

No. 855,002.

PATENTED MAY 28, 1907.

W. S. GUTHRIE.
SECONDARY ELECTRIC CLOCK.
APPLICATION FILED JULY 5, 1906.

Fig. 1.

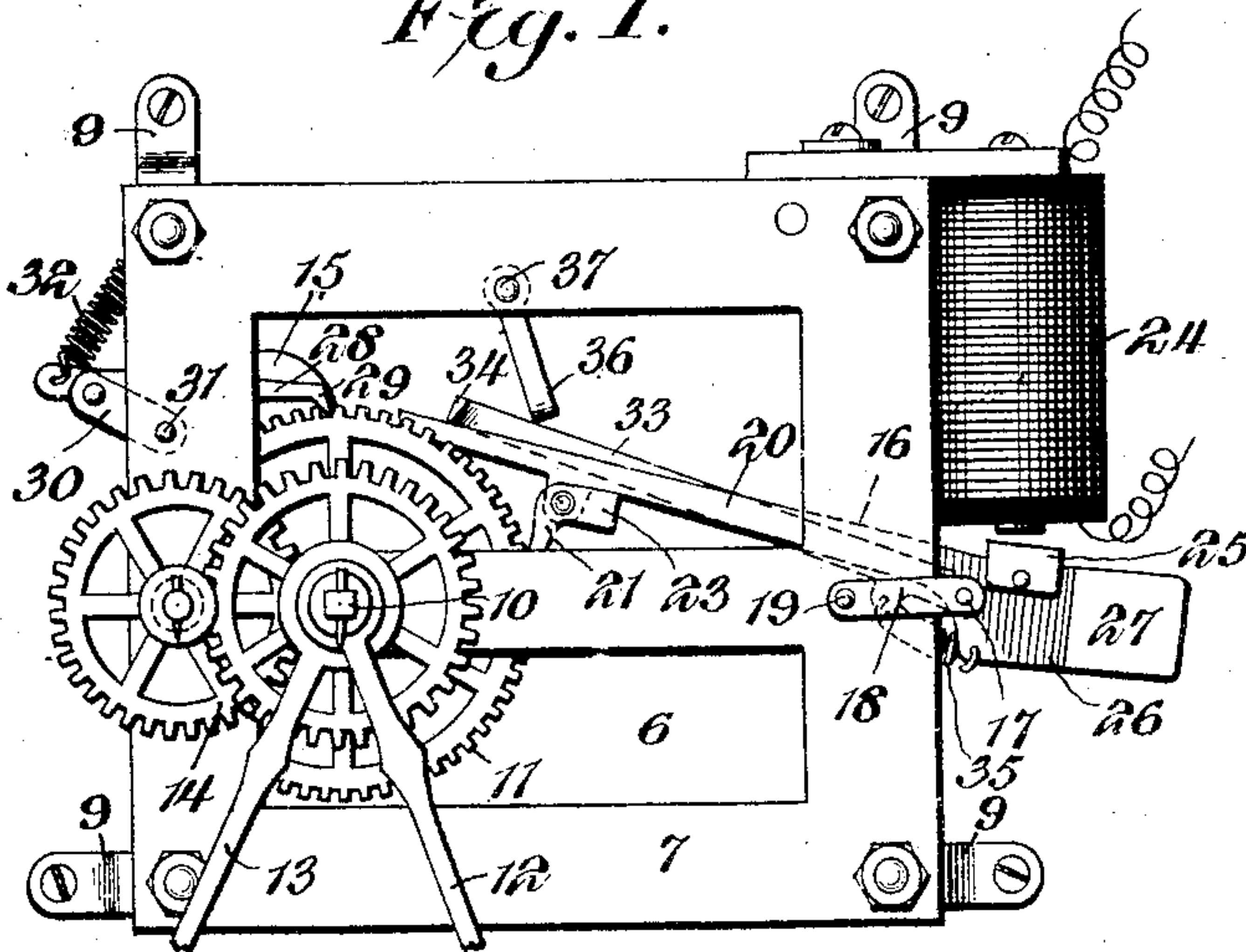


Fig. 4.

