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(54) Work tool comprising a head and a handle, and assembling method thereof

(57) The present invention relates to a work tool (1) comprising a head (10) and a handle (20), wherein the head (10) is preferably made of a non-deformable material and has a hole (11).

The invention is characterized in that said handle (20) comprises:
- a core (30) having a first end (31), a second end (32) and an intermediate body (33), and
- a sleeve (40) having a first portion (41), a second portion (42) and an intermediate portion (43), said sleeve (40) being adapted to secure said core (30), in particular said second end (32), in said hole (11) by interference.

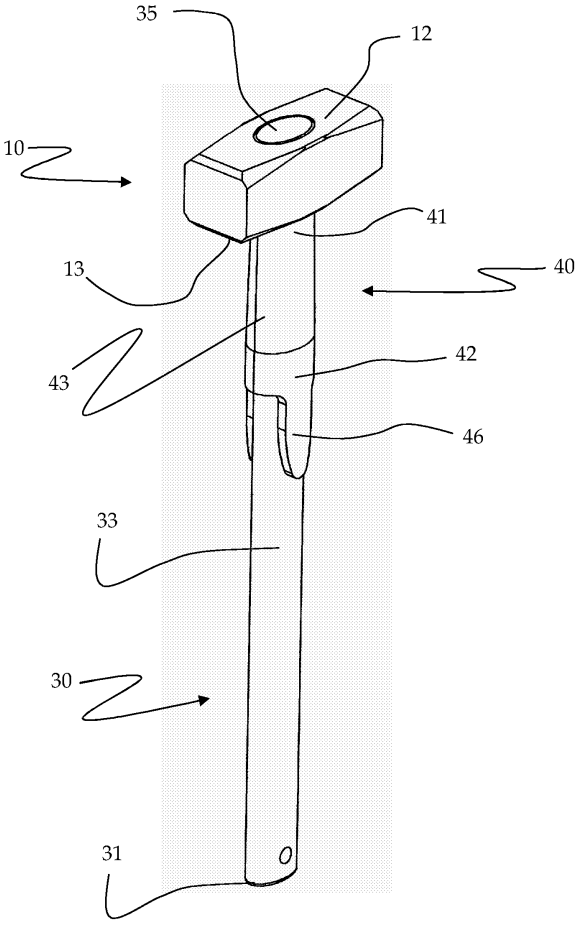

Fig. 2b

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Description

[0001] The present invention relates to a work tool according to the preamble of claim 1, as well as to a method for assembling said work tool.

[0002] The present invention particularly applies to the field of work tools comprising a head and a handle to be secured to said head, in particular hammers; clearly, it may also apply to axes, hatchets, picks and other similar work tools.

[0003] At present, in general, several work tools are known wherein the handle, typically a wooden handle, is secured to the tool head by means of nails, wedges, resins, glues or the like, which are engaged through suitable apertures in the tool head.

[0004] It has however been noticed that such work tools are particularly subject to handle failures, especially in the areas weakened by the insertion of nails, resulting in the head coming off the handle.

[0005] Many different work tools, and assembling methods thereof, are also known in the art wherein the handle is secured to the tool head by inserting wedges in the handle portion fitted into the holes being present in said head.

[0006] For example, the United States patent No. US 1,565,668 describes a work tool comprising a head, provided with a through hole, and a handle.

[0007] In said US patent, a first end of the handle is inserted into the through hole and is secured in that position by fitting a wedge into the portion of said first end which has been inserted into the through hole; in fact, the wedge causes the first end of the handle to expand, so that it is secured inside the tool head.

[0008] The assembling method described in the above US patent suffers from many drawbacks, in particular due to the fact that the wedge fitted into the first end of the handle inserted into the head tends to damage the handle, which may break and thus endanger the user.

[0009] Work tools are also known in the art wherein the handle is secured to the tool head by forcibly driving one end of said handle into the hole being present in the tool head.

[0010] For example, the United States patent No. US 3,897,534 relates to a method for securing a plastic handle in a hole extending through the metal head of a work tool, in particular a hammer.

[0011] The plastic handle is provided with a first end having a wider cross section than the hole; said end is compressed in a press, so that its cross section is reduced to being still slightly oversize in relation to the hole and can be forcibly driven thereinto.

[0012] In practice, such securing method is based on the so-called "shape memory" of thermoplastic materials, which, after being deformed under pressure without application of heat, tend to return to their original size; in fact, once the first end of the handle has been compressed and forcibly driven into the hole of the work tool head, it tends to expand and fill up the inner space of the hole, thereby securing the handle to the work tool head.

