

No. 859,824.

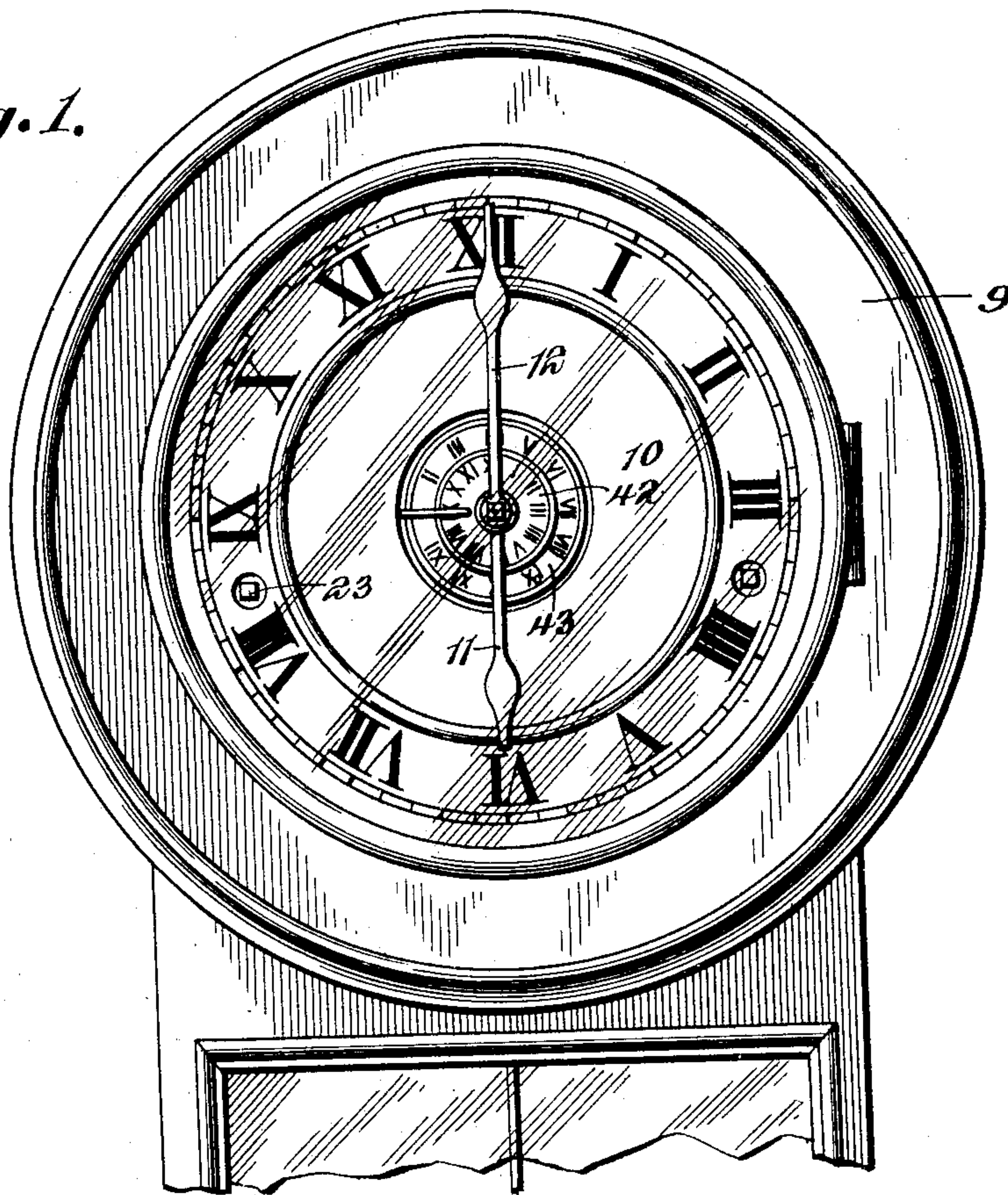
PATENTED JULY 9, 1907.

G. H. LINK.  
SWITCH OPERATING MECHANISM.

APPLICATION FILED NOV. 12, 1904.

