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(54) **TIMEPIECE CASE**

UHRENGEHÄUSE

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Description

Technical Field

[0001] The present disclosure relates to a timepiece case.

Background Art

[0002] In order to make a wrist watch have a sense of high quality, it has been suggested that a timepiece case, which is an external component used to accommodate movements, etc., is to be formed of ceramics.

[0003] For example, Patent Literature 1 discloses a timepiece case, wherein a shell and a back cover of the case are wholly or partially formed of ceramics or artificial gems.

[0004] JP H04 258785 A discloses a method for processing a cemented carbide case for wristwatches comprising a first step of grinding a biting groove forming a biting portion, a second step of honing an acute-angled portion on a groove side of the biting portion, a third step of ultrasonically polishing the top surface of the biting portion, and a fourth step of brushing the acute-angled portion.

Citation List

Patent Literature

[0005]

Patent Literature 1: Japanese Unexamined Patent Publication JP-A 63-249085 (1988)

Summary of Invention

[0006] The present invention provides a timepiece case according to claim 1. Preferred embodiments are described in claims 2 to 7.

Brief Description of Drawings

[0007] FIG. 1 is a schematic view of a timepiece case according to the disclosure.

Description of Embodiments

[0008] A timepiece case for a wrist watch is configured so that a lid member may be installed or detached (hereinafter, referred to as 'attached/detached'). This lid member is an element for preventing moisture, dust, etc. from infiltrating into the timepiece case. Here, when a battery of the wrist watch is replaced, the lid member needs to be detached from the timepiece case. In a case where the timepiece case is formed of ceramics, when the lid member is repeatedly attached/detached in order to replace the battery, a fitting surface of the timepiece case facing the lid member when fitting with the lid member (hereinafter, may be simply referred to as the fitting surface) may be easily worn out. When the fitting surface in the timepiece case is worn out, moisture, dust, etc. may easily intrude from a gap between the lid member and the timepiece case, and waterproof and dustproof properties of the timepiece case degrade. In addition, dust generated when the fitting surface is worn out penetrates into movements, which becomes a cause of malfunction.

[0009] According to the timepiece case of the disclosure, even when the lid member is repeatedly attached/detached, the fitting surface is less prone to be worn out, and thus, waterproof and dustproof properties may be retained for a long period of time. Hereinafter, the timepiece case according to the disclosure will be described in detail with reference to FIG. 1. In a timepiece case 1 shown in FIG. 1, the lid member is fitted from a lower portion in the drawing, and a surface which is hatched is a fitting surface 2.

[0010] The timepiece case 1 according to the disclosure is formed of ceramics. Here, the ceramics include aluminum oxide-based ceramics, zirconium oxide-based ceramics and silicon nitride-based ceramics. Among the ceramics, when the timepiece case 1 of the disclosure is formed of zirconium oxide-based ceramics, the timepiece case 1 is less prone to be damaged even when being used for a long period of time and does not destroy the beauty.

[0011] Here, the zirconium oxide-based ceramics is ceramics containing zirconium oxide as a main component, and contains 70 mass% or greater of zirconium oxide in 100 mass% of all the components constituting the ceramics. In addition, the content of the main component may be calculated by a method below. First, the timepiece case 1 is measured by using an X-ray diffraction device (XRD), and a value of obtained 2θ (2θ is a diffraction angle) is identified as a JCPDS card. At this time, when the timepiece case 1 includes the zirconium oxide-based ceramics, presence of the zirconium oxide is found.

[0012] Next, quantitative analysis of metal components (other than oxygen, carbon, and nitrogen) in the identified components is performed by using an inductively coupled plasma (ICP) emission spectrophotometer (ICP). In addition, a content of the component (compound) identified by the XRD is calculated from a result of the quantitative analysis. For example, when the component identified by the XRD is zirconium oxide, the content of zirconium (Zr) obtained through the measurement performed by the ICP is converted into zirconium oxide (ZrO_2). Here, when the converted content is 70 mass% or greater, the ceramics is zirconium oxide-based ceramics. Note that, other ceramics may be identified by the same method.

[0013] In addition, the timepiece case 1 of the disclosure includes the fitting surface 2 facing the lid member when the lid member is fitted to the timepiece case 1. An arithmetic mean roughness Ra of the fitting surface 2 which is obtained from a roughness profile, is 0.6 μm or less, and a reduced peak height Rpk of the fitting surface 2 which is obtained from the roughness profile, is 0.9 μm or less.

