No. 646,036. Patented Mar. 27, 1900.

H. REICH.

ELECTRIC TIME ALARM.

(Application filed Oct. 11, 1898.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

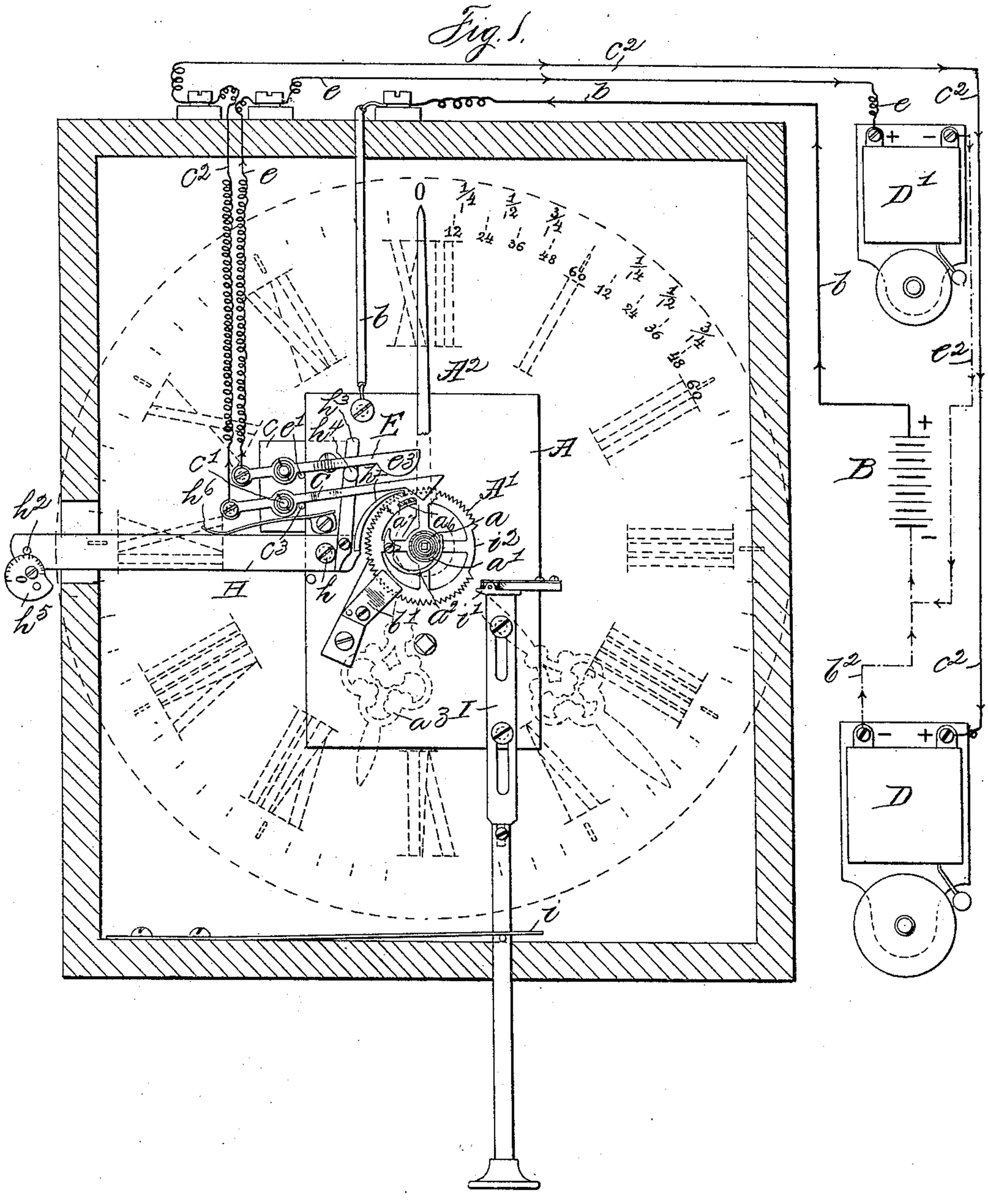

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Fig. 2.

