(No Model.) 4 Sheets—Sheet 1.

A. NEWMAN.

WATCHMAN'S TIME DETECTOR.

No. 455,410. Patented July 7, 1891.

Fig. 1.

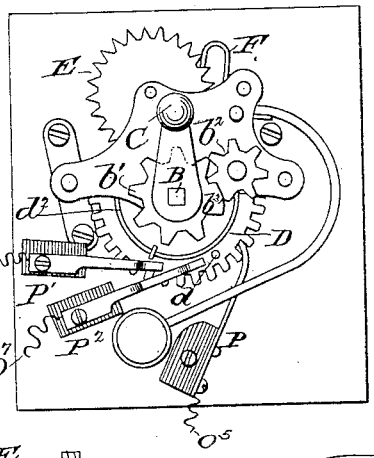
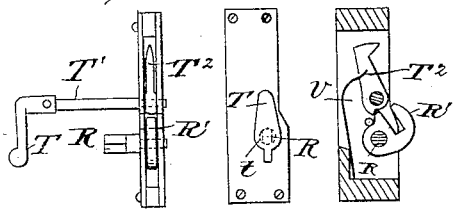


Fig. 10.



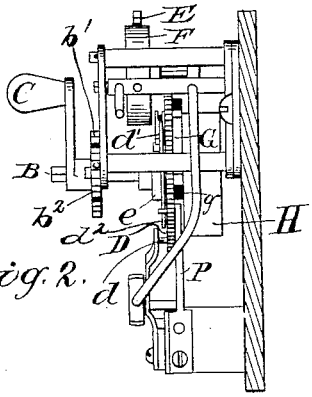


Fig. 2.

Fig. 2*

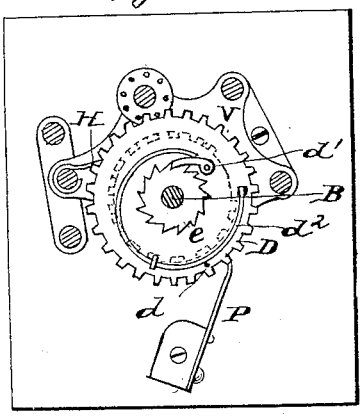
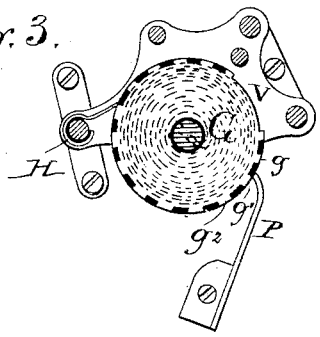


Fig. 3.



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(No Model.) 4 Sheets—Sheet 2.

A. NEWMAN.

WATCHMAN'S TIME DETECTOR.

No. 455,410. Patented July 7, 1891.

Fig. 5.

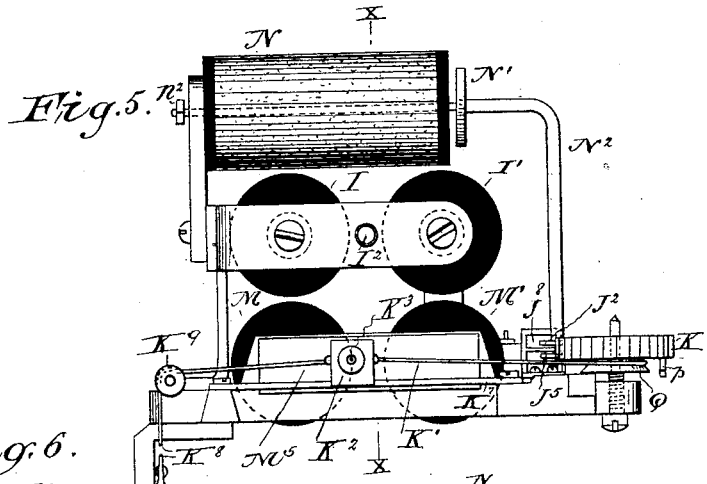


Fig. 6.

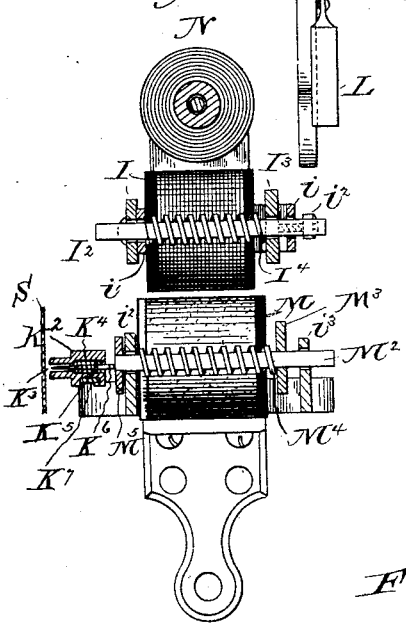


Fig. 7.

