(No Model.) 2 Sheets—Sheet 1.

W. RAMSAY.

ELECTRIC TIME DENOTING DEVICE.

No. 455,055. Patented June 30, 1891.

Fig. 1.

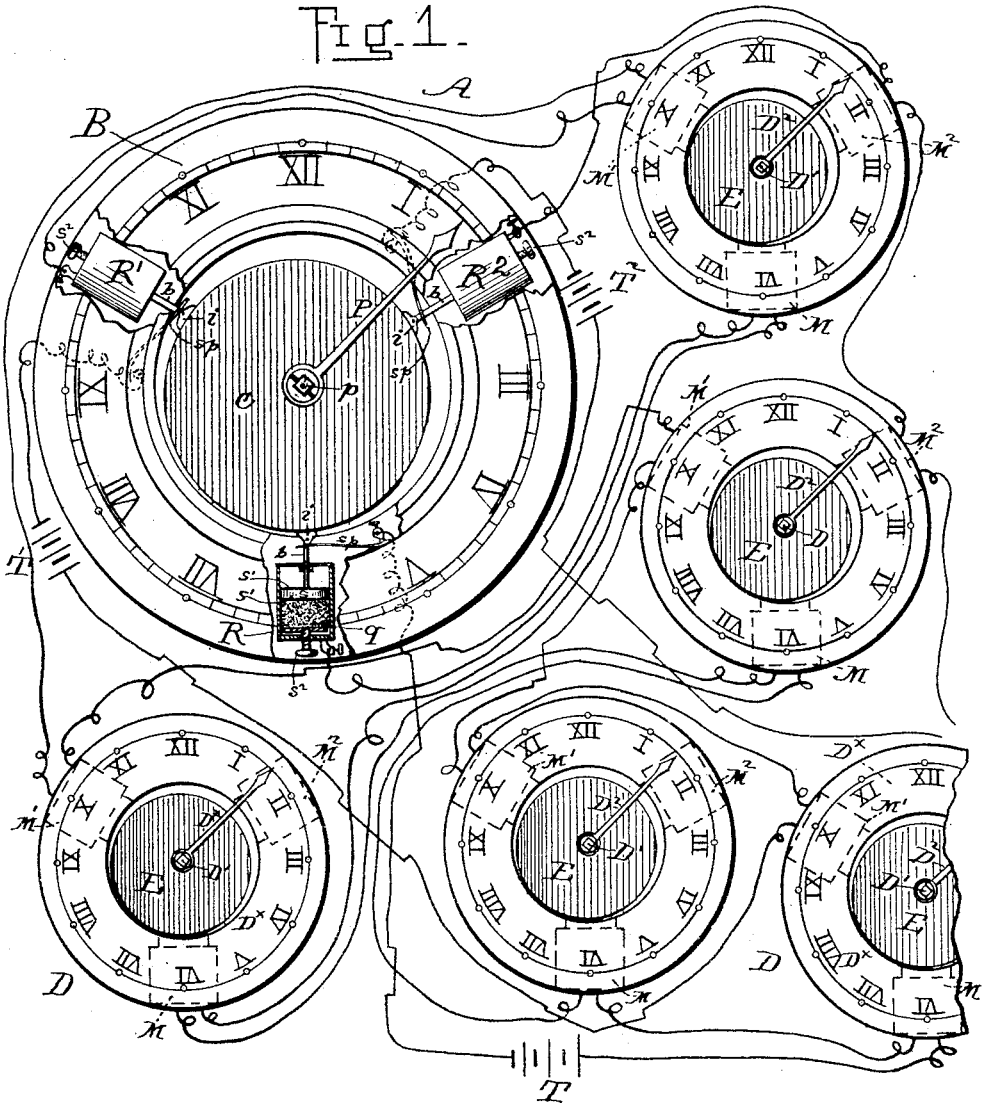
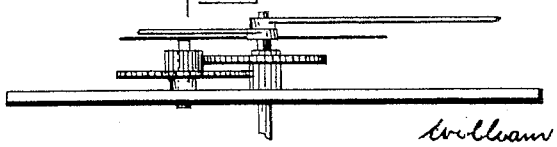


Fig. 3.



Witnesses.

Thos. Houghton.

