

T. F. GAYNOR.
FIRE ALARM TELEGRAPHY.

No. 335,026.

Patented Jan. 26, 1886.

Fig. 1.

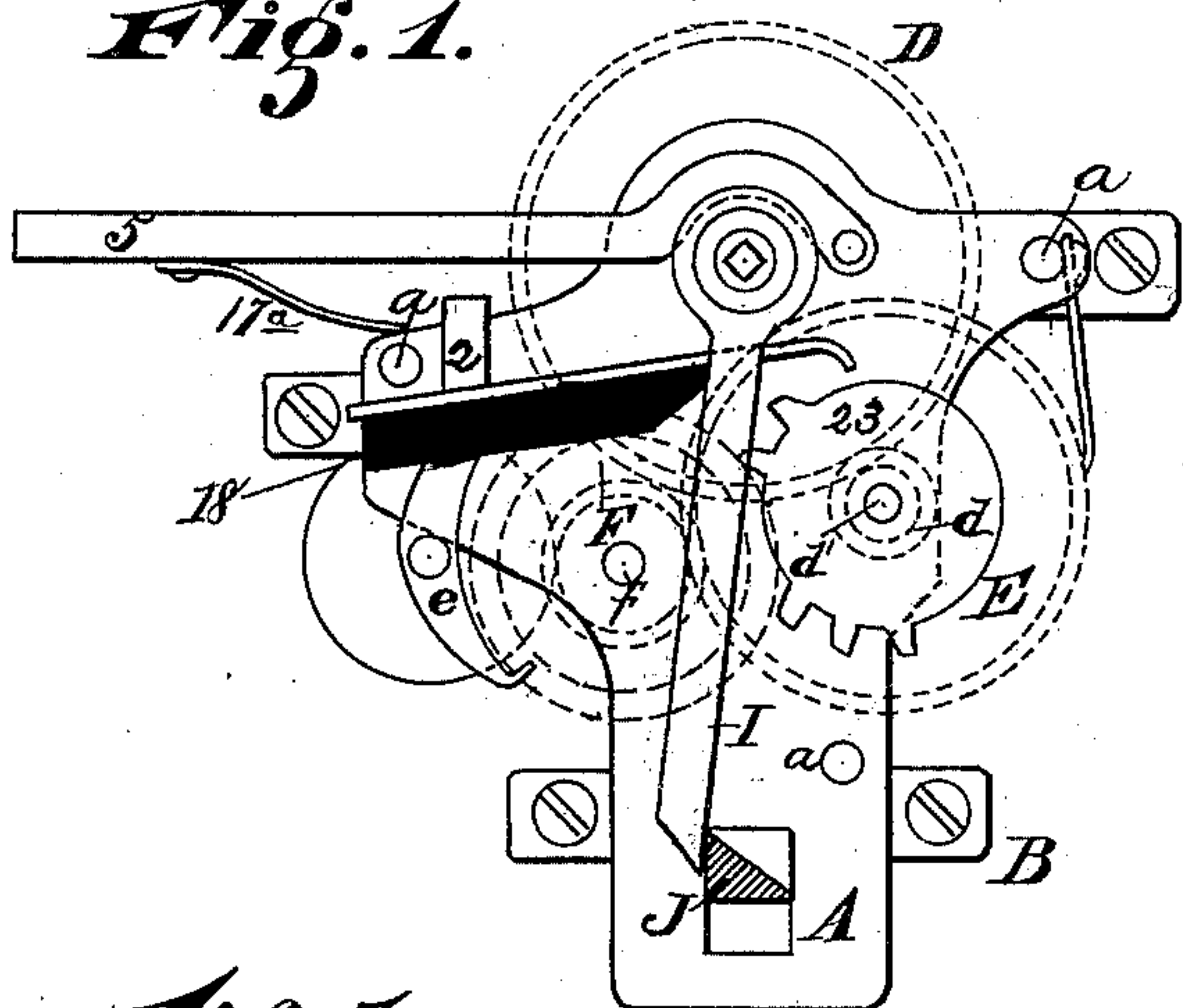


Fig. 6.

