

(19)



(11)

EP 2 455 324 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
11.07.2018 Bulletin 2018/28

(51) Int Cl.:
B67B 7/16 (2006.01)

(21) Application number: **10192123.7**

(22) Date of filing: **22.11.2010**

(54) **An opener device**

Öffnungsvorrichtung

Dispositif d'ouverture

(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**

(43) Date of publication of application:
23.05.2012 Bulletin 2012/21

(73) Proprietor: **SBD Technologies Limited**
Malahide
Dublin (IE)

(72) Inventors:
• **Moans, Stephen**
Swords (IE)
• **Carthy, Bernard**
Malahide (IE)

• **Ellison, David**
Newry, Down BT34 1GF (GB)
• **O' Brien, Colin**
Julianstown (IE)

(74) Representative: **Schütte, Gearoid et al**
Cruickshank
8a Sandford Business Centre
Sandford
Dublin 18 (IE)

(56) References cited:
FR-A- 1 506 569 **FR-A1- 2 880 878**
US-A1- 2003 097 717 **US-A1- 2007 095 171**
US-B1- 6 836 920

EP 2 455 324 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] This invention relates to an opener device.

[0002] From the prior art, an opener device in accordance with the preamble of claim 1 is known from U.S. Patent Publication Number US 2003/0097717 (WARNER MANUFACTURING COMPANY) whereby the opener device is designed to open a container, mix the contents contained in the container, and clean the container by removing its contents using a single tool. In removing the contents, the tool has a sharpened edge with a radial curvature for scraping the sides of the container.

Statements of Invention

[0003] According to the invention there is provided an opener device comprising:-

means to remove a cap of a container, and

means to clean at least part of the container, whereby the cleaning means is configured to emit energy to clean at least part of a container.

[0004] By cleaning the container, the invention provides a hygienic means of accessing the contents of the container, for example a drink or food in the container.

[0005] In one embodiment of the invention the removal means is engagable with a cap to remove the cap. Preferably the removal means comprises a protruding tooth engagable with a cap to remove the cap. Ideally the removal means is configured to remove a cap upon movement of a container relative to the removal means. Most preferably the removal means is configured to remove a cap of a bottle.

[0006] Preferably the cleaning means is configured to emit one or more energy pulses. Ideally the cleaning means is configured to emit light. Most preferably the cleaning means is configured to emit ultra-violet light.

[0007] In one case at least part of the cleaning means is curved in shape. Preferably at least part of the cleaning means is toroidal in shape. In this manner the cleaning means may be arranged relative to the container with the cleaning means surrounding the container.

[0008] In another case the cleaning means is configured to clean at least part of a container after removal of a cap of the container. In this manner the surface of the container being cleaned is maximised. Preferably the device comprises means to determine whether a cap of a container has been removed. Ideally the cleaning means is configured to clean at least part of a container, responsive to the determining means determining that a cap of the container has been removed.

[0009] In one embodiment the cleaning means is configured to clean at least part of a neck of a container. Preferably the cleaning means is configured to sterilise at least part of a container. In this manner any microorganisms on the container are removed.

[0010] In another embodiment the device comprises means to indicate to a person cleaning of at least part of a container. In this manner the person may have confidence that it is hygienic to access the contents of the container, for example a drink or food in the container. Preferably the indicating means is configured to enable a person to view cleaning of at least part of a container.

[0011] In one case the device comprises means to mount the device to a support. Preferably the mounting means is configured to releasably mount the device to a support. In this manner the device may be easily repositioned if desired. Ideally the mounting means is configured to clamp the device to a support.

[0012] In another case the device comprises means to display a visual image. In this manner the device may be used for advertising purposes. Preferably the display means is configured to display digital content. Ideally the device comprises means to store digital content to be displayed. Most preferably the device comprises means to determine digital content to be displayed. In this manner the digital content may be selected to suit a particular target audience. The determining means may be configured to determine the type of a container. In this manner the digital content may be selected to match the type of container being opened. Preferably the device comprises means to transfer digital content from the storage means to the display means, responsive to the type of a container being determined.

Brief Description of the Drawings

[0013] The invention will be more clearly understood from the following description of some embodiments thereof, given by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is an isometric view of an opener device according to the invention,

Fig. 2 is an exploded isometric view of the device of Fig. 1,

Fig. 3 is a cut-away isometric view of part of the device of Fig. 1,

Fig. 4 is an isometric view of the device of Fig. 1 in use,

Fig. 5 is a side view of the device of Fig. 1 in use,

Figs. 6 to 11 are isometric views of the device of Fig. 1 and a bottle in use,

Fig. 12 is a cut-away isometric view of part of the device of Fig. 1 and a bottle in use,

Fig. 13 is a side view of the device of Fig. 1 and a bottle in use,

Fig. 14 is an isometric view of the device of Fig. 1 and a bottle in use,

Fig. 15 is an isometric view from the front of another opener device according to the invention,

Fig. 16 is an isometric view from the rear of the device of Fig. 15,

Fig. 17 is an isometric view from the rear of the device of Fig. 15 and a bottle in use,

Fig. 18 is a side view of the device of Fig. 15 and a bottle in use,

Fig. 19 is an isometric view of another opener device according to the invention in use,

Fig. 20 is an isometric view of another opener device according to the invention and a bottle in use,

Fig. 21 is a side view of the device of Fig. 20 and a bottle in use,

Fig. 22 is an isometric view of another opener device according to the invention in use,

Fig. 23 is an isometric view of the device of Fig. 22 and a bottle in use,

Fig. 24 is an isometric view of another opener device according to the invention and a bottle in use,

Fig. 25 is a side view of the device of Fig. 24 and a bottle in use,

Fig. 26 is an isometric view of another opener device according to the invention and a bottle in use,

Fig. 27 is an isometric view of the device of Fig. 26 and a bottle in use, and

Fig. 28 is an isometric view of the device of Fig. 26 and a bottle in use.

Detailed Description

[0014] Referring to the drawings, and initially to Figs. 1 to 14 thereof, there is illustrated a bottle opener device 1 according to the invention.

[0015] The device 1 comprises an element 8 to remove a cap of a container, and two ultra-violet light bulbs 7 to sterilise part of a neck of the container (Fig. 3). In this case the removal element 8 is employed to remove a cap 15 of a bottle 2, and the two ultra-violet light bulbs 7 are employed to sterilise part of the neck of the bottle 2.

[0016] The removal element 8 comprises a central opening 16 and a protruding tooth extending into the cen-

tral opening 16 (Fig. 2). The upper part of the neck of the bottle 2 may be inserted into the central opening 16, and the protruding tooth is engagable with the cap 15 to remove the cap 15. The removal element 8 may remove the cap 15 upon movement of the bottle 2 relative to the removal element 8 in a pivoting manner (Fig. 11). The device 1 comprises a housing element 9 located radially outwardly of the removal element 8 surrounding the removal element 8 to protect the removal element 8 (Fig. 3).

[0017] Each ultra-violet light bulb 7 is curved in shape. In this case each ultra-violet light bulb 7 is toroidal in shape, as illustrated in Fig. 3. The device 1 comprises a housing element 10 located radially outwardly of the two ultra-violet light bulbs 7 and radially inwardly of the two ultra-violet light bulbs 7 surrounding the two ultra-violet light bulbs 7 to protect the two ultra-violet light bulbs 7 (Fig. 3). The housing element 10 is located radially outwardly of the housing element 9 surrounding the housing element 9. The ultra-violet light bulbs 7 emit energy pulses in the form of ultra-violet light to sterilise part of the neck of the bottle 2.

[0018] The ultra-violet light bulbs 7 are employed to sterilise part of the neck of the bottle 2 after removal of the cap 15 of the bottle 2. In particular the device 1 comprises a sensor to determine whether the cap 15 of the bottle 2 has been removed. The sensor may be provided in any suitable form, for example a mechanical sensor and/or an electronic sensor. The ultra-violet light bulbs 7 are triggered to sterilise part of the neck of the bottle 2, responsive to the sensor determining that the cap 15 of the bottle 2 has been removed. The ultra-violet sterilisation with the pulsed light sterilises part of the neck of the bottle 2.

[0019] The device 1 comprises a transparent window 5 to enable a person, such as a customer in a bar or a restaurant, to view the ultra-violet light bulbs 7 emitting energy pulses in the form of ultra-violet light to sterilise part of the neck of the bottle 2 (Fig. 1). In this manner the device 1 indicates to the customer that sterilisation of part of the neck of the bottle 2 is taking place.

[0020] As the ultra-violet light pulse is activated, an additional light such as a LED may be activated and may remain activated for a longer period of time to indicate visually to a consumer that the bottle 2 has been sterilised.

[0021] The device 1 comprises a protruding upper lip 13 which may extend over the upper surface of a support structure 3, such as a bar top or a table top, and a protruding lower lip 14 which may extend beneath the lower surface of the support structure 3 (Figs. 1 and 5). A recess 12 is defined between the upper lip 13 and the lower lip 14 into which the support structure 3 may extend. The device 1 comprises a clamp element 6 extending upwardly from the lower lip 14. The clamp element 6 may be extended to engage the lower surface of the support structure 3 to clamp the device 1 to the support structure 3 (Fig. 5). In this manner the device 1 may be releasably mounted to the support structure 3.

[0022] The device 1 comprises an electronic monitor 4 to display digital advertising content by means of visual images (Fig. 1), and means to store the digital content to be displayed. The digital content may be a static advertising image, and/or moving screen images. The device 1 comprises a sensor to determine the type of the bottle 2 being opened and thus to determine the appropriate digital content to be displayed by the electronic monitor 4. The sensor may determine the type of the bottle 2 by scanning a barcode on the neck of the bottle 2. The device 1 also comprises means to transfer digital content from the storage means to the electronic monitor 4, responsive to the type of the bottle 2 being determined. In this manner the digital content may be selected to match the type of the bottle 2 being opened. The electronic monitor 4 may be connected in communication with one or more other data stores, for example by means of an internet connection.

[0023] By determining the type of the bottle 2 being opened and the time and the date of opening, this data may be employed by a drink supplier for stock control purposes.

[0024] The device 1 comprises an elongate neck element 11 extending from the transparent window 5 to the electronic monitor 4 (Fig. 1).

