F. WILLIAMS.

DOOR INDICATOR.

APPLICATION FILED SEPT. 18, 1912.

1,162,837.

Patented Dec. 7, 1915.

3 SHEETS—SHEET 1.

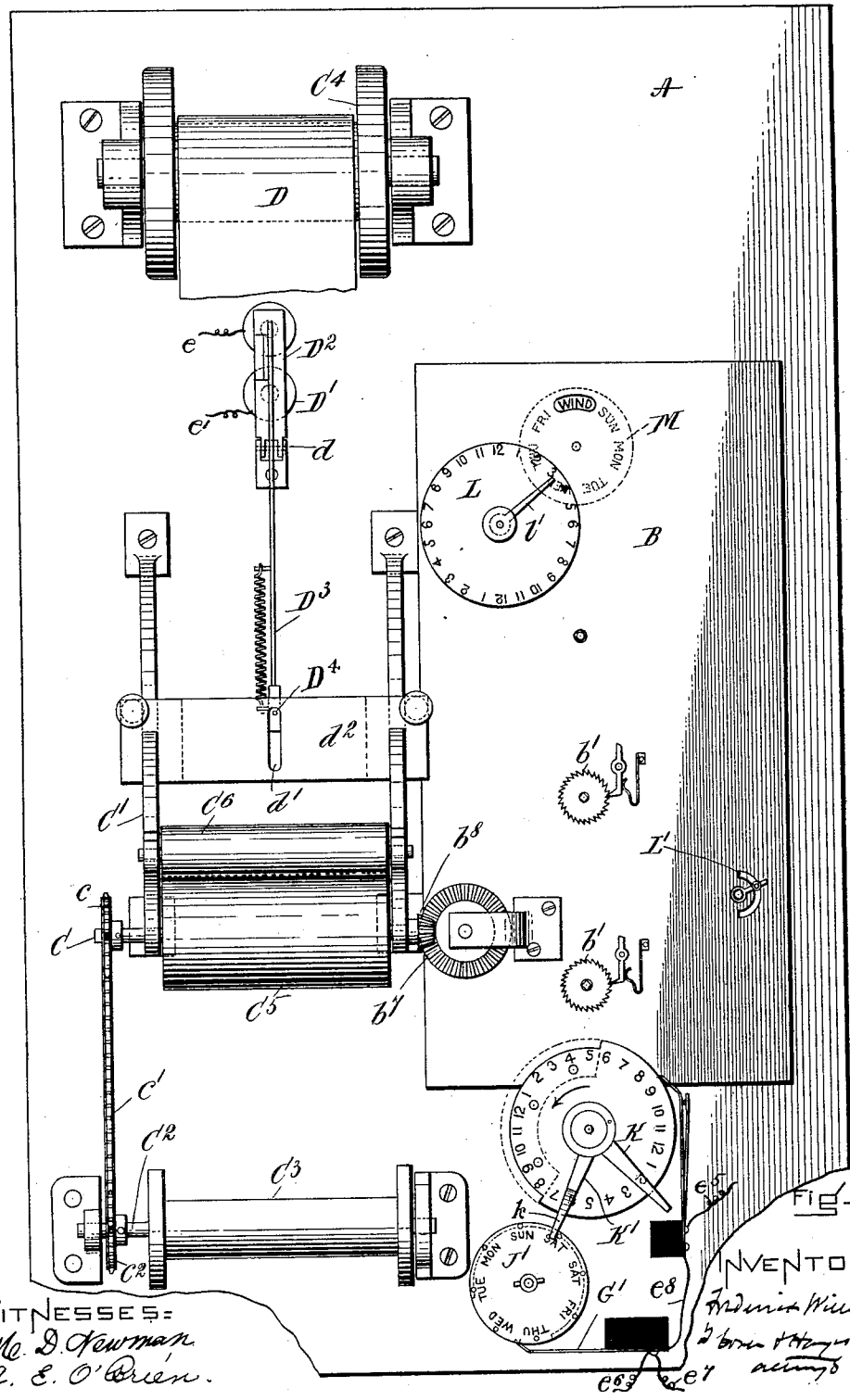


Fig. 1.

