

(No Model.)

E. J. A. DUPUIS.

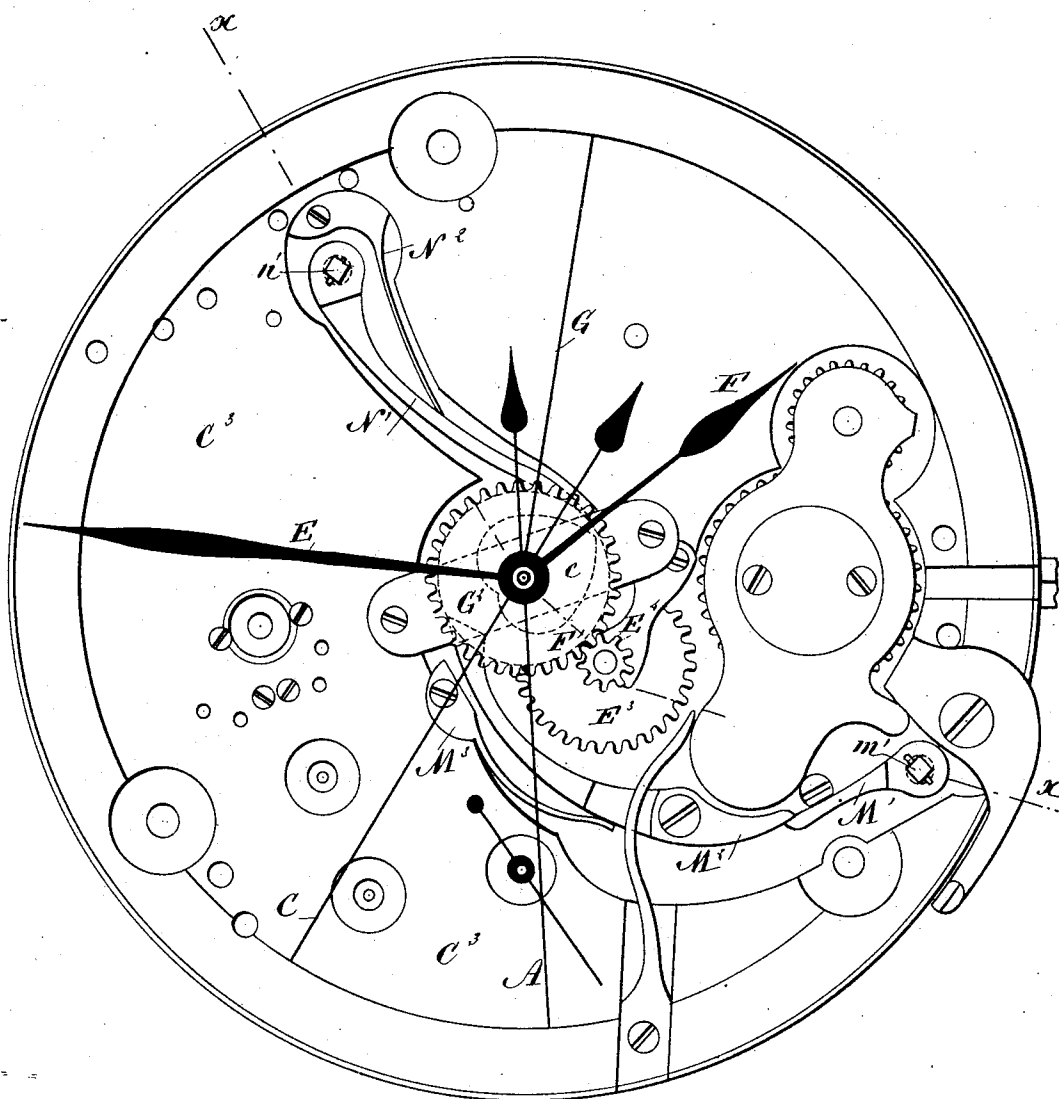
4 Sheets—Sheet 1.

STOP WATCH.

No. 307,925.

Patented Nov. 11, 1884.

Fig. 1



WITNESSES:

C. Neveu
C. Sedgwick

INVENTOR:

E. J. A. Dupuis
BY *Munn & Co*
ATTORNEYS.

(No Model.)

