

No. 844,345.

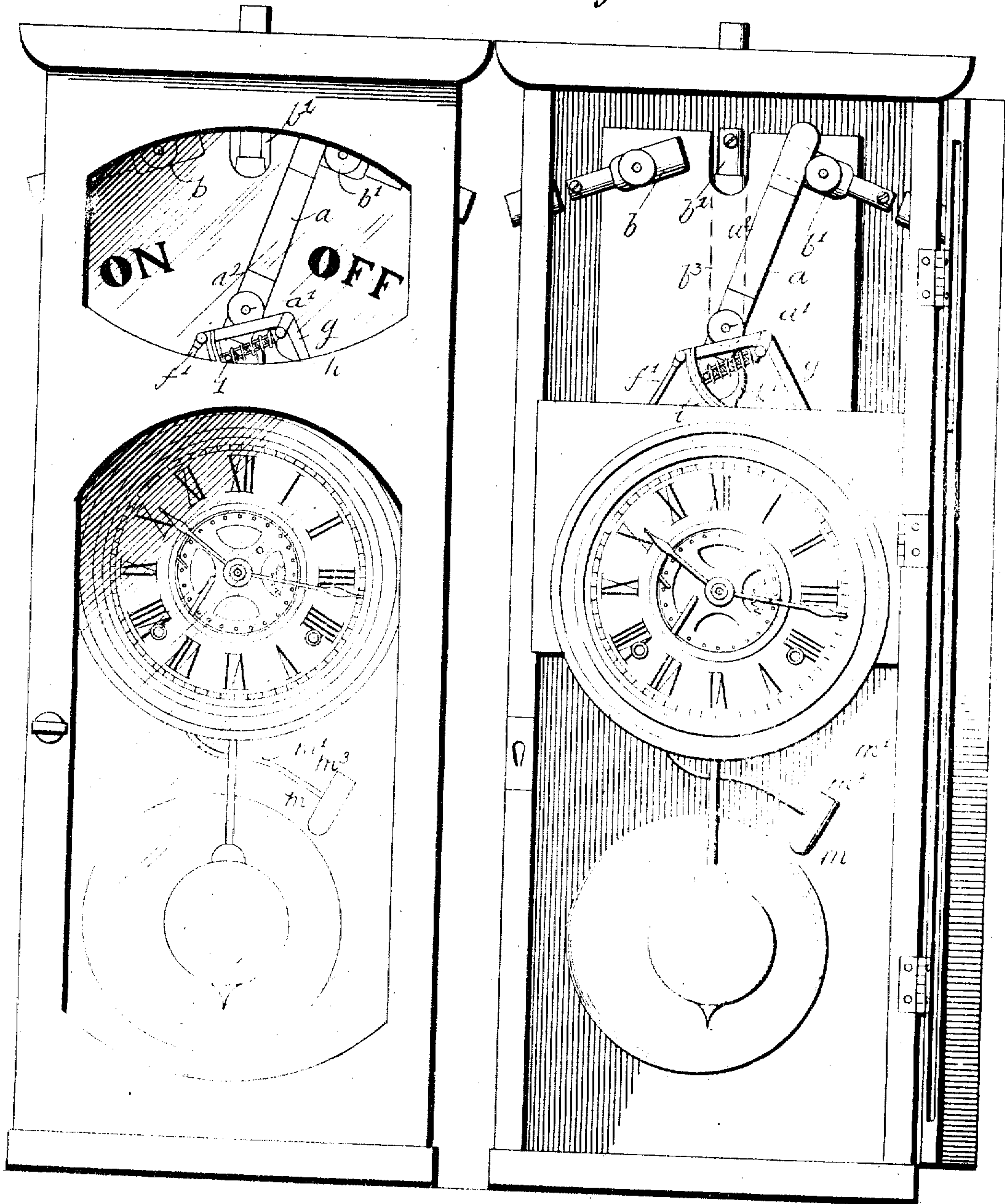
PATENTED FEB. 19, 1907.

M. I. FLOWERS.
ELECTRIC TIME SWITCH.
APPLICATION FILED NOV. 22, 1905.

Fig. 1.

Fig. 2.

6 SHEETS—SHEET 1.



WITNESSES:

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N. Curtis Lammond

INVENTOR

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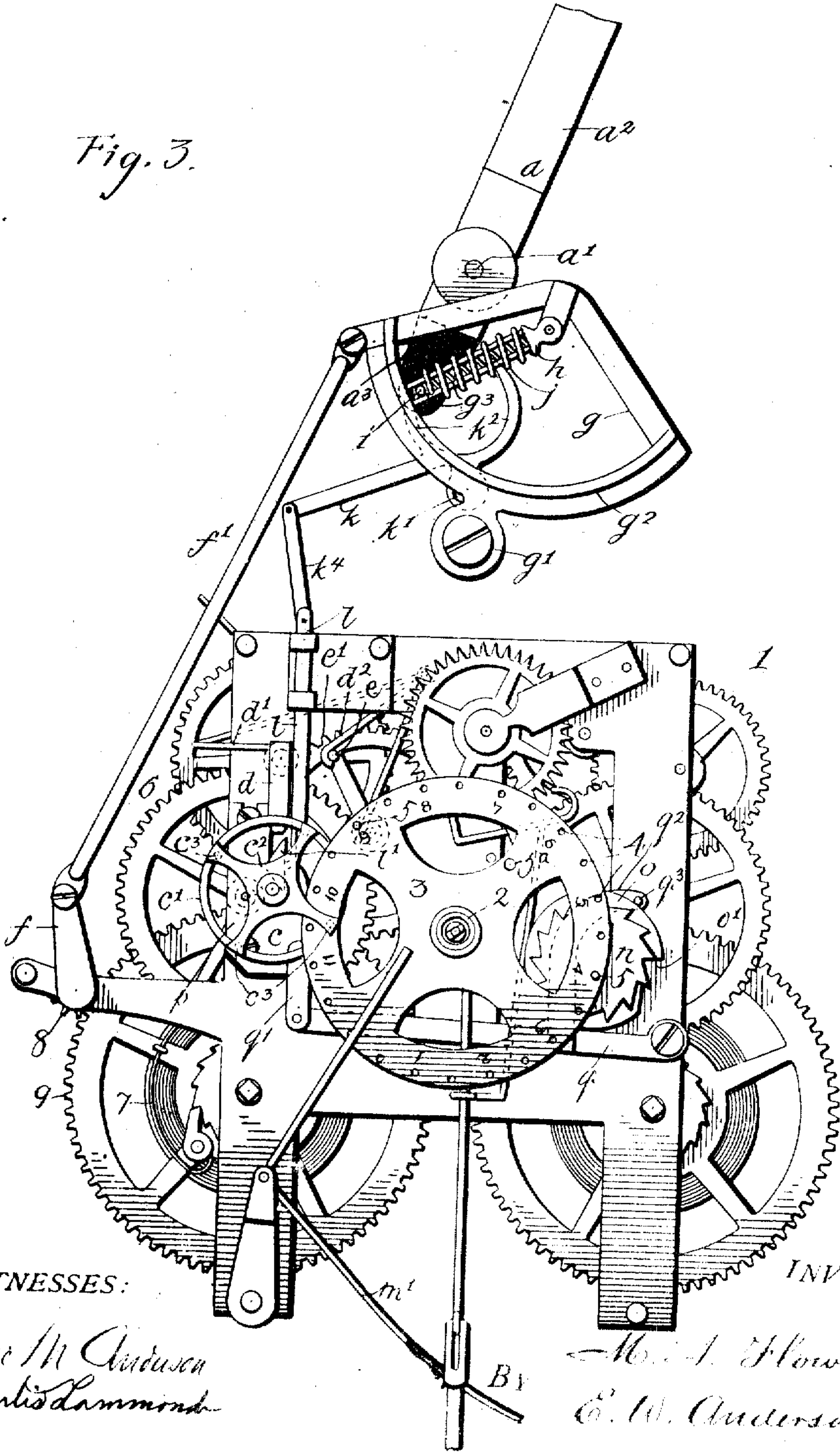
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6 SHEETS—SHEET 2.

Fig. 3.



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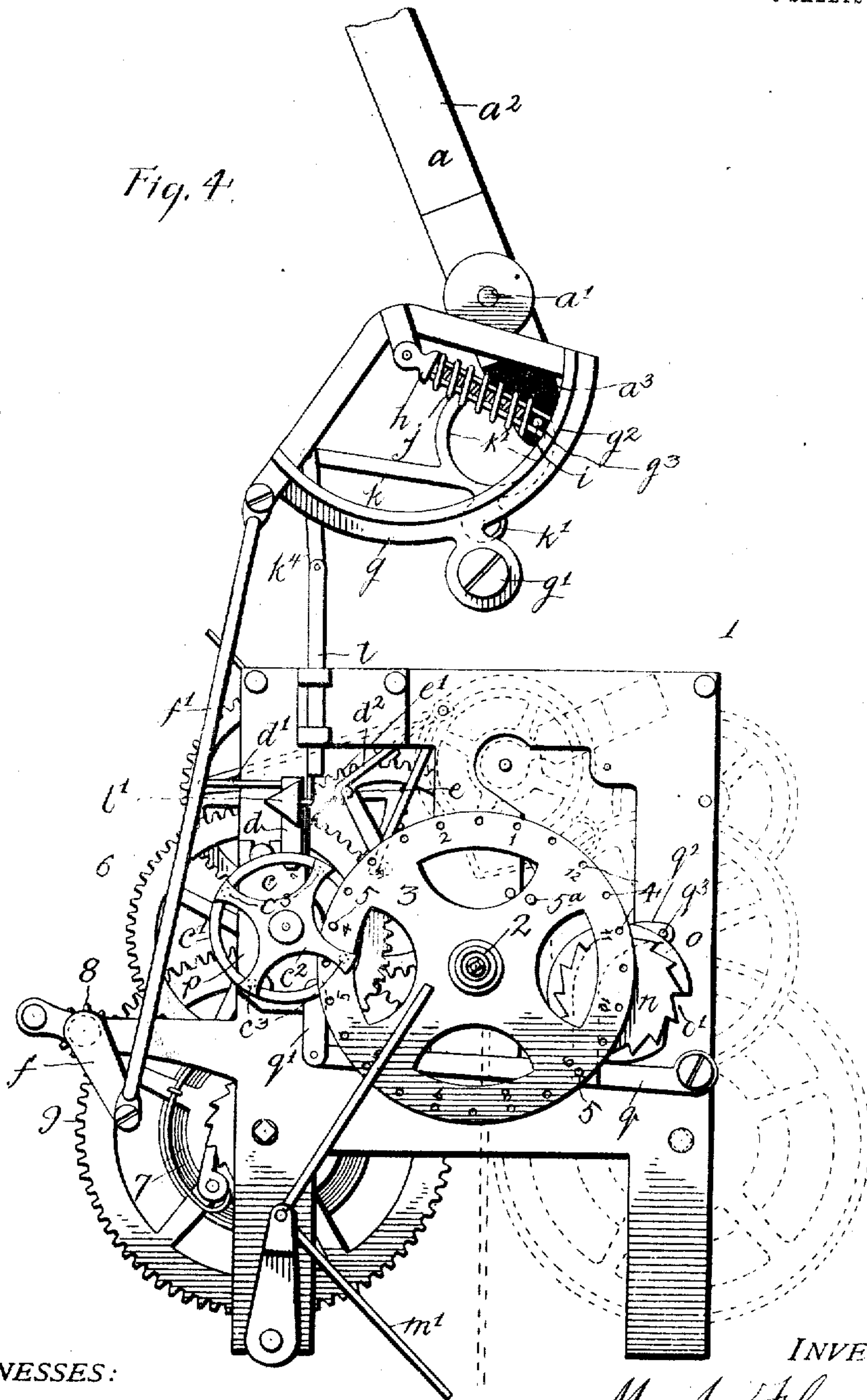
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6 SHEETS—SHEET 2

