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(54) **Process for manufacture of a tool for abrasive purposes.**

Herstellungsverfahren eines Schleifwerkzeuges.

Procédé de fabrication d' un outil abrasif.

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Description

Field of the invention

[0001] The present invention relates to a process for the manufacture of an abrasive tool, in particular an abrasive tool for application on a power tool of the eccentric orbit sander type.

Background art

[0002] For abrasive purposes sheet materials provided with small particles of a hard material on the surface have been known for a long time. Such abrasive sheet materials may be composed of a sheet of e.g. paper or cloth onto which grains of a hard material, such as sand, silicon carbide, tungsten carbide or the like is provided. Common products of such abrasive sheet materials are sand paper or emery cloth, which may be used for manually driven tools as well as for power driven tools.

[0003] A very common type of a power driven tool using such an abrasive sheet material is a tool having a moving pad on which the abrasive sheet material is attached. An example of such a tool is an orbital sander which has a rectangular pad which under use is moving back and forth.

[0004] More sophisticated types of power tools are so-called eccentric orbit sanders or random orbit sanders respectively, in which the path of movement of the pad holding the abrasive sheet material is not linear, but rather eccentric.

[0005] The abrasive sheet material for the tools of the eccentric orbit sander type is usually provided with attachment means on the non-abrasive surface in order for the sheet material to be secured on the moving pad. Such attachment means of the sheet material usually comprises one part of a Velcro fastening means (the loop part of the Velcro) whereas the pad on which the sheet material is to be attached, is provided with the other part of the Velcro fastening means (the hook part of the Velcro).

[0006] Abrasive tools of the above type comprising such power driven tools however suffers from the disadvantage that the grains provided on the sheet material very quickly loose their respective adhesion to the sheet material used, resulting in a very rapidly declining abrasive efficiency. Furthermore, due to the somewhat fragile character of the sheet material, use of such material will under rough conditions eventually result in the sheet material itself being torn apart. The above features result in the need to a frequent renewal of the abrasive sheet material of the power tool, which is a time consuming operation as well as a rather expensive solution.

[0007] In order to solve the problems set out above, attempts have previously been made to substitute the abrasive paper or cloth material to be used with the power tool with a metal disc having soldered thereon small grains of an abrasive material, such as silicon carbide, tungsten carbide etc.

[0008] Metal discs having abrasive material soldered thereon for application on an angle grinder are already on the market. In such a tool the disc is secured to the rotating shaft with a nut.

[0009] In the case of an eccentric orbit sander, in order for a metal disc having abrasive material soldered thereon to be able to be securely attached to the Velcro fastening means under the working conditions of such an eccentric orbit sander, wherein quite violent forced are involved, the disc should have a weight that is not too high (i.e. the disc should not be too thick); if the disc is too heavy (too thick) the forces involved will be able to overcome the attachment forces of the Velcro tape, resulting in the disc leaving its position on the pad on which it is attached which may lead to a very dangerous situation. Accordingly it is essential that discs having relatively light weights (i.e. thin discs) are used for such power tools. It has been found that the Velcro fastening means of a typically eccentric orbit sander tool, e.g. of the type Würth Master ETS 150 Twin is capable of securely attaching a metal disc having a weight of not more than 42 grams (a typically paper disc has a weight of 34 grams).

[0010] DE 1 288 950 B discloses a method of manufacturing an abrasive tool wherein particles of metal carbide are soldered to a thin steel plate.

[0011] However until now, such light weight (thin) metal discs for use on power tools of the eccentric orbit sander type have not been available. This may be due to the fact that attempts to manufacture such metal discs having a thickness in the upper part of the allowable range (allowable in this respect is to be interpreted in terms of safety) have lead to products that were not planar enough to be suitable for an eccentric orbit sander tool.