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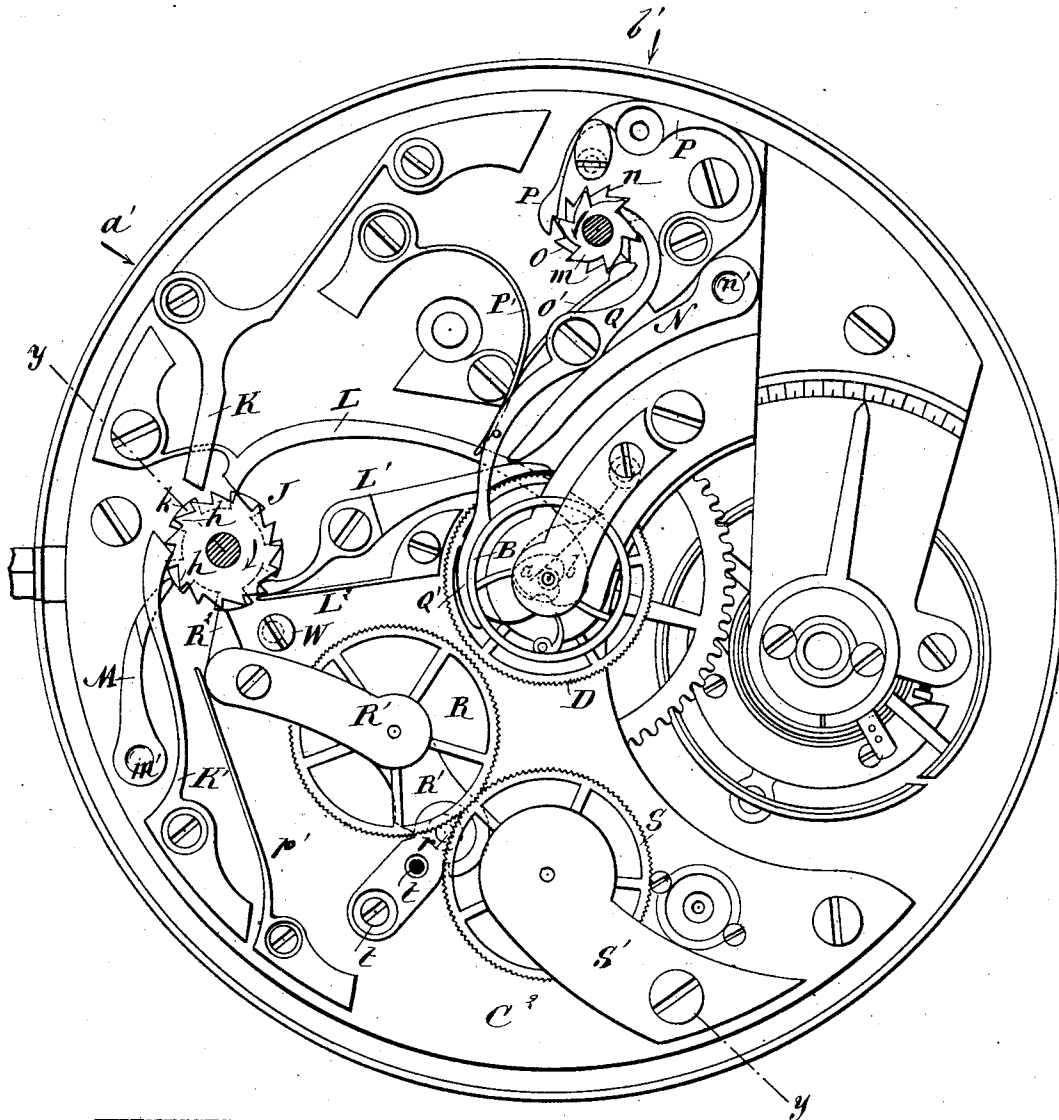
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STOP WATCH.

