

P. G. GIROUD.
SECONDARY ELECTRIC CLOCK.

APPLICATION FILED NOV. 15, 1907. RENEWED AUG. 26, 1908.

917,047.

Patented Apr. 6, 1909.

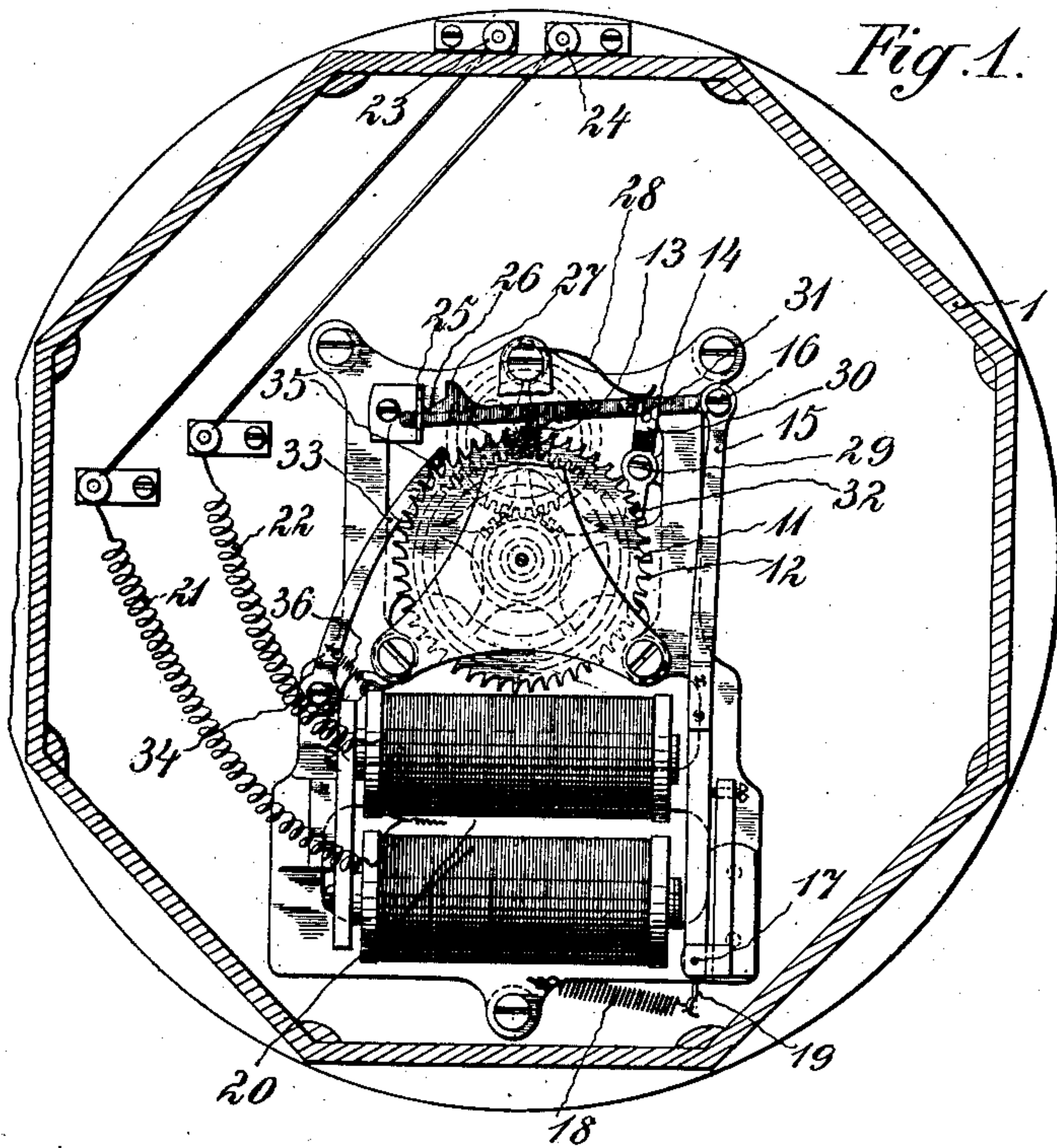


Fig. 1.

