

No. 759,177.

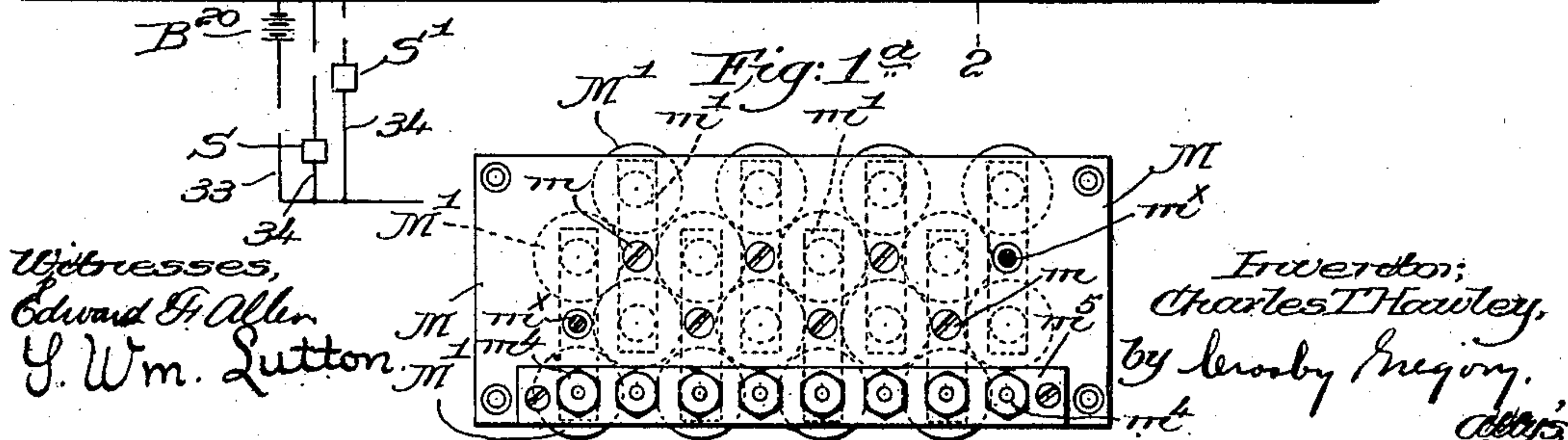
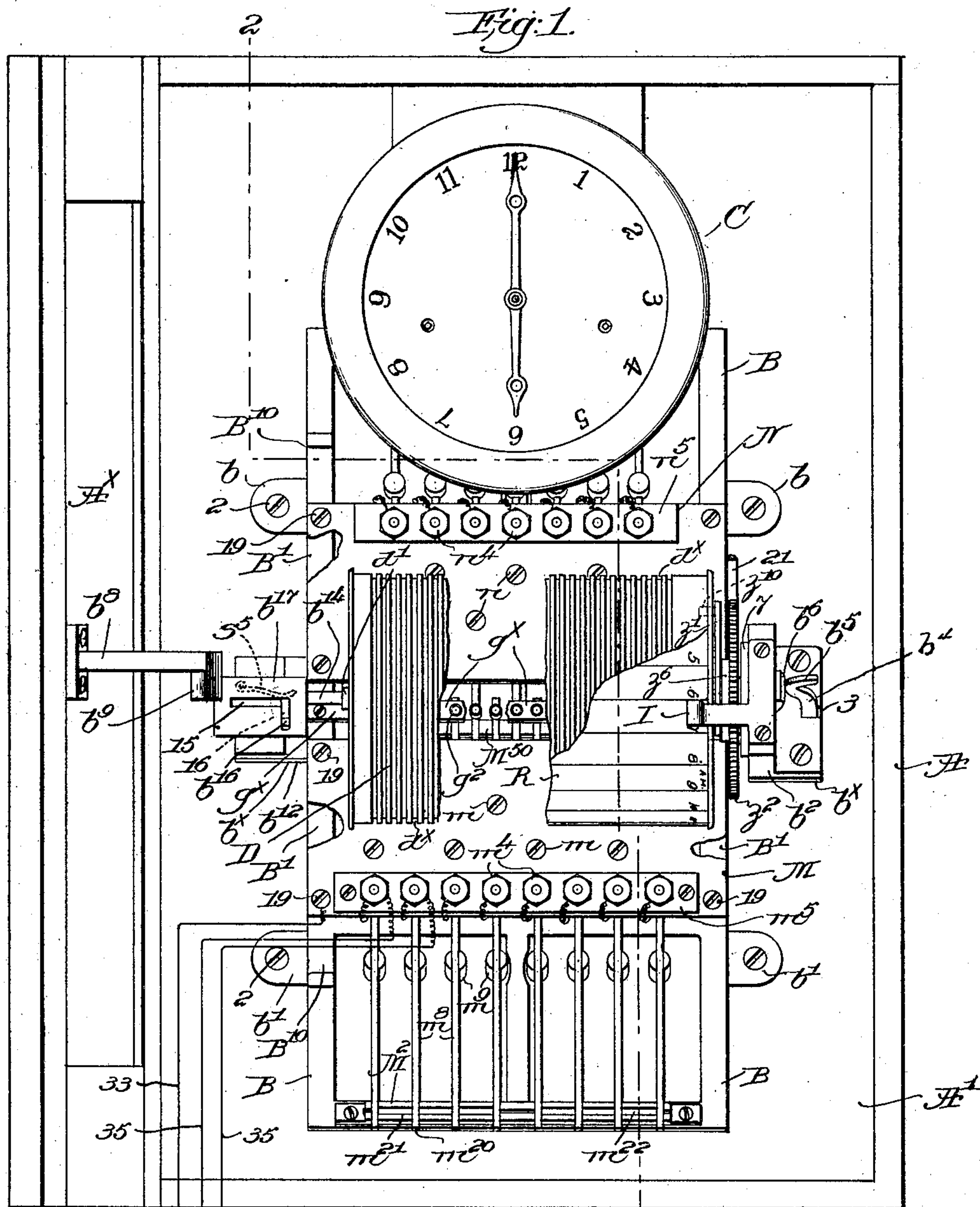
PATENTED MAY 3, 1904.

