

(No Model.)

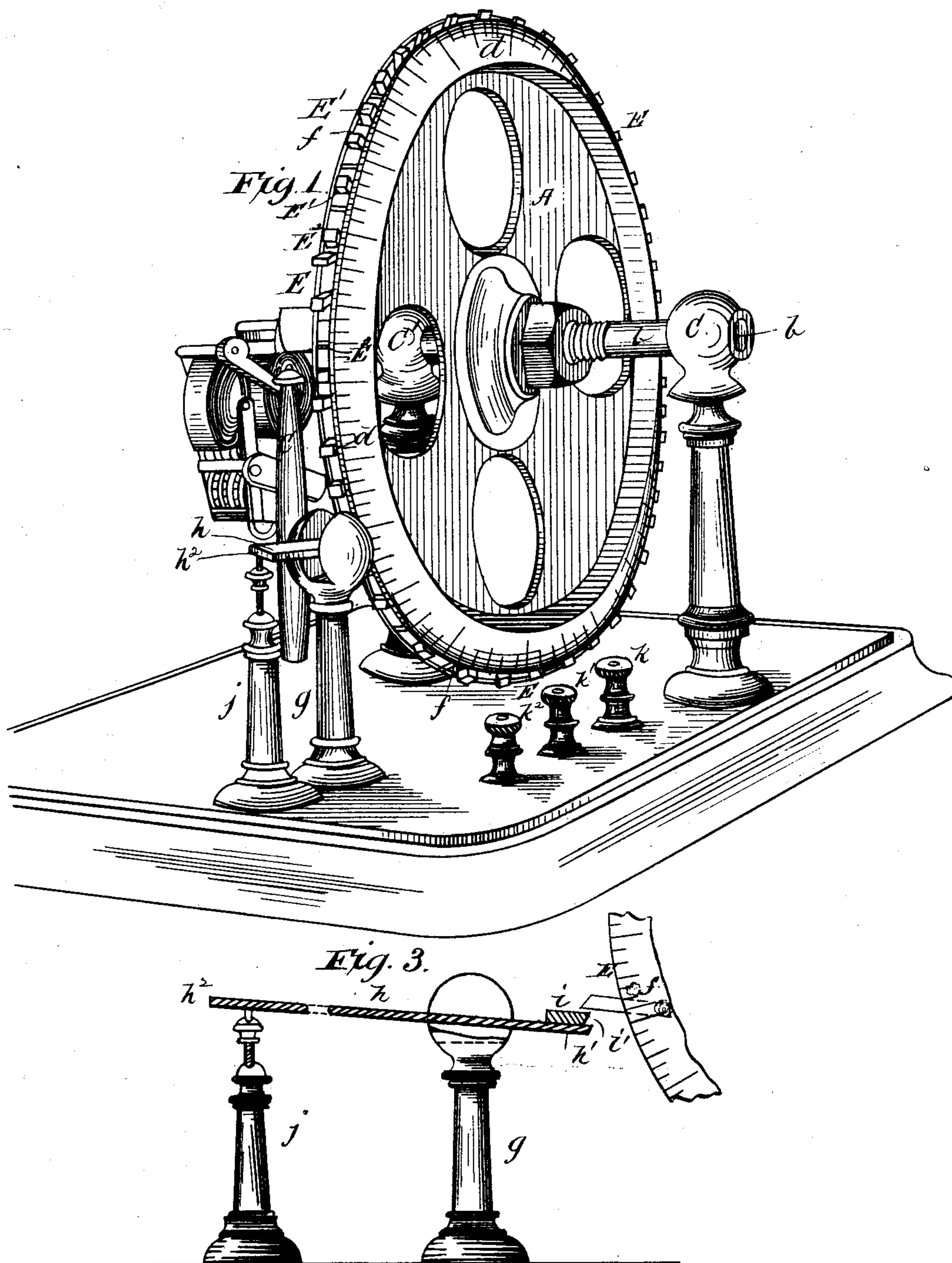
4 Sheets—Sheet 1.

J. E. RICHARDS.

ELECTRIC TIME DETECTOR.

No. 258,603.

Patented May 30, 1882.



Witnesses:
H. L. Bunnem
Phillips Abbott

Inventor:
James E. Richards
By Wetmore Jensen and
Hompson his Attys

(No Model.)

