

C. F. HEATH.  
ELECTRIC TIME SWITCH.

(Application filed Mar. 11, 1902.)

(No Model.)

2 Sheets—Sheet 1.

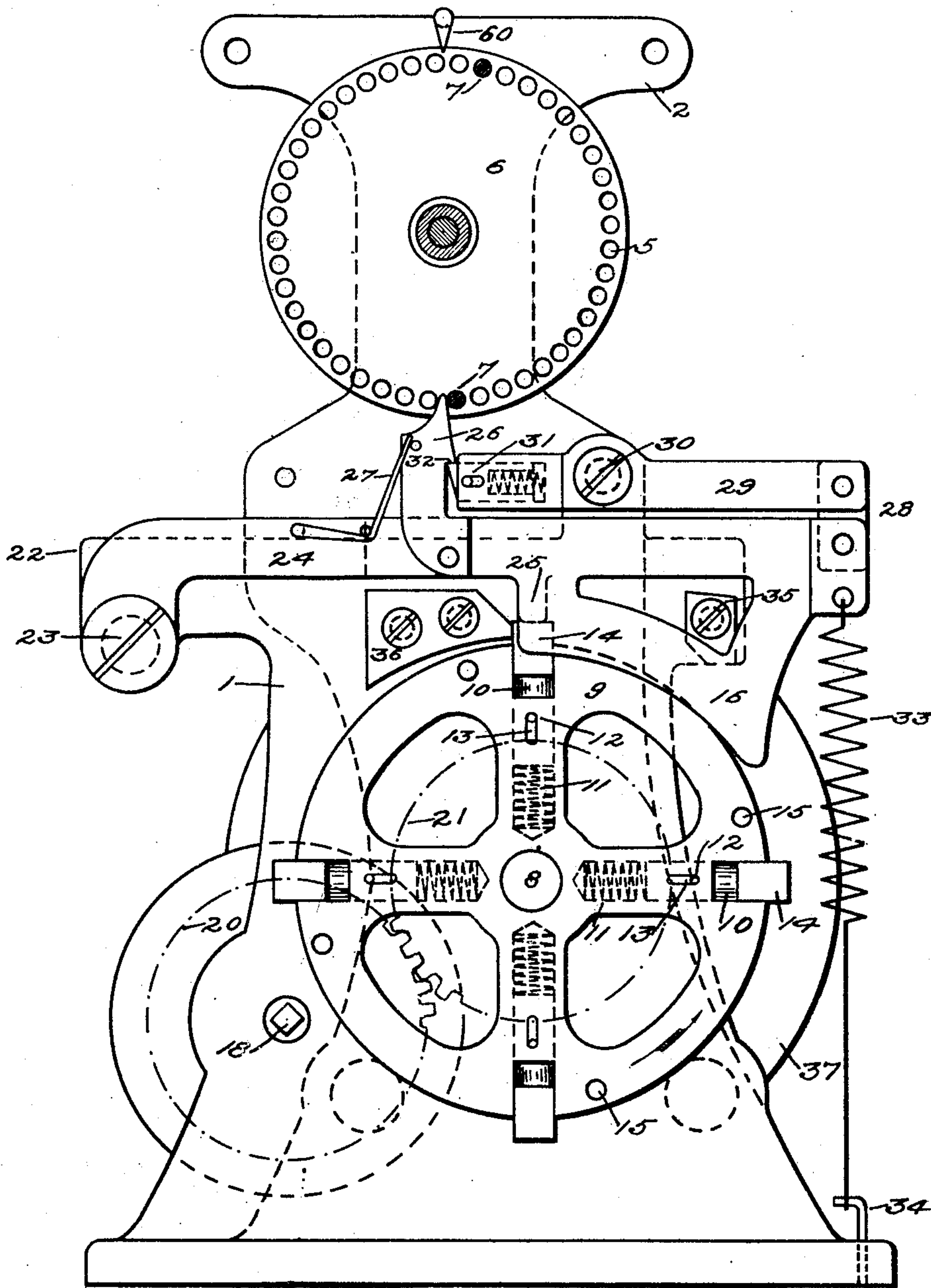


FIG. 1.