[0012] The reason for the product being non-planer is the extremely harsh conditions encountered during the soldered (high temperature etc). The disappointing results obtained by using metal disc having a thickness in the upper end of the allowable range may have made the manufacturer reluctant to attempt to make disc having a smaller thickness as it is logical that metal disc of a smaller thickness will inevitably lead to a yet more non-planar product.

[0013] Accordingly, a need still exists for an abrasive tool made of metal sheet having soldered thereon grains of an abrasive material, which abrasive tool is for example intended for a power tool of the eccentric orbit sander type, wherein the metal sheet is sufficiently thin in order to be securely attached to the fastening means involved, and wherein the metal sheet after being soldered is suitable for the intended application.

Brief description of the invention

[0014] The present invention is aimed at solving the problems set out above. This is accomplished by a process according to the present invention for the manufacture of an abrasive tool, in particularly an abrasive tool for application on a power tool of the eccentric orbit sander type, comprising:

i) application of a soldering paste to an area of a metal body having a thickness of 0.04 to 0.25 mm;
ii) application of tungsten carbide particles to all or a part of said soldering paste area;
iii) in a heating zone of an atmosphere of cracked propane, ammonia or a mixture of hydrogen and nitrogen, subjecting said metal body provided with tungsten carbide particles to a temperature of 980 to 1140 degrees C in a time of residence which is sufficient for soldering the particles onto the metal body;
iv) in a curing zone subjecting said metal body provided with tungsten carbide to a temperature declination which is appropriate for curing the metal of said metal body.

[0015] Although the abrasive tool primarily relates to application with a power tool of the eccentric orbit sander type it has been found, that the abrasive tool according to the present invention is highly useful in such applications of other types of power tools, wherein an abrasive tool can be attached to a pad on the power tool. Such other types of power tools comprises e.g. orbital sander type, an angle grinder or a sander of the type for use for sanding wooden floors. In fact the abrasive tool is contemplated for use with any type of power tool allowing such tool. Even belt sanders/grinders of the hand held or floor grinder/sander type are contemplated as power tools which may be used with the abrasive tool.
[0016] It has surprisingly been found that the abrasive tool is capable of providing an efficiency which may be more than three times the efficiency encountered with conventional abrasive tools (in the form of paper discs) in terms of time consumed in order to perform a given abrasive task.
[0017] Without being bound to any theory it is believed that the reason for this efficiency is that the abrasive residues, such as e.g. dust appearing during the working of the tool is less prone to adherence to the spaces between the individual grains of the tool of the present invention, as compared to the situation for the conventional tools. This might be so because the grains are more sharp and more distant to each other, as compared to the prior art tools.
[0018] Furthermore it has been shown that the abrasive tool has a lead time which is 40 - 400 times the lead time of conventional abrasive tools.

Detailed description of the invention

[0019] The present invention relates in a first aspect to a process for the manufacture of an abrasive tool, in particular an abrasive tool for application on a power tool of the eccentric orbit sander type according to claim 1.
[0020] In the process according to claim 1 a metal body is applied with soldering paste on some of or all the area of a surface of the metal body. Then an abrasive material is applied to all or a part of said soldering paste whereafter the metal body is subjected to a heating zone for a period of time under a specific gas atmosphere during which the abrasive material becomes soldered onto the metal body, and it is subsequently subjected to a temperature declination in a curing zone.
[0021] The process according to claim 1 may be performed manually as separate steps wherein the respective metal bodies are manually moved from step to step. However, in a preferred embodiment, the complete process in automatic, so that the metal bodies are moved from step to step via automatic conveying means.

