(No Model.)

O. BARTEL.

DEVICE FOR EQUALIZING POWER OF MAINSPRINGS.

No. 536,257. Patented Mar. 26, 1895.

Fig. 1.

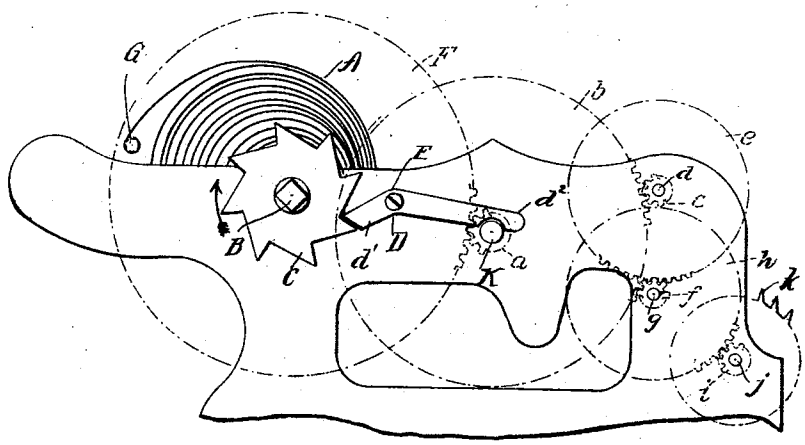
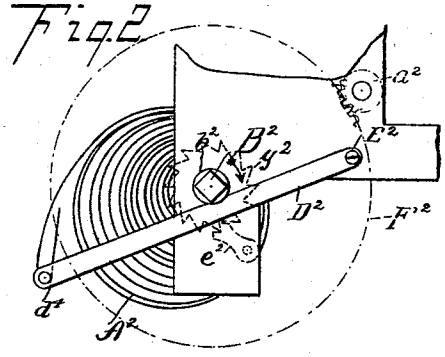


Fig. 2.



WITNESSES:

Edmund A. Strauss

Geo. C. Maines

INVENTOR

Otto Bartel,

BY Briesen & Knauth

his ATTORNEYS.

UNITED STATES PATENT OFFICE.

OTTO BARTEL, OF NEW YORK, N. Y.

DEVICE FOR EQUALIZING POWER OF MAINSPRINGS.

SPECIFICATION forming part of Letters Patent No. 536,257, dated March 26, 1895.

Application filed December 24, 1894. Serial No. 532,880. (No model.)

To all whom it may concern:

Be it known that I, OTTO BARTEL, a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Watches and Clocks, of which the following is a specification.

My invention relates to spring movements, such as are used in watches and clocks that are operated by springs in which a uniform power for a certain time of operation is desired.

To this end my invention consists in a movement provided with a spring for driving the same connected with a single lever pivoted to a fixed portion of the movement, which lever may be shaped according to the requirements of practice and adapted to bear or press directly against one or more of the revolving parts of the movement, whereby, when the spring or springs are fully wound and exert their full power upon the movement, the pressure of the lever will be greatest upon the moving part or parts to which they are applied and which pressure lessens as the spring loses its force when running down, by which arrangement a uniform power of the spring upon the movement is exerted for predetermined times.

I attain the object of my said invention by means of the mechanism shown in the accompanying drawings, in which—

Figure 1 illustrates an ordinary movement showing my invention applied thereto; and Fig. 2 illustrates a modified form of construction embodying my invention.

In the drawings, (Fig. 1) A represents the driving or operating spring of the clock movement which imparts power to the main wheel F which is hung loosely upon the winding-arbor B. The spring A is secured by its outer end to the stud G on the wheel F and by its inner end to the arbor B. By this arrangement the spring A will drive the wheel F, causing the same to turn freely upon its arbor B, which arbor remains stationary during the operation of the device. The wheel F meshes with a pinion *a* carried upon a post or arbor K, which post or arbor also has mounted thereon a wheel *b* which meshes with a pinion *c* carried upon an arbor *d*, upon which is also carried a wheel *e* which meshes with a pinion *f* carried upon an arbor *g*, upon which is also carried a wheel *h* which meshes with a pinion *i* carried upon an arbor *j* which also carries an escapement-wheel *k*, which wheels, pinions and escapement-wheel constitute with the wheel F the going train of the watch or clock.

It will be quite obvious that this structure may be modified in various details, as various types of going trains may be used without departing from the spirit of my invention. Thus for instance the spring A may be incased in a barrel as mostly found in watch and in certain clock movements, in which case the end of the spring is flattened in any of the customary ways, and the barrel secured to the wheel to enable both the barrel and the wheel to revolve on the shaft.

C indicates a ratchet-wheel mounted upon the winding-arbor B.

