2 Sheets—Sheet 1.

J. R. HOPKINS.

WATCHES.

No. 186,838. Patented Jan. 30, 1877.

Fig. 3.

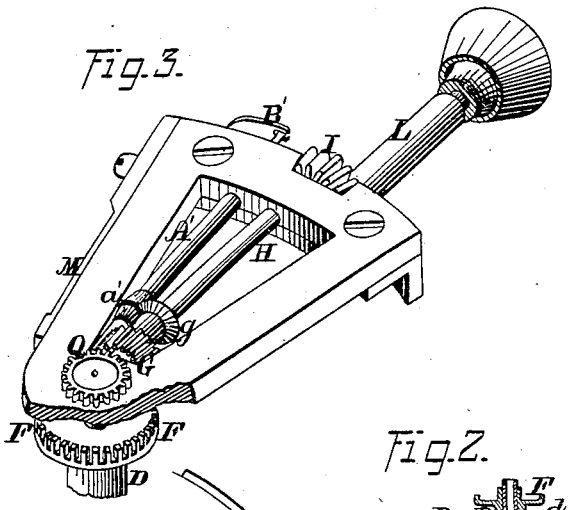


Fig. 1.

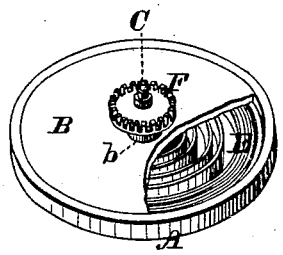


Fig. 2.

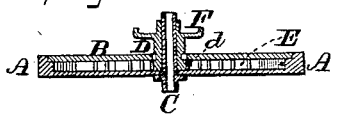


Fig. 4.

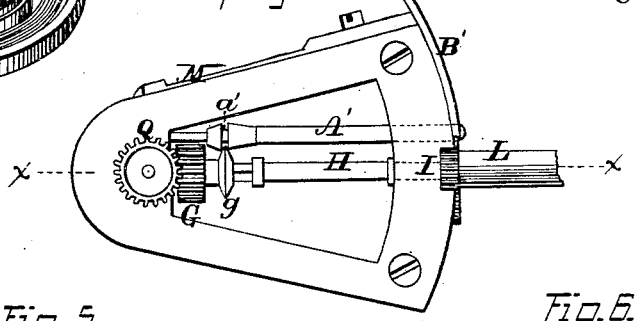


Fig. 5.

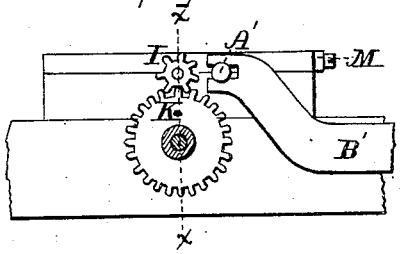
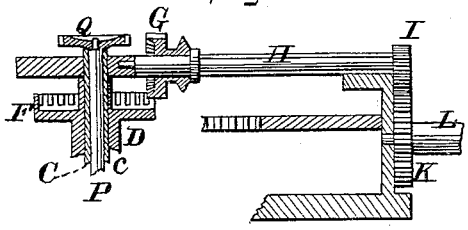


Fig. 6.



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2 Sheets—Sheet 2.

J. R. HOPKINS.

WATCHES.

No. 186,838. Patented Jan. 30, 1877.

Fig. 7.