WITNESSES

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*By Loris E. Bellomo*

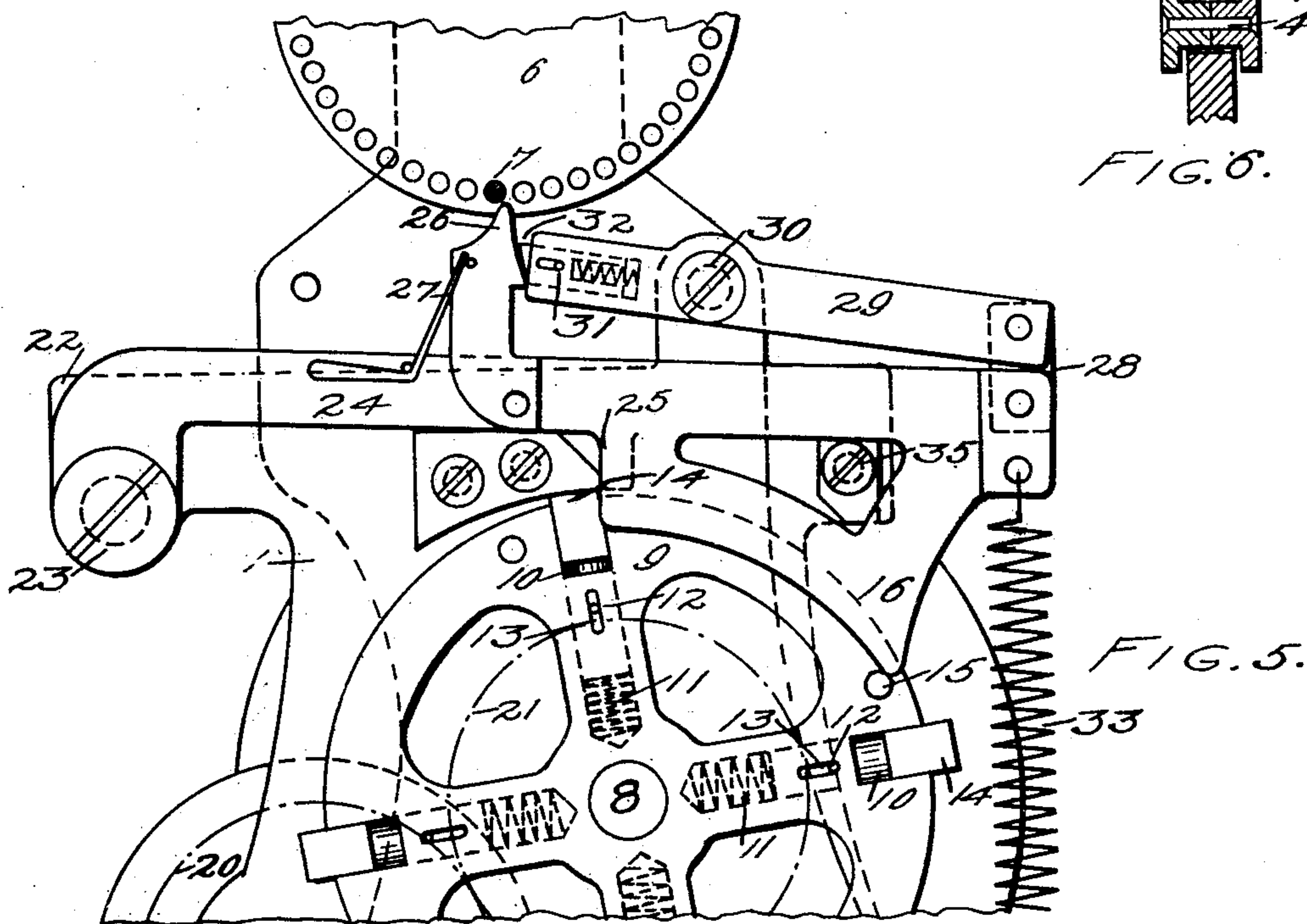
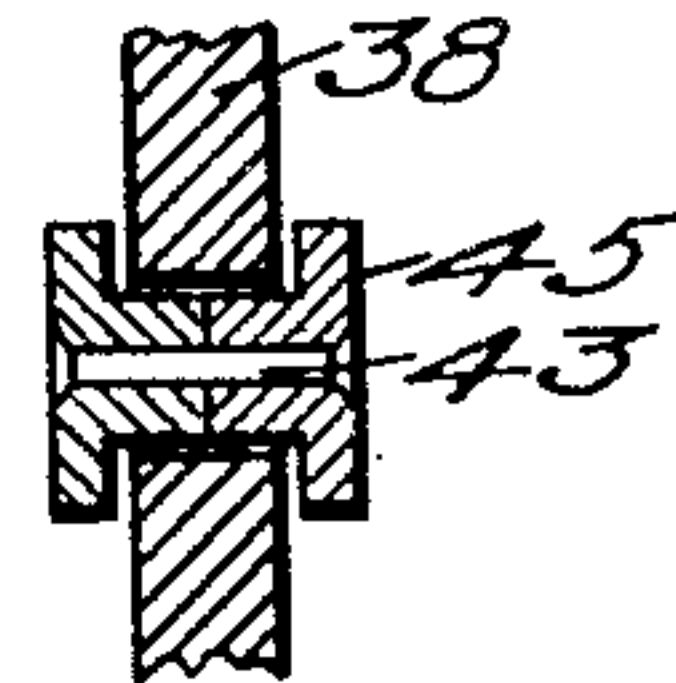
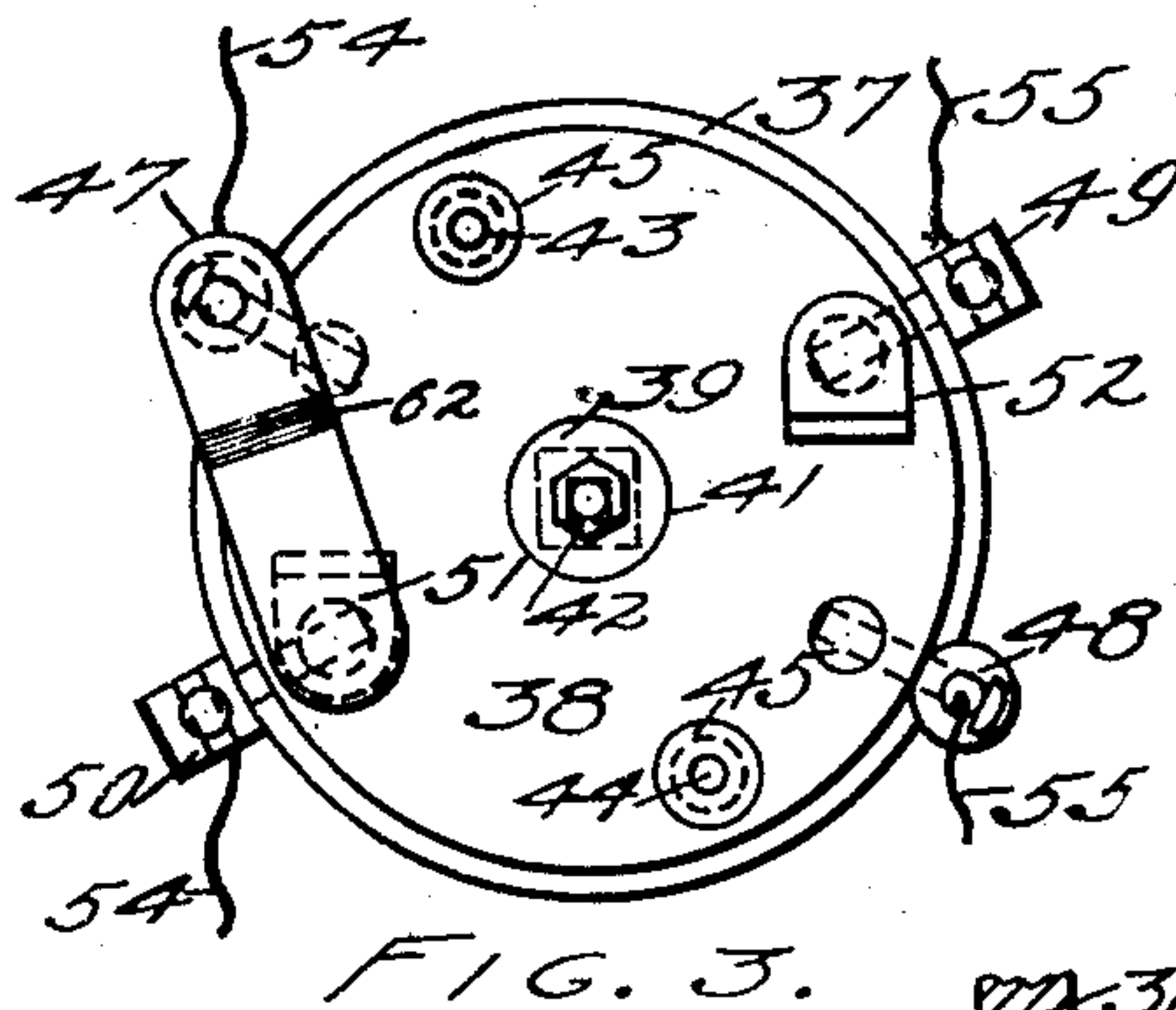
