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IMPULSE MECHANISM FOR THE PENDULUMS OF CLOCKWORKS

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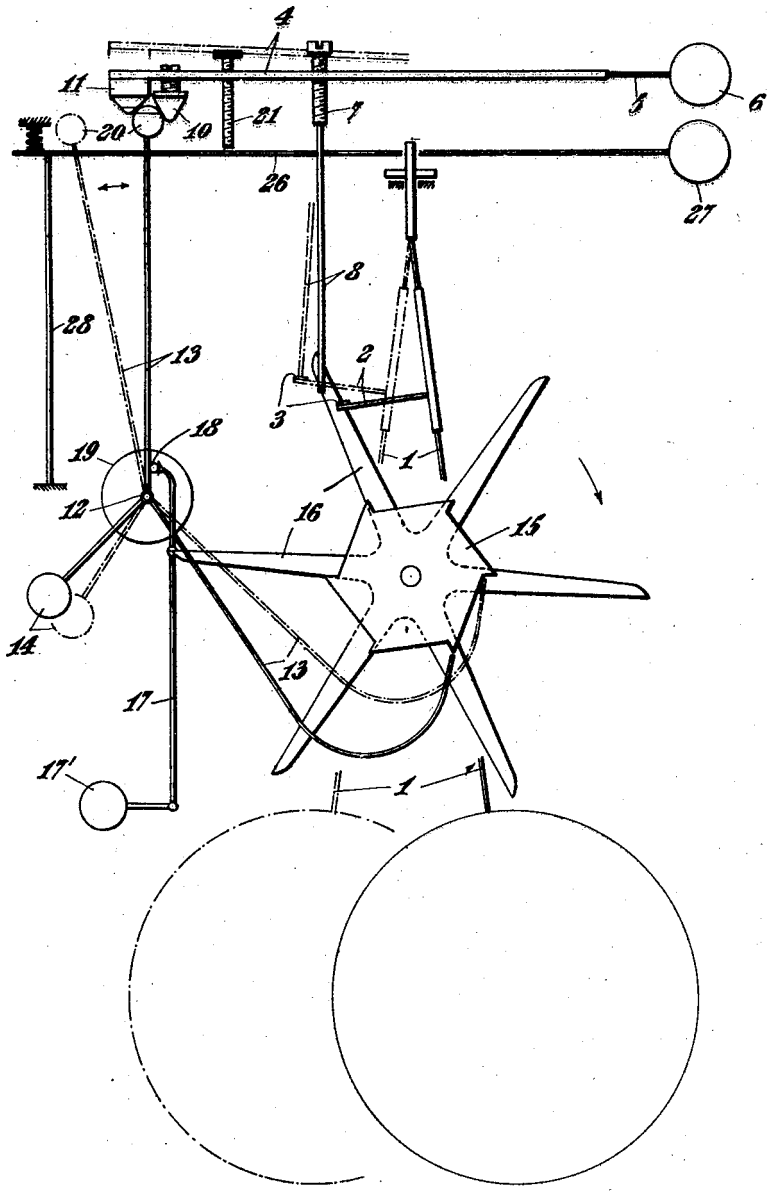

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IMPULSE MECHANISM FOR THE PENDULUMS OF CLOCKWORKS

Application filed August 25, 1927, Serial No. 215,342, and in Switzerland August 26, 1926.

My invention relates to an impulse for the pendulum of a clockwork in which the impulse is imparted periodically to the swinging time beater or pendulum by means of a weighted lever.

The invention consists in a device which so changes automatically the impulse imparted to the swinging time beater according to the variations of the temperature that the effects of temperature influencing the time beater are compensated.

The accompanying drawing represents an embodiment of my invention.