<u>The metal body</u>

[0022] The metal body to be used as a starting material in the process according to the present invention may be selected from the group of metals termed "spring steel". A preferred metal to be used in the process according to the present invention is spring steel CK 75 (according to DIN 17222/1544) or spring steel CK 101.
[0023] The metal body should be in sheet form having a thickness of 0.04 to 0.25 mm. For example the thickness of the metal plate may have a lower limit of 0.05, preferably 0.06, more preferred 0.07, yet more preferred 0.08 mm and most preferred 0.1 mm. Additionally, the thickness of the metal plate may for example have an upper limit of 0.22 mm, such as 0.20, more preferably 0.18, yet more preferably 0.16, still more preferred 0.14, and most preferred 0.12 mm. If the abrasive tool is for application on a power tool of the eccentric sander type, the thickness of the metal body is preferably 0.2 or 0.1 mm. Depending on the type of power tool, the shape of the metal body may be circular, triangular or any other suitable shape that fits well onto the pad of the power driven tool. Typical sizes for circular shapes are 0 115 mm, Ø 125 mm and Ø 150 mm. A typical size of a triangular shape is a triangle having identical curved leg lengths of 95 mm.
[0024] In a preferred embodiment according to the process of the present invention the metal body is subjected to a

cleaning and/or degreasing process prior to the application of the soldering paste. Typically the cleaning and/or degreasing process will be performed by immersing the metal body in a cleaning and/or degreasing material, such as a detergent. However any other suitable cleaning/degreasing materials and/or techniques generally used for such purposes are contemplated.

The soldering paste

[0025] In the first process step according to the process of claim 1, the metal body, which has previously been cut into a shape which makes the final product suitable for use with the intended type of power tool, is applied with a soldering paste to an area of the surface. This application may be performed by applying the soldering paste to the selected area of the metal body with a spray brush or a roller or in any other suitable way. However the preferred way of application is application by spraying.

[0026] If the desired abrasive tool is a metal disc to be used on an eccentric orbit sander power tool the metal body is preferable applied with soldering paste on one surface only. However for other purposes the metal body, which may have another shape, may be applied with soldering paste on more than one surface.

[0027] The type of soldering paste to be applied may be any kind of soldering paste which is suitable for the intended purpose of soldering the abrasive particles onto the metal body. In this respect it should be kept in mind that the final product should be able to withstand to a very high extend the rough conditions encountered by the abrasive particles under use. Accordingly, the soldering paste applied must be able to prevent to a high extend the loss of adherence of the abrasive particles to the metal body under the considerably strong forces applicable under use.

[0028] Examples of types of soldering pastes which are applicable for use in the process of the present invention are nickel, bronze or copper soldering pastes. Such soldering pastes are commercially available. A few preferred copper soldering pastes are: Cubond Furnace Brazing Paste 15H and C699.

Application of the abrasive material

[0029] In the second process step according to the process of claim 1 particles of an abrasive material is applied onto the area of or onto a part of the area of the metal body which has been applied with the soldering paste.

[0030] The application of the abrasive material may very well be performed simply by dispensing the grains of the abrasive material onto the metal body being applied with the soldering paste.

[0031] The abrasive material to be used in accordance with the process of the present invention is tungsten carbide. The grain size of the tungsten carbide may be selected from the following: grain 36 (0.6 - 1 mm); grain 45 (0.4 - 0.8 mm); grain 60 (0.3 - 0.5 mm); grain 80 (180 - 250 micron); grain 120 (125 - 180 micron); grain 160 (75 - 106 micron); and grain 180 (45 - 75 micron).

[0032] The term "tungsten carbide" is in this application intended to mean a sintered material comprising iron, carbon, tungsten, nickel, cobalt, chromium, niobium, tantalum and optionally also titanium. A person skilled in the art will know which types of tungsten carbide to be used in the process according to claim 1.

[0033] Such tungsten carbide grain material is commercially available in the above mentioned particle sizes. As an example such products may be obtained from the following companies: Höganäs, Belgium, Kenna Metal, USA and ZCCW, China.

[0034] The density of choice of the tungsten carbide grains when applied on the metal body depends on the particle size of the grains and the contemplated use of the abrasive tool. For use as a tool for an eccentric orbit sander, the following particle size and density may for example be used: Grain 180: 4.6 g/100 cm^2; Grain 80: 2.2 g/100 cm^2.