C. T. HAWLEY.
WATCHMAN'S TIME RECORDER.

APPLICATION FILED SEPT. 23, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



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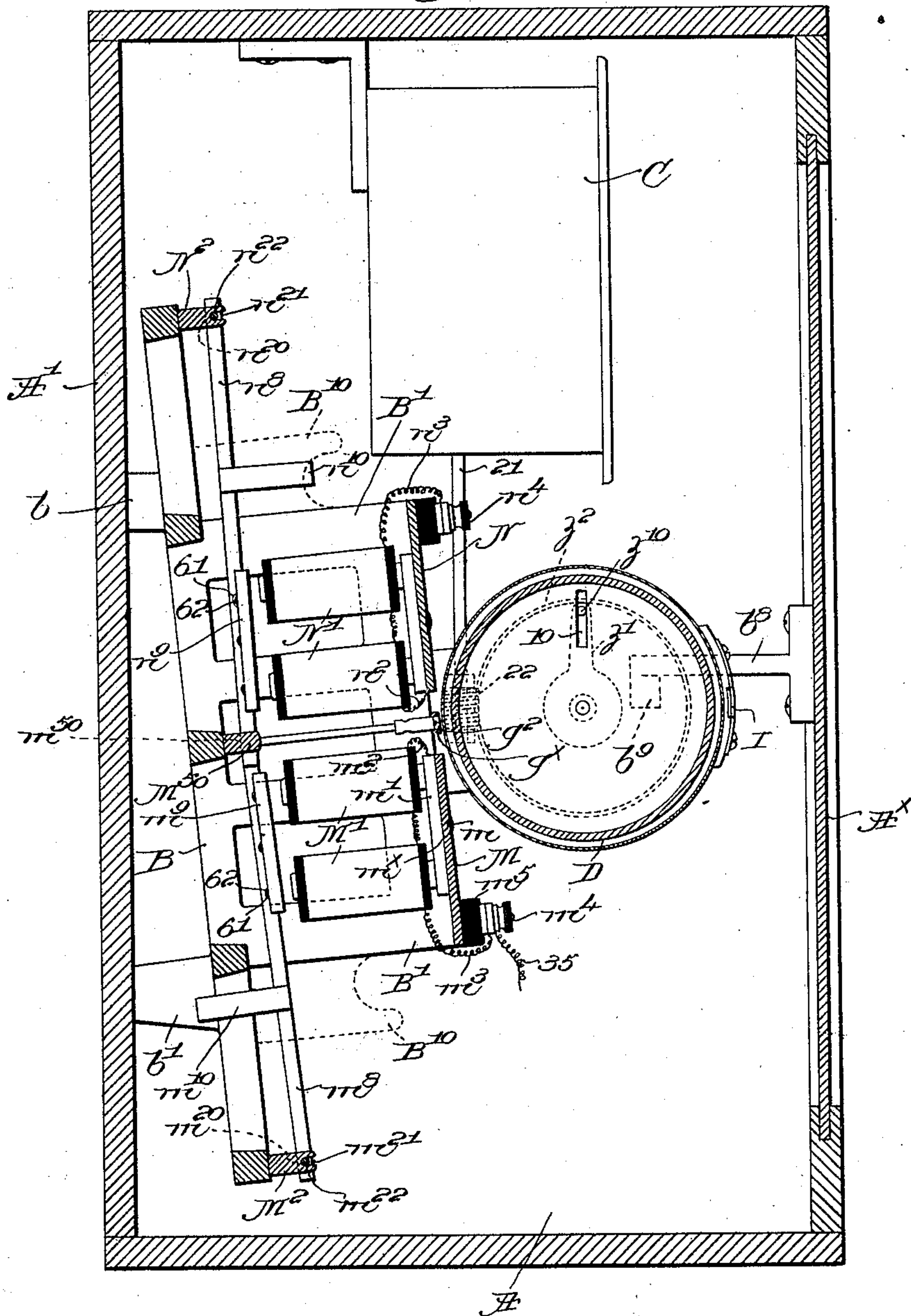
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3 SHEETS—SHEET 2.