4 Sheets—Sheet 2.

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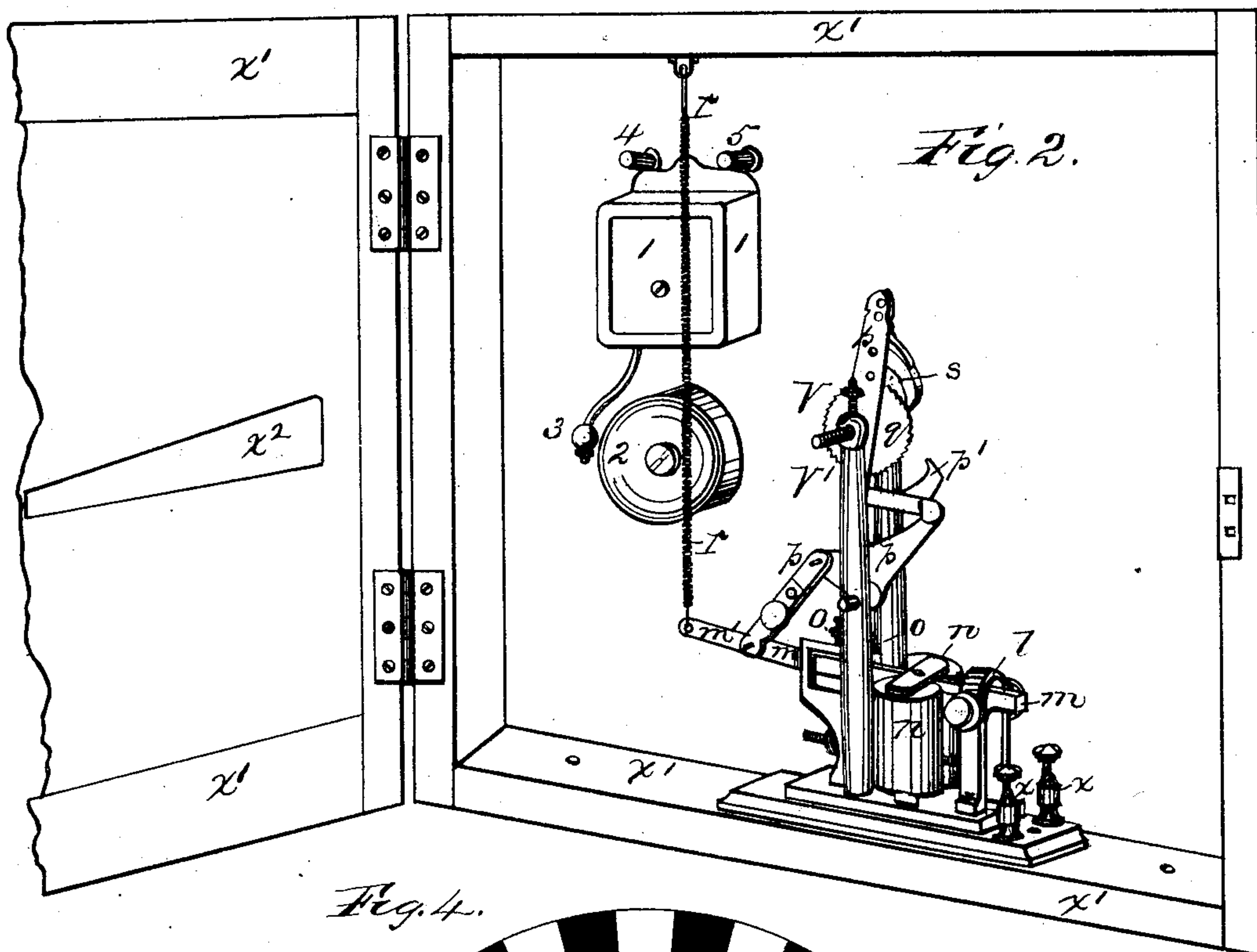
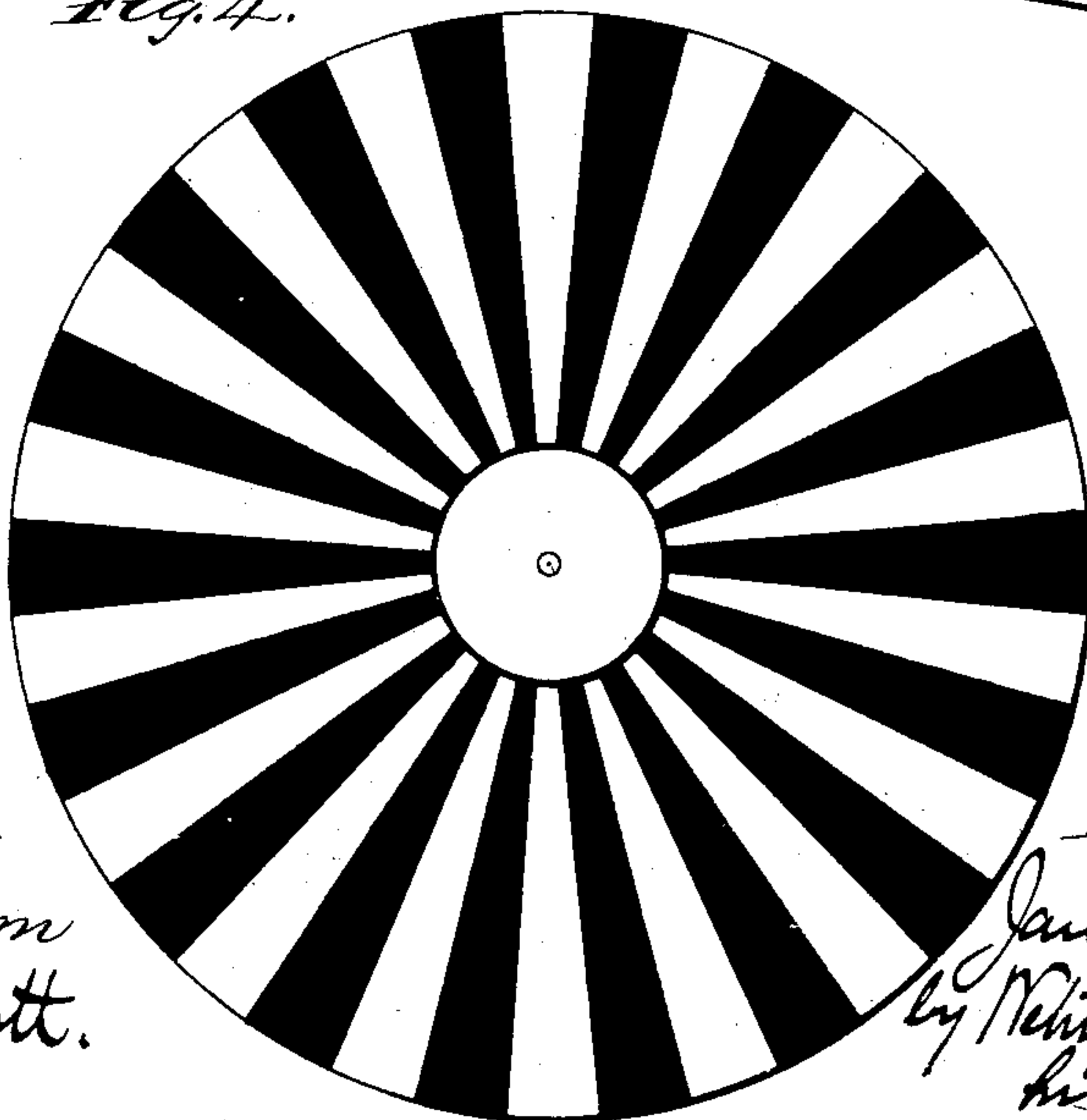