Jamb. A. Jacobson

Inventor

William Ramsay

By Lewis Abraham

his Attorney

(No Model.) 2 Sheets—Sheet 2.

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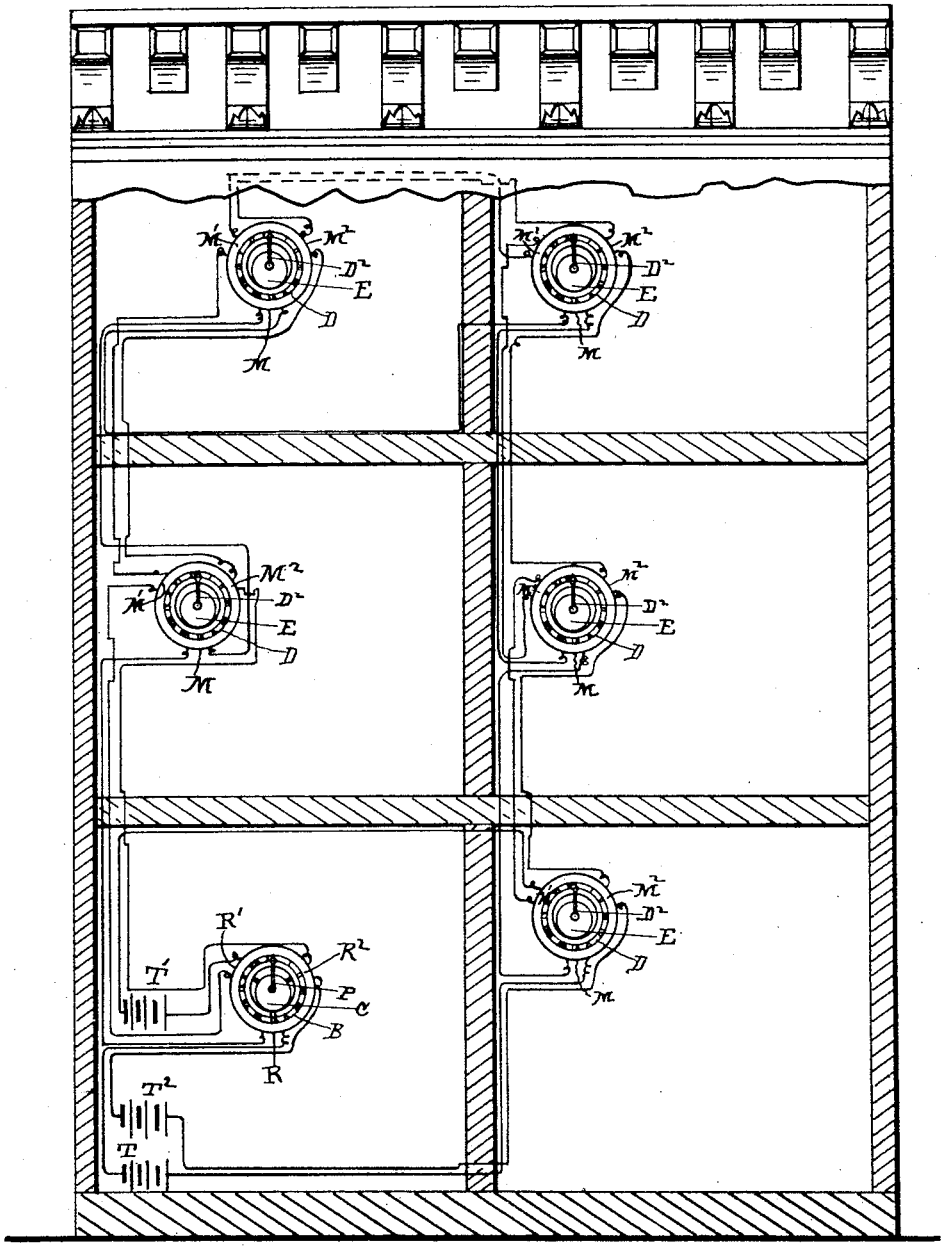

Fig. 2.

Witnesses
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Lamb. H. Jacobson

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William Ramsay
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UNITED STATES PATENT OFFICE.

WILLIAM RAMSAY, OF WASHINGTON, DISTRICT OF COLUMBIA.

