

(No Model.)

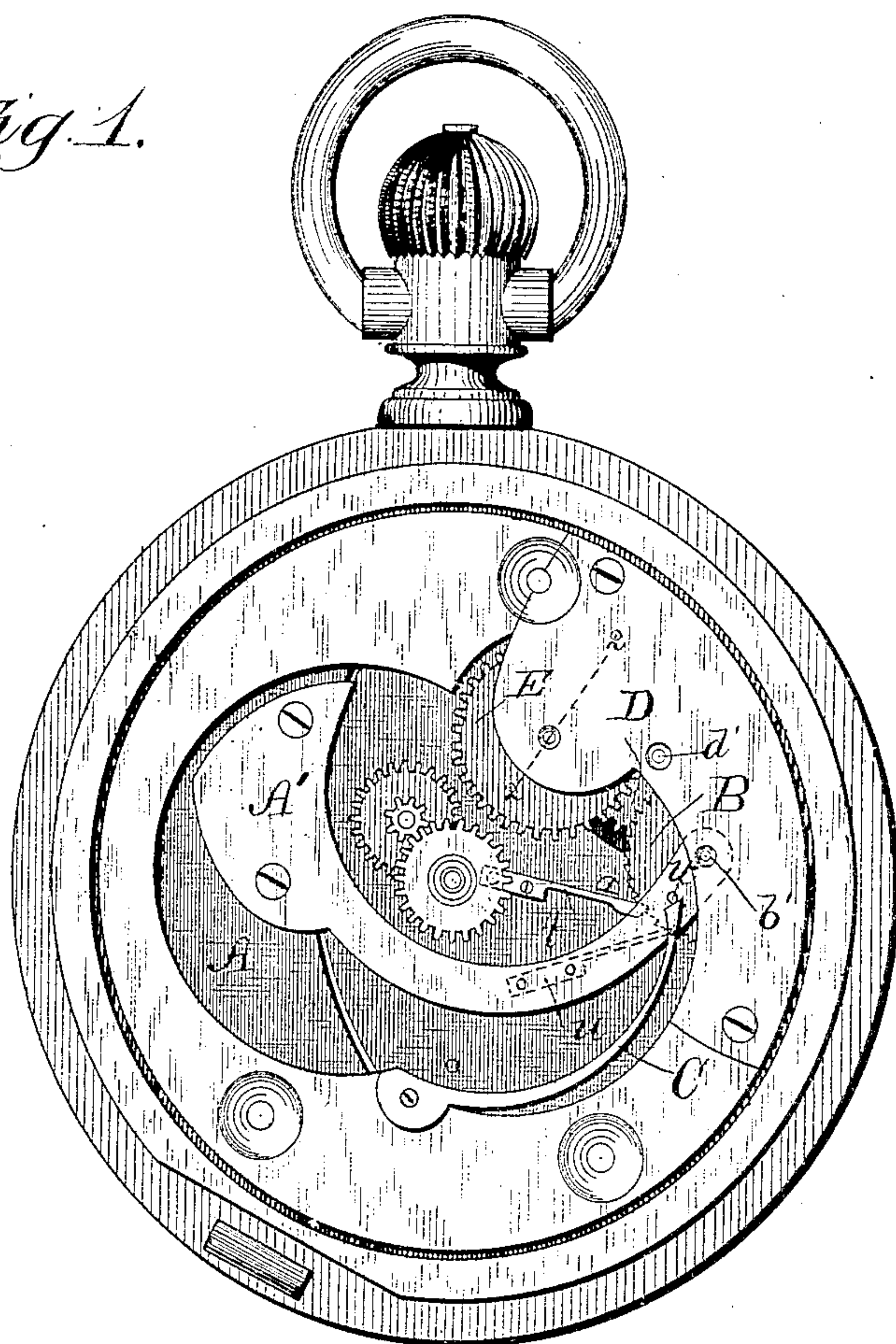
H. VON DER HEYDT.
SELF WINDING WATCH.

2 Sheets—Sheet 1.

No. 293,691.

Patented Feb. 19, 1884.

Fig. 1.



Witnesses:

C. E. Gaylord.
H. H. Dyrenforth

Inventor:

Hermann von der Heydt
By R. L. Dyrenforth
his Attorney.

(No Model.)

2 Sheets—Sheet 2.

H. VON DER HEYDT.

SELF WINDING WATCH.