[0013] This method, described in the aforementioned US patent, has many drawbacks, due in particular to the fact that both compressing the thermoplastic material and driving the handle end into the hole of the work tool head require the use of particular tools in addition to those used for manufacturing the head and the handle.

[0014] Another problem of said method is the difficulty in coupling the handle to the tool head due, in particular, to the difficulty required to drive the handle with force into the hole of the work tool head.

[0015] The general object of the present invention is to provide a work tool and an assembling method thereof which are adapted to overcome the above-described drawbacks.

[0016] In this frame, the main object of the present invention is to provide a work tool so manufactured and assembled as to ensure a secure coupling between the head and the handle of the work tool, which is also easy to manufacture and extremely safe to use.

[0017] It is another object of the present invention to provide a work tool which is strong and well balanced, and whose head cannot separate accidentally from the handle when said work tool is in use.

[0018] It is a further object of the present invention to provide a work tool so manufactured and assembled that the handle is not weakened when it is coupled to the head of the work tool.

[0019] It is another object of the present invention to provide a work tool wherein the handle portion adjacent to the head is strengthened, thus preventing the handle of the work tool from breaking and/or bending accidentally when the work tool is in use.

[0020] These and other objects, which will be explained in detail below, are achieved according to the present invention through a work tool, and through a method for assembling said work tool, having the features set out in the attached claims, which are intended as an integral part of the present description.

[0021] Further objects, features and advantages will become apparent from the following detailed description of preferred embodiments of the present invention and from the attached drawings, which are supplied by way of non-limiting example, wherein:

- Fig. 1 is a perspective view of a work tool according to the present invention;
- Figs. 2a, 2b, 2d show the various steps of the method for assembling the work tool according to the present invention;
- Fig. 2c is a perspective view of a detail of the work tool of Fig. 2b.

[0022] Referring now to the drawings, reference number 1 designates a work tool, in particular a hammer, according to the present invention.

[0023] Said tool 1 comprises a head 10 and a handle 20, wherein head 10 is preferably made of a non-deform-

able material and has a hole 11.

[0024] According to the present invention, said handle 20 comprises:

- a core 30 having a first end 31, a second end 32 and an intermediate body 33, and
- a sleeve 40 having a first portion 41, a second portion 42 and an intermediate portion 43, said sleeve 40 being adapted to secure said core 30, in particular said second end 32, in said hole 11 by interference.

[0025] Preferably, said core 30 is made of a plastic material; first end 31 and intermediate body 33 of core 30 are so provided as to have a cross section being smaller than hole 11 of head 10.

[0026] The second end 32 of core 30 is so provided that its section diameter is slightly smaller than the diameter of said hole 11, and has an outer surface which is complementary to the inner surface of hole 11.

[0027] According to a preferred embodiment of the present invention, the outer surface of second end 32 is so provided as to comprise means 34 adapted to prevent said second end 32 from disengaging from hole 11, said means consisting in particular of a plurality of reliefs and/or recesses adapted to be coupled to respective recesses and/or reliefs being present on the surface of hole 11, not shown in the drawings.

[0028] The second end 32 of core 30 comprises stop means 35, in particular a cap 35 adapted to abut on an upper surface 12 of head 10 or on a slot obtained in said upper surface 12 and adapted to receive said cap 35.

[0029] As aforementioned, sleeve 40 is adapted to secure said core 30, in particular of said second end 32, in said hole 11 by interference; sleeve 40 is also preferably made of a plastic material, in particular rigid plastic suitable for withstanding the vibration caused by the blows of head 10 when the work tool 1 is in use.

[0030] As shown in the detailed view of Fig. 2c, said sleeve 40 comprises a through hole 44 substantially extending along the axis of said sleeve 40 and having a shape and a cross section complementary to the outer surface of core 30 and suitable for containing said core 30.

[0031] Sleeve 40 may be secured to core 30 in several ways, e.g. by using known securing means such as glues, or by moulding sleeve 40 over core 30.

[0032] Furthermore, the first portion 41 of sleeve 40 comprises an annular protrusion 45, adapted to abut on a lower surface 13 of head 10.

[0033] As shown in Fig. 2d, said handle 20 also comprises a grip 50 having a first section 51, a second section 52 and an intermediate section 53.

[0034] Said grip 50 comprises a cavity 54 substantially extending along the axis of said grip 50, which cavity has a shape and a cross section complementary to the outer surface of the core 30 and suitable for containing said core 30.

