F. WEHINGER.

CLOCK.

APPLICATION FILED AUG. 10, 1914.

1,127,134. Patented Feb. 2, 1915.

Fig. 1.

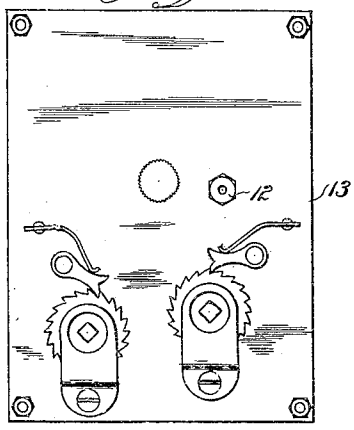


Fig. 3.

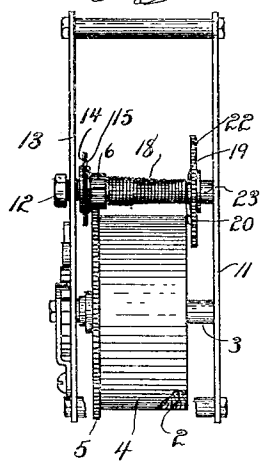
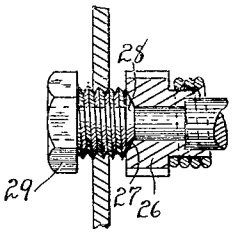


Fig. 6.



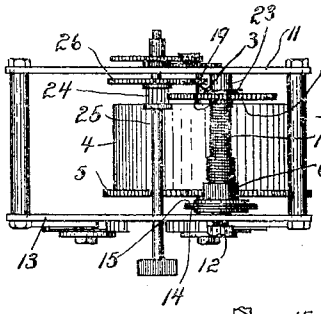


Fig. 2.

Fig. 4.

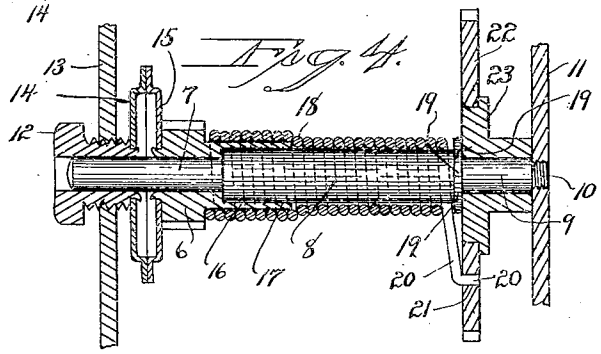
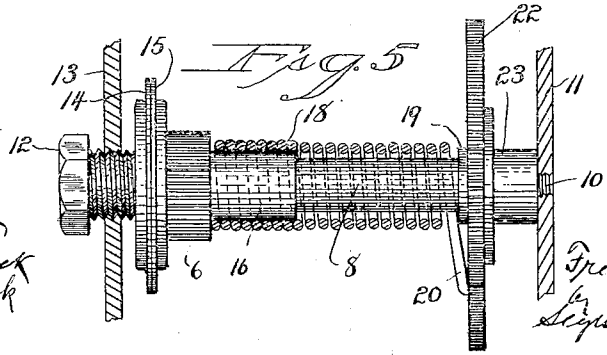


Fig. 5



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THE NORRIS PETERS CO. PHOTO-LITHO., WASHINGTON

UNITED STATES PATENT OFFICE.

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CLOCK.

1,127,134. Specification of Letters Patent. Patented Feb. 2, 1915.

Application filed August 10, 1914. Serial No. 856,038.

To all whom it may concern:

Be it known that I, FREDERICK WEHINGER, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Clocks; and I do hereby declare the following, when taken in connection with the accompanying drawings and the characters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this application, and represent in—

Figure 1 a view in rear elevation of an eight-day, strike-clock movement constructed in accordance with my invention. Fig. 2 a plan view of the movement showing my improved equalizing device with portions of the time-train, the entire escapement, and the strike-train removed. Fig. 3 a corresponding view of the movement in right hand side elevation. Fig. 4 an enlarged broken view in vertical section showing the equalizing mechanism, the parts being shown in the positions due to them immediately after the equalizing-spring has been coiled and so energized. Fig. 5 a corresponding view showing the equalizing-spring uncoiled and just before re-coiling and reënergization. Fig. 6 a detail broken view of a modified form of friction device for the equalizing-spring.

