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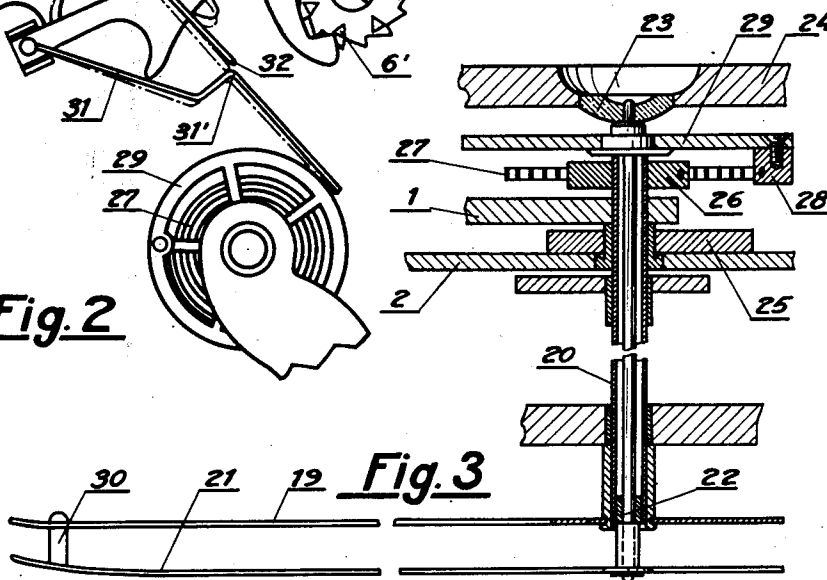
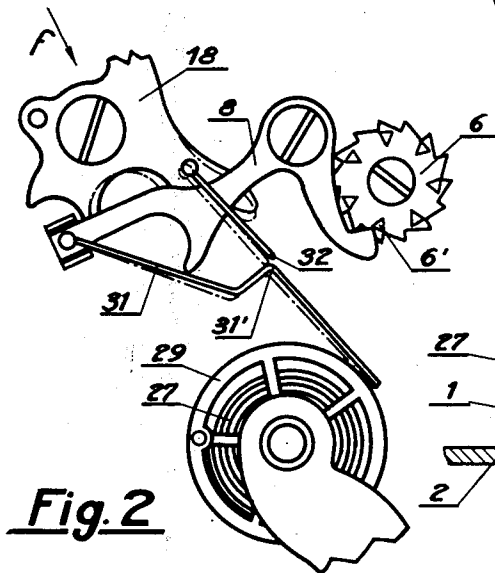
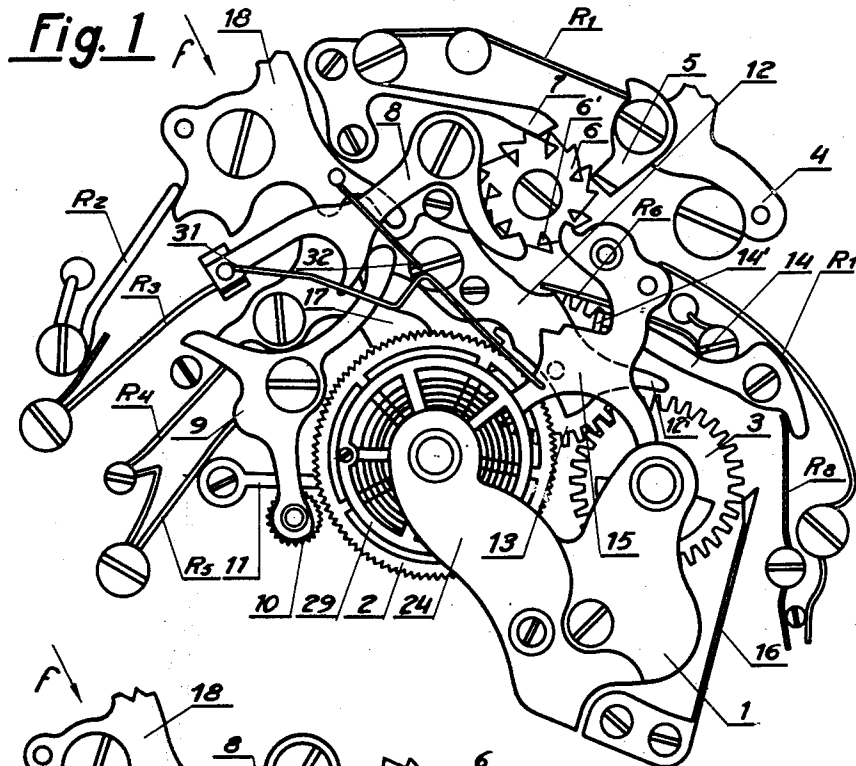
G. DUBEY ET AL