Fig. 2.



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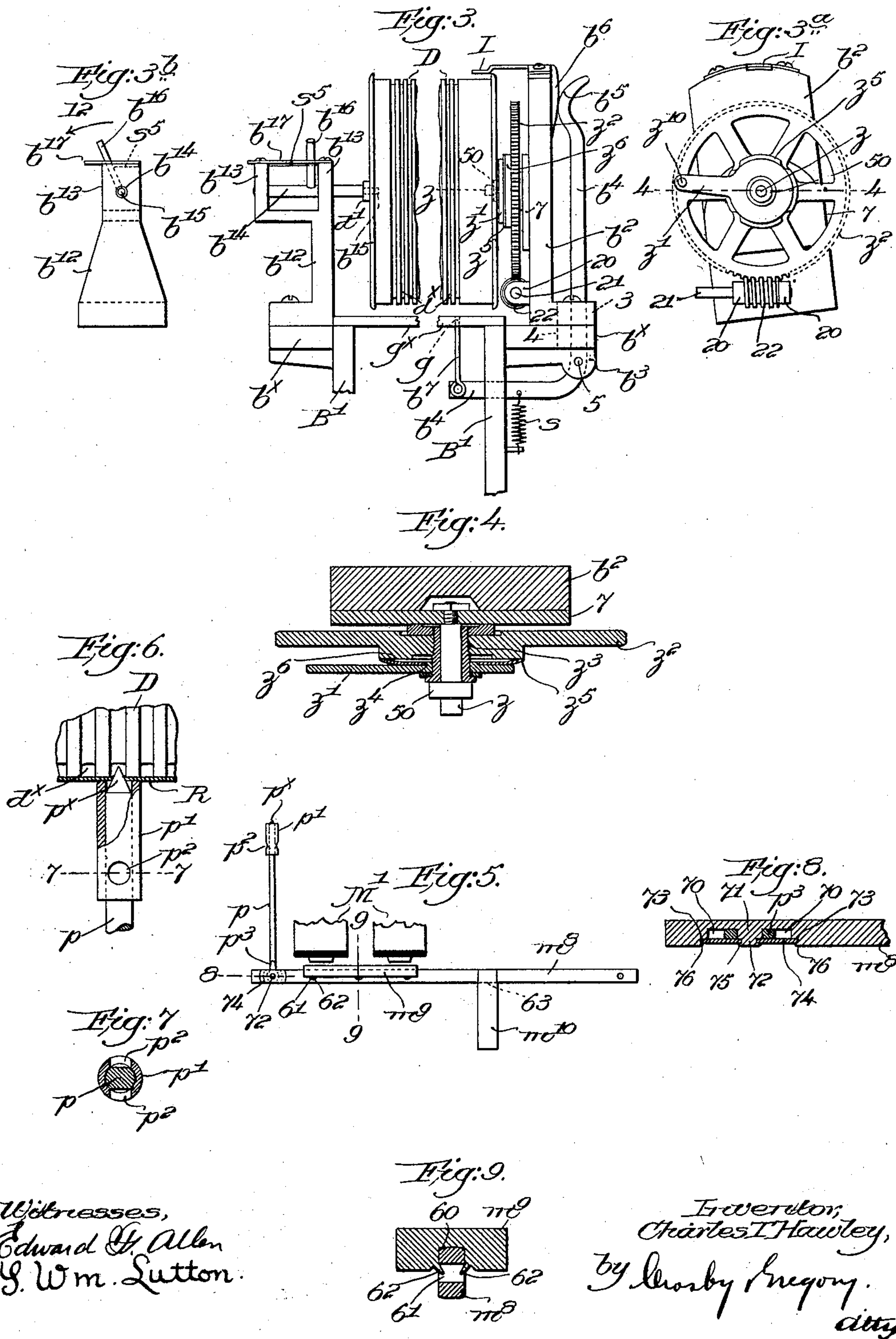
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NO MODEL.