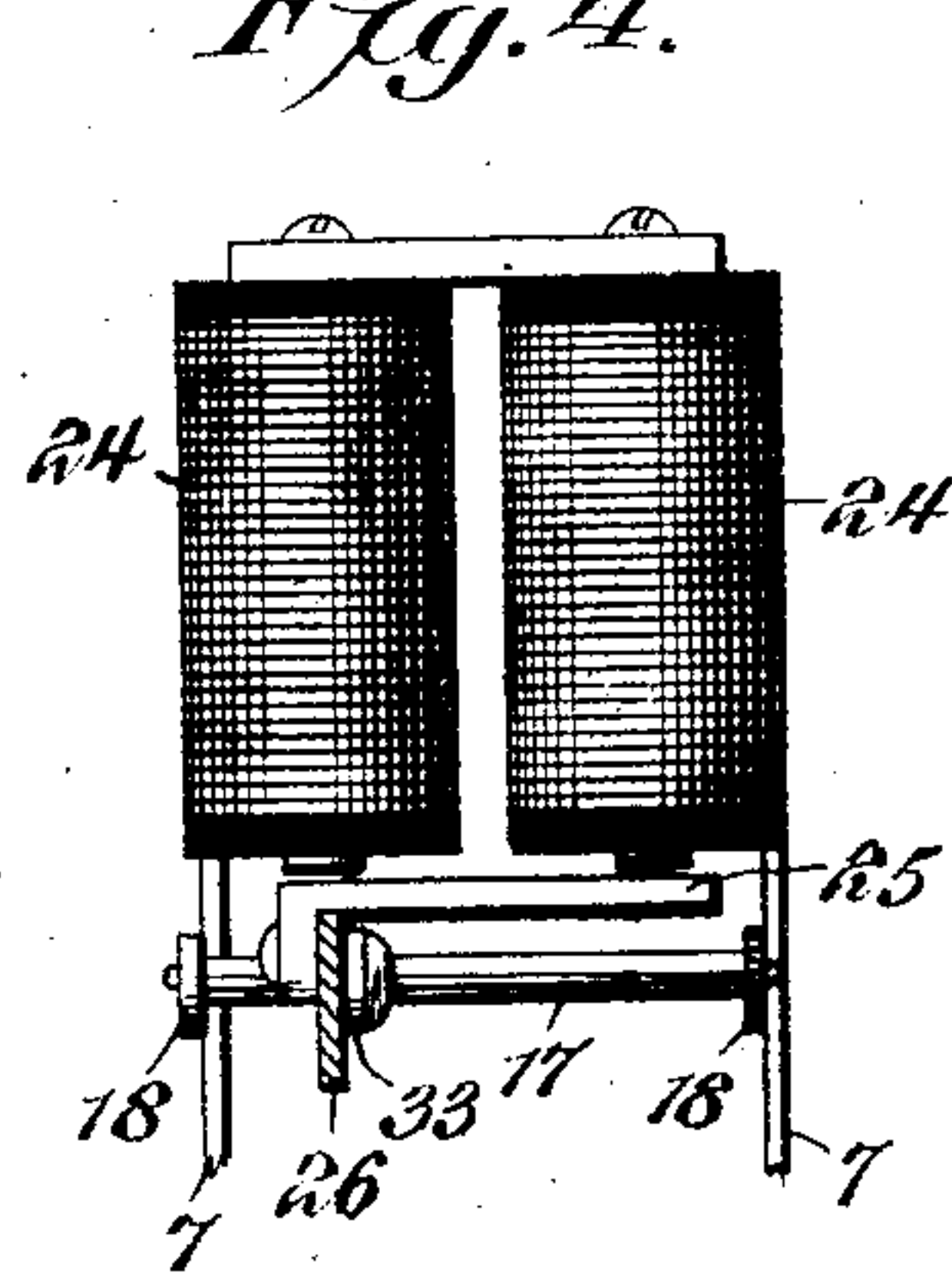


Fig. 2.