[0035] If the abrasive tool is to be used as a sanding tool for finishing of for example wood or any other material that has to present a smooth surface it is important that the tungsten carbide particles are evenly or homogeneous distributed over the area that comes in contact with the material to be sanded. If these particles are not homogeneously distributed, the tool may leave behind traces or small grooves in the treated material.

[0036] In a preferred embodiment of the process according to claim 1 the abrasive material is applied onto the soldering paste of the metal body under the influence of a magnetic field. By applying a magnetic field during the application of the abrasive particles it is possible to orientate said abrasive particles in a desired direction in relation to the surface of the metal body. A desired orientation may be an orientation in which those particles having an oblong shape is arranged in a configuration in which they are aligned essentially perpendicular to the surface of the metal body. This will have the effect that the distance from the respective outermost points of the abrasive particles to the base of the metal body is increased compared to the situation in which no magnetic field is applied. Accordingly the presence of an applied magnetic field during the application of the abrasive particles will give a resulting product which resembles a product obtained by use of larger particles of the abrasive material, but without applying a magnetic field. Thus, by applying a magnetic field a more coarse structure of the abrasive tool may be achieved without increasing the weight of the abrasive tool.

[0037] The magnetic field applied may originate from an ordinary magnet, such as a rod-shaped magnet, or it may originate from an electromagnet. The use of an electromagnet is preferred.

The heating zone

[0038] In the third step of the process according to claim 1 the metal body now provided with soldering paste and tungsten carbide particles enters into a heating zone for the purpose of soldering the tungsten particles onto the metal body. In the heating zone the metal body provided with the tungsten particles is subjected to high temperatures as well as a specific gas atmosphere. The heating zone usually consists of a chamber which is provided with electrical heating means and means for supplying the specific gas atmosphere. Such a chamber may be a furnace, such as a belt furnace, a retort furnace or a vacuum furnace. A belt furnace is preferred.

[0039] The temperature to be applied in the heating zone is from 980 to 1140 degrees C. The amount of heat supplied to the metal body provided with soldering paste and tungsten carbide at this temperature will make sure that the tungsten particles will be properly soldered onto the metal body.

[0040] The actual temperature to be applied in the heating zone depends on the soldering paste which is used, and information relating to which temperature is useful with the specific soldering paste is usually given by the supplier of the soldering paste. Thus, a temperature of 984 degrees C is for example useful for the soldering paste Cubond Furnace Brazing Paste C699, mentioned above.

[0041] The heating zone is provided with a specific protective atmosphere. The effect of such an atmosphere is to act as protection against the action of oxygen. Thus it should be made sure that essentially no oxygen is present in the heating zone. As protective gases cracked propane, cracked ammonia or a mixture of hydrogen and nitrogen is useful. The choice of type and composition of the atmosphere depends on the specific furnace type used and also on the preferred dew point, which on the other hand is determined by the soldering paste of choice. The supplier of the soldering paste can provide information relating to a preferred dew point for a specific soldering paste.

[0042] The mixture of nitrogen and hydrogen is preferred due to the less aggressive properties of this mixture as compared to the cracked propane or the ammonia.

[0043] Such protective atmosphere may be present in the heating zone in a composition ranging from pure hydrogen to a hydrogen/nitrogen mixture of 40:60 vol%, such as for example a hydrogen/nitrogen mixture of 90:10, 80:20, 70/30, 60:40 or 50:50 vol%.

[0044] The time of residence of the metal body in the heating zone should obviously be sufficient in the way that it is ensured that the tungsten carbide are being soldered onto the metal body. Normally a time of residence of 5 to 30 minutes, such as 10 to 25 minutes is sufficient. A preferred time of residence of the metal body in the heating zone is 15 to 20 minutes.