[0035] Said grip 50 is preferably made of a plastic material, in particular soft plastic, and may advantageously be so manufactured as to comprise on its outer surface a plurality of means of grip 55, in particular a plurality of notches or knurls, suitable for making the handle easy to grip by the user.

[0036] Grip 50 may be secured to core 30 in several ways as well, e.g. by using known securing means such as glues and/or screws, or by moulding grip 50 over core 30.

[0037] The first section 51 of grip 50 and second portion 42 of sleeve 40 comprise securing means 46, 56 adapted to prevent said sleeve 40 and/or said grip 50 from turning on the outer surface of core 30; in particular, said securing means comprise tongues 46 of said sleeve 40 adapted to engage with slots 56 of said grip 50.

[0038] It is however apparent that, according to an alternative solution of the present invention, not shown in the attached drawings, tongues 46 might be integrated with first section 51 of grip 50 and slots 56 might be integrated with second portion 42 of sleeve 40.

[0039] With particular reference to Figs. 2a, 2b and 2d, it will hereafter be described the assembling of a tool 1 comprising a head 10 and a handle 20, wherein head 10 is preferably made of a non-deformable material and has a hole 11, and handle 20 comprises a core 30.

[0040] The assembling of tool 1 comprises the following steps:

- a first end 31 of core 30 is inserted into hole 11 of head 10;
- an intermediate body 33 of core 30 is slid entirely through hole 1 l, until a second end 32 of core 30 fits and/or abuts into hole 11;
- a first portion 41 of a sleeve 40 is positioned in abutment with a lower surface 13 of head 10, so as to secure said second end 32 of core 30 in hole 11.

[0041] Positioning of first portion 41 of sleeve 40 in abutment with a lower surface 13 of head 10 may be obtained by inserting first end 31 of core 30 into a through hole 44 of sleeve 40, then sliding sleeve 40 over the whole length of core 30 and securing sleeve 40 to core 30 by using securing means, e.g. glue and/or screws and/or the like.

[0042] Alternatively, said positioning of first portion 41 of sleeve 40 in abutment with a lower surface 13 of head 10 may be obtained by moulding sleeve 40 over core 30.

[0043] Moreover, said joint and/or abutment between second end 32 of core 30 and hole 11 are obtained by positioning a cap 35 of the second end 32 in abutment with an upper surface 12 of head 10 and/or by using joining means 34, in particular a plurality of reliefs and/or recesses obtained on said second end 32, adapted to be coupled to respective reliefs and/or recesses being present on the surface of hole 11.

[0044] Fig. 2d shows a further step to be carried out for assembling tool 1, consisting in securing a grip 50 to core 30, in particular to the first end 31 and to the inter-

mediate body 33 of core 30.

[0045] Grip 50 is secured to core 30 through the following steps:

- the first end 31 of core 30 is inserted into a cavity 54 of grip 50;
- said grip 50 is slid over core 30, until a first section 51 of said grip 50 abuts on a second portion 42 of sleeve 40;
- said grip 50 is secured to core 30 by using securing means, e.g. glue and/or screws and/or the like.

[0046] Alternatively, grip 50 may be secured to core 30 by moulding grip 50 over core 30.

[0047] The features of work tool 1 according to the present invention and of the assembling method thereof are apparent from the above description and from the attached drawings.

[0048] The above description has also clearly explained the advantages offered by work tool 1 according to the present invention and of the assembling method thereof.

[0049] In particular, handle 20 of work tool 1 according to the present invention cannot be damaged during the assembling operations, since it is not necessary to use nails, wedges or the like to obtain a safe and secure fixing of handle 20 to head 10 of tool 1.

[0050] A further advantage of work tool 1 according to the present invention is represented by the fact that by using sleeve 40 for securing core 30 in hole 11 of head 10 it is possible to provide a work tool 1 wherein the portion of handle 20 adjacent to head 10 is strengthened, thus preventing handle 20 from breaking and/or bending accidentally when work tool 1 is in use.

[0051] Furthermore, the construction of handle 20 comprising a core 30, a sleeve 40 and a grip 50 according to the teachings of the present invention allows to provide a tool 1 which is strong and well balanced, and whose head 10 cannot separate accidentally from handle 20 when said tool 1 is in use.

[0052] It can be easily understood from the above description that the assembling of tool 1 according to the present invention is particularly simple, said work tool 1 being at the same time also extremely safe to use.

