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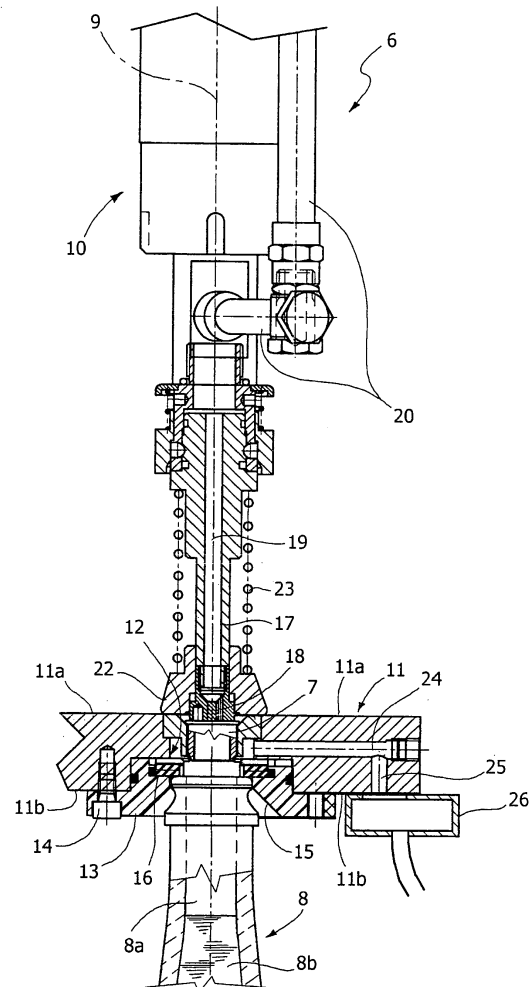
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(54) **Device for application of closures on containers**

(57) The space inside a bottle (8) is connected to a vacuum source just before the application of a cap or cork (7). For this purpose, between the bottle (8) and a capping head (6) a support (11), having a through cavity (12), is interposed. The cavity (12) has a lower end equipped with sealing means which can be engaged on the bottle, and an upper end which is closed, so as to isolate the cavity (12) with respect of the outer environment, due to the lowering of the capping head (6) towards the support (11), which determines the insertion of the cork within the support, and also the sealing engagement of the support head, if necessary.

FIG. 3



Description

[0001] The present invention relates to devices for the application of caps, corks or the like on bottles or containers, of the type including a capping head, movable along a main axis thereof, which can be drawn near or away from the bottle or container, and means for connecting the space inside the bottle or container, right before the application of the cap or cork, with a vacuum source, for the purpose of partially or totally voiding air from the internal space of the bottle or container.

[0002] A device of the above-mentioned type is, for example, described and shown in US-A-2 114 964. This document shows the more obvious solution to vacuum the inside of the bottle before the application of the cap: the application operation of the cap is carried out within a chamber subjected to a vacuum, wherein both the bottle and the capping head are provided.

[0003] The Applicant has proposed a new and original solution to the above mentioned problem, consisting of combining to the capping head itself a casing movable axially with the capping head, which abuts on the bottle during the application of the cap so as to define a closed chamber, in communication with the space inside the bottle, which is connected with a vacuum source (see EP-A-1 462 41). In the case of the preferred embodiment of such previous solution proposed by the Applicant, the casing is mounted upon the capping head with the interposition of rolling-contact bearings which allow the casing to remain fixed upon the bottle, while the capping head rotates for applying a screwing cap.

[0004] The aim of the present invention is to suggest an alternative solution to that proposed by the Applicant in EP-A-1 462 411.

[0005] A further aim of the invention is to foresee a solution to the above problem which is feasible with extremely simple and effective means and which particularly prevents, in comparison with the solution above suggested, to adopt complicated and bulky solutions, as the one proposed in US-A-2 114 964.

[0006] In view of attaining this aim, the object of the invention is a device having the features shown at the beginning of the present invention and also characterized in that the aforesaid connecting means with the vacuum source include a support having a lower surface destined for abutting on the bottle or container, and an upper surface towards which the capping head can be lowered, so that said support results axially interposed between the bottle or container and the capping head, and in that said support shows a cavity, joinable to said vacuum source, which extends through the support from the lower surface to the upper surface thereof and having a lower end equipped with sealing means intended for abutting on the bottle or container, said cavity being isolated at its upper end from the outside environment due to the lowering of the capping head towards said support.

