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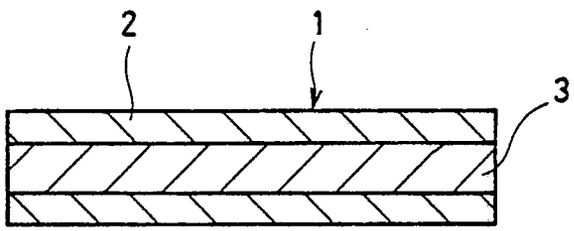
(54) **Workpiece for a watch band.**

(57) A workpiece for a watch band comprises a worked part (3) to be machined and a base part (2) joined by diffused junction with the worked part (3), which is prepared by a material being superior in machinability to that for the base part (2).

FIG.1



Workpiece for a Watch Band

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a workpiece employed for forming a watch band for a wrist watch.

Description of the Prior Art

A band for a wrist watch, which is easily scratched, is preferably formed by a hard alloy. In particular, cemented carbide is employed as a material for the band of a high-grade wrist watch.

However, it is difficult to work an extremely hard material such as cemented carbide into a desired configuration which is applicable to a watch band. Such a watch band must be provided with holes for receiving pins or screws, which are adapted to couple parts of the watch band with each other. In the case of a workpiece for a watch band made of cemented carbide, such holes are formed by electric discharge machining, which requires a long time.

On the other hand, parts of cemented carbide for a watch band may be formed to be previously provided with such holes. However, sufficient dimensional accuracy cannot be attained if the parts are previously formed to have holes of desired diameters.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a workpiece of excellent machinability for a watch band, which can be manufactured at a low cost, by employing unscratchable cemented carbide.

The workpiece for a watch band according to the present invention comprises a worked part to be machined and a base part joined through diffused junction with the worked part, which is prepared by a material being superior in machinability to that for the base part.

Thus, the worked part of the inventive workpiece for a watch band 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 to the base part. Therefore, the worked part can be joined to the base part simultaneously with sintering of the base part. Thus, steps for manufacturing the workpiece are not complicated.

According to the present invention, the worked part is prepared by a material which is superior in machinability to that for the base part. When the base part is prepared by cemented carbide, the worked part is preferably prepared by a metal selected from groups IV, V and VI of the periodic table or an alloy of two or more such metals. Particularly when the cemented carbide is WC-Co cemented carbide, the material for the worked part is preferably prepared by Mo, W or Ta, most preferably by Mo in view of junction strength. When the cemented carbide is TaC-Ni cemented carbide, the worked part is preferably prepared by Mo or a W-Ni alloy, most preferably by the W-Ni alloy in view of junction strength.

Diffused junction in the present invention is preferably performed by sintering diffused junction or HIP (hot isostatic pressing) diffused junction in view of manufacturing steps. Such sintering diffused junction and HIP diffused junction may be combined with each other. In case of such combination, HIP diffused junction may be performed after sintering diffused junction, or sintering diffused junction and HIP diffused junction may be simultaneously performed.

For example, a sintered worked part may be brought into close contact with an unsintered base part, which in turn is sintered in this state, to thereafter perform HIP forming. Alternatively, an unsintered worked part may be brought into close contact with an unsintered base part so that both of the base part and the worked part are sintered in this state, to thereafter perform HIP forming. Further, a sintered worked part may be brought into close contact with a sintered base part to be re-sintered, to thereafter to perform HIP

forming.

It may be considered that carbide of the material for the worked part is formed in the junction interface in diffused junction, to improve junction strength.

A material of excellent machinability is joined by diffused junction to the worked part of the inventive workpiece for a watch band, which can be easily machined to obtain watch band parts of high dimensional accuracy. Further, the worked part can be worked by general machining with no electric discharge machining, which has been generally required in the prior art, whereby the working time can be extremely reduced.

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, the manufacturing steps are not complicated.

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 front sectional view showing a workpiece for a watch band according to an embodiment of the present invention;

Fig. 2 is a side elevational view showing the workpiece for a watch band according to the embodiment of the present invention;

Fig. 3 is a front sectional view showing a state in which the workpiece of Figs. 1 and 2 is worked to be provided with holes; and

Fig. 4 is a side elevational view showing the state in which the workpiece of Figs. 1 and 2 are worked to be provided with holes.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Figs. 1 and 2 are a front sectional view and a side elevational view showing a workpiece for a watch band according to an embodiment of the present invention. Referring to Figs. 1 and 2, a workpiece 1 for a watch band comprises a base part 2 of cemented carbide and worked parts 3 embedded in holes formed in the base part 2. This workpiece 1 for a watch band is obtained by embedding sintered worked parts 3 in the holes of the base part 2 being in an unsintered state, sintering the base part 2 and thereafter performing HIP forming.