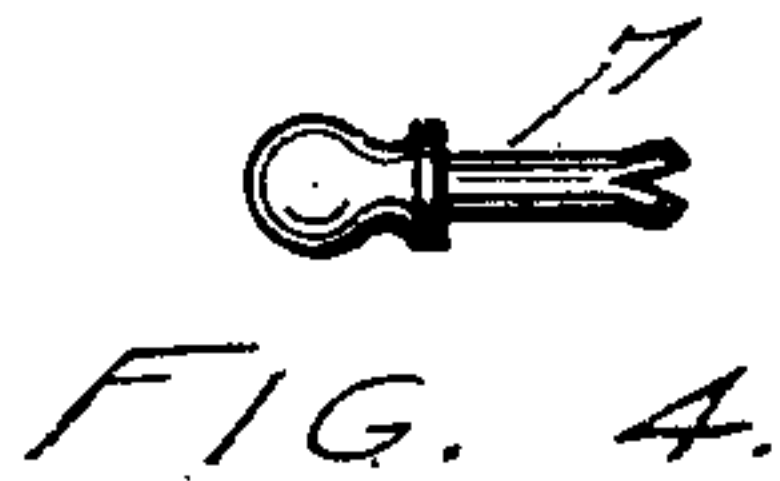
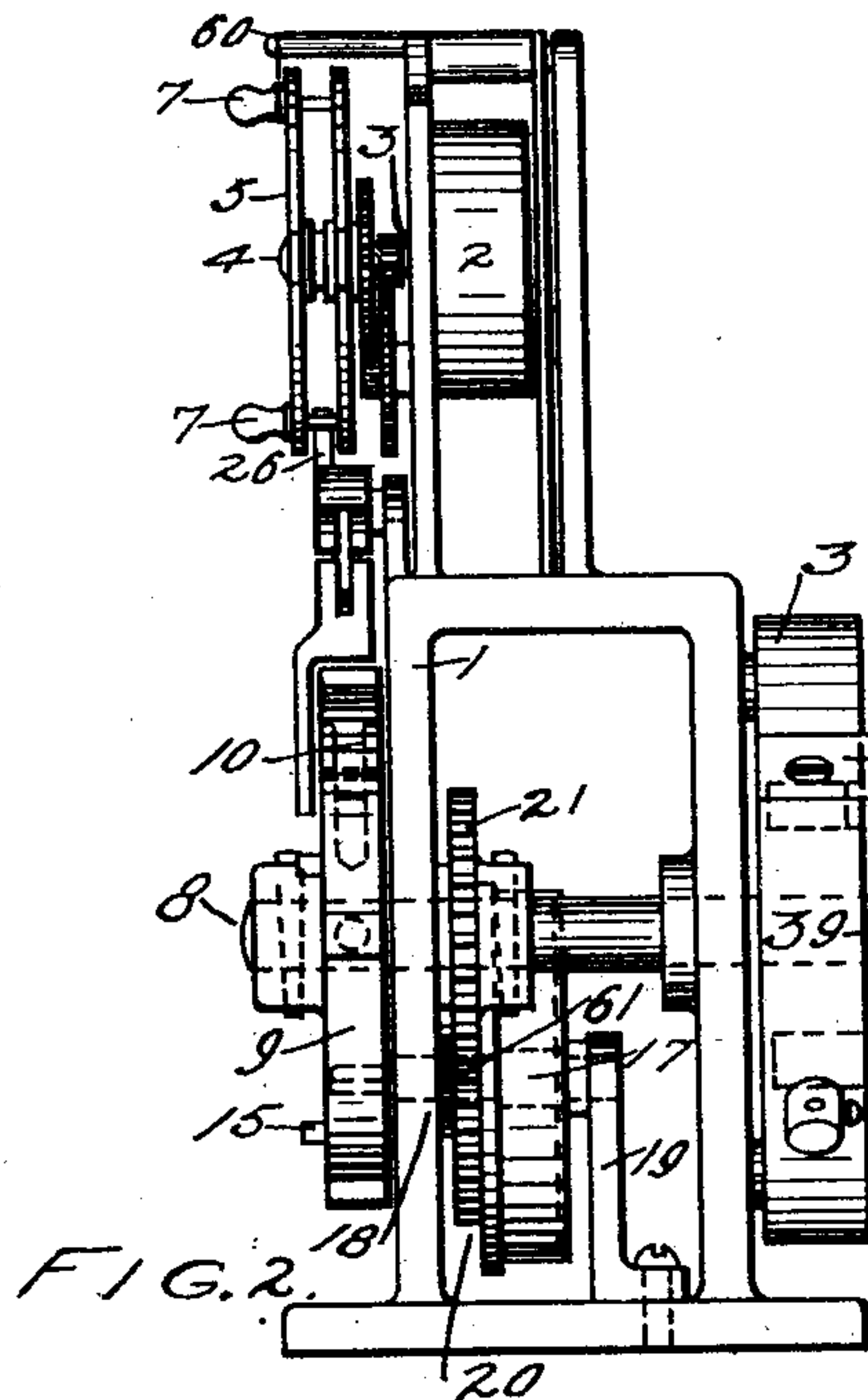
ATTY.

