

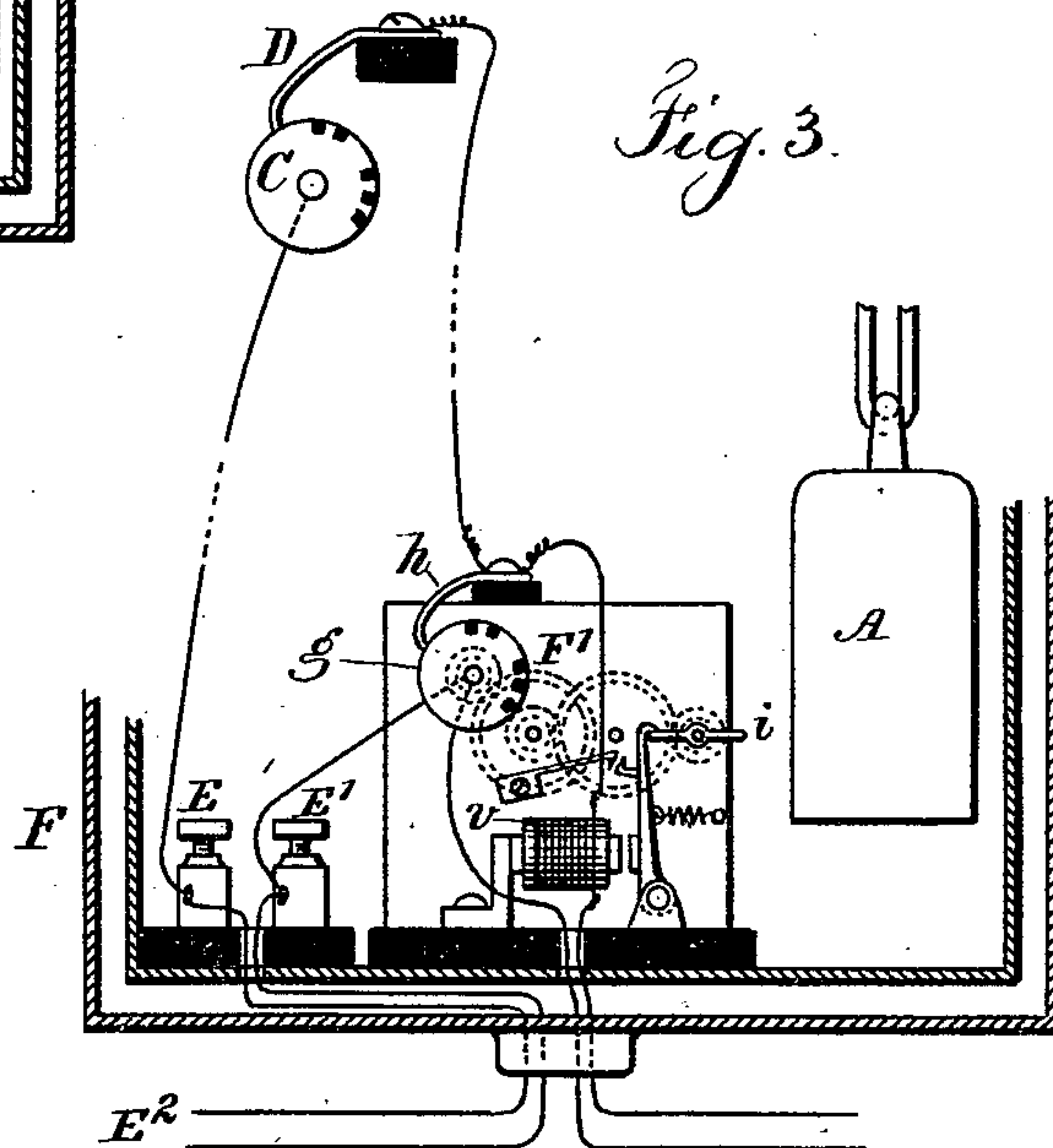
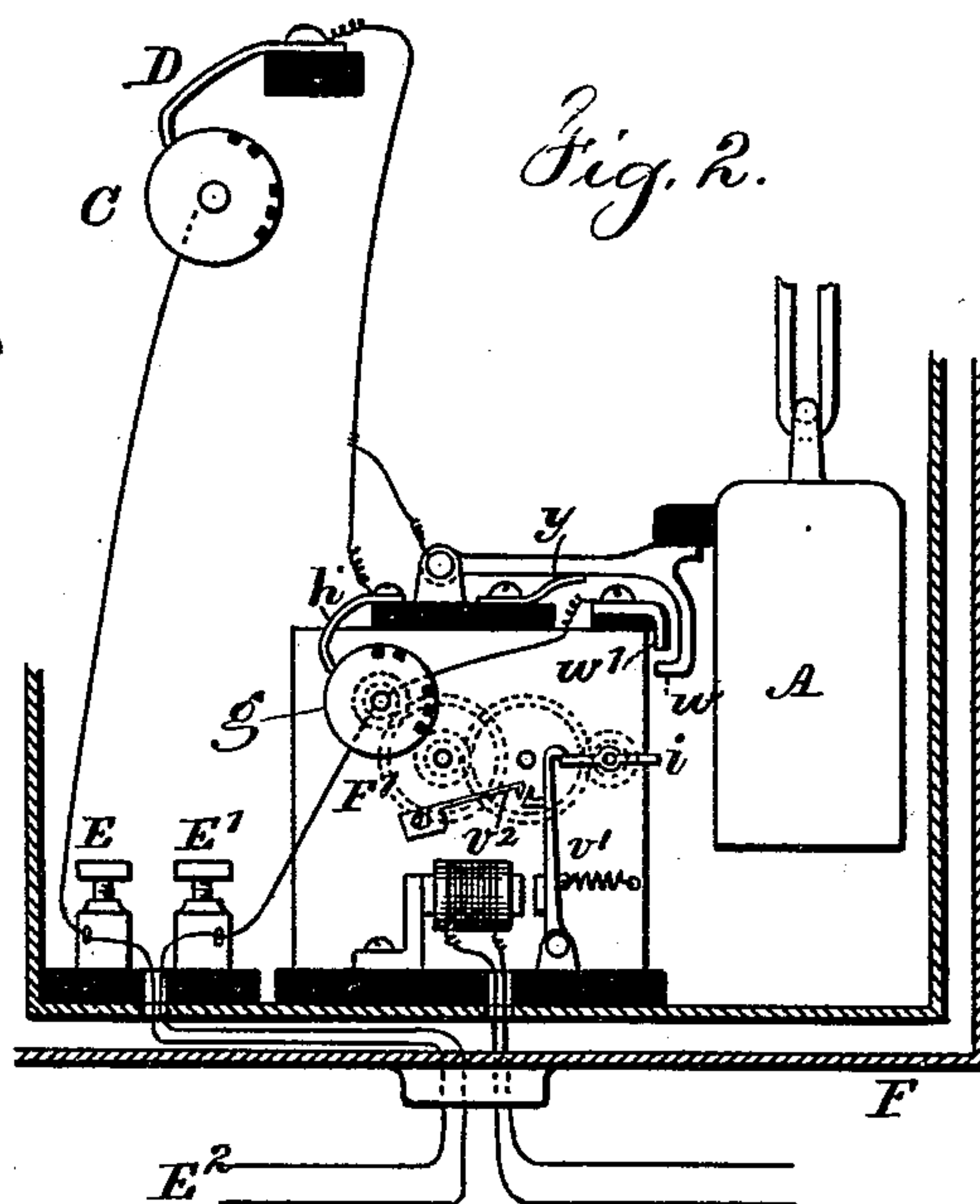