3 SHEETS—SHEET 3.



Witnesses,
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UNITED STATES PATENT OFFICE.

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WATCHMAN'S TIME-RECORDER.

SPECIFICATION forming part of Letters Patent No. 759,177, dated May 3, 1904.

Application filed September 23, 1903. Serial No. 174,271. (No model.)

To all whom it may concern:

Be it known that I, CHARLES T. HAWLEY, a citizen of the United States, and a resident of Gardner, county of Worcester, State of Massachusetts, have invented an Improvement in Watchmen's Time-Recorders, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to watchmen's time-recorders such as are used to record the time at which a watchman visits certain fixed points or stations in factories, office-buildings, hotels, &c., whereby an accurate record is made and preserved of the manner in which the watchman has performed his duty. The particular type of such recorders to which my invention is specially applicable is that in which the record-sheet is detachably mounted on a revoluble drum or cylinder operated by a suitable clock mechanism, the time of the watchman's visit to a station being recorded upon the sheet by a stylus which makes a puncture therein.

My invention comprises various novel features of construction and arrangement whereby the operation, efficiency, and durability of the apparatus is improved, with a very considerable simplification of construction and convenience of operation. Such novel features will be fully described in the subjoined specification, and particularly pointed out in the following claims.

Figure 1 is a front elevation of a time-recorder embodying one form of my invention shown as mounted in the usual inclosing case, the door of which is thrown open and the revoluble cylinder or drum on which the record-sheet is carried is broken out centrally to show certain portions of the apparatus beneath it. Fig. 1^a is a plan view of one of the supporting-plates for the electromagnets to illustrate the manner in which said magnets are mounted. Fig. 2 is a vertical sectional view on the irregular line 2 2, Fig. 1, looking toward the right, the door of the case being shut. Fig. 3 is a front elevation of the

revoluble cylinder and its supports and also showing the telltale for recording the opening and shutting of the door of the inclosing case, the cylinder being centrally broken out to save space. Fig. 3^a is an inner face view of the cylinder-support shown at the right, Fig. 3, and also illustrating the driving or transmitting connection between the cylinder and clock or motor. Fig. 3^b is an inner face view of the cylinder-support shown at the left, Fig. 3. Fig. 4 is an enlarged sectional detail on the line 4 4, Fig. 3^a, of the driving or transmitting connection for the cylinder. Fig. 5 is a side elevation of one of the armatures and its connected stylus or perforator to be described. Fig. 6 is an enlarged detail, in side elevation and partly broken out, of the stylus or punch and the means for limiting its perforating movement. Fig. 7 is a transverse section on the line 7 7, Fig. 6, to be referred to. Fig. 8 is a longitudinal sectional detail, enlarged, of a portion of the armature on the line 8 8, Fig. 5, showing the pivotal connection between the armature and the punch or stylus; and Fig. 9 is a transverse section, enlarged, on the line 9 9, Fig. 5, to be referred to.

The apparatus is mounted in a suitable case A, Figs. 1 and 2, and herein shown as provided with a swing-door A^x, which is intended to be opened only by such person as may be authorized to remove and replace record-sheets, and I have provided a telltale device which automatically registers each opening and shutting of the door, so that any meddling therewith is recorded in an ineffaceable manner. This telltale device will be described hereinafter.

The case is provided with a clock C of any desired construction and operatively connected with and rotating the record-cylinder, as will be described.

The working parts of the recording apparatus are mounted on a rigid base B, preferably a grid-like casting, having legs *b b'* to rest against the back A' of the case and attached thereto by suitable screws 2, Fig. 1, the upper legs *b* being shorter, so that the

base B is inclined to the back of the case, as shown in Fig. 2. Upright parallel sides B' are formed on the sides of the base and extending only part way the length thereof, said sides having each an outwardly-extended lug b^x at right angles thereto. (Shown best in Fig. 3.) The right-hand lug b^x , viewing Figs. 1 and 3, has erected thereon an upright stand b^2 , having a slot 3 in its foot registering with a slot 4 in the lug, the latter having depending ears b^3 below the slot supporting a pin 5, Fig. 3, on which is fulcrumed an L-shaped lever b^4 , the lower end of which extends inward through the adjacent side B' of the frame. At its upper end the lever has a cam portion b^5 , which is normally held against a projecting rest b^6 on the stand by a spring s , fast at one end on the frame and at its other end attached to the inturned end of the lever. A prick-pin or punch b^7 is pivotally connected at its lower end to the inturned arm of the lever, the pointed upper end of the punch playing easily through a hole g in a guide, shown as a narrow plate g^x , extended from one to the other of the frame sides B' and rigidly secured thereto. On its inner side the case-door is provided with an actuator, shown as a beveled enlargement b^9 on the free end of an arm b^8 , attached to the door and so located that when the door is shut said enlargement will pass between the rest b^6 and cam portion b^5 , moving the latter outward, and thereby swinging the bent lever b^4 to elevate the punch b^7 and punch a hole in the record-sheet carried by the record-cylinder to be described. After so operating the punch the actuator moves beyond the cam portion and the spring s returns the lever and punch to normal position; but when the door is opened the actuator again operates the lever b^4 , as described, and another record is made on the record-sheet.