C. F. HEATH.  
ELECTRIC TIME SWITCH

(Application filed Mar. 11, 1902.)

2 Sheets—Sheet 2.

(No Model.)



WITNESSES,

*William C. Stanton,**Robert S. Stanton.*

INVENTOR,

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ATTY.



# UNITED STATES PATENT OFFICE.

CLARENCE F. HEATH, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR, BY  
DIRECT AND MESNE ASSIGNMENTS, TO CHARLES S. ORR AND JOHN W.  
BOND, OF PROVIDENCE, RHODE ISLAND.

## ELECTRIC TIME-SWITCH.

SPECIFICATION forming part of Letters Patent No. 703,128, dated June 24, 1902.

Application filed March 11, 1902. Serial No. 97,753. (No model.)

*To all whom it may concern:*

Be it known that I, CLARENCE F. HEATH, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Time-Switch Mechanisms, of which the following is a specification.

My invention relates to clock-controlled apparatus designed to open and close electric-light or other circuits at a predetermined time, and has for its primary objects simplicity and accuracy.

To these ends my invention consists in the novel construction and combination of parts hereinafter described, and illustrated in the accompanying drawings, wherein—

Figure 1 is a front view of my mechanism with the dial-plate removed; Fig. 2, a side elevation of the entire mechanism; Fig. 3, an end view of the switch mechanism mounted in the rear of the machine-frame; Fig. 4, a detail view of a tripping-pin; Fig. 5, a front view of a portion of the switch mechanism with lever and plunger in released position, and Fig. 6 a longitudinal central section of a button.

