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MEANS FOR MAINTAINING UNIFORMITY OF MOTION OF SPRING DRIVEN MECHANISM.

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1,063,781.

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Fig. 1.

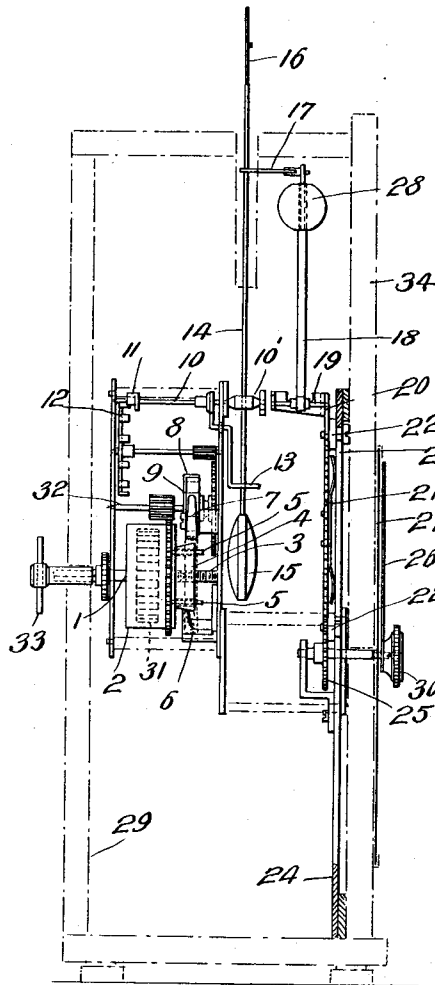


Fig. 2.

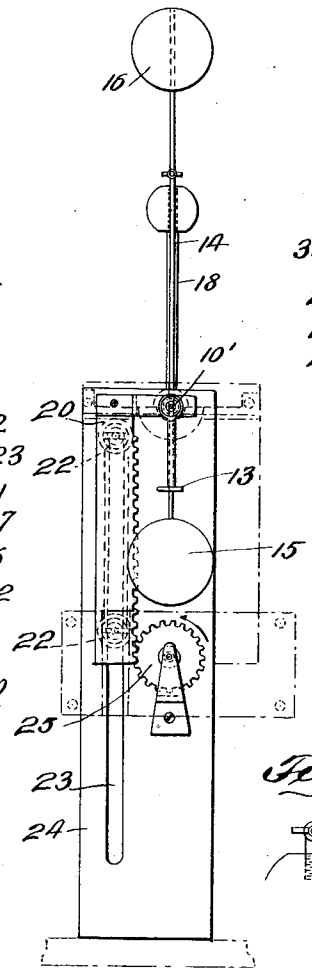


Fig. 3.

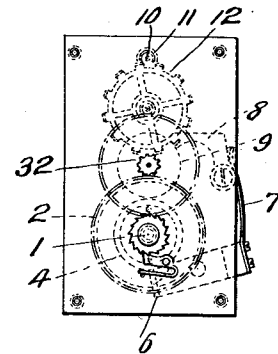


Fig. 5.

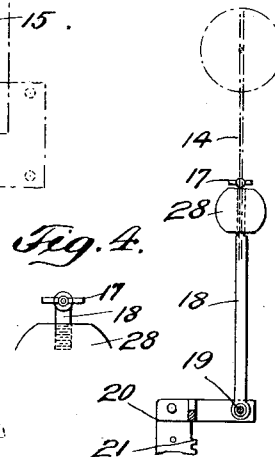


Fig. 4.

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MEANS FOR MAINTAINING UNIFORMITY OF MOTION OF SPRING-DRIVEN MECHANISM.

1,063,781.

Specification of Letters Patent.

Patented June 3, 1913.

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To all whom it may concern:

Be it known that HENRY SAVIN DECASTIAU, who was a citizen of the Republic of France, and a resident of 125 Rue Chevalier, Levallois-Perret, Seine, France, but is now deceased, did invent a certain new and useful Means for Maintaining Uniformity of Motion of Spring-Driven Mechanism, (for which a patent has been obtained in France, bearing date April 28, 1911, No. 429,095, in the name of Gustave Frantz Lyon, of Paris, France,) of which the following is a full, clear, and exact specification.

The invention relates to an improvement in metronomes of the kind in which the beam is fixed to the oscillating member of an escapement wheel actuated by clockwork or the like, and particularly to instruments driven by spring-motors.

According to the invention the beam is connected by a fork to a pendulum, whose axis of oscillation is mounted on a vertical slide. By moving this slide by means of a suitable actuating mechanism, the period of oscillation of the beam can be varied at will. In order to render this period absolutely independent of the degree of tension of the spring, the clockwork mechanism or motor comprises a brake or retarding device whose action is greater according as the tension of the spring is greater.

In the accompanying drawings, Figure 1 is a cross-section of a metronome according to the invention; Fig. 2 is a front view, the clockwork being removed; Fig. 3 is a front view of the clockwork; Figs. 4 and 5 show details of the mechanism.

