April 12, 1932. A. W. WADSWORTH 1,853,388

WATERPROOF WATCH CASE CONSTRUCTION

Filed Jan. 5, 1931 2 Sheets-Sheet 1

Fig. 1.

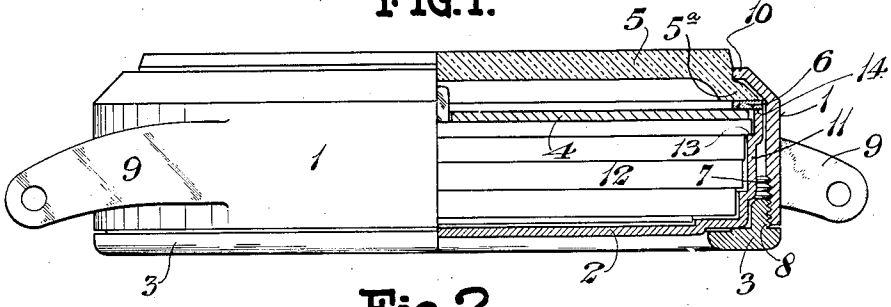

Fig. 2.

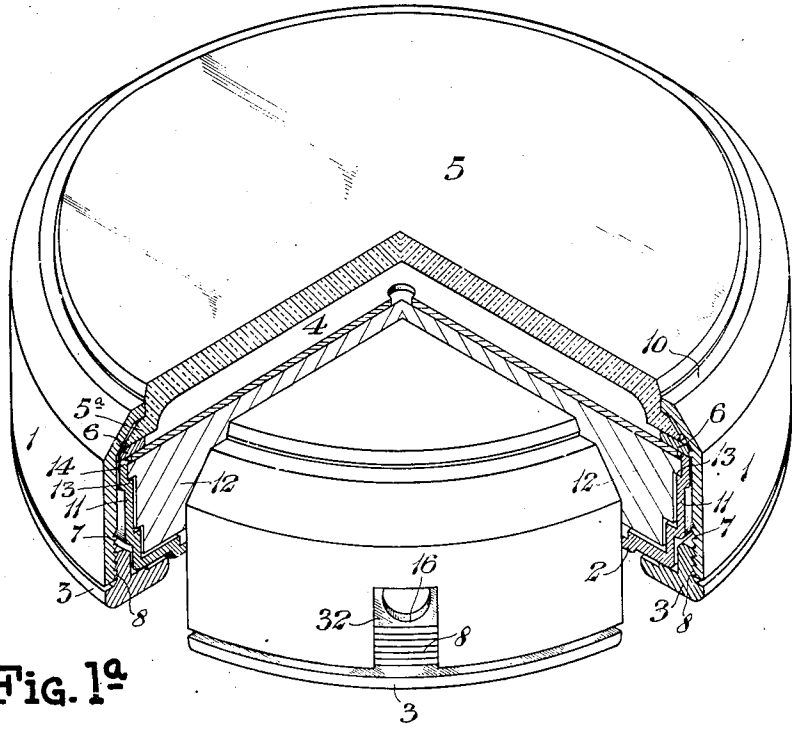

Fig. 1a

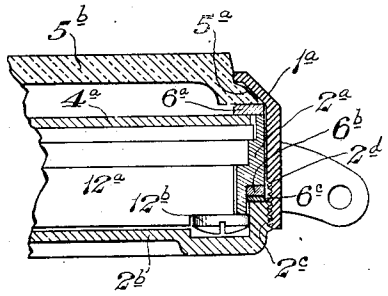

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Fig. 3.