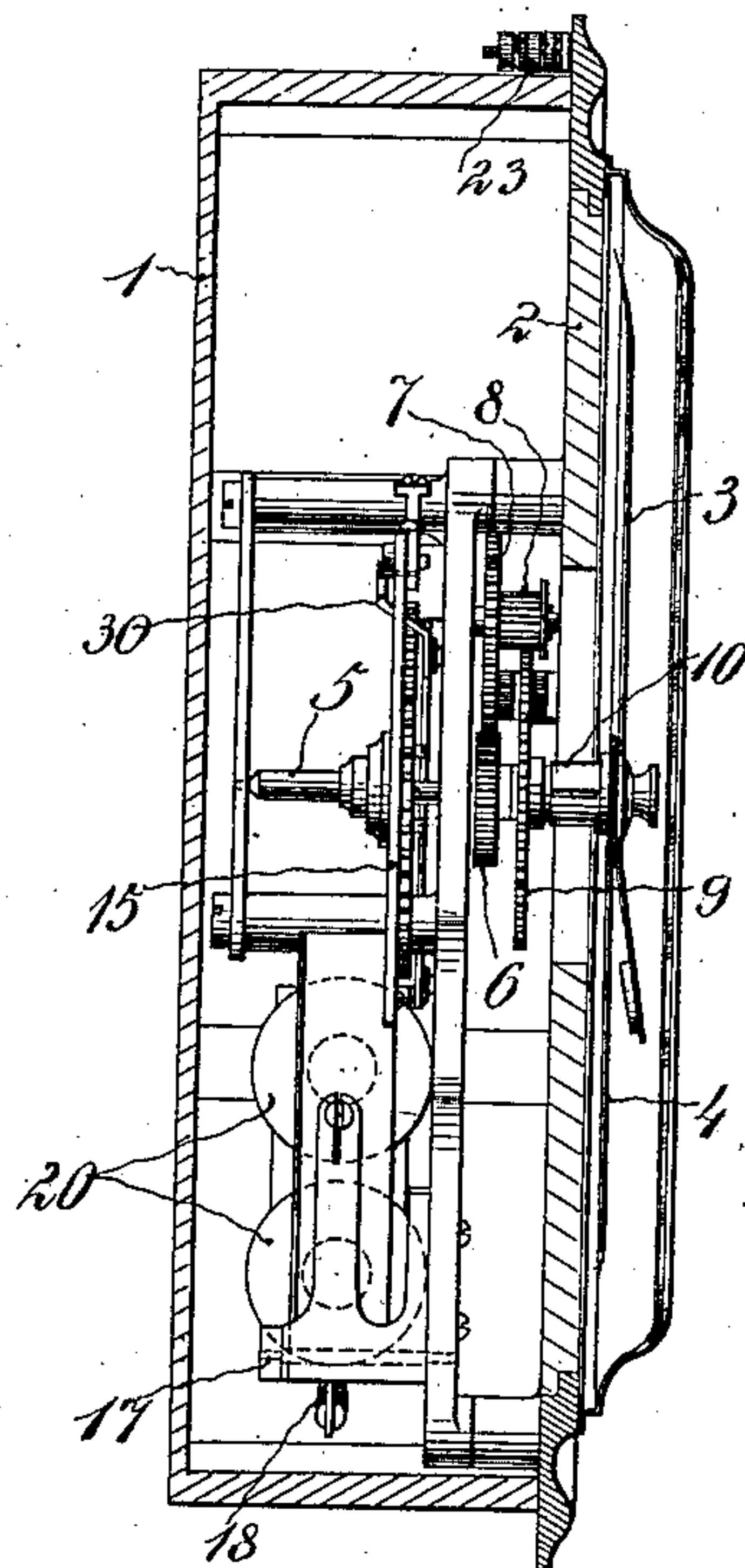


Fig. 3.