[0025] The video screen 4 is attached to the unit 11. The screen 4 may be a static advertising display area that has interchangeable insert advertisements.

[0026] Fig. 2 is an exploded view showing components of the device 1. Fig. 3 is a sectional view detailing the unit 1.

[0027] In use, the protruding upper lip 13 is extended over the upper surface of the support structure 3 and the protruding lower lip 14 is extended beneath the lower surface of the support structure 3. The support structure 3 extends into the recess 12. The clamp element 6 is extended to engage the lower surface of the support structure 3 to clamp the device 1 to the support structure 3 (Fig. 5). In this manner the device 1 is releasably mounted to the support structure 3.

[0028] Fig. 4 illustrates the unit 1 prior to fixing to the table/bar 3. Fig. 5 illustrates the unit 1 fixed to the table 3 with the table clamp 6.

[0029] The upper part of the neck of the bottle 2 is inserted into the central opening 16, and the bottle 2 is positioned with the cap 15 engaging with the protruding tooth of the removal element 8 (Figs. 6 to 10). The bottle 2 is moved relative to the removal element 8 in a pivoting manner to remove the cap 15 of the bottle 2 (Figs. 11 to 13). In this manner the device 1 opens the bottle 2.

[0030] Fig. 6 illustrates the bottle 2 with the lid/cap 15 on the bottle 2 prior to insertion into the unit 1. Fig. 7 illustrates a view from below prior to insertion of the bottle 2. Fig. 8 illustrates a rear view of the bottle 2 approaching the unit 1. Fig. 9 illustrates the bottle 2 being pushed up into position within the unit 1. Fig. 10 illustrates the unit 1 with the bottle 2 in the vertical position prior to opening of the lid 15 by pulling back the bottle 2. Fig. 11 illustrates

the bottle 2 levered back, releasing the lid 15 which then falls to the ground.

[0031] The sensor determines when the cap 15 of the bottle 2 has been removed. After removal of the cap 15 of the bottle 2, the ultra-violet light bulbs 7 emit energy pulses in the form of ultra-violet light to sterilise part of the neck of the bottle 2, responsive to the sensor determining that the cap 15 of the bottle 2 has been removed (Figs. 11 to 13). A customer may view through the transparent window 5 the ultra-violet light bulbs 7 emitting energy pulses in the form of ultra-violet light to sterilise part of the neck of the bottle 2. In this manner the device 1 indicates to the customer that sterilisation of part of the neck of the bottle 2 is taking place.

[0032] Once the lid 15 is released the ultra-violet light pulse is emitted for a short period of time, in this case of the order of milliseconds, and sterilises the top of the bottle 2. Fig. 12 illustrates the main body 11, the bulb housing 10, the bottle top opener 8, the ultra-violet bulb high intensity pulse 7, the clear material window 5 which may focus light or direct it, and the table clamp 6. Fig. 12 illustrates a sectional view. Fig. 13 illustrates a side view at the same time period. Fig. 14 illustrates the sterilised bottle 2 beside the unit 1 ready for safe use by the consumer.

[0033] The electronic monitor 4 displays digital advertising content by means of visual images. The sensor determines the type of the bottle 2 being opened to determine the appropriate digital content to be displayed. Digital content is transferred from the storage means to the electronic monitor 4, responsive to the type of the bottle 2 being determined. In this manner the digital content may be selected to match the type of the bottle 2 being opened.

[0034] In Figs. 15 to 18 there is illustrated another bottle opener device 20 according to the invention, which is similar to the bottle opener device 1 of Figs. 1 to 14, and similar elements in Figs. 15 to 18 are assigned the same reference numerals.

[0035] In this case the device 20 comprises a substantially spherical shaped main body 11. The device 20 does not comprise a transparent window. The area 4 for displaying advertising media may be cut flat.

[0036] Fig. 19 illustrates a further bottle opener device 30 according to the invention, which is similar to the bottle opener device 20 of Figs. 15 to 18, and similar elements in Fig. 19 are assigned the same reference numerals.

[0037] In this case the device 30 does not comprise an electronic monitor.

[0038] Referring to Figs. 20 and 21 there is illustrated another bottle opener device 40 according to the invention, which is similar to the bottle opener device 1 of Figs. 1 to 14, and similar elements in Figs. 20 and 21 are assigned the same reference numerals.

[0039] In this case the walls of the device 40 are translucent to enable a person, such as a customer in a bar or restaurant, to view the ultra-violet light bulbs 7 emitting energy pulses in the form of ultra-violet light to sterilise

part of the neck of the bottle 2. In this manner the device 40 indicates to the customer that sterilisation of part of the neck of the bottle 2 is taking place. The device 40 does not comprise a transparent window. The entire unit 40 lights up like a beacon to indicate that sterilisation has taken place

[0040] The device 40 is fixedly attached to the upper surface of the support structure 3. In this manner the device 40 is releasably mounted to the support structure 3. The device 40 does not comprise a clamp element.

[0041] The device 40 does not comprise an electronic monitor. The sides may be of advertising material which may be backlit. The light may be activated for a time period once sterilisation has taken place.

[0042] The device 40 comprises a substantially cube shaped main body 11.

[0043] The unit 40 has the front side on display to the consumer.

[0044] In Figs. 22 and 23 there is illustrated another bottle opener device 50 according to the invention, which is similar to the bottle opener device 40 of Figs. 20 and 21, and similar elements in Figs. 22 and 23 are assigned the same reference numerals.

[0045] In this case the device 50 comprises an elongate curved main body 11. The concave portion of the curve faces away from a user towards a customer.

[0046] The unit 50 may be located behind a barman rather than facing a customer. The top section may be back lit.

[0047] Figs. 24 and 25 illustrate a further bottle opener device 60 according to the invention, which is similar to the bottle opener device 40 of Figs. 20 and 21, and similar elements in Figs. 24 and 25 are assigned the same reference numerals.

[0048] In this case the device 60 comprises a substantially cylindrical shaped main body 11 with an upper dome 61.

[0049] Referring to Figs. 26 to 28 there is illustrated another bottle opener device 70 according to the invention, which is similar to the bottle opener device 50 of Figs. 22 and 23, and similar elements in Figs. 26 to 28 are assigned the same reference numerals.

[0050] In this case the device 70 comprises an elongate curved main body 11. The convex portion of the curve faces away from a user towards a customer.

[0051] It will be appreciated that the invention may also be employed as a can opener device. The device may comprise an element to remove a cap of a can, and one or more ultra-violet light bulbs to sterilise part of the can.

Claims

1. An opener device (1) comprising:

means (8) to remove a cap (15) of a container (2), and
means (7) to clean at least part of the container

(2),

characterised in that,

the cleaning means (7) is configured to emit energy to clean at least part of a container (2).

2. A device (1) as claimed in claim 1 wherein the removal means (8) is engagable with a cap (15) to remove the cap (15).

3. A device as claimed in claim 1 or 2 wherein the removal means (8) is configured to remove a cap (15) upon movement of a container (2) relative to the removal means (8).

4. A device (1) as claimed in claim 1 wherein the cleaning means (7) is configured to emit ultra-violet light.

5. A device (1) as claimed in any of claims 1 to 4 wherein at least part of the cleaning means (7) is curved in shape.

6. A device (1) as claimed in any of claims 1 to 5 wherein the cleaning means (7) is configured to clean at least part of a container (2) after removal of a cap (15) of the container (2).

7. A device (1) as claimed in claim 6 wherein the device (1) comprises means to determine whether a cap (15) of a container (2) has been removed.

8. A device (1) as claimed in any of claims 1 to 7 wherein the cleaning means (7) is configured to sterilise at least part of a container (2).

9. A device (1) as claimed in any of claims 1 to 8 wherein the device (1) comprises means (5) to indicate to a person cleaning of at least part of a container (2).

10. A device (1) as claimed in claim 9 wherein the indicating means (5) is configured to enable a person to view cleaning of at least part of a container (2).

11. A device (1) as claimed in any of claims 1 to 10 wherein the device (1) comprises means (6, 13, 14) to mount the device (1) to a support (3).

12. A device (1) as claimed in any of claims 1 to 11 wherein the device (1) comprises means (4) to display a visual image.

13. A device (1) as claimed in claim 12 wherein the display means (4) is configured to display digital content.

14. A device (1) as claimed in claim 13 wherein the device (1) comprises means to determine digital content to be displayed.

Patentansprüche

1. Öffnervorrichtung (1), die Folgendes umfasst:

ein Mittel (8) zum Entfernen eines Deckels (15) eines Behältnisses (2) und Mittel (7) zum Reinigen zumindest eines Teils des Behältnisses (2),
dadurch gekennzeichnet, dass die Reinigungsmittel (7) so konfiguriert sind, dass sie zum Reinigen zumindest eines Teils des Behältnisses (2) Energie abstrahlen.

2. Vorrichtung (1) nach Anspruch 1, wobei das Entfernungsmittel (8) zum Entfernen eines Deckels (15) an dem Deckel (15) angreifen kann.

3. Vorrichtung nach Anspruch 1 oder 2, wobei das Entfernungsmittel (8) so konfiguriert ist, dass es bei einer Bewegung eines Behältnisses (2) in Bezug zu dem Entfernungsmittel (8) einen Deckel (15) entfernt.

4. Vorrichtung (1) nach Anspruch 1, wobei die Reinigungsmittel (7) so konfiguriert sind, dass sie ultraviolettes Licht abstrahlen.

5. Vorrichtung (1) nach einem der Ansprüche 1 bis 4, wobei zumindest ein Teil der Reinigungsmittel (7) eine gekrümmte Form aufweist.

6. Vorrichtung (1) nach einem der Ansprüche 1 bis 5, wobei die Reinigungsmittel (7) so konfiguriert sind, dass sie nach dem Entfernen eines Deckels (15) eines Behältnisses (2) zumindest einen Teil des Behältnisses (2) reinigen.

7. Vorrichtung (1) nach Anspruch 6, wobei die Vorrichtung (1) ein Mittel zum Bestimmen umfasst, ob ein Deckel (15) eines Behältnisses (2) entfernt worden ist.