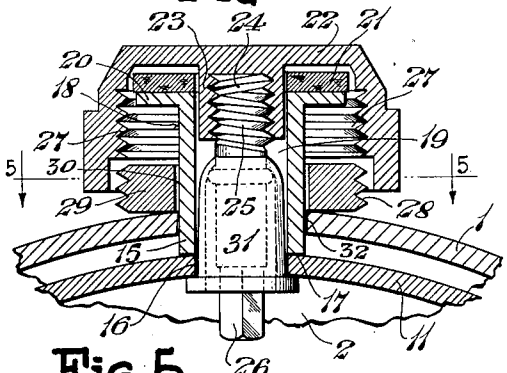


Fig. 4.

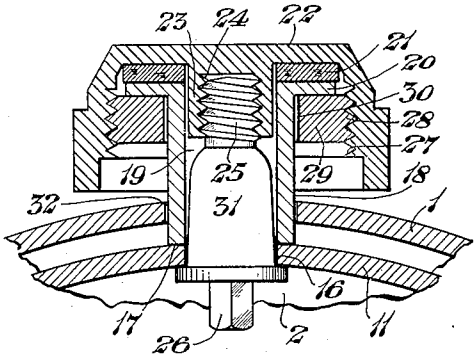


Fig. 5.

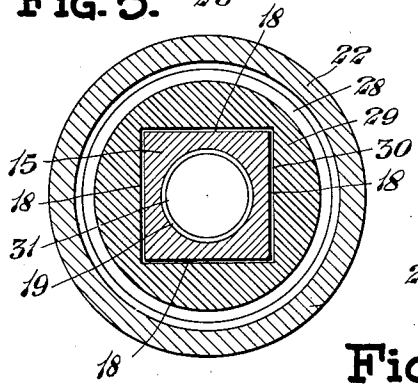


Fig. 6.

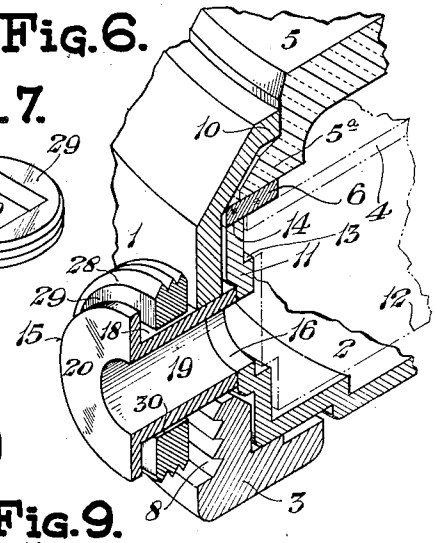


Fig. 7.

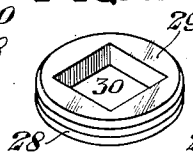


Fig. 8.

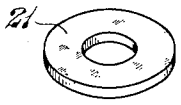


Fig. 10.

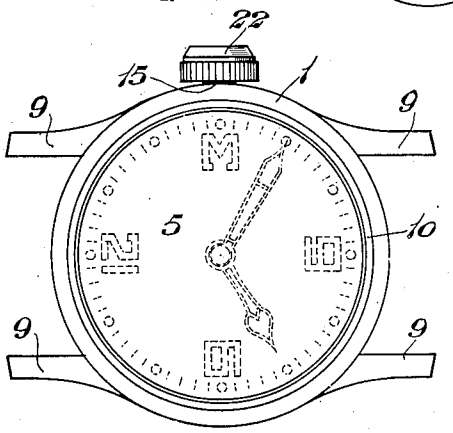
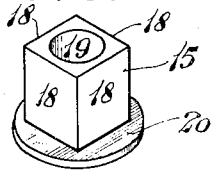


Fig. 9.



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UNITED STATES PATENT OFFICE

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WATERPROOF WATCH CASE CONSTRUCTION

Application filed January 5, 1931. Serial No. 506,563.

This invention relates to watch case construction and more particularly to watch-case construction incorporating waterproof features.

The main or principal object of this invention is to provide a watch case of the above character, the construction of which solves the problem of effecting water-tight joints between the case and the movement and between the movement, winding stem, pendant and crown, respectively.