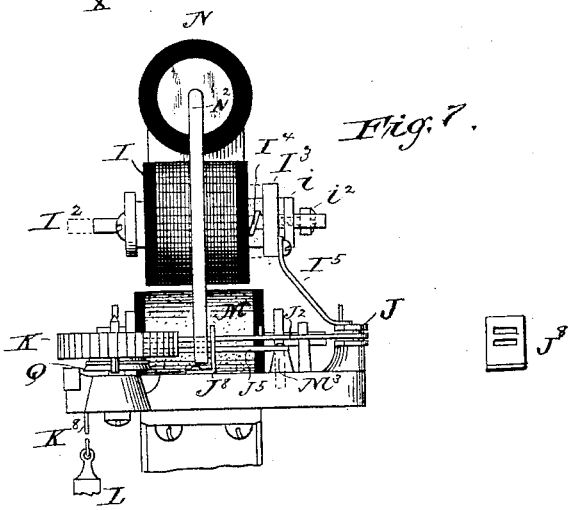
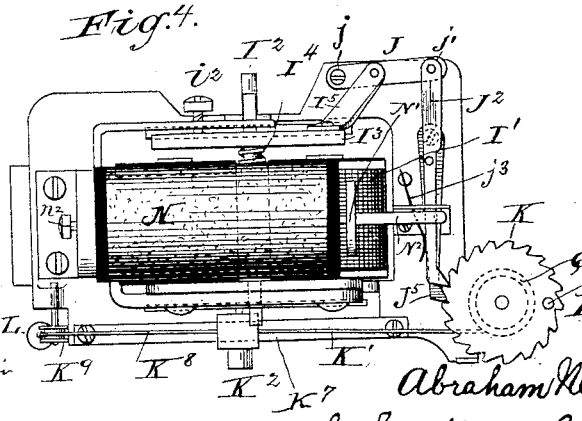


Fig. 4.



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A. NEWMAN.

WATCHMAN'S TIME DETECTOR.

No. 455,410. Patented July 7, 1891.

Fig. 9.

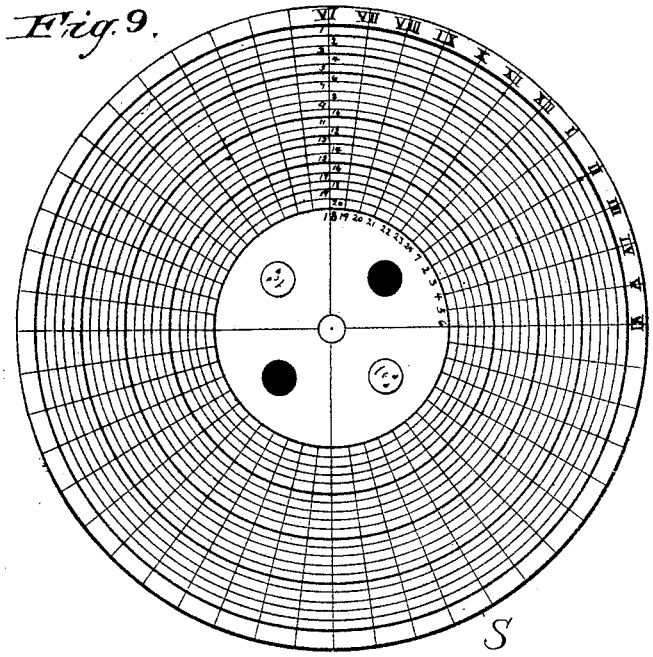
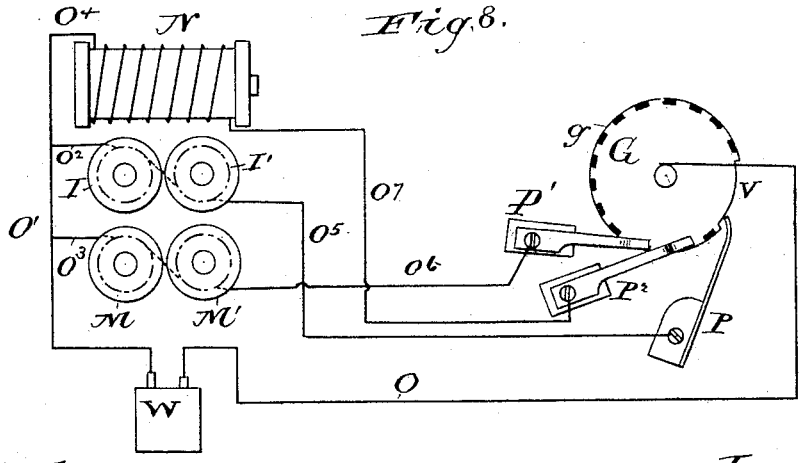


