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(54) **Device for weight filling**

Vorrichtung zur Gewichtsfüllung

Dispositif de remplissage ponderal

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EP 2 233 428 B1

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Description

[0001] The subject of the present invention is a device for ponderal filling according to the preamble of claim 1 and as known from US 4, 832, 092, and a ponderal filler using this device.

[0002] As is well-known, ponderal fillers enable accurate bottling even of dense products or products which tend to form foam during bottling (for example milk or its derivatives). Such fillers, inline or rotary, have a series of filling stations at which the bottles are filled "by weight". In particular, at a filling station, the bottle is arranged under the relative filling valve which delivers the product. During the filling of the bottle, the weight is measured by a load cell which, by means of a feedback control, brings about the closure of the valve on reaching the desired weight (i.e. when filling is completed).

[0003] In the most common solutions, the load cell is surmounted by a pan on which the bottom of the bottle rests.

[0004] The principal disadvantage of these solutions is connected with the fact that the pan and the load cell tend to get dirty easily. In fact, once the filling is finished, the filling valve closes; however, several drops of residual product can fall by gravity, causing dirtying both of the pan and of the load cell.

[0005] Another disadvantage of such solutions lies in the fact that bottles arriving subsequently on the dirty pan also tend to become dirty on the bottom. This situation is particularly disadvantageous in the case of filling with oily products.

[0006] A further disadvantage of such solutions is connected with the presence of a plurality of tank for collecting the product of dripping. These tanks are movable and must be positioned manually under the corresponding filling stations. Furthermore, for operations of changing format, it is necessary to change the tanks.

[0007] In another configuration, described in patent EP 1025424, the bottle is supported by the neck by means of a clamp pivoting on a load cell located laterally to the body of the bottle.

[0008] The principal disadvantage of this configuration lies in the fact that the clamp, embracing the neck of the bottle, is in proximity to the filling valve and, therefore, to the spout of product delivered. The clamp therefore tends to easily get dirty.

[0009] Another disadvantage of this configuration lies in the fact that bottles subsequently gripped by said clamp tend themselves also to become dirty. This situation is particularly disadvantageous because the bottles become dirty on the neck, i.e. in proximity to the mouth of the bottle.

[0010] In this context, the technical task at the base of the present invention is to propose a ponderal filling device and a ponderal filler, which overcome the disadvantages of the known art mentioned above.

[0011] In particular, it is an object of the present invention to propose a ponderal filling device and a ponderal

filler which allow filling the containers without dirtying them.

[0012] Another object of the present invention is to make available a ponderal filling device and a ponderal filler in which the collection of product residue (due to dripping) is practical and quick.

[0013] The declared technical task and the specified objects are substantially achieved by a device for ponderal filling and a ponderal filler, comprising the technical characteristics set forth in one or more of the attached claims.

[0014] Additional characteristics and advantages of the present invention will become more readily apparent from the indicative, and hence non-limiting, description of a preferred but not exclusive embodiment of a ponderal filling device and a ponderal filler, as illustrated in the accompanying drawings in which:

- figure 1 illustrates a ponderal filling device, according to the present invention, in a perspective view;
- figure 2 illustrates the device shown in figure 1, in a lateral sectioned view;
- figure 3 illustrates the device shown in figure 1, seen from above;
- figures 4a and 4b illustrate a detail (first clamp) of the device shown in figure 1, seen from above, in two different operative conditions;
- figures 5a and 5b illustrate another detail (second clamp) of the device shown in figure 1, seen from above, in two different operative conditions;
- figure 6 illustrates a ponderal filler according to the present invention, in a perspective view;
- figure 7 illustrates a portion of the filler shown in figure 6, with some parts removed for clarity, in a lateral view.

[0015] With reference to the figures, the number 1 indicates a ponderal device for filling a container 2 (or bottle) with a fluid product. In particular this device 1 has application in the sector of the bottling of fluids used for personal hygiene (detergents or liquid soaps) or food fluids (milk, drinks, oils etc.).

[0016] Preferably, this device 1 comprises a filling valve 3 for dispensing the product into the container 2 located in a filling station 4. The product is dispensed according to a delivery direction 5.

[0017] The device 1 comprises weighing means 6 located outside the delivery direction 5, i.e. having an extension such as not to interfere with the delivery direction 5. The weighing means 6 are operatively active on the container 2 placed in the filling station 4, in order to weigh it. In the embodiment here described and illustrated, the weighing means 6 comprise an electronic load cell 7 of known type. In particular, the load cell 7 comprises a bar 9 of deformable elastic material, inside which is formed a cavity 10 defining a weight sensor of constant moment. One or more extensometers are applied to this sensor to convert the elongation or compression of bar 9 to an

electrical signal. Preferably, this signal is amplified by means of an instrumentation amplifier and subsequently processed. Preferably, the electronic load cell 7 is compensated, for example to correct nonlinearity or temperature variations.

