

(No Model.)

3 Sheets—Sheet 1.

L. G. ROWAND.
FIRE ALARM SYSTEM.

No. 477,069.

Patented June 14, 1892.

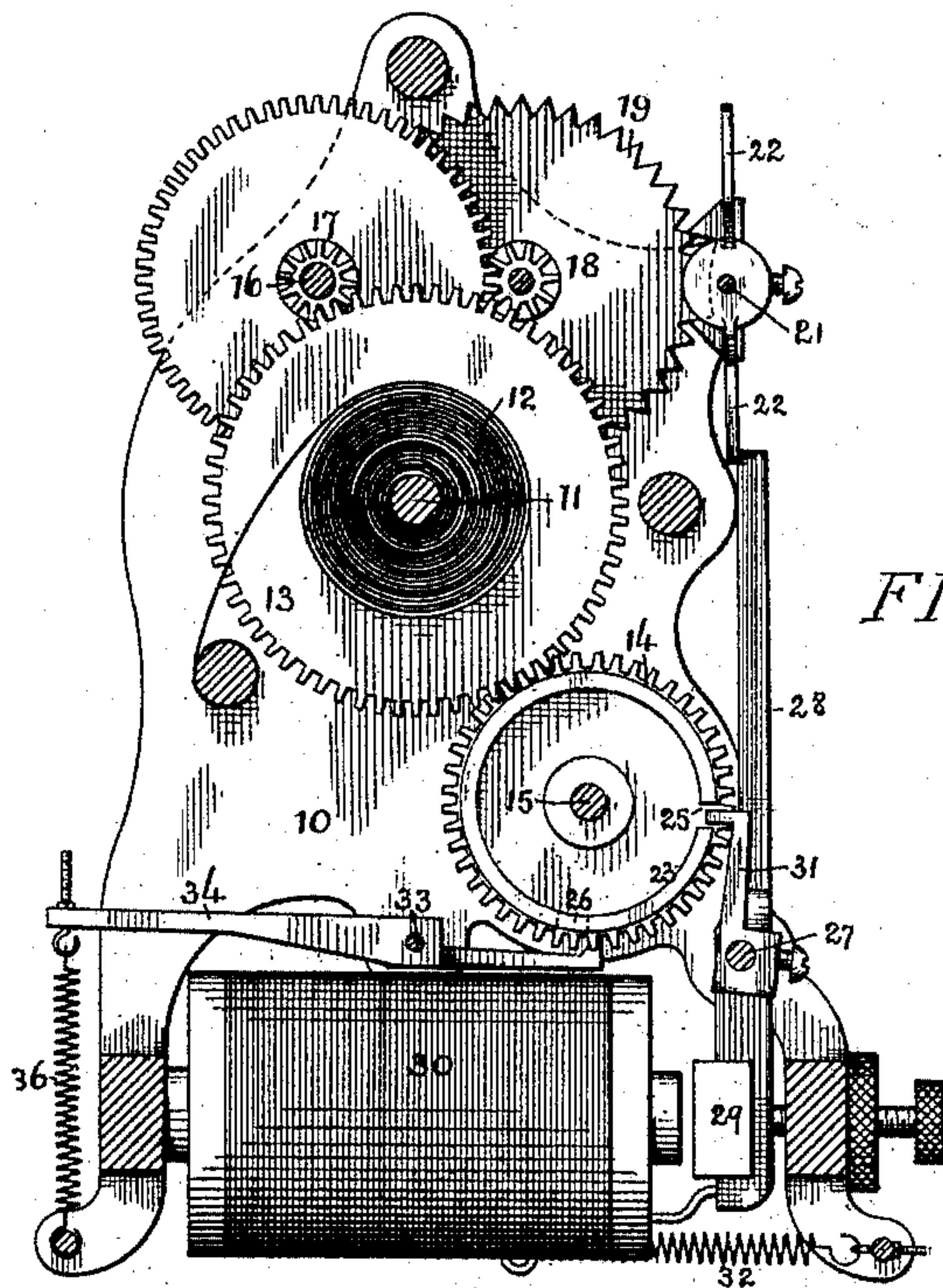


FIG. 1.