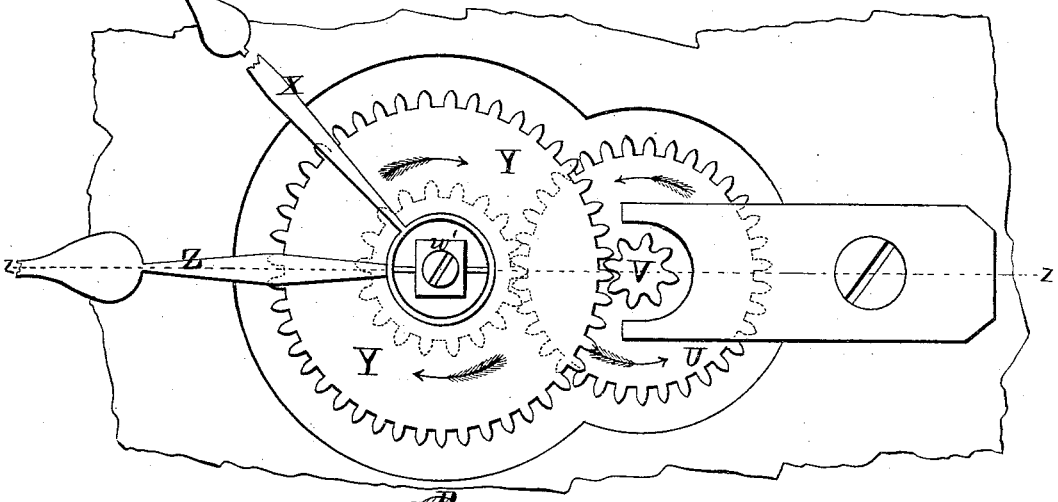


Fig. 8.

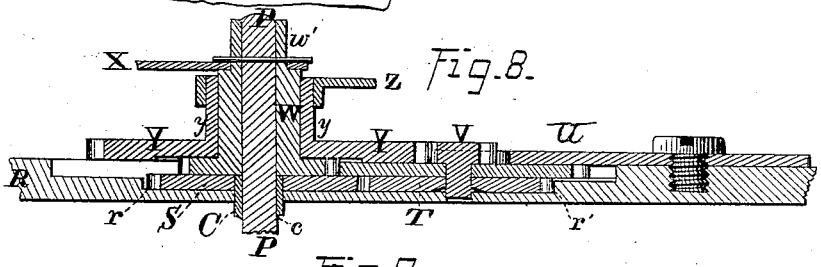
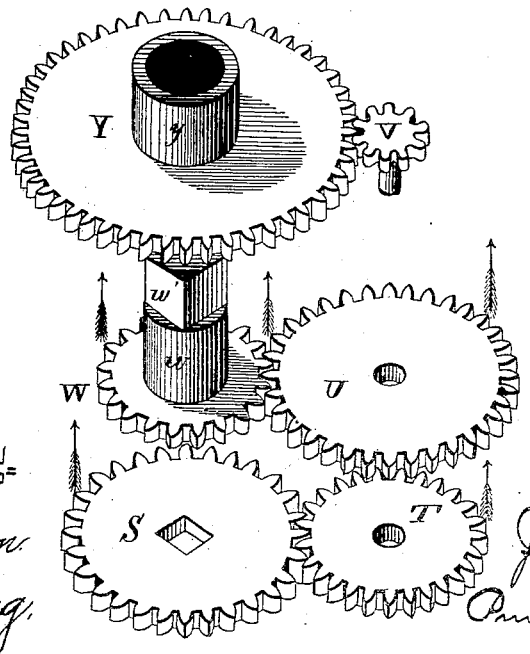


Fig. 9.



WITNESSES:
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J. R. Hopkins, by
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UNITED STATES PATENT OFFICE.

JASON R. HOPKINS, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO WILLIAM B. FOWLE, OF AUBURNDALE, MASSACHUSETTS.

IMPROVEMENT IN WATCHES.

Specification forming part of Letters Patent No. **186,838**, dated January 30, 1877; application filed January 12, 1876.

To all whom it may concern:

Be it known that I, JASON R. HOPKINS, of Washington, in the county of Washington, and in the District of Columbia, have invented certain new and useful Improvements in Watches; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which—

Figure 1 is a perspective view of my main-wheel, arbor, and spring as constructed and combined. Fig. 2 is a vertical central section of the same. Fig. 3 is a perspective view of my winding and hand-setting mechanism attached to a watch, the parts being arranged for winding the spring. Fig. 4 is a plan view of the same, showing the relative arrangement of parts when in position for setting the hands. Fig. 5 is an elevation of the outer end of said mechanism. Fig. 6 is a section of the same upon line *x x* of Figs. 4 and 5. Fig. 7 is a plan view of the mechanism employed for transmitting motion to the hands. Fig. 8 is a central section of the same upon line *z z* of Fig. 7, and Fig. 9 is a perspective view of the gearing detached from each other and from the watch-movement.

