



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
17.10.2018 Bulletin 2018/42

(51) Int Cl.:
B28D 1/22 (2006.01) **B26D 1/24 (2006.01)**
B26D 3/08 (2006.01) **B26D 1/00 (2006.01)**

(21) Application number: **18166326.1**

(22) Date of filing: **09.04.2018**

(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:
KH MA MD TN

(72) Inventors:
• **MONTOLI, Vincenzo**
21050 CANTELLO (IT)
• **CASARTELLI, Luigi**
21050 CANTELLO (IT)

(74) Representative: **Faggioni, Carlo Maria et al**
Fumero S.r.l.
Pettenkoferstrasse 20/22
80336 München (DE)

(30) Priority: **13.04.2017 IT 201700041610**

(71) Applicant: **Brevetti Montolit S.P.A.**
21050 Cantello (Varese) (IT)

(54) **NIPPERS FOR CUTTING SLABS OR TILES**

(57) Engraving nippers for tiles or slabs made of hard material are disclosed, comprising a pair of mutually hinged lever pieces (1a, 1b), provided on two opposite sides of a hinge axis (2) respectively with a handle portion (1a', 1b') and an end head (1a'', 1b'') carrying cutting elements in the form of cutting wheels (4a, 4b) with a perimeter cutting edge, said wheels (4a, 4b) being fixed parallel to a fastening land which is perpendicular to a lying plane of said pair of lever pieces (1a, 1b), wherein said end heads (1a'', 1b'') are L-shaped, so as to define said fastening lands arranged cantilevered towards a side of said lying plane, and said end heads (1a'', 1b'') have opposing projections (5a, 5b) which extend according to a direction joining centres of said wheels (4a, 4b), up to a mutual distance shortly greater than the distance between said cutting edges of the wheels (4a, 4b).

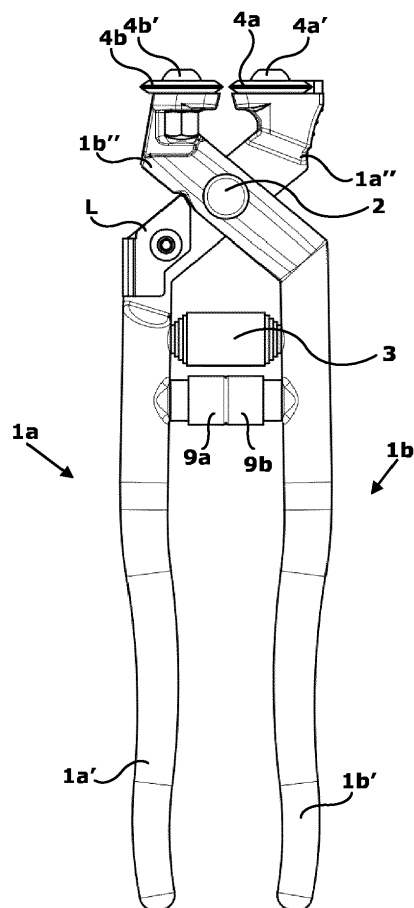


Fig. 1

Description

Field of the invention

[0001] The present invention relates to nippers for cutting hard tiles or slabs, in particular for cutting and breaking off hard cladding material.

Background art

[0002] As is known, in order to engrave and cut off slabs or tiles made of ceramic, stone or similar material, there are numerous different tools. Among the simplest ones are the so-called nippers, that is, tools that can be operated with one hand, which provide two opposite cutting elements, pressed one towards the other by respective favourable levers, hinged together in a central fulcrum axis.

[0003] Classic nippers are constructed substantially in two pieces hinged together when the cutting elements constitute the two opposite shaped ends (typically wedge- or beak-shaped, with a more or less sharpened cutting edge) of the respective pieces.

[0004] This simple and inexpensive solution has some drawbacks. First of all, since the cutting element and the respective lever pieces are integrally formed, they are made of the same material, therefore it is not possible to optimize the performance according to the particular features of each element: the cutting element should have high hardness, while the levers should have some resilience and flexural strength. Secondly, the traditional configuration involves certain operating limits. In fact, the cutting elements typically have two opposing and rectilinear cutting edges, arranged orthogonally to the main hinge axis of the nippers: this is effective for balancing the nippers, but hinders performance of curved cutting, because the space between the cutting edges and the hinge axis is very small and the nippers hit the edge of the tile as soon as it is placed angled.