In the drawing 1 indicates the time beater or pendulum which carries near its point of suspension a laterally projecting arm 2 provided at its free end with a precious stone plate 3. Above said pendulum 1 a lever arm 4 is attached to a rod 6 of the otherwise not represented frame work by means of a flat spring 5. A flexible steel wire 8 is extended downward from a screw 7 fixed to the arm 4 so that the plate 3 at each oscillation of the pendulum will strike against the lower end of said wire, whereby lever arm 4 will be moved upwards while the pendulum is first retarded by the weight of the arm 4 and then receives an impulse in the reverse sense from said arm 4. The arm 4 carries at its free end, adjustable in height, a conical check piece 10 and outside of the same a retarding tappet 11 for the oscillating pallet 13 mounted on the staff 12. The said pallet always tends under the effect of the weight 14 to assume the position shown in broken lines being returned to the position shown in full lines by means of the escapement wheel 15. A spider 16 fast to the axis of the escapement wheel is delayed in its course by means of a pivoted lever arm 17 which bears against a crank pin 18 of a disk 19 and is displaced by said disk when the latter oscillates together with the pallet to retard and release said escapement wheel. The upper end of the pallet has a head 20 the upper portion of which is a precious stone, for instance an agate. The contact surface of the tappet 11 is likewise made of a jewel having a different hardness, so that the stones will not act injuriously on each other but to the contrary become polished, whereby the reliable operation of the described device is insured. The weighted arm 4 of the pendulum 1 is made of ordinary metal iron or brass. A second lever arm 26 is arranged under the weighted arm 4 and is supported at 27 resting with its free end on a vertical rod 28 made of a very expansible metal for instance of zinc. With the increasing temperature therefore, the rod 28 will increase its length and, the arm 26 which forms a stop for the adjusting screw 21 of the weighted arm 4 will move upwards with the result that the adjusting screw 21 strikes it earlier and that the impulse stroke imparted by the weighted lever 4 to the pendulum is correspondingly shortened. Therefore, the impulse imparted to the pendulum is changed according to the variation of the temperature and an unalterable amplitude and therefore, also a constant running of the clock will result therefrom.

The mechanism works as follows: The escapement wheel 15, 16 is rotated under the action of the main spring (not shown) in the direction of the arrow, until it is arrested by the lever 17 which as shown is provided with a stop. As the escapement wheel is rotated, it moves the lever 13 from its broken-line to its full-line position. The head 20 at the end of lever 13 is held between the stops 10, 11 provided on the lever arm 4 until the latter by the projecting arm 2 of the pendulum engaging the wire rod 8 is raised from its full-line to the broken-line position. The lever 13 then being released is moved by the weight 14 from its full-line to the broken-line position, and in this movement participates the disk 19 carrying the pin 18, so that the lever 17 by the weight 17′ is moved out of the path of the spider arms 16, of the escapement wheel 15, 16, which now is permitted to rotate so that the lever 13 is moved back to its full-line position. Disk 19, carrying pin 18 with the lever 13 returns to its former position, so that the pin will again arrest the escapement wheel 15, 16. If the pendulum swings back from the broken line to its full-line position, the lever arm 4 is permitted to descend until with the screw 21 it bears on arm 26. This position is a lit-

tle lower than if the arm 4 rests with its stops 10, 11 on the head 20 of lever 13, so that when the lever 13 with its head 20 raises the lever 4 as the head 20 enters between the stops 10, 11, there will be a slight space between the end of the screw 21 and the arm 26. About the size of this space, the lever 4 acts a longer time on the pendulum than the latter acts on the lever 4 as the same is raised by the pendulum and because of this longer action of the lever 4 on the pendulum, the latter receives the required impulse, which as the weight of lever 4 is always the same, remains the same for the same stroke, so that the clock has a uniform action. In order that in temperature changes the effect of the variation in length of the pendulum is compensated for, the impulse is varied, that is to say, it is prolonged or shortened in that the level of arm 26, due to the expansion or contraction of the supporting rod 28 which is made of an easily expansible metal, is varied. In this manner, an automatic compensation in the case of changes in temperature is obtained.

The amplitude of the pendulum swing is selected sufficiently great to practically compensate for the varying frequency due to a variation in the length of the pendulum by a variation of the length of time of the impulse acting on the pendulum.

What I claim as new is:

In an impulse device for a clockwork driven by a swinging time beater pendulum and in combination the pendulum having a laterally projecting arm, a weighted lever arranged above said pendulum having a downwardly extended wire arranged to make periodic contact with said arm, a second lever arranged underneath said first lever and pivotally held at one end, a vertical rod made of easily expansible metal and supporting the other end of said second lever, and an adjusting screw fast on said first lever and adapted to rest on said second lever, so as to determine the position of said first lever and to render its sweep dependent on the expansion of said supporting rod.

Signed at Basel this 13th day of August, 1927.

ALBERT WIRZ.