2,548,101

SPLIT SECONDS FLYBACK CHRONOGRAPH

Filed March 4, 1947

2 Sheets-Sheet 1



INVENTORS: Georges Dubey, Robert Schmalz
And René Schaldenbrand. ATTORNEY

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2 Sheets-Sheet 2

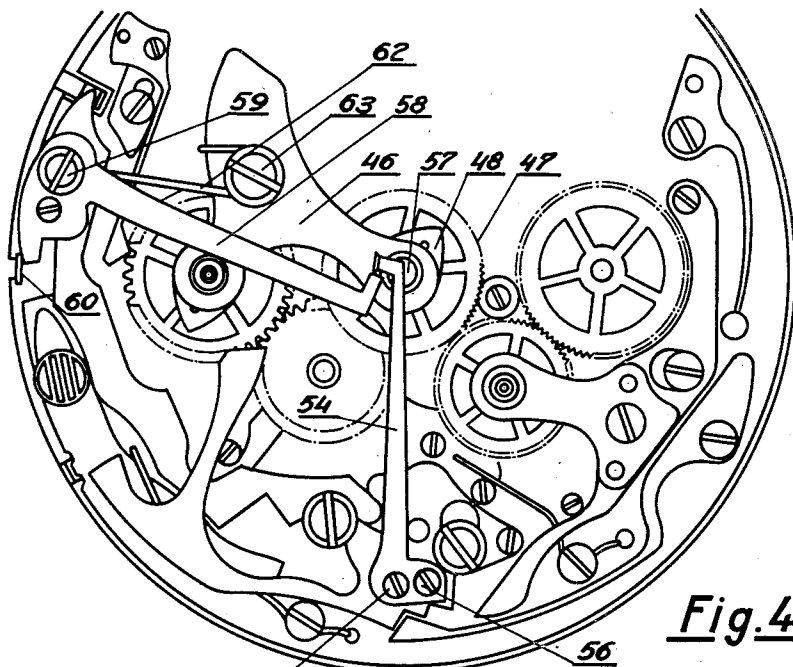


Fig. 4

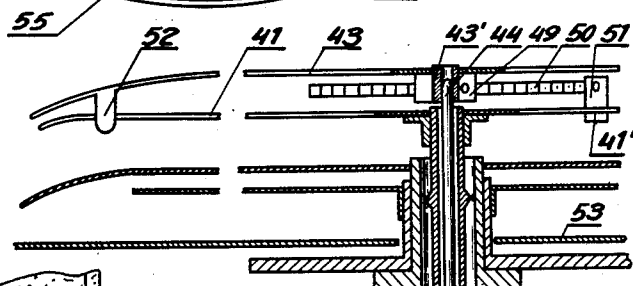


Fig. 6

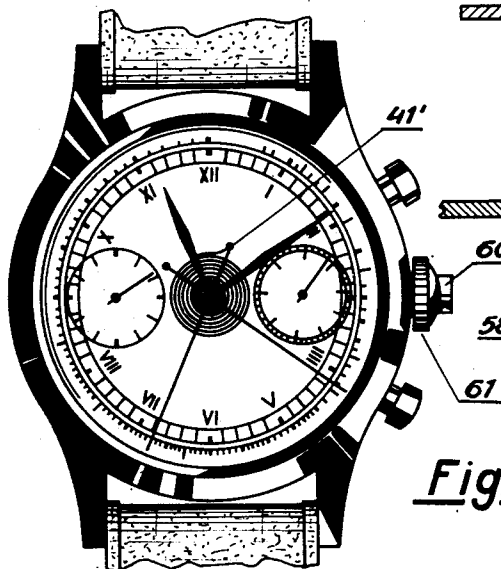


Fig. 5

INVENTORS
Georges Dubey
René Schaldenbrand
By *Robert E. Burns*
ATTORNEY

UNITED STATES PATENT OFFICE

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SPLIT SECONDS FLYBACK CHRONOGRAPH

Georges Dubey and René Schaldenbrand,
La Chaux-de-Fonds, SwitzerlandApplication March 4, 1947, Serial No. 732,282
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2 Claims. (Cl. 58—75)

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This invention relates to so called split seconds fly back chronographs, that is to chronographs with two co-axial long seconds-hands, one of which is a fly-back hand.

