

(No Model.)

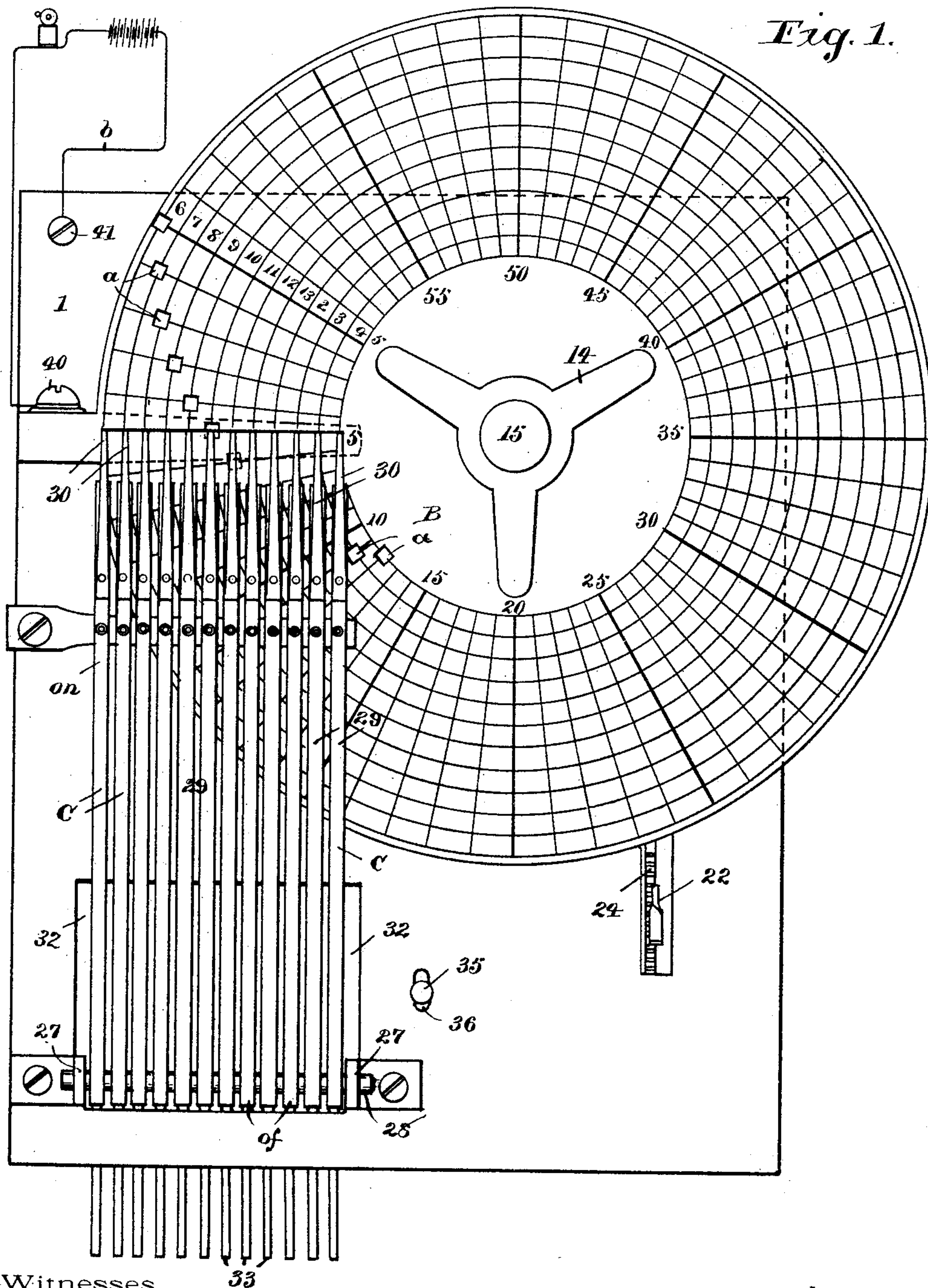
4 Sheets—Sheet 1.

J. O. LYMAN.
ELECTRIC PROGRAM CLOCK.

No. 603,450.

Patented May 3, 1898.

Fig. 1.



Witnesses.

R. H. Newman.

Harriet L. Plasen.

Inventor.

JAMES O. LYMAN

By

Chamberlain & Newman

Attorneys

(No Model.)

4 Sheets—Sheet 2.

J. O. LYMAN.
ELECTRIC PROGRAM CLOCK.

No. 603,450.

Patented May 3, 1898.

Fig. 2.

