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(54) **A HANDHELD MASONRY WORK TOOL**

(57) The present invention relates to a handheld masonry work tool (1), such as a mason's trowel, a stucco work trowel, a finishing trowel or a plastering float, comprising a surface working element (2), preferably thin-walled, and at least one handle element (3) connected to the working element (2) and provided with a grip (4). In order to improve ergonomics of using the tool (1), said grip (4) is made of a thermoplastic material having a melting point within a range of 40 to 110 °C or is at least partially coated with a layer (44) of a thermoplastic material having a melting point within a range of 40 to 110 °C.

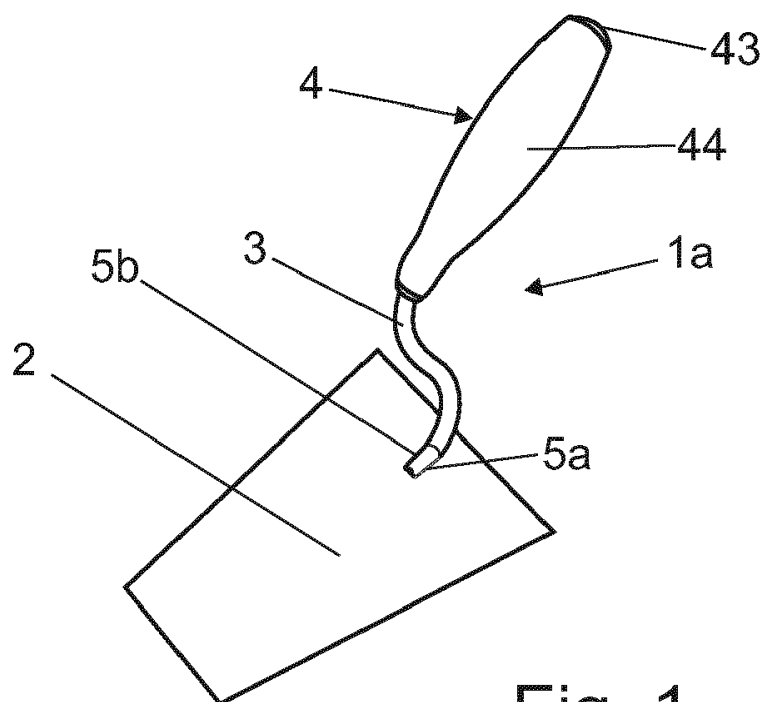
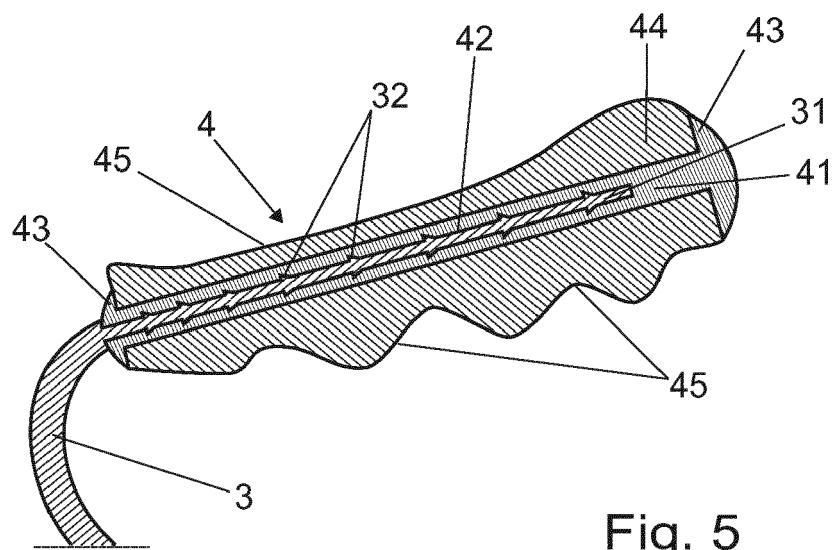


Fig. 1



Description

[0001] The present invention relates to a handheld masonry work tool, such as a mason's trowel, a stucco work trowel, a finishing trowel or a plastering float, comprising a surface working element, preferably thin-walled, and at least one handle element connected to the working element and provided with a grip.

Background of the Invention

[0002] Known grips of masonry work tools usually have substantially cylindrical shapes. In order to improve ergonomics, it is known from the prior art to provide a grip with a shape imitating an anatomical shape of a clenched palm grip.