8. Vorrichtung (1) nach einem der Ansprüche 1 bis 7, wobei die Reinigungsmittel (7) so konfiguriert sind, dass sie zumindest einen Teil eines Behältnisses (2) sterilisieren.

9. Vorrichtung (1) nach einem der Ansprüche 1 bis 8, wobei die Vorrichtung (1) ein Mittel (5) umfasst, welches einer Person anzeigt, dass zumindest ein Teil eines Behältnisses (2) gereinigt wird.

10. Vorrichtung (1) nach Anspruch 9, wobei das Anzeigemittel (5) so konfiguriert ist, dass es einer Person ermöglicht, ein Reinigen von zumindest einem Teil eines Behältnisses (2) zu sehen.

11. Vorrichtung (1) nach einem der Ansprüche 1 bis 10,

wobei die Vorrichtung (1) Mittel (6, 13, 14) zum Befestigen der Vorrichtung (1) an einer Unterlage (3) umfasst.

12. Vorrichtung (1) nach einem der Ansprüche 1 bis 11, wobei die Vorrichtung (1) ein Mittel (4) zum Anzeigen eines sichtbaren Bildes umfasst.

13. Vorrichtung (1) nach Anspruch 12, wobei das Anzeigemittel (4) so konfiguriert ist, dass es digitale Inhalte anzeigt.

14. Vorrichtung (1) nach Anspruch 13, wobei die Vorrichtung (1) Mittel zum Bestimmen von anzuzeigenden digitalen Inhalten umfasst.

Revendications

1. Dispositif de décapsulation (1) comportant :

un moyen (8) servant à retirer une capsule (15) d'un contenant (2), et
 un moyen (7) servant à nettoyer au moins une partie du contenant (2),
caractérisé en ce que,
 le moyen de nettoyage (7)
 est configuré pour émettre de l'énergie à des fins de nettoyage d'au moins une partie d'un contenant (2).

2. Dispositif (1) selon la revendication 1, dans lequel le moyen de retrait (8) est en mesure de se mettre en prise avec une capsule (15) à des fins de retrait de la capsule (15).

3. Dispositif selon la revendication 1 ou la revendication 2, dans lequel le moyen de retrait (8) est configuré pour retirer une capsule (15) lors du mouvement d'un contenant (2) par rapport au moyen de retrait (8).

4. Dispositif (1) selon la revendication 1, dans lequel le moyen de nettoyage (7) est configuré pour émettre de la lumière ultraviolette.

5. Dispositif (1) selon l'une quelconque des revendications 1 à 4, dans lequel au moins une partie du moyen de nettoyage (7) est de forme courbe.

6. Dispositif (1) selon l'une quelconque des revendications 1 à 5, dans lequel le moyen de nettoyage (7) est configuré pour nettoyer au moins une partie d'un contenant (2) après le retrait d'une capsule (15) du contenant (2).

7. Dispositif (1) selon la revendication 6, dans lequel le dispositif (1) comporte un moyen servant à déterminer si une capsule (15) d'un contenant (2) a été re-

tirée.

8. Dispositif (1) selon l'une quelconque des revendications 1 à 7, dans lequel le moyen de nettoyage (7) est configuré pour stériliser au moins une partie d'un contenant (2). 5
9. Dispositif (1) selon l'une quelconque des revendications 1 à 8, dans lequel le dispositif (1) comporte un moyen (5) servant à indiquer à une personne le nettoyage d'au moins une partie d'un contenant (2). 10
10. Dispositif (1) selon la revendication 9, dans lequel le moyen d'indication (5) est configuré pour permettre à une personne de visualiser le nettoyage d'au moins une partie d'un contenant (2). 15
11. Dispositif (1) selon l'une quelconque des revendications 1 à 10, dans lequel le dispositif (1) comporte un moyen (6, 13, 14) servant à monter le dispositif (1) sur un support (3). 20
12. Dispositif (1) selon l'une quelconque des revendications 1 à 11, dans lequel le dispositif (1) comporte un moyen (4) servant à afficher une image visuelle. 25
13. Dispositif (1) selon la revendication 12, dans lequel le moyen d'affichage (4) est configuré pour afficher un contenu numérique. 30
14. Dispositif (1) selon la revendication 13, dans lequel le dispositif (1) comporte un moyen servant à déterminer le contenu numérique devant être affiché. 35

