W. A. WILSON.

Electric Register and Time Recorder.

No. 203,689. Patented May 14, 1878.

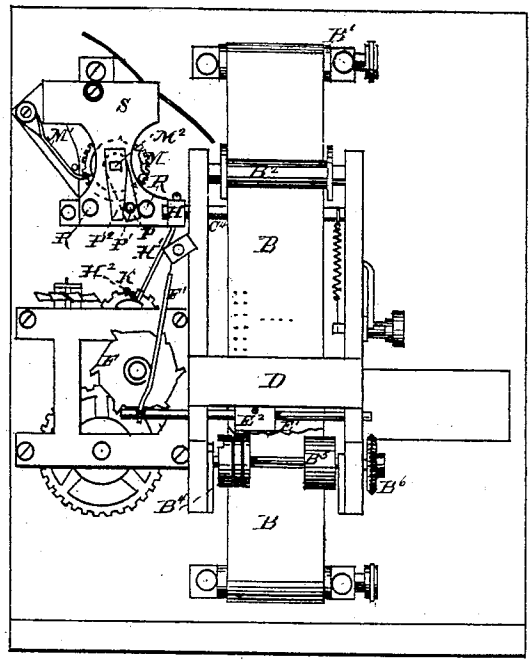

Fig. 1.

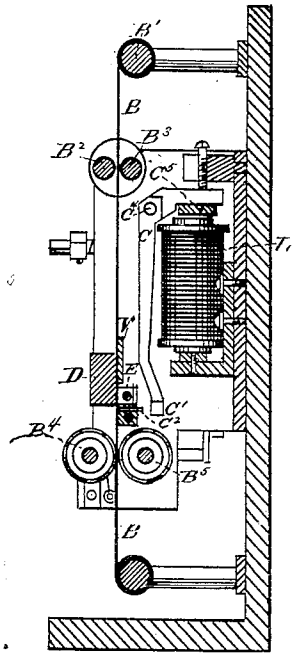

Fig. 2.

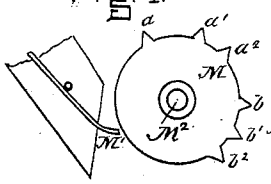

Fig. 4.

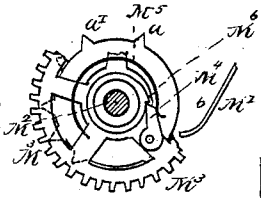

Fig. 7

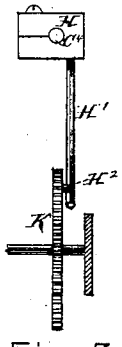

Fig. 3.

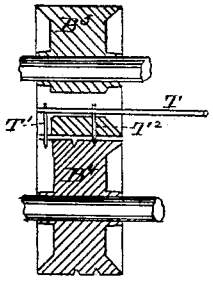

Fig. 6.

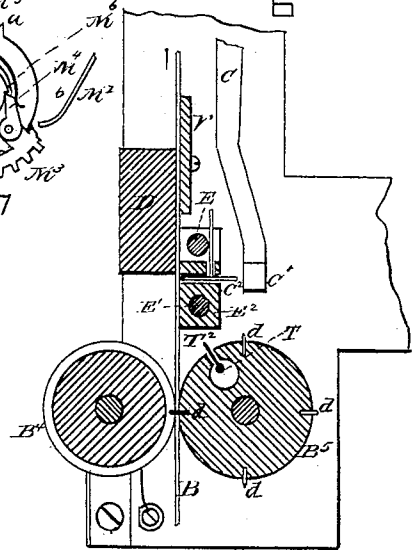

Fig. 5.

WITNESSES.

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UNITED STATES PATENT OFFICE.

WILLIAM A. WILSON, OF BOSTON, ASSIGNOR TO SARAH HELEN WILSON, OF CHELSEA, MASSACHUSETTS.

IMPROVEMENT IN ELECTRIC REGISTER AND TIME-RECORDER.

Specification forming part of Letters Patent No. **203,689**, dated May 14, 1878; application filed April 4, 1878.

To all whom it may concern:

Be it known that I, WILLIAM A. WILSON, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Electric Register and Time-Detecter, of which the following is a specification:

The nature of my invention consists, first, in so arranging the paper-support in connection with the stylus that the points raised on the paper by the prick of the stylus shall not interfere with the free movement of the paper; second, in an arrangement for moving the stylus by the use of a spur-wheel; third, in a device made in connection with a paper-feeding device of a system of spurs that will puncture the paper so as to indicate time.

The devices have such complicated relations that they may be best understood by reference to the specification and drawings, and are especially pointed out in the claims.

Referring to the drawings, Figure 1 is an elevation, showing my registering device and one of the circuit-closers. Fig. 2 is a vertical cross-section of the same. Fig. 3 is a view of the let-off of the registering device. Fig. 4 is a detail view of a part of the circuit-closer. Fig. 5 is a vertical section, showing the lower feed-wheels and a part of the stylus-carrying device. Fig. 6 is a section through the lower feed-wheels, and shows in detail the device for making the punctures on the registering-paper to indicate time.