[0007] In the preferred embodiment, which relates to the case of a cap intended for being pressed within a

bottle neck, the capping head is equipped with a frontal foot for abutting against the upper surface of said support, and a stem, having at a front end thereof, gripping means for the cap, intended for being pressed downwards relative to said frontal foot, so as to insert the cap through said support cavity and within the bottle neck.

[0008] The support according to the invention has inner channelings for connecting the aforesaid cavity with a vacuum source. When the capping head introduces the cap inside the support cavity, the cavity itself results isolated with respect to the outside, whereby the vacuum is communicated to the inner space of the bottle, which depletes the air until the cap, pressed downwards by the capping head, clogs the bottle opening.

[0009] The device according to the invention is advantageously usable in each application wherein the air depletion from the clearance inside the bottle above the liquid which fills it, is suitable, for a better storage of the liquid itself.

[0010] Further features and advantages of the invention will result from the following description with reference to the enclosed drawings, which are given by mere way of not limitative example, wherein:

- figure 1 is a plan diagrammatic view of a machine using a plurality of capping heads carried out according to the teachings of the present invention,
- figures 2, 3 and 4 show a sectional view of a preferred embodiment of the device according to the present invention in three different operating conditions, and
- figure 3 is a sectional view of a second embodiment of the invention.

[0011] In figure 1, numeral 1 generally shows a machine for the application of caps or corks on bottles, including in a way per se known, a carousel mechanism 2 equipped with a circumferential series of capping heads with vertical axis (not shown in figure 1) for the application of caps and corks on bottles, which are fed to the carousel mechanism 2 through a feed line 3 and which are sent to the exit of the machine by means of a discharge line 4. In the present specification and in the enclosed drawings, further details concerning the construction and the operation of the carousel mechanism 2 are not provided, because such construction and such operation are those of the conventional mechanisms, well known to artisans skilled in the art.

[0012] Figures 2-4 show the operational steps of a single capping head carried out according to the teachings of the present invention. As already stated, the carousel mechanism 2 has a plurality of heads of the type shown in figures 2-5, each of which performs its operating cycle during the rotation of the carousel mechanism around its vertical central axis, shown by 5 in figure 1.

[0013] In figures 2-4, numeral 6 generally shows a capping head for the application of a cap 7 inside the neck of a bottle 8. The example shown relates to caps of the so-called "bidule" type, which are temporary applied on

the bottle during the vinification process with the "cham-penoise" method. It is obvious, however, that the device forming the object of the present invention can be applied to any type of caps or corks, and in particular both to caps intended for being pressed within the neck of the bottle and to caps intended for being applied, for instance by screwing, above the neck of the bottle, as well to any forms of bottle or container and generally to any forms of corks or caps.

[0014] The capping head 6 shows a body 8 which is movable in the direction of a vertical axis 9 thereof, in approaching and going away from the bottle 8. The enclosed drawings do not show the means intended for causing such an alternative displacement of the body of the capping head, because they can be carried out in any known manner and do not lie, taken independently, within the scope of the present invention. In the case of carousel machines, the axial movement of the capping head is obtained automatically due to the circulation movement of the capping heads around the central axis of the carousel, through mechanical cams. It is also known the use of electrical actuators.

[0015] A fundamental feature of the present invention is that in the application step of the cap, between the bottle 8 and the capping head 6 there is axially interposed a support 11 which, in the shown example, is plate-shaped. The support 11 is made of a metal material and shows a through cavity 12 extending from the upper surface 11a to its lower surface 11b. The cavity 12 shows, at the lower end thereof, an enlarged mouth in which a plastic ring 13, equipped with a flange fixed by screws 14 to the support 11, is tight-mounted. The ring 13 shows in turn a frustoconical mouth 15 for receiving the upper end of the bottle and is equipped with a rubber holding ring 16 and assigned to abut upon the top surfaces of the bottle for isolating the cavity 12 of the support with respect to the outside environment in correspondence of the mouth of the lower end of the cavity.

