(No Model.)

J. S. BAILEY.

ELECTRIC CLOCK FOR TRANSMITTING SIGNALS.

No. 353,840. Patented Dec. 7, 1886.

Fig. 1.

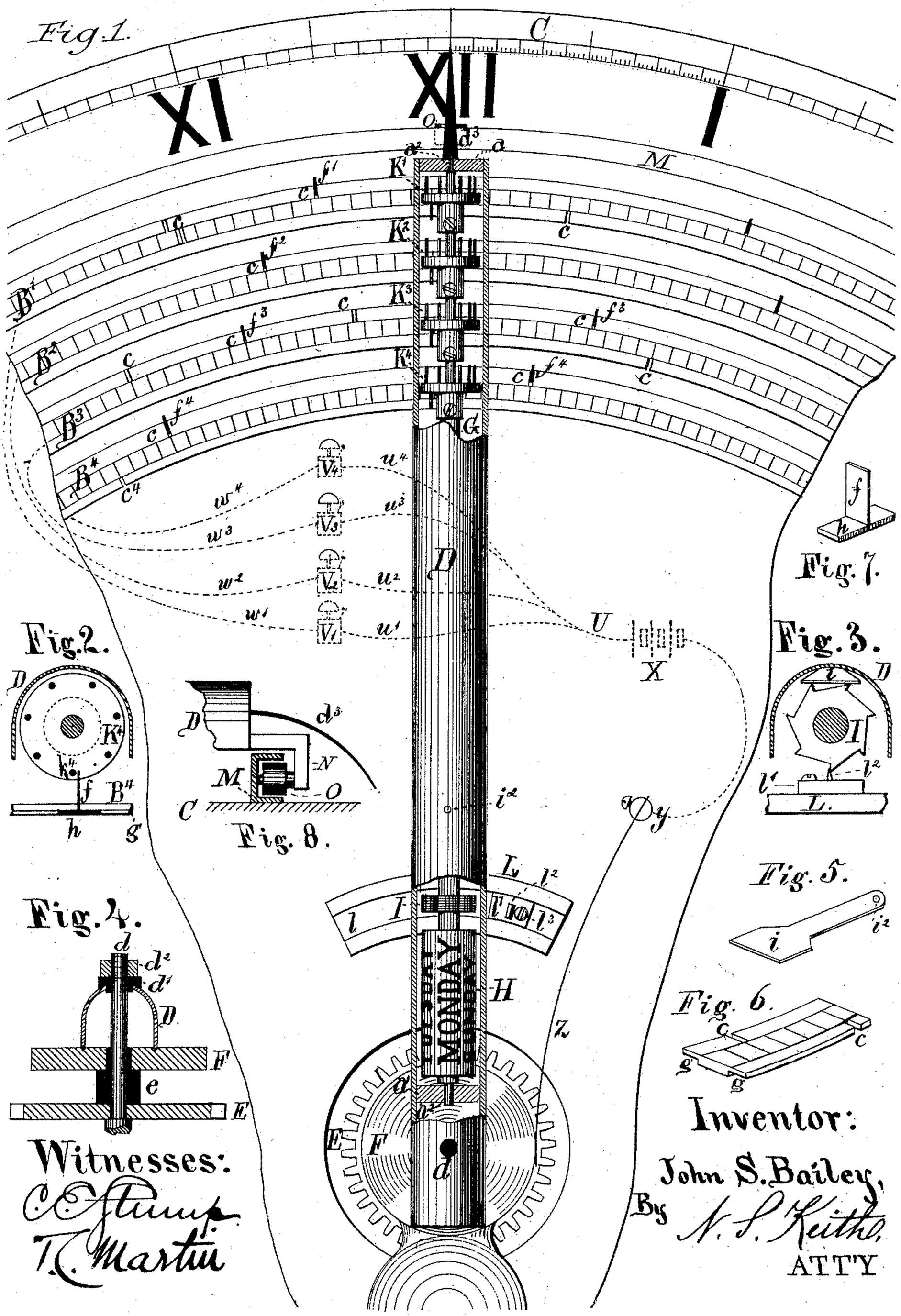

Fig. 2.

Fig. 8.

Fig. 4.

Witnesses:
C. F. Stump
T. C. Martin

Fig. 7.

Fig. 3.

Fig. 5.

Fig. 6.

