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

(11) EP 2 172 816 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
07.04.2010 Bulletin 2010/14

(21) Application number: **08791729.0**

(22) Date of filing: **28.07.2008**

(51) Int Cl.:
G04B 45/00 *(2006.01)* ***A44C 5/14*** *(2006.01)*
G04B 37/16 *(2006.01)* ***G04B 37/18*** *(2006.01)*

(86) International application number:
PCT/JP2008/063494

(87) International publication number:
WO 2009/017080 (05.02.2009 Gazette 2009/06)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

(30) Priority: **31.07.2007 JP 2007200235**

(71) Applicant: **Namiki Seimitu Houseki Kabushiki Kaisha**
Adachi-ku
Tokyo 123-8511 (JP)

(72) Inventors:
- **RATAJSKI, Michel**
  CH-2504 Bienne (CH)
- **SHIBATA, Susumu**
  Yuzawa-shi
  Akita 012-0855 (JP)
- **SASAKI, Hajime**
  Yuzawa-shi
  Akita 012-0855 (JP)
- **YAGUSHI, Yoichi**
  Tokyo 123-8511 (JP)

(74) Representative: **Schäfer, Matthias W.**
Patentanwalt
Schwanseestrasse 43
81549 München (DE)

(54) WRIST WATCH CASE

(57) [Problem] To realize a construction where the decorated properties and rigidity of a hard wristwatch case are enhanced by a simple configuration change, and no cracking or chipping is generated in the legs of a case frame body when attaching and detaching spring rods for supporting watchbands to provide a hard wristwatch case where the construction for installing a back cover is improved so that the need for brazing a threaded bush is eliminated.

[Means for solution] Decorated members made of a shock-resistant metal provided with retaining holes for spring rods at both ends and protruding piece-like threaded members for engagement are fitted into grooves provided on the 3 o'clock and 9 o'clock side surfaces of the case frame body and cavities, respectively, installation members for the spring rods are embedded and installed in the through-holes provided in the legs of the case frame body so that the installation members are exposed on the inner wall surfaces of the band attachment spaces of the legs, the back cover is installed and fixed to the case frame body by screwing back cover screws into the threaded holes of the threaded members for engagement arranged at the cavities of the case frame body when installing the back cover, and the spring rods are bridged between the retaining holes of the decorated members when attaching the watchbands.

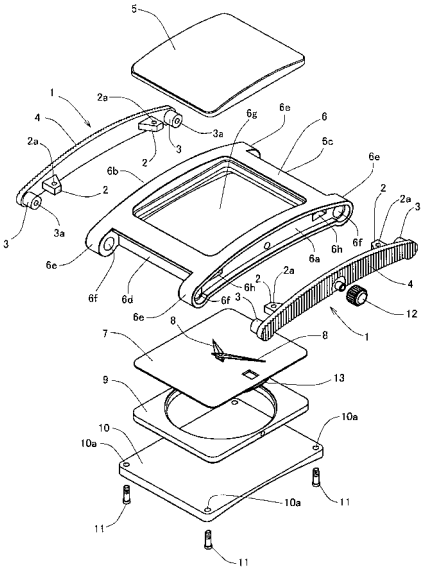


Fig. 1

EP 2 172 816 A1

Description

TECHNICAL FIELD

[0001] The invention relates to a wristwatch case, more specifically to the construction for installing band components and a back cover component onto a case frame body. Furthermore, the invention relates to a decorative construction for enhancing a decorated property of an external case frame body.

BACKGROUND OF THE INVENTION

[0002] In the past, wristwatch case construction generally consisted of a pair of right and left legs in positions relative to a case frame body, and separate watchbands are attached between the aforementioned legs. (See patent references 1 and 2.) In this wristwatch case, an inner wall surface of each leg in the 12 and 6 o'clock sides is provided with a retaining hole for bridging and engaging a spring rod.

[0003]

Patent reference 1: Japanese Unexamined Patent Application Publication No. 07-231802

Patent reference 2: Japanese Unexamined Patent Application Publication No. 10-225309

[0004] One of the wristwatch cases is, for example, shown in Fig. 11 where a case frame body 60 is made of hard materials that are difficult to machine, such as cemented carbide or ceramics. The case frame body 60 made of cemented carbide is directly provided with retaining holes 60f for protruding pins 50a located at the tips of spring rods 50 by subjecting an inner wall surface 60h of each leg 60e to electro-discharge machining.

[0005] In the case of the frame body 60 shown in the aforementioned Figure 11, when fitting or removing the spring rods 50 for attachment or detachment of separate bands, a shock of a pressing force caused by spring elasticity of the protruding pin 50a easily results in a crack R or chipping S around the retaining hole 60f of the leg 60e as shown by an encircled enlarged drawing, often leading to a problem in quality and appearance. The cause of such damage can be said to be not only the physical properties of an easily chipped cemented carbide material but the cause of such damage can also be microcracks in a surface layer where the property was changed from electro-discharge machining. This can be said for ceramics materials as a type of hard materials, meaning that "hard but easily chipped" was a disadvantage of a wristwatch case made of hard materials.

[0006] Moreover, in an easily chipped hard wristwatch case, biting-into construction or a press-fit construction generally used for wristwatch cases made of stainless steel cannot be applied for fixing a back cover 70. Therefore, it was necessary to embed threaded bushes 62 into a back surface side of the case frame body for brazing secured by screwing in screws 71, thus causing problems of the screw-fixing construction of the back cover resulted from low workability for secondary processing and high costs required for electro-discharge machining, ultrasonic hole opening, heat treatment for brazing, etc.

[0007] Therefore, a hard wristwatch case had problems that difficulty in designing a thin-walled case frame body provides limitations to dimensional specifications for the design because it is difficult to make the hard wristwatch case thinner, resulting in the difficulty to obtain sufficient design strength. In particular, damage caused by insufficient strength of the legs for the case frame body to which watchbands are attached was a major problem.

[0008] In order to solve this problem, a construction is proposed in which the protrusions for attaching watchbands are provided perpendicularly at four corners of the back cover as positions corresponding to the retaining holes for the spring rods at the legs of the case frame body, and the retaining hole members for spring rods are integrally formed with a shock-resistant back cover made of a metal. (See patent reference 3.)

[0009] Patent reference 3: Japanese Unexamined Patent Application Publication No. 2004-198183

[0010] However, even the construction shown in patent reference 3 had some problems. That is to say, problems from the viewpoints of machinability, workability, and costs of a case frame body were not yet solved because a construction for installing the back cover to the case frame body was exactly the same as that for installing the back cover with conventional screws and threaded bushes. In addition, there was concern that bending force caused by installing the spring rod results in concentration of bending stress to protrusions located at four corners of the thin-walled back cover, leading to deformation of the corner portions of the back cover, thus adversely affecting the threaded bush.

[0011] Moreover, the construction shown in patent reference 3 is an innovative and excellent construction for attaching the watchband with no visual difference in comparison with a construction of a usual hard wristwatch case. However, from the viewpoint of the design of a hard wristwatch case as an ornament, it was a construction lacking visual decoration with difficulty in realizing a more innovative design.

SUMMARY OF THE INVENTION

Problems to be solved by the invention

[0012] The purpose of this invention is to realize a construction where the decorated properties and the rigidity of a hard wristwatch case are enhanced by changing the configuration simply, and no cracking or chipping is generated in the legs of a case frame body when attaching and detaching spring rods for the watchbands, and further to provide a hard wristwatch case where the construction for installing a back cover is simultaneously improved so that the need for brazing threaded bushes is eliminated.

Means for solving the problems

[0013] In a wristwatch case according to Claim 1 of this invention comprising a case frame body made of hard materials provided with a pair of right and left legs or legs having a shape equivalent to such legs in the relative positions, a cover glass to be installed to a front face side of the case frame body, a back cover to be installed to a back face side of the case frame body, and band attachment spaces for supporting separate watchbands between the aforementioned legs, decorated members made of a shock-resistant metal provided with retaining hole members for spring rods at both ends are fit into grooves provided on the 3 o'clock and 9 o'clock side surfaces of the aforementioned case frame body, the retaining hole members are embedded in the through-holes provided in the legs of the case frame body so that the members for installing the aforementioned spring rods are exposed on the inner wall surfaces of the band attachment spaces of the aforementioned legs, and the watchbands are attached by bridging the spring rods between the retaining holes of the decorated members installed as already stated.

[0014] In a wristwatch case according to Claim 2 of this invention comprising a case frame body made of hard materials provided with a pair of right and left legs or legs having a shape equivalent to such legs in the relative positions, a cover glass to be installed to a front face side of the case frame body, a back cover to be installed by screws to a back face side of the case frame body, and band attachment spaces for supporting separate watchbands between the aforementioned legs, decorated members made of a shock-resistant metal provided with retaining holes for spring rods at both ends and protruding piece-like threaded members for engagement are fitted into grooves provided on the 3 o'clock and 9 o'clock side surfaces of the aforementioned case frame body and cavities corresponding to the threaded members for engagement of the aforementioned case frame body, respectively, the retaining hole members are embedded in the through-holes provided in the legs of the case frame body so that the members for installing the aforementioned spring rods are exposed on the inner wall surfaces of the band attachment spaces of the aforementioned legs, the back cover is installed and fixed to the case frame body by screwing the back cover screws in threaded holes of the threaded members for engagement arranged in the cavities of the aforementioned case frame body when installing the back cover, and further the watchbands are attached by bridging the spring rods between the retaining holes of the decorated members installed as already stated when attaching the watchbands.