40

45

50

55

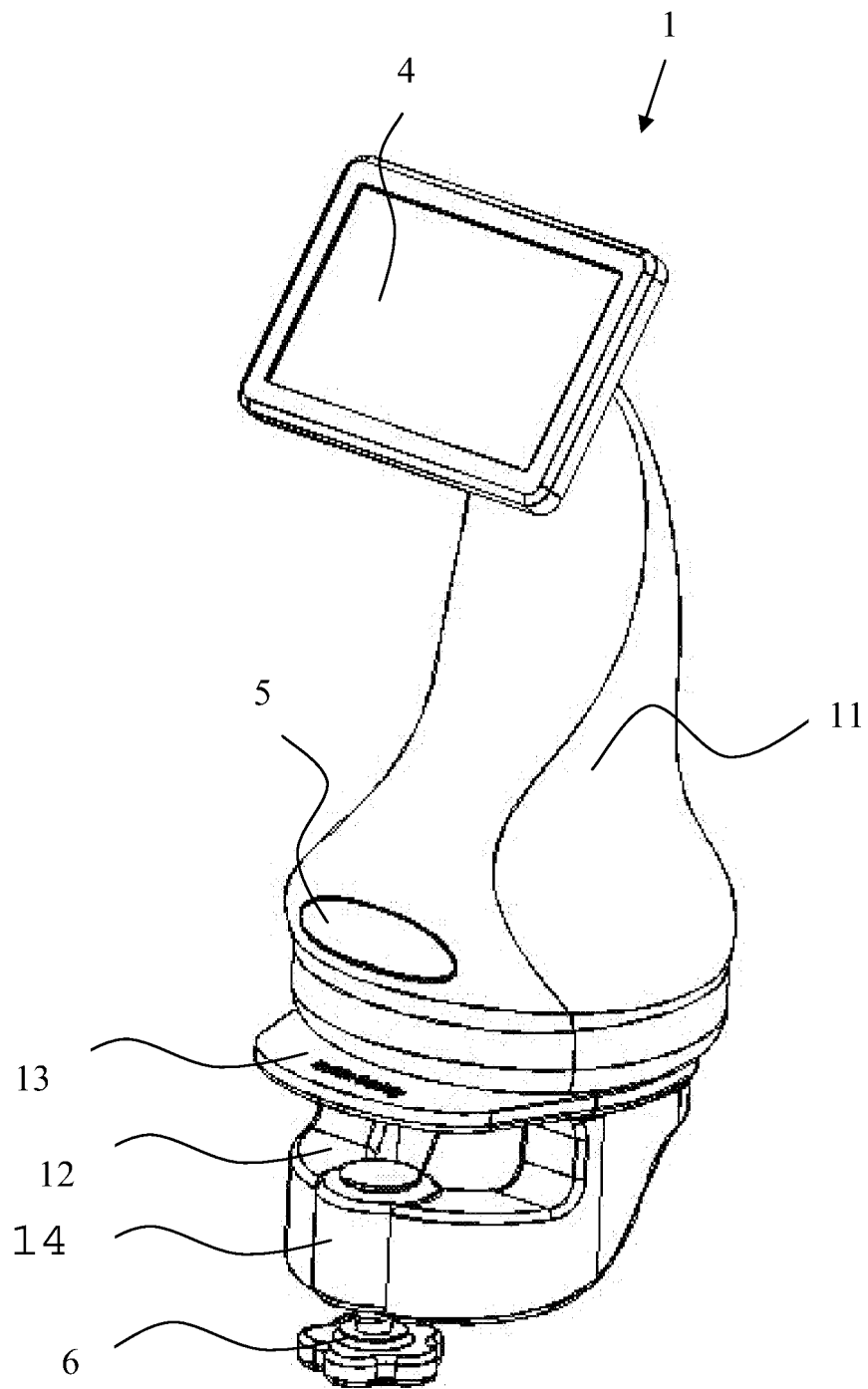


Fig. 1

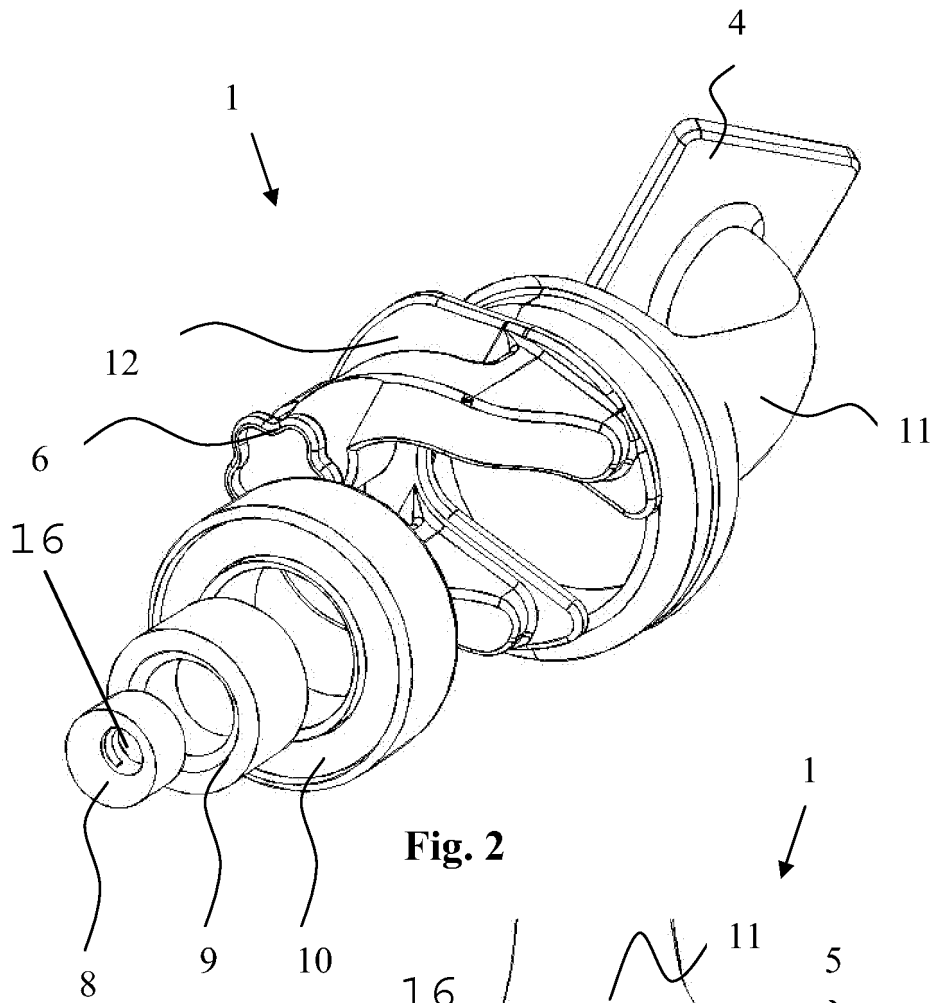


Fig. 2

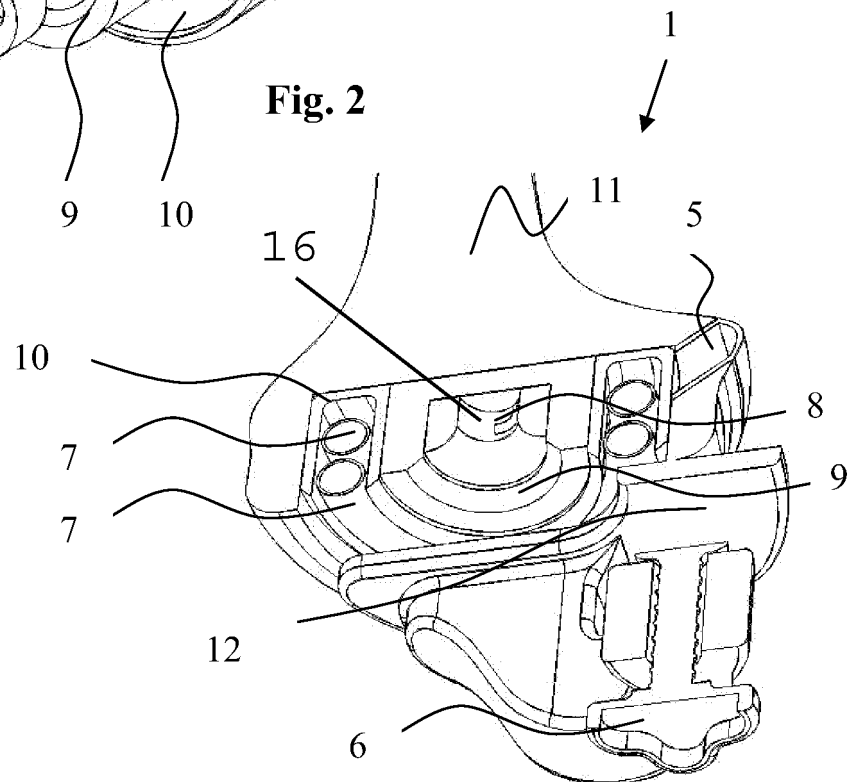


Fig. 3

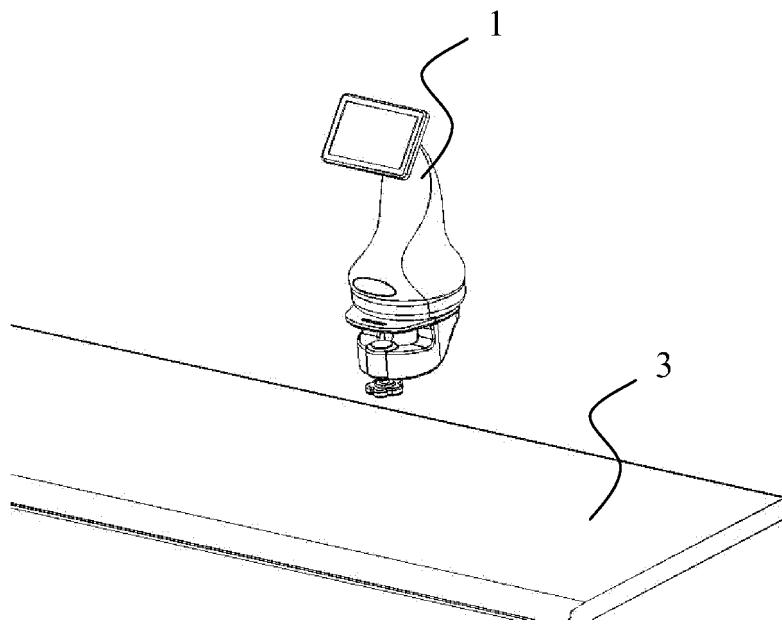


Fig. 4

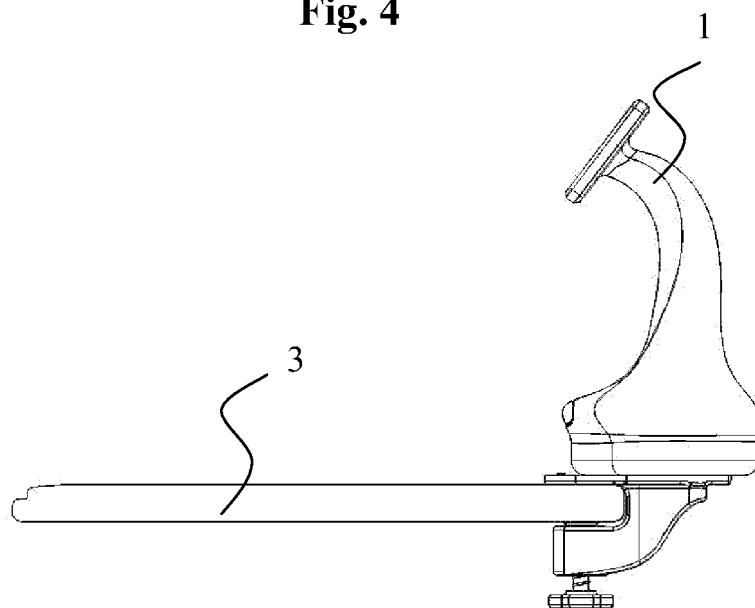


Fig. 5

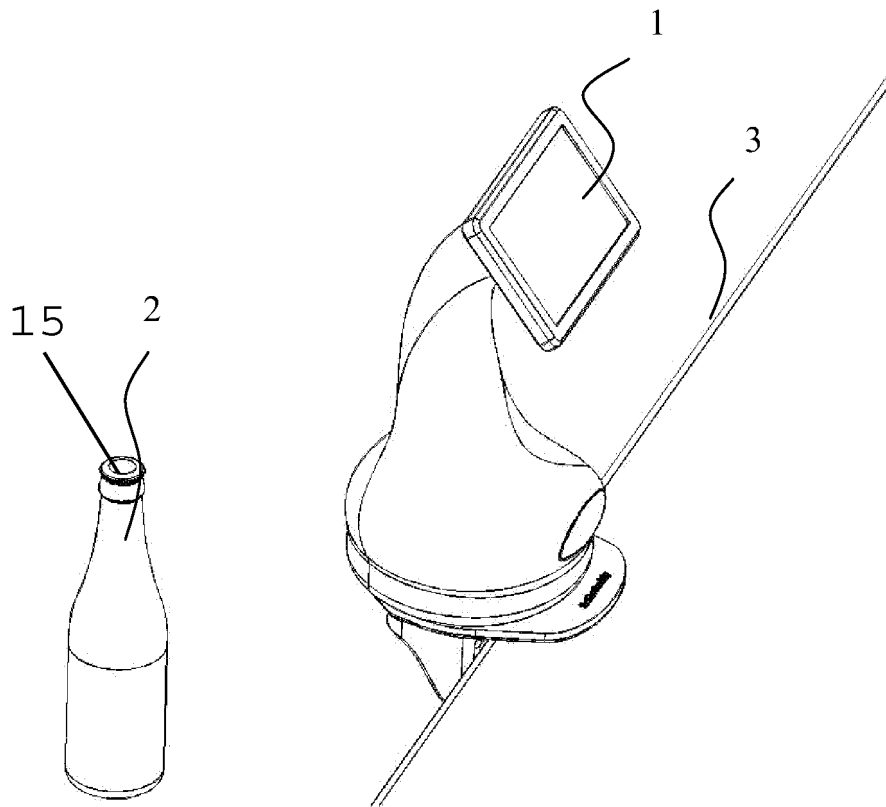


