

SPECIFICATION

Sealed watch case and method of making

- 5 This invention relates to sealed watch cases and to a method of making such watch cases.

The prior art discloses various sealed and water-tight watch cases which utilize gaskets and sealing rings of various materials to seal the back to a case member as well as the bezel and crystal to the case member and to each other and effect a water-tight seal between the various case components.

- 10 The utilization of formed-in-place seals of an epoxy material either in liquid or paste form such as a metal glue has also been suggested to permit greater flexibility in the tolerance of the bezel, the case, the back and the crystal. However, such seals provide a permanent bond which would be destroyed on disassembly of the caseback and/or crystal.

Accordingly, an object of this invention is to provide an improved sealed watch case.

- Another object of this invention is to provide an improved method of producing sealed watch cases.

- A further object of this invention is to provide a new and improved sealed watch case utilizing a formed-in-place flexible gasket of an elastomeric material applied in bead form to each component as necessary, which then becomes an integral part of the component.

- The present invention provides a sealed watch case assembly comprising a watch case member including an upper body portion having downwardly extending peripheral side walls, a first recess extending axially within the upper body portion and a second axial recess in the watch case member formed by the peripheral side walls, said upper body portion having an inwardly projecting ledge portion forming a crystal seat; a crystal having an upper surface to enclose the first recess in the watch case member and downwardly depending side wall portions to engage said seat; a first resilient gasket bead applied to said crystal seat and adapted to receive the downwardly depending sidewall portions of the crystal to effect a seal, said first bead being applied to said seat as an uncured elastomeric bead and then being cured in situ prior to assembly so that it is integral and adherent to said seat but nonadherent to the side wall portions of said crystal when brought into sealed relation therewith during assembly; a caseback member having a base and upwardly extending peripheral walls for insertion into the second recess in the watch case member and having an exterior seat portion protruding outwardly from the walls to receive the downwardly extending side walls of the watch case member; and a second resilient gasket bead applied to at least one of the case member and caseback member to

provide a seal therebetween, said second bead being applied to said one of said members as an uncured elastomeric bead and then being cured in situ prior to assembly so that it is integral and adherent to said one of said members but non-adherent to the other of said members when placed in sealed relation therewith during assembly, whereby the non-adherence of said first and second gasket

- 70 beads to said crystal and said other member respectively enables the watch case assembly to be disassembled for repair and the like and then reassembled without impairing the sealing effectiveness of said gasket beads.
- 80 The present invention also provides the method of making a sealed watch case assembly comprising the steps of providing a watch case member having an upper body portion with a first recess therein and an inwardly protruding crystal seat portion at the base of said recess, and downwardly extending side walls forming a second recess, providing a crystal having an upper surface and a downwardly extending rim portion; applying a first bead of uncured elastomeric material to the crystal seat; providing a caseback member having a base and upwardly extending side walls having an exterior seat portion protruding outwardly therefrom; applying a second bead of uncured elastomeric material to the interior of the watch case member side walls; curing the first and second beads in place so that said first and second beads are integral and adherent to said crystal seat and said watch case member side walls, respectively, but non-adherent to said crystal rim portion and said caseback member side walls, respectively, when brought into sealed relation by inserting the crystal into the first recess so that the rim portion of the crystal engages the first cured bead and inserting the caseback member into the second recess in the case member so that the caseback member side walls engage the second cured bead, whereby the non-adherence of said first and second gasket beads to said crystal rim portion and caseback member sidewalls, respectively, enables disassembly of the watch case assembly for repair and the like and then reassembly without impairing the sealing effectiveness of said gasket beads.

- The beads of adherent resilient compressible elastomeric polymer or copolymer become integral parts of the watch case components.
- 120 With the bead laid down on the crystal seat, disassembly of the crystal for replacement due to scratches, cracking or breakage of the crystal does not impair the effectiveness of the bead when a new crystal is inserted. Furthermore, the bead laid down on the case member in the caseback area or directly onto the caseback becomes an integral part of either watch case component. Disassembly of the case back for any reason such as movement repair does not affect the bead's functionality.

