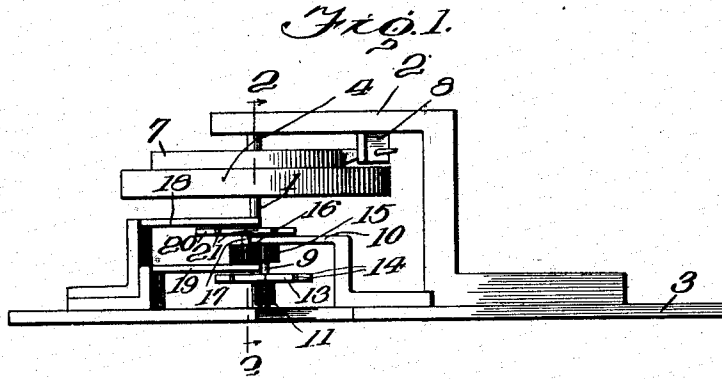
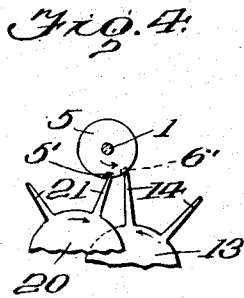
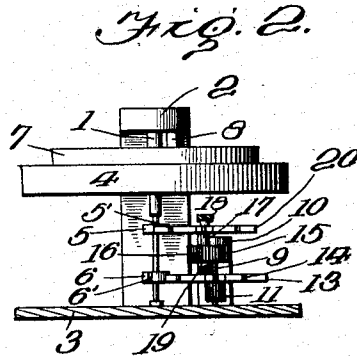
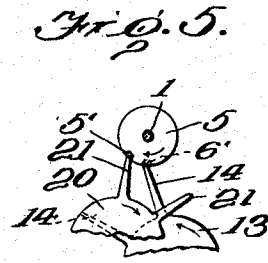
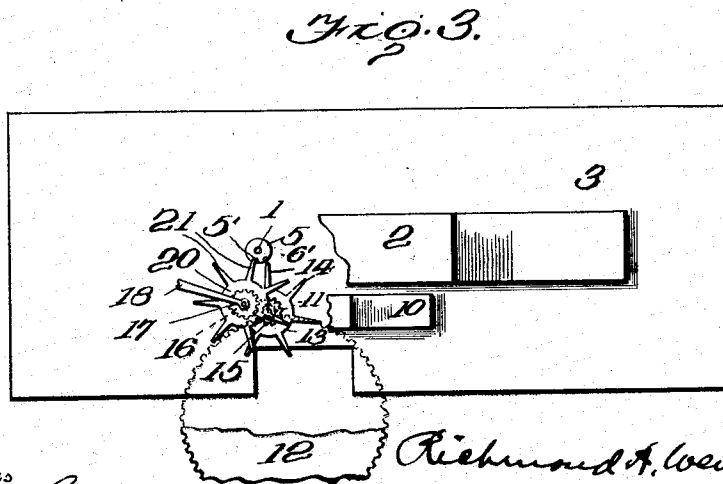


R. A. WENTWORTH.
 ESCAPEMENT FOR CHRONOMETERS.
 APPLICATION FILED JULY 5, 1916.

1,213,716.

Patented Jan. 23, 1917.



Witnesses
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UNITED STATES PATENT OFFICE.

RICHMOND A. WENTWORTH, OF HOPE, MAINE.

ESCAPEMENT FOR CHRONOMETERS.

1,213,716.

Specification of Letters Patent.

Patented Jan. 23, 1917.

Application filed July 5, 1916. Serial No. 107,670.

To all whom it may concern:

Be it known that I, RICHMOND A. WENTWORTH, a citizen of the United States, residing at Hope, in the county of Knox and State of Maine, have invented certain new and useful Improvements in Escapements for Chronometers, of which the following is a specification.

My invention relates to an improvement in escapements for chronometers.

The objects of my invention are to provide a new and novel arrangement of elements, whereby strain on the works is eliminated, smoother action is obtained and a more efficient utilization of the power is rendered possible.

The preferred form of invention is disclosed in the accompanying drawings, in which—

Figure 1 is a side elevation; Fig. 2 is a vertical section taken on line 2—2 of Fig. 1; Fig. 3 is a horizontal section of Fig. 1; and Figs. 4 and 5 are enlarged top plan views, showing the relation of the arms on the star-wheels to the grooved pallets on the balance-shaft.