The curing zone

[0045] In a fourth step according to the process of claim 1 metal body upon exit from the heating zone enters into a curing zone in order to cure the product obtained so far. The curing of the metal prevents the resulting abrasive tool form being to fragile in respect of the harsh condition that will be encountered on the working condition. If not cured, the abrasive tool will simple be too prone to wrinkling when used for abrasive purposes on a power tool.

[0046] Usually the curing of the metal consists in a simple cooling of the metal bodies exiting the heating zone. Like in the heating zone, the curing zone also comprises a chamber having a protective atmosphere. As protective atmosphere, the same types as applicable for the heating zone can be used.

[0047] The course of the curing to be applied depends on the metal used. The supplier of the sheet metal can provide information relating to the curing temperatures and rate of decreasing temperature applicable for curing purposes.

[0048] Typically the curing consists in decreasing the temperature from approximately 900 degrees C to approximately 300 degrees C in a time span of approximately 2-3 min.

[0049] In a preferred embodiment, the heating zone and curing zone are parts of the same apparatus. Thus, in a preferred embodiment, the heating zone is provided in a belt furnace wherein the metal bodies by means of a metal conveying belt enter from one end into the central part of the furnace which is provided with electrical heating elements and thus forms the actual heating zone. In the direction of movement of the belt the metal bodies after having passed the heating zone enter into the curing zone which is provided in one end of the furnace. The curing zone has a lower temperature than the heating zone and this is provided by means of a water-cooled jacket surrounding the curing zone After having left the curing zone the conveyer belt transports the metal bodies out of the furnace. In this embodiment hydrogen is supplied in the central part of the furnace, whereas nitrogen is supplied at the entrance and exit openings, respectively, of the furnace. This design of the heating zone and curing zone has proved to be very convenient.

[0050] When the metal body has finished its curing in the curing zone the abrasive tool is ready for application. However, for a number of applications wherein the abrasive tool is to be fitted on a power tool it is necessary for the abrasive tool to be provided with some kind of fastening means which allows the abrasive tool to be fitted on the power tool. Such fastening means thus depends on the specific power tool with which the abrasive tool is to be used. As fastening means any suitable means are contemplated, such as Velcro tape, self-adhesive tape nuts and/or bolts etc.

[0051] In the case where the abrasive tool is to be used on a power tool of the eccentric orbit sander type the abrasive tool is usually provided with the loop part of a Velcro tape.

[0052] Such Velcro tape is commercially available in a form suitable for this purpose and is even manufactured with self-adhesive means on the non-Velcro side which may simply be applied to said abrasive tools. Such Velcro tape will - even under very rough working conditions - provide for a safe and efficient attachment of the abrasive tool to the corresponding pad on the power tool which is provided with the other part of the Velcro tape (the hook part). It should be noted that it is important that the Velcro tape it self is able to withstand the temperatures encountered under working conditions. Accordingly, the adhesive of the Velcro tape should be able to withstand a temperature of approximately 90 degrees C.

Examples

[0053] An abrasive tool was made in the following way:

I. Copper paste (Cubond Furnace Brazing Paste 15H) was by means of a spraying gun applied to a metal body spring steel CK 75 having a thickness of 0.1 mm and a size and shape that fits on an typically eccentric orbit sander power tool (the disc was laser cut into the desired shape and the disc was also supplied with holes allowing removal of dust through the pad of the power tool). It was assured that the paste was applied homogeneously over the desired area.

II. Tungsten carbide of grain size180 was applied to the metal disc in a density of 4.6 g/100 cm^2 by dispensing the grains over the plate.

III. The metal disc having tungsten carbide applied thereto was then arranged on a conveyer belt of a belt furnace of the type Zentronic DO 6800-500 DS. The speed of the belt was 20% of the maximum speed of said belt. The temperature of the heating zone of the furnace was 1140 degrees C. The central part of the heating zone was supplied with hydrogen and at the entrance end and at the exit end of the furnace nitrogen was supplied by a pipe entering approximately 30 cm into the furnace. The supply of hydrogen and nitrogen were each adjusted so as secure that the heating zone was essentially free of oxygen and so as to obtain a hydrogen/nitrogen mixture of approximately 40:60 vol.%. The conveyer belt transferred the metal disc into the heating zone at a speed that provided for a residence time of approximately 15 min..