Interchangeability of individual components is possible, i.e. the original assembly of crystal, watch case and caseback can be changed with components of identical configuration without losing effectiveness of the original seal.

The gasket material, such as a flexible single or multicomponent elastomeric material such as urethane, epoxy, etc., is applied in its natural state in the form of a gasket bead to the crystal seat in the watch case member, the caseback seat in the watch case member, and/or the caseback in predetermined locations. The gasket beads are appropriately cured so that they are integral and adherent to the crystal seat, caseback seat, and/or caseback but non-adherent to mating parts of the watch case which will be brought into sealed contact therewith and the parts then assembled together in such sealed contact so that the gasket material provides a fixed flexible gasket between the components of the watch case assembly. This seal is extremely effective and inexpensive to produce.

The invention is further illustrated in the accompanying drawings wherein:

Figure 1 is an exploded cross-sectional view of the components of a watch case in accordance with an embodiment of the invention showing an elastomeric material applied thereto;

Figure 2 is a partial cross-sectional view of the watch case formed by assembling the components shown in *Fig. 1*;

Figure 3 is an exploded cross-sectional view of a second embodiment of the invention;

Figure 4 is a cross-sectional view of the embodiment of *Fig. 3* in an assembled condition;

Figure 5 is an enlarged and exploded cross-section of a portion of *Fig. 1*, and

Figure 6 is an enlarged and exploded cross-section of a portion of *Fig. 3*.

Referring to *Figs. 1* and *2* of the drawings, the sealed watch case 10 shown therein comprises a crystal 11, a watch case member 12, and a caseback 13. A first gasket bead 31 is applied to a crystal seat 19 formed in the upper body portion of the case member 12 and a second gasket bead 18 is applied at the juncture of the upwardly extending caseback peripheral wall 24 and the outwardly protruding exterior seat portion 17 of the caseback 13. The beads 31 and 18, after appropriate curing prior to assembly, provide a fixed, formed-in-place and flexible gasket arrangement between the components 11, 12 and 13 of the watch case to prevent entry of foreign matter into the watch case 10. By appropriate curing prior to assembly the beads 31 and 18 become an integral part of the components to which they are applied and provide effective sealing of the watch case, and yet are not adherent to the crystal 11 and watch case member 12 respectively, so that

disassembly does not impair the effectiveness of these beads 31 and 18 when reassembly occurs. This is a considerable improvement over conventional techniques of relying upon a watch crystal to watch case fit, and a caseback to watch case fit presently employed on non-water resistant watches or a loose gasket arrangement such as O-rings which are used in water resistant watches to seal out foreign matter.

In the embodiment of *Figs. 1* and *2*, it is noted that the bead 31 is readily applied to the crystal seat 19 so that a seal may be formed with the seat 19 and side wall 21 in the watch case member 12 when the crystal 11 is positioned within the recess 22. The crystal 11 includes a downwardly depending rim 27 which normally engages the inwardly projecting ledge portion 28 on the case member 12 which forms the crystal seat. On the other hand, the bead 18 is applied at the juncture between the outwardly projecting seat 17 on the caseback 13 and the upwardly projecting rim 29. The gasket is effective, again after appropriate curing prior to assembly, when the caseback rim 29 is inserted into the aperture 30 in the watch case member 12 with the base 23 of the side wall of case member 12 engaging the bead on the seat 17 and the interior wall 26 forming a seal with the side wall 24.

In the embodiment of *Figs. 3* and *4*, the same numbers are employed to indicate the components thereof since the structure of the watch crystal 11, watch case member 12 and caseback 13 are identical. As before the bead 31 is laid down along the crystal seat 19 and adjacent side wall portion 21 of the case member 12. The bead 31 is of adherent, resilient, compressible elastomer so that disassembly of the crystal for replacement due to scratching, cracking or breaking does not impair the effectiveness of the bead 31 when a new crystal 11 is inserted.

A slightly different arrangement is used for the case to caseback seal. The caseback 13 has an adherent gasket seal applied as a bead 32 which is placed about the interior side wall 26 of the watch case 12 so that the upper portion 33 of the rim 29 contacts said bead 32 when the caseback 13 is inserted into the watch case member 12. A seal is thereby formed by the bead 32 when it is compressed by the mating part of the watch case assembly. The watch case member 12 also includes a grooved portion 34 which is engaged by a protruding portion 35 on the caseback 13 to provide a snap-fit.