A shaft 1 has one end pivotally mounted in the arm 2, which is in turn affixed to the base 3. The other end of the shaft 1 is pivotally supported upon the base 3. The shaft 1 carries the balance wheel 4 and the pallets 5 and 6. The pallets have vertical grooves 5' and 6' in the sides thereof, which grooves are in staggered relation with each other. The customary balance spring 7 is fastened to the hub of the wheel 4, and to a stationary lug 8 on the arm 2. A power shaft 9 is pivotally connected between a rigid arm 10 and the base 3, and carries on it the driven gear 11, which is adapted to be engaged by the drive gear 12 carrying the power from the motor. Above the gear 11 is rigidly affixed to the shaft 9 a star wheel 13 having a plurality of arms 14—14, which are adapted to engage the groove in the pallet 6.

Above the star wheel 13 is a gear 15 of larger size than the gear wheel 11, engaging a similar gear wheel 16 on the driven shaft 17, pivotally supported between the arms 18 and 19. This shaft 17 has also integrally fastened upon it a star wheel 20, having a plurality of arms 21—21, adapted to engage the groove in the pallet 5. It will

be noticed that the arms 14 and 21 on the wheels 13 and 20 respectively, are staggered in relation to each other.

The grooves in the pallets are as set forth, in staggered relation with each other and are so placed as to be engaged by the arms on the star wheels 13 and 20. It will be noticed that these star wheels 13 and 20 will, due to the action of the gears 15 and 16, operate in opposite directions.

In operation the power will force the drive gear 12 to rotate the driven gear 11, thus rotating the star wheel 13, the arms 14 of which engage the groove 6' in the pallet 6, giving the shaft 1, and balance wheel 4 a rotative impulse against the tension of the spring 7. At the same time, through the gears 15 and 16 the star wheel 20 will have been actuated in the opposite direction and an arm 21 will be forced against the groove 5' in the pallet 5, upon the return rotation of the balance wheel, caused by the tension of the spring overcoming the impetus given by an arm on the star wheel 13.

Catching the balance wheel on the rebound, as it were, the arm 21 gives the wheel 4 an added impulse to that already given by the spring 7. This impulse is, in turn, overcome by the tension of the spring 7, and the wheel returns; in a rotation in the same direction as the first one described, and so the operation continues.

The star wheels can work without conflicting action because the arms of each are staggered with relation to the arms of the other.

I claim:

1. An escapement comprising a balance-wheel, a shaft, a plurality of actuated pallets on said shaft, and star-wheels engaging said pallets and moving in different directions for oscillating said balance wheel.

2. In an escapement, the combination with a balance wheel, of a shaft, grooved pallets on said shaft, star-wheels so located as to engage the grooves of said pallets, and geared together so as to turn in opposite directions, and thus to oscillate the balance-wheel.

3. In an escapement, the combination with a balance-wheel and shaft, of notched pallets in superimposed relation on said shaft, escape-wheels geared so as to revolve in opposite directions and engage the notches in

said pallets, said balance-wheel and pallets permitting intermittent movement of said escape-wheels.

4. An escapement comprising a shaft, a
5 balance wheel thereon, pallets on said shaft having grooves therein, a power shaft and a driven shaft substantially parallel to said first mentioned shaft, star wheels on said power and said driven shafts, and means for
10 actuating said last mentioned shafts, whereby the pallets will be alternately engaged by said star wheels, and the balance wheel will be oscillated in opposite directions alternately.

15 5. An escapement comprising a balance shaft carrying a balance wheel thereon, pallets having vertical grooves therein, the grooves in said pallets being in staggered relation to each other, actuating means in
20 close proximity to said balance shaft comprising star wheels adapted to engage the grooves in said pallets alternately, said star wheels having arms in staggered relation with each other.

25 6. In an escapement the combination with a base, of an arm thereon, a balance shaft pivotally mounted between said base and said arm, a balance wheel mounted on said balance shaft, vertically grooved pallets on
30 said balance shaft, resilient means connected to said balance shaft, whereby to limit its rotation, power and driven shafts geared to each other and mounted upon said base,

actuating means on said power and said driven shafts, and means for actuating said 35 power shaft, whereby upon the continual rotation thereof in one direction, the said pallets will be alternately actuated in the opposite direction by the actuating means on said power and said driven shafts. 40

7. In an escapement, the combination with a balance-wheel and shaft, of notched pallets on said shaft, escape-wheels, arms on said escape-wheels adapted to enter the notches in said pallets, and means for rotating said escape-wheels in opposite directions for permitting intermittent movement of said escape-wheels and intermittent engagement of said pallets by the arms on said escape-wheels. 50

8. In an escapement mechanism, the combination with a balance-wheel and shaft, two escapement collets carried by said shaft, two star-wheels mounted adjacent each other and adjacent the shaft, and geared together 55 to operate in opposite directions, said star-wheels being arranged to engage with said collets, a driving-gear, and connections from said gear to said star-wheels so that they may be driven in opposite directions, said 60 collets having notches therein for permitting the escape of the teeth of said star-wheels, and for receiving impulses therefrom.

In testimony whereof I affix my signature. 65
RICHMOND A. WENTWORTH.

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