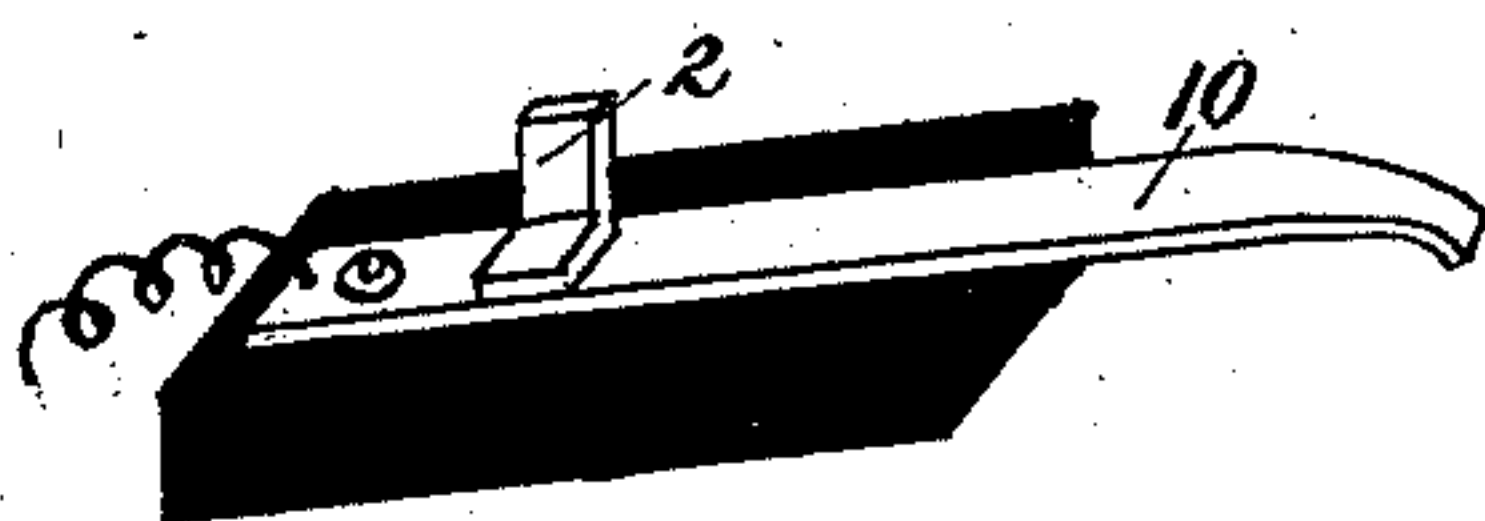


Fig. 2.