Fig. 8.



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(No Model.) 4 Sheets—Sheet 4.

A. NEWMAN.

WATCHMAN'S TIME DETECTOR.

No. 455,410. Patented July 7, 1891.

Fig. 11.

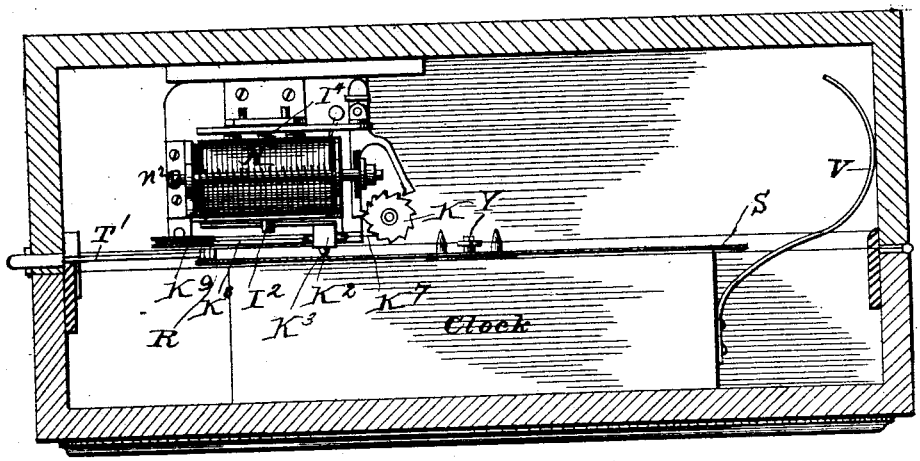


Fig. 12.

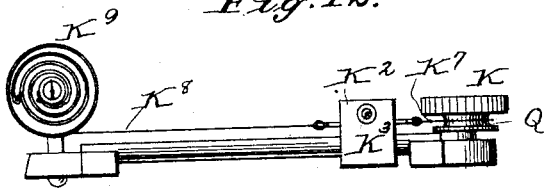
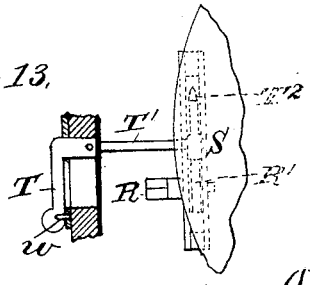


Fig. 13.



Witnesses

G. A. Taubenschmidt,
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By his Attorney

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UNITED STATES PATENT OFFICE.

ABRAHAM NEWMAN, OF BROOKLYN, NEW YORK.

WATCHMAN'S TIME-DETECTOR.

SPECIFICATION forming part of Letters Patent No. 455,410, dated July 7, 1891.

Application filed March 11, 1890. Serial No. 343,456. (No model.)

To all whom it may concern:

Be it known that I, ABRAHAM NEWMAN, of Brooklyn, in Kings county, in the State of New York, have invented a certain new and useful Improvement in Watchmen's Time-Detectors, of which the following is a specification.

I will describe the improvement in detail, and then point out the novel features in the claims.

In the accompanying drawings, Figure 1 is a face view of a station-box, the casing or cover of the box being removed. Fig. 2 is a side view of the same. Fig. 2* is a view of certain parts of the apparatus of the signal-box. Fig. 3 is a view of one of the wheels and a contact-piece used in the station-box. Fig. 4 is a plan view of the recording devices of the apparatus. Fig. 5 is a front end view of the apparatus illustrated in Fig. 4. Fig. 6 is a sectional elevation taken on the plane of the dotted line x x, Fig. 5. Fig. 7 is a side view of the apparatus illustrated in Fig. 4. Fig. 8 is a view showing the connection of the magnets illustrated in Fig. 5 with the battery. Fig. 9 is a face view of a dial intended to be used in connection with the apparatus illustrated in Fig. 4. Fig. 10 contains views of a device used in connection with the device for locking the case in which the apparatus illustrated in Fig. 4 is intended to be inclosed. Fig. 11 is a view showing the position of parts of the recording apparatus of my device with respect to each other. Fig. 12 is a view illustrating a modification of a portion of an apparatus embodying my improvement, and Fig. 13 is a detail view of certain parts of an apparatus embodying my improvement.

