(No Model.) 2 Sheets—Sheet 1.

A. M. LANE.

FOUR-HUNDRED DAY CLOCK.

No. 462,009. Patented Oct. 27, 1891.

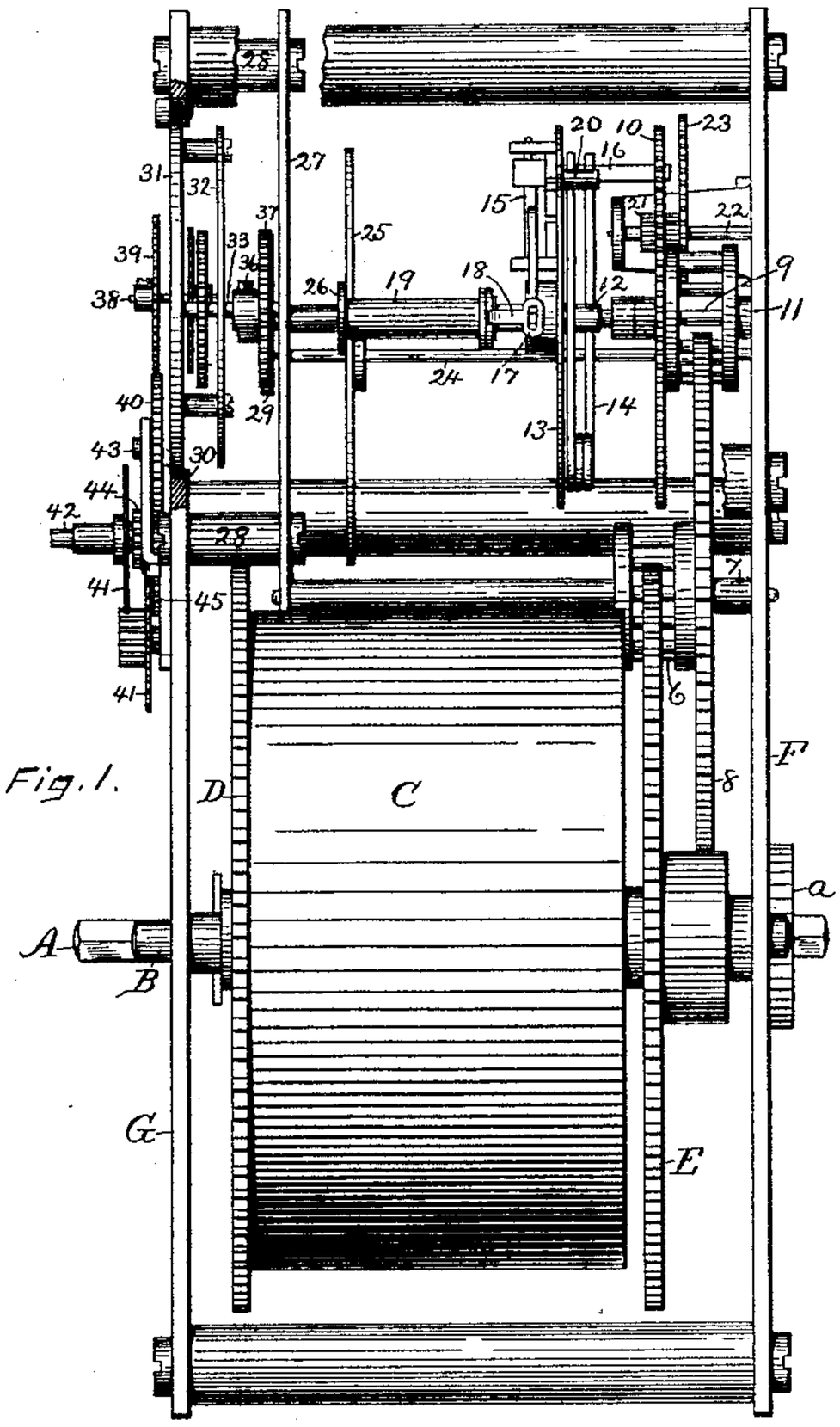

Fig. 1.

