

(No Model.)

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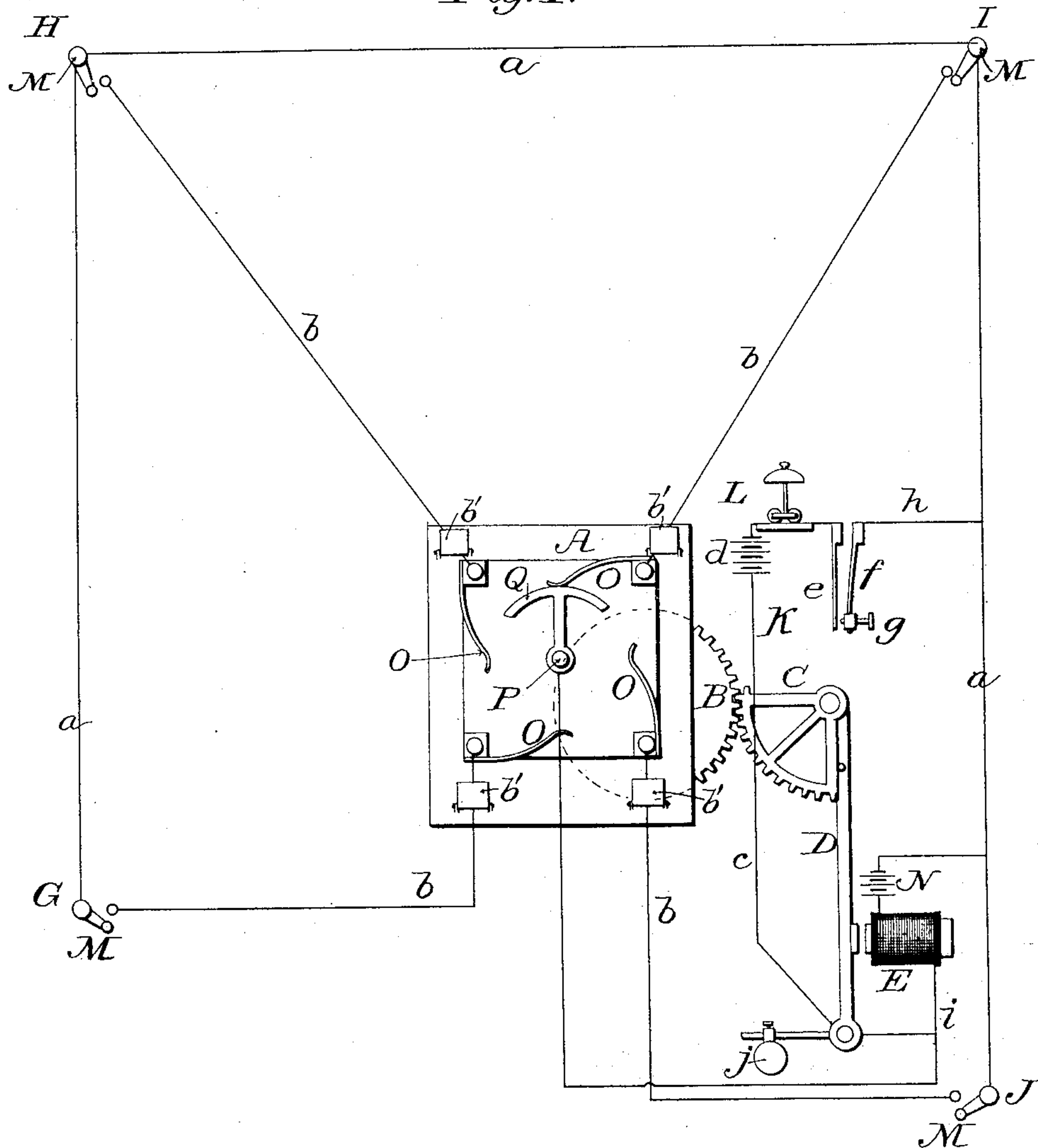
T. AHEARN.

ELECTRIC TIME DETECTOR.

No. 329,874.

Patented Nov. 10, 1885.