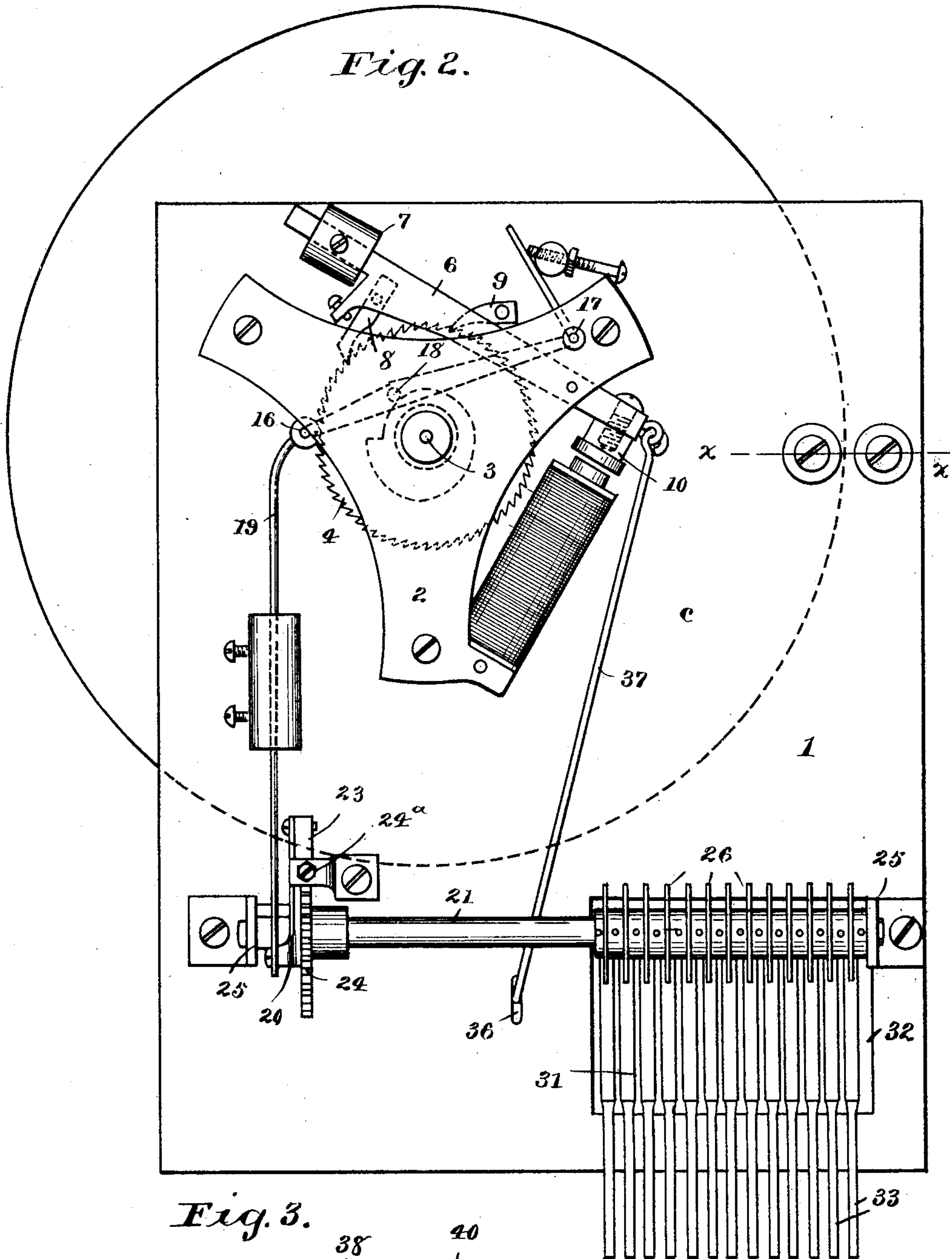
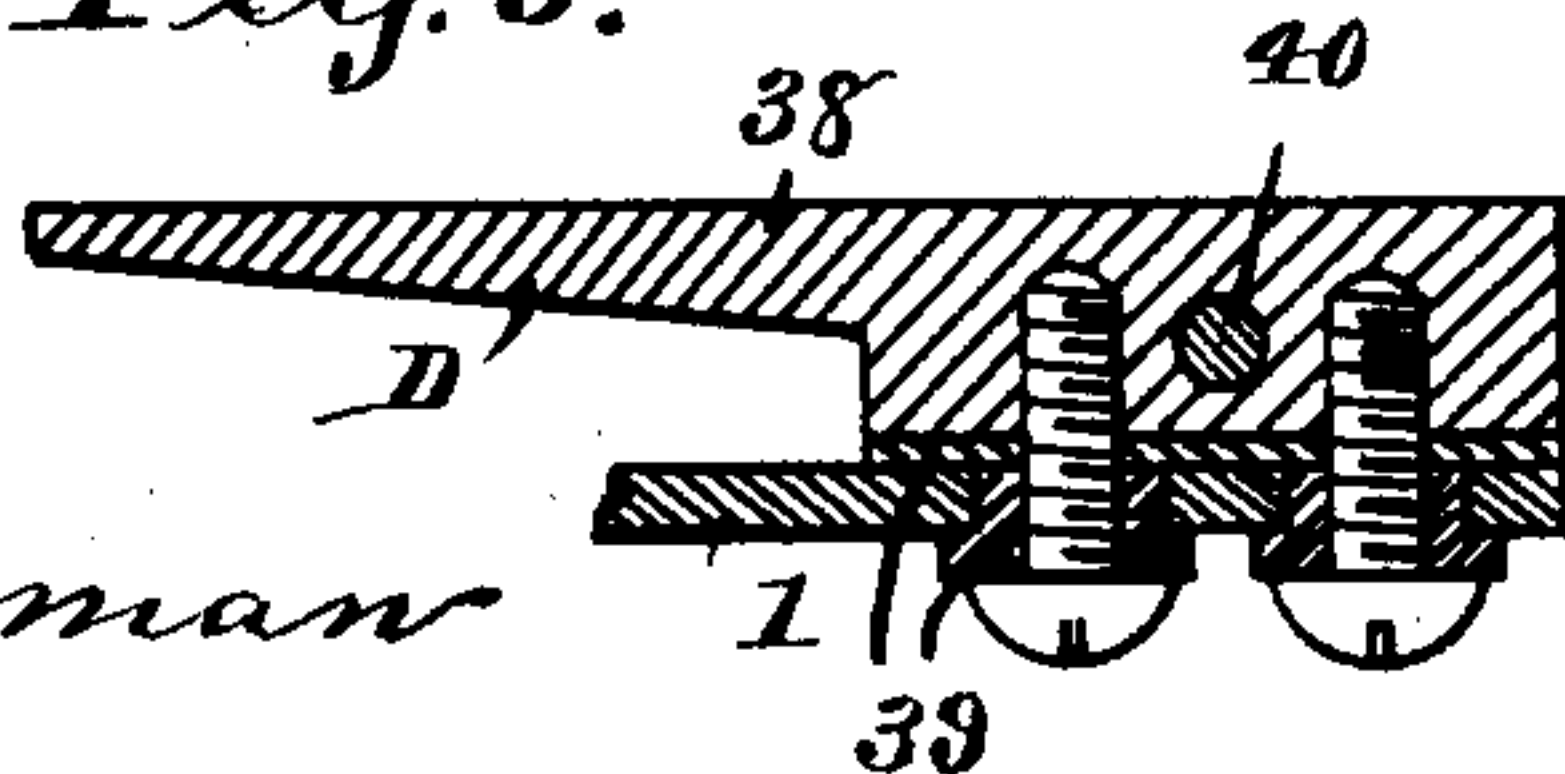


