(No Model.) 2 Sheets—Sheet 1.

A. J. REAMS.

ELECTRICAL PROGRAM CLOCK.

No. 563,883. Patented July 14, 1896.

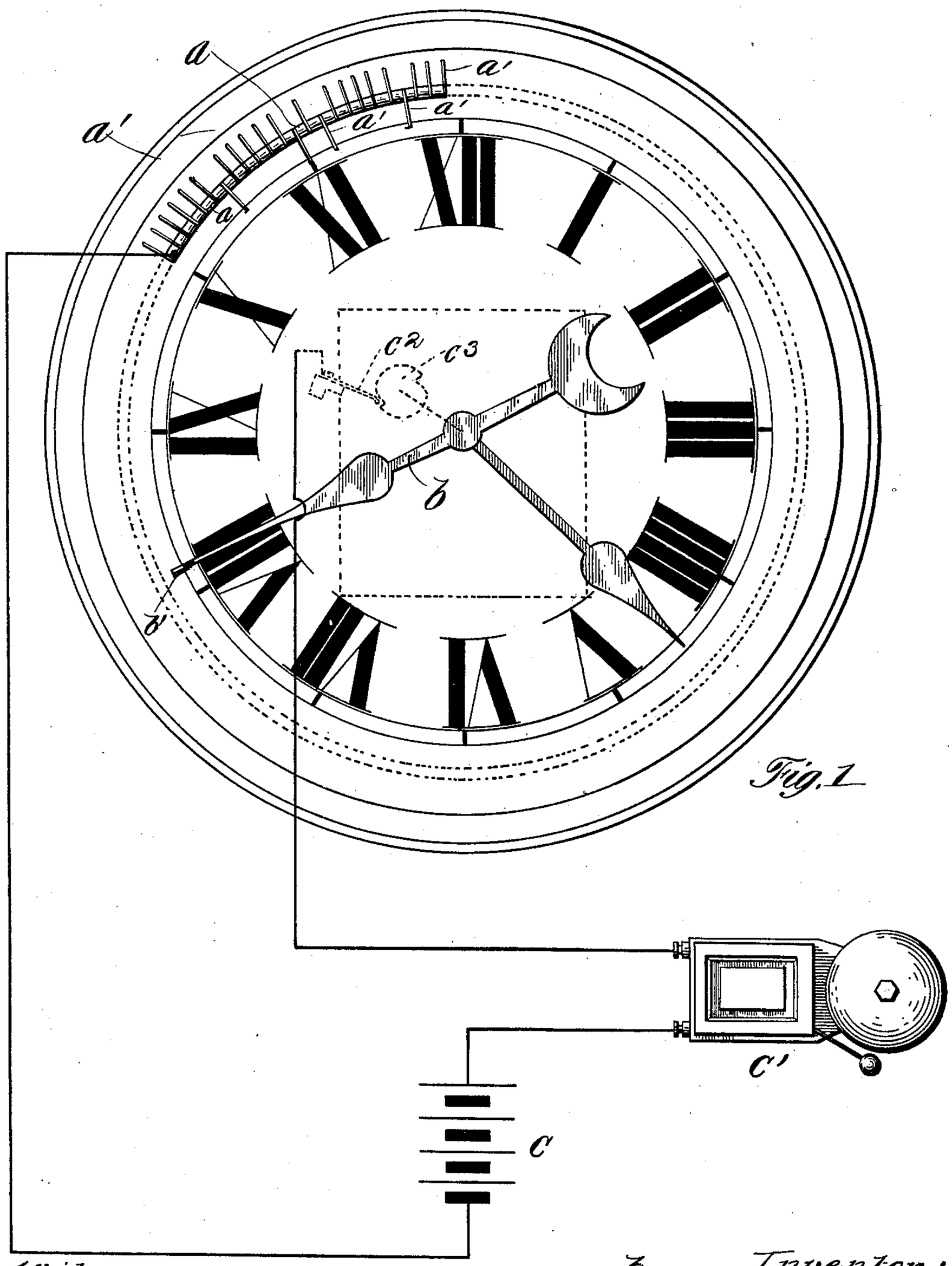

Fig. 1.