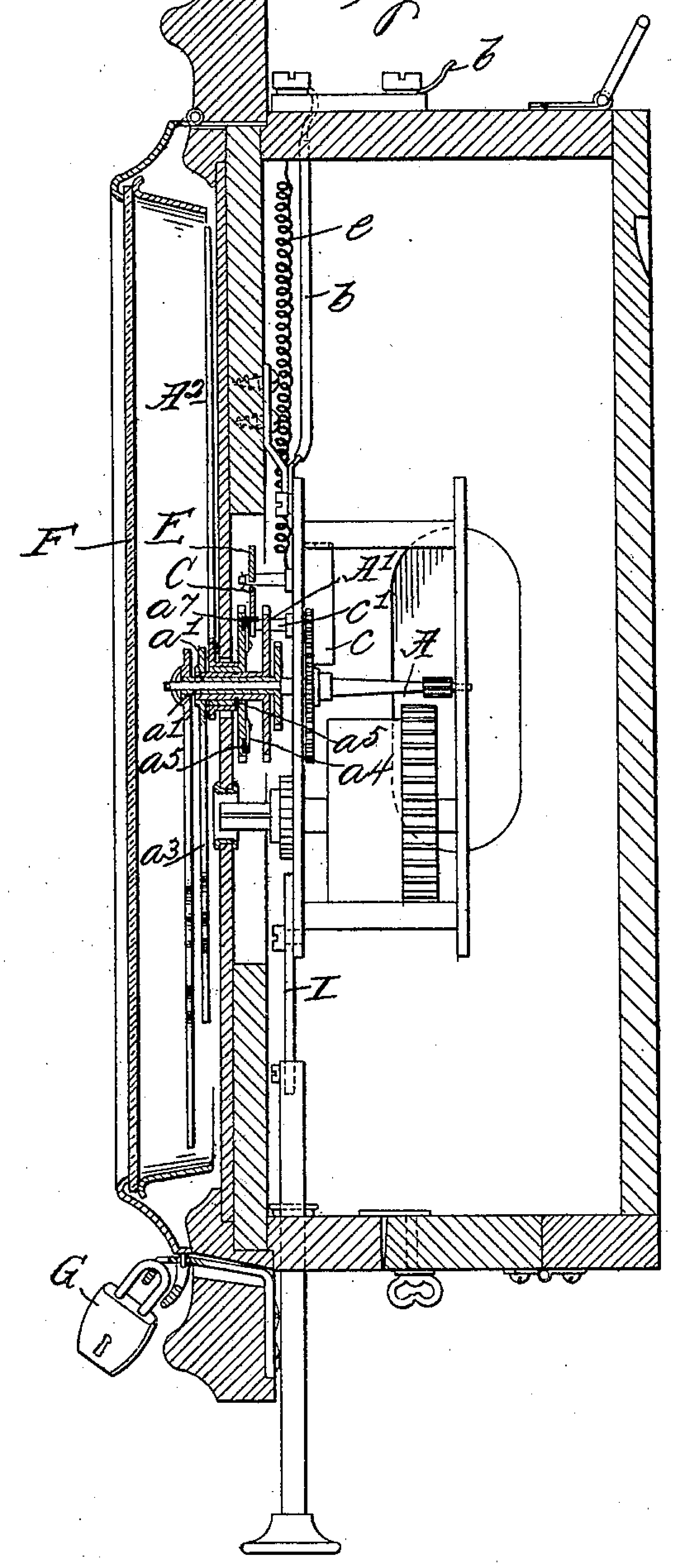

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Fig. 6.

