

[54] **WATCH WITH STOPWATCH HAND**

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- [63] Continuation-in-part of Ser. No. 758,265, Sept. 9, 1968, abandoned.

[30] **Foreign Application Priority Data**

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 [58] Field of Search.....58/74-79, 126 A, 58/126 R

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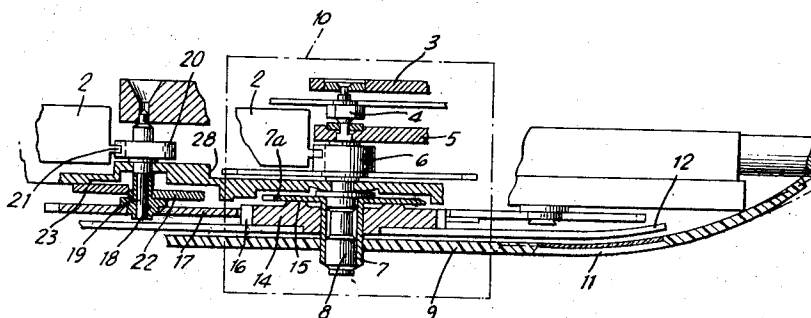
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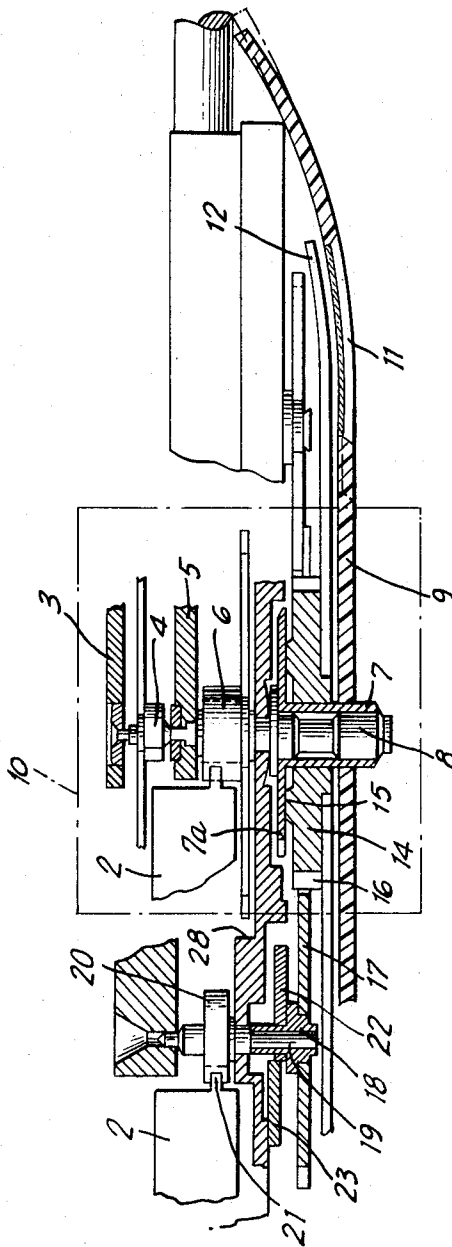
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[57] **ABSTRACT**

This invention covers a watch which has a normally synchronized stopwatch hand and which is improved in that the transmission ratio between the minute hand and the stopwatch hand can be easily changed. The stopwatch hand may consist of a disk, a second hand may be provided which is coaxial with the minute hand, a self-winding mechanism may be incorporated in the watch, these improvements being made possible without requiring an increase in the thickness of the watch movement. The stopwatch hand is thus normally arranged to rotate in synchronism with the minute arbor and stopwatch hand setting means are mounted in the mounting structure and operable to rotate the stopwatch hand to a zero position and to hold it there until the hand is to be released.