IV. After having exited the heating zone, the metal discs entered the curing zone, which was arranged in the exit part of the furnace. The lower temperature of the curing zone was provided by a water cooled jacket surrounding the inner part of the curing zone. In the curing zone the metal disc was subjected to a temperature drop from 1140 degrees C to 50 degrees C in 8 - 10 min. Furthermore, and within these ranges it was assured that the disc was subjected to a temperature drop of 900 degrees C to 300 degrees C in approximately 2 - 3 min.

V. When the metal disc had exited the curing zone and the furnace, it was allowed to further cooling to room temperature, whereafter a self-adherent piece of loop-part-Velcro tape was applied to the disc.

Comparison example

[0054] A comparison test was made in order to compare the abrasive tool with a conventional abrasive tool.

[0055] The convention tool was a Bosch Redwood Top K40 sheet, and the inventive tool used was an abrasive metal tool having wolfram carbide soldered thereon of grain size 45 (which in fact is less coarse than the Bosch tool). The abrasive tools were successively attached to a Bosch GEX 150 eccentric orbit sander/grinder and applied as abrasive tools for the materials listed below.

[0056] Efficiency was measured as amount of material removed per minute and for each type of the three materials sanded, the results were correlated, the result of the Bosch Redwood Top K40 tool being indexed as 100% for each particular type of material.

[0057] Lead times were measured for the GFK material until the efficiency was half the initial value at which time the tool was declared "dead" (or after 1 hour in case of the inventive tool)

[0058] The following results were obtained.

Table

Material sanded/ grinded	**Load**	**Efficiency (averaged over the time measured) and lead times**	
		Bosch Redwood Top K40	**Inventive tool having tungsten carbide of grain 45**
GFK (a very hard plastic composite material)	Weight of power tool	Efficiency 100% Lead time: tool was declared "dead" after 12 min of sanding/ grinding	Efficiency 1316% Lead time: tool was not declared "dead" even after 1 hour of sanding/grinding
Hard wood	Weight of power tool + 2.1 kg	Efficiency 100%	Efficiency 224%
Paint	Weight of power tool + 2.1 kg	Effectivty 100%	Effectivty 137%

[0059] It is seen from the table that not only was the inventive tool much more effiective than the prior art tool, but the lead time was considerably longer for the inventive material as well.

Claims

1. A process for the manufacture of an eccentric orbit abrasive tool, for application on a power tool of the eccentric orbit sander type, comprising:

   i) application of a soldering paste to an area of a metal body having a thickness of 0.04 to 0.25 mm;
   ii) application of tungsten carbide particles to all or a part of said soldering paste area;
   iii) in a heating zone of an atmosphere of cracked propane, ammonia or a mixture of hydrogen and nitrogen, subjecting said metal body provided with tungsten carbide particles to a temperature of 980 to 1140 degrees C in a time of residence which is sufficient for soldering the particles onto the metal body; and wherein the time of residence in the heating zone is of 5 to 30 minutes, preferably 10 to 25 minutes, most preferred 15 to 20 minutes;
   iv) in a curing zone subjecting said metal body provided with tungsten carbide to a temperature declination which is appropriate for curing the metal of said metal body.

2. A process according to claim 1, wherein the metal body is selected from spring steel, e.g. spring steel CK 75 or CK 101.

3. A process according to claims 1 or 2, wherein the soldering paste is selected from nickel, bronze or copper soldering paste.

4. A process according to any of the preceding claims, wherein the tungsten carbide has a grain sizes of grain 36, grain 45, grain 60, grain 80, grain 120, grain 160 or grain 180.