[0014] Here, the arithmetic mean roughness Ra is a value defined in JIS B 0601 (2013). The reduced peak height Rpk is defined in JIS B 0671-2 (2002), and has a definition as follows. First, in a central portion of a material ratio curve including 40% of measurement points in the roughness profile, a straight light that makes a split line of the material ratio curve drawn to set a material ratio difference to be 40% the gentlest slope is assumed to be an equivalent straight line. Next, a space between two height positions where the equivalent straight line crosses a vertical axis at locations where the material ratio of 0% and 100% is assumed as a core. Then, in the roughness profile, a mean height of a peak above the core is the reduced peak height Rpk.

[0015] In addition, since the timepiece case 1 of the disclosure satisfies the above configuration, irregularities of the fitting surface 2 are small and the peaks are small, and thus, even when the lid member is repeatedly attached/detached, the peak is less prone to be worn out. Accordingly, according to the timepiece case 1 of the disclosure, even when the lid member is repeatedly attached/detached, the waterproof and dustproof properties can be retained for a long period of time. Note that, in the fitting surface 2, when the arithmetic mean roughness Ra is 0.1 μm or greater and the reduced peak height Rpk is 0.06 μm or greater, not a few peaks exist, and thus, the lid member can be easily attached and detached.

[0016] In addition, in the timepiece case 1 of the disclosure, a core roughness depth Rk of the fitting surface 2 which is obtained from the roughness profile, may be 0.8 μm or less. Here, the core roughness depth Rk is defined in JIS B 0671-2 (2002), and in the roughness profile, is an index indicating a level difference between an upper side and a lower side of the core described above.

[0017] When the above configuration is satisfied, according to the fitting surface 2 of the timepiece case 1 of the disclosure, since the variation in core height is small, even when the lid member contacts a portion corresponding to the core in the fitting surface 2, the portion may be less prone to be worn out. Accordingly, even when the lid member is repeatedly attached and detached, the waterproof and dustproof properties may be retained for a long period of time. Note that, in the fitting surface 2, when the core roughness depth Rk is 0.11 μm or greater, the lid member may be easily attached/detached while retaining excellent waterproof and dustproof properties.

[0018] In the timepiece case 1 according to the disclosure, a ratio Rpk/Rk between the core roughness depth Rk and the reduced peak height Rpk of the fitting surface 2 may be 0.7 or less. When such a configuration is satisfied, the fitting surface 2 of the timepiece case 1 according to the disclosure may have the surface texture, in which the peaks are small and the variation in core height is small, and thus, even when the lid member is repeatedly attached/detached, the waterproof and dustproof properties may be retained for a long period of time. Note that, in the fitting surface 2, when the ratio Rpk/Rk is 0.5 or greater, the lid member may be easily attached/detached while retaining excellent waterproof and dustproof properties.

[0019] In addition, in the timepiece case 1 of the disclosure, a skewness Rsk of the fitting surface 2 which is obtained from the roughness profile, may be negative. Here, the skewness Rsk is defined in JIS B 0601 (2013), and is an index indicating a ratio between the peak and a valley when a mean height of the roughness is assumed as a center line. When the skewness Rsk is negative, it may be indicated that a region that corresponds to the peak is greater than that of the valley. When such a configuration is satisfied, even when the lid member is repeatedly attached/detached, the peak itself in the fitting surface 2 is not likely to be chipped, and thus, the waterproof and dustproof properties may be retained for longer period of time.

[0020] Further, in the timepiece case 1 of the disclosure, a mean peak height Rpm of the fitting surface 2 which is obtained from the roughness profile, may be 0.5 μm or less. Here, in sections where a reference length in a direction of the average line of the roughness profile is divided into five equal parts, when a height from a mean height of the highest peak in each section to a peak is assumed as Rpi, the mean profile peak height Rpm means a mean value of the Rpi in the five sections. When such a configuration is satisfied, the fitting surface 2 in the timepiece case 1 of the disclosure has a small peak, and thus, even when the lid member is repeatedly attached and detached, abrasion of the fitting surface 2 is reduced, and the waterproof and dustproof properties may be retained for longer period of time. Note that, in the fitting surface 2, when the mean profile peak height Rpm is 0.2 μm or greater, the lid member may be easily attached/detached while retaining excellent waterproof and dustproof properties.