[0015] In a wristwatch case according to Claim 3 of this invention, a visible surface portion of a decorated member made of a metal is provided with decoration, such as a decorative pattern, jewel materials, etc., and at least partial or entire portion of the aforementioned decorated members is made of noble metal materials such as gold, platinum, etc.

[0016] In a wristwatch case according to Claim 4 of this invention, a case frame body is formed from powder injection molding technology.

[0017] In a wristwatch case according to Claim 5 of this invention, a case frame body is made of hard alloy materials or cemented carbide materials of TaC-base, TiC-base or WC-base.

[0018] In a wristwatch case according to Claim 6 of this invention, a case frame body is made of zirconium-base ceramics or alumina ceramic materials.

[0019] In a wristwatch case according to Claim 7 of this invention, an internal shape of grooves provided on the 3 o'clock and 9 o'clock side surfaces of a case frame body is similar to an external shape of the aforementioned decorated members made of a metal and fitting of the aforementioned decorated members into grooves reinforces the entire case frame body from the viewpoint of construction.

[0020] In a wristwatch case according to Claim 8 of this invention, threaded members for engagement are provided integrally with decorated members.

[0021] In a wristwatch case according to Claim 9 of this invention, threaded members for engagement are provided separately from decorated members.

Effect of the invention

[0022] As shown above, a wristwatch case according to this invention enables the arrangement of retaining holes for spring rods so as to make them correspond to inner wall surfaces of a pair of right and left legs of the case frame body

through the decorated members made of a shock-resistant metal provided to the grooves of the 3 o'clock and 9 o'clock side surfaces of the case frame body to engage the spring rods for supporting the watchbands by bridging the rods between the retaining holes.

[0023] This mechanism prevents cracking and chipping of the case frame body side caused by attachment and detachment of the spring rods and makes the case frame body resistant to a bending force generated after installing the spring rods to solve the problem of cracking generated in the legs of the case frame body.

[0024] Furthermore, in the wristwatch case according to this invention, the decorated members made of a metal act as reinforcing members from the viewpoint of construction at the 3 o'clock and 9 o'clock sides to eliminate a lack of strength of the case frame body making a hard wristwatch case thinner. Thus acquisition of design strength required by the case frame body enables design of a wristwatch case with a thin wall.

[0025] Moreover, the back cover can be installed by screws to the case frame body very easily without using conventional threaded bushes, and the need for embedding and brazing work of the threaded bushes is eliminated, leading to excellent machinability and workability as well as a reduction in the manufacturing processes.

[0026] Furthermore, in the wristwatch case according to this invention, the decorated members made of a metal in the 3 o'clock and 9 o'clock sides provide decorative patterns with the brilliance of a glossy mirror surface of gold or silver colored noble metals and brilliance of light reflected by diamonds, jewels, etc., and the combination of such brilliance and black or pearl-white colored zirconium ceramic materials used for the case frame body gives such wristwatch cases a high class feeling and novelty design.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

<Embodiment 1>

[0027] Now an example of a wristwatch case construction according to this invention is described in reference to Figures 1 through 6. In the most preferred embodiment of this invention as shown in Figure 1, a case frame body 6 as a timepiece case is a basic body in which watch parts are built, a cover glass 5 is installed to a front side of the case frame body 6, a set of watch machinery consisting of watch hands 8, a dial 7, a movement 13 and a movement holder 9 is assembled into an interior of an internal space 6g from a back surface side, further a back cover 10 is fixed to the case frame body 6 by screwing screws 11 into threaded holes 2a of threaded members for engagement 2 provided to decorated members 1 to assemble as a wristwatch case 100 provided with airtightness, and a construction for installing the decorated members 1 arranged to 3 o'clock and 9 o'clock sides is a special feature of this embodiment.

[0028] Black zirconium-base ceramic raw materials formed from powder injection molding technology used for the case frame body 6 in this embodiment can be changed to sintered materials composed of alumina-base or zirconium-base white ceramics or to cemented carbide or hard materials formed using any one of sintered alloy materials of TaC-base, TiC-base, WC-base, etc. In addition, a portion of a visible surface 4 (decorated surface) of the decorated members 1 made of a metal can be decorated by decorative patterns, jewel materials, etc., and at least partial or entire bodies of the aforementioned decorated members are made of noble metal materials such as gold and platinum. Furthermore, the back cover 10 is formed as a shock-resistant metallic member made of general stainless steel and the like.

[0029] The case frame body 6 is a circular and rectangular case frame body consisting of the 3 o'clock and 9 o'clock sides and 12 o'clock and 6 o'clock sides basically designed as a framework for a wristwatch case, legs 6e are relatively located in the two pairs of right and left positions, namely four positions, in both ends of a 12 o'clock to 6 o'clock orientation, and installation spaces 6c and 6d (generally this portion is called "fork" as a specific watch term) for spring rods for supporting watchbands not illustrated in Figure 1 between the aforementioned pair of right and left legs 6e and 6e are provided to form the case frame body.

[0030] The back cover 10 is formed in a flat plate shape having a contour capable of being fitted and fixed in an entire opening (inner space 6g) located at a back side of the case frame body 6 other than legs 6e provided to the aforementioned four places. In order to assume an assembly of a wristwatch case using the abovementioned components as a basic form and to bridge and engage the spring rods, the decorated members 1 made of a shock-resistant metal are installed into the grooves 6a and 6b of the case frame body.

[0031] An example of the decorated members 1 is shown in Figure 2. As shown in Figure 2, a visible surface 4 of the decorated member 31 made of noble metal materials is provided with a decorative pattern having a stripe-like concavo-convex shape, an opposite surface of the decorative pattern is provided with spring rod installation members 3 like cylinders at both ends, and threaded members for engagement 2 are provided inside the two spring rod installation members. Furthermore, a spring rod retaining hole 3a is arranged at a central position of the spring rod installation member 3, and the threaded member 2 located inward from the installation member is also provided with threaded hole 2a.

[0032] These decorated members 1 are fitted to the grooves 6a and 6b provided on the 3 o'clock and 9 o'clock sides of the case frame body 6 from directions of arrows E and F shown in Figure 3. As for the grooves of the case frame body 6 already assembled with the decorated members 1, external shapes of the aforementioned decorated members

1 made of a metal are fitted to the internal shapes of the grooves provided on the 3 o'clock and 9 o'clock sides with similar shapes as the external shapes so that the aforementioned decorated members 1 completely fill the interiors of the grooves 6a and 6b in a manner where the bottoms of the decorated members are fully in contact with the internal surfaces of the grooves as shown in Figure 5. Thus, a construction is obtained where the entire case frame body 6 designed to be thinner is reinforced by the fitted decorated members 1 made of metal.

[0033] At this time, the spring rod installation members 3 of the aforementioned decorated members 1 are simultaneously fitted into through-holes 6f provided to a pair of right and left legs 6e of the case frame body 6, and the aforementioned threaded members for engagement 2 are engaged in cavities 6h of the case frame body 6 in a similar way.

[0034] Thus, as shown by a 9 o'clock side of the case frame body 6 in Figure 4, the aforementioned spring rod installation members 3 with the spring rod retaining holes 3a positioned in the centers of the installation members are passed through the through-holes 6f of the legs 6e of 9 o'clock side and are exposed on an inner wall surface of the band attachment space 6c.

[0035] In a similar way, the decorated member 1 of 3 o'clock side is fitted to the case frame body 6 from a direction of an arrow G, and then screws 11 for engaging the back cover 10 are inserted through holes 10a of the back cover 10 and are screwed in the threaded holes 2a of the threaded members for engagement 2 arranged in cavities 6h of the aforementioned case frame body 6 to install and fix the back cover 10 to the case frame body 6.

[0036] Figure 6 shows a cross-sectional view of a screw locking construction of the back cover 10 using the threaded members for engagement 2. As shown in Figure 6, the decorated member 1 of which visible surface 4 is provided with a decorative pattern is fitted and fixed to the groove 6b of the case frame body 6, and simultaneously the threaded member 2 integrally formed is inserted into the cavity 6h of the case frame body 6. The threaded members for engagement 2 with the threaded holes 2a are penetrated through the case frame body 6 toward an inner space side, and the screws 11 are screwed in the threaded holes through the holes 10a of the back cover 10 to fix the back cover 10.

[0037] In addition, as shown in Figure 5, the exposed surfaces of the spring rod installation members 3 of the decorated members 1 are assembled by being fitted in the inner walls of the right and left legs 6e of the case frame body 6 so that the exposed surfaces of the rod installation members are not protruded from the surfaces of the legs to keep the surfaces even with the surfaces of the legs. Therefore, the assembly can be performed with a same appearance as a form of legs of a normal case frame body without distinctiveness from the viewpoint of design.

[0038] Thus an assembly construction is obtained where the decorated members 1 are mechanically fixed in the grooves of the case frame body 6 completely, and the case frame body 6 can be only disassembled by removing the screws 11 of the back cover 10. This assembly construction is important for designing an airtight (waterproof) mechanism using a gasket.