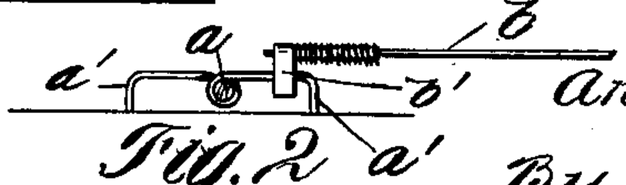

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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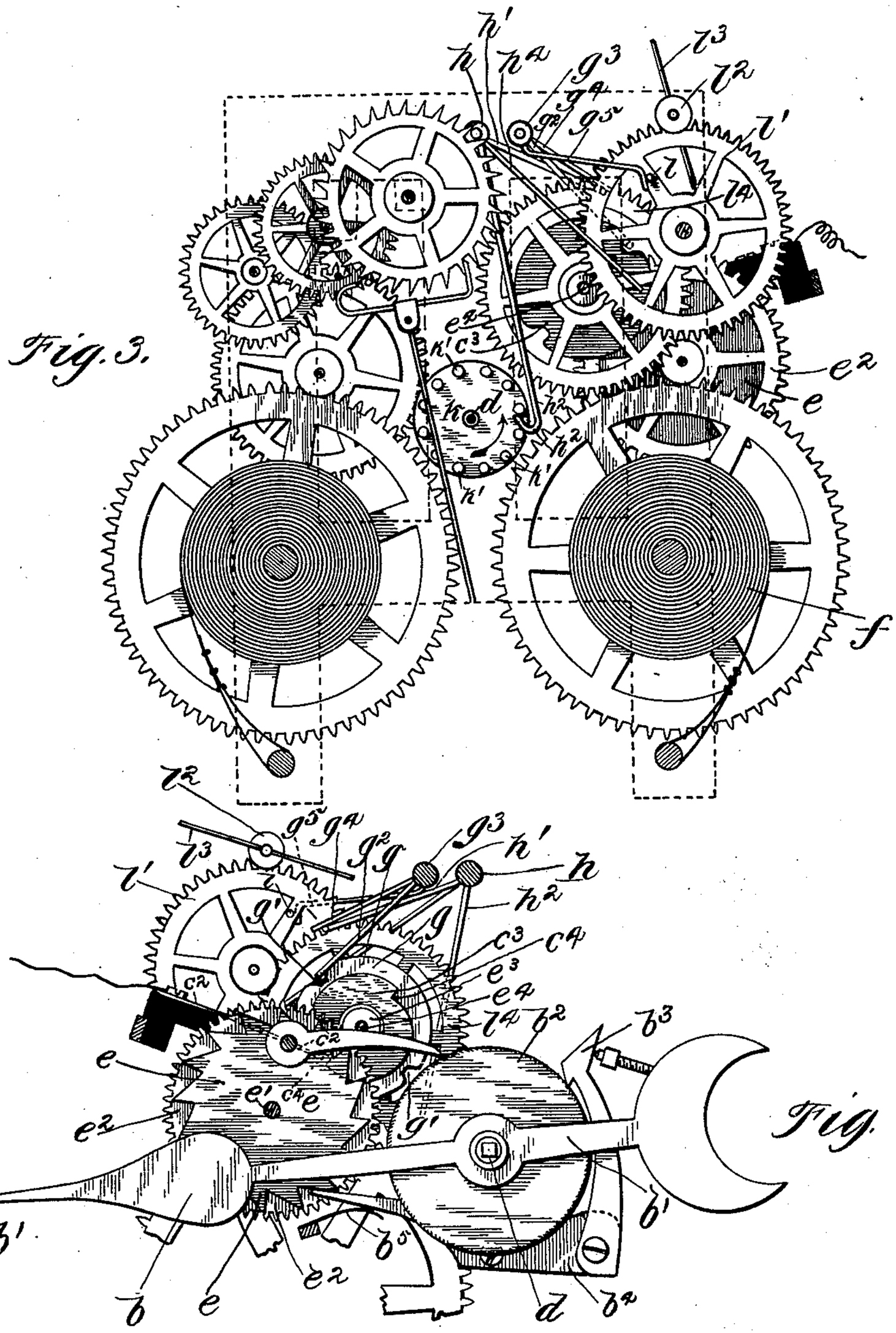

Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

ANDREW J. REAMS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE PROGRAM CLOCK COMPANY, OF ILLINOIS.

