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(54) **Workpiece for a watchcase.**

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GB-A- 2 000 812
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Description

The present invention relates to a workpiece for a watchcase as defined in the preample of claim 1.

A hard alloy is generally employed for a case or a wrist watch, which is easily scratched. In particular, cemented carbide is employed as a material for the watchcase of a high-grade wrist watch.

However, an extremely hard material such as cemented carbide causes a problem in working, in employment for a watchcase.

High working accuracy is required for an inner portion of the watchcase, i.e., an inner shell portion which is adapted to store precisely designed watch parts. When a workpiece for the watchcase is prepared by cemented carbide, such an inner shell portion is generally worked by electric discharge machining, which requires a long time.

Further, a tapped hole is formed in the watchcase by electric discharge machining, and thereafter a thread bush of a workable material is embedded in the tapped hole, to be subjected to brazing. When the workpiece for the watchcase is prepared by cemented carbide, therefore, workability in electric discharge machining of the tapped hole is particularly inferior, to require a long time for such working.

GB-A- 2 094 034 discloses a workpiece for a watchcase comprising a cemented carbide base part and a worked part to be machined, i.e. made of a material being superior in machinability to that of said base part, joined with said base part. Therein, an outer case band is joined to its inner counterpart or a supporting ring by brazing.

GB-A- 2 000 812 refers to coated articles with a gold coloured outer surface, for example watch cases, where the coating is a material selected from TaC or a nitride of Ti, Ta, Zr or V.

CH-B- 656 146 discloses sintered alloys for decorative articles, for example watches, with improved outer appearance and wear resistance.

The object of the present invention is to provide a workpiece for a watchcase, which is excellent in machinability and manufactured at a low cost.

The workpiece for a watchcase according to the invention, is characterized in that the worked part and the base part are joined by sintering from diffused junction, said base part being prepared from WC-Co cemented carbide or TaC-Ni cemented carbide, and said worked part being prepared from Mo, W or Ta for a WC-Co cemented carbide base part and Mo or a W-Ni alloy for a TaC-Ni cemented carbide base part and in that said diffused junction is achieved by sequentially performing HIP after said sintering from diffusion junction.

Thus, the worked part of the inventive workpiece for a watchcase can be easily machined in high accuracy, to require no electric discharge machining for a long time as in the conventional case.

Further, diffused junction is employed in order to join the worked part of the inventive workpiece for a watchcase to the base part. Therefore, the worked part can be joined to the base part simultaneously with sintering of the base part to require no brazing step of the conventional case, for example. Thus, steps for manufacturing the workpiece can be extremely simplified.

The material of excellent machinability is joined by diffused junction to the worked part of the inventive workpiece for a watchcase, which can be easily machined in high accuracy. Thus, the workpiece according to the present invention can be worked in a short time with no electric discharge machining, which has been generally required in the prior art.

Due to employment of diffused junction, the worked part can be joined to the base part in sintering or HIP forming of the base part. Thus, no conventional brazing step is required and the manufacturing steps can be extremely simplified, whereby the workpiece according to the present invention can be manufactured at a low cost.

These and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional view showing an embodiment of the present invention in a state before tapped hole working;

Fig. 2 is a sectional view showing the embodiment of the present invention in a state after tapped hole working;

Fig. 3 is a front elevational view showing another embodiment of the present invention; and

Fig. 4 is a sectional view taken along the line IV - IV in Fig. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Embodiment 1

As shown in Fig. 1 in section, a sintered worked part 2 was embedded in a hole 1a of an unsintered base part 1, which was then sintered and subjected to HIP forming to provide a workpiece for a watchcase. Table 1 shows combinations of materials for such base parts and worked parts. The worked part 2 of each workpiece for a watchcase thus obtained was subjected to tapped hole working as shown in Fig. 2, and workability thereof was evaluated as an index. Evaluation was made on working steps and working ability thereof. The working steps were formed by a tapped hole working (drilling) step and a screw cutting step, and the average value in working ability of the two steps was expressed as an index.

For the purpose of comparison, workability indices were also evaluated as to the case of performing tapped hole working of base parts joined with no worked parts, to be listed in Table 1. In each case, such evaluation was made on working steps and working ability thereof, similarly to the above. The working steps were formed by a tapped hole working (electric discharge machining) step and a brazing step, and the average value in working ability of the two steps was expressed as an index.