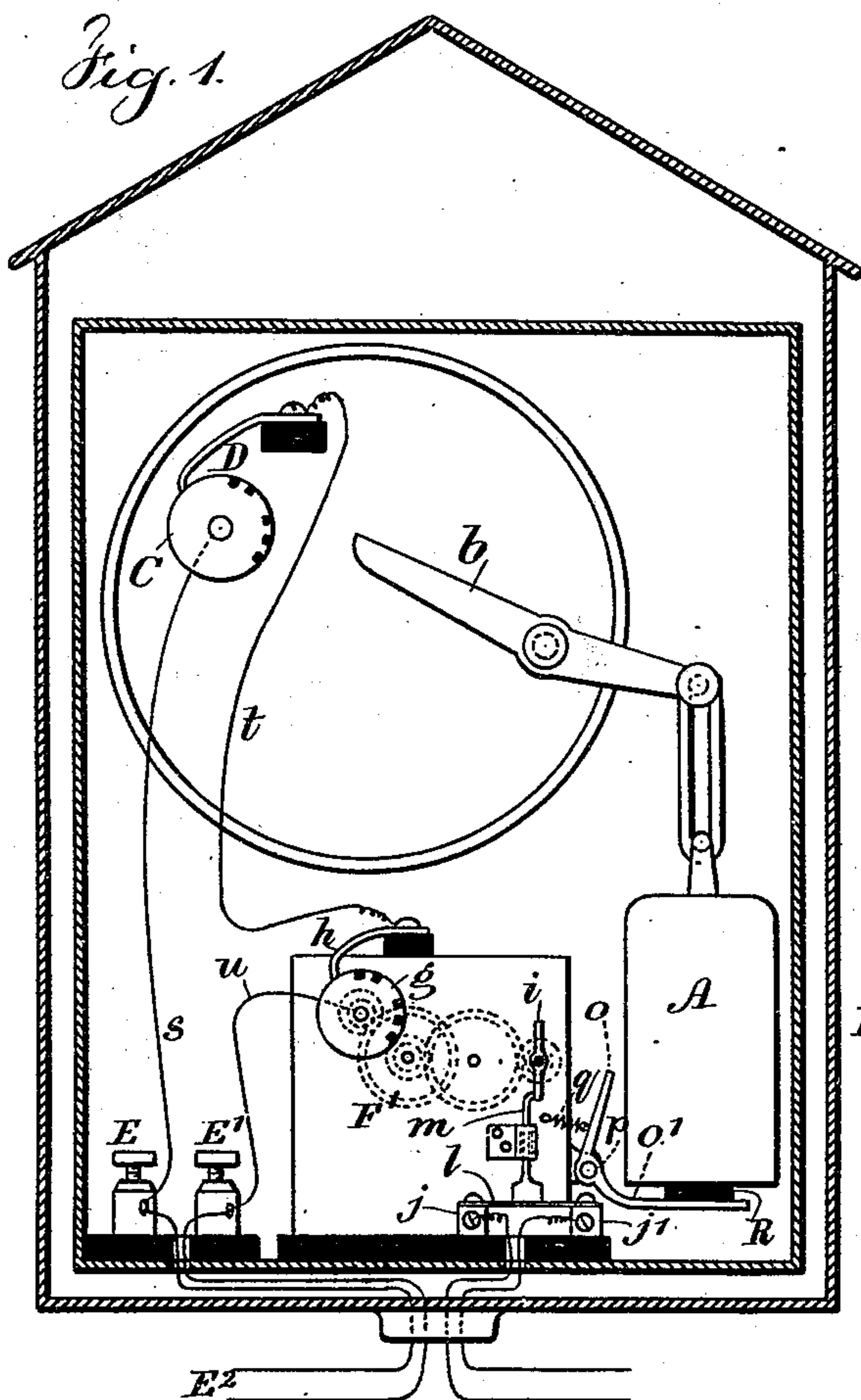
(No Model.)