2 SHEETS—SHEET 1.

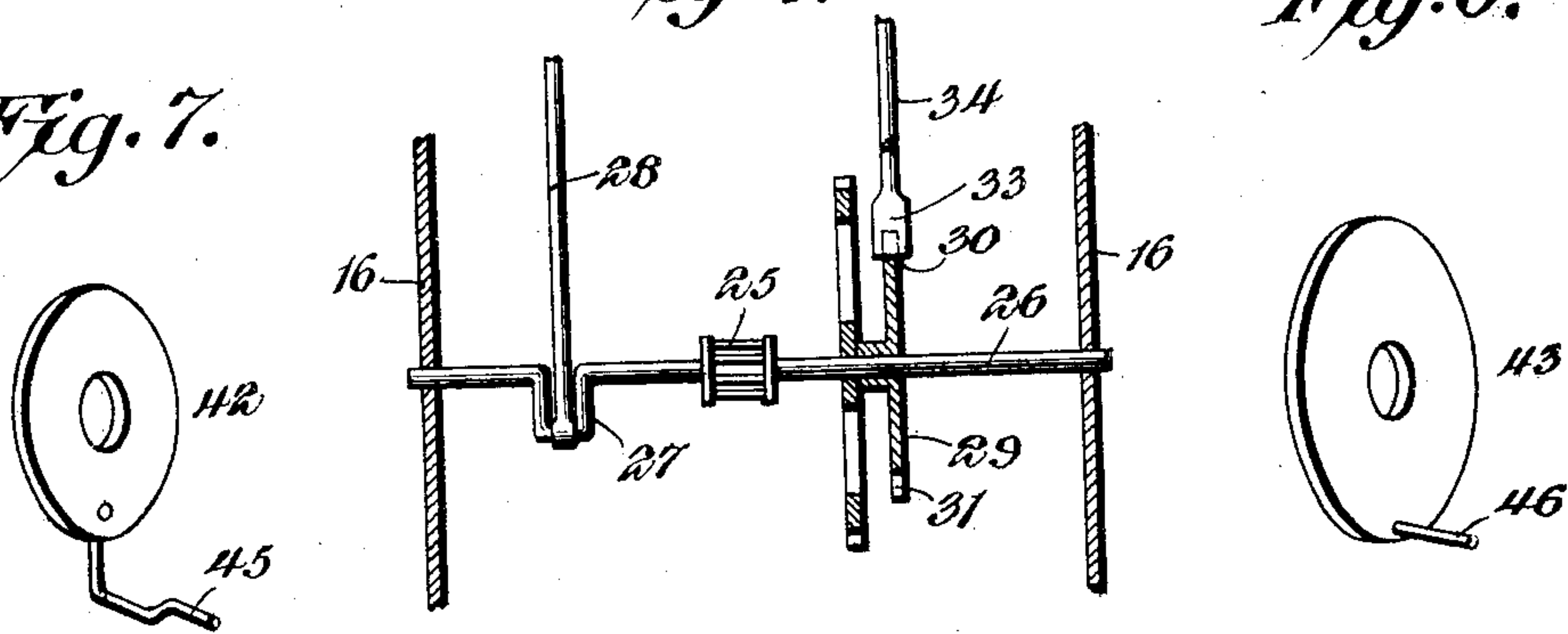
*Fig. 1.*



*Fig. 6.*

*Fig. 8.*