Fig. 1.



Witnesses:
Jas. F. Duhamel.
Walter S. Dodge.

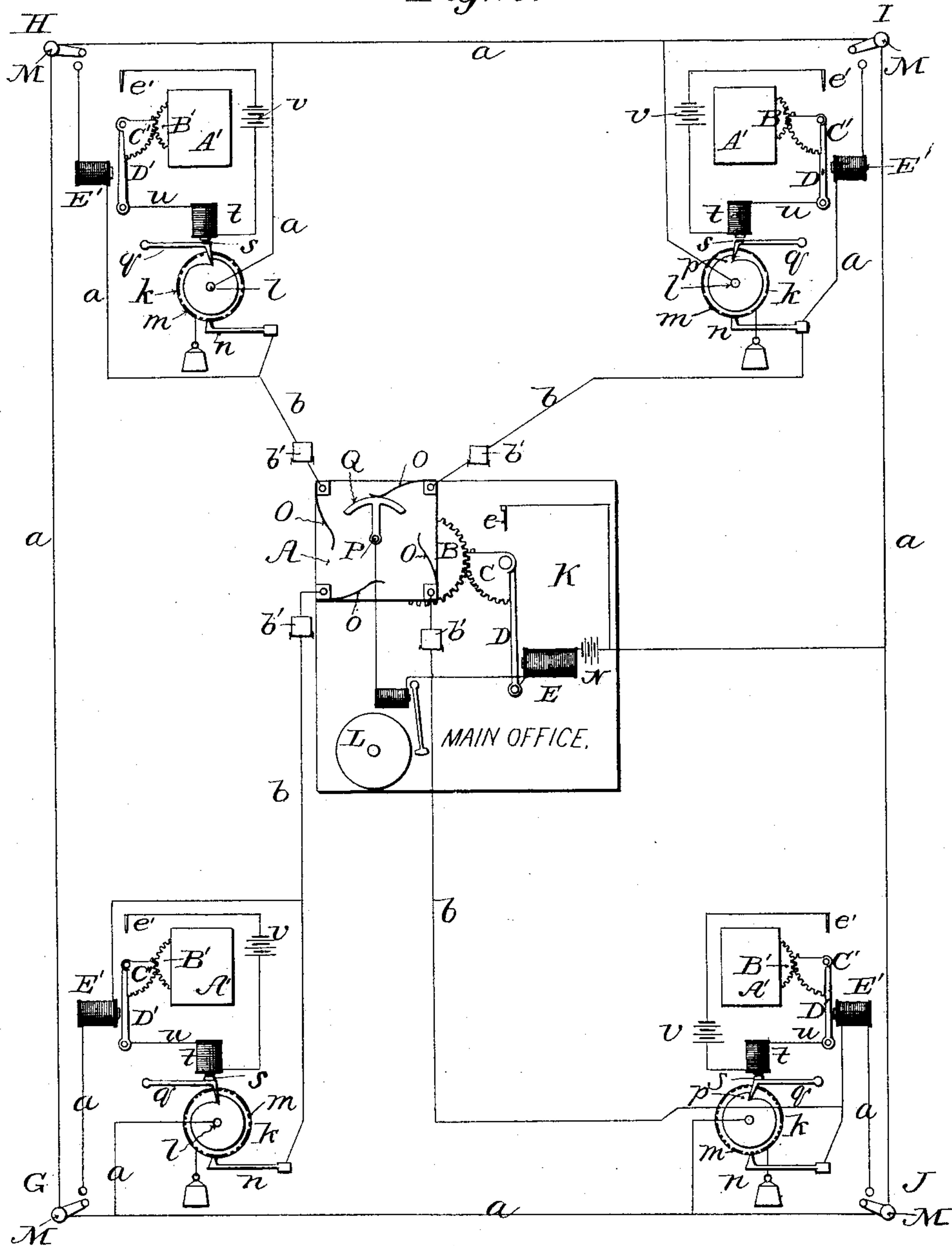
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ELECTRIC TIME DETECTOR.

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Fig. 2.



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(No Model.)

