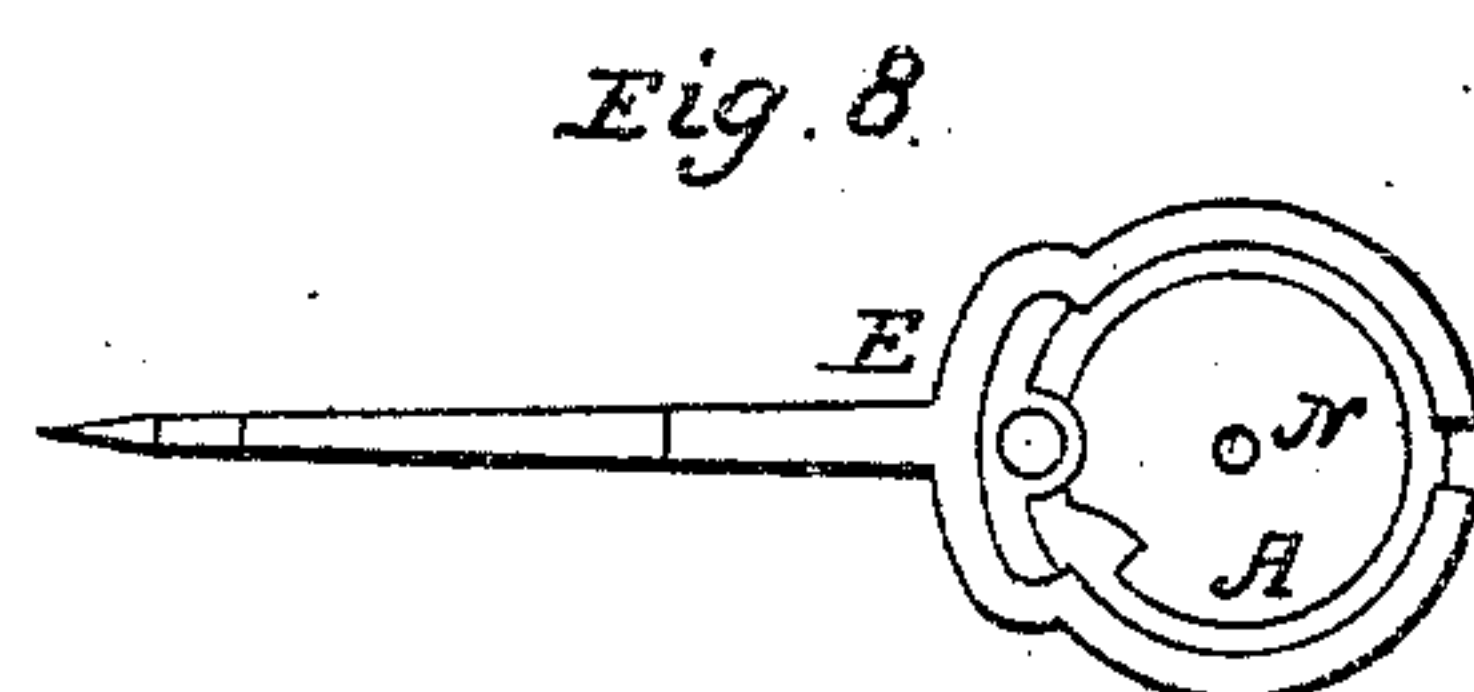