[0016] In the case of the illustrated example, the support 11 is in a fixed position and the bottle 8 engages the mouth 15 moving itself vertically upwards. Such a relative movement of the bottle 8 with respect to the support 11 is obtained during the movement of the carousel mechanism, since the base on which the bottle 8 stands on, rises during the rotatory movement of the carousel in the step just before the application of the cap, and then lowers again for allowing the exit of the bottle from the machine. As already stated, during the rotatory movement of the carousel, each capping head, the respective bottle 8 and the support 11 interposed between them move together at the same speed around the central axis of the carousel, with the capping head 6 and the bottle 8 remaining with their axes aligned.

[0017] In the case of the example shown, the capping head 6 shows an axial stem 17 equipped at the front end thereof with gripping means for the cork 7. Still in the case of the example shown, such gripping means are of a vacuum-type and consist of openings 18 ending on the

frontal surface of the stem 17 which are put in communication with a vacuum source (not shown) through an axial channel 19 obtained in the stem 17 and connecting lines 20.

5 **[0018]** During the movement of the carousel mechanism, the capping head takes the cork 7 from a support surface (not shown) to which the corks are successively fed by means of a feeding device of the corks. Continuing on with its path around the central axis of the carousel mechanism, the capping head lowers above the support 11 until a position wherein the cork 7 enters a bushing 21 which is mounted at the upper end of the cavity 12, while a frontal foot 22 constituting the capping head 6, which is slidably mounted upon the stem 17 and drawn back towards an end stop position downwards by a coil spring 23, abuts against the lower surface 11a of the support 11. In such a condition, shown in figure 3, the cavity 12 is isolated with respect to the exterior both in the correspondence of its lower end, thanks to the engagement of the holding ring 16 upon the top edge of the bottle 8, and in correspondence of its upper end, thanks to the engagement of the cork 7 within the bushing 21. Alternatively, or in addition, the sealing is carried out by the engagement of the frontal foot 22 on the upper surface 11a of the support 11. In the condition shown in figure 3, wherein the cork 22 is still not inserted in the bottle, the space 8a inside the neck of the bottle, above the liquid 8b contained therein, communicates with the cavity 12 of the support 11 and is isolated from the outer environment. In such a condition, the inner space of the bottle is joinable with a vacuum source, by means of channels 24, 25 obtained in the support 11. This support, as already stated, rotates with the carousel mechanism around the central axis of the carousel and has the lower surface 11b thereof which is in sliding contact with a lower construction 26 (shown only diagrammatically in figure 3) containing a chamber connected with a vacuum source (not shown). Therefore, in correspondence with the step shown in figure 3, which corresponds to an angular zone of the rotating path of the carousel mechanism, the space inside the bottle is partially or totally depleted of air. With the progress of the rotation of the carousel mechanism, the capping head 6 is further moved downwards so as to insert the cork 7 in the bottle neck, as shown in figure 4.

[0019] Figure 5 shows a variation, wherein the support 11 constitutes a construction vertically moving downwards in order to engage above the bottle, unlike it is shown with reference to figures 2-4, where the bottle, which rises for engaging downwards the support 11, is placed. The construction, shown with numeral 27, of which the support 11 is a part, has in this case a post 28 from which a head 29 protrudes, through which the capping head 6 is movable. For the remainder, the construction and the operation of the device are completely identical to those above described.

[0020] Obviously, further without prejudice to the principle of the invention, construction details and embodi-

ments could widely vary with respect to what has been described and shown by mere way of example, without leaving the ambit of the present invention.

Claims

1. Device for application of caps, corks or the like on bottles or containers, including:

- a capping head (6), movable along a main axis thereof (9) which can be drawn near to or away from the bottle or container (8), and
 - means for connecting the space inside the bottle or container (8), right before the application of the cap or cork (7), with a vacuum source, for the purpose to remove partially or totally air from the space (8a) inside the bottle or container (8), **characterized in that** said connecting means include a support (11) having a lower surface (11b) for abutting on the bottle or container (8), and an upper surface (11a) towards which the capping head (6) is intended for being lowered, and in such a way that said support (11) results axially interposed between the bottle or container (8) and the capping head (6), and **in that** said support (11) has a cavity (12) which can be connected with a vacuum source, extending through said support (11) from the lower surface (11b) to the upper surface (11a) thereof and having a lower end equipped with sealing means which can be tight-abutted on the bottle or container (8), said cavity (12) being isolated at its upper end from the outside environment due to the lowering of the capping head (6) towards said support (11).

