

(No Model.)

2 Sheets—Sheet 1.

F. FITT.
STOP WATCH.

No. 310,936.

Patented Jan. 20, 1885.

Fig. 1.

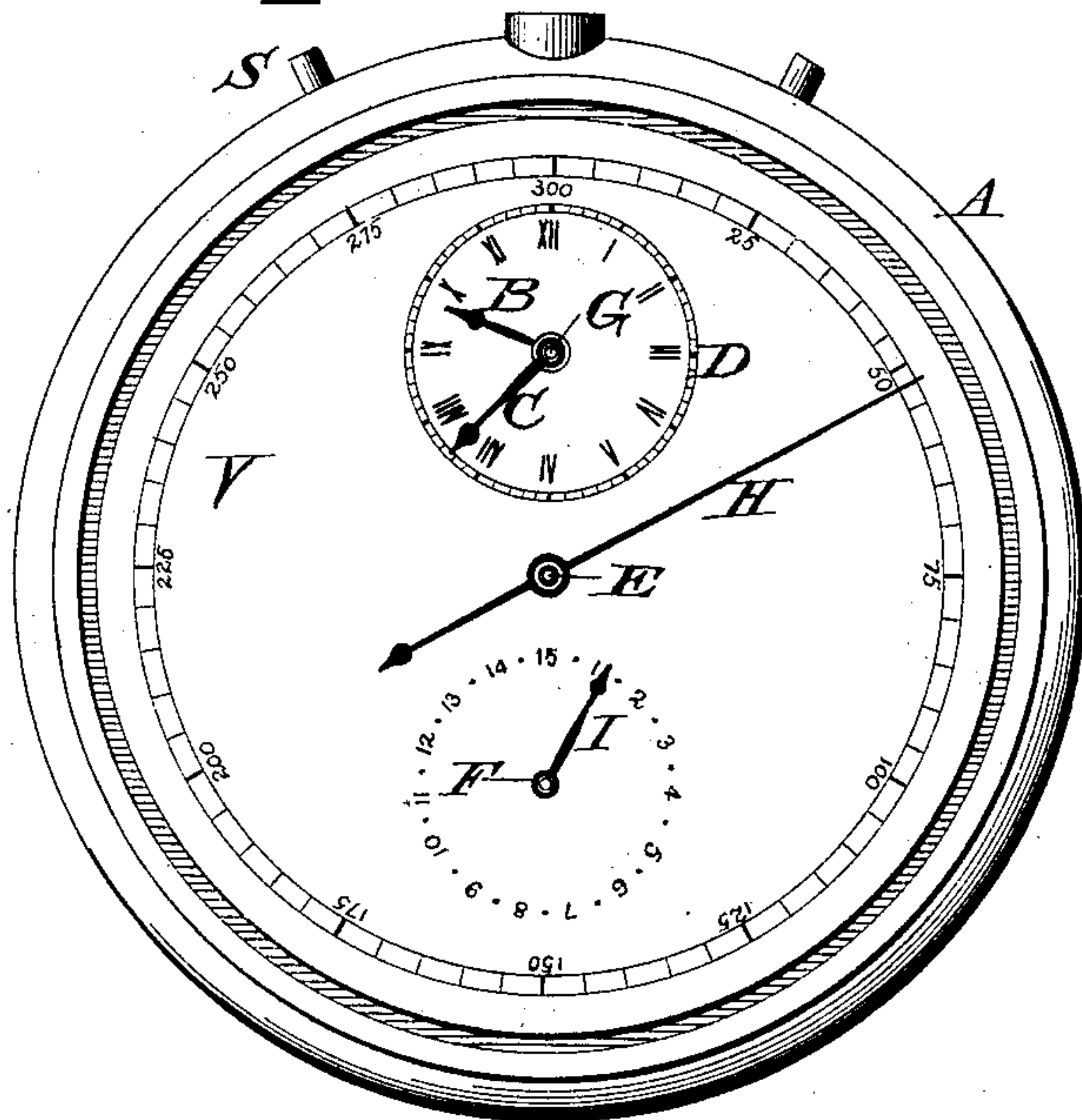
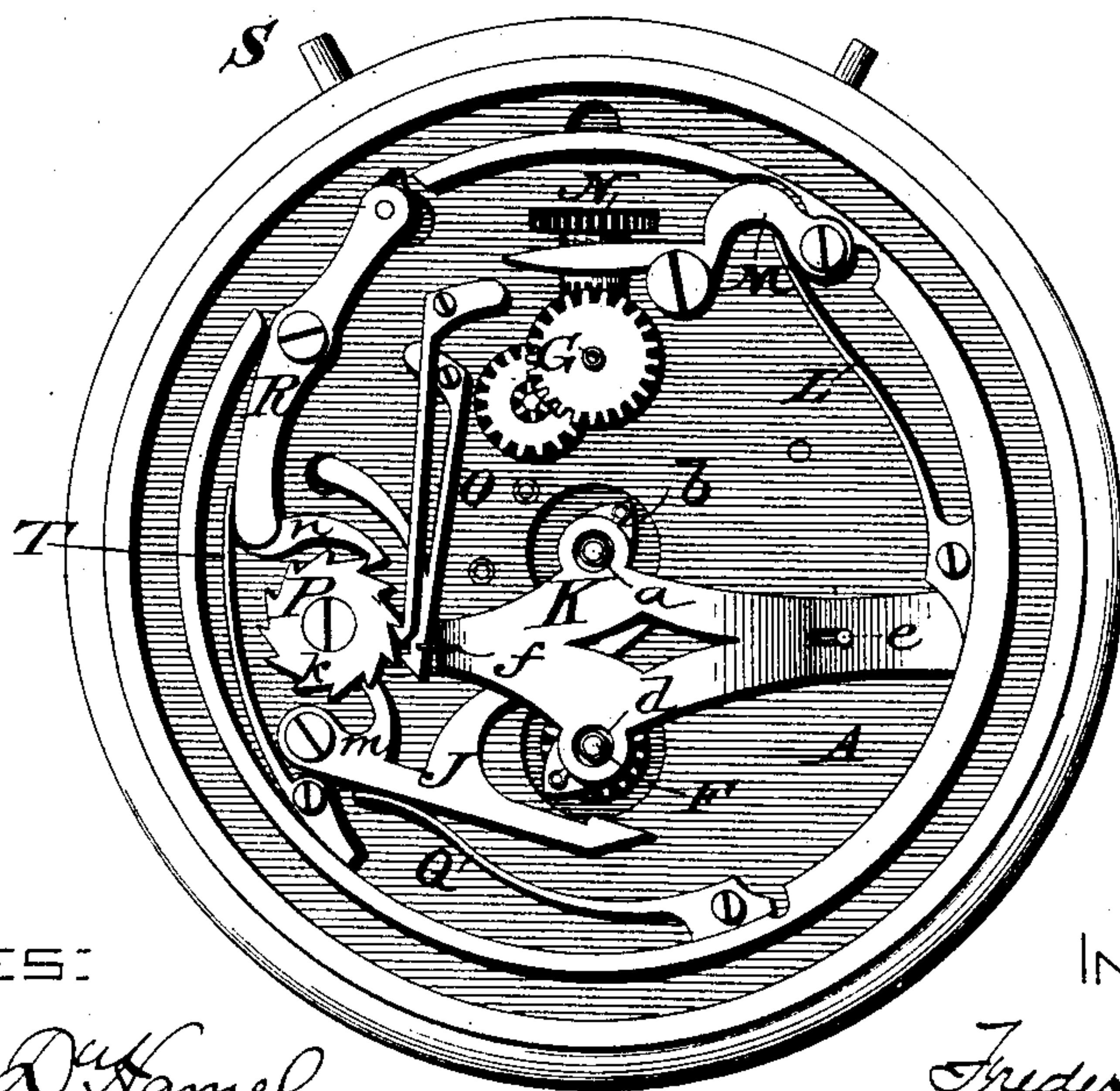