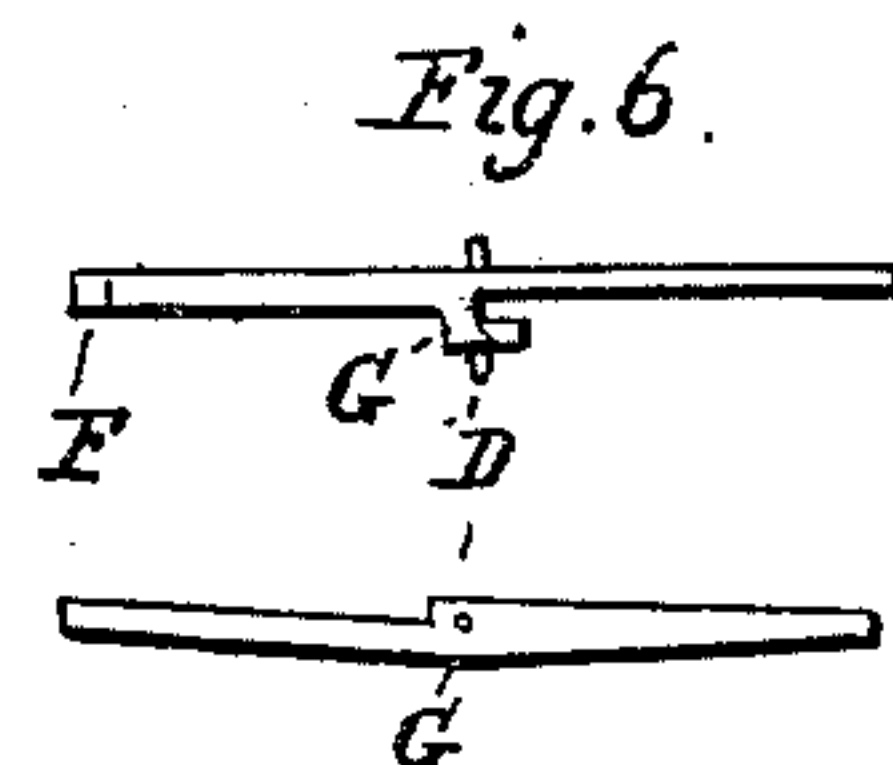
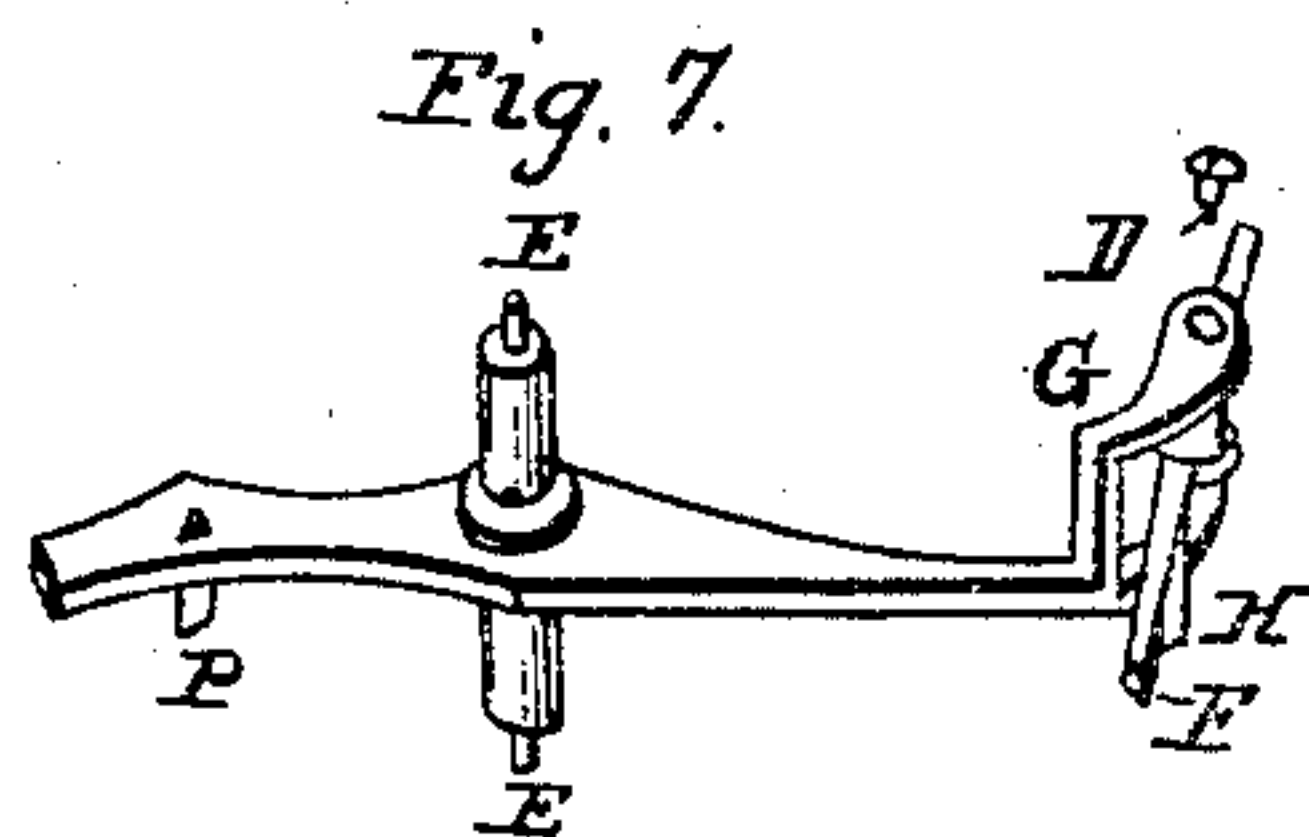