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Fig. 2



WITNESSES:

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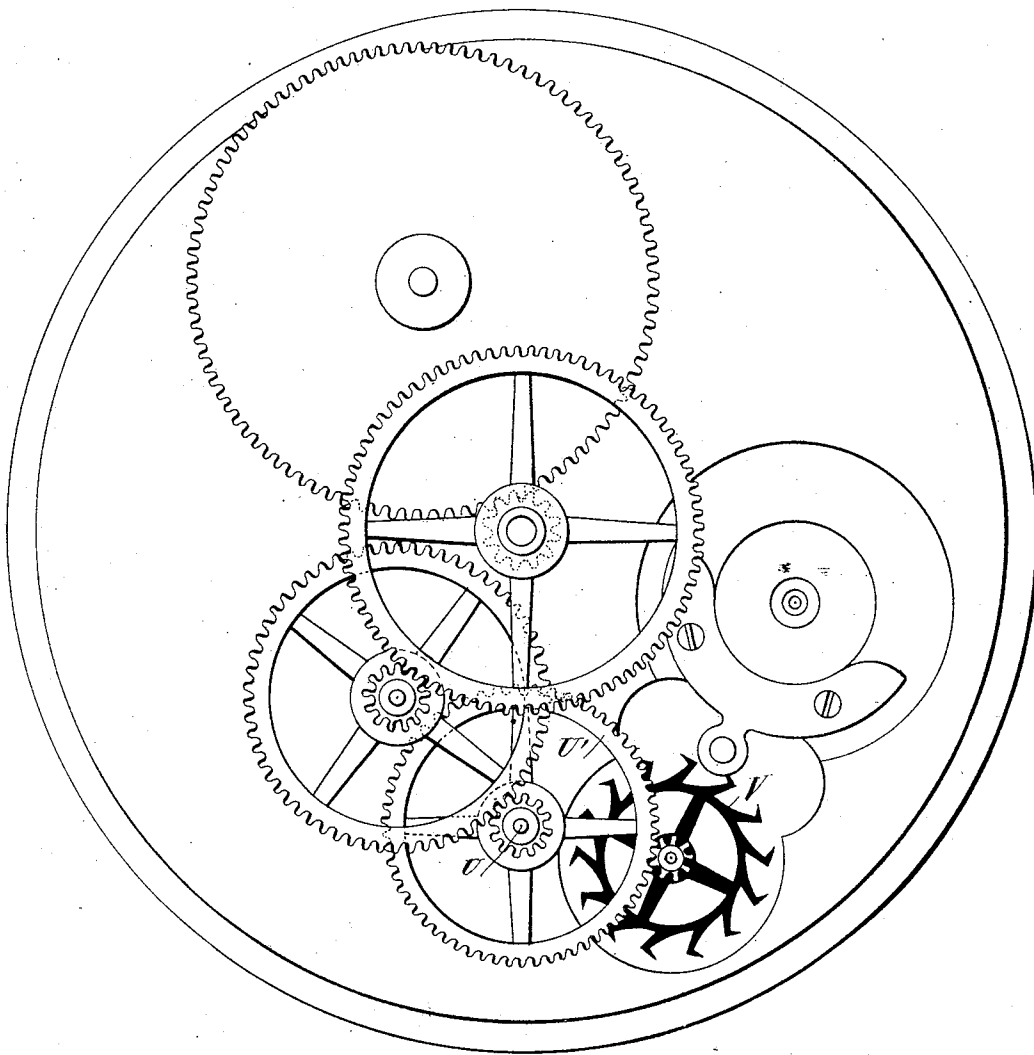
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STOP WATCH.

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Fig. 3



WITNESSES:

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(No Model.)

4 Sheets—Sheet 4.

E. J. A. DUPUIS.

STOP WATCH.