3 Sheets—Sheet 1.

J. SACHS.  
AUXILIARY FIRE ALARM TELEGRAPH.

No. 514,279.

Patented Feb. 6, 1894.



Witnesses

Chas. H. Smith  
J. Stait

Inventor  
Joseph Sachs  
per Lemuel W. Ferrell  
Atty.

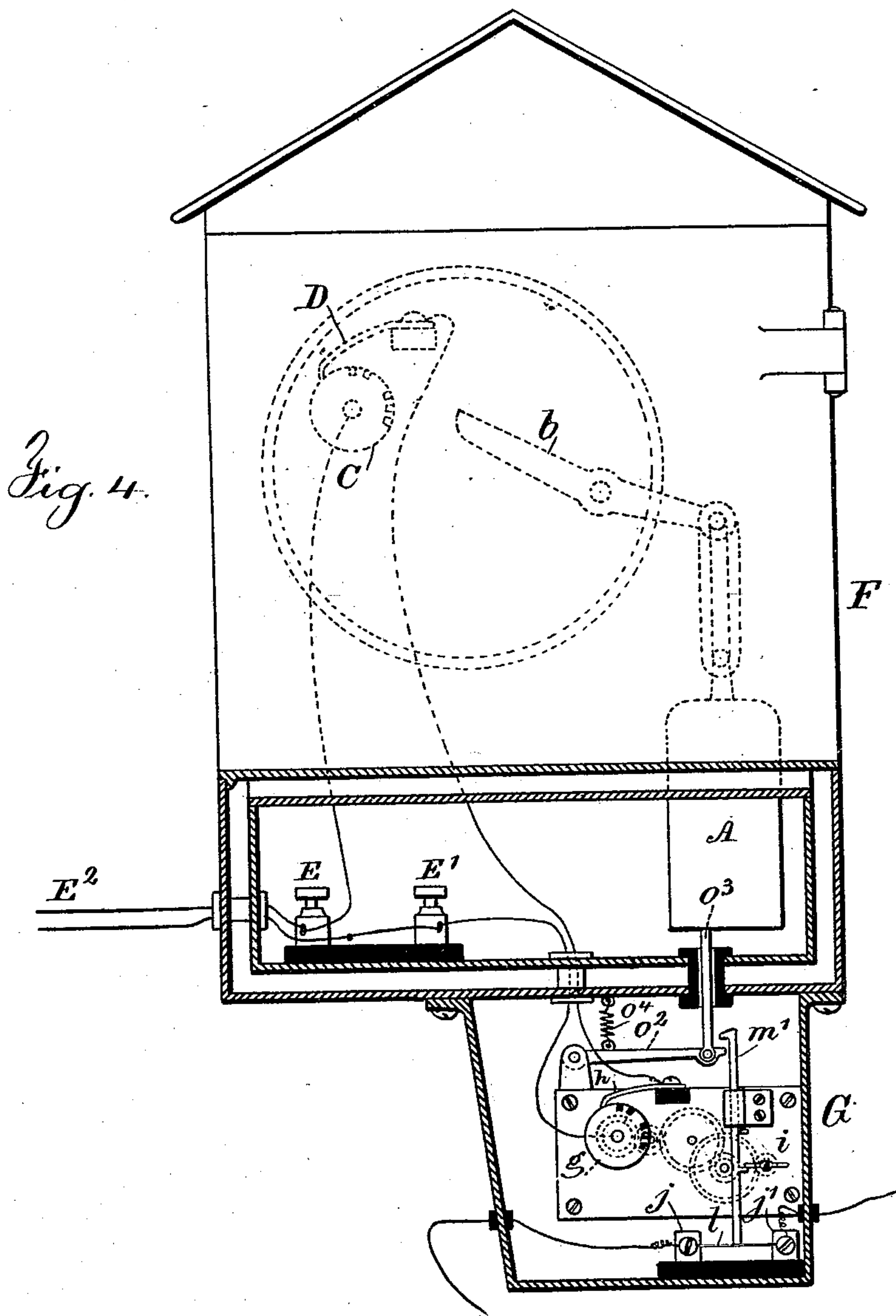
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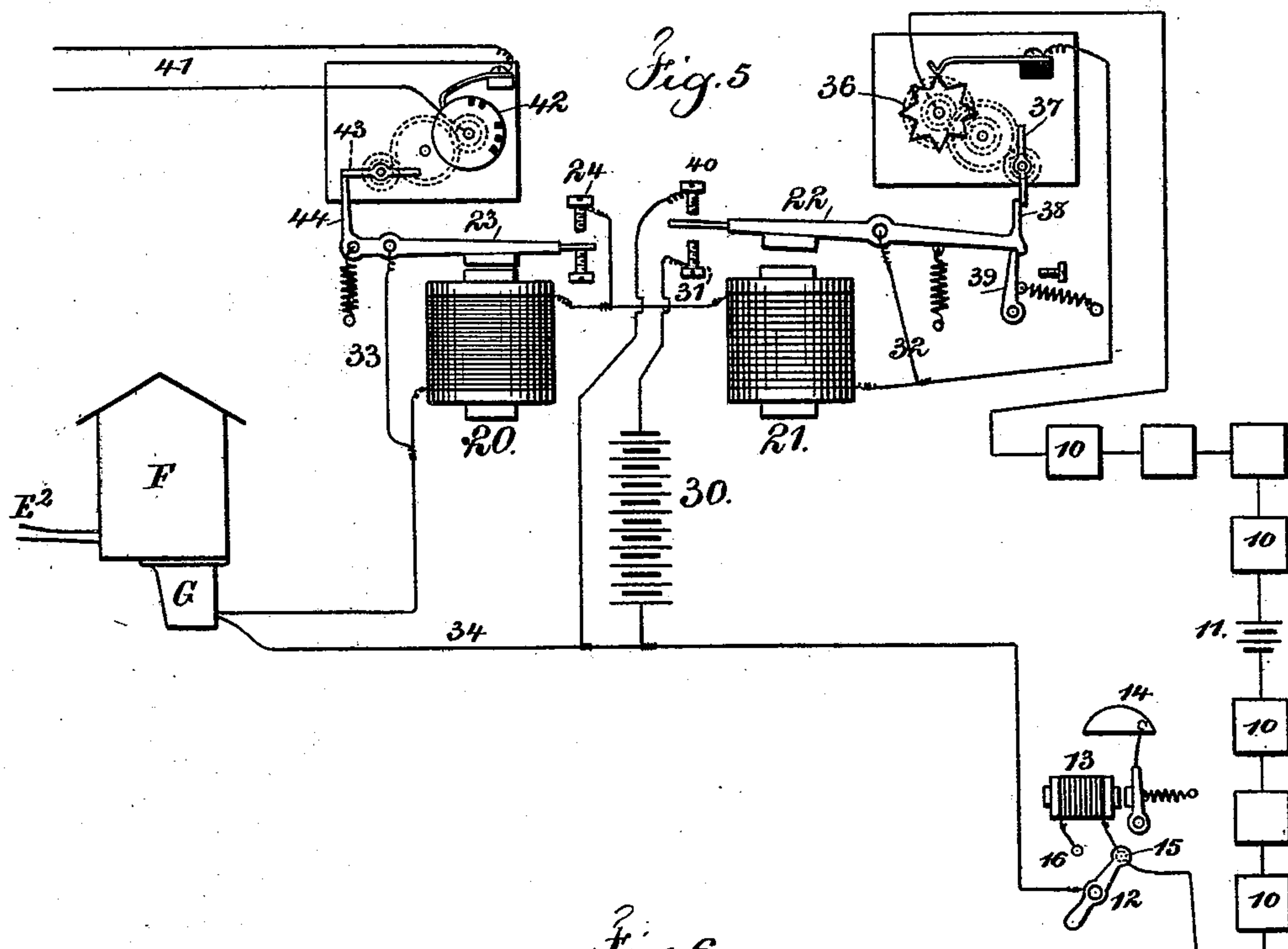
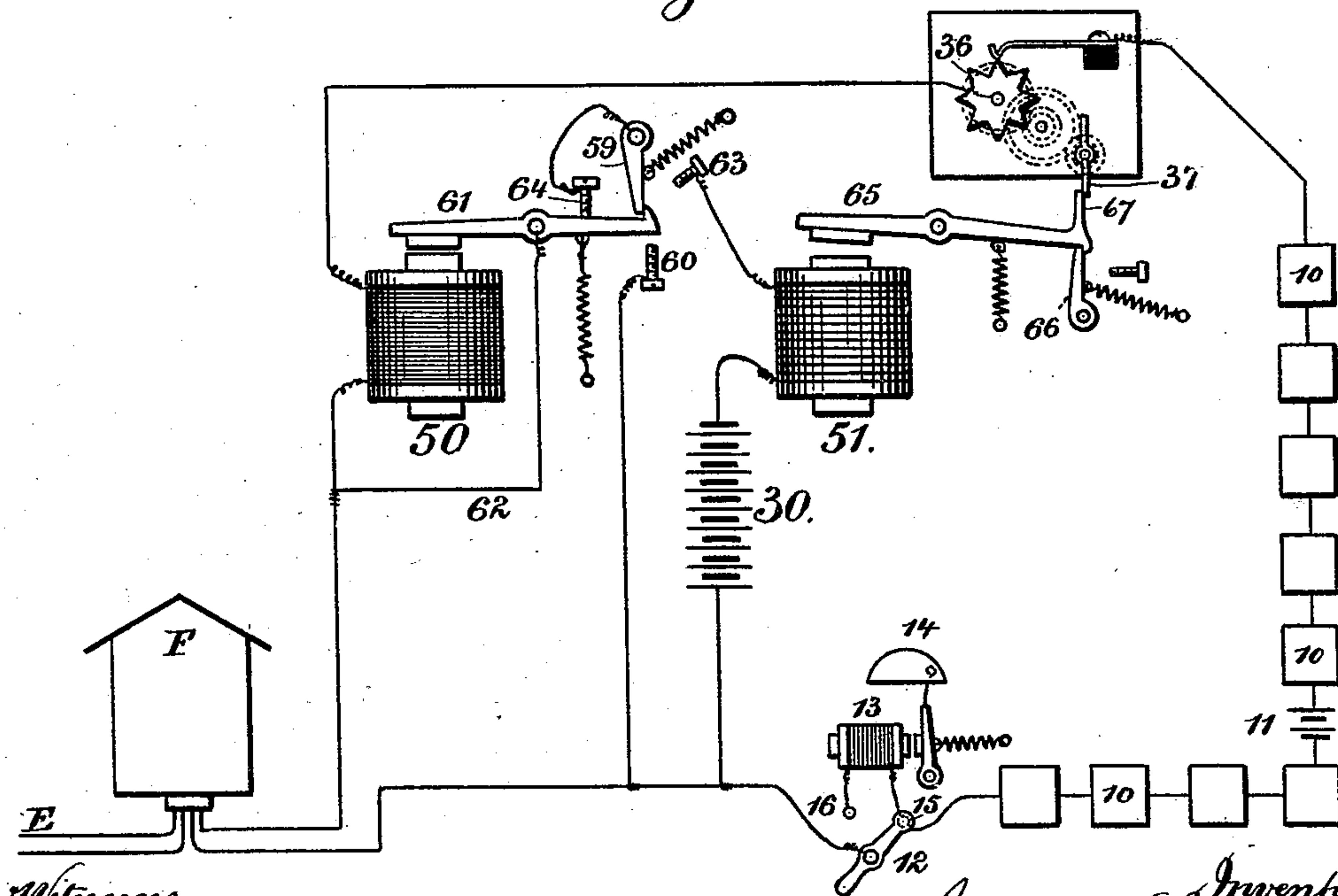