2. Device according to claim 1, **characterized in that** said support has a plate-portion horizontally arranged, and that said cavity (12) consists of a hole passing through said plate (11), and that said plate shows channels (24, 25) for the connection of the plate (12) with the vacuum source.

3. Device according to claim 1, **characterized in that** the capping head shows a frontal foot (22) which can be abutted against the upper surface (11a) of the support (11) and a stem (17) movable downwards relative to the aforesaid frontal foot (22) and equipped at its frontal end with gripping means for the cap or container (7).

4. Device according to claim 3, **characterized in that** said gripping means are of a vacuum-type.

5. Device according to claim 1, **characterized in that** it includes a plurality of capping heads (6) movable in a carousel mechanism around a central axis (5)

and each suitable for performing its operating cycle during the rotation around said central axis, said support (11) being movable around said central axis (5) of the carousel together with the aforesaid capping heads and together with the bottles, which are each maintained aligned with a respective capping head.

6. Device according to claim 5, **characterized in that** said support (11) is in an axially fixed position and that it receives at the lower end of said cavity (12) the upper end of the bottle or container due to a rising movement of the bottle or container relative to the support.

7. Device according to claim 5, **characterized in that** the support (11) is axially movable in order to allow its application on the bottle or container.

FIG. 1

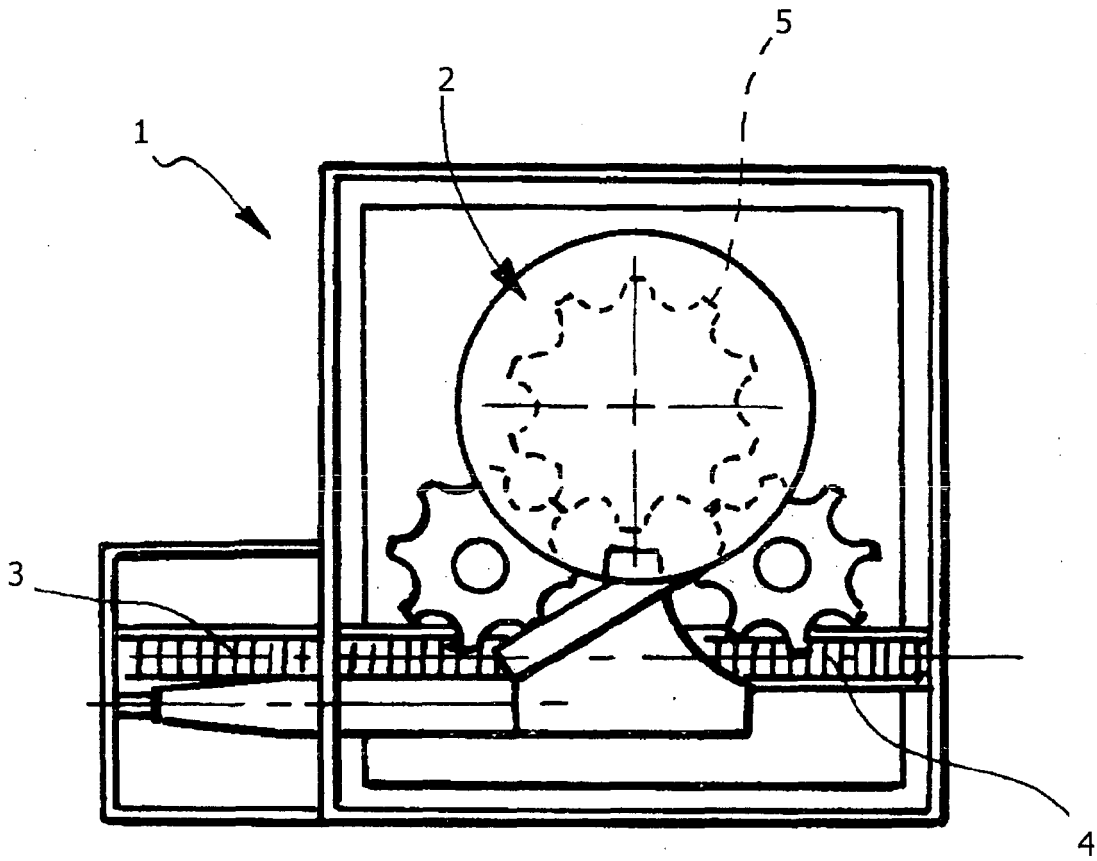


FIG. 2

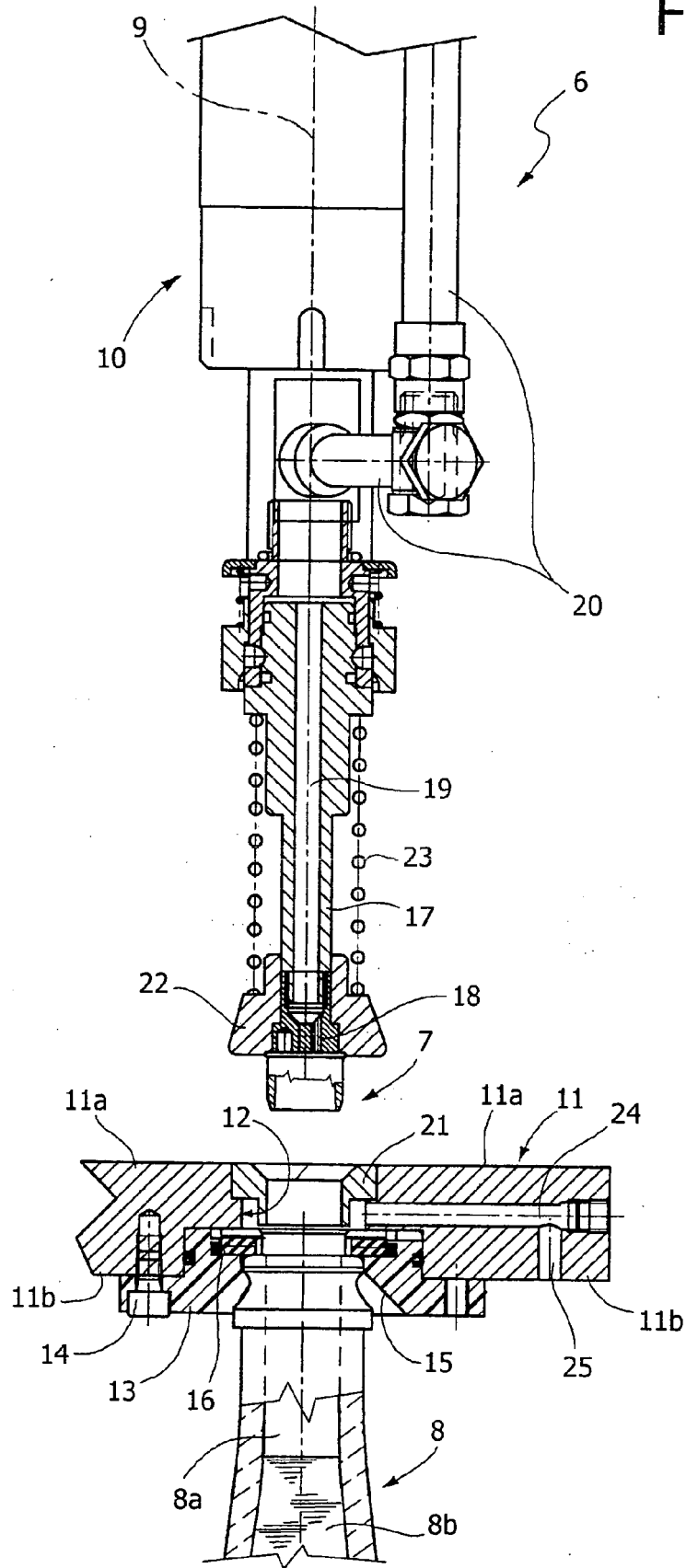


FIG. 3

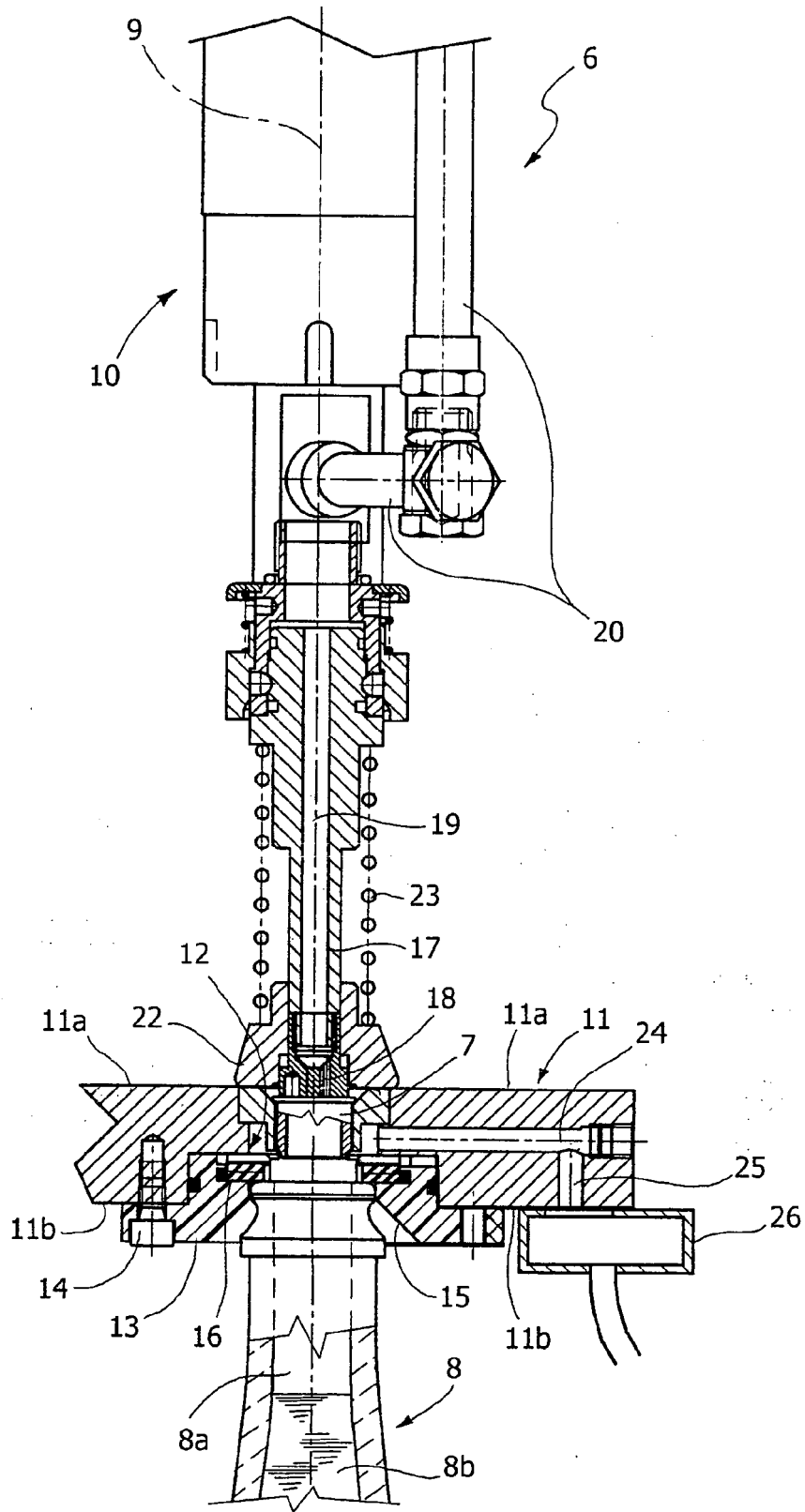


FIG. 4

