(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 628 173 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
22.02.2006 Bulletin 2006/08

(21) Application number: **04019016.7**

(22) Date of filing: **11.08.2004**

(51) Int Cl.:
G04B 39/00 *(2006.01)* ***G04B 39/02*** *(2006.01)*
G04D 3/06 *(2006.01)*

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL HR LT LV MK

(71) Applicant: **Martini, Gian Carlo**
43100 Parma (IT)

(72) Inventor: **Martini, Gian Carlo**
43100 Parma (IT)

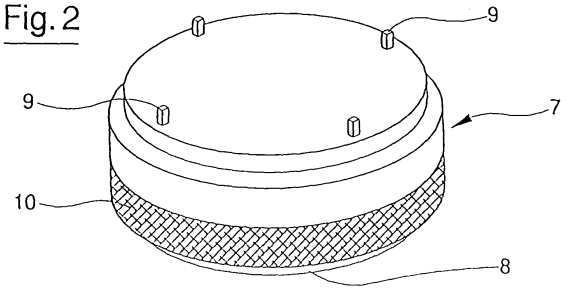
(74) Representative: **Guareschi, Antonella**
c/o Ing. Dallaglio S.r.l.
Viale Mentana 92/C
43100 Parma (IT)

(54) Circular crystal for a watch and a device for mounting and removing the crystal

(57) A circular crystal (5) for a watch or a chronographic or chronometric device (1) has a thread (5a) formed in the thickness of its circumferential edge, adapted to be coupled to a corresponding thread (2a) formed in a case (2) of the watch (1).

A mounting device (7) may be associated to the crystal, which device is formed by a manually graspable member, with an operating surface (8) at its bottom, which is shaped complementary to the surface of the crystal (5) and is made of a rubberlike material or of any material that can provide sufficient friction with the crystal when the latter is screwed on (or off).

Fig. 2



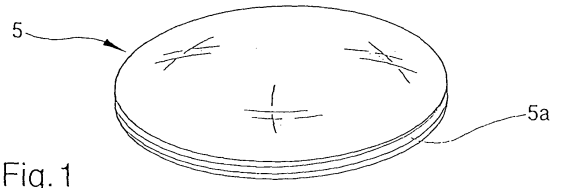
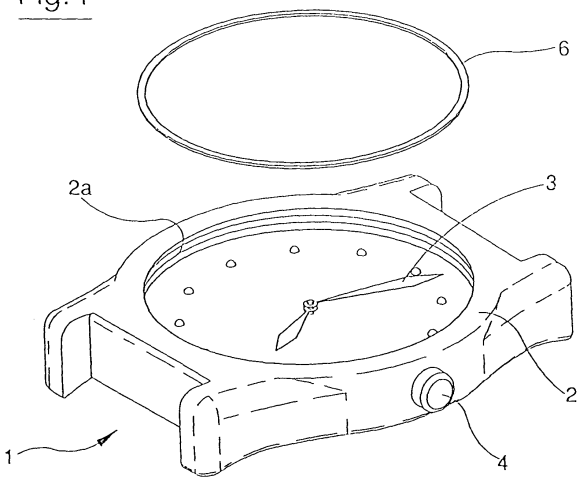


Fig. 1



EP 1 628 173 A1

Description

[0001] This invention relates to a circular crystal for a watch, or for a chronographic or chronometric device, and to an associated crystal mounting or removing device.

[0002] Watches typically comprise a case which contains the watch operating mechanisms and is closed at its bottom by a cover and at its top by a transparent crystal which allows to view the motion of the hands rotating on the dial.

[0003] The transparent crystal, typically made of glass and having a circular perimeter, may be flat or cambered and may further include a gasket for connection thereof with the watch case.

[0004] Nevertheless, the crystal may be only removed by opening the case and taking off the movement, as the crystal is typically inserted in the case opening from the inside and has a rim that internally abuts against the case opening edge. As a result, the crystal cannot be removed alone, but requires the watch to be opened and disassembled.

[0005] In certain embodiments, the crystal is press-fitted from the outside, without the need to open the watch, but may be only removed from the inside, by disassembling the timepiece, with a high risk of irremediably damaging the crystal, which is associated to a particularly delicate nylon gasket.