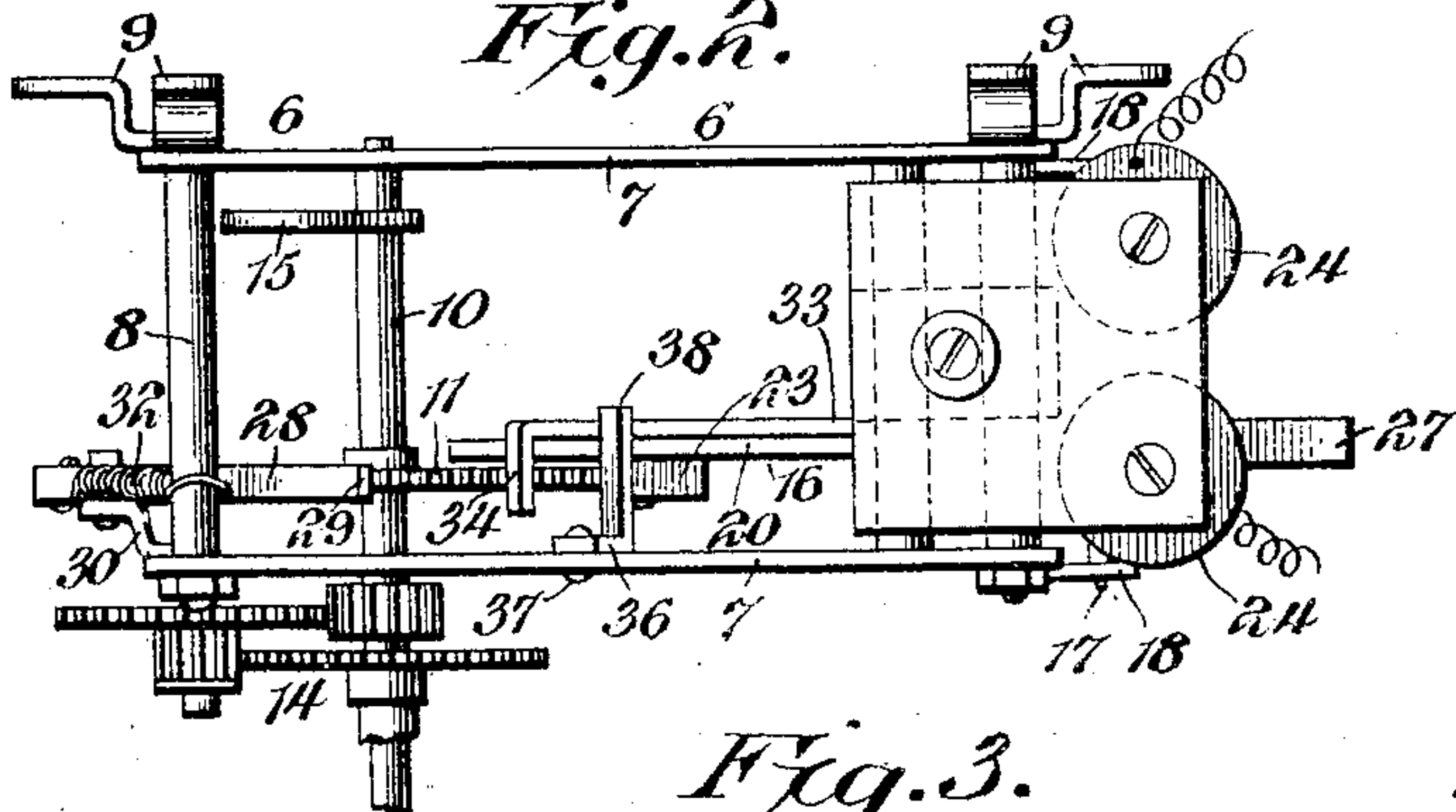


Fig. 5.

