(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 321 033 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
16.05.2018 Bulletin 2018/20

(51) Int Cl.:
B24D 11/00 *(2006.01)* ***B24D 11/02*** *(2006.01)*
B24D 13/14 *(2006.01)*

(21) Application number: **16198776.3**

(22) Date of filing: **15.11.2016**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

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(54) ABRASIVE TOOL

(57) For achieving an optimal polishing result process it is suggested to configure an abrasive tool (1000) in such a way that the abrasive tool (100) has an elastic layer (11) wherein the elastic layer (11) comprises sand.

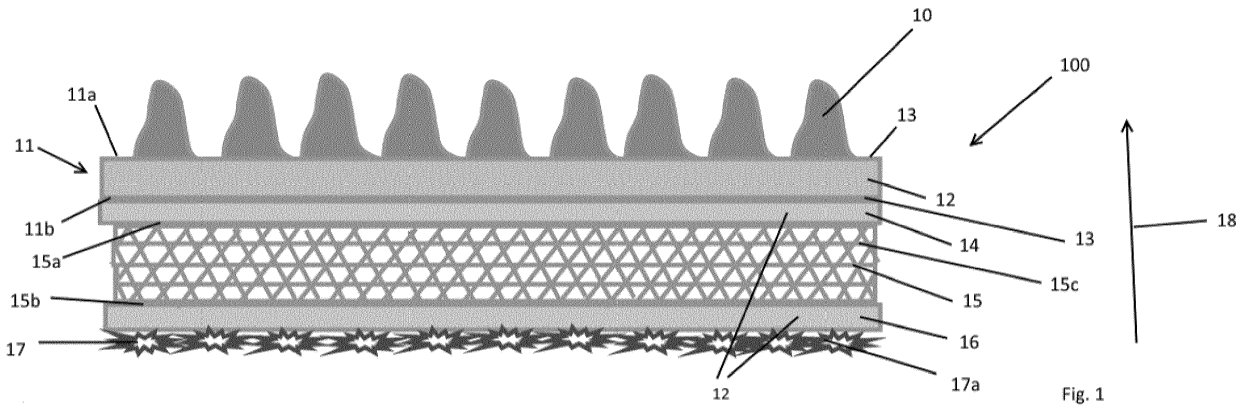

Fig. 1

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Description

Field of the invention

[0001] The invention relates to an abrasive tool according to claim 1 as well as a method of manufacturing an abrasive tool according to claim 7.

Description of Related Art

[0002] Abrasive tools are known from prior art which typically specialize to have one specific function, mainly an abrasive function. However, none of these abrasive tools combine different advantageous functions such as superior tension, elasticity and softness while at the same time being self-lubricating.

Summary of the Invention

[0003] It is an objective of the present invention to improve an abrasive tool in such a way that the polishing quality is improved.

[0004] The above objective is solved by providing an abrasive tool for polishing which has an elastic layer, said elastic layer comprising sand.

[0005] The term "layer" preferably means a film of an especially constant thickness. The term "elastic" refers to the function that a layer is reversibly deformed under the application of external forces.

[0006] Most preferably, the elastic layer comprises a sand layer and an elastic glue layer. The sand layer is attached onto the elastic glue layer at at least one side. Thus, the sand layer is disposed at a first end of the elastic layer. Most preferably, the sand layer is also disposed at another side of the elastic glue layer such that the sand layer is disposed at a second end of the elastic layer. Thus, in this case the glue layer would be disposed between two sand layers.

[0007] By means of the elastic layer comprising sand an improved elasticity as well as adaption to surfaces to be polished can be achieved. The abrasive tool can optimally be used for curvy surfaces since, due to the elasticity, a close fit to the surface is always ensured. At the same time, the elastic layer is adapted to provide the abrasive tool with a toughness, abrasion resistance, cold resistance, environmental protection and non-toxicity.

[0008] Advantageously, the abrasive tool comprises a substrate, wherein the elastic layer is bonded to the substrate. The elastic layer is advantageously compounded to the substrate. Preferably, the substrate itself is also configured to be elastic.

[0009] The elastic layer is preferably bonded with the substrate, most preferred by an adhesive bonding process. The elastic layer is bonded to the substrate at a first end of the substrate. The elastic layer is bonded to the substrate by means of a first adhesive layer. The first adhesive layer advantageously has a thickness of 0,01 mm to 0,1 mm, especially preferred 0,025 mm to 0,075 mm, further preferred 0,04 mm to 0,06 mm. Optimally, the thickness is 0,05 mm.