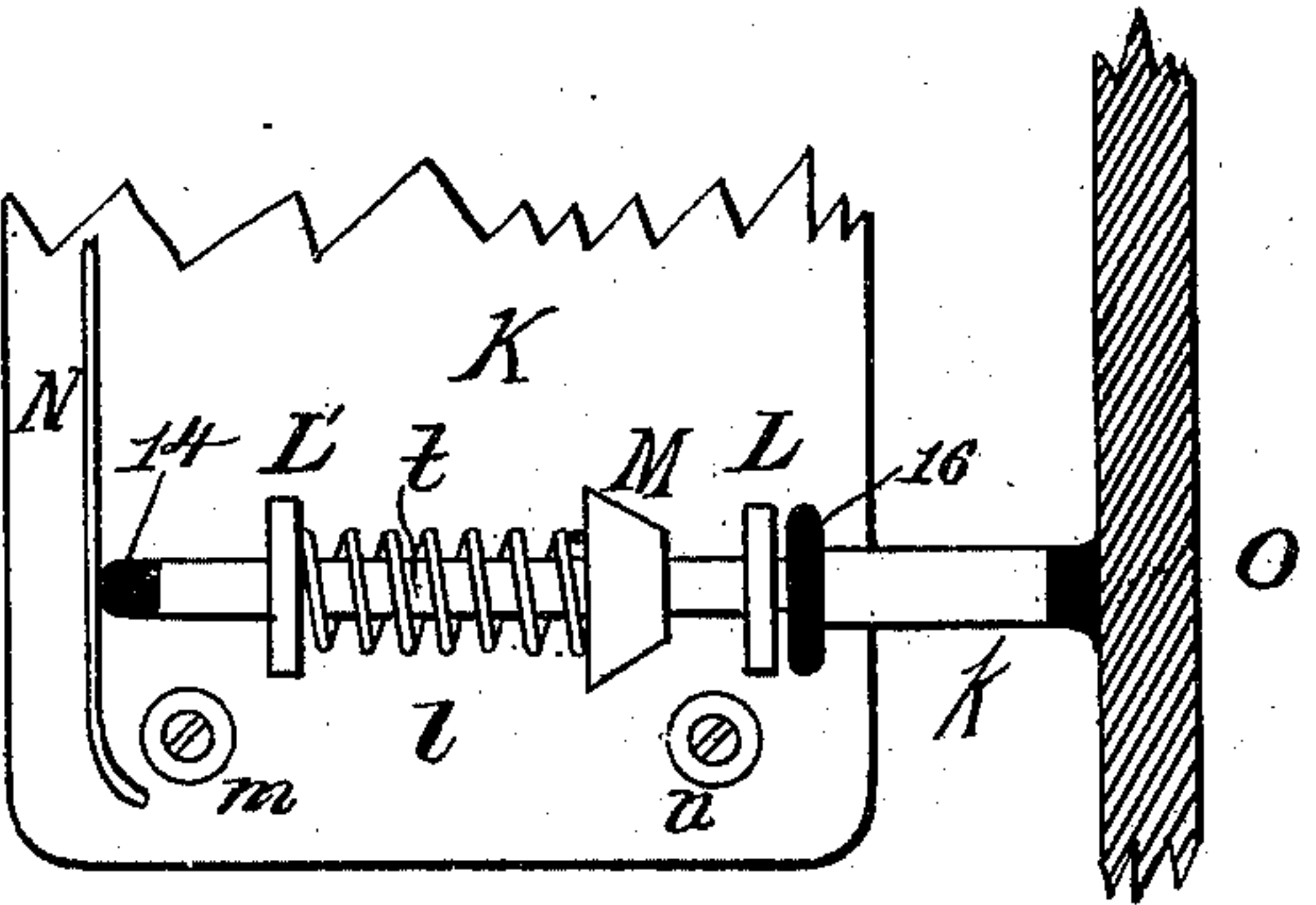


Fig. 3.