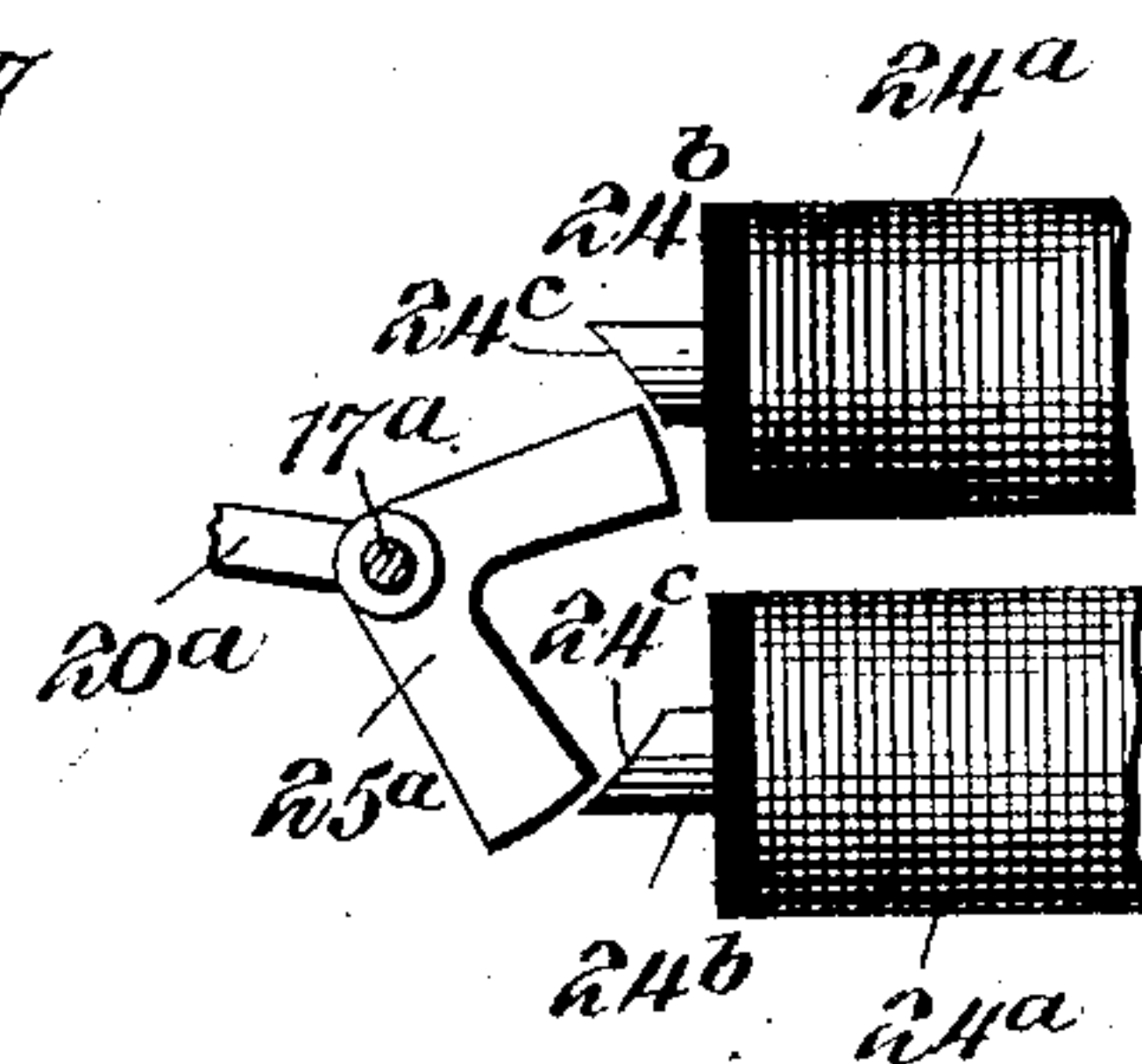
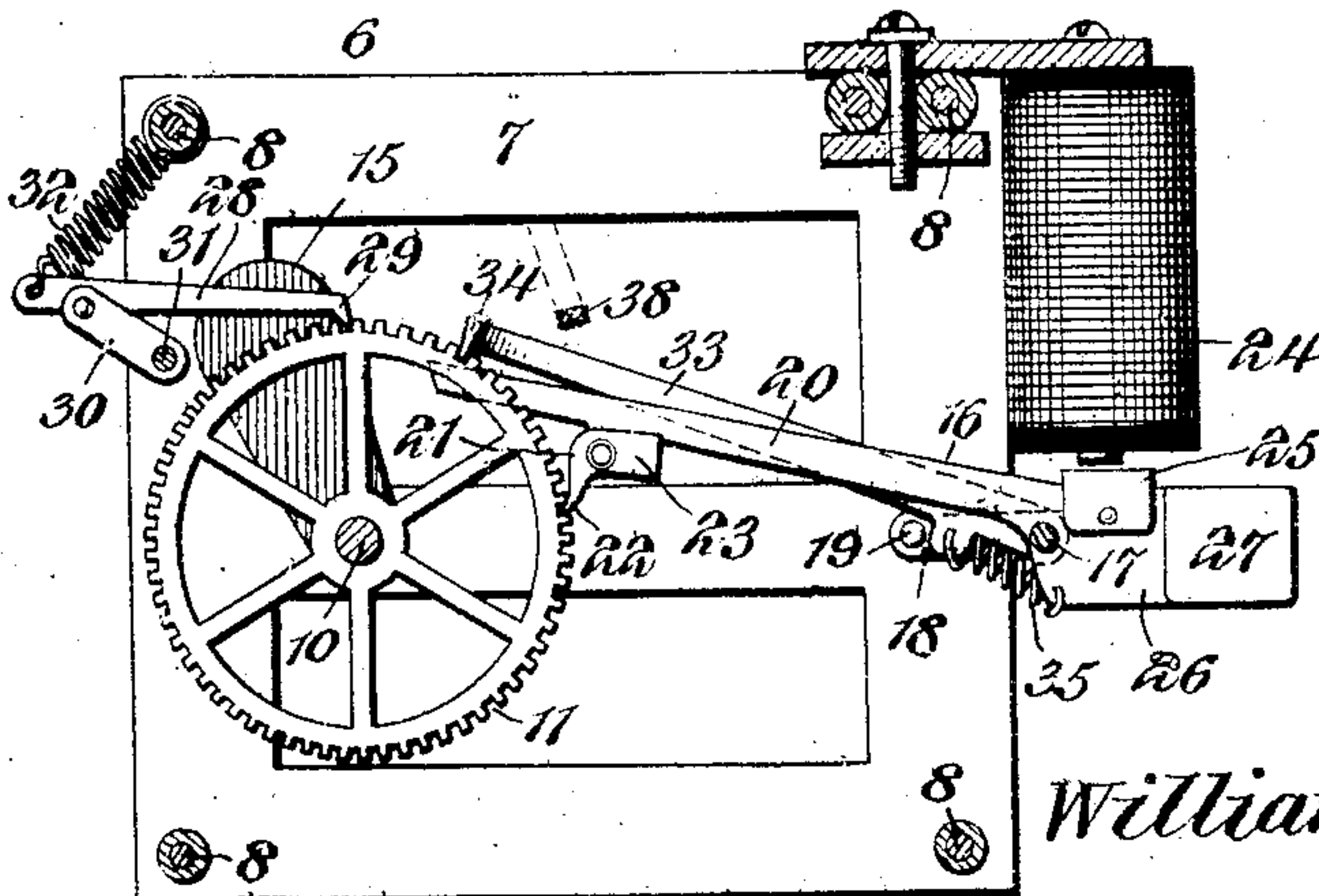


