

(No Model.)

3 Sheets—Sheet 1.

C. A. RANDALL.
ELECTRIC TIME ALARM AND INDICATOR.

No. 420,890.

Patented Feb. 4, 1890.

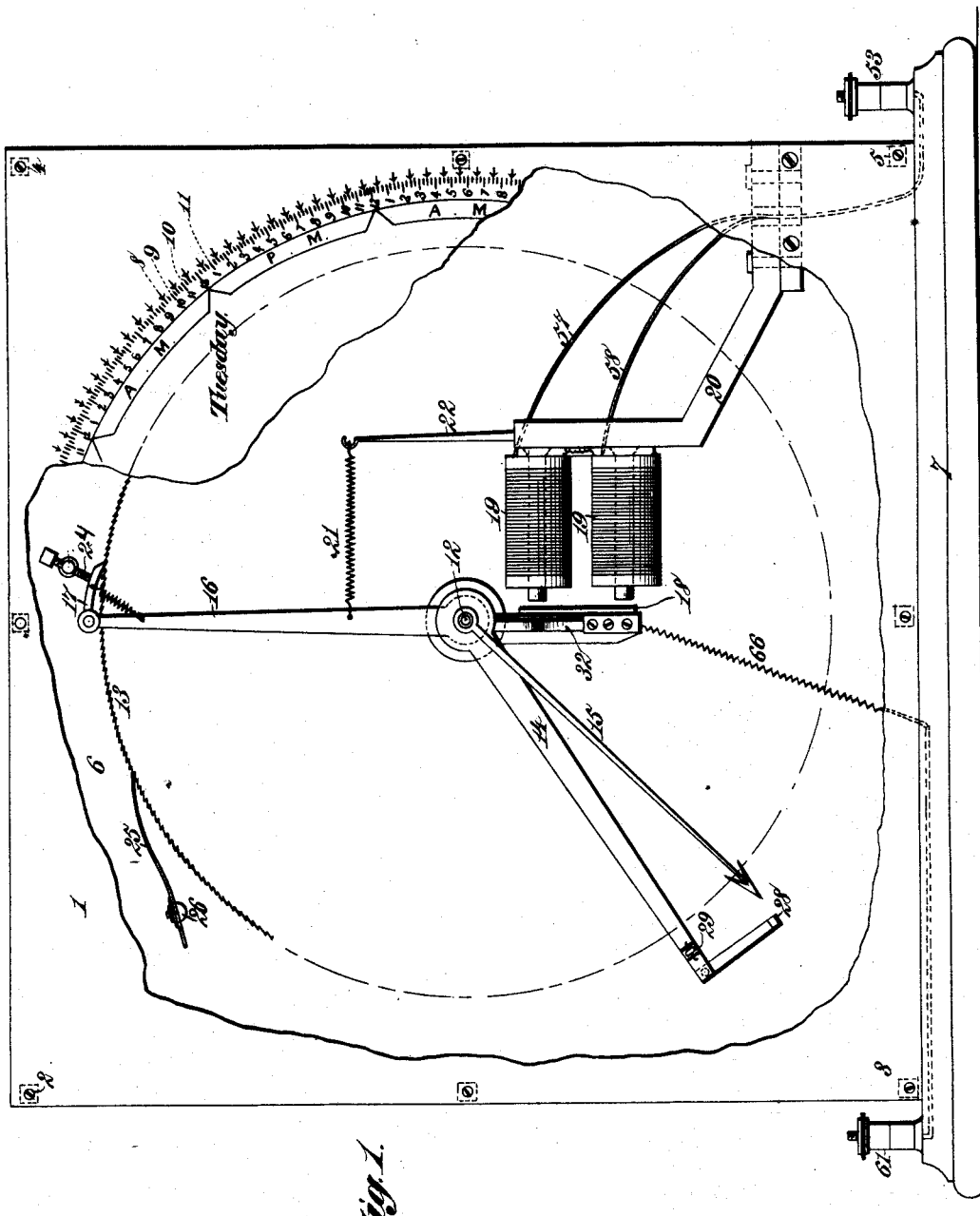


Fig. 1.

Witnesses:
Philo G. Smith,
Dennis Sumby.