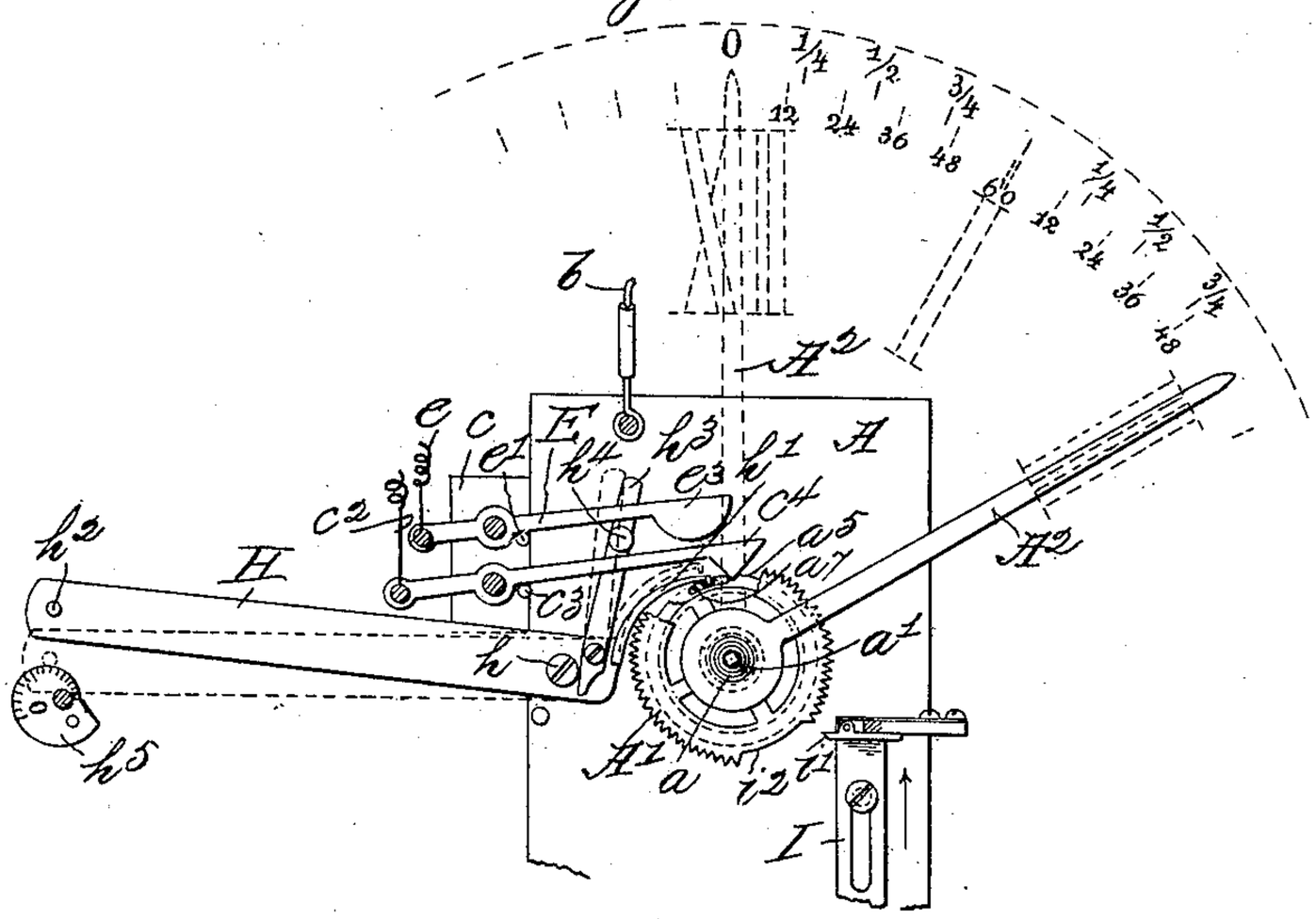
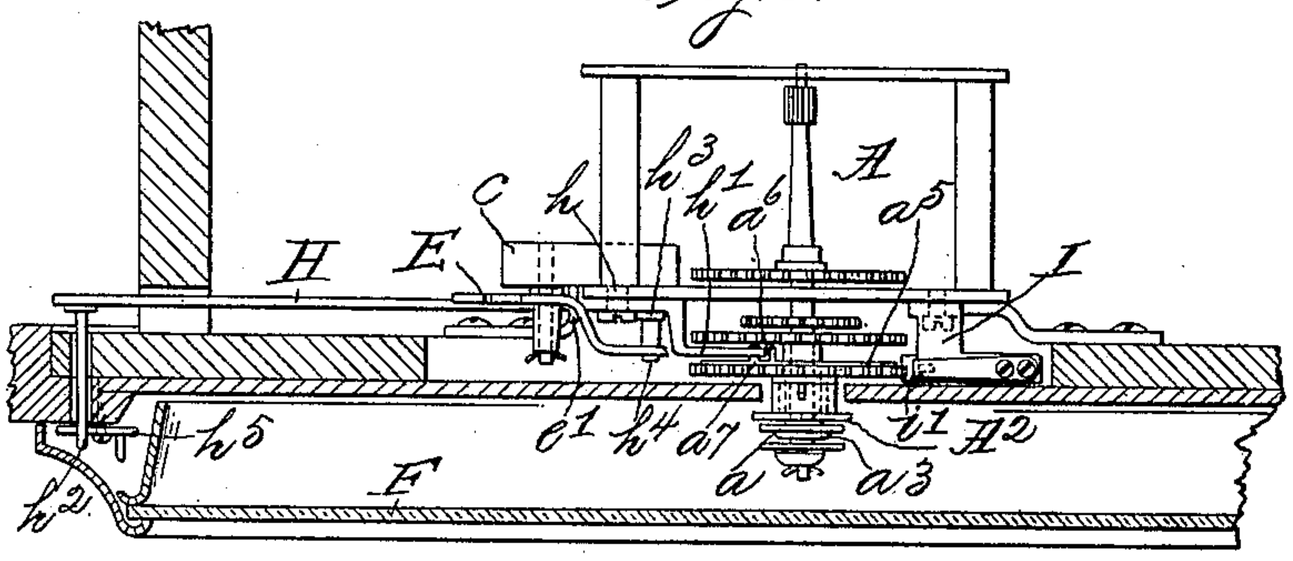


Fig. 3.



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(No Model.) 4 Sheets—Sheet 4.

Fig. 7.