*Fig. 7.*



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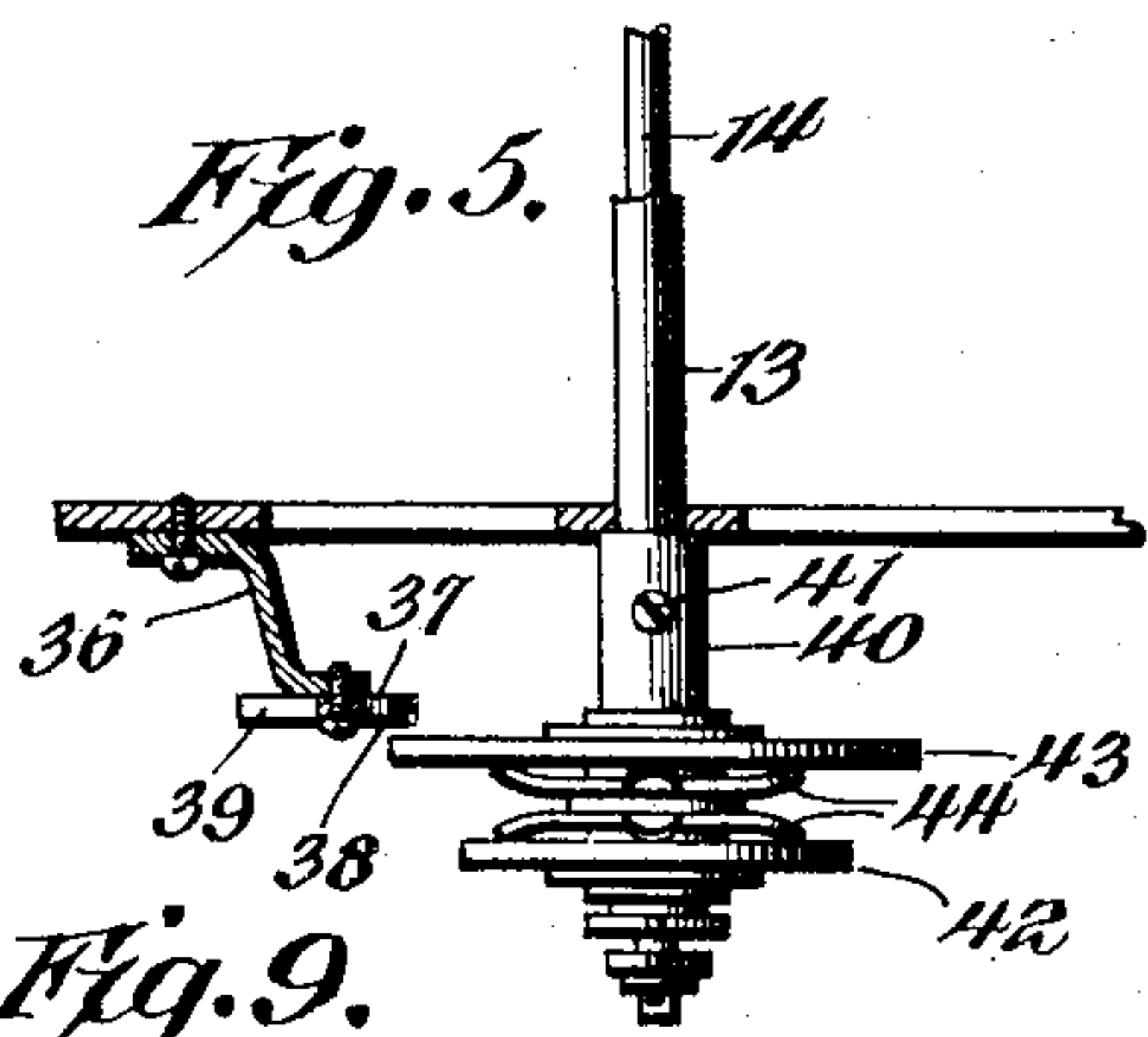