Fig. 3.

Witnesses.

R. H. Newman

Harriet L. Plason



Inventor.

JAMES O. LYMAN

By

Chamberlain & Newman

Attorneys

(No Model.)

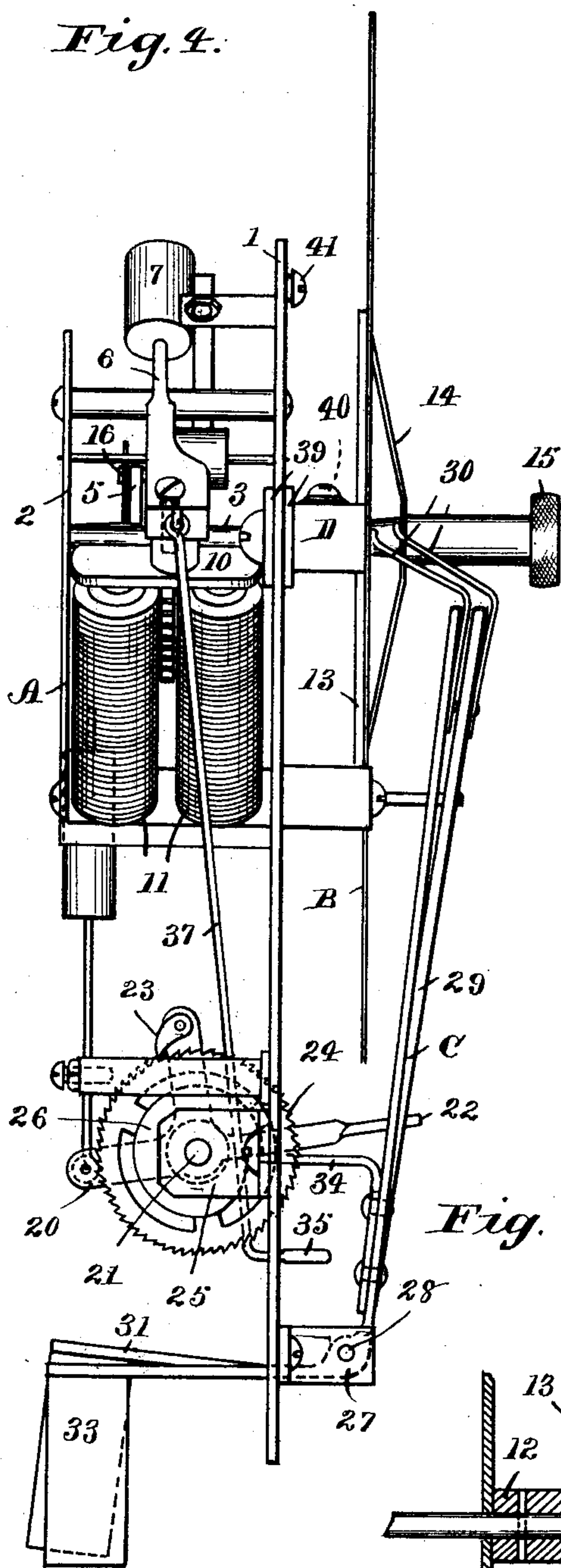
4 Sheets—Sheet 3.

J. O. LYMAN.
ELECTRIC PROGRAM CLOCK.

No. 603,450.

Patented May 3, 1898.

Fig. 4.

