(No Model.)

G. B. FESSENDEN.

WATCHMAN'S TIME DETECTOR.

No. 381,992. Patented May 1, 1888.

Fig. 1,

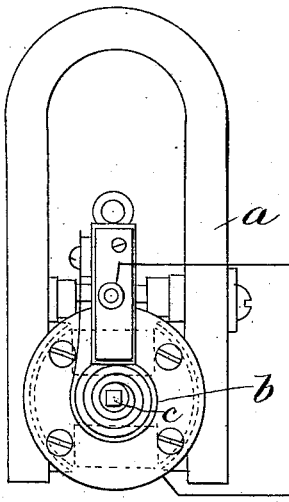
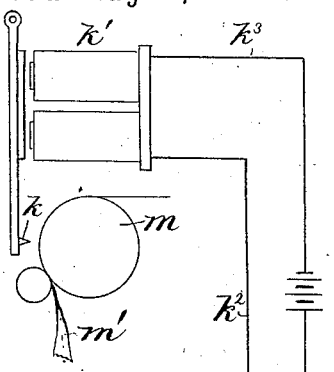


Fig. 2,



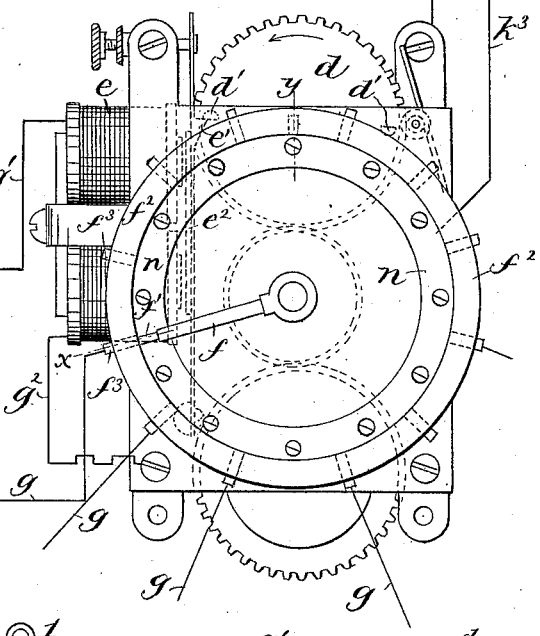


Fig. 3,

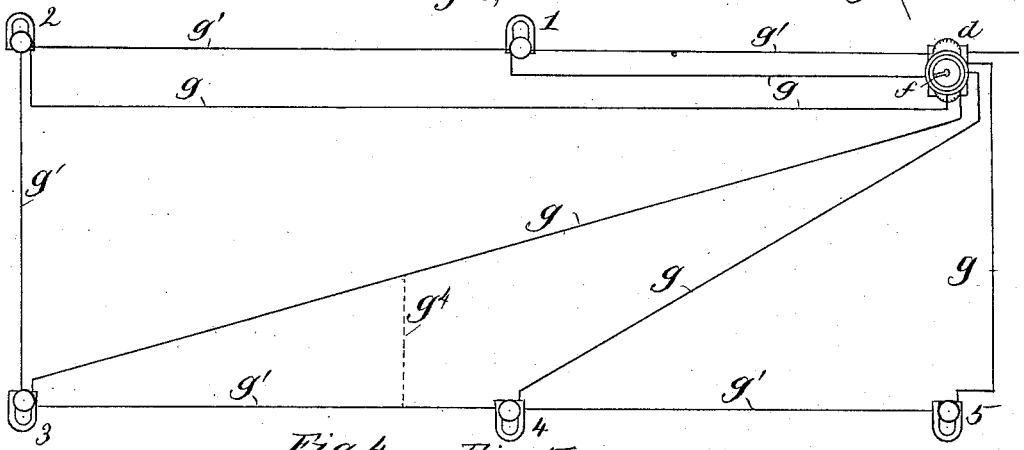


Fig. 4.

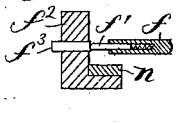
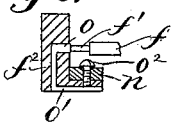


Fig. 5.



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UNITED STATES PATENT OFFICE.

GEORGE B. FESSENDEN, OF BOSTON, MASSACHUSETTS.

WATCHMAN'S TIME-DETECTOR.