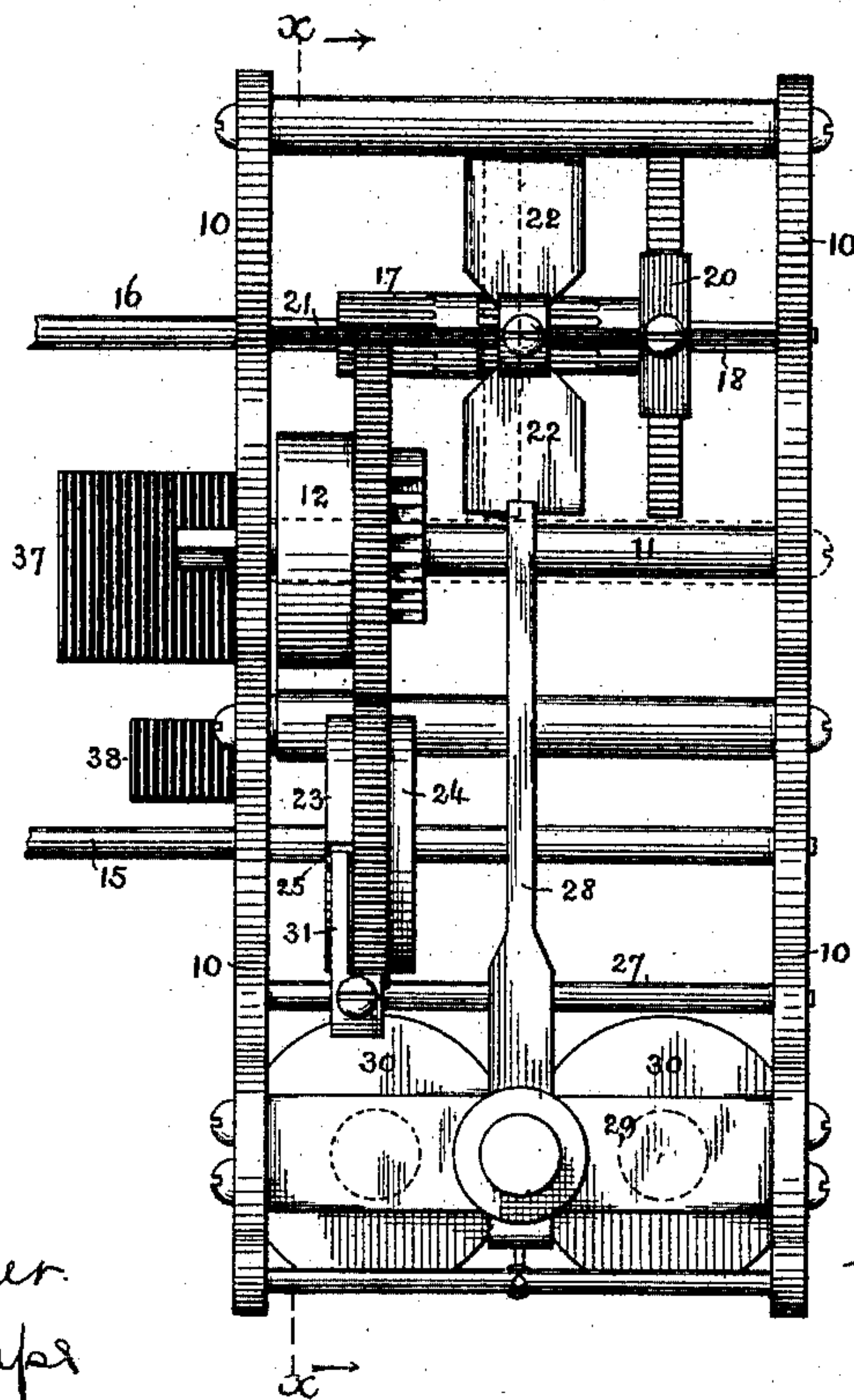


FIG. 2.

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by his Attorneys
Howson & Howson

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3 Sheets—Sheet 2.

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FIG. 3.

