

(No Model.)

2 Sheets—Sheet 1.

A. LE COULTRE.

STOP WATCH.

No. 284,444.

Patented Sept. 4, 1883.

Fig. 1

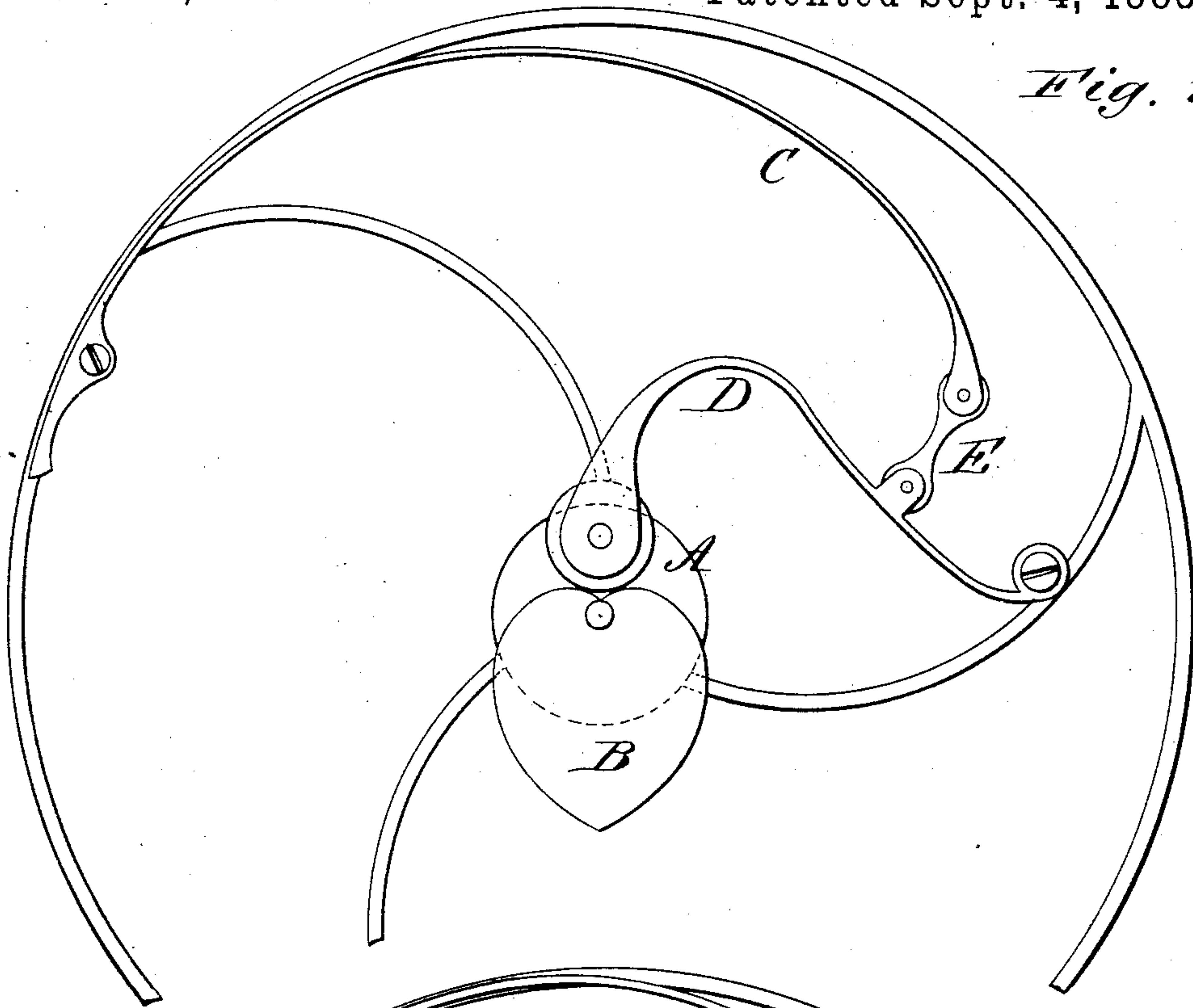
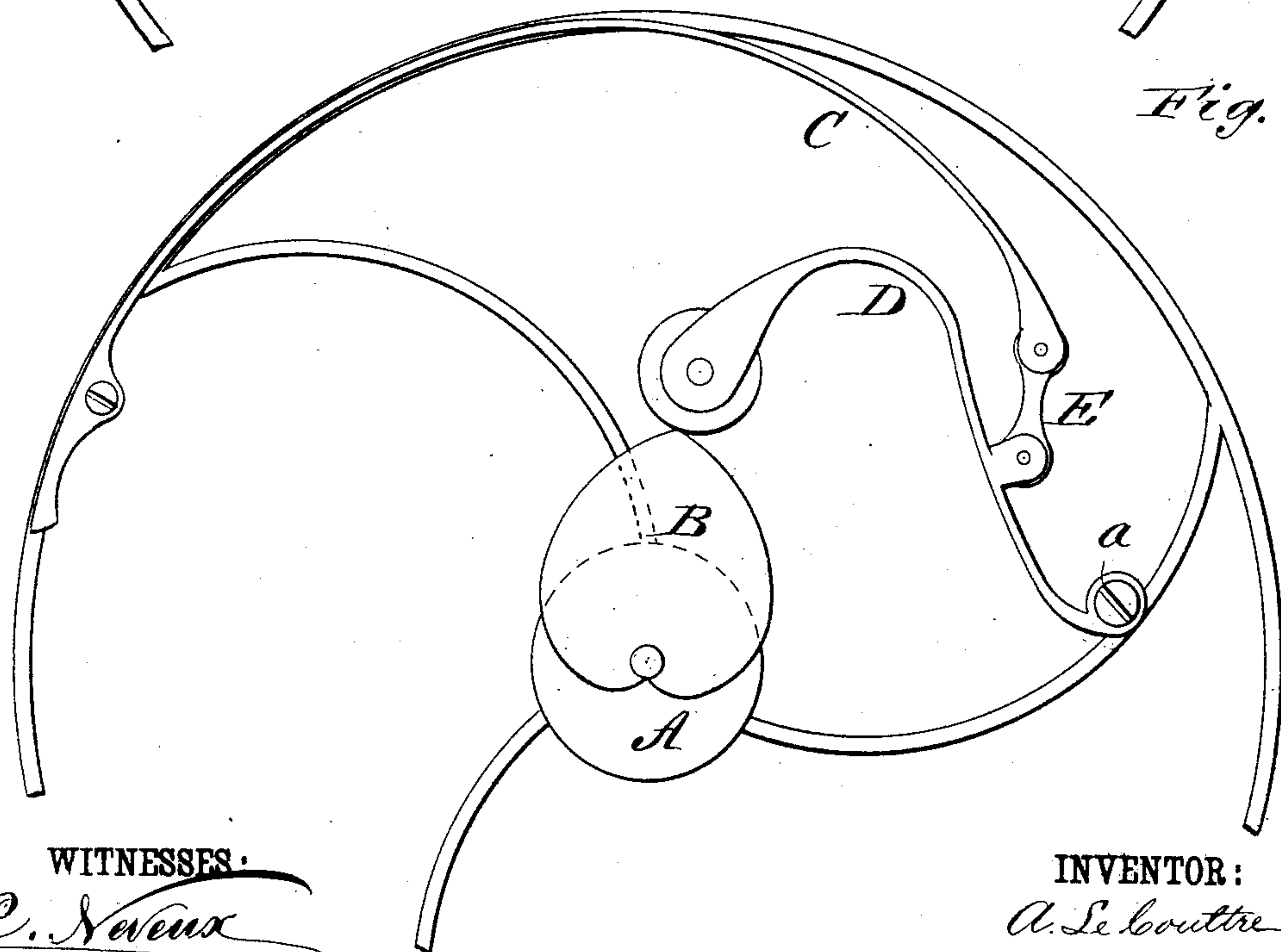


Fig. 2



WITNESSES:

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L. Sedgwick

INVENTOR:

A. Le Coultre

BY

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ATTORNEYS.

