(No Model.)

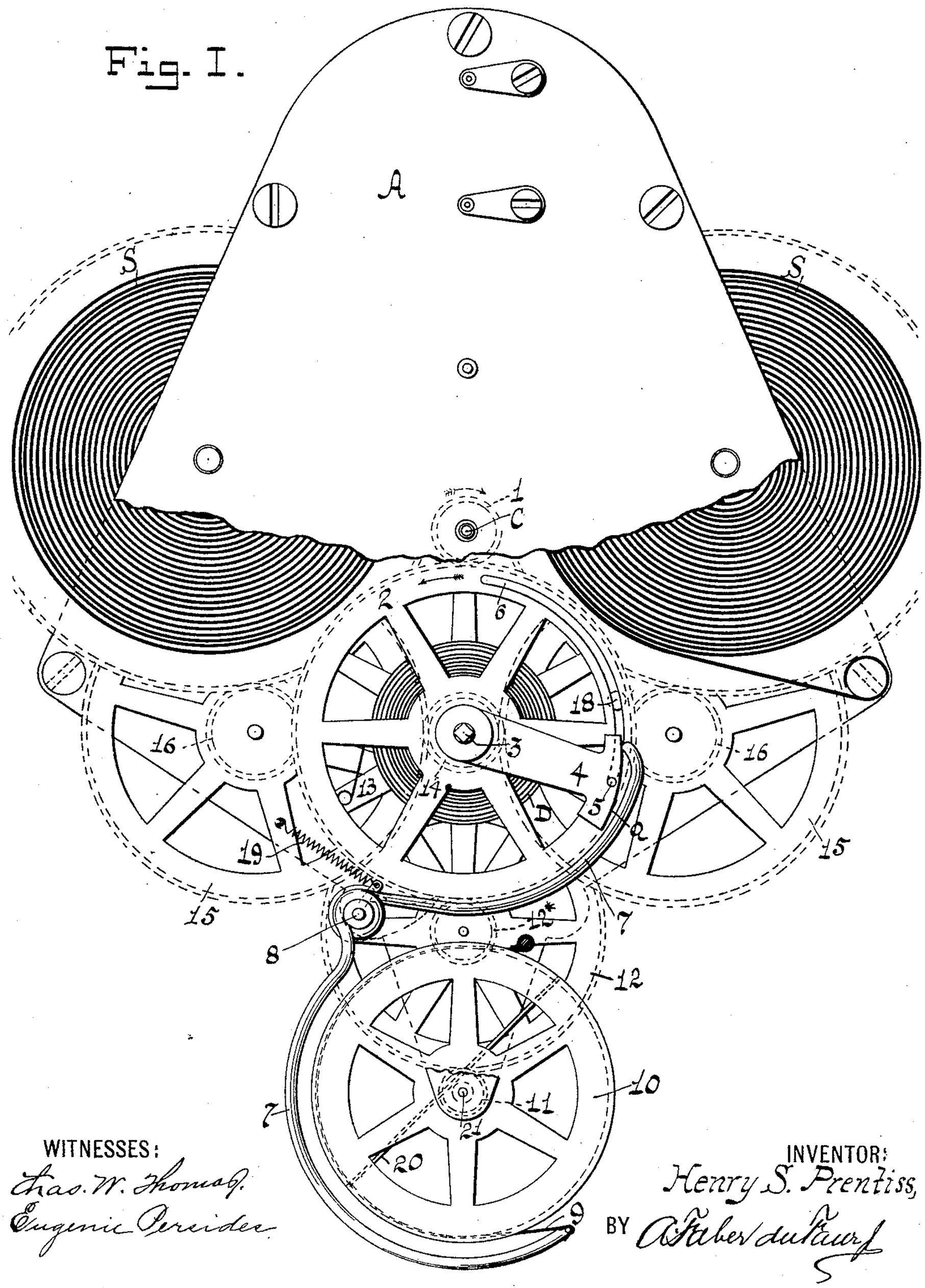
2 Sheets—Sheet 1.

H. S. PRENTISS.

SELF WINDING CLOCK.

No. 572,274. Patented Dec. 1, 1896.

Fig. I.



WITNESSES:

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Eugenie Pereidee.

INVENTOR:

Henry S. Prentiss,

BY A. Faber du Faur

ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. III.