No. 293,691.

Patented Feb. 19, 1884.

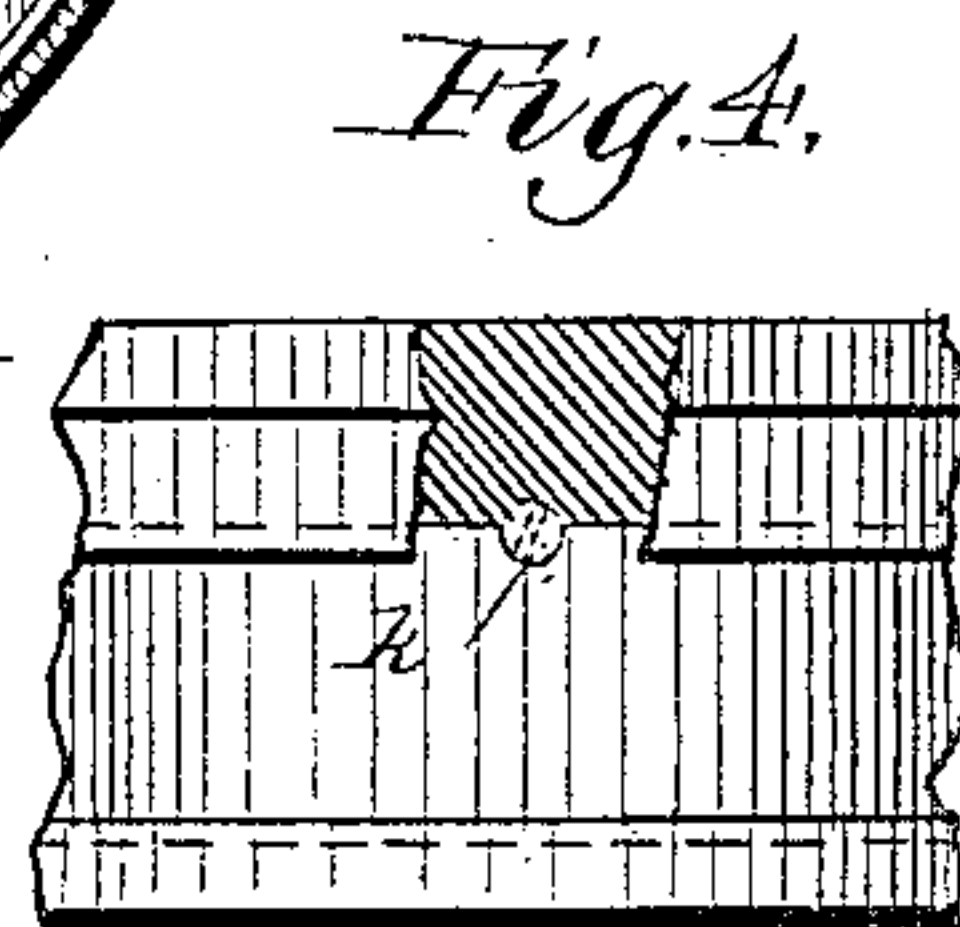