Inventor:
Charles A. Randall,
By James L. Norris
Att'y.

(No Model.)

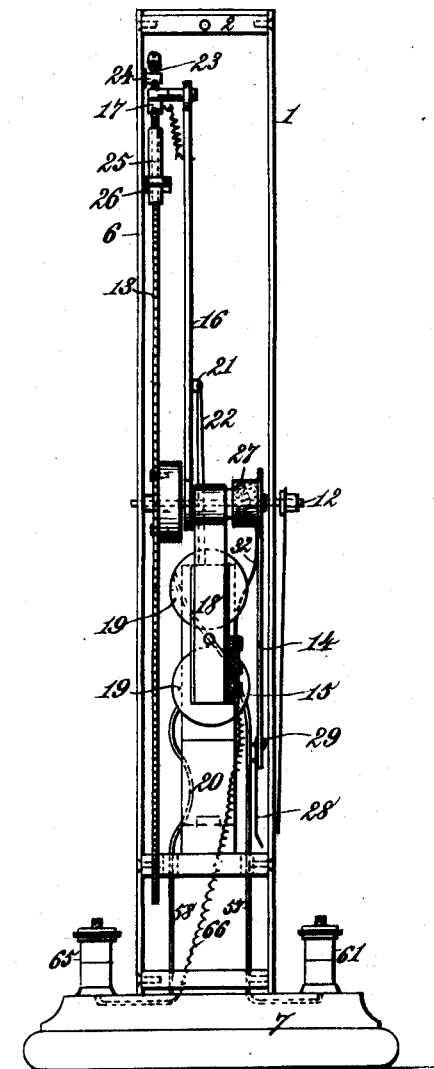
3 Sheets—Sheet 2.

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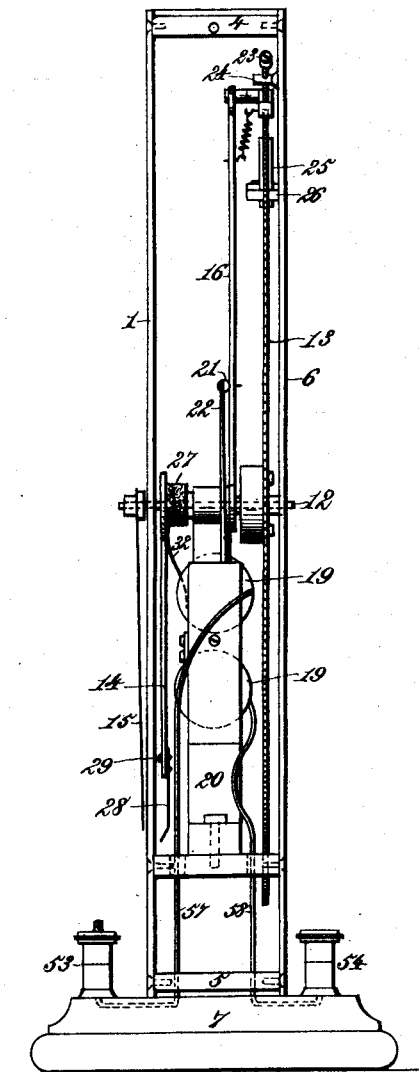
Patented Feb. 4, 1890.

Fig. 2.



Witnesses:
Robert G. Watt,
Dennis Sumby.

Fig. 3.