[0003] Furthermore, in order to improve possibilities of gripping a grip with a palm it is known to coat a grip of a masonry work tool with a layer of a relatively soft thermoplastic material having a high friction coefficient. An exemplary tool of this kind is disclosed in patent application US5446941. The grip of this tool comprises an internal core made of a hard synthetic material providing a smooth and relatively slithery surface, and an external gripping layer made of a soft rubber thermoplastic material having a greater friction coefficient and providing a possibility of solid and reliable gripping by a palm of a user.

[0004] A specific character of masonry work tools appears in that such tools are very repeatedly gripped and then laid down by a user.

[0005] During a number of typical operations performed with a handheld masonry work tool of this kind, a handgrip with a user's palm has to resist moments of force that try to rotate a grip around its longitudinal axis in the user's palm, what is intensely perceptible by a user in particular in case of tools having a large surface of a working element.

[0006] Furthermore, many works performed with such masonry work tools consist in a relatively strong tightening and dragging over a tool working element for example in order to apply and spread a even layer of construction mortar or to press in construction mortar into a slit. Such operations require a relatively strong gripping a tool grip with a user's palm.

[0007] Moreover, it is important that at a construction site a user has frequently wet and dirty palms on which aggressive materials and/or abrasive materials are deposited, such as sand or mortar.

[0008] A given user grips a masonry work tool each time substantially in the same characteristic manner, thus for each individual user there exists a different characteristic but substantially the same distribution of areas on a palm which are exposed to extremely high pressures generated by a tool grip during work.

[0009] The above indicated factors result in that a long-lasting work with known handheld masonry work tools causes fatigue of a user's palm and hand and often causes

skin damages such as for example corns.

[0010] An object of the present invention has been to provide a handheld masonry work tool devoid of the above-mentioned drawbacks.

Summary of the Invention

[0011] According to the present invention there is provided a handheld masonry work tool of the kind mentioned in the outset which is characterized in that the grip of the tool is made of a thermoplastic material having a melting point within a range of 40 to 110 °C or is at least partially coated with a layer of a thermoplastic material having a melting point within a range of 40 to 110 °C.

[0012] Said thermoplastic material preferably comprises polycaprolactone.

[0013] An employment of a thermoplastic material as proposed according to the present invention enables an individual formation by a user an anatomical grip matched perfectly to his palm grip in a simple manner and practically in any arbitrary location.

[0014] It is sufficient to slightly heat the grip of the tool according to the present invention to a temperature higher than the melting point of the thermoplastic material, for example higher than 40 °C, for example by immersing it in a hot water or putting it in a hot air stream, and subsequently to grip by a palm in a working position and to clench a palm achieving a working position and producing a deformation of the thermoplastic layer. Subsequently the grip is to be cooled below the melting point of the thermoplastic material in order to enable it to become hardened.

[0015] An anatomical external shape of the grip is thus obtained which precisely matches the shape of a user's individual handgrip.

[0016] Heating to a higher temperature, such as for example to 60 °C, shall obviously result in a greater plastification of the thermoplastic material which facilitates a deformation of the grip by a user's palm.

[0017] The above-described method of a formation of an anatomical grip may be repeated many times by any arbitrary number of users.

[0018] According to the present invention it is preferable that said thermoplastic material additionally comprises a photoluminescence dye, in particular a fluorescent dye, and/or a filler material, preferably biodegradable.

[0019] The filler material according to the present invention is not as such a thermoplastic material, but in a combination with a thermoplastic material it constitutes a mixture constituting as a whole a thermoplastic material.

[0020] According to the present invention it is possible to use any arbitrary filler material suitable for a given thermoplastic material. It is possible to use mineral filler materials or natural filler materials such as for example wood dust or chips, cut cotton fibres, cut linen fibres, granulated natural cork and the like biodegradable filler materials. In particular, according to the present invention it is pref-

erable that said filler material is a biodegradable material

[0021] The content of the filler material in said thermoplastic material according to the present invention may amount from 1 to 95 % by weight. Use of filler materials is particularly preferable in a case of expensive polymers available with difficulty, such as for example polycaprolactone.

[0022] According to the present invention it is possible to use any arbitrary photoluminescence/fluorescent dyes suitable for an addition to a given particular thermoplastic material used. Dyes appropriate generally for synthetic materials shall be applicable in most cases.

[0023] According to the present invention it is preferable that said thermoplastic material is a biodegradable material.

