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(54) Title: CLAMPING DEVICE

(57) Abstract: There is provided a clamping device (100, 600). The clamping device (100, 600) comprises a body portion (102, 602), the body portion (102, 602) comprising a region (104, 604) arranged to allow the clamping device (100, 600) to be removably attached to a separate clamp (200, 1000) by a push-fit connection. The clamping device (100) has a clamping portion (106), the clamping portion (106) being movable relative to the body portion (102).

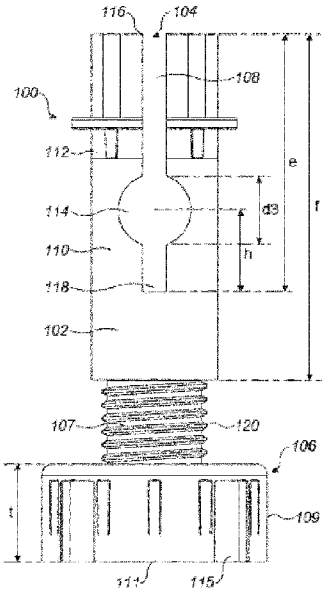

Fig. 3

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Clamping device

Technical field

The present disclosure relates to a clamping device.

Background

Clamps are known. Clamps are used for holding two or more materials or items together. For example, a clamp may be used to hold two items together while waiting for an adhesive to set between the two items.

Summary

According to a first aspect there is disclosed a clamping device comprising: a body portion, the body portion comprising a region arranged to allow the clamping device to be removably attached to a separate clamp by a push-fit connection; and the clamping device having a clamping portion, the clamping portion being movable relative to the body portion.

According to some examples, the region is arranged to allow the clamping device to slide along a frame of the separate clamp.

According to some examples, the region comprises a recess in the body portion.

According to some examples, the recess comprises a slot that extends longitudinally along the body portion.

According to some examples, the body portion comprises a first side and a second side, the slot extending between the first side and the second side and enabling the first side and the second side to flex relative to each other.

According to some examples, the region comprises a location portion for locating the clamping device on the separate clamp.

According to some examples, the location portion comprises an arced region.

According to some examples, the location portion is circular.

According to some examples, the location portion is positioned between an open end and a closed end of the slot.

According to some examples, the body portion has a flared portion proximate to the open end of the slot.

According to some examples, the flared portion flares outwardly from the body portion.

According to some examples, the body portion is generally circular in plan view.

According to some examples, the clamping device comprises a threaded portion for enabling the clamping portion to be moved towards and away from the body portion.

According to some examples, the clamping portion is separable from the body portion.

According to some examples, the clamping portion is generally circular in plan view.

According to some examples, the clamping portion comprises a clamping surface, and at least one recess in the clamping surface.

According to some examples, the at least one recess comprising a through-hole in the clamping surface.

According to some examples, the clamping portion comprises one or more projections to assist with screwing and un-screwing the clamping portion to the body portion.

According to some examples, the body portion is formed from plastic.

According to some examples, the body portion is formed from metal.

According to some examples, the clamping portion is formed from plastic.

According to some examples, the clamping portion is formed from metal.

According to some examples, the clamping device is configured to provide an edging clamp function.

According to some examples, the separate clamp comprises a solo-clamp.

According to some examples, the separate clamp comprises a G-clamp.

According to a second aspect there is provided, in combination, a clamp and a clamping device according to the first aspect.

According to some examples, the clamp comprises a solo-clamp.

According to a third aspect there is provided a kit of parts comprising a clamp and a clamping device according to the first aspect.

According to some examples, the clamp comprises a solo clamp.

According to a third aspect there is disclosed a clamping device comprising: a body portion, the body portion comprising a region arranged to allow the clamping device to be removably attached to a separate clamp; and the clamping device having a clamping portion, the clamping portion being movable relative to the body portion.

Brief description of drawings

The invention is described in more detail with reference to the accompanying Figures in which:

Figure 1 shows a prior art clamp;

Figure 2 shows a prior art clamp;

Figure 3 shows a clamping device in accordance with an example of the invention;

Figure 4 shows a clamping device in accordance with an example of the invention, in combination with the prior art clamp of Figure 1;

Figure 5 is a plan view of parts of the clamping device according to an example of the invention;

Figure 6 is a side view of a clamping device according to an example of the invention;

Figure 7 is another side view of a clamping device according to an example of the invention;

Figure 8 is a perspective view of a clamping device according to an example of the invention;

Figure 9 is a perspective view of a clamping device according to an example of the invention, showing the clamping portion separated from the body portion;

Figure 10 is a cross-sectional view through a clamping device according to an example;

Figure 11 is a perspective view of a clamping device according to an example of the present invention, showing the clamping device attached to a separate clamp;

Figure 12, is a perspective view of a clamping device according to an example of the present invention, showing the clamping device detached from a separate clamp.

Detailed description

Figure 1 shows an example of a known clamp 200. The clamp 200 of Figure 1 is commonly known as a solo clamp. Clamp 200 comprises frame 202 and a clamping region 230 between clamping surfaces 232 and 234. Clamping surface 234 can be driven towards clamping surface 232 by squeezing trigger 236, so that materials can be clamped together in clamping region 230. Clamping surface 234 can be drawn away from clamping surface 232, by pressing clutch 238 and pulling on handle 240.

Figure 2 shows an example of a known clamp 300. The clamp 300 of Figure 2 is commonly known as an edging clamp. Edging clamp 300 comprises clamping surfaces 350, 352 and 354, which can be extended and retracted by turning

respective handles 356, 358 and 360. Clamp 300 also comprises a frame 302. Edging clamp 300 enables clamping in two perpendicular planes. For example, and with respect to Figure 2, materials 362 and 364 can be squeezed together with clamping surfaces 350 and 352. Material 366 can be joined to materials 362 and 364 by clamping surface 354.

The present disclosure identifies some disadvantages with the prior art clamps of Figures 1 and 2. The solo-clamp 200 of Figure 1 does not provide an edging function. Rather, two solo-clamps 200 would be required if additional edging functionality is required. The edging clamp 300 of Figure 3 does of course enable edging, but there is no lateral adjustability (left to right when viewing Figure 2) of clamping surface 354. Moreover, for times when a user does not require edging functionality, clamping surface 354 becomes redundant. Therefore, work persons such as carpenters typically carry around both solo clamps and edging clamps (which can be quite large and heavy), and often many of each. The present disclosure identifies that this is cumbersome, and unnecessarily expensive for such users.

An aim of the invention as described in more detail below is to overcome or at least mitigate these drawbacks.

Figure 3 shows a clamping device 100 according to the present invention. Figure 4 shows clamping device 100 attached to separate clamp 200.

The clamping device 100 comprises a body portion 102. The body portion 102 comprises a region 104 that is arranged to allow the clamping device 100 to be removably attached to the separate clamp 200. The clamping device 100 has a clamping portion 106. The clamping portion 106 is movable relative to the body portion 102. For example, the clamping portion 106 may be moved towards and away from the body portion 102. In some examples a threaded connection or

threaded portion 120 is provided between clamping portion 106 and body portion 102, to enable the two parts to move relative to each other. In some examples, the clamping portion 106 is separable from the body portion 102, for example by completely unscrewing the clamping portion 106 from the body portion 102.

In some examples it may be considered that the clamping portion 106 comprises a barrel portion 107 and a clamping section 109. Clamping section 109 comprises clamping surface 111, which clamping surface 111 is configured to contact a surface of a material to be clamped. Clamping section 109 has a thickness t. In some examples, t is between 10mm and 20mm. In some examples, t is 15mm or about 15mm. In some examples, clamping portion 109 has one or more recessed portions 115. In some examples, threaded portion 120 is provided on barrel 107.

In another example, threaded portion 120 is provided on the body portion 102, to engage a corresponding threaded portion in an interior of the clamping portion 106.