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STOP WATCH.

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Fig. 3.

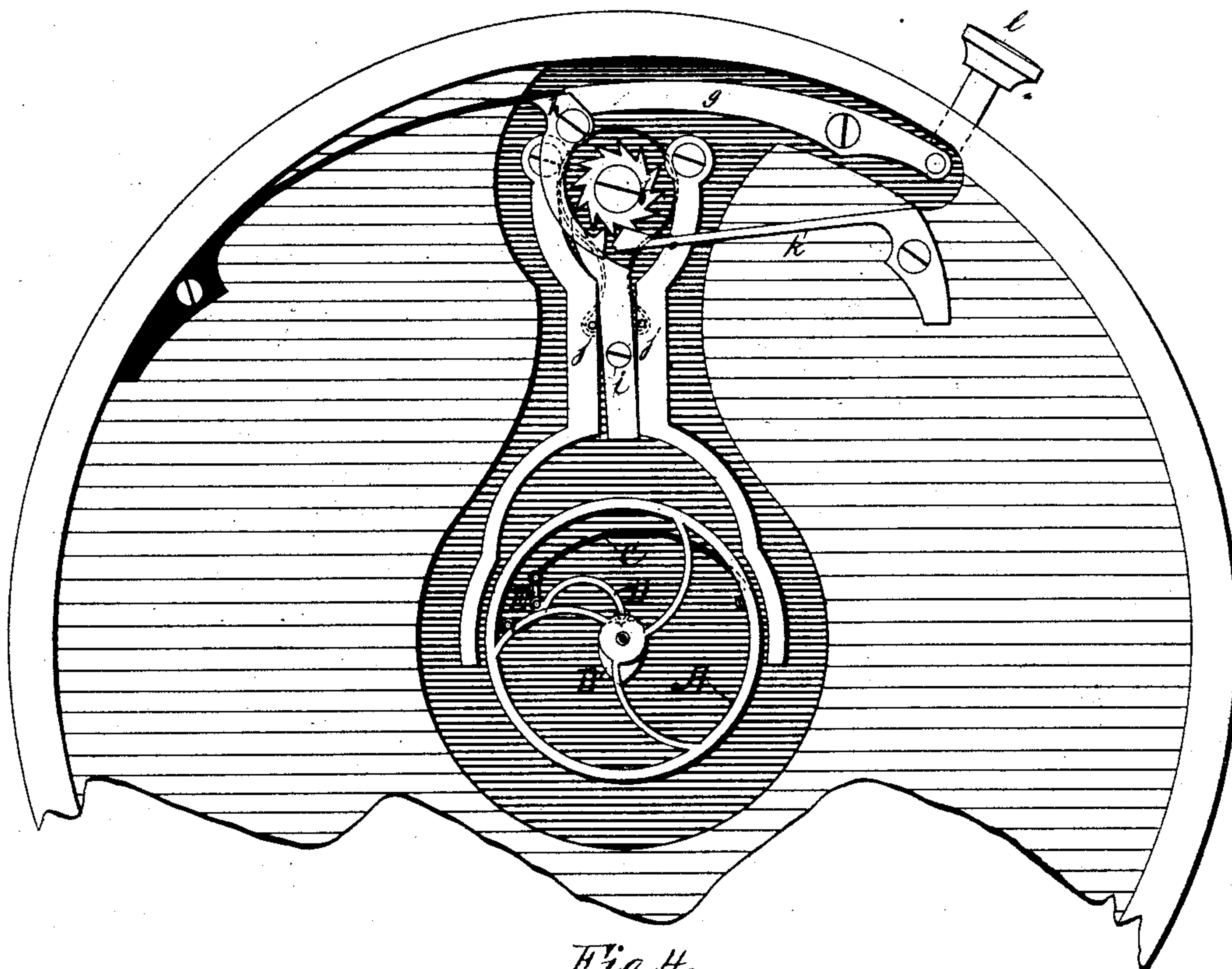
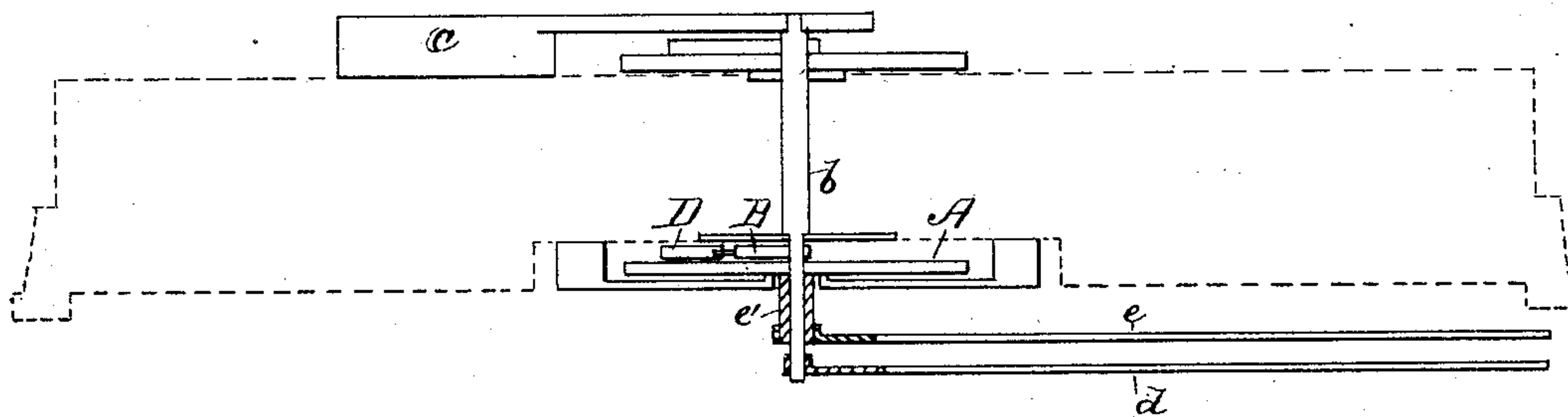