My invention relates to an improvement in devices for improving the time-keeping qualities of clocks by a uniform distribution of the power of the main spring over the period covered by a single winding thereof, the object being to provide at a low cost for manufacture, a simple and effective equalizing mechanism of the character described.

With these ends in view, my invention consists in certain details of construction and combinations of parts as will be hereinafter described and pointed out in the claims.

In the accompanying drawings, I have shown my invention as applied to an eight-day, strike clock, but it will be understood that its application is not limited, although as a matter of practice, it will chiefly be applied to clocks running eight or more days.

As herein shown, a main spring 2 on a main-spring arbor 3 is inclosed in a barrel 4 provided at its rear end with a main wheel 5 meshing into a pinion 6 loosely mounted upon a long stem or bearing 7 formed at the rear end of a fixed stud 8 the forward end of which is formed with a similar, but shorter stem or bearing 9 terminating in a threaded tenon 10 screwed into the front movement-plate 11. The rear end of the said stud 8 is supported in a hollow adjusting-screw 12 mounted in the rear movement-plate 13 and furnished at its inner end with a friction-disk 14 co-acting with a corresponding friction-disk 15 staked upon the rear end of the pinion 6, the forward end of which is furnished with a sleeve 16 counterbored at 17 to receive the rear end of the full diameter of the stud 8.

Upon the stud 8, I mount a helical equalizing-spring 18 the rear end of which is driven over the sleeve 16, the said rear end of the spring serving to attach the spring to the pinion 6 and being to all intents and purposes inert. In being driven over the sleeve 16, the rear and inert end of the spring 18 is slightly expanded as clearly shown, but to no functional purpose beyond causing it to grip the sleeve and virtually fix the spring at one end thereto.

The forward coil of the spring 18 co-acts with an abutment-flange 19 formed upon the stud 8 between the forward end thereof and its forward bearing 9. The said forward coil of the spring terminates in a coupling-arm 20 which is entered into a hole 21 in the second wheel 22 of the time-train, this wheel being staked upon a hub 23 turning upon the forward bearing 9 of the stud 8. The wheel 22 meshes into a pinion 24 on the center-arbor 25 which carries the center wheel 26 of the time-train which may be of any approved construction and arrangement, that having nothing to do with my present invention.

It will be noted that the active part of the spring 18 is so proportioned in length to that portion of the stud 8 between the edge of the sleeve 16 and the abutment-finger 19, that when the said spring is elongated as shown in Fig. 4, as the result of its constriction due to coiling it, it will, from the said flange 19 as a point of purchase, exert a rearward thrust so as to crowd the friction disk 15 against the friction disk 14. When, on the other hand, the spring 18 has by uncoiling expended its energy to the limit allowed, it is virtually contracted in length

and expanded in diameter as shown by Fig. 5, its coils standing away from the surface of the stud 8 with which, however, they are not designed to make contact even when the spring is first energized.

The operation of my improved mechanism is as follows:—The uncoiling of the main-spring 2 turns the main wheel 5 and rapidly rotates the pinion 6 and so coils and energizes the equalizing-spring 8 which is thus elongated and also reduced in diameter without, however, being bound upon the stud 8. The pinion 6 is rapidly rotated as described until brought to a stop by the rearward thrust of the spring 18, due to its elongation, which so crowds the friction-disk 15 against the friction-disk 14 as to develop sufficient friction to over-balance, as it were, the power of the main-spring 2 which will then have its power conserved for a short period, since the binding of the disks 14 and 15, as described, stops and holds the pinion 6 which in turn locks the main-wheel 5 against rotation and hence the further uncoiling of the main-spring 2.