In some examples the region 104 is arranged to allow the clamping device 100 to be slid onto or pushed onto the clamp 200. For example, it may be considered that the clamping device 100 is arranged to be slid on to frame 202 of clamp 200. For example, with respect to Figure 4 it may be considered that the clamping device 100 is arranged to be slid on to the clamp 200 in the direction of arrow A, and slid off the clamp in the direction of arrow B. Again, with respect to Figure 4, it may be considered that the clamping device 100 is arranged to be slid on to the clamp 200 in a direction that is perpendicular to a clamping direction X of the clamp 200. In some examples it may be considered that the region 104 of the clamping device 100 is arranged to allow the clamping device to be push-fit on to the clamp 200.

In some examples, the region 104 is arranged to allow the clamping device to slide along frame 202 of clamp 200. For example, and with reference to Figure 4, the region 104 may be arranged to allow the clamping device 100 to slide in the direction

of arrows C and D. In some examples it may be considered that the region 104 is arranged to allow the clamping device 100 to slide along frame 202 in a direction parallel to clamping direction X of clamp 200.

As shown for example in Figure 3, the region 104 comprises a recess in the clamping device 100. In some examples, the recess is in the form of slot 108. In some examples it may be considered that the slot 108 extends longitudinally along the body portion 102. The length of the slot 108 is represented by double-headed arrow “e” in Figure 3. In some examples, e is approximately between 45mm and 55mm. In some examples, e is 50mm or about 50mm. The overall length of body portion 102 is represented by double-headed arrow “f”. In some examples, f is approximately between 62mm and 72mm. In some examples, f is 67mm or about 67mm.

According to some examples it may be considered that the body portion 102 comprises a first side 110 and a second side 112. In examples, the slot extends between the first side 110 and the second side 112. The slot 108 introduces a deliberate level of weakness to the body portion 102, so that the first side 110 and second side 112 can flex relative to each other. The body portion 102 has a resilience so that if a force is applied that pushes first side 110 and second side 112 away from each other, then after that force is removed the first side 110 and second side 112 will return towards each other.

According to some examples the region 104 comprises a location portion 114 for locating the clamping device 100 on the clamp 200. For example, the location portion 114 may be constructed and arranged to engage with a feature on the clamp 200. For example, the location portion 114 may be arranged to locate on a raised feature or rib 203 of frame 200.

According to some examples the location portion 114 is circular or substantially circular. According to some examples, a diameter d3 of location portion 114 is between 10mm and 18mm. According to some examples, d3 is 14mm or about 14mm. According to some examples the location portion 114 is positioned or located between an open end 116 and a closed end 118 of the slot 108. According to some examples, the location portion 114 is located closer to the closed end 118 than the open end 116. In Figure 3, a distance between closed end 118 and a centre of location portion 114 is shown by dimension "h". In some examples, h is between 10mm and 20mm. According to some examples, h is 15mm or about 15mm.

Although in Figure 3 location portion 114 is shown as being circular, this is by way of example and other shapes may be used. For example, location portion 114 could be any one of: square; rectangular; triangular; or indeed any other shape.

According to examples, when the clamping device 100 is being slid onto the clamp 200, frame 202 first enters open end 116 of slot 108. This may cause the first side 110 and second side 112 of body portion 102 to splay out slightly from each other. The clamping device 100 can continue to be slid on to frame 202 until rib 203 locates in location portion 114. As discussed above, the clamping device 100 can be slid along frame 200 in a direction parallel to the clamping direction X (i.e. in the direction of arrows C and D). This may be useful for adjusting the position of the clamping device 100 relative to the material to be clamped. Then the clamping section 109 can be moved towards a material to be clamped (e.g. by turning the clamping section 109 so that it begins to unscrew from body portion 102). Once the clamping surface 111 firmly engages the material to be clamped, a frictional force between clamping surface 111 and the material to be clamped will cause the clamping device 100 to be firmly positioned in place on the clamp 200. It may be considered that the clamping device 100 is arranged to add an edging clamp function to the separate clamp 200.

According to some examples, the body portion 102 is formed from plastic. For example, the body portion 102 may be injection moulded. In other examples, the body portion 102 may be 3D printed.

According to some examples, the body portion 102 is formed from metal. By way of non-limiting example, the metal may be any one of: steel; stainless steel; aluminium.

According to some examples, the body portion 102 has a wall thickness of 2mm or about 2mm.

According to some examples the clamping portion 106 is formed from plastic. For example, the clamping portion 106 may be injection moulded. In other examples, the clamping portion 106 may be 3D printed.

According to some examples, the clamping portion is formed from metal. By way of non-limiting example the metal may be any one of: steel; stainless steel; aluminium.

Figure 5 shows the body portion 102 and the clamping portion 106 in plan view, when they have been separated. As shown in the example of Figure 5 the body portion 102 and the clamping portion 106 are generally circular in plan view. The body portion 102 has an outer diameter d1. In some examples, d1 is approximately between 23mm and 33mm. In some examples, d1 is 28mm or about 28mm. The clamping portion 106 has an outer diameter d2. In some examples, d2 is approximately between 38mm and 48mm. In some examples, d2 is 43mm or about 43mm. Width of slot 108 is schematically shown by double-headed arrow “g”. According to some examples, g is approximately between 2mm and 8mm. According to some examples, g is 5mm or about 5mm.

In some examples, the clamping device 100 may be provided in different sizes. The overall dimensions may differ between different sizes of the clamping device, and dimensions of the slot 108 and location portion 114 may differ between different sizes of the clamping device 100. In some examples, two different sizes of clamping device 100 may be provided e.g. small and large. In some examples, three different sizes of clamping device 100 may be offered e.g. small, medium, and large. This is of course by way of non-limiting example. In some examples, different sizes of clamping device may be sold together in a kit. A user may select a suitable sized clamping device 100 based on application requirement.

In some examples, one or more clamping devices 100 may be offered together with a separate clamp 200, as part of a kit.

Some further examples of the invention are shown with respect to Figures 6 to 12. It will be appreciated that aspects of the embodiments of Figures 6 to 12, may be combined with aspects of the embodiments of Figures 3 to 5. For conciseness, notable further features of the examples of Figures 6 to 12 are discussed below.

Figure 6 shows a clamping device 600. The clamping device 600 comprises a main body portion 602 and a clamping portion 606. The location portion 614 is located between open end 616 and closed end 618 of slot 608. According to some examples, the location portion 614 is at least partially elliptical in profile, having an arced or curved edge 670.

According to some examples, the body portion 602 comprises a flared portion 672. According to some examples, the flared portion 672 is flared outwardly on the body portion 602.

In some examples, there is a narrowed throat portion 674 between open end 616 and location portion 614, and between first side 610 and second side 612 of body

portion 602. Thus it may be considered that (starting from the bottom of Figure 6), slot 608 comprises a relatively wide portion (open end 616), followed by a relatively narrower portion (throat 674), followed by a relatively wider portion (location portion 614), followed by a relatively narrower portion (closed end 618). In side-view (as per Figure 6), the slot 608 (which may also be referred to as an opening), may be considered to have a “coke bottle” profile.

In some examples, as clamping device 600 is being attached to a separate clamp 1000 (see Figure 10), a frame of clamp 1000 first passes through open end 616 and throat portion 674, causing first side 610 and second side 612 to splay apart somewhat. Then, as the clamping device 600 is pushed further on the clamp 1000, the location portion 614 eventually locates onto clamp 1000. In some examples, a ridge of clamp 1000 fits neatly against or close to closed end 618 of slot 608 (see Fig. 11).

It may be considered that the shape of the slot 608 and location portion 614 allows for easier attachment & removal from a separate clamp (e.g. clamp 1000). The shape of the slot 608 and location portion 614 may also give a better fit around the separate clamp (e.g. clamp 1000), once installed thereon.