ELECTRIC TIME-DENOTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 455,055, dated June 30, 1891.

Application filed January 15, 1891. Serial No. 377,825. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM RAMSAY, a citizen of the United States, residing in Washington, in the District of Columbia, have invented certain new and useful Improvements in Time-Denoting Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the means for controlling and operating electrically a series of time-denoting devices from a main time-piece or clock mechanism.

My invention consists in combining in an electric circuit a mechanically-operated main-clock mechanism, and a circuit-controlling device actuated by said clock mechanism, with electro-magnets in the circuit located adjacent to or around a supplementary time-face at a distance from the main clock to actuate an armature carrying a pointer, whereby a variable current is caused through the electro-magnets and the armature actuated to move the pointer.

My invention further consists in certain details in the construction and arrangement of parts, all as hereinafter explained.

Referring to the accompanying drawings, wherein like letters of reference indicate similar parts on each figure, Figure 1 is a plan view of a field of time-denoting devices adapted to be actuated according to my invention, said view showing a main clock and several of a series of secondary dials with their operating connections, parts of the main dial being broken away and a portion in section. Fig. 2 is a sectional view of a building, the several apartments being supplied with time-denoting devices electrically connected and to be operated from a main-clock mechanism. Fig. 3 is a view of mechanism for operating the hour-hand from the minute-hand.

A main-clock mechanism A, of any suitable construction, is employed in carrying out my invention, and has mounted upon the hour-spindle *p* a circular disk C, having its pivotal bearing arranged eccentrically thereto, which disk is adapted to turn with said spindle, but in eccentric arcs by reason of the described pivotal connection. There may be attached to the clock A an ordinary pointer P to give the usual time-indication on the dial-band B. There may also be connected therewith suitable gearing for audibly indicating divisions of time, no special mechanism therefor being herein claimed or illustrated.

Located around the dial-band are variable rheostats R R′ R² at equal distances from the post or spindle. These consist, preferably, of the non-conducting cylindrical portions *q*, and in the end adjacent to the spindle is placed a carbon packing or similar material *s*, fitting or held between two metal plates *s′*, platinum being preferred. I do not, however, limit myself to such material, as many other substances may be employed without departing from the scope and purview of my invention. The object to be secured in this element is to maintain a normally-weak conductor or semi-conductor, the intensity of which is to be increased and diminished in the manner and by means presently set forth. For adjustment of the resistance of rheostats of this character the base of each cylinder is provided with an inner lower plate and regulating-screw s^2 or any suitable means common in analogous devices. In that end of each of the cylinders adjacent to the spindle are piston-rods *b*, adapted to be engaged and actuated by the contact therewith of the disk C and to bear with varying pressure on the resisting medium as the disk revolves consequent to the eccentric arrangement of its pivotal point and the concentric arrangement of the pistons to the spindle and causing a varying current through the several circuits, one rheostat losing while another is gaining, the pistons being relieved from pressure on the resisting medium by means of springs *sp* as the pressure of the disk is withdrawn.

I use the generic word "piston" as describing the device illustrated in the drawings, which element will appear when rheostats of the character described and illustrated are employed; but rheostats that are provided with fluid or semi-fluid contents or means for varying the electric current by metallic contact, or any desired form for securing a variable electric current, may be substituted for the form of rheostat described and illustrated. Therefore when using the word "piston" I desire to be understood as meaning any form

of device that is caused to move within, against, or adjacent to conducting media to vary its intensity.

Suitable insulators must necessarily be supplied to prevent any electric impulse from the periphery of the disk C.

I show in the drawings insulating-shoes *i*.

D is one of a series of time-denoting devices, consisting of the secondary dial D *x*, spindle D′, and pointer D^2, and arranged around the spindle at equal distances therefrom or in a circle concentric thereto are electro-magnets M M′ M^2, each in circuit with its corresponding rheostat R R′ R^2, the current being generated by suitable batteries T T′ T^2, each in circuit.

Eccentrically pivoted upon the spindle D′ is an armature E, adapted to revolve freely between the poles of the magnets, the point of armature farthest from the center always following the line of greatest attraction, and consequently causing the pointer to follow or move correspondingly with the pointer of the main clock and in the same radii, the pointer in this instance representing the minute-hand; but either this or an hour-hand may be operated in a similar manner, or the minute-hand may operate the hour-hand by any suitable connecting-gearing, one form being shown in Fig. 3.