[0006] The object of the present invention is to obviate the above drawbacks and provide a crystal that may be mounted on a watch and removed therefrom, without requiring any action on the other parts of the watch.

[0007] A further object is to provide this as a simple and cost-effective arrangement.

[0008] These objects are fully achieved by the inventive crystal and crystal mounting device, which are characterized by the contents of the accompanying claims.

[0009] Particularly, the crystal has a thread formed in the thickness of its circumferential edge.

[0010] The crystal, that may be made of glass or plastic, may be mounted on a watch case whose inner edge is threaded or on an unthreaded case, which accommodates an adapter ring therein, with an internal thread for connection to the crystal.

[0011] The mounting device for screwing the crystal on (or off) includes a preferably cylindrical, manually graspable member, with an operating surface at its bottom, which is shaped complementary to the surface of the crystal and is made of a rubberlike material or of any material that can provide sufficient friction with the crystal when the latter is screwed on (or off).

[0012] These and other characteristics will be more apparent from the following description of a preferred embodiment, which is only described by way of example and without limitation in the accompanying drawings, in which:

- Figure 1 is an exploded view showing the crystal, a gasket and the watch case respectively;
- Figure 2 is a view of a mounting device

[0013] Referring to the figures, numeral 1 generally designates a watch, whereof the case 2, the dial with hands 3 and a hand position setting crown 4 are shown. The case defines an opening at its top for receiving a crystal 5 and said opening, which has a circular shape, innovatively has an internal thread 2a which is designed to be coupled with a corresponding thread 5a, formed in the thickness of the lateral surface of the crystal 5.

[0014] The case opening has an annular abutment surface, not shown, which acts as a support for a gasket 6, adapted to be inserted in the case until it abuts against said annular surface, substantially at the base of the thread 2a.

[0015] The crystal 5, which is innovatively threaded, is made of glass or plastic and may have various shapes, substantially flat or cambered, provided it has a circular perimeter, to allow it to be screwed on and off the case 2.

[0016] The gasket 6, which forms a mechanical stop member when the crystal 5 is screwed on, also acts as a dust-and waterproof seal, to preserve the tightness of the watch.

[0017] In accordance with a variant embodiment, not shown, the case 2 may not be internally threaded, in which case it accommodates an internally threaded adapter ring for connection with the crystal.

[0018] The ring preferably also defines an abutment rim or surface for the gasket 6, if this is not already defined by the case.

[0019] The invention has been described herein with particular reference to a watch, but may be extended to any chronographic or chronometric device (e.g. a wrist watch, a pocket watch or a table clock, an alarm clock, etc...).

[0020] The thread 5a formed in the crystal or the adapter ring advantageously allows an easy and fast replacement of the crystal (which is mounted and removed on the same side of the case opening) without the need of disassembling any other part of the watch.

[0021] The crystal may be screwed on and off manually, without using any special tool, nevertheless the Applicant has provided a device 7, which is shown in Figure 2, to facilitate such an operation, which device is substantially composed of a cylindrical member having a bottom surface 8 that is shaped complementary to the crystal 5 and is made of a rubberlike material or of any material capable of providing sufficient friction during the rotary screw on-off motion with the device being manually pressed on the crystal.

[0022] On the face opposite the surface 8, the device 7 may have a plurality of pins 9 for interaction with corresponding recesses (not shown) on the back of the case 2, thereby allowing to screw on and off the rear cover of the watch case.

[0023] Obviously, crystals having considerably different shapes and cambers will require devices with differ-

ent surfaces 8, whereby a special mounting device is associated to each crystal type.

[0024] The device 7 has a knurl 10 on its lateral surface or, according to an embodiment that is not shown, it may have slide-preventing shapes adapted to facilitate a firm grasp by an operator.

Claims

1. A circular crystal (5) for a watch or a chronographic or chronometric device (1), **characterized in that** it has a thread (5a) formed in the thickness of its circumferential edge.

2. A crystal as claimed in claim 1, wherein the crystal (5) is made of glass.

3. A crystal as claimed in claim 1, wherein the crystal (5) is made of plastic.

4. A chronographic or chronometric device (1), **characterized in that** it comprises a crystal (5) as claimed in any claim from 1 to 3.

