J. A. SMITH.

Safety Center-Pinion for Watches.

No. 217,419. Patented July 8, 1879.

Fig. 1.

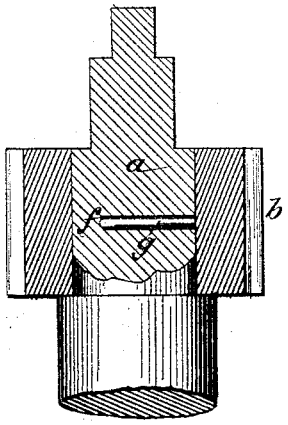


Fig. 2.

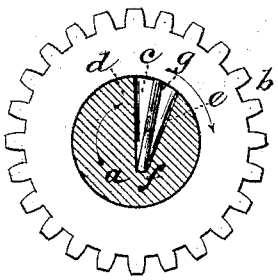


Fig. 3.

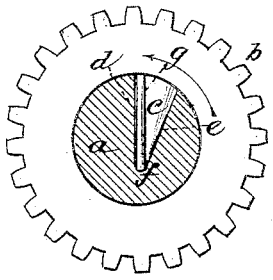


Fig. 4.

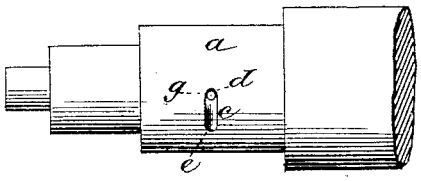
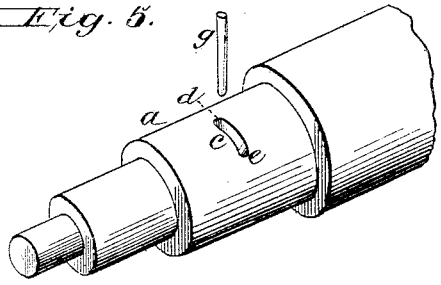


Fig. 5.



Attest.
H. L. Dennis.
Floyd Harris

Inventor.
Jacob A. Smith
By Johnson & Johnson
Atty.

UNITED STATES PATENT OFFICE.

JACOB A. SMITH, OF SALEM, OHIO, ASSIGNOR OF ONE-HALF HIS RIGHT TO CHARLES F. KESSELMIRE.

IMPROVEMENT IN SAFETY CENTER-PINIONS FOR WATCHES.

Specification forming part of Letters Patent No. **217,419**, dated July 8, 1879; application filed May 6, 1879.

To all whom it may concern:

Be it known that I, JACOB A. SMITH, of Salem, in the county of Columbiana and State of Ohio, have invented certain new and useful Improvements in Safety Center-Pinions for Watches, of which the following is a specification.

In watch-movements, in the event of the breaking of the mainspring, the reverse movement of the barrel or winding gear is liable to break the teeth of the wheels of the train; and to avoid such contingency many plans have been devised for connecting the pinion which engages with the barrel-gear, and called the "center-pinion," with its arbor in a manner to allow this pinion to be disengaged from its arbor, and, turning freely thereon with the reverse movement of the barrel, save the train from injury.

My improvement is a new device for this purpose, and it is adapted for use with the center-pinion and its arbor as commonly made. This is an important matter in such devices, while at the same time my improvement has extreme simplicity, and there is nothing in it that can get out of order.

I provide that part of the arbor on which the center-pinion is placed with a pocket or drilled hole, which extends about two-thirds through its diameter, with one side radial, and the other, extending from the bottom of the hole, widens outward, forming a flaring hole at one side of a radial line, and with its oblong end crosswise the arbor and its inner closed end extending past the axis of the arbor, so as to form the bearing or pivot point for a pin placed therein, and equal in length to the radial side of the hole. The pinion is fitted with a smooth bore upon the arbor over the hole and the outer end of the pin seated therein, so that the forward pull of the pinion will, by the frictional contact of the end of the pin against the smooth wall of the pinion-bore, cause the pin to move or shift upon its inner point as a pivot away from the radial side of the hole and to describe an arc outside of that of the arbor circumference, and thereby cause the pin to bind against the wall of the pinion-bore and lock or connect the pinion and its arbor in a manner that such connection will not only be effective, but will be instantly released or disengaged in case of the reverse movement of the barrel-gear from any cause. This action of a shiftable pivot-pin within an arbor hole or pocket, and at right angles to the axis of the arbor, forms a sort of "dead-center" to the pinion, beyond which said pinion cannot pass in turning in one direction, but which dead-center is destroyed the instant said pinion is turned in the other direction to free said pinion from its arbor.