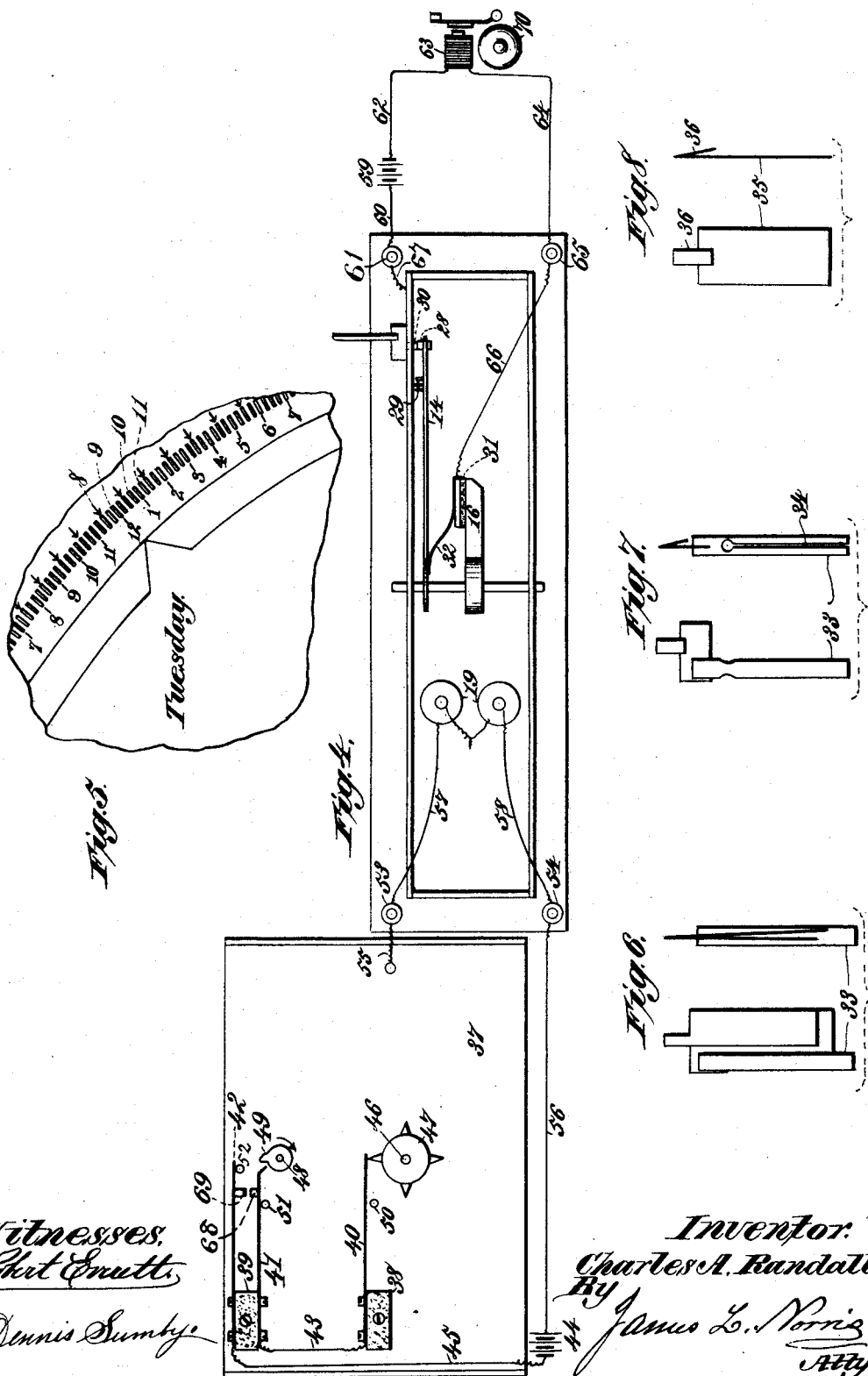


Inventor:
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UNITED STATES PATENT OFFICE.

CHARLES ADAMS RANDALL, OF LONDON, ENGLAND.

ELECTRIC TIME ALARM AND INDICATOR.

SPECIFICATION forming part of Letters Patent No. 420,890, dated February 4, 1890.

Application filed June 13, 1889. Serial No. 314,093. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ADAMS RANDALL, a citizen of the United States, residing at London, in the Kingdom of Great Britain, have invented new and useful Improvements in Electric Time Alarms and Indicators, of which the following is a specification.

This invention has for its object to provide a novel time alarm or indicator for automatically giving notice of the arrival of predetermined periods of time, and is more especially designed for notifying a person or persons of the arrival or approach of the time for keeping appointments, engagements, and the like.

The invention also has for its objects to materially simplify this type of apparatus; to avoid the necessity of using the ordinary independent switch-boards; to increase the usefulness of the apparatus by enlarging its capacity, whereby it can be employed to give an alarm or indication at any predetermined time from a few minutes to the expiration of seven days, (more or less,) and to otherwise improve electrical time alarms or indicators, as will hereinafter more fully appear.