5. A process according to any of the preceding claims, wherein the temperature declination in the curing zone approximately comprises a temperature decrease of from 900 degrees C to 300 degrees C in a time span of approximately 2-3 min.

6. A process according to any of the preceding claims, wherein the composition of the atmosphere of the heating zone comprises a mixture of hydrogen and nitrogen.

7. A process according to any of the preceding claims, wherein the metal body prior to the application of the soldering paste in step i) is subjected to a cleaning/degreasing process.

8. A process according to any of the preceding claims wherein in step ii) the tungsten carbide particles are applied to the soldering paste area in an oriented manner under appl ication of a magnetic field.

9. A process according to any of the preceding claims wherein the abrasive tool subsequent to step iv) is provided with fastening means allowing the abrasive tool to be fitted onto a power driven tool, such as an eccentric orbit sander.

10. A process of claim 9, wherein the metal body is a sheet of metal, and wherein the metal body is provided with tungsten carbide particles on one side only, and wherein the other side is provided with a fastening means in the form of a self-adhesive loop-part of a Velcro tape being attached thereto.

Patentansprüche

1. Verfahren zum Herstellen eines Exzenterschleifwerkzeuges zur Verwendung auf einer Exzenterschleifmaschine des Sandpapiertyps, wobei das Verfahren folgende Schritte umfaßt:

i) Auftragen einer Lötpaste auf eine Fläche eines Metallkörpers mit einer Dicke von 0,04 bis 0,25 mm;
ii) auf die Lötpastefläche ein ganzes oder teilweises Auftragen von Wolframkarbidpartikeln;
iii) Aussetzen den mit Wolframkarbidpartikeln versehenen Metallkörper einer Temperatur von 980 bis 1140°C in einer Heizungszone in einer Atmosphäre von gekracktem Propan, Ammoniak oder einer Mischung von Wasserstoff und Stickstoff während einer fiir das Löten der Partikel auf dem Metallkörper ausreichenden Verweilzeit, und wobei die Verweilzeit in der Heizungszone 5-30 Minuten, vorzugsweise 10-25 Minuten, am meistens bevorzugt 15-20 Minuten beträgt;
iv) Aussetzen den mit Wolframkarbid versehenen Metallkörper einer zur Aushärtung vom Metall des Metallkörpers gerechten Temperaturneigung in einer Aushärtungszone.

2. Verfahren nach Anspruch 1, wobei der Metallkörper aus Federstahl, z.B. Federstahl CK 75 oder CK 101, gewählt wird.

3. Verfahren nach den Ansprüchen 1 oder 2, wobei die Lötpaste aus Nickel-, Bronze- oder Kupfer-Lötpaste gewählt wird.

4. Verfahren nach irgendeinem der vorhergehenden Ansprüchen, wobei das Wolframkarbid eine Korngröße von Korn 36, Korn 45, Korn 60, Korn 80, Korn 120, Korn 160 oder Korn 180 aufweist.

5. Verfahren nach irgendeinem der vorgehenden Ansprüchen, wobei die Temperaturneigung in der Aushärtungszone etwa den Temperaturrückgang von 900°C bis 300°C während einer Zeitspanne von etwa 2-3 Minuten umfaßt.

6. Verfahren nach irgendeinem der vorhergehenden Ansprüchen, wobei sich die Atmosphäre in der Heizungszone aus einer Mischung von Wasserstoff und Stickstoff zusammenstellt.

7. Verfahren nach irgendeinem der vorhergehenden Ansprüchen, wobei den Metallkörper vor der Auftragung der Lötpaste im Verfahrensschritt i) einem Reinigungs/Entfettungsverfahren ausgesetzt wird.

8. Verfahren nach irgendeinem der vorhergehenden Ansprüchen, wobei im Verfahrensschritt ii) die Wolframkarbidpartikel auf orientierter Weise auf die Lötpastefläche unter Aufbringung eines Magnetfeldes aufgetragen werden.