[0018] Alternatively, the weighing means 6 comprise a hydraulic load cell 7.

[0019] The weighing means 6 include a loadbearing support 11 for a base 12 of the container 2. Originally, said support 11 has a hole or aperture 13 passing through it in such a way as not to intercept the delivery direction 5.

[0020] In the embodiment here described and illustrated, the loadbearing support 11 consists of a hollow body 14 whose cavity is formed by the through hole 13. This hollow body 14 has a support surface 14a with a substantially rectangular outline, as illustrated in figure 1. Alternatively, in a variant not illustrated, the hollow body 14 has a support surface 14a with a substantially elliptical outline. Preferably, the support surface 14a is in the form of a profile capable of supporting the container 2. In this way, the support surface 14a has an extension in terms of area which is less than the extension delimited by it, corresponding to the hole or aperture 13.

[0021] In a further embodiment (not shown), the support 11 consists of a ring having a diameter less than the diameter of the base 12 of the container 2.

[0022] Preferably, the container 2 is a bottle which, when placed in filling station 4, has a longitudinal axis 15 parallel or coinciding with the delivery direction 5 in such a way that a mouth 16 of the bottle 2 receives the dispensed product.

[0023] Preferably, the device 1 has restraining means 17 operatively active on the bottle 2 to lock it in the filling station 4. These restraining means 17 comprise at least one first clamp 18 having two jaws 18a and 18b to laterally grip the bottle 2. Preferably, the restraining means 17 also comprise a second clamp 19 having two jaws 19a, 19b to grip the bottle 2 in proximity to its neck 20.

[0024] Advantageously, the loadbearing support 11 is connected to the load cell 7 by means of a fork 21 having an inclined upper surface 21a. In particular, the fork 21 is fitted to a top 7a of the load cell 7 in such a way that its upper surface 21a is facing towards the filling valve 3.

[0025] A rod 22, which is substantially parallel to the longitudinal axis 15 of bottle 2, is attached to fork 21. The first and the second clamps 18, 19 are rotatably pivoted on said rod 22 at two different heights. In particular, the second clamp 19 is pivoted at a height corresponding to the neck 20 of the bottle 2.

[0026] The number 23 indicates a ponderal filler 23 in a rotating carousel 24 comprising a plurality of devices 1 operatively active on an equal number of containers 2 located in corresponding filling stations 4. Advantageously, the filler 23 is provided with a single tank 25 for collecting the product of dripping, i.e. product dispensed but not bottled. This tank 25 extends below the filling stations 4 and has the shape of an annular channel 26. In particular, the annular channel 26 is fixed.

[0027] In the embodiment shown, the load cell 7 is located at an inferior level than the loadbearing support 11.

[0028] The operation of the ponderal filling device and of the ponderal filler, according to the present invention, is described below.

[0029] Each empty bottle 2 is gripped by the restraining means 17 which take it to the respective filling station 4. In particular, the first clamp 18 passes from an open condition in which the jaws 18a and 18b separate from each other to accept the body of the bottle 2, to a closed condition in which the jaws 18a and 18b move together to laterally grip bottle 2. Simultaneously, the second clamp 19 passes from an open condition in which the jaws 19a and 19b separate from each other to accept the neck 20 of the bottle 2, to a closed condition in which the jaws 19a and 19b move together to grip said neck 20.

[0030] The base 12 of the bottle 2 rests on the support surface 14a of the hollow body 14 and the clamps 18 and 19 maintain it firmly in that position. The longitudinal axis 15 of bottle 2 coincides with the delivery direction 5, as shown in figure 2. This delivery direction 5 is substantially vertical with respect to the ground or the floor on which the filler 23 is situated.

[0031] The filling valve 3, located above the mouth 16 of the bottle 2, dispenses the product into the bottle 2.

[0032] The weight of the bottle 2 is measured by the load cell 7 both at the beginning (i.e. with bottle 2 empty), and during the filling stage. The bottle 2, bearing on the hollow body 14, causes an elongation of the elastic bar 9. The sensor located inside the load cell 7 converts this elongation into an electrical signal which, suitably amplified and processed, is used to control the delivery of the product. When filling is complete, the filling valve 3 is closed.

[0033] The characteristics of the ponderal filling device and the ponderal filler, according to the present invention, are clear from the description given above, as also are the advantages.

[0034] In particular, thanks to the use of a pierced support which does not intercept the delivery direction of the product, the residual product of dripping falls by gravity without accumulating on the support itself. In fact, this product residue passes through the through hole without dirtying the support. In this way, the loadbearing supports remain always clean, i.e. clear of accumulations of product, and the bottles also remain clean.