Fig. 4.



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(No Model.)

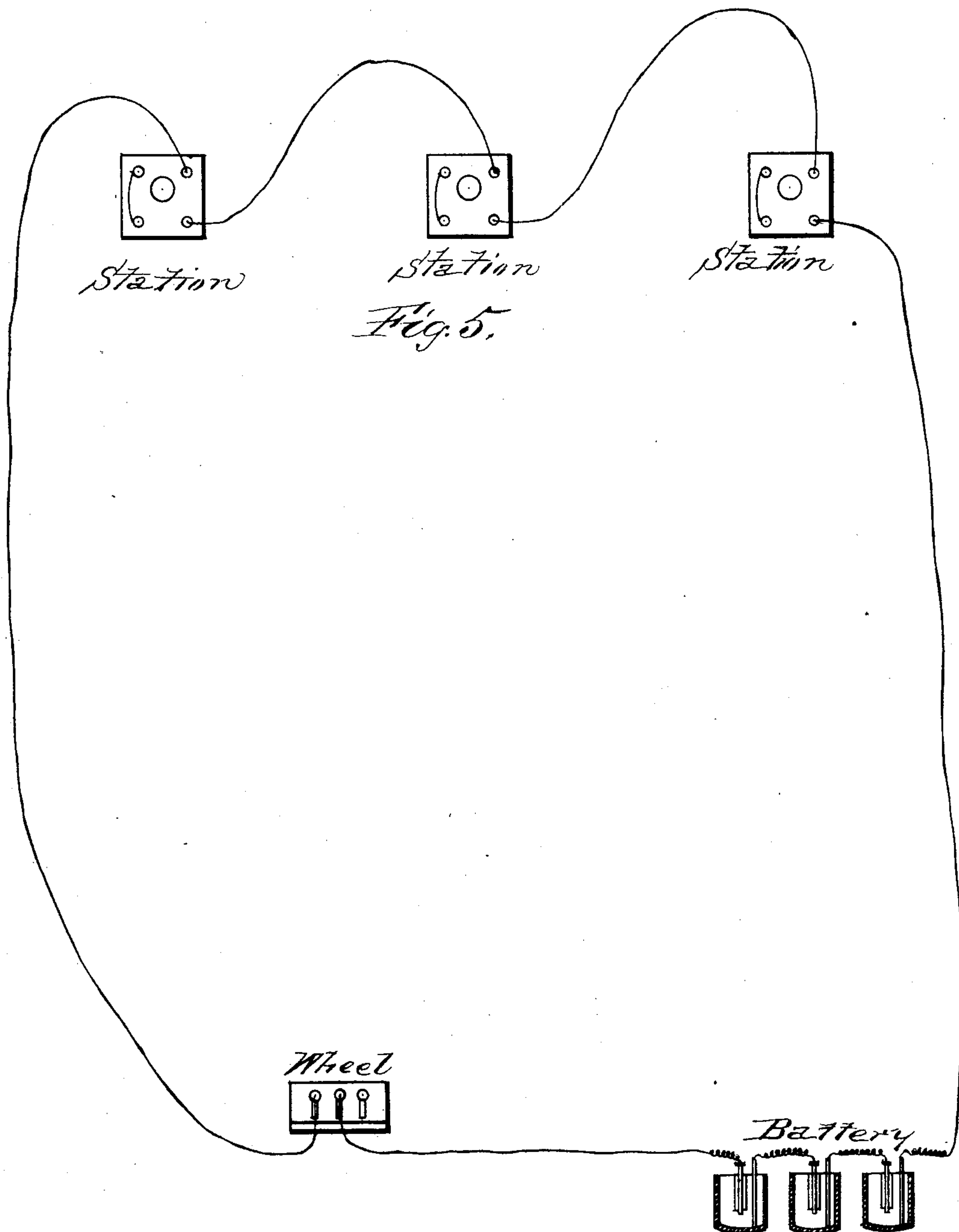
4 Sheets—Sheet 3.