[0021] In addition, in the timepiece case 1 of the disclosure, a root mean square slope RΔq of the fitting surface 2 may be 10° or less. Here, the root mean square slope RΔq is defined in JIS B 0601 (2013), and is an index indicating a gentleness of the slope of the peak. When such a configuration is satisfied, the slope of the peak in the fitting surface 2 of the timepiece case 1 according to the disclosure is gentle, and thus, even when the lid member is repeatedly attached/detached, the peak is less prone to be worn out and the waterproof and dustproof properties may be pertained for longer period of time. Note that, in the fitting surface 2, when the root mean square slope RΔq is 3° or greater, the lid member may be easily attached/detached while retaining excellent waterproof and dustproof properties.

[0022] In addition, in the timepiece case 1 according to the disclosure, an average interval S between the vertexes at the peaks of the fitting surface 2 which is obtained from the roughness, profile may be 15 μm or less. Here, the average interval S of the peak vertex is defined in JIS B 0601 (1994), and is an index indicating an average of intervals among the vertexes of the adjacent peaks. When such a configuration is satisfied, in the fitting surface 2 of the timepiece case 1 according to the disclosure, the interval between the peaks, through which the moisture, dust, etc. is likely to infiltrate, is small, and thus, the waterproof and dustproof properties may be improved. Note that, in the fitting surface 2, when the average interval s between the peak vertexes is 3 μm or greater, the lid member may be easily attached/detached while retaining the excellent waterproof and dustproof properties.

[0023] Here, in the fitting surface 2 of the timepiece case 1 according to the disclosure, the arithmetic mean roughness Ra, the skewness Rsk, the mean profile peak height Rpm, and the root mean square slope RΔq can be measured in accordance with JIS B 0601 (2013). In addition, in the fitting surface 2 of the timepiece case 1 according to the disclosure, the average interval S between the peak vertexes can be measured in accordance with JIS B 0601 (1994). On the other hand, in the fitting surface 2 of the timepiece case 1 according to the disclosure, the reduced peak height Rpk and the core roughness depth Rk can be measured in accordance with JIS B 0671-2 (2002). Measurement conditions may include, for example, a measurement length of 0.8 mm, a cut-off value of 1.0 mm, and a scanning speed of 1 mm/sec. with a needle having a needle radius of 2 μm. Then, in the fitting surface 2, at least three points are measured and a mean value thereof may be obtained.

[0024] As shown in FIG. 1, the timepiece case 1 of the disclosure may include a groove 3. When the lid member has a projection, the groove 3 is a part fitted to the projection. As described above, when the timepiece case 1 of the disclosure includes the groove 3 and the projection of the lid member and the groove 3 are fitted to each other, the lid member may be firmly fixed to the timepiece case 1.

[0025] As shown in FIG. 1, the timepiece case 1 of the disclosure may include a through hole 4 which is a hole to which a winding crown is inserted in the fitting surface 2. The winding crown is provided to perform a time correction operation and the like of the timepiece from outside.

[0026] Hereinafter, a method of manufacturing the timepiece case 1 according to the disclosure will be described. Here, the timepiece case 1 formed of zirconium oxide-based ceramics will be described as an example.

[0027] First, zirconium oxide (ZrCt) powder which is a main raw material is put into a mill with a solvent and a ball, and is ground to a predetermined particle size to prepare a slurry. Next, after adding a binder to the obtained slurry, a spray-drying is performed by using a spray dryer to obtain granules.

[0028] Next, these granules, a thermoplastic resin, wax, etc. are put into a kneader and are kneaded while being heated to obtain a green body. Then, the obtained green body is put into a pelletizer, and then, a pellet that becomes a raw material for injection molding is obtained. Next, the obtained pellet is put into an injection molding machine to be injection molded, and thus a molded body of a timepiece case shape is obtained.

[0029] In order to obtain the molded body of the timepiece case shape as described above, a shaping mold for obtaining the timepiece case shape is manufactured based on a general injection molding method, and may be installed in an injection molding machine to perform injection molding. Here, a surface texture on an inner surface of the shaping mold is transferred to a surface of the molded body. Accordingly, in order to obtain the fitting surface 2 having the arithmetic mean roughness Ra of 0.6 μm or less and the reduced peak height Rpk of 0.9 μm or less, the molded body is preferably manufactured by using the shaping mold, whose inner surface has the surface texture which is obtained taking into account a polishing amount due to a surface treatment such as a barrel polishing, etc. after a firing process. Note that the same as above is applied to cases in which the core roughness depth Rk is 0.8 μm or less, a value of Rpk/Rk is 0.7 or less, the skewness Rsk is negative, the mean profile peak height Rpm is 0.5 μm or less, the root mean square slope RΔq is 10° or less, and the average interval S between the peak vertexes is 15 μm or less, in the fitting surface 2.