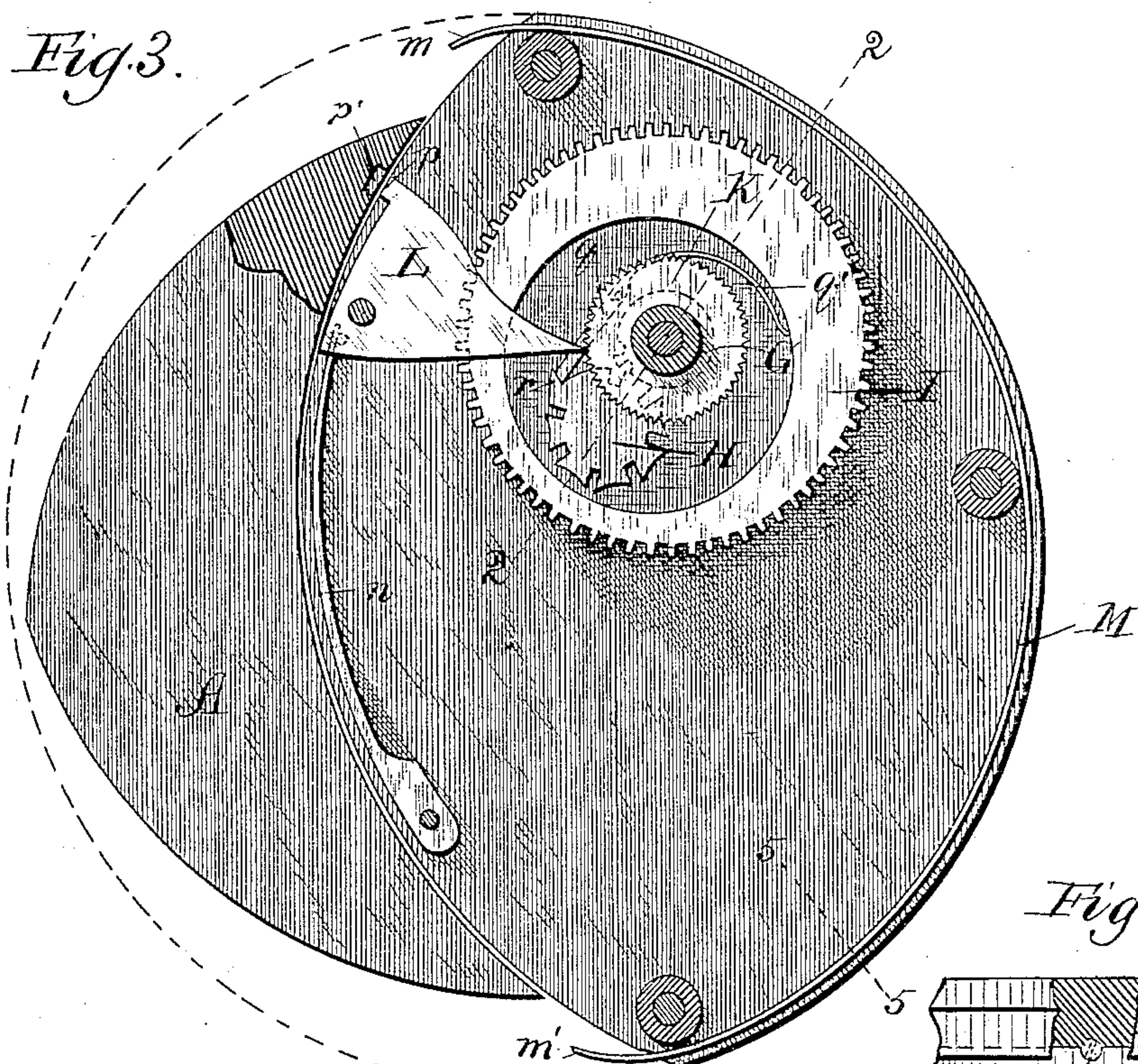
