

[54] WATERTIGHT WATCH CASE

3,479,771 11/1969 Steimann 58/90 R

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[58] Field of Search 58/90 R

[56] References Cited

UNITED STATES PATENTS

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[57]

ABSTRACT

In a watch, the joint between the watch crystal and the frame for said crystal is rendered watertight by placing a gasket therebetween, and the joint between said frame and the inner case body is rendered watertight by placing a second gasket therebetween, means being provided for pressing said crystal toward said frame in an axial or diametral direction.

4 Claims, 4 Drawing Figures

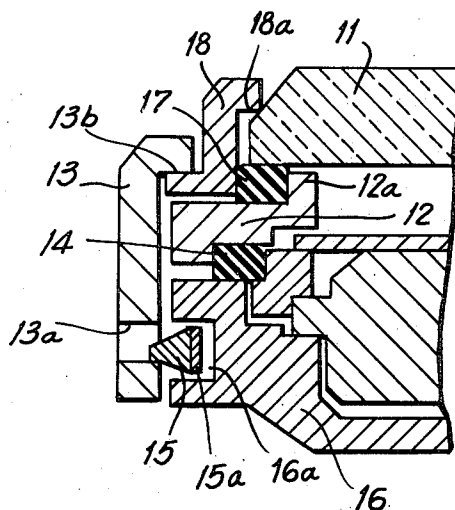


FIG. 1
PRIOR ART

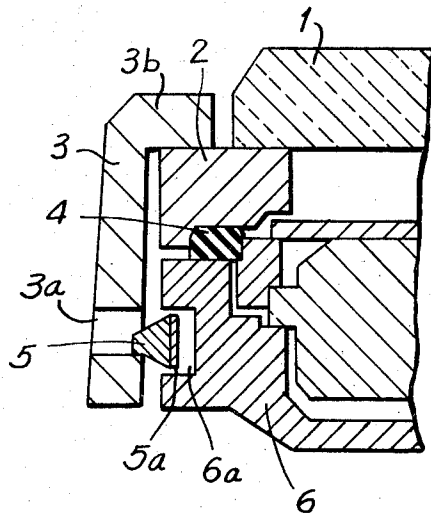


FIG. 2

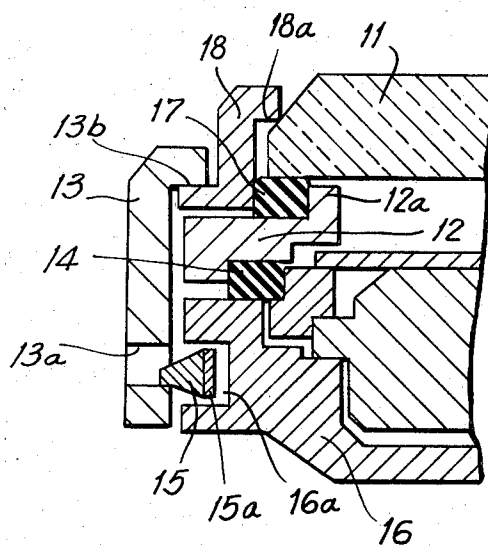


FIG. 3

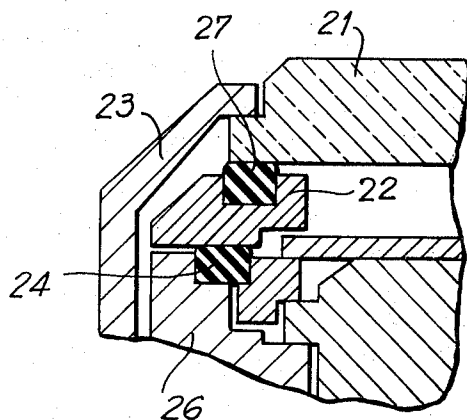
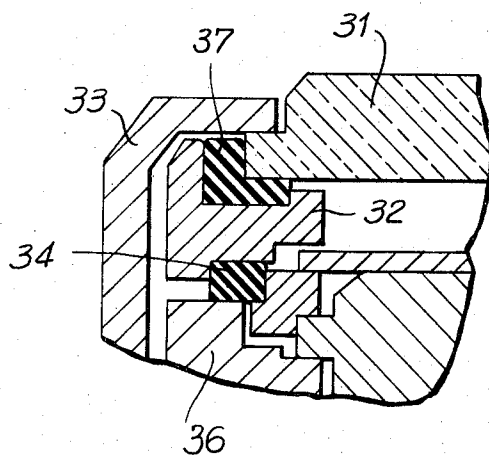