[0039] Furthermore, when the decorated member 1 and the threaded members for engagement 2 are integrally formed, the spring rod installation members 3 arranged in the decorated members 1 can be firmly fixed to the case frame body 6 by a screw locking the back cover 10, thus the spring rod installation members 3 can sufficiently withstand pressing forces due to spring elasticity at the time of spring rod installation.

[0040] In this embodiment, although it is assumed that a watchband is installed by bridging the spring rod, it is also possible to adopt an installation construction where the watchbands are fixed by screws. For example, as shown by an exploded view in Figure 7, when the decorated member 21 and the threaded members for engagement 22 are separately manufactured, it is possible that the threaded members for engagement 22 are fitted and fixed or attached with adhesives to the cavities 6h of the case frame body 6, that the decorated members 21 are bonded to the case frame body 6 by brazing or with adhesives, or that a pin or a screw is inserted through an inserting hole 3b of the decorated member 21 to fix the watchband with the pin or the screw. That is to say, wristwatch case constructions according to this invention can be realized by various installation methods.

<Embodiment 2>

[0041] Now another example of a wristwatch case construction according to this invention is described in reference to Figures 8 through 10. In the other embodiment of this invention as shown in Figure 8, a case frame body 36 as a wristwatch case is a basic body in which watch parts are built, a cover glass 35 is installed to a front side of the case frame body 36, a set of watch machinery consisting of watch hands 8, a dial 37, a movement (not illustrated) and a movement holder 39 is assembled into an interior of an internal space 36g from a back surface side, further a back cover 40 is fixed to the case frame body 36 by screwing screws 11 in threaded holes 32a of threaded members for engagement 32 provided to front side cavities 36h of the case frame body 36 to assemble as a wristwatch case 200 is airtight, and a construction for installing the decorated members 31 arranged on the 3 o'clock and 9 o'clock sides is a special feature of this embodiment.

[0042] The white zirconium-base ceramic raw materials used for the case frame body 36 in this embodiment can be changed to sintered materials composed of alumina-base white or zirconium-base black ceramics or to cemented carbide or hard materials formed using any one of sintered alloy materials of TaC-base, TiC-base, WC-base, etc. In addition, a

portion of a visible surface 4 (decorated surface) of the decorated members 31 made of a metal can be decorated by decorative patterns, jewel materials, etc., and at least partial or entire bodies of the aforementioned decorated members 31 are made of noble metal materials such as gold and platinum. Furthermore, the back cover 40 is formed as a shock-resistant metallic member made of general stainless steel and the like.

[0043] The case frame body 36 is a circular round-shaped case frame body consisting of the 3 o'clock and 9 o'clock sides and 12 o'clock and 6 o'clock sides basically designed as a framework for a wristwatch case, legs 36e are relatively located in the two pairs of right and left positions, namely four positions, at both ends of the 12 o'clock to 6 o'clock orientation as shown in Figure 8, and installation spaces 36c and 36d (generally this portion is called "fork" as a specific watch term) for spring rods 50 for supporting watchbands not illustrated between the aforementioned pair of right and left legs 36e and 36e are provided to form the case frame body.

[0044] The back cover 40 is formed in a flat plate shape with a contour capable of being fitted and fixed in an entire opening (inner space 36g) located at a back side of the case frame body 36 other than legs 36e provided to the aforementioned four places. In order to assume an assembly of a wristwatch case using the abovementioned components as a basic form and to bridge and engage the spring rods, the decorated members 31 made of a shock-resistant metal are installed into the grooves 36a and 36b of the case frame body.

[0045] The decorated members 31 are made of noble metal materials, the visible surfaces 4 of the decorated members 31 are provided with a decorative patterns of stripe-like concavo-convex shape, and both ends of an opposite surface of the decorative pattern are provided with cylinder-like spring rod installation members 3. Furthermore, spring rod retaining holes 3a are arranged in the central positions of the spring rod installation members 3.

[0046] These decorated members 31 are fitted into the grooves 36a and 36b provided on the 3 o'clock and 9 o'clock sides of the case frame body 36 from the directions of arrows K and L shown in Figure 9. As for the grooves of the case frame body 36 already assembled with the decorated members 31, the external shapes of the aforementioned decorated members 31 made of a metal are fitted to internal shapes of the grooves provided on the 3 o'clock and 9 o'clock sides with similar shapes as the external shapes so that the aforementioned decorated members 31 completely fill the interiors of the grooves 36a and 36b in a manner where the bottoms of the decorated members are fully in contact with internal surfaces of the grooves as shown in Figure 10. Thus a construction is obtained where the entire case frame body 36 designed to be thinner is reinforced by the fitted decorated members 31 made of metal.

[0047] At this time, the spring rod installation members 3 of the aforementioned decorated members 31 are fitted into through-holes 36f provided to a pair of right and left legs 36e of the case frame body 36, and the aforementioned separately manufactured threaded members for engagement 32 are engaged into cavities 36h of a bottom side of a bezel 30 of the case frame body 36.

[0048] Thus, as shown by band attachment spaces 36d of 9 o'clock side legs 36e of the case frame body 36 in Figure 10, the spring rod retaining holes 3a located at centers of the aforementioned spring rod installation members 3 are passed through the through-hole 6f of the legs 6e of 9 o'clock side and become exposed on inner wall surfaces of the band attachment spaces 36d.

[0049] Furthermore, since the aforementioned separately manufactured threaded members for engagement 32 are engaged in the cavities 36h of the bottom side of the bezel 30 of the case frame body 36, the back cover 40 is installed and fixed to the case frame body 36 by screwing the screws 11 for engaging the back cover 40 in threaded holes 32a of the threaded members for engagement 32 arranged in the cavities 36h of the aforementioned case frame body 36 through holes 40a of the back cover 40.

[0050] The threaded members for engagement 32 having the threaded holes 32a are penetrated through the case frame body 36 toward an inner space 36g, and the screws 11 are screwed in the threaded holes 32a through the holes 40a of the back cover 40 to fix the back cover 40.

[0051] Thus an assembly construction is obtained where installation of the back cover 40 does not require drilling or brazing work for embedding threaded bushes in the case frame body 36, and the back cover 40 can be fixed by screwing the screws 11 in the threaded holes 32a of the engaging members 32 only after fitting the threaded members for engagement 32 in the cavities 36h of the case frame body 36. This assembly construction is important for designing an airtight (waterproof) mechanism using a gasket.

[0052] As shown by an exploded view in Figure 8, even if the decorated members 31 and the threaded members for engagement 32 are manufactured separately, it is possible that the threaded members for engagement 32 are fitted into the cavities 36h of the case frame body 36 for fixing or attaching with adhesives, and that the decorated members 31 are bonded to the case frame body 36 by brazing or using adhesives to be fixed with watchbands using screws. That is to say, wristwatch case constructions according to this invention can be realized in various installation methods.

[0053] As described above, the watchband installation construction for a wristwatch case according to this invention enables to fit protruding pins 50a of the spring rods 50 in the retaining holes 3a of the spring rod installation members 3 and to bridge the spring rods 50 between the retaining holes 3a to engage the rods as shown in Figure 8 (only the 6 o'clock side illustrated with dotted line). Since this spring rod installation members 3 are made of shock-resistant metallic materials as stated above and are integrally formed with the decorated members 31, cracking and chipping at portions

of the legs 36e of the case frame body 36 due to attachment and detachment of the spring rods 50 do not occur.

[0054] Furthermore, the threaded members for engagement 32 can be easily provided to the cavities 36h of the bottom side of the bezel 30 of the case frame body 36 as shown in Figure 8. Moreover, since the cavities 36h can be easily injection-molded on an external surface of the case frame body 36 using powder injection molding technology, work processes where the case frame body is directly provided with holes by spot facing using a conventional electro-discharge machining method, and where threaded bushes are bonded by brazing, are not required. In addition, it is not necessary to directly provide the legs of the case frame body with retaining holes for the spring rods.

[0055] Furthermore, since the 3 o'clock and 9 o'clock sides, including the legs of the case frame body, can be reinforced by the decorated members, strength of the entire case frame body is increased, and generation of cracking and chipping in the legs of the case frame body due to bending force generated after watchband installation can be prevented.

[0056] The abovementioned technical terms and expressions were used only for description and do not limit the features of this invention at all. For example, a pair of right and left legs includes legs having shapes equivalent to them. In addition to this, even usage of limited terms and expressions does not mean intention to exclude embodiments equivalent to those of the abovementioned invention. Therefore, various changes can be added within the range of this invention that requires patent right.

Industrial Applicability

[0057] This invention relates to a wristwatch case equipped with a case frame body made of hard materials for the purpose of realizing decoration using noble metals and jewelry design.

Brief Descriptions of Drawings

[0058]

Figure 1 is an exploded perspective view showing a wristwatch case relating to an embodiment of this invention by developing each component.

Figure 2 is a perspective view showing a shape of decorated members to be installed to the wristwatch case shown in Figure 1.

Figure 3 is a perspective view describing the assembly of the decorated members and a case frame body of the wristwatch case shown in Figure 1.