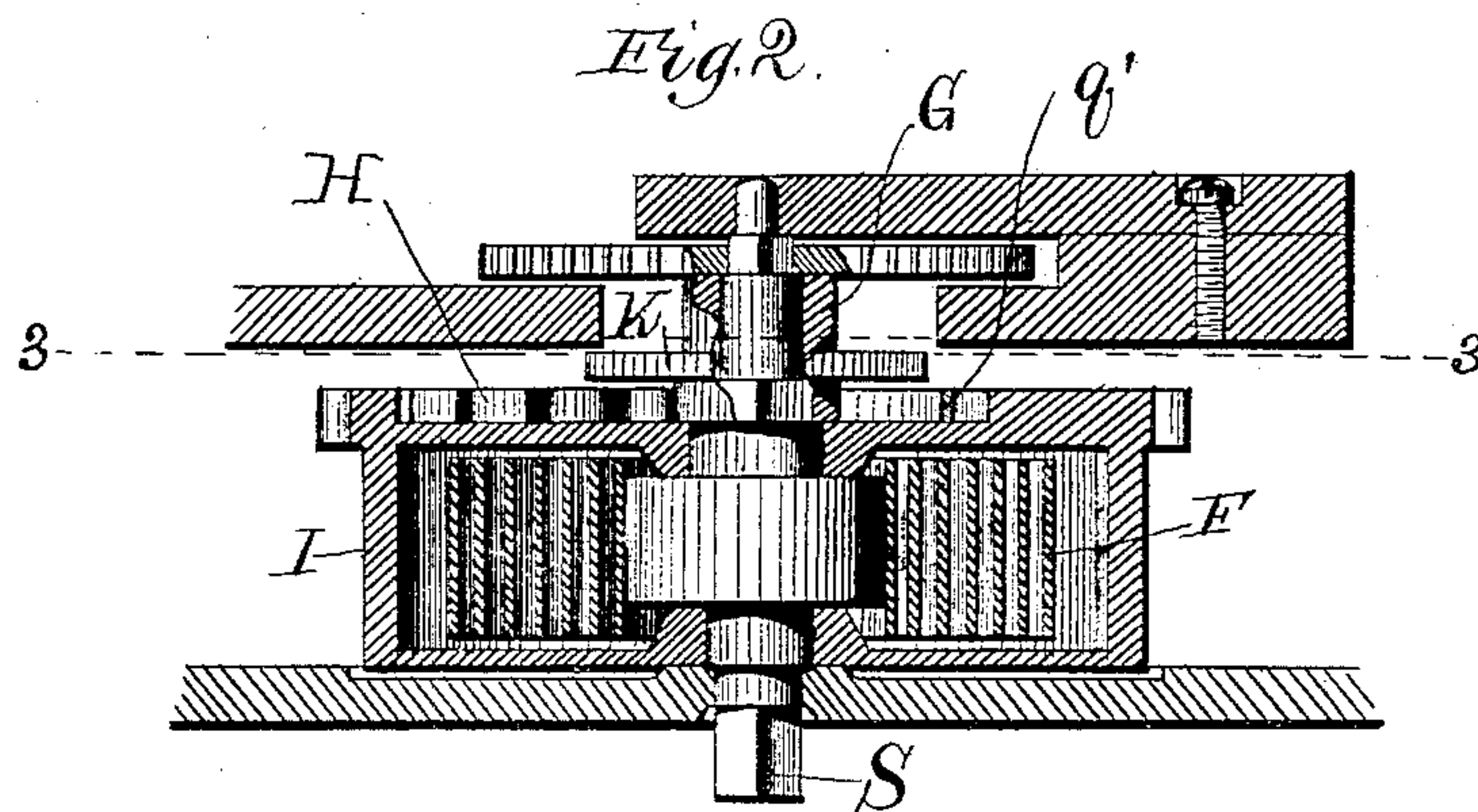
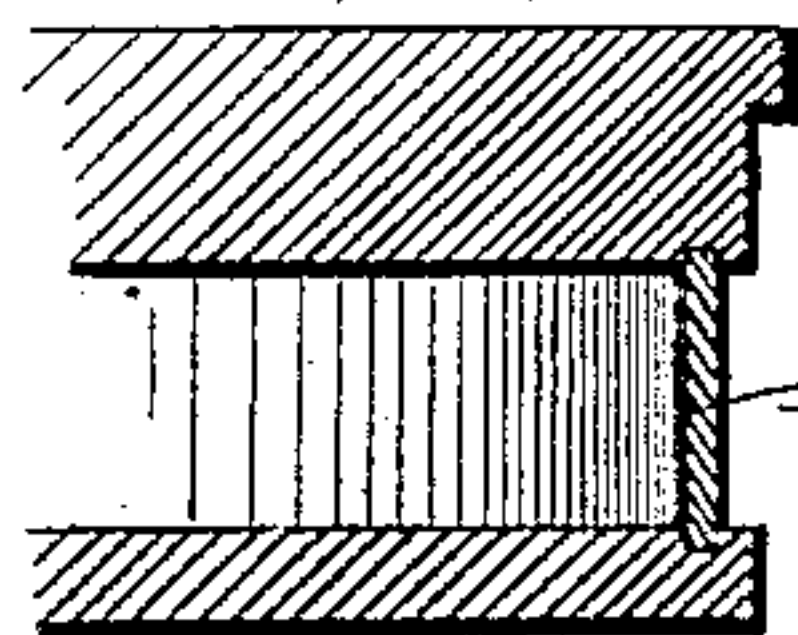


