A battery cover structure comprising an elastic sealing member having a large-diameter portion and a small-diameter portion, the large-diameter portion forming a peripheral flange portion around the small-diameter portion; and a rigid member joined to the elastic sealing member and located on a side of the small-diameter portion remote from the large-diameter portion, the battery cover adapted for attachment to a battery access hole in a watch case by inserting the elastic sealing member in the hole and engaging the peripheral flange portion with the case. Because of the rigidity imparted by the rigid member, the battery cover structure is substantially free from the risk of pushing the battery cover into the watch case to impede or damage the movement of the watch, or deforming the battery cover itself by excessive force to cause the battery cover to come off the battery case. Furthermore, the cover has an improved appearance. Also, the battery cover structure has a reduced risk of being easily detached and accidentally swallowed by a little child or the like, or to be removed unintentionally and lost by mishandling.
ABSTRACT

A battery cover structure comprising an elastic sealing member having a large-diameter portion and a small-diameter portion, the large-diameter portion forming a peripheral flange portion around the small-diameter portion; and a rigid member joined to the elastic sealing member and located on a side of the small-diameter portion remote from the large-diameter portion, the battery cover adapted for attachment to a battery access hole in a watch case by inserting the elastic sealing member in the hole and engaging the peripheral flange portion with the case. Because of the rigidity imparted by the rigid member, the battery cover structure is substantially free from the risk of pushing the battery cover into the watch case to impede or damage the movement of the watch, or deforming the battery cover itself by excessive force to cause the battery cover to come off the battery case. Furthermore, the cover has an improved appearance. Also, the battery cover structure has a reduced risk of being easily detached and accidentally swallowed by a little child or the like, or to be removed unintentionally and lost by mishandling.
BATTERY COVER STRUCTURE

BACKGROUND OF THE INVENTION

Field of the Invention:

The present invention relates to a battery cover structure in a watch case.

Description of the prior Art:

One example of a battery cover structure for a watch case is disclosed in Japanese Utility Model Application Laid-Open No. Sho 62-55190. This battery cover structure is characterized in that the battery cover is formed of an elastic sealing member which is attached to a battery access hole portion of the case in such a manner that its side wall recess portion has a horizontal fitting margin relative to the battery access hole.

The above described watch case battery cover structure entails certain problems as described below.

1) Since the battery cover is an elastic member, it can be pushed into the watch case by excessive force, which can push the battery inwards and impede or damage the movement, such as to stop the turning of the hands.

2) Since the battery cover is an elastic member, the battery cover itself can be deformed by unintentional pressure thereagainst to become detached from the battery access hole.

3) The battery cover is made of rubber or the like and therefore has a poor appearance.

4) The battery cover and battery can easily be detached, so that there is a risk of allowing a little child to accidentally swallow the battery cover or battery.

5) There is a risk of the battery cover and battery being lost by mishandling.

The present invention seeks to at least minimize the disadvantages and problems associated with prior art structures as described above.

SUMMARY OF THE INVENTION

According to the present invention, there is provided a battery cover structure comprising: an elastic sealing member having a large-diameter portion and a small-diameter portion, said large-diameter portion forming a peripheral flange portion around said small-diameter portion; and a rigid member joined to said elastic sealing member and located on a side of said small-diameter portion remote from said large-diameter portion, said battery cover
adapted for attachment to a battery access hole in a watch case by inserting said elastic sealing member in said hole and engaging said peripheral flange portion with said case.

In a preferred embodiment of the invention, the elastic sealing member has a cavity extending inwardly from said side of said small-diameter portion remote from said large-diameter portion, said cavity communicating with a recess, and said rigid member is provided with a complementary projection which extends into said recess, whereby said elastic sealing member and said rigid member are joined by projection-recess fitting.

In a further preferred embodiment, said elastic sealing member and said rigid member are joined by an adhesive, either in conjunction with or as an alternative to projection-recess fitting.