Fig. 6.



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# UNITED STATES PATENT OFFICE.

JOSEPH SACHS, OF NEW YORK, N. Y.

## AUXILIARY FIRE-ALARM TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 514,279, dated February 6, 1894.

Application filed April 20, 1893. Serial No. 471,082. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH SACHS, a citizen of the United States, residing in the city and State of New York, have invented an Improved System of Auxiliary Alarms, of which the following is a specification.

The present invention relates to that class of signals and particularly fire alarms in which a signal is sent upon a main circuit leading to a central office by means of auxiliary or local circuits leading to a number of local auxiliary boxes, so that by the operation of one of these auxiliary boxes an alarm is transmitted on the main circuit in the same manner as if it had been directly transmitted from the main alarm mechanism.

In previous systems it has been the practice to operate the main signal transmitting mechanism by attaching thereto an electro-magnet or similar device, and on actuating the electro-magnet by the auxiliary circuit, the signal mechanism was tripped and operated as if it had been directly operated by hand. There have been many modifications of this class of auxiliary systems, but in my present invention I dispense entirely with any tripping device for the main signal mechanism. I place within the main or an appended box a small motor device for revolving a circuit wheel that usually is similar in its signal to the main wheel, and this motor device is so arranged as to be actuated by an auxiliary electric circuit through the agency of either a small magnet or the burning away of a fine wire, and it is also so arranged as to be entirely separate from the main transmitting motor. I also provide a means for preventing the signal from either the main or the auxiliary device interfering with each other if they should be tripped at the same or about the same time and so that each one can be operated separately without in any way interfering with the other.

In the drawings, Figure 1 shows a main signal mechanism having my invention therein. Figs. 2 and 3 are modifications of the same. Fig. 4 illustrates the improvement with an appended box, and Figs. 5 and 6 are diagrams of the circuits.

As my system is particularly applicable to fire alarms, I show in Fig. 1 a main fire alarm signal box which is operated by raising a

weight, and the falling of this weight causes the circuit wheel to revolve, but my invention is applicable to any style of signal box.

The general construction of the main signaling mechanism is so well known that it is unnecessary to describe the same.

A represents a weight attached to the lever *b* and by which this weight is raised, and as this weight descends a train of wheels is set in motion and the circuit wheel *C* is revolved, causing it to make and break the circuit and send any predetermined signal by make and break of contact with the brush *D*; the wheel here shown is set for 23.

*E E'* are the binding posts which are connected to the line wires which go to other boxes in the main circuit *E*<sup>2</sup> and to the headquarters or central station.