[0035] In addition, thanks to the fact that the upper surface of the fork is inclined, any drops of product which inadvertently fall on this fork slide downwards, i.e. into the tank, avoiding dirtying the load cell and the support surface.

[0036] Also, thanks to the use of a single, fixed annular collection tank, the collection of product residue is quick and easy: in fact it is not necessary to move the tank by displacing it along the filler, nor to replace it in the event of a change of format of the bottles.

Claims

1. Device (1) for ponderal filling of a container (2) with a fluid product dispensed in a delivery direction (5), comprising:

weighing means (6) located outside the delivery direction (5) and operatively active on the container (2) located in a filling station (4) for weighing the container, wherein said weighing means (6) comprise a loadbearing support (11) for a base (12) of the container (2),

characterised in that said support (11) has a hole or aperture (13) passing through it in such a way as not to intercept the delivery direction (5).

2. Device (1) according to claim 1, comprising furthermore a filling valve (3) for dispensing the product to the container (2) located in said filling station (4).

3. Device (1) according to claim 1 or 2, wherein said loadbearing support (11) consists of a hollow body (14) whose cavity is formed by the through hole (13).

4. Device (1) according to any of the preceding claims, wherein the container (2) is a bottle which, when placed in the filling station (4) has a longitudinal axis (15) parallel or coinciding with the delivery direction (5) in such a way that a mouth (16) of the bottle (2) receives the dispensed product.

5. Device (1) according to claim 4, comprising furthermore restraining means (17) operatively active on the bottle (2) to lock it in the filling station (4).

6. Device (1) according to claim 5, wherein said restraining means (17) comprise at least one first clamp (18) having two jaws (18a, 18b) to laterally grip the bottle (2).

7. Device (1) according to claim 6, wherein the restraining means (27) comprise a second clamp (19) having two jaws (19a, 19b) to grip the bottle (2) in proximity to a neck (20) on the bottle.

8. Device (1) according to any of the preceding claims, wherein the weighing means (6) comprise furthermore an electronic load cell (7).

9. Device (1) according to claim 8, wherein said loadbearing support (11) is connected to the load cell (7) by means of a fork (21) having an inclined upper surface (21a).

10. Device (1) according to claim 9, wherein said fork (21) is fitted to a top (7a) of the load cell (7).

11. Device (1) according to claims 8-10, wherein said load cell (7) is located at an inferior level than the loadbearing support (11).

12. Ponderal filler (23) with rotating carousel (24) comprising a plurality of devices (1) operatively active on an equal number of containers (2) located in corresponding filling stations (4) according to the tangential extension of the carousel (24), **characterised in that** said devices (1) are of the type described in the preceding claims.

13. Filler (23) according to claim 12, comprising furthermore a single tank (25) for collecting drips of the product, said tank (25) extending beneath the filling stations (4).

14. Filler (23) according to claim 13, wherein said tank (25) has the shape of an annular channel (26).

Patentansprüche

1. Vorrichtung (1) zur Gewichtsfüllung eines Behälters (2) mit einem flüssigen Produkt, das in einer Zuführ- richtung (5) verteilt wird, umfassend:

Wiegemittel (6), die außerhalb der Zuführ- richtung (5) angeordnet sind und bei Betrieb auf den Behälter (2),

befindlich in einer Füllstation (4) zum Wiegen des Behälters, wirken, wobei die genannten Wiegemittel (6) eine lasttragende Halterung (11) für eine Basis (12) des Behälters (2) umfassen, **dadurch gekennzeichnet, dass** die genannte Halterung (11) ein Loch oder eine Öffnung (13) besitzt, die durch sie führt, sodass die Zuführ- richtung (5) nicht unterbrochen wird.

2. Vorrichtung (1) nach Anspruch 1, zudem umfassend ein Füllventil (3) zur Verteilung des Produkts an den Behälter (2), angeordnet in der genannten Füllsta- tion (4).

3. Vorrichtung (1) nach Anspruch 1 oder 2, wobei die genannte lasttragende Halterung (11) aus einem Hohlkörper (14) besteht, dessen Hohlraum durch das Durchgangsloch (13) gebildet ist.

4. Vorrichtung (1) nach einem der vorhergehenden An- sprüche, wobei es sich beim Behälter (2) um eine Flasche handelt, die beim Einsetzen in die Füllstation (4) eine Längsachse (15) besitzt, die parallel zur Zuführ- richtung (5) angeordnet ist oder mit ihr übereinstimmt, sodass eine Öffnung (16) der Flasche (2) das ver- teilte Produkt aufnimmt.

