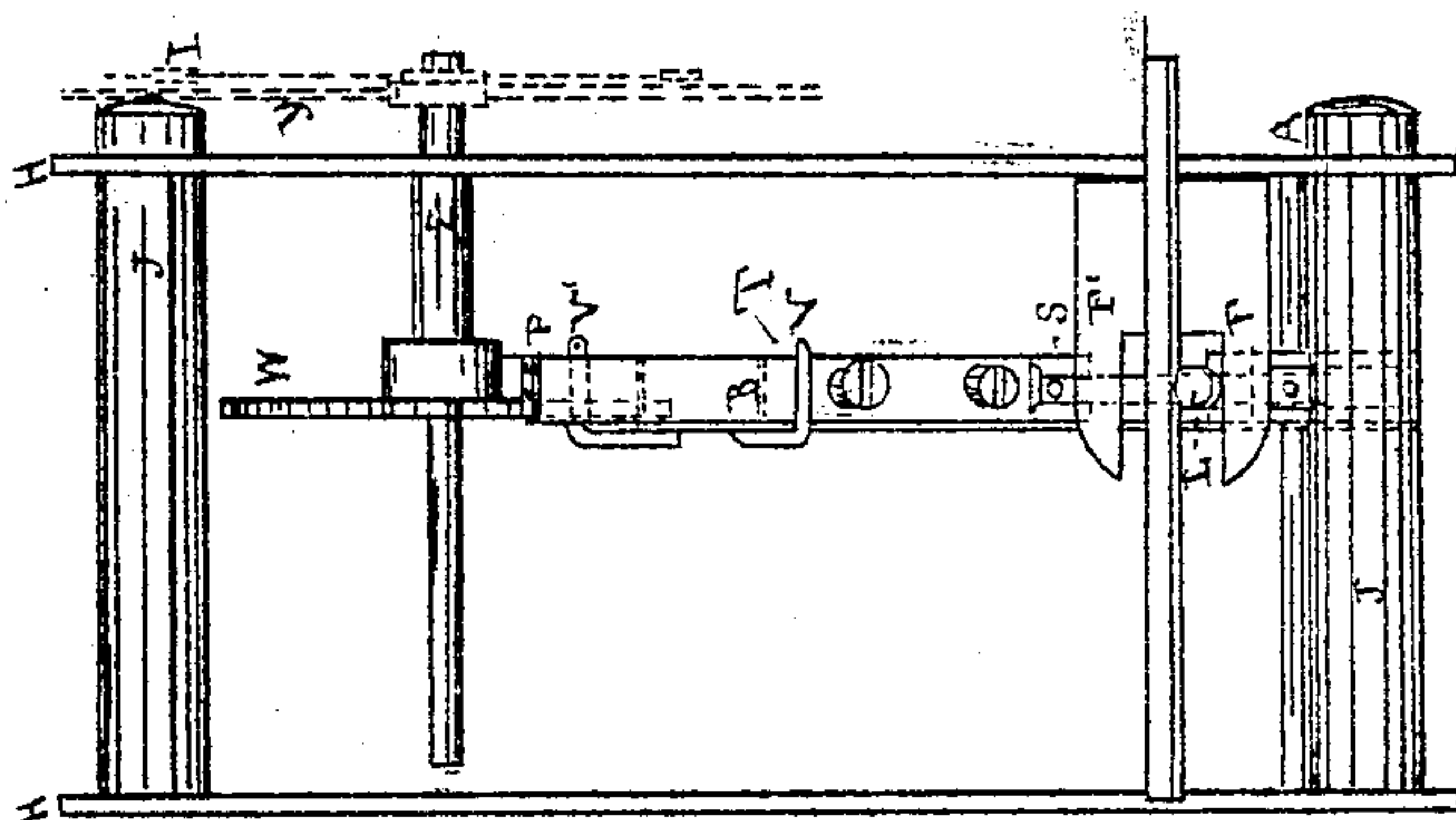


*Edmands & Hamblet Jr.*  
*Escapement for Electric Clocks &c.*  
*Nº 71470* *Patented Nov. 26, 1867.*

Fig. II.