[0005] Therefore, improved nippers have been offered on the market, wherein the cutting element consists of a separate element, constrained to the ends of the levers by means of suitable fastening means. In this way, the cutting element can be designed specifically for its purpose, for example in the form of wheels of very hard material (widia). The wheels also have the advantage that can be rotated as the cutting edge wears out.

[0006] Examples of nippers with this configuration are illustrated for example in figs. 3-5 of WO91/17964.

[0007] The Applicant has further developed this concept by placing the cutting wheels on a slightly inclined plane, for example inclined by 20°, with respect to the lying plane of the respective lever pieces, as shown for example in the EU registered design no. 181110-0005. This configuration is more effective and ergonomic when it is necessary to make cuttings with a component orthogonal to the edge of the tile, for example a rectangular or semi-circular window along the edge of the tile.

[0008] In any case, what these last solutions have in common is the fact that the two cutting wheels are arranged on a same plane which is parallel or slightly inclined with respect to the lying plane of the lever pieces of the nippers or, which is the same, perpendicular to the fulcrum axis of the lever pieces of the nippers: this feature serves to prevent the nippers' wheels from being turned around their contact point on the tile by applying lateral force on the nipper's body, which would end up applying an excessive flexural stress on the plane of the wheel, which would cause its breakage (being of hard but fragile material).

[0009] This constructive limit means that the manoeuvrability of the nippers in the execution of shaped cuttings is not entirely satisfactory.

[0010] The same document WO91/17964 (fig. 1-2) describes nippers wherein the cutting wheels are arranged on a plane parallel to the fulcrum axis. However, this configuration, in which the wheels are mounted with their central axis on the symmetry plane of nippers, has proved to be not very effective and exposes the wheels to easy breakage under the action of a torsional stress.

[0011] The Applicant has therefore noted that there is an improvement margin for this arrangement.

Summary of the invention

[0012] The object of the present invention is therefore to provide a manual cutting tool, such as nippers, which constitutes an enhancement with respect to the prior art, especially in terms of manoeuvrability and accessibility of the tool in the performance of shaped cuttings.

[0013] This object is achieved by the features mentioned in claim 1. The dependent claims describe preferred features of the invention.

[0014] In particular, according to a first aspect, it is provided engraving/cutting nippers for tiles or slabs made of hard material, comprising a pair of mutually hinged lever pieces, provided on two opposite sides of an hinge axis respectively with a handle portion and an end head carrying cutting elements in the form of cutting wheels with a perimeter cutting edge, said cutting wheels being fixed parallel to a fastening land which is perpendicular to a lying plane of said pair of lever pieces, wherein said end heads are L-shaped, so as to define said fastening lands arranged offset with respect to said lying plane, and said end heads have opposing projections which extend according to a direction joining centres of said cutting wheels, up to a mutual distance shortly greater than the distance between said cutting edges of the cutting wheels.

[0015] According to another aspect, the end heads also have raised protective ribs which follow and partly surround said cutting edges of the cutting wheels.

[0016] Further, preferably, one of said end heads has a pressure surface for exerting manual pressure, while the other end head carries a freely rotatable cutting

wheel. Moreover, said freely rotatable cutting wheel is mounted on a surface of a respective land by means of a through screw engaged with a counter-nut arranged on the opposite side of said land surface.

[0017] According to another aspect, the lever pieces have closing end travel retainers, which determine a closed configuration wherein the cutting edges of said wheels are spaced apart by at least 1.5 mm. Said retainers can be in the shape of rubber pads mounted opposite each other on said handle portions.

Brief description of the drawings

[0018] Further features and advantages of the invention will anyhow be more evident from the following detailed description, given by mere way of non-limiting example and illustrated in the accompanying drawings, wherein:

figs. 1, 2 and 3 are respectively front, lateral and rear elevation views of the nippers according to the invention;

figs. 4 and 5 are plane views from above and below of the nippers of Figure 1, respectively;

fig. 6A is a perspective view of the nippers of fig. 1, of which fig. 6B represents a partial magnification;

fig. 7 is a perspective view similar to that of fig. 6A, but on the opposite side;

fig. 8 is a perspective view similar to that of fig. 6B, according to different line of sight.