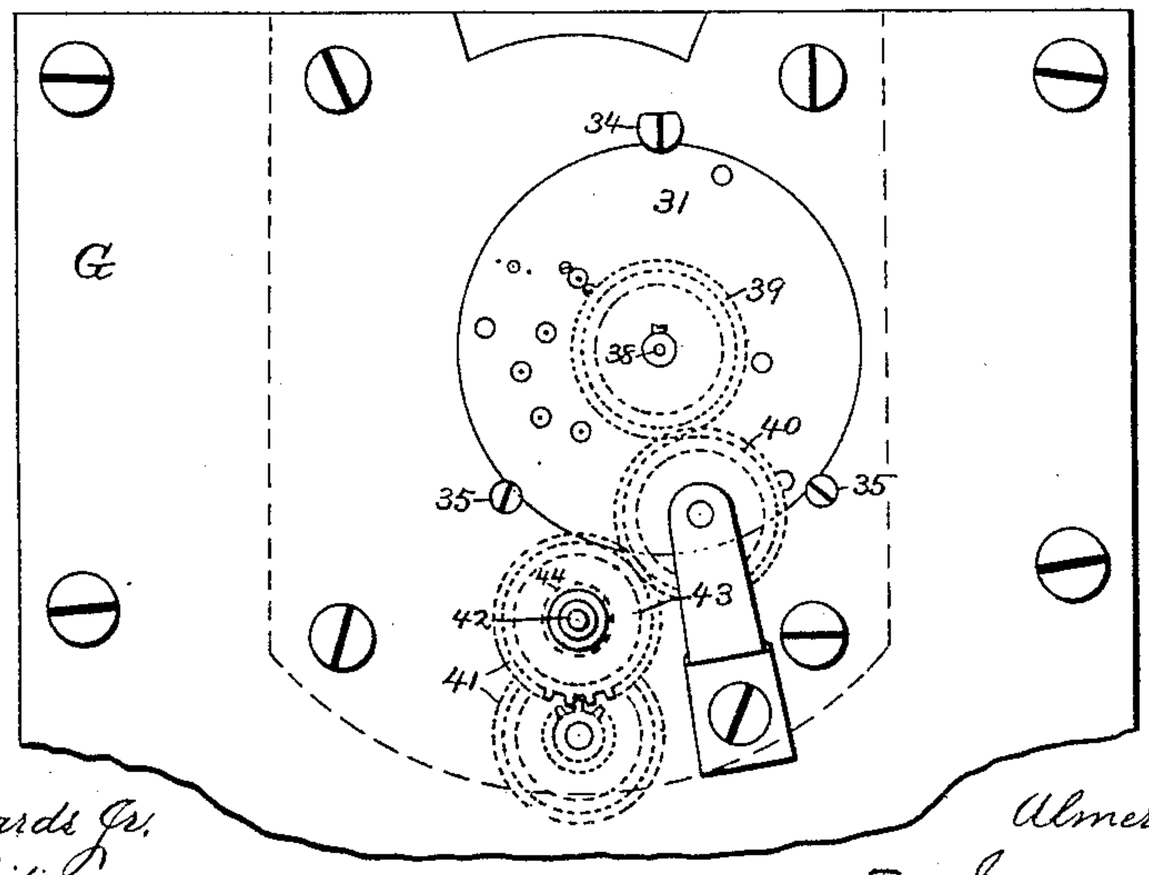

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

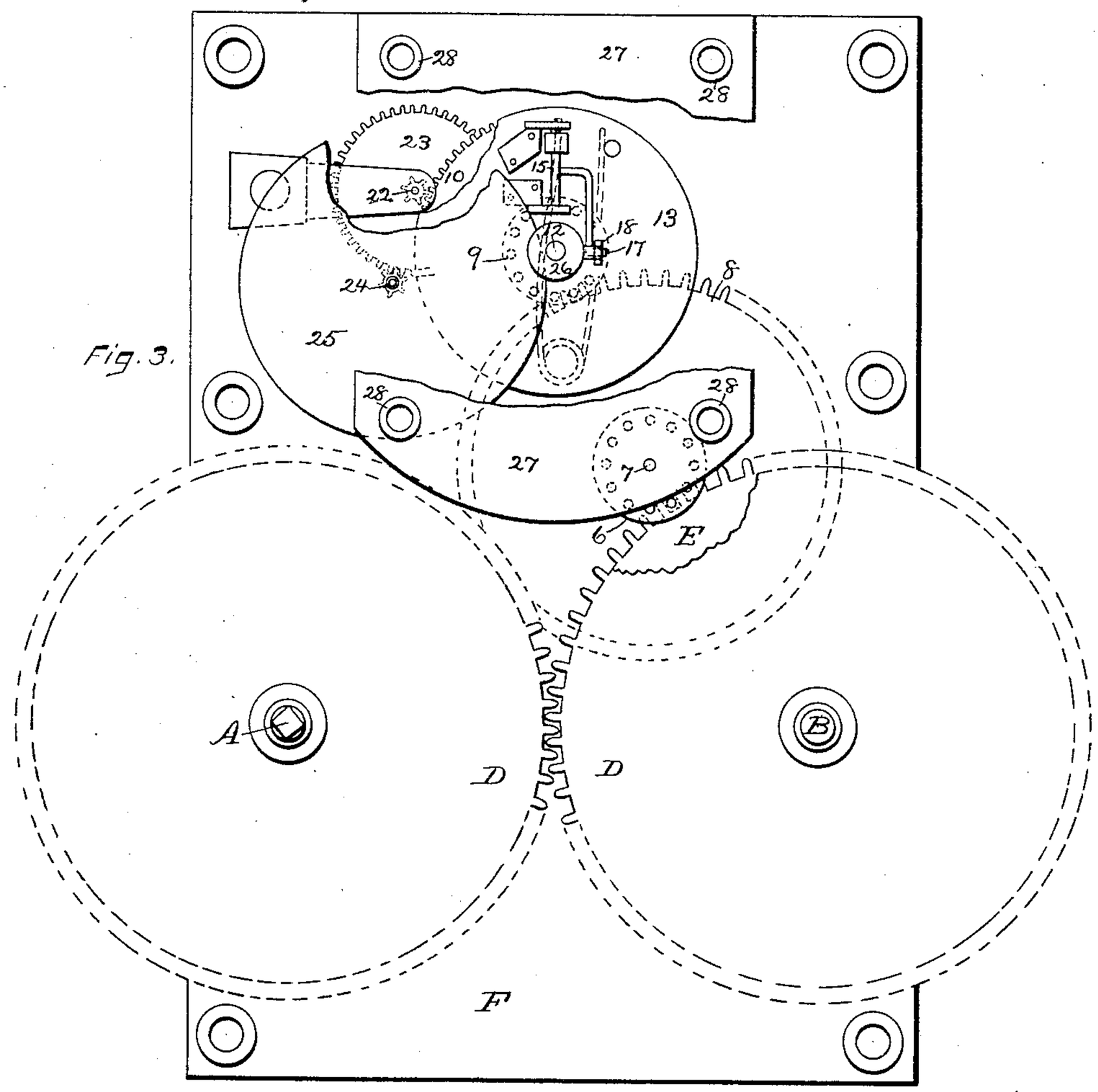


