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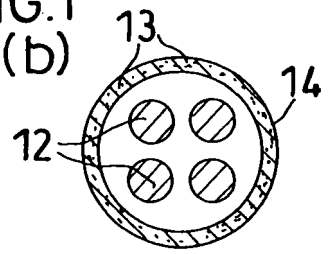
(54) **Brush material**

(57) A brush material includes a brush bristle material (12a) that is composed of a bundle of plural metal brush bristles (12) each having a circular or polygonal section; and a covering layer (14) that contains an abrasive (13) and is provided on a surface of the brush bristle material.

FIG.1
(b)



EP 2 050 541 A1

Description

BACKGROUND OF THE INVENTION

Field of the Invention:

[0001] The present invention relates to a brush material that can be used for polishing the surface of a workpiece or for polishing and grinding it for burring.

Description of the Related Art:

[0002] A conventionally known brush material that can be used for polishing the surface of a workpiece or for polishing and grinding it for burring is, for example, a brush material that includes as a core a plurality of synthetic fibers containing abrasive particles and as a covering a thin multifilament of synthetic fiber provided around the core (see JP-A SHO 63-318907).

[0003] However, in the case where the brush material including the covering of the thin multifilament of synthetic fiber is used for polishing the surface of a workpiece or for polishing and grinding it for burring, and used under severe conditions such as being brought into contact with the surface of the workpiece while being rotated at high speed, or being subjected to a strong pressing force, a burring effect or a polishing effect cannot be expected when a hard burr is formed on the surface or corner of the workpiece, and there is a need for improvement.

[0004] The present invention has been achieved to solve the above described problem, and has as an object to provide a brush material having wear resistance and durability so that a burring effect or a polishing effect can be expected even when a hard burr is formed on the surface or corner of a workpiece in the case where the brush material is used for polishing the surface of the workpiece or for polishing and grinding it for burring, and used under severe conditions such as being brought into contact with the surface of the workpiece while being rotated at high speed, or being subjected to a strong pressing force.

SUMMARY OF THE INVENTION

[0005] In order to achieve the object, the invention provides, as the first aspect thereof, a brush material including: a brush bristle material that is composed of a bundle of plural metal brush bristles each having a circular or polygonal section; and a covering layer that contains an abrasive and is provided on a surface of the brush bristle material.

[0006] In the second aspect of the invention that includes the brush material of the first aspect, the covering layer contains as the abrasive at least one member selected from the group consisting of alumina, silicon carbide, cerium oxide and diamond.

[0007] In the third aspect of the invention that includes the brush material of the first aspect, each of the metal brush bristles has an abrasive layer formed by electrodepositing an abrasive on a surface of each metal brush bristle.

[0008] In the fourth aspect of the invention that includes the brush material of the second aspect, the covering layer contains as the abrasive plural members comprising 1% to 10% by weight of diamond and 90% to 99% by weight of other members.

[0009] In the fifth aspect of the invention that includes the brush material of the first aspect, the covering layer has a resin coated thereon, a resin coat wound thereon in a spiral shape or a pipe member of thin resin film mounted thereon.

[0010] In the sixth aspect of the invention that includes the brush material of the first aspect, the covering layer contains aromatic or deodorant powder.

[0011] According to the brush material of the present invention, the brush bristle material includes the covering layer provided on the surface of the resin brush bristle material composed of a bundle of plural brush bristles. Thus, the brush material has wear resistance and durability, and a burring effect or a polishing effect can be expected even when a hard burr is formed on the surface or corner of a workpiece in the case where the brush material is used under severe conditions such as being brought into contact with the surface of the workpiece while being rotated at high speed, or being subjected to a strong pressing force.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1(a) is a schematic perspective view of a brush material of Embodiment 1 according to the present invention, and FIG. 1(b) is an enlarged sectional view of the brush material taken along line Ib-Ib in FIG. 1(a).

[0013] FIG. 2 (a) is a schematic perspective view of a brush material of Embodiment 2 according to the present invention, and FIG. 2(b) is an enlarged sectional view of the brush material taken along line IIb-IIb in FIG. 2(a).

[0014] FIG. 3 (a) is a schematic perspective view of a brush material of Embodiment 3 according to the present invention, and FIG. 3(b) is an enlarged sectional view of the brush material taken along line IIIb-IIIb in FIG. 3(a).