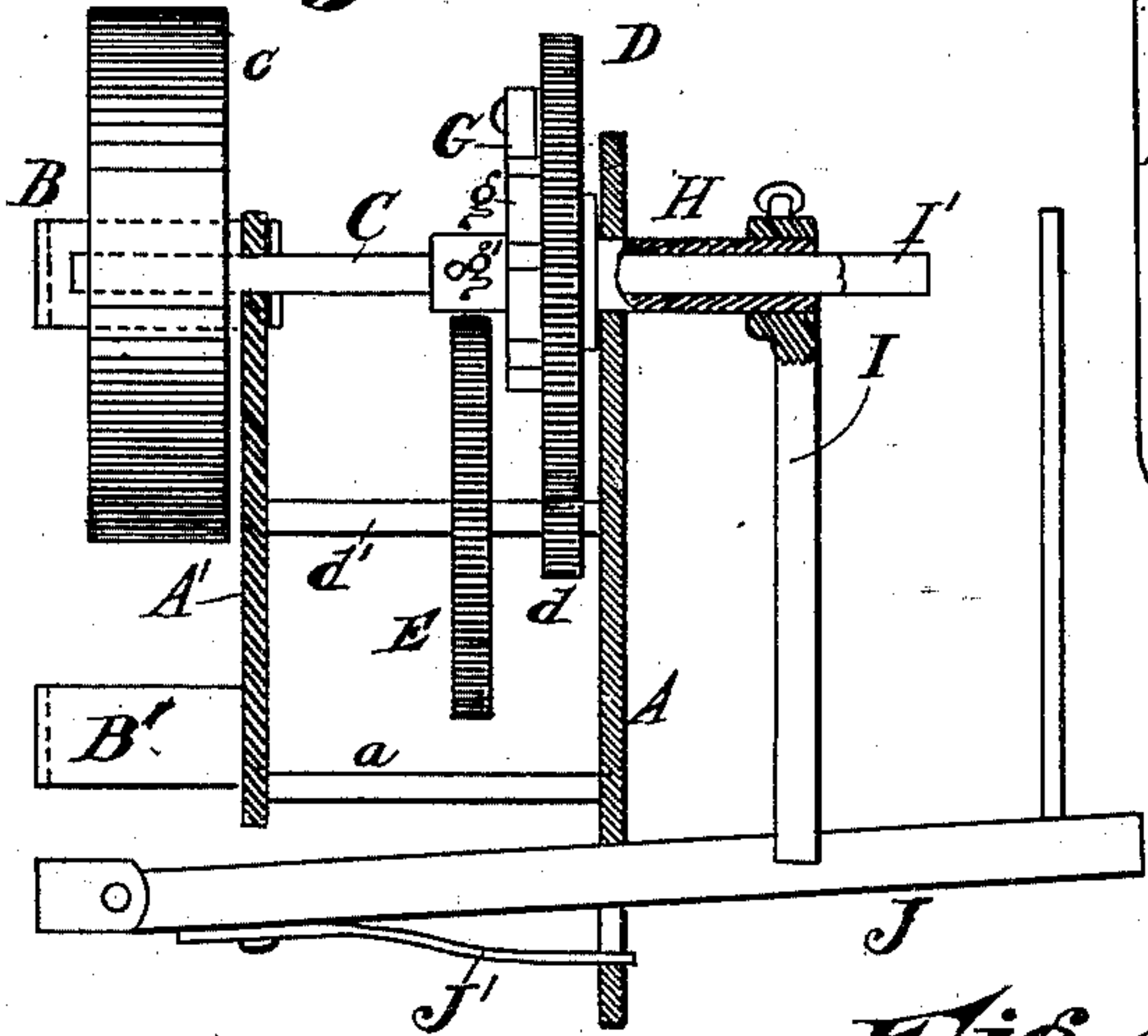
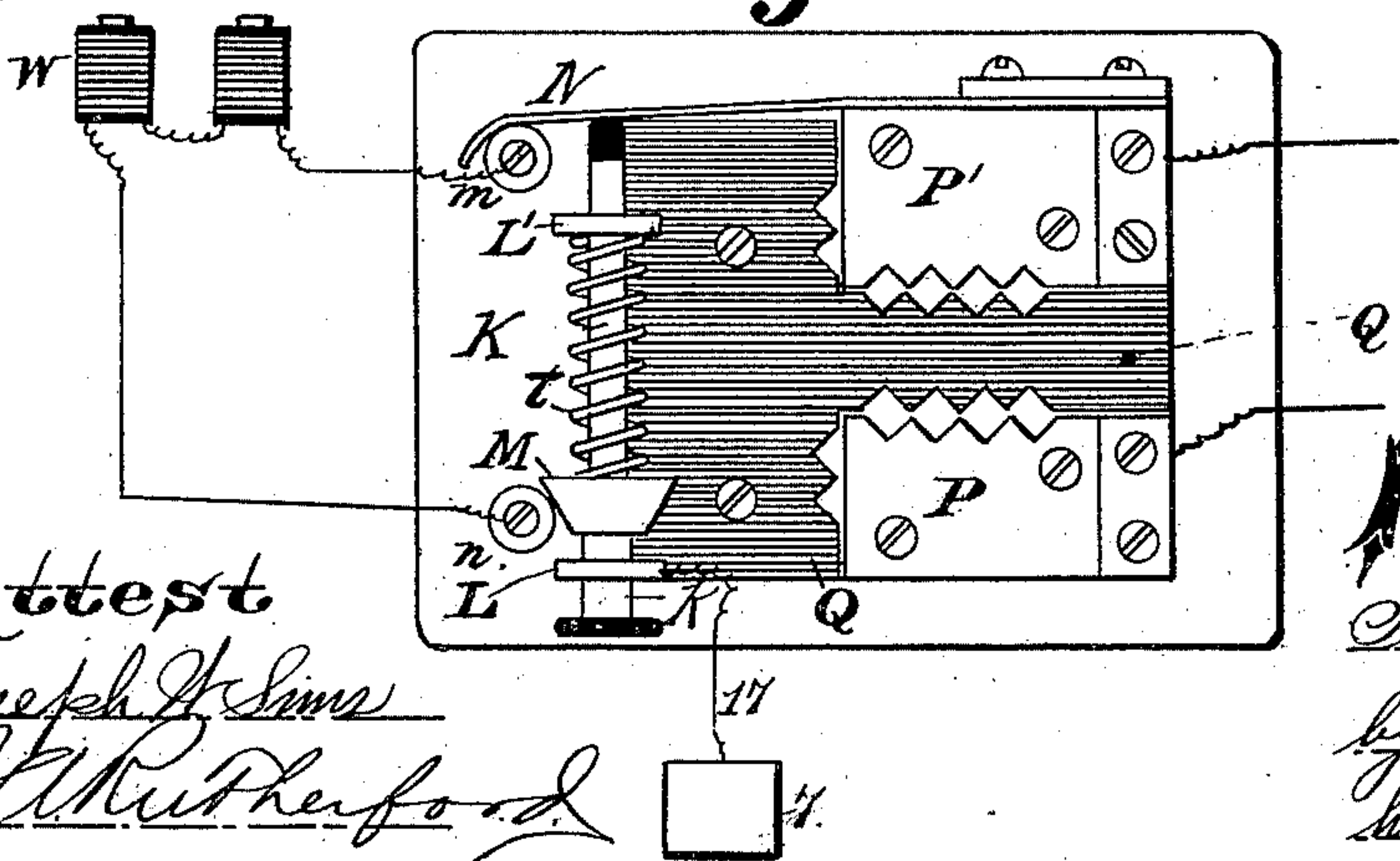