ELECTRICAL PROGRAM-CLOCK.

SPECIFICATION forming part of Letters Patent No. 563,883, dated July 14, 1896.

Application filed November 20, 1895. Serial No. 569,547. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. REAMS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electrical Program-Clocks, (Case No. 1,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to an electrical program-clock, its object being to provide an improved construction of clock mechanism and a circuit-controlling device whereby a signal may be sounded at any predetermined time.

Upon the face of the clock I provide a series of contacts adapted to be placed at will in position to be engaged by a contact carried upon the hour-hand, the contacts being preferably in the form of a ring, upon which contact-fingers are rotatably mounted, whereby they may be moved into a position with their ends projecting into the path of the traveling contact, or they may be rotated into a position to rest out of the path of the traveling contact. The contacts may thus be arranged to sound a signal at any predetermined time. The hour-hand, instead of traveling continuously, as has been the usual practice, is adapted to be moved at intervals, that is, step by step, the driving mechanism of the hour-hand being normally locked, but released at intervals, preferably every five minutes, to move the hour-hand forward through a space corresponding to five minutes. By this arrangement the closing of the circuit between the contact carried upon the hour-hand and the contact provided upon the face of the clock may be effected at the precise instant of time desired. A circuit-controller is operated by the mechanism which moves the hour-hand, so that when the hour-hand is rotated the continuity of the circuit is completed through the normally open circuit-controller for an interval of time, the interval during which the bell or other signal device is sounded being thus always uniform.

I will describe my invention more in particular by reference to the accompanying drawings, in which—

Figure 1 is a view of the face of a program-clock embodying my invention, the circuit arrangements being indicated diagrammatically. Fig. 2 is a detailed view showing the contact-fingers mounted upon the face of the clock and the contact carried upon the hour-hand. Fig. 3 is a view in elevation of the clock mechanism. Fig. 4 is a view of the mechanism for rotating the hour-hand as seen from the opposite side to that of Fig. 3.

Like letters refer to like parts in the several figures.

Upon the face of the clock is mounted a metallic ring a, upon which are rotatably mounted contact-fingers a' a', the fingers being preferably arranged at intervals corresponding to five minutes. When rotated toward the center of the ring, the ends of the contact-fingers rest in the path of the contact b', carried upon the hour-hand b, and when rotated in the opposite direction the contact-fingers lie out of the path of the contact b'. By rotating the desired contact-fingers into the path of the traveling contact an alarm may be sounded at any predetermined time.

The ring a is connected with one side of a battery or other source of electricity c, circuit then extending through the bell or signal device c', thence to the contact-spring c^2, to the rotating disk c^3, with the periphery of which the spring c^2 is adapted to make contact when the disk is rotated, the spring c^2 normally resting out of engagement with the disk. The disk c^3 is electrically connected with the clock mechanism with which the hour-hand b is in electrical connection, the circuit thus extending through the hour-hand to the contact b', carried upon the end thereof, and thence to the particular contact-finger a', with which the contact b' may engage.

The contact b', carried upon the hour-hand, comes in contact with one of the contact-fingers a', and when the mechanism driving the hour-hand is released the disk c^3 is rotated, thus completing circuit from the battery c through the bell c', spring c^2, disk c^3, hour-hand b, contact b', contact-finger a', to the opposite side of the battery. When disk c^3 has made a half-rotation, the contact between the spring c^2 and the disk c^3 is broken and the contact b' is moved out of engagement with the contact-finger a'.