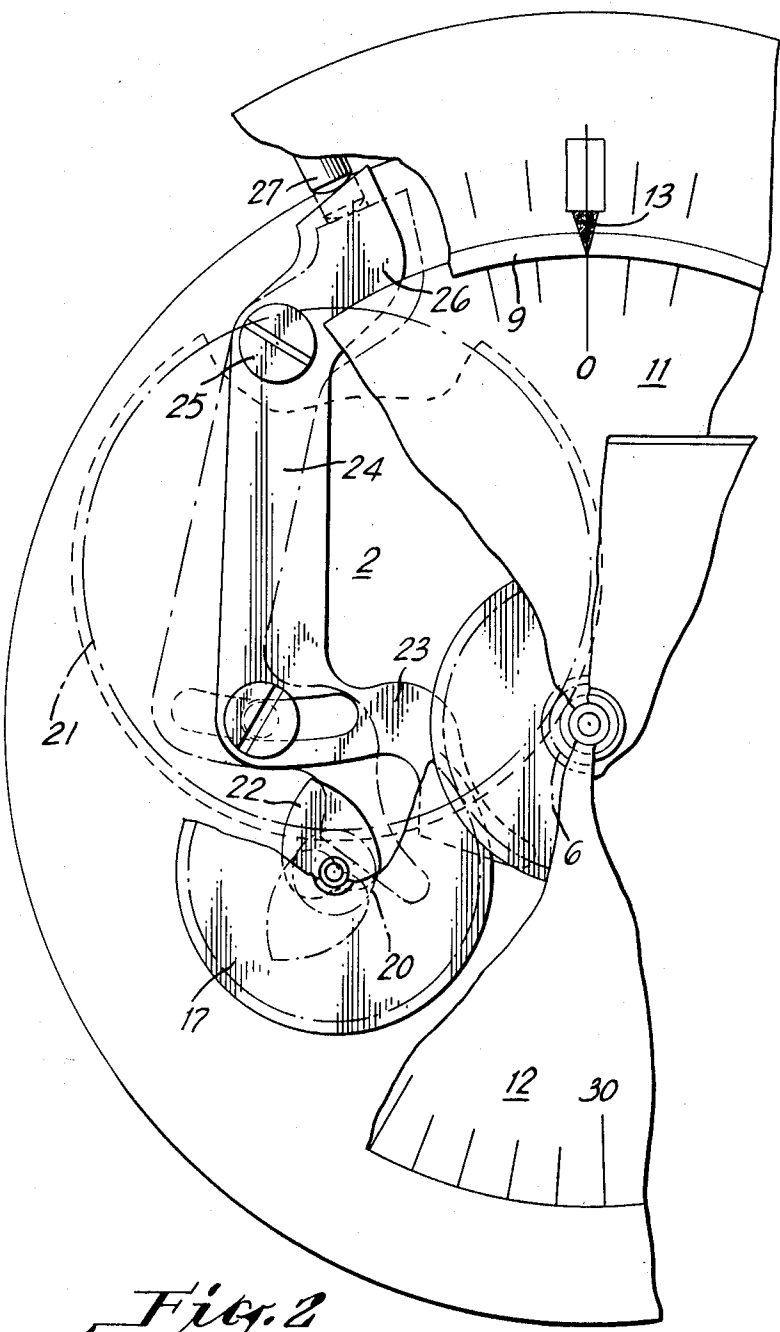
**1 Claims, 2 Drawing Figures**





*Fig. 1*

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*Fig. 2*

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## WATCH WITH STOPWATCH HAND

## CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of abandoned application Ser. No. 758,265 filed Sept. 9, 1968.

This invention relates to a pocket or wrist watch having a stopwatch mechanism.

Stopwatches for measuring a length of time are known. It is also known to combine such stopwatches with pocket or wrist watches. In stopwatches of a generally known type, the stopwatch hand begins to move when its pinion is coupled to the watch movement and the stopwatch hand is stopped when its pinion is uncoupled.

More recently, stopwatches have been proposed in which the stopwatch hand revolves in synchronism with the minute hand and is arbitrarily turned to a zero position to be held there until the beginning of the length of the time to be measured when it is desired to use the stopwatch mechanism. These watches will be referred to hereinafter as stopwatches having a normally synchronized stopwatch hand.

It is an object of the invention to provide a watch which has a normally synchronized stopwatch hand and which is improved in that the transmission ratio between the minute hand and the stopwatch hand can easily be changed, the stopwatch hand may consist of a disc, a second hand may be provided which is coaxial with the minute hand, a self-winding mechanism may be incorporated in the watch, and all these improvements are enabled without requiring an increase in the thickness of the watch movement.

These objects are accomplished by the combination of the following features:

The stopwatch hand is driven by idler gear means comprising a first idler gear, which is in mesh with an external circular series of teeth of the barrel and connected to an idler shaft having an axis offset from the axes of the barrel and minute arbor. The idler shaft extends through the baseplate of the watch and is operatively connected to the stopwatch hand by a second idler gear. One of said idler gears is connected to the idler shaft for rotation therewith by a slip coupling. The other of said idler gears is connected to said idler shaft to rotate therewith.

Because the idler gear means for driving the stopwatch hand are centered on an axis which is offset from the axis of the minute arbor, the stopwatch hand may consist of a disc and a second hand which is coaxial with the minute hand may be provided.

In the watch mechanism according to the invention, the torque for driving the stopwatch hand as well as the torque for driving the minute hand are derived at two angularly spaced points from a circular series of teeth provided on the barrel.

The stopwatch hand consists preferably of a graduated disc, which revolves below the dial and is visible through a window in the dial.

The slip coupling comprises suitably a friction tube which is frictionally fitted and rotatable on the idler shaft.

Stopwatch hand-setting means are provided, which are mounted in the mounting structure and arbitrarily operable to return the stopwatch hand to a zero position and to hold it there until said stopwatch hand is to be released. Said setting means comprise a heart-shaped Valjoux cam, which is restored in known manner by the end of a two-armed lever from any position always to a predetermined position so that the graduated disc is moved in this case to its zero position.

The drawing shows partly diagrammatically and partly in section a preferred embodiment of the invention by way of example.

FIG. 1 is a sectional view showing a watch movement that is provided with a stopwatch mechanism according to the invention and

FIG. 2 is a top plan view showing the means for actuating the heart-shaped cam.