FIG. 4



WATERTIGHT WATCH CASE

BACKGROUND OF THE INVENTION

It has been conventional to join the watch crystal of a watch to the frame for said crystal by means of a material such as cement. Unfortunately, as the cement ages, its dimensions change and its bond to the frame and the crystal may deteriorate to such an extent that water either as liquid or as vapor may penetrate to the interior of the watch. Furthermore, in the event that the watch crystal is broken or otherwise defaced, it becomes necessary to provide a new frame as well as a new crystal or else to go through the labor of removing pieces of crystal still adhering to the frame as well as all traces of cement. As is evident, it would be desirable, especially from the standpoint of cost, to be able to replace the crystal alone and to be able to re-establish a water-tight joint in the replacement process. This point becomes especially important when the crystal and frame are other than circular in shape. At the present time, watches are manufactured in oval shape, square shape, egg shape, etc. For such non-circular shapes, the cost of the frame is greater than for a circular frame, so that the saving in cost resulting from the elimination of the need to replace the frame when a crystal is broken becomes particularly important.

SUMMARY OF THE INVENTION

In a watertight watch case a first gasket is placed between the watch crystal and the frame for said crystal and a second gasket is placed between the frame and the inner case body of said watch case for rendering the watch case watertight. Means are provided for urging the crystal axially toward the inner watch case body in an axial direction, thereby making the joints between the surfaces in contact with said gaskets watertight. Means for pressing said crystal toward said frame may consist of a leaf spring located in a peripheral groove around the inner watch case body, an opening in the outer watch case body and a pin affixed to said leaf spring, it being possible to bring said opening into coincidence with said pin by forcing said outer case body axially toward said inner case body thereby permitting said pin to snap into said opening. The outer case body may be removed from said inner case body by forcing said pin out of said opening, thereby making it possible to move said outer case body in an axial direction away from said inner case body.

An object of the present invention is a watch case of improved water-tightness wherein the watch crystal and a frame are pressed together in a watertight joint and said frame and an inner case body are pressed together in a water-tight joint.

Another object of the present invention is a watch case of improved water-tightness wherein a gasket is provided between the watch crystal and the frame of said watch, a second gasket is provided between the frame of said watch and the inner case body of said watch and means are provided to press said crystal toward said inner case body.

A further object of the present invention is a watch case of improved water-tightness wherein the method of making the waterproof joint between the watch crystal and the frame is applicable to circular glasses, polygonal glasses, elliptical glasses, egg-shaped glasses and free-formed glasses in general.

Yet another object of the present invention is a watch case of improved water-tightness wherein said water-tightness does not deteriorate with age or with change in temperature.

An important object of the present invention is a watch case of improved water-tightness wherein the tendency of the watch crystal to break under shock is decreased.

A significant object of the present invention is a watch case of improved water-tightness wherein in the event of breakage of the watch crystal only the watch crystal need be replaced, thereby reducing the cost of replacement.

Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the invention, reference is had to the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a partial sectional view of a watch case according to the prior art which relies on a cement joint between the watch crystal and the crystal frame for water-tightness;

FIG. 2 is a partial sectional view of an embodiment in accordance with the present invention wherein an outer case body presses upon a bezel which in turn presses upon the crystal of said watch;

FIG. 3 is a partial sectional view of another embodiment of the present invention in which an outer case body presses directly upon a watch crystal; and

FIG. 4 is a partial sectional view of another embodiment of the present invention in which an outer case body presses directly upon a watch crystal and the seal therebetween is radial as well as axial.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A sectional view of a watch in accordance with the prior art is shown in FIG. 1 where watch crystal 1 is held to watch crystal frame 2 by means of cement. Further, frame 2 is pressed against inner water case body 6 by outer case body 3. Between frame 2 and inner case body 6 is positioned gasket 4 of a resilient material such as rubber to provide a water-tight seal between these two elements of the structure. Axial compression by outer watch case 3 is provided as the result of leaf spring 5a having pin 5 on the end thereof which protrudes into opening 3a. Leaf spring 5a having pin 5 on the end thereof is disposed in groove 6a; pin 5 can enter opening 3a only when outer watch case 3 is pressed downward sufficiently. Pin 5 then maintains pressure in an axial direction between members 2 and 6. The principal difficulty with this construction is the cement bond between crystal 1 and crystal frame 2; this bond deteriorates with age and eventually becomes permeable to water or to water vapor. Moreover, as aforesaid, if crystal 1 is broken, it becomes necessary to replace frame 2 as well as crystal 1. Alternatively, all fragments of crystal adhering to frame 2 must be removed and all vestiges of cement must be removed

from the upper surface of frame 2 before a new crystal can be cemented thereto. Obviously, either method of repair involves a substantial expense.

The cement bond of the conventional construction can be replaced with a gasket as shown in FIG. 2. Here gasket 17 rests against the upper surface of frame 12 and the outer surface of shoulder 12a of frame 12. The lower surface of crystal 11 is pressed against gasket 17 by means of pressure from outer case body 13 against bezel 18 which has a shoulder 18a pressing against an upper surface of crystal 11. The axial pressure thus exerted against crystal 11 makes a water-tight joint between crystal 11 and frame 12.

The axial pressure provided by outer case 13 is transmitted through frame 12 against second gasket 14 which rests on an upper surface of inner case body 16. The axial pressure transmitted through outer case body 13 similarly seals the joint between frame 12 and inner case body 16.

An arrangement in which the bezel is eliminated is shown in FIG. 3 wherein outer case body 23, biased downwardly in an axial direction, presses against an upper surface of crystal 21 without an intermediary bezel.

In the embodiment of FIG. 4 frame 32 and gasket 37 make contact with each other in a radial direction as well as in an axial direction. Consequently, a seal is established against the outer periphery of crystal 31 and an inner periphery of frame 32.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above article without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all state-

ments of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. A water-tight watch case comprises a crystal, a frame supporting said crystal, a first gasket between said crystal and said frame for a water-tight joint there between, an inner case body underlying said frame, a second gasket between said frame and said inner case body for a water-tight joint there between and means for biasing said crystal axially inwardly toward said inner case body with an effective force for thereby making said joints water-tight, said biasing means including an outer case body and a compression spring cooperating therewith, said compression spring acting radially on said outer case body for biasing said outer case body cooperatively toward said inner case body, said outer case body being arranged to bias said crystal simultaneously toward said inner case body.

2. The water-tight watch case as claimed in claim 1 wherein said compression spring comprises a leaf spring and a pin affixed thereto, said inner case body including a groove in the periphery thereof for said leaf spring and said outer case body including a recess therein for said pin, said pin being received in said recess when said outer body is biased axially toward said inner case body, for thereby releasably connecting said outer case body to said inner case body for a plurality of water-tight joints there between.

3. The water-tight watch case as claimed in claim 1, said outer case body including a shoulder cooperatively engageable with said crystal for biasing said crystal axially inwardly into said inner case body.

4. The water-tight watch case as claimed in claim 1, said biasing means including a bezel operatively connected to said crystal for biasing said crystal axially inwardly into said inner case body, said outer case body cooperating with said bezel for biasing said bezel axially inwardly into operative connection with said crystal.

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