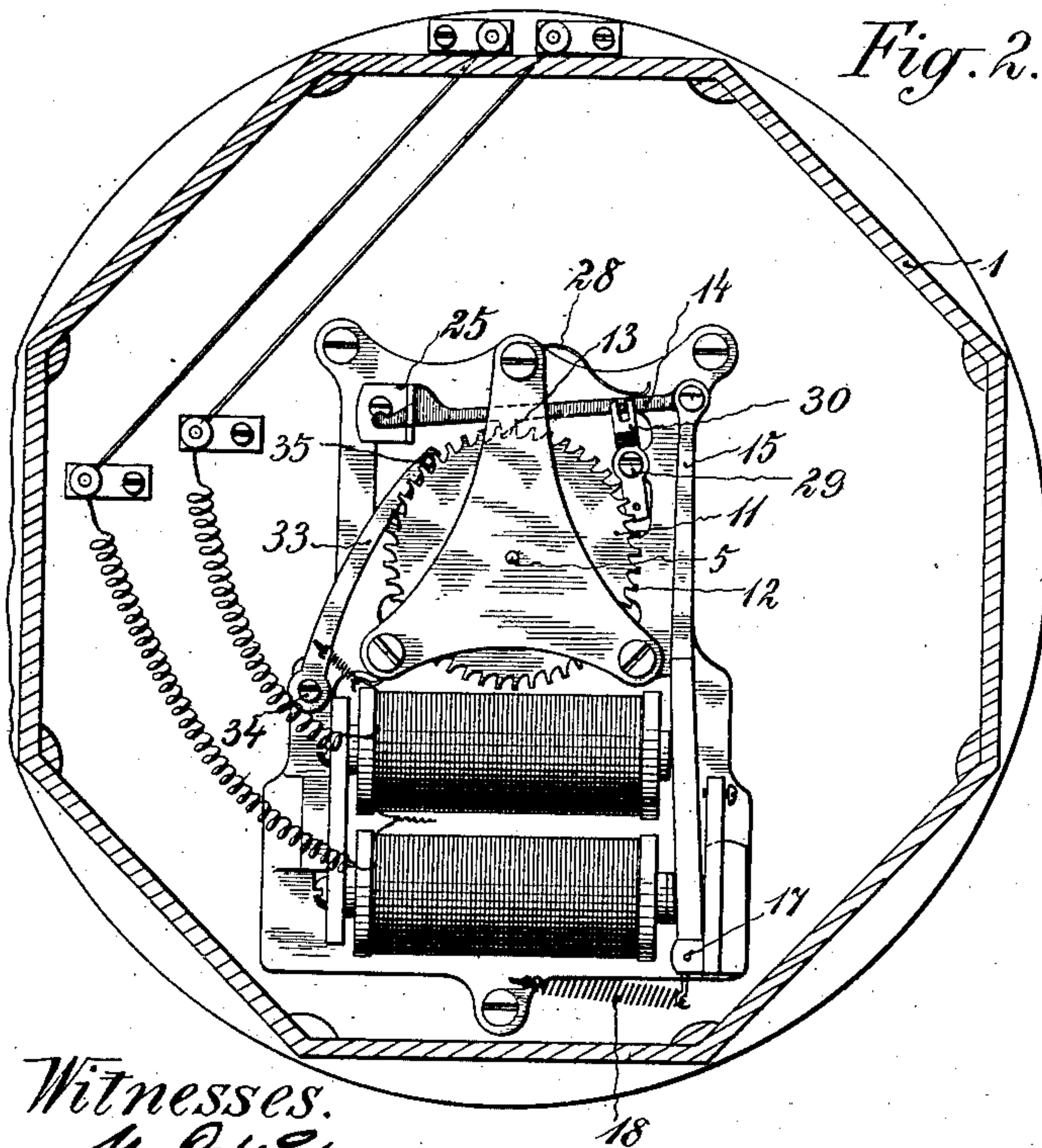


Fig. 2.