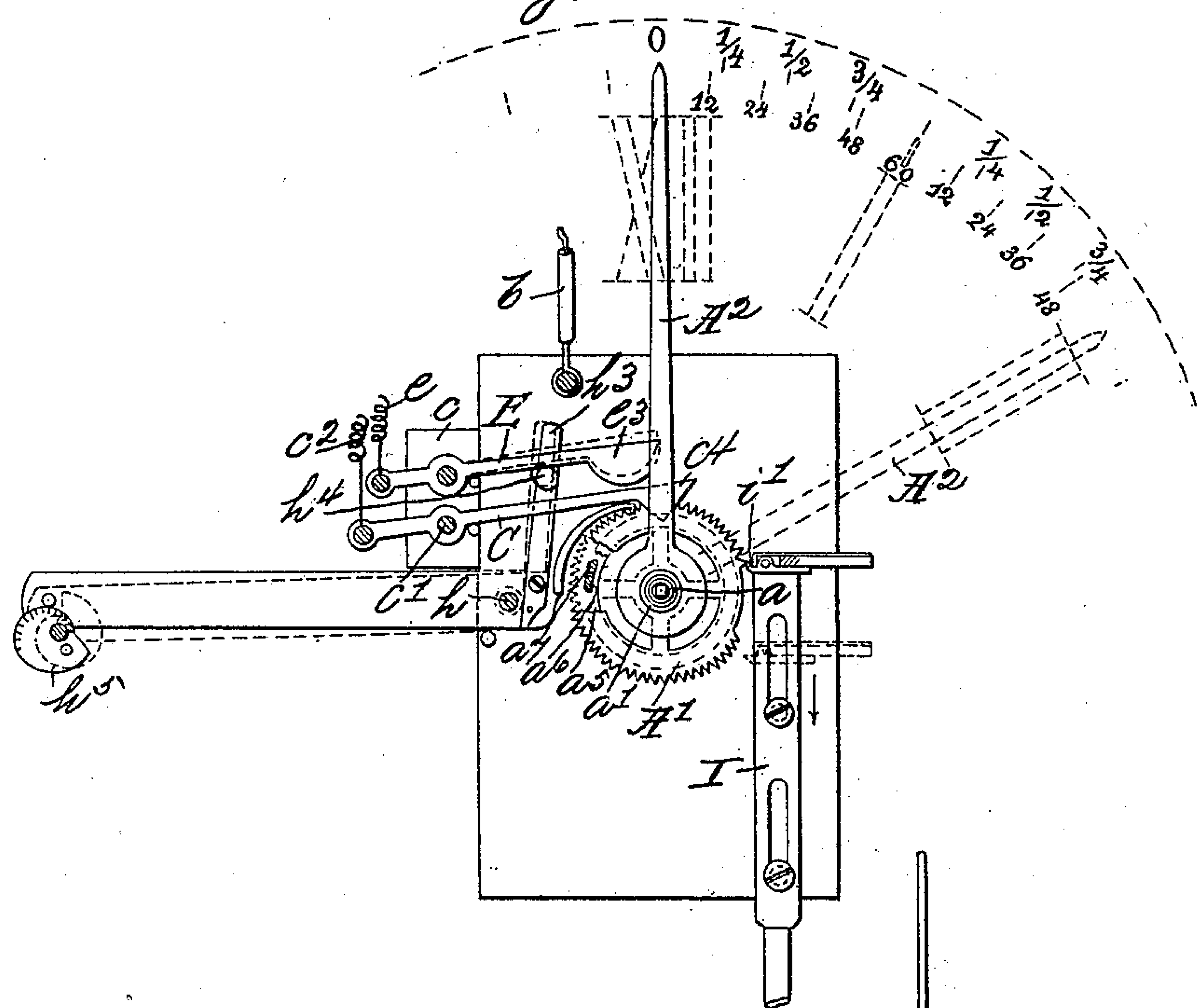
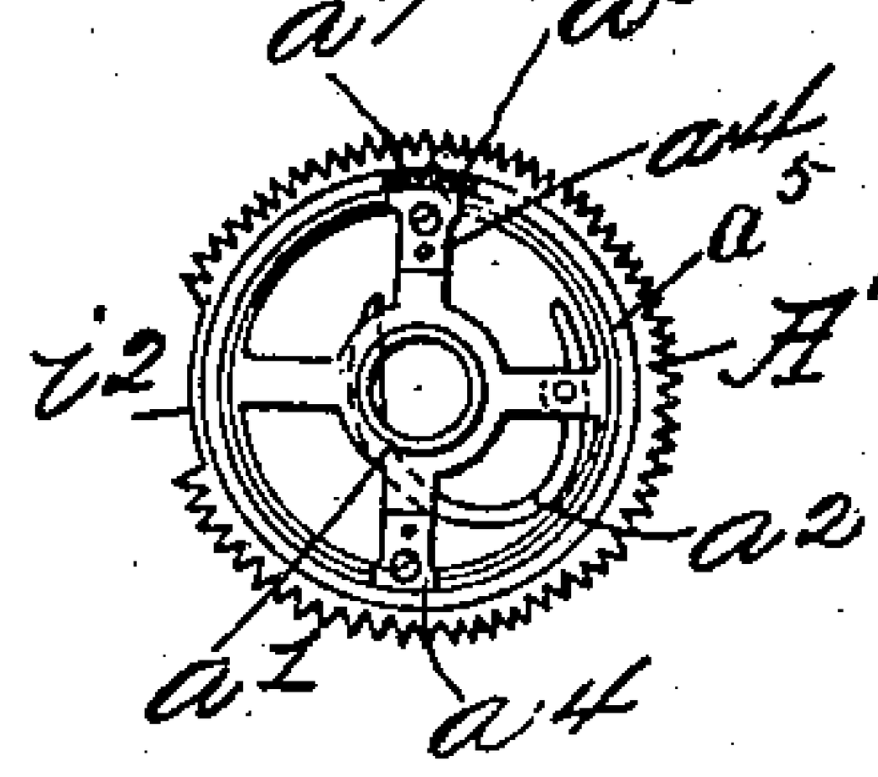