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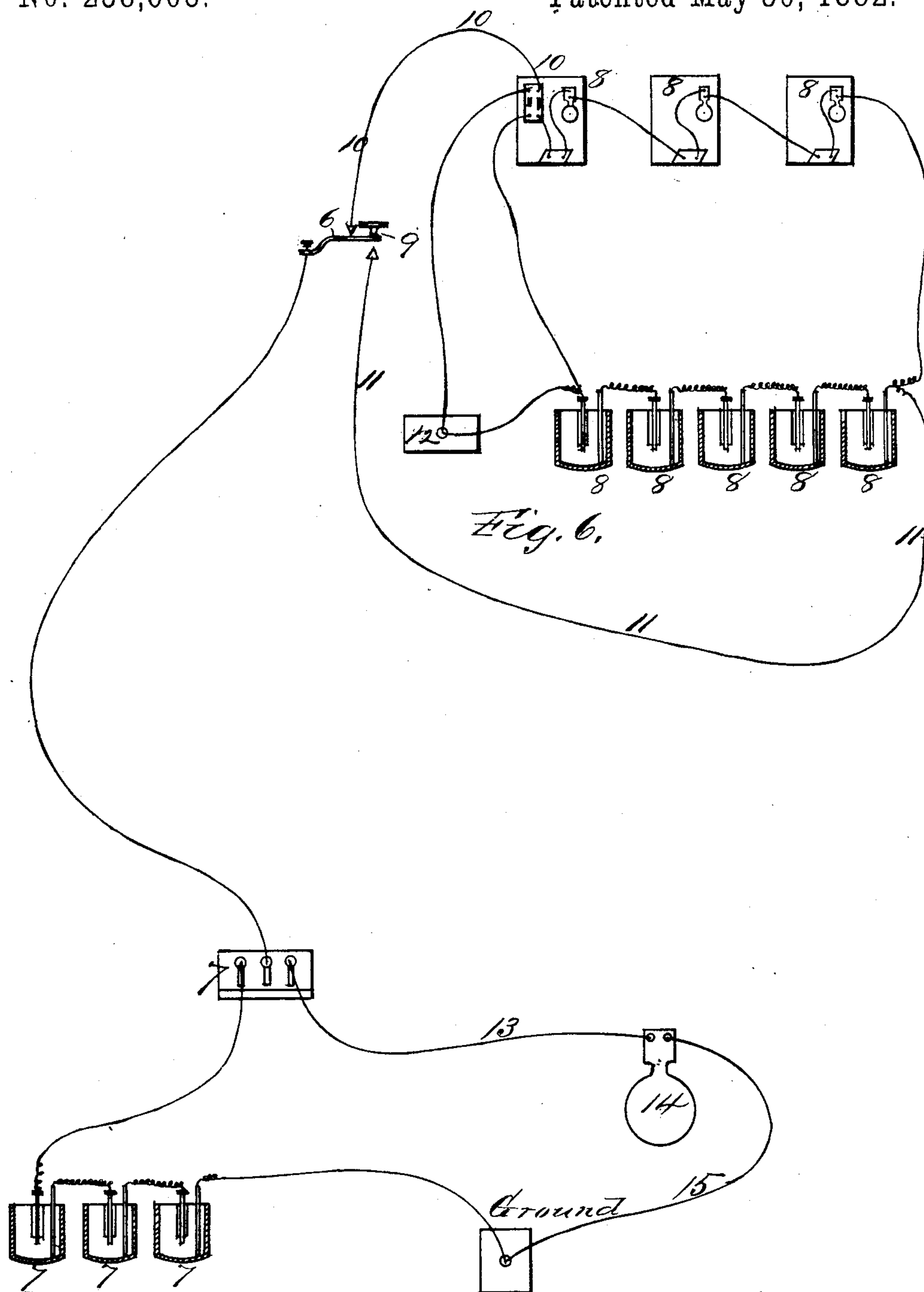
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UNITED STATES PATENT OFFICE.