Other objects of my invention are to produce a waterproof watchcase which is simple, efficient, economical to manufacture, durable and highly satisfactory in preventing dust, moisture and other matter from entering the case and causing damage to the movement, or otherwise interfering with the accurate operation of the movement.

Another object of my invention is to reduce to a minimum the number of parts necessary in the construction of waterproof watchcases. The watchcase of the present invention is characterized by the fact that odd-shaped cases, crystals and bezel openings can equally well be manufactured without destroying any of the principles of construction which form the subject of the invention.

An attempt to produce a watch case of water-tight construction has heretofore been made by many different means, such as covers, packing and the like, but none of such means has given entire satisfaction some being too complicated and costly in their manufacture and others inadequate or not sufficiently practical to satisfy the requirements of a truly waterproof case and, further, for the reason that the so-called heretofore waterproof watchcases have been limited to round shapes and always to round shaped bezel openings and crystals.

With the present invention, however, the shaped case desired is of no moment as the bezel can be made of any desired shape and likewise the crystal without changing or modifying the waterproof construction in the least.

With these and other objects, not specifically mentioned, in view, the invention consists in certain combinations, construction and arrangement of parts which will be hereinafter described and specifically pointed out in the claims.

Referring to the drawings which form a part of this specification:

Fig. 1 is a side elevation of a wrist watch case illustrated by partial section and shown on a greatly enlarged or exaggerated scale;

Fig. 2 is an isometric view of Fig. 1, the bracelet, lugs, crown and its associated parts being omitted and a portion of the view broken away to clearly illustrate the characteristic parts of one embodiment of the invention;

Fig. 1*a* is a fragmentary sectional view similar to the right hand side of Fig. 1 but showing a modified construction;

Figs. 3 and 4, respectively, illustrate in section two different positions of the waterproof crown and tube;

Fig. 5 is a horizontal section taken on a plane corresponding to line 5—5 of Fig. 3;

Fig. 6 is a fragmentary isometric sectional view, on a greatly enlarged or exaggerated scale, in the vicinity of the pendant tube 15, the winding stem 26, crown 22 and crown gasket 21 being omitted;

Fig. 7 is an isometric view of the locking nut 29;

Fig. 8 is an isometric view of the crown gasket;

Fig. 9 is an isometric view of the pendant tube 15 shown in an inverted position; and

Fig. 10 is a face view of a wrist watchcase made in accordance with the present invention.

In the embodiment of my invention as illustrated and which shows a preferred construction, I have selected a round watchcase, although the mentioning of any particular shaped case is not to be regarded as limiting the invention in any manner whatsoever, as odd-shaped cases, bezel openings and crystals can be equally well employed in carrying out the principles of construction. The watch illustrated in the drawings comprises, generally, the bezel 1, combined back and center 2, locking ring 3, dial 4, movement 12, crystal 5 and flexible or pliable gasket 6, all as clearly

shown in Figs. 1 and 6, respectively. The bezel 1, in the present instance, is cylindrical in form and is provided with an internal screw thread 7 to receive the corresponding external screw thread 8 of locking ring 3. If, as shown in Fig. 1, the case is to be used as a wrist watch the bezel 1 is provided with bracelet holding lugs 9, which lugs can be formed as an integral part of said bezel or suitably attached thereto, as desired, to form a rigid unit. The upper portion of bezel 1 is flared inwardly and terminates in the form of circular horizontal flange 10. This flange 10 engages the flange 5*a* of crystal 5 in a manner presently to be described.

As shown in Fig. 1, and again in Fig. 2, the combination back and center 2 comprises a cylindrical cup-shaped member, the upstanding wall 11 of which is provided with the usual seating for supporting a movement, as shown at 13, the movement being designated 12. The upper edge 14 of wall 11 partially supports the flexible gasket 6, which will be explained more fully as the description proceeds.