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Fig. 4

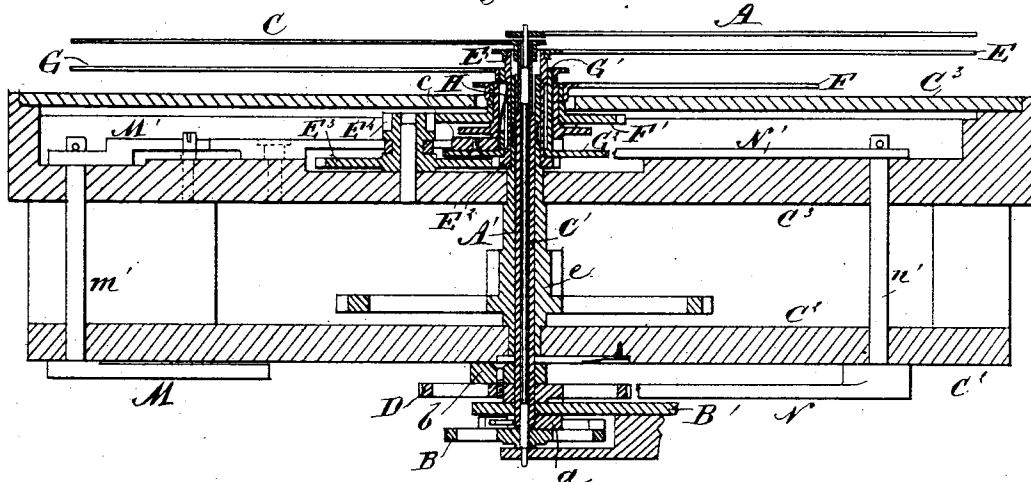


Fig. 5

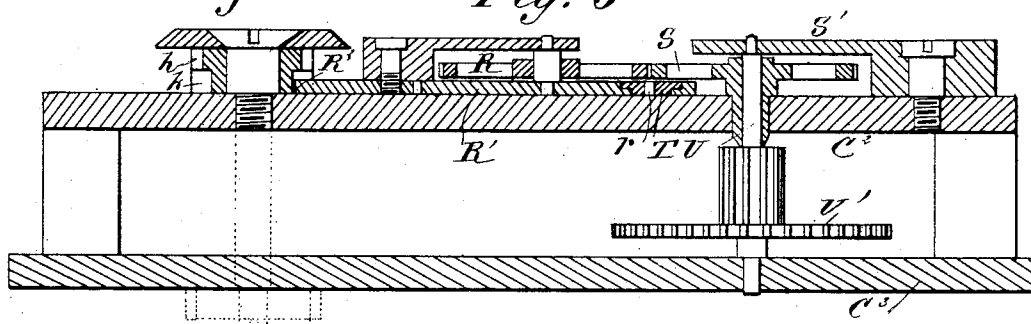


Fig. 6

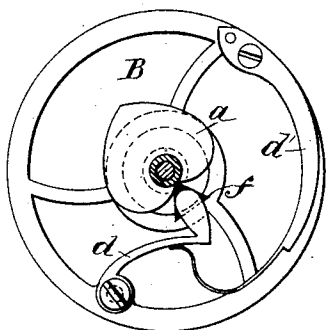
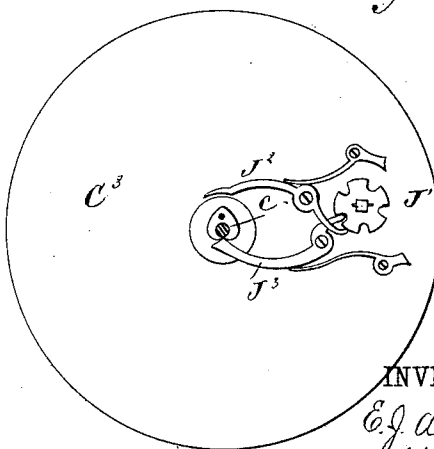


Fig. 7



WITNESSES:

C. Neveu

C. Sedgwick

INVENTOR:

E. J. A. Dupuis

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Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

EUGENE J. A. DUPUIS, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO
PAUL A. REYMOND, OF SAME PLACE.

STOP-WATCH.

SPECIFICATION forming part of Letters Patent No. 307,925, dated November 11, 1884.

Application filed July 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, EUGENE J. A. DUPUIS, of the city, county, and State of New York, have invented a new and Improved Stop-Watch, of which the following is a full, clear, and exact description.

My invention relates to improvements in stop-watches; and it consists in the peculiar construction and arrangement of parts, as hereinafter fully described, and pointed out in the claims.