JAMES E. RICHARDS, OF CEDAR KEYS, FLORIDA.

ELECTRIC TIME-DETECTOR.

SPECIFICATION forming part of Letters Patent No. 258,603, dated May 30, 1882.

Application filed October 20, 1881. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. RICHARDS, of Cedar Keys, State of Florida, have invented a new and useful Electric Watchman's Time-Detector, of which the following is a full, clear, and exact description, when taken in connection with the accompanying drawings, in which—

Figure 1 shows a perspective of the automatic make and break circuit apparatus and adjacent parts. Fig. 2 shows a perspective of one of the dial-operating stations, including the station-bell. Fig. 3 shows a longitudinal section of the tipping lever and adjacent parts. Fig. 4 shows a front view of one of the station paper dials. Fig. 5 shows a metallic circuit with the entire apparatus on it. Fig. 6 shows a ground circuit which brings into action a local metallic circuit.

Prior to my invention watchmen's time-detectors have been so constructed and operated that it has been possible for an unscrupulous watchman to so manipulate his detector that it would show a proper register, and yet he be neglectful of his duties.

My invention obviates the defects in detectors heretofore used, and is as follows: In Fig. 1 of the drawings A shows a metallic wheel, mounted on a metallic shaft, *b*, which is supported upon and revolves in journals on the top of two upright metallic posts, C C'. One end of the shaft *b* extends beyond its supporting-post C', and by means of clock-work or any other suitable power applied to this end of the shaft it is caused to revolve, carrying the wheel A with it once in every twelve hours. The clock-work is shown in this instance as attached to the post C', and is an ordinary duplex marine movement; but the kind of clock-work used, or the kind of power, whatever it may be, that should be employed to effect the revolution of the shaft and wheel is entirely immaterial, provided it be sufficiently powerful to operate the wheel and rotate it regularly one revolution in every twelve hours, for the purposes hereinafter set forth. I prefer to insulate the clock-work from the metallic shaft *b* by interposing some suitable insulating material between the arbor of the clock-work and the shaft. The wheel is set and time is reckoned from the end *h'* of the tipping lever, hereinafter described, and for con-

venience a pointer designating the time may be applied to the end *h'* of the lever. On or near the periphery of this wheel, as seen at *d d*, is provided a circumferential dial, on the face of which the twelve hours are designated in figures of any kind from 1 to 12, as is an ordinary clock-dial, and the half and quarter hours also are designated by lines not necessarily numbered, as is shown in the drawings.

In a circumferential groove running entirely around the periphery of the wheel A, and directly opposite the hour, half-hour, and quarter-hour marks on this dial, and, if desired, opposite the marks designating the other fractional parts of the hour, I place a series of teeth or points, (shown at E E E.) These teeth or points, as shown in the drawings, are not rigidly fixed in the groove, but are pivoted at their inner end, so that they may be, by the application of a little force, tilted forward, as shown at E' E', until, moving on their pivot, their exposed ends swing downward and toward the center of the wheel until they recede so far into the groove that they are flush with the external periphery of the wheel, as seen at E'' E''. In order that these teeth or points shall not, by gravity, as the wheel revolves, or because of jars, move from any position in which they may be placed, I apply sufficient friction to them, by means of small springs applied in any of the well-known ways, so that they shall be pressed against one of the sides of the groove, or else move under friction applied to their ends near the pivot, and thus accomplish this result. A stop is provided for each of these teeth, (shown by pins *f f f*), spanning the groove, so that when the teeth are in their most projecting position they will impinge upon the stop *f f*, and cannot be farther thrown over backward. *g* is a metallic post, on the top of which is pivoted by a metallic pin a metallic tipping lever, *h*. (Seen in cross-section in Fig. 3.) This lever is pivoted nearer the end *h'*, which is adjacent to the wheel A, than to its other end, *h''*, so that gravity will tend always to cause the end *h''* to drop. Near the end *h'* of this lever I fasten a piece of hard rubber or other insulating material, as seen at *i*, Fig. 3. The extremity of the end *h'* of the lever extends beyond this insulating-plate a short distance, for the purposes hereinafter set forth.

It is from this end h' of this tipping lever that the time of the wheel A is reckoned, as before stated.