The same letters and numerals of reference designate the same or corresponding parts in all the figures.

The station-box illustrated in Figs. 1, 2, and 3 may have a cover made of any suitable material. The mechanism contained in the box may be fastened in any proper position within this cover.

B designates a key-post, which may be revolved by turning the crank C. In lieu of the crank I may, if preferred, use a key to turn the post.

Firmly fastened to the key-post is the star-wheel b', which meshes with another star-wheel b^2, mounted on the frame of the apparatus. The star-wheel b^2 is so shaped at the point b^3 that it holds the star-wheel b' against revolution past that point.

D designates a toothed wheel, through the center of which the key-post B passes loosely. This toothed wheel meshes with another wheel E in a manner well known in clock-movements, and the wheel E is prevented from too rapid rotation by the verge F.

Mounted upon the toothed wheel D is a short pin d, of conducting material, the use of which I will more fully explain hereinafter. The wheel D has also mounted on it a pawl d', which is caused by the spring d^2 to engage with a ratchet e, securely fastened on the key-post B.

In the rear of the wheel D and fastened to it is another wheel G, and underneath the wheel G is a spring H, coiled around the key-post B and having one of its ends attached to it, while the other end is fastened to one of the posts of the frame, as shown in Fig. 3. Excepting where non-conducting material is required, the various parts of the apparatus of the station-boxes will be made of conducting material. When the key-post is turned, the spring H will wind up, and by the time the star-wheel b' reaches the point b^3 of the star-wheel b^2, past which it cannot revolve, the pawl d' on the wheel D will have engaged with the ratchet e, and upon leaving the key-post to perform its function the spring H will cause the key-post to revolve in a direction opposite to that in which it was turned by the operator, and the pawl d' and ratchet e will cause the toothed wheel D, and with it the wheel G, to revolve.

These station-boxes are located at different points in the place which the watchman is to patrol, and the watchman is instructed to operate each station-box at proper intervals of time, and his fidelity to his duty will be recorded by the recording mechanism, which I will proceed to explain.

I I′ designate a pair of spool-magnets mounted in any suitable frame and having their cores connected in the usual manner. Between the magnets I I′ is a sliding arm I^2, whose ends pass loosely through holes in portions of the frame. The armature I^3 is fastened to this sliding arm near one end, and a

helical spring I^4 encircles the arm I^2. One end of the helical spring I^4 rests against the inner side of the armature I^3, while the other end of said spring rests against the inner side of the portion i' of the frame. This helical spring will be of sufficient tension to permit the armature I^3 to be attracted by the magnets I I′ and remove the armature from contact with the magnets when the magnets cease to attract the armature. The amount of play of the arm I^2 is regulated by a thumb-screw i^2 in the portion i of the frame.

I^5 designates an arm screwed or otherwise fastened at one end to the armature I^3 and at its other end fastened by a pin or otherwise to another arm J. This arm J is fastened at one end j in such manner that its end j' is capable of movement. To the end j' is fastened another arm J^2, which forms a tooth or pawl. A spring j^3 holds the free end of the arm J^2 in contact with the ratchet-wheel K.

J^5 designates another arm, fastened at one end to a portion of the frame. A spring similar to the spring j^3 keeps the free end of the arm J^5 in contact with the ratchet-wheel K. Both the arms J^2 and J^5 work in guides on a portion J^8 of the frame. The ratchet-wheel K is mounted on the frame in any suitable manner.

Attached to the ratchet-wheel K and revolving with it is a spool Q. A piece of cord K′ is properly fastened at one end to the spool Q, and the other end of the cord K′ is fastened to the carriage K^2. In this carriage K^2 is arranged a needle K^3, pointed at one end. A helical spring K^4 is arranged around this needle, and one end of the spring rests against a washer K^5 on the needle and so presses the needle out at its rear part K^6. The carriage K^2 is grooved out on its under side, and this groove causes the carriage to fit into a track K^7, along which the carriage K^2 travels. The track K^7 is fastened to the frame or made a part of it.