Fig. 4.

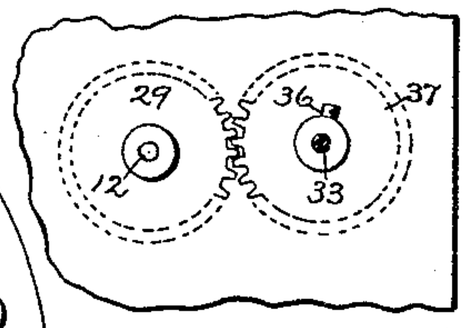
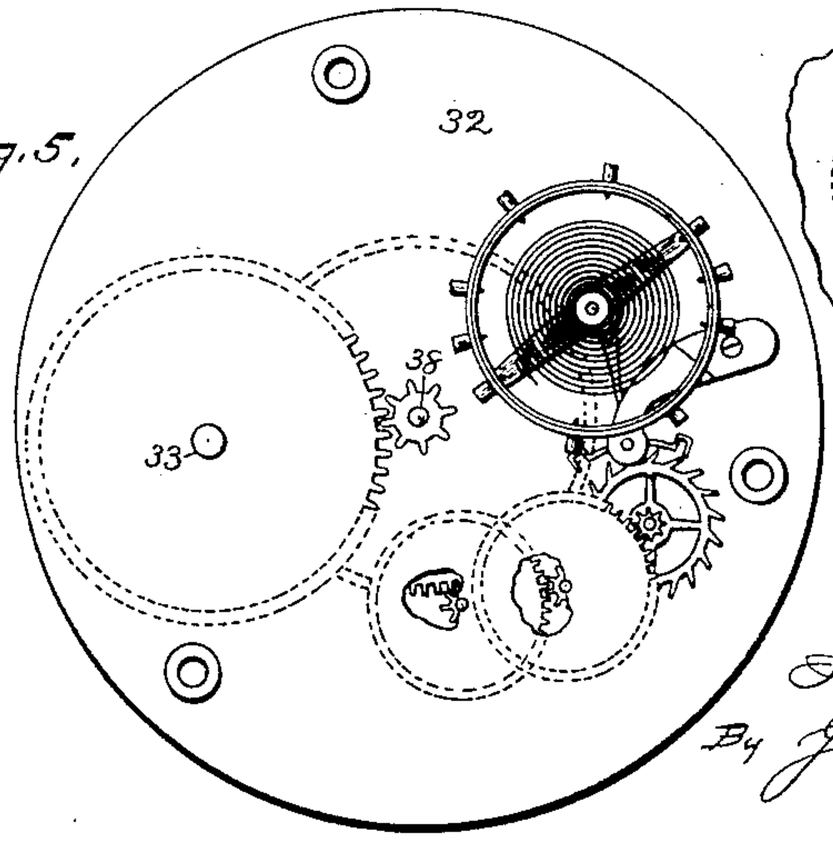


Fig. 5.