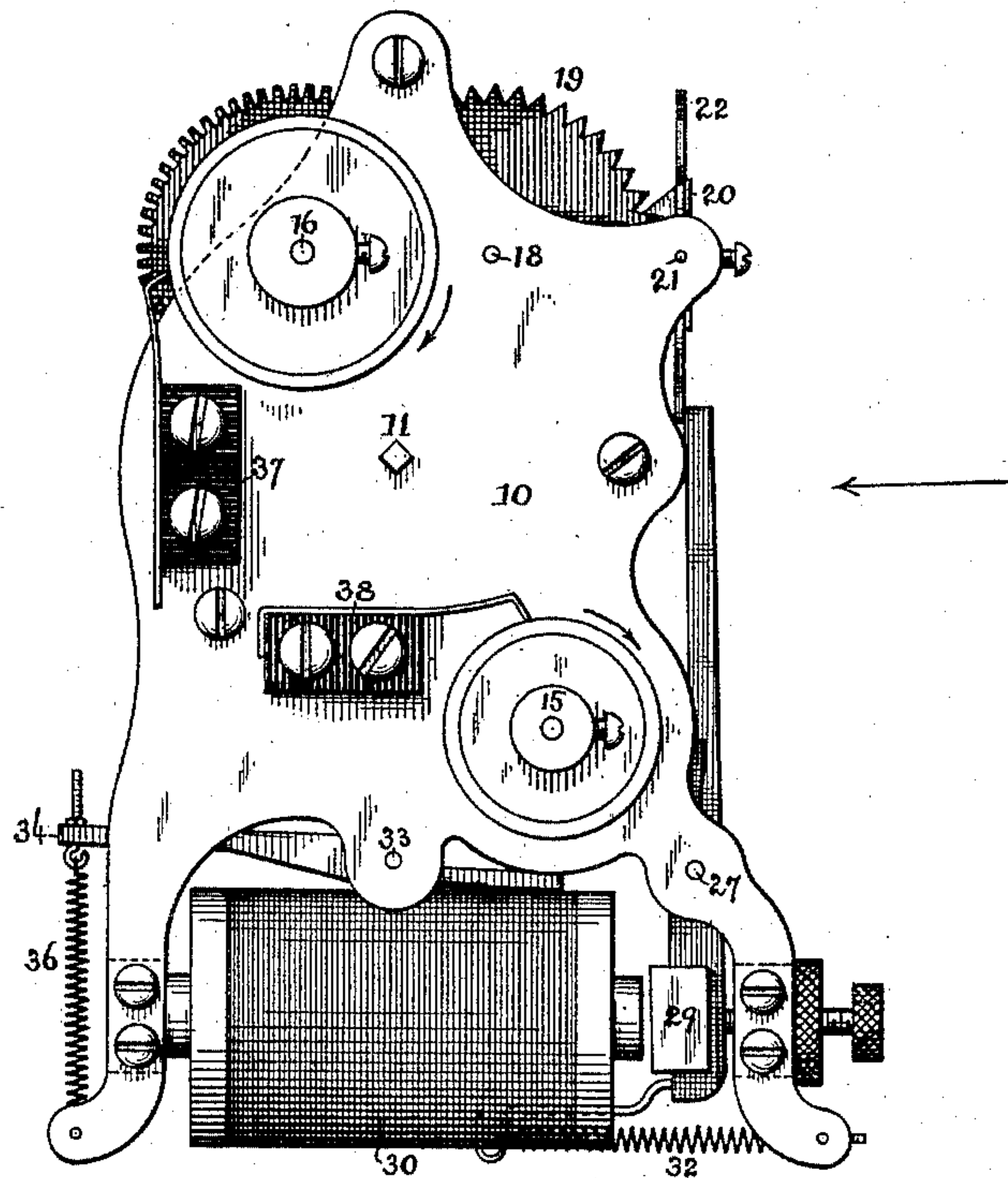


FIG. 5.

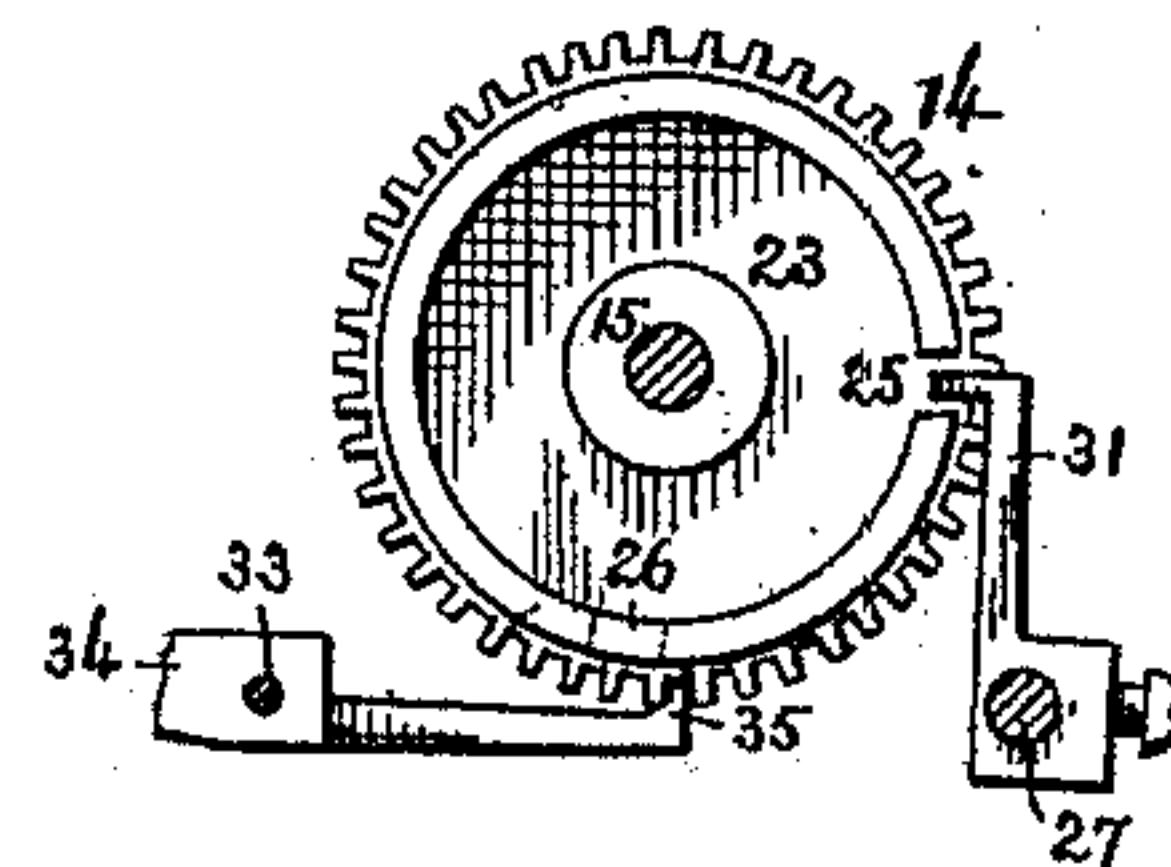


FIG. 4.