D indicates a lever hung on the pivot E to a fixed portion of the movement and having one of its ends d' in position to engage with the ratchet C and its free end d^2 bearing directly against the pivot K or any other revolving part of the movement by a positive pressure. By this arrangement it will be observed that a connection is established between the spring A and lever D.

The lever D may be of various shapes and pivoted according to requirements, and any of the pivots, wheels or other revolving parts of the movement may be chosen as the point for direct contact of the lever, and if the outer edge of any of the wheels is chosen for the point of contact, the free end d^2 of the lever would be preferably provided with a wheel meshing with the wheel against which it bears; also in place of the ratchet-wheel C one or more pins or arms mounted on the shaft or arbor B could be used to co-operate with the lever D, but a ratchet-wheel is preferable, as in winding a turn of the key could be divided into small sections and thus make the winding more convenient and diminish the chance of breakage, should the winding-arbor B escape from the key while the spring was being wound. It will now be quite obvious that when the winding-arbor B is turned in the direction of the arrow, the spring A will be wound, and when the spring begins to uncoil, it will thereby turn the wheel F which will drive the going train to operate the rest

of the movement. As soon as the winding key is released from the winding-arbor, the ratchet-wheel C will turn in a direction opposite to the direction of the arrow, but is prevented from turning more than through a short angle by one of the teeth of the ratchet C coming against the end d' of the lever D and rocking the lever on its pivot and forcing the end d^2 of the lever by a positive pressure against the pivot K. This end of the pivot d^2 constitutes a brake for the pivot K, and it will be obvious that the braking action of the lever will be proportional to the force with which it presses against the pivot K. It will also be obvious that when the spring is fully wound, its tension will be exerted upon the movement and upon the ratchet C, and that as the spring runs down, its tension will decrease, and that the pressure of the lever D against the pivot K will also decrease. It will now be understood that the spring A will exert a braking pressure upon the going train which will be at all times proportional to its tension and consequently that the spring will exert a uniform tension upon the going train during successive periods of time, which is a result highly to be desired in clock and watch movements where uniform motion of the going parts is a desideratum.

In Fig. 2, A^2 indicates the spring, and B^2 the winding-arbor to which the spring is connected by its inner end. D^2 is a lever which is pivoted at E^2 to a fixed portion of the movement and is connected at its free end d^4 to the outer end of the spring. This lever D^2 bears against a collar b^2 on the winding-arbor. F^2 is the main wheel of the movement which is hung on the arbor B^2 and provided with a usual click e^2 which co-operates with a ratchet g^2 mounted on the arbor B^2, so that the wheel F^2 turns with the arbor only when the spring is unwinding, and meshes with a pinion a^2 which forms part of the going train, which, for the purpose of clearer illustration, is omitted from this figure. The operation of this form of my invention is in many respects similar to the operation in the preceding form, except that in the present case the outer end of the spring remains stationary and the arbor turns.

The operation may be thus briefly stated: The spring is wound by turning the winding-arbor B^2 in the direction of the arrow, and when the winding key is removed, the arbor will begin to turn in a direction opposite to that of the arrow, and the clock movement will be thereby driven. The lever D^2 will exert a braking action directly upon the arbor B^2, which action will be greatest when the spring is exerting its greatest tension, and will decrease as the tension decreases, there resulting, as in the former case, a uniform power exerted upon the clock movement during successive periods of time.

Now while I have described in positive terms several forms of my invention, I would have it understood that I do not mean to thereby limit myself to the form so shown and described, as it will be obvious that the construction may be varied without departing from the spirit of my invention. For instance, two or a greater number of springs may be employed in the same movement, and each provided with its lever to cause a uniform pressure thereof to be applied.

It will be observed that by my invention a simple and effective device is provided wherein a single pivoted lever connected with the spring, bears directly upon a revolving part of the movement, and a positive pressure is thereby had. It will also be observed that by slight modification my invention can be adapted either to a movement wherein power is derived from the spring through the outer end thereof as shown in Fig. 1, or through the inner end thereof as shown in Fig. 2.

What I claim, and desire to secure by Letters Patent, is—

1. In a watch or clock movement, the combination of a spring constituting the moving power for the movement, a shaft or arbor connected to one end of said spring, a single lever pivoted to a fixed portion of the movement and connected with the spring, which spring retains the lever in constant contact with one or more revolving parts of the movement, whereby when the spring is under the greatest tension the pivoted lever will be applied with the greatest force by a positive pressure, substantially as described.

2. In a spring movement, the combination of a spring secured firmly to a shaft or arbor, a ratchet-wheel driven from the arbor, and a single lever pivoted to a fixed part of the movement and having one end engaging with the ratchet-wheel and the other end arranged to press directly against a revolving part of the movement, substantially as described.

OTTO BARTEL.

Witnesses:
GEO. E. MORSE,
HARRY M. TURK.