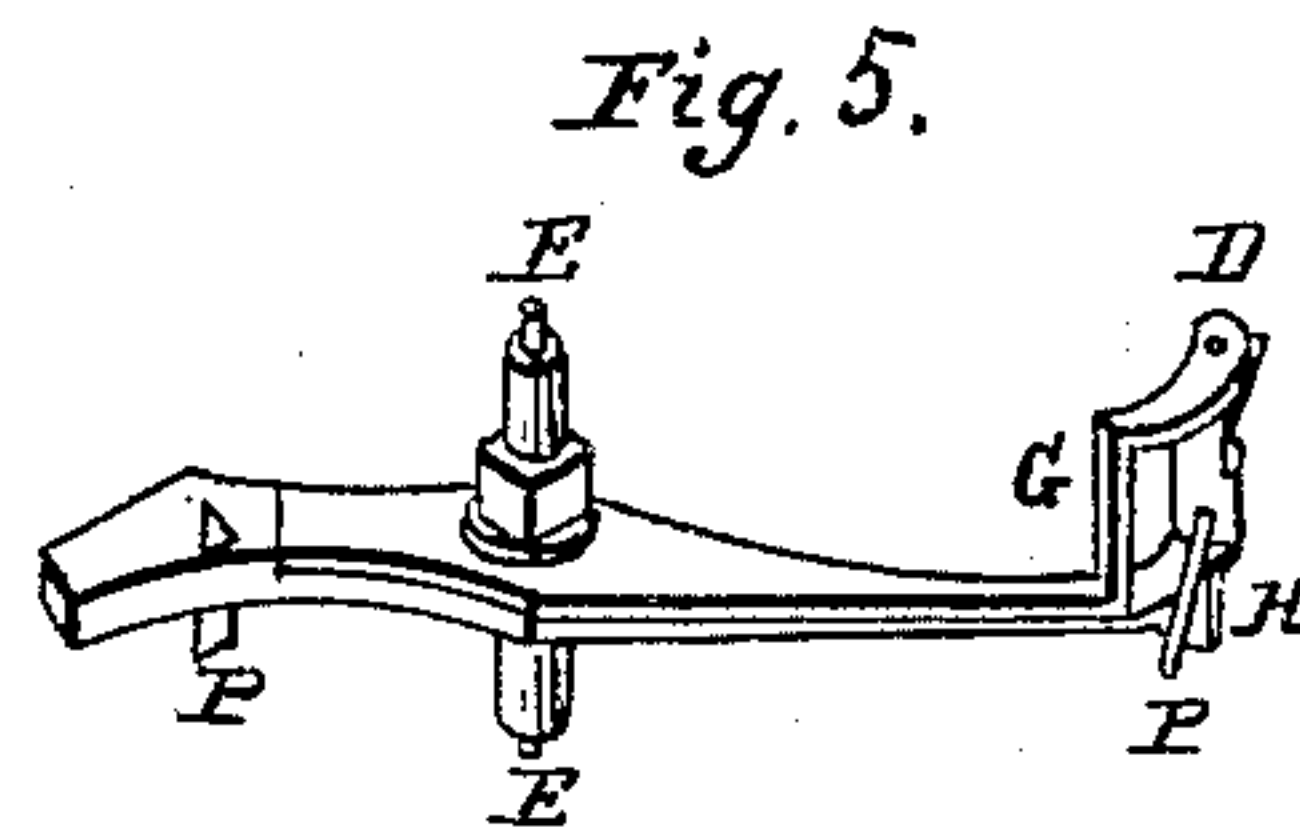