Situated between the weight *A* and the binding posts *E E'* is a small spring motor *F'* which has a circuit wheel *g* numbered similar to the main wheel, a brush *h* pressing thereon and an escapement or fan *i*. This spring motor has a suitable train of wheels for properly rotating the wheel *g* and means for winding. This spring motor or movement is mounted on an insulating base. *j j'* are two posts also mounted on the insulating base but separate from the movement and to which the wires of the auxiliary circuit are connected. In this circuit are located a suitable battery and auxiliary boxes, the form of circuit, style of battery or auxiliary boxes being immaterial. Across these posts *j j'* is fastened a fine wire *l* of suitable metal which is burned away when a current is passed through it. Pressing on this wire is an arm *m* to the escapement or fan and preventing the same working and permitting the circuit wheel *g* to be revolved when the wire is melted. The arms *o o'* are suitably fastened together and pivoted at *p*.

*q* is a small spring having a tendency to pull the arm *o* up against the escapement or fan *i* but it is prevented from so doing when the weight *A* is resting in its normal position on the insulating piece *R* fastened to the arm *o'*.

It will be noticed that the two circuit wheels are here connected in series, and the current goes by the wire *s* from the post *E* to the wheel *C*, thence to the brush *D* and by the



wire *t* to the brush *h* and wheel *g* to the wire *u* and post *E'* and out again on the main circuit *E*<sup>2</sup>.

In the operations of the devices we will presume that an auxiliary box is actuated and throws an excess of current on the fine wire *l* which is immediately burned away, thereby removing the obstacle to the arm of the escapement or fan *i* and permitting the circuit wheel *g* to revolve and send its signal on the main line. In so doing the auxiliary circuit is opened by the rupture of the fine wire. This may be used to give a signal at the auxiliary box to show that the call has been made, as hereinafter set forth. If while the auxiliary wheel *g* is revolving the main mechanism should be operated by raising the weight *A*, the pressure on the arm *o'*, would be at once removed and the arm *o* would be drawn by the spring *q* up against the escapement or fan *i* and stop the wheel *g*, and the main signal wheel *c* as it is revolved by the falling of the weight will send in its signal without mutilation. If we now assume that the main mechanism has first been actuated, the raising of the weight *A* will immediately let the arm *o* come against the escapement or fan *i* and prevent the auxiliary circuit wheel *g* from revolving and mutilating the signal. It will therefore be seen that no matter which mechanism is first started the wheel *g* will be arrested during the movement of the wheel *c*, so that the signals will not interfere.

In Fig. 2, I have shown a modification in which the fusible wire *l* is dispensed with and a small magnet is provided having the armature *v'* which normally holds the escapement or fan *i* and when the magnet is energized that armature is attracted and catches under the hook *v*<sup>2</sup>, and the escapement or fan *i* of the spring motor is liberated and the circuit breaking wheel *g* is rotated.

Instead of mechanically stopping the motor device when the main weight *A* is raised, I short circuit or cut out the auxiliary circuit wheel *g* and its brush by allowing the arm *w* to be pressed up against the contact *w'* by the spring *y* when the weight *A* is raised, see Fig. 2, so that even if the wheel *g* is revolving it will not interfere with the signals sent by the main wheel *c*.

In Fig. 3, I show a novel way of sending a return call to the auxiliary circuit boxes by connecting one of the wires from the magnet *v* to the brush *h* and circuit wheel *g* and out on the auxiliary circuit, thereby when the magnet *v* has been energized and permitted the wheel *g* to revolve, this wheel *g* will open the auxiliary circuit at the same time that it sends its signal out on the main line.

It will be seen that I may use any form of motor to revolve the circuit wheel *g* and also that I may vary the methods of releasing the same, and also the methods of preventing the wheel *g* mutilating the signal sent out on the main line by the wheel *c*.

The form of auxiliary circuit may be any

well known form or it may be one of those for which I have received patents or for which applications are pending. I have represented in Figs. 5 and 6 the circuit connections that are preferred.

The form of main circuit mechanism is also not material, as my improvement may be used in a main signal box when a weight is raised or a spring is pulled or tripped, the necessary connections being made with the actuating arm of the main mechanism so as to cut out the auxiliary circuit wheel when the main wheel is operated.

In some instances the ordinary fire alarm box *F* is not sufficiently large for the reception of the second circuit breaking wheel and its motor; in this case I apply the second circuit breaking wheel and its motor in a separate box *G*, as represented in Fig. 4. In this instance the box is advantageously screwed to the bottom of the main box and the circuit connections are substantially the same as hereinbefore described, and the fusible wire between the posts *j j'* supports the stop for the fan or pulsator. This stop may be of any desired character, but I have represented it as a vertical rod resting at its lower end upon the fusible wire *l* and having a projecting finger for the fan, and in place of the lever *o o'*, shown in Fig. 1, I make use of the lever *o*<sup>2</sup> having a vertical rod or stud *o*<sup>3</sup> passing up below the weight *A*, and the upper end of the vertical rod *m'* is provided with a finger or projection adjacent to the lever *o*<sup>2</sup>, and the contractile spring *o*<sup>4</sup> is adapted to raise the lever *o*<sup>2</sup> and the pin *o*<sup>3</sup> when the weight *A* has been raised, thereby preventing the stop rod *m'* dropping while the main signal box is in operation, even though the fusible wire *l* may have been burned away. By either of the constructions hereinbefore described the mutilation of either signal is prevented, because the circuit wheel *g* is held from rotating when the weight *A* has been raised for actuating the main circuit closing wheel *C* until the weight returns to its normal position.