[0030] Next, in a case where, for example, the zirconium oxide is the main raw material, the obtained molded body of the timepiece case shape is fired at a maximum temperature of 1350°C or more and 1550°C or less under the atmosphere to obtain a sintered body. Then, the obtained sintered body is barrel-polished to obtain the timepiece case 1 of the disclosure. In addition, since the firing condition varies depending on a shape and size of a product, the firing condition may be adjusted according to necessity.

[0031] Hereinafter, examples of the disclosure will be described in detail, but the disclosure is not limited to the examples.

Example 1

[0032] Samples (timepiece cases) having different arithmetic mean roughness Ra, reduced peak heights Rpk, and core roughness depths Rk in a fitting surface were manufactured, and attachment/detachment tests of the lid member were performed.

[0033] First, raw material powder was obtained by weighing and mixing 94.8 mass% of zirconium oxide (ZrO_2) and 5.2 mass% of yttrium oxide (Y_2O_3) as a stabilizer. Then, with respect to 100 mass% of the raw material powder, total 4 mass% of chromium oxide (Cr_2O_3), iron oxide (Fe_2O_3), and cobalt oxide (Co_3O_4) were added as pigment components. Moreover, water was added thereto, and ground and mixed by a ball mill to obtain a slurry.

[0034] Next, after adding a binder to the slurry, a spray-drying was performed by using a spray dryer to obtain granules. Then, a thermoplastic resin and wax were added the obtained granules, and then, the mixture were put into a kneader to be kneaded while being heated to obtain a green body. Next, the obtained green body was put into a pelletizer to obtain a pellet which is to be a raw material for injection molding. Then, the pellet was put into an injection molding machine to obtain a molded body of a timepiece case shape.

[0035] Here, the surface texture on the inner surface of a shipping mold provided in the injection molding machine was set in consideration of the polishing amount due to the barrel polishing after the firing process, so that the fitting surface of each sample may have the arithmetic mean roughness Ra, the reduced peak height Rpk, and the core roughness depth Rk as shown in Table 1.

[0036] Next, the molded body of the timepiece case shape was fired at the maximum temperature of 1500°C in the atmosphere to obtain the sintered body of the timepiece case shape. Then, the obtained sintered body is barrel-polished to obtain each sample.

[0037] Then, for each of obtained samples, the arithmetic mean roughness Ra, the reduced peak height Rpk, and the core roughness depth Rk in the fitting surface were measured by using a contact type surface roughness meter based on JIS B 0601 (2001) and JIS B 0671-2 (2002). The measurement conditions were set to be the measurement length of 0.8 mm, the cut-off value of 1.0 mm, and the scanning speed of 1 mm/sec. by using a needle having a needle radius of 2 μm, and three points in the fitting surface were measured and a mean value thereof was calculated.

[0038] Next, an attachment/detachment test of the lid member was performed by using each sample. First, a lid member which is formed of stainless steel and that can be fitted to the fitting surface of each sample was used as the lid member. Next, the attachment/detachment of the lid member was performed 10 times for each sample by using a commercially available lid member closure machine. At this time, a load $\sigma 0$ required when the lid member is attached for the first time and a load $\sigma 1$ required when the lid member is attached for the tenth time were measured by using a push-pull gauge. Then, a decrease rate of the required load $\Delta\sigma(\%) = (\sigma 0 - \sigma 1)/\sigma 0 \times 100$ was calculated from the load $\sigma 0$ and the load $\sigma 1$. Then, the samples were ranked in a descending order of the decrease rate $\Delta\sigma$ of the required load. That is, the sample having the lowest decrease rate $\Delta\sigma$ of the required load was ranked first, and the sample having the highest decrease rate $\Delta\sigma$ of the required load was ranked as the lowest. In addition, as the rank of the decrease rate $\Delta\sigma$ of the required load is higher, even when the lid member is repeatedly attached/detached, the fitting surface was less prone to be worn out, and it is shown that the adhesion between the fitting surface and the lid member may be maintained.

[0039] Results are shown in Table 1.