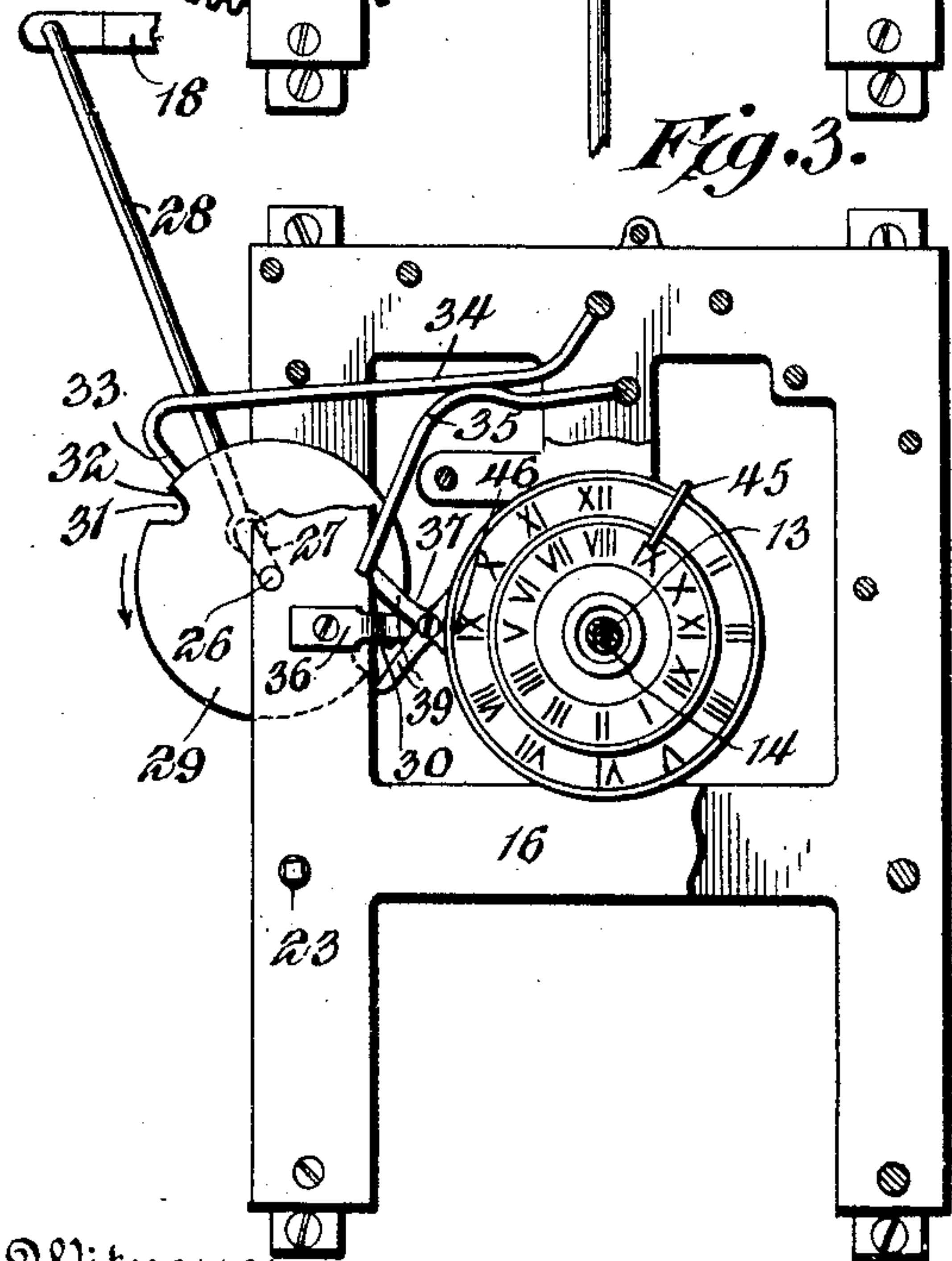
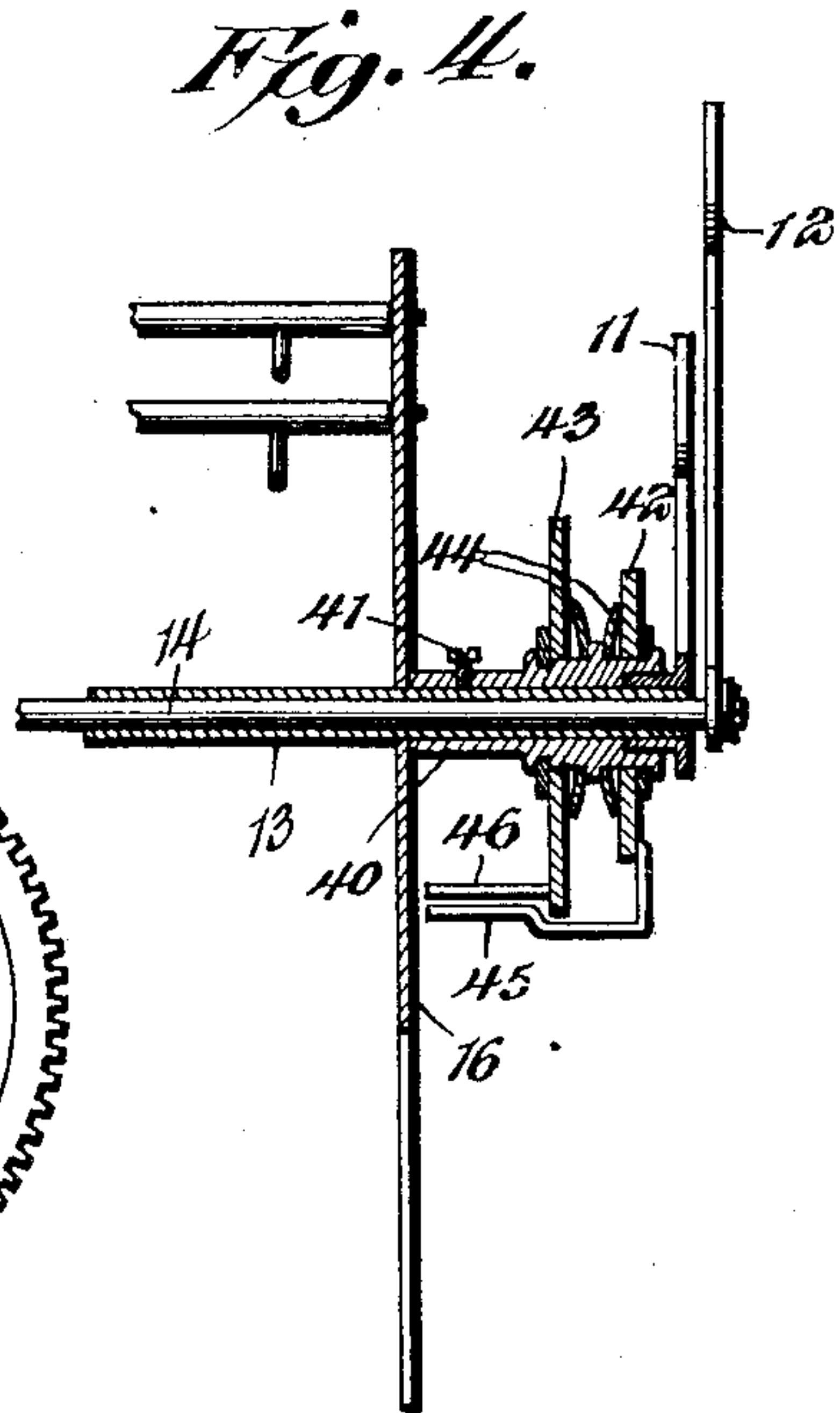