It will be understood that in cases where a spring is made use of in place of the weight *A* in actuating the main fire alarm call box, the stop which prevents the auxiliary circuit breaking wheel from rotating while the main wheel is in rotation, may be actuated by the lever *b* which is ordinarily pulled down in actuating the main fire alarm signal box.

In order to more fully illustrate the circuits which it is advantageous to make use of, I have shown in Fig. 5 a diagram in which the main fire alarm box is represented at *F* and the auxiliary or appended signal box is shown at *G*, and in the auxiliary circuit leading therefrom any desired number of auxiliary signal boxes 10 are placed and a battery 11, and each of the auxiliary signal boxes 10 is to contain a switch 12 and a magnet 13, the armature of which moves the hammer of the bell 14, and in the normal position the switch 12 is closed to the stop 15, and when the sig-



nal is given the switch is thrown over to the stop 16, and in so doing the circuit is broken and then closed.

In the circuit to the auxiliary box G there are two electro-magnets 20 and 21, the magnet 20 being of high resistance and the magnet 21 of low resistance, and there is a back stop 24 to the armature 23 of the magnet 20, and this back stop and armature form a shunt around the helix of the magnet 20 so that when the circuit is broken by moving the switch 12 the high resistance magnet 20 is shunted by the armature 23 flying back against the back stop 24 and closing the shunt around the magnet 20, and in the normal condition of the circuit containing the auxiliary alarm boxes 10 the resistance of the magnet 20 is sufficient to prevent the armature 22 of the magnet 21 being attracted, but as soon as the circuit is broken by the movement of either switch 12 and the shunt is made around the magnet 20, as before stated, the high resistance magnet 20 is thrown out of the circuit and the electric circuit is again closed by the switch 12 to the stop 16 and the current from the battery 11 is now sufficient to cause the magnet 21 to attract the armature 22, and in so doing the main battery 30 is thrown into the circuit by the armature 22 closing against the front stop 31, and the current passes from the battery 30 by the armature 22 and the wire 32, thence through the helix of the magnet 21 by the back stop 24, armature 23 and wire 33 to the circuit in the auxiliary call box G and returning by the circuit wire 34 to the main battery 30, thereby sending a call out upon the main line by the duplicate mechanism at G.

In the movement of the armature 22 the main battery 30 is thrown across the line and the current divides on the two routes, the one containing the electro-magnet 21 and the electric devices for bringing into action the duplicate mechanism in G, and the other containing the auxiliary call boxes 10 and battery 11, and as soon as the wire in G is burned out or the circuit broken, the armature 22 flies back to bring into action a return signal as next described.

I provide a spring motor to drive the circuit breaking wheel 36, which motor has a fan 37 that is normally stopped by an arm 38 on the armature 22, and the prop block 39 holds the armature 22 to prevent the spring thereof moving the armature to the back stop 40 until after the prop block 39 has been liberated by the attraction of the armature 22 and it falls away. It will now be understood that when the current passing through the helix of the magnet 21 is sufficient to attract the armature 22, the prop block 39 falls away but the finger 38 holds the fly 37 until the magnet 21 is demagnetized. This demagnetization occurs immediately upon the burning out of the wire in the auxiliary box G or the breaking of the circuit therein, and the spring of the armature 22 then closes the

same against the back stop 40 and liberates the fly 37 and the wheel 36 revolves and the circuit is closed from the battery 11, through the back stop 40, armature 22, wire 32, and auxiliary boxes, and the rotation of the wheel 36 makes and breaks the auxiliary circuits through the boxes 10, pulsating the armature of the magnet 13 in the box from which the signal has been sent so as to indicate at that box that the signal has been received.

Where a tell-tale circuit is required, the same is operated from the armature 23. In this instance the tell-tale circuit 41 containing any desired character of instrument also contains the circuit breaking wheel 42 that is provided with a spring actuating mechanism and a fly 43, which fly is held in position by a finger 44 from the armature 23, and as this armature 23 is normally attracted the circuit breaking wheel 42 is kept from revolving, but when the circuit is broken and the armature 23 closes against the back stop 24 the fly 43 is liberated and the rotation of the wheel 42 sends out a signal into the tell-tale circuit 41. This tell-tale will operate if there is any derangement in the auxiliary circuit such as a break or short circuit.