Fig. 6

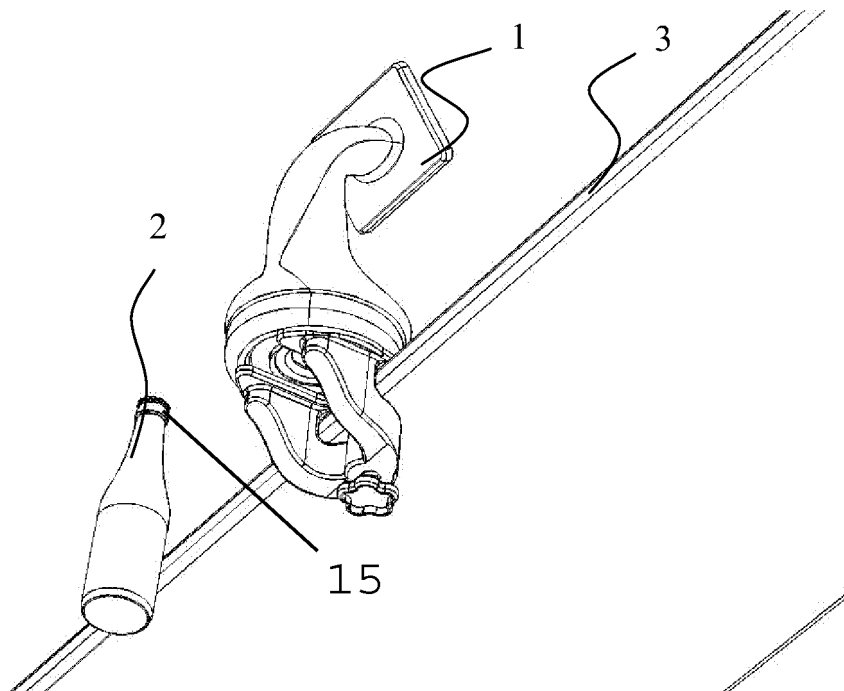


Fig. 7

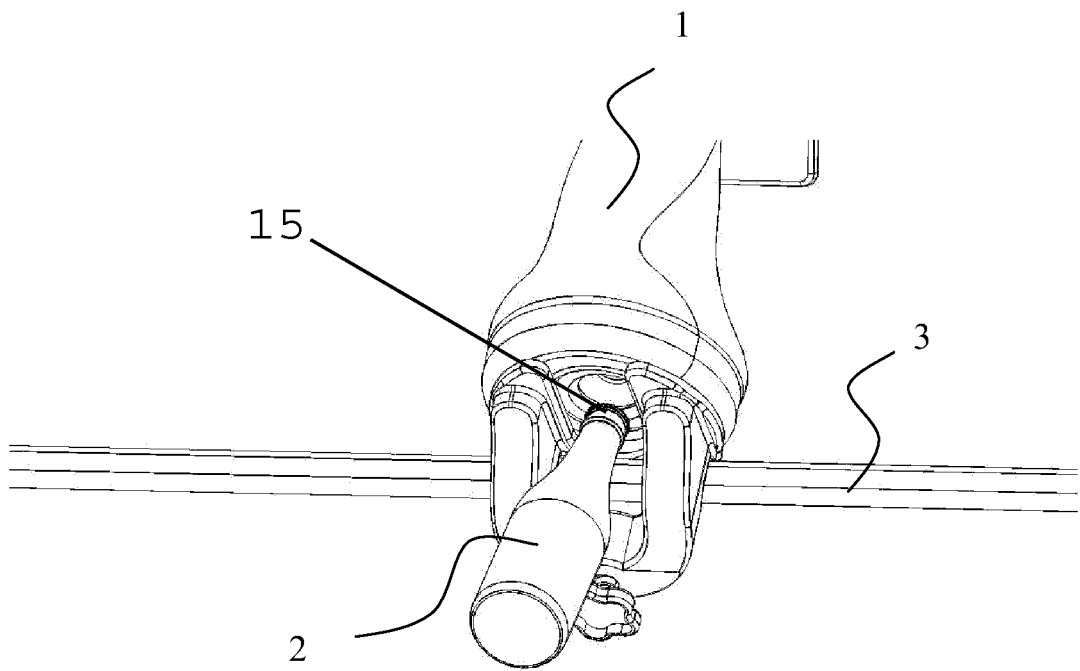


Fig. 8

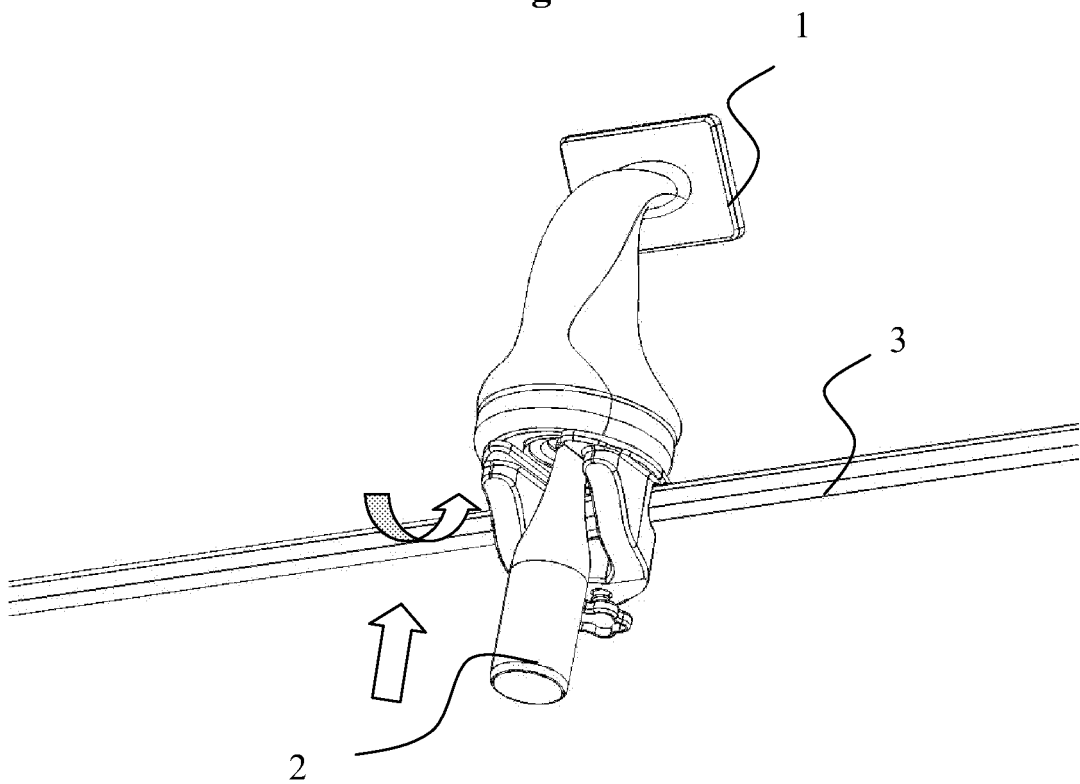


Fig. 9

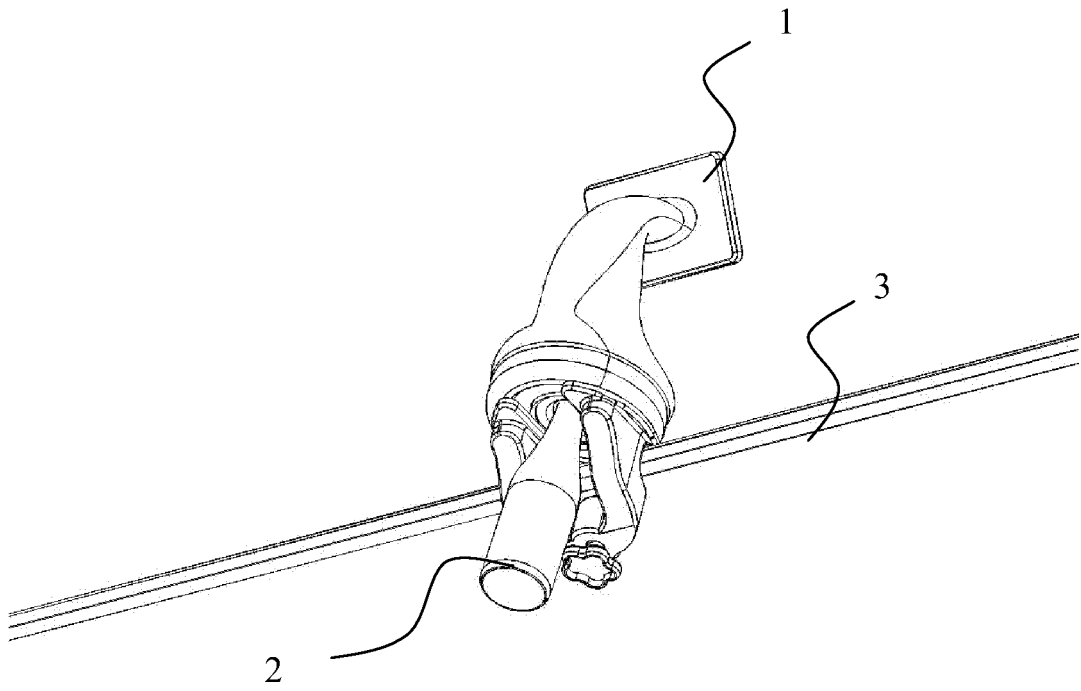


Fig. 10

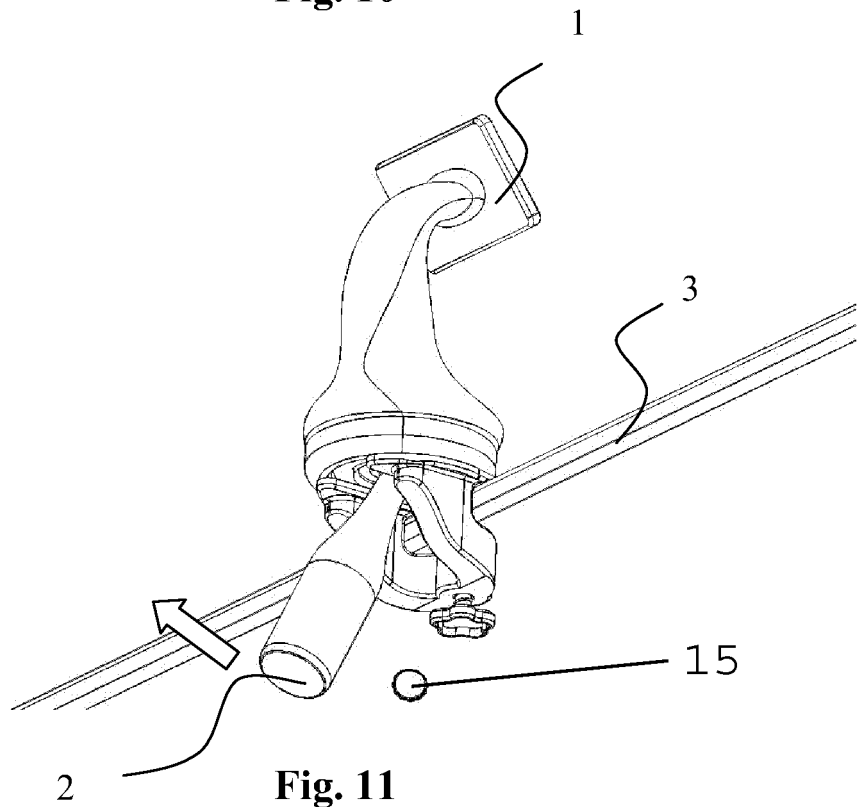


Fig. 11

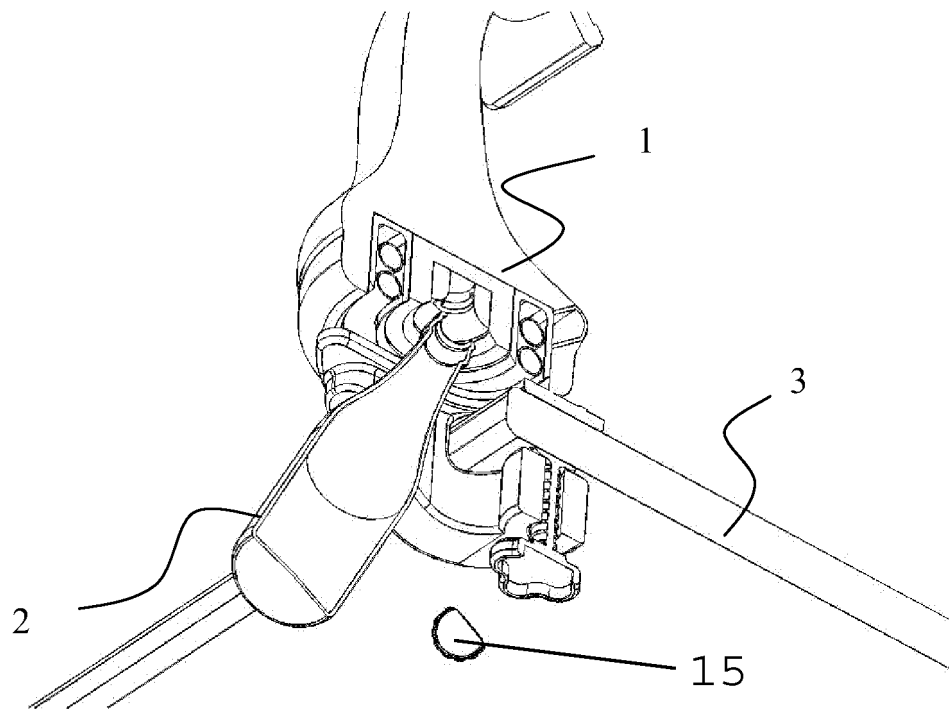