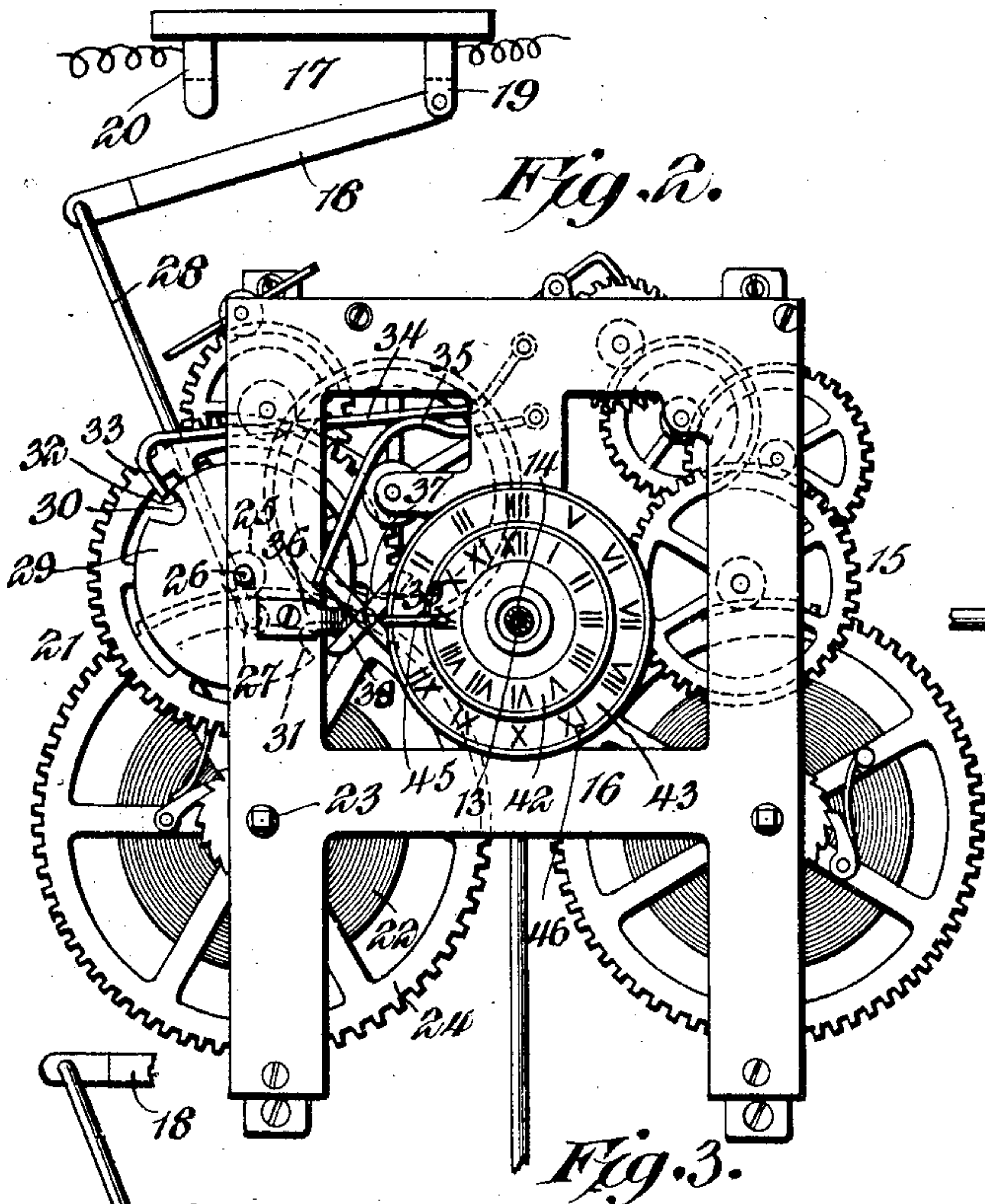
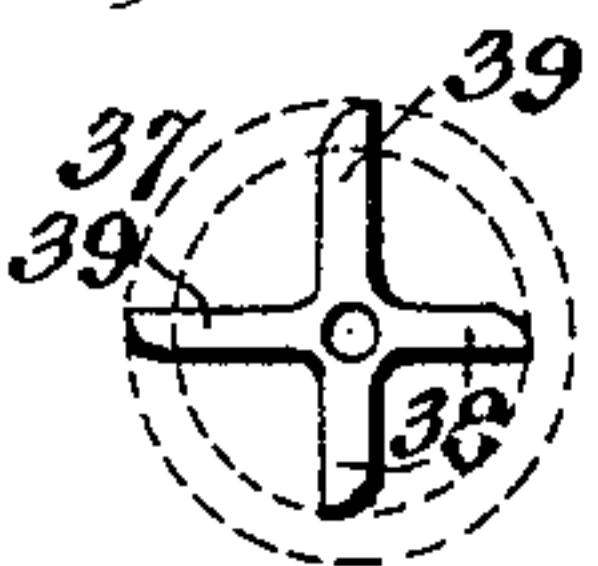