In yet a further preferred embodiment, an edge portion of said rigid member is provided with an undercut adjacent said case and an outer surface of said rigid member remote from said elastic sealing member is provided with a groove. Said undercut portion is preferably either chamfered or stepped. Preferably, said structure is rotatable in said hole by engagement of a turning implement with said groove and rotating said structure by turning said implement, said case and/or said rigid member being provided with marks which indicate that said undercut portion is in an opening or a closed position of said battery cover. More preferably, a first of said marks indicates that said undercut portion is in an opening position of said battery cover when said undercut portion is adjacent a recessed surface region of the case, which facilitates insertion of an implement between said undercut portion and said case for prying said structure away from said case.

BRIEF DESCRIPTION OF THE DRAWINGS
Preferred embodiments of the present invention are illustrated in the accompanying drawings in which:

Fig. 1 is a cross-sectional view of part of a watch and shows a first embodiment of the watch case battery cover structure of the present invention;

Fig. 2 is a cross-sectional view of a second embodiment of the watch case battery cover structure of the present invention;

Fig. 3 is a cross-sectional view of a third embodiment of the watch case battery cover structure of the present invention;

Figs. 4A and 4B are respectively cross-sectional and bottom views of a fourth embodiment of the watch case battery cover structure of the present invention and show the cover in an
"OPEN" position; and

Figs. 5A and 5B are respectively cross-sectional and bottom views of said fourth embodiment and show the cover in a "CLOSE" position.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Fig. 1 is a cross-sectional view of part of a watch, showing a first embodiment of the watch case battery cover structure of the present invention.

The watch case 1, as shown in Fig. 1, is constituted by a body 2, a case back 3 fixed to the lower part of the body 2, and glass 4 attached to the upper part of the body 2. A battery 7 is accommodated in a battery compartment 7h defined by a main plate 5 and a secondary main plate 6 located above it in the case 1. A dial 8 is provided on the secondary main plate, and hands 9a to 9c are rotatably accommodated in the space between the dial 8 and the inner surface of the glass 4.

A circular battery access hole 10 is formed in the case back 3 in line with the battery compartment 7h, and a portion of the outer surface of the case back around the battery access hole is recessed as shown at 3c. A battery cover 13 is formed of a disklike elastic sealing member 11 having a large-diameter inner portion 11b at its side adjacent the interior of the watch case and a small-diameter outer portion 11s at its opposite side, thus forming a resilient circular flange 11f. The cover 13 further comprises a disklike rigid member 12 made of metal, plastic or the like, joined to the outer side of the elastic sealing member 11. The battery cover 13 is attached to the case through the access hole 10 by engagement of the flange 11f with the inner peripheral surface region of the case back 3 surrounding the battery access hole 10. In the battery cover 13 of this embodiment, the elastic sealing member 11 has a open cavity extending inwardly from its outer side, which communicates with an interior recess portion 11c. The rigid member 12 has a projection 12c at its inner side, which can be pressed into engagement with the recess portion 11c to join the parts 11 and 12 together in a projection-recess fitting manner.

Since the elastic sealing member 11 is backed up with the rigid member 12 made of metal, plastic or the like, and these members are integrally joined, the battery cover cannot be bent or deformed by pressure applied to the cover from the outer side of the case to an such an extent as to adversely affect the movement of the watch and the battery cover itself does not easily become detached unintentionally. Also, the external appearance is improved because the outer side is formed by a metal, a plastic or the like.

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A second embodiment of the watch case battery cover structure of the present invention will next be described with reference to Fig. 2. The battery cover 13 shown in Fig. 2 is the same as that described above with reference to Fig. 1 except for the following. Namely, while in the first embodiment the elastic sealing member 11 and the rigid member 12 are joined solely by projection-recess fitting, in the embodiment of Fig. 2, the mating surfaces of the elastic sealing member 11 and the rigid member 12 are also bonded to each other by an adhesive 14 to strengthen the joint. The functions of this embodiment are the same as those of the above-described first embodiment.