Fig. 12

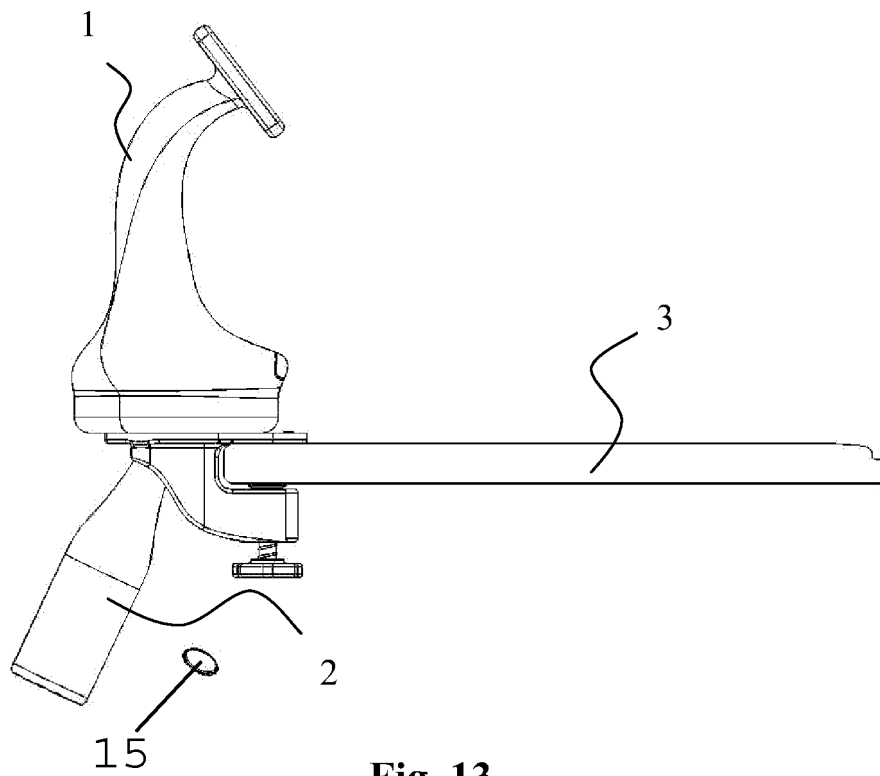


Fig. 13

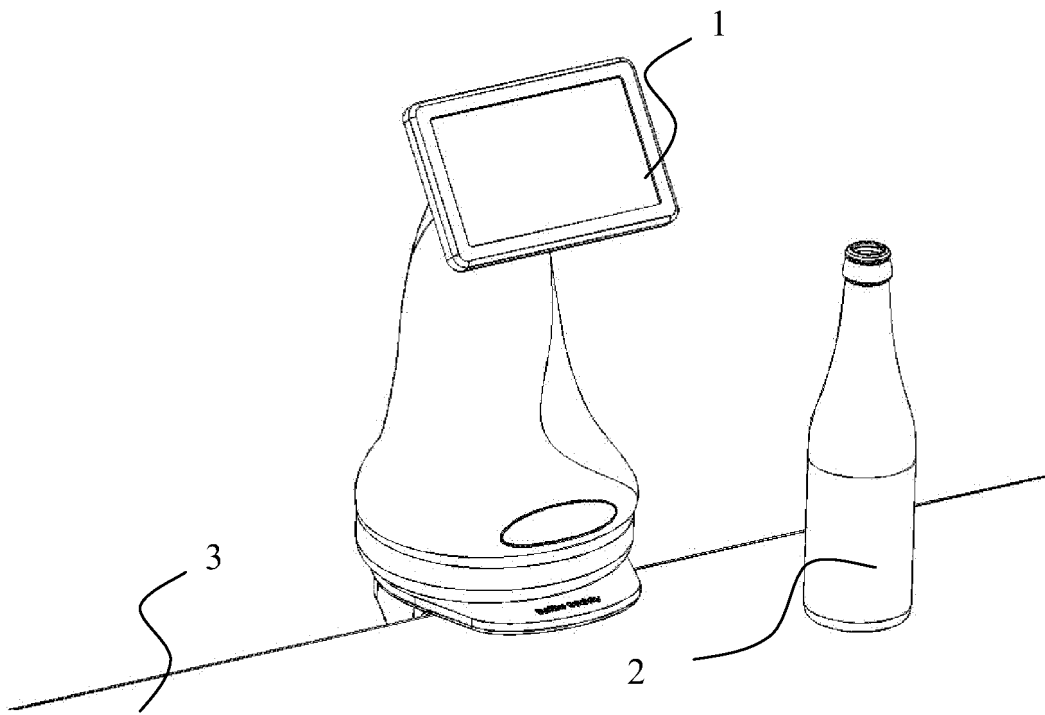


Fig. 14

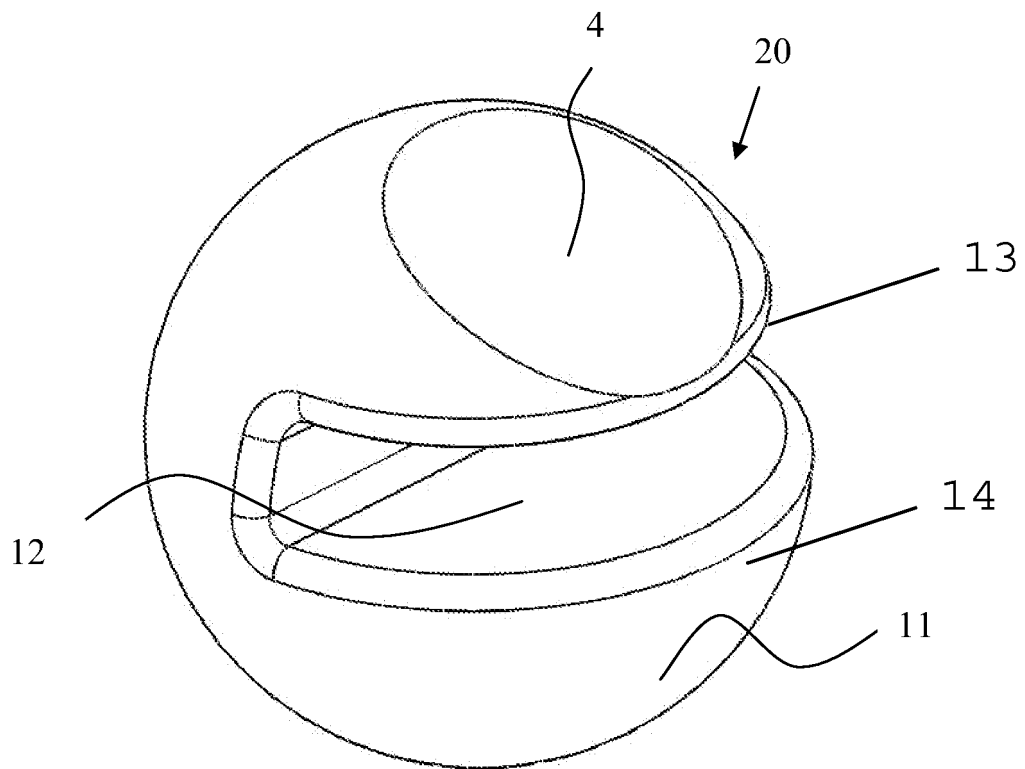


Fig. 15

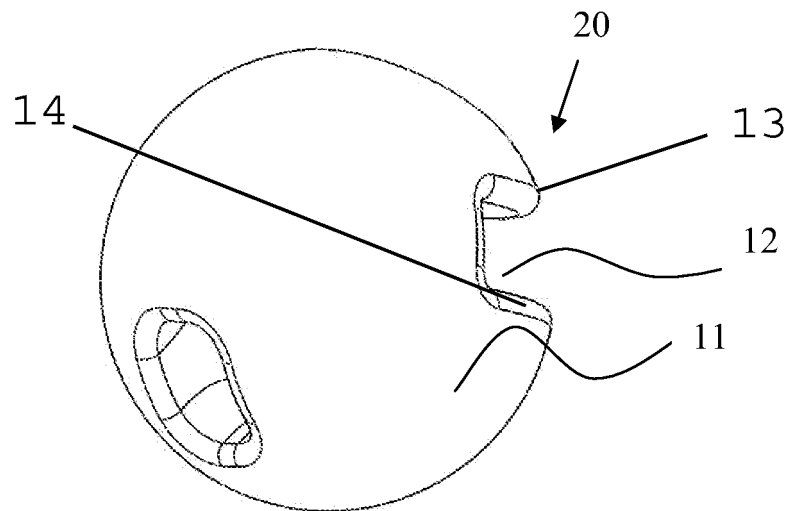


Fig. 16

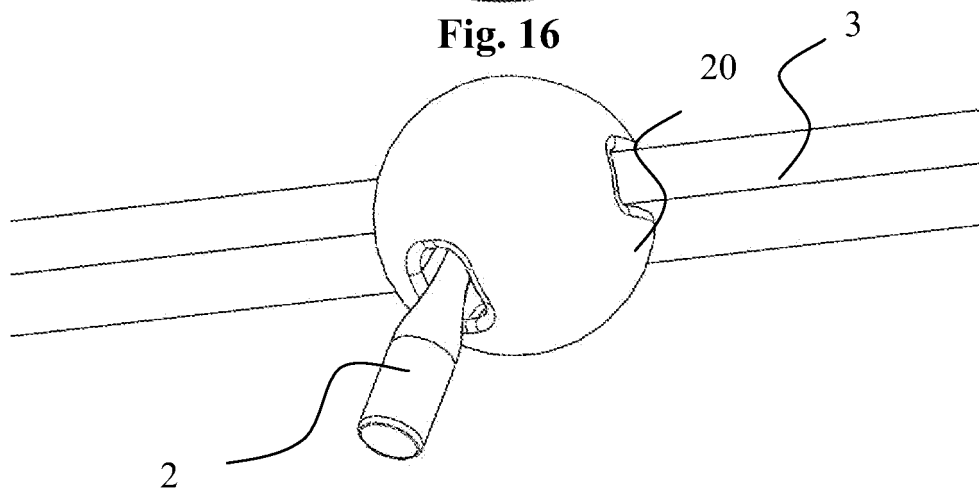


Fig. 17

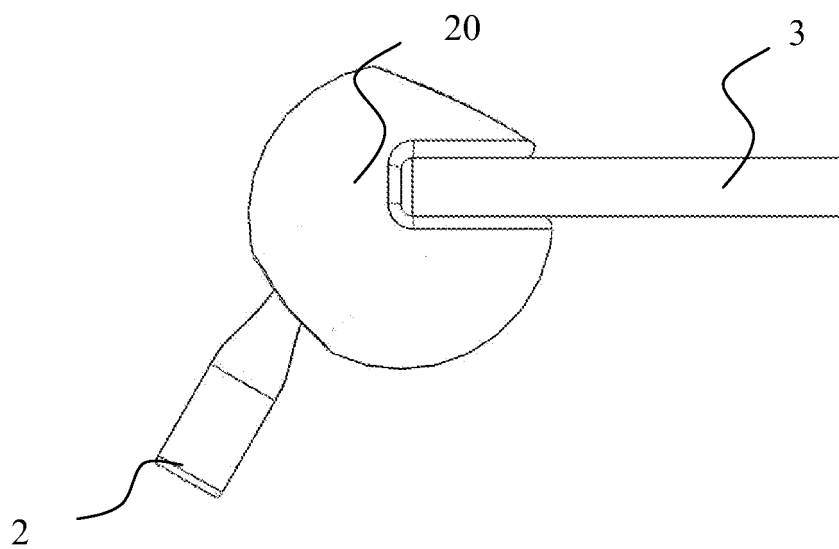