Fig. 4.



Attest
Joseph H. Sims
J. H. Rutherford

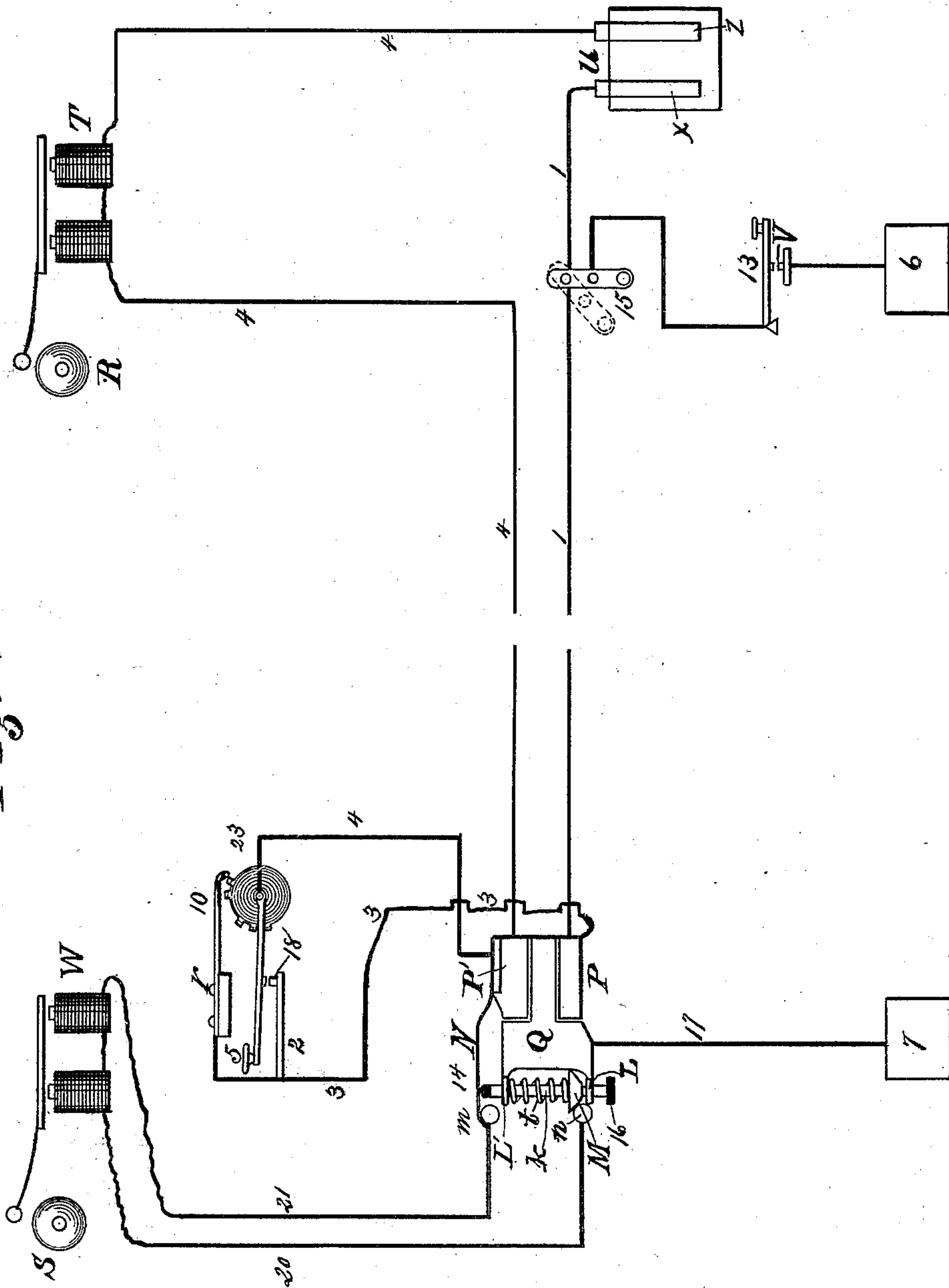
Inventor
Thomas F. Gaynor
by Wood & Boyd
his Attorneys, &c