Fig. 5.



Witnesses:

C. E. Gaylord.
W. H. Dyrenforth

Inventor:

Hermann von der Heydt.
By P. C. Dyrenforth,
his Attorney.

UNITED STATES PATENT OFFICE.

HERMANN VON DER HEYDT, OF CHICAGO, ILLINOIS.

SELF-WINDING WATCH.

SPECIFICATION forming part of Letters Patent No. 293,691, dated February 19, 1884.

Application filed May 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, HERMANN VON DER HEYDT, a subject of the Emperor of Germany, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Self-Winding Watches; and I hereby declare the following to be a full, clear, and exact description of the same.

10 The idea of constructing watches made self-winding by means of the vibrations of a pendulum connected with the mainspring, the said vibrations being produced by the physical movements of the wearer in walking, originated with one Breguet, of Paris, France, at or
15 about the beginning of the present century. Himself a man of extraordinary ability in the practice of his art, he was able to make self-winding watches of such perfect workmanship that, even at this time, various samples of his skill in this direction are in existence, and still continue, it is believed, to perform their functions satisfactorily. The principle upon which Breguet constructed his self-winding
25 watch has met since with various attempts, more or less successful, at improvement. Of these the most recent attempt, as far as known, is due to one August von Loehr, of Vienna, Austria, to whom Letters Patent of the United
30 States No. 211,280 were granted January 7, 1879. This device is objectionable in the fact that it cannot be sufficiently wound up unless worn by one who practices considerable bodily exercise. The patentee himself recognizes
35 this fact in various articles written by him; but he regards it rather as an advantage than otherwise, not in the watch, however, but to its possessor, since, as he has stated, every one wearing a watch of his construction will be reminded of the evil of his ways by the failure
40 of his time-piece to perform its duty by running down, and that it thereby becomes a monitor tending to reform the wearer of his inactive habits, thus promoting his general health. Whatever its advantages in conduc-
45 ing to the enjoyment of bodily health, it lacks an important feature to make it a practical and useful time-keeper for general use—viz., the adaptability of its mechanism to main-
50 springs other than those of the kind employed in the most delicate watches of smallest size,

and known to the trade in this country as the "lady's watch;" and it is further found, notwithstanding the assurance that owing to its peculiar construction the mainspring cannot
55 be overwound, that such is not strictly correct, for there is a continual strain upon the spring after the latter has been wound to its full capacity, owing to the continuing action of the pendulum when the wearer exercises himself for
60 a longer time than is required to wind the watch up to completion.

It is my object to overcome these objections; and my invention consists in certain mechanisms, hereinafter described, whereby a watch
65 is made self-winding, and whereby, in order to be sufficiently wound up to go a whole day, the wearer will only be required to walk for about fifteen minutes or perform movements of his body that will be equivalent to walking
70 that length of time. At the same time the self-winding mechanism constituting a part of my invention is capable, by its application, of successfully operating the mainsprings of watches of all sizes; and to obviate any fur-
75 ther winding of or strain upon the spring after it has been wound up to a desired extent, I have invented a suitable automatic mechanism.

My invention further consists in providing
80 a self-winding mechanism, whereby not only the coarsest mainspring used in watches may be wound by a minimum of vibrations of a pendulum, but which shall be so arranged that the space required for the works of an
85 ordinary watch need not be increased to accommodate its parts; and it still further consists in certain additional features, details of construction, and combinations of parts, all as hereinafter more fully set forth.

90 In my invention the self-winding mechanism has but six parts additional to those of an ordinary key-winding watch, while the mechanism for protecting the mainspring from overwinding has but five, thus making a total of
95 eleven additional parts.

100 In the drawings, Figure 1 is a plan view of that part of my invention by which the self-winding is effected; Fig. 2, a vertical section taken on the line 2 2 of Figs. 1 and 3; Fig. 3, a horizontal section taken on the line 3 3 of Fig. 2, and showing the mechanism for relieving

ing the mainspring from strain when it has been wound to a desired extent; Figs. 4 and 5, detail views, the latter being a section taken on the line 5 5 of Fig. 3.

5 A is a pendulum, partly covered by the plate in Fig. 1 of the drawings, but shown in its real form—one approximating a section of an ellipse—on the reverse side of the watch represented in Fig. 3. I prefer to give the pendulum this form, for the reason that it thus be-
10 comes possible to make it heavier than could be done were it of another shape.

Secured at one end to the upper face of the pendulum A is the pendulum-rod A', preferably curved, as shown, to avoid interference
15 with the works of the watch. At the other it is suspended on the axis of the ratchet-wheel B by means of a pin passing through the said axis, and supported at each projecting end to
20 prevent in any way its influence upon the motion of the said wheel.

