March 9, 1954 J. CIANA 2,671,308

CENTER SECONDS CHRONOGRAPH

Filed July 3, 1952

Fig.1

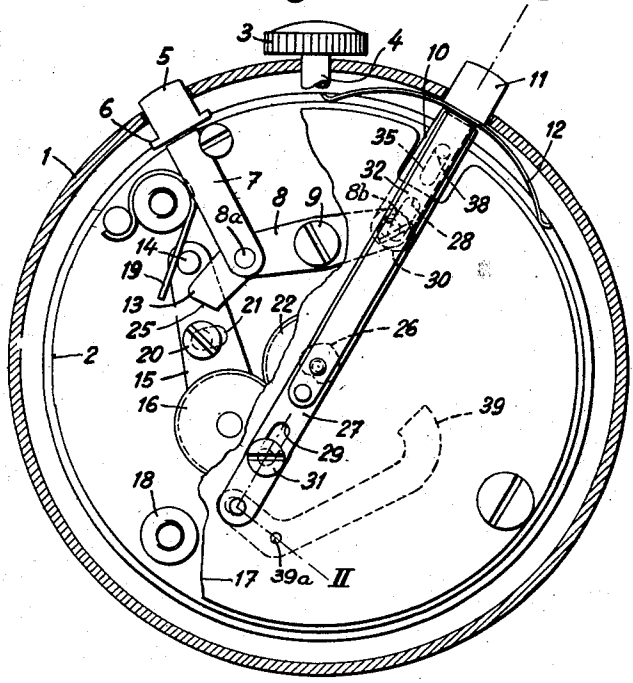


Fig.2

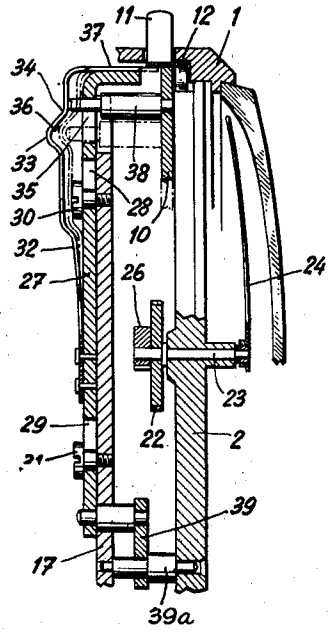


Fig.3

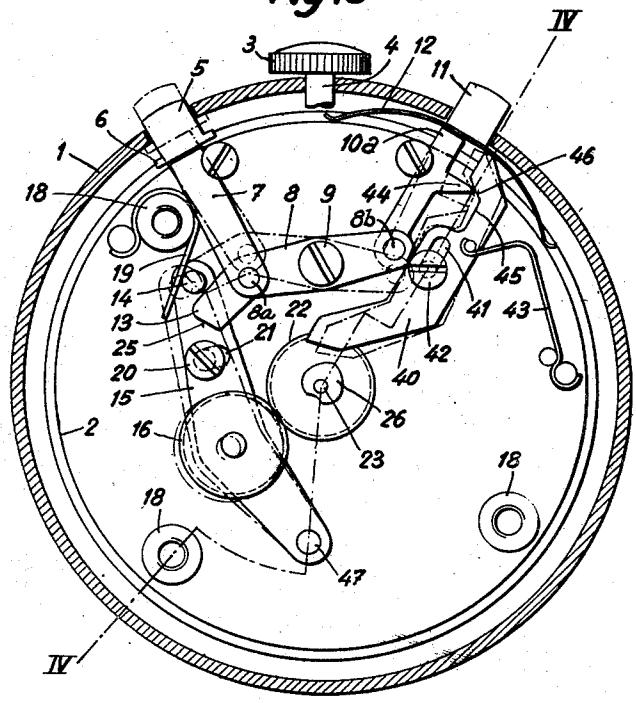
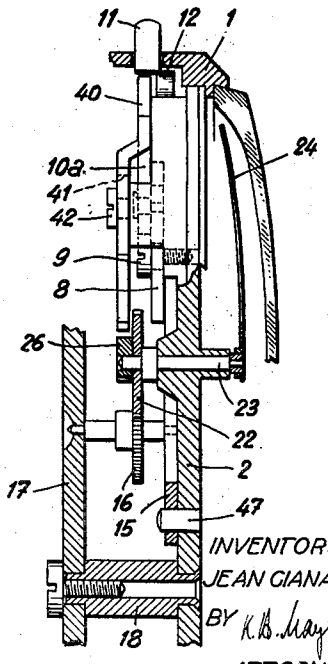