A third embodiment of the watch case battery cover structure of the present invention will next be described with reference to the accompanying Fig. 3. The battery cover 13 shown in Fig. 3 is formed of a disklike elastic sealing member 11, again having a large-diameter portion 11b at its watch case interior side and a small-diameter portion 11s at its outer side, thus forming the flange 11f, and a disklike rigid member 12 made of metal, plastic or the like, and joined to the outer side of the elastic sealing member 11. These two members are joined to each other by an adhesive 14, instead of a projection-recess fitting. Again, this embodiment functions similarly to those described above.

In the foregoing embodiments, to remove the cover, the rigid member 12 is pressed inwardly at its centre to a sufficient extent that its edge region lifts slightly to enable a knife edge or fingernail to be inserted between the edge region and the case and to be used to pry the cover away from the case. Depending upon the hardness of the elastic member 11, the deformation of the rigid member 12 resulting from its being pried away from the case may be such that it cannot be re-used. By using a softer material for the elastic member 11, less force is required and consequently less deformation occurs - however, using a softer material can also reduce the child-proofness of the arrangement.

A fourth embodiment of the watch case battery cover structure of the present invention will next be described with reference to Figs. 4A and 4B, which show a state wherein battery cover 13 in this embodiment is in an "OPEN" position. Figs. 5A and 5B show a state wherein the battery cover 13 in this embodiment is in a "CLOSE" position.

In this embodiment, the disklike rigid member has an undercut 12a formed in its peripheral edge portion adjacent the case back 3. A rectangular groove 12g is formed in the hard member 12 at its outer surface remote from the case back 3 and extends in a direction at a right angle to the direction of the undercut. Markings "OPEN" and "CLOSE"
15 and 16, respectively, are provided in the outer surface of the case back 3 of the watch case, as shown in Fig. 4B. The "OPEN" marking 15 is located adjacent the recess 3c and the "CLOSE" marking 16 is angularly displaced therefrom by 90 degrees.

The method of attaching and detaching the battery cover of the watch case in this embodiment will now be described.

A. Attachment of Battery Cover 13

The battery cover 13 is pushed into the battery access hole 10 in the case back 3 so that the flange 11f engages the inner surface of the case back 3. In this condition, the hard member is held in contact with the outer surface of the case back 3. The edge of a coin or the like is then inserted in the rectangular groove 12g and operated to rotate the battery cover 13 until the undercut portion 12a is adjacent the "CLOSE" mark 16 (see Fig. 5B). In this state, it is relatively difficult to force the battery cover 13 open by inserting the tip of a nail or a knife between the case back 3 and the upper surface of the rigid member 12.

B. Detachment of Battery Cover 13

The edge of a coin or the like is inserted in the rectangular groove 12g and operated to horizontally rotate the cover 13 until the direction of the groove coincides with the "OPEN" mark 15, thereby bringing the undercut 12a adjacent the recess 3c. In this state, the battery cover 13 can be forced open relatively easily by inserting the tip of a nail or a knife between the recessed portion 3c of the case back 3 and the undercut region 12a of the rigid member 12.

Instead of a chamfered undercut as illustrated in Fig. 4A, a stepped undercut may be employed to provide the same function.

The foregoing arrangement enables a relatively hard elastic material to be employed for the member 11, which makes it difficult for a child to pry away from the case when it is in the CLOSE position. However, when the cover is turned to its OPEN position, the undercut makes it relatively easy to pry away from the case without significant deformation of the rigid member, which enables the cover to be re-used. At the same time, the cover is more childproof because it requires a two-part movement - i.e. turning and prying - for a child to be able to remove it.

The present invention has been described with respect to preferred embodiments thereof, but the present invention is not limited to the described embodiments. For example, although a watch case with a case back has been described, the present invention
can also be applied in exactly the same manner to integral type watch cases.

The present invention has numerous advantages, including the following:

(1) According to the present invention, the battery cover structure is substantially free from the risk of pushing the battery cover into the watch case to impede or damage the movement, or deforming the battery cover itself by excessive force to cause the battery cover to come off the battery case. Furthermore, the cover has an improved appearance.