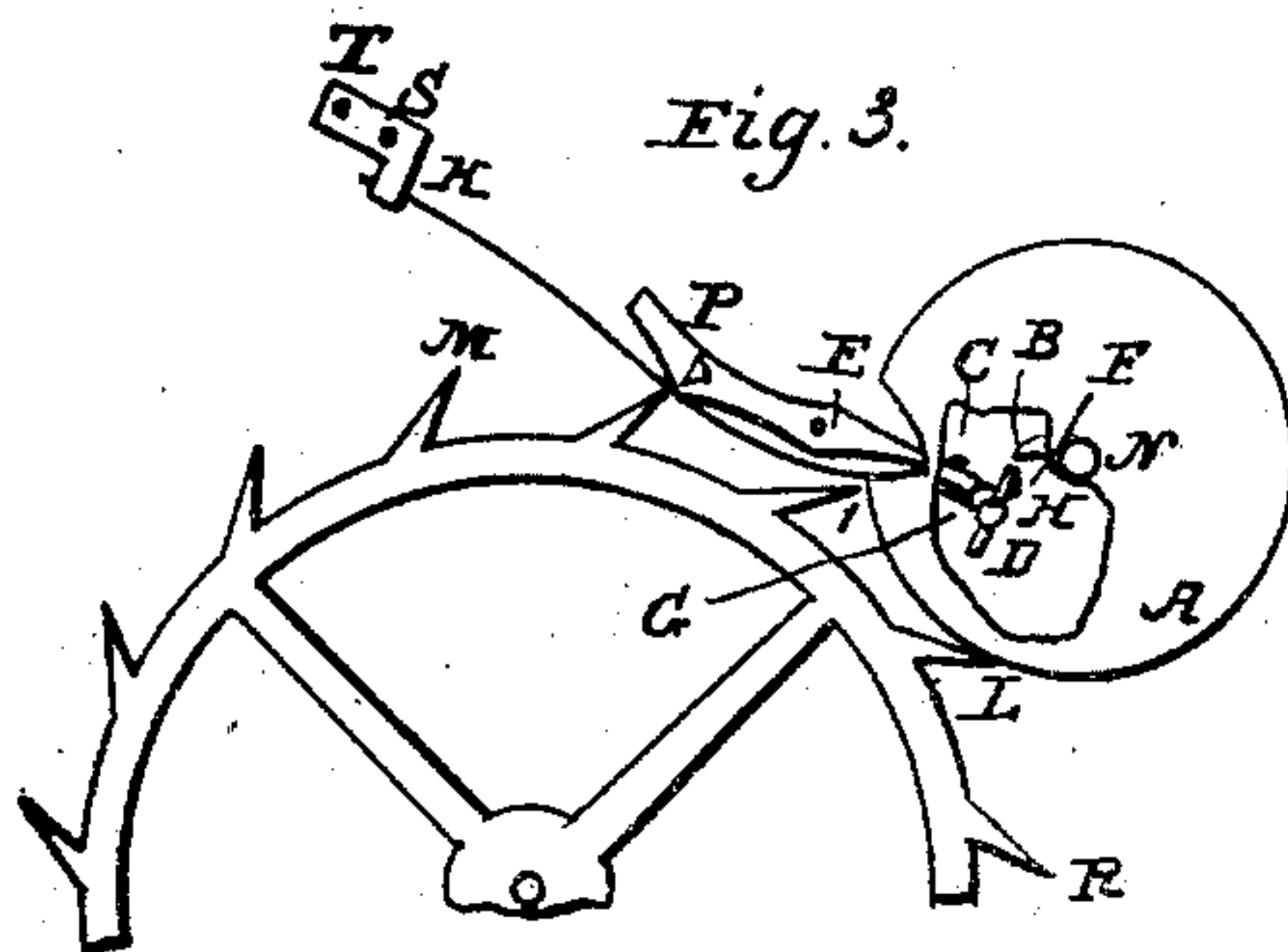