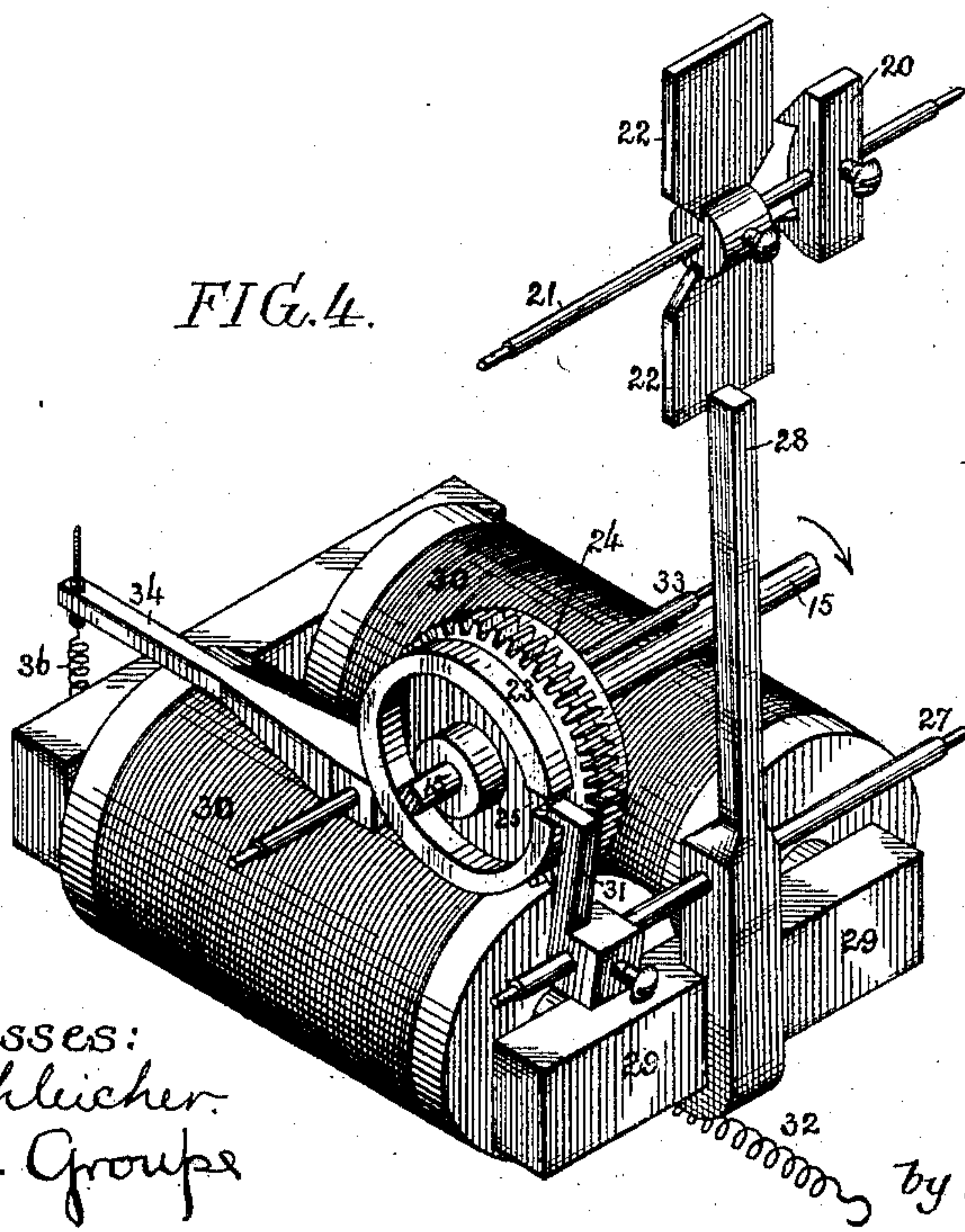


FIG. 6.

