

Oct. 12, 1965

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3,210,925

ALARM STOP WATCH

Filed July 8, 1963

2 Sheets-Sheet 1

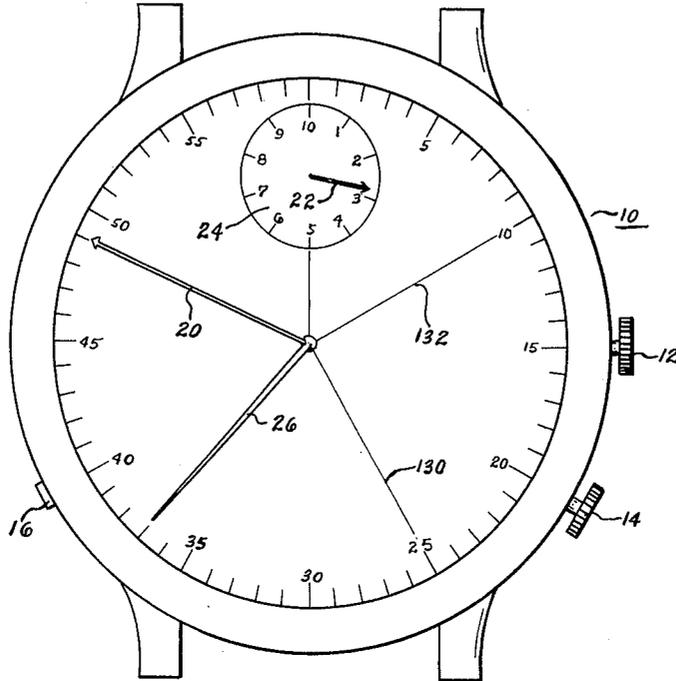


FIG. 1

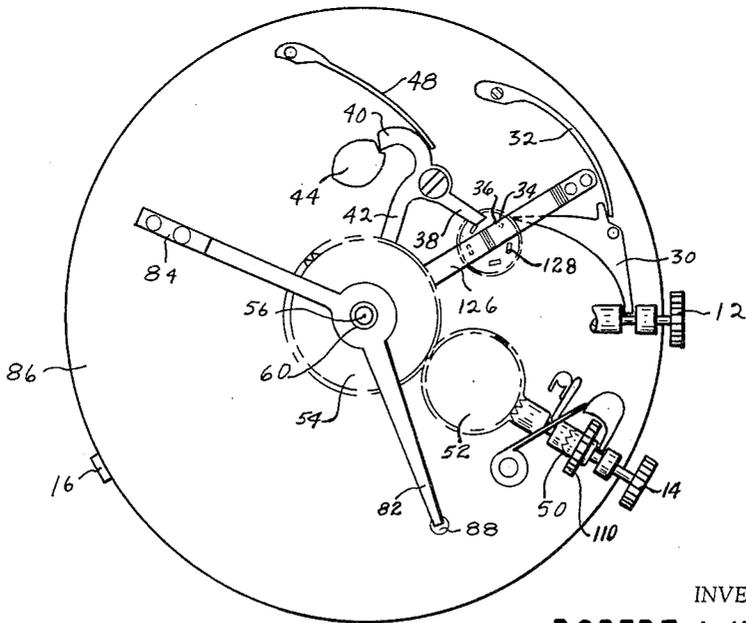


FIG. 2

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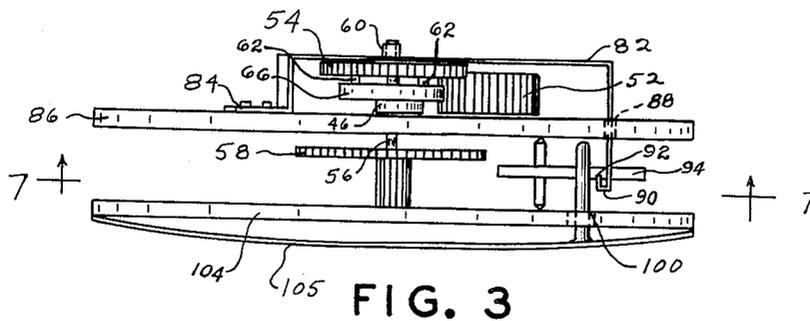


FIG. 3

FIG. 4

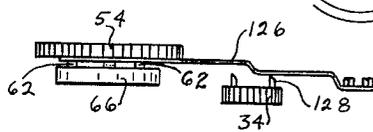
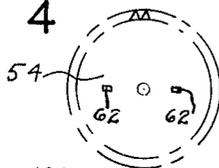