The equalizing spring 18 having thus been coiled and energized, operates to drive the time-train for a given length of time which will be determined by the setting of the hollow screw 12 which determines the position of the disk 14 with respect to the disk 15 which has a very slight lateral movement due to the coiling and uncoiling, and hence the elongation and contraction of the spring 18. As the equalizing spring gradually uncoils in driving the time-train, it gradually increases in diameter and contracts in length, whereby its rearward thrust is at length sufficiently reduced to lower the friction between the disks 14 and 15 below the power represented by the main-spring 2 which will then reassert itself to again rapidly rotate the pinion 6 and coil and thus reënergize the equalizing-spring 18 until the same has been again sufficiently elongated to jam the disks 14 and 15 together until their friction over-balances the power of the main-spring, and so on, this operation being repeated at brief regular intervals until it becomes necessary to rewind the main-spring 2. In this connection, it may be noted that every revolution of the pinion 6 will increase the length of the equalizing spring 18 by the thickness of the wire of which it is formed by putting an extra coil into it. In other words, every complete revolution of the pinion 6 detracts from the diameter of the active portion of the spring 18 and increases its length by one additional coil. In this manner the power stored in the mainspring is in effect tapped off into the equalizing spring, and used for driving the time-train and the equalizing spring, will be uniformly energized throughout the entire period covered by the use of the main-spring for driving the clock. The power of the main spring will, of course, decline regularly from the time of winding until the time of rewinding, but it will have such an excess of power that up to the time of rewinding it will always have sufficient power to energize the equalizing spring as strongly at the last equalization thereof as when the main-spring is freshly rewound.

In the modified form shown by Fig. 6, the pinion 26 is formed with a concentric conical recess 27 receiving a cone 28 at the inner end of a hollow adjusting-screw 29, the friction of the cone 28 in the recess 27, taking the place of the disks 14 and 15.

I claim:—

1. In a clock, the combination with the main-spring and time-train thereof, of an equalizing-spring interposed between the time-train and the main-spring, and a friction device located at one end of the equalizing spring and operated by the lengthwise thrust thereof.

2. In a clock, the combination with the main-spring and time-train thereof, of an equalizing-spring interposed between the said time-train and main-spring, a friction device located at one end of the equalizing-spring and operated by the longitudinal thrust thereof when the same is energized by being wound by the main-spring, and adjusting means for the friction device.

3. In a clock, the combination with the main-spring and time-train thereof, of an equalizing-spring connected at one end with the time-train, a pinion meshing into a wheel driven by the main-spring and having the opposite end of the equalizing-spring fixed to it, and a friction device co-acting with the said pinion and brought into play to over-balance the power of the main-spring by the elongation of the equalizing-spring due to coiling it.

4. In a clock, the combination with the main-spring and time-train thereof, of an equalizing-spring interposed between the same, and a friction device located at one end of the equalizing-spring and comprising two disks brought into operation for arresting the uncoiling of the main-spring by the elongation of the equalizing-spring at the time of its energization by the main-spring.

5. In a clock, the combination with the main-spring and time-train thereof, of a stud provided at one end with a bearing, a pinion turning upon the said bearing and connected with the main-spring, an equalizing-spring encircling the said stud and connected at one end with a member of the time-train and fixed at its opposite end to the said pinion, and a friction device co-acting with the said pinion and brought into play for arresting the uncoiling of the main-

spring by the endwise thrust of the equalizing-spring due to its elongation at the time of energization which is effected by the rotation of the pinion by the main-spring.

6. In a clock, the combination with the main-spring and the time-train thereof, of a stud provided at one end with a bearing, a pinion turning upon the said bearing and driven by the main-spring, a friction-disk connected with the said pinion, a hollow screw receiving the end of the said bearing and carrying a friction-disk co-acting with the friction-disk before mentioned, and an equalizing-spring connected at one end with a member of the time-train and at its opposite end with the said pinion and bringing the friction-disks into action by its endwise thrust at the time of its energization and elongation by the rotation of the pinion by the main-spring.

7. In a clock, the combination with the main-spring and time-train thereof, of a stud provided at each end with a bearing, a pinion turning upon the bearing at one end of the stud, a member of the time-train turning upon the bearing at the opposite end of the stud, an equalizing-spring encircling the stud and connected at one end with the said member of the time-train and at its opposite end with the said pinion, and a friction device located at one end of the said equalizing-spring the elongation of which at the time of its energization operates to bring the friction device into play for over-balancing and stopping the uncoiling of the main-spring.

8. In a clock, the combination with the main-spring and time-train thereof, of a stud, a pinion mounted thereupon, driven by the main-spring and provided with a sleeve, a friction device connected with the said pinion, and an equalizing-spring encircling the stud, connected at one end with a member of the said time-train and having its opposite end connected with the said sleeve of the pinion, the elongation of the equalizing-spring at the time of its energization acting to bring the friction device into play for over-balancing the power of the main-spring and arresting the uncoiling thereof.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

FREDERICK WEHINGER.

Witnesses:
J. R. PUTNAM,
C. W. SHADER.

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