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM S. GUTHRIE, OF TERRELL, TEXAS.

SECONDARY ELECTRIC CLOCK.

No. 855,002.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed July 5, 1906. Serial No. 324,809.

To all whom it may concern:

Be it known that I, WILLIAM S. GUTHRIE, a citizen of the United States, residing at Terrell, in the county of Kaufman and State of Texas, have invented a new and useful Secondary Clock, of which the following is a specification.

This invention relates, in a specific sense, to improvements in clocks of the type that are controlled in their movements by master clocks, though the structure is also useful in other analogous relations.

The principal object of the present invention is to provide novel means of an exceedingly simple nature, that will effect a certain predetermined movement of the driven members or hands, and will effectively prevent any abnormal movement of the same, the structure being such that it is not liable to derangement or excessive wear, and is thus peculiarly useful as a secondary clock.

A further and important object is to provide a novel structure, wherein the parts are readily and relatively adjustable in order to secure their proper coöperation to effect the desired movements.

The preferred form of construction is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of the mechanism. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical longitudinal sectional view. Fig. 4 is an end elevation of the upper portion of the same, a part of the lever being shown in section. Fig. 5 is a detail view, showing a slightly modified arrangement of the magnets and coacting armature.

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

In the embodiment illustrated in the first four figures, a frame 6 is employed, comprising sides 7, connected by tie elements or posts 8. This frame has suitable feet 9, whereby it may be secured to a support. A driven member is journaled in the frame, and comprises a shaft 10, having a toothed wheel 11, fixed thereto. The present embodiment of the invention is a secondary clock, and consequently hands 12 and 13 are employed, the hand 12 being secured to one end of the shaft 10, the hand 13 being rotatably mounted on said shaft and operated therefrom through suitable gearing 14. The

hand 12 is preferably counterbalanced by a weight 15, secured to the shaft 10.