Table 1

	Base Part	Worked Part	Workability Index
Example A	WC-Co Cemented Carbide	Mo	100
Example B	-do.-	W	100
Example C	-do.-	Ta	90
Reference Example D	-do.-	None	37.5
Example E	TaC-Ni Cemented Carbide	Mo	100
Example F	-do.-	W-Ni Alloy	100
Reference Example G	-do.-	None	35

Embodiment 2

As shown in Fig. 3, a worked part 4 was joined by diffused junction to a base part 3 forming an inner shell portion of a watchcase. Fig. 4 is a sectional view taken along the line IV - IV of Fig. 3. Table 2 shows combinations of materials for such base parts and worked parts. Diffused junction of each Example was performed by bringing a sintered worked part into close contact with an unsintered base part, sintering the base part in this state and then performing HIP forming.

A workability test was performed on each workpiece thus obtained. Workability was evaluated by measuring a working time required for cutting by 0.3 mm through machining. Table 2 shows the results of measurement. For the purpose of comparison, times required for working by 0.3 mm through electric discharge machining were also measured on reference examples formed by only base parts, to be listed in Table 2.

Table 2

	Base Part	Worked Part	Working Time
Example H	WC-Co Cemented Carbide	W-Ni Alloy	0.1
Example I	-do.-	Mo	0.3
Example J	-do.-	Ni	0.2
Reference Example K	-do.-	None	0.5 (electric discharge machining)
Example L	TaC-Ni Cemented Carbide	Mo	0.3
Example M	-do.-	W-Ni Alloy	0.1
Reference Example N	-do.-	None	0.5 (electric discharge machining)

As obvious from Table 2, each workpiece according to the embodiment of the present invention can be worked in a short time as compared with the case of working the workpiece formed by only a base part by electric discharge machining.

Although the present invention has been described and illustrated in detail, it is clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, the spirit and scope of the present invention being limited only by the terms of the appended claims.

Claims

1. A workpiece for a watchcase comprising a cemented carbide base part (1, 3), and a worked part (2, 4) to be machined, i.e. made of a material being superior in machinability to that of said base part (1, 3), joined with said base part (1, 3), characterized in that the worked part (2, 4) and the base part (1, 3) are joined by sintering from diffused junction, said base part (1, 3) being prepared from WC-Co cemented carbide or TaC-Ni cemented carbide, and said worked part (2, 4) being prepared from Mo, W or Ta for a WC-Co cemented carbide base part (1, 3) and Mo or a W-Ni alloy for a TaC-Ni cemented carbide base part (1, 3) and in that said diffused junction is achieved by sequentially performing HIP after said sintering from diffusion junction.

2. A workpiece for a watchcase in accordance with claim 1, wherein said worked part (2, 4) is a part subjected to tapped hole working.

3. A workpiece for a watchcase in accordance with claim 1, wherein said worked part (2, 4) is an inner shell portion of said watchcase.

Patentansprüche

1. Werkstück für ein Uhrengehäuse umfassend einen Hartmetallgrundteil (1,3) und einen zu bearbeitenden Teil (2, 4), das heißt bestehend aus einem Material, welches eine bessere Bearbeitbarkeit aufweist als der Grundteil (1, 3), welcher mit dem Grundteil (1, 3) verbunden ist, dadurch gekennzeichnet, daß der zu bearbeitende Teil (2, 4) und der Grundteil (1, 3) mittels einer Diffusionsschicht durch Sintern verbunden sind, daß der Grundteil (1, 3) aus WC-Co Hartmetall oder TaC-Ni Hartmetall hergestellt ist, und der zu bearbeitende Teil (2, 4) aus Mo, W oder Ta für einen WC-Co Hartmetallgrundteil (1, 3) und aus Mo oder einer W-Ni Legierung für einen TaC-Ni Hartmetallgrundteil (1, 3) gebildet ist, und daß die Diffusionsschicht durch das anschließende Durchführen eines HIP-Prozesses nach besagter Sinterung

der Diffusionsschicht gebildet wird.

2. Werkstück für ein Uhrengehäuse nach Anspruch 1, dadurch gekennzeichnet, daß der zu bearbeitende Teil (2, 4) ein Teil ist, welcher dem Gewindebohrvorgang ausgesetzt ist.

3. Werkstück für ein Uhrengehäuse nach Anspruch 1, dadurch gekennzeichnet, daß der zu bearbeitende Teil (2, 4) ein inneres Gehäuseanteil des besagten Uhrengehäuses bildet.

Revendications

1. Pièce façonnée pour un boîtier de montre, comportant une partie de base en carbure cémenté (1,3), et une partie façonnée (2,4) à usiner, c'est-à-dire composée d'un matériau d'usinabilité supérieure à celui de ladite partie de base (1,3), relié à ladite partie de base (1,3), caractérisée en ce que la partie usinée (2,4) et la partie de base (1,3) sont reliées par frittage de la jonction diffusée, ladite partie de base (1,3) étant préparée à partir d'un carbure de WC-Co cémenté ou d'un carbure de TaC-Ni cémenté, et ladite partie façonnée (2,4) étant préparée à partir de Mo, W ou Ta, pour une partie de base (1,3) en carbure de WC-Co cémenté, et d'un alliage à base de W-Ni pour une partie de base (1,3) en carbure de TaC-Ni cémenté, et en ce que ladite jonction diffusée est obtenue en effectuant séquentiellement une HIP, après ledit frittage de ladite fonction à diffusion.