Fig. 4.



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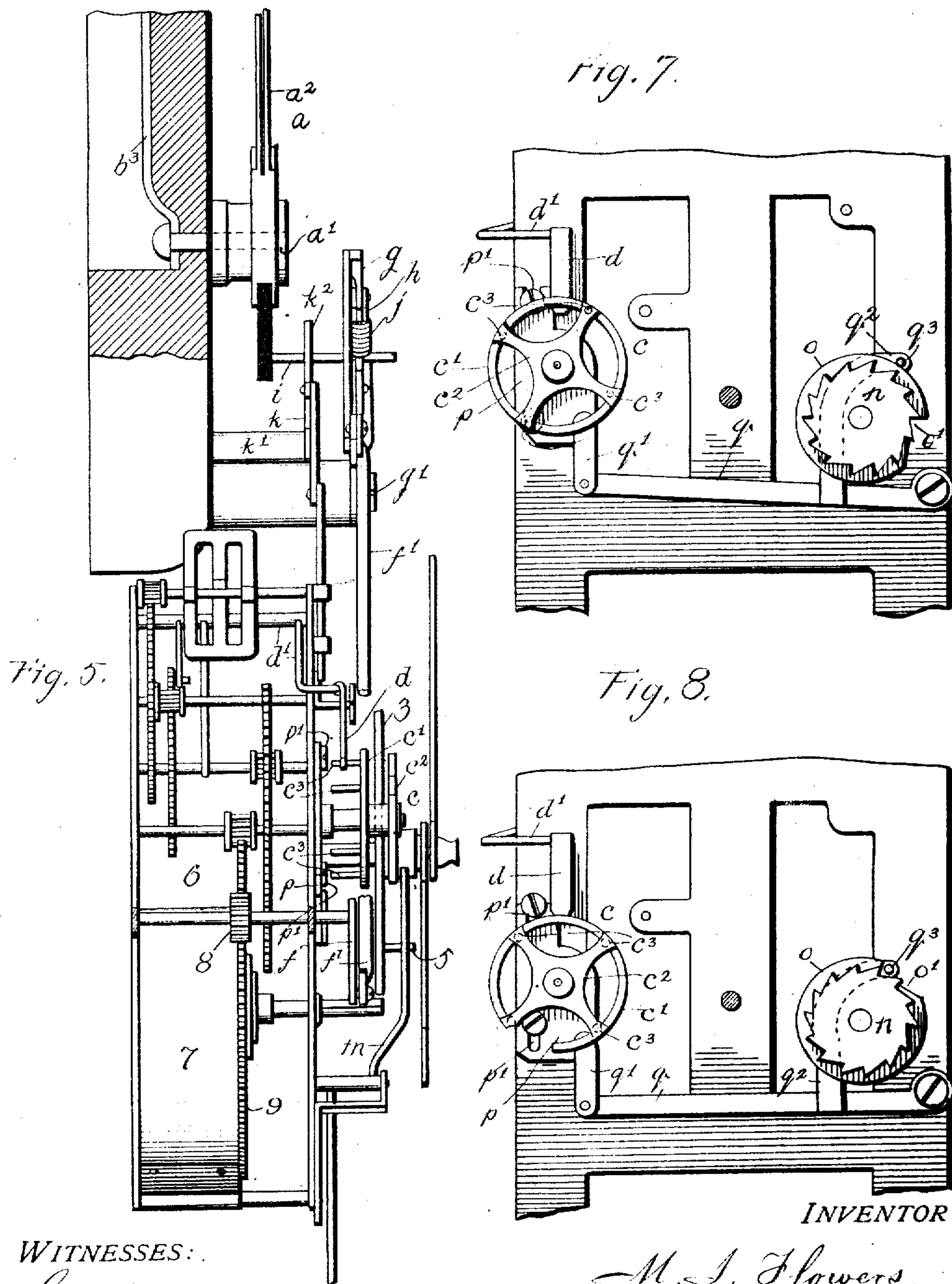
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6 SHEETS—SHEET 4.