The objects of my invention I accomplish in the manner and by the means hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a detail side elevation of the apparatus with the indicating dial or plate broken away to show the internal operating mechanism; Fig. 2, an elevation looking at the left-hand end of the apparatus shown in Fig. 1; Fig. 3, an elevation looking at the right-hand end of the apparatus shown in Fig. 1; Fig. 4, a diagram showing the circuits and connections with the frame of a controlling-clock or other time-keeper; Fig. 5, a broken detail view, on an enlarged scale, of the indicating dial or plate; and Figs. 6, 7, and 8, detail views of different forms of contact-plugs.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein—

The numeral 1 designates the indicating dial or plate, and 2, 3, 4, and 5, cross-bars connected with a back plate 6, which plates are mounted in upright positions on a base-piece 7. The indicating dial or plate, as here

shown, is divided into six hundred and seventy-two divisions, representing seven days of twenty-four hours each, which are subdivided into hours and quarter-hours. The division-marks are formed by apertures or slots, as at 8, 9, 10, 11, while the hours are designated by the circular rows of characters 1 to 12, and the half-hours by the arrow-heads, the quarter-hours being between the hour-marks and the arrow-heads, all as will be clearly understood by reference to Figs. 1 and 5 of the drawings. A central shaft 12 is journaled in the plates 1 and 6, and has secured to it between the plates a ratchet feed-wheel 13 and a circuit-closing arm 14, which is insulated from the shaft and the plates, while on the shaft outside the dial-plate is secured an index hand or pointer 15, all in such manner that the shaft, feed-wheel, arm, and pointer move or rotate together. An armature feed-lever 16, loosely mounted on the central shaft, carries at one end a feed-pawl 17 to engage the teeth of the feed-wheel, and at the other end is secured an armature 18, opposite the cores of an electro-magnet 19, supported by bracket 20, which is secured between the plates 1 and 6. The movement is given to the feed-lever in one direction—preferably to set the pawl in engagement with the feed-wheel—by the action of the electro-magnet, and in the opposite direction by a spring 21, secured to the lever and to a pin or hook 22. A stop-screw 24, mounted in a post secured to the plate 6, limits the movement of the pawl and its carrying-lever in one direction, while a small flat spring 25, secured to the stud 26 on the plate 6, prevents retrograde movement of the feed-wheel. The circuit-closing arm 14 is secured to a piece of vulcanite 27, or other insulating material, on the shaft 12, and carries at its outer end a yielding contact-spring 28 and a small non-metallic roller 29, bearing upon the inner surface of the dial-plate and steadying the arm in its traveling movement. The arm moves in such manner that in due time the spring comes in contact with a contact-plug inserted in a slot of the dial-plate, as indicated at 28 and 30, Fig. 4, thereby closing an electric circuit, hereinafter explained.

An insulating-piece 31, secured to the feed-lever 16, carries a connecting spring-plate 32,

that contacts with the circuit-closing arm 14, and is properly connected with a battery. The pointer 15 is secured to the central shaft in line with the free end of the contact-spring 28 and serves to indicate the particular plug with which the spring is in contact when the circuit is closed and the alarm given.

The contact-plug 33, Fig. 6, is composed of a round piece of metal having an attached piece of thin flat metal, which is doubled or bent back upon itself, so that when inserted into a slot of the dial-plate it will act to hold itself therein, and also serve to hold an indicating-card or slip of paper.

In the contact-plug shown in Fig. 7, a portion of the flat piece of metal is omitted and the round piece of metal is furnished with a longitudinal slit, as at 34, to hold an indicating card or tablet.

In Fig. 8 the contact-plug is composed of a flat piece of metal 35, having the spring-lid 36, and such flat piece of metal may have one or both sides provided with a tablet of ivory, celluloid, or silicate to receive the desired record, which can be erased when desired.

I do not confine myself to any particular contact plug or piece, as various other constructions may be adopted, it only being necessary that the plug or piece shall be securely held in a slot of the dial and adapted to carry a reference card, slip, or record indicating the nature or character of the matter or business requiring attention when the alarm is given.