Fig.4



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CENTER SECONDS CHRONOGRAPH

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11 Claims. (Cl. 58—76)

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This invention relates to center seconds chronographs and more especially to a simplified chronograph mechanism, which is particularly suitable for low-priced watches.

The chronograph according to this invention is of the type, wherein the second hand wheel is started and stopped by a mechanism, comprising a rocker pivotally mounted on the frame (or particularly on the base-plate of the watch movement) and two levers connected to said rocker for swinging it into starting and stopping positions, each of said levers being actuated by a pusher generally provided at the periphery of the watch movement.

In order to return in prior art the second hand to zero after a time-record (that is after stopping the chronograph) a heart-shaped cam is mounted on the second hand spindle, whereon both the second hand wheel and the second hand are mounted; and a third pusher controls a returning lever; whereby an end of said returning lever when actuated comes into contact with the above-mentioned heart-shaped cam and cooperates therewith in the well-known manner.

It is the main object of this invention to provide cooperating means between the returning lever and one of the two levers connected to said rocker so that both levers may be actuated by the same pusher.

These cooperating means are particularly provided between the returning lever and the disengaging lever, that is the lever which swings said rocker into stopping position when it is actuated by its pusher.

The cooperation of the disengaging lever with the returning lever is secured by a projection provided on the disengaging lever for removing the returning lever, against the action of resilient means, from the control of the disengaging pusher, when the rocker is in starting position. Said resilient means normally assure that the returning lever will be under the control of the disengaging pusher.

An advantage of this combination is to provide a simplified chronograph mechanism with only two pushers instead of three. Another advantage of this combination is to avoid pressing the returning lever, as long as the chronograph runs, as may occur in the case of three pushers, if the pusher of the returning lever is inadvertently pressed instead of the disengaging pusher.

The preferred chronograph mechanism is that wherein at least a part of the returning lever extends in parallel to the disengaging lever, the disengaging lever being slidably mounted on the

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base-plate and said part of the returning lever being slidably mounted on the bridge of the movement, above the disengaging lever. In this preferred case, the projection of the disengaging lever extends perpendicularly to the plane thereof, pasess through a slot provided in the returning lever and cooperates with a resilient strip fixed on one end on the upper face of the returning lever, said strip having an extension normally projecting in the zone of action of the disengaging pusher, the projection of the disengaging lever removing, however, said extension of the resilient strip from the zone of action of the disengaging pusher when the rocker with both engaging and disengaging levers connected to it is in the stopping position.

In the drawings affixed to this specification and forming part thereof, two embodiments of this invention are illustrated diagrammatically by way of example.

In the drawings:

Fig. 1 is a partial plan view of the preferred embodiment of the chronograph, the movement bridge being partially torn away to show the mechanism of the chronograph;

Fig. 2 is a cross-section along the line II—II of Fig. 1;

Fig. 3 is a partial plan view of the second embodiment with the movement bridge taken away;

Fig. 4 is a cross-section along the line IV—IV of Fig. 3.

Only the parts necessary for the comprehension of the invention have been represented and the same references throughout the specification designate the same objects.

Referring now to the drawings, 1 is the watch-case in which the base-plate 2 of the watch movement is held in any usual manner, not represented, and 3 is the ordinary crown fixed to the stem 4 partially represented. The engaging pusher 5 is slidably mounted in an appropriate aperture provided at the periphery of the watch-case 1.