The watch mechanism comprises a mounting structure, which includes a baseplate 28. In FIG. 1, the usual com-

ponents of a watch mechanism are shown within a frame 10 indicated by dash-dot lines. On the same side of the baseplate 28 with the dial 9, are components which comprise a train bridge 3, a second wheel 4, a minute wheel bridge 5, a minute wheel 6 and an hour wheel 7a. The train bridge 3 and the minute wheel bridge 5 form parts of the above-mentioned mounting structure. A tubular hour arbor 7 carrying the hour wheel 7a and a tubular minute arbor 8 carrying the minute wheel 7 have a common axis and are rotatably mounted in the baseplate 28 and extend therethrough to the side thereof which faces the dial 9. The dial 9 has a window 11, through which a stopwatch hand in the form of a graduated disc 12 disposed between the baseplate 28 and the dial 9 is visible and readable. To this end, the dial 9 carries a mark 13 (FIG. 2). The graduated disc 12 is secured to a gear 14, which is freely rotatably mounted on the tubular hour arbor 7 and has a protruding ring 15 bearing on the hour wheel 7a. The axis of the barrel 2 is offset from the axis of the arbors 7 and 8. The arbors 7 and 8 carry an hour hand and a minute hand, respectively. These hands are not shown.

The barrel 2 is provided with an external circular series of teeth 21. The minute wheel 6 is in mesh with the teeth 21 and constitutes first gear means operatively connecting the circular series of teeth to the minute arbor 8.

Idler gear means are provided which operatively connect the teeth 21 to the disc 12 and comprise an idler shaft 19, which extends through the baseplate 28 and is rotatably mounted therein on an axis which is offset from the axes of the barrel 2 and tubular minute arbor 8, a first idler gear 20 mounted on shaft 19 for rotation therewith and in mesh with the teeth 21 at a point angularly spaced from the point where the minute wheel 6 is in mesh with teeth 21, a second idler gear 17 rotatably mounted on the shaft 19 and in mesh with teeth 16 of the gear 14, so that the gear 17 is operatively connected to the disc 12, and a slip coupling connecting the shaft 19 and the idler gear 17 for joint rotation. The slip coupling comprises a friction tube 18, to which the gear 17 is secured and which is a friction fit on shaft 19 and rotatable thereon in the manner of a slip coupling. It is apparent that the gear 20 is disposed on the same side of the baseplate 28 as the barrel 2 and the gear 17 is on the same side of the baseplate 28 as the dial 12.

In the above arrangement, the dial 12 normally rotates in synchronism with the tubular minute arbor 8.

Stopwatch-hand setting means are mounted in the mounting structure and arbitrarily operable to rotate the dial 12 to a zero position and to hold it there until the dial is to be released. These setting means comprise a heart-shaped cam 22, which is secured to the friction tube 18, a two-armed lever 24, which is rotatable on a pin 25 and has a suitably shaped end portion 23 acting in known manner on the heart-shaped cam. A pushpin 27 extends radially through the watch housing forming part of said mounting structure and acts on a free end 26 of the lever 24.

To prepare the stopwatch mechanism for operation, the pushpin 27 is actuated so that the lever 24 rotates the heart-shaped cam 22 to a position in which the end 23 of the lever 24 engages the flat of the heart-shaped cam, as is shown in dash-dot line in FIG. 2. In this operation, the friction between the friction tube 18 and the shaft 19 is overcome and the graduated disc 12 is stopped and moved to its zero position by the gear 14.

While the coupling between tube 18 and shaft 19 is slipping, the disc 12 remains in its zero position as long as the pushpin 27 is depressed. Upon release of the pushpin 27, the graduated disc 12 revolves in synchronism with the tubular minute arbor 8.

What is claimed is:

1. A watch mechanism, which comprises a mounting structure including a baseplate, a barrel rotatably mounted in said mounting structure on an axis and having an external circular series of teeth,

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a minute arbor extending through said baseplate and rotatably mounted in said mounting structure on an axis offset from the axis of said barrel,

first gear means operatively connecting said circular series of teeth to said minute arbor,

a stopwatch hand rotatably mounted in said mounting structure,

Idler gear means operatively connecting said circular series of teeth to said stopwatch hand and comprising an idler shaft which extends through said baseplate and is rotatably mounted in said mounting structure on an axis which is offset from the axes of said barrel and said minute arbor, a first idler gear mounted on said idler shaft and in mesh with said circular series of teeth, a second idler gear rotatably mounted on said idler shaft and operatively connected to said stopwatch hand, and a slip

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coupling connecting said idler shaft and one of said idler gears for joint rotation, whereas the other of said idler gears is connected to said idler shaft to rotate therewith, whereby said stopwatch hand is arranged normally to rotate in synchronism with said minute arbor, and

stopwatch hand-setting means which are mounted in said mounting structure and arbitrarily operable to rotate said stopwatch hand to a zero position and to hold it there until said stopwatch hand is to be released,

said barrel and first gear means and said first idler gear being disposed on one side of said baseplate, said stopwatch hand, said second idler gear, said slip coupling and said stopwatch hand-setting means being disposed on the other side of said baseplate.

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