Fig. 2.



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2 Sheets—Sheet 2.

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Fig. 3.

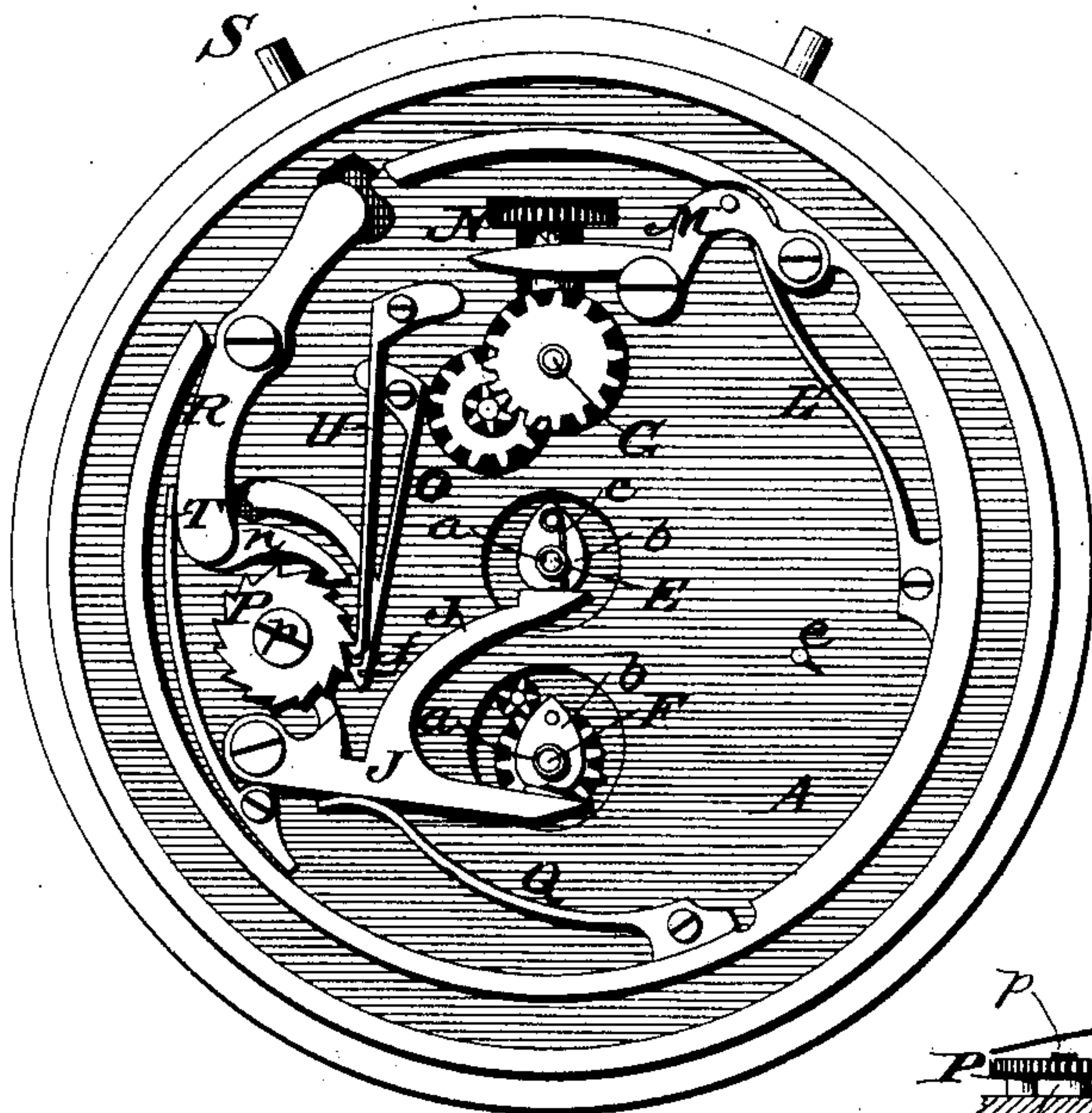
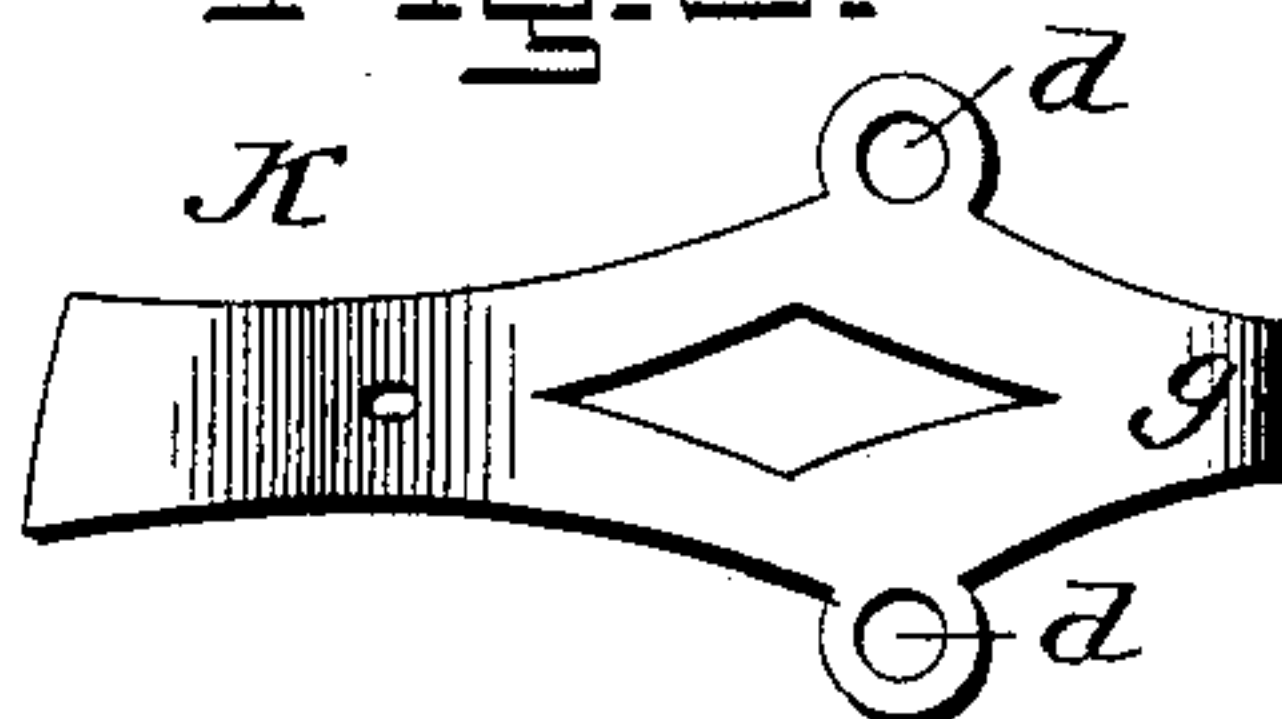


Fig. 5.