3 Sheets—Sheet 3.

T. AHEARN.

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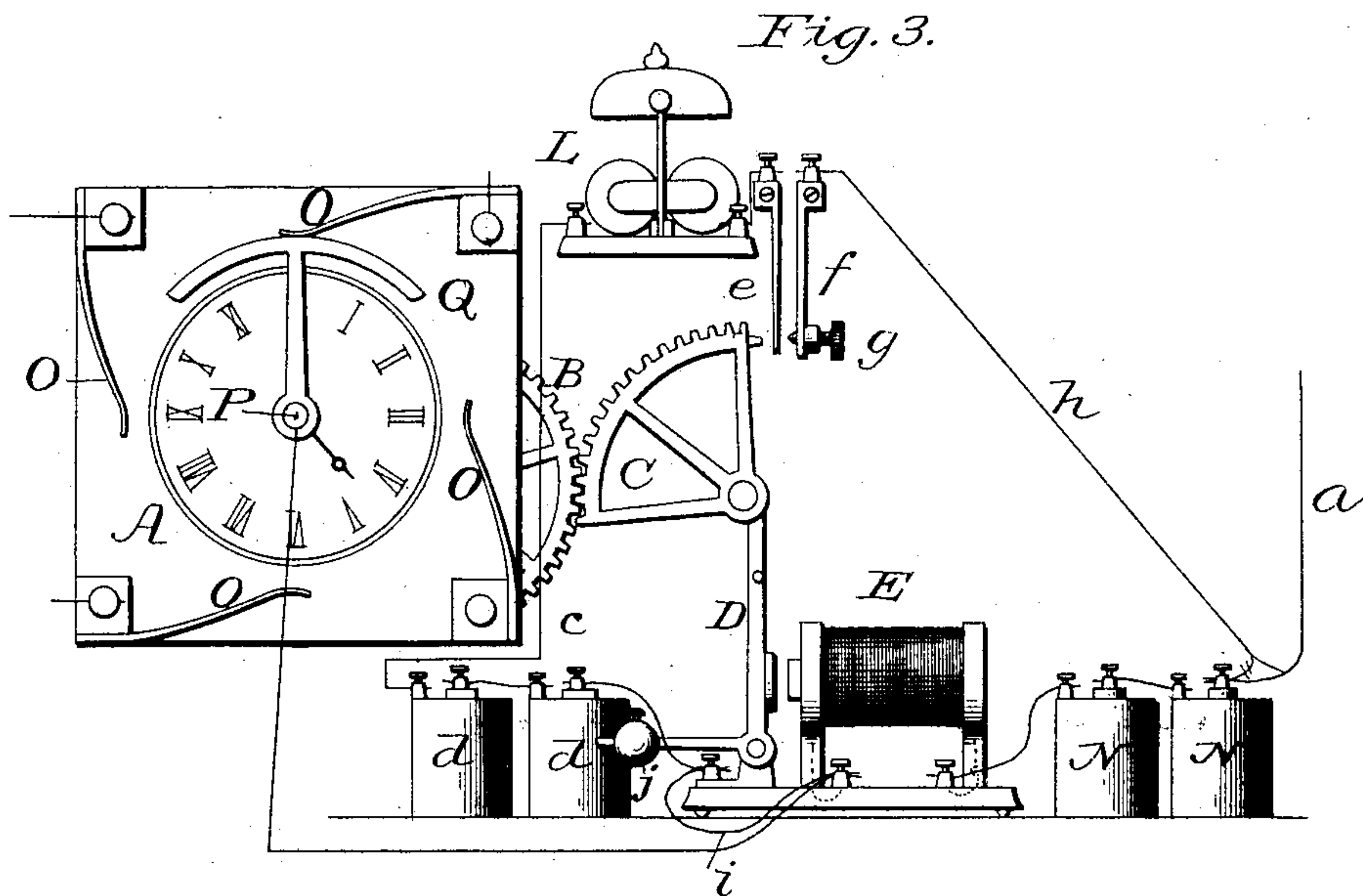
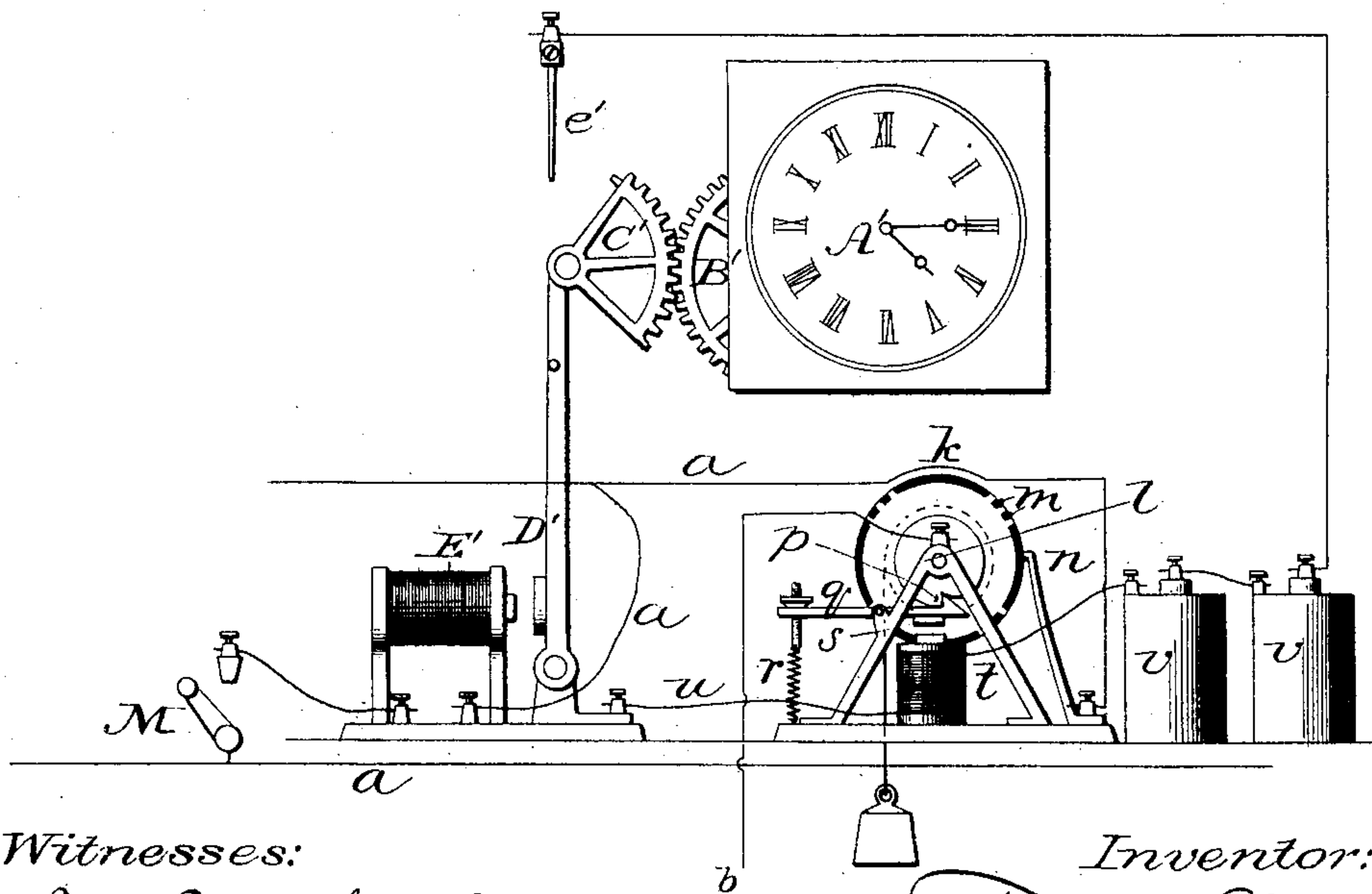