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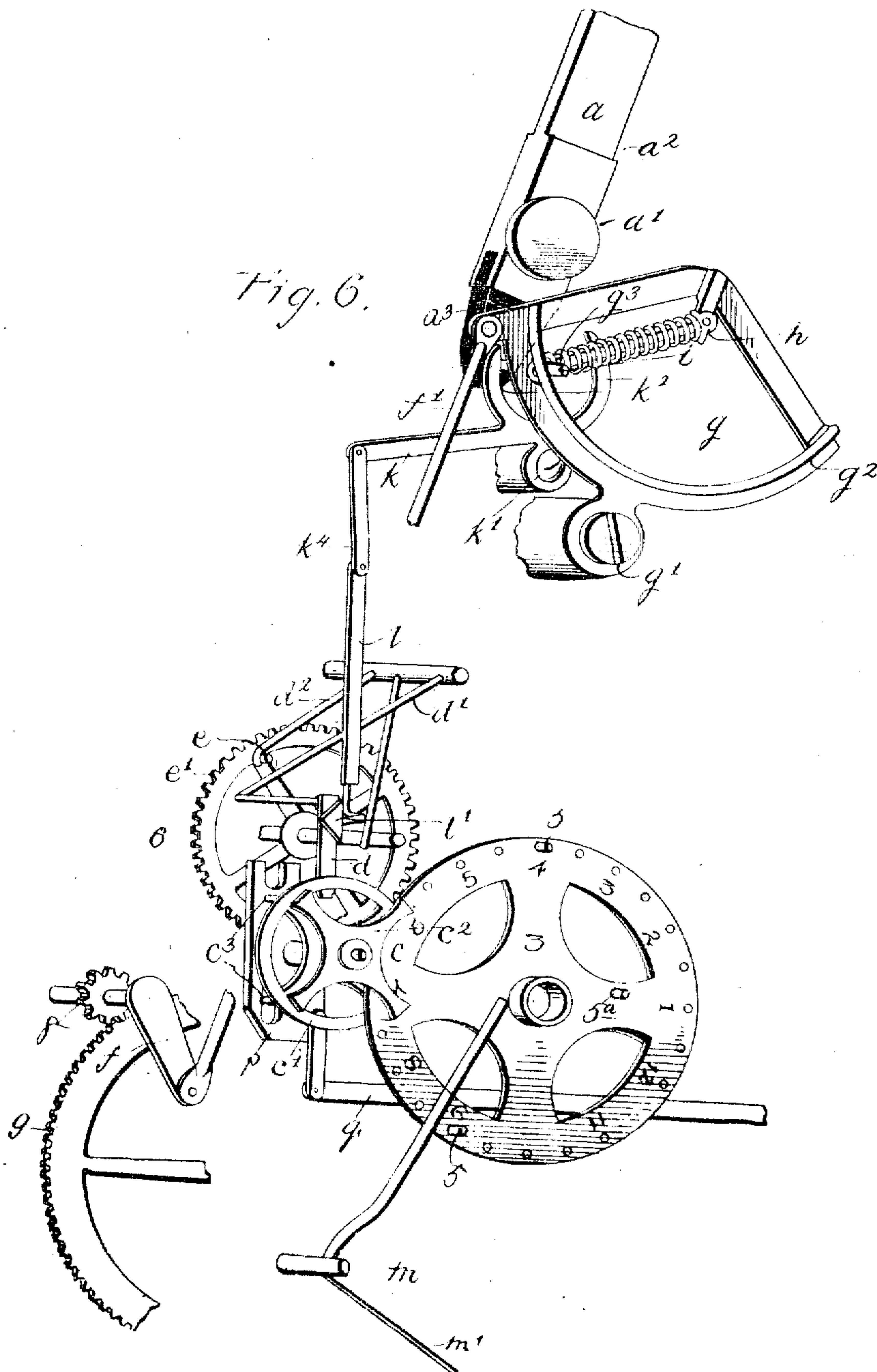
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6 SHEETS—SHEET 5



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6 SHEETS—SHEET 6.

Fig. 9.