[0053] It is clear that the man skilled in the art may introduce many changes to and applications of tool 1 as described herein by way of example, without departing from the novelty spirit of the invention; likewise, it is also clear that in the practical implementation of the invention the various components may have different shapes and dimensions or be replaced with other technically equivalent elements.

[0054] Among the various possible changes, core 10 and/or through hole 44 and/or cavity 54 may comprise a corrugated surface in order to ensure an even safer coupling between said components.

[0055] It can therefore be easily understood that the present invention is not limited to tool 1 described above in all its various components, but may be subject to many modifications, improvements or replacements of equivalent parts and elements without departing from the inventive idea, as clearly specified in the following claims.

Claims

1. Work tool (1) comprising a head (10) and a handle (20), wherein the head (10) is preferably made of a non-deformable material and has a hole (11), **characterized in that** said handle (20) comprises:

   - a core (30) having a first end (31), a second end (32) and an intermediate body (33), and
   - a sleeve (40) having a first portion (41), a second portion (42) and an intermediate portion (43), said sleeve (40) being adapted to secure said core (30), in particular said second end (32), in said hole (11) by interference.

2. Tool (1) according to claim 1, **characterized in that** said core (30) is made of a plastic material.

3. Tool (1) according to claim 1 or 2, **characterized in that** the first end (31) and the intermediate body (33) of the core (30) are so provided as to have a cross section being smaller than said hole (11).

4. Tool (1) according to claim 1, **characterized in that** said second end (32) comprises stop means (35), in particular a cap adapted to abut on an upper surface (12) of the head (10) or on a slot obtained in said upper surface (12).

5. Tool (1) according to claim 1, **characterized in that** said second end (32) comprises means (34) adapted to prevent said second end (32) from disengaging from the hole (11), in particular a plurality of reliefs and/or recesses adapted to be coupled to respective recesses and/or reliefs being present on the surface of the hole (11).

6. Tool (1) according to claim 1, **characterized in that** said sleeve (40) is made of a plastic material, in particular rigid plastic suitable for withstanding the vibration caused by the blows of the head (10).

7. Tool (1) according to claim 1, **characterized in that** said sleeve (40) comprises a through hole (44) substantially extending along the axis of said sleeve (40) and having a shape and a cross section complementary to the outer surface of the core (30) and suitable for containing said core (30).

8. Tool (1) according to claim 1, **characterized in that** the first portion (41) of the sleeve (40) comprises an annular protrusion (45) adapted to abut on a lower

surface (13) of the head (10).

9. Tool (1) according to claim 1, **characterized in that** said handle (20) comprises a grip (50) having a first section (51), a second section (52) and an intermediate section (53).

10. Tool (1) according to claim 9, **characterized in that** said grip (50) is made of a plastic material, in particular soft plastic.

11. Tool (1) according to claim 9 or 10, **characterized in that** said grip (50) comprises a cavity (54) substantially extending along the axis of said grip (50) and having a shape and a cross section complementary to the outer surface of the core (30) and suitable for containing said core (30).

12. Tool (1) according to claim 9 or 10, **characterized in that** the outer surface of said grip (50) comprises a plurality of grip means (55), in particular a plurality of notches or knurls.

13. Tool (1) according to claim 9, **characterized in that** the first section (51) of the grip (50) and the second portion (42) of the sleeve (40) comprise securing means (46; 56) adapted to prevent said sleeve (40) and/or said grip (50) from turning on the outer surface of the core (30).

14. Tool (1) according to claim 13, **characterized in that** said securing means (46; 56) comprise tongues (46) of said sleeve (40), adapted to engage with slots (56) of said grip (50).

15. Method for assembling a work tool (1) comprising a head (10) and a handle (20), wherein the head (10) is preferably made of a non-deformable material and has a hole (11), said method being **characterized by** comprising the following steps:

- inserting a first end (31) of a core (30) of said handle (20) into said hole (11),
- sliding an intermediate body (33) of the core (30) through the hole (11), until a second end (32) of the core (30) fits into the hole (11) and/or said second end (32) abuts on an upper surface (12) of the head (10);
- positioning a first portion (41) of a sleeve (40) in abutment with a lower surface (13) of the head (10), so as to secure said second end (32) of the core (30) in the hole (11).

16. Assembling method according to claim 15, **characterized in that** said positioning of a first portion (41) of a sleeve (40) in abutment with a lower surface (13) of the head (10) is obtained through the following steps:

- inserting the first end (31) of the core (30) into a through hole (44) of the sleeve (40);
- sliding the sleeve (40) over the core (30);
- securing the sleeve (40) to the core (30) by using securing means.