5. A device as claimed in claim 4, **characterized in that** it comprises a case (2) whose inner edge is threaded (2a) to be coupled to the external thread (5a) of the crystal (5).

6. A device as claimed in claim 5, wherein the case (2) has an annular abutment surface for receiving an annular gasket (6) which acts both as a stop member and as a seal when the crystal is screwed on.

7. A device as claimed in claim 5, wherein an internally threaded ring is snugly fitted in the case (2), for screwing the crystal (5) therein.

8. A device as claimed in claim 7, wherein the ring has an abutment rim or surface, for receiving a sealing gasket.

9. A device (7) device for screwing a crystal (5) on (or off) as claimed in claims 1 to 3, **characterized in that** it includes a manually graspable member, with an operating surface (8) at its bottom, which is shaped complementary to the surface of the crystal (5) and is made of a rubberlike material or of any material that can provide sufficient friction with the crystal when the latter is screwed on (or off).

10. A device as claimed in claim 9, **characterized in that** it has a lateral surface (10) that is knurled or shaped to facilitate manual grasp.

11. A device as claimed in claim 9, wherein, on the side opposite the surface (8) that operates with the crystal (5), it has a plurality of pins (9) for manually screwing on and off the back of a case (2) of the chronographic or chronometric device (1).

Fig. 2

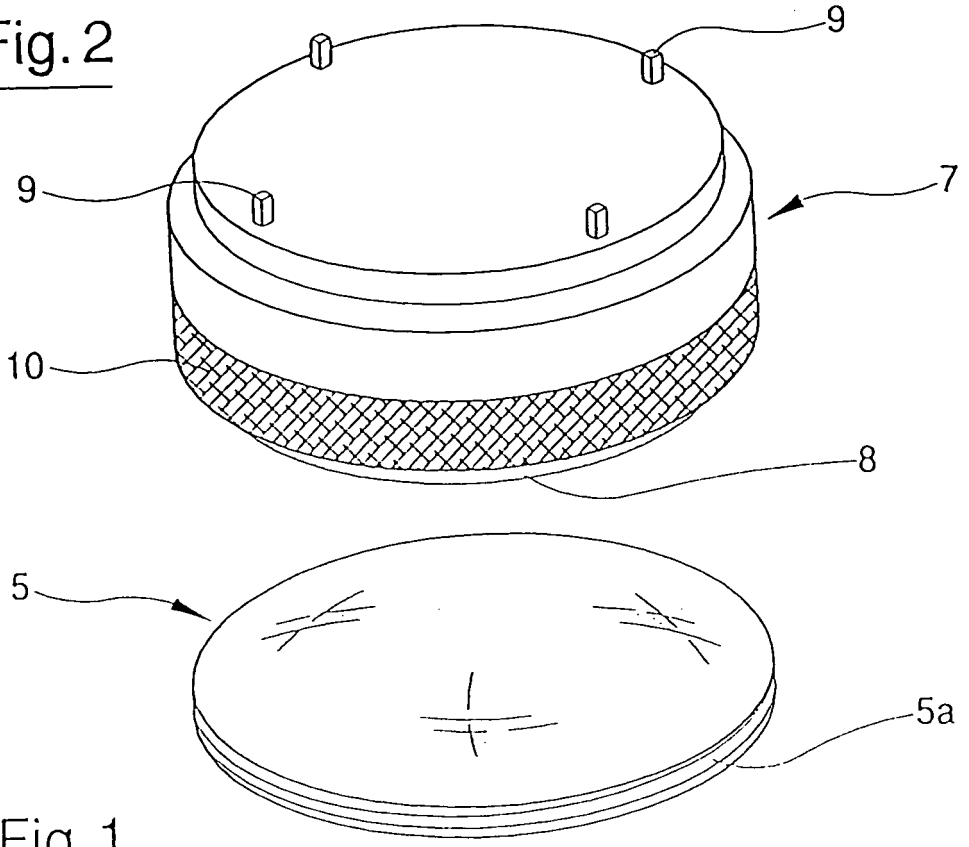
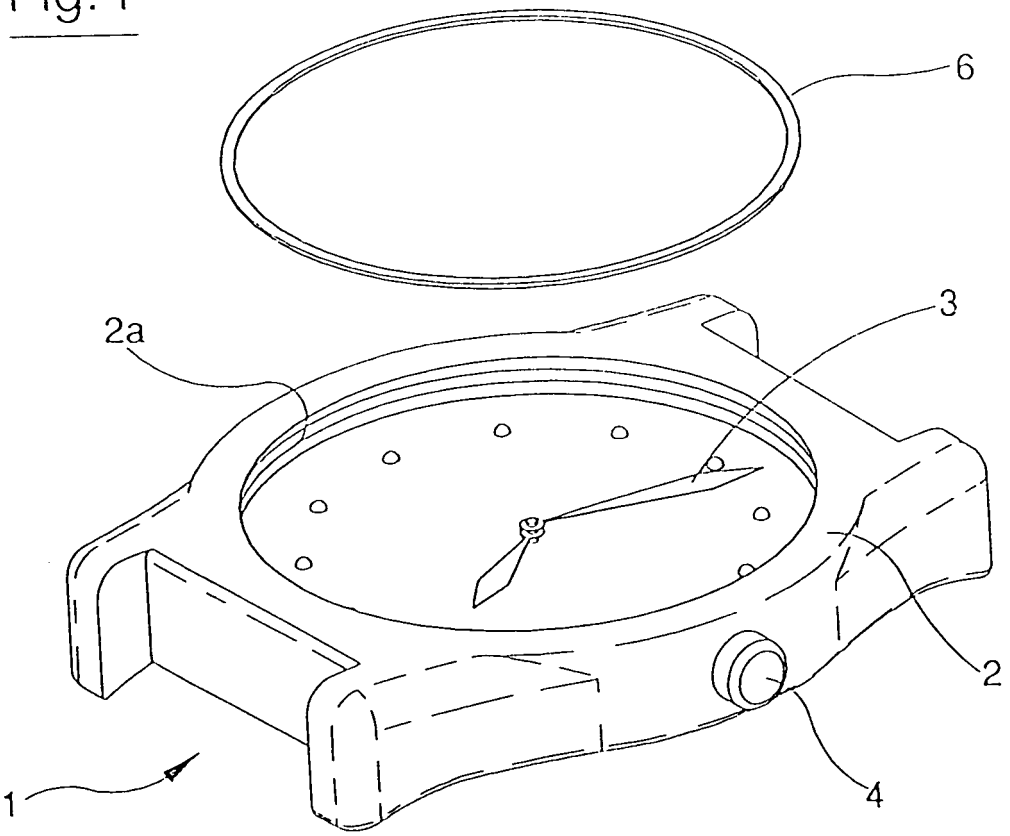