5. Vorrichtung (1) nach Anspruch 4, umfassend zudem Rückhaltemittel (17), die beim Betrieb auf die Flasche (2) wirken, um diese in der Füllstation (4) festzuspannen. 5
6. Vorrichtung (1) nach Anspruch 5, wobei die genannten Rückhaltemittel (17) mindestens eine erste Spanneinrichtung (18) umfassen, die zwei Klemmbacken (18a, 18b) besitzt, um die Flasche (2) seitlich zu greifen. 10
7. Vorrichtung (1) nach Anspruch 6, wobei die Rückhaltemittel (27) eine zweite Spanneinrichtung (19) umfassen, die zwei Klemmbacken (19a, 19b) besitzt, um die Flasche (2) in der Nähe eines Halses (20) auf der Flasche zu greifen. 15
8. Vorrichtung (1) nach einem der vorhergehenden Ansprüche, wobei die Wiegemittel (6) zudem eine elektronische Wägezelle (7) umfassen. 20
9. Vorrichtung (1) nach Anspruch 8, wobei die genannte lasttragende Halterung (11) mit der Wägezelle (7) mittels einer Gabel (21) verbunden ist, die eine geneigte obere Fläche (21a) aufweist. 25
10. Vorrichtung (1) nach Anspruch 9, wobei die genannte Gabel (21) mit einer Oberseite (7a) der Wägezelle (7) verbunden ist. 30
11. Vorrichtung (1) nach den Ansprüchen 8-10, wobei die genannte Wägezelle (7) auf einer unteren Ebene als die lasttragende Halterung (11) angeordnet ist. 35
12. Gewichtsfüller (23) mit Drehkarussell (24), umfassend eine Vielzahl von Vorrichtungen (1), die während des Betriebs auf eine gleiche Zahl an Behältern (2), angeordnet in entsprechenden Füllstationen (4) gemäß der tangentialen Ausdehnung des Karussells (24), wirken, **dadurch gekennzeichnet, dass** die genannten Vorrichtungen (1) vom in den vorhergehenden Ansprüchen beschriebenen Typ sind. 40
13. Füller (23) gemäß Anspruch 12, umfassend zudem einen einzelnen Tank (25) zum Sammeln von Tropfen des Produkts, wobei sich der genannte Tank (25) unterhalb der Füllstationen (4) erstreckt. 45
14. Füller (23) gemäß Anspruch 13, wobei der genannte Tank (25) die Form eines ringförmigen Kanals (26) besitzt. 50

Revendications

1. Dispositif (1) de remplissage pondéral d'un récipient (2) avec un produit liquide distribué dans une direction de distribution (5), comprenant : 55

des moyens de pesage (6) placés en dehors de la direction de distribution (5) et opérationnellement actifs sur le récipient (2) situé dans un poste de remplissage (4) pour peser le récipient, dans lequel lesdits moyens de pesage (6) comportent un support porteur (11) pour une base (12) du récipient (2), **caractérisé en ce que** ledit support (11) présente un orifice ou une ouverture (13) le traversant, de sorte à ne pas gêner la direction de distribution (5).

2. Dispositif (1) selon la revendication 1, comprenant aussi une vanne de remplissage (3) pour distribuer le produit dans le récipient (2) situé dans ledit poste de remplissage (4).
3. Dispositif (1) selon les revendications 1 ou 2, dans lequel ledit support porteur (11) consiste en un corps creux (14), dont la cavité est formée par l'orifice débouchant (13).
4. Dispositif (1) selon l'une quelconque des revendications précédentes, dans lequel le récipient (2) est une bouteille qui, placée dans le poste de remplissage (4), a un axe longitudinal (15) parallèle ou coïncidant avec la direction de distribution (5), de manière qu'un goulot (16) de la bouteille (2) reçoit le produit distribué.
5. Dispositif (1) selon la revendication 4, comprenant également des moyens de retenue (17) opérationnellement actifs sur la bouteille (2) pour la bloquer dans le poste de remplissage (4).
6. Dispositif (1) selon la revendication 5, dans lequel lesdits moyens de retenue (17) comprennent au moins une première pince (18) avec deux mors (18a, 18b) pour saisir latéralement la bouteille (2).
7. Dispositif (1) selon la revendication 6, dans lequel les moyens de retenue (27) comprennent une seconde pince (19) avec deux mors (19a, 19b) pour saisir la bouteille (2) à proximité d'un col (20) sur la bouteille.
8. Dispositif (1) selon l'une quelconque des revendications précédentes, dans lequel les moyens de pesage (6) comportent également une cellule de charge électronique (7).
9. Dispositif (1) selon la revendication 8, dans lequel ledit support porteur (11) est raccordé à la cellule de charge (7) par une fourche (21) présentant une surface supérieure inclinée (21a).
10. Dispositif (1) selon la revendication 9, dans lequel ladite fourche (21) est montée sur une partie supé-

rieure (7a) de la cellule de charge (7).