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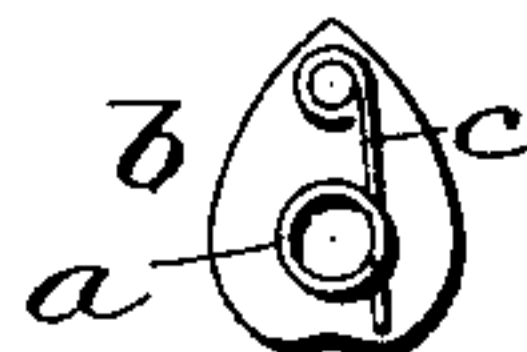


Fig. 8.

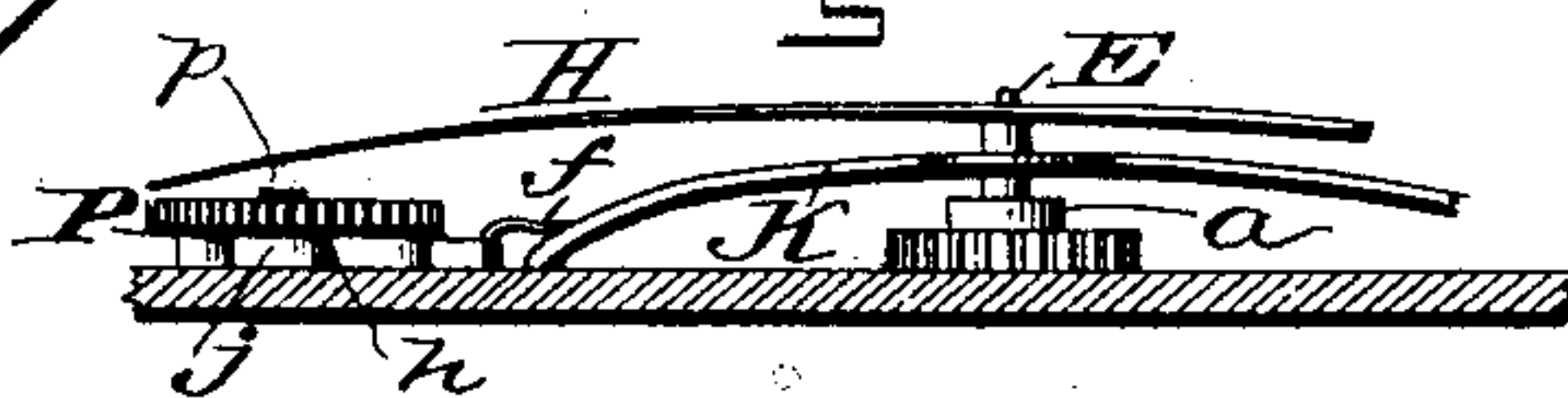


Fig. 4

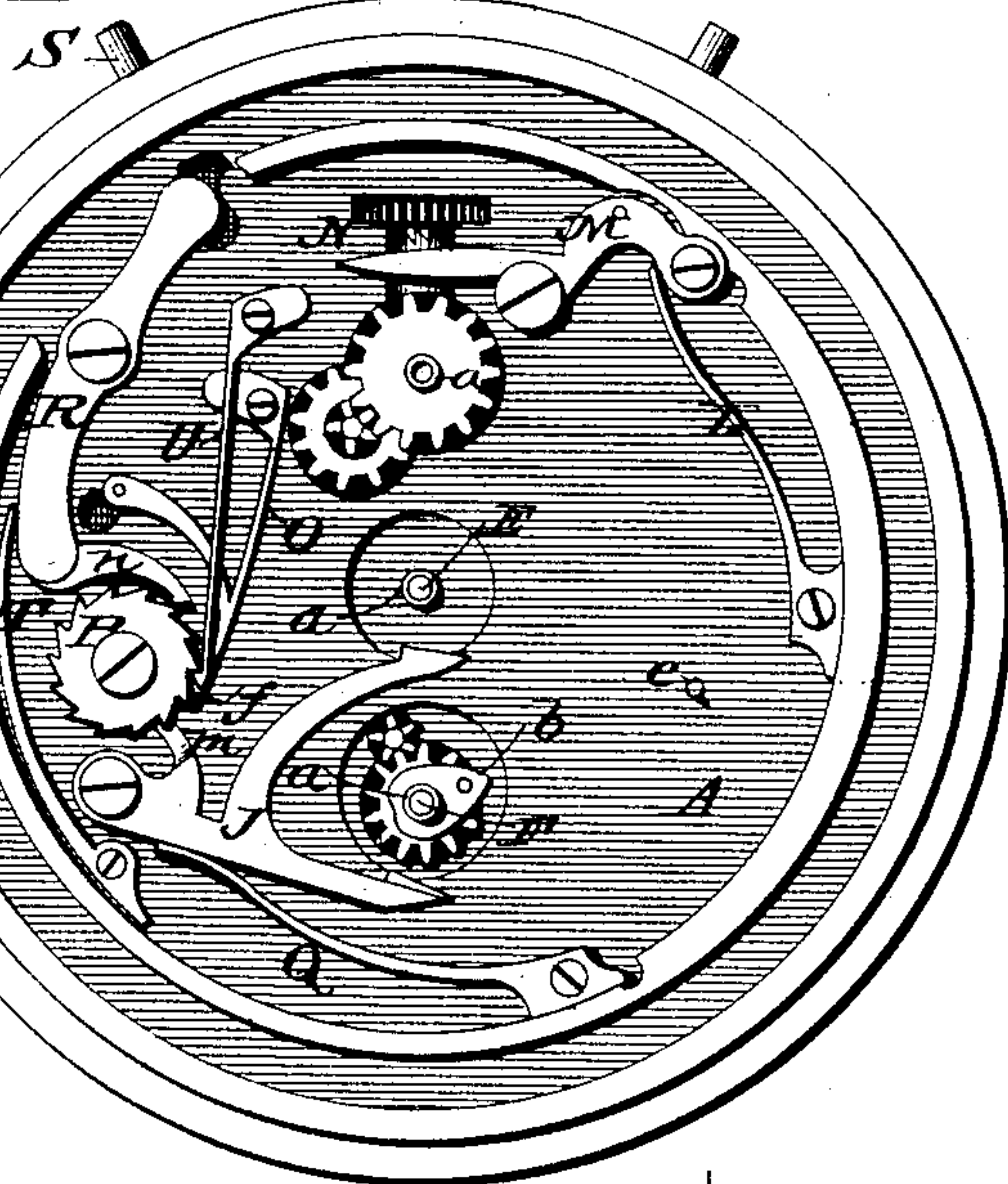
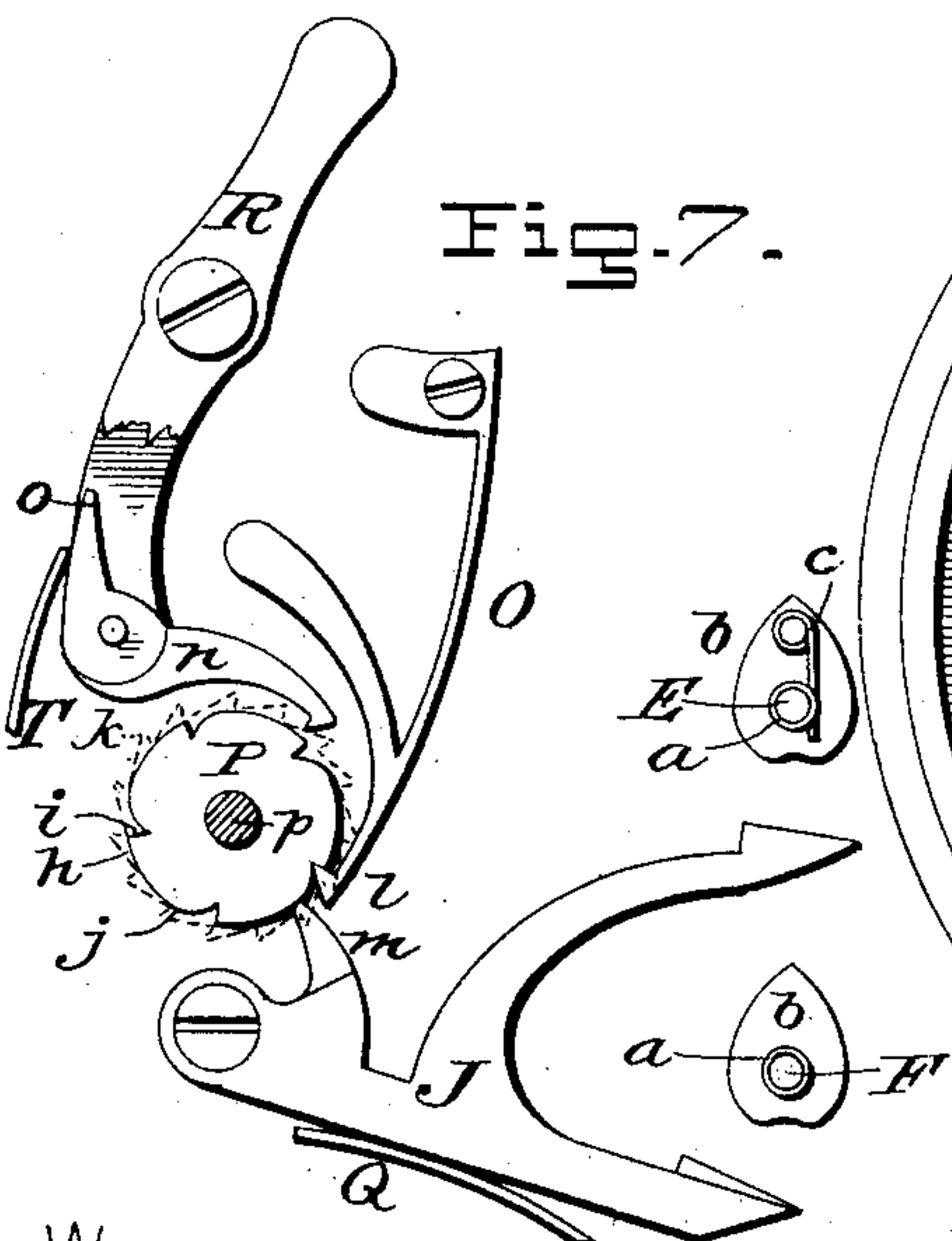