To effect the step-by-step movement of the hour-hand b, the hour-hand is mounted loosely upon the shaft d, which carries the minute-hand, a ratchet-wheel b^2 being mounted to move with the hour-hand. A pawl b^3 is provided for rotating the ratchet-wheel b^2 and is carried upon a pivoted lever b^4, the end of which is adapted to be engaged by the teeth of a wheel e, the wheel e being driven by the spring f through intermediate gearing. The wheel e is provided with sixteen teeth and is rotated a tooth at a time at the end of each interval of five minutes, the end of the lever b^4 thus riding upon the tooth and causing the pawl b^3 to slide over the periphery of the ratchet-wheel b^2. When the end of the lever b^4 passes over the point of the tooth, a spring b^5 depresses the lever, thus moving the pawl b^3 to rotate the ratchet-wheel b^2 and thus advance the hour-hand b through a space corresponding to five minutes. Upon the shaft e', carrying the wheel e, is mounted a toothed wheel e^2, meshing with a pinion e^3, carried upon a shaft e^4. The disk c^3 of the circuit-controller is mounted upon the shaft e^4 and is provided in its periphery with diametrically-situated notches c^4 c^4, in which the end of the contact-spring c^2 is adapted to normally rest, circuit being thus opened between the contact-spring and the disk. The disk c^3 is adapted to rotate through a half-revolution while the wheel e is rotating through the distance of one tooth. As the disk c^3 rotates the end of the spring c^2 rides upon the periphery thereof, thus completing the circuit, the end of the spring falling into the opposite notch c^4 upon the completion of a half-rotation of the disk. Upon the shaft e^4 is mounted a disk g, provided at opposite points in its periphery with notches g' g', in which the end of a rod or arm g^2 is adapted to rest. When the train begins to move, the arm g^2 is moved out of the notch g' and rides upon the periphery of the disk g until the disk has completed a half-revolution, when it falls into the opposite notch g'. The arm g^2 is mounted upon the rocking shaft g^3, which carries an arm g^4, engaged by an arm h', carried upon the rocking shaft h. An operating arm or rod h^2 is mounted upon the rocking shaft h and is engaged at its upturned end by pins k' k', mounted upon a disk or wheel k, carried upon the shaft d, upon which is mounted the minute-hand. The pins k' k' are twelve in number, and, as the shaft d makes one revolution each hour, the distance between the pins k' k' corresponds to five minutes. As the wheel k rotates one of the pins k' engages the under side of the upturned end of arm h^2, thus rocking the shaft h, and, through the engagement of arm h' with arm g^4, the shaft g^3 is likewise rocked, thus raising the end of arm g^2 out of the notch g'. Upon the rocking shaft g^3 is also mounted an arm g^5, which normally engages a pin or stop l, carried upon the wheel l', which meshes with a pinion l^2, mounted upon a shaft carrying the regulating-fan l^3. A pinion is mounted upon the same shaft with the wheel l' and meshes with the wheel l^4, carried upon the shaft e^4. When the arm h^2 is engaged by one of the pins k' to rock the shafts h and g^3, the arm g^5 is raised out of engagement with the stop l, and the arm g^2 is moved out of engagement with the notch g', thus permitting the train to rotate through a short distance until the stop l engages the arm h^4, carried upon the rocking shaft h. The movement of the train is thus checked until the pin k' has completely passed the upturned end of the rod h^2 and permits the rod to move inward beneath the pin that has just passed. This movement of the rod h^2 carries the arm h^4 out of the path of the stop l and permits the train to rotate. The end of arm g^2 now rides upon the periphery of the disk g, thus maintaining the arm g^5 out of the path of the stop l. When the disk g has completed a half-revolution, the arm g^2 falls into the opposite notch g', thus moving the end of the arm g^5 into the path of the stop l and checking the movement of the train. The movement of the train is sufficient to rotate the wheel e through the distance of one tooth, thus operating the pawl b^3 and moving the hour-hand through the distance corresponding to five minutes. During the movement of the train the contact-spring c^2 rides upon the periphery of the disk c^3, thus completing circuit through the circuit-controlling device. Supposing the hour-hand b to be resting against one of the contact-fingers a' when the train is started in motion, circuit will be closed through the bell so long as the contact-spring c^2 engages the disk c^3. At the completion of the movement of the train the hour-hand b is moved forward by the pawl b^3 and the circuit is opened between the spring c^2 and disk c^3.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a program-clock, the combination with the time-keeping clock-train, of an hour-hand carrying the traveling contact, a second driving-train the intermittent movement of which is controlled by the clock-train, a ratchet-wheel mounted to rotate with the hour-hand, a pawl for rotating said ratchet-wheel, a toothed wheel for operating said pawl connected in the driving-train of the hour-hand and thereby periodically rotated the distance of a single tooth to advance the hour-hand of the clock step by step, substantially as described.