The outward motion of the pusher 5 is limited by an annular rim 6 provided thereon. This pusher 5 cooperates with an end of a substantially radially disposed engaging lever 7. The other end of lever 7 is joined by a pin 8*a* at an end of a rocker 8, so that the rocker 8 and the lever 7 are articulated with one another by the pin 8*a*. The other end of the rocker 8 is similarly connected by a pin 8*b* to a disengaging lever 10 (Fig. 2). The rocker 8 is pivotally mounted on the base-plate 2 by a screw bolt 9. A disen-

gaging pusher 11 slidably mounted in an appropriate aperture at the periphery of the watchcase 1, cooperates with the external end of the disengaging lever 10, which is also substantially disposed normally to the outer edge of the baseplate 2. The pusher 11 is normally held in the represented position by a spring 12 fixed thereto and bearing against the outer edge of the baseplate 2.

A nose 13 of the rocker 8 cooperates with a bolt 14 fixed to a yoke 15 for controlling the starting and stopping positions of the chronograph mechanism in the manner described below. The yoke 15, carrying the lower bearing of the third wheel 16 of the watch movement, is pivotally mounted on the base-plate 2 about an axle 47 (Figs. 3 and 4). The upper bearing of the wheel 16 is provided in the movement bridge 17, which is fixed to the base-plate 2 by means of pillars such as represented at 18 (Figs. 3 and 4). The base-plate 2 and the bridge 17 constitute together the frame of the chronograph mechanism within which the wheels of the watch movement are pivoted.

The yoke 15 is pushed in clockwise direction about its axle 47 by a spring 19. This motion of the yoke is limited by the screw bolt 20, which is screwed into the base-plate 2 and which cooperates with an oblong slot 21 provided in the yoke 15. In the starting position the yoke 15 abuts against the bolt 20 and the third wheel 16 meshes with a small serrated second hand wheel 22, mounted on a second hand spindle 23, carrying the second hand 24 and being pivoted in the center of base-plate 2.

The starting and stopping mechanism described above is of a well known type and is the same in the two embodiments shown in the drawings. The only difference between the two said mechanisms in the embodiments represented consists in the disengaging levers. The disengaging lever 10*a* in Figs. 3 and 4 is somewhat different from the disengaging lever 10 shown in Figs. 1 and 2.

This starting and stopping mechanism operates as follows: Once the pusher 5 has been actuated, the mechanism is in the starting position represented in full lines in the drawings. In this position the nose 13 of the rocker 8 has allowed a clockwise motion of the yoke 15 about its axle 47 under the action of the spring 19, so that the yoke 15 abuts against the bolt 20 and the third wheel 16 meshes with the second hand wheel 22, carrying it along with the watch movement.

On pressing the disengaging pusher 11 when the mechanism is in starting position, the disengaging lever 10, 10*a* respectively causes in each embodiment the rocker 8 to swing out into the position represented in dot- and stroke-lines in the drawings. During this motion of the rocker 8 its nose 13 pushes the bolt 14 of the yoke 15 against the action of the spring 19, causing this yoke 15 to pivot counterclockwise about its axle 47, so that the wheels 16 and 22 no longer mesh with each other. The rim 6 of the pusher 5 abutting against the watchcase 1 prevents a further clockwise motion of the rocker 8 under the action of the spring 19 pushing the bolt 14 which bears against the edge 25 of the nose 13.

A clockwise motion both of the rocker 8 about the axle 9 in the stopping position and of the yoke 15 about the axle 47 in the starting position could, of course, be limited in any other manner.

The mechanism having once been stopped can be started again by pressing the engaging pusher 5, which pushes the engaging lever 7, articulated with the rocker 8, causing the latter to swing counterclockwise till the top of the nose 13 passes on the other side of the bolt 14; thereby, allowing the yoke 15 to pivot clockwise under the action of the spring 19 until the wall of the oblong aperture 21 abuts against the bolt 20, putting the starting and stopping mechanism again in the starting position represented in full lines in the drawings.