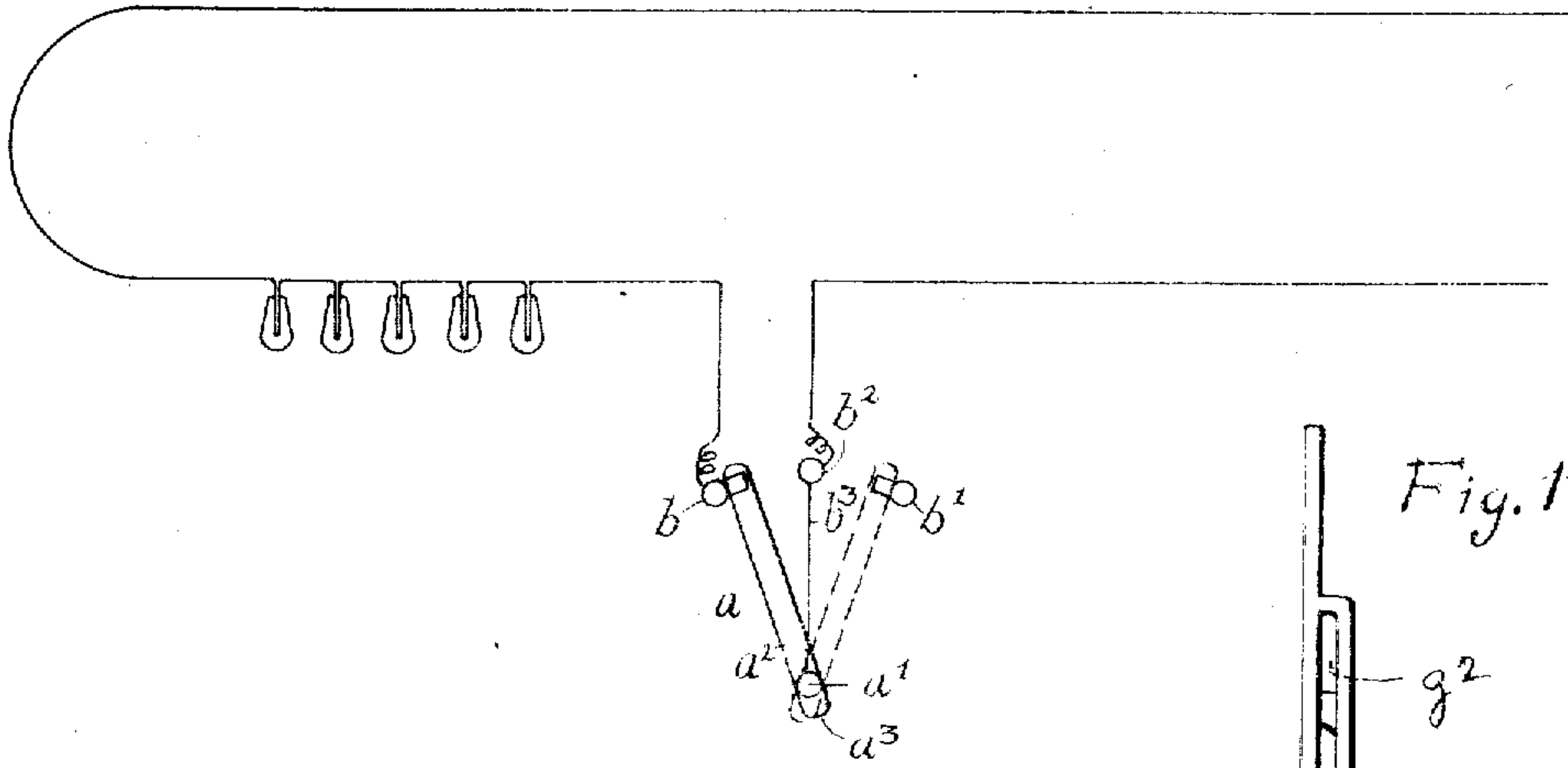
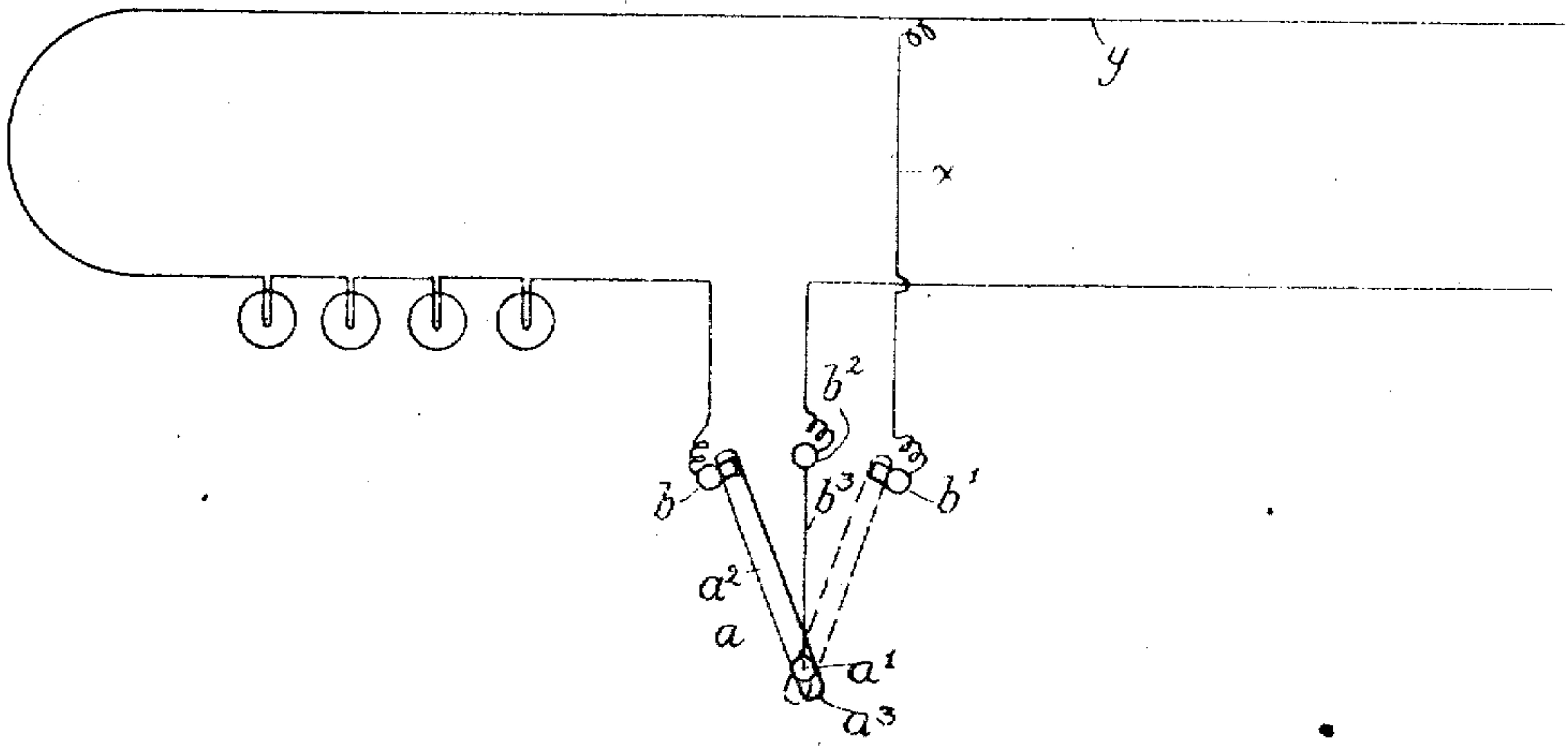


Fig. 10



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UNITED STATES PATENT OFFICE.