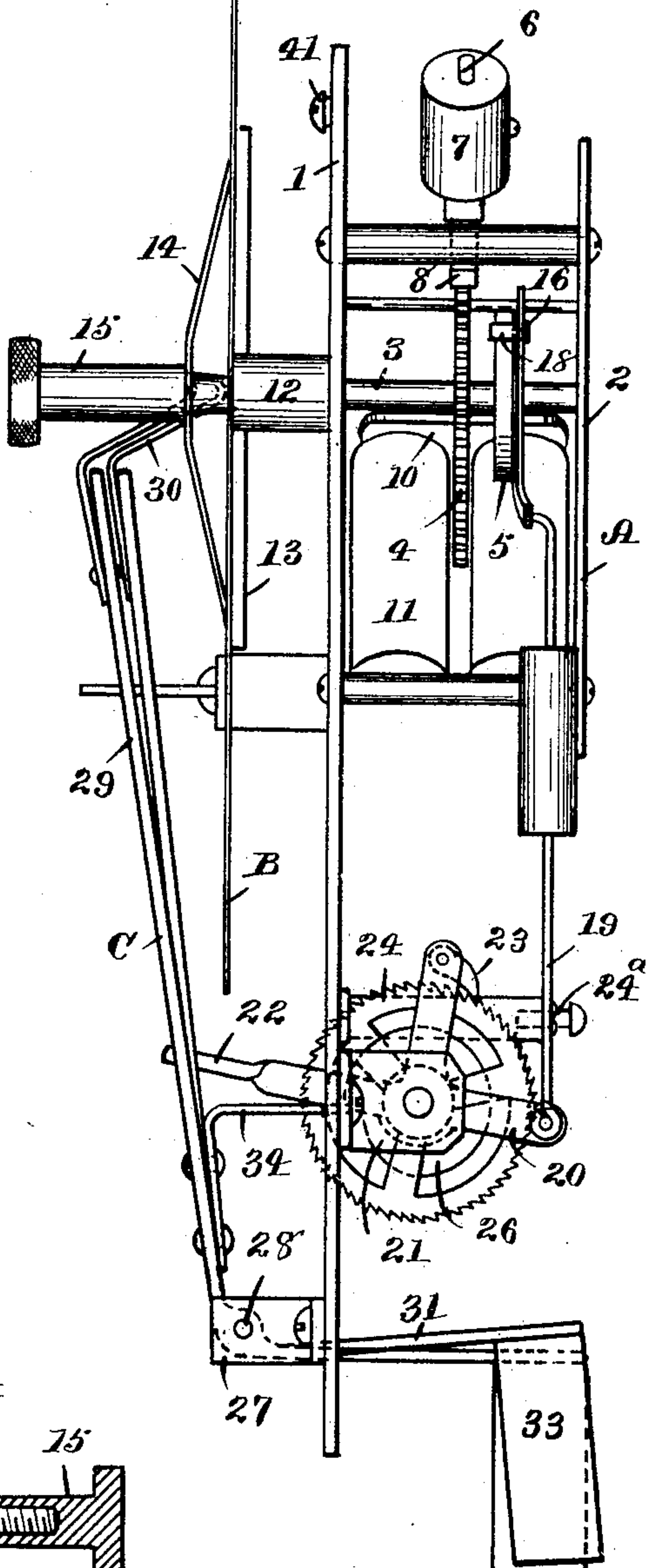


Witnesses.

R. H. Newman

Harriet L. Plasen.

Fig. 5.



Inventor.

JAMES O. LYMAN

By

Chamberlain & Newman
Attorneys

(No Model.)

4 Sheets—Sheet 4.

J. O. LYMAN.
ELECTRIC PROGRAM CLOCK.

No. 603,450.

Patented May 3, 1898.