The post g is situated on the base of the apparatus in a line with the plane of the wheel A, and the tipping lever on it is so adjusted that the teeth or points in the periphery of the wheel will, when they are in their projecting position, as the wheel revolves strike against the insulating-plate i and depress the end h' of the lever, and, as the wheel continues to revolve, the lever will be more and more depressed until the tooth in contact with the insulating-plate slips off from it onto the slightly-projecting metallic end h' of the lever, thus effecting metallic contact between the wheel and the lever.

j is a metallic post directly behind the post g and in a line with the plane of the wheel, and upon the top of this post j the end h'' of the lever h normally rests by the action of gravity, so that when the lever is not tilted by the teeth of the wheel there is metallic contact between the lever h and the post j .

k k' k'' , Fig. 1, show three ordinary binding-posts, the purposes of which will be hereinafter explained.

Fig. 2 of the drawings shows devices substantially identical with the well-known telegraphic sounder. l is the support for the pivoted end of the armature-lever. m is the armature-lever. n n are the electro-magnets, and o o are the usual adjusting-screws. I attach one end of the series of levers p p p to the armature-lever m at the end m' thereof. This series of levers, when the armature-lever is attracted by the electro-magnets, which occurs whenever a current of electricity is passed through them, receive motion from the armature-lever m and transmit it to the ratchet-wheel q for the revolution of the dial, as hereinafter set forth, and I provide a spring (shown as a spiral spring, r , in the drawings, although it may be of any kind, or a weight may be used) for the retraction of the armature-lever when the current ceases and the armature-lever is no longer attracted by the electro-magnets, so that the pawl s will be brought back into proper position for engagement with the next tooth of the ratchet-wheel. This spring may be applied to any suitable part of this mechanism.

The levers p p p connect the end m' of the armature-lever with the pawl s , which engages with the teeth of the ratchet-wheel q . This ratchet-wheel is rigidly fixed upon the shaft V, which shaft is supported upon and revolves in journals on posts, as shown in the drawings. Upon the projecting end V' of this shaft is placed and rigidly fixed a disk, of wood or metal, for the support of the paper registering-dial, which paper registering-dial, as shown in Fig. 4, has upon its face an equal number of radially-arranged black and white spaces, which spaces are equal in shape and size, and alternate black and white entirely around the

dial, there being in this instance, as the drawings show, eighteen of the white and eighteen of the black spaces, although any desired number may be employed, depending upon the number of teeth in the ratchet-wheel q , and if the number of teeth be decreased the levers p p p must be so adjusted as to increase the movement of the pawl, and vice versa, unless the diameter of the ratchet-wheel be varied. The number of teeth and the total number of spaces on the dial must correspond. The paper dial has a hole punched in its center and is placed on the end of the shaft V, and is fastened firmly in its position by the usual washer, screw, and nut. The end of the shaft is made sufficiently long to accommodate the dial-support, the dial itself, the washer, and the nut, and is threaded, so that the nut may be screwed up to its place, and also, if desired, the dial-support and washer may also screw on.

Attached to the series of levers, as seen at p' , is a projecting arm, having a tooth formed upon its extremity. This tooth is so adjusted relative to the pawl, the ratchet-wheel, and the series of levers that it engages in a square-cut notch cut on the back side of each of the teeth of the ratchet-wheel as soon as, but not before, the pawl has effected a movement of the ratchet-wheel to the extent of one tooth. Thus this arm, catching in the notch aforesaid, prevents the momentum of the dial-supporting plate and paper dial from carrying the ratchet-wheel around or over more than one tooth, or, in other words, farther than the pawl has pushed it.

x x are two ordinary binding-posts for convenience of fastening conducting-wires, and are connected with the electro-magnets in the usual way.

The number 1 in Fig. 2 shows the case inclosing the electro-magnets of the bell. 2 is the gong, and 3 the hammer. 4 and 5 are two ordinary binding-posts for attachment of the conducting-wires, and are connected with the magnets, as usual. This dial-revolving apparatus and the bell are inclosed in a wood or metal box, as seen at x' x' , and through the lid of the box a slot is cut, (seen at x'' ,) which, when the lid is closed, comes directly opposite and exposes to view one of the radially-arranged black or white spaces on the paper dial. Care must be taken that the paper dial is placed on the dial-support in such position that the black and white spaces will come opposite to the slit in the lid of the box. Properly-located marks on both the dial supporting plate and the dial itself will assist in properly placing the dial in its position. The lid of this box is securely locked, and the watchman has not access to it.

The operation of this apparatus is as follows: The automatic make and break circuit apparatus and adjacent parts, as shown in Fig. 1, are placed in a securely-locked box, vault, or closet in the office of or elsewhere upon the property to be guarded and which the watch-

man can neither see nor obtain access to, and the locked boxes containing the dial-operating apparatus and bell, as heretofore set forth, are placed wherever desired throughout the property in the watchman's charge.