Fig. 9.



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# UNITED STATES PATENT OFFICE.

GEORGE H. LINK, OF CINCINNATI, OHIO.

## SWITCH-OPERATING MECHANISM.

No. 859,824.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed November 12, 1904. Serial No. 232,448.

*To all whom it may concern:*

Be it known that I, GEORGE H. LINK, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Switch-Operating Mechanism, of which the following is a specification.

This invention relates more especially to means for effecting the automatic operation of an electric switch at predetermined intervals and is thus particularly useful in lighting and extinguishing electric lamps employed in the illumination of show windows, for sounding alarms, and numerous other analogous purposes.

One of the objects is to provide novel mechanism of a simple nature which is controlled by the time movement of an ordinary clock for effecting the periodic opening and closing of the switch, said mechanism being adjustable so that the period may be readily varied as desired, both as to time of commencement and as to its length.

Another object is to provide mechanism which can be employed in connection with an ordinary time piece and will effect the closing and opening operations of the switch but once in twenty-four hours, or, in other words, once to every second rotation of the hour hand of such time piece.

The preferred embodiment of the invention is illustrated in the accompanying drawings and is described in the following specification.

An inspection of the claims hereto appended will clearly indicate that the invention is not limited to the structure set forth, but is open to various changes and modifications.

In the drawings: Figure 1 is a view in elevation of a clock having the improved controlling mechanism. Fig. 2 is a view in elevation of the said controlling mechanism and the time movement when removed from the case. Fig. 3 is a view partly in elevation and partly in section of the said controlling mechanism. Fig. 4 is a vertical cross sectional view. Fig. 5 is a detail horizontal sectional view. Fig. 6 is a sectional view showing the switch-actuating shaft. Fig. 7 is a detail perspective view of one of the controlling disks. Fig. 8 is a similar view of the other disk. Fig. 9 is a detail view in elevation of the star wheel and indicating the different lengths of the fingers thereof.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment illustrated, the clock may be of any desired or well known construction, including a case 9 and a dial 10, the usual hour and minute hands 11 and 12 operating over the latter and being carried respectively by shafts 13 and 14, extending through the dial. These shafts are operated in the usual manner by a time movement, designated generally by the reference numeral 15, and of which a detailed descrip-