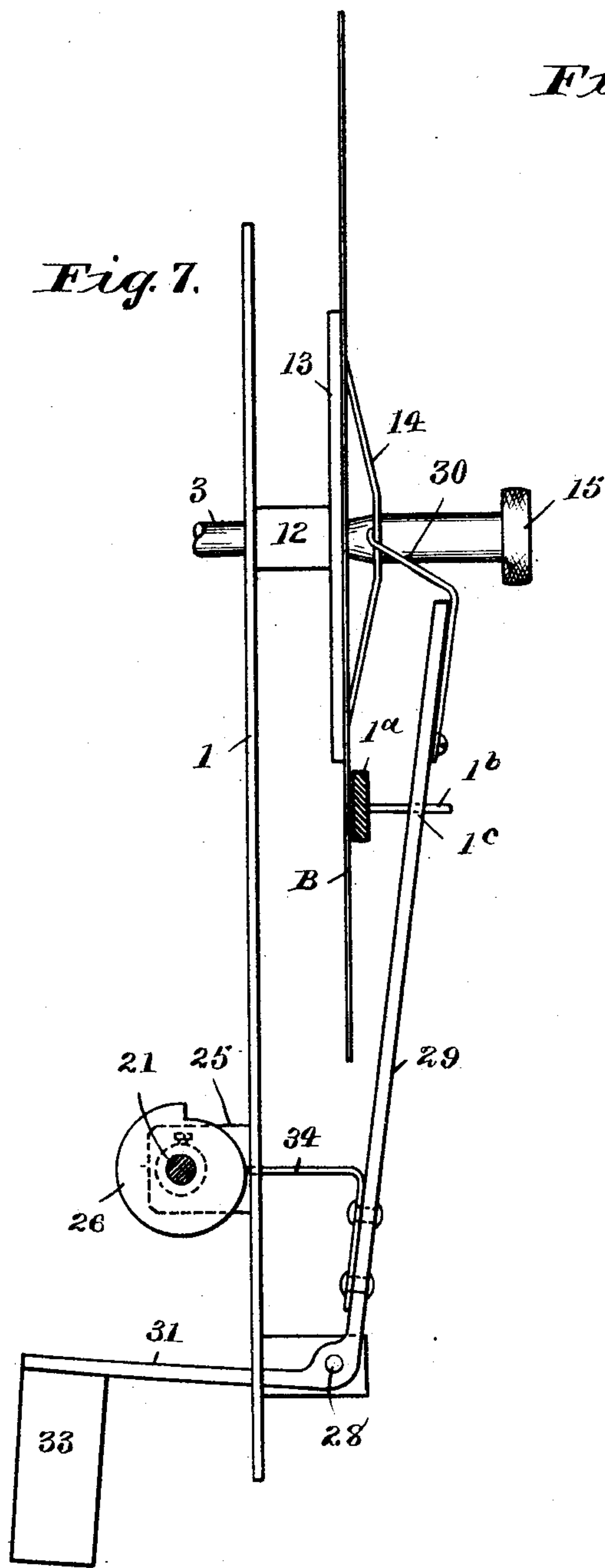


Fig. 8.