In Figs. 1 and 2, B represents a strip of paper having graduations upon it to represent divisions of time. This strip of paper is coiled up upon the roller B^1, and when in use extends downward through the fixed guides B^2 B^3 (see Figs. 1 and 2) to the drawing-rolls B^4 B^5, Figs. 1, 2, and 5. These drawing-rolls are operated by a clock, from which motion is communicated through the bevel-gear B^6, Fig. 1. This motion is so regulated that the strip of registering-paper B shall so move that the time-divisions, which may be printed on it before its use, or time-punctures made on it while in use, as will be explained, shall pass the stylus-point at intervals to correspond with the clock-time.

L, Figs. 1 and 2, represents an electro-magnet having an armature, C^5, Fig. 2. This armature is connected by a bent lever, C, which is hung on a shaft, C^4, to a T-shaped piece, C^1, which serves to operate the stylus C^2, Figs. 2 and 5, which, in turn, punctures the registering-paper.

The stylus C^2 is fitted loosely in a block, E^2, Figs. 1 and 5, which, in turn, is attached to a sliding rod, E^1, and is connected loosely to a fixed guide-rod, E.

The sliding rod E^1 is operated by a spur-wheel, F, Fig. 1, the spur-wheel being propelled by a train of wheels operated by a spring or weight, and governed by any suitable regulator. This spur-wheel F, revolving to the left, causes the sliding rod E^1, (together with the block E^2, which carries the stylus C^2,) to move forward, so that at certain times, as the stylus moves forward in front of the T-shaped piece C^1, Fig. 2, it (the stylus,) will be made to puncture the registering-paper, as will be hereinafter explained.

After the wheel F has pushed the rod E^1 a certain distance the spur will slip off from the end of the rod, and allow the spring F^1, Fig. 1, to throw the rod E^1 and stylus back to its original position.

The train of wheels which operates the spur-wheel F is set in motion by a let-off device operating upon a pin, H^2, Fig. 3, which is fixed to the wheel K, Fig. 1. This let-off device consists of a bent rod, H^1, Fig. 3, attached by a block, H, to the shaft C^4, upon which the armature-lever C is fixed, so that when the armature is drawn to the magnet (the circuit being closed) it will cause the shaft C^4 to partly revolve, and thus throw the bent rod H^1, Fig. 3, out of contact with the let-off pin H^2. This will allow the train of wheels to revolve sufficiently to cause the spur-wheel F to force the sliding rod E and stylus C^2 across the back of the registering-paper, which corresponds to one revolution of the wheel K; then the train is stopped by the bent lever H^1, as in the mean time the circuit has been broken and the armature released.

The circuit-closer shown at S, Fig. 1, consists of a train of wheels operated by a spring

which actuates the switch-disk M, Figs. 1, 4, and 7. This switch-disk has an arm, P^2, attached to its shaft M^2.

When the watchman wishes to record his presence, he turns the arm P^2, by means of a key, a single revolution, which is all it can turn, as the motion of the arm P^2 is limited by a pin, P^1, on the swinging arm P. This swinging arm P can move only between the fixed pins R R.

The object of having the stopping-pin P^1 affixed to a swinging arm is that the arm P^2 may be permitted to make a complete revolution, for, if the pin P^1 were immovable, the arm P^2 could only be turned through an arc which would be less than a complete circle to an extent which would be measured by the width of the arm and diameter of the pin P^1.

The switch-wheel M is connected through the coil on the magnet L with one pole of the battery, the spring-switch M^1, Figs. 1 and 4, being connected with the other pole by return wire or ground. Now, as the wheel M revolves, the point *a* will come in contact with the switch M^1. This will close the circuit, make a magnet of L, and actuate the armature C^5, which will, acting through the let-off device H H^2, allow the spur-wheel F to begin its motion. The continued motion of the wheel M will cause the point *a* to leave the switch M^1, and thus break the circuit and release the armature; but the spur-wheel F will continue its motion, carrying the stylus C^2. At the same time the switch-wheel M continues to revolve, bringing in succession the points *a* a^2 *b* b^1 b^2 in contact with the switch M^1, thus at intervals closing the circuit. At each time the circuit is closed the armature C^5 is operated upon, and the lever C, acting through the T-piece C^1, will cause the stylus C^2 to make a puncture in the registering-paper B, and, as the two wheels F and M move in unison, it may be seen that the position of the points a^1 a^2 *b* b^1 b^2 govern the time of closing the circuit, and therefore determine the time (place) on the registering-paper at which the puncture is made.

Therefore, by having a number of these circuit-closers S, each being provided with a switch-wheel, M, having circuit-closing points differently distributed on each, the action on the stylus will be different for each circuit-closer. Therefore the record punctured upon the registering-paper B will indicate from which circuit-closer the signal is sent, the time of the same being indicated by the longitudinal place on the registering-paper upon which the punctures are made.