Letters of like name and kind refer to like parts in each of the figures.

My invention relates to watch-movements in which the hands and winding-arbor have one common axis; and it consists, principally, in a main-wheel arbor, provided at each end with pivotal bearings, and having an opening through its axial center, in combination with an arbor that fits loosely into said opening, and operates to move the dial-work whenever the hands are set, substantially as and for the purpose hereinafter shown.

It consists, further, in an arbor which extends radially from the winding-arbor to the outer side of the movement, is provided at its inner end with a pinion for imparting motion to a contrate-wheel that is secured upon said winding-arbor, and at its outer end is connected with the stem, substantially as and for the purpose hereinafter set forth.

It consists, further, in combining with the radial winding-arbor named, and with a gear-wheel attached to the hands-arbor, a longitudinally-movable shaft, for throwing the winding-pinion out of engagement with said contrate-wheel, and causing it to engage with said hand-arbor gear-wheel, substantially as and for the purpose hereinafter shown and described.

It consists, further, in the means employed for connecting together the hand-setting arbor and the pinion employed for operating the winding and hands arbors, substantially as and for the purpose hereinafter specified.

It consists, further, in the means employed for returning to and retaining in position the hand-setting arbor, substantially as and for the purpose hereinafter shown.

It consists, further, in a watch in which the dial-wheels are driven directly by the arbor of the main wheel, substantially as and for the purpose hereinafter set forth.

It consists, further, in combining, with the minute-wheel of a watch, a supplemental driving-wheel, which is connected therewith by means of a friction-bearing, substantially as and for the purpose hereinafter shown and described.

It consists, finally, in the combination of the main-wheel arbor, dial-wheels, and hand-setting arbor, substantially as and for the purpose hereinafter specified.

In the annexed drawings, A represents the main wheel or spring-barrel of my watch, which has any desired depth and radial dimensions interiorly, is provided with a cover, B, and has rigidly secured to its center an arbor, C, that has such length as to enable it to extend through the movement, and have its ends pivoted or journaled within suitable bearings in the plates which contain the moving parts, or within bridges secured upon said plates. Journaled upon the arbor C is a sleeve, D, which extends from or near the bottom of the barrel A outward beyond the cover B, and, fitting loosely within the central opening *b* of the latter, has perfect freedom of motion independent of the motion of said barrel, cover, and arbor. The portion of the sleeve D within the barrel A is provided with a hook or stud, *d*, for the attachment of the inner end of a mainspring, E, while the opposite end of said

spring is connected with the inner periphery of said barrel, in the usual manner, so that by rotating said sleeve in a forward direction said spring will be coiled or wound up.

As constructed, it will be seen that, as the distance between the axial bearings of the main wheel is limited only by the thickness of the frame of the movement, great strength and durability are secured, while, as ordinarily constructed, the axial support of said wheel is limited to its thickness, and is, of necessity, subjected to greater strain, and more quickly worn out.

In order that the sleeve D may be rotated for the purpose of winding or coiling the spring E, the outer end of said sleeve is provided with a contrate-wheel, F, which is rigidly attached thereto, and engages with a spur-pinion, G, that is attached to, and is rotated by, an arbor, H, said arbor being journaled radially within suitable bearings, and extending from a point near the rear bearing of the arbor C to the periphery of the frame. Upon the outer end of the arbor H is secured a spur-pinion, I, which engages with and receives motion from a spur-gear wheel, K, that is fitted upon and rotates with the stem or push-pin L.

As thus arranged, by rotating the stem L, the arbor H and sleeve D, through their connecting gearing, will be correspondingly moved, and the spring C wound. A spring-pawl, M, attached to some suitable support, engages with the contrate-wheel F, and prevents the same from moving except in a forward direction.

