

G. W. DICKINSON.
Safety Centre-Pinion for Watches.

No. 213,550.

Patented Mar. 25, 1879.

Fig. 1.

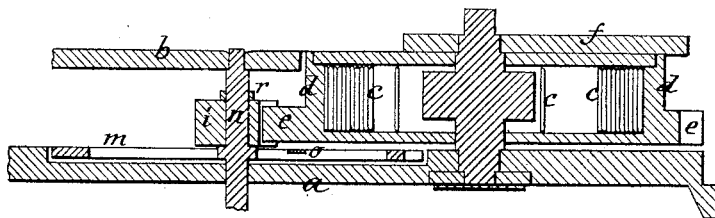


Fig. 1^a.

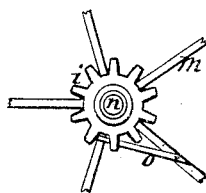


Fig. 2.

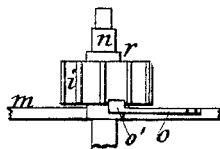


Fig. 3.

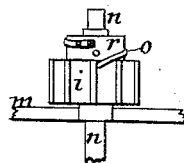


Fig. 1^b.

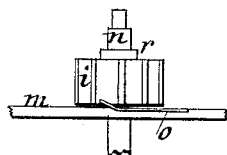


Fig. 2^a.

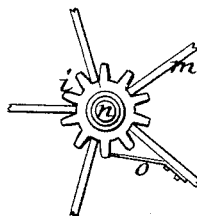
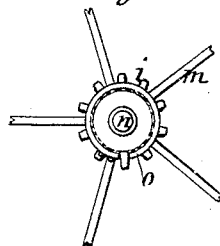


Fig. 3^a.



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UNITED STATES PATENT OFFICE.

GEORGE W. DICKINSON, OF ASHTABULA, OHIO.

IMPROVEMENT IN SAFETY CENTER-PINIONS FOR WATCHES.

Specification forming part of Letters Patent No. **213,550**, dated March 25, 1879; application filed December 11, 1878.

To all whom it may concern:

Be it known that I, GEORGE W. DICKINSON, of the city and county of Ashtabula, and State of Ohio, have invented certain new and useful Improvements in Single-Action Pinions for Watches, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a section through a portion of a common watch-movement. Fig. 1^a represents, in plan, a portion of the center-wheel and its arbor, and the main pinion and its coupling. Fig. 1^b represents the same parts in elevation. Fig. 2 represents, in elevation, a part of the center-wheel and its arbor, the main pinion, and a modified form of its coupling. Fig. 2^a represents the same parts in plan. Fig. 3 represents, in elevation, another modification of the coupling and the parts connected with it. Fig. 3^a represents, in plan, the same parts.

The same letters represent corresponding parts in all figures.

A frequent accident to which all watches are liable is the breaking of the mainspring, which can readily be replaced by a new spring at small expense; but the sudden recoil of the main wheel and barrel, which are ponderous, compared with the smaller parts of the train, generally impacts with such force upon the more delicate parts of the movement as to break or otherwise injure them, such injuries often being difficult and costly to repair, and occasionally result in impairing the quality of the watch as a time-keeper. To avoid such injuries the main pinion has been fitted so as to turn loosely on its arbor, and coupled thereto or to the center-wheel by various devices intended to make it drive the train whenever the main wheel should turn in the proper direction for keeping and indicating time; but when the rotation of the main wheel should be reversed by the recoil of a broken mainspring, or otherwise, then the main pinion should revolve loosely on its arbor without transmitting its motion through the train.

Such devices have not left the pinion with such absolute freedom or sensitiveness to backward rotation on its arbor as will certainly prevent the transmission to the train beyond it of the force of recoil from the breaking of a

mainspring, the pinion in one class of these devices being bound to its arbor or to its seat on the center-wheel by the pressure or wedging action of a screw-thread or of an eccentric, and cannot turn backward independently of the rest of the train until force enough to overcome such binding-pressure has been exerted to release it; and, meanwhile, a shock from the recoil has been communicated through the train.

In another class of these devices the pinion is connected with the center-wheel, or with its arbor, by means of ratchet-teeth or pins, one side of such teeth or pins standing at right angles to the plane of rotation of the pinion, to act as a stop for the pinion to abut against in moving forward to drive the train, the opposite side of such teeth or pins being inclined to the plane of rotation at an angle of from thirty to forty-five degrees, so that when the motion of the pinion is reversed it may rise up the inclination to pass over the stop. The force exerted to thrust the pinion up the inclined plane tends to communicate motion to the train; and as the main wheel, on the breaking of a mainspring, generally springs back with great and sudden velocity and momentum, it causes the pinion to strike the inclined side of the stop with great force, a part of which is consumed in giving a shock to the train, and another part in carrying the pinion over the stop.