The description thus far deals with the case construction only, but in order to produce a waterproof watchcase it is necessary to have the crown and pendant tube water-tight also. This I have accomplished by the construction shown in Figs. 3 and 4. By an examination of these figures in connection with Fig. 6, it will be seen that the inner end of pendant tube 15 is attached to wall 11 of combination back and center 2 by a soldered joint 17, or the equivalent, thus fixing the tube 15 as an integral part of the wall 11. A detail of this tube 15 is shown in Fig. 9, where it will be observed that the outside thereof is rectangular in shape, forming vertical walls 18, while the center is bored out to form hole 19. 20 designates a circular horizontal flange formed as an integral part of the tube 15 and serves as a support for the crown gasket 21. This gasket 21 fits between the flange 20 of pendant tube 15 and the crown 22, as clearly shown in Figs. 3 and 4, respectively. Cylindrical core 23, formed integral with the crown 22, extends inwardly from the top of the latter and is provided with a right-hand internal screw-thread 24 to receive the right-hand externally threaded portion 25 of winding stem 26. Crown 22 is further provided with a left-hand internal screw thread 27 which is adapted to receive a corresponding external screw-thread 28 formed upon the locking nut 29. This locking nut 29 is shown in detail in Fig. 7 and is provided with a central opening 30, rectangular in shape and of a size suitable for slidably fitting over the walls 18 of pendant tube 15, as shown in Fig. 6. In this figure the upstanding wall 11 of combined back and center 2 is shown provided with a cylindrical opening 16, the diameter of which opening is the same as the diameter of the bored hole 19 in the pendant tube 15. This opening serves to receive the winding stem material 31, as shown in Figs. 3 and 4, respectively, which material is well known to those skilled in the art of watchcase manufacture and has no bearing on the present invention.

In assembling a watchcase made in accordance with my invention the first step is that of placing the locking nut 29 upon the pendant tube 15 so that the walls 18 of said tube are received by the rectangular central opening 30 of said locking nut. Then the inner end of said tube is rigidly connected to the outer periphery of wall 11 of the combination back and center 2 by the soldered joint 17, as before stated and in such a manner that the hole 19 of said tube is in alinement with opening 16 of said wall, as clearly illustrated by Fig. 6. With the pendant tube 15 thus permanently attached to the wall 11 of combination back and center 2, the locking nut 29 is free to have an axial movement upon said tube between the flange 20 of said tube and said wall 11 but is prevented from rotation upon the tube due to the rectangular central opening 30 thereof engaging the walls 18 of said tube. Then the winding stem 26 is passed into the winding stem material 31 and said material and stem inserted through the opening 16 in wall 11 and into the hole 19 in pendant tube 15. Then crown gasket 21 is placed upon flange 20 of said pendant tube 15. Crown 22 is then attached to the winding stem 26 by screwing the right-hand internal screw thread 24 of core 23 upon the right-hand externally threaded portion 25 of said stem. Next, the movement 12 is placed within the combined back and center 2, as shown in Fig. 1 and the dial 4, gasket 6 and crystal 5 placed thereon in the order mentioned. Bezel 1 is then placed over the wall 11 of combined back and center 2, the pendant tube 15 being received by the opening 32 (Fig. 2) in said bezel and the flange 10 of said bezel engaging the flange 5*a* of crystal 5, as clearly shown in Figs. 1, 2 and 6, respectively. Locking ring 3 is then screwed within the bezel 1 by means of its external screw thread 8 engaging the internal screw thread 7 of said bezel 1. As this ring is screwed home within the bezel 1 it engages the back 2 and forces it upwardly or in a direction towards the crystal 5, thus causing the movement 12 to bear against the dial 4, the dial 4 and the upper edge 14 of wall 11, in turn, against the gasket 6, the gasket 6 in turn against the flange 5*a* of crystal 5 and the flange 5*a* of crystal 5 in turn against one side of flange 10 of bezel 1. By this arrangement of parts a water-tight joint is provided between the combined back and center 2 and the crystal 5 by means of the gasket 6 being tightly wedged therebetween.