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Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS F. GAYNOR, OF LEXINGTON, KENTUCKY, ASSIGNOR TO THE LEXINGTON MANUFACTURING COMPANY, OF SAME PLACE.

FIRE-ALARM TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 335,026, dated January 26, 1886.

Application filed November 18, 1884. Serial No. 148,230. (No model.)

To all whom it may concern:

Be it known that I, THOMAS F. GAYNOR, a resident of Lexington, in the county of Fayette and State of Kentucky, have invented certain new and useful Improvements in Fire-Alarm Telegraphy, of which the following is a specification.

My invention relates to an improved signal fire-alarm mechanism adapted to be inclosed in the ordinary metallic box. I have shown the mechanism adapted to be worked by an automatic trip attached to the door-lock of the fire-box, similar to that shown in an application of even date herewith.

One of the objects of my invention is to provide a clock-train adapted to automatically make a circuit to send signals or sound an alarm when the clock-train is set in motion, in combination with the independent key for sending separate signals by the same circuit.

Another object of my invention is to provide simple and effective means for setting the clock-train into operation for making and breaking the circuit.

Another feature of my invention consists in combining with the metallic circuit a ground-circuit, using one of the metallic circuit-wires as part of the circuit, operated by an independent key when the clock-work train is out of circuit.

Another object of my invention is to provide a lightning-arrester with an ordinary ground-wire connection, for carrying to the ground atmospheric electricity, combined with an automatic switch for making one of the ground-connections for the ground-circuit.

Another object of my invention is to employ a second ground-circuit connection, which can be brought into circuit by an independent key for signaling over the secondary or ground circuit.

Other features of my invention will be fully set forth in the description of the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a front elevation of my improved clock-work mechanism. Fig. 2 is a plan view of the switch for closing the ground-circuit; Fig. 3, a side elevation of Fig. 1, partly in section. Fig. 4 is a top plan view

of the lightning-arrester and switch. Fig. 5 is a diagram of the mechanism in circuit. Fig. 6 is a detail view of the independent signaling-key.

A A' represent the front and rear plates of the frame-work of the clock-train mechanism.

a represents the cross-girders combining the parts together.

B B' represent the arms rigidly secured to plate A', for connecting the frame-work to the inside of the fire-alarm box, of the ordinary construction, within which it is inclosed.

The clock-work mechanism is mounted upon the frame A A'.

C represents a main shaft. c represents a drum, within which is coiled a spring connected to the shaft C, for setting it in motion in the manner usual in clock and watch mechanism.

D represents a spur-wheel keyed upon sleeve H, meshing and driving spur d, keyed upon a suitable shaft, d', which also carries spur-gear E, which in turn meshes with the spur f, which carries the ratchet or escapement wheel F, the teeth of which engage with the escapement e, so as to regulate the movement of the clock-train.