L designates a weight fastened to the carriage K^2 by means of a cord K^8, which passes over a roller K^9, suitably mounted in the frame.

M M′ designate a second pair of spool-magnets mounted in the frame and having their cores connected in the usual manner. Between these magnets M M′ is a sliding arm M^2, whose ends pass loosely through holes in the portions i^2 i^3 of the frame. The armature M^3 of these magnets M M′ is fastened to the sliding arm M^2 near one end, and a helical spring M^4 encircles the arm M^2. One end of the spring M^4 rests against the inner side of the armature M^3, while the other end rests against the inner side of the portion i^2 of the frame. This spring M^4 is intended to be of sufficient tension to permit the armature M^3 to be attracted by the magnets M M′ and to remove the armature from contact with the magnets when the magnets cease to attract the armature. One end of the arm M^2 has a plate M^5 fastened to it.

Arranged above the magnets I I′ is a magnet N, suitably mounted on the frame. N′ designates the armature of this magnet. This armature N′ is fastened to a rod N^2, of brass or other suitable material, one end of which passes through the center of the magnet and has a nut n^2 at its end to hold it in place. The other end of this rod N^2 extends downwardly far enough to be able to engage the arms J^2 and J^5.

W designates the battery which furnishes the electric current to the apparatus. From this battery a wire, as O, extends and is fastened to the apparatus of the station-box. Another wire, as O′, also extends from the battery and is connected with the branch wires O^2 O^3 O^4. The wire O^2 is connected to the magnets I I′, the wire O^3 is connected to the magnets M M′, and the wire O^4 is connected to the magnet N. From the magnets I I′ a wire O^5 extends to the metallic contact-piece P, from the magnets M M′ a wire O^6 extends to the metallic contact-piece P′, and from the magnet N a wire O^7 extends to the metallic contact-piece P^2. The arrangement of the conducting-wires is best illustrated in Fig. 8. The contact-pieces P′ and P^2 are so arranged with reference to the wheel D that as said wheel D revolves the pin d will be successively brought into contact with said contact-pieces P′ and P^2.

S designates a dial fastened by pins or otherwise to the hour-shaft Y of an ordinary time-movement, Fig. 11, and revolving with the hour-shaft. This dial may be of paper or any other suitable material and may be divided off in any suitable manner to indicate hours and fractions thereof. It may also have circles on it, as shown in Fig. 9.

The dial S illustrated in the drawings is a forty-eight-hour dial, and the use of this dial will require the shaft of the hour-wheel to revolve once in forty-eight hours. The time-movement may have hands fastened to it in front to permit of the use of the device as an ordinary time-piece. In lieu of this dial, however, a dial indicating any desired number of hours may be used; but in such case the hour-shaft should be made to revolve at a rate commensurate with the dial used.

The operation of the apparatus is as follows: Suppose, for example, that the watchman has reached station 5 and desires to indicate his presence there. Turning the key-post B of the station-box with the means provided for that purpose until the star-wheel b' reaches the point b^3 of the star-wheel b^2, which prevents the key-post from being turned farther, the watchman ceases further interference with the key-post. The pawl d' engages the ratchet e, and as the spring H causes the key-post B to return to the position it occupied before being turned by the watchman the pawl d' and ratchet e cause the revolution of the toothed wheel D and the wheel G. The contact-piece P will thus be brought to touch each of the contact-points g g' g^2, &c., of the wheel G, and as the con-