In order to be able to return the second hand 24 to zero after a time-record, a heart-shaped cam 26 is mounted on the second hand spindle 23 and a returning lever cooperates with this cam on depressing a pusher.

In the first embodiment (Figs. 1 and 2) the returning lever is a jointed lever. A first part 27 of this returning lever is slidably mounted on the bridge 17 by means of two oblong slots 28, 29 provided in this part 27 for coacting with two guiding bolts 30, 31 screwed on to the bridge 17. The part 27 extends substantially in parallel to the disengaging lever 10 and is disposed above it. A resilient strip 32 is riveted by one end on to the upper face of the part 27 of the returning lever, i. e. onto the face thereof which is turned away from the disengaging lever 10. This resilient strip is so bent at 33 and 34 over an oblong slot 35 provided in the part 27 as to form a cam surface 36. The free end of the resilient strip 32 is so bent at a right angle over the external end of the part 27 as to form an extension 37, which plunges into the zone of action of the disengaging pusher 11 when said resilient strip lies normally over the part 27 as represented in dot and dash lines in Fig. 2.

A finger 38 fixed to the disengaging lever 10 projects normally therefrom through the slot 35 and its end cooperates so with the cam surface 36 of the resilient strip 32 that the strip 32 lies on the part 27 when the mechanism is in stopping position (represented in dot and dash lines in Fig. 2), causing the extension 37 of said strip to plunge into the zone of action of the disengaging pusher 11. The finger 38 pushes the resilient strip 32 away from the part 27 of the returning lever when the mechanism is in starting position (represented in full lines in Fig. 2), causing the extension 37 to be pushed out of the zone of action of the pusher 11. Consequently, in the starting position a first pressing of the disengaging pusher 11 will stop the chronograph in the manner described above, without any action on the part 27 of the returning lever. The chronograph having once been stopped, a second pressing of the pusher 11 will then cause the part 27 of the returning lever to slide inwards.

A second part 39 of the returning lever is pivoted in the frame of the watch movement by means of an axle 39*a*. An end of the part 39 is articulated on the internal end of the part 27. The other end of the part 39 comes into contact with the heart-shaped cam 26 when the part 27 is slid inwards by the pusher 11.

After having been actuated by the disengaging pusher 11, the returning lever could be brought into its original, outward position by any spring means. In the represented embodiment, however, the oblong slot 35 is so provided that the returning lever is only then pushed outwards into its original position by the finger 38 cooperating with the wall of the slot 35 when the mechanism is started again, i. e. when the disengaging lever is pushed outwards by pressing the engaging pusher 5.

In the second embodiment (Figs. 3 and 4), the returning lever **40** extends also substantially in parallel to the disengaging lever **10***a*. In this embodiment, however, the returning lever **40** is mounted on the base-plate **2** at substantially the same level as the disengaging lever **10***a*. An oblong slot **41** is provided in the returning lever **40** for slidably and pivotally guiding it by means of a screw bolt **42** screwed into the base-plate **2**. A spring **43** is so provided as to maintain the lever **40** outwards and in contact with the disengaging lever **10***a*.

A projection **44** is provided on the disengaging lever **10***a* and in the plane thereof for cooperating with a cam surface **46** of a nock **45** provided on the returning lever **40**. The projection **44** and the cam surface **46** cooperate in such a manner, that the projection **44**, bearing against the cam surface **46**, causes the returning lever **40** to pivot in a clockwise direction against the action of the spring **43** about the screw bolt **42**, when the disengaging lever is pushed into starting position by the engaging pusher **5**. The disengaging lever **10***a* comes thereby at least into the position represented in full lines in Fig. 3.

In the starting position the external end of the returning lever **40** consequently lies beside the zone of action of the disengaging pusher **11**, so that a first pressing of this pusher **11** stops the chronograph mechanism by pushing the disengaging lever **10***a* inwards, without moving the returning lever **40**. The chronograph mechanism having once been stopped, the projection **44** no longer bears against the cam surface **46** of the nock **45**, so that the returning lever **40** may pivot (under the action of the spring **43**) in a counterclockwise direction into the position represented in dot and dash lines in Fig. 3. In this case its external end lies in the zone of action of the disengaging pusher **11**, so that a renewed pressing of the pusher **11** will slide the returning lever **40** inwards till its internal end comes into contact with the heart-shaped cam **26** for returning the second hand to zero.