The bead material is a flexible, single or multi-component elastomeric material such as urethane, epoxy, etc. It is applied in the form of a gasket bead to selected portions of the watch case assembly 10 and cured thereon to become a permanent part of the selected component. It is selected to be adherent to

the component in its non-cured as well as cured state and non-adherent to another mating part of the watch case after curing when the other part is brought into sealing contact therewith. The bead thickness and width may be varied depending upon the design of the watch case. The beads 18, 31 and 32 shown in the embodiments provide a formed-in-place and flexible gasket arrangement which seals the watch case assembly 10 and becomes an integral part of the selected watch case component so that disassembly or repair of the assembly 10 does not adversely effect the seal, even after reassembly of components.

15 CLAIMS

1. A sealed watch case assembly comprising a watch case member including an upper body portion having downwardly extending peripheral side walls, a first recess extending axially within the upper body portion and a second axial recess in the watch case member formed by the peripheral side walls, said upper body portion having an inwardly projecting ledge portion forming a crystal seat; a crystal having an upper surface to enclose the first recess in the watch case member and downwardly depending side wall portions to engage said seat; a first resilient gasket bead applied to said crystal seat and adapted to receive the downwardly depending sidewall portions of the crystal to effect a seal, said first bead being applied to said seat as an uncured elastomeric bead and then being cured in situ prior to assembly so that it is integral and adherent to said seat but non-adherent to the sidewall portions of said crystal when brought into sealed relation therewith during assembly; a caseback member having a base and upwardly extending peripheral walls for insertion into the second recess in the watch case member and having an exterior seat portion protruding outwardly from the walls to receive the downwardly extending side walls of the watch case member; and a second resilient gasket bead applied to at least one of the case member and caseback member to provide a seal therebetween, said second bead being applied to said one of said members as an uncured elastomeric bead and then being cured in situ prior to assembly so that it is integral and adherent to said one of said members but non-adherent to the other of said members when placed in sealed relation therewith during assembly, whereby the non-adherence of said first and second gasket beads to said crystal and said other member respectively enables the watch case assembly to be disassembled for repair and the like and then reassembled without impairing the sealing effectiveness of said gasket beads.

2. A sealed watch case assembly in accordance with Claim 1, wherein said second gasket bead is applied to the exterior seat

portion on the caseback member at a point where the bead may be engaged by the downwardly extending side walls of the watch case member.

3. A sealed watch case assembly in accordance with Claim 1, wherein the second gasket bead is applied about the interior of the side walls on the watch case member at a point wherein the bead may be engaged by the upper portion of the caseback member walls when the caseback member is inserted into the case member.

4. A sealed watch case assembly in accordance with Claim 1 further including a circumferentially grooved portion on the interior of the watch case member walls and a protruding portion on the exterior of the caseback member walls to engage said grooved portion in a snap fit.

5. The method of making a sealed watch case assembly comprising the steps of providing a watch case member having an upper body portion with a first recess therein and an inwardly protruding crystal seat portion at the base of said recess, and downwardly extending side walls forming a second recess; providing a crystal having an upper surface and a downwardly extending rim portion; applying a first bead of uncured elastomeric material to the crystal seat; providing a caseback member having a base and upwardly extending side walls having an exterior seat portion protruding outwardly therefrom; applying a second bead of uncured elastomeric material to the interior of the watch case member sidewalls; curing the first and second beads in place so that said first and second beads are integral and adherent to said crystal seat and said watch case member sidewalls, respectively, but non-adherent to said crystal rim portion and said caseback member side walls, respectively, when brought into sealed relation by inserting the crystal into the first recess so that the rim portion of the crystal engages the first cured bead and inserting the caseback member into the second recess in the case member so that the caseback member side walls engage the second cured bead, whereby the non-adherence of said first and second gasket beads to said crystal rim portion and caseback member sidewalls, respectively, enables disassembly of the watch case assembly for repair and the like and then reassembly without impairing the sealing effectiveness of said gasket beads.