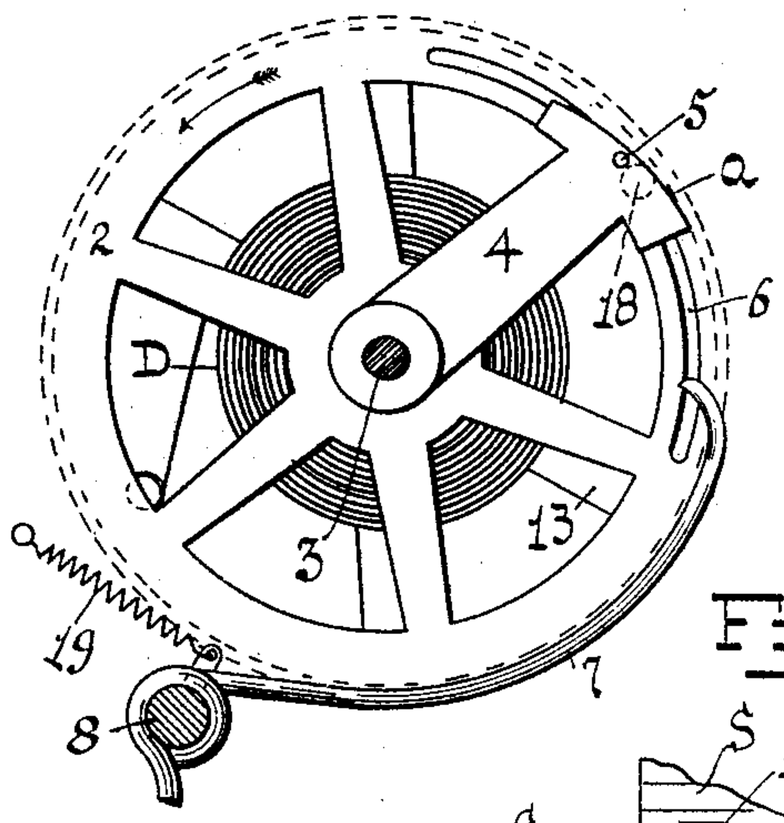


Fig. IV.

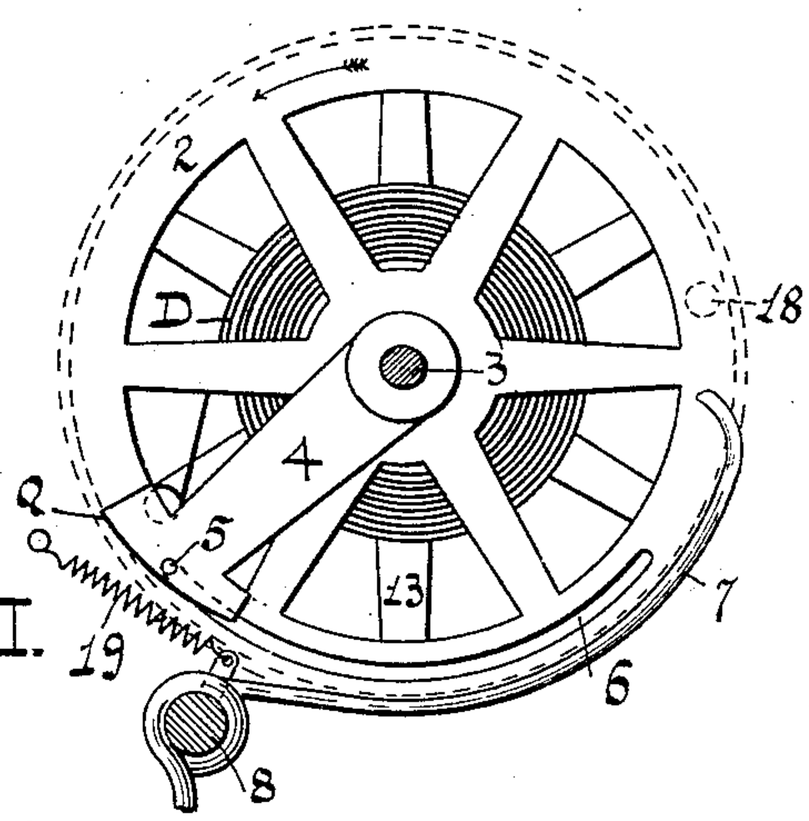


Fig. II.