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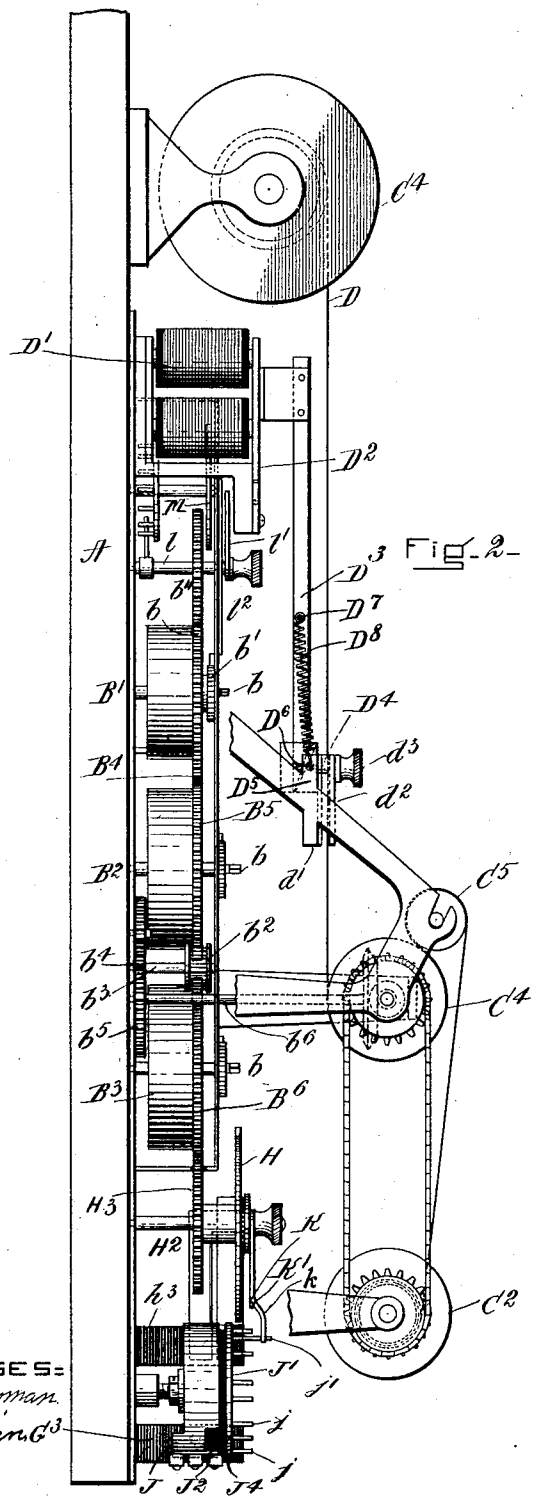


Fig. 2.