Inventor:
John S. Bailey,
By N. L. Keith,
ATT'Y

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JOHN S. BAILEY, OF BUCKINGHAM, PENNSYLVANIA.

ELECTRIC CLOCK FOR TRANSMITTING SIGNALS.

SPECIFICATION forming part of Letters Patent No. 353,840, dated December 7, 1886.

Application filed August 19, 1884. Serial No. 140,954. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. BAILEY, a citizen of the United States, and a resident of Buckingham, in the county of Bucks and State of Pennsylvania, have invented certain new and useful Improvements in Electric Time-Signalizers, of which the following is a specification.

The object of my invention is to provide an apparatus which shall automatically close one or more electric-signal circuits at predetermined times, and by so closing said circuits cause the sounding of a bell or bells or other sound-signals, or, where desired, the moving of visual signals or the production of various mechanical movements, such as may be desirable to make from time to time during a day or week. To effect this object I employ mechanism which consists of a clock or other chronograph, having a dial divided into twenty-four sectoral divisions, denoting the hourly divisions of a day, and a hand or pointer carrying mechanism which denotes the day of the week, and also carrying contact-pins, which serve to close electric circuits at designated times, within which circuits are the signaling bells, gongs, semaphores, or other calling, warning, or mechanical devices. There are also placed concentrically on the dial-rings contact-points which engage the contact-pins of the pointer.

Accompanying this specification are the following drawings: Figure 1 represents a sectoral portion of a clock whose dial-scale is divided into twenty-four major parts consisting of two series of twelve each. The two series represent the hours of time from midnight to midnight. Figs. 2, 3, 4, 5, 6, 7, and 8 represent details of the apparatus shown in Fig. 1.

Like letters refer to like parts in all the figures.

A, Fig. 1, is a sector of a dial which is divided or scaled for twenty-four hours, and the hourly divisions are subdivided into minutes, as at from XII to I. There are four flat rings, B′ B² B³ B⁴, of metal, fastened concentrically to the dial, but insulated therefrom, if the dial be not made of insulating material. These rings are also marked into divisions and subdivisions in number equal to the scale C of the dial itself. The lines of division are placed radially, so that the marks on all denoting the same division of time are on the same radial line.

A pointer or hand, D, is mounted axially on the arbor *d*, which is the arbor by which, by means of motion communicated to the cog-wheel E, it receives its motive power. The body of this pointer consists of a rod of sheet metal having a ∩-shaped cross-section, and mounted at one end on the metal disk F. The disk F and pointer D are insulated from the wheel E and arbor *d*, as shown in Fig. 4, by means of the sleeve *e* and washer *d′*, both made of hard rubber or other insulating material. The nut d^2 serves to bind the whole together, as shown in section in Fig. 4. To the end of the body of the pointer is a pointed extension, d^3, for the purpose of exactness. A metal head, *a*, and metal diaphragm *a′* are fastened in the pointer D. They have central holes, a^2, in them, to act as journal-bearings for the shaft G, which is placed longitudinally in the pointer D.

The shaft is rotatable in its place. It has fastened to it, first, the calendar-cylinder H, which has on it the names of the days of the week, placed each in one of seven equal circumferential divisions; second, it has the ratchet-wheel I, with seven teeth, as shown more plainly in Fig. 3; third, it has the four pin-disks K′ K^2 K^3 K^4, which are fastened in position over the rings B′ B^2 B^3 B^4, respectively. An end or face view of one of these disks is shown in Fig. 2. There are seven pins in each of these disks—one pin in each for each day of the week. The calendar-cylinder, ratchet-wheel, and disks are so fastened to the shaft that when any day's name on the cylinder is turned toward the observer the pins representing that day are as near as possible to their respective rings B. This is illustrated by the position of pin k^4, Fig. 2, to the section of the ring B^4, and the ratchet-wheel has the position shown relative to a flat spring, *i*, Figs. 3 and 5, so that the bearing of the spring on two teeth of the ratchet prevents the too easy turning of the shaft. On the dial there is also fastened an arc-shaped piece of metal, L. In a groove, *l*, therein is a metal slide, *l′*, carrying a pin, l^2, and a set-screw, l^3. This slide is movable in the groove, and may be fastened in any

desired place therein by the set-screw in obvious manner. The pin engages with the teeth of the ratchet-wheel whenever the pointer is moved over it, and as the shaft is rotatable this engagement insures a movement of the shaft just one-seventh of a rotation.