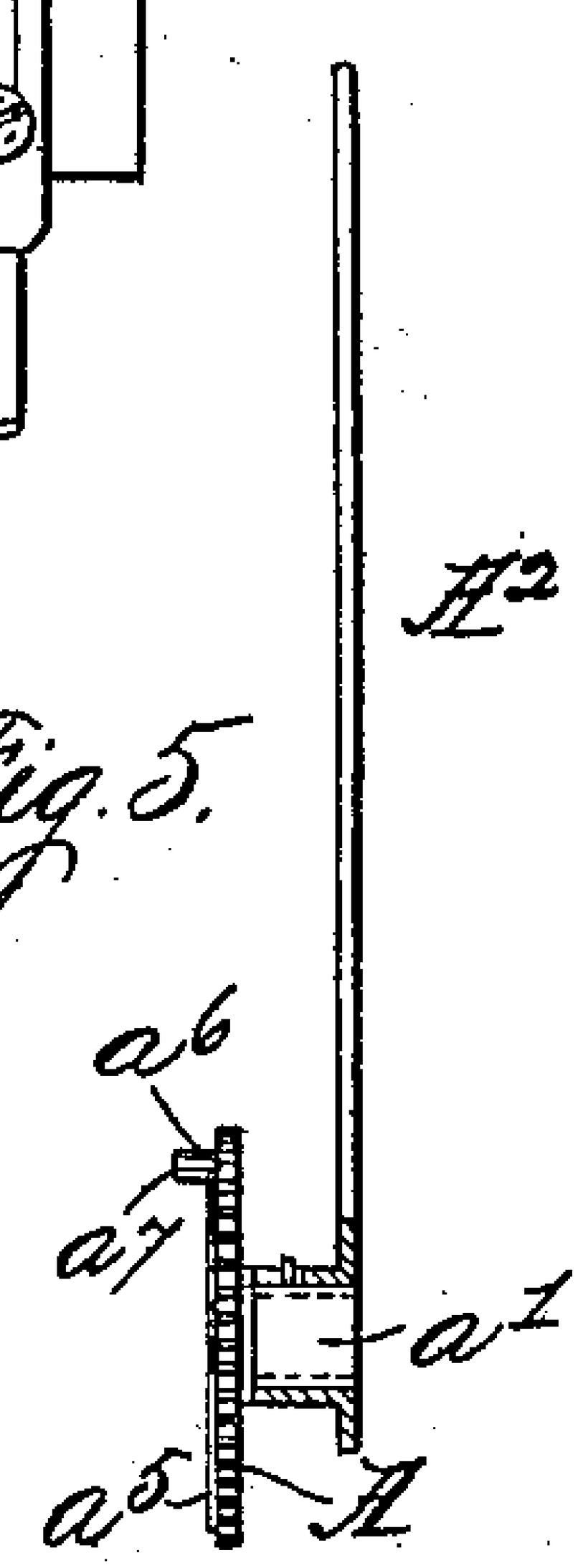