tact-piece and each tooth touch each other the electric circuit will be closed and the current will pass along the wire O and the apparatus of the station-box, through the teeth g g' g^2, &c., the contact-piece P, and the wire O^5, to the magnets I I', thence to the wire O^2, whence it passes along the wire O' to the battery. As each of the teeth g g' g^2, &c., touches the contact-piece P the armature I^3 will be attracted to the magnets I I', and as each tooth ceases to touch the contact-piece P the armature I^3 will be repelled from the magnets I I' by the spring I^4. Each time the armature I^3 is attracted the arm I^5 will of course move with it. This movement of the arm I^5 will cause the arm J to move the arm J^2, and the arm J^2 will thereby push the ratchet-wheel K around one tooth. The ratchet-wheel K will cause the spool Q to revolve with it, and the spool Q will thus draw the cord K' around, and thereby draw the carriage K^2 and its operating mechanism forward. The arm J^5 holds the ratchet-wheel K from turning while the arm J^2 is returning to its original position. The pin d is so placed on the toothed wheel D that it will not touch the contact-piece P' until all the teeth of the wheel G and the contact-piece P have ceased to touch each other. When the pin d and contact-piece P' touch each other, the electric circuit is again closed, and the current passes along the wire O to the apparatus of the station-box, then through the pin d to the contact-piece P', from the contact-piece P', through the wire O^6, to the magnets M M', and from these magnets to the wire O^3 and along the wire O^3 to the wire O' and back to the battery. When the electric current passes through the magnets M M', these magnets will attract the armature M^3, and this armature by means of the arm M^2 will cause the plate M^5 to press against the rear part of the needle K^3, and this pressure will cause the sharp point of the needle to protrude and prick the dial S. As soon as the pin d and contact-piece P' cease engagement with each other the spring M^4 will cause the armature M^3 to resume the position it occupied before attraction by the magnets M M', and the plate M^5 will then cease to press against the needle K^3. After the pin d has passed beyond the reach of the contact-piece P' said pin d meets the contact-piece P^2 and touches this contact-piece. When this occurs, the electric circuit is again closed and the current passes along the wire O to the apparatus of the station-box, then through the pin d to the contact-piece P^2, from the contact-piece P^2, through the wire O^7, to the magnet N, and from this magnet N to the wire O^4 and wire O' back to the battery. When the current passes through the magnet N, its armature N' will be attracted to it, and the rod N^2 will thus be caused to press against the arms J^2 and J^5 and draw these arms away from the ratchet-wheel K. The ratchet-wheel K will then be free, and the weight L will cause the ratchet-wheel and carriage to return to their initial position. A pin p may be fastened on the ratchet-wheel K and extended down far enough to strike against a portion of the frame and so cause the ratchet-wheel K to stop at a certain point in its return. As soon as the magnet N is demagnetized the arms J^2 and J^5 will resume contact with the ratchet-wheel K. The apparatus will then be in the same condition as before being operated. When the wheel G ceases to revolve backward, it is in the same position it occupied before the key-post B was turned by the watchman. It will of course be readily understood that the position of the carriage K^2 at the time the needle K^3 pricks the paper dial will depend on how far the ratchet-wheel K has been turned, and as the ratchet-wheel K is intended to be turned one tooth each time the contact-piece P and each tooth of the wheel G touch each other the distance which the ratchet-wheel K revolves will depend on the number of teeth on the wheel G which come in contact with the contact-piece P. This is very desirable, because I can mark circles on the dial S distant apart from each other the space which the carriage K^2 will travel at each attraction of the armature I^3 by the magnets I I', and the spaces between these circles may be numbered 1 2 3, &c., corresponding to the number of the station-boxes. Now, suppose that the watchman is at station 5. We may make the wheel G at this station with five teeth, and as the contact-piece P and each tooth g g' g^2, &c., meet the ratchet-wheel K will be driven forward five teeth, and this will bring the carriage K^2 in such position in front of the dial S as to face the circular space marked 5. The pin K^3 then pricks in this circular space, and the dial not only records the time when the watchman operated the station-box, but also which station-box he operated. At one of the stations intended to be visited by the watchman an ordinary electric push-button may be used in place of the station-box described. This push-button will close the electric circuit which operates the magnets M M', and so cause these magnets to attract the armature M^3, and thus cause the needle K^3 to prick the dial. I may call this "station 1." It will be seen that it will be unnecessary at this station to operate the magnets I, I', or N. If this push-button were used for station 1, the wheel G at station 2 might have only one tooth, the wheel G at station 3 might have two teeth, &c.

Any desired number of stations may be used with this apparatus, and it is obvious that each station-box may be connected with the wires O and O'.

The wheel G of the station-box is made by punching holes near the circumference of the wheel and filling these holes with hard rubber or other insulating material. The periphery of the wheel is then ground down and leaves the insulating material and parts of the wheel g g' g^2, &c., exposed. If the space intended to be insulated is of any consider-

able distance, a portion, as V, of the wheel may be cut out, and the contact-piece P will be so arranged as to allow this cut-out portion to pass without touching it.

Any desired means may be used for detecting the tampering with the case in which the recording mechanism is inclosed.