23 represents a toothed wheel on shaft d', which is revolved by the clock-train and spring. This wheel is shown as provided with two teeth or projections having a small space between them, and then a longer space and three teeth, and then a longer space still between the set of three teeth and the two, so as to signal an alarm of 2, then 3, indicating 23.

It is obvious that any number of teeth with suitable spaces may be employed to represent the number of the call desired.

G represents a pawl attached to wheel D, engaging with teeth g on the ratchet-wheel, secured to shaft C.

H represents a sleeve connected to the hub of wheel D, journaling in standard A, which is shown partly in section, Fig. 3, and forms a journal-bearing for the shaft C.

I represents a detent-arm keyed to the sleeve H. The spring which drives the clock-work train drives the wheel D forward by means of the pawl G and ratchet g.

In order to wind the mechanism, the front

end of shaft C is squared to form a spur, I', so that shaft C may be revolved backward, by a wrench fitting the spur I', to wind the spring. When wheel D revolves forward, the detent-arm I is carried with it. The clock-work train is arrested by means of the tripping-lever J, which is held normally in position by means of a spring, J', as shown in Fig. 3. The wheel 23 is preferably geared to move around five times as wheel D, carrying the detent-arm I, moves around once, so as to signal the alarm five times when the tripping-lever J is depressed, so as to allow the detent-arm I and the wheel D to start in motion. The lower end of the arm I is beveled off, and the detent-arm J is likewise beveled off in a reverse direction, as shown in Fig. 1, so that as tripping-lever J is depressed the arm I may be moved sufficiently forward to bring the two inclines opposite each other, to prevent the arresting of the motion of the arm I by the contact of the points when tripping-lever J is forced upward by the retraction of the spring J'.

K represents a plate secured upon the bottom of the fire-alarm box, upon which is mounted the automatic switch hereinafter described.

LL' represent ears or posts in plate K, through which passes a shaft, *k*, journaled in said ears. *t* represents a retractile spring wound around said shaft and seated against the disk M and the ear L'.

m n represent binding-posts, to which wires are connected, the posts being insulated. When disk M is in contact with post *n*, and spring N is in contact with post *m*, the circuit is established through spring N and posts *m n*.

In order to have the magnet W normally out of ground-connection when the door of the fire-box is closed, switch-shaft *k* is projected outward, so as to strike against door O of the fire-box. Moving spring N, Figs. 2 and 5, from contact with post *m*, and disk M from contact with post *n*, breaks the ground-connection, as will be explained in connection with the diagram Fig. 5. When the switch is in position shown in Fig. 4, post *n* and shaft *k* are in ground-connection with ground-plate Q.

P P' represent lightning-arrester plates, forming part of the metallic circuit, which are placed in close proximity to plate 2, and being of large area an overcharge of current of atmospheric electricity on the wires and plates P P' will be attracted by plate 2, and the overcharge carried off through wire 17 to the ground, and prevent damage to the magnet W of call S, located in the fire-box.

I have shown by diagram Fig. 5 the method of connecting the parts in circuit.

R represents a call-bell operated by a magnet, T, in circuit at, say, the principal station, but not inclosed in the alarm-box.

S represents a call-bell inclosed within the signal-box in metallic-circuit connection.

U represents a battery or other suitable

source of electricity, X representing, say, the copper or one pole, and Z the zinc or opposite pole.

The metallic circuit is as follows: 1 represents a wire leading from pole X to plate P; thence from plate P, by wire 3 and spring-hook 10, through tooth or teeth of wheel 23, by wire 4, to plate P'; thence by wire 4, through magnet T, to pole Z. When the circuit-wheel 23 is revolved by the clock-train, the regular alarm-signals are given automatically on call R by the contact made with the spring 10, which closes the current intermittently. When spring-hook 10 is not in contact with the teeth of wheel 23, or when the latter is stationary, key 5 may be operated to form a circuit through it with wire 4 and magnet T to operate the call R. A sounder may be substituted for the bell R and ordinary telegraphic signals made by means of the circuit-key 5. Key 5 being in the fire-alarm box, the door must be opened to operate it.