[0015] FIG. 4 (a) is a schematic perspective view of a brush material of Embodiment 4 according to the present invention, and FIG. 4(b) is an enlarged sectional view of the brush material taken along line IVb-IVb in FIG. 4(a).

[0016] FIG. 5(a) is a schematic perspective view of a brush material of Embodiment 5 according to the present invention, and FIG. 5(b) is an enlarged sectional view of the brush material taken along line Vb-Vb in FIG. 5(a).

[0017] FIGS. 6(a), 6(b) and 6(c) are schematic perspective views of metal brush bristles having circular, triangular and quadrangular sections, respectively, used in Embodiments 1 to 5 according to the present invention.

[0018] FIGS. 7(a), 7(b) and 7(c) are schematic perspective views of the metal brush bristles having the circular, triangular and quadrangular sections in FIG. 6 each

having an abrasive layer formed by electrodepositing an abrasive on the surface of the metal brush bristle.

[0019] FIG. 8 is a schematic view of examples of various sectional shapes of the metal brush bristle.

[0020] FIGS. 9(a) and 9(b) are schematic perspective views of other examples of metal brush bristles.

[0021] FIG. 10 is a schematic perspective view of another brush bristle material.

[0022] FIGS. 11(a) and 11(b) are schematic perspective views of examples of covering layers according to the present invention.

[0023] FIGS. 12(a) to 12(e) are schematic views of sectional shapes of other brush materials.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0024] Now, embodiments of the present invention will be described with reference to the drawings. In the drawings, like reference numerals denote like components.

[0025] FIG. 1(a) is a schematic perspective view of a brush material of Embodiment 1 according to the present invention, and FIG. 1(b) is an enlarged sectional view of the brush material taken along line Ib-Ib in FIG. 1(a).

[0026] In FIGS. 1(a) and 1(b), a brush material 11 includes a brush bristle material 12a composed of a bundle of four metal brush bristles 12 each having a circular section, and a covering layer 14 of a resin coat that contains an abrasive 13 and is provided on the surface of the brush bristle material 12a.

[0027] FIG. 2 (a) is a schematic perspective view of a brush material of Embodiment 2 according to the present invention, and FIG. 2(b) is an enlarged sectional view of the brush material taken along line IIb-IIb in FIG. 2(a).

[0028] In FIG. 2, a brush material 21 includes a brush bristle material 22a composed of a bundle of four metal brush bristles 22 each having a triangular section, and a covering layer 14 of a resin coat that contains an abrasive 13 and is provided on the surface of the brush bristle material 22a.

[0029] FIG. 3(a) is a schematic perspective view of a brush material of Embodiment 3 according to the present invention, and FIG. 3(b) is an enlarged sectional view of the brush material taken along line IIIb-IIIb in FIG. 3(a).

[0030] In FIG. 3, a brush material 31 includes a brush bristle material 32a composed of a bundle of four metal brush bristles 32 each having a quadrangular section, and a covering layer 14 of a resin coat that contains an abrasive 13 and is provided on the surface of the brush bristle material 32a.

[0031] FIG. 4(a) is a schematic perspective view of a brush material of Embodiment 4 according to the present invention, and FIG. 4(b) is an enlarged sectional view of the brush material taken along line IVb-IVb in FIG. 4(a).

[0032] In FIG. 4, a brush material 41 includes a brush bristle material 42a composed of a bundle of three metal brush bristles, one metal brush bristle 12 having a circular section, another metal brush bristle 22 having a triangular section and the remaining one metal brush bristle 32 having a quadrangular section, and a covering layer 14 of a resin coat that contains an abrasive 13 and is provided on the surface of the brush bristle material 42a.

[0033] FIG. 5(a) is a schematic perspective view of a brush material of Embodiment 5 according to the present invention, and FIG. 5(b) is an enlarged sectional view of the brush material taken along line Vb-Vb in FIG. 5(a).

[0034] In FIG. 5, a brush material 51 includes a brush bristle material 54 composed of a bundle of plural metal brush bristles consisting of one center metal brush bristle 52 having a circular section and a large diameter and a plurality of (twelve in FIG. 5) metal brush bristles 53 each having a circular section and a small diameter placed around the center metal brush bristle 52, and a covering layer 14 of a resin coat that contains an abrasive 13 and is provided on the surface of the brush bristle material 54.