Detailed description of a preferred embodiment

[0019] Nippers for tiles or slabs of hard material, such as stone material, are composed in a manner known per se, of two lever bodies 1a and 1b reciprocally hinged on a fulcrum or hinge axis 2. The two lever bodies 1a and 1b have a generic S-shape and have, on one side and the other of the hinge axis 2, a longer portion 1a' and 1b', which acts as a grip end, and a shorter portion 1a'' and 1b'', which acts as a pressure head. This configuration is that which allows to obtain an advantageous lever effect, by acting manually on the longer grip portions 1a' and 1b'.

[0020] Preferably, between the two extended portions 1a' and 1b' of the levers a spring 3 or other similar elastic element is provided, which urges the two portions to spread apart, thus keeping the nippers in open configuration, with the two pressure heads, or end heads, more distant from each other.

[0021] According to the invention, each head portion 1a'' and 1b'' of the two levers has an inverted L-shaped configuration (see fig. 2), so as to define a fastening plane or land P perpendicular to the lying plane of lever bodies 1a and 1b and laterally offset. In other words, as can be clearly seen in fig. 2, the end heads 1a'' and 1b'' define a fastening land having a central axis R which is offset compared to the lying plane of the lever bodies.

[0022] By definition, said central axis R is perpendicular to the land surface and passing through the center of gravity of said land surface.

[0023] On each laterally offset land of the two end heads 1a'' and 1b'' a respective cutting wheel 4a and 4b of hard material, such as widia, which has a sharp circumferential edge, is supported. The circular symmetry axis of the cutting wheels 4a and 4b is substantially placed on the central axis R of the lands.

[0024] The wheels 4a and 4b are held in position by a fastening element, such as a screw 4a' and 4b', which is inserted on the central axis R of the land and thus acts as a fastening axis.

[0025] Advantageously, the two head ends 1a'' and 1b'' have respective opposed projections 5a and 5b, which extend beneath the wheels 4a and 4b so as to constitute a lateral support element close their cutting edge. The projections 5a and 5b essentially constitute extensions of a base portion of the supporting lands of the wheels 4a and 4b, which protrude from the profile of the end heads as a short, low-thickness shelf with substantially straight and partially bevelled opposing edges (as can be seen in figs. 6A-8). The opposed projections 5a, 5b extend up to a mutual distance briefly greater than the mutual distance between the cutting edges of the wheels 4a and 4b: in this way, they do not interfere with the cutting action (it is to be considered that the cutting edge of the wheels must be able to penetrate the slab material in a more or less pronounced measure depending on its compactness), but are available to prevent an application of bending force to the wheels, as will be explained further below. For example, each projection extends up to about 1-2 mm from the cutting edge of the respective wheel.

[0026] These projections have the dual function of better supporting the wheels 4a and 4b, as well as taking contact with the surface of the slab to be cut - when inclining the longitudinal axis of the tool with respect to the plane of the slab to be cut - avoiding a flexural load on the wheels.

[0027] The end heads 1a'' and 1b'' also have raised protective ribs 6a and 6b, which follow and surround a part of the circular profile of the wheels 5a and 5b, extending for a height at least equal to the height of the cutting edge with respect to the fastening land. These ribs 6a and 6b have the function of protecting the cutting edge of the wheels 5a and 5b from accidental impacts: for this purpose, they are provided on the rear side of the tool, that is on the side opposite to the offset direction of the central axis R, i.e. the farthest side from the axis R.

[0028] One of the two end heads 1a'' also has an enlargement which defines a pressure surface 7, arranged at least in correspondence with an axis passing through the centres of the two wheels 4a and 4b. The pressure surface 7 preferably has knurls to give it an anti-slip effect. The thumb of a user's hand is intended to exert pressure on the pressure surface 7, in case the use of a wheel 4b of the tool to perform a sliding cut is desired. The pressure

of the thumb is thus directed along the axis passing through the centres of the two wheels and is going to load the furthest wheel that can engrave the surface with which it is in contact.