An important feature of the invention resides in that the movable elements of the two seconds-hands are connected with each other by means of a spiral spring and that one of the said seconds-hands carries a stop adapted to engage the other seconds-hands.

Other features and advantages of the invention will appear from the following description. Two practical embodiments of this invention are illustrated in the accompanying drawings, in which:

Fig. 1 is a top plan view of the chronograph movement of the first embodiment in which only the parts necessary to the understanding of the invention are represented.

Fig. 2 is a partial top plan view of the same movement illustrating the function thereof.

Fig. 3 is an axial sectional view on enlarged scale of the seconds movable elements.

Fig. 4 is a top plan view of the chronograph movement of the second embodiment in which only the parts necessary to the understanding of the invention are represented.

Fig. 5 is a top plan view on reduced scale of this second embodiment, and

Fig. 6 is an axial sectional view on enlarged scale of the seconds movable elements.

With reference to the Figure 1 in which are represented the principal elements of a usual chronograph minute-register, 1 designates a center bridge 2, the usual chronograph wheel, 3 the minute-register wheel, 4 the starting lever acting under the control of a pusher (not shown) through the medium of its click 5 on the column wheel 6 the columns of which are indicated 6'. 7 designates the pawl of the column wheel and 8 an intermediate rocking lever actuated by the column wheel and against which bears one extremity of the chronograph yoke 9 carrying at its other extremity the rocking pinion 10 which may be driven in usual way by the watch movement. 11 designates a friction spring, 12 the minute-register yoke carrying the minute-register rocking pinion 13 and adapted to operate by its nose 12' the locking lever 14 the projection 14' of which is adapted to lock the setting-to-zero hammer 15. 16 designates the pawl of the minute-register wheel, 17 a brake, and 18 the setting-to-zero sliding lever acting on the minute-register yoke 12, under the action of a pusher not shown. The various restoring springs acting on

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the hereinbefore mentioned elements are designated R¹ to R⁸.

The chronograph is provided with two coaxial long seconds-hands, namely the usual chronograph or plain seconds-hand 19 secured to the hollow shaft 20 and the seconds-hand 21, the shaft 22 of which (Fig. 3) passes through the hollow shaft 20 from end to end and is pivoted on the bottom side of the chronograph in a pierced jewel 23 set in an auxiliary bridge 24 which may be designated fly-back bridge, the seconds-hand 21 being a fly-back hand. On the hollow shaft 20 there are secured the chronograph wheel 2 and the heart-shaped cam 25 for setting the seconds-hands to zero. On the back portion of the hollow shaft 20 is further secured a bush 26 to which is attached the inner extremity of a spiral spring 27 the outer extremity of which is attached to a stud 28 screwed in the rim of a wheel 29 which will be designated fly-back wheel. This fly-back wheel is fixed on the shaft 22 of the fly-back seconds-hand 21. This latter hand is provided at its extremity with an inwardly bent lug 30 adapted to be urged against the plain chronograph hand 19 under the action of the spiral spring 27. A stopping device of the fly-back movable elements 21—22—29 comprises a stop-arm 31 secured to the intermediate rocking lever 8 and a push-arm 32 secured to the setting-to-zero sliding lever 18.

The operation of this chronograph is as follows: In the Figure 1 the various members of the chronograph movement are at rest, the chronograph being stopped. To start the chronograph, a pressure is put through the medium of a pusher not shown upon the starting lever 4. Upon pressure of the click 5 of starting lever 4, the column wheel 6 is rotated one step; the column 6' actuates the intermediate rocking lever 8 which releases the chronograph yoke 9 thus causing the rocking pinion 10 to mesh with the chronograph wheel 2 for starting the chronograph minute-register movement. The hollow shaft 20 carrying the plain chronograph hand 19 rotates also the fly-back wheel through the medium of the spiral spring 27 and consequently both the seconds-hands 19 and 21 begin to rotate together as a whole in close engagement with each other by the lug 30. The rotation of the intermediate rocking lever 8 causes the extremity of the stop-arm 31 to come nearer to the periphery of the fly-back wheel 29; the bend 31' of arm 31 faces the extremity of the push-arm 32; these members occupy the position shown in full lines in Fig. 2.

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Pressure upon the setting-to-zero sliding lever 18 in the direction of the arrow *f* causes the push-arm 32 to press the stop-arm 31 against the rim of the fly-back wheel 29 thus stopping said wheel, its shaft 22 and its seconds-hand 21 against the action of the spiral spring 27 while the whole plain chronograph movable elements 2—19—29 including the bush 26 continue to rotate, consequently more and more tensioning the spring 27. The stopping position of the arms 32 and 31 is shown in dotted lines in Fig. 2.