The means for actuating the driven member and thereby the hands is as follows. A lever 16 is fulcrumed between its ends, as shown at 17, the fulcrum 17 being carried by links 18 pivotally mounted at 19 upon the side elements 7 of the frame. These links, while adjustable, are normally held by their frictional engagement with the frame, against movement, and thus the fulcrum can be adjusted upon the frame. One arm 20 of the lever extends alongside the driven wheel 11, and has pivoted between its ends, a weighted actuating dog 21, the tooth 22 of this dog being arranged to engage the teeth of the driven wheel 11, and being held in engagement therewith by the weighted end 23. The lever is actuated by one or more electro-magnets 24, secured to one end of the frame and having an armature 25 coacting therewith, said armature being carried by the arm 26 of the lever, which arm is weighted, as shown at 27. Any suitable means may be employed for periodically effecting the energizing of the magnets, an example of such means being set forth in co-pending application, Serial No. 276,233. It will thus be evident that when the magnets are energized, the armature 25 will be drawn toward them, thereby swinging the lever and causing the dog 21 to move the wheel.

Instead of the magnets shown in Figs. 1—4 inclusive, the arrangement disclosed in Fig. 5 may be employed. These magnets are designated 24^a, and have poles 24^b, provided with curved end faces 24^c. The armature coöperating with the poles, is shown at 25^a, and is mounted on a fulcrum 17^a, to which the faces 24^c are substantially concentric. In this modification, the armature 25^a constitutes an arm of the actuating or supporting lever, a portion of the other arm being shown at 20^a, and carrying the actuating dog for the driven wheel, as will be understood. It will be evident that the operation of this structure is precisely the same as that first described.

In order to prevent retrograde movement of the driven member or wheel 11, a dog 28 is employed having a tooth 29 that engages the teeth of the wheel 11. This dog 28 is pivoted at its rear ends on an adjustable support, in the form of a link 30, pivotally

mounted at 31 on the frame, and normally held by its frictional engagement, against movement thereon. The rear end of the dog 28 is engaged by a coiled spring 32, the opposite end of said spring being connected to one of the tie elements or posts 8 of the frame. The spring yieldingly holds the dog in engagement with the teeth of the wheel 11, and while permitting the rotation of said wheel in one direction, prevents its rotation in an opposite direction, as will be evident.

In order to prevent the overthrow of the wheel 11 by the actuating dog 21, a stop dog is employed comprising an arm 33 that is pivoted on the fulcrum 17 at one side of the lever 16. This lever carries at its free end an offset angularly disposed dog 34 that extends over the free end portion of the arm 20 of the lever 16, and over the teeth of the wheel 11, as clearly disclosed in Fig. 2. The arm 20 of the lever 16 thus constitutes a support for the dog, and normally holds it out of engagement with the wheel 11, but when the lever is operated by the electro-magnet, it will be evident, particularly by reference to Fig. 3, that the tooth 34 of the dog will be permitted to move into engagement with the wheel 11. In order to insure this movement, a coiled spring 35 is connected at one end to the arm 33 of the stop dog, and at its other end is connected to the lever 16. The movement of the arm 20 of the lever 16 and of the stop dog away from the driven wheel 11 is limited by a stop 36, having one end pivoted, as shown at 37 to the frame, the other end 38 being offset and disposed in the path of movement of the arm 33. The parts are normally held against this arm by the weight 27.

The operation of the structure may be briefly described as follows: As often as the magnets are energized, the armature 25 will be drawn toward the same, thereby causing a movement of the lever 16. The arm 20 of said lever is thus swung downwardly, and the dog 21 engaging the driven wheel 11, will effect a movement of said wheel. The downward movement of the arm 20, however, permits the downward swinging movement of the stop dog, as already described, and the parts are so arranged that the tooth 34 of this dog will engage the wheel just prior to the completion of the movement of the actuating dog 21. The result is that the movement of the wheel 11 will continue until the tooth 34 is struck by one of the teeth of the wheel 11, and this necessitates a slight relative movement between the arm 20 and the arm 33, a movement which is permitted by the separate mounting of said arms and their connection by the spring 35. At the same time, one of the teeth of the wheel 11 will pass beneath the dog 28. As soon as the circuit in which the magnets are located, is broken, said magnets are deenergized, and

the weight 27 will again elevate the arm 20 of the lever 16, thus raising the actuating dog 21 to a position to engage the succeeding tooth of the driven wheel, and carrying the tooth 34 of the stop dog out of engagement with the wheel.