Referring to Figure 7, this shows the clamping device 600 rotated through 90 degrees about its longitudinal axis, compared to Figure 6. As shown from Figure 7, the body portion 602 comprises scalloped or recessed portions 676 and 678.

In some examples, it may be considered that the clamping portion 606 comprises a clamping surface 680. As shown in Figure 8, in some examples the clamping surface 680 comprises at least one recess 682. In some examples, the at least one recess 682 comprises a through-hole in the clamping surface. In some examples the at least one recess comprises a blind-hole in the clamping surface 680. In some examples, it may be considered that the clamping surface 680 is in the form of a

grate, the grate comprising the at least one recess 682. In some examples, the at least one recess comprises a plurality of recesses. In some examples, the at least one recess 682 reduces friction between the clamping surface 680 and an item being clamped. For example, the grated clamping surface may reduce excessive turning friction as the clamping surface is being tightened against an item being clamped.

According to some examples, the clamping portion 606 comprises one or more projections 684. The one or more projections 684 project radially outwardly from the clamping portion 606. In some examples, the one or more projections 684 are in the form of one or more wings or ribs. The one or more projections enable a user to grip the clamping portion 606, and assist with screwing and un-screwing the clamping portion 606 to the body portion 602.

As shown in Figure 9, in some examples the body portion 602 comprises a projecting portion 686 that carries a thread 688. The thread 688 engages with a corresponding thread 690 of clamping portion 606, as shown in the cross-sectional view in Figure 10.

Figure 11 shows the clamping device 600 attached to a clamp 1000. The clamping portion 606 is in an extended position relative to the body portion 602.

Figure 12 shows the clamping device 600 detached from a clamp 1000. The clamping portion 606 is in a retracted position relative to the body portion 602.

The examples described herein are to be understood as illustrative examples of embodiments of the invention. Further embodiments and examples are envisaged. Any feature described in relation to any one example or embodiment may be used alone or in combination with other features. In addition, any feature described in relation to any one example or embodiment may also be used in combination with

one or more features of any other of the examples or embodiments, or any combination of any other of the examples or embodiments. Furthermore, equivalents and modifications not described herein may also be employed within the scope of the invention, which is defined in the claims.

Claims

1. A clamping device comprising:

a body portion, the body portion comprising a region arranged to allow the clamping device to be removably attached to a separate clamp by a push-fit connection; and

the clamping device having a clamping portion, the clamping portion being movable relative to the body portion.

2. A clamping device according to claim 1, the region arranged to allow the clamping device to slide along a frame of the separate clamp.

3. A clamping device according to claim 1 or claim 2, wherein the region comprises a recess in the body portion.

4. A clamping device according to claim 3, wherein the recess comprises a slot that extends longitudinally along the body portion.

5. A clamping device according to claim 4, wherein the body portion comprises a first side and a second side, the slot extending between the first side and the second side and enabling the first side and the second side to flex relative to each other.

6. A clamping device according to any of claims 1 to 5, wherein the region comprises a location portion for locating the clamping device on the separate clamp.

7. A clamping device according to any of claims 1 to 6, wherein the location portion comprises an arced region.

8. A clamping device according to claim 6 or claim 7, wherein the location portion is circular.

9. A clamping device according to any of claims 6 to 8, wherein the location portion is generally elliptical in profile.

10. A clamping device according to any of claims 6 to 9 when dependent on claim 4, wherein the location portion is positioned between an open end and a closed end of the slot.

11. A clamping device according to claim 10, wherein the body portion has a flared portion proximate to the open end of the slot.

12. A clamping device according to any of claims 1 to 11, wherein the body portion is generally circular in plan-view.

13. A clamping device according to any of claims 1 to 12, comprising a threaded portion for enabling the clamping portion to be moved towards and away from the body portion.

14. A clamping device according to any of claims 1 to 13, wherein the clamping portion is separable from the body portion.

15. A clamping device according to any of claims 1 to 14, wherein the clamping portion is generally circular in plan-sview.

16. A clamping device according to any of claims 1 to 15, wherein the clamping portion comprises a clamping surface, and at least one recess in the clamping surface.

17. A clamping device according to claim 16, the at least one recess comprising a through-hole in the clamping surface.

18. A clamping device according to any of claims 1 to 17, wherein the clamping portion comprises one or more projections to assist with screwing and un-screwing the clamping portion to the body portion.

19. A clamping device according to any of claims 1 to 18, wherein the body portion is formed from plastic.

20. A clamping device according to any of claim 1 to 18, wherein the body portion is formed from metal.

21. A clamping device according to any of claims 1 to 20, wherein the clamping portion is formed from plastic.

22. A clamping device according to any of claims 1 to 20, wherein the clamping portion is formed from metal.

23. A clamping device according to any of claims 1 to 22, wherein the clamping device is configured to provide an edging clamp function.