In Fig. 4 the numeral 37 indicates one side of the frame of a clock or other time-keeper, to which are secured pieces 38 and 39 of insulating material, the piece 38 supporting the contact-spring 40 and the piece 39 supporting the contact-springs 41 and 42. The springs 40 and 41 are electrically connected by wire 43, and the spring 42 is electrically connected by wire 45, with a battery 44. The hour-shaft of the clock (indicated at 46) is provided with an attached wheel 47, having, as here shown, four spurs or teeth, though a greater or less number may be used, if required. The minute-shaft of the clock (indicated at 48) carries a cam 49, which is insulated from the shaft, or such cam may be of non-conducting material, its purpose being to operate the contact-spring 41. The downward movement of the three contact-springs 40, 41, and 42 is limited by stop-pins 50, 51, and 52, located, respectively, under such spring, and the springs, contact-points, and spur-wheel constitute what may be termed a "duplex" or "compound" circuit-closing device at the controlling time-keeper.

The clock-frame 37 and battery 44 are connected to the terminals 53 and 54 on the base-piece 7 by wires 55 and 56, and the electro-magnet 19 is connected with said terminals by wires 57 and 58. A battery 59 is connected by wire 60 to the terminal 61 on the base-piece 7, and by wire 62 with the electro-magnet 63 of any suitable electric bell, alarm, or indicating device, as at 70, which latter I do

not deem it necessary to further illustrate. The electro-magnet 63 connects by wire 64 with the terminal 65, and the latter connects by wire 66 with the contact-spring 32, carried by the feed-lever 16, the circuit through the apparatus being from terminal 65 by wire 66 to spring 32, to circuit-closing arm 14, to contact-spring 28, to the inserted plug, as at 30, thence to the frame or dial-plate to wire 67 to terminal 61.

The apparatus being constructed and connected up substantially as described and shown, the operation is as follows: The clock being properly wound and in operation, the cam 49 momentarily closes the contacts 68 and 69 once every minute, and the contact spur-wheel 47 makes contact for a few seconds with the spring 40 once every fifteen minutes, the closing of the contacts 68 and 69 and 40 and 47 simultaneously closing the circuit from the battery 44. As represented in Fig. 4, the contacts 68 and 69 have just been closed simultaneously with contact 40 and 47, which latter are still closed, but will be opened or separated before the cam has completed its next revolution, whereby one electric impulse is transmitted every fifteen minutes upon the simultaneous closing of the contacts 40, 47, 68, and 69. The electric impulse sent from the clock or other time-keeper vitalizes the electro-magnet 19 in the apparatus, the circuit being from battery 44 to wire 45, spring 42, contact-points 69 68, spring 41, wire 43, spring 40, spur-wheel 47, shaft 46, frame 37, wire 55, terminal 53, wire 57, electro-magnet 19, wire 58, terminal 54, and wire 56. The electro-magnet, when vitalized, attracts the armature of the feed-lever and sets the feed-pawl into position to rotate the feed-wheel, which is effected by the spring 21 upon the devitalization of the magnet, thereby turning the feed-wheel, the arm 14, and pointer 15 a uniform distance, such pointer being in accord with the clock and operating in unison therewith to indicate the full hours, half-hours, and quarter-hours. If now a contact plug or piece be inserted into the aperture or slot first in advance of the pointer, at the next closing of the circuit at the clock the feed-wheel, arm, and pointer will advance one step, the circuit will be closed, (as at 28 and 30, Fig. 4,) and the electro-magnet 63 and battery 59 will serve to cause an electric bell or other alarm or indicator to be operated. The pointer shows which plug is in contact, and such plug being removed the circuit is broken, while the card, tablet, or record on the plug informs the person of the nature or character of the engagement, appointment, or matter requiring attention.

I may dispense with the battery 59 and make the connection through the alarm-operating electro-magnet 63 with the battery 44.

The apparatus, as herein described and shown, is constructed for seven days, the circle being divided into six hundred and seventy-two divisions representing full, half, and

quarter hours, and the apparatus can be set to give an alarm in from fifteen minutes, or thereabout, from the time of setting, or in seven days or any part thereof, so that all future engagements from fifteen minutes to seven days in advance can be quickly set upon the apparatus by the insertion of the contact plugs or pieces into the correct apertures or slots of the dial-plate, and the same will be automatically made known at the instant the predetermined time arrives. The feed-wheel is provided with as many teeth as there are divisions on the dial-plate.