The lever b^4 , its punch or prick-pin, and the cam portion b^5 constitute the telltale device operated by the actuator b^9 whenever the door of the case is opened or shut.

I have herein shown the recording cylinder or drum D as having its cylindrical surface corrugated, Figs. 1, 3, and 6, and so arranged that when in operative position the grooves d^x will be opposite the several styluses or punches to be described, such a cylinder being shown in United States Patent No. 527,304, it being understood that the record-sheet R will be wrapped around the cylinder and held thereon in any suitable manner—as, for instance, by elastic bands.

The telltale-punch b^7 is arranged near one end of the cylinder to perforate the sheet along a certain line or path which will indicate opening or shutting of the door of the case. At its right-hand end the cylinder is rotatably supported on a spindle z , Figs. 3, 3^a, and 4, having a collar 50 and screwed into

a plate 7, attached to the inner face of the stand b^2 . The worm-gear z^2 , having a hub z^3 , rotatable on the spindle z , the crank-arm z' , having a squared boss z^4 , loosely mounted on the hub z^3 , and spring z^5 , mounted on the said boss between the gear z^2 and the crank-arm z' and turning with the latter are and may be all substantially as shown in United States Patent No. 570,241, dated October 27, 1896, and operate as therein provided, the spring bearing on an annular friction-surface z^6 of the gear z^2 . It will be obvious that the driving member, comprising the gear z^2 , arm z' , and spring z^5 , will turn upon the spindle z irrespective of the tension of the spring, the latter normally causing the arm to rotate in unison with the gear, while permitting rotation of the crank-arm independently of the gear, when it is desired to turn the cylinder D on its axis for adjustment or to inspect the record-sheet. The crank-pin z^{10} is adapted to enter a recess 10 in the adjacent end of the cylinder to rotate the latter in unison with the crank-arm. Below the gear z^2 the stand b^2 is provided with bearings 20 for a shaft 21, adapted to be connected in any usual manner (and forming no part of my invention) with the clock mechanism C, said shaft having fast upon it a worm 22 in mesh with and to rotate the worm-gear z^2 to thereby transmit rotative movement to the cylinder D, the latter having central sockets in its opposite ends, one for the spindle z and the other for a movable spindle to be described. The left-hand lug b^x has secured upon it an upturned stand b^{12} , branched or forked at its upper ends to form bearings b^{13} for a slidable spindle b^{14} , located opposite and in alinement with the fixed spindle z . At its inner end the spindle b^{14} is reduced, as at b^{15} , to enter a hole or socket in a boss d' on the adjacent end of cylinder D, and a controlling-pin b^{16} extending rigidly from the spindle at right angles to it, passing up through a locking-slot 15 16 in a locking-plate b^{17} , attached to the tops of the bearings b^{13} . (See Figs. 1 and 3.) A spring s^5 is attached to the outer bearing b^{13} and at its free end presses against the pin b^{16} , tending to throw the same in the direction of arrow 12, Fig. 3^b, so that when the spindle is pushed inward to operative position and the pin is opposite the notch 16 of the slot the pin will be thrown thereinto to lock the spindle from accidental retraction. This condition of affairs is shown clearly in Fig. 1, and it will be manifest that in order to remove the cylinder the pin b^{16} must be pushed back against the spring out of the notch 16 and into the slot 15 and then moved outward in the slot, thereby retracting the spindle b^{14} and disengaging it from the cylinder, which latter may then be withdrawn from spindle z and crank-pin z^{10} and removed from the apparatus.

Inasmuch as a watchman's stations are more

or less widely separated in different parts of a building or group of buildings, the stations are arranged in electrical connection with the time-recorder, which may be located in the office or other central location, and in my present invention I have provided novel and simple means for mounting the electromagnets by or through the armatures of which the records of the different stations are made upon the record-sheet R. The various novel features of this portion of my invention will now be described in detail, it being first stated that the guide g^x is located just below the center of the cylinder D and is provided with a row of guide-holes g^2 for the several styluses or punches, one being operated from each station of the system.