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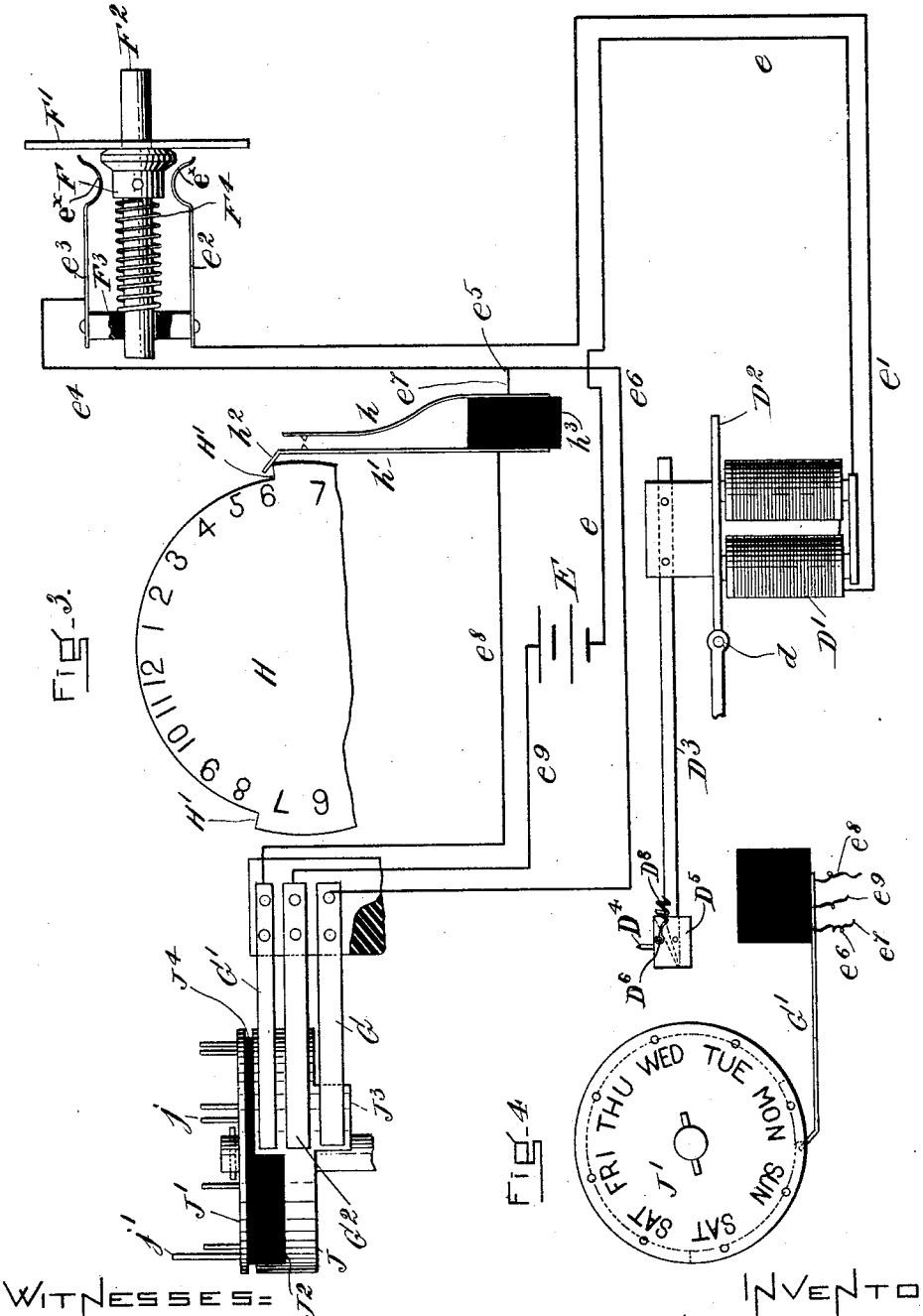


Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

FREDERICK WILLIAMS, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO ACME REGISTER COMPANY, OF SOMERVILLE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

DOOR-INDICATOR.

1,162,837. Specification of Letters Patent. Patented Dec. 7, 1915.

Application filed September 18, 1912. Serial No. 720,921.

To all whom it may concern:

Be it known that I, FREDERICK WILLIAMS, of Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Door-Indicators, of which the following is a specification.

The purpose of my invention is to provide a means whereby the exact moment at which, say the outer door of a building or store is opened. In large stores, for example, the opening hour is, say, shortly after 7 in the morning, and the store is closed shortly after 6 in the evening, and it is desirable to know in the first place the moment when the door was first opened in the morning and so check the arrival of the first employee and the moment that it was last opened after the closing hour, as well as to determine whether the door had been opened during the night. This purpose is accomplished by mechanism described below, which is constructed not only to register the openings of the door during the period above stated, but also is so constructed as to operate automatically to register any openings of the door on Sunday, and to provide for a change in closing hours such as often prevails one day in the week, usually Saturday. As described below the apparatus shown is so constructed as to allow for a late closing Saturday night.

My invention will be understood by reference to the drawings, in which—

Figure 1 shows a front elevation and Fig. 2 a side elevation of the device embodying my invention in the best form known to me. Fig. 3 is a diagram showing the electric circuit by which registry is made, and Fig. 4 is a dial described below, my invention being shown in these drawings in the best form known to me, for the purposes referred to.

A is a baseboard upon which the mechanism is mounted, B being the front plate of the clock movement described below, the back of this clock movement being mounted upon the base A.

The clock movement is controlled by three drums B^1, B^2, B^3, each of which contains the usual spring and each of them also is provided with the usual winding arbor b and pawl and ratchet holds b^1. As shown, one pawl and ratchet is mounted under the plate B, but this is immaterial, as it is constructed like the other parts b^1 and operates exactly in the same way to prevent untwisting of the arbors b.