Fig. 4. *Fig. 5.*





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UNITED STATES PATENT OFFICE.

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ELECTRIC TIME-ALARM.

SPECIFICATION forming part of Letters Patent No. 646,036, dated March 27, 1900.

Application filed October 11, 1898. Serial No. 693,262. (No model.)

To all whom it may concern:

Be it known that I, HANS REICH, a subject of the Emperor of Austria-Hungary, residing at Bozen, in the Province of Tyrol, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Electric Check-Clock or Alarm-Signal Apparatus; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to a clock which is connected with electric signal-bells and causes at any desired predetermined time the sounding of an electric alarm-signal, and if the latter is not stopped in due time the said clock after a desired predetermined interval of time puts into operation a second signal, which is situated at a distance from the clock.

The clock has for its object to remind a person in a certain place—for example, a boiler-attendant, a boiling-master, &c.—by means of a bell-signal which sounds at a determined time, that some particular operation is to be performed. It is the duty of the said person to stop the said signal at once, because if the said signal is not stopped, either through neglect of duty, illness, or accident to the said person, a second alarm-bell, which serves as a check and may be, for example, arranged in the manager's or foreman's office, will sound, and thus give notice in good time that the first signal has not been obeyed or could not be obeyed, and that therefore measures must be taken in the case of the occurrence of an accident to bring aid in order to prevent interruption of the working or to obviate in time the beginning of damage. In order that the said signal shall be given, there is arranged in the clock a contact-piece, which is moved together and simultaneously with the hour-hand and which is adapted to be set by means of a special hand. This contact-piece constitutes the end of an electric conductor which closes a circuit leading to an alarm-bell by the raising of a contact-lever, which lever, if the contact is not at once broken by means of a switch, closes by the contact of a second contact-lever a circuit leading to a second alarm-bell, the arrangement being such that the interval of time between the making of the two contacts can be predetermined as desired within certain limits by means of an adjusting-lever acting upon the second contact-lever.

The accompanying drawings illustrate a control-clock constructed according to this invention.

Figure 1 is a front elevation of the clock, showing the connections of the respective electric signal-bells. Figs. 2 and 3 are respectively vertical and horizontal sections of the clock. Fig. 4 is a rear side view of the contact-wheel with the adjustable contact; and Fig. 5 is a side elevation of the latter, together with the setting hand or pointer. Figs. 6 and 7 are elevations of the contact mechanism before and after the setting of the hand-contact.

As shown in Figs. 1 and 2, there is placed upon the hour-tube a of any suitable clock A a wheel A′, with its sleeve a', which is clipped by means of a spring a^2 engaging in a groove in the hour-tube in such a manner that it can be rotated freely on the hour-tube by means of the control-hand A^2, connected with the sleeve a', while the said wheel A′ is held so firmly that it is moved along by and with the hour-hand a^3.

In the rim of the wheel A′ there is let in, so as to be capable of rotation, a ring a^5, Fig. 4, which is held by means of the plates a^4 and which is provided with a projecting contact a^7, that is formed in the center with a slot a^6.

For the purpose of holding the contact-piece fast during the adjusting movement there is employed a lever H, which is pivoted at h on the front plate of the clockwork, and the arc-shaped arm h' of which takes with its hooked end into the notch a^6 of the contact-piece a^7 as soon as the lever H is engaged and raised (see Fig. 6) by the pin h^2, Fig. 3, projecting from the clock-casing, whereupon the control-hand can be shifted, as hereinafter described, without moving the contact-piece.

The current is supplied to the contact a^7 from a battery B through the lead b, connected to the clockwork A, and through the rubbing-spring b', bearing on the wheel A′, Fig. 1.

On the front plate of the clockwork A there is pivoted on the bolt c', on a vulcanite plate c, a contact-lever C, which in the position of rest, Fig. 1, is kept bearing against the stop-pin c^3 by means of the lead c^2, which is in part formed as a coiled spring. The lead c^2 of the contact-lever C leads to the alarm mechanism D, Fig. 1, which is situated in the same room as the clock and whose return-lead b^2 is connected to the battery B. In the normal position of the contact-lever C and of the contact a^7 the circuit of the alarm mechanism D is interrupted; but it is closed, and thereby caused to sound the alarm, when the contact a^7 has been moved forward by the hour-hand to such an extent as to come in contact with the nose c^4 of the contact-lever C. Above the contact-lever C there is pivoted, in the same manner as this lever, on the vulcanite plate c, a second contact-lever E, which is pressed down against the stop-pin e' by means of a lead e, that is in part formed as a spring. In the position of rest of the two contact-levers C and E the connection of the lead e is also interrupted. This lead e leads to the signal-bell D', that serves as a distance-signal and is situated in a room at a distance from the clock and whose return-lead e^2 is also connected with the battery B. When the contact-lever C is raised by the contact a^7 running up on its inclined nose c^4, then as soon as the lever C touches the nose e^3 of the contact-lever E the circuit b e is closed and the signal-bell D' is set going. The amount of the distance of the contact-lever nose e^3 from the contact-lever C determines the interval of time which elapses between the sounding of the first signal-bell and the sounding of the second signal-bell. For the purpose of enabling this interval to be predetermined, as desired—say, for example, from one to fifteen minutes—the lever H is provided near its pivot h with an arm h^3, which carries an insulated pin h^4, upon which the contact-lever E bears. The free end of the lever H bears with its pin h^2 upon an eccentric or cam h^5, mounted so as to be capable of rotation on the clock-casing. According as the pin h^2 bears on the lowest point or on the highest point (marked "0") of the eccentric h^5 the lever H is depressed or is raised, (see Fig. 7,) whereby the contact-lever E is moved in such a manner that in the first case the distance between the two contact-levers C and E, and consequently also the interval of time, is increased, while in the other case the contrary happens.