11. Dispositif (1) selon les revendications 8-10, dans lequel ladite cellule de charge (7) se situe à un niveau plus bas que le support porteur (11). 5
12. Remplisseuse pondérale (23) avec carrousel pivotant (24) comprenant une pluralité de dispositifs (1) opérationnellement actifs sur un nombre égal de récipients (2) situés dans des postes de remplissage correspondants (4) selon le développement tangentiel du carrousel (24), **caractérisée en ce que** lesdits dispositifs (1) sont du type décrit dans les revendications précédentes. 10
13. Remplisseuse (23) selon la revendication 12, comprenant aussi une cuve simple (25) pour collecter des gouttes du produit, ladite cuve (25) se développant sous les postes de remplissage (4). 15
14. Remplisseuse (23) selon la revendication 13, dans laquelle ladite cuve (25) a la forme d'un canal annulaire (26). 20

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FIG. 1

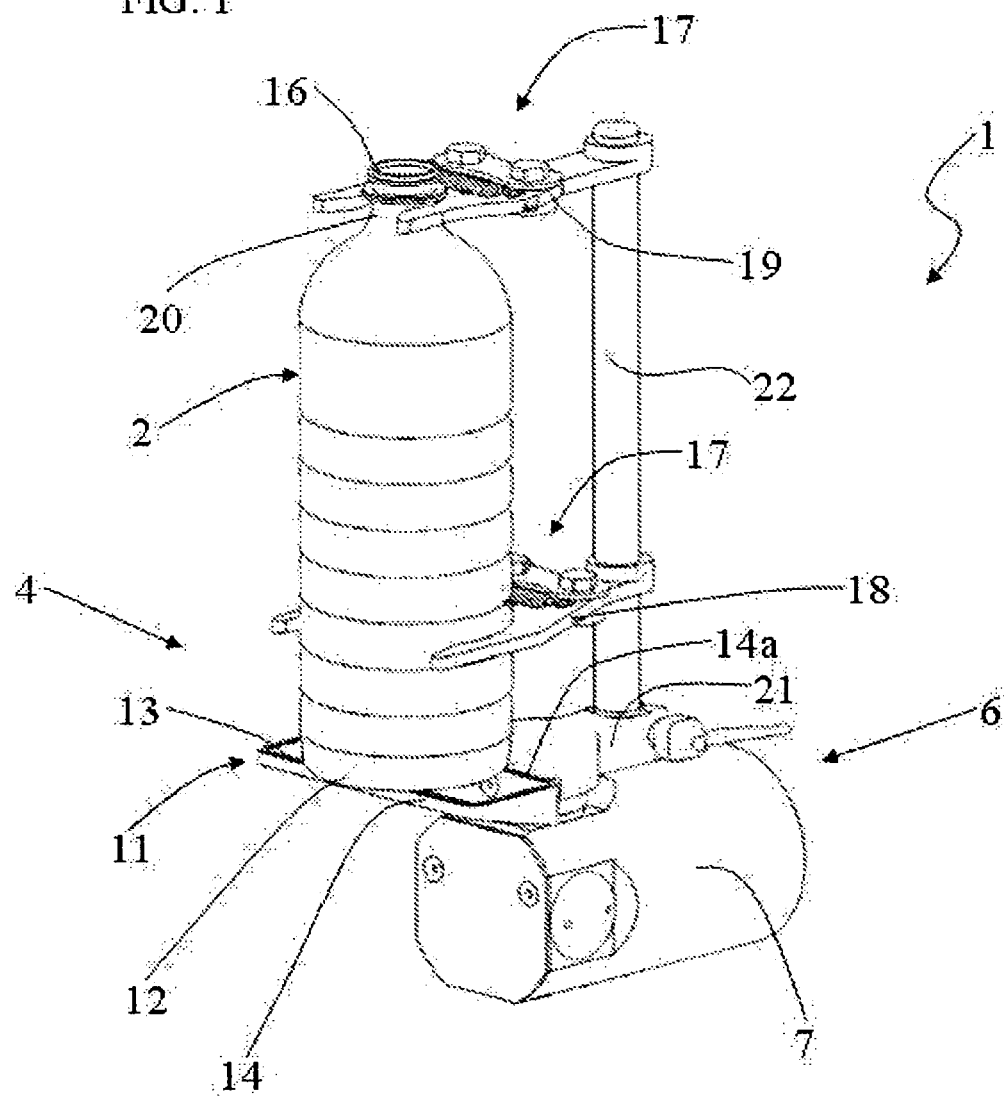


FIG. 2

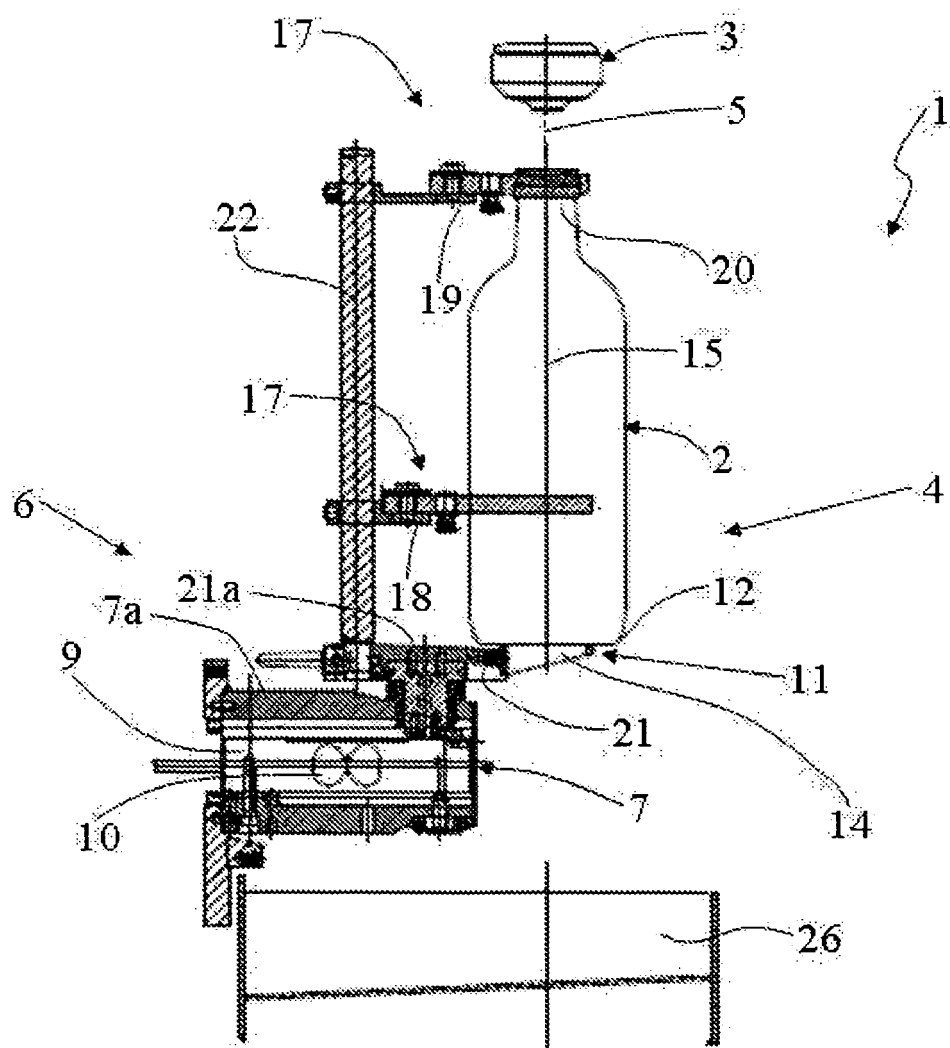


FIG. 3

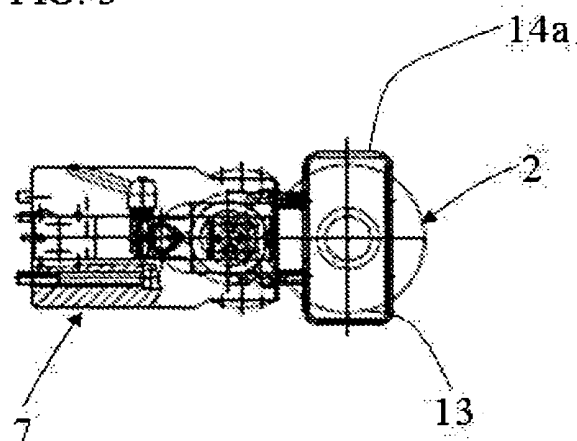


FIG. 4a

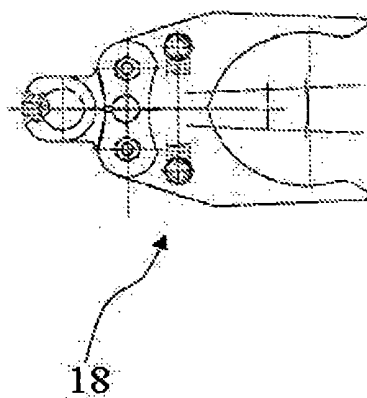