It will be readily understood that the apparatus can be modified and constructed for one day only, or constructed for a greater number of days than seven. It will also be understood that the controlling-clock, electric generator, indicating-dial, operative mechanism, and the alarm or indicating device may all be constructed and arranged or inclosed within a case, box, or frame, instead of being detached, as shown, without departing from the gist of my invention.

Having thus described my invention, what I claim is—

1. The combination, in an electric time alarm and indicator, of a time-dial subdivided into divisions indicating the time of day, a contact-plug having a record-surface to indicate the matter requiring attention and adapted to be connected with the dial at any one of the divisions designating the time at which a signal is desired, a circuit-closing arm movable around one side of the dial to make contact with the plug, an electro-magnet and armature operating to move the circuit-closing arm, a controlling time-keeper containing a circuit-closer operated at intervals by the clock-work, a signal, an electric generator, a circuit including the signal, generator, circuit-closer of the time-keeper, and the electro-magnet for vitalizing the electro-magnet by the closing of the circuit at the time-keeper and causing the electro-magnet to intermittently operate the circuit-closing arm, substantially as described.

2. The combination, in an electric time alarm and indicator, of a time-dial having a circular line of apertures or slots designating the time of day, a contact-plug having a record-surface to carry a record of the matter requiring attention and adapted to be inserted into any aperture or slot to designate the time at which a signal is desired, a circuit-closing arm movable around the time-dial to make contact with the plug, an electro-magnet operating to intermittently move the circuit-arm, a controlling time-keeper, an electric generator, and proper electric connections, whereby the circuit-closing arm is operated periodically by the electro-magnet in unison with the controlling time-keeper, substantially as described.

3. The combination, in an electric time alarm and indicator, of a time-dial having a

circular row of apertures or slots designating the time of day, a contact-plug having a record-surface to carry a record of the matter requiring attention and adapted to be inserted into any aperture or slot to designate the time at which a signal is desired, a circuit-closing arm and a pointer, both movable in unison around the dial for the arm to contact with the plug and the pointer to designate the time, an electro-magnet operating to intermittently move the circuit-arm, a controlling time-keeper having a circuit-closer, an electric generator, and proper electric connections, whereby the pointer and the circuit-closing arm are operated periodically by the electro-magnet in unison with the controlling time-keeper, substantially as described.

4. In a time alarm and indicator, the combination of the hour and minute shafts of a time-keeper having, respectively, a spur-wheel and a cam, a spring making contact with the spurs of the wheel, two springs having points brought into contact by the minute-shaft cam, a time-dial subdivided into divisions designating the time of day, a circuit-closing arm movable about the time-dial, an electro-magnet operating to intermittently move the circuit-closing arm, an electric generator, and proper electric connections, whereby the circuit-closing arm is moved periodically by the electro-magnet in unison with the controlling time-keeper, substantially as described.

5. The combination, with the time-dial and adjustable contact-plugs therefor, of the shaft 12, the rotating circuit-closing arm 14, having a yielding circuit-closer 28 and a non-conducting roller 29, traveling against the side of the dial, and an insulating-block 27, fixed on the shaft carrying the circuit-closing arm and insulating the latter from the shaft, substantially as described.

6. The combination, in an electric time alarm and indicator, of a time-dial subdivided into divisions indicating the time of day, a contact-plug adapted to connect with the dial at any one of the divisions designating the time a signal is desired, a central shaft carrying a circuit-closing arm and a pointer which move in unison, a ratchet feed-wheel fixed to the shaft, a feed-lever loose on the shaft having a pawl engaging the ratchet feed-wheel and provided with an armature, an electro-magnet for actuating the feed-lever, a controlling-clock having a circuit-closer, an electric generator, and electric connections, whereby the circuit-closing arm and the pointer are moved at intervals in unison with the controlling-clock, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES ADAMS RANDALL.

Witnesses:

GEO. J. B. FRANKLIN,

THOS. LAKE,

Both of No. 17 Gracechurch Street, London.