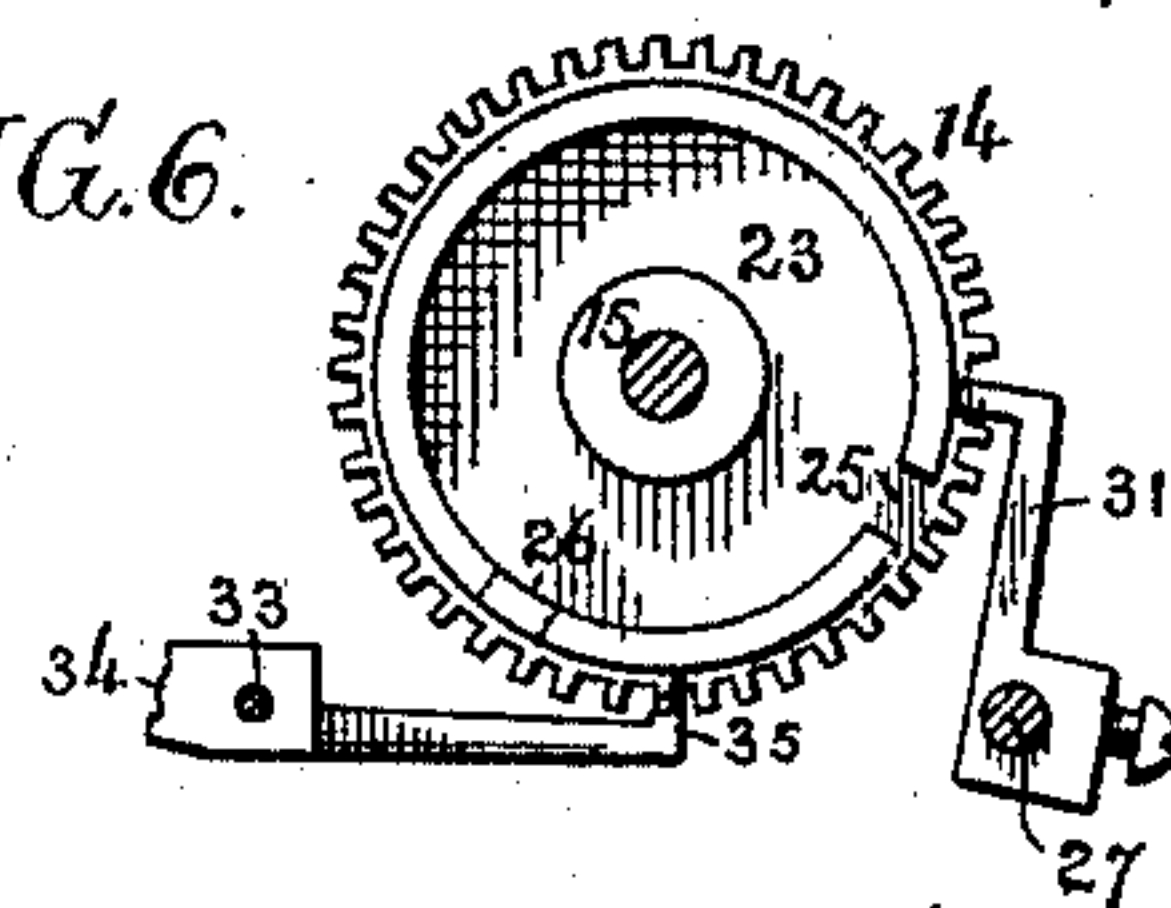
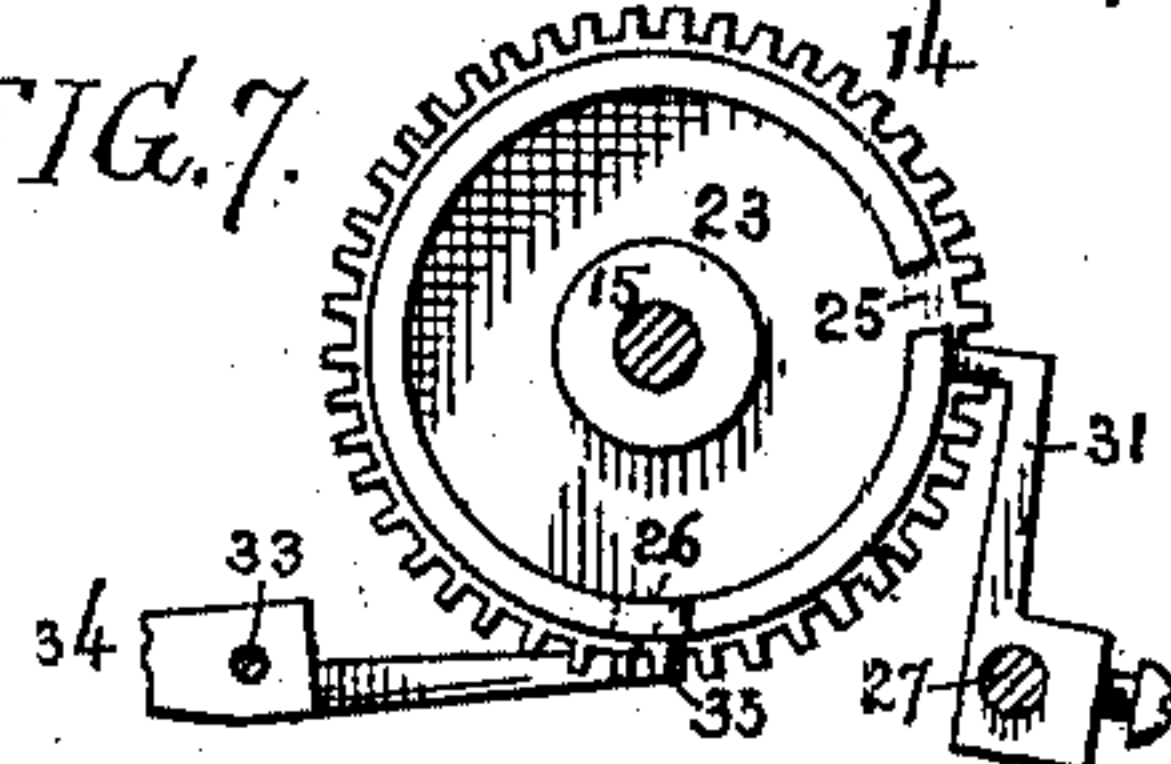


FIG. 7.



