

J. J. BUSENBENZ.

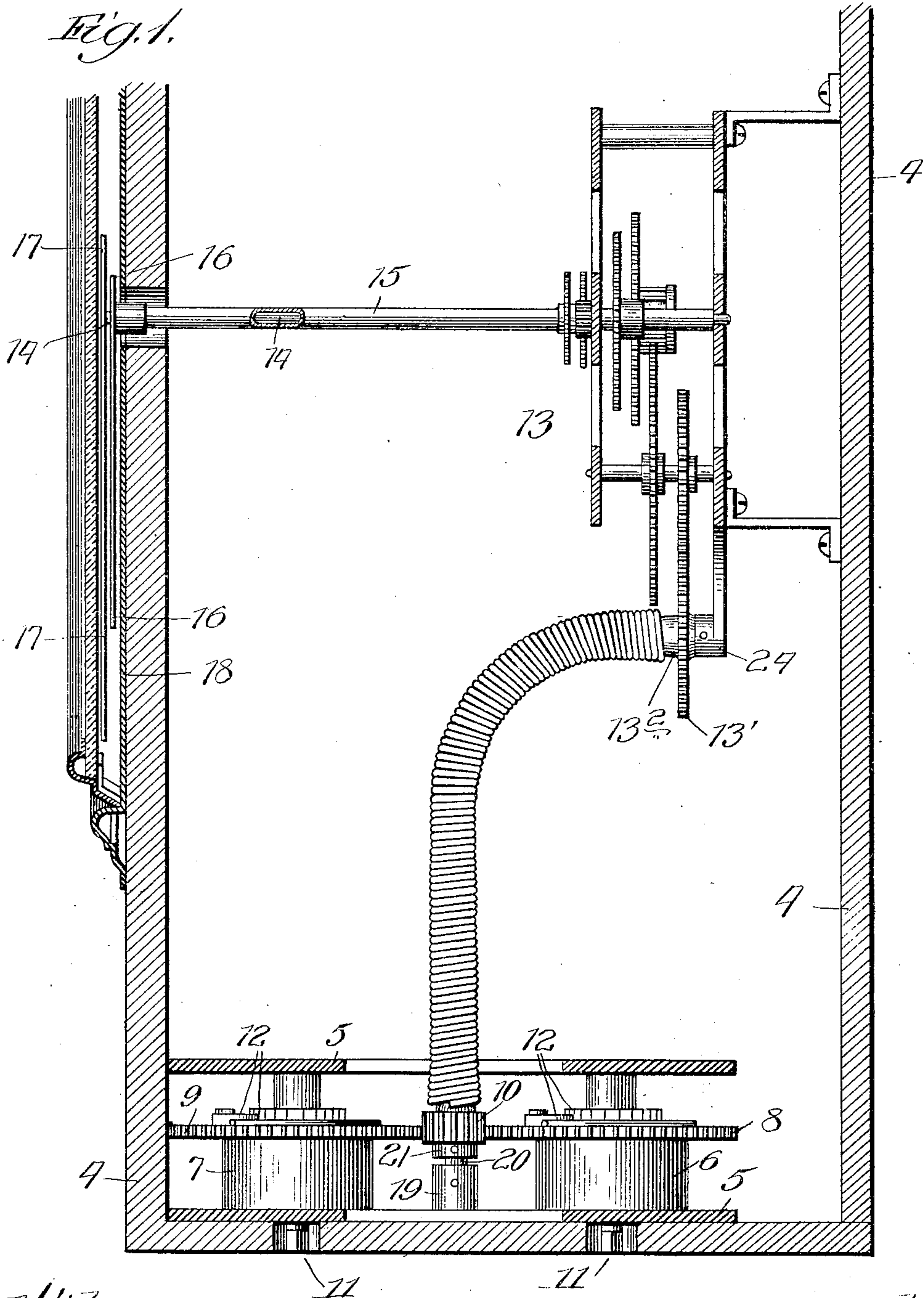
CLOCK.

APPLICATION FILED APR. 16, 1910.

973,854.

Patented Oct. 25, 1910.

2 SHEETS-SHEET 1.



Witnesses:  
Edw. Gaylord,  
Chas. H. Bull

Inventor.  
Jacob J. Busenbenz,  
By Drenforth, Lee, Chittenden & Mills,  
Attys.