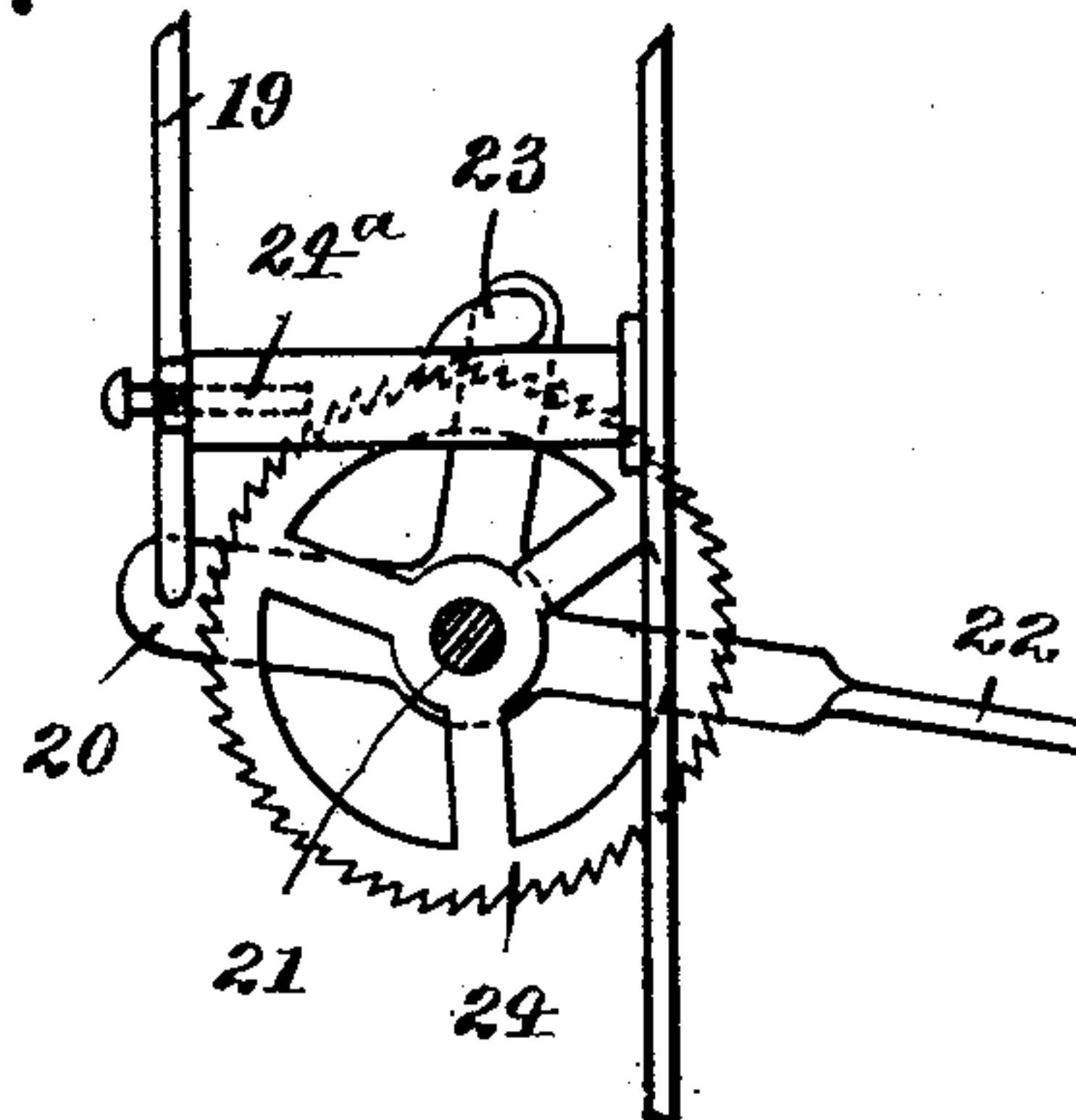
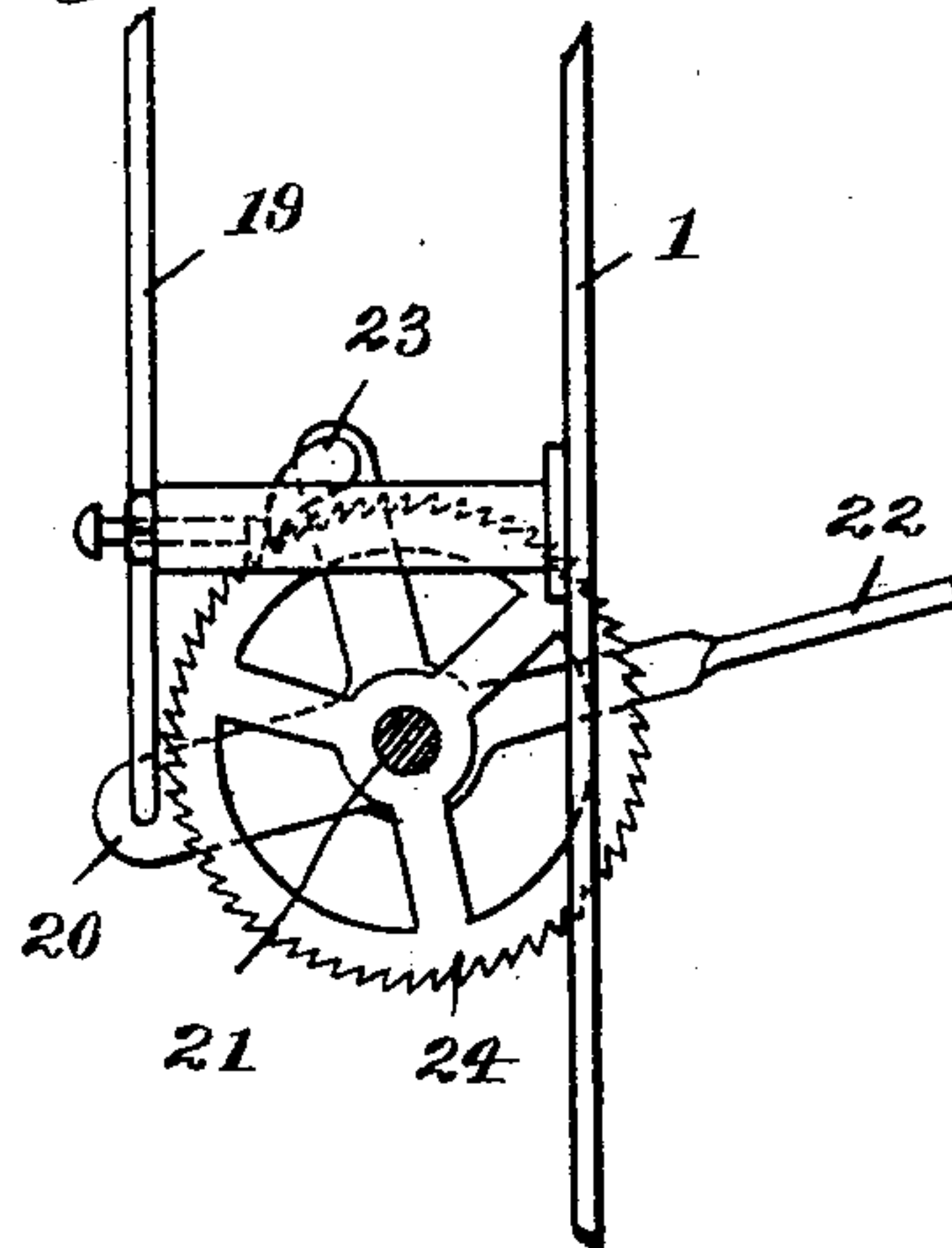


Fig. 9.



Witnesses.

R. H. Newman.
Harriet L. Plason

Inventor.

JAMES O LYMAN

By

Chamberlain & Newman

Attorneys

UNITED STATES PATENT OFFICE.

JAMES O. LYMAN, OF WATERBURY, CONNECTICUT.

ELECTRIC PROGRAM-CLOCK.

SPECIFICATION forming part of Letters Patent No. 603,450, dated May 3, 1898.

Application filed April 26, 1897. Serial No. 633,910. (No model.)

To all whom it may concern:

Be it known that I, JAMES O. LYMAN, a citizen of the United States, and a resident of Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Electric Program-Clocks, of which the following is a specification.

This invention relates to new and useful improvements in electric program-clocks which are used to operate a signal, such as an electric bell, at predetermined times during the day or night—as, for instance, in schools or like places.

It is the object of my invention to simplify and improve devices of the above class and especially adapt it for changes of program with little or no trouble or expense. It is entirely electrical in both its time movement and signaling apparatus, as will later be more fully explained. It is further designed to be operated by or in connection with any ordinary electrical or other master clock.