Fig. 1



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 01 9016

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	CH 392 398 A (PIQUEREZ,ERVIN) 29 January 1965 (1965-01-29)	1-6	G04B39/00 G04B39/02
Y	* figures 1-3 * * page 1, line 51 - page 2, line 7 * -----	7,8	G04D3/06
X	CH 192 884 A (PAUL WYLER & CIE) 15 September 1937 (1937-09-15) * figure 1 *	1-6	
A	* page 1, column 2, lines 3-12 * -----	7,8	
Y	US 3 261 159 A (SIMON JOHN ET AL) 19 July 1966 (1966-07-19) * figure 2 *	7,8	
A	* claim 1 * -----	1-6	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

G04B

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
The Hague	9 February 2005	Burns, M

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

European Patent Office

Application Number
EP 04 01 9016

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-8

European Patent Office

LACK OF UNITY OF INVENTION SHEET B

Application Number
EP 04 01 9016

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-8

A circular crystal for a watch or a chronographic or chronometric device incorporating a thread formed in the thickness of its circumferential edge

---

2. claims: 9-11

A device for screwing a crystal on or off incorporating a manually graspable member with an operating surface at its bottom shaped complementary to the surface of the crystal and made of a rubberlike material or or of any material that can provide sufficient friction with the crystal when the latter is screwed on or off

---

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 01 9016

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-02-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CH 392398 A	29-01-1965	CH 260863 A	29-01-1965
CH 192884 A	15-09-1937	NONE	
US 3261159 A	19-07-1966	CH 399335 A	30-04-1965
		GB 1065162 A	12-04-1967

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82