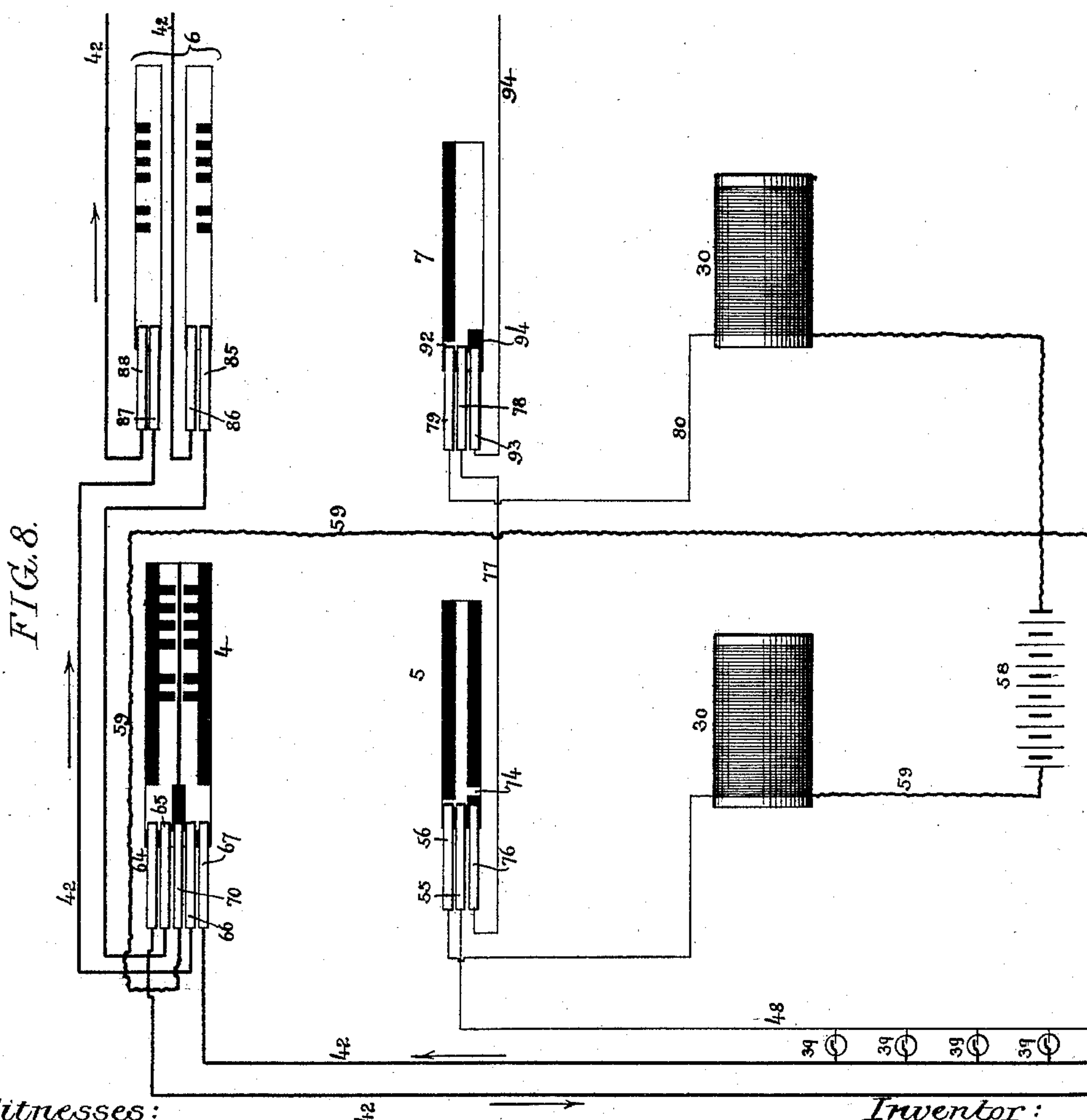
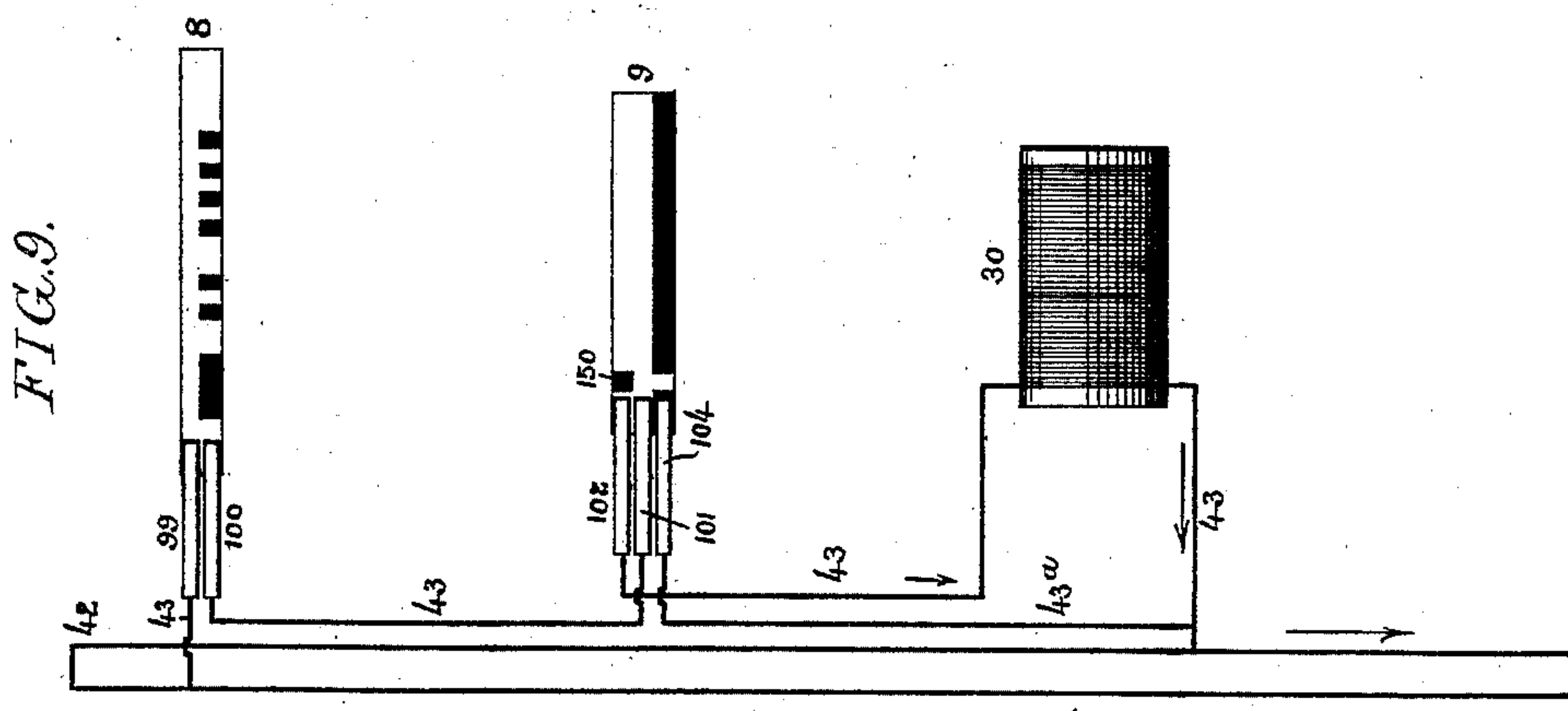
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UNITED STATES PATENT OFFICE.