Fig. 4.



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UNITED STATES PATENT OFFICE.

THOMAS AHEARN, OF OTTAWA, ONTARIO, CANADA.

ELECTRIC TIME-DETECTOR.

SPECIFICATION forming part of Letters Patent No. 329,874, dated November 10, 1885.

Application filed September 1, 1884. Serial No. 141,934. (No model.)

To all whom it may concern:

Be it known that I, THOMAS AHEARN, of Ottawa, in the county of Carleton and Province of Ontario, Dominion of Canada, have invented certain Improvements in Time-Detectors, of which the following is a specification.

My invention relates to time-detectors for watchmen; and it consists in certain improvements upon the apparatus for which Letters Patent of the United States were issued to me bearing date October 30, 1884, and numbered 287,401, to which patent reference is hereby made for any details not found herein.

The purpose of my invention is to more certainly prevent the watchman from neglecting his duty or interfering with the operation of the alarm mechanism, except from the proper point and in the proper way, and compel him to be at the proper stations at required times. These results are accomplished by providing automatic mechanism for establishing a circuit from each of a series of stations in a predetermined order and for a definite length of time, which circuit may be completed by the watchman through a button, switch, or like device provided for the purpose. If the watchman fail to arrive at the station within the prescribed limit of time, the circuit is destroyed and cannot be completed by the button or switch, and the alarm in the office, central station, or other proper place is sounded, showing the failure of the watchman to attend to his duty. A "drop," operated by an electro-magnet in connection with the push-button and main line, falls when the watchman is on time and presses the button.

In the apparatus heretofore patented to me, as above mentioned, the resetting of the apparatus depends upon the closing of the "watch-circuit" manually. This is undesirable, because if the person whose duty it is to notice the alarm does not reset the segment the alarm will keep on ringing continuously, unnecessarily consuming battery; and for other obvious reasons it is desirable that it should automatically reset itself. To accomplish this, I provide a circuit-closer adapted to first complete the alarm-circuit, and thus allow the alarm to be sounded, and then, after a proper interval, to complete the resetting-circuit, which causes the operation of the alarm to

cease, the alarm to be set back, and the mechanism to be made ready for the next operation.

A number of signal-boxes connected with a line or lines running from the central station may be placed one in each of the premises or buildings to be protected, and each held normally out of action by a detent controlled by an electro-magnet which is energized only at the expiration of the period the watchman is allowed to work upon the building where the particular instrument is located, and only then in case of his failure to press the button or device by which the sounding of the alarm is prevented.

The signal device is adapted to transmit a predetermined and definite signal—as, for instance, the number of the station or building—to a central office, showing that the watchman at that point is not attending properly to his duty, whereupon a person will be dispatched from the central office to look after the derelict watchman.

Referring now to the drawings, Figure 1 represents the apparatus arranged to sound a simple alarm, as the ringing of a bell in the office or sleeping-apartment of the clerk or like place; Fig. 2, a similar view, but showing the signal-boxes introduced into the line at different stations, and arranged to send an alarm to a central station or main office, which, with this system, could embrace a whole city. Fig. 3 is an enlarged view of the circuit-closer which causes the sounding of the alarm and consequent resetting of the apparatus; Fig. 4, an enlarged view of the signal device at the stations.

Referring for the present to Fig. 1, A indicates the clock or time movement which controls the circuit-closer and the mechanism for establishing the different circuits at proper times, and B a wheel thereof, which, as in my former patent, meshes with and serves to raise a segment, C, pivoted to a swinging or movable arm, D, which forms or carries the armature of an electro-magnet, E. I should here explain that the circuit-closer mentioned does not under this arrangement complete the entire circuit, but puts it in condition to be completed by the button or switch controlled by the watchman. The electro-magnet E is included in the line-circuit *a*, which is connected with various stations, G H I J, &c., with the

main office K, which may be the clerk's desk or apartment, a special office, or such other place as desired, at which point is located the alarm L, and, advisably, the time devices A.