[0035] The covering layer 14 is formed of a resin coat containing as the abrasive 13 at least one member selected from the group consisting of alumina, silicon carbide, cerium oxide and diamond. When the covering layer 14 contains as the abrasive 13 plural members, the plural members comprise 1 to 10% by weight of diamond and 90 to 99% by weight of other members.

[0036] The covering layer 14 may contain aromatic powder or deodorant powder together with the abrasive 13. The aromatic powder or deodorant powder contained in the covering layer 14 can provide an aromatic property or a deodorant property to the brush bristle material 12a during polishing of a workpiece.

[0037] FIG. 6(a) shows the metal brush bristle 12 having a circular section, FIG. 6(b) shows the metal brush bristle 22 having a triangular section, and FIG. 6(c) shows the metal brush bristle 32 having a quadrangular section.

[0038] Each of the metal brush bristles 12, 22 and 32 having circular or polygonal sections may have an abrasive layer 10a formed by electrodepositing an abrasive 10 on the surface of the metal brush bristle and firmly securing the abrasive 10 with one layer of metal skin. FIG. 7(a) shows a metal brush bristle 12b having an abrasive layer 10a formed by electrodepositing the abrasive 10 on the surface of the metal brush bristle 12 having the circular section, FIG. 7(b) shows a metal brush bristle 22b having an abrasive layer 10a formed by electrodepositing the abrasive 10 on the surface of the metal brush bristle 22 having the triangular section, and FIG. 7(c) shows a metal brush bristle 32b having an abrasive layer 10a formed by electrodepositing the abrasive 10 on the surface of the metal brush bristle 32 having the quadrangular section. The abrasive 10 may be made of the same material as the abrasive 13 or a different material from the abrasive 13.

[0039] FIG. 8 is a schematic view of examples of various sectional shapes of the metal brush bristle. The shown metal brush bristles 12, 22 and 32 in Embodiments 1 to 4 have the circular, triangular and quadrangular (square) sections. Besides, the metal brush bristle may have a section of a polygonal shape, such as a hexagonal

shape 33 or an octagonal shape 34, an oval shape 35, a cross shape 36, a shape of glasses like a gourd 37, a shape of a four-leaved clover 38 (or an unshown shape of a three-leaved clover), or a rectangular shape 39.

[0040] The shown metal brush bristles 12, 22 and 32 are linear members. Besides, a twisted metal brush bristle 22c as shown in FIG. 9(a), or a finely corrugated metal brush bristle 22d as shown in FIG. 9(b) may be used.

[0041] When two or more metal brush bristles 12, 22 and 32 are bound to form a brush bristle material, the plurality of metal brush bristles 12 may be bound as they are to form a brush bristle material, or a plurality of (three in FIG. 10) metal brush bristles 12 having various sectional shapes may be woven to form a brush bristle material 60 as shown in FIG. 10.

[0042] The covering layer 14 can be formed by coating resin, but a covering layer 14a may be formed by winding a resin coat in a spiral shape as shown in FIG. 11(a), or a covering layer 14b may be formed by mounting a pipe member of thin resin film as shown in FIG. 11(b).

[0043] FIGS. 12(a) to 12(e) are schematic views of sectional shapes of other brush materials. The covering layer 14 of each of the shown brush materials 11, 21, 31, 41 and 51 in Embodiments 1 to 5 has a section of a circular ring shape, but the covering layer of the brush material may be formed to have a section of a quadrangular ring shape 61 with a circular hole as shown in FIG. 12(a), a triangular ring shape 62 as shown in FIG. 12(b), a hexagonal ring shape 63 as shown in FIG. 12(c), an octagonal ring shape 64 as shown in FIG. 12(d), or an oval ring shape 65 as shown in FIG. 12(e).

[0044] The present invention is not limited to the embodiments, but may be implemented in any manner without changing the configuration described in Claims. For example, three or four resin brush bristles are provided inside the covering layer in Embodiments 1 to 5, but other plural number of resin brush bristles may be provided.

Claims

1. A brush material comprising:

a brush bristle material that is composed of a bundle of plural metal brush bristles each having a circular or polygonal section; and
a covering layer that contains an abrasive and is provided on a surface of the brush bristle material.

2. The brush material according to claim 1, wherein the covering layer contains as the abrasive at least one member selected from the group consisting of alumina, silicon carbide, cerium oxide and diamond.

3. The brush material according to claim 1, wherein each of the metal brush bristles has an abrasive layer formed by electrodepositing an abrasive on a surface of each metal brush bristle.