[0024] Said handle element of the tool according to the present invention has preferably a form of a S-shaped rod wherein the core of the grip is mounted on this rod. Said grip core is preferably made of wood but it is also possible to use any arbitrary different material including synthetic materials.

[0025] Said thermoplastic material or said layer of a thermoplastic material is preferably surrounded by limiter elements along the longitudinal direction of the grip.

[0026] The tool according to the present invention may preferably have in particular a form of a mason's trowel, a stucco work trowel, a joint trowel or a finishing trowel, a stucco work float or a plastering float.

[0027] The grip as proposed according to the present invention does not additionally complicate a production process of the claimed tool. The layer of a thermoplastic material of the grip may be simply injected directly on the connecting element or on the core of the grip, without any necessity of using additional layers or binding materials. Therefore a process of a production of the tool according to the present invention is fast and simple.

[0028] The grip of the masonry work tool has a contact with a plenty of different dirty substances and decolorizing substances. Using polycaprolactone which is particularly preferably according to the present invention ensures that the grip of the present invention is simple in cleaning as polycaprolactone is resistant to an action of many substances. Furthermore, polycaprolactone as a biocompatible material shall not cause irritations and sensitisations that are relatively easy to occur in a result of an impaired or even damaged skin of user's palms at construction sites.

[0029] The polycaprolactone melting point amounting 60 °C is also very preferable regarding masonry work tool. From one side this temperature is high enough not to cause a deformation of the grip during intense using the tool at a construction site, and from the other side it is relatively low enabling a simple plastification of the grip in order to obtain its anatomical match.

[0030] An addition of a fluorescent (photoluminescence) dye to the grip thermoplastic material facilitates greatly a visual localization of the tool according to the present invention, what is very important at a construction

site which is a typical site of using the tool of the present invention. Regarding such a dye it is particularly advantageous to use polycaprolactone as the basis of the thermoplastic material in consideration of a very good miscibility of polycaprolactone with other substances.

[0031] In some preferable embodiments the handheld masonry work tool according to the present invention is made of metal, from which the working element and the connecting element are made of, and of biodegradable thermoplastic material forming the external layer of the grip. Such preferable embodiments of the tool according to the present invention are thus completely biodegradable.

15 Brief description of drawings

[0032] The invention shall be described and explained below in reference to its preferred embodiments and in connection with the attached drawings wherein:

Fig. 1 shows an axonometric view of a first embodiment of a handheld masonry work tool according to the present invention;

Fig. 2 shows a side view of the tool of Fig. 1,

Fig. 3 shows a longitudinal-sectional view of the grip of the tool of Fig. 1 as seen along the plane of Fig. 2, Fig. 4 shows the grip of the tool of Fig. 1 in a cross-sectional view along the line A-A from Fig. 2;

Fig. 5 shows a longitudinal-sectional view of the grip of the tool of Fig. 1 as seen along the plane of Fig. 2, after a formation of an anatomical grip part on a thermoplastic material layer,

Fig. 6 shows an axonometric view of a second embodiment of the tool according to the present invention; and

Fig. 7 shows an axonometric view of a third embodiment of the tool according to the present invention.

[0033] Numerical references of elements performing the same functions remain the same in all figures of the drawing, wherein suffixes (a-c) were added, where appropriate, to additionally distinct elements having the same functionality but different construction.

[0034] In Figs. 1-5 a tool 1a according to the present invention is depicted having a form of a mason's trowel. The trowel tool 1a has a trapezoid thin-walled working element 2 connected to a rod-like S-shaped handle element 3 which is provided with a grip 4.

[0035] The working element 2 and the handle element 3 are made of steel, such as for example stainless steel or carbon steel.

[0036] In the presented embodiment the handle element 3 is fixed to the working element 2 by means of welds 5a and 5b formed in a process of welding or pressure welding. Such a welding may be preferably an impulse welding using a shielding gas or a shielding gas mixture, and infusible tungsten electrode or a laser impulse welding.

[0037] The grip 4 has a cylindrical core 41 made of wood and is arranged on the handle element 3. The core 41 has an internal channel 42 into which a terminal straight-line section 31 of the handle element 3 is inserted wherein this section is provided with catches 32 which

[0038] Circumferential collars 43 protrude outward from the terminal sections of the core 41. The collars 43 constitute limiter elements between which the core 41 is coated with a layer of thermoplastic material of the melting point amounting from 40 to 110 °C, such as for example a mixture of polycaprolactone with a photoluminescence dye (such as for example fluorescent dye) suitable for synthetic materials and a biodegradable filler material, such as for example wood dust or chips, cut cotton fibres, cut linen fibres, granulated natural cork and the like biodegradable filler materials.