Figure 4 is a perspective view describing the assembly of the decorated members, a case frame body of the wristwatch case, and a back cover shown in Figure 1.

Figure 5 is an external perspective view showing a completed condition after assembling the wristwatch case shown in Figure 1.

Figure 6 is a cross-sectional view for describing a screw locking construction of threaded members for engagement and a back cover in the wristwatch case shown in Figure 1.

Figure 7 is a perspective view for describing the assembly of each of decorated members and threaded members for engagement of which construction is partially different from the wristwatch case shown in Figure 1.

Figure 8 is an exploded perspective view showing a wristwatch case relating to another embodiment of this invention by developing each component.

Figure 9 is a perspective view for describing the assembly of the case frame body of the wristwatch case, the decorated members, and the back cover shown in Figure 8.

Figure 10 is an external perspective view showing a completed condition after assembling the wristwatch case shown in Figure 8.

Figure 11 is a view for describing constructions for installing spring rods and a back cover in a construction for a conventional wristwatch case.

Description of items

[0059]

1, 21 and 31	Decorated members
2, 22 and 32	Threaded members for engagement
2a, 22a, 32a, and 62a	Threaded holes
3	Spring rod installation member
3a and 60f	Retaining holes
3b	Inserting holes

4	Visible surface (decorated surface)
5 and 35	Cover glasses
6, 36 and 60	Case frame bodies
6a, 36a, and 60a	Side grooves in the 3 o'clock side
6b, 36b, and 60b	Side grooves in the 9 o'clock side
6c, 36c, and 60c	Band attachment spaces for the 12 o'clock side
6d, 36d, and 60d	Band attachment spaces for the 6 o'clock side
6e, 36e, and 60e	Legs
6f and 36f	Through-holes
6g, 36g, and 60g	Inner spaces
6h and 36h	Cavities
7 and 37	Dials
8	Watch hands
9 and 39	Movement holders
10, 40, and 70	Back covers
10a, 40a, and 70a	Holes
11 and 71	Screws
12	Winding crown
13	Movement
30	Bezel
50	Spring rods
50a	Protruding pins
62	Threaded bushes
100 and 200	Wristwatch case

Claims

1. A wristwatch case, comprising:

a case frame body made of hard alloy material provided with a pair of right and left legs or legs having a shape equivalent to such legs in relative positions;
a cover glass to be installed to a front side of said case frame body;
a back cover to be installed to a back side of said case frame body; and
band attachment spaces for supporting separate watchbands between said legs,
characterized in that decorated members made of a shock-resistant metal provided with retaining holes for spring rods at both ends are fitted in grooves provided on the 3 o'clock and 9 o'clock sides of said case frame body, installation members for said spring rods are embedded and installed into through-holes provided to said legs of said case frame body so that said installation members are exposed on the inner wall surfaces of said band attachment spaces for said legs, and
said spring rods are bridged and fixed between said retaining holes of said installed decorated members at a time of installing watchbands.

2. A wristwatch case, comprising:

a case frame body made of hard material provided with a pair of right and left legs or
legs having a shape equivalent to such legs in relative positions;
a cover glass to be installed to a front side of said case frame body;
a back cover to be installed to a back side of said case frame body; and
band attachment spaces for supporting separate watchbands between said legs,
characterized in that decorated members made of a shock-resistant metal provided with retaining holes for spring rods at both ends and protruding piece-like threaded members for engagement are fitted in grooves provided on the 3 o'clock and 9 o'clock sides of said case frame body and in cavities corresponding to threaded members for engagement of said case frame body respectively,
installation members for said spring rods are embedded and installed to through-holes provided to said legs of said case frame body so that said installation members are exposed on inner wall surfaces of said band attachment spaces for said legs,
said back cover is installed and fixed to said case frame body by screwing screws for engaging said back cover

in threaded holes of threaded members for engagement arranged in said cavities of said case frame body at a time of installing said back cover, and
said spring rods are bridged and fixed between said retaining holes of said installed decorated members at a time of installing watchbands.

3. A wristwatch case according to Claim 1 or Claim 2, wherein visible surface portions of said decorated members made of a metal are provided with a decorative patterns or jewelry decoration with jewel materials etc., and at least partial or entire bodies of said decorated members are made of noble metal materials such as gold, platinum, etc.

4. A wristwatch case according to Claim 1 or Claim 2, wherein said case frame body is formed using powder injection molding technology.

5. A wristwatch case according to Claim 1 or Claim 2, wherein said case frame body is made of hard alloy materials or cemented carbide alloy materials of TaC-base, TiC-base or WC-base.

6. A wristwatch case according to Claim 1 or Claim 2, wherein said case frame body is made of zirconium-base ceramics or alumina-ceramics materials.

7. A wristwatch case according to Claim 1 or Claim 2, wherein an internal shape of grooves provided on the 3 o'clock and 9 o'clock side surfaces of said case frame body is similar to an external shape of said decorated members made of a metal, and fitting of said decorated members into grooves provides a construction that reinforces an entire case frame body.

8. A wristwatch case according to Claim 2, wherein said threaded members for engagement are integrally provided with said decorated members.

9. A wristwatch case according to Claim 2, wherein said threaded members for engagement are separately provided with said decorated members.

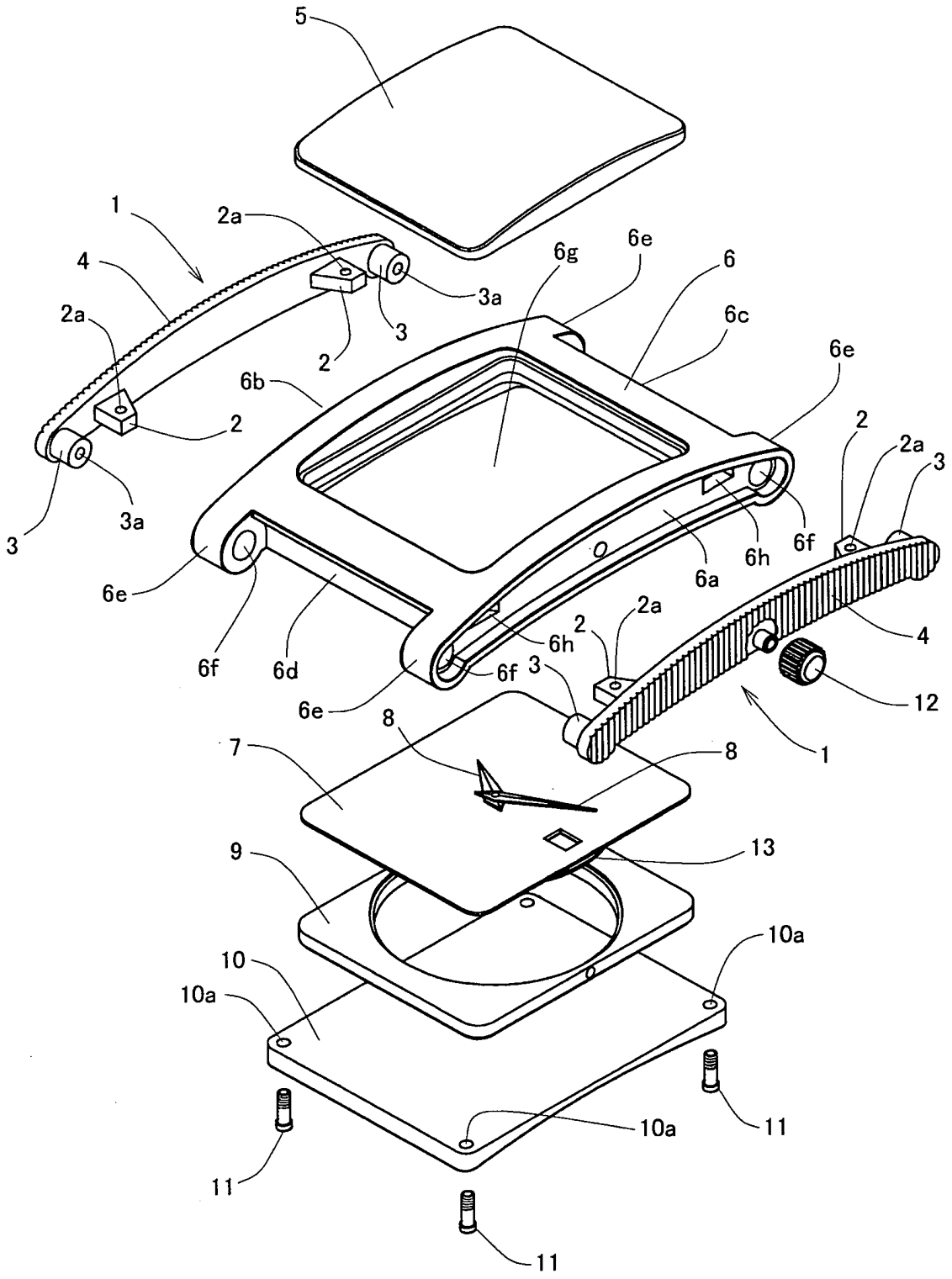

5
1
2a
4
2a
2
3a
3
6g
6e
6
6c
6b
6e
2
2a
3
3
3a
2
6h
6f
6a
6e
6f
6d
6h
6f
6e
2
2a
4
3
12
1
8
8
7
13
9
10a
10
10a
10a
11
11
11