5 The line *a* forms an open circuit, but at each station that the watchman is required to visit there is placed a push-button or equivalent device, M, by which the circuit may be closed, causing the electro-magnet E to be energized by

10 the battery N, and to attract the armature D, thereby withdrawing the teeth of segment C from those of the wheel B, and permitting said segment to fall by gravity to a position where its uppermost teeth will again mesh

15 with the wheel B upon the release of the armature, this being essentially as in my former patent. Instead, however, of a single circuit, as before, which plan was objectionable, because the watchman was enabled to control

20 the segment continuously from any one of the stations without detection unless a special signal was provided. I now provide from each station to the main or central office a separate line, *b*, with which the push-button or like

25 device makes connection. These wires *b* are connected each to an independent spring-finger, O, which fingers are insulated and arranged at equal distances apart, and in regular series about a spindle or arbor, P, of the

30 time mechanism A, which spindle carries an anchor-shaped arm, Q, included in the line or circuit *a*, but otherwise insulated from all electrical contact. The outer face of arm Q is an arc of a circle concentric with the spindle P,

35 and in the present instance is represented as constituting about one-quarter of a circle, the extent of the surface being in all cases in direct proportion to the number of stations, which in the drawings is four. The spring-

40 fingers O are so located that as the arm Q travels around with spindle P it makes contact with each successively and perfects contact with one just at the instant it destroys contact with the other, thus keeping one circuit al-

45 ways in connection with the detector. The spindle P, which may be that to which the minute-hand is commonly attached, is regulated to complete one revolution in a given time—an hour, for instance; hence each of

50 the four wires *b* will be connected and maintained in connection with arm Q for fifteen minutes, one after another; or the period and the number of circuits and stations thereon may be varied, as desired, and as will be readily understood. As but one circuit is con-

55 nected at any time, and as such circuit remains connected for a predetermined period only, which period corresponds with the intervals between the required visits of the watchman at different points, it follows that he is com-

60 pelled to appear at each point on time, or else the alarm will sound and disclose his failure to appear.

L indicates the alarm, as before mentioned, which under the arrangement shown in Fig. 1 may be simply a vibrating bell. As best shown in Fig. 3, this alarm is included in a normally-

open local circuit, *c*, containing a battery, *d*, and including segment C and armature D, the circuit being completed only when, through

70 failure of the watchman to cause the withdrawal of said segment and armature, the segment is permitted to make contact with spring-arm *e*, which is insulated, as indicated. When

75 such contact is made, the electro-magnet of the alarm bell or device L is energized and the alarm is sounded, the alarm continuing until spring-arm *e* is forced by the pressure

80 of the segment C into contact with a second arm, *f*, or with contact-screw *g* thereof, said screw being provided in order that the length of movement of arm *e*, and consequently the duration of the alarm, may be varied as desired. Arm *f* is included in a short circuit

85 formed by arm D, segment C, spring-arms *e f*, wire *h*, line *a*, battery N, electro-magnet E, and wire *i*, which latter connects with arm D; hence when arms *e* and *f* are brought into contact the magnet attracts armature D, with-

90 draws segment C, and permits the latter to fall, thereby breaking both the local or alarm circuit and the short circuit of the main battery. The segment in thus falling is carried

95 back to the starting-point of its rise or travel, and is thrown into engagement with wheel B by the counter-weight *j* of the armature-lever D. Thus the apparatus operates continuously, sounding no alarm unless the watchman is derelict in his duty, and promptly giving notice

100 in the event of his failure to perform the same.

As shown in Figs. 1 and 2, each of the lines *b* is provided at the central office with a drop-shutter, annunciator, or self-starting register, *b'*, of any common construction, which, acting

105 in its ordinary way, indicates to the attendant the station from which the operator sends in his signal or fails to send it as required, so that the attendant is not dependent upon the alarm-bell for this information.

In many places it is found inconvenient or

110 impracticable to place the alarm in or about the building to be protected by the detector, and hence I propose to place in such buildings or stations an automatic signal device which is included in the circuit and so constructed

115 and arranged that upon the failure of the watchman to appear and perform the requisite releasing operation a definite and predetermined signal will be automatically sent to the main or central station or headquarters, as is

120 now done manually in certain district messenger systems. Such an arrangement is shown in Fig. 2.