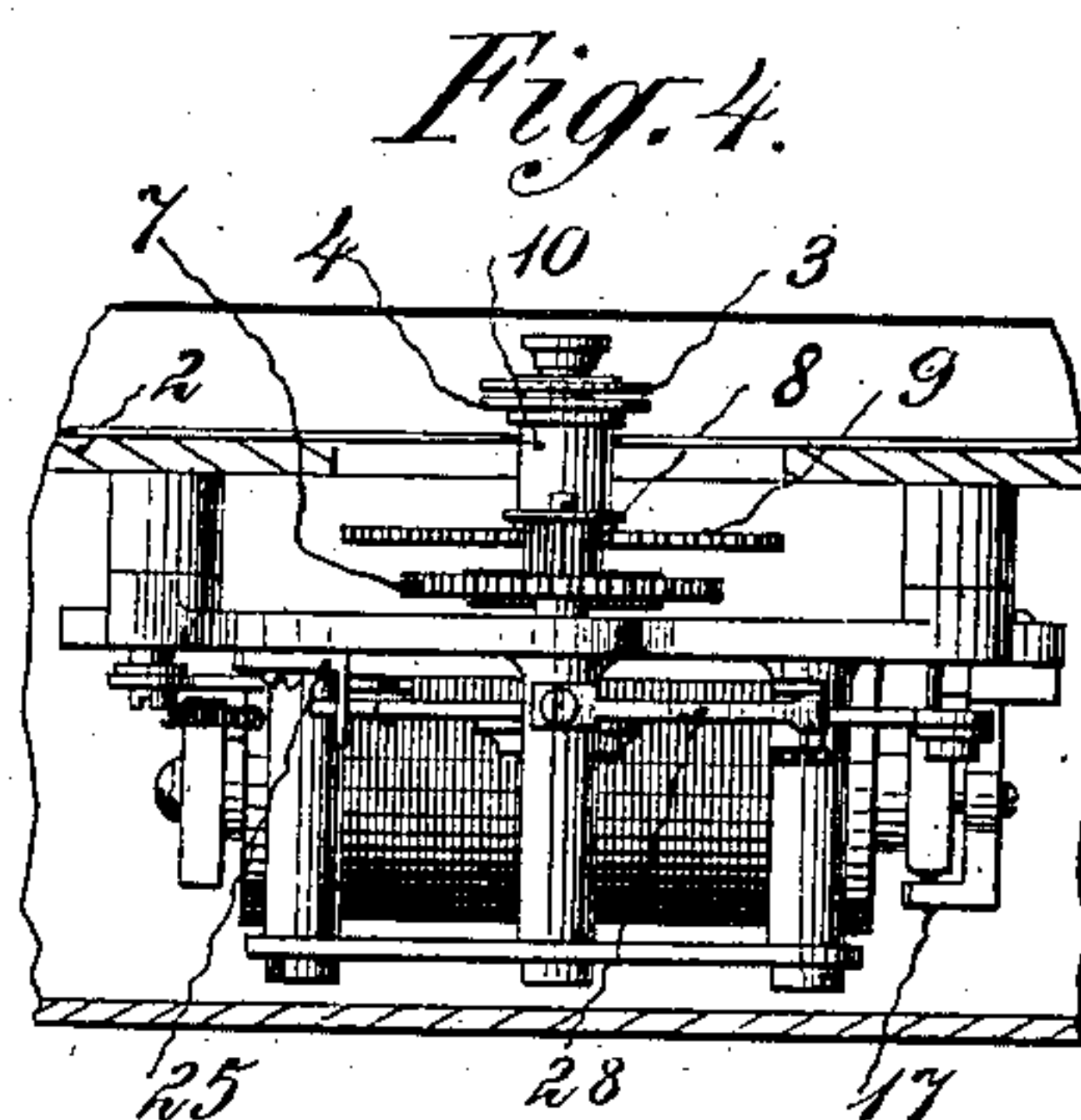


Fig. 4.

Witnesses.
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UNITED STATES PATENT OFFICE.

PETER G. GIROUD, OF NEW YORK, N. Y.

SECONDARY ELECTRIC CLOCK.

No. 917,047.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed November 15, 1907, Serial No. 402,242. Renewed August 26, 1908. Serial No. 450,370.

To all whom it may concern:

Be it known that I, PETER G. GIROUD, a citizen of the United States, and resident of the borough of Manhattan, in the city and State of New York, have invented a new and useful Improvement in Secondary Electric Clocks, of which the following is a specification.

My invention relates to secondary electric clocks, with the object in view of providing simple and effective means for advancing the hands step by step and holding them in position against any liability of displacement.

In the accompanying drawings, Figure 1 is a view of the clock in rear elevation, showing the casing in section and the parts in the position which they assume intermediate of two consecutive electric impulses, Fig. 2 is a similar view showing the parts in the position which they assume under the effect of an electric impulse, Fig. 3 is a central section from front to rear through the casing, showing the wheels in edge elevation, and Fig. 4 is a partial horizontal section through the casing, showing the operative parts in top plan.

The casing is denoted by 1; the front plate on which the dial is placed by 2; the minute hand by 3; the hour hand by 4; the central arbor by 5; the pinion thereon for driving the hour hand by 6; the gear wheel intermeshing with said pinion by 7; the pinion rotating with said gear wheel by 8; the toothed wheel intermeshing with said pinion and fixed to rotate with the hour hand by 9, and the sleeve mounted on the main arbor 5 to which the hour hand 4 is attached, by 10. These parts may be of any well known or approved form, such as are in common use in connection with clocks.