The arrangement whereby the stop dog is normally held out of engagement with the driven wheel is important, particularly in secondary clocks, for the reason that the driven wheel can be freely rotated in one direction, and the hands thereby readily adjusted without the necessity of manually holding the dogs out of their operative positions. The adjustable mountings of the fulcrum 17, the stop 38 and the dog 28 are important, for they permit the relative change of parts in order to secure their proper coöperation and the accurate movements of the mechanism. The present embodiment of the invention is designed to effect the movements of the hands 12 and 13 every minute. Consequently, the driven wheel 11 is provided with sixty teeth. It will, however, be apparent that the number of teeth may be changed if it is desired to effect the movement of the driven member at other periods or in case the mechanism is to be employed for other analogous purposes.

From the foregoing, it is thought that the construction, operation, and many advantages of the herein described 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 advantages of the invention.

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

1. In mechanism of the character described, the combination with a rotatable driven member, of a movable dog for actuating the member, a movable support for the actuating dog, a stop dog movable into and out of engagement with the member to prevent its overthrow when moved by the actuating dog, said stop dog being normally maintained out of engagement with the member by the actuating dog support, and means for moving said support to move the actuating dog and effect the movement of the stop dog into engagement with the member.

2. In mechanism of the character described, the combination with a rotatable driven member, of a swinging arm, an actuating dog mounted on the arm and operating on the member for rotating the same, a pivotally mounted stop dog movable into engagement with the driven member and normally held out of such engagement by the swinging arm, and means for swinging the

arm to move the actuating dog and effect the movement of the stop dog into engagement with the driven member.

3. In mechanism of the character described, the combination with a rotatable driven member, of a supporting lever, a dog pivoted on the supporting lever for actuating the driven member, a stop dog movably mounted separately from the lever and movable into engagement with the driven member, said stop dog having a portion engaging the arm and being normally held thereby out of engagement with the driven member, a spring connecting the stop dog, a lever for maintaining said portion of the stop dog against the lever, and means for operating the lever to effect the movement of the driven member by the actuating dog, and permit the movement of the stop dog into engagement with the driven member.

4. In mechanism of the character described, the combination with a frame, of a toothed wheel journaled therein, a lever fulcrumed on the frame, an actuating dog pivoted on one arm of the lever and engaging the wheel to operate the same, a stop dog pivoted on the fulcrum of the lever and having an offset tooth that is movable into engagement with the wheel to prevent its overthrow by the actuating dog, said tooth engaging the lever and being normally held thereby out of engagement with the wheel, a spring connecting the lever and stop dog, and an electro-magnet for actuating the lever.

5. In mechanism of the character described, the combination with a frame, of a rotary wheel journaled therein, a lever, a fulcrum for the lever adjustably mounted on the frame, an actuating dog carried by the lever

and operating on the wheel, a stop dog pivoted on the fulcrum of the lever and adjustable therewith, said dog being movable into engagement with the wheel and being normally held out of such engagement by the lever, and means for actuating the lever to effect the movement of the wheel by the actuating dog, and permit the movement of the stop dog into engagement with the wheel.

6. In mechanism of the class described, the combination with a frame, of a toothed wheel journaled therein, links pivotally mounted on the frame and normally held against movement thereon, a fulcrum carried by the links, a lever mounted on the fulcrum, an electro-magnet for operating the lever, an actuating dog carried by the lever and engaging the wheel to operate the same, an overthrow preventing dog pivoted on the fulcrum and movable into engagement with the wheel when the same is operated by the actuating dog, said stop being normally held out of engagement with the wheel by the lever, a swinging stop disposed in the path of movement of the dog for limiting the movement of the same away from the wheel, another link pivotally mounted on the frame and normally held against movement thereon, and a dog pivoted on the last mentioned link and engaging the wheel to prevent retrograde movement 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.

WILLIAM S. GUTHRIE.

Witnesses:

JOHN H. SIGGERS,
LEWIS EBERLY.