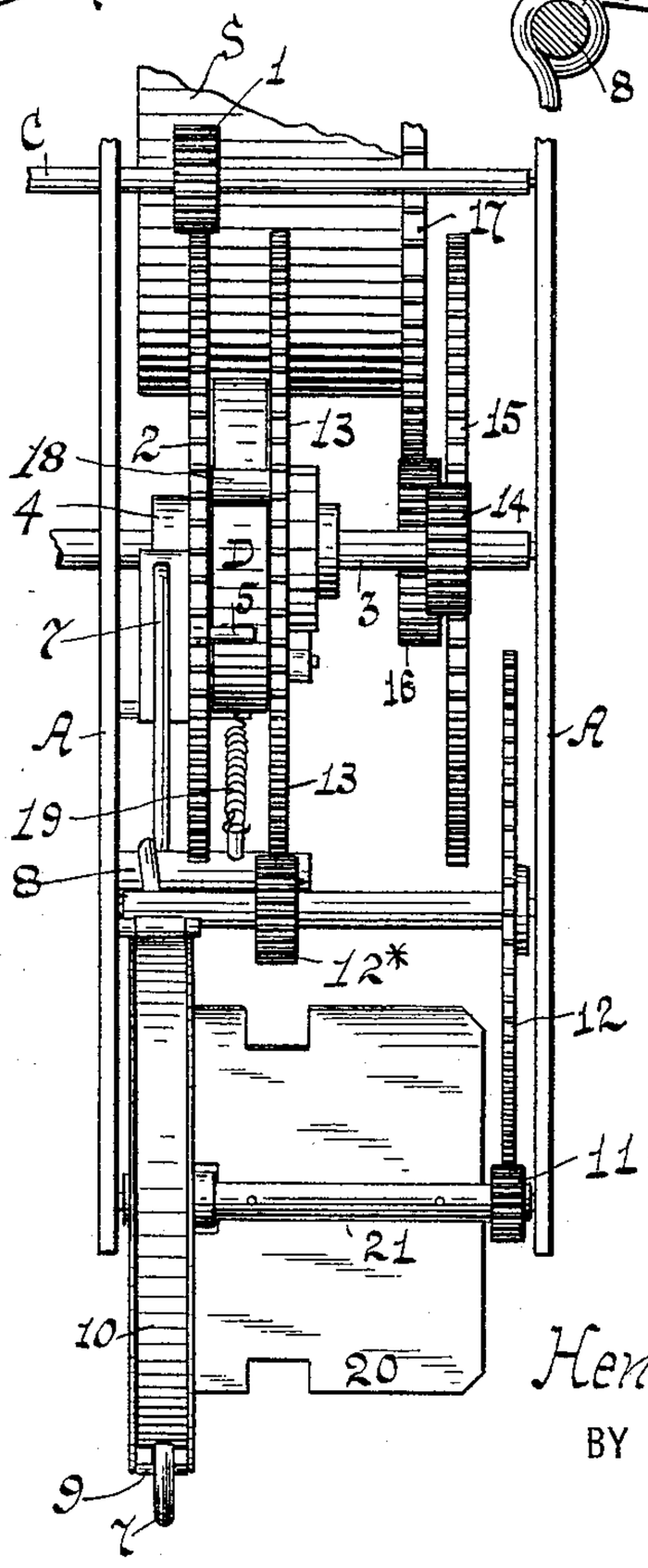


Fig. V.

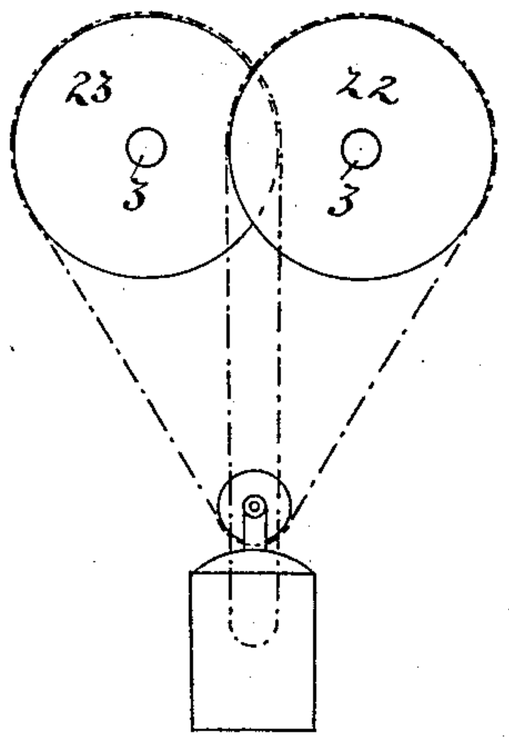
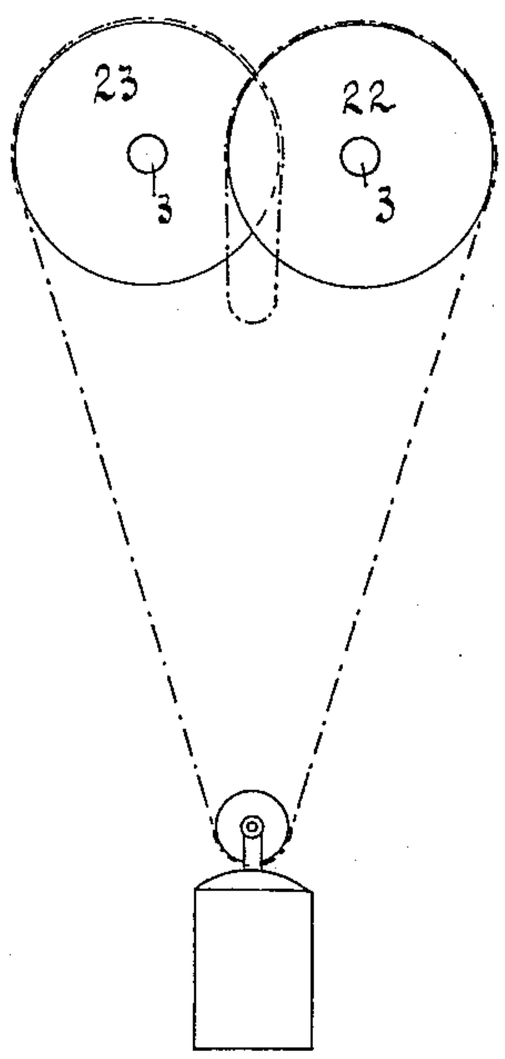