Where a large number of time-indicators are to be employed operated from the same machine, the corresponding electro-magnet of each supplementary dial of the system is in circuit with its special controlling-rheostat—that is, the rheostat R of the main clock is in circuit with the magnets M of each time-indicator, the rheostat R′ with magnets M′, and the rheostat R^2 with magnets M^2, and so on, if more of such elements are utilized, for more than three rheostats and complementary magnets may surround the respective peripheries, if desired. It will be seen that the electric conductors are led from the first group of magnets to the next group in the field, and so on in succession from one group to another, it being understood that all will be therefore operated simultaneously from the main mechanism. Should the main clock run down or require resetting of its time-pointers for corrective purposes, each secondary dial will be concurrently corrected, as each pointer thereon will turn in consonance with the one on the main dial.

From the foregoing it will be seen that an independent closed circuit is formed through each rheostat and its correlative electro-magnet, and that as the disk on the pintle of the actuating mechanism is revolved, owing to its eccentric arrangement, it will bear with varying force on each piston of the rheostat in succession, causing a varying current through each circuit in turn, and consequently to cause the armature at the time-indicating stations to conform to the movements of the controlling-disk.

Having thus fully described my invention and the manner of its operation, what I claim, and desire to secure by Letters Patent of the United States of America, is—

1. In a system for controlling electrically from a main-clock mechanism time-denoting devices, a series of main closed circuits provided adjacent to the clock with variable resistance mechanism and at the time-denoting devices with electro-magnets, and means actuated by the clock mechanism to control the variable-resistance mechanism, substantially as set forth.

2. In a system for controlling electrically from a main-clock mechanism time-denoting devices, a series of main closed circuits, a series of rheostats located adjacent to the clock mechanism, and a series of electro-magnets, each one in circuit independently with one of the rheostats, and means actuated by the clock mechanism to cause varying currents in turn through the circuits, substantially as set forth.

3. In a system for controlling electrically from a main-clock mechanism time-denoting devices, a series of main closed circuits, a series of rheostats located adjacent to the clock mechanism, a series of electro-magnets, each in circuit with one of the series of rheostats, a disk mounted eccentrically on the spindle of the clock mechanism, and an armature mounted eccentrically on the spindle of the supplementary time-denoting device, controlled electrically by the action of the disk of the main-clock mechanism, substantially as set forth.

4. In a system of controlling electrically from a main-clock mechanism time-denoting devices, a series of main closed circuits, a series of rheostats located adjacent to the clock mechanism, a series of electro-magnets, each one of which is in circuit with one of the series of rheostats, a disk mounted eccentrically on the spindle of the clock mechanism, an armature mounted eccentrically on the spindle of the time-denoting mechanism, controlled by the magnets and carrying the minute-pointer, and mechanism operated by the pointer of the minute-hand to denote the hour, substantially as set forth.

5. In a system of controlling electrically from a main-clock mechanism time-denoting devices, a series of cylinders located around the dial of the main-clock mechanism, an electric semi-conducting medium in the cylinders, a moving piston located in the cylinders to bear upon the conducting medium, a disk pivoted eccentrically on the spindle of the clock mechanism to engage in turn with varying force the series of pistons, a series of electro-magnets in circuit located near the time-denoting device, and an armature to be controlled thereby, substantially as described.

6. In a time-indicating system of the character described, mechanically-operated rheostats arranged to be actuated by a main-clock mechanism, said rheostats being respectively

connected with one or more electro-magnets adjacent to supplementary dials, upon which dials, through said connections, progressive time-indications are displayed concurrently with the time-indications on the main-clock dial, substantially as described.

7. In a system of controlling electrically from a main-clock mechanism time-denoting devices, a series of main closed circuits, a series of rheostats R R′ R^2, located around the spindle concentric thereto, a series of electro-magnets M M′ M^2, one in circuit with one of each of the rheostats, a disk C, mounted eccentrically on the spindle *p* of the clock mechanism, and an armature E, eccentrically pivoted on the pintle D′, substantially as set forth.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

WILLIAM RAMSAY.

Witnesses:

SAML. H. JACOBSON,

CHARLES G. SHOEMAKER.