[0010] Especially, the substrate is formed by a foamed polymer. Therefore, the substrate internally comprises a plurality, preferably thousands, of fines pores. As a result, the substrate has a superior absorption function. In other words, the substrate has an increased absorption capacity. This means it can absorb a large amount of liquid material, preferably a lubricant and/or a coolant. At the same time the foamed polymer provides the substrate with a slow release function. Thus, the substrate can release the absorbed liquid material under the action of external forces, e.g. pressing onto a surface to be polished, in a slow and controllable way. Furthermore, since due to the foamed polymer the substrate can absorb and release a lubricant and/or a coolant, the substrate has a cooling and/or lubricating function during polishing and abrading. Additionally, the substrate can have an anti-blocking function. This results in a novel surface quality as a result of the polishing process.

[0011] Furthermore, the abrasive tool can comprise an abrasive layer which provides the abrasive tool with polishing and/or abrading and/or cutting function. In addition, the abrasive layer can possess antistatic function. The abrasive layer serves the treatment of surfaces. In particular, the abrasive layer is the layer of the abrasive tool which is to be brought in contact with the surface to be polished. In addition, the abrasive layer has a lubricating function so that scratches on the surface are reduced. Furthermore, the abrasive layer has a very good water resistance. All of the functions of the abrasive layer are even improved under wet polishing or abrading conditions.

[0012] In particular, the abrasive layer has a lubricant component, an adhesive component and an antistatic component. The ratio between the lubricant component and the adhesive component is between 20:1 and 20:5, most preferred 20:3, while advantageously the ratio between adhesive component and antistatic component is between 5:1 and 5:4, most preferred 5:2,7. In particular, the ratio between lubricating component, adhesive component and antistatic component is thus 100:15:8.

[0013] Also, the abrasive tool can comprise a touch fastener layer. The term "touch fastener layer" refers to a hook and loop fastener layer, in particular a velcro layer. Advantageously, the touch fastener layer is configured as a touch fastener backing cloth, preferably a hook and loop fastener backing cloth, most preferred a velcro backing cloth.

[0014] The touch fastener layer is preferably bonded to the substrate by means of a second adhesive layer. The touch fastener layer is advantageously bonded to a second end of the substrate, wherein the second end is opposite of the first end. The second adhesive layer advantageously has a thickness of 0,01 mm to 0,1 mm, especially preferred 0,025 mm to 0,075 mm, further preferred 0,04 mm to 0,06 mm. Optimally, the thickness is 0,05 mm. In particular, the second adhesive layer has

the same thickness as the first adhesive layer.

[0015] The second and/or the first adhesive layer are preferably configured as an elastic glue layer which is not liquid. The adhesive forming the adhesive layer can comprise resin, a curing agent and a leveling agent, wherein the ratio between resin and curing agent is preferred between 20:1 and 20:3, especially 20:2. The ratio between curing agent and levelling agent is preferably between 5:0,01 and 5:1, especially preferred 5:0,1. So most preferred the ratio between resin, curing agent and levelling agent is 100:10:0,2.

[0016] Especially, the first and/or second adhesive layer and/or the touch fastener layer are configured elastic so that the entire abrasive tool can be elastic and thus provides an optimal flexibility for polishing.

[0017] The abrasive tool can be configured in various shapes, such as e.g. a disc shape or a square shape. Especially, the abrasive tool is touch fastener backed, preferably velcro backed, and punched to have a desired shape.

[0018] The abrasive tool is adapted to be used in a dry and/or a wet state. The abrasive tool is therefore adapted to be used as a dual-purpose tool. The abrasive tool is preferably adapted to be used for polishing components in automobile manufacturing and/or electronics, computer and/or communication components. The abrasive tool is further adapted to be used for repair, especially paint repair, e.g. of automobile components.

[0019] Further the abrasive tool is adapted to be used for fine abrading and polishing, preferably of irregular and/or curved surfaces.

[0020] Due to its special configuration, especially by combining the elastic layer and the substrate comprising a foamed polymer, the abrasive tool has the functions of superior tension, elasticity, superior softness, self-lubricating and anti-blocking. Those advantages of the abrasive tool are even more superior in a wet state of the tool. Overall, a novel precision and polishing quality, i.e. surface quality after polishing, is achieved by means of the abrasive tool.

[0021] In another aspect, the invention relates to a method of manufacturing an abrasive tool, in particular an abrasive tool as described above. The method is characterized by the step of bonding a substrate with an elastic layer using an adhesive bonding process.