As shown, the winding-drum B^1 is provided with a gear B^4 which meshes with a corresponding gear B^5 on the drum B^2. The winding-drum B^3 has a gear B^6 and the gears B^5 and B^6 each mesh with a pinion b^2 on the shaft b^3, having a pinion b^4 at its rear end in mesh with intermediate gears which mesh with the gear b^5 on the end of shaft b^6. The shaft b^6 carries a beveled gear b^7 supported on the plate B which meshes with a beveled gear b^8 on the end of a horizontal shaft C, which forms one element of the mechanism for carrying the paper strip on which the registry is made. The shaft C is mounted in bearings C^1 mounted on the base A. It carries a sprocket c by means of which, a chain c^1 and a corresponding sprocket c^2 on the end of shaft C^2, also mounted in bearings on the base A, the reel C^3 carried on shaft C^2 is turned.

C^4 is a reel mounted in brackets at the upper end of the base A. A roll of paper of suitable width to receive records is wound, the strip being lettered D and being carried from the reel C^4 over a drum C^5 which is mounted on the shaft C; then under and over an idler C^6 to the reel C^3, on which it is wound. The marking or registering mechanism by means of which a record is made on this strip comprises an electro-magnet D^1, the armature D^2 of which is hinged at d and carries a rod D^3 having at its outer end a needle D^4. The strip D of paper passes over a table d^1 and under a plate d^2 which is attached to the table d^1 by thumb screws d^3. Both the table d^1 and the plate d^2 are provided with slots such as d^4 through which the needle D^4 may operate in making a puncture in the record strip D, and the rod D^3 is so mounted on the armature that as the armature D^2 is attracted the needle will be thrown upward against the record strip. Thus, whenever a circuit through the electro-magnet D^1 is closed a puncture will be made. The circuit by which this operation of the armature is secured is shown in Fig. 3.

E is a battery, one pole of which is connected by the wire e to the electro-magnet D^1, the other wire e^1 from the electro-magnet passing to a door-controlled instrument which comprises a circuit-closer F operat-

ing between two springs, one of which, e^2 forms the terminal of the wire e^1.

F^1 represents a plate which with the parts e^2, e^3 and brace F^3 may be set in the door jamb and through which passes a spindle F^2 on which the circuit-closer F is mounted. The other terminal e^3 is similar to the terminal e^2, and the construction is such that when the pin F^2 is moved inwardly, that is, to the left in Fig. 3, the circuit-closer F will come in contact with and pass in contact with the bow-shaped portions e^x of the terminals e^2, e^3.

F^3 is a brace made of insulating material to which these terminals e^2 and e^3 are attached and which serves, with the plate F^1, as a support for the spindle which carries the circuit-closer F. This device is so located that when the door is closed the end of the spindle F^2 will be flush with the plate F^1, a spring F^4 returning it to its normal position when the door is opened. The wire e^4 which leads from the terminal e^3 divides at the point e^5, one branch e^6 passing to the wiper G and the other e^7 passing to a circuit-closer comprising two spring members h and h^1. From the member h^1 the circuit is continued by wire e^8 to wiper G^1. A third wiper G^2 is connected by the wire e^9 to the battery E. A rotatable drum J carrying a dial J^1 engages these wipers and switches the current from G^2 to either G^1 or G in the manner below described so that the circuit at this point is always closed. This drum is mounted on a stud J^4 so that it may be easily turned and the dial is insulated from it by an insulating disk j^4.