The operation of setting the contact a^7 to give a signal at a predetermined time by the clock through the alarm-bell D or through said alarm-bell and the bell D' is as follows: In the normal position of the clock, Fig. 1, in which the control-hand A^2 stands at "0," the contact-piece a^7 is situated only at such a distance from the nose c^4 of the contact-lever C as is just necessary to prevent the circuit being closed. Let us assume that the control-clock is to be set so that the signal of the bell D shall sound exactly two hours afterward with reference to the position of the hour-hand at the time being. For this purpose the control-hand A^2 is advanced slowly in the direction of the hour-hand until the signal is given by the bell D, whereupon by raising the lever H its forward end h' is hooked into the notch a^6 of the contact-piece a^7, whereby the latter is held fast. (See Fig. 6.) Now by then setting the control-hand A^2 upon the figure "II" of the clock-face the contact-wheel A' is rotated as well, while the contact-piece a^7 (which is held fast) in the wheel A' remains behind the amount of the angular rotation of the hand A^2. The released lever H is then pressed down by the spring h^6, Fig. 1, and the contact-piece a^7 is therefore released. Now the control-hand A^2 is set back to "0," whereby the contact-piece a^7 moves away to a corresponding extent from the nose c^4 of the contact-lever. (See Fig. 7.) Unauthorized adjustment of the control-hand is prevented by closing in the hand mechanism of the clock by means of a glazed cover F, which can be fastened with a lock G, Fig. 2, which cover also covers in the eccentric h^5.

If during the operation of the clock the contact-wheel A', together with the control-hand A^2, is moved forward by the hour-hand a^3 through the amount of two hours, the signal-bell D will be caused to sound in the manner above described.

For the purpose of enabling the first signal (or it may be both signals) to be at once stopped by means of the checking part there is provided on the clock a vertically-movable switch I, Figs. 1 and 2, which is pressed down by means of a spring i and which engages with its operating-pawl i' in teeth of the contact-wheel A' and by moving upward causes the control-hand a^2 to be moved back. The rotation of the control-hand backward, by means of the switch I, beyond the "0" point is prevented by means of a space i^2, which is formed in the toothed periphery of the contact-wheel and into which, when the switch-rod is pulled down, the pawl i' enters, and thus comes out of gear with the teeth. So long as the control-hand A^2 is set to a determined hour the signal (when the said hand has been returned to its "0" point after the signal has been given) will again sound on the expiration of the predetermined interval of time.

The duration of the sound of the signal is determined by the width of the contact-piece a^7.

If the sounding alarm mechanism D is not at once thrown out of operation, the second alarm D' will sound after the interval of time which has been determined by the adjusting mechanism h^5 H h^4. Both signal-bells will then sound until they are placed out of operation by operating the switch.

The controlling-hand A^2 may be set in the direction of the hour-hand from "0" to the figure XI to any desired hour and minute.

In setting the said hand from a former position into a new position (backward or forward) the above-described operation must always be effected. The exact setting of the control-hand can be readily effected with the aid of suitable divisions in quarter-hours and minutes provided on the dial.

The arrangement of the adjustable contact a^7 offers, on one hand, the advantage that it can be set by means of the control-hand A^2 to any desired controlling-time only by the person authorized to do so, while, on the other hand, abuse by unauthorized setting of the control-hand by the person who operates the switch I is completely prevented, because in consequence of the space i^2 in the contact-wheel A′ the control-hand can be moved back by means of the switch only to the "0" point and never beyond it. Further, by the arrangement of the adjustable contact a^7, and in consequence of the condition that the control-hand A^2 must always be returned to "0" in order to stop the signal or both signals, the advantage is gained that the signal of the bell D sounds at regular intervals of time, so long as the control-hand is set for one and the same controlling-time.

I claim—

1. In an electric alarm-clock, the combination with the clock mechanism, an electric contact revoluble synchronously with the hour-hand, a movable contact in the path of and displaced by the revoluble contact, a third contact in the path of said movable contact, an electric circuit including the three contacts, and a local and distant alarm-bell, and means for setting the revoluble contact to close the electric circuit through the other two contacts at any predetermined time; of means for varying the interval of time between the closure of the circuit through the local alarm and the closure of the circuit through the distant alarm, for the purpose set forth.

2. In an electric alarm-clock, the combination with the clock mechanism, an electric contact revoluble synchronously with the hour-hand, a second contact in the path of said revoluble contact, an electric circuit including said contacts and an alarm-bell, and means for setting the revoluble contact to close the electric circuit through said second contact at any time during a revolution of the hour-hand; of means for returning the revoluble contact to its starting-point and means for preventing such return without closing the electric circuit, for the purpose set forth.