4. The brush material according to any one of claim 2, wherein the covering layer contains as the abrasive plural members comprising 1% to 10% by weight of diamond and 90% to 99% by weight of other members.

5. The brush material according to claim 1, wherein the covering layer has a resin coated thereon, a resin coat wound thereon in a spiral shape or a pipe member of thin resin film mounted thereon.

6. The brush material according to claim 1, wherein the covering layer contains aromatic or deodorant powder.

FIG.1 (a)

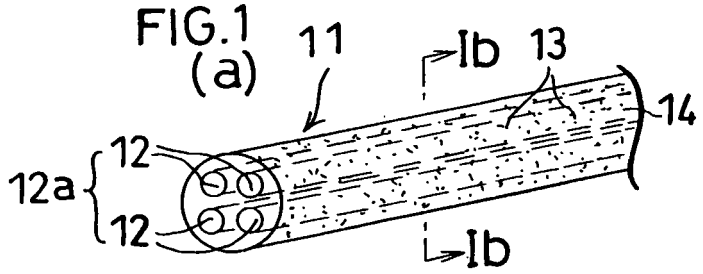


FIG.1 (b)

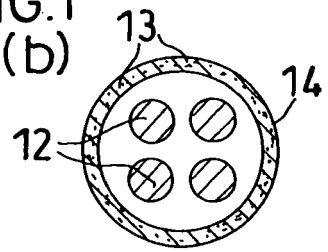


FIG.2 (a)

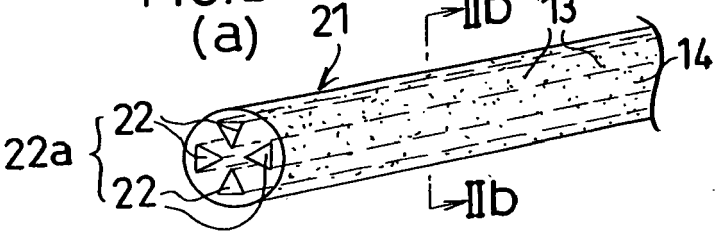


FIG.2 (b)

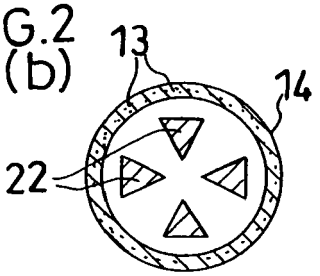


FIG.3 (a)

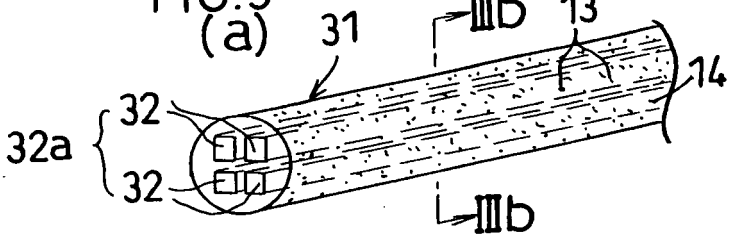


FIG.3 (b)

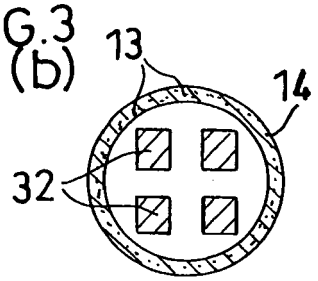


FIG.4 (a)

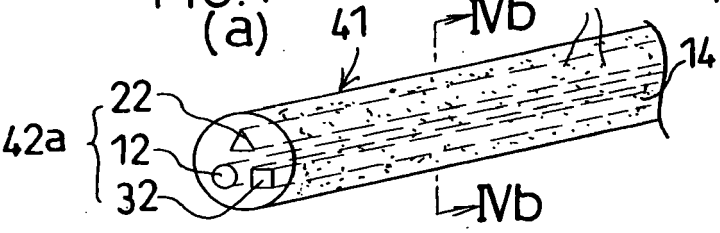


FIG.4 (b)

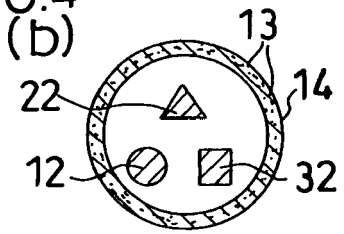


FIG.5 (a)