[0039] Fig. 4 presents a deformation of the thermoplastic material layer 44 obtained by means of clenching a palm grip thereon after a previous heating the grip 4 to a temperature higher than the melting point of the thermoplastic material. After cooling down the grip 4, the external surface of the grip 4 comprises a characteristic projection 45 of an anatomical shape of an individual palm grip of a given user.

[0040] During a deformation of the thermoplastic material layer 44 by a user, the circumferential collars 43 of the core 41 serve as transverse limiter elements, which surround the layer 44 on both sides along the longitudinal direction of the grip 4 and thus prevent against an uncontrollable melting away of the thermoplastic material along the grip 4.

[0041] A thickness of a thermoplastic material layer is substantially arbitrary, wherein for most of cases a layer of a thickness amounting from 5 to 35 mm shall be sufficient. As it is visible in Figs. 3-4, in the presented embodiment the thickness of the thermoplastic material layer 44 is increased at the side of the grip 4 in the areas of a grip with a palm finger in comparison to the thickness in the areas of a grip with an internal part of a palm, in order to obtain deeper deformations of projection 45 for providing a better finger stabilization.

[0042] In Fig. 6 another embodiment of the tool according to the present invention is presented. This tool is a finishing trowel 1b comprising a rectangular working element 2b, two rod-like S-shaped handle elements 3b and a grip 4 with a thermoplastic material layer 44 having a construction analogical to the construction of the grip 4 of the mason's trowel from Figs. 1-4. Fig. 7 presents yet another embodiment of the tool according to the present invention. This tool is mason's trowel 1c provided with an angle bar working element 2c. The grip 4 of the angular trowel 1c has a thermoplastic material layer 44 and a construction which is analogical to the construction of the grip 4 of the trowel from Figs. 1-4, and additionally is provided with a typical metal ferrule 46.

[0043] In alternative embodiments of the tool according to the present invention the whole grip may be made of a thermoplastic material having a melting point amounting from 40 to 110 °C. However in many cases such a solution shall not be optimal in consideration of a relatively high cost of a thermoplastic material. A replacing of a portion of a volume (in particular an internal portion for which an anatomical match is not required) of the grip with a different cheaper material shall be advantageous in particular in a case of using relatively expensive polycaprolactone as a thermoplastic material.

[0044] For a skilled technician it is obvious that the working element, the handle element and the grip core of the tool according to the present invention may be optionally made of different materials than the materials used in the embodiments described above; in particular they may be made of suitable synthetic materials.

[0045] According to the present invention it is not necessarily required that a layer of a thermoplastic material coats the whole grip. It is also possible to apply a thermoplastic material only in given areas, such as for example in the areas of contact with user's palm fingers.

[0046] A thickness of the thermoplastic material layer may be differentiated in different areas of the grip, wherein a distribution of the thickness variability may be also arbitrary, and in particular it may be different for different types of tools that differ from each other with its typical basic grip.

[0047] The figures are not necessarily to scale, and some features may be exaggerated or minimized, in order to provide better an invention illustration. Therefore the presented embodiments should not be regarded as limiting the scope of protection defined in the patent claims.

List of reference numerals

[0048]

1. handheld masonry work tool;
2. surface working element;
3. handle element;
31. terminal straight-line section of the handle element;
32. catch;
4. grip;
41. core;
42. internal channel;
43. limiter element (circumferential collar);
44. thermoplastic material;
45. projection.

Claims

1. A handheld masonry work tool (1) comprising a surface working element (2), preferably thin-walled, and at least one handle element (3) connected to the working element (2) and provided with a grip (4),
characterized in that
 said grip (4) is made of a thermoplastic material having a melting point within a range of 40 to 110 °C or is at least partially coated with a layer (44) of a thermoplastic material having a melting point within a range of 40 to 110 °C.
2. The handheld masonry work tool according to Claim 1, characterized in that said thermoplastic material comprises polycaprolactone.
3. The handheld masonry work tool according to Claim 1 or 2, characterized in that said thermoplastic material additionally comprises a photoluminescence dye, in particular a fluorescent dye, and/or a filler material, preferably biodegradable.
4. The handheld masonry work tool according to Claim 1 or 2 or 3, characterized in that said thermoplastic material is a biodegradable material.
5. The handheld masonry work tool according to any one of the preceding Claims, characterized in that said handle element (3) has a form of a S-shaped rod, wherein a core (41) of the grip (4) is mounted on this rod and is preferably made of wood.
6. The handheld masonry work tool according to any one of the preceding Claims, characterized in that said thermoplastic material or said layer (44) of a thermoplastic material is surrounded by limiter elements (43) along the longitudinal direction of the grip (4).
7. The handheld masonry work tool according to any one of the preceding Claims, characterized in that it is a mason's trowel (1a, 1c), a stucco work trowel or a joint trowel.
8. The handheld masonry work tool according to any one of the preceding Claims, characterized in that it is a finishing trowel (1b), a stucco work float or a plastering float.