The rings B' B^2 B^3 B^4 are insulated from one another and from the dial. At various suitable places, as at the minute-marks, radial slots at *c c c c*, &c., are cut in them to receive the spring-pins *f*, Figs. 1, 2, and 7. The rings are rabbeted on the two edges of their planes next to the dial, as shown at *g g*, Figs. 2 and 6, for the purpose of receiving the part *h*, while the slots receive the part *f*, so that that part stands perpendicular to the plane of the dial and rings. The part *f* is made thin and springy, so that when one of the pins on the disks K engage with it it will bend to let the pointer move by. The spring *i*, Figs. 3 and 5, is fastened within the pointer at i^2, Fig. 1, so that its broad end bears on the ratchet-wheel, as shown in Fig. 3. A set-screw for adjustment of pressure thereon may be used. There is a guide, M, Figs. 1 and 8, fastened concentrically on the face of the dial. Within this guide, which is a grooved piece of metal forming a ring and lying on its side, with the groove facing outward, there runs a roller, O, which turns on a pin fastened to the L-shaped arm N, Fig. 8. This arm is fastened on the end of the hand D. This device is for the purpose of keeping the hand at its proper distance from the dial, and to relieve the strain on the axle *d*.

Each ring B' B^2, &c., is connected by a wire, w' w^2, &c., to one binding-post of an electric-bell signal or other desirable electric apparatus. The other binding-post of each electric apparatus is connected by wire u' u^2, &c., to one pole of a battery, X. The other pole of the battery is connected by wire to the post *y*, which carries a metal ribbon-spring, *z*, pressing against the edge of the disk F.

The operation of this my invention is as follows: Motion is given to the pointer at a rate which will carry it around the dial in exactly twenty-four hours. This motion may be produced by clock mechanism behind the dial; or it may be derived in any other way—as, for instance, by pneumatic or electric secondary clock-work—so long as the movement is a positive one and chronographically exact. Suppose that this instrument is in use in a union or central depot for four railroads, and that it is desired to announce the time for dispatching the trains of the several railroads at the headquarters of each of the several roads. Pins like *f*, Fig. 7, are placed in those slots *c* which are made in the several rings at the marks which denote the departing-time of the several trains, as are shown by the short black radial lines on the rings. If at this time it were 10:15 o'clock p. m. on Monday, the pointer would move forward. When the Monday pin k^4 on disk K^4 came to pin *f* at point 10:30 o'clock on ring B^4, it would make an electric contact which would close the electric circuit from battery X through post *y*, metal spring Z, disk F, pointer D, and its shaft to disk K^4, pin k^4, pin f^4, ring B^4, wire w^4, signal-bell V^4 at the locality where the signal is desired, and then by wire u^4 and U to the battery X. This causes the ringing of the signal to denote that it is 10:30 o'clock until the pin k^4 has passed the pin f^4. As the pointer moves along, the bottom pin of K^3 comes in contact with pin f^3, and thus an electric circuit is completed like the previous one, except that it is through signal-bell V^3, located elsewhere. As the pointer moves along, it makes circuits at cf^2 cf' cf^4 cf^3 at, respectively, 11:10, 11:26, 12:25, and 12:41 o'clock. When the pointer arrives at one o'clock, the ratchet-wheel I comes into engagement with the pin l^2, and as it moves along the pin causes the ratchet-wheel and its connected shaft to turn with the disks K' K^2 K^3 K^4 and the calendar-cylinder, so that pins for Tuesday take the position of the Monday ones, and the calendar-cylinder shows "Tuesday" to the observer. The spring *i*, pressing on two teeth of the ratchet-wheel, holds the shaft and connections from turning until the wheels come again over the pin l^2 twenty-four hours thereafter, when another change becomes necessary and takes place.

The grooved arc L is placed on the dial at approximately the midnight hour, because it is usual to have less need for ringing signals at that time, and therefore the few minutes needed for the shifting of the calendar and disks need not interfere with the making of contacts for the ringing of signals; but of course the arc may be placed at any other convenient place on the dial, or it may be made a complete circle. The slide l' is made movable in the arc or circle, if used, for adjusting the precise position of the pin l^2. The set-screw l^3 is used to fasten the slide in place, it being screwed in to bear on the bottom of the groove when fastening the slide.