The same letters and numerals of reference denote like or corresponding parts upon the several figures of the accompanying drawings, and of which—

Figure 1 is a front elevation of my program complete, the case being removed. Fig. 2 is a rear view of my program complete, the position of the parts corresponding with Fig. 1. Fig. 3 is a cross-section on line *x x* of Fig. 2. Fig. 4 is a left side view of Fig. 1. Fig. 5 is a right side elevation of Fig. 1. Fig. 6 is a detail sectional view through shaft 3 and the clamping device. Fig. 7 is a detail side view of one of the fingers C, together with its connected parts. Fig. 8 is a detail view of the pawl-and-ratchet mechanism for operating the cam-shaft 21. Fig. 9 is a similar detail view, the parts being in their opposite extreme position.

Referring to the figures and letters of reference marked upon the drawings, 1 indicates a main frame-plate, to which the several parts are secured. Said frame in practice is supported in a suitable case. (Not shown, but resembling the ordinary wood clock-case.) To the upper rear side of the frame is attached an electric time-movement A, which is similar in some respects to that shown in patent to Warner, No. 363,440. It consists of a suitable frame

2, a dial-actuating shaft 3, bearing a propelling-wheel 4, and a cam 5. Within the frame 2 is pivoted an electrically-operated lever 6, which is provided with a weight 7 and a pawl 8, the latter serving to engage and operate the wheel 4. A retaining-pawl 9 is secured to the frame and engages the ratchet-wheel to prevent it from backward movement. 10 indicates an armature, which also constitutes the operated end of the lever, and 11 is an electromagnet which serves to operate the armature and lever aforesaid, it being energized through wire 6 from a suitable source. It will thus be apparent that when an electric current is applied through the magnet aforesaid the armature-lever and its pawl will be operated in a manner to turn the ratchet-wheel one notch or sixtieth of a rotation, as is customary with the ordinary electric clock-movement.

The shaft 3 extends through the frame-plate 2 and is then provided with a collar 12, a disk 13, clamp 14, and clamping-screw 15. The purpose of the foregoing construction is to detachably secure the dial-plate B to said shaft and insure said dial turning therewith. The dial B is necessarily made of insulating material—such, for instance, as paper, celluloid, or the like.

The face of the dial is divided into hours and minutes. The circles thereon, of which there are twelve, represent the hours in the rotation, indicated by figures "6, 7, 8, 9, 10, 11, 12, 1, 2, 3, 4, 5," while the radial lines, of which there are sixty and numbered "5, 10, 15, 20," &c., indicate the minutes of each hour. As before stated, this dial serves to make and break the electrical connections whereby the bell (not shown) is rung at predetermined times. Said dial is composed of insulating material and provided with perforations *a*, through which the electrical connections are made by means of the fingers C and arm D, the construction of which will be later more fully explained. But one of these fingers C rests upon the dial B at a given time, and remains there exactly one hour, the said dial being successively moved thereunder step by step each minute during the hour. It will thus be obvious by such movement of the dial while one of the fingers is pressed thereon that a contact is only permitted therethrough at such place or places where said dial is per-

forated. For convenience I have simply shown but one series of perforations, representing one perforation for each hour and each perforation located one minute later in
 5 each hour, as indicated on the dial. For instance, as indicated, the bell would be rung at 6 a. m., 7.1, 8.2, 9.3, &c., it being obvious that any change of time would be made by further perforations or by the substitution of
 10 an additional dial perforated in accordance with the change desired.

The fingers C are automatically raised and lowered from the dial in proper rotation through a special train of mechanism which
 15 will next be explained and which is operated by the clock-movement A before mentioned. The cam 5 on shaft 3 serves to operate a lever 16, hinged to frame 2 at 17, (see Fig. 2,) by reason of the pin 18 of said lever riding upon
 20 the periphery of said cam. To the free end of said lever 16 is attached a weighted link 19, the opposite end of which is connected to a bell-crank lever 20. Said bell-crank lever is provided with a small handle 22, which ex-
 25 tends through a slot of the frame-plate and permits of a hand movement of the lever and shaft to set the fingers. The bell-crank lever is provided with a pawl 23, which serves to engage and operate the ratchet-wheel 24, se-
 30 cured to shaft 21 aforesaid. Said pawl and ratchet-wheel is further provided with an adjustable stop 24^a, whereby the amount of its movement is determined. It will thus be apparent that with each rotation of the shaft
 35 3 and its cam 5 the lever 16 will be raised and lowered in a manner to operate the pawl and ratchet, which in turn move the shaft 21 one twenty-fourth of a rotation.

To the front side of the frame 1 I attach an
 40 arm 1^a, which extends inward and is provided with a series of guide-pins 1^b, each one of which enters an orifice 1^c in the respective fingers C in a manner to guide the latter in their operations, and thus insure their proper
 45 alinement with the circles and perforations upon the dial.

The shaft 21 is journaled in brackets 25, secured to the frame, and is provided with a series of cams 26, which are all similar in con-
 50 tour; but their positions vary slightly upon said shaft. As shown and adjusted, these cams will successively operate the fingers C with each movement of the ratchet-wheel and shaft during one half of the rotation of the
 55 latter (which consumes twelve hours) and turn idly during the other half or remaining twelve of the twenty-four hours of a day. It will further be apparent that if it is desirable to have a program of more than twelve hours
 60 one additional cam and finger would be necessary for each additional hour.