[0029] For this purpose, preferably the wheel 4b mounted on the end head 1b' opposite to that on which the pressure surface 7 is formed, is freely rotatably mounted on the respective axis R. For example, thanks to the fact that the supporting lands are cantilevered with respect to the lever pieces of the nippers, it is possible to provide a counter nut 8 which engages with a screw 4b', on a portion that protrudes below the land, so as to leave a loose lock of the wheel against its support land. The free rotation of the wheel 4b makes the pressure engraving action more effective.

[0030] Preferably, the raised protective rib 6a, near the pressure surface 7, ends with a sharp corner 6a' at the intersection with the axis passing through the centres of the two wheels 4a and 4b. Since the cutting point of the wheels also falls on this axis, the sharp corner 6a' can advantageously be used by the user to have a line of sight on the cutting point on the slab, which otherwise remains covered by the same tool.

[0031] Finally, the tool according to the invention can provide a tilting locking means L, hinged on one of the two lever pieces 1b and with an operative end suitable for engaging/disengaging the other lever piece 1a, to determine or not a mutual locking (in closed position, as shown in Fig. 1) between the two lever pieces.

[0032] The tool according to the invention can be used in two different modes.

[0033] A first method is similar to traditional nippers. With the lever pieces 1a and 1b spread apart in an open position, the slab to be cut down is brought between the two opposing cutting edges of the two wheels 4a and 4b, and then a cutting pressure is exerted by manually acting on the two lever pieces 1a and 1b. The pressure is amplified by the lever effect and by the thin cutting edge of the wheels 4a and 4b, so as to cut and fracture the slab. The device is configured in such a way that - even in its fully closed configuration - the two wheels 4a and 4b never come into contact with each other, but between them there is a gap of, for example, 1-1.5 mm: at the time of the fracture of the slab the two wheels are not subjected to abut each other which could break them. To make the operation more comfortable for the user, the closing end of travel of the two lever pieces 1a and 1b is determined by two opposed pads 9a and 9b of sufficiently soft material, such as hard rubber, to cushion the impact when fracture of the slab to be cut down is determined. The two opposed pads 9a and 9b are mounted on the respective lever portions of the nippers, near the spring 3.

[0034] In this type of operation, should the user also tilt the tool body with respect to the slab plane, to exploit a lever effect, the two extensions 5a and 5b come into contact with the slab surface, unloading the rotation bending thereon and avoiding flexural stress on the two fragile wheels 4a and 4b.

[0035] The lateral offset arrangement of the two wheels 4a and 4b, with the fastening axis R - which resides on the cutting plane - offset with respect to the lying plane of the lever pieces 1a and 1b, facilitates user intervention when it is necessary to make a shaped cut, in particular along lines which have a component perpendicular to the edge of the slab to be cut. In fact, the asymmetry of the cutting plane with respect to the plane of the lever pieces 1a and 1b makes it easier to rotate the tool with respect to the slab and to perform the cut inside the surface, proceeding from the perimeter edge.

[0036] A second method is similar to that of a traditional engraving tool. Keeping the tool in the closed position, the user can place the free wheel 4b on the plane of the slab to be cut down and, by pressing on the pressure surface 7, makes the wheel 4b roll on the surface, producing a superficial engrave.

[0037] As can be understood from the above description, the tool of the invention perfectly achieves the objects stated in the introduction.

[0038] In fact, the specific configuration of the end heads equipped with cantilevered wheels allows the user to easily perform shaped cuts as well, when using the tool as nippers. The presence of the projections on the wheels' fastening lands protects the fragile cutting wheels from flexural stresses. Finally, the pressure surface opposed to a rotary-mounted wheel offers the possibility of using the tool also as a surface engraving tool.

[0039] It is however understood that the invention is not limited to the particular embodiments illustrated above, which represent only non-limiting examples of its scope, but that numerous variants are possible, all within the reach of a skilled in the art, without thereby departing from the scope of the invention.