Besides the punctures above described, another set of punctures are made by the feed-wheels B^4 B^5. These punctures are made longitudinally at intervals on the registering-paper to indicate time. To produce this effect, I place in the feed-wheel B^5, Fig. 5, a series of small spurs, *d d d d*, and on the wheel B^4, Figs. 1 and 5, a channel, so as these feed-wheels revolve by clock-work the registering-paper B is drawn down, and is punctured by the spurs *d d d d*. The wheel B^5 is timed to revolve once each hour, so that the punctures will indicate quarter-hours. To indicate periods of twelve hours, I have the following device, (shown in Figs. 5 and 6:) T is a spring-rod, placed within the feed-roll B^5, having a puncturing-point, T^2, Fig. 6, and a guard, T^1. The wheel B^4 is so proportioned in size to the wheel B^5 that common points on the two wheels will only coincide at each twelfth revolution of the wheel B^5. Therefore, by making a point in B^4 for the guard T^1 to enter, and so arranging the guard T^1 in relation to the puncturing-point T^2 that, as the wheels revolve, no puncture can be made by T^2 except when the guard T^1 is in the recess of the wheel B^4, and as this can only happen at each twelfth revolution of the wheel B^5, it is evident that the puncture made by T^2 will indicate the twelve-hour divisions.

For convenience of placing the registering-paper B in position, I place the inner guard V partly above the outer guard D, as shown in Figs. 2 and 6, so that to insert the paper I have only to place its lower edge against the guard V and give it a slightly-downward impulse. This will cause it to pass through readily.

The stylus C^2, Figs. 2 and 5, is placed just below the edge of the outer guard D, so that when the puncture is made (which causes a slight projection on the face of the paper) there is nothing to prevent a free passage of the paper downward, as there would be in case the puncture were made in a recess in D.

In Fig. 3, which shows a part of the circuit-closing device S, Fig. 1, in detail, I illustrate a mechanism which I have adopted to force the watchman to turn the key in the watch-box a complete circle. If he neglects to do this, no record will be made, nor will the power of the driving-spring be exhausted.

M^2, Figs. 1, 4, and 7, is the shaft to which the watchman's key is to be applied. The circuit-disk M is attached to a sleeve in such a manner that the shaft may be revolved independent of the disk and sleeve. To this sleeve I attach the time-controlling wheel M^3, (see Fig. 7,) and on the wheel M^3 I place a pawl, M^4, and as this pawl M^4 revolves with the wheel M^2, and is connected through the wheel M^2 to the circuit-closing disk M, as described, they must both revolve together, so that the end of the ratchet-pawl M^4 maintains the same relation at all times with the projections *a a a*, *b*, and *c*.

As M^6 is a single ratchet-tooth attached directly to the shaft M^2, it will be seen that by this arrangement the watchman must cause the shaft M^2 to make a complete revolution in the direction of the arrow S before the pawl M^4 will engage with the tooth M^6. Any turning of the shaft M^2 by the watchman less than a complete circle will be of no avail, as the pawl M^4 will not engage with the tooth M^6,

and hence the shaft will fly back without causing the wheel M^3 and the circuit-closing disk M to revolve, and no signal will be given.

Another advantage of this device is that, as there is a fixed relation between the tooth M^6 and the circuit-closing point *a*, this point *a* will be in the proper position for connecting with the switch M^1 before any of the other points can touch it. Thus the wheel F will be started at the proper time.

The spur-wheel F, Fig. 1, has the advantage of the cams as heretofore used. First, it reduces the friction very much. It is also one wheel nearer the power. Furthermore, it makes six records at one revolution, while the cam in common use will make but one at a revolution. The velocity being regulated by the fan, all extra power over and above that used by the fan and that used in moving the stylus-block is reserved for overcoming accidents or other unprovided-for difficulties. I am also enabled by the use of this device to get a larger number of records with the same weight than can be done by the old device of cams, and thereby save a large number of pulleys in an ordinary-sized case, when many boxes for recording are used.

I do not claim any part of the transmitting device as my invention.

The particular features of the above-described invention that I claim as new, and desire to secure by Letters Patent, are—

1. In a registering device, the combination of the outer guide D and the paper B with the stylus C^2, said stylus puncturing the paper at a point just clearing the lower edge of said outer guide, whereby the burr made by said puncture will not impede the motion of the paper, all operating together substantially as described and set forth.

2. In a registering device, the combination of the stylus-block E and guiding-rod E^1, with the spur-wheel F and its operating mechanism, substantially as described, and for the purpose set forth.

3. In a registering device, the combination of the differential wheels B^4 B^5, the spring-rod T, and guard T^1 with the puncturing-point T^2, all operating together substantially as described, and for the purpose set forth.

WILLIAM A. WILSON.

Witnesses:

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N. EVANS.