To wind the watch or set the hands the crown 22 is brought to the position shown in

Fig. 3 by rotating it in the reverse direction to that of winding. This rotation of the crown 22 causes the locking nut 29 to be unscrewed from the crown, as shown in Fig. 3, whereupon winding can be effected and the hands set.

To effect a waterproof joint between the crown and tube, it is merely necessary to press the crown 22 slightly towards the case and rotate it in a direction opposite to that of winding the watch, to screw the locking nut 29 home within the crown and against the flange 20 of pendant tube 15. When said locking nut 29 is thus screwed home within the crown 22, as shown in Fig. 4, the crown gasket 21 is tightly compressed or wedged between the flange 20 of said pendant tube 15 and the top of said crown 22, thus effecting a water-tight joint between said crown and tube, as will be clearly apparent upon examination of Fig. 4. The usual setting mechanism of the "pull type" is, therefore, not interrupted or modified in its action in any way whatsoever by the waterproof construction of the crown and tube, due to the fact that when the locking nut 29 is disengaged and separated from the crown 22, as shown in Fig. 3, the crown can be manipulated for winding the watch or setting the hands in the usual manner. When winding of the watch or setting of the hands has been accomplished to the satisfaction of the user, all that is necessary to make the crown and tube water-tight is to press against the crown, thus moving it slightly towards the case, due to the natural pump in the stem and rotate the crown in an anti-clockwise direction, or in a direction opposite to that of winding the watch, whereupon the locking nut 29 will be drawn within the crown and against the flange 20 of the pendant tube 15, as above described.

In the event that crystal 5 should become broken, all that is necessary to remove it is to unscrew locking ring 3 from the bezel 1, whereupon said bezel 1 can be removed and a new crystal inserted, the bezel being then replaced and the locking ring 3 again screwed therein, in the manner heretofore explained.

By actual severe tests a watchcase constructed in the foregoing manner has proven to be moisture and dust proof beyond any doubt.

While I have shown and described one particular embodiment of my invention, it is to be understood that I contemplate certain changes and modifications without departing from the scope or spirit thereof as, for example, in Fig. 1*a* I have shown a modified case construction wherein the back and center are shown as two separate parts, the movement 12*a* being locked within the center 2*a* by the customary case screws 12*b* and the back 2*b* having an external screw-thread 2*c* adapted to be received by an internal screw thread 2*d* formed within the bezel 1*a*, as shown. With this construction it is necessary to provide a pliable gasket 6*b* and a thin metal gasket 6*c* between said back 2*b* and center 2*a* in addition to the pliable gasket 6*a* between the center 2*a*, dial 4*a* and crystal 5*b*.

With a construction such as shown in Fig. 1*a*, employing two gaskets 6*a* and 6*b*, it becomes necessary to supply a metal gasket 6*c* between the back 2*b* and the gasket 6*b*, due to the fact that said back, when screwed within the bezel 1*a* would have a tendency to tear the gasket 6*b* without the metal gasket 6*c* being inserted between said gasket and said back. This construction also eliminates the necessity of the locking ring 3 as the back 2*b* serves not only as a back but as a locking member for tightly drawing the bezel 1*a* against the crystal 5*b* as will be clearly apparent from an examination of Fig. 1*a*.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A watchcase of waterproof construction comprising the combination of a cup-shaped combination back and center adapted to receive and support a watch movement, a dial supported by said movement and adapted to have its outer face flush with the edge of said center, a gasket supported by said center and dial, a crystal, a flange on said crystal adapted to rest upon said gasket, a bezel adapted to fit over said center, a flange on said bezel and a locking ring having screw-threaded engagement with said bezel whereby when said ring is screwed home within said bezel it is adapted to engage said back, thereby drawing the flange of said bezel against the flange of said crystal, the flange of said crystal against said gasket, and the gasket against said dial and center to thereby effect a water-tight joint between said crystal and center, substantially as described.