While the bound-pinion and jumping-pinion arrangements already mentioned both tend to lessen they are far from removing all danger of injury to a watch-train from the recoil of a broken spring.

It is the object of my improvement to remove such danger altogether; and I accomplish this important object by mounting the pinion on a journal formed on its arbor, on which it is entirely free to turn either forward or backward between collars or end bearings, that keep it at all times properly in gear with the main wheel. I then attach a short arm by a pivot or spring-hinge to the center-wheel or to its arbor, and arrange the arm so that it will stand in the proper position for the teeth of the pinion to abut against when it turns forward to drive the train, the arm moving aside to allow the pinion to turn backward without

obstruction, and without transmitting its motion to the rest of the train.

An important feature of this improvement is its fitness for being applied readily to existing watches of all classes. In Fig. 1, I have shown a portion of the movement of an ordinary watch, embracing a part of the pillar-plate *a*, a part of the top plate, *b*, the bridge *f*, main-spring *c*, barrel *d*, main wheel *e*, main pinion *i*, center-wheel *m*, arbor *n*, which is the arbor or spindle of both the center-wheel and main pinion, and a stop, *o*, which permits the pinion to turn freely on its arbor in one direction without turning the center-wheel, and prevents it from turning in the other direction without carrying the center-wheel with it. The remainder of the mechanism of the watch is omitted, as unnecessary for showing the construction, application, and operation of my improvement.

The main pinion *i*, as shown in Fig. 1, is made as if it were an ordinary double-action pinion, to be rigidly fixed upon the arbor *n*, except that its eye is large enough to allow it to turn freely upon the arbor. Its lower end rests upon the end of the hub of the center-wheel *m*, and it is kept in place by a collar, *r*, secured to the arbor by a pin. A stop, *o*, Figs. 1^a and 1^b, is made of a slender bar of steel, having a spring-temper, and is attached by one end to one of the arms of the center-wheel, from which it projects toward and slightly under the lower end of the pinion, where its extremity is turned upward at a slight angle, and abuts against the side of one of the pinion-teeth. This stop effectually prevents the pinion from turning on its arbor when it moves forward to drive the train, but leaves it entirely free to turn in the opposite direction, as the stop is only held toward the path in which the pinion rotates by its own elasticity, which exerts a tension so slight that it yields almost without appreciable resistance to permit the pinion to pass unobstructed in revolving backward. The yielding stop, it is obvious, could be made in many different forms and still perform its functions properly. It might be hinged or pivoted to any convenient part of the center-wheel or its arbor, or to an arm projecting from either of them, and be held by a slender spring in the proper position for the teeth of the pinion to abut against it or turn it aside. The arrangement of pinion and stop which I have shown in Figs. 1, 1^a, and 1^b is simple in construction and well adapted for application to most common watches.

Another simple form of stop *o* is shown in Figs. 2 and 2^a. It consists of a single bar of tempered steel attached to the side of one of the arms of the center-wheel, and extending toward the periphery of the lower end of the main pinion. At the free end of the bar is a lateral and upward projection, *o'*, Fig. 2, formed to abut against one of the teeth of the pinion, as shown. *o'* presents an inclined surface for the pinion while turning backward to sweep over and turn it aside. This is a very simple form of stop, and is more particularly applicable to those watches in which the hub of the center-wheel projects so far that only the ends of the teeth of the pinion can be reached by a stop.

Fig. 3 represents a stop, *o*, attached to the arbor. The stop consists of a spring-bar, *o*, coiled on the collar *r*, by which the pinion is held in place, one end of the bar being attached, by means of screws or otherwise, firmly to the collar, from which point of attachment it extends obliquely downward until its free end abuts against the end of the teeth of the pinion, as shown, to stop the pinion from revolving forward round its arbor, but allowing it freely to turn backward on its arbor, the stop in the latter case yielding to a slight touch of the teeth of the pinion.

I have described the construction of my improvement, and shown how it may be applied to the various kinds of watches which have been constructed without reference to it; but I have not deemed it necessary to describe the more elegant and compact manner in which the improvement might be made and applied to watches specially designed for embodying it, as all competent designers and constructors can make a proper application of it to watches of new design.

What I claim in the foregoing as my invention is—

The combination of the main wheel with a pinion, plane-faced on top and under, and turning freely on its arbor, and a stop to engage with the working-face of the cogs of the pinion, said stop being rigidly attached to the main wheel, or to its projecting hub at one end, but capable of yielding against the face of the cogs of the pinion at the other, substantially as and for the purpose described.

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Witnesses:

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