J. J. BUSENBENZ.

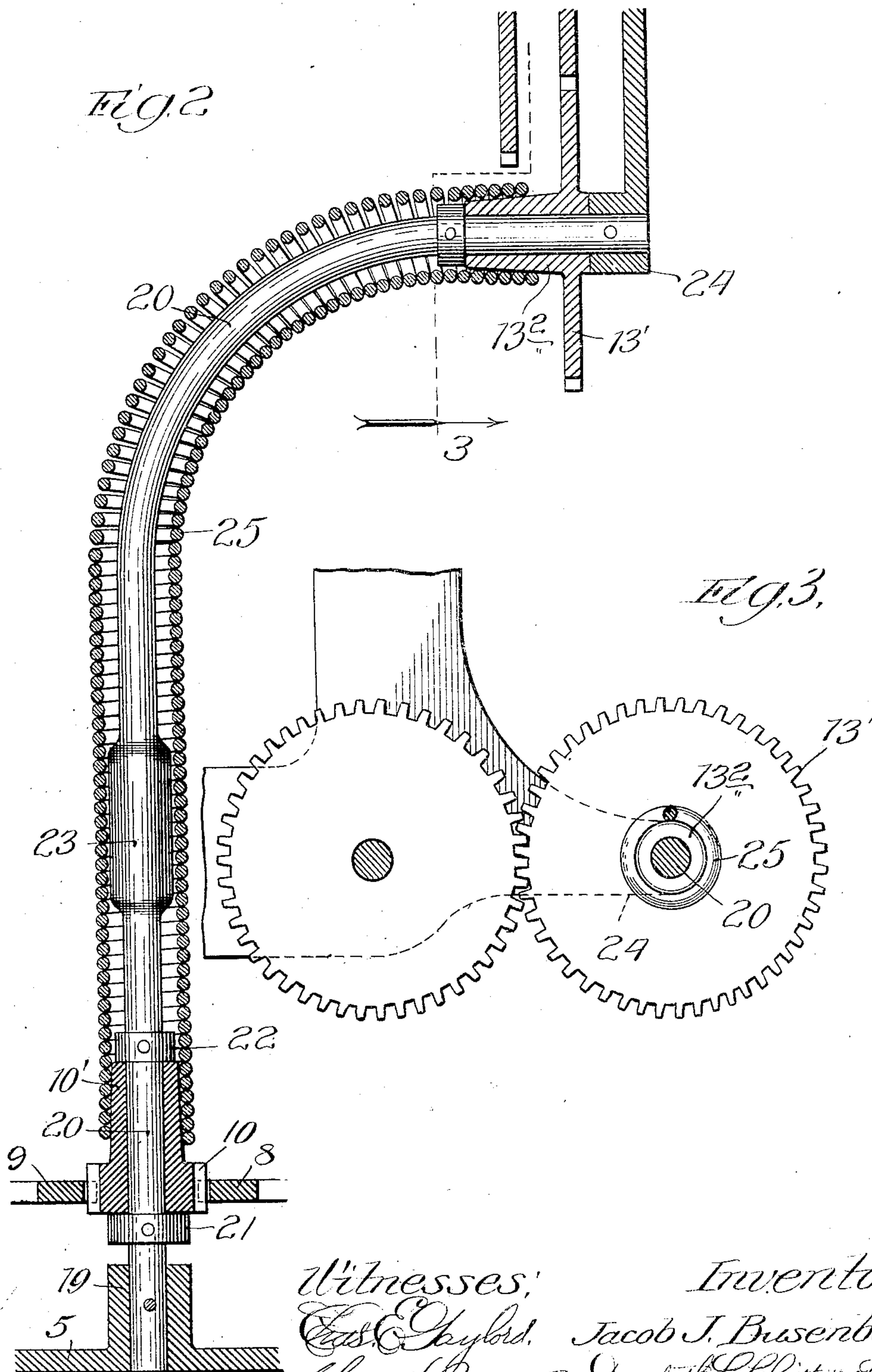
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Witnesses:  
Chas. E. Gaylord, Jacob J. Busenbenz,  
Chas. H. Buell, By *Bygren & Co.,* Attorneys,  
Chicago, Ill.



## UNITED STATES PATENT OFFICE.

JACOB J. BUSENBENZ, OF CHICAGO, ILLINOIS.

CLOCK.

973,854.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed April 16, 1910. Serial No. 555,784.

*To all whom it may concern:*

Be it known that I, JACOB J. BUSENBENZ, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Clocks, of which the following is a specification.

My invention relates to an improvement in the class of long-period clocks, meaning those which are adapted to run with a single manual winding for a year or more, in the case of pendulum-clocks.

A known type of clock in the class referred to, and upon which my invention is especially designed to afford an improvement, employs a hand-wound primary spring-motor, of the flat-coil variety, for periodically winding, by its recoil, a similar but relatively light spring which drives the clock-train, the power of which lighter spring is expended not only for driving the train but also for overcoming the resistance of a normally-locked release for the spring-motor to enable the latter to act. By this arrangement, as the unwinding of the stored-power or primary motor progresses, its action becomes retarded with the result of varying and rendering inaccurate the time-keeping of the clock.

The object of my invention is to provide a construction of clock in the aforesaid class which shall dispense with all resistance to be overcome, such as the release above mentioned, interposed between the primary motor and the clock-train other than the resistance presented by the lighter train-driving spring to winding, whereby such winding as well as the unwinding of the lighter spring shall be continuous and uniform, with the advantage of rendering the running of the clock regular.