2. A waterproof watchcase construction comprising, in combination, movement holding means adapted to receive and support a watch movement, a bezel adapted to fit over said movement holding means, a crystal, a gasket, means adapted to draw said bezel and movement holding means towards one another to wedge the crystal and gasket therebetween, a pendant tube fixed to said movement holding means and received through an opening in said bezel, a crown, a winding stem carried thereby and adapted to move therewith, a flange on said pendant tube, a gasket located between said flange and said crown, a locking nut capable of axial movement upon said tube but prevented from rotating thereon, an external screw thread on said locking nut and an internal screw thread on said crown whereby when said crown is rotated in an opposite direction to that of winding, said locking nut is drawn within said crown to engage the flange of said tube,

thereby compressing the crown gasket between the tube flange and the crown to effect a water-tight joint between said crown and tube.

3. The combination with a waterproof watchcase, of a waterproof pendant and crown therefor comprising a pendant tube fixed to said case, a winding stem rotatably mounted within the tube, a crown gasket supported by the upper portion of said tube, a crown screwed upon the winding stem, an internal thread formed upon said crown, a locking nut received over said tube and capable of having axial movement thereon while at the same time held against rotation with respect to said tube, an external thread on said nut adapted to be engaged with the internal thread on said crown to thereby compress said gasket between said tube and crown to effect a water-tight joint therebetween.

4. In combination with a watchcase, a waterproof pendant and crown therefor comprising a pendant tube rigidly attached to a part of said case and having a central bore adapted to be in alinement with an opening in said case, a flange formed integral with the outer end of said tube, a locking nut received over said tube and held against rotation thereon but being free for axial movement between said flange of said tube and said case, an external screw thread on the periphery of said nut, a winding stem rotatably mounted within the tube, a crown screwed upon the winding stem, a gasket located between the flange of said tube and said crown and an internal thread upon said crown adapted to be engaged with the external thread of said nut whereby when said nut is screwed home within said crown said gasket will be tightly pressed between said crown and the flange upon said tube to thereby insure a water-tight joint therebetween.

5. The combination with a waterproof watch case, of a waterproof pendant and crown therefor comprising a pendant tube fixed to a part of said case, a winding stem received within the tube, a crown gasket supported by said tube, a crown screwed upon the winding stem, a locking member received over said tube and capable of having axial movement thereon while at the same time held against rotation relative to said tube, means formed upon said crown for adjustable attachment with said nut, means on said nut adapted to engage with the means on said crown to draw said nut within said crown, thereby compressing said gasket between said tube and crown to effect a water-tight joint therebetween.

6. A watchcase having, in combination, a waterproof pendant and crown comprising a pendant member mounted in such a manner as to be integrally connected to a part of the watch casing and provided with a hole bored longitudinally therethrough, a winding stem received within the longitudinal hole in said pendant member, a winding crown connected to and adapted to actuate said winding stem, waterproof means located between said crown and said pendant member, adjustable locking means free to move axially upon said pendant member but held against rotation upon the latter, and means capable of drawing said locking means within said crown to thereby tightly compress said waterproof means between said crown and pendant member to insure a water-tight joint between said crown and last-mentioned member.

7. A watchcase having, in combination, a waterproof pendant and crown comprising a pendant member mounted so as to be integrally connected to a part of the watch casing and provided with a hole extending throughout its length, a winding stem received within the hole in said pendant member, a winding crown detachably connected to and adapted to actuate said winding stem and having a recess, gasket means located between said crown and pendant member, locking means for said crown free to move axially upon said pendant member but held against rotation thereof and means capable of drawing said locking means within said recess when the crown is rotated in a reverse direction to that of winding the watch to thereby tightly wedge said gasket means between said crown and pendent member when a water-tight joint is desired between said crown and pendant member.

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