9. Verfahren nach irgendeinem der vorhergehenden Ansprüchen, wobei das Schleifwerkzeug nach Verfahrensschritt iv) mit Befestigungsmitteln versehen wird, die das Aufsetzen des Schleifwerkzeuges auf ein kraftbetriebenes Werkzeug, sowie eine Exzenterschleifmaschine des Sandpapiertyps, ermöglichen.

10. Verfahren nach Anspruch 9, wobei der Metallkörper eine Blechtafel ist, und wobei der Metallkörper nur auf der einen Seite mit Wolframkarbidpartikeln versehen ist, und wobei die andere Seite mit einem Befestigungsmittel in der Form eines selbstklebenden Flauschteils eines darauf befestigten Klettverschlusses versehen ist.

Revendications

1. Procédé de fabrication d'un outil abrasif à orbite excentrique, pour application sur un outil électrique du type ponceuse à orbite excentrique, comprenant :

i) l'application d'une pâte à braser à une zone d'un corps de métal ayant une épaisseur de 0,04 à 0,25 mm ;
ii) l'application de particules de carbure de tungstène à tout ou partie de ladite zone de pâte à braser ;

iii) dans une zone de chauffage d'une atmosphère de propane dissocié, d'ammoniac ou d'un mélange d'hydrogène et d'azote, la soumission dudit corps de métal pourvu de particules de carbure de tungstène à une température de 980 à 1 140 °C dans un temps de séjour qui est suffisant pour braser les particules sur le corps de métal ; et où le temps de séjour dans la zone de chauffage est de 5 à 30 minutes, de préférence 10 à 25 minutes, de manière préférée entre toutes 15 à 20 minutes ;
iv) dans une zone de durcissement, la soumission dudit corps de métal pourvu de carbure de tungstène à un déclin de température qui est approprié pour durcir le métal dudit corps de métal.

2. Procédé selon la revendication 1, dans lequel le corps de métal est choisi parmi l'acier à ressort, par exemple l'acier à ressort CK 75 ou CK 101.

3. Procédé selon la revendication 1 ou 2, dans lequel la pâte à braser est choisie parmi la pâte à braser de nickel, de bronze ou de cuivre.

4. Procédé selon l'une quelconque des revendications précédentes, dans lequel le carbure de tungstène a une taille de grain de grain 36, grain 45, grain 60, grain 80, grain 120, grain 160 ou grain 180.

5. Procédé selon l'une quelconque des revendications précédentes, dans lequel le déclin de température dans la zone de durcissement comprend approximativement une diminution de température de 900 °C à 300 °C dans un intervalle de temps d'approximativement 2 à 3 minutes.

6. Procédé selon l'une quelconque des revendications précédentes, dans lequel la composition de l'atmosphère de la zone de chauffage comprend un mélange d'hydrogène et d'azote.

7. Procédé selon l'une quelconque des revendications précédentes, dans lequel le corps de métal avant l'application de la pâte à braser dans l'étape i) est soumis à un procédé de nettoyage/dégraissage.

8. Procédé selon l'une quelconque des revendications précédentes, dans lequel dans l'étape ii), les particules de carbure de tungstène sont appliquées à la zone de pâte à braser de manière orientée sous l'application d'un champ magnétique.

9. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'outil abrasif ultérieurement à l'étape iv) est pourvu d'un moyen de fixation permettant d'ajuster l'outil abrasif sur un outil électrique, tel qu'une ponceuse à orbite excentrique.

10. Procédé selon la revendication 9, dans lequel le corps de métal est une tôle de métal, et dans lequel le corps de métal est pourvu de particules de carbure de tungstène sur un côté uniquement, et dans lequel l'autre côté est pourvu d'un moyen de fixation sous la forme d'une partie de boucle autoadhésive d'une bande velcro qui lui est attachée.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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