Fig. 18

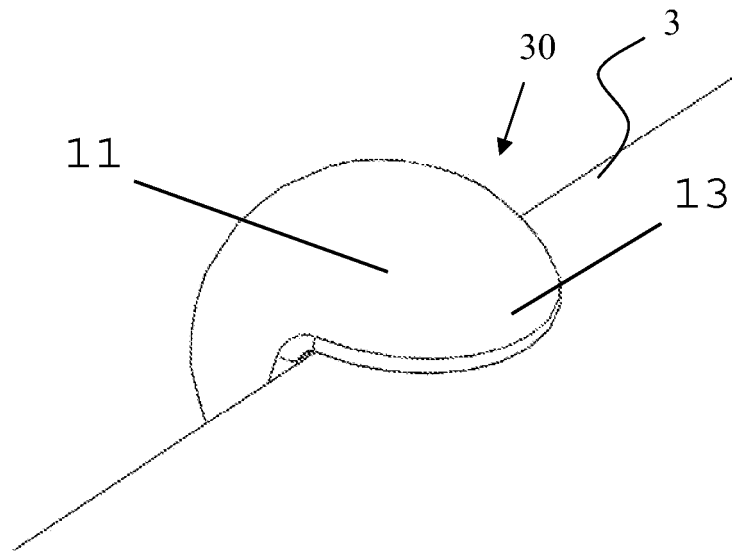


Fig. 19

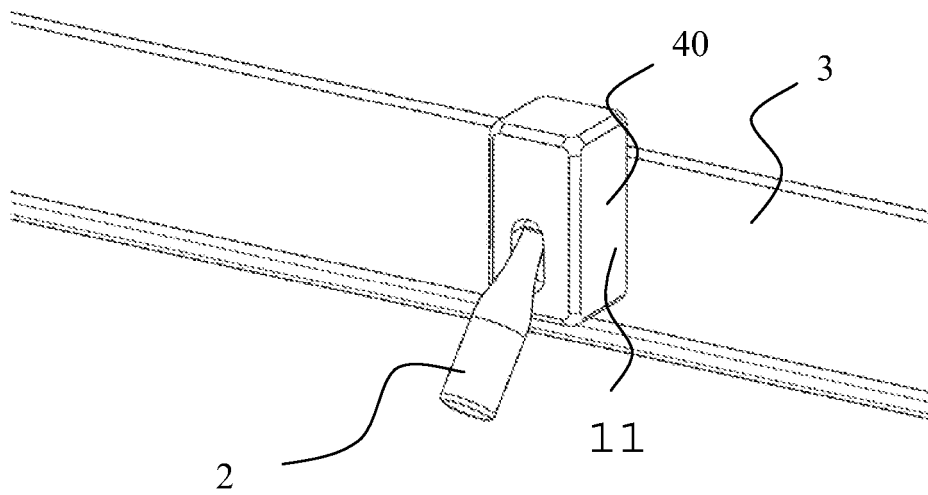


Fig. 20

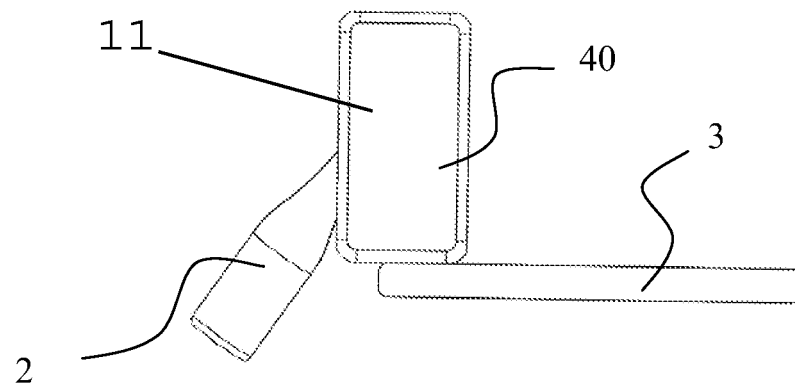


Fig. 21

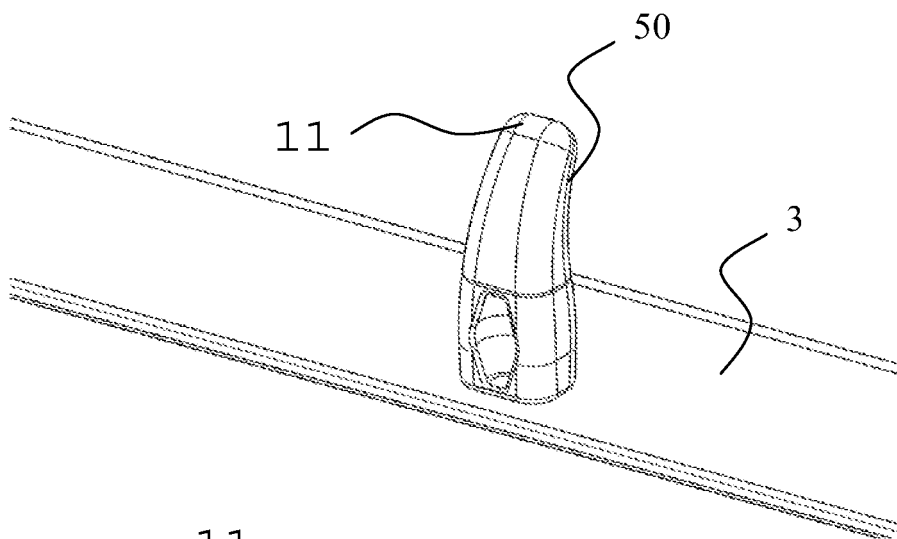


Fig. 22

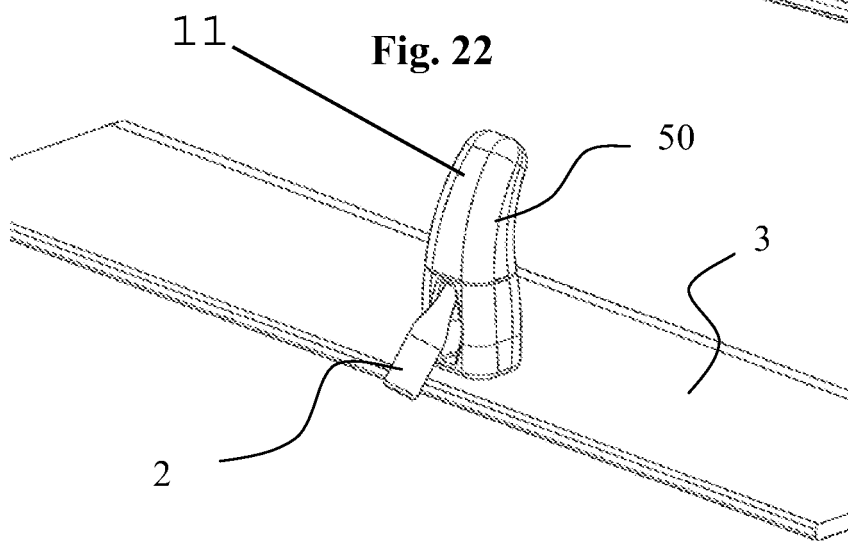


Fig. 23

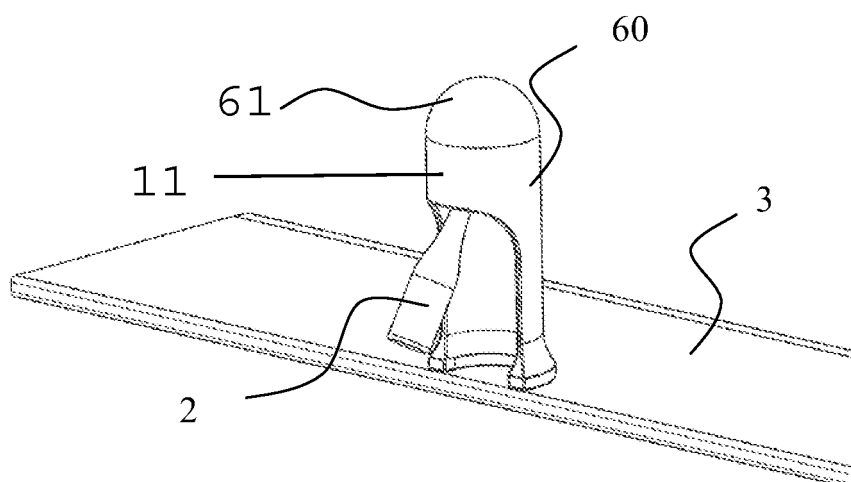