Referring now to Fig. 2, L indicates an alarm at the central office or headquarters,

125 which alarm should in this case be a single-stroke bell placed in the main circuit *a b* at a point between the electro-magnet E and arm Q of the mechanism at said central office. This bell or alarm is used in connection with

130 self-starting signal devices or mechanisms, one at each of the stations or points to be protected, each capable of giving a different determinate signal. This mechanism is illus-

trated in Figs. 2 and 4, and embraces a time-movement, A', having a wheel, B', which meshes with and lifts a segment, C', pivoted to the upper end of a swinging or rocking armature, D'. The armature is held toward wheel B' by the weight of segment C' at one side of the center, or by a special counter-weight, except when withdrawn therefrom by an electro-magnet, E', included in the circuit *a b*, and energized only when the circuit-closer M is moved to close the circuit at the station, and when the return-line *b* from that particular station is in electrical connection with arm Q, thus fully completing the circuit. The mechanism thus described is provided at the stations to close a local-battery circuit in case the watchman fails to arrive and move the circuit-closer M of the main line on time, said local circuit including battery *v*, electro-magnet *t*, wire *u*, armature D', segment C', and finger *e'*, as shown in Figs. 2 and 4.

k indicates a signal-wheel of ordinary construction, (one at each station,) provided with insulated portions *m*, alternating with metallic portions in proper number and order to make and break with a spring-finger, *n*, attached to the return-line *b* from each station, and thus to send a predetermined definite signal over said line *b* to the central office. Each wheel *k* is carried by an arbor, *l*, about which is wound a spring or weight-cord, so that when released the wheel may rotate, and upon the side of each wheel *k* there is formed a hub or boss having a single tooth, *p*. This tooth is for a locking dog or pawl, *q*, to engage with, said dog being held close down to the hub by gravity, as in Fig. 2, or by a spring or weight, as in Fig. 4. The dog or pawl *q* is furnished with a soft-iron armature or block, *s*, which is placed within the field of attraction of the electro-magnet *t*. When the wheel *k* is at rest, the finger *n* rests upon an insulated portion of the wheel.

The mechanism being thus constructed and arranged, and the time mechanisms A' of the stations being put in motion, the action is as follows: As the wheel B' rotates, it lifts segment C' toward finger *e'*; but if the watchman arrives in time he operates button or switch M of that station the return-line *b* of which is in electrical connection with arm Q of the instrument at the central office. By this arrangement the watchman completes the circuit *a b* from the station at which he is then present, thereby energizing electro-magnet E' at that station, withdrawing armature D' and segment C', and thus preventing the completion of the local circuit at the station. The fact that he is at such station is shown to the attendant at the central office by the falling of the drop-shutter or like indicator *b'* at the central office. In case the watchman fails to arrive at the proper station on time, the segment C', raised by wheel B', will make contact with finger *e'* and complete the local circuit through finger *e'*, battery *v*, electro-magnet *t*, wire *u*, armature D', and segment C', thereby

energizing said electro-magnet *t* and causing it to attract armature *s* and withdraw dog or pawl *q* from engagement with tooth *p* of wheel *k*. When this happens, wheel *k* immediately begins to rotate, and makes one complete revolution before it is again stopped by the engagement of dog *q* and tooth *p*. By that time the segment C', unable to rise any farther, is thrown off by the wheel B' and drops back, destroying the local-battery circuit and allowing the dog to resume its normal position. This disengagement of the segment from the wheel is due to the fact that its upper end being arrested, no further movement can take place in that direction, and the full force of the clock-train is then exerted to cause the teeth of wheel B' to ride upon and crowd outward the teeth of the segment C', thus forcing back the segment, overcoming the action of gravity by which the segment is held toward or in contact with the wheel, straightening the upright D' to a vertical position, and allowing the segment to drop.

The springs, weight, or other impelling mechanism of the several wheels *k* are adapted to cause a considerable number of revolutions of the wheels, so that they need be wound only at comparatively long intervals.

I do not limit myself to the use of the particular construction of the signal-wheel *k*, as it is apparent that it may be provided with more than one tooth *p*, as indicated in Fig. 2, and otherwise modified, without departing from the spirit of my invention.