H is a dial having a portion of its periphery cut away as shown at H^1. It will be noted from Fig. 1 that this dial has upon its face two sets of numerals, each running from 1 to 12, and representing the twenty-four hours of the day. The portion of this dial which is cut away represents the business day, so to speak, that is, the hours in the case supposed, from say 7.20 in the morning to 6.15 in the evening, and upon examination of Fig. 3 it will be seen that during that period in the rotation of the dial H that portion of its periphery will not engage the circuit-closer h^1, so as to press it sufficiently far outwardly to make contact with the member h, and hence during that period the circuit will always remain broken. At the point H^1, however, the enlarged portion of the dial H engages the bent end h^2 of the member h^1 and is about to throw its contact point into contact with a corresponding contact point on the member h and thereafter (see Fig. 1) in the rotation of the dial a closed circuit will be maintained at this point until the reduced diameter of the dial reaches the member h^1, when it will be released from contact with h and will spring back again into the position shown in Fig. 3 and the circuit will be broken again. For the purpose of moving these various parts the clock movement above referred to is used. It rotates the dial H once in twenty-four hours. For this purpose the dial H is mounted on an arbor H^2 which carries a gear H^3 in mesh with the gear B^6 carried by the drum B^3. Upon this shaft H^2 are also mounted hands K K^1 which may be set upon the shaft H^2 opposite or over any desired figures thereof and turn with the dial.

The face of the dial J^1 carried by the drum J besides carrying the names of the days of the week as above stated also carries a series of pins j, one against each day of the week, together with a pin j^1 of extra length against a second name Saturday, and it will be noted from Figs. 1 and 2 that the arms K K^1 differ in length and also that the arm K^1 has an upwardly or outwardly bent portion k. These two arms engage pins j, j^1, the arm K being of sufficient length to engage the pins j and the arm K^1 being constructed or bent so as not to engage the pins j but to engage the longer pin j^1. This construction is such that as the dial H is turned by the clock mechanism once in twenty-four hours the hand K once in twenty-four hours will engage one of the pins j and the drum J, and give the drum a partial revolution. It will be seen that the dial repeats the day Saturday, the second Saturday having opposite it the long pin j^1. The hand K^1 is so shaped that while it will not engage the short pins j it will engage the long pin j^1 and it is set to engage the pin j^1 before the usual closing time 6.15, or rather the time at which the last employee leaves the store on week days except Saturday. On Saturday therefore it will give the dial J^1 and drum J an extra turn for the following purpose.

The drum J has an insulating inset J^2, one end of which is so located that when the pin j^1 has been engaged by the hand K^1 and the drum turned thereby this inset is brought under the wiper G^1 so that the electrical connection between wipers G^2 and G^1 is broken. The drum has a segmental projection J^3 on which the wiper G can rest when the drum is in the position shown in Fig. 3, and its relation to the insulated inset J^2 is such that upon the next movement of the drum by the hand K the projection J^3 will come under the wiper G at which moment the shunt circuit around the spring contacts h, h^1 will be established and upon the closing of the circuit by the door instrument F the electro-magnet will be energized and a record will be made by the needle D^4 on the strip D. In the usual operation of the device contact should be maintained between J^3 and the wiper G during all of Sunday or any other day when the store is to be closed until the usual week day closing hour, say

6.15 p. m., at which time the hand K will engage the pin j located on the dial J^1 and turn the dial and drum J to provide for the regular routine of Monday and the following week days until Saturday when the pin j^1 is again utilized as before.

To accomplish the operation above described the hand K should be set to bring the insulating inset J^2 under the wiper G^1 at the ordinary closing hour so that in the rotation of the drum when that hour is reached on Saturday the inset will become effective to break the circuit between G^1 and G^2 and the hand K^1 should be set to bring the projection J^3 under the wiper G when the hour of closing on Saturday is reached, and so close the circuit between G and G^2 until the evening of Sunday. This mechanism can be otherwise arranged to provide for a late closing hour during the week and for other holidays than Sunday. The result of this construction of the drum J and dial J^1 is that no record can be made on the strip D until after the closing hour on Saturday (which is later than the closing hour on other days) and a record can be made on Sunday during those hours when the store is ordinarily open for business on week days. The hands K, K^1 being held in place on the arbor H^2 by a thumb nut may be adjusted in place to suit any desired situation, and the hand and pins may be added to give other movements to the drum, if desired. I have also shown at L and M two features which are convenient though not necessary to the operation of my device. They comprise a disk L which is stationary and through which passes an arbor l carrying at its upper end a hand l^1 fastened to the arbor by a thumb nut l^2. The dial L is provided with two sets of 12 figures about its periphery, representing the twenty-four hours of the day, and the arbor l is rotated from the drum B^1 through its gear b and the gear b^{11} on the said arbor. This construction is such that the hand rotates once in twenty-four hours and hence if properly set, shows by inspection at any time that the clock mechanism is moving as it should. If the clock mechanism should be running fast or slow, suitable change can be made at the lever L^1, which is constructed in the ordinary way of such devices for adjustment of the speed of the clock mechanism, the hand L^1 being set to indicate the right time and the drum J and its appurtenances being also set if necessary. In addition there is also provided a disk M which is connected by gearing with the gear b^1 so that it will rotate once in seven days and will show through the opening m in the plate B, the day of the week. Preferably, as shown in Fig. 1, I substitute for Saturday the word "Wind", as an indication that sometime during Saturday the clock should be wound. These two details do not form any essential part in my invention but are merely conveniences indicating that the clockwork is in proper order and working at proper speed.