In order that the hands may receive the necessary motions, the following-described means are employed: The arbor C is provided with an axial opening, *c*, and within the same is loosely fitted an arbor, P, that projects beyond each side of the movement, and upon its rear end is provided with a spur-pinion, Q. Upon the forward end of the arbor C, within a suitable recess, *r*, in the plate R, is attached a spur-gear wheel, S, which engages with and imparts motion to a similar wheel, T, that is contained within a corresponding recess, *r'*, within said plate R, at one side of said gear-wheel S. Upon the upper side of the gear-wheel T is placed a gear-wheel, U, which is connected therewith by means of a friction-bearing, and upon its upper side is provided with a rigidly-attached pinion, V. Upon the forward end of the arbor P is attached a cannon-pinion, W, which engages with the gear-wheel U, and upon the upper end of its barrel *w* is provided with a squared portion, *w'*, that receives a minute-hand, X, while upon said barrel, below said squared part, is journaled a second cannon-pinion, Y, the teeth of which engage with those of the pinion V, while the upper end of its barrel *y* receives an hour-hand, Z.

It will be seen that the motion of the arbor C is communicated, through the gear-wheels S, T, and U, to the cannon-pinion W, which carries the minute-hand X, and through said gear-wheels and the pinion V to the cannon-pinion Y, that carries the hour-hand Z, so that by giving to said gear-wheels and pinions the necessary relative proportions each of said hands will be moved with the necessary speed. The arbor P and pinion W being connected together with sufficient closeness to cause the former to be moved by the motion of the latter said arbor acts as a bearing for said pinion, and materially increases its durability, and the ease and correctness of its operation.

In order that the hands may be set by and through the stem L, the pinion G is arranged to move longitudinally upon the arbor H, so as to enable it to be moved inward beyond the line of, and out of engagement with, the teeth of the contrate-wheel F, and cause the teeth upon its inner end to engage with the teeth of the pinion Q of the arbor P. This change of position of the pinion G is effected by means of a rod or arbor, A', that extends inward from the periphery of the movement, is capable of longitudinal movement within its bearings, and is connected with said pinion by means of a circular disk, *g*, which is formed upon the rear end of the latter, and, extending radially outward, has its edge contained within a recess, *a'*, formed within the contiguous portion of said rod. The outer end of said rod A' is loosely connected with one end of a flat spring, B', while the opposite end of the latter is rigidly attached to or upon the periphery of the movement-frame, said spring operating to hold said arbor at the outer limit of its motion.

A push-pin within the bezel of the case enables the spring B' and rod A' to be moved inward whenever it is desired to set the hands, during which operation the friction-bearing between the gear-wheels T and U permits the latter to move independently, and enables the arbor P to move said gear-wheel U, the pinion V, and the cannon-pinions W and Y.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. A main-wheel arbor, provided at each end with pivotal bearings, and having an opening through its axial center, in combination with an arbor that fits loosely into said opening, and operates to move the dial-wheels whenever the hands are set, substantially as and for the purpose shown.

2. The arbor H, extending radially between the periphery of the movement and the winding-arbor D, provided upon its inner end with the pinion G, that engages with the contrate-pinion F, attached to said winding-arbor, and having its outer end connected to or with the stem L, said parts being combined to operate in the manner and for the purpose set forth.

3. In combination with the arbor H, provided with the longitudinal movable pinion G, and capable of rotation by means of the stem L, and with the hands-arbor P, having the gear-wheel Q attached to its lower end,

the shaft or rod A′, arranged to move longitudinally, and provided with a recess, *a′*, which engages with a disk, *g*, upon the hub of said pinion, substantially as and for the purpose shown and described.

4. In combination with the shaft A′, arranged to move longitudinally within its bearings, the spring B′, attached at one end to or upon the periphery of the movement, and at its opposite end caused to engage with the projecting outer end of said shaft, substantially as and for the purpose specified.

5. A watch in which the dial-wheels are driven directly by the arbor of the main wheel, substantially as and for the purpose shown.

6. In combination with the minute-wheel U, the supplemental driving-wheel T, connected therewith by means of a friction-bearing, substantially as and for the purpose set forth.

7. The main-wheel arbor C, gear-wheels S, T, and U, pinion V, cannon-pinions W and Y, and arbor P, all combined to operate in the manner and for the purpose shown.

In testimony that I claim the foregoing I have hereunto set my hand this 4th day of January, 1876.

JASON R. HOPKINS.

Witnesses:

GEO. S. PRINDLE,

WILLIAM FITCH.