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 face view of my improved chronograph-watch, the dial being removed and the parts directly under the dial being exposed. Fig. 2 is a face view of the rear of my improved chronograph-watch. Fig. 3 is a face view of the works. Fig. 4 is a cross-sectional elevation of the same on the line *x x*, Fig. 1. Fig. 5 is a cross-sectional elevation of the same on the line *y y*, Fig. 2. Fig. 6 is an enlarged detail plan view of the heart and wheel of that second-hand which is thrown back first. Fig. 7 is a face view of the modification of the levers for operating the fly-backs.

The uppermost fly-back second-hand, *A*, which is the one that is to fly back first, is mounted on the upper end of a shaft, *A'*, on the lower end of which shaft a wheel, *B*, is rigidly mounted. The fly-back second-hand *C*, which is next to fly back, is mounted securely on the upper end of a sleeve, *C'*, surrounding the shaft *A'*, and having mounted a short distance from its lower end a wheel, *D*, the periphery of which is toothed.

On the extreme end of the sleeve *C'* a small heart-cam, *a*, is mounted, and a separating-strip, *B'*, is arranged between the heart-cam *a* and the wheel *D* on the sleeve *C'*. A heart-cam, *b*, is mounted on the sleeve *C'* between the back plate, *C''*, of the watch and the separating-strip *B'*. The sleeve *C'* is surrounded by a sleeve, *e*, on the upper end of which a sleeve, *E'*, is mounted, which carries the usual minute watch-hand, *E*.

On the sleeve *e* a pinion, *E'*, is mounted, which engages with a cog-wheel, *E''*, made in-

tegral with a pinion, *E'*, which engages with a cog-wheel, *F'*, carrying the usual watch hour-hand, *F*. The fly-back minute-hand *G* is mounted on a sleeve, *G'*, surrounding the sleeve *E'*, on which the usual minute watch-hand, *E*, is mounted. The sleeve *G'* is provided with a longitudinal slot, through which a spring, *H*, passes, which is secured to a brake-wheel, *G''*, mounted rigidly on the sleeve *E'* and connected with a heart-cam, *c*, also mounted rigidly on the sleeve *G'*, the free end of which spring *H* presses against the sleeve *E'*, so that sufficient friction will be produced to revolve the sleeve *G'* with the sleeve *E'*, and thus cause the hand *G* to revolve with the hand *E*. A lever, *d*, pivoted on the wheel *B*, has its free end pressed against the edge of the heart-cam *a* by a spring, *d'*, secured on the wheel *B*. Usually the ends of levers—such as the lever *d*—are provided with small ruby rollers, which are pressed against the edges of the heart-cams; but in place of the said ruby rollers I use the triangular piece *f* of ruby, the point of which rests against the edge of the cam, so that the point of the lever *d* which acts on the heart will always be exactly in the center of the heart, and will thus always hold the heart firmly and true. A compound ratchet-wheel, *J*, is provided with fifteen triangular teeth, *h*, and with five teeth having outward segmental edges, *k*, so that there will be three teeth *h* for every tooth *k*. A spring-pawl, *K*, is adapted to engage with the teeth *h* of the ratchet-wheel *J*, and thus revolve the said ratchet-wheel in the direction of its arrow. A locking spring-pawl, *K'*, rests on the edges of the teeth *h*, and prevents the ratchet-wheel from revolving in the inverse direction of its arrow. A spring-lever, *L*, secured to the back plate, *C''*, has one end near the middle of the plate, so that the said end can press against the edge of the heart *b*, the spring of the lever being of such strength that the end of the said lever will be pressed on the edge of the heart, unless the said end of the lever is held from the heart by some suitable device. A tooth or bend formed in the lever *L* is pressed by the spring of the said lever against the edges of the teeth *k* of the double ratchet-wheel *J*. One end of a lever, *L'*, is pressed against the teeth *k* of the wheel *J* by a spring,

L², and the other end of the said lever L' acts on a brake-shoe, and is pressed against the rim of the wheel D by the said spring L². A lever, M, resting against the teeth *k* of the wheel J, is secured on a pivot, *m'*, which extends through the works, and projects from the front plate, C³, and is provided with a lever, M', which rests against one end of a lever, M², pivoted on the plate C³, the other end of the said lever M² being bent downward to act on the edge of the heart-cam *c*, mounted on the sleeve G', carrying the fly-back minute-hand G.