Fig. 1

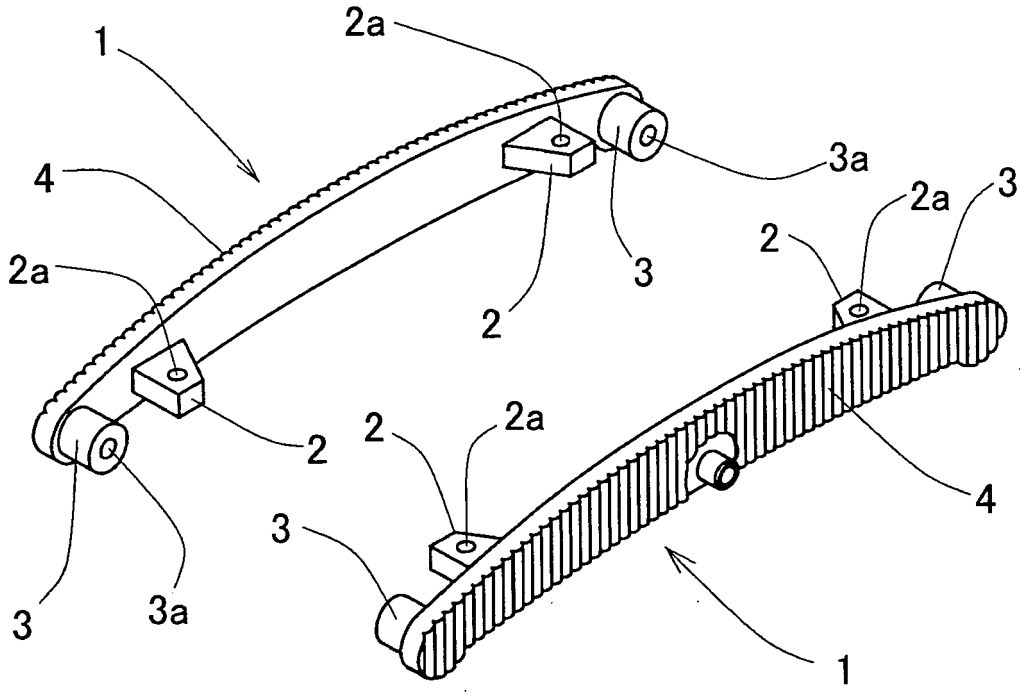


Fig. 2

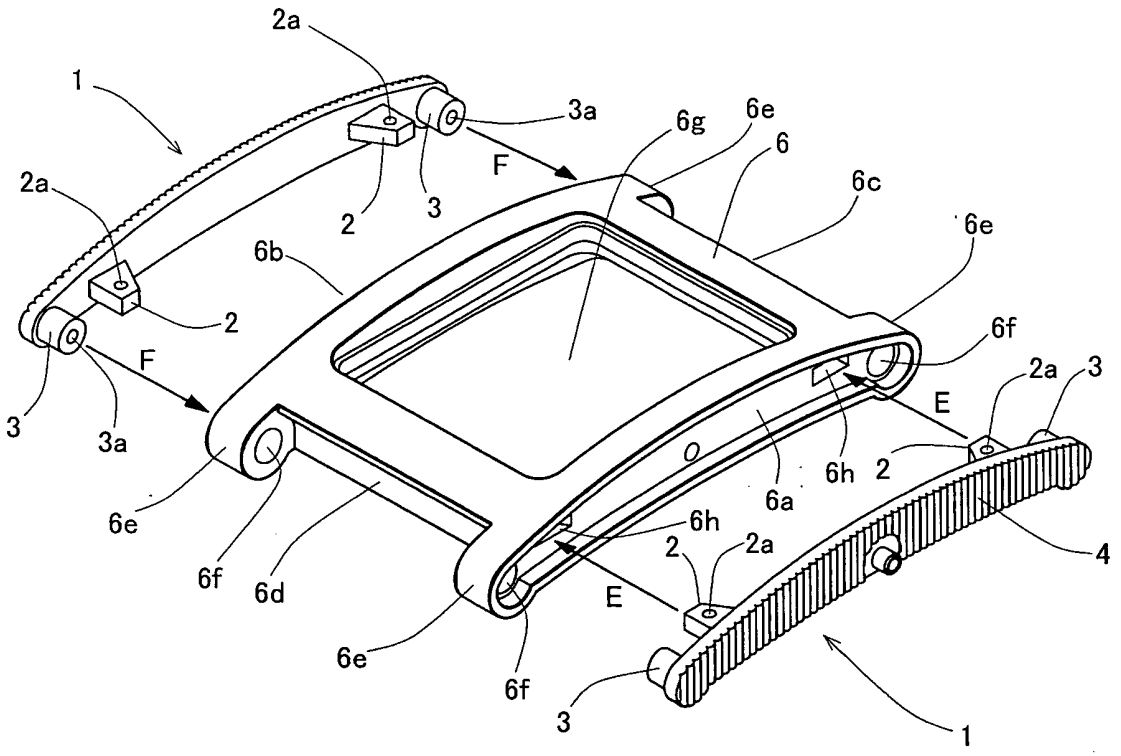

2a
1
3a
6g
6e
6
F
2a
2
3
6c
6e
6b
2
6f
F
2a
3
E
3
3a
6h
2
6e
6a
4
6h
2
2a
6f
6d
E
6e
6f
3
1

Fig. 3

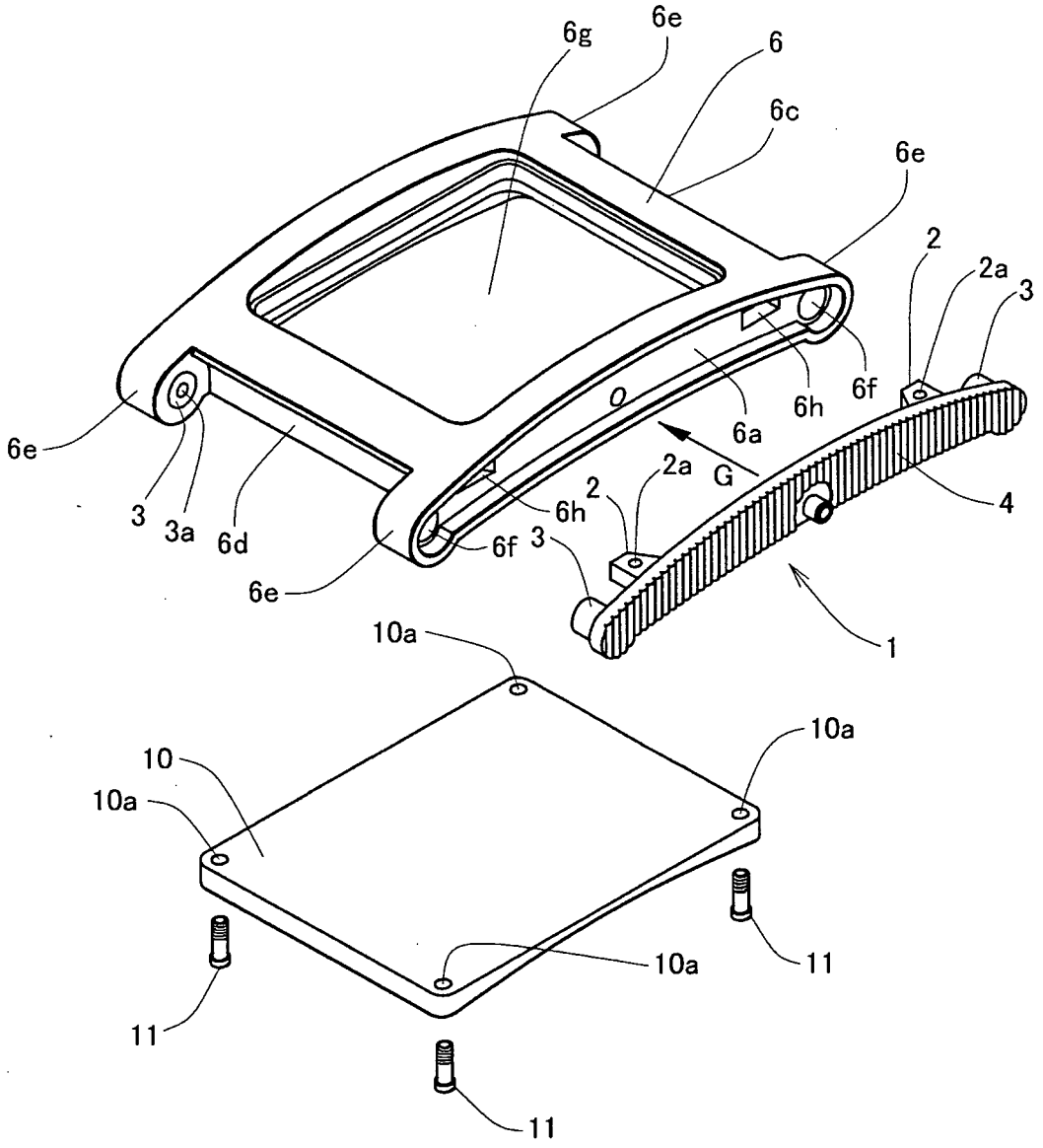

6g
6e
6
6c
6e
2
2a
3
6e
6h
6f
6a
G
2a
2
3
6h
6f
4
3
3a
6d
6e
1
10a
10a
10
10a
10a
11
11
11

