June 11, 1935. W. C. HANDLEY 2,004,280

WATERPROOF WATCH

Filed May 29, 1933

Fig. 1.

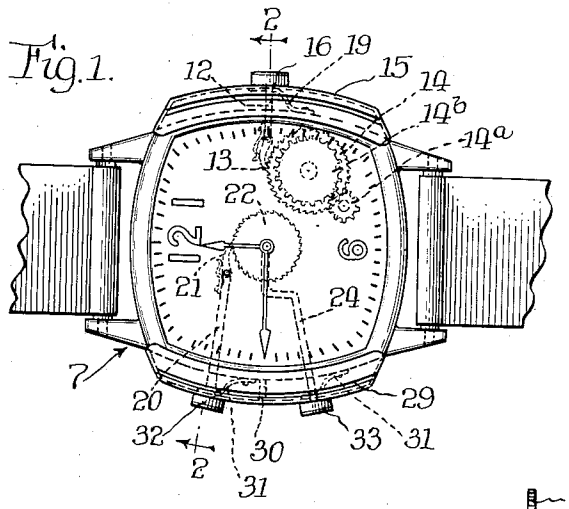


Fig. 4.

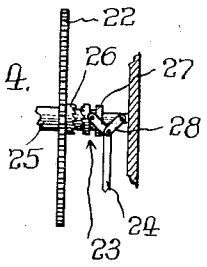


Fig. 2.

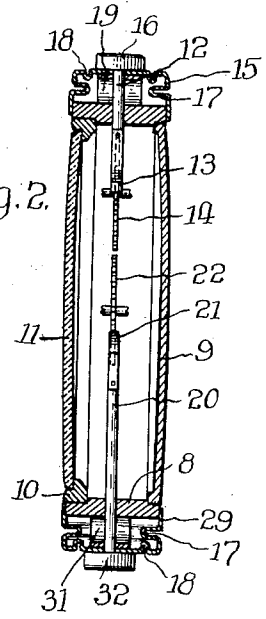
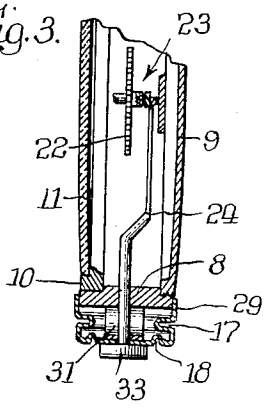


Fig. 3.



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Patented June 11, 1935

2,004,280

UNITED STATES PATENT OFFICE

2,004,280

WATERPROOF WATCH

William C. Handley, Chicago, Ill.

Application May 29, 1933, Serial No. 673,439

8 Claims. (Cl. 58—90)

The invention relates generally to watches or clocks and has as a primary object the perfecting of a watch of novel construction that is water-proof.

Stated with greater particularity, it is an object of the invention to provide a watch having winding or setting means of a unique character combined with cooperating sealing means positively preventing the entrance of moisture into the watch around the stem of the winding or setting means.

Moreover, it is an object of the invention to provide a waterproof construction that is simple and economical, that permits of a convenient setting and winding of the watch and that will retain its water-proof character.

Other objects and advantages will become apparent from the following detailed description taken in connection with the accompanying drawing, in which:

Figure 1 is a face view of a watch embodying the features of the invention.

Fig. 2 is a sectional view taken along line 2—2 of Fig. 1, but showing only the operating mechanism forming a part of the invention.

Fig. 3 is a fragmental view showing a part of the setting means.

Fig. 4 is an enlarged detail view of the mechanism shown in Fig. 3.

For purposes of disclosure, I have shown and will hereinafter describe the invention as embodied in a wrist-watch having a casing 7 of generally rectangular shape. The casing 7 is of usual construction and comprises generally a central ring 8, a back cover 9, a bezel 10 and a crystal 11. These parts are fitted together in any suitable and well known manner to form water-tight joints, the precise construction being immaterial because the casing per se forms no part of the invention.

In attempting to construct water-proof watches great difficulty is experienced in obtaining a satisfactory construction which prevents moisture from entering the casing around the stem or stems employed for winding and setting the watch. It is to the perfection of a construction preventing moisture from entering the casing at that point that the present invention is directed.

Accordingly, I provide winding and setting means of a unique character having a portion projecting outwardly of the casing for actuation and a sealing member of novel construction cooperating with the winding and setting means to permit actuation thereof and at the same time providing a completely closed member over the opening in the casing through which the winding and setting means projects. Such winding and setting means are designed to be actuated by a reciprocatory motion of the portion projecting outwardly of the casing and the sealing member cooperating therewith is in the nature of a collapsible or resilient shell constructed of a material impervious to moisture and connected between the projecting portion of the winding and setting means and the casing over the opening therein. In the present instance, separate means are employed for winding and for setting the watch and the outwardly extending portions thereof project through opposite side edges of the casing.

The winding means comprises a stem 12 projecting through an opening in one side edge of the central ring 8 and guided thereby for axial reciprocation. Pivotally mounted on the inner end of the stem 12 is a pawl 13 spring pressed into engagement with a toothed wheel 14. The stem 12 and pawl 13 are located substantially on a tangent to the wheel 14 so that reciprocation of the stem causes rotation of the wheel. The wheel 14 is formed with a large number of teeth so that only a short stroke of the stem 12 is required to advance the wheel. Suitable motion-multiplying gearing, of which only a pinion 14^a and an intermeshing gear 14^b fast with the wheel 14 are shown, connects the wheel 14 to the main spring of the watch, also not shown.