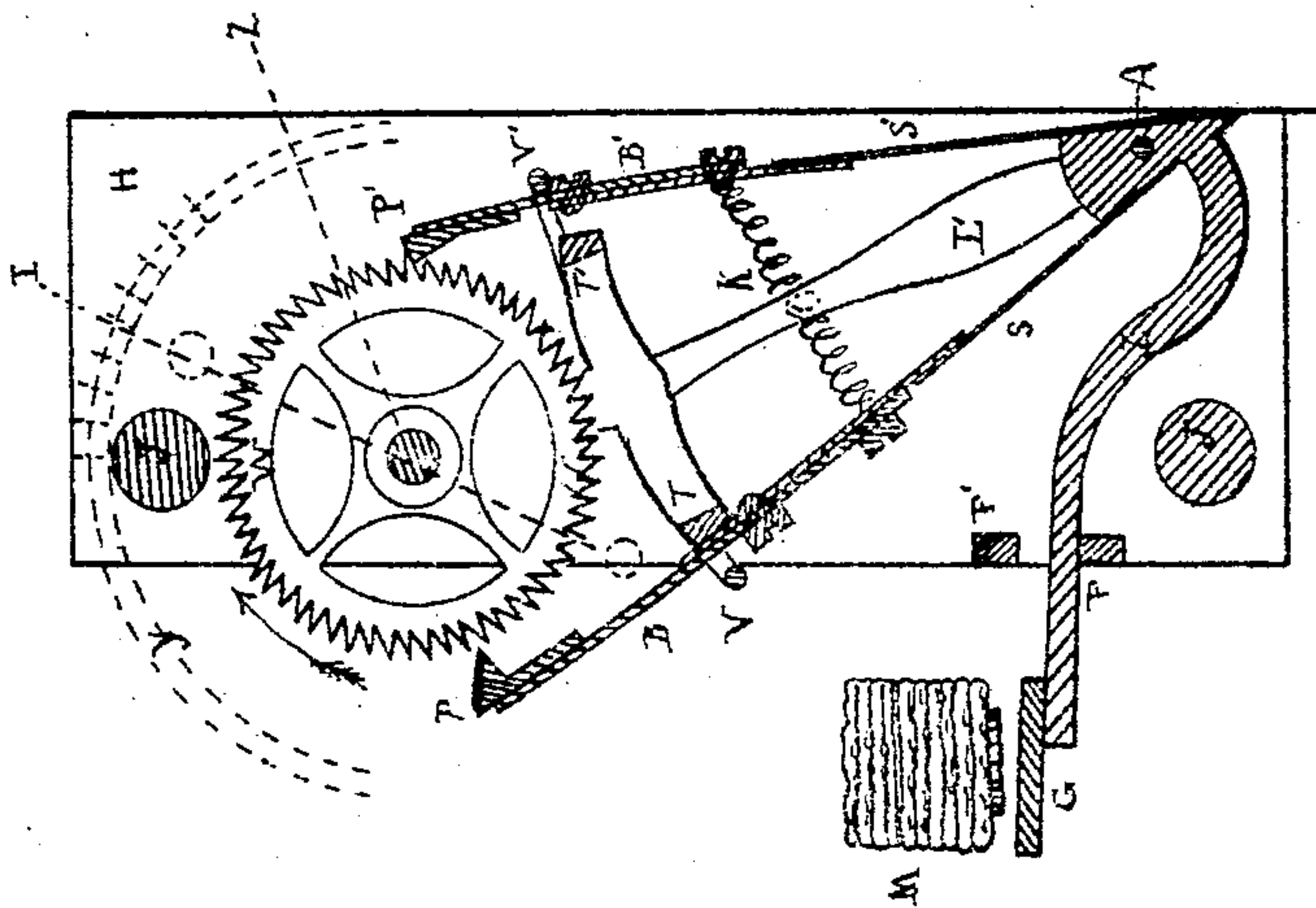


Witnesses:

Inventor:

*Franklin Edmands*  
*James Hamblet Jr.* *Joseph C. Reed*  
*John S. Brown*

Fig. I.



# United States Patent Office.

BENJAMIN FRANKLIN EDMANDS, OF BOSTON, AND JAMES HAMBLET, JR.,  
OF CHARLESTOWN, MASSACHUSETTS.

*Letters Patent No. 71,470, dated November 26, 1867.*

## IMPROVEMENT IN ESCAPEMENTS FOR ELECTRIC CLOCKS AND DIAL INDICATORS.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that we, BENJAMIN FRANKLIN EDMANDS, of Boston, in the county of Suffolk, and State of Massachusetts, and JAMES HAMBLET, Jr., of Charlestown, in the county of Middlesex, and State aforesaid, have invented an "Improvement in Escapement of Electric Clocks and Dial Indicators;" and we do hereby declare that the following is a full and exact description of the construction and use of the same, reference being had to the accompanying drawings, and to the letters and figures marked thereon.

Figure I is a front view of the instrument, and

Figure II is a side view of the same.

The invention consists of a combination of the common form of an escape-wheel, with the arrangement and use thereof, in connection with a magnet, armature, bent lever, spring, and other mechanism, as hereinafter described, its construction being such as to insure a positive movement of the escape-wheel and the advance of one tooth at every successive impulse, this effect being always produced, although the power of the battery and magnet (or other motor) may be variable.