Similar figures of reference indicate like parts throughout the views.

In the drawings, 1 is the machine-frame, the top of which supports a clock 2. Projecting from the face of the clock and actuated thereby is a spindle 3, upon which is fixed a sleeve 4, carrying a double dial consisting of a front member 5, indicating twenty-four hours, and a rear unmarked member 6, both having around their margins ninety-six holes, making a time interval between each of fifteen minutes. These holes are for the accommodation of two tripping-pins 7. (Shown in detail in Fig. 4.) One end of the pin may be split, as shown. Projecting above the dial is a fixed pointer 60, which assists when it is desired to manually adjust the dial.

Pivoted to the end of the main shaft 8, which is mounted in the frame 1, is a wheel 9, having holes radiating quadrentially from the hub. In the lower portion of each hole is a spiral spring 11, upon which rests a plunger 10, carrying a transverse stop-pin 12, longitudinally movable in a slot 13 in the arm of the wheel. The plunger-head 14 is rectangu-

lar and normally projects beyond the face of wheel 9. Around the rim of the wheel, slightly in advance of each plunger, is a projection 15, adapted to contact during rotation with the lever-cam 16.

The shaft 8 is actuated by the tension of a clock-spring housed in barrel 17 and wound upon the key-shaft 18, one of whose extremities is carried by the frame 1 and the other by the support 19. Upon shaft 18 is mounted a gear 20, meshing with a gear 21 upon the main shaft. The shaft 18 is periodically wound by means of a key, which operation is facilitated by the usual pawl-and-ratchet mechanism 61, adjacent the gear 20.

Pivoted to an arm 22 on the frame 1 by a stud 23 is a lever-arm 24, carrying near its free end a downwardly-projecting cam 16, which has a concave lower edge and overlaps a portion of the wheel 9. Extending downwardly from the lever-arm 24 and directly above the axis of the wheel is a projection 25, contacting with the upper surface of the plunger-head 14. The lever-arm 24 has also pivoted near its middle an upwardly-directed tripping-lever 26, whose pointed upper extremity normally intersects the path of the dial tripping-pins. This tripping-lever is supported at its rear by a spring 27. A link 28 joins the free end of lever 24 to the outer end of a second lever 29, fulcrumed above the first lever and near its middle on a stud 30. The inner end of lever 29 carries a spring-actuated latch 31, which engages a shoulder 32 upon the front of the tripping-lever 26. The outer end of lever-arm 24 is normally drawn downward by a spiral spring 33, extending from its extremity to a fastening 34 at the base of the frame. Extreme downward travel of the lever-arm is checked by a lug 35 upon the frame 1. Fixed by screws or otherwise to the front of the frame is also a stop 36, situated slightly above the face of wheel 9 and in the line of travel of the plunger-head 14, against which it normally abuts.

The switching mechanism receives its primary impulse from the main shaft 8, which projects beyond the frame of the machine, traversing also a slate disk 37, and carries upon its extremity a fiber disk 38, journaled upon a squared brass bushing 39, with an interior flange 40, and held against horizontal



displacement by a washer 41 and two nuts 42. The fiber disk carries two contact-buttons 43 and 44, located diametrically opposite each other near its margin. These buttons consist of two pieces riveted together, terminating in flanges 45, resting upon both sides of the disk, and the whole loosely incorporated in said disk. The slate disk 37 is screwed to the frame 1, and let into its periphery at diametrically opposite points are four terminals 47, 48, 49, and 50. Two of these terminals 47 48, diametrically opposite each other, carry copper spring-contacts 53. One only of these is shown in the drawings. Each has an inward bend 62 intermediate its length. The terminals 49 and 50 are screwed into the shanks of two beveled contacts 51 and 52, located directly beneath the free ends of the spring-contacts 53. The rotation of the fiber disk carries the buttons 43 and 44 between the fixed and spring contacts, thus electrically connecting the legs of the circuit 54 and 55.