Fig. 7.



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STOP-WATCH.

SPECIFICATION forming part of Letters Patent No. 310,936, dated January 20, 1885.

Application filed January 22, 1884. (No model.) Patented in England January 7, 1884, No. 892.

To all whom it may concern:

Be it known that I, FREDERICK FITT, of Chaux-de-Fonds, in the Canton of Neuchâtel, Switzerland, watch-maker, have invented certain new and useful Improvements in Chronographs; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of time-keepers commonly known as "stop-watches."

The invention consists in a novel construction of parts, whereby all the advantages of former expensive constructions may be secured at a very small cost.

In the accompanying drawings, Figure 1 is a face view of my improved chronograph complete; Fig. 2, a face view with the dial-plate and hands removed, the parts set to allow the hands to move; Fig. 3, a similar view with the friction or stop plate removed and the parts set as in Fig. 2; Fig. 4, a similar view with the friction-sleeve of the second-hand removed; Fig. 5, a face view of the friction or stop plate; Fig. 6, a face view of the friction-sleeve detached; Fig. 8, a face view of the cam-wheel at the back of the ratchets, which controls or effects the movements of the stop devices, showing also other parts; Fig. 7, an edge view of the friction-plate and its controlling devices.

Stop-watches have hitherto been made in a variety of forms, but may be grouped under two general heads or classes, viz: those in which the stop-hands may be started, stopped, and returned to their starting-point without in any way interfering with the ordinary time-movement proper; second, those in which the stopping and starting of the stop-hands causes a simultaneous stopping and starting of the timer. The first of these involves an expensive and complicated gearing, and the second are useless as time-keepers when used as chronographs, the time being interfered with, as will be readily observed.

The object of my invention, therefore, is to combine with a watch or time-keeper the stop-hands and dials, with simple and convenient means for connecting said hands with or disconnecting them from spindles of the time-movement, so that the stop-hands may be controlled and manipulated without in any way

affecting the time-movement proper, and without a separate train. This I accomplish by the construction shown in the drawings, which construction may be embodied in different forms involving the same principle.

A, Fig. 1, indicates a watch-case containing a time-movement of any approved construction capable of carrying and giving the requisite motion to an hour-hand, B, and minute-hand C of a time-keeper proper, these hands being represented in the drawings as of small size and traveling over a small dial or properly-divided circle, D, within the circle of the main dial V. Two spindles, E and F, independent of and additional to the spindle G of the timer proper, extend through the pillar-plate and dial, as shown in Figs. 1, 2, 3, and 4, adapted to carry, respectively, the second-hand H and independent minute-hand I of the stop-watch, as in Fig. 1.

In the drawings I have represented the second-hand spindle E as located at the center of the dial, which location is adopted primarily because the hand is made to indicate seconds and fractions of seconds—in the present instance fifths—and a large circle is necessary to enable the spaces to be large enough to be readily distinguishable in reading. The independent minute-hand I is arranged to travel over a small circle or dial within or upon the main dial, which is shown divided into fifteen parts, in order to give ample room for the divisions, and yet cover a sufficient space or length of time for all ordinary purposes of a stop-watch. I desire to have it understood, however, that while this arrangement is preferred, it is not essential, the invention being applicable alike to a variety of movements. In some cases the independent minute-hand may be omitted, or it may be carried by the central spindle and the second-hand by a sleeve encircling the same, or vice versa.

Having thus explained the only essential characteristics of the time-movement, I will now describe the mechanism by which the stop-hands are operated and controlled.

The second-hand H and minute-hand I are each carried by a sleeve or collar, *a*, adapted to loosely encircle the spindles E F, and provided with a heart-shaped disk or plate, *b*, carrying a light friction-spring, *c*, which bears

against the side of the spindle and produces just sufficient friction to cause the disk, collar, and hand to travel with the spindle when not held against such movement.