[Table 1]

Sample No.	Ra (μm)	Rpk (μm)	Rk (μm)	Rpk/Rk	Rank of decrease rate Δσ of required load
1	0.7	1.12	0.95	1.2	6
2	0.6	1.00	0.92	1.1	5
3	0.6	0.90	0.85	1.1	4
4	0.4	0.60	0.80	0.8	3
5	0.2	0.30	0.43	0.7	2
6	0.1	0.06	0.11	0.5	1

[0040] As shown in Table 1 above, the decrease rates $\Delta\sigma$ of the required loads in sample Nos. 3 to 6 were highly ranked. From the above results, it was shown that, when the arithmetic mean roughness Ra was 0.6 μm or less and the reduced peak height Rpk was 0.9 μm or less in the fitting surface, even if the attachment/detachment of the lid member were repeatedly performed, the waterproof and dustproof properties were maintained for a long period of time.

[0041] In addition, sample Nos. 4 to 6 had higher ranks in the decrease rates $\Delta\sigma$ of the required loads as compared with the sample No. 3. From the above result, it was shown that, when the core roughness depth Rk is 0.8 μm or less in the fitting surface, the waterproof and dustproof properties were maintained for longer period of time.

[0042] Further, sample Nos. 5 and 6 had higher ranks in the decrease rates $\Delta\sigma$ of the required load as compared with sample No. 4. From the above result, it was shown that, when a ratio Rpk/Rk between the core roughness depth Rk and the reduced peak height Rpk is 0.7 or less in the fitting surface, the waterproof and dustproof properties can be further maintained for a long period of time.

Example 2

[0043] Next, samples in which the skewness Rsk in the fitting surface was differently set to be positive or negative were manufactured, and attachment/detachment tests of the lid member were performed.

[0044] The manufacturing method was the same as the method of manufacturing the sample No. 6 according to Example 1, except that the surface texture on an inner surface of a shaping mold installed in an injection molding machine was changed in consideration of a polishing amount due to a barrel polishing after a firing process so that the fitting surface of each sample had the skewness Rsk as shown in Table 2. Note that sample No. 7 is the same as the sample No. 6 according to Example 1.

[0045] In addition, for each obtained sample, the skewness Rsk in the fitting surface was measured, and the measurement condition was the same as that of Example 1. In addition, the attachment/detachment test of the lid member was performed in the same manner as in Example 1.

[0046] Results are shown in Table 2. In addition, ranking of the decrease rates $\Delta\sigma$ of the required load is performed by only comparing the samples shown in Table 2.

[Table 2]

Sample No.	Rsk	Rank of decrease rate $\Delta\sigma$ of required load
7	positive	2
8	negative	1

[0047] As shown in Table 2, the decrease rate $\Delta\sigma$ of the required load in the sample No. 8 was lower as compared with the sample No. 7. From the above result, it was shown that when the skewness Rsk is negative, the waterproof and dustproof properties can be further maintained for longer period of time.

Example 3

[0048] Next, samples having different mean profile peak heights Rpm in fitting surfaces were manufactured, and attachment/detachment tests of a lid member were performed.

[0049] The manufacturing method was the same as the method of manufacturing the sample No. 8 according to Example 2, except that the surface texture on an inner surface of a shaping mold installed was changed in an injection molding machine in consideration of a polishing amount due to a barrel polishing after a firing process so that the fitting surface of each sample had the mean profile peak height Rpm as shown in Table 3. Note that sample No. 9 is the same as the sample No. 8 according to Example 2.

[0050] In addition, for each obtained sample, the mean profile peak height Rpm in the fitting surface was measured, and the measurement condition was the same as that of Example 1. In addition, the attachment/detachment test of the lid member was performed in the same manner as in Example 1.

[0051] Results are shown in Table 3. In addition, ranking of the decrease rates $\Delta\sigma$ of the required load was performed by only comparing the samples shown in Table 3.

[Table 3]

Sample No.	Rpm (μm)	Rank of decrease rate $\Delta\sigma$ of required load
9	0.6	3
10	0.5	2
11	0.2	1

[0052] As shown in Table 3, the decrease rates Δσ of the required load in the sample Nos. 10 and 11 were lower as compared with the sample No. 9. From the above result, it was shown that when the mean profile peak height Rpm is 0.5 μm or less, the waterproof and dustproof properties can be maintained for longer period of time.

Example 4

[0053] Next, samples having different root mean square slopes RΔq in fitting surfaces were manufactured, and attachment/detachment tests of a lid member were performed.

[0054] The manufacturing method was the same as the method of manufacturing the sample No. 11 according to Example 3, except that the surface texture on an inner surface of a shaping mold installed in an injection molding machine was changed in consideration of a polishing amount due to a barrel polishing after a firing process so that the fitting surface of each sample had the root mean square slope RΔq as shown in Table 4. Note that sample No. 15 is the same as the sample No. 11 in Example 3.