FIG. 4b

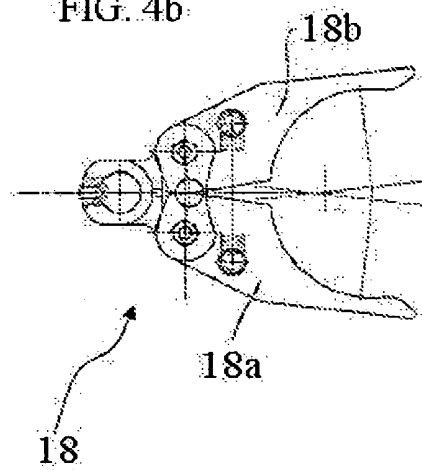


FIG. 5a

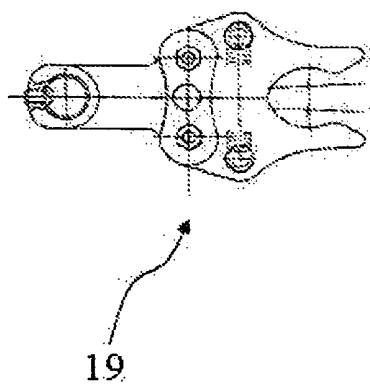


FIG. 5b

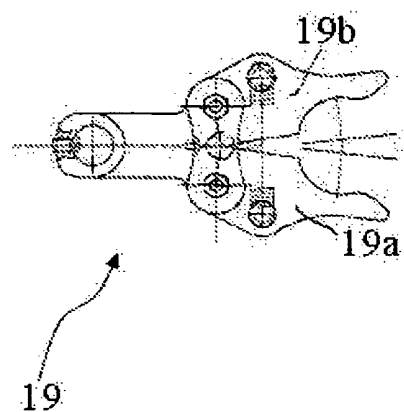


FIG. 6

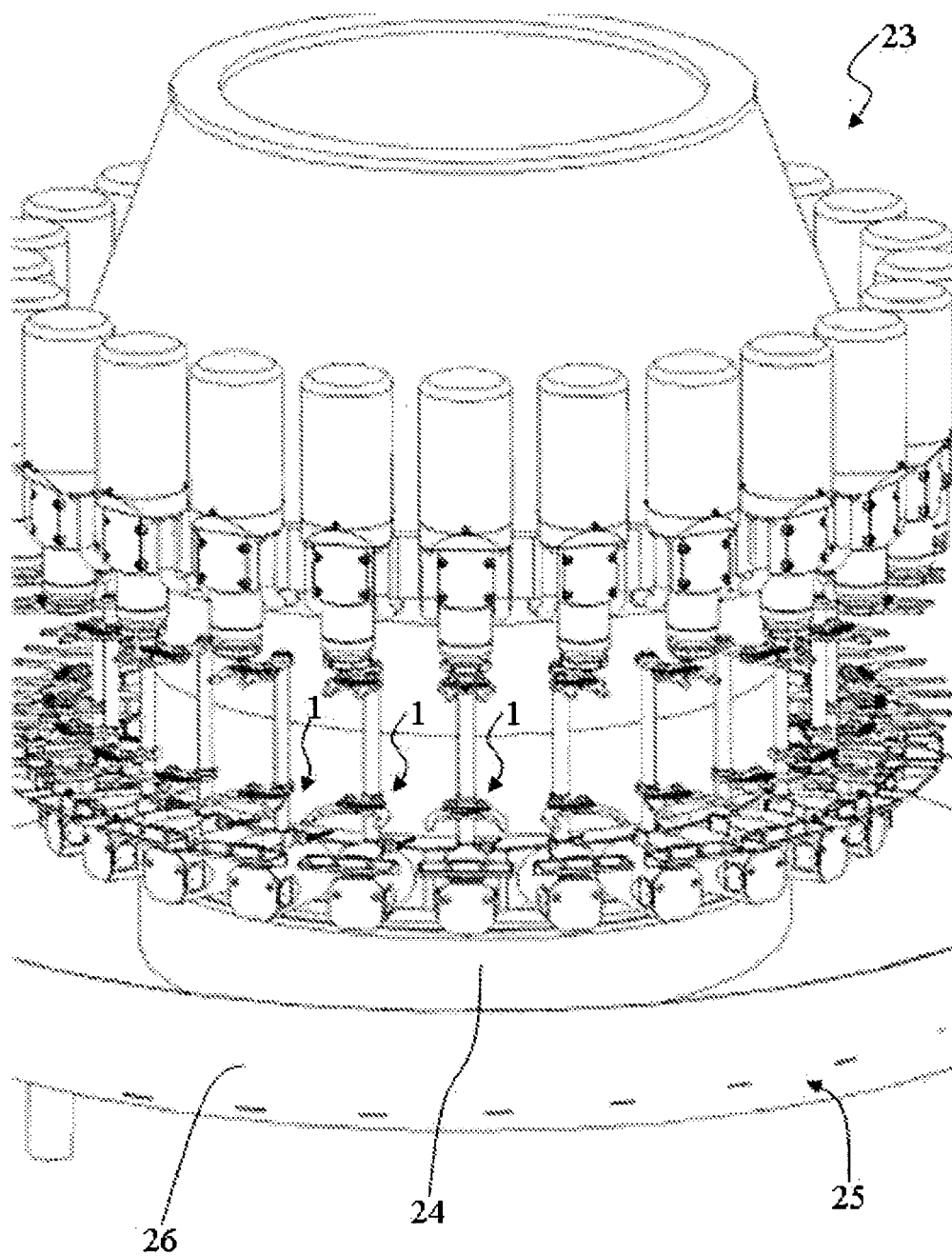
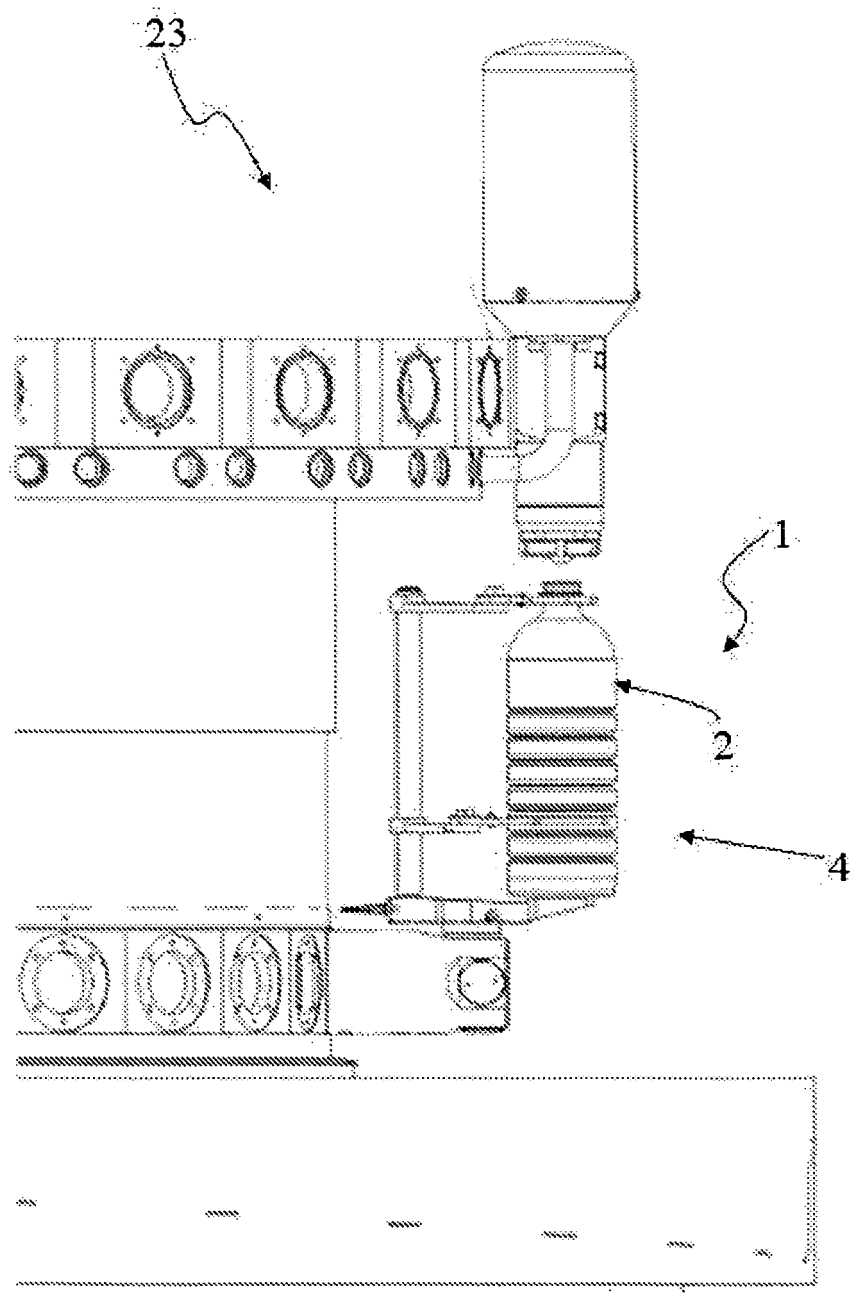


FIG. 7



REFERENCES CITED IN THE DESCRIPTION

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