FIG. 10

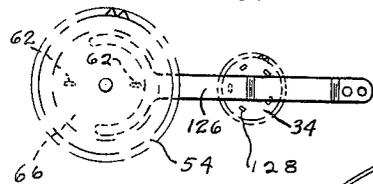


FIG. 9

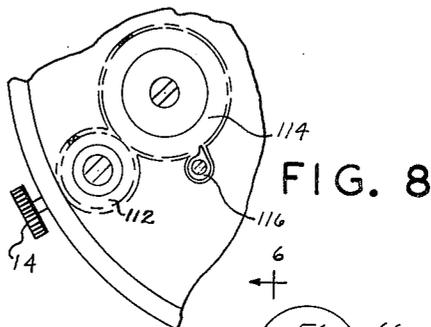


FIG. 8



FIG. 5

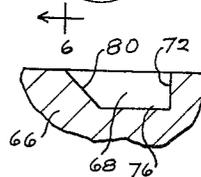


FIG. 6

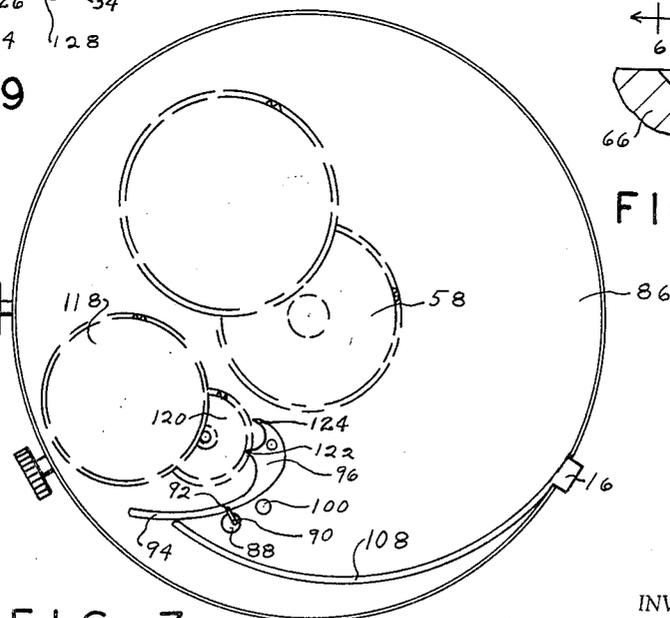


FIG. 7

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**ALARM STOP WATCH**

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5 Claims. (Cl. 58—57.5)

The present invention relates to watches and more particularly to a stop watch with an alarm.

In scientific experiments, athletic coaching, sporting events, and the like, it is often necessary or desirable for a man to know that a short period of time has elapsed and to be automatically notified of the end of the period without his having to watch a clock. For example, during sporting events, the referee or timekeeper must time various activities such as periods of "time out" and call penalties when those periods exceed certain fixed lengths; thus, the huddle time in football can not exceed 25 seconds and a penalty must be called when it does. But at the same time, the referee may have his attention distracted by some other event, either on the playing field or in the stands. It is therefore desirable that the referee or timekeeper have some means of timing events which last only seconds and be warned when a specified period is exceeded.

In many cases a stop watch is used by the experimenter, coach or referee, but heretofore it has been necessary for him to use a separate timer with an alarm to notify him of the end of the period, or he has been forced to keep his attention on his stop watch. It is therefore one principal object of the present invention to provide a stop watch which has an alarm for warning the user of the end of a short time period.

In the excitement of a game, the crowd often becomes so noisy that the referee can not hear any alarm. Therefore, it is another object of the present invention to provide a stop watch with an alarm in which vibrations produced by the alarm mechanism are transmitted directly to the skin of the person using the watch.

Since it is desirable that the alarm may operate several times without requiring rewinding of its spring, it is an object of the present invention to provide an alarm stop watch in which the alarm rings for only a limited time, for example 3 seconds, and then stops automatically.

At times the user may desire that the alarm stop ringing even before its automatic stop, or he may wish to prevent its ringing at all. Therefore, it is a further object of the invention to provide a stop watch having an alarm which can be stopped at will.

An additional object of the invention is to provide a stop watch of the above description which is simple and easy to manufacture and use, and yet which does not greatly increase the thickness of the watch beyond that of an ordinary stop watch.