The minute hand 3 is driven step by step by a wheel 11 fixed to rotate with the main arbor 5 and having teeth 12 curved on one side and abruptly faced on the opposite side for receiving a pointed nose 13 on a vibrating bar 14 hinged to an upright vibrating lever 15 at 16, the opposite end of said vibrating lever being pivoted to a suitable support on the casing at 17. A spring 18 connected at one end with a fixed support on the frame of the works and at the opposite end with an extension 19 on the lever 15 serves to hold the vibrating lever normally rocked to the right or away from the core of the electro-magnet 20. The electro-magnet 20

consists in the present instance of two coils placed in a horizontal position in the lower portion of the casing and supported by suitable brackets attached to the frame of the clock works, wires 21, 22, leading from the holes of the said electro-magnets to suitable binding posts 23, 24, on the casing for the attachment thereto of the line wire not shown leading to the master clock which controls the several secondary clocks of a circuit as is usual.

The free end of the bar 14 is received through a slot in a keeper 25 and is beveled as shown at 26 to cause it to positively hold its engagement with a tooth of the wheel, 11, when being advanced by the lever 15 and it also has an abutment 27 which, when the bar has reached the limit of its advanced movement, engages the front of the keeper 25. A light spring 28 also bears upon the top of the bar 14 to stop any rattling and hold it steadily to its work.

A swinging two-armed dog is pivotally secured to a fixed support at 29, its upper arm 30 being slotted to receive a pin 31 on the side of the bar 14 and its lower end being provided with a pin 32 in position to enter between two consecutive teeth on the wheel 11. A second dog 33 is hinged at 34 to a suitable support on the frame of the works while its free end is provided with an anti-friction roller 35 which is adapted to roll into position between two consecutive teeth on the wheel 11 and the dog 33 is under spring tension by means of a spring 36 tending to hold its free end lightly pressed into engagement with the teeth on the wheel 11. The construction is such that when the wheel 11 is forced to the left as the drawing is held, the anti-friction roller will ride up the curved side or back of a tooth on the wheel 11, the lever being forced back by such curved side of the tooth against the tension of the spring 36 to permit a roller to ride over the top of the tooth into the succeeding space, and the pin 32 on the swinging dog is so located that when the lever 15 is back out of engagement with the electro-magnet, the said pin will lie in the space between the two consecutive teeth on the wheel 11 and will positively lock it against movement. When, however, the lever 15 is drawn toward the electro-magnet and the bar 14 is thereby pushed in a direction to advance the wheel 11 one tooth, the said bar 14 will, at the same time, by

means of its pin 31, rock the said swinging lever into position to remove the pin 32 from between two consecutive teeth thereby permitting the wheel 11 to advance one tooth, the return movement of said bar 14 again swinging the pin into locking engagement between the next two consecutive teeth. During this operation of the swinging lever with its locking pin 32, the roller 35 on the dog 33 will ride up and over a tooth thereby producing sufficient restraining pressure on the wheel to prevent it from pitching forward and at the same time permitting it to move with a fair degree of ease under the action of the bar 14.

This simple device serves at each impulse of electric current from the master clock to advance the wheel 11 one tooth and one tooth only or whatever the distance may be determined upon for the advance movement of the wheel, in the present instance one tooth, and this will be accomplished without any liability whatever of the wheel advancing too far and the wheel will be securely locked intermediate of two consecutive impulses.

What I claim is:—

In a secondary electric clock, the combination with a suitable clock work for operating the hour hand and a toothed wheel on the main arbor for operating the minute hand and indirectly operating the hour hand, of an electro-magnet, a spring actuated vibrating lever under the control of said electro-magnet, a bar hinged to the free end of said vibrating lever and supported at its free end in a suitable keeper, the said bar being provided with a projection to engage the teeth on said wheel, a spring actuated dog provided with an anti-friction roller for exerting light pressure upon said wheel and a swinging locking dog operated by said bar for positively holding the wheel in its advanced position.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this fourteenth day of November 1907.

PETER G. GIROUD.

Witnesses:

F. GEORGE BARRY,
C. S. SUNDGREN.