17. Assembling method according to claim 15, **characterized in that** said positioning of a first portion (41) of a sleeve (40) in abutment with a lower surface (13) of the head (10) is obtained by moulding the sleeve (40) over the core (30).

18. Assembling method according to claim 15, **characterized in that** said abutment between the second end (32) of the core (30) and the hole (11) is obtained by positioning stop means (35) of the second end (32), in particular a cap (35), in abutment with an upper surface (12) of the head (10).

19. Assembling method according to claim 15, **characterized in that** said joint between the second end (32) of the core (30) and the hole (11) is obtained by engaging joining means (34), in particular a plurality of reliefs and/or recesses obtained on said second end (32), with respective reliefs and/or recesses being present on the surface of the hole (11).

20. Assembling method according to claim 15, **characterized by** comprising a step for securing a grip (50) to the core (30), in particular to the first end (31) and to the intermediate body (33) of the core (30).

21. Assembling method according to claim 20, **characterized in that** said securing step is obtained through the following steps:

- inserting the first end (31) of the core (30) into a cavity (54) of the grip (50);
- sliding the grip (50) over the core (30), until a first section (51) of said grip (50) abuts on a second portion (42) of the sleeve (40);
- securing the grip (50) to the core (30) by using securing means.

22. Assembling method according to claim 20, **characterized in that** said securing step is obtained by moulding the grip (50) over the core (30).