Fig. 4

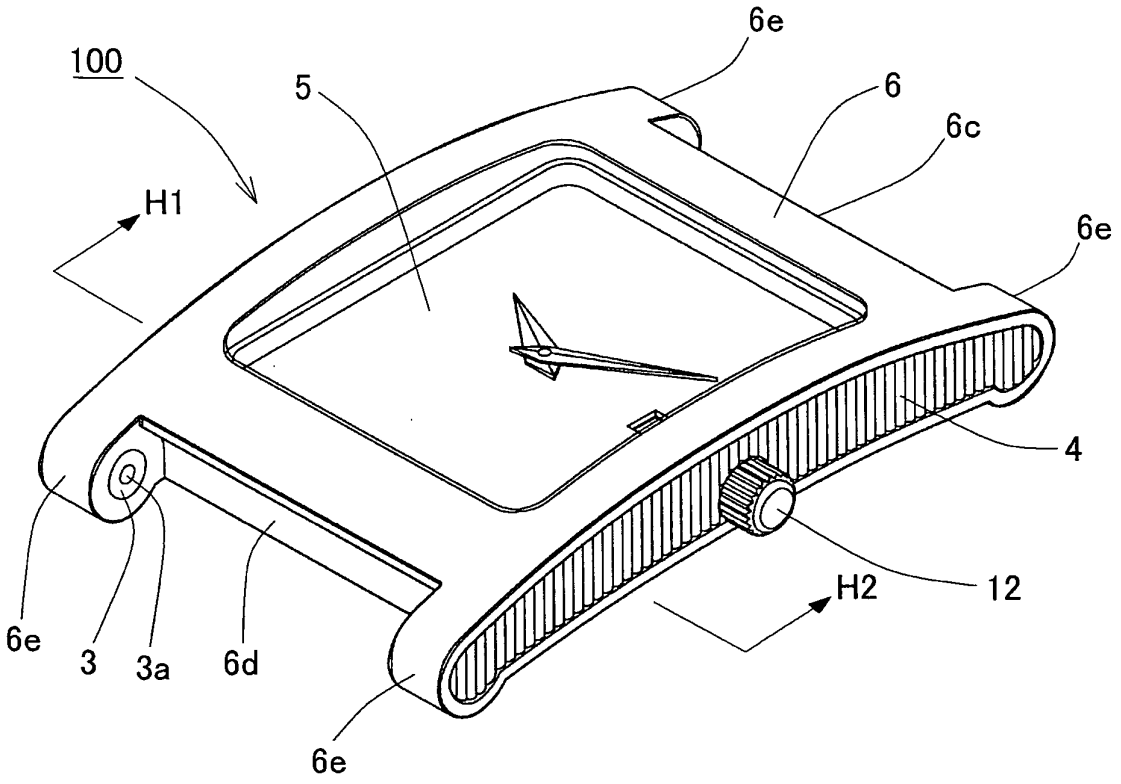


Fig. 5

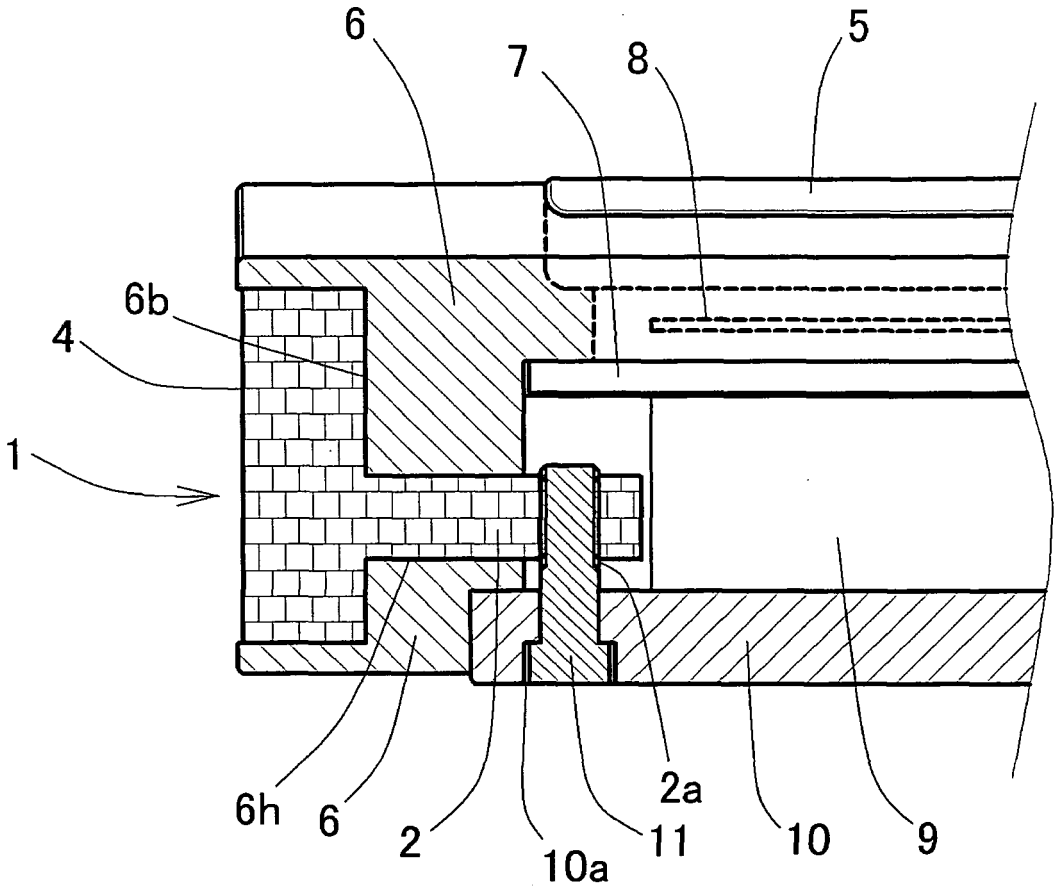


Fig. 6

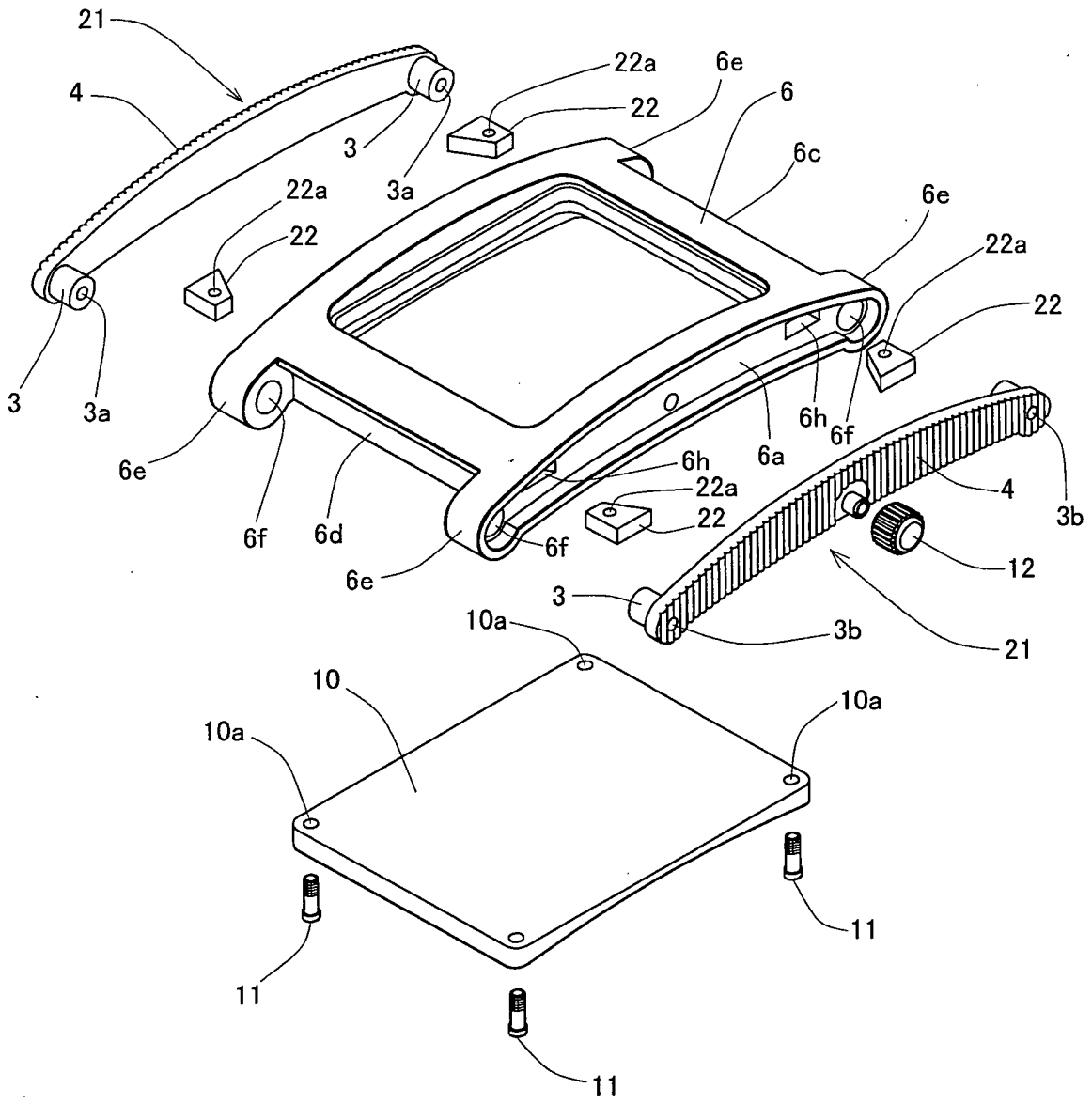

21
4
3
3a
22a
22
6e
6
6c
6e
22a
22
3
3a
6e
6f
6d
6e
6f
6h
6a
6h
6f
22a
22
4
3b
12
3
3b
21
10a
10
10a
10a
11
11
11