Mounted over the opening in the side edge of the casing 7 through which the stem 12 projects is the sealing member herein taking the form of an elongated collapsible shell 15 extending, in the present instance, the full length of the edge to maintain the original outline of the casing. The shell 15 is preferably metallic and is formed with an open face enabling it to fit partially over the side edge of the casing to which it is permanently attached in water-tight relation in any desired manner, such as by brazing. As here shown, the stem 12 projects through the shell 15 but is also fastened and sealed thereto to maintain the shell water-tight. The stem 12 terminates in a head 16 to simulate the usual winding stem and particularly to provide a portion raised above the shell to facilitate depressing the stem by one winding the watch.

In order that the shell 15 may be collapsible it is formed with longitudinal corrugations 17 in the sides and a corrugation 18 around the head 16. As a result, the stem 12 though brazed to the shell 15, is free to be reciprocated to effect

a winding of the watch. Preferably the natural tendency of the shell 15 to return to its expanded position, shown in Fig. 2, is aided by a leaf spring 19 interposed between the casing and the stem to urge the latter outwardly. Thus, it is seen that by the employment of a winding means and a sealing means of the character described the stem 12 is in effect completely enclosed and thus prevents any moisture from entering the casing around the stem.

The setting means, like the winding means, comprises a stem 20 projecting through the side edge of the central ring 8, opposite the stem 12, and guided thereby for axial reciprocation. At its inner end the stem 20 carries a pawl 21 spring pressed into engagement with a toothed wheel 22. In order that an accidental reciprocation of the stem 20 may not change the setting of the watch, the wheel 22 is not permanently connected to the hands of the watch but is connected or disconnected by means of a clutch 23 controlled by a third stem 24. Accordingly, the wheel 22 is freely rotatable on a shaft 25 and carries a clutch element 26. Reciprocable axially of the shaft 25 but fixed against relative rotation therewith is a cooperating clutch element 27. This element is connected to the inner end of the stem 24 by a pair of toggle links 28 arranged to cause engagement of the clutch elements when the stem 24 is pressed inwardly. The shaft 25 is connected in any well known and suitable manner, not shown, to the hands of the watch.

Secured and sealed to the casing 7 and to the stems 20 and 24 is a collapsible shell 29. With the exception of a transverse corrugation or partition 30 provided to permit opposite halves of the shell to have an independent collapsing movement, the shell 29 is identical with the shell 15 so that the symmetry of the watch is not destroyed. A leaf spring 31 is also provided for each of the stems 20 and 24 urging the same outwardly and the stems terminate in a head 32 and 33 respectively. Thus to set the watch, the stem 24 must be held in its inward position while the stem 20 is reciprocated. Any accidental setting is thereby effectually precluded.

I claim as my invention:

1. In a watch a casing enclosing operating parts of the watch, the parts of said casing being assembled in a water-tight relationship, means including a reciprocable member for winding the main spring of the watch, a stem projecting through a wall of said casing and operable to actuate said reciprocable member, and a hollow member secured to said casing over the place of projection of said stem to seal the casing against moisture and collapsible to permit operation of the stem.

2. In a watch having a casing with the parts thereof fitted together to form water-proof joints, a stem projecting from within the casing and reciprocable axially to wind the watch and a collapsible member connected to said stem and to the casing around the stem to form a water-proof seal preventing moisture from entering the casing around the stem.

3. In a watch having a casing, the parts of which are assembled in water-tight relationship, means for winding the main spring of the watch comprising an axially reciprocable stem projecting outwardly through one edge of the casing, a toothed wheel geared to the main spring and a pawl actuated by reciprocation of said stem to rotate said wheel, and a collapsible metallic shell secured to the edge of the casing around the stem to seal the casing against the entrance of moisture around the stem.

4. In a watch having operating mechanism and a casing therefor the parts of which are assembled in a water-tight relationship, an axially reciprocable stem projecting from within the casing, said stem having an engagement with a part of the mechanism and operable upon reciprocation to actuate the same, a metallic sealing shell attached to the casing in water-tight relationship over the place of projection of said stem and attached in water-tight relation to the stem near the outer end thereof, said shell being collapsible to permit reciprocation of said stem, and a spring urging said stem outwardly of the casing.

5. In a watch, the combination of a casing for enclosing the works of the watch, the parts comprising the casing being assembled in water-tight relationship, an axially reciprocable stem projecting from within the casing and operatively associated with the works to wind the same upon reciprocation of the stem, a second axially reciprocable stem projecting from within the casing operative upon reciprocation to set the watch, and a collapsible metallic sealing member associated with each of said stems, each of said members encircling the stem with which it is associated and attached to the stem and to the casing in a water-tight connection.

6. In a watch having operating mechanism including hands, a casing therefor the parts of which are assembled in water-tight relationship, an axially reciprocable stem projecting outwardly of the casing, a wheel adapted to be rotated by reciprocation of said stem, a clutch operable to connect said wheel to the mechanism to set the hands, a second axially reciprocable stem projecting outwardly of the casing and controlling the clutch, and a collapsible metallic shell connected to the casing around said stems to seal the casing against the entrance of moisture around the stems.

7. In a watch having operating mechanism including hands, a casing therefor the parts of which are assembled in water-tight relationship, means for setting the hands comprising an axially reciprocable stem projecting outwardly of the casing, means including a clutch for connecting said stem to the hands, a second stem projecting outwardly of the casing and axially reciprocable to control the clutch, said stem being urged in a direction to disconnect the hands and the first mentioned stem, and a sealing device attached to the casing around said stems and collapsible to permit reciprocation of the stems.

8. In a watch having a casing, the parts of which are assembled in water-tight relationship, a pair of axially reciprocable stems projecting outwardly of the casing along the same side edge and an elongated collapsible metallic shell mounted over the side edge and connected to the casing and to the stems in water-tight relation, said shell having a transverse partition intermediate the points of attachment to the stems to permit independent collapse of the portions of the shell.

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