Claims

1. Engraving nippers for tiles or slabs made of hard material, comprising a pair of mutually hinged lever pieces (1a, 1b), provided on two opposite sides of an hinge axis (2) respectively with a handle portion (1a', 1b') and an end head (1a'', 1b'') carrying cutting elements in the form of cutting wheels (4a, 4b) with a perimeter cutting edge, said wheels (4a, 4b) being fixed parallel to a fastening land which is perpendicular to a lying plane of said pair of lever pieces (1a, 1b), **characterized in that** said end heads (1a'', 1b'') are L-shaped, so as to define said fastening lands arranged offset with respect to said lying plane, and said end heads (1a'', 1b'') have opposing projections (5a, 5b) which extend according to a direction joining centres of said wheels (4a, 4b), up to a mutual distance shortly greater than the distance between said cutting edges of the wheels (4a, 4b).

2. Nippers as in claim 1, wherein said end heads also

have raised protective ribs (6a, 6b) which follow and partly surround said cutting edges of the wheels (4a, 4b).

3. Nippers as in claim 1 or 2, wherein one of said end heads (1a'') has a pressure surface (7) for exerting manual pressure, while the other end head (1b'') carries a freely rotatable cutting wheel (4b). 5
4. Nippers as in claim 3, wherein said freely rotatable cutting wheel (4b) is mounted on a surface of a respective land by means of a through screw (4b') engaged with a counter nut (8) arranged on the opposite side of said land surface. 10
15
5. Nippers as in any one of the previous claims, wherein said lever pieces (1a, 1b) have closing end travel retainers (9a, 9b), which determine a closed configuration wherein the cutting edges of said wheels are spaced apart by at least 1.5 mm. 20
6. Nippers as in claim 5, wherein said retainers (9a, 9b) are in the shape of rubber pads mounted opposite each other on said handle portions (1a', 1b'). 25