Fig. 7

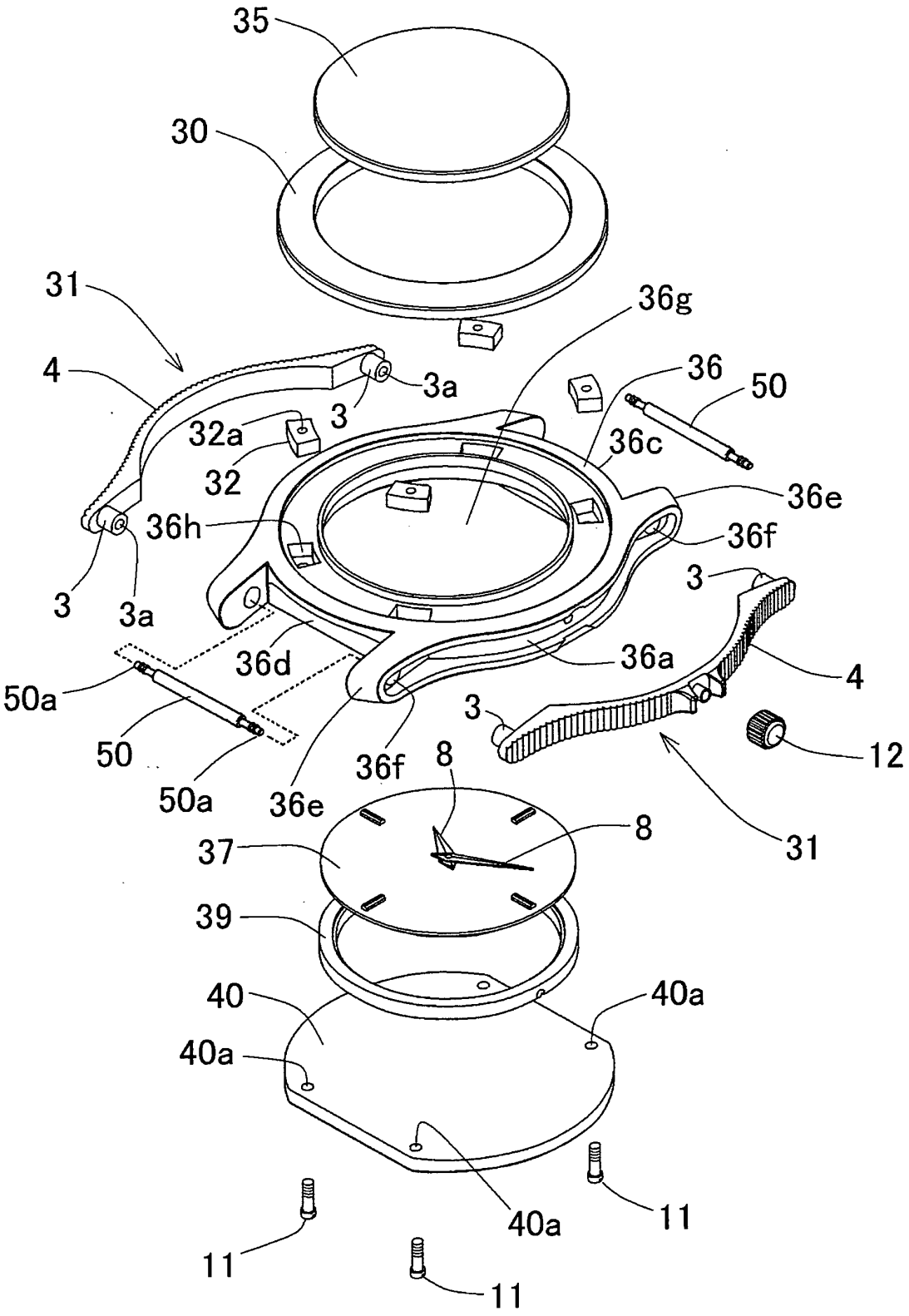

35
30
31
4
3a
3
32a
32
36g
36
50
36c
36e
36h
36f
3
3a
3
36d
36a
4
50a
3
50
50a
36f
8
36e
12
8
37
31
39
40
40a
40a
40a
11
11
11

Fig. 8

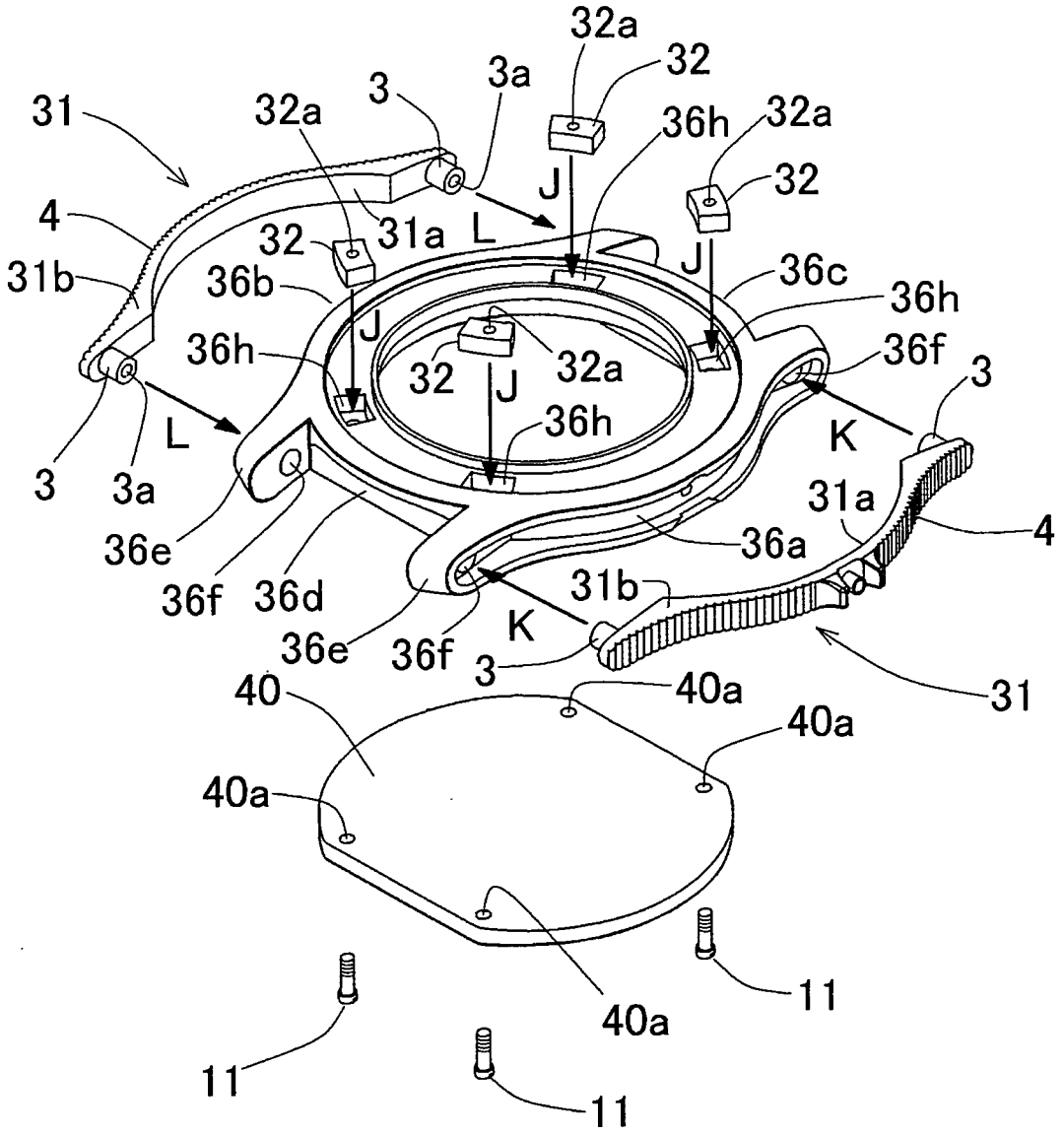

31
32a
3
3a
32a
32
36h
32a
J
L
4
32
31a
32
J
31b
36b
36c
36h
J
36h
32
32a
36f
3
J
36h
L
K
3
3a
31a
4
36e
36a
36f
36d
31b
36e
36f
K
3
31
40
40a
40a
40a
40a
11
11
11