Various samples of such workpieces 1 were manufactured by combining materials for the base parts 2 and the worked parts 3 as listed in Table 1. As shown in Figs. 3 and 4, each workpiece 1 for a watch band thus obtained was formed with holes 5 in the worked parts 3 through machining, and workability thereof was evaluated as an index. Evaluation was made on the working step and working ability thereof. As to the working step, the average value in working ability of hole working by drilling was expressed as an index.

For the purpose of comparison, workability indices were also evaluated as to the case of working holes in base parts 2 being joined with no worked parts 3, i.e., being provided with no holes themselves. The results are also listed in Table 1. In each case, such evaluation was made on the working step and working ability thereof, similarly to the above. As to the working step, the average value in working ability of hole working by electric discharge machining 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

Although the workpiece 1 for a watch band is formed with through holes to be filled with the worked parts 3 in the aforementioned embodiment, non-through type holes may be formed from both of longitudinal end portions of the workpiece 1 toward its center to be filled with the worked parts 3, which are then provided with holes respectively to receive pins in both of longitudinal end portions. Further, the holes to be filled with the worked parts 3 are not restricted to be circular in section as shown in the drawings, but the same may be provided in an arbitrary sectional configuration such as a square one.

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 watch band comprising:
a worked part (3) to be machined; and
a base part (2) joined with said worked part by diffused junction,
said worked part (3) being prepared by a material being superior in machinability to that for said base part (2).

2. A workpiece for a watch band in accordance with claim 1, wherein
said base part (2) is prepared by cemented carbide.

3. A workpiece for a watch band in accordance with claim 2, wherein
said cemented carbide is WC-Co cemented carbide

4. A workpiece for a watch band in accordance with claim 2, wherein
said cemented carbide is TaC-Ni cemented carbide.

5. A workpiece for a watch band in accordance with claim 1, wherein
said worked part (3) is prepared by a metal selected from groups IV, V and IV of the periodic table or an alloy of two or more such metals.

6. A workpiece for a watch band in accordance with claim 3, wherein
said worked part (3) is prepared by Mo, W or Ta.

7. A workpiece for a watch band in accordance ith claim 4, wherein
said worked part (3) is prepared by Mo or a W-Ni alloy.

8. A workpiece for a watch band in accordance with claim 1, wherein
said diffused junction is sintering diffused junction.

9. A workpiece for a watch band in accordance with claim 1, wherein
said diffused junction is HIP diffused junction

10. A workpiece for a watch band in accordance with claim 1, wherein said diffused junction is achieved by sequentially performing sintering and HIP.

11. A workpiece for a watch band in accordance with claim 1, wherein said diffused junction is achieved by simultaneously performing sintering and HIP.

FIG.1

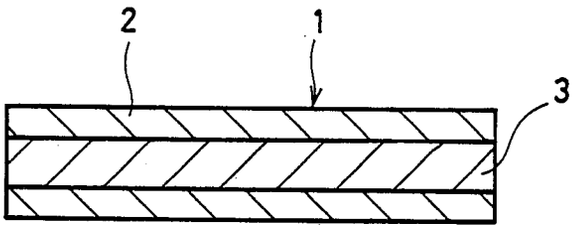


FIG.2

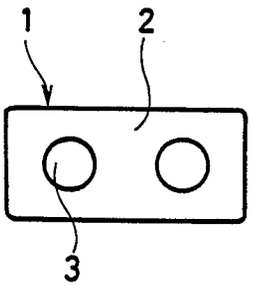


FIG.3

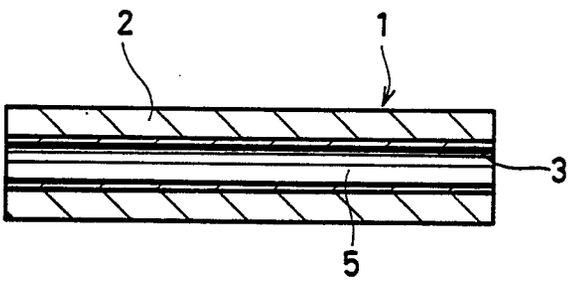


FIG.4