Fig. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

AMI LE COULTRE, OF GENEVA, SWITZERLAND.

STOP-WATCH.

SPECIFICATION forming part of Letters Patent No. 284,444, dated September 4, 1883.

Application filed January 24, 1883. (No model.)

To all whom it may concern:

Be it known that I, AMI LE COULTRE, of Geneva, Switzerland, have invented a new and Improved Stop-Watch, of which the following is a full, clear, and exact description.

My improvements relate to split second-wheels for chronograph-watches.

The invention consists in a flexible connection uniting the spring to the hammer or piece acting on the cam which operates the "fly-back," the object being to avoid the friction, which is apt to cause the stoppage of the split and sometimes of the watch, and also lessen the pressure which causes resistance to the working of the chronograph, thereby rendering the wheel reliable in operation.

In watches of this character the fly-back mechanism consists in a special hand joined to that of the chronograph, so that it can fly back to allow the noting of several successive observations and their duration. The fly-wheel carries a heart-cam held by friction, so as to follow the chronograph-wheel in moving, stopping, and returning. It is at the moment when the fly-back is stopped that the delicate function is executed—namely, the heart continues to revolve and the hammer commences to rise by the action of the cam. The more the hammer rises on the cam the greater and more irregular is the force of the spring acting on the hammer, and as soon as the point of the cam is passed the reverse action occurs and the movement is accelerated. This irregularity of friction of these delicate parts causes errors in the movement of the watch, and often stops the fly-back. This fault has been corrected to some extent by bending the spring in such a manner as to decrease the leverage as the hammer rises; but in order to obtain perfect operation, it is necessary that the full power of the spring be exerted when the hammer is down, in order to hold the hand at its fixed point, and this pressure should decrease as the hammer rises, so as to amount to almost nothing at the top. When that is accomplished the fly-back, instead of being a detriment, adds to the value of the watch.