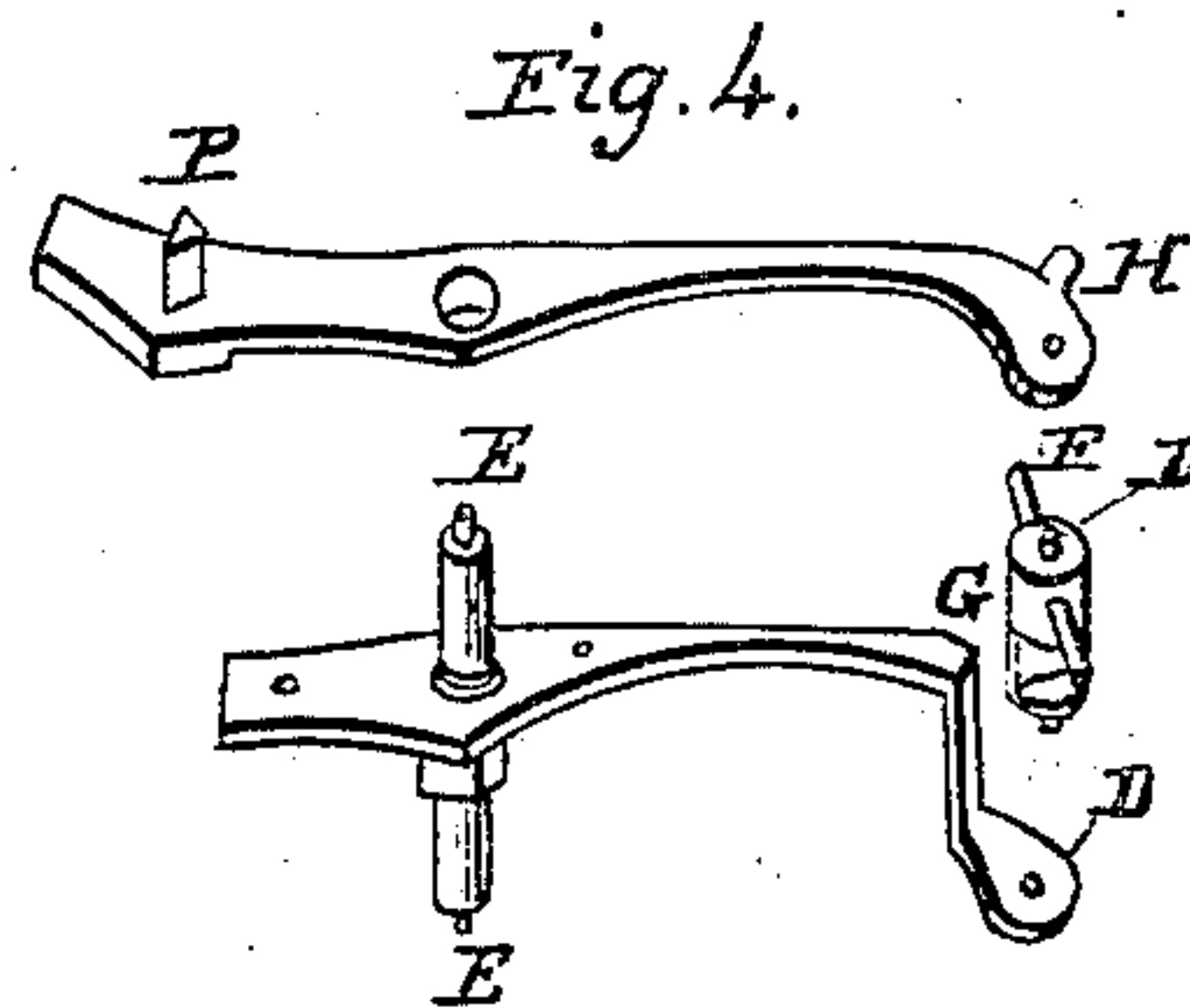
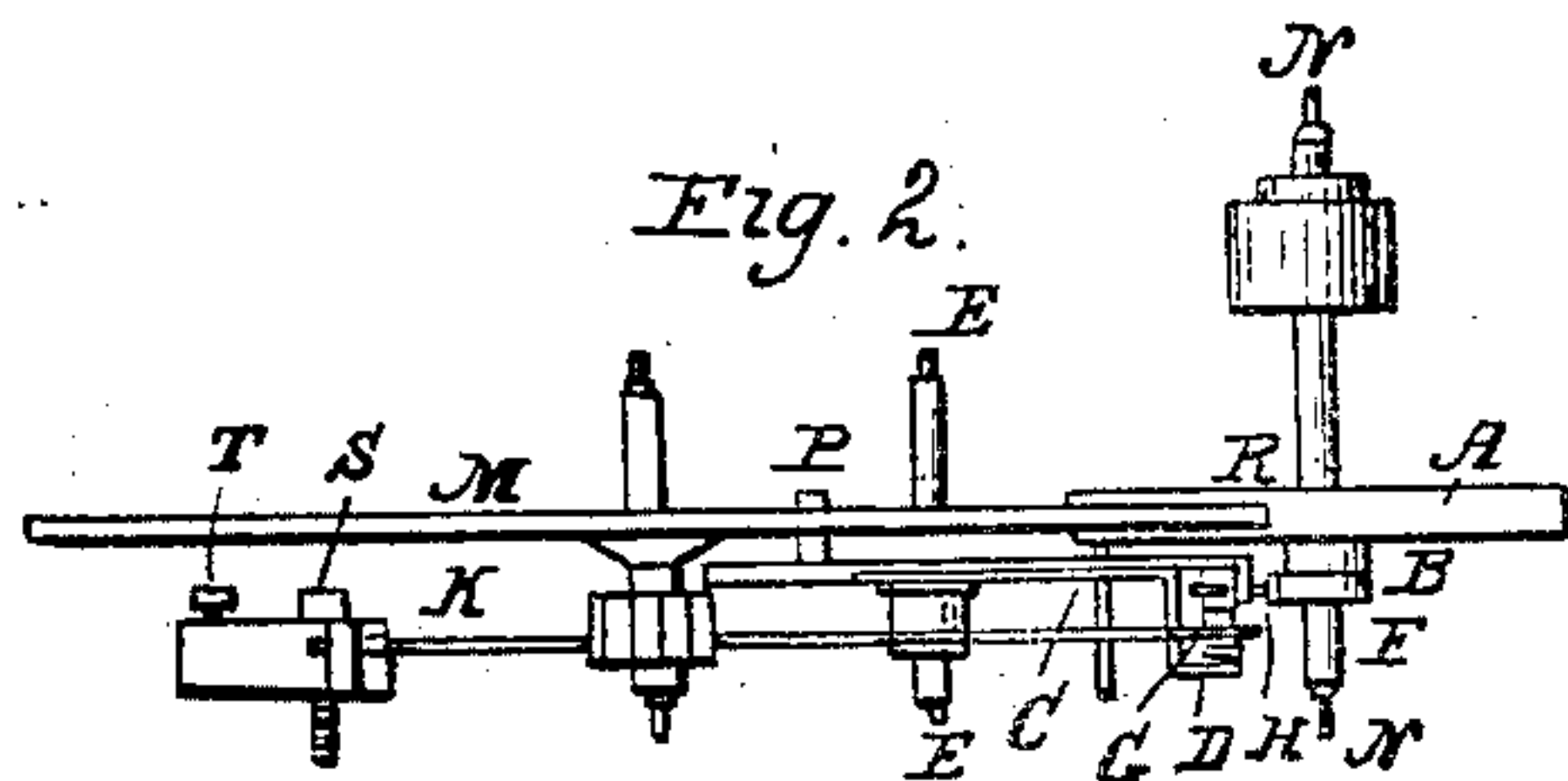