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Atty.

UNITED STATES PATENT OFFICE.

ALMERON M. LANE, OF MERIDEN, CONNECTICUT.

FOUR-HUNDRED-DAY CLOCK.

SPECIFICATION forming part of Letters Patent No. 462,009, dated October 27, 1891.

Application filed December 28, 1889. Serial No. 335,276. (No model.)

To all whom it may concern:

Be it known that I, ALMERON M. LANE, a citizen of the United States, residing at Meriden, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Four-Hundred-Day Clocks, of which the following is a specification.

My invention relates to improvements in four-hundred-day clocks; and the main objects of my improvement are economy in construction and efficiency in operation.

In the accompanying drawings, Figure 1 is a side elevation of my clock-movement, a portion of the front plate being shown in section. Fig. 2 is a front view of the upper portion of said movement. Fig. 3 is a front elevation of the motor-train, the escapement-train of finer grade being detached therefrom. Fig. 4 is a detached front elevation showing a part of said train and the wheel that connects it with the escapement-train, and Fig. 5 is an enlarged rear elevation of said escapement-train with one of the plates removed.

I make my clock-movement in separate trains, one of which constitutes the motor-train, which is of a grade such as may be produced in clock-shops, and the other is the escapement-train of a finer grade, like a watch-movement, in a separate frame, made attachable to and detachable from the frame of the motor-train. I make the motor-train of the class that is called "remontoir," and it is so illustrated. Such trains are well known in the art, and the particular one which I have selected for illustration is substantially that which is shown and described in Letters Patent No. 328,724, dated October 20, 1885, granted to David Shive. Other trains of this class may be substituted for this particular one, the movement being made to wind up a small weight or bend a delicate spring under the influence of the mainspring, which small weight or delicate spring alone gives its force to the escapement, by means of which the pendulum or balance is supposed to be always impelled by an equal and uniform force, and for this reason I term said train an "equalizing-motor." An example of an equivalent train for the purposes of my invention is described in *Reid's Treatise on Clock and Watch Making*, published by Blackie & Son, Glasgow, Edinburgh, London and New York, MDCCCLIX, beginning on page 213.

A B designates the main shafts, having a spring-barrel C rigidly secured to and moving with the wheels D D, said wheels engaging each other, as shown in Fig. 3. The springs within the spring-barrels (not shown) are connected by one end to said barrels and by their other end to the respective shafts A B, the winding-shaft A being provided with the ordinary ratchet *a*. This arrangement of the springs and wheels is not of my invention. The force of the springs in both barrels are exerted upon the shaft B for driving what I may term the "main wheel" E. Instead of putting one wide spring in each spring-barrel, I prefer to employ double springs in each barrel, so as to secure greater length without any increase of strength, the connection of two such springs within a spring-barrel being a matter of common knowledge, and therefore requires no description.

The main wheel E engages a lantern-pinion 6 on the shaft 7, which shaft carries the wheel 8, that drives the pinion 9 of the wheel 10, which revolves on a stationary shaft or stud 11. In axial alignment with said stud 11 is a revolving shaft 12, carrying upon it a plate or disk 13, upon which disk is mounted the equalizing-spring 14 and bell-crank lever 15. One arm 16 of said lever projects rearwardly into an opening in the wheel 10, while its other arm 17 enters an opening in the arm 18 of the sliding sleeve 19 on the shaft 12. One arm of the spring 14 bears against a stud 20 on the disk 13, and the other arm bears against the arm 16 of the angle-lever 15. The wheel 10 engages a pinion 21 on the shaft 22, and thereby drives the wheel 23, that engages a pinion on the shaft 24, and thereby drives the friction-disk 25, that is mounted on said shaft, all substantially as shown and described in said Shive patent. The operation of the parts is to equalize the force of the mainsprings and from time to time wind up the lesser spring 14, so that the latter alone exerts its force in propelling the shaft 12. Whenever the power of the springs exerted upon the main wheel E is greater upon the wheel 10 than that required for driving the shaft 12, said wheel 10 moves faster than the disk 13 and operates the angle-lever to impinge the flange 26 of the sleeve 19 upon the friction-disk 25, thereby either stopping the movement of said friction-disk and wheel 10 or holding them in check while they move

slowly, thereby exerting just power enough to keep the lesser spring properly wound, the surplus force being lost by friction, all substantially as shown and described in said Shive patent.