24. In combination, a clamp, and a clamping device according to any of claims 1 to 23.

25. A combination according to claim 24, wherein the clamp comprises a solo-clamp.

26. A kit of parts comprising a clamp, and a clamping device according to any of claims 1 to 23.

27. A kit of parts according to claim 26, wherein the clamp comprises a solo clamp.

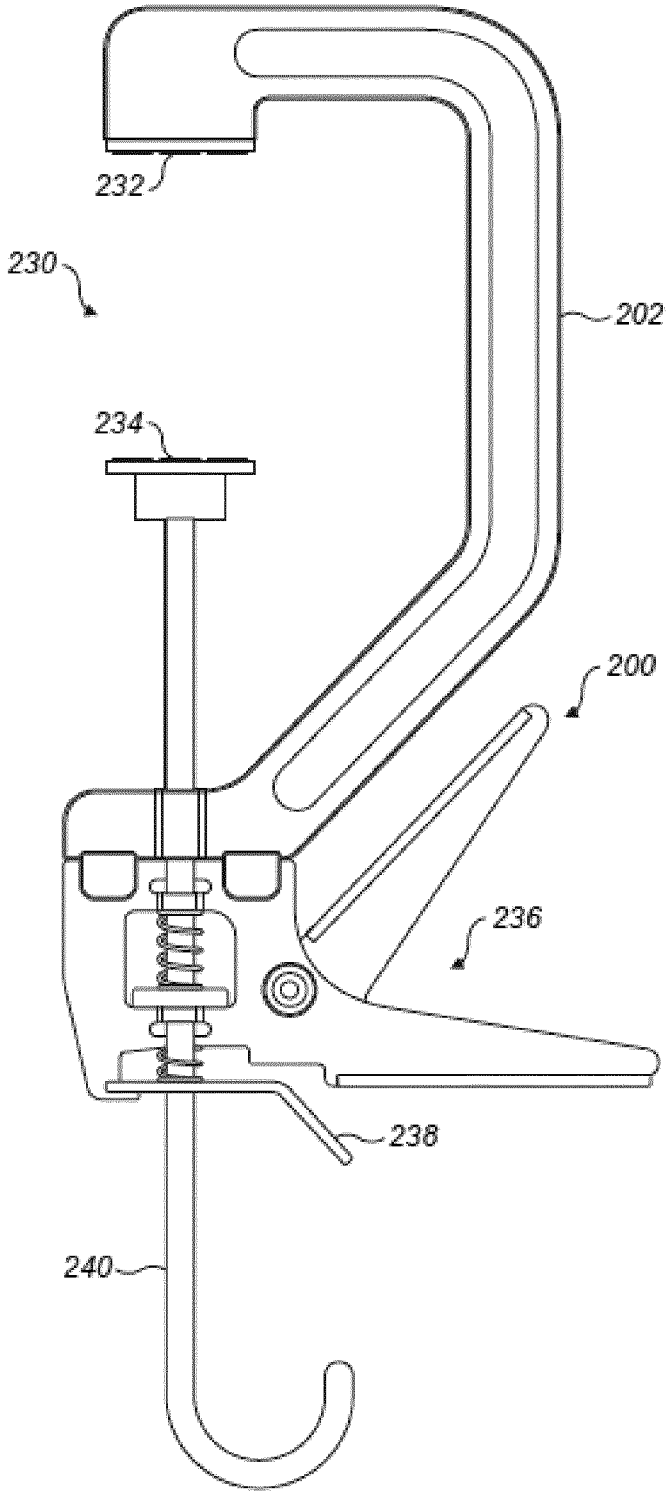

Fig. 1

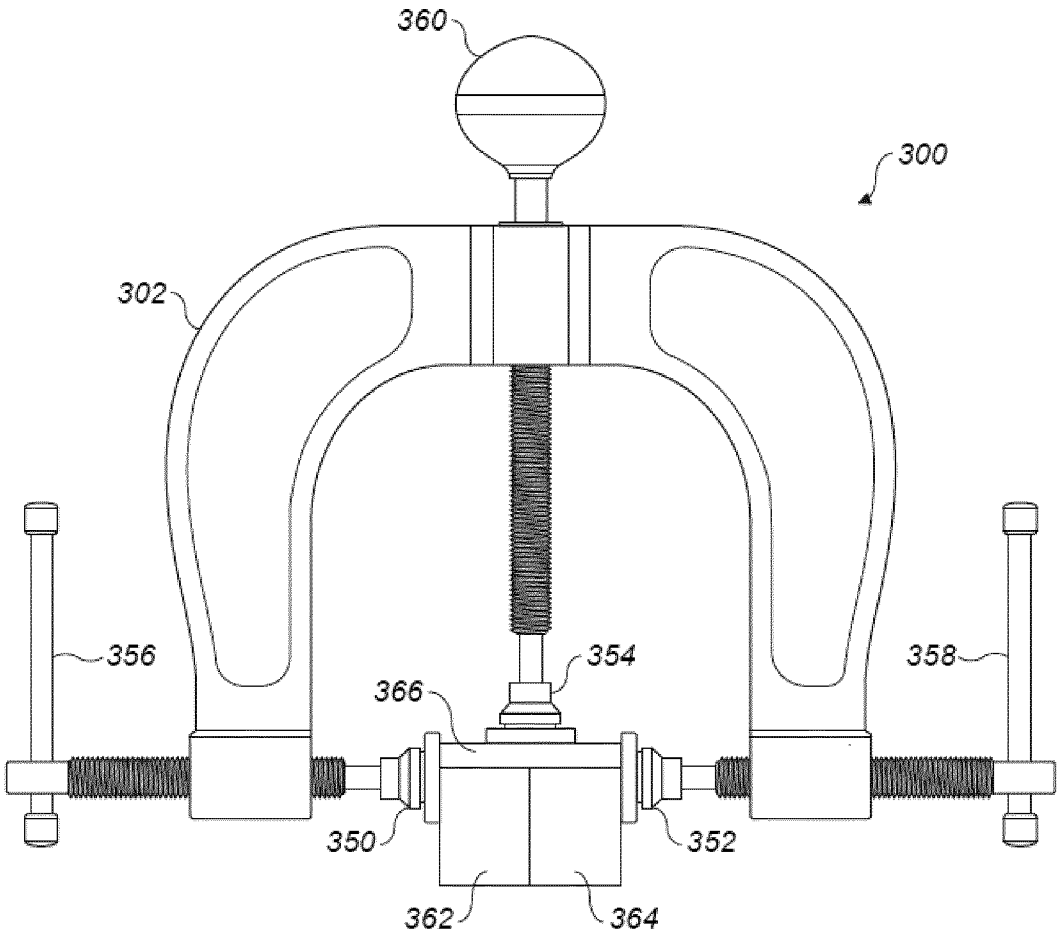

Fig. 2

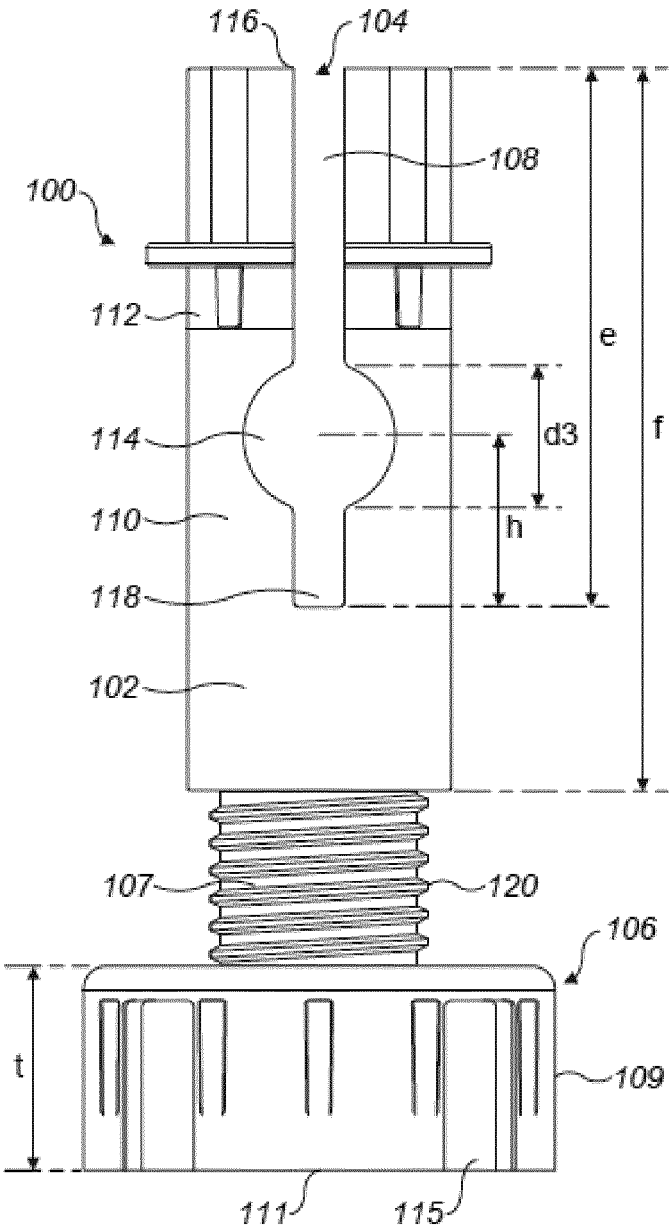
116
104
108
100
112
e
f
d3
114
h
110
118
102
107
120
106
t
109
111
115