I have for simplicity and convenience herein arranged the magnets in two groups, each group being mounted on a separate plate, said plates M and N being attached to the tops of the frame sides B' by screws 19, Fig. 1, the plates being located symmetrically on opposite sides of the guide g^x .

As the arrangement of the magnets on each plate is the same, only one need be described in detail, and referring to the drawings the plate M is provided with two rows of staggered countersunk holes m^x , through each of which a screw m is passed and screwed into the core-head m' of each magnet M' of the well-known horseshoe form. By reference to Fig. 1^a it will be seen that by this arrangement the magnets are very compactly arranged, a coil of one occupying a portion of the space between the coils of the next adjacent magnet. One end of the coil, as m^2 , Fig. 2, of each magnet is electrically connected in any suitable manner with the core-head m' , and the other end m^3 is carried to one of a series of binding-posts m^4 , mounted on a strip of vulcanite, hard rubber, or other insulating material m^5 , secured to the upper surface of the plate M. Inasmuch as the latter is made of metal, it serves as a common conductor for the coil ends m^2 of the several magnets and in practice is connected with a wire 33, Fig. 1, forming a part of the main station-circuit. Two stations S and S' are indicated diagrammatically in Fig. 1 connected with the main circuit by wires 34 and with the binding-posts m^4 by wires 35, it being understood that one of the electromagnets M' will be included in each station-circuit 33 34 35, and at each station a magneto device of usual construction may be located, whereby the watchman can energize the magnet of that circuit.

Instead of a magneto device a common push-button may be used at each station to temporarily close the circuit, and in that case a battery or other source of power B²⁰ would be included in the main line-wire 33.

As shown in Fig. 2, the several magnets project from the rear side of the supporting-plate

M toward the frame-base B, on which the several armatures are mounted, as will be described.

By removing a magnet carrier or plate, as M or N, an entire group of magnets can be withdrawn from the apparatus without disarranging any of the circuits, and any one of the group can be inspected, repaired, or renewed, as may be necessary.

A transverse bar M² is secured to the base at its lower end, having transverse slots m^{20} and a longitudinal intersecting groove m^{21} , and at the upper end of the base a similar bar N² is secured and similarly slotted and grooved, the transverse slots in each bar corresponding in number and position to the magnets of the nearer carrier-plate M or N. A fulcrum-rod m^{22} is extended through the groove m^{21} and suitably held at its ends, the rod crossing the several slots m^{20} , which, as shown in dotted lines, Fig. 2, are deeper than the groove. A guide-bar M⁵⁰ is secured to the base B beneath the guide g^x and is provided with a series of deep transverse slots m^{50} , alternate slots being in alinement with the slots m^{20} of the bar M², while the intervening slots are in alinement with the slots n^{20} of the bar N², the guide-bar M⁵⁰ serving to guide the movement of the free ends of the two series or groups of armature-levers to be described. The fulcrum-rod n^{22} pivotally supports a series of depending armature-levers n^8 , which are long enough to pass through the slots m^{50} of the guide-bar M⁵⁰ and project slightly below it, while a similar series of armature-levers m^8 are fulcrumed on the rod m^{22} and extend upward therefrom through the slots m^{50} and slightly beyond them, as shown in Figs. 1 and 2, each lever of a series extending back of one of the magnets of the corresponding group and having attached to it an armature proper, m^9 or n^9 , opposite the magnet. The transverse slots in each end bar M² and N² laterally space the levers fulcrumed on the pin, extending longitudinally of the bar.

The armatures are made of broad flat pieces of iron, each longitudinally grooved at 60, Fig. 9, to slip snugly onto the lever m^8 and secured thereto in a novel and cheap manner. Holes 61 are made in the armature-lever, and when the armature is positioned thereon a pointed tool or die is forced into the under side of the armature at each side of the lever opposite one of the holes to force a portion 62 of the metal of the armature inward and overlapping the edge of the hole 61, as clearly shown in Fig. 9. The armature is thereby firmly secured in place on the lever, obviating brazing or the use of pins or screws.

Instead of springs to retract the armatures from the magnets I show herein weights, as m^{10} n^{10} , secured to the armature-levers and extended therefrom, and referring to Fig. 2 it will be seen that the weights m^{10} project to-

ward the back of the case A, tending to hold the free ends of the levers m^8 on the bottoms of the slots m^{50} , while the weights n^{10} project toward the front and act in a similar way for the levers n^8 .

Referring to Fig. 5, the weight is slotted at 63, and the lever is forced thereinto and suitably riveted in position.