[0022] Different problems arise when bonding a substrate made from a foamed polymer and an elastic layer comprising sand. For example, due to the smoothness and softness of the elastic sand layer it is easily deformed and corrugated when being bonded with the substrate. In addition, the substrate has very good adsorption capacity, so that an adhesive easily permeates the substrate when a liquid adhesive is used for bonding, resulting in insecure bonding, embrittlement and a significant loss of adsorption and slow release properties of the substrate.

[0023] Therefore, the invention suggests using an adhesive bonding process which preferably comprises the step of producing an elastic glue layer from an adhesive. The glue layer has the advantages that it is elastic, but not liquid so that the above difficulties do not arise.

[0024] In particular, the adhesive is produced into a glue layer which has a thickness of 0,01 mm to 0,1 mm, especially preferred 0,025 mm to 0,075 mm, further preferred 0,04 mm to 0,06 mm. Optimally, the thickness is 0,05 mm. In particular, the glue layer is configured as the first adhesive layer of the above described abrasive tool.

[0025] The method further comprises the step of hot pressing. By means of hot pressing the elastic layer and the substrate are bonded by means of the elastic glue layer. The temperature applied during hot pressing is preferably between 50 °C and 100 °C, preferably between 60 °C and 90 °C, most preferred between 70 °C and 80 °C.

[0026] In particular, the method comprises the step of bonding the substrate with a touch fastener layer using an adhesive bonding process which preferably comprises the same steps as for bonding the elastic layer and the substrate. In particular, the glue layer used for this step is configured as the second adhesive layer of the above described abrasive tool.

[0027] In particular, the method further comprises the step of manufacturing a substrate from a foamed polymer material. In addition, the method can comprise the step of manufacturing the elastic layer comprising an elastic glue layer and a sand layer by applying a sand layer onto an elastic glue layer, which could be produced as explained above by means of an adhesive.

[0028] Preferably, the adhesive used in the adhesive bonding process is based on resin. The adhesive especially comprises resin, a curing agent and a leveling agent as components. The ratio between resin and curing agent is preferred between 20:1 and 20:3, especially 20:2. The ratio between curing agent and levelling agent is preferably between 5:0,01 and 5:1, especially preferred 5:0,1. So most preferred the ratio between resin, curing agent and levelling agent is 100:10:0,2.

[0029] The method can further comprise the step of applying an abrasive layer onto the elastic layer such that the abrasive layer substantially covers the elastic layer when the abrasive tool is in use.

[0030] The method can further comprise touch fastener backing, preferably velcro backing, and especially punching the abrasive tool for it to have a desired shape.

Brief Description of the Drawing

[0031] The invention will be described below with reference to figure 1 which shows in schematic representation a sectional view of an abrasive tool.

Detailed Description of the Invention

[0032] Figure 1 shows a sectional view of an abrasive tool (100) along the thickness direction (18) so that all the different layers of the abrasive tool (100) can be seen.

[0033] The abrasive tool (100) comprises an abrasive layer (10) on one side and a touch fastener layer (17) on the other side. The touch fastener layer (17) is configured as a touch fastener backing cloth (17a).

[0034] The abrasive tool (100) comprises an elastic layer (11) onto which the abrasive layer (10) is applied. The elastic layer (11) comprises a sand layer (13) and an elastic glue layer (14). The sand layer (13) is disposed at a first end (11a) of the elastic layer (11) which faces the abrasive layer (10). Furthermore, there is a sand layer (13) disposed at the second end (15b) of the elastic layer (11) so that the glue layer (14) is disposed between the sand layers (13).

[0035] The abrasive layer (10) is configured such on the elastic layer (11) or rather the sand layer (13) on the first end (11a) of the elastic layer (11) that it substantially covers the sand layer (13) when the abrasive tool is in use.

[0036] The elastic layer (11) is bonded to a substrate (15) of the abrasive tool (100) by means of a first adhesive layer (14). The substrate (15) is configured as a foamed polymer (15c). The substrate (15) comprises a first end (15a) facing the first adhesive layer (14) and the elastic layer (11) and a second end (15b) facing the touch fastener layer (17). On its second end (15b) the substrate (15) is bonded to a touch fastener layer (17) by means of a second adhesive layer (16). The touch fastener layer (17) is configured as a touch fastener backing cloth (17a).

List of reference signs

[0037]

100	abrasive tool
10	abrasive layer
11	elastic layer
11a	first end of the elastic layer
11b	second end of the elastic layer
12	elastic glue layer
13	sand layer
14	first adhesive layer
15	substrate
15a	first end of the substrate
15b	second end of the substrate
15c	foamed polymer
16	second adhesive layer
17	touch fastener layer
17a	touch fastener backing cloth
18	thickness direction

Claims

1. Abrasive tool (100) for polishing
characterized in that the abrasive tool (100) has an elastic layer (11), wherein the elastic layer (11) comprises sand.