2. The combination with the time-keeping train of a clock, of a controlling-wheel actuated thereby rotating with the minute-hand, a second driving-train and spring actuating the hour-hand of the clock, an hour-hand carrying the traveling contact, and a lever for controlling the driving-train of the hour-hand controlled by the rotation of said controlling-wheel, substantially as described.

3. In a program-clock, the combination with

a time-keeping train actuating the minute-hand, of a separate driving-train and spring actuating the hour-hand thereof, contacts adjustably disposed upon the face of the clock, an hour-hand and a traveling contact mounted thereon adapted to successively engage the adjusted contacts on the face of the clock as the said hour-hand is rotated, substantially as described.

4. The combination with the driving-train of a clock actuating the minute-hand, of an hour-hand loosely mounted upon the shaft of the minute-hand, a second driving-train and spring actuating the hour-hand, a traveling contact carried upon the hour-hand, contacts provided upon the clock-face adapted to be adjustably disposed in position to be engaged by the traveling contact, a stop normally checking the said second driving-train adapted to be intermittently actuated by the clock-train to release the said driving-train and permit the advance of the hour-hand and traveling contact step by step to successively engage the adjusted contacts upon the clock-face, substantially as described.

5. In a program-clock, the combination with the clock-train, of a separate driving-train and spring for the hour-hand, the movement of which is controlled by the clock-train, adapted to periodically advance the hour-hand step by step, a plurality of contacts upon the clock-face, each of which may be adjusted to be engaged by the traveling contact, a traveling contact carried upon the hour-hand and adapted to engage the said adjusted contacts upon the face of the clock, and a circuit-controlling device for closing the circuit therethrough for a period of definite duration, substantially as described.

6. In a program-clock, the combination with the hour-hand b of said clock loosely mounted upon the shaft of the minute-hand and carrying a traveling contact b', a ratchet-wheel b^2 rotating with the said hour-hand, pawl b^3 engaging teeth upon the said ratchet-wheel, contacts a' mounted upon the face of the clock adapted to be adjustably disposed in the path of the traveling contact, a spring f, and a second driving-train, a time-keeping clock-train actuating the minute-hand, a stop g^5 normally checking the movement of said second driving-train adapted to be periodically actuated by the clock-train to release the second driving-train, and toothed wheel e mounted in said driving-train adapted to periodically actuate the pawl b^3 to rotate the said ratchet-wheel and hour-hand a predetermined distance and alter the circuit-connections upon the clock-face, substantially as described.

7. The combination with the wheel k mounted to rotate with the minute-hand and carrying the pins k' k', of the operating-lever h^2 mounted upon rocking shaft h, rocking shaft g^3 adapted to be rocked when said shaft h is rocked, arm g^2 mounted upon shaft g^3, notched disk g adapted to be engaged by said arm g^2, arms g^5 h^4 carried upon shafts g^3 and h respectively, wheel l' carrying the stop l, circuit-controlling disk c^3 and contact-spring c^2, toothed wheel e, pawl b^3 operated thereby, hour-hand b, and ratchet-wheel b^2 mounted to rotate therewith; substantially as described.

8. In a clock for transmitting electrical signals, the combination with the clock-train, of a separate driving-train for the hour-hand of the clock, a stop normally checking the said driving-train of the hour-hand adapted to be periodically actuated by the clock-train to permit the driving-train to advance the hour-hand a predetermined distance, a contact carried upon the hour-hand, contacts mounted upon the clock-face, each of which may be adjusted to be engaged by the said contact upon the hour-hand, and a circuit-controlling device provided in the driving-train of the hour-hand for completing the continuity of the circuit a definite length of time, substantially as described.

In witness whereof I hereunto subscribe my name this 15th day of November, A. D. 1895.

ANDREW J. REAMS.

Witnesses:
JOHN W. SINCLAIR,
W. CLYDE JONES.