30

35

40

45

50

55

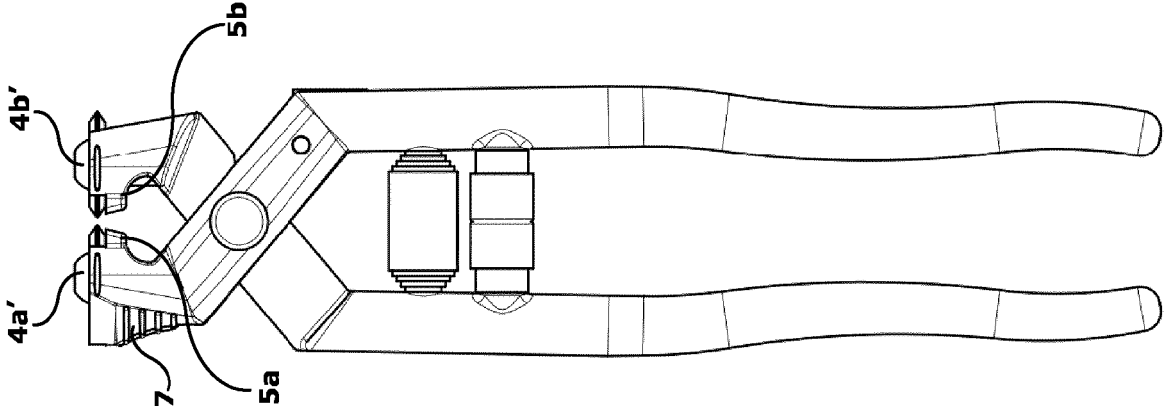


Fig. 3

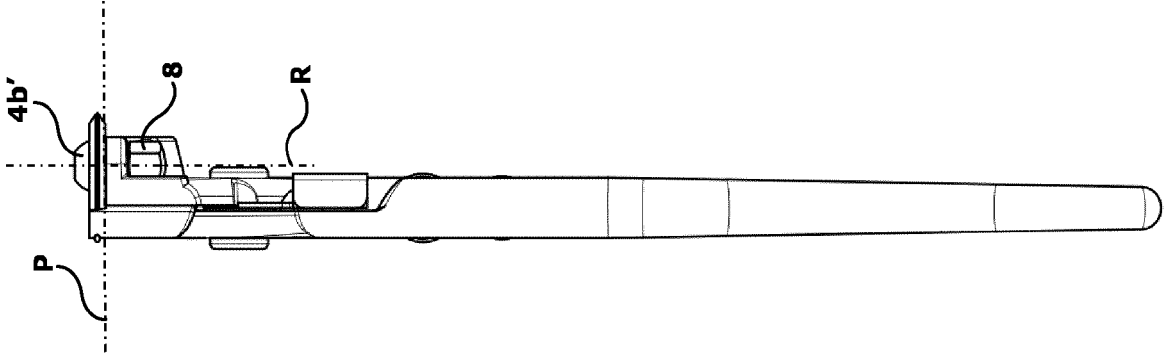


Fig. 2

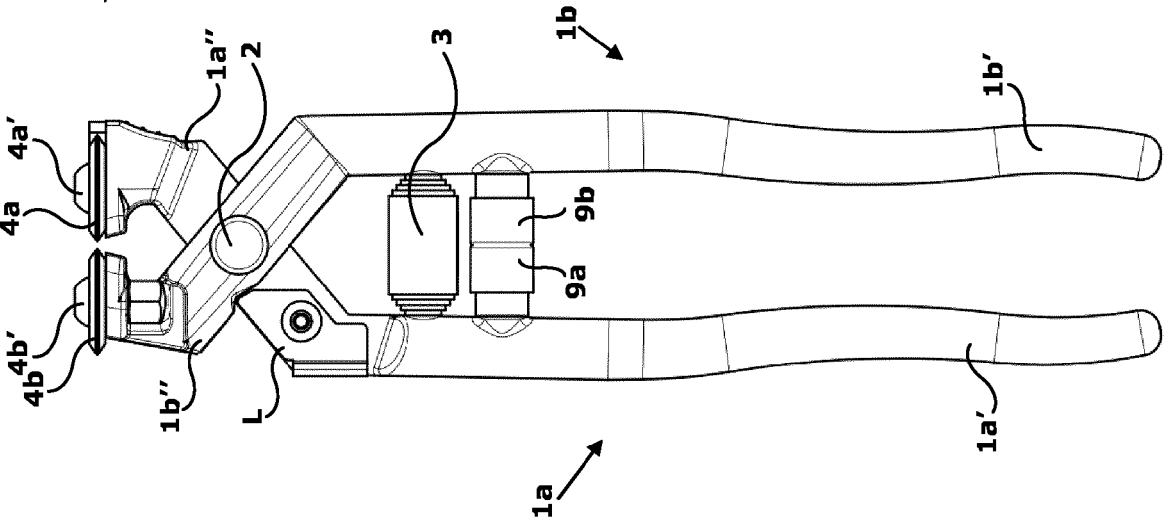


Fig. 1

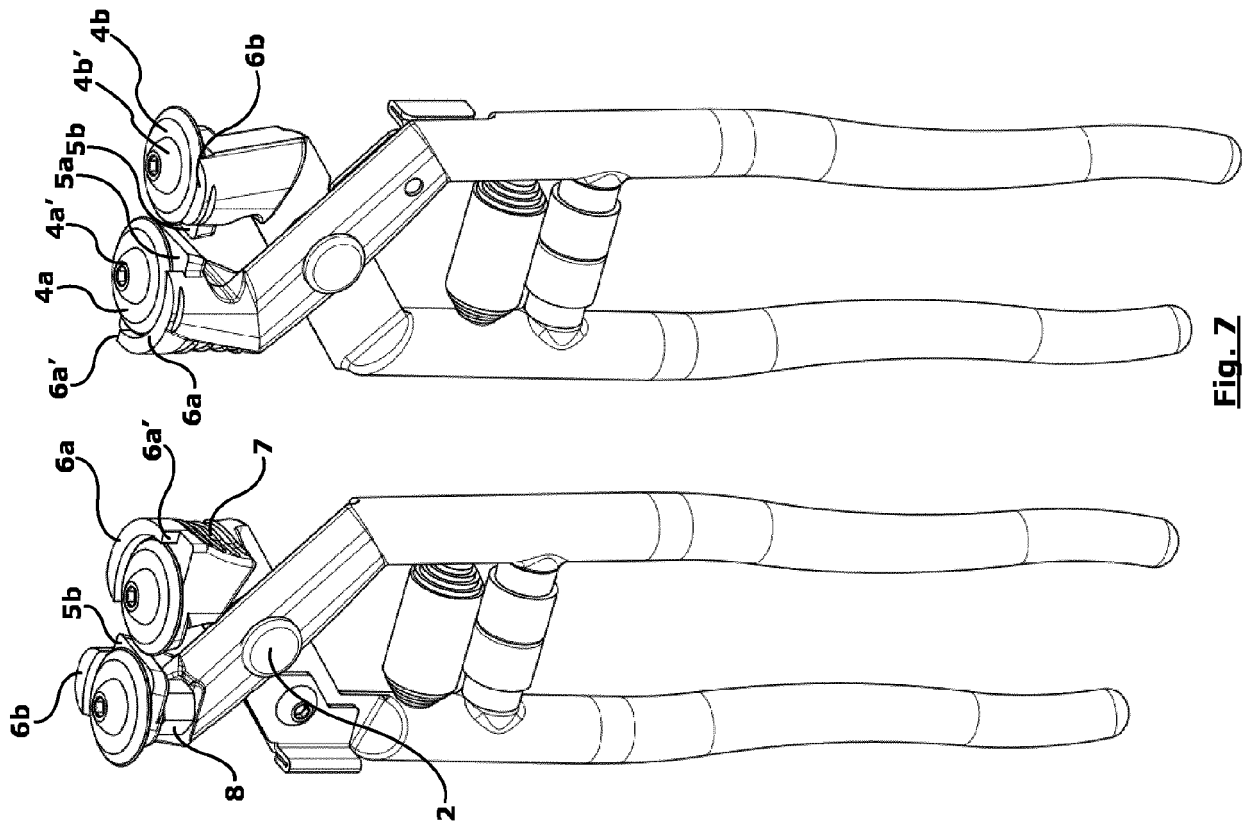


Fig. 6A

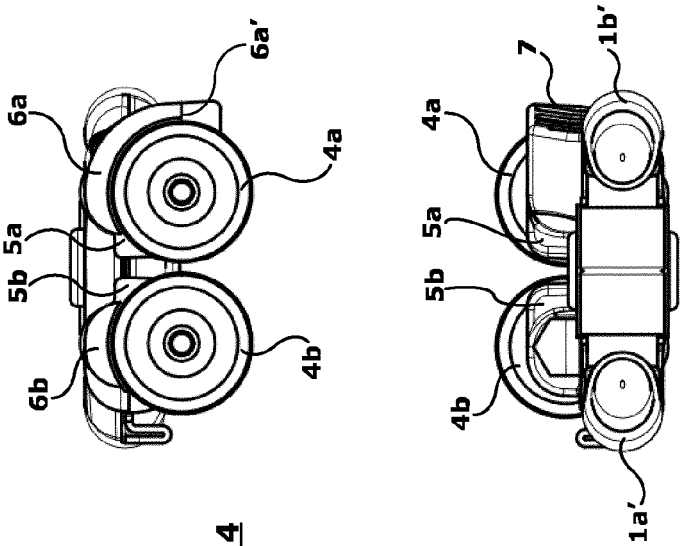


Fig. 4

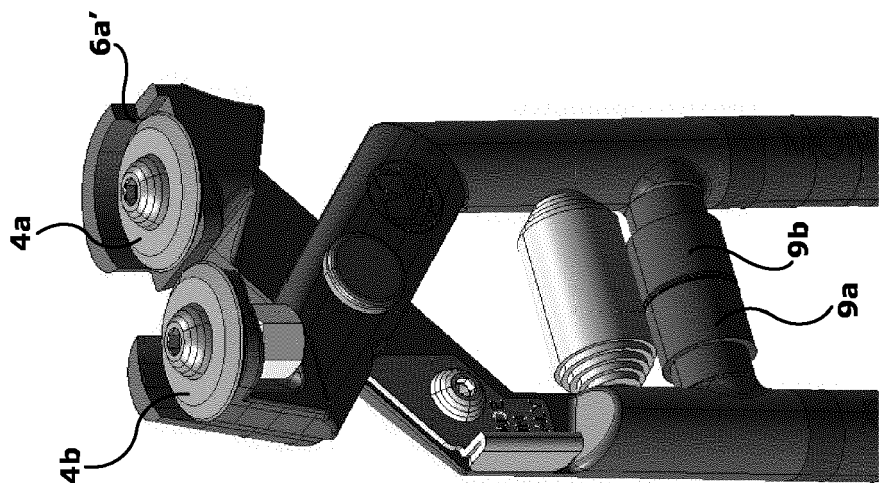


Fig. 8

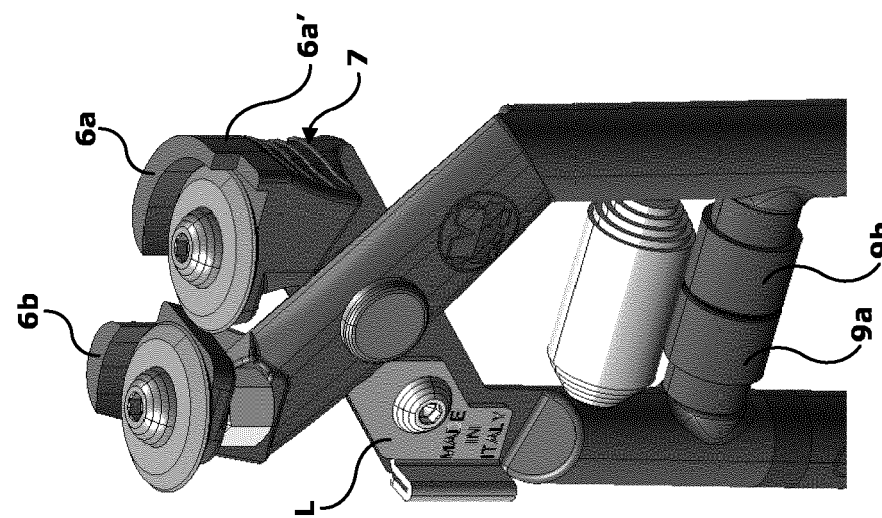


Fig. 6B



EUROPEAN SEARCH REPORT

Application Number
EP 18 16 6326

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 530 223 A1 (BOHLE JOSEF STIFTUNG [DE]) 10 March 1993 (1993-03-10)	1,3-6	INV. B28D1/22 B26D1/24 B26D3/08 B26D1/00
Y	* page 3, lines 9-20 * * page 4, lines 11,12; claim 1; figures * * page 4, lines 41-49 *	2	