LEWIS G. ROWAND, OF CAMDEN, NEW JERSEY, ASSIGNOR TO HENRY C. TERRY, OF PHILADELPHIA, PENNSYLVANIA.

FIRE-ALARM SYSTEM.

SPECIFICATION forming part of Letters Patent No. 477,069, dated June 14, 1892.

Application filed December 14, 1891. Serial No. 415,054. (No model.)

To all whom it may concern:

Be it known that I, LEWIS G. ROWAND, a citizen of the United States, and a resident of Camden, Camden county, New Jersey, have invented certain Improvements in Fire-Alarm Systems, of which the following is a specification.

My invention relates to certain improvements in fire-alarm systems, more particularly those in which the alarm is sounded at a central station from a building provided with switches, push-buttons, or thermostatic alarms, the present invention being for a construction of mechanical signaling-alarm by which the circuits of the main line to the central station are alternately made and broken for the purpose of sounding the number of the building at such central station.

In the accompanying drawings, Figure 1 is a sectional view on the line *xx*, Fig. 2, of a mechanical alarm constructed in accordance with my invention. Fig. 2 is an end view of the same, looking in the direction of the arrow, Fig. 3. Fig. 3 is an elevation of the same. Fig. 4 is a detached perspective view of a portion of the device. Figs. 5, 6, and 7 are views illustrating different positions of a portion of the locking mechanism, and Figs. 8 and 9 are diagrams illustrating the alarm in different circuits.

In general the alarm comprises a mechanically-driven train of gears which is normally locked in position and prevented from rotating by catches under the control of the armatures of electro-magnets energized by the closing of an electric circuit either by a thermostat or from a ground connection or by the intentional or unintentional breaking of one or other of the circuits in the building. This alarm carries upon a number of its shafts contact-drums, hereinafter termed "circuit-breakers," one of which is provided with alternate conducting and insulated portions and against which bear brushes in the main circuit leading to the central station. Normally these brushes are at the same time in contact with the conducting portion of the circuit-breaker and the circuit is closed; but on the rotation of the circuit-breaker the contact is alternately made and broken, the circuit opened and

closed, and the central station is notified by the printing on the register of the number and character of makes and breaks in the circuit. This device is more particularly intended for use upon my fire-alarm system for which I have applied for Letters Patent, my application having been filed of even date herewith, Serial No. 415,053.

Referring to the drawings, 10 represent suitable side plates, in which are journaled the shafts of the train of gears, 11 representing the main or primary shaft, which carries a spring 12 and a gear-wheel 13, meshing with a gear-wheel 14, the shaft 15 of which extends outside the frame-work and carries one of the circuit-breakers 5, which is used for opening another circuit. The gear-wheel 13 also serves to impart a rotative motion at a greater speed to a shaft 16 through the medium of a pinion 17, the shaft 16 being rotated four times while the shaft 15 is rotated once. The shaft 16 also extends outside the frame-work and carries the circuit-breaker 4.

On a shaft 18 is mounted a pinion engaging with the teeth of a wheel on the shaft 16. There is also mounted upon this shaft an escapement-wheel 19, with which engages an ordinary form of escapement-block 20, fixed upon a shaft 21, which is provided with a governing-fan 22. The gear-wheel 14, which is mounted upon the shaft 15, is provided on its opposite faces with disks 23 24, in which are cut grooves or notches 25 26, the groove or notch 25 in the disk 23 being at an angle of about ninety-two degrees from the notch 26 in the disk 24.

Suitably mounted in the frame-work is a rock-shaft 27, on which is carried a lever 28, provided at its lower end with an armature 29 under control of an electro-magnet 30, the upper end of the lever 28 being normally in engagement with one of the wings of the governing-fan 22 and acting through the fan to prevent the movement of the train of gears. On this shaft 27 is likewise secured an arm 31, the upper end of which is normally in engagement with the groove or notch 25 in the disk 23. It is held in engagement therewith by a spring 32, extending from the lower end of the lever 28 to a fixed point on the frame,

the tension of the spring being adjusted in any suitable manner.

On a cross-shaft 33 is mounted a lever 34, one end of which is provided with a toe 35, normally pressed against the periphery of the disk 24 and held in contact therewith by a spring 36, the tension of which may be adjusted in any suitable manner. This toe 35 is adapted to enter into engagement with the groove or notch 26 in the disk 24. The contact-drums 4 and 5 are secured to the shafts 16 and 15, and to suitable insulated blocks 37 and 38 are secured contact-brushes, to which the various line-wires are electrically connected and through which the circuits are alternately made and broken.

In order that the operation of this alarm may be more readily understood, I have shown in Figs 8 and 9 diagrams illustrating the peripheries of the circuit-breakers 4 and 5 extended and with their brushes in the positions they occupy normally when the alarm is not acting.