In Figs. 10 to 13, T designates an escutcheon-plate intended to fit over the key-hole *t* of the case in which the recording mechanism is inclosed. This escutcheon-plate is fastened to a bar T′, to which is also fastened an arm T^2, formed into a marking-point at one end. When the escutcheon-plate T is turned away from the key-hole, the bar T′ will be revolved, and the arm T^2 will thereby be caused to approach the dial S and mark it, and when interference with the escutcheon-plate T ceases the spring *v* will draw the arm T^2 away from contact with the dial S. This movement of the arm T will cause the bar T′ to revolve in a direction opposite to that in which it revolved upon the uncovering of the key-hole, and this revolution of the arm T′ will cause the escutcheon-plate T to be again brought into position to cover the key-hole. The escutcheon-plate T is prevented from moving past the key-hole by a pin or stop *w*.

R designates a shaft intended to be turned by a key inserted in the key-hole *t*. This shaft operates the catch R′ to lock and unlock the case.

A spring V, Fig. 11, will preferably be used to keep the two sections of the case apart, except when they are locked, by turning the shaft R. It will be readily understood that as it is necessary in order to turn the shaft R to move the escutcheon-plate away from over the key-hole *t* the dial S will record the moving and the time of moving the escutcheon-plate. Any attempt to tamper with the clock will thereby be discovered. The arm T^2 may be so shaped at its pointed end that the mark made by it on the dial S will be different in shape from the mark made by the needle K^3.

Modifications of parts of the apparatus may readily be suggested. For instance, instead of the weight L, I might use a spring, such as is shown in Fig. 12, to cause the roller K^9 to revolve and fasten the cord K^8 at one end to this roller, so that the revolution of the roller might return the carriage K^2 to its initial position.

The portion of the contact-piece P′ which the pin *d* meets in its travels may be divided into two or even more pieces, and the spaces between these pieces may be filled with non-conducting material. This is advantageous, because sometimes the dials used are made of very heavy paper, and a single pressing of the needle against the paper might not perforate it, whereas this pressure repeated two or three times would perforate the paper. There will preferably be just enough lost motion of the toothed wheel D, so that when the watchman turns the key-post the toothed wheel will be brought back to touch the contact-piece P^2. The advantage of this is that if through any cause the ratchet-wheel K had not been freed the contact of the pin *d* and contact-piece P^2 would cause the freeing of the ratchet-wheel K, as before explained.

The dial S shown in the drawings is divided off into quadrants of twelve hours, and suitable designs may be used to show which of the quadrants are intended for days and which for nights.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a station-box for a watchman's time-detector, the combination of a key-post, a stop for limiting the movement of the key-post, a ratchet on the key-post, a pawl capable of engagement with the ratchet and mounted on a wheel, a pin, as *d*, on said wheel, means for regulating the speed of travel of this wheel, another wheel fastened to said last-mentioned wheel and capable of revolving with it and having electrical contact-points, means for revolving the key-post in a direction opposite to that in which it is turned by the operator, a contact-piece so located that the contact-points of said last-mentioned wheel will touch said contact-piece when said wheel revolves, and other contact-pieces so located that pin *d* will touch them successively as the wheel upon which said pin *d* is fastened revolves, substantially as specified.

2. In a watchman's time-detector, the combination of a clock-movement, a dial revolved thereby, a carriage capable of traveling and carrying a dial-marking device, means for causing said carriage to travel, means for operating the dial-marking device when the carriage has reached the end of its journey, and means for returning said carriage and its dial-marking device to their initial position after said dial-marking device accomplishes its function, substantially as specified.

3. In a watchman's time-detector, the combination of a clock-movement, a dial carried thereby, a carriage capable of traveling and carrying a dial-marking device, and means for operating said dial-marking device when the carriage has reached the end of its journey, substantially as specified.

4. The combination of a magnet or magnets, an armature for the same, means for normally holding said armature out of engagement with its magnet or magnets, a traveling carriage, means connecting said traveling carriage with said armature, a dial-marking device carried by said traveling carriage, a clock-movement, a dial carried thereby and so located as to be capable of being marked by said dial-marking device, and means for establishing electrical communication between said magnet or magnets and an operating-station to operate the magnet or magnets to attract its armature and cause the carriage and its dial-marking device to travel, substantially as specified.

5. The combination of a magnet or magnets,

as I I′, an armature, as I^3, means, as I^4, for normally holding said armature out of engagement with its magnet or magnets, an arm, as I^5, connected to another arm, as J, an arm, as J^2, connected to said arm J, means, as J^3, for holding one end of the arm J^2 in contact with a ratchet-wheel, as K, another arm, as J^5, means for holding one end of the arm J^5 in contact with said ratchet-wheel, a spool, as Q, attached to the ratchet-wheel, a cord, as K′, attached at one end to the spool and at the other end to a carriage, as K^2, means for establishing electrical communication between the magnet or magnets, as I I′, and an operating-station, and a cord, as K^8, provided with means for drawing the carriage in a direction opposite to that in which it is drawn by the ratchet-wheel, as K, substantially as specified.