An ordinary Leclanché or other suitable galvanic battery of a sufficient number of cups to furnish the necessary current to operate the several station dials and bells on the circuit is placed in any convenient location. A circuit is then made by means of suitable wires from one pole of the battery to and through the coils of the electro-magnets used to actuate the dial-operating apparatus and the bells of all the stations, (all of the electro-magnets on the circuit should be of the same resistance,) and, returning, enters the binding-post *k* of the automatic make and break circuit apparatus shown in Fig. 1, which binding-post is in metal contact by wire beneath the base with the wheel-supporting metallic post *U*, which by means of the shaft *b* and wheel *A* is in metal contact with the teeth or points *E*, *E'*, and *E''*. The circuit is broken at this wheel so long as none of these teeth or points are in contact with the metal of the tipping lever *h*; but when by the action of the clock-work the revolving wheel *a* brings one of the projecting teeth or points *E* *E* into contact with the metal of the lever *h*, as hereinbefore set forth, then the metallic circuit is completed through the tipping lever *h* and the metallic post *g*, to which this lever is pivoted by means of a continuation of the line-wire from the post *g* beneath the base to the binding-post *K'*, and thence to the other pole of the battery; and when the revolving wheel *A* carries the tooth which is in contact with the metal of the lever *h* so far that the lever is released, then the circuit is broken, and this making and breaking of the circuit takes place every time a projecting tooth or point comes in contact with the metal of the lever *h* or releases it, and at each completion of the circuit the dials at each of the stations revolve one space, black or white, as the case may be, by the action of the pawl of the ratchet-wheel, as hereinbefore explained; also, the bell at each station will ring at each completion of the circuit.

The apparatus having been described, its practical operation is as follows: The person having access to the box in which the automatic make and break circuit wheel is placed—as, for instance, the superintendent—will determine the time during the coming night at which he desires the watchman to make his rounds, and he then turns out into their most projecting position from the periphery of the wheel such of the teeth or points *E* *E* *E* as are opposite the hours or parts thereof, as indicated by the circumferential dial, at which he desires the watchman to make his rounds, and to record the exact time of making them and his name by writing the same upon the white space on the dials at each of the several station-boxes, one of which white spaces, as

hereinafter described, the watchman will find exposed at the slot in the lids of the station-boxes. This duty is required of the watchman whenever he hears the station-bells ring. The superintendent then, having previously ascertained the time required by the watchman to make his rounds, also turns out into their most projecting position such of the other teeth or points behind the teeth or points previously turned out as the circumferential dial of the wheel indicates will, after the lapse of the time allowed the watchman, in their turn be brought into metal contact with the tipping lever *h*, and when this takes place, the circuit being again completed, as before stated, the white spaces of the paper dials at all the station-boxes will disappear from the slot in the lids and black spaces will appear. The wheel being now set at the times at which the superintendent desires the watchman to make his rounds, and also so set as to compel him to perform this duty within the reasonable time allowed him, and the watchman being ignorant of the times when he may be summoned to make his rounds, and knowing that when summoned he must make them in the time allowed him, will fear to go out of hearing of the station-bells or to fall asleep, or otherwise neglect his duty even for a moment, and, moreover, he cannot substitute any other person in his place, as the handwriting on the dials the next morning will expose the substitution, and the absence of all signature will indicate neglect on the watchman's part. The dials are compared each morning with the position of the teeth of the wheel, and new dials are applied each day.

The combinations on which the teeth or points of the automatic make and break circuit wheel can be set may be almost infinitely varied, so that the watchman will not be called two nights alike in a year.

If desired, the automatic make and break circuit wheel and its adjacent parts and battery may be placed at a distance from the property to be guarded—as, for instance, the residence of the proprietor or superintendent, and, as in this instance (especially if the distance be such as to make it desirable) a single wire only running between the house and the property had best be used and the circuit completed through the earth by means of the ordinary ground-wires at each end of the line, I put into one of the station-boxes at the property an ordinary telegraphic relay, through the coils of which the current from the house passes, and thence to the ground. Thus the armature of the relay in a manner well known closes a local circuit upon which all the dial-operating apparatus and bells and a local battery are placed. Thus only sufficient battery-power is needed at the house where the automatic make and break circuit wheel is placed to operate this relay. Instead of this single-wire circuit for operating the relay being a ground-circuit, it may be a metallic circuit.

In order that the watchman may notify the occupants of the house where the make and break circuit wheel is placed, if fire or any other trouble occurs at the property, I enable him so to do by means of a double-contact button (seen at 6, Fig. 6) placed in the main line and at any convenient place at the property. In this drawing the figure 7 shows the automatic make and break circuit wheel and its adjacent parts, and the line-battery located at the house, and also an ordinary electric bell, 14, either single strokes or vibrating, which is also placed at the house, and the figure 8 shows the dial-stations (only three are shown) and the local battery placed at the property, and also the double-contact button 6, before mentioned. When any trouble arises, or when for any reason whatever the watchman desires to call up the house, he depresses the end of the lever 9 of the double-contact button, thereby cutting out the portion of the main line and relay seen at 10 10 10 and making contact through the wire 11 11 11 with one pole of the local battery, the other pole being connected with the ground, as shown by wire 12. The lever, when so depressed, sends a current from the local battery through the line-wire to the binding-post h' , Figs. 1 and 3; thence by wire beneath the base to the post g ; thence, when the tipping lever h is in its normal position—to wit, resting on the metal post j —through the lever h and the post j and the wire beneath the base, connecting the post j with the binding-post h^2 , and thence by the wire 13 to and through the electro-magnets of the alarm-bell 14, and thence by wire 15 to the ground, thus completing the circuit and ringing the bell.

