs  $S'$  and  $S^2$ , thereby dropping the annunciator plate, recording short dashes on the switch board register and each time attracting the armature of the coil  $R^2$  to the point  $r^2$  and as the armature of coil  $R'$  is during all this time in contact with point  $r'$  the fire alarm circuit  $d$  is closed by each notch causing the alarm bells to ring the two revolutions of wheel P. After the segment O releases the small crank Q the metallic circuit  $a a'$  closes again and for the two revolutions of wheel P which occur before the handle arrives at rest, the alarm will be recorded on both registers in the manner of the police alarm described above.

The manipulation of the fire alarm causes thereby the following operation at the central station: first, one long dash on police alarm register attracting the attention of the operator at central office; second, one record of character wheel on both registers; third, one long dash on police alarm register, two records of character wheel on switch board register and two sounds of the fire alarm gong; fourth, two records of the character wheel on both registers.

By the above description the different operation of police and fire alarm will be clearly understood as will also the main feature of my switch-board and confusion of alarms from the several circuits will be prevented.

By means of the electric bell inside the call box the operator when sending an alarm will observe that the line is free and the alarm passing through by the ringing of said bells, will be the same as contained in the open or



ground circuit, but should he hear no sound of the bell on turning on the call he will know that a previous alarm through some other circuit is in operation as the switch bars have  
5 broken the contact of all other circuits and will be thereby reminded to wait a short time before sending through his alarm.

Another very important feature of my switch board is detecting of the grounding of the  
10 wires in the main or line circuit  $a, a, a', a'$ , as such grounding would necessitate a closing of the ground circuit, which then would actuate the annunciator, switch-board register and coil  $R^2$  of repeater. An extra plug  
15 inserted into opening  $g^2$  of the switch-board short circuits the main battery B and relay C through wire  $a^3$  and will thereby direct all calls through the ground circuit to the central office.

20 If the main circuit be broken without grounding, the insertion of an extra plug in opening  $g^2$  of the switch-board brings both sides of the break in contact with bar  $g'$ , thence through annunciator coils  $R^2$ , relay  
25 H, repeater coils  $R^2$ , ground battery  $B^2$ , to ground—thus bringing all call boxes in contact, through ground connections, with the switch-board register.

Having thus described my invention, what  
30 I claim, and desire to secure by Letters Patent, is—

1. In an alarm system the combination with a call box, of a closed or metallic circuit controlling an open circuit containing a register  
35 and one magnet of a repeater, an open or ground circuit comprising a switch-board, an annunciator controlling a registering circuit, and another magnet of said repeater controlling a fire alarm sounding circuit, sub-  
40 stantially as described.

2. In an alarm system the combination with a call box, of a closed or metallic circuit  $a, a'$ , comprising relay C, an open registering and repeating circuit  $b$ , an open or ground circuit  
45 comprising switch board F with relay H and an open registering circuit  $h, h$ , and a repeating fire alarm circuit controlled by a relay having one magnet in the metallic and the other in the ground circuit, substantially as set forth.

3. In a compound alarm system the combination with a call box of an open or ground  
50 circuit, a switch-board and annunciator a relay controlling registering circuit, of a short circuit obtained by inserting an extra plug into opening  $g^2$  of a repeater, substantially as  
55 described.

4. In combination with an alarm system a switch board F consisting of the contact points  $g g^x$  contact bar  $g'$ , annunciator plate G magnetic coils  $G'$  with armature and lock-  
50 ing bar  $G^4$  switch bar  $F' F^2$ , push pin  $F^4$  and relay H, substantially as described.

5. In an alarm system, the combination with a transmitting or call box having segment O, character wheel P, contact springs S, S'  
65 S<sup>2</sup>, and an electric bell, of the closed or metallic circuit, and the contacts  $Q^3, Q^4$ , therein adapted to be separated by said segment, substantially as described.

6. In an alarm call box the combination  
70 with the segment O, the character wheel P, the contact springs S, S' S<sup>2</sup>, a small crank Q suspended from a bracket, the metal strips  $Q^2-Q^3$  and the spring  $Q^4$  for the purpose of cutting off the closed circuit, substantially as  
75 described.

7. In a switch board for a police and fire alarm system the combination with the switch bars  $F', F^2$  of the annunciator plate G with the magnetic coils and locking bar, the push  
80 pin  $F^4$ , of the contact bar and points, substantially as described.

8. In an alarm system, the combination with a transmitting or call box having the segment O, character wheel P, and contact  
85 springs operated thereby and in the operated circuit; of the closed or metallic circuit, contacts  $Q^3, Q^4$  therein adapted to be separated by said segment, and pin T held normally against the glass face of the call box in the  
90 path of said segment, as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

JAMES B. GILL. [L. S.]

Witnesses:

C. W. M. SMITH,  
W. I. REED.