[0055] In addition, for each obtained sample, the root mean square slope RΔq in the fitting surface was measured, and the measurement condition was the same as that of Example 1. In addition, the attachment/detachment test of the lid member was performed in the same manner as in Example 1.

[0056] Results are shown in Table 4. In addition, ranking of the decrease rates Δσ of the required load was performed by only comparing the samples shown in Table 4.

[Table 4]

Sample No.	RΔq (°)	Rank of decrease rate Δσ of required load
12	3	1
13	7	2
14	10	3
15	12	4

[0057] As shown in Table 4, the decrease rates Δσ of the required load in the sample Nos. 12 to 14 were lower as compared with the sample No. 15. From the above result, it was shown that when the root mean square slope RΔq is 10° or less, the waterproof and dustproof properties can be maintained for longer period of time.

Example 5

[0058] Next, samples having different average intervals S between peak vertexes in fitting surfaces were manufactured, and attachment/detachment tests of a lid member were performed.

[0059] The manufacturing method was the same as the method of manufacturing the sample No. 12 according to Example 4, except that the surface texture on an inner surface of a shaping mold installed was changed in an injection molding machine in consideration of a polishing amount due to a barrel polishing after a firing process so that the fitting surface of each sample had the average interval S between the peak vertexes, as shown in Table 5. Note that, sample No. 19 is the same as the sample No. 12 in Example 4.

[0060] Then, for each obtained sample, the average interval S between the peak vertexes in the fitting surface was measured based on JIS B 0601 (1994), and the measurement condition was the same as that of Example 1. In addition, the attachment/detachment tests of the lid member were performed in the same manner as in Example 1.

[0061] Results are shown in Table 5. In addition, ranking of the decrease rates Δσ of the required load was performed by only comparing the samples shown in Table 5.

[Table 5]

Sample No.	S (μm)	Rank of decrease rate Δσ of required load
16	3	1
17	5	2
18	15	3
19	18	4

[0062] As shown in Table 5, the decrease rates $\Delta\sigma$ of the required load in the sample Nos. 16 to18 were lower as compared with the sample No. 19. From the above result, it was shown that when the average interval S between the peak vertexes is 15 μm or less, the waterproof and dustproof properties can be maintained for longer period of time.

Reference Signs List

[0063]

1: Timepiece case
2: Fitting surface
3: Groove
4: Through hole

Claims

1. A timepiece case (1), comprising:

   a fitting surface (2) facing a lid member when the lid member is fitted to the timepiece case (1),
   the timepiece case (1) being formed of ceramics, which is any one selected from aluminum oxide-based ceramics, zirconium oxide-based ceramics and silicon nitride-based ceramics,
   an arithmetic mean roughness Ra, as defined in JIS B 0601 (2013), of the fitting surface (2) which is obtained from a roughness profile, being 0.6 μm or less, a reduced peak height Rpk, as defined in JIS B 0671-2 (2002), of the fitting surface (2) which is obtained from the roughness profile, being 0.9 μm or less.

2. The timepiece case (1) according to claim 1, wherein a core roughness depth Rk of the fitting surface (2), as defined in JIS B 0671-2 (2002), which is obtained from the roughness profile, is 0.8 μm or less.

3. The timepiece case (1) according to claim 1 or 2, wherein a ratio Rpk/Rk between the core roughness depth Rk, as defined in JIS B 0671-2 (2002), and the reduced peak height Rpk, as defined in JIS B 0671-2 (2002), of the fitting surface (2) which is obtained from the roughness curvature, is 0.7 or less.

4. The timepiece case (1) according to any one of claims 1 to 3, wherein a skewness Rsk, as defined in JIS B 0601 (2013), of the fitting surface (2) which is obtained from the roughness profile, is negative.

5. The timepiece case (1) according to any one of claims 1 to 4, wherein a mean profile peak height Rpm, as defined in JIS B 0601 (2013) of the fitting surface (2) which is obtained from the roughness profile, is 0.5 μm or less.

6. The timepiece case (1) according to any one of claims 1 to 5, wherein a root mean square slope RΔq, as defined in JIS B 0601 (2013), of the fitting surface (2) is 10° or less.

7. The timepiece case (1) according to any one of claims 1 to 6, wherein an average interval S between peak vertexes, as defined in JIS B 0601 (1994), of the fitting surface (2) which is obtained from the roughness profile, is 15 μm or less.