In the accompanying drawings, Figure 1 is a broken sectional plan view of a so-called annual clock embodying my improvement; Fig. 2 is an enlarged broken sectional view of the train-driving spring device, showing the preferred manner of gearing it at its opposite ends, respectively, to the spring-motor and train, and Fig. 3 is a section on line 3, Fig. 2.

The clock-case 4, which may involve any usual or desired general form and construction, contains in one end a frame 5 for holding the stored-power motor, usually provided in clocks of the present class in the form of two similar flat spring-coils 6 and

7 carrying corresponding gears 8 and 9 meshing with a pinion 10 interposed between them and adapted to be wound at key-arbors 11, 11 projecting through the case; 60 and detent-mechanism 12 is provided on each spring. Only a portion of the clock-train 13 is illustrated, since it may be of ordinary construction, presenting no features of novelty, and turns in the usual way 65 shafts 14 and 15 carrying, respectively, the hour and minute hands 16 and 17 about a glass-covered dial 18.

Between the springs 6 and 7 there extends from the frame 5 a bearing 19 in which is 70 rigidly confined one end of a cylindrical core 20, which passes centrally through and thus journals the pinion 10 and its sleeve-extension 10<sup>1</sup>, confined against longitudinal displacement between collars 21 and 22 on 75 the core. Adjacent to the collar 22 the core has formed upon it a cylindrical enlargement 23 to perform the power-reducing function hereinafter explained; and the opposite end of the core is rigidly supported 80 in a bearing 24 on the frame of the clock-train, adjacent to which it passes centrally through and thus journals a gear-wheel 13<sup>1</sup> having a sleeve-extension 13<sup>2</sup> and meshing with the first gear of the train. The core 85 is shown curved toward its end which engages the wheel 13, owing to the relative disposition of the parts to attain compactness; though otherwise the core might be straight. A closely-wound, relatively-light 90 spiral-spring 25 surrounds the core, with one end secured to the sleeve 10<sup>1</sup> and its opposite end to the sleeve 13<sup>2</sup>.

With the motor-springs 6 and 7 wound up, they cooperate, by their recoil-force in gradually unwinding, which may continue for a 95 year or more, to continuously and regularly turn the pinion in one direction. By so turning the pinion it winds and tensions the spring 25 throughout its length about the 100 core 20 as far as resultant hugging it about the enlargement 23 will permit; and as the winding proceeds at the end of the spring adjacent to the pinion the tension toward the opposite end overcomes the resistance of and 105 drives the clock-train by corresponding unwinding of the spring toward that end. Thus the continuous and uniform turning of the pinion constantly winds the relatively light spring 25 at one end while it is unwinding correspondingly at the opposite end 110 to drive the train; and the enlargement 23



reduces the excessive power of the spring-motor to that required to actuate the clock-train by limiting the tensioning of the spring 25 to the extent required for performing its function.

As will be seen, the effect of my improvement is to run the clock for an indefinitely long period with absolute regularity and without tendency of the mechanism to get out of order, since there is nothing in it to become impaired by wear; and my improvement is equally applicable to pendulum-movement and lever-movement clocks.

While the primary motor is herein described as a pair of coiled springs acting against a pinion 10, and might be one such spring, any suitable variety of primary motor is contemplated as being within my invention.

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

1. In a clock of the character described, the combination with a primary motor and a clock-train, of a core, a spiral spring about the core having one end geared to said motor, for contracting the spring to tension it about the core, and its opposite end geared to the train, and regulating means cooperating with the spring between its ends to form the train-actuating spring-section and limit the extent of tensioning said section, for the purpose set forth.

2. In a clock of the character described, the combination with a primary motor and a clock-train, of a score provided with an

enlargement between its ends, and a spiral spring about the core and said enlargement having one end geared to said motor and its opposite end geared to the train, for the purpose set forth.

3. In a clock of the character described, the combination with a primary motor and a clock-train, of a rigid cylindrical core, a pinion journaled on said core and engaged by said motor to be continuously driven thereby, a spiral spring about said core having one end connected with the pinion for contracting the spring to tension it about the core by the power of said motor, and its opposite end geared to the train, and regulating means cooperating with the spring between the ends to form the train-actuating spring-section and limit the extent of tensioning said section, for the purpose set forth.

4. In a clock of the character described, the combination with a primary motor and a clock-train, of a stationary cylindrical core provided with an enlargement between its ends, a pinion journaled on said core and engaged by said motor to be continuously driven thereby, and a spiral spring about said core and enlargement having one end connected with the pinion and its opposite end geared to the train, for the purpose set forth.

JACOB J. BUSENBENZ.

In the presence of—  
R. A. RAYMOND,  
R. A. SCHAEFER.

Correction in Letters Patent No. 973,854.

It is hereby certified that in Letters Patent No. 973,854, granted October 25, 1910, upon the application of Jacob J. Busenbenz, of Chicago, Illinois, for an improvement in "Clocks," an error appears in the printed specification requiring correction as follows: Page 2, line 35, the word "score" should read *core*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3d day of January, A. D., 1911.

[SEAL.]

E. B. MOORE,  
*Commissioner of Patents.*