Against that end of the lever L' forming the brake-shoe which presses against the rim of the wheel D one end of a lever, N, rests, which is secured to a shaft, *n'*, extending through the works and projecting from the top plate, C³, on which upper end of the said shaft an arm or lever, N', is mounted, the end of which is pressed by the spring N² against a friction-wheel or brake-wheel, G², mounted on the sleeve G', carrying the fly-back minute-hand G. A compound ratchet-wheel, O, is provided with six teeth, *m*, and with twelve teeth, *n*. A spring-pawl, P, engages with the teeth *n*, and a locking spring-pawl, O', rests against the teeth *n*. One end of a lever, Q, pivoted on the plate C², rests against the teeth *m*, and the other end of the said lever Q terminates in a brake-shoe, Q', which is pressed against the periphery of the wheel B by a spring, P'. A cog-wheel, R, of the same diameter and having the same number of teeth as the wheel D, is journaled in a frame, R', pivoted at *r* to the plate C², which frame R' is provided at one end with a tooth or tongue, R², pressed against the edges of the teeth *k* of the wheel J by a spring, *p'*, resting against the free end of the frame R'. The cog-wheel R engages with a cog-wheel, S, of a like size, and having the same number of teeth as the cog-wheel D, which cog-wheel S is journaled between the plate C² and a bridge, S'. The pivot *r* of the frame R' is secured in a block, T, which is held by two screws, *t*, to the plate C², the aperture through which the said screws pass being considerably greater than the diameter of the screws, so that the free end of the block T can be adjusted very finely and nicely, so that the wheels R and S can engage with each other properly. A check-screw, W, provided with an eccentric head, is screwed into the plate C² in such a manner that the swinging end of the frame R' can strike against the same, whereby the movements of the said swinging frame can be limited, and as the said screw is provided with an eccentric head the limit of the said movement can be adjusted very finely and nicely. The fine cog-wheel S is mounted on the arbor U, on which the wheel U' is mounted, which drives the escapement-wheel V, as shown in Fig. 3.

In place of using the lever M and the levers M' and M² on the face-plate C³, the ratchet-wheel J can be mounted on a shaft which extends through the entire works and projects

from the plate C³, and on that end of the shaft projecting from the plate C³ a ratchet-wheel, J, can be mounted which has as many teeth as there are teeth *k* in the wheel J, the teeth being of the same shape.

On the face-plate C³ brake-levers J² and J³, for throwing back the heart-cam *c*, are pivoted, and the ends of the same rest on the edges of the wheel J', the levers J² and J³ being acted upon by suitable springs. The levers J² and J³ act in the same way as the levers M' and M², and need not be further described.

The operation is as follows: As shown in Fig. 2, the several parts are in the normal position when the fly-backs have been stopped. If the free end of the pawl K is pressed in the direction of the arrow *a'*, it engages with one of the teeth *h* of the compound ratchet-wheel and revolves the ratchet-wheel in the direction of its arrow, thereby causing the bend of the lever L to slide off of that tooth *h* on which it rests and drop into the recess between two teeth, whereby the point of the lever L will be thrown against the heart-cam *b* and will throw the sleeve C' so that the second fly-back hand C will be thrown to XII. At the same time that the lever L is released the lever M is acted on by the corresponding tooth of the wheel J, which lever M acts on the lever M', which acts on the lever M². The point of the lever M² will then be thrown by its spring M² against the heart-cam *c*, and will throw the fly-back minute-hand G to XII. Before the hands can be thrown back the fly-back second-hand A must be released, so that it will be in the same position as the other fly-back hand, C, and then the two are thrown together back to XII, as will be explained hereinafter. If, now, the fly-backs are to be started at the beginning of a race, &c., the free end of the lever K is pushed in the direction of the arrow *a'*, and turns the ratchet-wheel J in the direction of its arrow the distance of one tooth, whereby the tooth R² of the pivoted frame R' will slide off the corresponding tooth, *k*, of the wheel J, and will be pressed into the recess between two teeth by its spring *p'*, and thereby the wheel R will be engaged with the wheel D, thereby revolving the wheel D and its sleeve C', carrying the second-hand C. The sleeve C' revolves the heart-cam *a*, and the heart-cam moves the lever *d*, which is pressed against the heart-cam, which lever is secured on the wheel B, which in turn revolves the shaft A' and the fly-back second-hand A thereon; or, in other words, if the fly-backs are started, the two fly-back second-hands A and C will be revolved together. At the same time that the wheels R and D are engaged the brake-lever L' is raised from the periphery of the wheel D, and the brake-lever Q has been disengaged or raised from the wheel B previously. The lever L' acts on the lever N, which acts on the lever N', thereby removing the end of the same from the brake-wheel G² of the minute fly-back hand G. At the same time, also, the lever M is acted on and acts on the