Fig. 3

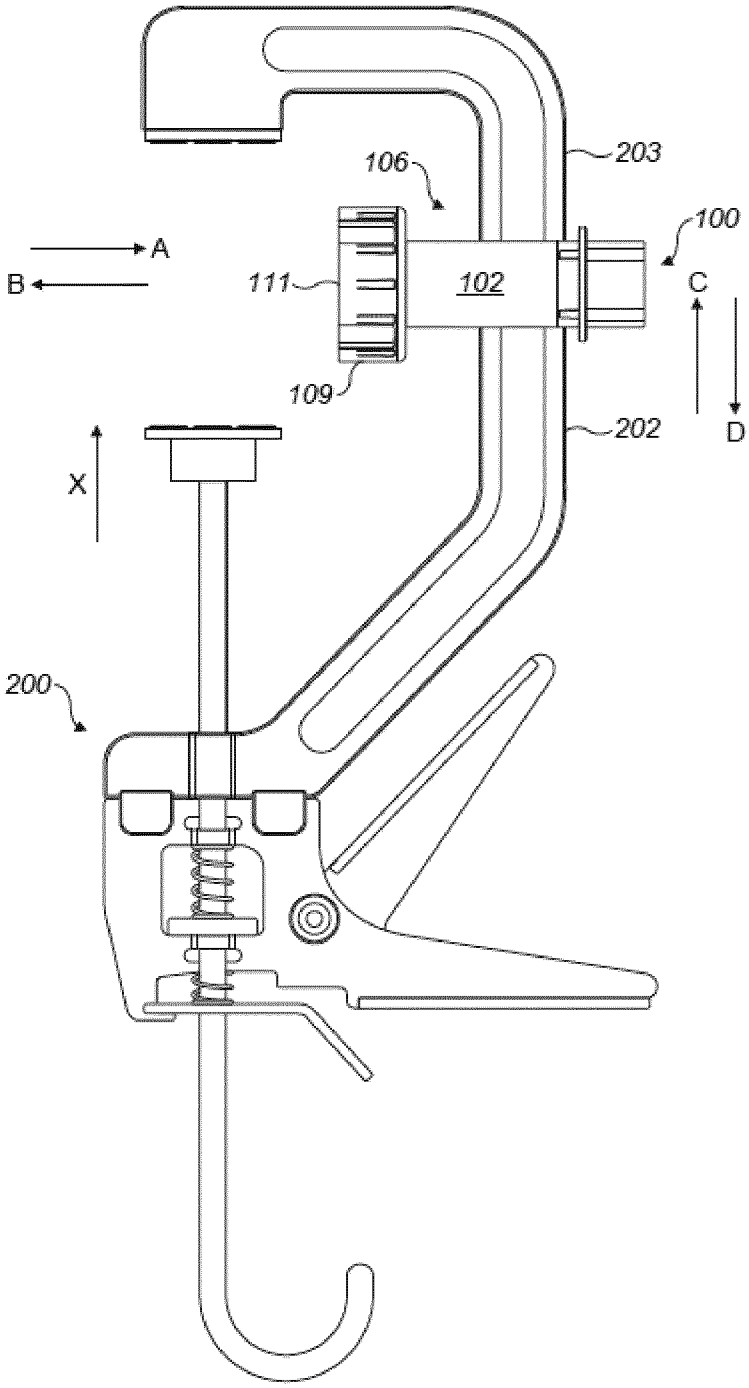

Fig. 4

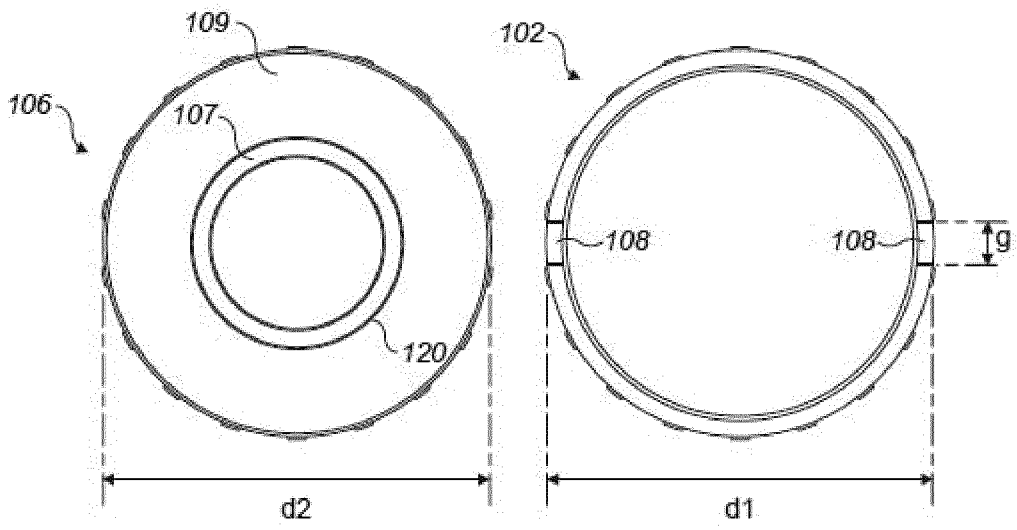

Fig. 5

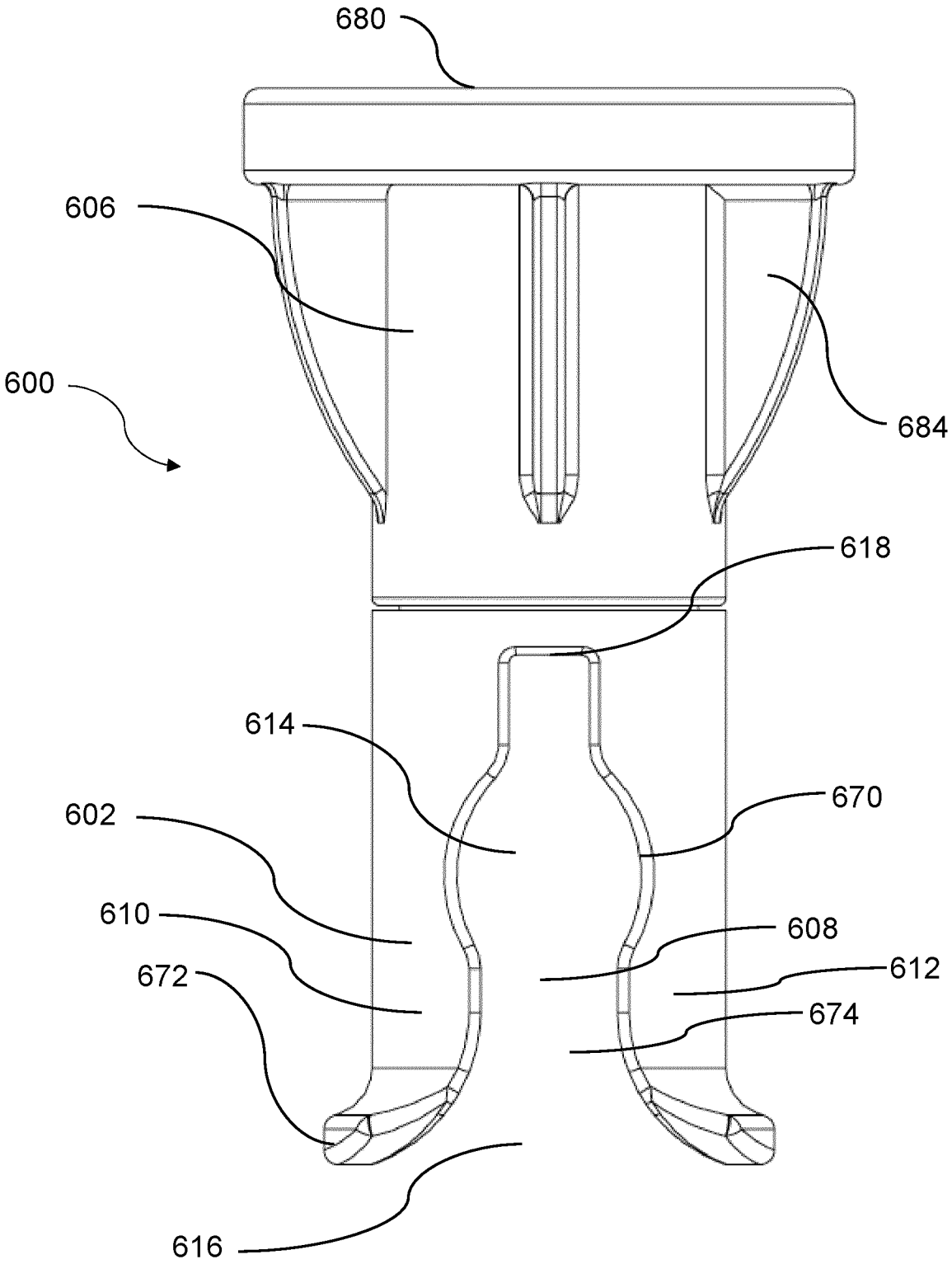

Fig. 6

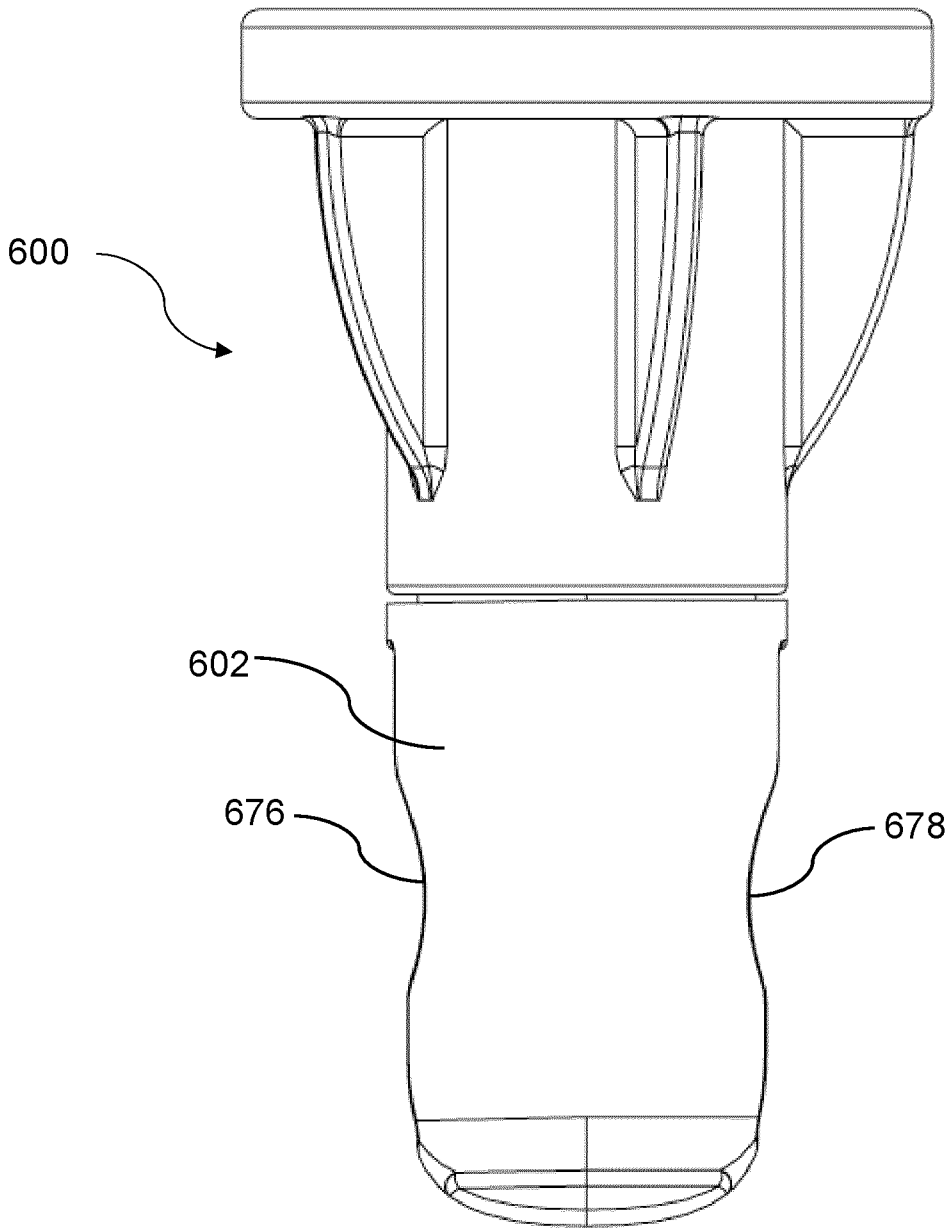

Fig. 7

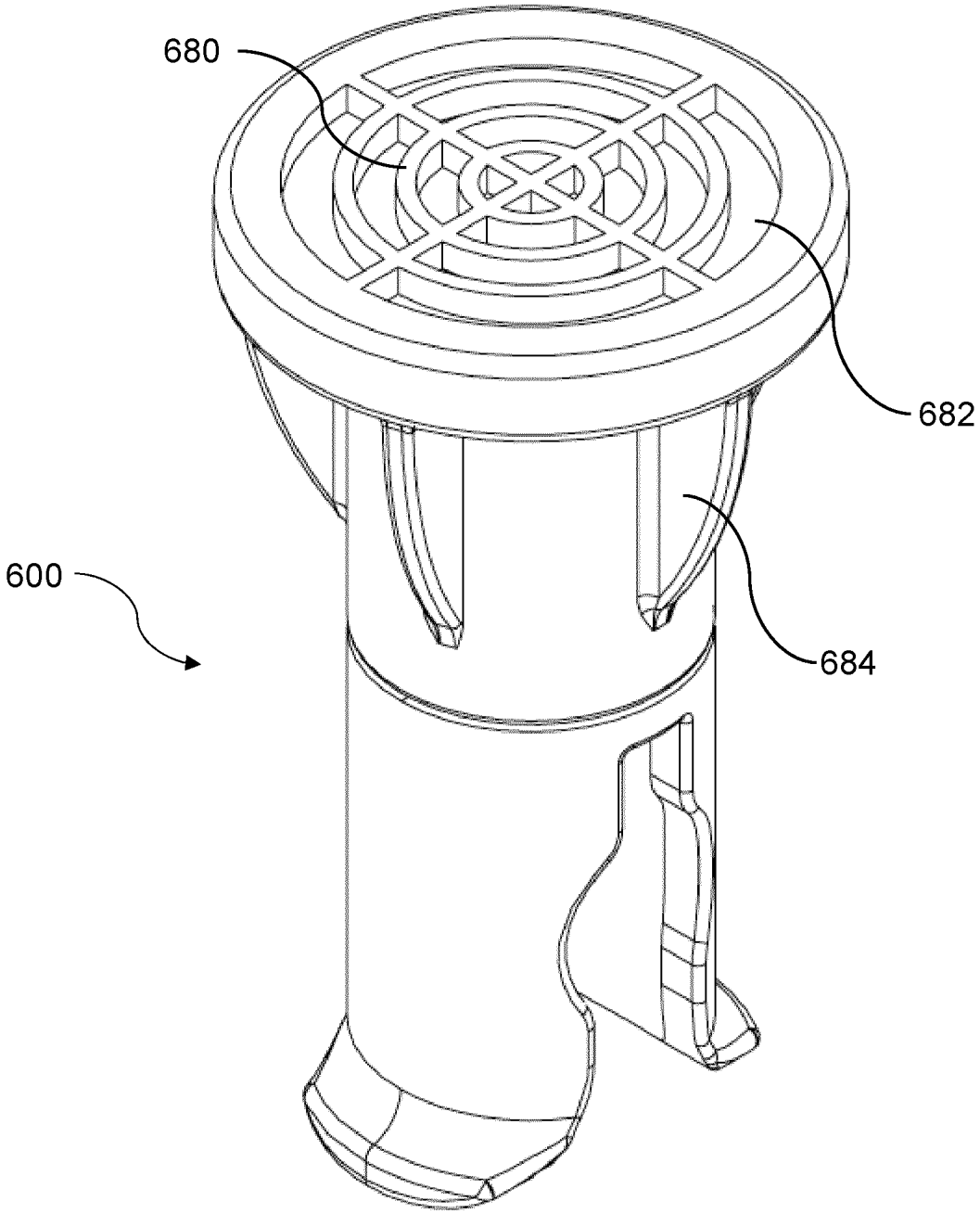

Fig. 8

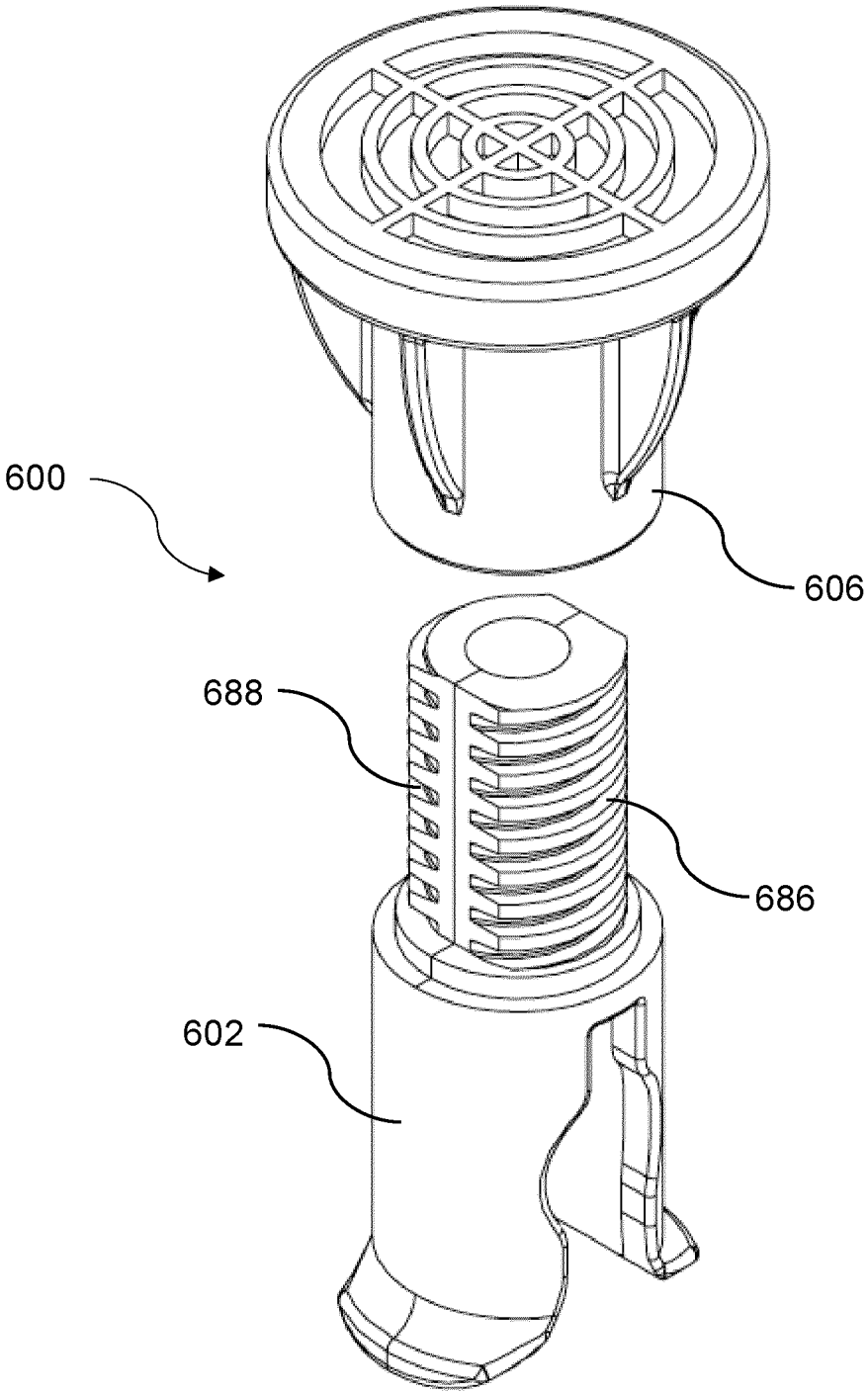

Fig. 9

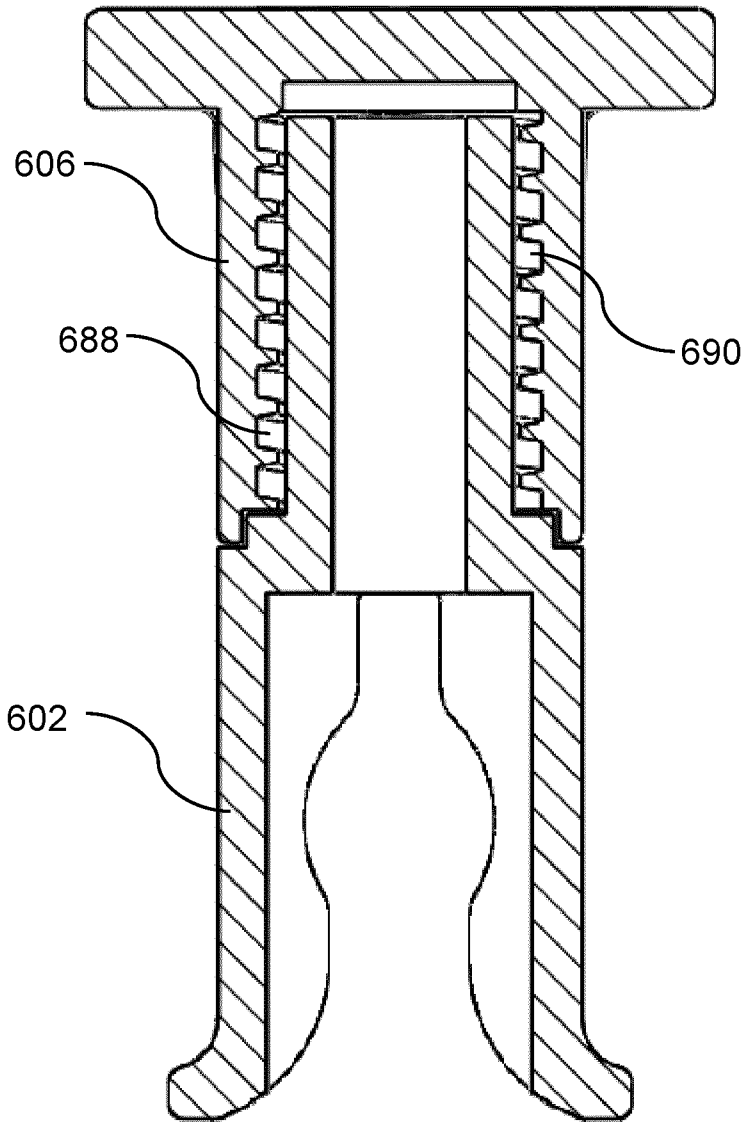

Fig. 10

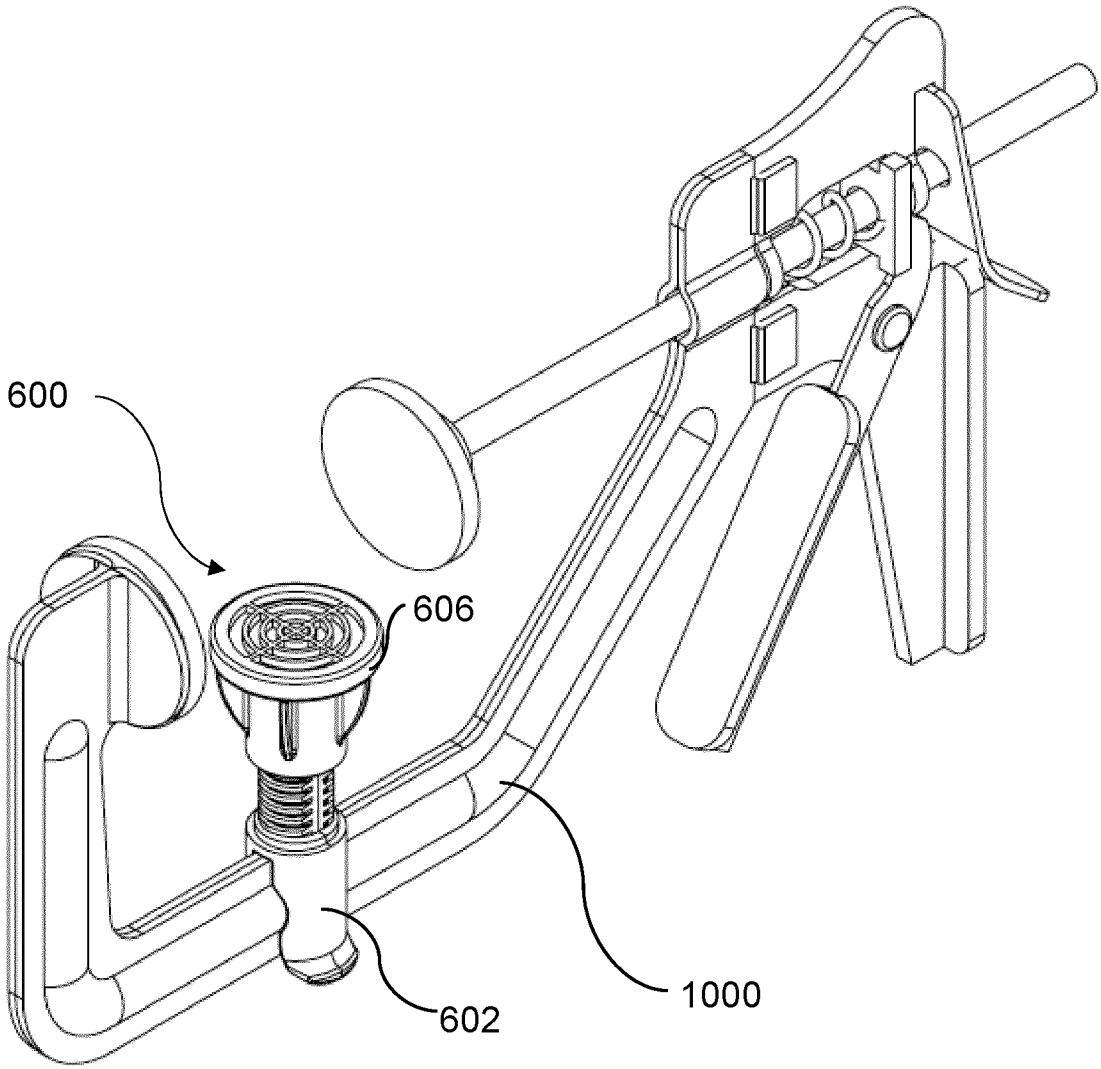

Fig. 11

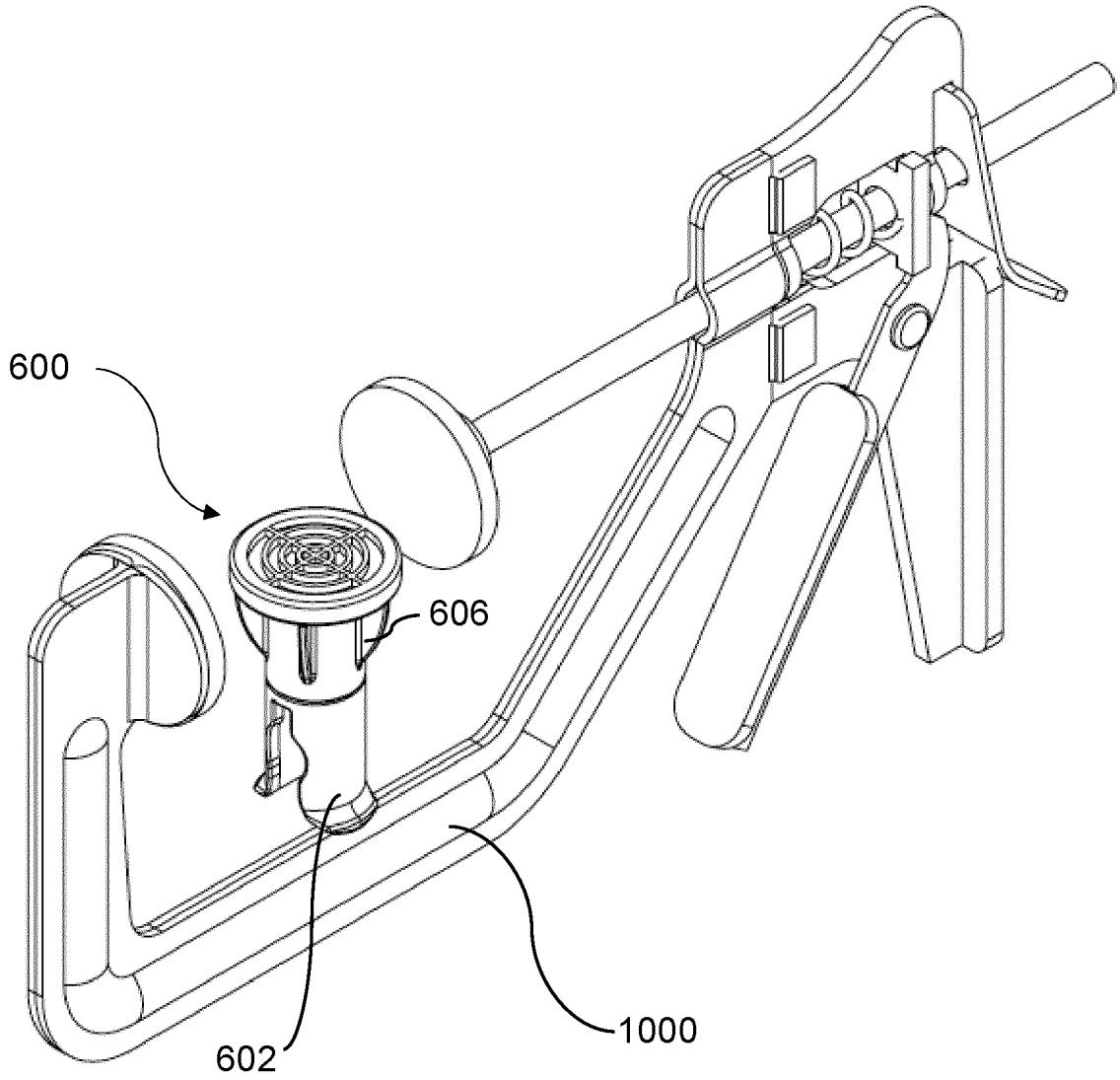

Fig. 12