5 J indicates a pivoted lever, which is thrown against the heart-shaped disk or plate *b*, and serves to carry back the hand connected therewith, these being essentially the same as in ordinary fly-back stop-watches already in use.
10 The lever J is furnished with two arms, in order to act simultaneously upon the disks of both the second and the minute hand.

K indicates a flat plate or spring, which is very light, thin, and elastic, and which is of such shape as to extend laterally over both
15 spindles E and F, which project through perforations *d* in said plate. The rear end of spring-plate K is held beneath the fixed end of spring L, which presses the shifting-lever
20 M of the winding-clutch N, which latter parts are of ordinary construction and arrangement. The spring-plate is held against lateral movement by means of a stud or pin, *e*, projecting from the pillar-plate through a
25 hole or opening in the spring-plate, as shown. Obviously, however, other means of securing the spring-plate in place may be adopted. A spring-arm, O, Figs. 2, 3, and 4, is secured at
30 at its free opposite end with a lateral ear or projection, *f*, which may be conveniently made of wire bent into proper form. This wire or projecting lip is arranged to project at all times over the curved or beveled end of the
35 spring-plate K a short distance, but is arranged to be moved more or less upon the beveled end *g* thereof, so as to depress the plate and cause it to bear upon the end of the collars *a*, which bear the stop-hands, or to re-
40 lease the plate and relieve said collars of the friction of the plate or spring K, whereupon the hands will again begin their travel with and about their spindles. This spring-plate and the mechanism for controlling its action
45 and the action of the "fly-back" lever constitute the essential features of my improvements.

Referring now to Figs. 2, 3, and 4, the construction and arrangement of this mechanism
50 will be seen, and in Fig. 7 the cam-wheel and the parts immediately associated therewith are shown on a larger scale.

A combined ratchet and cam wheel, P, (shown on an enlarged scale in Fig. 7,) is mounted up-
55 on a pivot or axle, *p*, secured to the pillar-plate. This wheel consists of an inner portion provided with a series of notches, *h*, having abrupt walls *i* at one side, and curved or cam-shaped faces *j* at the other side, extending from
60 the bottoms of the recesses up to the circumference of the cam wheel or disk, each notch being about one-half the width of the portion remaining between it and the next, which portion is concentric with the axle of the disk.

65 The ratchet portion of wheel P is composed of a series of ratchet-teeth, *k*, of which there are three for each notch *h* of the cam portion

of the wheel. The notches *h* permit the nose
70 *l* of spring-arm O to drop into them when the wheel P is turned to bring the notches successively opposite said nose, and the inclines or cam-faces *j* serve to throw said nose and the arm O outward. As the arm O is crowded outward the lip *f* bears upon the beveled or curved end of plate K and depresses it,
75 causing it to stop the stop-hands, as explained; but when the nose *l* drops into one of the notches *h*, the lip or extension *f* rides back sufficiently to permit the plate K to spring up and rise clear of the collars *a*, on which said
80 hands are secured, leaving them free to turn with the spindles E F. The notches *h* in like manner permit a finger or extension, *m*, of the fly-back lever J to drop into them when they come opposite said finger, and to force the le-
85 ver back when turned, so that the notches are out of line with said finger. When a notch is brought into line with the finger *m*, the lever is thrown inward by a spring, Q, and its arms, coming against the heart-shaped disks *bb*, carry
90 them and their hands around to the starting-points in the ordinary manner. The nose *l* of spring-arm O and the finger *m* of lever J are so arranged with reference to the notches *h* that as the nose *l* drops into one notch the
95 finger *m* is crowded out of another; hence, as the lateral extension or ear *f* releases spring-plate K and sets the stop-hands free, so far as said plate is concerned, the lever J is likewise
100 thrown back out of contact with the heart-shaped disk *b*, and the hands are thus made wholly free to turn with the spindles E F. At the next movement of wheel P, which is rotated one tooth at a time, the spring-arm O is forced back and depresses plate K, thereby
105 holding the collars *a* and heart-shaped disks *b* fast at whatever point they may have reached at the time, the lever J being unaffected by this movement of wheel P. The third or next movement of wheel P, however, brings a
110 notch, *h*, beneath the finger *m*, and permits spring Q to throw lever J inward, thus returning the heart-shaped disks to their starting-points and holding them and their hands at such points until the first movement is re-
115 peated.

To effect the step-by-step rotation of wheel P, I provide a lever, R, one end of which is connected in any suitable manner with a push pin or button, S, projecting through the ring
120 of the case and adapted to be readily pressed inward by the thumb or finger, and the other end of which carries a dog or click, *n*, which engages with the ratchet-teeth *k*, and serves to move the wheel about its axis. The move-
125 ment of the push-pin S and lever R are sufficient to rotate the wheel the length of one tooth only. The lever R and its dog *n* are thrown and normally held forward by a spring, T, which, bearing against a tail or rearward
130 extension, *o*, of the dog, also holds its nose in engagement with the teeth of the ratchet, thereby rendering a separate spring unnecessary for this purpose. A pawl or dog, U, en-

gages with the teeth *h*, to prevent its turning accidentally or beyond the required distance. The parts being thus constructed, the time-movement runs as usual, and the stop-hands 5 may remain at rest or may be permitted to travel with the others, as will be desirable, in order to avoid even the very slight drag or retarding effect of the friction devices by which the hands are caused to turn with the spindles.