Fig. VI.



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UNITED STATES PATENT OFFICE.

HENRY S. PRENTISS, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE PRENTISS CLOCK IMPROVEMENT COMPANY, OF NEW JERSEY.

SELF-WINDING CLOCK.

SPECIFICATION forming part of Letters Patent No. 572,274, dated December 1, 1896.

Application filed January 7, 1895. Serial No. 534,018. (No model.)

To all whom it may concern:

Be it known that I, HENRY S. PRENTISS, a citizen of the United States of America, residing at Elizabeth, in the county of Union, State of New Jersey, have invented certain new and useful Improvements in Mechanical Self-Winding Clocks, of which the following is a specification.

My invention has reference to improvements in timepieces, and especially to that class in which the light driving-spring of the time-movement is periodically rewound by a second powerful spring motor or movement. Commonly such timepieces are termed "mechanical self-winding clocks," to distinguish the same from electric self-winding clocks.

The general object sought to be accomplished in the construction of such clocks is to provide for the lapse of a long interval of time before rewinding becomes necessary, while the error due to the variation in the force of the spring as it runs down is reduced to a minimum.

The object of my present invention is to provide a timepiece of this character with novel and efficient means for periodically winding the driving-spring from a second powerful spring without injury or shock to the parts, both said springs being contained in one and the same movement, while the number of parts employed is but slightly in excess of that contained in an ordinary movement. Heretofore mechanical self-winding clocks have practically been composed of two separate and distinct trains, the one a clock-movement of the usual construction and the second a spring-motor adapted to wind the mainspring of the clock-movement at predetermined regular intervals.

The nature of my invention will best be understood when described in connection with the accompanying drawings, in which—

Figure 1 is an elevation of a timepiece constructed according to my invention, part of the front plate being removed. Fig. 2 is a side elevation taken from the right-hand side of Fig. 1. Figs. 3 and 4 are sectional detail views illustrating the operation of the spring releasing and winding devices. Figs. 5 and 6 are diagrams illustrating a construction in which a weight is substituted for the driving-spring.

Similar letters and numerals of reference designate corresponding parts throughout the several views of the drawings.

Referring to the drawings, the letter A designates the frame of the timepiece.

C is the center, having thereon the usual center-pinion 1, engaged, as usual, by the great wheel 2. In this instance said wheel is mounted loosely on an arbor 3, which, in this example, constitutes the winding-arbor of the timepiece.

S S designate the two driving-springs of the movement, made sufficiently strong to afford the necessary power for keeping the timepiece in motion for a period of about one hundred days or more.

D is the light driving-spring, which surrounds the winding-arbor 3, and is secured at its inner terminal to the great wheel 2. Its outer end is secured to a gear 13, mounted on the winding-arbor 3. Said gear has a pawl-and-ratchet connection with the winding-arbor of a usual construction and receives motion at predetermined intervals from the winding-springs S through a suitable gear connection presently to be described.