Further objects and advantages of the invention will be seen from the following description and accompanying drawings, wherein:

FIGURE 1 is a plan view of the face of the present watch;

FIGURE 2 is a diagrammatic front elevational view of a portion of the mechanism of the alarm stop watch, showing the apparatus for setting the alarm;

FIGURE 3 is a side elevational view of the watch with portions removed to show the automatic starting and stopping mechanism of the alarm;

FIGURE 4 is a bottom elevational view of one wheel used in the present invention;

FIGURE 5 is a top plan view of a second wheel used in the invention;

FIGURE 6 is a cross sectional view taken along line 6—6 of FIGURE 5;

FIGURE 7 is a cross sectional view taken along line

2

7—7 of FIGURE 3 but having several parts added to show the alarm mechanism;

FIGURE 8 is a bottom plan view of a portion of the watch with the casing removed to show the winding mechanism of the alarm; and

FIGURES 9 and 10 are plan and elevational views, respectively, of a part of the alarm control mechanism of the watch.

Referring more specifically to the drawings, and to FIGURE 1 in particular, numeral 10 designates a stop watch having a winding, setting and operating stem and crown 12, alarm winding and setting stem and crown 14, and alarm stop switch 16. Seconds are indicated on a dial 18 by a sweep hand 20, while minutes are indicated by a hand 22 on a dial 24. The setting of the alarm mechanism is shown by a hand 26. The stop watch shown and described in the drawings and specification indicates minutes and seconds, but the invention may be used with any form of stop watch, indicating seconds and fractions of seconds, or any other time units.

In the stop watch mechanism shown in FIGURE 2, a lever 30 is moved by the stem and crown 12 and is tensioned by a spring 32. The end of lever 30 turns counterclockwise a ratchet wheel 34 which has mounted thereon a star 36. A kickback lever 38 having extensions 40 and 42 riding on a minute return heart 44 and a second return heart 46, respectively, which have forked springs for tension to their respective pinions rather than friction, thus allowing kick-back without interfering with the gear train, is operated by star 36 and a tension spring 48. The operation of this stop watch mechanism is conventional, a first push on crown 12 starting the watch and releasing the hearts by forcing lever 38 onto one of the projections of star 36, a second push stopping the watch, and a third push releasing lever 38 to allow it to return to the position shown and thus allow the force of spring 48 to be transmitted through extensions 40 and 42 to force hearts 44 and 46 to return to the locked positions shown.

In the alarm setting mechanism shown in FIGURES 2 and 3, stem and crown 14 operates through an over-running clutch 50 and a setting wheel 52 to drive an alarm wheel 54, which is mounted to rotate freely on an arbor 56 turned by a center wheel 58 and is axially movable along arbor 56. Hand 26 is connected to rotate with alarm wheel 54 through a sleeve 60 surrounding and freely rotating with wheel 54 on arbor 56. As seen in FIGURES 3, 4 and 5, the wheel 54 has two small pins 62 on its lower face, with one pin spaced at a greater radial distance from the center of wheel 54 than the other. These pins act to space wheel 54 from a wheel 66, which is frictioned on arbor 56 to rotate with it and has slots 68 in its upper face corresponding to the pins 62 and so positioned that in one rotative position of wheel 66, the pins 62 may enter slots 68. Slots 68 are quite long and have a wedge-like form consisting of a drop-off 72, a bottom portion 76, and a ramp portion 80, as shown in FIGURE 6. Since the pins and their respective slots are spaced at different radial distances from arbor 56, wheel 54 is permitted to move axially toward wheel 66 in only one angular position of the two wheels, each pin being unable to enter more than one of the slots. Although the invention is shown with only two pins, any desirable number of such pins may be used, a plurality of pins being preferred, however, to prevent any tipping of wheel 54 when it is spaced from wheel 66.

A spring 82, connected at 84 to a plate 86, passes over and presses down on wheel 54 and passes down through a hole 88 in plate 86 to end in a hook-like portion 90. Tip 92 of portion 90 presses against an elongated extension 94 of an alarm hammer 96, as seen in FIGURES 3 and 7, with tip 92 touching extension

94 only when spring 82 is in the raised position shown in FIGURE 3. An alarm post 100 passes through plate 104 to the back 105 of the case and is secured thereto, and vibration of the alarm post in response to the action of the hammer causes the case to vibrate against the wearer's arm, thereby signalling the end of the pre-set interval of time. Furthermore, a curvilinear lever 108 extends from switch 16 around and past the watch mechanism to contact extension 94, and is movable into and out of engagement by switch 16.