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2022/082093

A. CLASSIFICATION OF SUBJECT MATTER
INV. B25B5/00 B25B5/10 B25B1/24 B25B5/16
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013/140750 A1 (ALLRED III JIMMIE B [US] ET AL) 6 June 2013 (2013-06-06)	1-11,13, 15-27
A	paragraphs [0019], [0020], [0028] - [0032] figures 10,11	12,14
X	US 4 962 918 A (YANG TAI-HER [TW]) 16 October 1990 (1990-10-16)	1-6,10, 12-27
A	column 3, line 36 - column 4, line 21 figures 4,4A,4B	11
X	US 5 192 060 A (NOVAK JOHN [US]) 9 March 1993 (1993-03-09)	1-4,6, 10,11, 13,15-27
A	column 1, lines 24-41 figures 1,4,5,6,7	5,7,8,14

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[x] Further documents are listed in the continuation of Box C.

[x] See patent family annex.

* Special categories of cited documents :

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 January 2023	10/02/2023

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Chariot, David

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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2 642 905 A (THOMAS HEWAT) 23 June 1953 (1953-06-23) figures 1-3	1-27

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2022/082093

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2013140750 A1	06-06-2013	NONE	
US 4962918 A	16-10-1990	EP 0342878 A2	23-11-1989
		US 4962918 A	16-10-1990
US 5192060 A	09-03-1993	NONE	
US 2642905 A	23-06-1953	NONE	