SPECIFICATION forming part of Letters Patent No. 381,992, dated May 1, 1888.

Application filed June 26, 1884. Serial No. 136,055. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. FESSENDEN, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Watchmen's Time-Detectors, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to a watchman's detector of that class in which the watchman visits a number of stations and by means of electric connections between the stations and a receiving apparatus causes a record to be made of the fact that the stations have been visited, which record also shows the time at which the round of visits was made.

In apparatus of this class as heretofore generally made the clock or recording apparatus is connected with the different stations by a series of normally-open circuits having a common return-wire containing a battery or other source of electricity, so that when the proper branch is closed by a suitable key or button at any station a current will be caused to flow, which, through suitable electro-magnetic devices at the clock, causes a record to be made on a traveling recording-surface having a uniform time movement. The record-mark on the traveling surface has usually been made by the direct action of an electro-magnet or its retractor, thus requiring a sufficiently-strong current to do the work of making the record, which is usually made by pricking or punching a hole through the traveling surface, which is usually a sheet of paper.

The object of my invention is to remove certain objections existing in the class of apparatus described; and the invention consists partly in having the source of the electric current located at the stations, instead of in the common return-wire, and thus removing the possibility of producing a record by connecting a branch wire with the return-wire at any other point except at the station to be visited.

The invention also consists in employing mechanical electric generators instead of batteries in the branch circuits, thus insuring several important advantages and especially increasing the difficulty of tampering with the apparatus or producing the record in any other manner than that intended.

Figure 1 represents a magneto-generator such as employed at the stations to be visited for the purpose of generating the current that affects apparatus at the receiving-station, so as to cause a record to be made at the proper time. Fig. 2 is a front elevation of a portion of the receiving apparatus called the "transmitter," the said transmitter having its operation controlled by the currents generated at the stations and itself controlling the operation of the recording apparatus by which the record of the watchman's visits is made, the said recording mechanism being indicated by diagram in Fig. 2. Fig. 3 is a diagram representing a series of stations and the circuits connecting the same with the transmitter represented in Fig. 2, and Figs. 4 and 5 sectional details on broken lines x and y of Fig. 2.

The invention is shown as embodied in an apparatus substantially like that shown and described in Letters Patent No. 236,257, granted to E. T. Quimby, to which reference may be had. The said apparatus comprises a circuit-changer, (represented in Fig. 2,) which is connected with and controlled by the circuits from the different stations to be visited, and also controls the said circuits, placing one station in circuit after another, and the said instrument also controls the operation of the recording device k m, Fig. 2, and thus acts as a transmitter, by which the watchman operating at the stations causes a signal to be transmitted to the recorder. The said transmitter consists of a mechanical motor or train of wheel-work, d, controlled by a detent or stop-shoulder, e', on the armature e^2 of the electro-magnet e, the said train of wheel-work operating an arm, f, having a yielding projection, f', that moves over the inner surface of an insulating-ring, f^2, provided with a series of metallic pins or studs, f^3, connected with wires g, leading to the different stations to be visited.

The train of wheel-work d and the stop projections d', controlled by the detent-shoulder e', are so proportioned and arranged that each time the said train is released it will move far enough to carry the arm f from one to the next of the studs f^3. One terminal of the magnet e is connected with a wire, g', that leads to all the stations (numbered 1 2 3, &c., in Fig. 2,) and thus forms a common return-wire for all the branch circuits g leading to the said

stations, and the other terminal of said magnet is connected by wire g^2 with the frame-work of the transmitter, which is in electrical connection with the arm f and contact-point f' thereof. Thus, when the said contact-point f' rests upon one of the projections f^3, as shown, the station connected with the branch wire g leading from that particular projection f^3 is in circuit and all the other stations are in open circuit at the ring f^2. If, now, a current is transmitted from a station that is in circuit, the magnet e will be energized, the motor d released, and the arm f will move on to the next stud, thus placing the station at which it was just operated in open circuit and closing the circuit to the next station of the series. It is therefore necessary in order to produce complete operation that the watchman should visit all the stations in regular order.