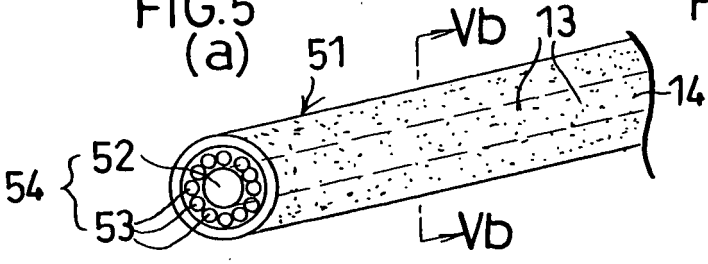


FIG.5 (b)

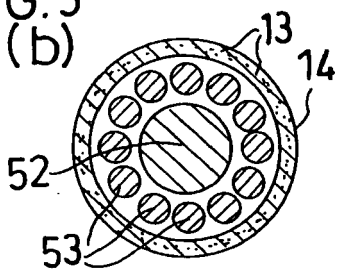


FIG.6 (a)

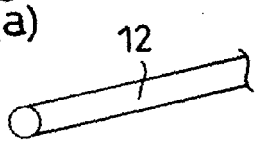


FIG.6 (b)

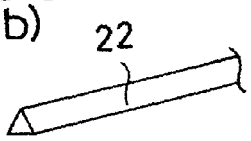


FIG.6 (c)

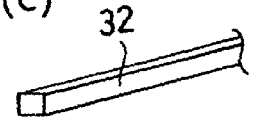


FIG.7 (a)

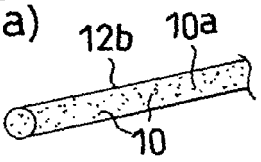


FIG.7 (b)

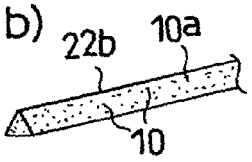


FIG.7 (c)

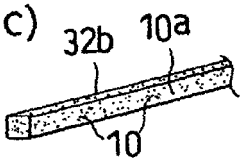


FIG.8

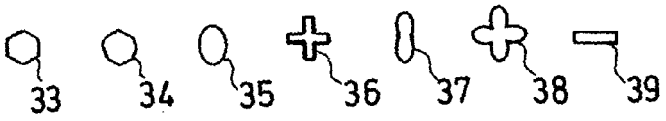


FIG.9(a)

FIG.9(b)

FIG.10

FIG.11(a)

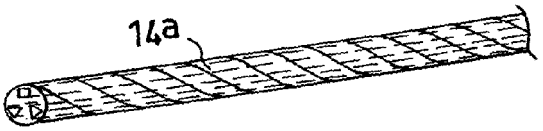


FIG.11(b)

FIG.12 (a)

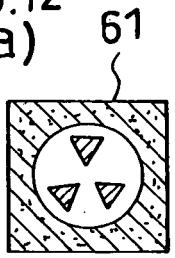


FIG.12 (b)

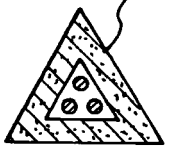


FIG.12 (c)

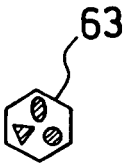


FIG.12 (d)

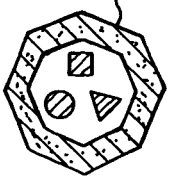
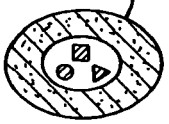


FIG.12 (e)



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 25 4107

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 93/18890 A (MINNESOTA MINING & MFG [US]) 30 September 1993 (1993-09-30)	1,2	INV. B24D13/10
Y	* page 10, lines 19-31 * * page 22, lines 3-25 *	6	B24D13/14
A	* page 23, lines 4-9; figures 1-3 *	3-5	
Y	US 3 147 503 A (CHARVAT VERNON K) 8 September 1964 (1964-09-08) * column 5, lines 32-38 *	6	
A	JP 62 251082 A (MATSUSHITA ELECTRIC WORKS LTD) 31 October 1987 (1987-10-31) * abstract *	3	

TECHNICAL FIELDS SEARCHED (IPC)

B24D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 February 2008	Zeckau, Jochen

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 25 4107

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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27-02-2008

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REFERENCES CITED IN THE DESCRIPTION

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