The operation of my device as shown is as follows: During week days except Saturday the contacts h and h^1 never make connection during the hours between 7.20 a. m. and 6.15 p. m. owing to the reduced diameter of the disk H between those hours. But at 6.15 p. m. the enlarged diameter of the disk engages the contact h^1 and pushes it against h so that the circuit is complete at this point and may be closed at any time upon the movement of the circuit closer F upon opening the door. Each day the drum J is turned by the hand K and on Saturday at or before 6.15 the drum is given an extra turn by the hand K^1 so as to bring the inset J^2 under wiper G^1 thus breaking the electrical contact at this point so that no record is made of the door movements. At the closing hour say eleven o'clock the drum is again turned so as to bring the segment J^3 under wiper G thus closing the electrical contact at the drum and shunting the spring contacts h, h^1. This condition is maintained all day Sunday until the smaller periphery of the dial H^1 has passed the end h^2 of contact h when as the apparatus is ready to perform its usual nightly functions the shunt contact is broken by the next rotation of the drum which carries the inset J^3 out from under the wiper G^1 so that electrical connection is again established between G^2 and G^1 through the metallic portion of the drum.

I have shown but one electro-magnet D^1 and but one door circuit closer F. Moreover I have shown a strip of paper D unnecessarily wide for a single recording needle. In practice I can use a circuit closer at every door and every window in a building, each circuit closer controlling its own electro-magnet and recording needle, each electro-magnet moreover being in circuit with the same battery, circuit closers h, h^1, wipers and drum J. In this case there will be a plurality of needles D^4 one for each door or window circuit closer and a plurality of slots d^4 in the plate d^1 and plate d^2, and the electro-magnets may be placed side by side or on opposite sides of the table d^1 but so that the needles D^4 are side by side as thought best. As this will be clear to all skilled in the art it does not seem necessary to give a detailed description of such an arrangement. The strip D should be of such width as to receive records from all the needles and should be so ruled and spaced as to indicate hours and minutes and thus enable the time of any record to be easily read, the speed of travel of the strip being properly related to the speed of movement of the other parts. The wipers or terminals G, G^1

and G^2 should be insulated from each other and for this purpose I have shown them mounted on an insulating block G^3. For a like reason the parts h and h^1 are preferably mounted on an insulating block h^3. I prefer to mount each needle D^4 in a block D^5 which preferably is mounted near the end of the rod D^3. The block D^5 carries a pin D^6 and the rod D^3 also carries a pin D^7. A spring D^8 attached to these pins holds the needle block D^5 and needle in proper position for making a puncture and yet allows it to yield so that the paper strip will be dragged off from it should the needle stick in the puncture.

I have described above the simplest form of my invention and one which has proved very effective in practice, but I do not mean to limit my invention to the precise construction shown. For example, the purpose of the dial H is to compress and hold the spring contacts h, h^1 together for the proper time so as to close the circuit during certain hours. Other means by which such contact may be made and held will occur to those skilled in the art. I prefer to inclose the entire mechanism in a suitable case the front of which may be provided with windows through which the record may be inspected if desired, or the front may be closed by an opaque door and locked so that only the manager or other official may have access to the information.

What I claim as my invention is:—

1. A device of the kind described comprising an electro-magnet, a spring circuit closer electrically connected therewith and normally open, movable means adapted to hold the members of said spring circuit closer in contact during a certain period of the day, means operable periodically when said spring circuit closer members are out of contact, to close a shunt circuit around said spring circuit closer, and a door circuit closer adapted to make an electrical contact upon the opening of the door.