3. In an electric alarm-clock, the combination with the clock-case, the clock mechanism, an electric contact revoluble synchronously with the hour-hand, a second contact in the path of said revoluble contact, said parts contained within the clock-casing, means for locking said casing, an electric circuit including the aforesaid contacts and an alarm-bell, and means for setting the revoluble contact to close the electric circuit through said second contact at any time during a revolution of the hour-hand, also within the clock-case; of means operated from without the clock-case for returning the revoluble contact to its starting-point, and means for preventing such return without closing the electric circuit, for the purpose set forth.

4. In an electric alarm-clock, the combination with the clock-case and means for locking the same, the clock mechanism, an electric contact revoluble synchronously with the hour-hand, a movable contact in the path of and displaced by said revoluble contact, a third contact in the path of the movable contact, said parts contained in the clock-casing, an electric circuit including the three contacts and a local and distant alarm-bell, means within the clock-case for setting the revoluble contact to close the electric circuit through the other two contacts at any predetermined time, and means likewise within the clock-case for varying the interval of time between the closure of the circuit through the local alarm and the closure of the circuit through the distant alarm; of means operated from without the clock-case for returning the revoluble contact to its starting-point only after closure of the electric circuit through the local alarm, for the purpose set forth.

5. In an electric alarm-clock, the combination with the hour-hand arbor of a clock, the hour-hand thereon, an electric contact mounted on the hour-hand sleeve to revolve therewith and independently thereof, said contact provided with a lock notch or slot intermediate of its ends and a second contact in the path of the revoluble contact; of a pointer or hand movable over the clock-dial and connected with the revoluble contact to revolve the same on the hour-hand sleeve, and a locking-lever constructed to engage the notch or slot in the revoluble contact, for the purpose set forth.

6. In an electric alarm-clock, the combination with the hour-hand arbor of a clock, the hour-hand thereon, a wheel mounted on the sleeve of the hour-hand to revolve therewith and independently thereof, a pointer or hand movable over the clock-dial secured to said wheel, a contact-ring arranged concentrically with said wheel to revolve therewith and independently thereof, a contact projecting from the ring and having a lock notch or slot in its contact-face; of a hand-operated locking-lever constructed to engage said notch, for the purpose set forth.

7. In an electric alarm-clock, the combination with the hour-hand arbor of a clock, the hour-hand thereon, the mutilated wheel A′ mounted on the sleeve of the hour-hand to revolve therewith and independently thereof, the pointer A^2 movable over the clock-dial and secured to wheel A′, the contact-ring a^5 arranged concentrically on one of the faces of said wheel to revolve therewith and independently thereof, said ring provided with the notched or slotted contact a^7; of the

spring-controlled push-bar I provided with a pawl *i* at its upper end for engagement with the teeth of the wheel A′, substantially as and for the purpose set forth.

8. In an electric alarm-clock, the combination with the hour-hand arbor of a clock, the hour-hand, an electric contact revoluble with and independently of said hour-hand, a resilient contact in the path of and displaced by the movable contact, and a second resilient contact in the line of displacement of the first resilient contact; of a lever provided with an arm having a laterally-projecting pin on which said third contact has bearing, and a hand-operated graduated cam having bearing on a pin at the free end of said lever for graduating the distance between the two resilient contacts, for the purpose set forth.

9. In an electric alarm-clock, the combination with the hour-hand arbor of a clock, the hour-hand, the mutilated wheel A′ mounted on the hour-hand sleeve to revolve therewith and independently thereof, a pointer or hand revoluble over the clock-dial and secured to said wheel, the contact-ring a^5 having slotted or notched contact a^6, said ring mounted on one of the faces of wheel A′ to revolve therewith and independently thereof, and the spring-held contact-levers C and E arranged relatively to each other and the contact a^7, as described; of the lever H provided with the arms h' and h^3, the former constructed for engagement with the notch or slot in contact a^7, and the latter h^3 provided with a stud on which contact-lever E has bearing, the hand-operated cam h^5 having bearing on a pin at the free end of lever H, and the push-bar I having pawl i' for engagement with the teeth on wheel A′, substantially as and for the purpose set forth.

10. The combination with the hour-hand tube, the toothed wheel A′ mounted thereon to revolve therewith and independently thereof, and provided with a hiatus i^2, the contact a^7 carried by said wheel and the spring-actuated push-bar I provided with a pawl i' at its upper end adapted to engage the teeth of said wheel when said bar is moved against the stress of its spring; of a contact-lever in the path of contact a^7, and an alarm-circuit including both contacts, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

HANS REICH.

Witnesses:
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ALVESTO S. HOGUE.