Having thus described my invention, what I claim is—

1. In a time-detector system, the combination of a number of independent circuits with one or more stations thereon extending to a central office or station, a circuit-closer at each station, a time mechanism, and a traveling circuit-closer carried by said mechanism and adapted to make and preserve contact with each of said circuits in succession for a given period, each of the circuit-closers or signal-alarm stations being constructed to send in a different number to correspond with a pre-arranged central-office list.

2. In combination with circuits *a*, return-wire or earth-wire *b*, circuit-closer M, time-movement A, provided with wheel B, segment C, meshing with said wheel, swinging armature D, electro-magnet E, and battery N, included in circuit *a*, local battery *d*, alarm L, and finger *e*, and an electrical conductor connecting said finger with line *a*, substantially as shown and described.

3. In a time-detector system such as described, the combination, with a time-movement and with a circuit-closer moved thereby, of spring-finger *e*, included in a local alarm-circuit, and finger *f*, included in a short circuit of the main line, finger *e* being movable and adapted to be pressed by the moving circuit-closer into contact with finger *f*, whereby said circuit-closer is caused to first close the alarm-circuit and insure the sounding of the

alarm, and then to close the short circuit of the main line for the purpose of resetting the apparatus and destroying the alarm-circuit.

4. In a time-detector substantially such as described and shown, the combination, with a local-alarm circuit, main lines or circuits, and time mechanism, of a circuit-closer moved by said time mechanism, a movable contact-finger in the path of said circuit-closer and included in the alarm-circuit, and a second contact-finger in the path of movement of the first and included in the main line controlling the circuit-closer, whereby the circuit-closer is caused first to complete the alarm-circuit, and subsequently to complete the circuit over the main line, as and for the purpose set forth.

5. The combination, in a time-detector system such as described and shown, of a time-movement, A, wheel B, segment C, armature D, line *a*, battery N, an electro-magnet in said line, alarm L, a local-battery circuit therefor, yielding finger *e* in said local circuit, and finger *f*, adapted to be touched by finger *e* as the latter is moved by segment C.

6. The herein-described time-detector system, consisting of time mechanism A, wheel B thereof, segment C, movable armature D, electro-magnet E, battery N, line *a*, circuit-closer M, signal-wheel *k*, return-wire *b*, traveling arm Q, detents *q*, and electro-magnets *t*, included in an independent circuit completed by the movement of segment C, all substantially as set forth and shown.

7. In a time-detector system, the combination of a main or outgoing line running from a central station to different outlying stations, an earth-connection or return-wire from each station to the central station, an annunciator in each return-line at the central station, a circuit-closer at each of the outlying stations under control of the watchman, and a circuit-wheel at the central station adapted and arranged to connect the outgoing or main line with each return-line successively, and to de-

stroy connection with all the remaining return-lines while connecting the one.

8. The combination, substantially as herein set forth, of an alarm line or wire, stations on said line, a return-line from each station to a central office, a circuit-closer at each station under control of a watchman, a signal-wheel included in the main line at each station, detents for holding the circuit-wheels at rest, an electro-magnet at each station included in a local or tell-tale circuit, adapted and arranged to withdraw the detent and allow the signal-wheel to operate if the watchman fails to operate the circuit-closer at the station to prevent such withdrawal, and a time mechanism adapted and arranged to close the local circuit at a predetermined time if the watchman fails to perform his duty.

9. The herein-described signal apparatus, consisting of a main or outgoing line, *a*, and return-wire *b*, connecting a main office or central station and an outlying station, an alarm at the main office or central station, a signal-wheel, *k*, at the outlying station, a detent, *q*, for holding the signal-wheel at rest, a local-battery circuit at the outlying station, an electro-magnet, *t*, included in the local circuit and adapted to withdraw the detent, a time mechanism, A', at the outlying station, a local-circuit closer, C', controlled by the time mechanism, a movable support, D', for the circuit-closer C', and electro-magnet E', included in the circuit *a b*, adapted to retract the movable support D' and withdraw the circuit-closer C' from the control of the time mechanism, and a circuit-closer, M, under control of a watchman and serving to close the circuit *a b*, said parts being combined and arranged to operate substantially as set forth.

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Witnesses:

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