Various changes may be made in the configuration and ararngement of the parts hereabove described and shown in the drawings without departing from the invention or sacrificing the advantages thereof.

What I claim is:

1. In a center seconds chronograph the combination of a frame, a second hand wheel mounted on a second hand spindle pivoted in said frame, a second hand mounted on said spindle, a rocker pivotally mounted on said frame and adapted for starting and stopping said second hand wheel, an engaging lever connected to said rocker, an engaging pusher adapted for pushing said engaging lever to swing said rocker into starting position, a disengaging lever having a projection and being connected to said rocker, a disengaging pusher adapted for pushing said disengaging lever to swing said rocker into stopping position, a heat-shaped cam mounted on said second hand spindle, a returning lever controlled by said disengaging pusher and adapted for coming into contact with said heat-shaped cam and returning said second hand to zero, resilient means for normally assuring said returning lever to be under the control of said disengaging pusher, said projection of said disengaging lever removing, against the action of said resilient means, said returning lever from the control of said disengaging pusher when said rocker is in starting position, and means removing said returning lever from said heart-shaped cam at the latest when said engaging pusher is pressed for starting said second hand wheel.

2. In a center seconds chronograph the combination of a frame, a second hand wheel mounted on a second hand spindle pivoted in said frame, a second hand mounted on said spindle, a rocker pivotally mounted on said frame and adapted for starting and stopping said second hand wheel, an engaging lever connected to said rocker, an engaging pusher adapted for pushing said engaging lever to swing said rocker into starting position, a disengaging lever having a projection and being connected to said rocker, a disengaging pusher adapted for pushing said disengaging lever to swing said rocker into stopping position, a heart-shaped cam mounted on said second hand spindle, a returning lever having a first part slidably mounted on said frame and a second part connected to the first, a resilient strip fixed by one end to said returning lever, said resilient strip having a cam surface and an extension projecting into the zone of action of said disengaging pusher for actuating said returning lever by pressing said disengaging pusher, the second part of said returning lever coming thereby into contact with said heart-shaped cam for returning said second hand to zero, said cam surface cooperating with said projection of said disengaging lever for removing said extension of said resilient strip from the zone of action of said disengaging pusher when said rocker is in starting position, and means removing said returning lever from said heart-shaped cam at the latest when said engaging pusher is pressed for starting said second hand wheel.

3. In a center seconds chronograph the combination of a frame, a second hand wheel mounted on a second hand spindle pivoted in said frame, a second hand mounted on said spindle, a rocker pivotally mounted on said frame and adapted for starting and stopping said second hand wheel, an engaging lever connected to said rocker, an engaging pusher provided at the periphery of said frame and adapted for pushing said engaging lever into a direction substantially normal to the outer edge of said frame to swing said rocker into starting position, a disengaging lever having a projection and being connected to said rocker, a disengaging pusher provided at the periphery of said frame and adapted for pushing said disengaging lever into a direction substantially normal to the outer edge of said frame to swing said rocker into stopping position, a heart-shaped cam mounted on said second hand spindle, a returning lever having a first part slidably mounted on said frame and a second part connected to the first, said first part extending substantially in parallel to said disengaging lever, said first part being arranged above the disengaging lever, a resilient strip fixed by one end on to the face of said returning lever, which is turned away from said disengaging lever, said resilient strip having a cam surface and an extension projecting into the zone of action of said disengaging pusher for actuating said returning lever by pressing said disengaging pusher, the second part of said returning lever coming thereby into contact with said heart-shaped cam for returning said second hand to zero, said cam surface cooperating with said projection of said disengaging lever for removing said extension of said resilient strip from the zone of action of said disengaging pusher when said rocker is in

starting position, and means removing said returning lever from said heart-shaped cam at the latest when said engaging pusher is pressed for starting said second hand wheel.