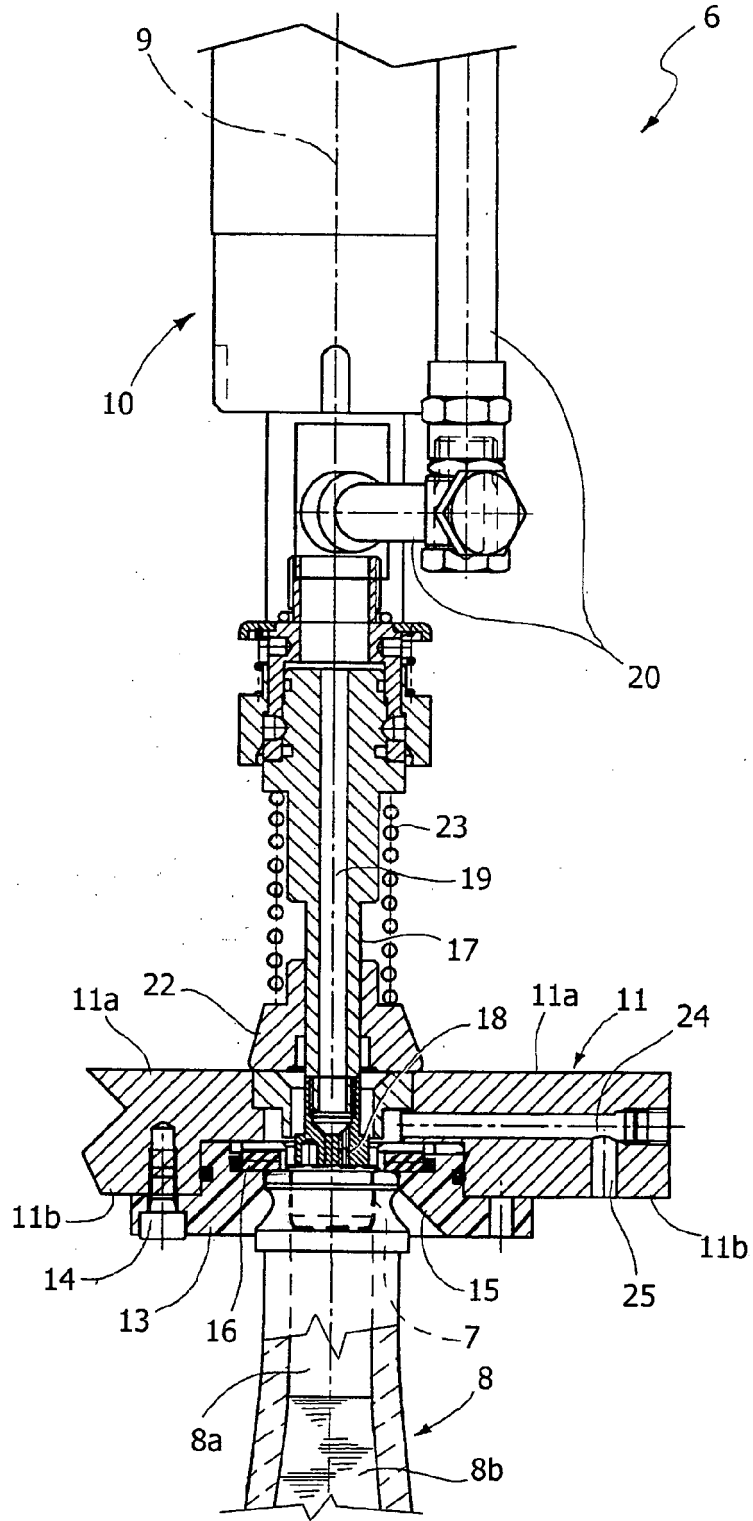
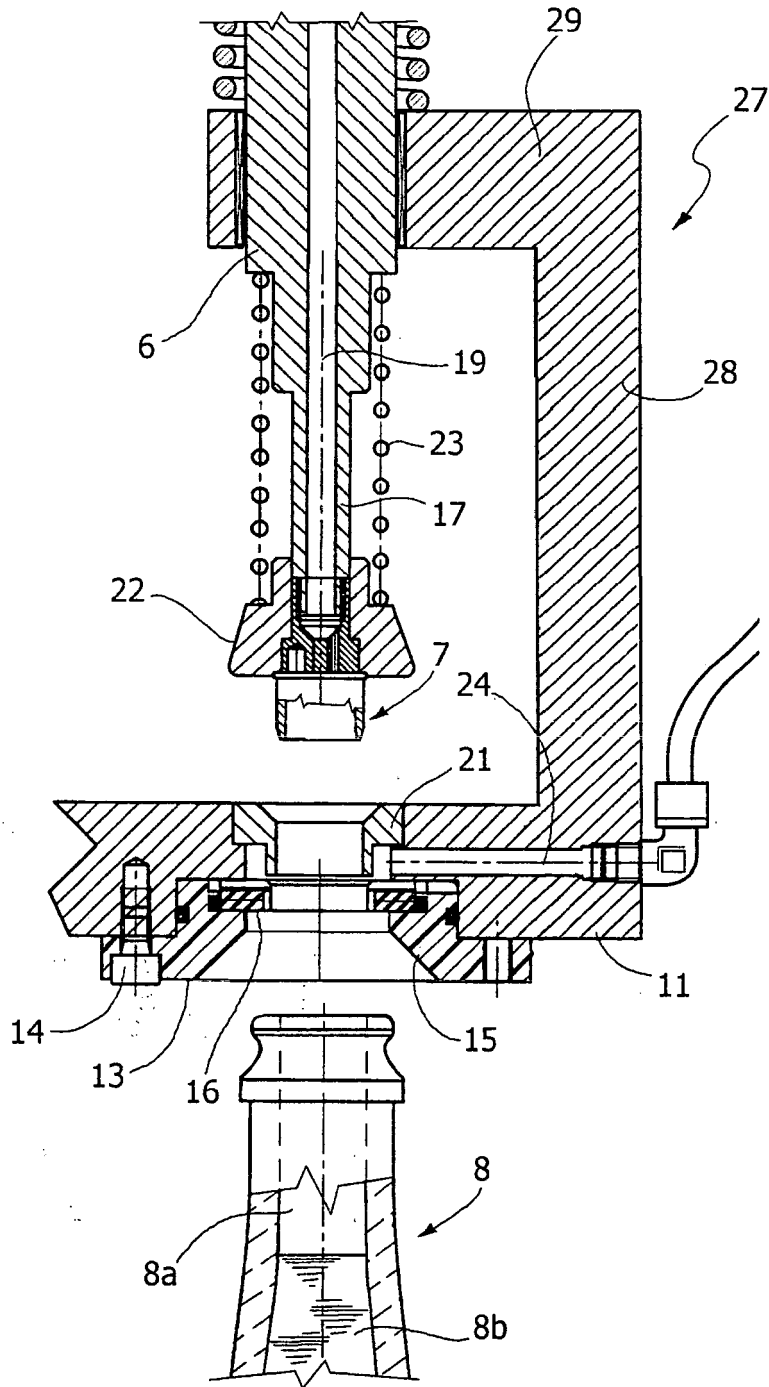


FIG. 5





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	GB 335 177 A (SIDNEY HUTCHIN) 17 September 1930 (1930-09-17) * page 2, right-hand column, line 43 - line 65; figures 1,2 *	1-5,7	B67B3/24
X	US 2 378 640 A (KANTOR JAMES) 19 June 1945 (1945-06-19) * page 2, line 38 - page 3, line 2 * * page 3, line 58 - line 66; figures 1,4,7,8 *	1,2,5,7	
X	US 3 350 839 A (CARTER JAMES S. F) 7 November 1967 (1967-11-07) * column 6, line 41 - column 7, line 43; figures 1-5 *	1,2,5,7	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B67B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		13 September 2005	Wartenhorst, F
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EPO FORM 1503 03.82 (P04C01)

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

EP 05 42 5263

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
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13-09-2005

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 335177	A	17-09-1930	NONE	

US 2378640	A	19-06-1945	NONE	

US 3350839	A	07-11-1967	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- EP 146241 A [0003]
- EP 1462411 A [0004]