The circuits illustrated in Fig. 6 are generally similar to those before described, the low resistance magnet 51 and the high resistance magnet 50 being so arranged in the electric circuits that the movement of the switch 12 in one of the auxiliary call boxes 10 breaks the circuit, passing through the high resistance magnet 50 and allows the armature 61 thereof to fly back and unlatch the prop block 59 which closes against the contact 63 and the completion of the movement of the switch 12 again closes the circuit and the armature 61 is attracted and the main battery 30 passing through the low resistance magnet 51 is put into the circuit through 63, 59, back stop 64, armature 61 and wire 62, thereby actuating the circuit wheel in the auxiliary circuit at the box F, and during this time the circuit from the battery 11 has remained closed through the helix of 50, but as soon as the circuit is broken in the box F the armature 61 flies back, breaking the circuit to the back stop 64 and closing the circuit through the stop 60, so that the main battery 30 is thrown out of the circuit by the break between 64 and 61, but the battery 11 remains in the circuit between 60, 61, 62 and 50. During the passage of the current from the main battery 30 through the low resistance magnet 51, the armature 65 has been attracted, the prop block 66 has dropped away, and the finger 67 continues to hold the fly 37 of the spring motor to the circuit wheel 36, and as soon as the main circuit is broken as aforesaid, the armature 65 flies back and liberates the fly 37 and the wheel 36 is rotated to give a return signal upon the bell 14 at the box from which the signal has been sent out.

It is to be understood that after the signal has been sent out and received as aforesaid,



and the object of the call effected, the parts are to be restored to their normal condition.

In devices before made by me the auxiliary signaling mechanism, if first started, causes the main signal box to remain inactive, but in the present improvement the main signal box arrests the movement of the auxiliary signaling device the moment the main signal is started.

I claim as my invention—

1. The combination with a main signal box, and a main signal mechanism therein, of a duplicate mechanism in the same box adapted to send its signal on the same main wires as the main signal mechanism, and a means to bring the said duplicate mechanism into action from a source exterior to the main box, substantially as set forth.

2. The combination with a main signal box and a main signal mechanism therein, of a duplicate mechanism in the same box, an electrical means for actuating said duplicate mechanism from a distance from said box, and a means for preventing the two mechanisms signaling at the same time, substantially as set forth.

3. The combination with a main signaling box and a main signal mechanism and means for actuating the same by hand, of a duplicate signaling mechanism, electric means for bringing such duplicate mechanism into action from a distance, and means for preventing the duplicate mechanism interfering with the main signaling mechanism, substantially as set forth.

4. The combination with a main signal mechanism in a main box, of a duplicate or auxiliary mechanism in the same main box, and a mechanical stop operated by said main mechanism to prevent said duplicate or auxiliary mechanism from operating while the main mechanism is in operation, substantially as set forth.

5. The combination of a main and an auxiliary or duplicate signal mechanism in the same box, said duplicate mechanism being so arranged as to be automatically cut out when the main mechanism is operated, and a means of electrically operating the duplicate mechanism from a distance, substantially as set forth.

6. The combination with a signal mechanism to revolve a circuit wheel, of a stop consisting of a small wire in an electric circuit by which it is heated or melted from a distance, and thereby liberating said stop and at the same time opening the electric circuit, substantially as set forth.

7. The combination with a main and a duplicate or auxiliary signal mechanism, of a small wire in an electric circuit to prevent said duplicate mechanism from operating until released by the melting of the small wire, substantially as set forth.

8. The combination of a main and a duplicate signal sending mechanism in the same box, said duplicate mechanism having an elec-

tro-magnet and a stop to hold it from operating until said stop is electrically actuated, substantially as set forth.

9. The combination with the main alarm box, of two signaling mechanisms therein on the main circuit, means for actuating one of the mechanisms manually electric devices for actuating the other from a distance and means for permitting only one of the mechanisms signaling at one time, substantially as set forth.

10. The combination with a main signal box and its signal sending mechanism, of a duplicate signal mechanism and an auxiliary circuit for the same, and two stops for the duplicate signal sending mechanism, one actuated by the auxiliary electric circuit and the other by the main signal mechanism, substantially as set forth.

11. The combination with a main signal mechanism in a main box, of a duplicate or auxiliary mechanism, and a mechanical stop operated by said main mechanism to prevent said duplicate or auxiliary mechanism from operating while the main mechanism is in operation, substantially as set forth.

12. The combination with a circuit closing wheel for sending a signal on a main line of an auxiliary circuit and signal boxes in such circuit containing a circuit breaker, a main battery and two electro-magnets, one of high and the other of low resistance, armatures and circuit closing stops, substantially as specified, for shunting the high resistance magnet and throwing in the main battery, substantially as set forth.

13. The combination with a circuit closing wheel for sending a signal on a main line of an auxiliary circuit and signal boxes in such circuit containing a circuit breaker, a main battery and two electro-magnets, one of high and the other of low resistance, armatures and circuit closing stops, substantially as specified, for shunting the high resistance magnet and throwing in the main battery, and a return circuit closing wheel to give a signal at the auxiliary box from which the call was sent, as set forth.

14. The combination with a circuit closing wheel for sending a signal on a main line, of an auxiliary circuit and signal boxes in such circuit containing a circuit breaker, a main battery and two electro-magnets, one of high and the other of low resistance, armatures and circuit closing stops, substantially as specified, for shunting the high resistance magnet and throwing in the main battery, a return circuit closing wheel to give a signal at the auxiliary box from which the call was sent, and a tell-tale circuit and wheel in the circuit, and means for liberating the motor of said wheel, substantially as set forth.

Signed by me this 18th day of April, 1893.

JOSEPH SACHS.

Witnesses:

S. O. EDMONDS,  
ANDREW FOULDS, Jr.