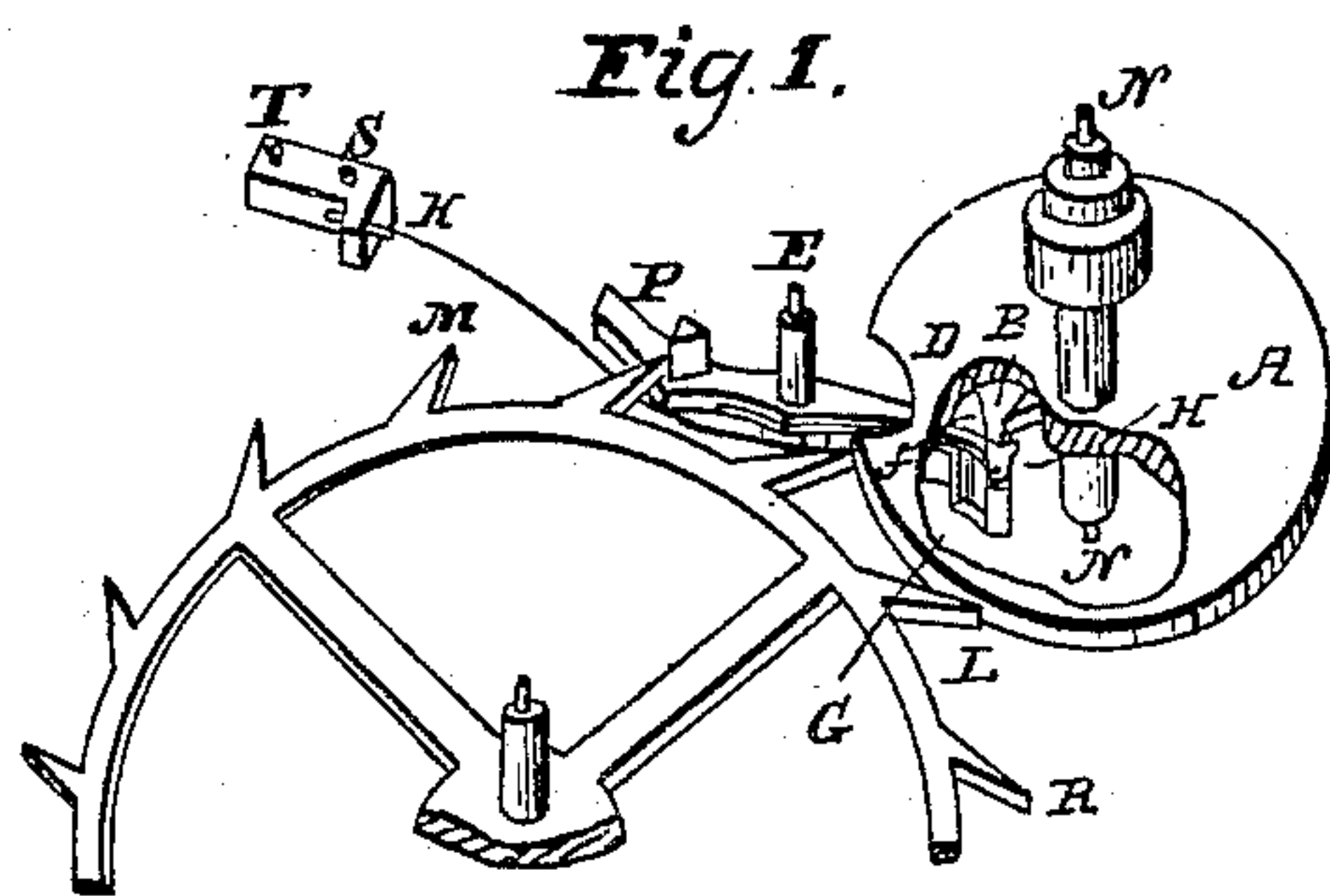