2. The abrasive tool (100) according to claim 1,
wherein the abrasive tool (100) has a substrate (15),
wherein the elastic layer (11) is bonded to the substrate (15).

3. The abrasive tool (100) according to claim 2,
wherein the elastic layer (11) is bonded to the substrate (15) by means of a first adhesive layer (14).

4. The abrasive tool (100) according to claim 2 or 3,
wherein the substrate (15) is formed by a foamed polymer (15c).

5. The abrasive tool (100) according to any previous claims,
wherein the abrasive tool (100) comprises an abrasive layer (10).

6. The abrasive tool (100) according to any previous claim,
wherein the abrasive tool (100) comprises a touch fastener layer (17).

7. Method of manufacturing an abrasive tool (100),
characterized by the step of bonding a substrate (15) with an elastic layer (11) using an adhesive bonding process.

8. The method tool according to claim 7,
wherein the method comprises the step of bonding the substrate (15) with a touch fastener layer (17) using an adhesive bonding process.

9. The method according to claim 7 or 8,
wherein the adhesive bonding process comprises the step of forming an elastic glue layer (12) from an adhesive (14, 16) and the step of hot pressing.

10. The method according to claim 9,
wherein the adhesive (14, 16) used in the adhesive bonding process is based on resin.

11. The method according to any previous claims,
wherein the method comprises the step of applying an abrasive layer (10) onto the elastic layer (11) such that the abrasive layer (10) substantially covers the elastic layer (11) when the abrasive tool (100) is in use.

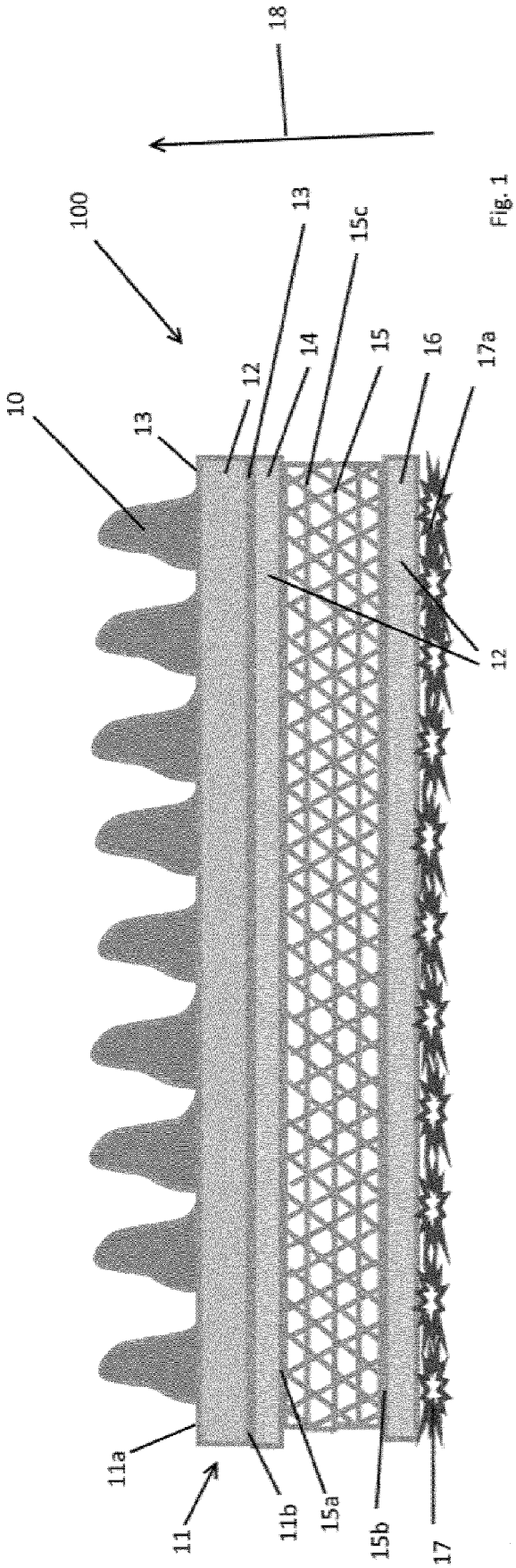

Fig. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 16 19 8776

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	20 April 2017	Herrero Ramos, J

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