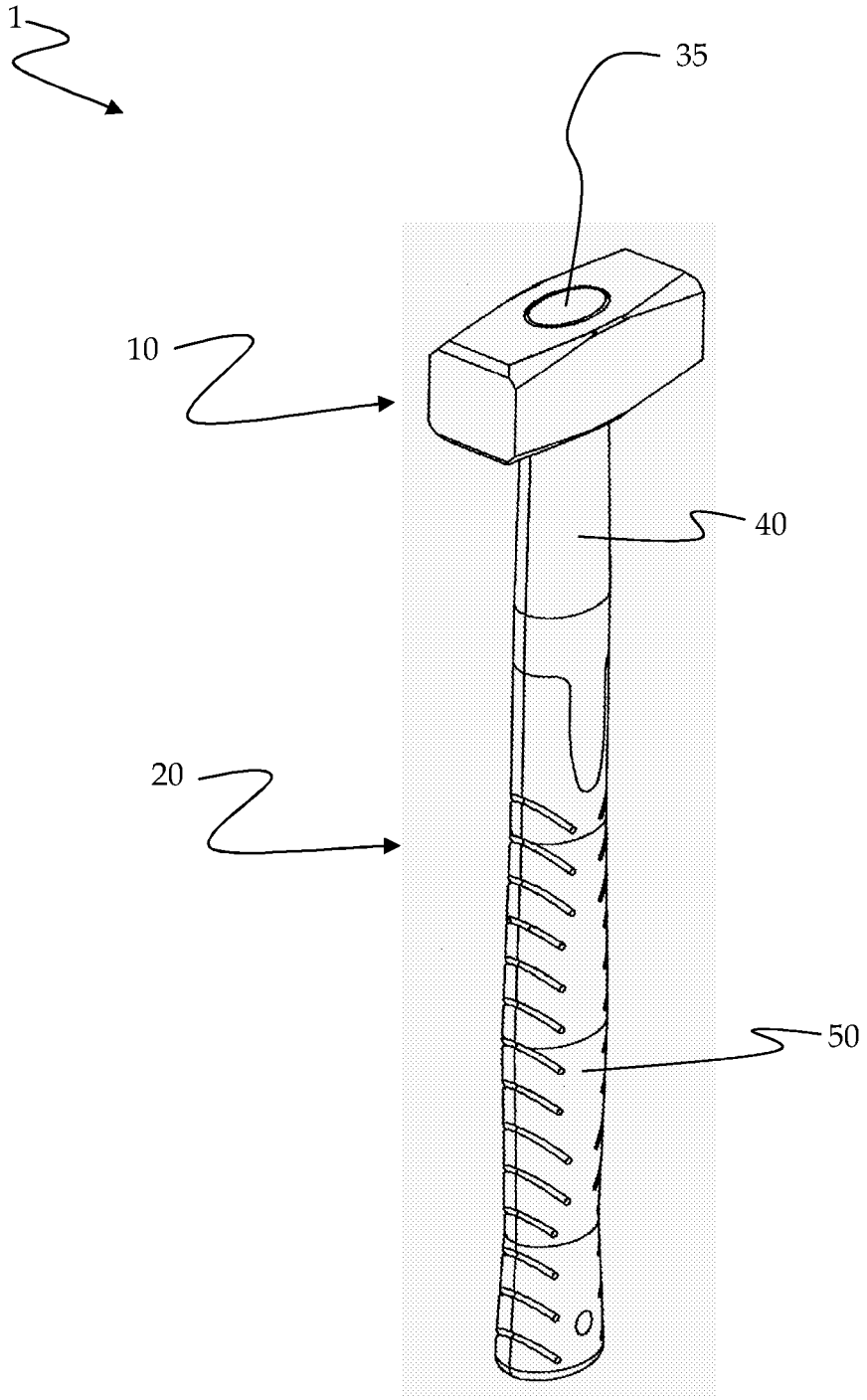

Fig. 1

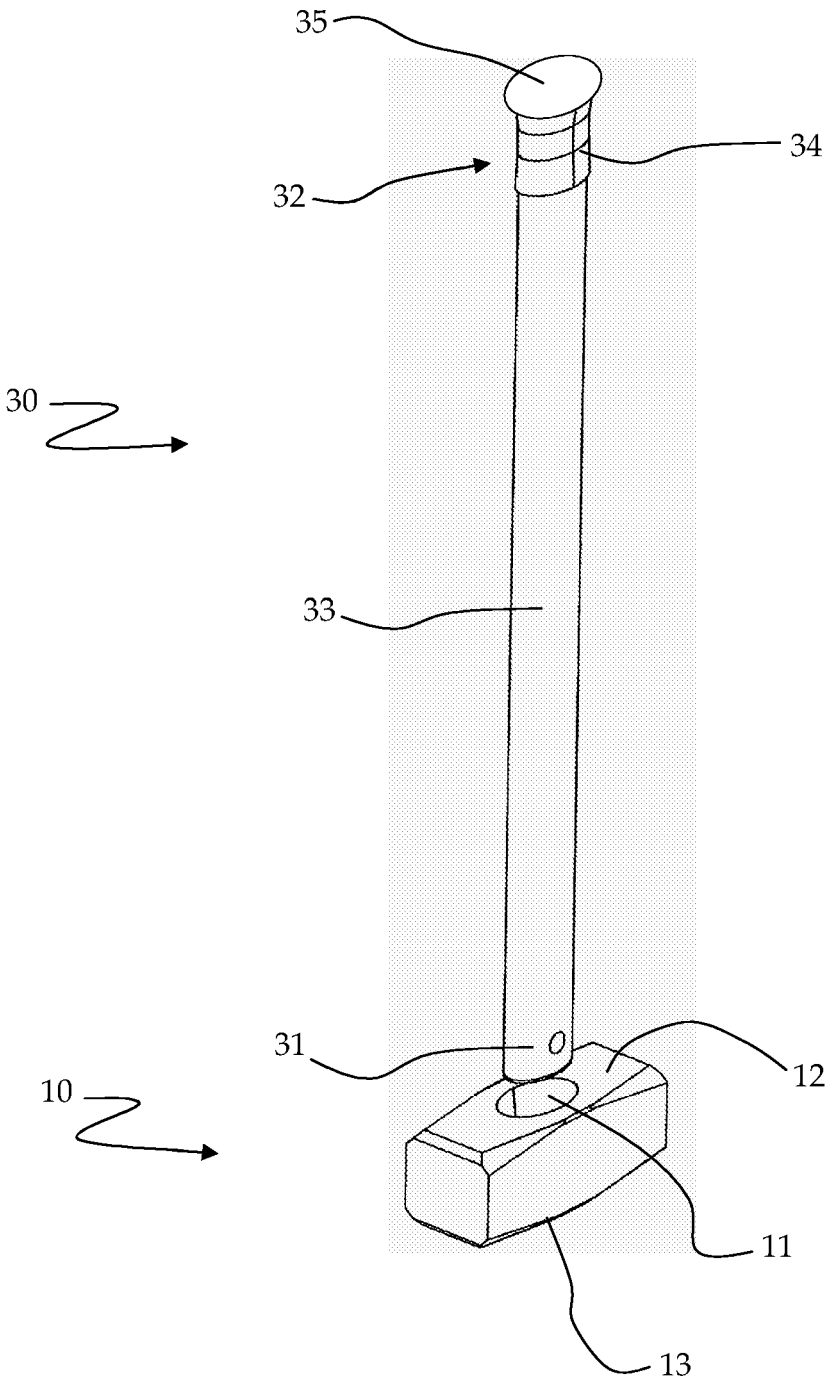

Fig. 2a