When a magnet of either group is energized, its armature is attracted and the lever attached thereto is swung toward the record-cylinder D, the slots m^{50} being of sufficient depth to cooperate with the free ends of the armature-levers at all times, thereby preventing any lateral movement or displacement of said levers. Each armature-lever has pivotally connected with it near its free end a punch or stylus, herein shown as a round steel rod p , sharpened to a point p^x at its outer end, to penetrate the record-sheet and extend into one of the grooves d^x of the record-cylinder when the corresponding magnet is energized, as shown in Fig. 6. A stop is provided to prevent undue movement of the punch or stylus, and herein I have shown the stop as a sleeve p' , surrounding the pointed end of the rod p^x and permitting the point to project far enough beyond it to properly punch the sheet, but not to engage the bottom of the groove in the cylinder, as the end of the stop engages the ribs at each side of the groove, and thereby limits the penetrative movement of the point.

In my present apparatus the several styluses are so arranged that they are opposite every alternate groove of the cylinder, so that the sleeve of one stylus will not interfere with those of the adjacent styluses. The sleeve also serves to position and guide the free end of its stylus, as the sleeve slides freely in one of the holes, g^2 , of the guide g^x , hereinbefore described.

Any suitable means may be employed to attach the sleeve to the rod p ; but herein I have shown a novel form of attachment. (Illustrated in Figs. 6 and 7.) The sleeve is bored through near its lower end, as at p^2 , and when the rod p is pushed through it to the proper point oppositely-acting dies are passed through the holes p^2 and forced against the opposite sides of the rod, slightly flattening it and expanding the metal laterally within the sleeve, between the holes thereof. Thus the sleeve is immovably secured to the stylus at the desired point.

I have also devised a novel pivotal connection between each armature-lever and its stylus or punch, (shown in Figs. 5 and 8,) it being noted that the lever is of greater depth than thickness. A hollow mill is applied to the side of the lever near its free end and two opposite segmental grooves 70 are made therein, leaving a central stud 71, the mill being shaped to leave a reduced neck 72 on the

stud, while the outer walls of the segmental grooves are slightly counterbored to leave shoulders 73. The end of the pin is flattened, as at p^3 , and bored to slip onto the stud or post 71. A segmental apertured washer 74 is then placed on the neck 72, and its ends rest on the shoulders 73, after which the end of the neck is upset, as at 75, Fig. 8, onto the washer, and the metal of the lever is also upset, as at 76, over the outer edge of the washer, holding the latter firmly in place, it in turn retaining the rod p on the stud 71, while the grooves 70 permit the requisite relative play of the rod and lever when the latter is actuated.

By employing the form of pivotal connection described and by the means for holding the armatures on their levers and the stop-sleeves on the styluses I do away with a large number of small pins, rivets, or screws and obviate any possibility of separation of the different parts.

Referring to Figs. 1 and 2, I have shown holders B^{10} for the bunch of wires 35, leading from the stations to the binding-screws of the two groups of magnets, the holders being located at the upper and lower ends of one of the frame sides B' , and they are shown in dotted lines, Fig. 2, inasmuch as they are adjacent the left-hand side B' , viewing Fig. 1.

An index I is secured to the top of the stand b^2 to project inward over the cylinder D to assist in setting the latter at the proper point when the record-sheet R is secured thereto.

My invention is not restricted to the precise construction and arrangement herein shown and described, as the same may be varied or modified in different particulars and details by those skilled in the art without departing from the spirit and scope of my invention, one practical embodiment thereof being described and illustrated in detail herein.

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

1. In apparatus of the class described, an inclosing case, a door therefor, a rotatable cylinder to carry the record-sheet, a punch or stylus to puncture the record-sheet, a lever on which it is mounted, provided with a cam portion, an opposed fixed rest, and an actuator mounted on the case-door and adapted to pass between said rest and movable cam portion to momentarily separate them when the door is opened or closed, to thereby cause the punch or stylus to puncture the record-sheet.

2. In apparatus of the class described, an inclosing case, a door therefor, a rotatable cylinder to carry the record-sheet, a punch or stylus to puncture the record-sheet, a lever on which it is pivotally mounted, a fixed guide for the free end of the punch, a spring connected with said lever to retain the punch inoperative, and an actuator carried by the case-

door and moved into and out of engagement with the lever when the door is opened or closed, to effect movement of the punch into and out of operative position and puncture the record-sheet.

3. In apparatus of the class described, an inclosing case, a door therefor, a rotatable cylinder to carry the record-sheet, a punch or stylus to puncture the record-sheet, a spring-controlled rocking support for and with which the punch is pivotally connected and normally maintaining it inoperative, a fixed guide for the free end of said punch and a double beveled actuator mounted on the case-door, to engage said support and rock it back and forth each time the door is opened or shut, and thereby cause the punch to puncture the record-sheet.