6. A sealed watch case assembly substantially as hereinbefore described with reference to Figs. 1, 2 and 5 or Figs. 3, 4 and 6 of the accompanying drawings.



the component in its non-cured as well as cured state and non-adherent to another mating part of the watch case after curing when the other part is brought into sealing contact therewith. The bead thickness and width may be varied depending upon the design of the watch case. The beads 18, 31 and 32 shown in the embodiments provide a formed-in-place and flexible gasket arrangement which seals the watch case assembly 10 and becomes an integral part of the selected watch case component so that disassembly or repair of the assembly 10 does not adversely effect the seal, even after reassembly of components.

15 CLAIMS

1. A sealed watch case assembly comprising a watch case member including an upper body portion having downwardly extending peripheral side walls, a first recess extending axially within the upper body portion and a second axial recess in the watch case member formed by the peripheral side walls, said upper body portion having an inwardly projecting ledge portion forming a crystal seat; a crystal having an upper surface to enclose the first recess in the watch case member and downwardly depending side wall portions to engage said seat; a first resilient gasket bead applied to said crystal seat and adapted to receive the downwardly depending sidewall portions of the crystal to effect a seal, said first bead being applied to said seat as an uncured elastomeric bead and then being cured in situ prior to assembly so that it is integral and adherent to said seat but non-adherent to the sidewall portions of said crystal when brought into sealed relation therewith during assembly; a caseback member having a base and upwardly extending peripheral walls for insertion into the second recess in the watch case member and having an exterior seat portion protruding outwardly from the walls to receive the downwardly extending side walls of the watch case member; and a second resilient gasket bead applied to at least one of the case member and caseback member to provide a seal therebetween, said second bead being applied to said one of said members as an uncured elastomeric bead and then being cured in situ prior to assembly so that it is integral and adherent to said one of said members but non-adherent to the other of said members when placed in sealed relation therewith during assembly, whereby the non-adherence of said first and second gasket beads to said crystal and said other member respectively enables the watch case assembly to be disassembled for repair and the like and then reassembled without impairing the sealing effectiveness of said gasket beads.

2. A sealed watch case assembly in accordance with Claim 1, wherein said second gasket bead is applied to the exterior seat

portion on the caseback member at a point where the bead may be engaged by the downwardly extending side walls of the watch case member.

3. A sealed watch case assembly in accordance with Claim 1, wherein the second gasket bead is applied about the interior of the side walls on the watch case member at a point wherein the bead may be engaged by the upper portion of the caseback member walls when the caseback member is inserted into the case member.

4. A sealed watch case assembly in accordance with Claim 1 further including a circumferentially grooved portion on the interior of the watch case member walls and a protruding portion on the exterior of the caseback member walls to engage said grooved portion in a snap fit.

5. The method of making a sealed watch case assembly comprising the steps of providing a watch case member having an upper body portion with a first recess therein and an inwardly protruding crystal seat portion at the base of said recess, and downwardly extending side walls forming a second recess; providing a crystal having an upper surface and a downwardly extending rim portion; applying a first bead of uncured elastomeric material to the crystal seat; providing a caseback member having a base and upwardly extending side walls having an exterior seat portion protruding outwardly therefrom; applying a second bead of uncured elastomeric material to the interior of the watch case member sidewalls; curing the first and second beads in place so that said first and second beads are integral and adherent to said crystal seat and said watch case member sidewalls, respectively, but non-adherent to said crystal rim portion and said caseback member side walls, respectively, when brought into sealed relation by inserting the crystal into the first recess so that the rim portion of the crystal engages the first cured bead and inserting the caseback member into the second recess in the case member so that the caseback member side walls engage the second cured bead, whereby the non-adherence of said first and second gasket beads to said crystal rim portion and caseback member sidewalls, respectively, enables disassembly of the watch case assembly for repair and the like and then reassembly without impairing the sealing effectiveness of said gasket beads.

6. A sealed watch case assembly substantially as hereinbefore described with reference to Figs. 1, 2 and 5 or Figs. 3, 4 and 6 of the accompanying drawings.