2. Pièce façonnée pour un boîtier de montre selon la revendication 1, dans laquelle ladite partie façonnée (2,4) est une partie soumise à un usinage d'un trou taraudé.

3. Pièce façonnée pour un boîtier de montre selon la revendication 1, dans laquelle ladite partie façonnée (2,4) est une partie d'enveloppe intérieure dudit boîtier de montre.

FIG.1

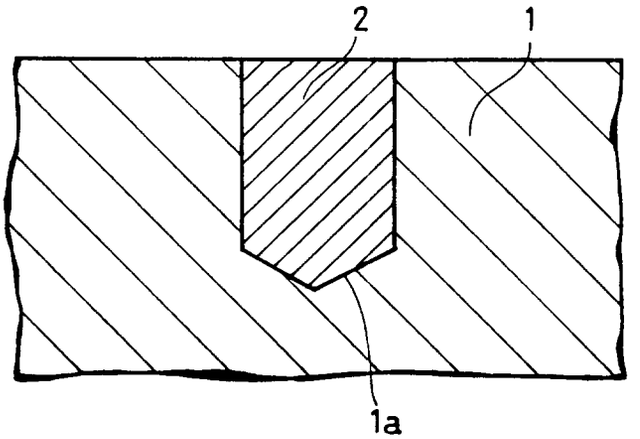

FIG.2

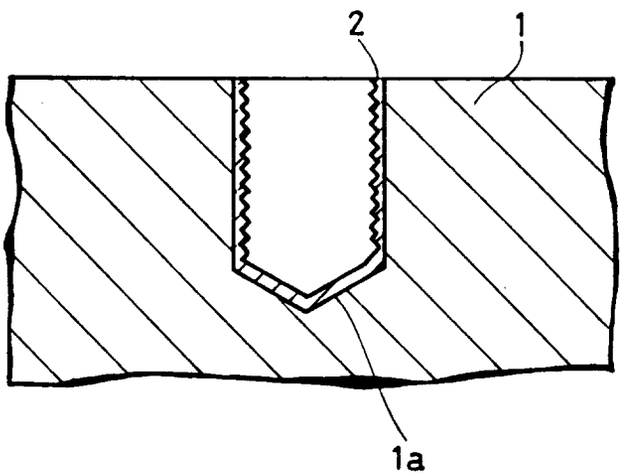

FIG.3

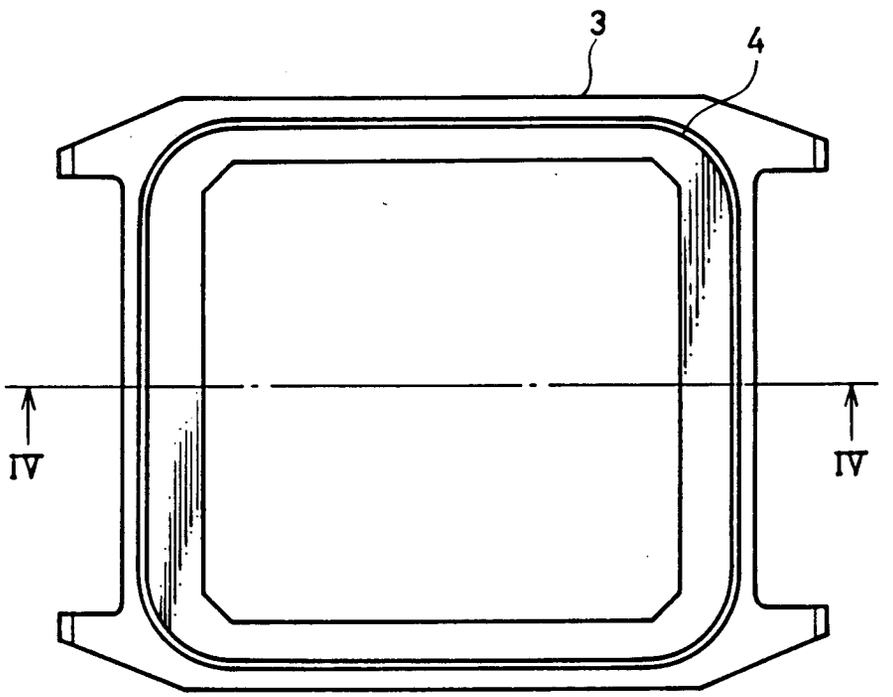

FIG.4