4. In apparatus of the class described, a removable rotatable cylinder to carry the record-sheet, two opposed and alined spindles one of which is fixed and the other longitudinally movable, to rotatably support the cylinder, a controlling-pin on the movable spindle, whereby it may be moved, and also cooperating with a locking-plate, and a fixed slotted locking-plate to cooperate with the pin and lock the spindle in operative position, the cylinder rotating upon the two spindles and being wholly supported thereby.

5. In apparatus of the class described, a removable rotatable cylinder to carry the record-sheet and provided with spindle-sockets at its ends, means to cooperate with and drive the cylinder, a fixed and a longitudinally-movable spindle, to enter the sockets in and rotatably support the cylinder, and a device to automatically lock the movable spindle in operative position when manually moved thereto, said device including a fixed locking-plate having an L-shaped slot, a cooperating pin on the movable spindle, and a spring to turn said spindle into locking position.

6. In apparatus of the class described, a cylinder to carry a record-sheet, means to rotate the cylinder, a plurality of marking devices arranged radially to the cylinder and pointed at their acting ends, a sleeve-like stop on each device at the pointed end thereof, a fixed guide having apertures through which the several stops slide, and electromechanical means to operate said devices to puncture the record-sheet, the stops at such time cooperating with the cylinder and limiting penetration of the marking devices.

7. In apparatus of the class described, a corrugated cylinder to carry the record-sheet, means to rotate it, a stylus movable in a radial path toward and from the cylinder opposite a groove thereof, a tubular stop on and surrounding the stylus adjacent its point, to limit penetrative movement thereof by engagement with the cylinder-ribs at opposite sides of a groove, a rocking lever on which the stylus

is mounted, and an apertured guide through which the stylus slides.

8. In apparatus of the class described, a marking punch or stylus, a rocking lever to which it is pivotally connected, a sleeve-like stop surrounding the pointed end of the stylus and having a hole in its side, the metal of the stylus being upset laterally through said hole to wedge the stop securely on the stylus.

9. In apparatus of the class described, a marking punch or stylus, a tubular stop surrounding it at its pointed end, the latter projecting the desired distance beyond the end of the stop, an apertured, fixed guide through which the stop slides, a rocking lever to which the other end of the stylus is pivotally connected, and electromechanical means to rock the lever and operate the stylus.

10. In apparatus of the class described, a rotatable cylinder to carry a record-sheet, means to rotate the cylinder, a series of marking devices arranged side by side longitudinally of and adjacent the cylinder, pivoted armature-levers by which the marking devices are carried and to which they are pivotally connected, an electromagnet to cooperate directly with each armature-lever, a common support on which the magnets are mounted, each magnet being adapted to be included in an electric circuit and energized from a distant station, to swing its lever and cause the marking device carried thereby to mark the record-sheet on the cylinder a fixed guide for and through which the marking devices slide, and means cooperating with and to guide the free ends of the armature-levers.

11. In apparatus of the class described, a stylus having one end pointed and the other end flattened and perforated, a lever having opposite segmental grooves in its side and a stud or post central thereto, to receive the perforated end of the stylus, and a retaining-washer mounted on the stud, the end of the latter being upset to hold the washer in place.

12. In apparatus of the class described, a case, an upright frame therein having parallel, upturned sides, a rotatable cylinder mounted on the sides and adapted to carry a record-sheet, a series of armature-levers fulcrumed at the top of the frame and depending beneath the cylinder, a second series of armature-levers fulcrumed at the bottom of the frame and extended upward and beneath the cylinder, the levers of one series being parallel to and alternating with those of the other series, a stylus pivotally mounted on the free end of each lever, to puncture the record-sheet when operated, a fixed guide having apertures through which the free ends of the styluses slide, means to rock the levers and operate the styluses, said means including a group of electromagnets for and cooperating directly with the armature-levers of each series, and

counterweights mounted on said levers eccentric to their fulcra, to retract them when the magnets are deenergized and thereby withdraw the respective styluses to normal position.

13. In apparatus of the class described, a rotatable cylinder adapted to carry a record-sheet, a rocking lever fulcrumed at one end, and a stylus on the other end of the lever, to mark the record-sheet, a broad, flat armature longitudinally grooved on its under side, to rest upon and embrace the lever, the latter

having holes therein beneath the armature, the metal of said armature being upset into the adjacent holes to secure the armature on the lever, and an electromagnet with which the armature coöperates. 15

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES T. HAWLEY.

Witnesses:

THATCHER B. DUNN,
FRED J. DUNN.