MALON I. FLOWERS, OF LINCOLN, ARKANSAS.

ELECTRIC TIME-SWITCH.

No. 844,345.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed November 22, 1905. Serial No. 288,604.

To all whom it may concern:

Be it known that I, MALON I. FLOWERS, a citizen of the United States, resident of Lincoln, in the county of Washington and State of Arkansas, have made a certain new and useful Invention in Electric Time-Switch; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the invention, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a front view of a timepiece having my invention applied thereto. Fig. 2 is a similar view with the door of the timepiece open. Fig. 3 is a front view of the clock mechanism having my invention applied thereto, with parts broken away. Fig. 4 is a similar view with the switch thrown to the opposite binding-post. Fig. 5 is a side view of the clock mechanism having my invention applied thereto. Fig. 6 is a perspective view of my invention as applied. Fig. 7 is a front view of the devices for lowering the trip-wheel to keep the lighting-circuit broken over Sunday. Fig. 8 is a similar view with the trip-wheel lowered. Fig. 9 is a diagrammatic view showing the wiring connections for incandescent lamps. Fig. 10 is a similar view showing the wiring connections for arc-lamps. Fig. 11 is a detail side view of the quadrant.

The invention has relation to time-switches for electric-lighting systems, having for its object the accurate regulation and estimation in a simple and efficient manner of the hours during which the lamps are kept burning for the protection of both the consumer and the lighting company.

With this object in view the invention consists in the novel construction and combinations of parts, as hereinafter set forth.

In the accompanying drawings, illustrating the invention, the numeral 1 represents an eight-day clock of the usual character, the hour-shaft 2 of which carries fast thereon the time-wheel 3, having perforations 4 for the insertion of pins 5, whereby the switch-operating mechanism is set in motion.

6 represents the striking mechanism of the clock, the spring 7 of which furnishes the power for working the switch-lever.

a designates the switch-lever, pivoted in-

mediately near its lower end at *a'*, said lever having a long upper arm *a²* of long stroke for engagement with the opposite binding-posts *b* and *b'* to make or break the lighting-circuit and a short lower arm *a³*, to which the switch-operating mechanism has connection.

c is the trip-wheel, composed of a rear circular portion *c'* and a forward cruciform portion *c²*, said circular portion having rearward-projecting pins *c³* opposite the arms of the cruciform portion, said pins being adapted for engagement with the vertical end portion *d* of the trip-lever *d'* to lift said trip-lever, and thereby disengage the stop-arm *d²* thereof from one of the pins *e* of the wheel *e'*, controlling the action of the striking-spring of the clock. In this manner the striking-spring is set in action, and while the trip-lever is held raised, as aforesaid, the pinion 8, having engagement with the large drive-wheel 9 upon the spring-shaft, will be turned to operate the crank *f* of the pinion-shaft. This crank *f* by means of connecting-rod *f'* has connection with the quadrant *g* at one lower corner thereof, said quadrant being pivoted at its lower end at *g'* at the center of its arc. A spring-holding arm *h* is pivoted at the center of the meeting radii of the quadrant and extends to the arc through a slot *g²* thereof, this spring-holding arm having a slot engagement *g³* with a pin *i*, extending from the outer end of the short arm of the switch-lever laterally, through the medium of a block of insulating material. A tension coil-spring *j* works upon the arm *h* between the pivot of such arm and the pin *i*, whereby when the quadrant is turned by the crank *f* to such an extent that the arm *h* passes the center of the quadrant (such arm *h* being held staticary by its engagement with the pin *i* of the switch-lever) the coil-spring *j*, which is put under tension by the pin *i* riding up in the slot *g³*, will throw the switch-lever to the opposite binding-post *b* or *c*, as the case may be.

k designates a lever for releasing the trip-lever *d'* from its engagement with one of the pins *c³*, said lever *k* being pivoted at one end at *k'*, above which pivot it has a bifurcated portion *k²*, the arms of which embrace the pin *i*. The lever *k* at its other end has connection by rod *k⁴* with a vertically-reciprocating rod *l*, having a double cam end portion *l'* for engagement with one of the pins *c³* of the trip-wheel. When the switch-lever is

thrown, the distance between the forked arms k^2 being less than the stroke of the pin i of the short arm of said lever, the lever k will be moved downward or upward to actuate the cam end l' in a similar direction, and thus rotate the trip-wheel c , so that a pin e^2 thereof will no longer be under the vertical end portion d of the trip-lever. The trip-lever will thus fall by gravity, its stop-arm d^2 engaging a pin of the wheel e' to stop the action of the power-spring.

m is an alarm device, consisting of a bell-crank lever m' , having one arm thereof projecting in the path of the time-controlling pin 5, whereby such lever is raised, and escaping from said pin is released at a given or set time, usually fifteen minutes, before the circuit is broken to put out the lights, in this manner through the hammer end m^2 acting upon the strike-gong giving notice that the lights will shortly be extinguished.