10 Assuming, however, that the time-movement is running as usual, but the hands *H* and *I* are held out of action by the lever *J* and plate or spring *K*, then the first movement of the push-pin will cause both the lever and spring 15 to free the hands, which will then run forward regularly until the instant for taking the time elapsed arrives, whereupon the second movement of said pin is made, and the hands are stopped and held stationary at whatever point 20 they may have reached. The time being taken or recorded, a third movement of the push-pin returns the hands to the starting-point, ready for a new series of operations.

It is obvious that the form of the friction 25 spring or plate *K* may be varied as desired to suit any style of movement, and that its action may be reversed, so that it shall normally press upon the collars and be freed by a movement of the push-pin or other device.

30 I am aware that watches have heretofore been made with stop-hands adapted to be connected with the spindles of the ordinary timer, stopped, and disconnected therefrom, so as to cause both the ordinary time-movement and 35 the stop-hands to be driven by one spring and train; and I am also aware that such a watch has been provided with a pawl, and a push-pin for operating the pawl, by which the starting, stopping, and return of the stop-hands could 40 be controlled. I therefore make no broad claim thereto.

I am also aware that it is not broadly new to apply special stop-hands to the spindle of an ordinary time-movement, and that such hands 45 have been carried by collars having disks which were held out of action by being pressed against a fixed bridge or plate while the spindle continued to rotate.

In the only prior mechanism known to me 50 embodying the construction just explained, the necessary pressure and friction for holding the special or extra hands out of action were secured by means of a lever having a beveled edge to bear against a similarly-beveled 55 edge of a disk on the collar of one of the special hands, the lever acting at right angles to the spindle, and consequently holding the collar against the spindle with considerable force, thereby unavoidably producing a friction sufficient to materially retard the movement of 60 the watch-train. Under my construction, however, the pressure is applied facewise to the collar, or in the direction of the axis of the spindle, and no lateral pressure whatever up- 65 on the spindle is occasioned in stopping the extra hands.

Having thus described my invention, what I claim is—

1. In combination with a watch-spindle, a collar encircling said spindle, provided with 70 a friction device to clasp the spindle and with a hand, and a spring-plate adapted and arranged to bear facewise upon the collar and to exert a pressure only in the direction of the length of the spindle, or to be raised there- 75 from as required, whereby the collar can be held against rotation without producing lateral pressure or friction upon the spindle.

2. In combination with a spindle of a watch-movement, a collar, *a*, provided with a hand, 80 a disk, *b*, and spring *c*, to bear against the spindle, spring-plate *K*, adapted and arranged to bear facewise upon the collar and to exert a pressure thereon only in the direction of the axis of the spindle, and means, substantially 85 such as described and shown, for raising and lowering the spring-plate to remove or apply pressure from or to the collar.

3. In combination with spindle *E F* of a watch-movement and with frictional collars *a*, 90 encircling said spindle, and provided with hands, spring-plate *K*, provided with perforations *d*, to encircle the spindles, and means, substantially such as shown and described, for raising and lowering the spring-plate. 95

4. The combination, substantially as described and shown, of a watch-movement having a dial and a cylindrical spindle, a collar, *a*, encircling said spindle and provided with 100 a friction-spring to bear thereon, and with a hand, spring-plate *K*, overhanging the collar, spring-arm *O*, having a lateral ear overlapping plate *K*, cam-wheel *P*, provided with notches *h*, and means, substantially such as 105 shown and described, for imparting a step-by-step rotation to said wheel.

5. In combination with a watch-movement having a dial and a cylindrical spindle, a friction-collar encircling said spindle, and provided with a hand, spring-plate *K*, overhang- 110 ing the collar, spring-arm *O*, having lip *f*, overlapping the plate *K*, wheel *P*, provided with notches *h* and teeth *k*, lever *R*, push-pin *S*, dog *n*, and spring *T*, substantially as set forth. 115

6. The herein-described chronograph, consisting of a time-movement provided with the ordinary time-hands and with cylindrical spindles *E F*, collars *a*, encircling said spindles, and provided with hands *H I*, heart-shaped 120 disks *b*, and springs *c*, spring-plate *K*, forked lever *J*, spring-arm *O*, provided with lateral extension *f*, wheel *P*, provided with notches *h* and teeth *k*, lever *R*, push-pin *S*, and dog *n*, all combined and arranged to operate substan- 125 tially as explained.

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Witnesses:

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