levers M' and M^2 , thereby raising the end of the lever M^2 from the heart-cam c , thus permitting the friction of the spring H to cause the sleeve G' , carrying the fly-back minute-hand G , to revolve with the sleeve E' , carrying the ordinary minute-hand E , so that the fly-back minute-hand will be started at the same time with the fly-back second-hands. Then if one of the contestants in the race stops, the fly-back hand A must be stopped, which can be accomplished by pressing the spring-lever P in the direction of the arrow b' , thereby revolving the ratchet-wheel O in the direction of its arrow, whereby the end Q' of the lever Q will be pressed against the wheel B , and will prevent the same from revolving, thus stopping the said hand A . If, then, the other fly-back hands, C and G , are to be stopped, the lever K is pressed in the direction of the arrow a' , whereby the wheel J will be revolved the distance of one tooth h , and a tooth k will strike the end of the tooth R^2 of the frame R' , and thereby disengage the wheel R from the wheel D , thus preventing further movement of the chronograph mechanism, and at the same time the brake-lever L' is thrown against the wheel D to stop further movement of the same, and the lever N' is thrown against the brake-wheel G^2 and stops the hand G . Then the positions of the fly-back minute and second hands can be seen, and the time of each contestant in minutes and seconds can easily be determined. It is then necessary to throw the second fly-back hand C back into the same position that the fly-back hand A has. To accomplish this the spring P is pressed in the direction of the arrow b' , and the wheel O is revolved the distance of one tooth n , and thereby the end Q' of the lever Q will be raised from the wheel B , and the lever d , acting against the heart-cam a , will turn the wheel B and the hand A connected therewith until the two hands point in the same direction. Then all the hands must be thrown back to XII. This is accomplished by pressing the lever K in the direction of the arrow a' , whereby the spring L will be permitted to strike against the end of the heart-cam b , and will throw the two fly-back second-hands A and C back to XII, and at the same time the lever L' is raised from the wheel

D , acts on the lever N , which in turn acts on the lever N' , thus permitting the said lever to be thrown against the heart-cam c , and to throw the fly-back minute-hand G back to XII.

The especial advantage of making the piece of ruby triangular is that if one point of the ruby is worn off the said piece can be turned and adjusted in such a manner that another point of the same will rest against the edge of the heart-cam.

In my improved chronograph-watch the pawls P and K , for operating the ratchet-wheels that start and stop the chronograph mechanism, are made of a single piece of spring metal, whereas formerly they were made of separate pieces.

My improved pawl is very much simpler than the pawls used heretofore, and it does not occupy so much space.

I do not abandon or dedicate to the public any patentable feature set forth herein and not hereinafter claimed; but reserve the right to claim the same, either in a reissue of any patent that may be granted upon this application, or in other applications for Letters Patent that I may make.

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

1. In a chronograph-watch, the combination, with the fine wheels for driving the chronograph mechanism, of the pivoted frame R' , in which one of the wheels is journaled, and of the adjustable plate T , in which the pivot of the frame R is held, substantially as herein shown and described, and for the purpose set forth.

2. In a chronograph-watch, the combination, with the fine cog-wheels for operating the chronograph mechanism, of the pivoted frame R' , in which one of the wheels is journaled, and of a check-screw provided with an eccentric head, W , for checking the movements of the frame R' , substantially as herein shown and described, and for the purpose set forth.

EUGENE J. A. DUPUIS.

Witnesses:

OSCAR F. GUNZ,
C. SEDGWICK.