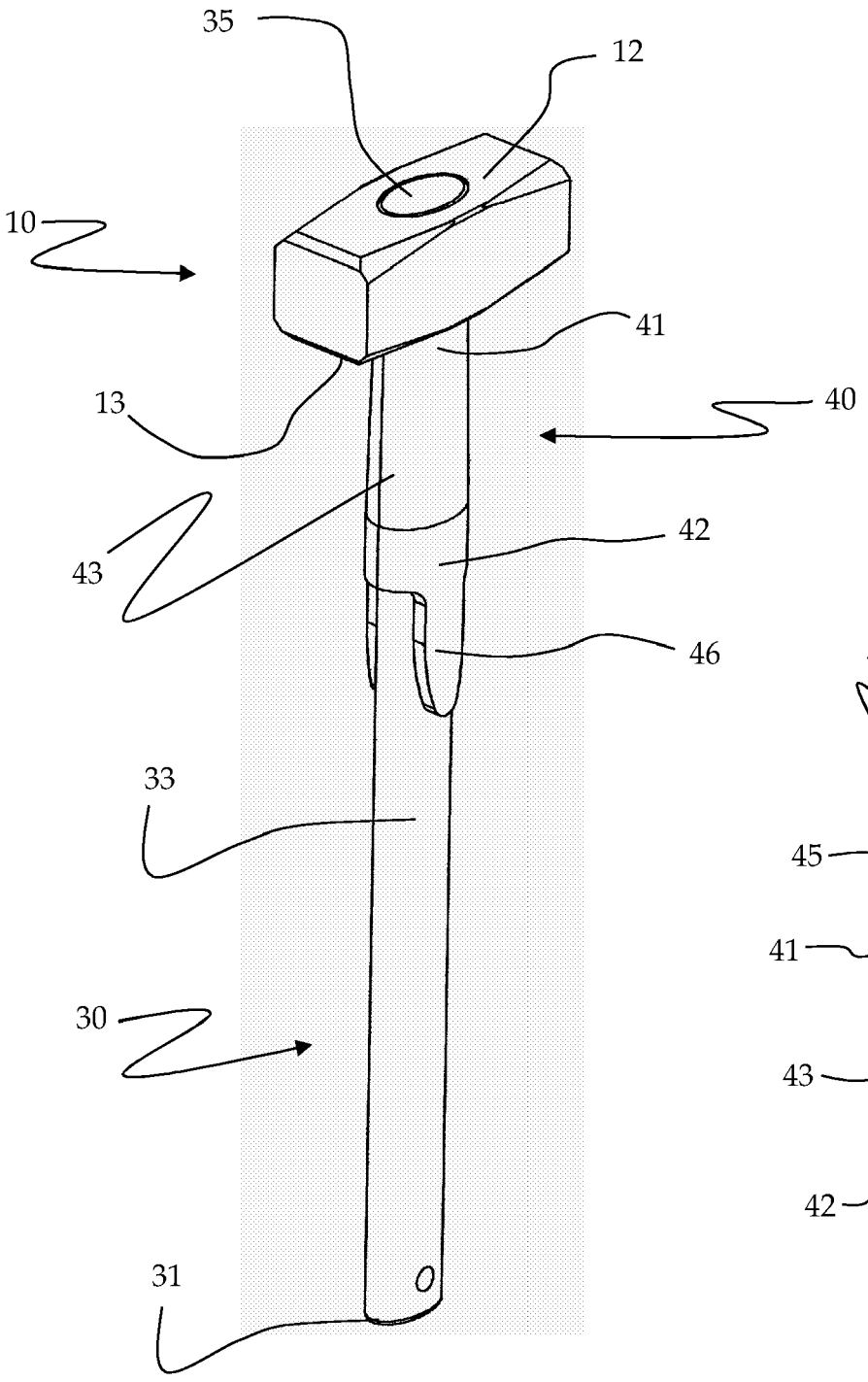

Fig. 2b

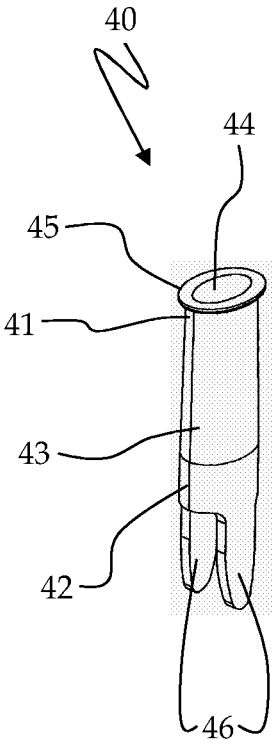

Fig. 2c