The barrel 2 carries an internal spring 31, which is fixed on the one hand to the internal surface of the barrel, and on the other hand to a shaft 1 which can be turned by a key 33 in order to wind up the apparatus. The clockwork is also provided with a stop device. The barrel actuates by means of multiplying gears a shaft 32 which transmits motion by gear-wheels to an escapement wheel 12, the teeth of which engage successively with a notched cylinder 11 on a shaft 10.

The shaft 1 of the barrel 2 terminates in a screwed portion 3 on which is mounted a plate 4 forming a nut. This plate is constrained to rotate with the barrel. For this purpose it is penetrated by two rods 5

screwed on the lid of the barrel 2 and sliding freely in openings provided for them. When the shaft 1 of the barrel is rotated by means of a suitable key for the purpose of tensioning the spring 31, the plate 4 approaches the barrel. The rim of the plate 4 is conical and can engage with the inclined plane of an arm 6 on which is mounted a spring 7 whose extremity acts on the block 8 of the brake in contact with a disk 9 fixed to the shaft 32 of the clockwork.

On the shaft 10 of the cylinder 11 of the escapement wheel 12 is fixed a fork or driven element 13 between the prongs of which the rod 14 of the beam passes. This rod 14 carries a heavy mass 15 at its lower end and a disk 16 at its upper end. It is fixed to a shaft 10' situated in a continuation of the shaft 10. A second fork 17 (Figs. 1 and 4) can slide upon the rod 14 and is hinged to a pendulum 18 carrying a weight 28, whose axis of oscillation 19 is mounted on a slide 20 (Fig. 5). The slide 20 can move vertically and is guided during this movement by two pins 22 penetrating a groove 23 formed in a plate 24 attached to the front wall of the casing of the metronome.

The rack 21 engages with a pinion 25 keyed on the same axis as an indicating needle 26 moving in front of a graduated scale 27. The needle is moved by acting on the milled knob 30.

The apparatus acts as follows: The escapement wheel 12, to which the tension of the spring 31 is transmitted by gear-wheels, has an intermittent rotary movement, while the cylinder 11 oscillates and, by means of the fork 13 takes with it the beam 14. The latter actuates the pendulum 18 by means of the fork 17. In order to vary the period of oscillation the milled knob 30 is actuated. If, for example, the pinion 25 is rotated in the direction of the arrow shown in Fig. 2, the slide 20 descends and with it the pendulum 18 and fork 17 which slides along the rod 14. By this means the oscillations become shorter and quicker owing to the retarding action of pendulum 18 being diminished. The brake-mechanism fitted to the driving mechanism serves to make the movement of the barrel absolutely independent of the tension of the motor spring 31. This device may be used in connection with any similar motor and the invention is of

course not to be limited to metronomes, although especially applicable thereto. When this spring is tensioned by acting on the key 33, the conical plate 4 approaches the barrel 2 and presses against the slope of the arm 6 which it tends to separate from the shaft 1. The spring 7 acts therefore more and more strongly upon the block 8 and produces a stronger and stronger braking action on the disk 9. When the metronome is working, the braking action produced by the block 8 on the disk 9 is at first very strong, then as the tension of the motor spring decreases the plate 4 separates from the barrel and the block 8 acts less energetically upon disk 9. By this means the braking action is progressively decreased in intensity and accordingly the power transmitted to the escapement mechanism is controlled. In this manner for any determined position of the indicating needle the period of oscillation remains constant.

I claim:

1. In a spring motor the combination of a clockwork mechanism comprising an actuating spring, a brake acting on said clockwork and means controlled by the actuating spring for actuating said brake in accordance with the tension of said spring.
2. In a spring motor the combination of a clockwork mechanism, a spring actuated shaft having a screwed end, a member engaging said screwed end and adapted to move along said end as the shaft rotates, a brake acting on said clockwork and means actuated by said member for controlling said brake.
3. In a spring motor the combination of a spring actuated shaft having a screwed end, a member engaging said screwed end and adapted to move along said end as the shaft rotates, a disk actuated by said shaft, a brake block engaging said disk and means actuated by said member to control the action of said brake block.

4. In a spring motor the combination of a shaft having a screwed end, a spring actuating said shaft, a member engaging said screwed end and adapted to move along said end as the shaft rotates, a disk actuated by said shaft, a brake block engaging said disk and means actuated by said member to control the action of said brake block according to the tension of said spring.

5. In a spring motor the combination of a shaft having a screwed end, a spring actuating said shaft, a member engaging said screwed end and adapted to move along said end as the shaft rotates, a disk rotated by said shaft, a brake block engaging said disk, a spring acting on said brake block, an arm carrying said spring, said arm being adapted to be acted on by the member on said brake block according to the tension of the screwed shaft to vary the pressure exerted by said spring on said brake block according to the tension of the motor spring.

6. The combination with a spring motor and its driven element of a retarding device operated from the spring to retard the driven element to an extent according to the tension of the spring.

7. In a spring motor, a driven element and means for maintaining uniformity of motion thereof operable in connection with the motor in such manner that when there is a tendency for the motor to accelerate the said element the said means automatically operate to retard the element to the same degree.

8. The combination with a spring motor and its driven element, of means to maintain uniformity of motion of the driven element comprising mechanism whose action is regulated according to the tension of the spring.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."