As soon as the pressure on the sliding lever 18 is released, the arms 31, 32 release the fly-back wheel 29 which is suddenly swung forward by the spring 27 until the fly-back seconds-hand 21 catches up the plain chronograph hand 19 against which its lug 30 comes to bear again.

A time up to 59 seconds may be readily measured without stopping either the plain chronograph hand 19 and the minute-register.

The second embodiment of the invention shown in the Figures 4 to 6 is also a split seconds fly-back chronograph minute register comprising two co-axial long seconds-hands, namely the plain chronograph hand 41 secured to the hollow shaft 42 and the seconds-hand 43 secured to the shaft 44 passing through the hollow shaft 42 from end to end. Hollow shaft 42 is pivoted on the bottom side of the chronograph in a pierced jewel 45 set into a bridge 46 which may be designated chronograph bridge. On the hollow shaft 42 there are secured the chronograph wheel 47 and a setting-to-zero heart-cam 48. On the sleeve 43' of the fly-back seconds-hand 43 is fixed a bush 49 to which is attached the inner end of the spiral spring 50, the outer extremity of which is attached to a stud 51 secured to the acorn 41' of the plain chronograph hand 41. The point of the fly-back seconds-hand 43 is provided with an inwardly bent lug 52 pointed towards the dial plate 53 and adapted to be pressed against the chronograph hand 41 by the spiral spring 50.

The stopping device for the fly-back movable elements comprises on the one hand, a resilient stop arm 54 secured to the frame on the bottom side thereof by two screws 55 and 56 and adapted to frictionally engage by its free end a semi-spherical head 57 formed rigid with the back extremity of the shaft 44, and on the other hand, a lever 58 pivoted about a screw 59 and having its free extremity formed with an inclined surface 58'. The lever 58 is controlled by a pusher 60 slidably mounted within the winding crown 61; a restoring spring 62 attached to a screw 63 screwed in the chronograph bridge 46 tends to maintain the lever 58 and the pusher 60 in the inoperative position as shown in the Figures 4 and 6, in which position the lever 58 does not operate the stop-arm 54, thus leaving the latter away from the head 57.

In operation, as the plain chronograph hand 41 fixed to the hollow shaft 42 is running under the action of the chronograph wheel 47 driven by the watch movement, the seconds-hand 41 drives through the medium of the spiral spring 50 the fly-back hand 43, and both said seconds-hands

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rotate together as a whole in close engagement with each other by the lug 52. A pressure applied onto the pusher 60 causes the lever 58 to rotate against the action of the restoring spring 62 and the inclined surface 58' of its free end to frictionally engage with the semi-spherical head 57 of the shaft 44. The fly-back hand 43 is thus stopped while the chronograph hand 41 continues to rotate consequently more and more tensioning the spiral spring 50. As soon as the pressure upon the pusher 60 is released, the lever 58 is brought back into inoperative position by the restoring spring 62 and the stop-arm 44 is retracted from the head 57, consequently the fly-back seconds-hand 43 is suddenly swung forward under the action of the spiral spring 50 until it catches up the hand 41 against which the lug 52 comes to bear again.

What we claim is:

1. In a split seconds fly-back chronograph, the combination with the chronograph movement of a hollow shaft carrying a first long seconds-hand, a bearing for said hollow shaft, situated at its back end, a chronograph wheel secured on said hollow shaft and driven by the movement, a second shaft passing through said first hollow shaft from end to end and carrying a second long seconds-hand, said second shaft having its back end emerging from said first hollow shaft and formed with a semi-spherical head, a spiral spring mounted co-axially with said shafts between said first and second long seconds-hands and connecting them directly, a stop on one of said seconds-hands adapted to normally engage the other seconds-hand, and a manually operable device adapted to be brought in axial engagement with said semi-spherical head for displacing axially said second shaft, that brings momentarily said head in braking engagement with said bearing, thus stopping said second shaft and its long seconds-hand only, in order to measure a time to 59 seconds without stopping the chronograph movement.

2. In a split seconds fly-back chronograph, the combination as claimed in claim 1 wherein the braking device comprises a resilient arm, a lever and a pusher, said lever acting, under the action of said pusher, on the free extremity of said resilient arm by means of an inclined surface.

GEORGES DUBEY.

RENÉ SCHALDENBRAND.

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