Fig. 9

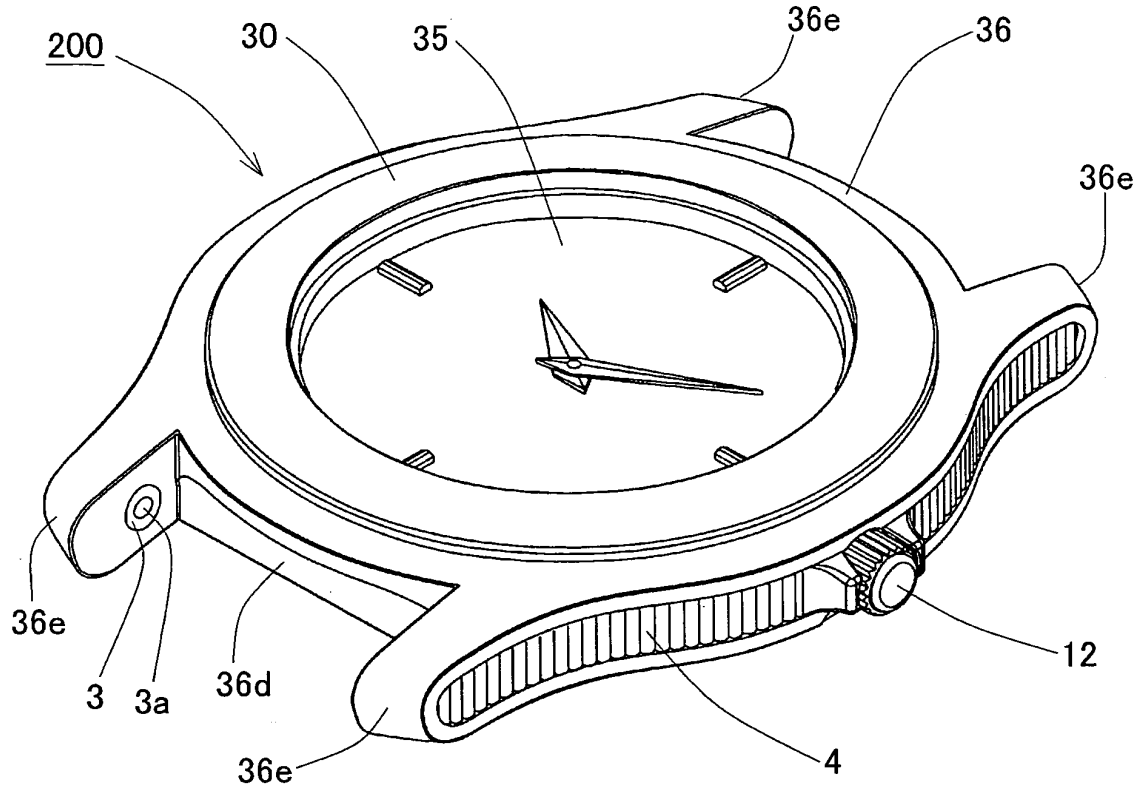


Fig. 10

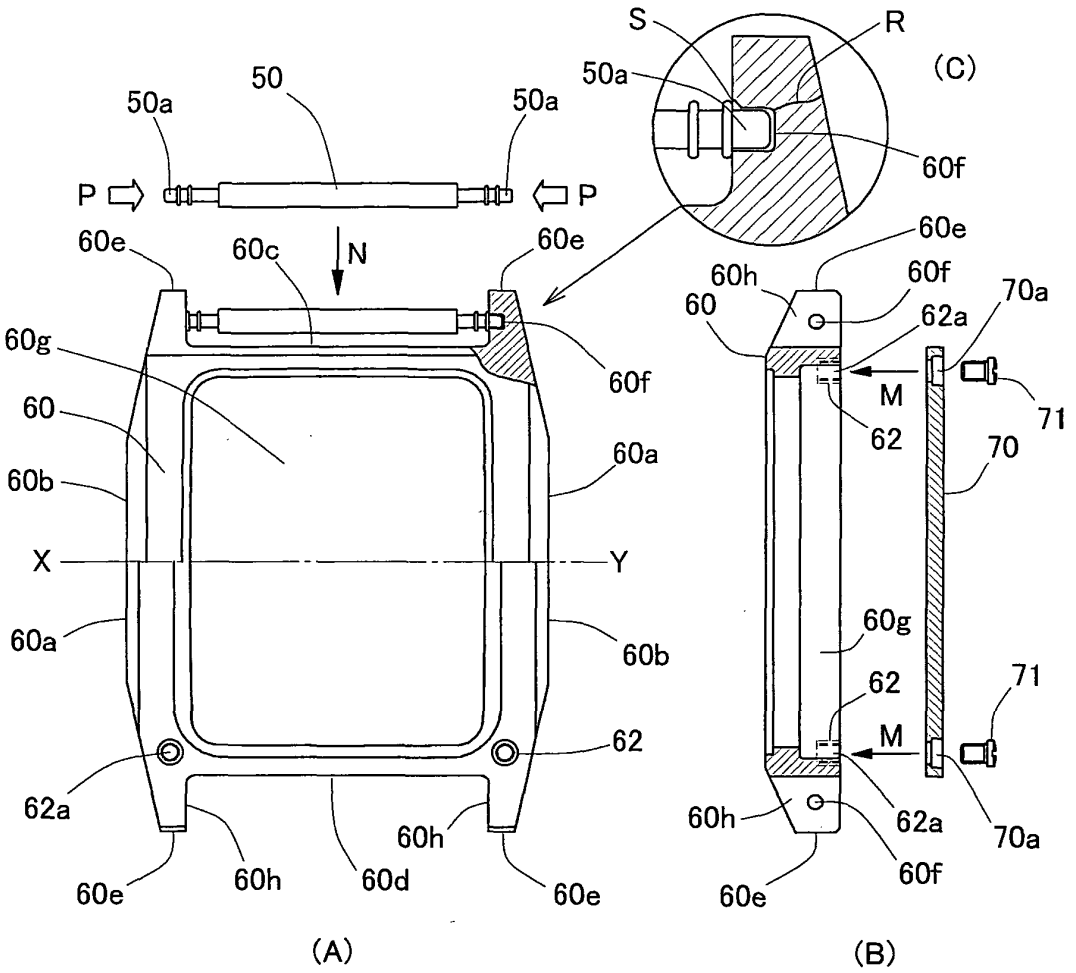

50
50a
50a
P
P
N
60e
60c
60e
60g
60
60b
X
Y
60a
60a
60b
62
62a
60e
60h
60d
60e
60h
60f
60f
(A)
S
R
50a
(C)
60f
60e
60h
60
60f
62a
70a
M
71
62
70
60g
62
71
M
60h
62a
70a
60e
60f
(B)

Fig. 11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2008/063494

A. CLASSIFICATION OF SUBJECT MATTER
G04B45/00(2006.01)i, *A44C5/14*(2006.01)i, *G04B37/16*(2006.01)i, *G04B37/18*(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G04B45/00, A44C5/14, G04B37/16, G04B37/18

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2008
Kokai Jitsuyo Shinan Koho 1971-2008 Toroku Jitsuyo Shinan Koho 1994-2008

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 57-19671 Y2 (Daini Seikosha Co., Ltd.), 26 April, 1982 (26.04.82), Full text; all drawings (Family: none)	1-7,9 8
Y A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 134680/1977(Laid-open No. 63659/1979) (Daini Seikosha Co., Ltd.), 04 May, 1979 (04.05.79), Claims; page 2, line 16 to page 3, line 11; Figs. 1 to 3 (Family: none)	1-7,9 8

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 August, 2008 (14.08.08)	26 August, 2008 (26.08.08)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2008/063494

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 2004-198183 A (Namiki Precision Jewel Co., Ltd.), 15 July, 2004 (15.07.04), Par. Nos. [0011] to [0014]; Fig. 1 & EP 1577717 A1 & WO 2004/055603 A1	1-7,9 8
Y A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 165607/1985(Laid-open No. 75490/1987) (Casio Computer Co., Ltd.), 14 May, 1987 (14.05.87), Page 4, lines 1 to 12; Fig. 1 (Family: none)	2,9 8
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 143427/1989(Laid-open No. 82012/1991) (Seiko Epson Corp.), 21 August, 1991 (21.08.91), Page 3, line 13 to page 4, line 13; Fig. 1 (Family: none)	3
Y	JP 3-199994 A (Seiko Instruments Inc.), 30 August, 1991 (30.08.91), Page 1, left column, lines 17 to 20 (Family: none)	4
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 113256/1986(Laid-open No. 20089/1988) (Namiki Precision Jewel Co., Ltd.), 09 February, 1988 (09.02.88), Page 1, line 15 to page 2, line 2 (Family: none)	5,6

Form PCT/ISA/210 (continuation of second sheet) (April 2007)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 7231802 A **[0003]**
- JP 10225309 A **[0003]**
- JP 2004198183 A **[0009]**