One of the reasons for placing the insulating-plate i on the end h' of the tipping lever h is so that when the revolving wheel A brings a projecting point or tooth, E, down upon the lever h the tooth may first touch the insulating material i and the lever be depressed, thus breaking contact with the post j , the electric bell 14, and the ground before metal contact is established between the tooth E and the lever h , thus diverting the current from the bell 14 and sending it through the main line to the relay at the property.

Another function performed by the insulating-plate i on the lever h is that by its use I am enabled to make good and instant metallic contact between the teeth E E of the wheel A and the lever h , and in order to do this I undercut the insulating-plate i , as seen at i' , Fig. 3, and I also undercut the end of the lever that the tooth may leave it promptly, and I bevel off the upper side of the teeth E E E. Thus when the tooth reaches the extreme point i' of the plate and ceases to bear on the plate, then the end h' of the lever, which projects slightly beyond the insulating-plate, instantly, by the force of gravity, ascends, and, touching the tooth, effects good and instant metal contact with it. The adjustment of the lever h must be such that when the tooth

leaves the insulating-plate the lever, will be caught again by the tooth before its end h'' comes in contact with the post j , and the adjustment must also be such that there will be no rebound of the lever from the tooth. The length of time that the teeth of the wheel A will remain in contact with the metal of the lever h at its end h' may be regulated by placing the insulating-plate i at a greater or less distance from the end h' , and also by adjusting the lever itself at a greater or less distance from the wheel.

Instead of the several parts of the foregoing apparatus being made of metal, they may, if preferred, be made of a non-conducting material, provided metal contact be secured through them by wires or otherwise, and, instead of teeth E E of the wheel A, removable pegs, to be inserted in holes in or near the periphery of the wheel, may be used, and it is not essential that this part of the apparatus should be in the form of a wheel, since a horizontally or vertically moving bar or plate provided with suitable points to engage with the tipping bar h may be used; and, in fact, this part of the apparatus may be made in a number of ways and still perform the function of my revolving wheel A.

I do not limit myself to the specific construction of the devices above set forth, as other devices can readily be substituted for them of different construction.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of a battery, a continuously-moving make and break circuit device so constructed that the times when the circuit will be made and broken may be varied at will, and one or more locked station-boxes, through a slot in the lid of which the dial may be seen, and in each of which is the following apparatus—*i. e.*, electro-magnets provided with the usual armature and fittings, a lever connecting the lever of the armature with mechanism for revolving a dial, and a bell, all combined and operating substantially as and for the purposes set forth.

2. The combination of a battery, a continuously-moving make and break circuit device so constructed that the times when the circuit will be made and broken may be varied at will, and one or more station-boxes, in each of which is the following apparatus—*i. e.*, electro-magnets provided with the usual armature and fittings, a dial caused to rotate at stated times by the movement of the armature, upon which dial the watchman may register his rounds, and a bell, all combined and operating substantially as and for the purposes set forth.

3. The combination of an automatic make and break circuit apparatus on an electric circuit and one or more station-boxes, in each of which is the following apparatus—*i. e.*, electro-magnets provided with the usual armature and fittings, a shaft upon which is a dial, which shaft is caused to rotate at stated times

by the movement of the armature-lever, and upon which dial the watchman can register his rounds, and a bell, the said station-boxes being placed on a local circuit, the relay of
5 which is actuated by the current sent through another circuit by the automatic make and break circuit apparatus.

4. The combination of the wheel A, provided with the teeth E, the tipping lever *h*, having
10 on one end thereof the insulating-plate *i*, and one or more station-boxes containing electromagnets provided with the usual armature and fittings, and a movable dial operated by the movement of the armature-lever, all combined
15 substantially as and for the purposes set forth.

5. The tipping lever *h*, having on one end thereof the insulating-plate *i*, placed near the end thereof, and an automatically-moving metallic surface, portions of which at stated times

come in contact with, first, the insulating-plate, 20 and, secondly, the metal of the tipping lever, all combined and arranged to give good and instant contact between the metal surfaces, substantially as and for the purposes set forth.

6. The combination, in an electric time-de- 25 tector, of an automatic make and break circuit apparatus provided with its battery, alarm, and dial-registering devices at one or more station-boxes, a double-contact button placed in the main line, and an alarm-bell, the bell 30 being operated by a current from a separate battery passing through the double-contact button, all combined and arranged substantially as and for the purposes set forth.

JAMES EDGAR RICHARDS.

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