In the drawings, the escape-wheel W is shown fixed upon its arbor, Z, but in a position the reverse of that proper for a clock or watch-movement. The arbor Z is extended through the dial-plate Y, and carries an index, I, or it may be made to actuate "motion work" to carry a minute and an hour-index. The reversal of the wheel upon its arbor, mentioned above, is to insure the motion in the direction of the arrow, when operated upon by the pallets P P'. These pallets are not fixed at their relative distance apart by attachment to a rigid bar or anchor-piece, but are carried upon the pallet-bars B and B', which, in their turn, are mounted upon the springs S S'. These springs are fixed to the bent lever L L', near its fulcrum or centre of motion, A, and at the upper end of the lever there is affixed a cross-piece, T T', of sufficient length to extend a distance a little less than from one pallet-bar to the other, when the instrument is at rest.

The action of these parts is as follows: The lower arm of the lever L is limited in its action by banking-screws F F', or any equivalent device, to that degree of motion sufficient to move the cross or anchor-piece T T', just enough to drive the pallets P P' alternately into and out from the spaces between the teeth of the wheel W.

The instrument being at rest, as shown in Fig. I, and having its springs S S' so adjusted, as regards their power, that they impel the pallet-bars B B' and the pallets P P' towards the line of central motion, as represented in the drawings, the pallet P being shown pushed out from between the teeth of the wheel W, while the end T' of the cross or anchor-piece has left the pallet-bar B', and allowed the spring S', on the opposite side, to push the pallet P' into the space between the teeth of the wheel.

Now, on applying any power, as an electro-magnet and armature, M G, (the armature G being affixed to the free end of the lever L,) to lift the lever L, the cross or anchor-piece T T', at the other end of the angular lever, turns on its fulcrum or arbor A, and will be so moved as to withdraw its end, T, from the pallet-bar B, and allow the pallet P to enter the space between the teeth of the wheel W, and to come into contact with the tooth just above it, when the pallet P will begin to press, under the influence of the spring S attached to its pallet-bar B, and to push the wheel forward in the direction of the arrow. While this is taking place, the cross-piece at the end T' will have passed over the distance, shown in the drawing, between itself and the pallet-bar B', and will begin to act upon it. At this point of time, both of the pallets P and P' will be between the teeth of the wheel W. The pressure at the end T' being continued until the lever L L' completes its vibration, will have the effect to push out the pallet P', when the pallet P will instantly propel the wheel W by the power of its spring S, and drive the index I one division forward on the dial Y, while the action of both springs prevents any tripping or receding of the wheel.

Any power which will effect a vibratory movement of the lever L L', will actuate this escapement, while the instrument may be placed in any position, thus doing away with the element of gravity in the lever L heretofore required when the electro-magnetic force, with the current in one direction, is used. The instrument is thus adapted for use at sea.

The instrument, as above described, is complete, and suitable for use, combining the power of an electro-magnet, or other motor, with the conjoined action of two springs, carrying two pallets, which act upon opposite sides of the escapement-wheel, imparting to it a positive motion entirely independent of gravity or any other



power than that derived from the motion of the free end of the lever L. In some cases, for convenience of adjustment, to prevent any excess of motion of the springs outwardly, and to insure to the pallets a firm hold upon the wheel W, we apply two studs or pins, V V', one at each end of the cross or anchor-piece T T', their position being outside of the pallet-bars B B'; also, to insure a more steady or uniform motion, and to afford the means of accurate adjustment of the straight springs and the pallet-bars, we use a spiral spring, K, which extends from the bar B to the bar B', the ends of the spring being fastened respectively to each bar. Great delicacy of adjustment is thus secured, and the instrument made capable of the most rapid action.

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

The construction of an escapement, in which the pallets are resilient, being attached to the end of springs or spring-bars, instead of to a rigid bar or anchor-piece, so that one pallet will always enter between the teeth on one side of the escape-wheel before the other is entirely pushed from between the teeth on the other side of the wheel, and in such manner that the power of the spring of the entering pallet renders the action of the pallet first propulsive and then detentive to the escape-wheel, substantially as herein described.

We claim the anchor-shaped independent levers L T T', or their equivalent, to actuate the movements of the pallets P P' to and fro, and cause them alternately to enter and leave the teeth of the escape-wheel, as herein described.

In combination with the resilient pallets and springs, and the bent lever, we claim the binding-spring K, and the stops or guards V V', substantially as herein described, and for the purpose specified.

B. F. EDMANDS, [L. S.]  
JAMES HAMBLET, JR. [L. S.]

Witnesses:

GEO. L. ANDERS,  
GEO. W. CHOATE.