Referring to the accompanying drawings, Figure 1 represents an axial section of a center-pinion and its arbor of a watch-movement embracing my invention; Fig. 2, a cross-section of the same, showing the independently-shiftable arbor-pin in a position out of radius to lock the pinion and arbor; Fig. 3, a similar section, showing the arbor-pin in a radial position to free the pinion from its arbor-lock and allow it to turn backward in the contingency stated; Fig. 4, the arbor and its pin seated in the hole therein, and Fig. 5 the same with the pin removed from the drilled hole.

The watch-movement may be of the usual construction of movements, in which a "going-barrel" drives the train, and, as these things are well understood to those skilled in the art, I deem it unnecessary to show other than the parts known as the reversible center-pin and its arbor, being the parts only to which my improvements apply, and which are represented upon an enlarged scale.

The arbor *a* and the center or third pinion, *b*, are like those now used in watches, and the bore of the pinion is fitted to turn freely upon the arbor. In that part of the arbor on which the center-pinion is seated I drill a hole, *c*, about two-thirds the diameter of the arbor, with one side, *d*, radial and the other, *e*, standing at one side of the axis, and widening from the inner end, *f*, said flaring side giving an oblong form to said hole, into which hole a pin, *g*, is seated, having a length equal to that of the radial side of said hole. The inner end of the hole *c* forms a pivot-bearing, *f*, for the pin, and the flaring form of said hole adapts the pin for independent shifting movement upon said bearing-point within the arbor, at right angles to its axis. The bearing-point of

the pin being at one side of and beyond the axis of the arbor, the outer end of the pin, therefore, in being moved or shifted upon its pivot-point away from the radial side of the hole, will describe an arc outside of and different from that forming the circumference of the arbor. This movement of the pin is caused by the frictional contact of the end of the pin against the wall of the pinion-bore as the pinion is pulled forward; and as the pin cannot yield in the direction of its length, it must, in moving through its eccentric arc, lock or engage the pinion with the arbor as effectually as if the parts were keyed together, because the pin forms a sort of "dead-center," beyond which the pinion cannot move on the arbor; but, should the mainspring break, the pull upon the center-pinion will be reversed, and the pin, by its end frictional contact therewith, will be moved in parallel position with the radial line of the flaring hole, and thus bring the end of the pin coincident with the circumference of the arbor and free the pinion from its hold therewith, allowing it to turn freely with the reverse movement of the barrel, and save the train from damage.

The movement of the pin for the purpose stated is very slight, and the pinion can be fitted closely upon the arbor.

I claim—

1. In safety center-pinions for watches, the arbor of said pinion, provided with a pocket, one side of which is radial, extending in depth beyond the axis of said arbor, the other side flaring outward crosswise, forming an inner point termination, in combination with a pin seated in said pocket and having its inner end forming a fixed pivot-point, upon which the outer end of said pin is adapted to have a movement in relation to the pinion in the event of the breaking of the mainspring, substantially as described.

2. A safety center-pinion for watches, consisting of the pinion *b*, adapted to turn freely upon its arbor *a*, the arbor provided with the pocket *c*, extending in depth beyond the axis of said arbor, with one side radial and the other flaring outward crosswise from an inner pivot-forming socket, and a pin, *g*, having a fixed pivot-seat, *f*, in said pocket, and adapted for movement only at its outer end within the oblong cross flaring pocket, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

JACOB A. SMITH.

Witnesses:
AMOS RANK,
S. F. REED.