Whenever signals are needed on Sundays, at times different from those of the other days of the week, as is generally the case with railroads, I leave out the Sunday pin on the side of the disks K' K^2 K^3 K^4, leaving the pins for other days, or such of them as is necessary, and insert the pin on the other side of the disk, so that it may come in contact with pins, like *f*, placed in suitable slots on the other sides of the rings, as at c^4. Then no signals will be rung on Sunday from the side of the ring used on other days, but only from the other side, where pins are placed in the rings at the slots or spaces representing the appropriate time or times.

Of course various things other than ringing signals may be caused to be done at predetermined times by the use of this apparatus, such as may be done by electricity, through the circuits thus established.

I do not confine my invention to the specific mechanical appliances herein shown and described, because they may be varied without departing from the spirit of my invention. I

do not limit my invention to any specific number of electric circuits to be closed and opened by the pointer and its attachments, nor to any number of parts needed for any number of circuits, for it is obvious that any number of circuits, from one up, may be supplied by one chronographic arrangement of this kind.

I do not limit myself to any definite number of rings on the dial, for the number is only limited by the requirements of the party using the invention, and by the size or capacity for rings of the dial.

It is plain that other hands may be mounted on this my apparatus for pointing the time.

Having described my invention, I claim—

1. The combination, with a time-designating apparatus, of an automatically-moved calendar mounted on one of the pointers or hands.

2. In a time-designating apparatus, the combination, with a pointer or hand thereof, of a rotatable shaft mounted thereon and parallel therewith, the shaft carrying a calendar-cylinder, and a device by which the shaft is rotated at stated intervals for exhibiting the calendar.

3. In an electric time-designating apparatus, the combination, with a hand or pointer, of a device rotatable on the hand or pointer and carrying pins or contact-points which engage, during revolution of the hand or pointer, with contact-pins placed concentrically around the axis of revolution of the hand or pointer.

4. In a time-designating apparatus, the combination of a revolving hand or pointer with a rotatable shaft carried by the hand or pointer, and a calendar-cylinder with the names of the days of the week thereon mounted on the shaft.

5. In an electric time-designating apparatus, the combination of the shaft G, the calendar-cylinder H, one or more disks, K, the ratchet-wheel I, and the contact-pins *k*, substantially as and for the purpose specified.

6. The combination of the pointer D, the shaft G, the ratchet-wheel I, and the spring *i*, substantially as and for the purpose specified.

7. The combination, with a dial provided with contact-pins, of a pointer provided with a rotatable disk carrying seven contact-pins, one for each day of the week, one of said pins only being in operative position at a time, and means for rotating such disk at a stated period each day, substantially as described.

8. The combination, with a dial provided with a metallic ring on its face, said ring being divided by lines into the conventional divisions of a day and provided with more than a single series of contact-pins in different concentric circles, of a pointer provided with a rotatable disk having more than a single series of contact-pins, only one of said pins of either series being in operative position at the same time, and means of rotating said disk, substantially as described.

9. In an electric time-designating apparatus, a dial having a metallic ring on its face, and two concentric series of contact-pins upon said ring, in combination with a pointer having a shaft pivoted upon the same, said shaft being provided with two series of contact-pins to engage the contact-pins of the metallic ring, and means for revolving the shaft, substantially as described.

10. In an electric time designating apparatus, a metallic ring fastened to the face or dial of the apparatus and rabbeted on two sides of its plane next to the face or dial, substantially as and for the purpose specified.

11. In an electric time-designating apparatus, a dial having two series of contact-points, in combination with a pointer having two series of movable contacts, one series being in operative position when the other is out, and means for moving the pointer-contacts into and out of operative position, substantially as described.

12. In an electric time-designating apparatus, a disk carrying contact-pins so set in the disk that the one for Sunday projects from one face of the disk and so that those for the other days of a week project from the other face of the disk.

13. In a time-designating apparatus, a circular guide on the face of the dial, in combination with a device attached to one of the hands and running in the guide.

14. In an electric time-designating apparatus, a dial having two concentric series of contact-points, a pointer having a shaft mounted upon the same, carrying two series of contact-points, and means for rotating said shaft, substantially as described.

Signed at Doylestown, in the county of Bucks and State of Pennsylvania, this 23d day of July, A. D. 1884.

JOHN S. BAILEY.

Witnesses:
HENRY C. MICHENER,
W. W. H. DAVIS.