In order to provide for shutting off the lights on Saturday night over Sunday when desired, I provide the following devices:

n is a toothed wheel having fourteen teeth and actuated by an inner pin 5^a of the time-wheel 3, whereby it is turned one tooth for each rotation of the time-wheel or two teeth every twenty-four hours. It thus turns once around every seven days. A cam-wheel o is fixed upon the shaft of the wheel n , this wheel o having a notch o' in the rim thereof, said notch having a length equal to two teeth of the wheel n .

The trip-wheel c is mounted upon a bracket p , having a slot-and-screw connection p' with the main frame of the clock mechanism. Thus when the lights are not desired on Sunday the screws of this connection are loosened, leaving the wheel c free to move up or down to an extent sufficient to bring the pins e^2 thereof into and out of engagement with the vertical end portion d of the trip-lever in the rotation of the trip-wheel.

q is a horizontal lever pivoted at one end thereof below the toothed wheel n and having at its other end a connection q' with the bracket p , upon which the trip-wheel is mounted. This lever q has an upward-extending intermediate curved arm q^2 , carrying at its upper end an outward or laterally-projecting pin q^3 , which normally rests upon the rim of the cam-wheel o and holds the lever q , bracket p , and trip-wheel c in raised position for engagement of the pins of the trip-wheel with the trip-lever. When, however, Saturday night arrives, the pin 5^a, set at the proper time in the time-wheel, will have turned the cam-wheel o so that its notch o' will come into register with the pin q^3 , which will fall through gravity into such notch, the trip-wheel also falling, so as to be out of position for engagement of the pins thereof with the trip-lever.

Inasmuch as the trip-wheel will not be

raised into operative position until the cam-wheel o has turned sufficiently to raise the pin q^3 out of the notch upon the rim of the wheel o , the lighting-circuit will remain broken for twenty-four hours, in the present case depending, however, upon the length of the notch with relation to the teeth of the wheel n . Thus it will be apparent that if one pin 5 is placed in the time-wheel at the point thereof corresponding to the time desired for the circuit to be broken—say nine o'clock—the lights will be extinguished each night at that hour, and the same pin will close the circuit again at nine o'clock every morning, ready for the lamps to be lighted at the desired time between nine a. m. and nine p. m. upon the starting of the dynamos.

If light is desired after four a. m., a second pin is inserted in the time-wheel at the proper point, as before stated, and thus the circuit will be closed at this time and broken at nine a. m. and closed again at nine p. m., each pin closing or breaking the circuit every twelve hours. So, it will be seen, the lighting hours may be regulated as desired by inserting pins at the proper places in the time-wheel, and no change need be made in the location of the pins until a change in the lighting hours is desired. If the lights are also desired during the day, a pin may be set in the time-wheel to close the circuit at, say, five o'clock a. m. and another pin set at, say, three o'clock or any other time during the day when the circuit is to be broken and the lights extinguished.

The wiring connections will now be described.

Three binding-posts are shown, b and b' opposite each other and between them a third binding-post b^2 , having connection at b^2 with the pivot of the switch-lever.

In wiring for incandescent lamps or any other circuit to be left open one side wire of the circuit is cut and the terminals connected with binding-post b or b' and the intermediate post b^2 .

In wiring for arc-lamps the connections are somewhat different. In this case one side wire of the circuit is cut and the terminal next to the lamps connected with binding-post b and the other terminal of the circuit connected with binding-post b^2 . A short-circuiting wire x is also connected with the opposite binding-post b' and leads to the outer wire y of the circuit, as shown in Fig. 10 of the drawings. In this manner, while the switch-lever a is in contact with binding-post b , the circuit through the lamps will be closed, and when the lever is in contact with binding-post b' the main circuit will be broken and the current short-circuited, the lamps being thus extinguished, but the current still acting in the short circuit, so that other lamps on the same circuit may be kept lighted.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In an electric time-switch, the combination with the mechanism of a clock having strike mechanism, of a switch-lever, means including a coil-spring having operation in the direction of its axis, and having operative connection with the strike mechanism of the clock, for shifting said lever, means for releasing the clock strike mechanism to shift said lever at predetermined times, and means for stopping the action of the clock strike mechanism, substantially as specified.

2. In an electric time-switch, the combination with clock mechanism having strike mechanism, of a switch-lever, mechanical means including a coil-spring having operation in the direction of its axis, and having operative connection with the strike mechanism of the clock, for shifting said lever, means having operative connection with the clock mechanism for releasing the strike mechanism to shift said lever at predetermined times, and means for automatically stopping the action of the clock strike mechanism, substantially as specified.

3. In an electric time-switch, the combination with clock mechanism having strike mechanism, of a switch-lever, mechanical means including a coil-spring having operation in the direction of its axis, and having operative connection with the strike mechanism of the clock, for shifting said lever, a time-wheel upon the hour-hand shaft, means having operative connection with said time-wheel for releasing the strike mechanism to shift said lever at predetermined times, and means for stopping the action of the strike mechanism, substantially as specified.

4. In an electric time-switch, the combination with the mechanism of a clock having strike mechanism, of a switch-lever, means including a coil-spring having operation in the direction of its length and having operative connection with the strike mechanism of the clock, for shifting said lever, a time-wheel upon the hour-hand shaft having a series of perforations, a pin for adjustment in said perforations, means having operative connection with said pin for releasing the strike mechanism to shift said lever at predetermined times, and means for stopping the action of the strike mechanism, substantially as specified.