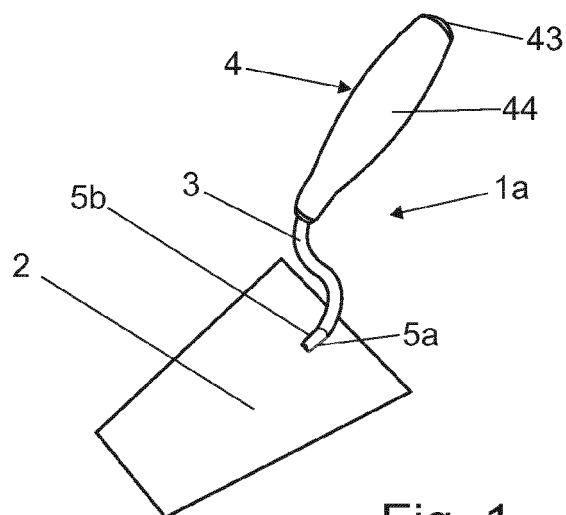


Fig. 1

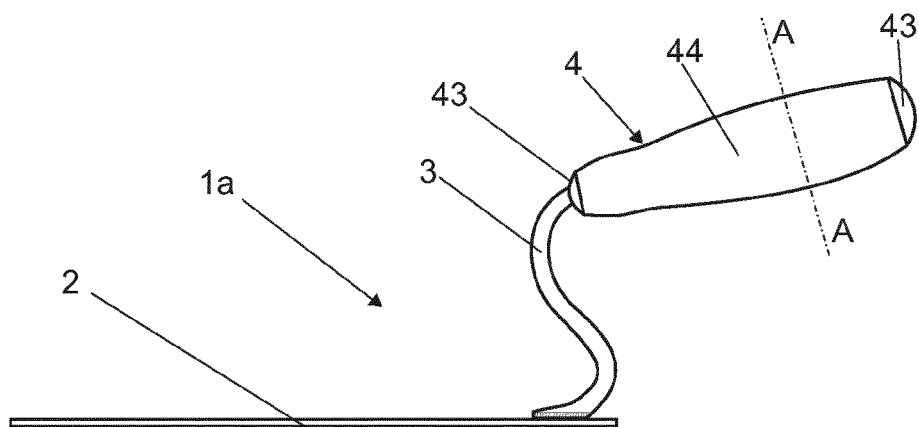


Fig. 2

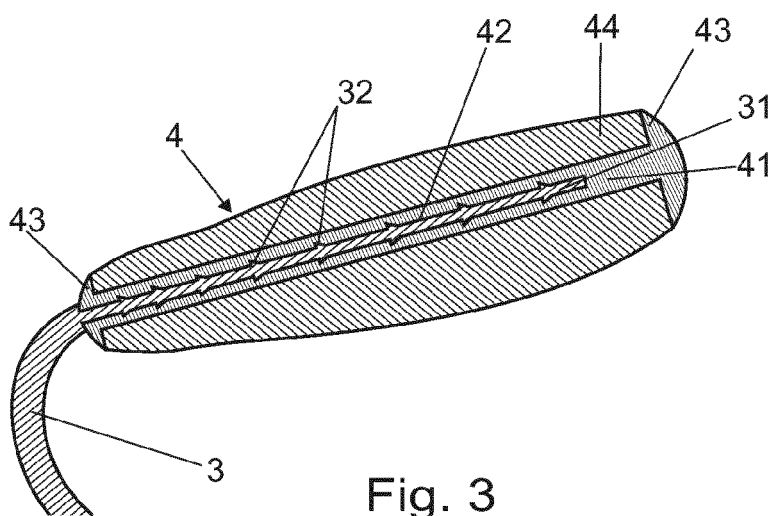


Fig. 3

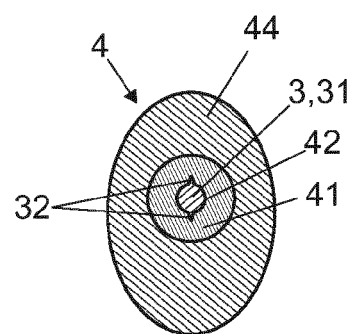


Fig. 4

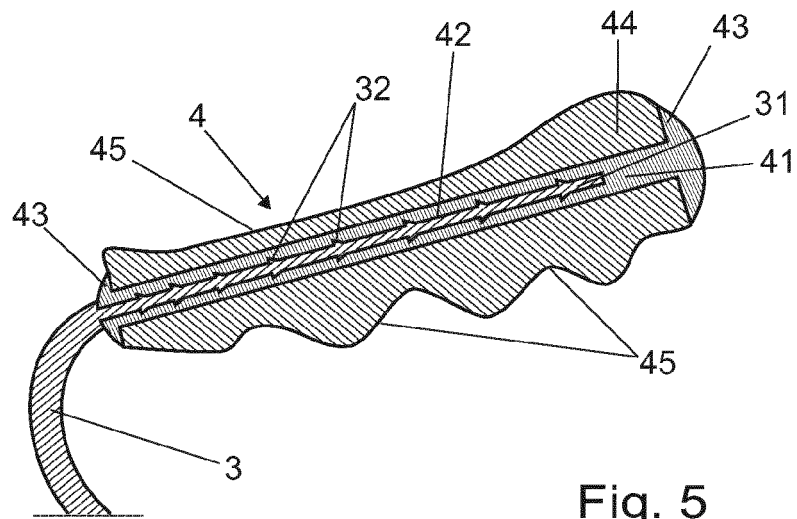


Fig. 5

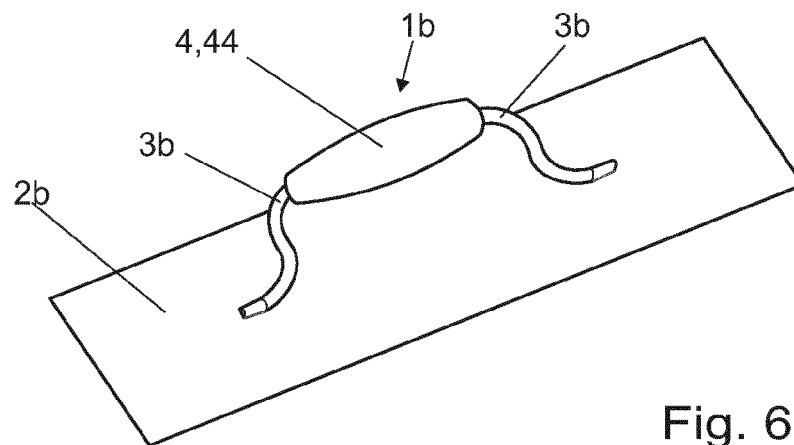


Fig. 6

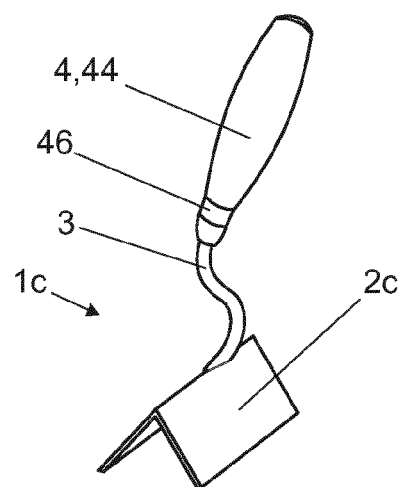


Fig. 7



EUROPEAN SEARCH REPORT

 Application Number
EP 19 18 0011

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 2017/291293 A1 (HUGHES JOHN T [US] ET AL) 12 October 2017 (2017-10-12) * figures 1, 4 * * paragraph [0030] - paragraph [0032] * * paragraph [0046] - paragraph [0048] *	1-8	INV. E04F21/16
Y	ISABELLE VROMAN ET AL: "Biodegradable Polymers", MATERIALS, vol. 2, no. 2, 1 April 2009 (2009-04-01), pages 307-344, XP055202472, DOI: 10.3390/ma2020307 * Abstract; page 307 * * page 310, last paragraph *	1-8	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04F B32B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 6 September 2019	Examiner Estorgues, Marlène
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EPO FORM 1503 03.02 (P04C01)

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2017291293 A1	12-10-2017	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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