The construction and mode of operation of the transmitter as thus far described are substantially the same as in the Quimby patent before referred to and form no part of the present invention. In the said Quimby patent, however, and in all other watchman's detector apparatus so far as I know, the magnet e, that is operated from the stations, has been energized by the current of the battery or source of electricity placed in the wire g', that leads to all the stations, and consequently if a cross-connection should be made between the branch wire g leading to a given station and the battery-wire g', as indicated at g^4, Fig. 3, the magnet e would be affected just the same as if the watchman had visited the corresponding station.

The present invention consists, mainly, in removing the source of electricity from the wire g', leading to all the stations, and placing a generator or source of electricity at each station, so that it makes connection or forms a part of the connection between the branch wire g leading to that station and the common return-wire, g'. By this arrangement a cross-connection between the station-wire g and return-wire g', such as represented at g^4, Fig. 3, will produce no effect on the magnet e of the receiving apparatus. I have found that in this arrangement, in which the source of electricity is placed at the stations or in the station-circuits, (branch wires g,) instead of in the common or return wire, g', there are many advantages derived from using mechanical generators of electricity instead of batteries; and the invention consists, partly, in the employment of a magneto-electric generator at each station instead of a battery common to all the stations. A suitable generator for this purpose is represented in Fig. 1, the same consisting of a permanent magnet, a, having a suitable armature in its field, the axis c of said armature being shown as squared to receive a key for turning it, and having connected with it an actuating-spring, b, which revolves the armature after it has been turned by the key to strain the spring.

The armature may be of the kind commonly known as the "Siemens" armature, having an H-shaped core upon which the wire is wound and being connected by suitable commutator brushes or springs with the wires $g\,g'$. By using a magneto-generator of this kind a connection of low resistance is maintained through the armature at each station between the wires $g\,g'$, so that even if a battery were interposed in a cross-connection such as represented at g^4 the greater portion of its current would pass through the circuit, including the generator at station 3, and, unless a very large battery were employed, the magnet e would not receive sufficient current to cause it to release the motor d.

When my improved arrangement of circuits and generators is employed in connection with the transmitter such as shown in Fig. 2, the record may be made on a traveling strip, m', as follows, although the specific means for making the record that will now be described form no part of the present invention:

The strip m', on which the record is made, is fed forward with a uniform time movement by a drum or wheel, m, which is connected with a clock-work, (not shown,) and the surface of the said strip is marked or indented by a point or stylus, k, connected with the armature-lever of the magnet k', one terminal of which is connected by wire k^2 with the frame-work of the transmitter, and thus with the arm f, and the other terminal of which is connected by wire k^3 with a metal ring, n, supported in the insulating-ring f^2, and thus insulated from the frame-work of the transmitter. The said ring f^2 contains one or more studs, o, (see Fig. 5,) preferably placed midway between the adjacent pairs of station-studs f^3, so that the finger f' will make contact with the said studs o as it passes from one to the next of the station-studs f^3. The studs o are in metallic connection with pieces o', extending beneath screws o^2, that pass through the ring n, so that by turning down any one of the said screws o^2 the corresponding stud o will be placed in electrical connection with the ring n and wire k^3, and consequently when the arm f passes the said stud o the circuit $k^2\,k^3$ will be closed and the recording-magnet k' energized and a record made. Thus one or any desired number of marks may be recorded at each revolution of the arm f produced by a round of visits of the watchman at the stations; but it is obvious that the arrangement of the generator of electricity in the branch or station wires instead of in the common return-wire is applicable to various forms of receiving and recording mechanism, and the invention is not limited to an apparatus containing a transmitting and recording mechanism such as herein shown.

I claim—

1. In a watchman's time-detector apparatus, a series of branch circuits leading from a receiving-station to different stations to be visited and a return-wire common to several of

said stations, combined with a generator of electricity connected in circuit with the branch wire at the station to be visited and a receiving-instrument having a switch or circuit-changer by which the said branch circuits are connected one at a time successively with the said receiving-instrument, substantially as described.

2. A watchman's detector apparatus comprising a magneto-generator consisting of a movable armature and field-magnet at each station, a circuit connecting said station with a receiving-station, and receiving apparatus comprising recording mechanism, the operation of which is controlled by the currents generated at the stations, and a circuit-changer that connects the said branch circuits one at a time successively with the receiving apparatus, substantially as described.

In testimony whereof I hereto affix my signature in presence of two witnesses.

GEO. B. FESSENDEN.

Witnesses:
A. H. SPENCER,
E. A. PHELPS.