(2) According to the present invention, the battery cover structure has a reduced risk of being easily detached and accidentally swallowed by a little child or the like, or to be removed unintentionally and lost by mishandling.
What is claimed is:

1. A battery cover structure comprising:
   an elastic sealing member having a large-diameter portion and a small-diameter portion, said large-diameter portion forming a peripheral flange portion around said small-diameter portion; and
   a rigid member joined to said elastic sealing member and located on a side of said small-diameter portion remote from said large-diameter portion, said battery cover adapted for attachment to a battery access hole in a watch case by inserting said elastic sealing member in said hole and engaging said peripheral flange portion with said case.

2. A battery cover structure according to Claim 1, wherein said elastic sealing member has a cavity extending inwardly from said side of said small-diameter portion remote from said large-diameter portion, said cavity communicating with a recess, and said rigid member is provided with a complementary projection which extends into said recess, whereby said elastic sealing member and said rigid member are joined by projection-recess fitting.

3. A battery cover structure according to Claim 1, wherein said elastic sealing member and said rigid member are joined by an adhesive.

4. A battery cover structure according to Claim 2, wherein said elastic sealing member and said hard member are further joined by an adhesive.

5. A battery cover structure according to Claim 1, wherein an edge portion of said rigid member is provided with an undercut adjacent said case and an outer surface of said rigid member remote from said elastic sealing member is provided with a groove.

6. A battery cover structure according to Claim 2, wherein an edge portion of said rigid member is provided with an undercut adjacent said case and an outer surface of said rigid member remote from said elastic sealing member is provided with a groove.
7. A battery cover structure according to Claim 3 wherein an edge portion of said rigid member is provided with an undercut adjacent said case and an outer surface of said rigid member remote from said elastic sealing member is provided with a groove.

8. A battery cover structure according to Claim 4, wherein an edge portion of said rigid member is provided with an undercut adjacent said case and an outer surface of said rigid member remote from said elastic sealing member is provided with a groove.

9. A battery cover structure according to Claim 5, wherein said structure is rotatable in said hole by engagement of a turning implement with said groove and rotating said structure by turning said implement and said case and/or said rigid member is or are provided with marks which indicate that said undercut portion is in an opening or a closed position of said battery cover.

10. A battery cover structure according to Claim 6, wherein said structure is rotatable in said hole by engagement of a turning implement with said groove and rotating said structure by turning said implement, and said case and/or said rigid member is or are provided with marks which indicate that said undercut portion is in an opening or a closed position of said battery cover.

11. A battery cover structure according to Claim 7, wherein said structure is rotatable in said hole by engagement of a turning implement with said groove and rotating said structure by turning said implement, and said case and/or said rigid member is or are provided with marks which indicate that said undercut portion is in an opening or a closed position of said battery cover.

12. A battery cover structure according to Claim 6, wherein said structure is rotatable in said hole by engagement of a turning implement with said groove and rotating said structure by turning said implement, and said case and/or said rigid member is or are provided with marks which indicate that said undercut portion is in an opening or a closed position of said battery cover.
13. A battery cover structure according to any one of Claims 9 - 12, wherein a first of said marks indicates that said undercut portion is in an opening position of said battery cover when said undercut portion is adjacent a recessed surface region of said case, which facilitates insertion of an implement between said undercut and said case for prying said structure away from said case.

14. A battery cover structure according to any one of Claims 9 - 13, wherein said undercut is chamfered in cross-section.

15. A battery cover structure according to any one of Claims 9 - 13, wherein said undercut is stepped in cross-section.
Fig. 4A

3 10
3c 12a 12g 12

Fig. 4B

16 CLOSE
15 OPEN
15 12a
3c 12g
13,12

Fig. 5A

3 10
3c 12g 12

Fig. 5B

16 CLOSE
15 OPEN
15 12a
3c 12g
13,12