Referring to Fig. 9, 42 represents the main-line wire from the central receiving-station. 43 indicates a shunt from the main line through brushes 99 and 100 in contact with the conducting-surface of a circuit-breaker 8, carried by the shaft 16, from thence through brushes 101 and 102 in contact with the conducting-surface of the circuit-breaker 9, carried by shaft 15, to an electro-magnet 30 of high resistance, and from thence to the return-wire of the main line. The drum 9 is locked with the brushes in the position shown in Fig. 9, and the disk 23 is locked in the manner illustrated in Fig. 5. The resistance of the electro-magnet 30 to the passage of the current is greater than the resistance of the line, and when the line is in good order the magnet will therefore not be energized. If, however, a break should occur in the main line, the current will pass through the shunt and energize the magnet, so that the locking mechanism will then assume the position illustrated in Fig. 6 and the train of gears be allowed to rotate. After the circuit-breaker 8 has rotated four times and the number of the building—"42" in the present instance—has been sounded four times the brushes 99 and 100 will again rest in the positions in which they are now shown in Fig. 9; but the brushes 101 and 102 will rest in different positions from those shown in Fig. 9, owing to the fact that the circuit-breaker 9 has not entirely completed a single revolution, the toe 35 on the lever 34 having been forced into engagement with the notch or groove 26 in the disk 24, thereby stopping the parts, as illustrated in Fig. 7. The brush 102 then rests on an insulated block on the circuit-breaker 9 and the brush 104 is in contact with the conducting-surface of the circuit-breaker, so that the current, instead of passing continuously through the electro-magnet 30, passes through a wire 43^a to the return-wire of the main line.

Fig. 8 represents a fire-alarm system in

which two of these alarms are employed, one carrying the circuit-breakers 4 and 5 and the other carrying the circuit-breakers 6 and 7. In this figure the heavy straight lines (marked 42) indicate the main line with the current constantly on, and the light lines indicate local circuits, which are normally not energized, while the heavy-waved lines 59 indicate wires leading from the electro-magnets to the ground.

On the main ingoing line are brushes 86 85 in contact with the conducting-surface of the circuit-breaker 6 and brushes 64 65 in contact with the conducting-surface of the circuit-breaker 4. On the outgoing wire are brushes 67 66 in contact with the circuit-breaker 4 and brushes 87 88 in contact with the circuit-breaker 6. The ground-wire 59 has also a brush 70 normally in contact with the insulated portion of said circuit-breaker 4.

48 represents a local wire running parallel with the main line 42 and terminating at an electro-magnet 30, the current passing through two brushes 55 56, normally in contact with the conducting-surface of the circuit-breaker 5. Between this line and the main line are a number of normally - open thermostats, switches, or other contacts 39, so arranged that when one or the other of them is closed by hand or automatically, as in the case of thermostats when subjected to any high degree of heat, the connection between the main and local line will be established through such switch contact or thermostat and the current grounded through the wire 59. The magnet 30 in the local circuit being thus energized unlocks the train of gears of the first alarm, permitting the circuit-breakers to rotate and make and break the circuit in the main line 42 through the brushes 65 and the ground-wire contact 70. After the circuit-breaker 4 has rotated four times and the number of the building has been signaled four times to the central station the circuit-breaker 5 is locked in the same manner, as previously described with reference to the circuit-breaker 9, and the circuit is then completed through the brush 55, the conducting portion 74 of the circuit-breaker, the brush 76, and the wire 77 to a brush 78 in contact with the conducting portion of the circuit-breaker 7. The circuit is completed through a brush 79 and wire 80 to the magnet 30 and ground-wire 59. This magnet is thus energized and the alarm is repeated at the central station by the revolving of the circuit-breaker 6 and making and breaking of the circuit through the wires 85 and 86. After the circuit-breakers 6 and 7 have started their revolutions the brush 79 rests on the insulated portion of the circuit-breaker, and a brush 93 is brought into electrical contact with the conducting-surface of the circuit-breaker, permitting the current to travel through a wire 94, leading to an alarm-gong or to another alarm, if desired.

Usually the first mechanical alarm is for the purpose of sounding the primary alarm,

and it will be operated either in case of fire or if the house-lines be grounded; but if the house-lines be grounded there will be no operation of the second alarm, as the circuit between the first alarm and the second alarm is not energized by the battery and cannot be energized except by the main circuit, which is put in circuit with the house-lines only in case of a fire.

10 As described in my above-mentioned application, filed of even date herewith, the alarm may be used for the purpose of signaling "trouble" on other circuits, if desired.

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

1. A signaling-alarm comprising a pair of circuit-breakers, a normally-locked train of power-driven gears adapted to rotate said circuit-breakers at different speeds, insulated and conducting surfaces on said circuit-breakers, a notched disk rotated by the gears, and an arm adapted to engage therewith, the insulated and conducting surfaces being so arranged with respect to the notches in the disk that one of said circuit-breakers may be stopped at a predetermined point and the path of the current through the conducting-surfaces of the contact-breaker changed, substantially as specified.

2. A signaling-alarm comprising a pair of circuit-breakers, a normally-locked train of power-driven gears adapted to rotate said circuit-breakers, a notched disk carried by said train of gears, a rock-shaft 27, an arm 31, adapted to engage with one of the notches in said disk and lock the same, an armature connected to said rock-shaft, an electro-magnet controlling said armature, a lever 34, having one of its ends adapted to engage with the second notch in said disk, and a spring connecting the opposite end of said lever to a fixed point on the frame, substantially as specified.

3. A circuit-breaker for a mechanical signaling-alarm, comprising a ring of conducting material extending entirely around the circuit-breaker, and insulating portions so arranged on either side of said ring that the stoppage of the circuit-breaker at a predetermined point after completing its rotation will re-establish the main circuit through another path, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEWIS G. ROWAND.

Witnesses:

JNO. E. PARKER,
HARRY SMITH.