tion is thought to be unnecessary, the same being well known to those skilled in the art. This time movement is preferably mounted in one side of a frame 16, that is suitably secured within the clock case. A switch 17 is also preferably located within the case and is constructed in the ordinary manner, comprising a swinging blade 18, pivoted at one end to a post 19 and arranged to be swung into and out of engagement with another post 20. To these posts are connected in any suitable manner the terminals of an electric circuit to be closed by the switch. On the opposite side of the frame to that carrying the time movement 15 is located a spring motor, designated generally by the reference numeral 21, and somewhat similar to that ordinarily employed in a clock for striking the hours and divisions thereof. In the present structure the motor includes a spring 22, operating on a shaft 23 that carries a gear wheel 24. This gear wheel meshes with the pinion 25 of another shaft 26, journaled in the frame and having a crank 27. The crank has a pitman or link connection 28 with the blade 18 of the switch and said crank is so related thereto that upon the half revolution of the shaft, the blade 18 will be swung into engagement with the post 20, and on the other half of the revolution will be swung out of engagement with the same, thus the switch will be opened and closed, as will be apparent by a comparison of Figs. 2 and 3. The crank shaft 26 also carries a detent disk 29, provided in diametrically opposite portions of its peripheral edge with seats 30 and 31, forming shoulders 32. These seats are adapted to receive the downturned free terminal 33 of a swinging latch 34, pivotally mounted in the frame 16, and including a depending arm 35. Suitably mounted on the frame, as, for instance, by a bracket 36, is a star wheel 37, consisting in the present instance of four fingers, two of which as 38, are preferably shorter than the others, designated 39. The arm 35 of the latch is located in the path of movement of these fingers 38—39, and during the rotation of said star wheel the longer fingers 39 will raise the terminal 33 of the latch out of the seats 31, so as to release the detent disk and thereby the motor, while the fingers 38 are short enough so that they will not thus release said motor.

The means for rotating the star wheel is carried by the hour hand shaft 13 and in the present embodiment is constructed as follows: A sleeve 40 is detachably fitted upon the outer end of the shaft 13, and is held in place by a suitable set screw 41. Upon this sleeve are rotatably mounted disks 42 and 43, normally held against relative rotation with respect to said sleeve by means of friction washers 44. The disks are of different diameters and are provided with scales corresponding to that of the clock dial, being numbered respectively from one to twelve. These disks fur-



thermore are provided with actuating pins 45 and 46, extending inwardly and arranged to engage the fingers of the star wheel and thereby effect the rotation thereof. The pins 45 and 46 are so arranged that  
 5 when the numeral twelve of the disk scales are uppermost, said fingers will be in coaction with said star wheel.

Assuming that the mechanism is to be employed in lighting and extinguishing lamps employed in the  
 10 illumination of a show window and assuming that said lamps are in circuit with the switch 17, the operation of the structure may be briefly outlined as follows: If, for instance, the lamps are to be lighted at six o'clock and extinguished at ten o'clock, one of the disks, as, for in-  
 15 stance, the smaller one 42, is turned until the numeral six thereof is directly beneath the hour hand 11, as shown in Fig. 1, while the other disk is turned until the numeral ten is directly beneath said hour hand, as also illustrated in Fig. 1. Now as the time movement ro-  
 20 tates the hour hand, it will be seen by comparing Figs. 1 and 2, that, when the time movement is at six o'clock, the pin 45 will be engaged with the star wheel, (which is so arranged that the first long finger will strike the arm 35), so that the first long finger thereof will have  
 25 raised the latch to release the detent disk. The motor thus being free to operate, the shaft 26 will revolve half way so as to close the switch 17. By this time the said long finger has passed the lower end of the arm 35, and the latch 34 will engage in the succeeding seat or  
 30 be abutted against by the shoulder 32 thereof. The circuit thus having been closed, the lamps will be turned on. When ten o'clock arrives, the other pin 46 will engage the star wheel and the succeeding long finger will again operate the latch, permitting the shaft  
 35 26 to have another half revolution, thus drawing down the switch blade 18 and opening the circuit. Consequently, it will be seen that the lamps are automatically controlled from the clock. On the other hand, when six o'clock in the morning arrives, the pin 45  
 40 again engages the star wheel but one of the shorter fingers thereof will be brought into engagement with the latch arm and this finger will not effect the release of the motor. The same is true when ten o'clock arrives. Therefore, by the simple arrangement shown, the  
 45 switch will be operated but once each day. It will, of course, be readily understood that the time for actuating the switch may be changed as desired by merely moving the controlling disks 42 and 43 with respect to the hour hand shaft, and that the length of the period  
 50 during which said switch is closed can be varied by changing the relation of the disks 42 and 43 with respect to each other.

From the foregoing it is thought that the construction, operation, and many advantages of the herein described  
 55 invention will be apparent to those skilled in the art, without further description and it will be understood that various changes in the size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the ad-  
 60 vantages of the invention.