2. In a device of the kind described, a spring circuit closer comprising two members one of which is a spring member, and means for causing said spring member to make contact with the other member, said means comprising a rotary dial having two diameters, one of the members of said circuit closer being located to engage the periphery of said dial and the other member being located in proximity to said first member, whereby when said first member engages the portion of the periphery of said dial which is of larger diameter said members will be forced into positive contact and when said first member engages the portion of the periphery of said dial which is of smaller diameter said members will remain out of contact, in combination with means for rendering said spring circuit closer inoperative periodically comprising a shunt circuit around said spring circuit closer, a circuit closer located therein, and automatic means adapted to operate said circuit closer periodically for the purpose described.

3. In a device of the kind described, a rotary dial, a spring circuit closer operated thereby to make electrical contact periodically, a drum operable intermittently and means for operating it, terminals resting on said drum and adapted to be electrically connected therethrough, means electrically connecting one of the members of said spring circuit closer with one of said terminals, and means carried by said drum whereby electrical connection between said last-named terminals and said drum will be broken periodically and recording means operable electrically upon the closing of the circuit through said spring circuit closer and said terminals.

4. In a device of the kind described, a spring circuit closer, means whereby electrical contact will be made therethrough periodically, a drum operable intermittently and means for so operating it, terminals resting on said drum and adapted to be electrically connected therethrough, means electrically connecting one of the members of said spring circuit closer with one of said terminals, and means carried by said drum whereby electrical connection between said terminals and said drum will be broken periodically, and recording means operable electrically upon the closing of the circuit through said spring circuit closer and said terminals.

5. In a device of the kind described, in combination, an arbor, means for moving it, a dial mounted on said arbor to be turned thereby, hands mounted on said arbor each adapted to be adjusted with relation to said dial, a drum and two sets of means mounted upon said drum, each set being adapted to be engaged by one of said hands and not by the other whereby said drum will be given an irregular intermittent movement.

6. In a device of the kind described, a drum and means for rotating it intermittently comprising a constantly-turning arbor and means for turning it, hands mounted on said arbor, a dial mounted on said drum, and pins mounted on said dial, one of said pins being longer than the others and one of said hands being adapted to engage said longer pin and to move out of contact with the shorter pins.

7. In a device of the kind described, an hour dial, means for rotating it, a circuit closer, means carried by said hour dial whereby said circuit closer will be periodically closed, a drum, terminals engaging said drum, means rotating with said hour dial adapted to engage and regularly move said drum a given distance once in every

rotation of said hour dial, and auxiliary means whereby said drum may be given an additional movement independent of its said regular movement.

8. In a device of the kind described, an hour dial, means for rotating it, a circuit closer, means carried by said hour dial whereby said circuit closer will be periodically closed, a drum, terminals engaging said drum, means rotating with said hour dial adapted to engage and regularly move said drum a given distance once in every rotation of said hour dial, auxiliary means whereby said drum may be given an additional movement independent of its regular movement, terminals resting upon the periphery of said drum, said periphery of said drum carrying an insulating segment adapted to engage one of said terminals and a metallic segment adapted to engage another of said terminals, said metallic segment being located with relation to said auxiliary means whereby the additional movement given to said drum will bring said metallic segment into engagement with said last named terminal.

9. In a device of the kind described, an electrically operated recording instrument, a circuit closer, means for operating said circuit closer during certain periods of time, a second circuit closer, means for moving it periodically, and means for giving it an additional movement at stated times, and electrical connections between said circuit closers and said recording instrument, in combination with a third circuit closer, and connections whereby said recording instrument will be operated only when the circuit is closed through all three circuit closers.

10. In a device of the kind described, an electrically operated recording instrument, a circuit closer adapted to close a circuit through said recording instrument, means whereby said circuit closer is closed for a period representing a number of hours, a second circuit closer comprising three terminals, one of said terminals being electrically connected with one member of said circuit closer, means whereby normally two of said terminals are in circuit and periodically one of said two terminals is thrown out of circuit, and the third of said terminals is thrown in circuit with said recording instrument thereby shunting said circuit closer, as set forth.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."