J. FULTON.  
Chronometer Escapement.

No. 16,727.

Patented March 3, 1857.



Witnesses:  
*Wm. Hardman*  
*J. S. Kirk*

Inventor:  
*James Fulton*



# UNITED STATES PATENT OFFICE.

JAS. FULTON, OF LOUISVILLE, KENTUCKY.

## CHRONOMETER-ESCAPEMENT.

Specification of Letters Patent No. 16,727, dated March 3, 1857.

*To all whom it may concern:*

Be it known that I, JAMES FULTON, of Louisville, in the county of Jefferson and State of Kentucky, have invented a new and  
5 useful Improvement on that Part of the Machinery of Chronometers which Gives Motion to the Balance, Termed "The Escapement"; and I do hereby declare that the following is a full, clear, and exact de-  
10 scription of the construction and operation of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a perspective view, Fig. 2 is a  
15 longitudinal elevation, Fig. 3 a transverse section.

The letters refer to the same parts in all the figures.

The plates, mainspring, train of wheels,  
20 balance roller, and lifting pallet may be in any of the forms in use in marine or pocket chronometers.

Fig. 3 M L R represents a part of the scape wheel, A the roller with a hole broken  
25 through it to show the lifting pallet B as below it, N the pivots of the staff. P E D is a lever on pivots at E, with the detent pallet placed on its upper side at P. C is a banking attached to the plate for the lever  
30 to stop against so as to limit the depth of the locking. F D G is a small lever which (to distinguish it from the other) I will call a click, with its pivots playing in the lever D, and is held against a banking at-  
35 tached to the lever at H by the pressure of the spring K G against the part G of the click. It will be seen that the same pressure of the spring K G will hold the lever against the banking C. As the balance with the  
40 roller and lifting pallet rotates in the direction L L it will be seen that the point of the lifting pallet B will come in contact with the point F of the click, and by its pressure communicate such a motion to the lever as  
45 will unlock the tooth from the detent pallet P, when the scape wheel will be urged forward by the force of the mainspring and a tooth will take effect on the impulse pallet or notch in the roller at I and give impulse  
50 to the balance till the tooth I arrives at the position of the tooth L when the tooth M will lock against the detent pallet P which will have been thrown back by the pressure of the spring K G. When the balance com-  
55 pletes its vibration and is caused by the hairspring to return in the direction L I

the back of the lifting pallet will strike the point F of the click and push it away from the banking H till the pallet passes it, when the pressure of the spring at G will cause the  
60 click to fall back against the banking H. The balance will complete its vibration and again return in the direction I L, when the same movements will be repeated.