Y	----- WO 2016/125088 A1 (FORMETAL S R L [IT]) 11 August 2016 (2016-08-11) * page 5, lines 1-7; figure 2 *	2	
A	----- US 2006/168826 A1 (SHAI MOTI [US]) 3 August 2006 (2006-08-03) * abstract; figures *	1-6	
A	----- US 2006/048393 A1 (STRAVITZ DAVID M [US]) 9 March 2006 (2006-03-09) * paragraph [0046]; figure 11 *	1-6	
A	----- EP 2 871 034 A1 (TNO [NL]) 13 May 2015 (2015-05-13) * paragraphs [0033], [0034]; figures *	1-6	
A	----- US 5 581 886 A (SESSER GREGORY L [US] ET AL) 10 December 1996 (1996-12-10) * abstract; figures *	1	TECHNICAL FIELDS SEARCHED (IPC) B28D
A	----- CH 41 151 A (GASSER ROBERT [CH]) 16 September 1908 (1908-09-16) * figures 1-4 *	1	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 10 September 2018	Examiner Popma, Ronald
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 18 16 6326

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

10-09-2018

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0530223 A1	10-03-1993	DE 4016310 A1	28-11-1991
		EP 0530223 A1	10-03-1993
		ES 2050540 T3	16-05-1994
		JP H05506823 A	07-10-1993
		US 5361498 A	08-11-1994
		WO 9117964 A1	28-11-1991

WO 2016125088 A1	11-08-2016	NONE	

US 2006168826 A1	03-08-2006	NONE	

US 2006048393 A1	09-03-2006	NONE	

EP 2871034 A1	13-05-2015	NONE	

US 5581886 A	10-12-1996	NONE	

CH 41151 A	16-09-1908	NONE	

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 9117964 A [0006] [0010]