Patentansprüche

1. Uhrengehäuse (1), aufweisend:

   eine Montagefläche (2), die einem Deckelelement zugewandt ist, wenn das Deckelelement an dem Uhrengehäuse (1) montiert ist,
   wobei das Uhrengehäuse (1) aus Keramik gebildet ist, die irgendeine ausgewählt aus Keramik auf Aluminiumoxidbasis, Keramik auf Zirkonoxidbasis und Keramik auf Siliciumnitridbasis ist,
   wobei ein arithmetischer Mittelrauwert Ra, wie in JIS B 0601 (2013) definiert, der Montagefläche (2), der aus einem Rauigkeitsprofil erhalten wird, 0,6 μm oder weniger beträgt, eine reduzierte Spitzenhöhe Rpk, wie in JIS B 0671-2 (2002) definiert, der Montagefläche (2), die aus dem Rauigkeitsprofil erhalten wird, 0,9 μm oder weniger beträgt.

2. Uhrengehäuse (1) gemäß Anspruch 1, wobei eine Kernrauigkeitstiefe Rk der Montagefläche (2), wie in JIS B 0671-2 (2002) definiert, die aus dem Rauigkeitsprofil erhalten wird, 0,8 μm oder weniger beträgt.

3. Uhrengehäuse (1) gemäß Anspruch 1 oder 2, wobei ein Verhältnis Rpk/Rk zwischen der Kernrauigkeitstiefe Rk, wie in JIS B 0671-2 (2002) definiert, und der reduzierten Spitzenhöhe Rpk, wie in JIS B 0671-2 (2002) definiert, der Montagefläche (2), erhalten aus der Rauigkeitskrümmung, 0,7 oder weniger beträgt.

4. Uhrengehäuse (1) gemäß irgendeinem der Ansprüche 1 bis 3, wobei eine Schiefe Rsk, wie in JIS B 0601 (2013) definiert, der Montagefläche (2), die aus dem Rauigkeitsprofil erhalten wird, negativ ist.

5. Uhrengehäuse (1) gemäß irgendeinem der Ansprüche 1 bis 4, wobei eine mittlere Profilspitzenhöhe Rpm, wie in JIS B 0601 (2013) definiert, der Montagefläche (2), die aus dem Rauigkeitsprofil erhalten wird, 0,5 μm oder weniger beträgt.

6. Uhrengehäuse (1) gemäß irgendeinem der Ansprüche 1 bis 5, wobei eine mittlere quadratische Neigung RΔq, wie in JIS B 0601 (2013) definiert, der Montagefläche (2) 10° oder weniger beträgt.

7. Uhrengehäuse (1) gemäß irgendeinem der Ansprüche 1 bis 6, wobei ein durchschnittlicher Abstand S zwischen Spitzenscheiteln, wie in JIS B 0601 (1994) definiert, der Montagefläche (2), der aus dem Rauigkeitsprofil erhalten wird, 15 μm oder weniger beträgt.

Revendications

1. Boîtier de pièce d'horlogerie (1), comprenant :

   une surface de montage (2) faisant face à un élément de couvercle lorsque l'élément de couvercle est monté sur le boîtier de pièce d'horlogerie (1),
   le boîtier de pièce d'horlogerie (1) étant formé de céramique qui est l'une quelconque choisie parmi la céramique à base d'oxyde d'aluminium, la céramique à base d'oxyde de zirconium et la céramique à base de nitrure de silicium,
   une rugosité moyenne arithmétique Ra, telle que définie dans la norme JIS B 0601 (2013), de la surface de montage (2), qui est obtenue à partir d'un profil de rugosité, étant 0,6 μm ou moins, une hauteur de pic réduite Rpk, telle que définie dans la norme JIS B 0671-2 (2002), de la surface de montage (2), qui est obtenue à partir du profil de rugosité, étant 0,9 μm ou moins.

2. Boîtier de pièce d'horlogerie (1) selon la revendication 1, dans lequel une profondeur de rugosité centrale Rk de la surface de montage (2), telle que définie dans la norme JIS B 0671-2 (2002), qui est obtenue à partir du profil de rugosité, est de 0,8 μm ou moins.