Fig. 4 shows an enlarged view of the lever  
65 with the upper piece unscrewed and lifted up and the click lifted out of its pivot holes. It will be seen that the shaft has a shoulder under the lower piece and screws into the upper one; and that the upper one has two  
70 steady pins to keep its pivot hole at D perpendicular to that in the lower one. Fig. 5 shows it inverted with the two parts screwed together. The click may be made as there  
75 represented with a cylindrical shaft which has a transverse slit cut a little more than half way through its diameter, for the spring to act in, and a hole drilled through it to receive the part F. Or it may be made  
80 of a solid piece as represented by Fig. 6.

The lever may be made of a single piece—  
Fig. 7 shows an inverted view of it in that form. Instead of pivots the click has a hole through which a pin may pass; or, as it is  
85 desirable that the part of the click against which the spring presses should be as nearly as possible in line between the axis of the click and that of the lever, and that the spring should extend some distance beyond  
90 the part of the click against which it presses, it would be better to make pivots on the points of two screws to be inserted in the lever as shown at D Fig. 7, which need not  
95 be so long as to reach the slit through which the spring passes. For the spring a piece of hairspring will answer every purpose. It should be attached to the plate in such a position that its action will be at right angles with a line drawn from the axis of the click to that of the lever; it may be pinned  
100 into a stud or piece of metal which may be fastened to the plate with a screw S. Another screw T may be placed in the back end of the piece with its point resting against the plate, for the purpose of adjusting the  
105 spring to the slit in the click. The pressure of the spring against the click may be made greater or less by moving the piece to which it is fastened about the screw S as an axis. When the balance is placed below the back  
110 plate the spring may be attached to the front plate; but when the balance is above the



plate it will be found more convenient to attach the spring to the back plate. In the latter case the foot which holds the lower pivot of the staff may be made broad enough  
 5 to receive likewise the lower pivot of the detent shaft. If the regulator is placed on the plate, it, and the jewel which holds the upper pivot of the detent shaft may be as represented by Fig. 8. The banking for the  
 10 click to stop against should be so placed on the lever as to make the angle D F E about eighty or eighty-five degrees.

The lever may be placed as represented in the drawings or it may be placed on the  
 15 other side of the staff so as to lock the tooth R or one still farther from the staff—the latter position may be found desirable in very thin watches, as the click may be made long enough to place its shaft outside of the  
 20 roller and allow the spring to act on it above the click in the same plane with the roller. As the detent pallet in this case will have to be placed between the axis of the lever and that of the balance, the lever will be  
 25 much longer, and will therefore be heavier. As lightness is a desideratum I think the arrangement represented in the drawings the preferable one.

The advantages which I believe this escapement possesses over the chronometer  
 30 escapement in the usual form are the following: It does not require the balance to move through so great an arc to allow it to operate, and will therefor be less liable to  
 35 act from handling. As the lever and click may be very light, the spring need not be so

strong as the detent spring commonly used in the chronometer escapement—therefore it will not give so much resistance to the balance in unlocking; and the resistance in  
 40 allowing the lifting pallet to pass back may be made much less than that from the lifting spring usually is, by making the distance from the axis D of the click to the part G  
 45 against which the spring presses, very short; or in other words by making the shaft of the click very small in diameter. The point at which the lifting pallet acts on the click may be as far as desired from a line drawn  
 50 from the axis of the balance to that of the lever, therefore the action may be as deep as desired without increasing the acting arc of the balance. These advantages I think will be sufficient to render its general adoption  
 55 in pocket time-pieces desirable.

The roller and lifting pallet, as has been stated are similar to those of the chronometer escapement in its usual form. The detent pallet is likewise so similar that I deem  
 60 a particular description of it unnecessary. I of course make no claim to originality in either.

What I claim as my invention and desire to secure by Letters Patent is—

The combination of two levers in such a  
 65 way that one spring may perform the offices above described by acting on both of them.

JAMES FULTON.

Witnesses:

J. W. HANDMAN,  
 Y. F. MECK.