To the face of the frame-plate 1 is secured a pair of brackets 27, in which shaft 28 is se-
 65 cured and upon which are pivoted the twelve fingers C before mentioned. Said fingers consist of a vertical portion 29, bearing contact-points 30, and a rearwardly-extended arm 31,

which projects through an opening 32 in the frame and is provided with a weight 33, de-
 signed to hold the contact-points of said fin- 70
 75 gers up against the dial when the position of the cams will permit. Said fingers are also provided with arms 34, which ride upon the cams 26, and whereby their positions are determined. Said fingers are each further pro-
 80 vided in their face with a hole 1^c, which loosely receives a guide-pin 1^b, secured to a fixed arm 1^a of the main frame.

In the rear of the dial and immediately be-
 85 neath the ends of the fingers is secured a brass contact-plate D, (see Fig. 3,) which plate is insulated from the frame by bushings 39 and is provided with a binding-screw 40, to which the conducting-wire *b* is secured. The other
 90 conducting-wire may be attached to a convenient part of the frame by a binding-screw 41.

I further provide means for setting both the dial B and the fingers C of my program at
 95 any time, should occasion require. The latter operation is accomplished by simply manipulating the handle 22 in a manner to operate the pawl and ratchet, which in turn
 100 lowers and raises the fingers in their proper rotation, beginning from the left at finger designated by the word "On" and successively
 105 operating to the right. The dial is set by successively pressing down upon the handle 35, which projects through an orifice 36 of the
 110 frame 2. This handle is formed integral with a link 37, whose upper end is connected with the armature 10 of weighted lever 6. It will thus be apparent that each manipulation of
 115 said handle 35 will draw down the armature against the action of its weight and will operate the propelling-wheel 4, its shaft 3, and
 120 dial through the medium of lever 6 aforesaid.

The operation of my program is as follows: The clock-movement A is operated every min-
 125 ute by an electric current through a wire from any suitable master-clock. (Not shown.) This operation will cause the dial B to turn one-sixtieth with each operation, which means a
 130 distance equal to that between two of the radial lines shown upon the dial. The disk is continually rotated in this manner, each complete rotation consuming one hour. With
 135 each complete rotation of shaft 3 the pawl and ratchet 23 and 24 are operated in a manner to slightly turn the shaft 21 and its cams, each of which will in their regular order lower
 140 and raise the fingers. Each of said fingers remains upon the moving dial for exactly one hour, and the number and instant of rings of the signal are determined by the number
 145 and location of the perforations in the dial. In accordance with the number of perforations indicated the bell will ring but once during each hour, and will ring one minute
 150 later during each hour of the day.

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

1. In a program-clock of the class described,

the combination with a rotatable perforated dial, of a contact-plate behind said dial, a series of fingers pivoted below said dial, and bearing weights 33 and arm 34, a series of cams to engage and operate said arms, means for intermittently rotating said cams in a manner to successively lower and raise the fingers.

2. In a program-clock of the class described, the combination with a rotatable perforated dial, of a contact-plate behind said dial, a series of fingers pivoted adjacent to said dial and having their free ends adapted to operate thereon, weights to normally hold said fingers in contact with the dial, arms attached to the fingers, a series of cams upon which the free ends of said arms ride, means for intermittently rotating said cams in a manner to operate the fingers.

3. In a program-clock of the class described the combination with a frame and a rotary perforated dial, of a contact-plate behind said dial, a series of fingers pivoted adjacent to said dial and having their free ends adapted to operate thereon, an arm secured to the frame and bearing guide-pins for the fingers aforesaid, weights for normally holding the fingers against the dial, a series of independent cams adapted to operate said fingers against the action of their weights, connections for intermittently rotating said cams in a manner to operate the fingers.

4. A program-clock mechanism comprising, a rotatable perforated dial, a series of fingers pivoted adjacent to said dial and bearing weights to hold them into engagement therewith with a series of cams adjacent to said fingers and adapted to control the position of the latter, connections for operating said cams com-

prising a pawl and ratchet, a link connected therewith, lever 16 attached to said link, a cam 5 for operating said lever, and means for operating said cam.

5. A program-clock mechanism comprising, a rotatable perforated dial, a series of fingers pivoted adjacent to said dial and bearing weights to hold them into engagement therewith, a series of cams mounted upon a shaft adjacent to said fingers and adapted to control the position of the latter, a pawl and ratchet mounted on said shaft, an arm on said pawl to permit of the independent operation of said ratchet and cam-shaft, connections with said pawl and ratchet whereby the latter is operated by an electric time-movement substantially as shown and described.

6. A program-clock mechanism comprising an electric time-movement A, cam 5 upon the minute-shaft thereof, a lever 16 operated by said cam, connections with said lever for operating a cam-shaft, a series of cams upon said shaft, a series of fingers bearing arms to engage said cams and provided with weights to insure said engagement, a dial provided with suitable perforations and upon which the free ends of said fingers are designed to operate, a contact-plate behind said dial and in line with the free ends of the fingers aforesaid.

Signed at Waterbury, in the county of New Haven and State of Connecticut, this 2d day of March, A. D. 1897.

JAMES O. LYMAN.

Witnesses:

C. M. NEWMAN,
J. J. ESTABROOK.