The operation of the mechanism is as follows: The tripping-pins 7 are inserted in the dial and its companion disk through the particular holes which indicate the times when it is desired that the circuit be closed and opened, respectively. The rotation of the dials 5 and 6 carries the pin into contact with the tripping-lever 26, at which time the parts of the entire mechanism are in the position shown in Fig. 1. The gradual pressure of the pin upon said lever finally forces the shoulder 32 from the latch 31, thereby releasing levers 29 and 24, which, in response to the tension of spring 33, drop until stopped by the lug 35. This movement also forces the plunger-head 14, upon which the lever projection 25 rests, into a plane below the stop 36, thus allowing the wheel 9 to rotate one-quarter of a revolution. During this revolution the projection 15 in its advance contacts with the lower edge of lever-cam 16, gradually raising the latter, together with lever 29, again into locked position with the tripping-lever 26 preparatory to the impact of the second tripping-pin. A repetition of the rotatory movement described brings another of the plunger-heads into position beneath the lever projection 25. The described quarter-revolution of wheel 9 imparts, through the main shaft 8, a similar movement of the fiber disk 38, thus forcing the heads or flanges of buttons 43 and 44 between the spring-contacts 51 and 49, thereby connecting the breaks in the two legs 54 and 55, respectively, and completing the circuit. The second tripping-pin 7 in its turn displaces the tripping-lever and allows another quarter-turn of the main shaft 8, whereby the fiber disk is similarly rotated and the buttons removed from their positions between the contacts. The circuit is thus broken.

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

1. In an automatic switch, the combination

with a wheel of plungers mounted in the wheel and normally projecting beyond the face thereof, means for rotating said wheel, a lever-arm, pivotally mounted above the wheel, adapted to depress one of the plungers, a tripping-lever mounted upon the lever-arm and means operated by a clock for tripping the tripping-lever.

2. In an automatic switch, the combination with a wheel of spring-actuated plungers mounted in the wheel, and normally projecting beyond the face thereof, a shaft for rotating said wheel, a lever-arm pivotally mounted above the wheel adapted to depress one of the plungers, a stop upon the machine-frame in the path of the projecting portion of the plunger, and means operated by a clock for releasing the lever-arm.

3. In an automatic switch, the combination with a wheel, of spring-actuated plungers radially mounted in the wheel and normally projecting beyond the face thereof, a projection on the side of the wheel in advance of each plunger, acting on the wheel to rotate the same, a stop upon the machine-frame, a lever-arm pivotally mounted above the wheel adapted to depress one of the plungers, a lever-cam projecting downwardly from the lever-arm, and normally within the path of the said projection, and means operated by a clock for releasing the lever-arm as described.

4. In an automatic switch, the combination with a wheel, of a spring-actuated plunger radially mounted in the wheel and normally projecting beyond the face thereof, a shaft for rotating said wheel, a stop upon the machine-frame in the path of the projecting portion of the plunger, a lever-arm pivotally mounted above the wheel adapted to depress one of the plungers, a spring upon the free end of the lever-arm exerting a downward tension thereon, and means operated by a clock for releasing the lever-arm.

5. In an automatic switch, the combination with a frame, of a lever-arm pivoted at one end to the frame, a second lever fulcrumed to the frame above the lever-arm, a link connecting the outer ends of lever and lever-arm, a latch mounted in the free end of the lever, a tripping-lever pivoted to lever-arm, a shoulder on the tripping-lever for engaging with said latch, a revolving clock-dial actuated by clock mechanism, tripping-pins, in the rotating dial adapted to contact with the tripping-lever, spring means for forcing the lever-arm downward, a wheel mounted below the lever-arm, and a spring-actuated plunger in said wheel adapted to receive the impact of the lever-arm upon release of the tripping-lever.

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

CLARENCE F. HEATH.

Witnesses:

HORATIO E. BELLOWS,  
CHARLES S. ORR.