In order to have a secondary circuit capable of operation when the fire-alarm box is open, I have provided ground-connections 6 7, to be used in lieu of the metallic circuit, said ground-connections being of small area, and thereby offering a comparatively high resistance. When the door of the box is closed, the ground-connection is broken at posts *m* and *n*, and when the door is open the reverse is the case. The area of the plates 6 and 7 is such that the resistance to the current is greater than through the metallic circuit, whereby the alarm will take precedence over the operation of the key. When the door of the box is opened, spring N is brought into contact with post *m* and disk M with post *n*. A ground-circuit is established when key 13 is in contact with post V as follows: from pole Z through wire 4, magnet T, to plate P'; then through spring N, post *m*, wire 21, magnet W, wire 20, post *n*, disk M, rod *t*, lugs L', plate Q, ground-wire 17, to ground 7; from ground 7 to ground 6; from ground 6, through key 13, switch 15, and wire 1, to pole X. It is thus evident that working-key 13 will give signals on call S and call R. By this ground-circuit signals may be given from either the box or station, as desired. Switch 15 may be turned to throw the ground 7 out of circuit and employ the metallic circuit alone.

14 16 show insulations made of gutta-percha for effectually cutting out the ground-circuit when the door O of the fire-box is closed, whereby the rod *t* is driven inward, breaking the connection at posts *m* and *n*, as already described.

In Fig. 1 I have shown key 5 attached to the frame of the clock-work mechanism and brought into metallic contact with the frame through wheel 23, so as to bring it into metallic-circuit connection when key 5 is in contact with post 2, which is insulated from contact with frame A by gutta-percha, 18. Spring 17^a holds the key normally out of contact with the metallic circuit.

The signal mechanism may be operated as follows: When the tripping-arm J is depressed so as to set the clock-train in motion, the call R at the main station is operated by the clock-train mechanism in the metallic circuit above described. Key 5 is operated to ring the call R or signal when the clock-work train is stationary, and key 13 is operated through the ground-connections to signal call S when the clock-train is at rest and the box open. Thus the operator at the main station can signal through call S any one of the stations by means of the ground-circuit when the door of the box is open, so that independent methods of signals may be operated at either station—one by means of the metallic circuit and the other by means of ground-circuit—and the automatic signal is operated by the metallic circuit and clock-train, as before described.

It will be observed that the mechanism herein shown may be employed for independent signaling through the ground-connection; but this will not interfere with the sending in of alarms through the metallic circuit, or independent signaling from any one of the keys 5 in metallic circuit; but the operation of the signaling through the metallic circuit will interrupt the signaling through the ground-circuit and take preference over the latter. As the metallic circuit has less resistance than the ground-circuit, it will operate primarily, and the clock-train when set in motion will convey signals whether key 13 is operated or not.

I have shown in the diagram only one box in circuit with the main office. It is obvious that as many signal-boxes and grounds 7 as desired may be put in metallic circuit 1 and 4. Various modifications may be made in the manner of connecting the metallic circuit and

ground without materially affecting the operation herein described.

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

1. The combination, with the normally-open metallic circuit and the clock-work train arranged therein, of the automatic switch M N, the ground-plates, the sliding rod *t*, and the door of the fire-box, substantially as described.

2. The combination, with the lightning-arrester and ground-connection, of the switch M N, the rod *t*, having its ends insulated, the door O, and a ground-circuit which is automatically closed by opening the door and opened when the box is shut, whereby danger of sounding alarm by breaking or cutting the wires is avoided, substantially as described.

3. The combination, with the clock-train, of a magnet, W, wires 20 and 21, binding-posts *m* and *n*, the spring-actuated rod K, spring-switch N, disk M, ground-connection 17, lightning-arrester P P', metallic circuit 1 3 4, magnet T, and ground 6, substantially as described.

4. In combination with the clock-work train, substantially as herein shown, and the normally-open metallic circuit in which said train is arranged, the detent-arm I and tripping-lever J, adapted to be set instantly in motion by the depression of the arm J, and a ground-branch which is automatically brought into circuit when the metallic circuit is broken by the closing of the door of the fire-box, substantially as specified.

In testimony whereof I have hereunto set my hand.

THOMAS F. GAYNOR.

Witnesses:

JOSEPH W. SIMS,
M. E. MILLIKAN.