5. In an electric time-switch, the combination with clock mechanism having strike mechanism, of a switch-lever, means including a coil-spring having operation in the direction of its length and having operative connection with the strike mechanism of the clock, for shifting said lever, a time-wheel upon the hour-hand shaft having a series of perforations, a pin for adjustment in said perforations, a trip-lever for releasing and stopping the strike mechanism of the clock,

means operated by the pin of the time-wheel at predetermined times for actuating said trip-lever to release the strike mechanism, and means operated by said switch-lever to release the trip-lever and stop the strike mechanism, substantially as specified.

6. In an electric time-switch, the combination with clock mechanism having strike mechanism, of a switch-lever, a time-wheel upon the hour-hand shaft having a series of perforations, a pin for adjustment in said perforations, a trip-lever for starting and stopping the clock strike mechanism, a trip-wheel operated by the pin of the time-wheel at predetermined times to raise said trip-lever and release the strike mechanism, a pivoted quadrant having operative connection with said strike mechanism, a spring device carried by said quadrant for shifting the switch-lever, and means operated by said switch-lever for releasing said trip-lever to stop the strike mechanism, substantially as specified.

7. In an electric time-switch, the combination with clock mechanism having strike mechanism, of a switch-lever, a time-wheel upon the hour-hand shaft having a series of perforations, a pin for adjustment in said perforations, a trip-lever for controlling the clock strike mechanism, a trip-wheel operated by the pin of the time-wheel at predetermined times to raise said trip-lever and release the strike mechanism, a pivoted quadrant having operative connection with said strike mechanism, a spring-holding arm pivoted at the meeting radii of the quadrant and engaging a slot in the arc of the quadrant, an arm of said switch-lever having a lateral projection engaging a slot of said spring-holding arm, a coil-spring upon the spring-holding arm between the pivot thereof and the lateral projection of the switch-lever, and means operated by said switch-lever engaging the trip-wheel to release the trip-lever and stop the clock strike mechanism, substantially as specified.

8. In an electric time-switch, the combination with clock mechanism having strike mechanism, of a switch-lever, a time-wheel upon the hour-hand shaft having a series of perforations, a pin for adjustment in said perforations, a trip-lever controlling the clock strike mechanism, a trip-wheel operated by the pin of the time-wheel at predetermined times to raise said trip-lever and release the strike mechanism, a pivoted quadrant having operative connection with said strike mechanism, a spring-holding arm pivoted at the meeting radii of the quadrant and engaging a slot in the arc of the quadrant, an arm of said switch-lever having a lateral projection engaging a slot of the spring-holding arm, a coil-spring upon the spring-holding arm between the pivot thereof and the lateral projection of the switch-lever, a forked lever

embracing the lateral projection of the switch-lever and operated thereby, and a rod having a double cam portion engaging the trip-wheel to release the trip-lever and stop the clock strike mechanism, and having connection with said forked lever, substantially as specified.

9. In an electric time-switch, the combination with clock mechanism having strike mechanism, of a switch-lever, a time-wheel upon the hour-hand shaft having a series of perforations, a pin for adjustment in said perforations, means having operative connection with the strike mechanism of the clock and set in action by the pin of the time-wheel for shifting said lever at predetermined times, means for stopping the action of the strike mechanism, and an alarm device having an arm extending in the path of the pin of the time-wheel to give notice at a predetermined time before the shifting of the switch-lever, substantially as specified.

10. In an electric time-switch, the combination with clock strike mechanism, of a switch-lever, a time-wheel upon the hour-hand shaft having a series of perforations, a pin for adjustment in said perforations, means having operative connection with the strike mechanism of the clock and set in action by the pin of the time-wheel for shifting said lever at predetermined times, means for stopping the action of the strike mechanism, a second pin engaging an inner perforation of the time-wheel, and means operated by said second pin for stopping the action of the switch-lever-shifting mechanism for a predetermined time, substantially as specified.

11. In an electric time-switch, the combination with clock strike mechanism, of a switch-lever, a time-wheel upon the hour-hand shaft having a series of perforations, a pin for adjustment in said perforations, means having operative connection with the clock strike mechanism and set in action by

the pin of the time-wheel for shifting said switch-lever every twelve hours at predetermined times, means for stopping the action of the strike mechanism, a second pin engaging an inner perforation of the time-wheel, and means operated by said second pin for stopping the action of the switch-lever-shifting mechanism for a given time every week longer than twelve hours, substantially as specified.

12. In an electric time-switch, the combination with clock mechanism having strike mechanism, of a switch-lever, a time-wheel upon the hour-hand shaft having a series of perforations, a pin for adjustment in said perforations, a trip-lever for controlling the clock-strike mechanism, a trip-wheel operated by the pin of the time-wheel at predetermined times to raise said trip-lever and release the strike mechanism, a pivoted quadrant having operative connection with said strike mechanism, a spring device carried by said quadrant for shifting the switch-lever, means operated by said switch-lever for releasing the trip-lever to stop the strike mechanism, a second pin engaging an inner perforation of the time-wheel, a toothed wheel operated by said second pin, a notched cam-wheel upon the shaft of said toothed wheel, a lever having a lateral projection resting upon the rim of said cam-wheel and adapted to fall into the notch thereof, said lever having connection with the trip-wheel to raise and lower the same into and out of engagement with the trip-lever for stopping the action of the switch-lever-shifting mechanism for a predetermined time, substantially as specified.

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

MALON I. FLOWERS.

Witnesses:

N. CURTIS LAMMOND,

GEORGE M. ANDERSON.