While I have illustrated and specifically described the Shive equalizing-motor, other equalizing-motors may be substituted as an equivalent therefor, and in fact I have already devised such an equivalent motor, which I intend to make the subject of an application to be soon filed.

The shafts 7, 12, and 24 have the bearings at their front end in the supplemental movement-plate 27, the same being represented as partially broken away in Fig. 3 to better show the other parts. Its contour is also indicated by broken lines in Fig. 2. The main shafts A and B and the other shafts of the motor-train, with the exception of 12, have their bearings at the rear end in the movement-plate F, while the bearings at the front end of said shafts A B are in the front plate G. The supplemental movement-plate 27 is secured to the back of said front plate by suitable pillars or posts 28, as shown in Fig. 1. The front end of the shaft 12 projects through the supplemental plate 27, and rigidly secured to said shaft in front of said plate is a wheel 29. (Most clearly shown in Fig. 5.)

In the front plate G, I make a circular recess, shouldered or flanged as at 30, Fig. 1, and in said recess I secure the frame of an escapement-train of a finer grade than that of the rest of the movement. 31 designates the front plate of said escapement-train, and 32 its rear plate. The parts inclosed by these plates are those of an ordinary watch-movement, less the spring, excepting that the shaft 33 of the main wheel projects farther from the rear plate. This watch-movement is attachably and detachably connected with the main frame by means of the screw 34, whose head is slabbed off on one side, so that when the cut-away portion of the head is immediately in front of the plate 31 the movement may be taken from the recess in the main frame. Suitable projections—as, for instance, the screws 35, Fig. 2—are provided for the lower edge of the watch-movement plate to hold it in place. Upon the main shaft 33 of the escapement-train is secured in any proper manner—as, for instance, by means of a set-screw 36—a wheel 37, that engages with and is driven by the wheel 29 on the shaft 12, thereby connecting the train of the watch-movement or escapement-train with that of the motor-train. These wheels are best shown in Fig. 4, the shaft 33 being shown in section. The center shaft 38 of the watch-movement or escapement-train projects to the front, and to it is secured the wheel 39. Said wheel engages and drives an intermediate wheel 40, which engages with and drives wheel 43, that carries the pinion 44 of the ordinary dial-wheels 41, for driving the usual pointers that revolve around the center 42. In Fig. 2 the wheels on the front of the movement-plate are illustrated in broken lines.

By thus employing an equalizing-motor consisting of principal and minor springs in connection with a train with a separately-formed escapement-train of a finer grade I am enabled to produce a four-hundred-day clock with a train of sufficient length and force to carry the clock during that time, while the escapement-train may be made as fine and delicate as any ordinary first-class watch, while at the same time the force of the motor will not injure said fine escapement-train in the least. Furthermore, the equalizing-motor may be made in a clock-shop, while the escapement-train may be made in a watch-shop, where they do a finer grade of work and are furnished with different facilities. Even in this case it requires no special machinery, as all the change necessary in the escapement-train resides in the omission of its driving-spring and supplying the main wheel with a longer shaft. When the escapement-train requires cleaning or repairs, it may be readily detached from the front of the movement-frame by taking off the bridge 43, on which the wheel 40 is mounted, and loosening the screw 34, and when cleaned or repaired it may be readily attached again. This makes it practicable to make a four-hundred-day clock at a reasonable cost and one that will give efficient service.

I claim as my invention—

1. The combination of an equalizing-motor consisting of a train with principal and minor springs mounted in a suitable frame, and an escapement-train in a separate frame, having no spring for said escapement-train, said escapement-train being attachably and detachably connected to the frame of the equalizing-motor, substantially as described, and for the purpose specified.

2. A clock consisting of a motor and its train mounted in a frame having two main plates, and a supplemental plate, with an escapement-train of a finer grade in a separate frame, having no spring for said escapement-train, said escapement-train being attachably and detachably connected to the front plate of the frame of said motor at a point in front of said supplemental plate, substantially as described, and for the purpose specified.

3. A clock consisting of a motor-train mounted in a frame and an escapement-train mounted in a separate frame from that of said motor-train, the center about which the pointers revolve being outside the frame of said escapement-train, substantially as described, and for the purpose specified.

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Witnesses:
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JOHN EDWARDS, Jr.