4. The combination of claim 3, whereby said extension of said resilient strip is formed by a fold thereof over the external end of said first part of the returning lever.

5. The combination of claim 3, whereby said extension of said resilient strip is formed by a fold thereof over the external end of said first part of the returning lever, a slot is provided in said first part, said cam surface of said resilient strip being formed by a fold thereof, and said projection of said disengaging lever extends normally thereto and cooperates with said cam surface formed by said fold of said resilient strip through said slot for removing said extension of said resilient strip from the zone of action of said disengaging pusher when said rocker is in starting position, said projection of said disengaging lever cooperating with the walls of said slot for removing said returning lever from said heart-shaped cam when said engaging pusher is pressed for starting said second hand wheel.

6. The combination of claim 3, whereby said first part of the returning lever is arranged above said disengaging lever and substantially extends in parallel thereto, and said second part is arranged within said frame and pivoted therein, one end of said second part being articulated to said first part and the other end of said second part coming into contact with said heart-shaped cam when said first part of said returning lever is actuated by said disengaging pusher.

7. In a center seconds chronograph the combination of a frame, a second hand wheel mounted on a second hand spindle pivoted in said frame, a second hand mounted on said spindle, a rocker pivotally mounted on said frame and adapted for starting and stopping said second hand wheel, an engaging lever connected to said rocker, an engaging pusher adapted for pushing said engaging lever to swing said rocker into a starting position, a disengaging lever having a projection and being connected to said rocker, a disengaging pusher adapted for pushing said disengaging lever to swing said rocker into stopping position, a heart-shaped cam mounted on said second hand spindle, a returning lever slidably and swingably mounted on said frame, said returning lever being controlled by said disengaging pusher, one end of said returning lever being adapted for coming into contact with said heart-shaped cam for returning said second hand to zero, resilient means for holding said returning lever under the control of said disengaging pusher, said projection of said disengaging lever cooperating with said returning lever for swinging it against the action of said resilient means out of the control of said disengaging pusher when said rocker is in starting position, and a spring removing said returning lever from said heart-shaped cam after releasing said disengaging pusher.

8. In a center seconds chronograph the combination of a frame, a second hand wheel mounted on a second hand spindle pivoted in said frame, a second hand mounted on said spindle, a rocker pivotally mounted on said frame and adapted for starting and stopping said second hand wheel, an engaging lever connected to said rocker, an engaging pusher provided at the periphery of said frame and adapted for pushing said engaging lever into a direction substantially normal to the outer edge of said frame to swing said rocker into starting position, a disengaging lever having a projection and being connected to said rocker, a disengaging pusher provided at the periphery of said frame and adapted for pushing said disengaging lever into a direction substantially normal to the outer edge of said frame to swing said rocker into stopping position, a heart-shaped cam mounted on said second hand spindle, a returning lever slidably and swingably mounted on said frame and extending substantially in parallel to said disengaging lever, said returning lever being arranged so as to be pushed by said disengaging pusher, the internal end of said returning lever coming thereby into contact with said heart-shaped cam for returning said second hand to zero, resilient means for maintaining said returning lever in the zone of action of said disengaging pusher, said projection of said disengaging lever cooperating with said returning lever for swinging it out of the zone of action of said disengaging pusher when said rocker is in starting position, and a spring removing said returning lever from said heart-shaped cam after releasing said disengaging pusher.

9. The combination of claim 8, whereby said returning lever is swingably mounted on said frame about an axis perpendicular to said frame.

10. The combination of claim 8, whereby a screw bolt is fixed to said frame and an oblong aperture is provided in said returning lever, the walls of said aperture surrounding said bolt for guiding the sliding and swinging movements of said returning lever.

11. The combination of claim 8, whereby said projection of said disengaging lever extends in the same plane as the disengaging lever, the disengaging lever and the returning lever substantially lying in the same plane, and a nock is provided on said returning lever, said projection of said disengaging lever cooperating with the walls of said nock.

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