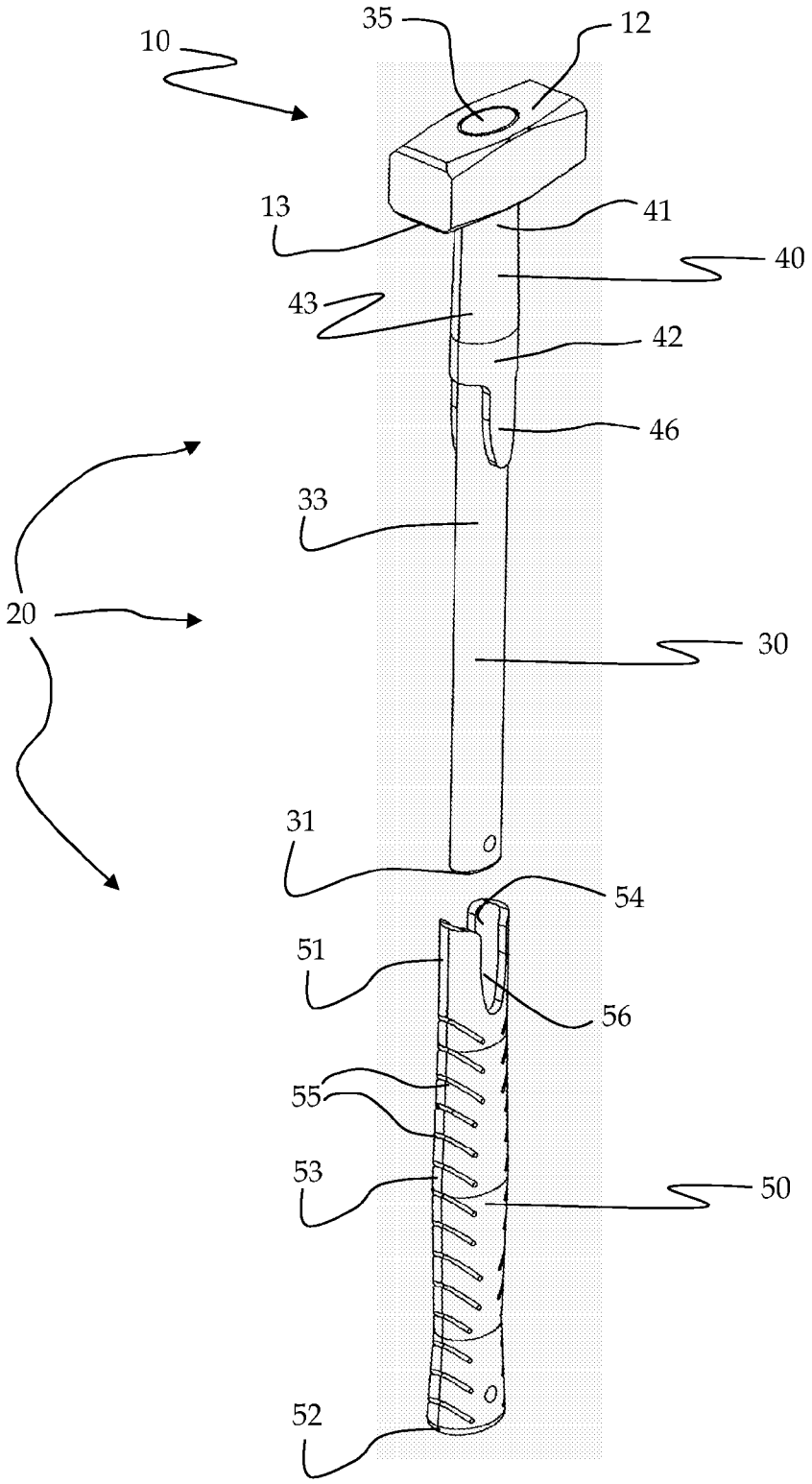

Fig. 2d

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- US 3897534 A **[0010]**