C is a spring, which engages with a pivot, *v*, inserted in the face of the rod A', near its extremity, and whose strength corresponds to
25 the weight of the pendulum. This spring serves to keep the pendulum A in a vertical position when the wearer is at rest, and to force it back into that position when caused to vibrate by the motion of his body.

30 On the inner side of the pendulum-rod A', and firmly secured thereto at one end, is a pawl, *u*, sufficiently stiff to prevent its bending when caused to operate, or by the counter-pressure of the ratchet-wheel B to engage in
35 the teeth of the said ratchet-wheel. When by a motion or jar in walking the pendulum moves in the direction against the spring C, the pawl *u* drives the ratchet-wheel part way around, where it is held by means of a pawl, *t*, acting
40 as a detent, the latter being suitably placed and similar in construction to the pawl *u*. The ratchet-wheel B is provided with very fine teeth, one hundred in number. Its pinion *b'* is provided with ten leaves to engage
45 with the wheel D, having a pinion, *d'*, provided with eight leaves to engage in the wheel E, which has forty-eight teeth, and which operates the barrel containing the mainspring. Each vibration of the pendulum drives the
50 ratchet-wheel B around, through the medium of the pawl *u*, five of its teeth; and by the above arrangement of the wheels it will be seen that to cause a complete revolution of the ratchet-wheel will require twenty vibrations of the
55 pendulum. These twenty vibrations will drive the wheel D, by means of the pinion *b'*, provided with ten leaves, around five of its teeth, and, having in all fifty such teeth, it will require five revolutions of the ratchet-wheel, or
60 one hundred vibrations of the pendulum, completely to revolve the wheel D. The pinion *d'*, with eight leaves, will with one revolution of the wheel D drive the wheel E, with forty-eight teeth, around eight of its teeth, and a
65 complete revolution of the latter will require six revolutions of the wheel D, or six hundred vibrations of the pendulum.

The mainspring F is preferably of such length that it will require six and three-quarters revolutions of the barrel completely to
70 wind it up, and it is so arranged that one such revolution will cause the watch to run six and two-thirds hours. Six revolutions of the barrel will therefore wind the watch sufficient to go for forty hours; and, if wound to its ut-
75 most capacity, it would go forty-five hours before running down. I prefer, however, to allow the last five hours of the spring's capacity to remain unutilized to avoid possible strain thereon, and with that view have invented a
80 means of checking the vibrations of the pendulum when the number six times six hundred, or thirty-six hundred thereof, has been reached, only allowing it again to vibrate when the watch has partially run down. 85

Thus far in the description of my self-winding device I have endeavored accurately to describe the specific mechanism by means of which the purpose is preferably effected. It is obvious, however, that slight changes may
90 be made in the positions and constructions of the different parts without departing from the spirit of my invention, and that likewise the number of teeth, &c., in the gear mechanism may be varied and still produce the desired results. 95 I therefore do not confine myself to the above specific construction. The checking device above referred to forms an especially-important feature of my invention, and a description thereof is as follows: 100

In Fig. 3 of the drawings, G is a cam-wheel provided with one cam, and H an intermittent wheel of peculiar construction. Both of these wheels are sunk into the bottom head of the barrel I. The cam-wheel G is secured to
105 the arbor, passing through the barrel I, to revolve with each revolution of the latter. The desire being to prevent further winding by continued vibration of the pendulum, after the arbor has made six revolutions, the intermittent wheel H is provided with six spurs, between each two of which the cam of the cam-wheel enters in its revolution, driving the intermittent wheel one spur farther toward the right
115 with each revolution. Having completed its sixth revolution, the cam enters the space to the left of the last spur, when a tooth, *r*, on the periphery of the intermittent wheel engages with a finger, *q*, pivoted at one end to the under side of the toothed wheel K, loosely
120 secured upon the bottom head of the barrel, thereby driving the wheel K around about three of its teeth and causing the projection *p* on the catch-click L (the latter being held at its point between the teeth of the wheel K
125 by means of the spring *n*) to sink into the recess *p'*, provided for the purpose in the pendulum, thus preventing further vibration of the latter until the mainspring has unwound sufficient to cause one revolution of the arbor in
130 the opposite direction, when the cam engages with the intermittent wheel H, to force it likewise in the opposite direction, thus releasing the finger *q* from its pressure, when the spring

q' , which forms a continuation of the finger q , drives the wheel K back sufficient to release the projection p from its recess p' in the pendulum, and thus allows the latter to vibrate, if caused so to do, until the mainspring is again wound up as far as the mechanism just described will permit.