Upon the winding-arbor 3 and in front of the great wheel 2 is mounted to swing freely an arm 4, provided with an inwardly-projecting pin 5, which latter extends through a concentric slot 6 of considerable length in the great wheel 2. This arm 4, under the influence of the great wheel 2, operates at certain intervals to release the winding-springs S from the constraining action of a detent. In this example the outer edge *a* of said arm 4 is cam-shaped and is adapted to engage at certain intervals with one arm of a lever 7, pivoted at 8 to the frame of the timepiece. To the opposite arm of said lever is secured one end of a strap 9, partially encompassing a brake-wheel 10. This brake-wheel 10 is under the influence of the springs S through a system of intermediate gears 11, 12, 12*, 13, 14, 15, 16, and 17, but is normally restrained from turning by the brake-strap 9, held against the same by a spring 19, connected to the lever 7.

The parts above described form a detent operating to release and check the winding-springs without shock or jar; but I wish it to be understood that I do not restrict myself to this specific construction.

On the gear 13 is secured a pin 18, arranged in the path of the pin 5 on the arm 4 and adapted to engage the latter for effecting the necessary movement of the arm 4 to release the lever 7.

The great wheel 2, as usual, makes one revolution about its arbor, under the influence of the driving-spring D, every six hours, while the gear 13 remains stationary. After the spring D has been rewound the parts are substantially in the position shown in Fig. 3, the pin 5 being to the left of pin 18. In the rotation of the great wheel the end of slot 6 ultimately reaches and engages with the pin 5 of arm 4 and carries the latter past the center, whence, if loosely mounted, said arm drops by its own weight to the opposite end of the slot. Ultimately the arm 4 is carried to the position shown in Fig. 1, where it is in engagement with the upper end of the brake-lever 7 and presses the same gradually outward, and in so doing causes the brake-wheel 10 to be gradually released. The winding-springs S are now free to act, and through the intermediate train of gears before described rotate gear 13. Toward the end of the rotation of said gear the pin 18 thereof engages with pin 5 on arm 4 and turns the same about its arbor a sufficient distance to throw it out of engagement with lever 7, which latter, under the action of spring 19, causes the brake-strap to be applied to the brake-wheel 10, thereby arresting the motion of said wheel. The position of the parts is indicated in Fig. 3. In this manner the driving-spring is, through the agency of the winding-springs, wound through one coil every six hours. Of course any other predetermined interval of time may be selected.

The motion of wheel 10, and consequently the rapidity with which the winding-springs unwind, may be controlled by a usual governor, such, for instance, as the fan 20, mounted on the arbor 21 of the brake-wheel. However, I find that with the brake herein described such a governor is not absolutely essential to the smooth working of the parts.

The gears 14, 15, 16, and 17 properly constitute a winding-train for the winding-springs, such as are commonly used in the Prentiss clock, for the purpose of enabling powerful springs to be more easily wound by hand, and they are not absolutely necessary. It is also evident that one winding-spring will answer the purpose.

In place of the driving-spring D a suitable weight may be used to actuate the great wheel, said weight being suspended from an endless chain or cord passing over pulleys 22 and 23, located, respectively, on the gear 13 and wheel 2. This construction is diagrammatically illustrated in Figs. 5 and 6.

While I have herein shown the release applied to and operated by the great wheel, it is to be understood that said release could be applied to and operated by any other suitable wheel of the movement.

What I claim as new is—

1. A mechanical self-winding clock comprising in its structure a driving-spring, a winding-spring for winding the driving-spring, a great wheel mounted loosely on its arbor, a detent restraining the motion of the winding-spring, an arm 4 engaged by the great wheel and adapted to engage with the detent, a gear arranged in line with the great wheel and provided with a pin adapted to engage arm 4, and a connection between said gear and the winding-spring, substantially as described.

2. A mechanical self-winding clock comprising in its structure a driving-spring having one terminal connected to the great wheel and its other terminal to a gear arranged to turn about an axis in line with that of the great wheel, a brake lever and wheel restraining the motion of the winding-spring, an arm provided with a pin extending through a slot in the great wheel, a pin on the gear adapted to engage the pin on the great wheel for throwing the arm out of contact with the brake-lever, and an operative connection between the gear and the winding-spring, substantially as described.

3. A mechanical self-winding clock comprising in its structure two winding-springs having a common winding-arbor connected thereto by a train of gears, a great wheel and gear mounted on said winding-arbor in the manner specified, a driving-spring located between said great wheel and gear and connected to the same, means, substantially as described for restraining the winding-springs, and a release actuated by the great wheel for freeing the winding-springs at predetermined intervals; all embodied in said clock-movement, substantially as described.

In testimony that I claim the foregoing as my invention I have hereunto set my hand in the presence of the subscribing witnesses.

HENRY S. PRENTISS.

Witnesses:
CHAS. W. THOMAS,
EUGENIE PERSIDES.