6. The combination of a magnet or magnets, an armature for the same, means for normally holding said armature out of engagement with its magnet or magnets, means for establishing electrical communication between the magnet or magnets and an operating-station to magnetize said magnet or magnets to attract the armature, a dial-marking device, a dial fastened to the hour-shaft of a clock-movement and revolving therewith, and a plate connected with said armature and capable of causing said dial-marking device to mark said dial, substantially as specified.

7. The combination of a magnet or magnets, as M M′, an armature, as M^3, means, as M^4, for normally holding said armature out of engagement with its magnet or magnets, an arm, as M^2, connected to said armature, a plate, as M^5, fastened to said arm, a movable carriage, as K^2, carrying a dial-marking device, a dial fastened to a clock-movement, and a means for establishing electrical communication between the magnet or magnets, as M M′, and an operating-station, substantially as specified.

8. The combination of a magnet or magnets, an armature for the same, an arm attached to said armature and extending to an arm for turning a ratchet-wheel and another arm for holding said ratchet-wheel against revolution except in one direction, and means for establishing electrical communication between said magnet or magnets and an operating-station to magnetize said magnet or magnets to attract the armature, whereby the arm carried by the armature will withdraw the said arms connected with the ratchet-wheel from engagement with the ratchet-wheel, substantially as specified.

9. The combination of a key-post, as B, a stop for limiting the movement of the same, a ratchet, as *e*, a pawl, as *d*′, mounted on a wheel, as D, means for regulating the speed of travel of said wheel, a wheel, as G, fastened to said wheel, as D, means for revolving the key-post in a direction opposite to that in which it is turned by the operator, a contact-piece, as P, so located that upon the revolution of the wheel G the said contact-piece and the electrical contact-points of said wheel, as G, will touch each other, a wire connecting said contact-piece with a magnet or magnets, as I I′, an armature, as I^3, means, as I^4, for normally holding said armature out of engagement with its magnet or magnets, an arm, as I^5, connected to another arm, as J, an arm J^2, connected to said arm J, means, as J^3, for holding one end of the arm J^2 in contact with a ratchet-wheel, as K, another arm, as J^5, means for holding one end of the arm, as J^5, in contact with the ratchet-wheel, a spool, as Q, attached to the ratchet-wheel, a cord, as K′, attached at one end to the spool and at the other end to a carriage, as K^2, carrying a dial-marking device, a cord, as K^8, connected at one end with said carriage and at the other end to a device for drawing the carriage in a direction opposite to that in which it is drawn by the ratchet-wheel, as K, aforesaid, a pin, as *d*, a contact-piece, as P′, so located as to be able to touch said pin upon the revolution of a wheel, as D, a wire connecting said contact-piece with a magnet or magnets, as M M′, an armature M^3, means, as M^4, for normally holding said armature out of engagement with its magnet or magnets, an arm, as M^2, connected to said armature, a plate, as M^5, fastened to said arm, a contact-piece, as P^2, so located as to be able to touch the pin, as *d*, upon the revolution of a wheel, as D, a wire connecting said contact-piece with a magnet or magnets, as N, an armature, as N′, a rod, as N^2, capable of withdrawing arms, as J^2 J^5, from engagement with a ratchet-wheel, as K, and a source of electricity, one pole of which is connected with the wheel, as G, and the pin, as *d*, and the other pole of which is connected with the magnets, as I I′, M M′, and N, and the contact-pieces P P′ P^2, whereby an electric circuit may be made through the contact-points on the wheel, as G, and the contact-piece, as P, and through the pin *d* and contact-pieces P′ P^2 to magnetize the magnets with which said respective contact-pieces are connected, substantially as and for the purpose set forth.

10. In a watchman's time-detector, a clock-movement, a dial carried thereby, an escutcheon-plate covering the key-hole of the case in which the apparatus of the detector is inclosed, a bar fastened at one end to the escutcheon-plate, and a device for marking said dial, operated by said bar whenever the escutcheon-plate is moved out of its position over the key-hole, substantially as specified.

ABRAHAM NEWMAN.

Witnesses:
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