The alarm winding and operating mechanism consists of a wheel 110 turning with crown 14 and adapted to turn crown wheel 112 (FIGURE 8) in one axial position of crown 14. Crown wheel 112 turns an alarm ratchet wheel 114, which is kept from turning in the reverse direction by a click 116 and which is connected to a coil spring (not shown) in an alarm barrel 118. When the alarm rings, barrel 118 rotates a ratchet wheel 120 which engages prongs 122 and 124 of alarm hammer 96 to actuate the hammer. To permit kickback, a spring lever 126 pushes wheel 54 away from wheel 66 to disengage pins 62 from slots 68 when crown 12 is pressed for kickback. The spring lever is raised by prongs 128 on wheel 34, which are beveled on the free end for lifting the lever as the wheel is rotated.

In the operation of this mechanism, when the stop watch is started, center wheel 58 rotates arbor 56, and hence sweep hand 20 moves to indicate the seconds elapsed. As arbor 56 rotates, wheel 66 also rotates clockwise and pins 62 slide along the surface of wheel 66. As pins 62 reach their own respective slots, they pass over drop-off 72 to bottom portion 76, and spring 82 is allowed to force wheel 54 closer to wheel 66. At this time, tip 92 drops below extension 94 to allow the alarm hammer to vibrate against post 100 and thus warn the wearer of the watch both by the sound of the vibrations on post 100 and by the direct transmission of those vibrations through the case to his skin by the post. As wheel 66 continues to turn, pins 62 ride up ramp portions 80, forcing wheel 54 and spring 82 upwardly, until finally tip 92 makes contact with extension 94 again and stops the alarm. This entire process lasts only a very few seconds, depending upon the length of slots 68, and the alarm will then not ring until wheel 66 has made a complete revolution and each pin 62 passes over its respective drop-off 72 again. If the user of the watch wishes to stop the alarm or prevent its ringing, he merely moves switch 16 into the position shown in FIGURE 7, with the end of lever 108 pressing against extension 94 to keep it from moving.

When the watch is to be used, the alarm spring is wound by rotating crown 14. Then by pressing inwardly and rotating crown 14, the position of wheel 54, indicated by hand 26, is set through clutch 50 and wheel 52. Since clutch 50 is overrunning, wheel 54 can only be turned counterclockwise, and hence pins 62 can never catch on drop-offs 72 to force the mechanism of the watch to move and possibly damage the watch.

After winding and setting the alarm, the watch is used in the conventional manner as previously described, but when hand 20 reaches the position of hand 26, the alarm

rings, unless switch 16 has been set to prevent it. The watch will continue operating, with the alarm ringing once every minute for a few seconds, until the watch is stopped or switch 16 is moved to prevent the ringing. If it is desired that the alarm should ring only after 4 minutes and 20 seconds, for example, it would be merely necessary to set switch 16 to prevent the alarm from ringing for the first 3½ minutes and then release it sometime during the last minute to allow the alarm to operate on time. For convenience in setting the alarm, lines may be inscribed on the face of the watch; thus, in the watch illustrated herein, a 25-second line 130 for football and a 10-second line 132 for basketball are provided.

Various changes and modifications may be made without departing from the scope of the present invention.

I claim:

1. In combination in a stop watch having a central arbor for driving a time indicating means, a manual means for resetting said time indicating means, a wheel fixed to said central arbor and rotating therewith, a sleeve arbor on said central arbor, an alarm setting indicating means connected to said sleeve arbor, a wheel on said sleeve arbor in proximity to said first mentioned wheel and rotatable relative thereto, said second mentioned wheel being movable axially with respect to said central arbor, interacting means on said two wheels for moving said second mentioned wheel axially relative to said first mentioned wheel, a signal means, a linkage operated by the axial movement of said second mentioned wheel for controlling the operation of said signal means, and a manually operated means for disengaging the interacting means between said wheels when the time indicating means is manually reset.

2. The mechanism defined in claim 1, wherein the interacting means includes a projection on one wheel and a slot means on the other wheel.

3. The mechanism defined in claim 1, wherein said linkage includes a pivoted lever moved by said second mentioned wheel when said wheel is moved axially by said interacting means.

4. The mechanism defined in claim 1, wherein said second mentioned wheel is rotated relative to said first mentioned wheel to set said alarm setting indicating means and a manually operated means is provided to rotate said second mentioned wheel to set said alarm setting indicating means.

5. The mechanism defined in claim 1, wherein the manually operated means for disengaging the interacting means includes a lever for moving said second mentioned wheel axially away from said first mentioned wheel when the time indicating means is manually reset.

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