With this statement of the difficulties which my invention is intended to overcome, I will

now proceed to describe the construction and operation.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the fly-back mechanism in one position. Fig. 2 is a similar view of the parts in reverse position. Fig. 3 is a plan view of the split-second mechanism of a watch having my improvement applied thereto; and Fig. 4 is a central vertical section of the watch, the watch-case being shown in dotted lines.

Referring to Figs. 3 and 4, A is the fly-back or brake wheel, mounted loosely on the central arbor, *b*, stepped in the bridge *c* at the back of watch. *d* is one second-hand, secured on arbor *b*, and *e* is the other second-hand, upon sleeve *e'* on arbor *b*, which sleeve is connected to and carried by the wheel A. B is the heart-cam, held by friction on the arbor *b*, so as to turn with it, and D is a hammer, which is pressed on the heart-cam by the spring C. *f* is a ratchet-wheel, fitted for movement by the lever *g* and pawl *h*, and *i* is an arm, pivoted between the spring-pressed arms *j*, with its end contiguous to the ratchet-wheel *f*, so that the teeth of the ratchet-wheel can act on said end to turn the arm upon its pivot to spread the spring-pressed arms *j*, to release the fly or brake wheel when desired. *k* is a pawl to prevent backward movement of the ratchet-wheel, and *l* is a stem projecting through the watch-case and connected to lever *g*, for operating it. If it be desired to stop the hand *e*, the stem *l* is pushed inward, when the ratchet-wheel *f* will be turned and its tooth disengaged from the projecting end of the arm *i*, and the spring-arms *j* will clamp and hold the fly or brake wheel A, and since the hand *e* is secured to the sleeve *e'*, carried by the said wheel A, it will also be stopped, the hand *d*, with its heart-cam B, continuing to move, and hammer D rolling on the edge of said cam out of its normal position. By pressing again on the stem *l*, the ratchet-wheel *f* will be turned and one tooth caused to engage the end of the arm *i* and turn it on its

pivot to spread the arms *j*, and thereby release the wheel A, when the heart-cam B, acting upon the spring-pressed hammer D, turns the wheel A, and consequently the hand *e*, forward to hand *d*.

5 Instead of having the spring C connected directly to the hammer D, I place between the end of the spring and the hammer a flexible connection, E, the same being preferably a
10 short link pivoted at one end to the hammer, and at the other end to the spring, as shown on an enlarged scale in Figs. 1 and 2. This piece may be of any form, so that it has the same function. When the hammer is down,
15 as shown in Fig. 1, the connection E is in such position that the pressure of the spring is directly upon the hammer for retaining it upon the base of the cam. As the hammer rises the link is moved from its right-angled position
20 with reference to the arm of the hammer, and the angle is gradually increased until, when the hammer reaches its highest point, as in Fig. 2, the link is nearly in line with the handle of the hammer, and the pressure of the

spring is consequently exerted mostly against 25 the pivot *a* of the hammer, thus relieving the heart of the pressure of the spring. On the reverse movement the pressure of the spring increases upon the heart until it reaches its maximum, as before.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In stop-watches, the combination, with the cam and hammer of the fly-back mechanism, of the spring connected to the point between the pivot and end of the hammer by a flexible connection, substantially as described. 35

2. In stop-watches, the combination of the cam B, the pivoted hammer D, spring C, and flexible connection E, substantially as described, for operation as specified. 40

The above specification of my invention signed by me this 11th day of September, 1882.

AMI LE COULTRE.

Witnesses:

LYELL T. ADAMS,
F. FAUQUE.