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

1. In mechanism of the class described, the combination with an electric circuit closer, of a motor for operating  
 65 the same, a lock for holding the motor against movement,

and means for controlling the movement of the lock, said means comprising a time movement, a rotary device mounted adjacent to the time movement, said device in-  
 70 termittently and detachably engaging the lock to inter- mittedly move the same by power transmitted from the time movement, and another device continuously rotatable with the time movement, said latter device periodically en-  
 75 gaging the first-mentioned device and intermittently mov- ing the same, said first mentioned device being stationary between the said periodical engagements.

2. In mechanism of the class described, the combination with an electric circuit closer, of a motor for operating the circuit closer, a lock for the motor, a rotatable star wheel having a finger that engages the lock and moves the same,  
 80 a time movement, and means driven by the time movement and intermittently effecting a partial rotation of the star wheel to transmit power from the time movement to the lock for operating the latter.

3. In mechanism of the class described, the combination with a switch, of a motor for operating the same, a latch  
 85 for holding the motor against movement, a time movement, a rotatable star wheel having a plurality of fingers, certain of which only effect the operation of the latch to release the motor, and means operated by the time movement and engaging all of the fingers of the star wheel to rotate  
 90 the same.

4. In mechanism of the class described, the combination with a switch, of a motor for operating the same, a latch for holding the motor against movement, a time movement, a rotatable star wheel having a plurality of  
 95 fingers, certain only of which engage and actuate the latch to release the motor, and a device driven by the time movement and in turn engaging said fingers and thereby intermittently driving the star wheel.

5. In mechanism of the class described, the combination  
 100 with a switch, of a motor for operating the same, a latch for holding the motor against movement, a time movement, a star wheel having a plurality of fingers of different lengths, the longer fingers effecting a movement of the latch to release the motor, and a device carried by the time  
 105 movement and engaging the fingers of the star wheel to rotate said wheel.

6. In mechanism of the class described, the combination with a switch, of a motor for operating the same, a latch for holding the motor against movement, a time movement,  
 110 a star wheel having a plurality of fingers, two of which are longer than the others and are arranged with one directly following the other, and separate pins carried by the time movement and engaging the star wheel to rotate the same, said pins being adjustable toward and from each  
 115 other.

7. In mechanism of the class described, the combination with a switch, of a motor for operating the same, a lock for holding the motor against movement, a rotary device for operating the lock, a time movement, and means for  
 120 intermittently moving the rotary device, said means being carried by the time movement and adjustable with respect thereto to vary the periodicity of the movement of the rotary device.

8. In mechanism of the class described, the combination  
 125 with a switch, of a motor for operating the same, a latch for holding the motor against movement, a time movement, and means for actuating the latch from the time movement, said means including a rotary star wheel and a device carried by the time movement and intermittently en-  
 130 gaging the star wheel to rotate the same.

9. In mechanism of the class described, the combination with a switch, of a motor for operating the same, a latch for holding the motor against movement, a time movement  
 135 including a shaft, and means for actuating the latch from the time movement, said means including a rotary star wheel having fingers, and a device carried by the said shaft and intermittently engaging the fingers of the star wheel to move said wheel.

10. In mechanism of the class described, the combina-  
 140 tion with a switch, of a motor for operating the same, a latch for holding the motor against movement, a rotary device engaging the latch for moving the same, a time movement, and a device rotated by the time movement and in turn engaging and intermittently driving the rotary de-  
 145 vice.



11. In mechanism of the class described, the combination with a switch, of a motor for operating the same, a latch for holding the motor against movement, a rotatable star wheel having fingers that engage the latch for moving  
5 the same, a time movement, and a device operated by the time movement and also engaging said fingers to effect the rotation of the star wheel.

12. In mechanism of the class described, the combination with a switch, of a motor for actuating the same, a  
10 latch for holding the motor against movement, a time movement, a rotatable device driven by the time movement, and a latch-actuating element driven, in turn, by the said rotatable device on every revolution thereof, said element effecting the movement of the latch to release the motor  
15 on every second movement of said device by the latch-actuating element.

13. In mechanism of the class described, the combination with a swinging switch, of a spring motor including a rotary shaft having a crank connection with the switch,

a detent disk carried by the shaft and having seats in its  
20 diametrically opposite edges, a swinging latch arranged to engage in the seats to hold the motor against movement, said latch having an arm, a rotatable star wheel having  
25 fingers of different lengths that engage the arm for effecting the actuation of the latch to release the detent disk, a time movement including an hour hand shaft, separate  
30 disks revolubly mounted on the shaft and normally held against relative movement with respect thereto, and pins carried by the disks and engaging the star wheel to effect the rotation of the same.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE H. LINK.

Witnesses:

ADAM B. ZETER,

LOUIS H. ZETER.