3. Boîtier de pièce d'horlogerie (1) selon la revendication 1 ou 2, dans lequel un rapport Rpk/Rk entre la profondeur de rugosité centrale Rk, telle que définie dans la norme JIS B 0671-2 (2002), et la hauteur de pic réduite Rpk, telle que définie dans la norme JIS B 0671-2 (2002), de la surface de montage (2), que l'on obtient à partir de la courbure de rugosité, est de 0,7 ou moins.

4. Boîtier de pièce d'horlogerie (1) selon l'une quelconque des revendications 1 à 3, dans lequel une asymétrie Rsk, telle que définie dans la norme JIS B 0601 (2013), de la surface de montage (2), qui est obtenue à partir du profil de rugosité, est négative.

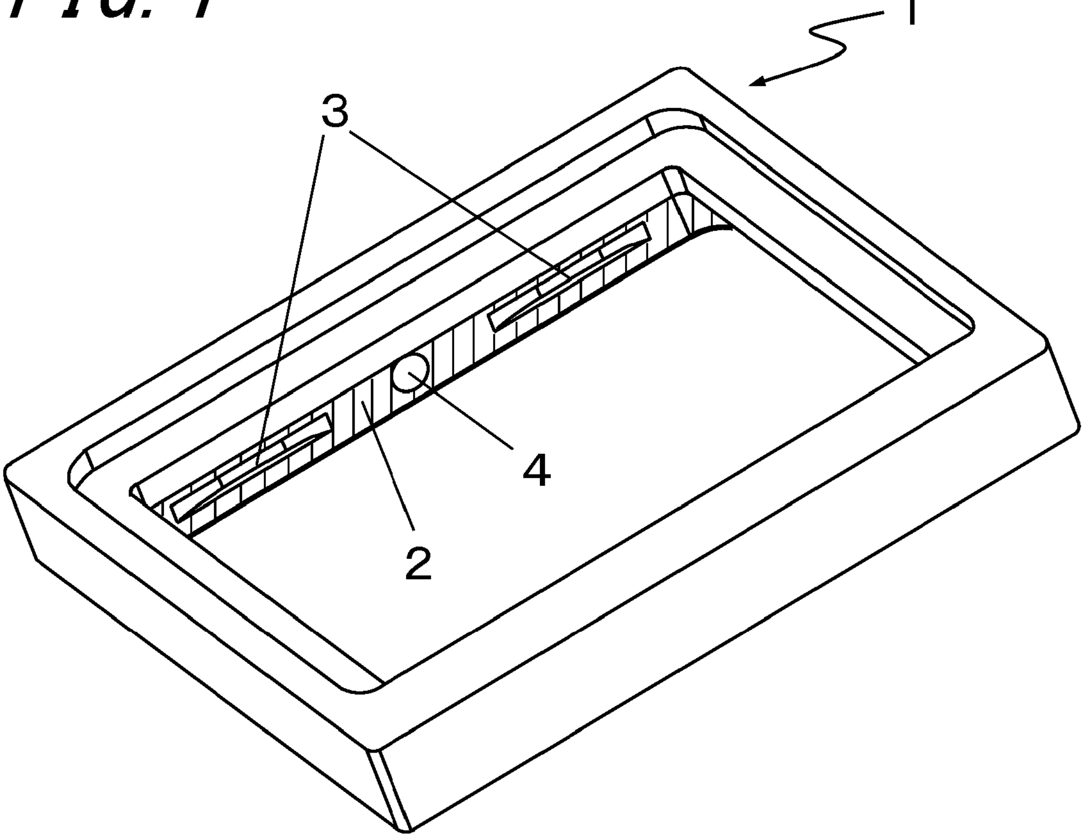
5. Boîtier de pièce d'horlogerie (1) selon l'une quelconque des revendications 1 à 4, dans lequel une hauteur de pic de profil moyenne Rpm, telle que définie dans la norme JIS B 0601 (2013), de la surface de montage (2), qui est obtenue à partir du profil de rugosité, est de 0,5 μm ou moins.

6. Boîtier de pièce d'horlogerie (1) selon l'une quelconque des revendications 1 à 5, dans lequel une pente quadratique moyenne RΔq, telle que définie dans la norme JIS B 0601 (2013), de la surface de montage (2) est de 10° ou moins.

7. Boîtier de pièce d'horlogerie (1) selon l'une quelconque des revendications 1 à 6, dans lequel un intervalle moyen S entre des sommets pic, tel que défini dans la norme JIS B 0601 (1994), de la surface de montage (2), qui est

obtenu à partir du profil de rugosité, est de 15 μm ou moins.

FIG. 1



REFERENCES CITED IN THE DESCRIPTION

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