Fig. 24

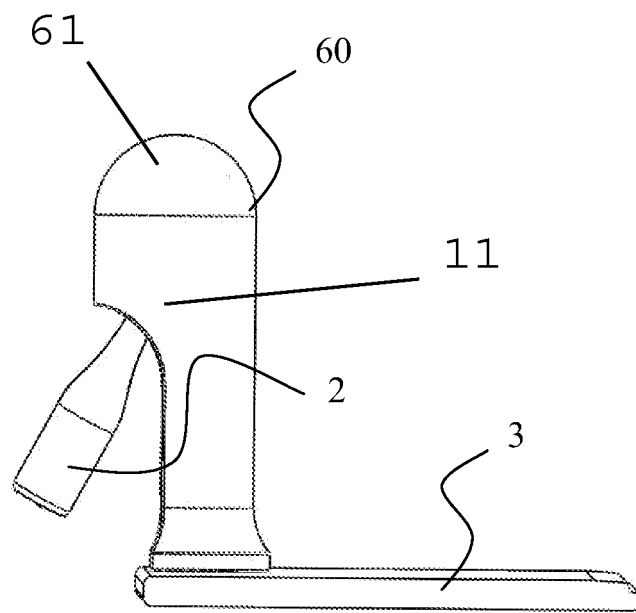


Fig. 25

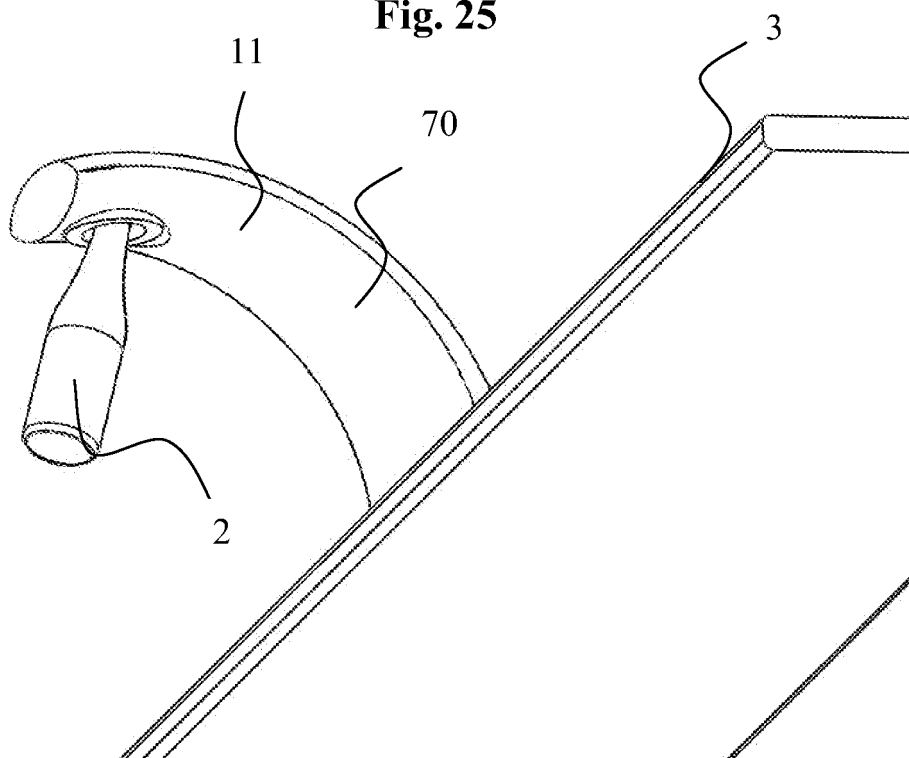


Fig. 26

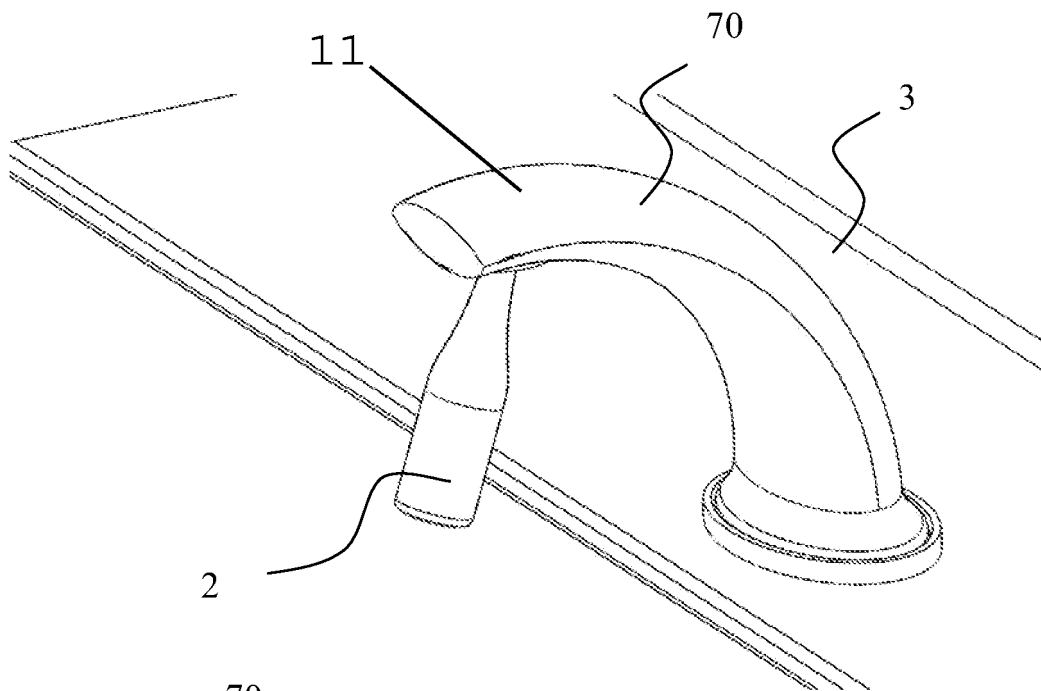


Fig. 27

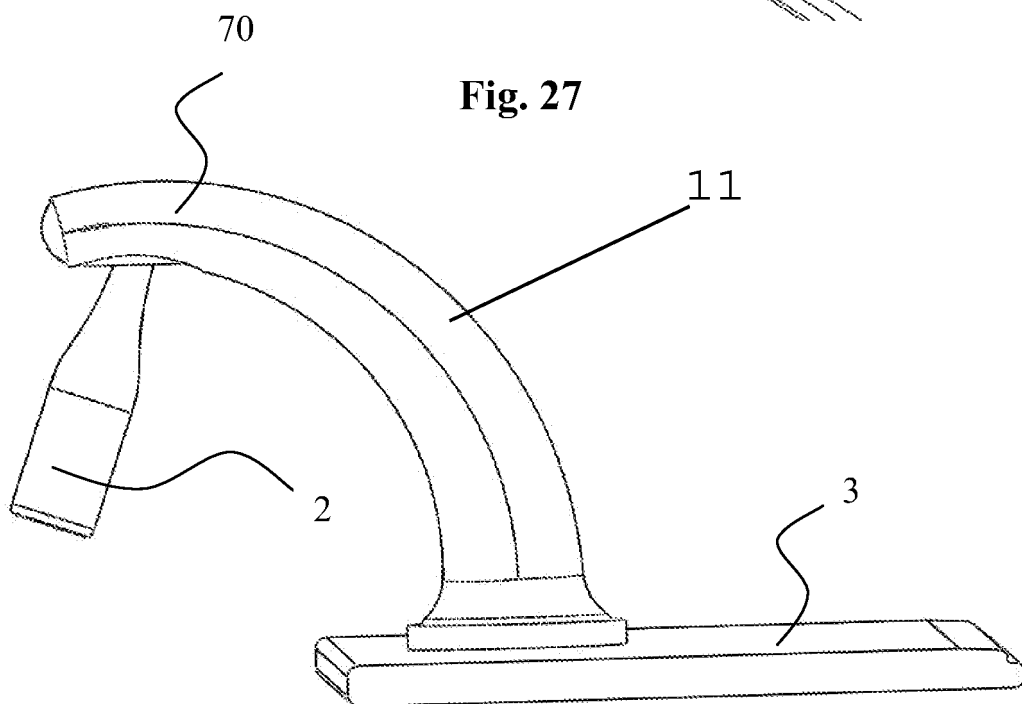


Fig. 28

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

- US 20030097717 A [0002]