M is a thin metal band, (shown in section in Fig. 5 of the drawings,) which passes part way around the inner circumference of the watch, and is made to fit within grooved recesses, formed one on the inner face near the edge of each of the two plates. As an additional security against displacement of the said band, I insert a screw, k , through its circumference, as shown in Fig. 4 of the drawings. This band is of sufficient length to permit its ends m and m' to reach into the chamber in which the pendulum A performs its vibrations, where they have a twofold purpose—viz., first, to prevent the clattering noise which would otherwise be caused by the pendulum in striking in its vibrations against the inside wall of the case; and, second, to accelerate the vibrations of the pendulum.

Although it is quite obvious that my invention admits of combination with the works of watches of whatever grade of workmanship and material, the one model which I have constructed contains the very finest material employed in the manufacture of watches, and its parts are constructed with the utmost care and arranged in the most accurate manner, thus constituting a watch that would correspond in value with the very best of known manufactures; and it is found that the means hitherto employed in the regulation of hair-springs cannot be controlled with sufficient delicacy of touch and accuracy to effect a mere shade in varying the speed of the works—a very essential feature in the finer watches containing my improvement, and, in fact, in the finer specimens of all watches. I therefore have invented a regulating mechanism capable of use in connection with my improvement; but I make no claim thereto in this connection, as it is intended that it shall form the subject of a separate application for Letters Patent.

Since it is not intended that my invention shall produce perpetual motion either in the watches to which it is applied, or necessitate it on the part of wearers thereof, circumstances may arise under which the pendulum will not be caused to vibrate, and the watch would therefore be allowed to “run down” unless some other means were provided for winding it up, and also for setting the hands. These requirements are met with a key, R, provided with a screw-thread, to permit it to be screwed into the stem of the watch, suitably prepared to receive it. No claim is made herein to the said key, as it is intended that the latter shall form the subject of a separate application for a patent.

The arrangement of my winding device,

containing, as it does, but two extra wheels, B and D, admits the winding of the mainspring in the barrel without detriment to the winding mechanism. This would not be the case had there been more wheels employed, since the last one, corresponding with the ratchet-wheel B, would have had to make its revolutions, unless wound with painful slowness, with such rapidity as to have done it, and likely also its immediate neighbor, serious injury.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a watch, the self-winding mechanism, consisting of the pendulum A, suspended by means of a rod, A' , from the axis of the pinion b' of the ratchet-wheel B, spring C, engaging with the rivet v , non-flexible pawl u , secured to the rod A' , to engage with the teeth of the ratchet-wheel B, non-flexible detent t , ratchet-wheel B, supporting the pinion b' , wheel D, supporting the pinion d , and the wheel E on the barrel, the whole being constructed and arranged to operate substantially as described.

2. In a self-winding watch, the combination, with the pendulum which operates the winding mechanism, and is provided with a recess, p' , of the pivoted catch-click L, provided with a projection, p , and mechanism for causing the said projection to enter the said recess when the watch is wound to a given degree, thus preventing further vibration of the pendulum, and for releasing it at the end of a given time, substantially as described.

3. In a self-winding watch, in combination with the pendulum A, mechanism to prevent overwinding of the mainspring, said mechanism consisting of a cam-wheel, G, on the barrel containing the mainspring, intermittent wheel H, having the tooth r to press against the finger q , the latter being pivoted to the wheel K, and having a continuation to form a spring, q' , to force the wheel K around in the direction of the revolving barrel when the mainspring is unwinding, and catch-click L, engaging at its point with the teeth of the wheel K, and held in position by means of the spring u , and provided with a projection, p , to fit into a recess, p' , in the pendulum, substantially as described, and for the purpose set forth.

4. In a self-winding watch, the band M, fitting within recesses, one on each inner face of the two plates of a watch, and formed near the edges of the said plates, and having its ends project into the pendulum-chamber to allow the pendulum to strike against them in its vibrations, thus preventing clattering noise and operating to accelerate the vibrations of the said pendulum, substantially as described.

HERMANN VON DER HEYDT.

In presence of—

WM. H. DYRENFORTH,
EDW. McCAFFREY.