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(54) **Title:** A SYSTEM TO FIX FILM SLEEVES

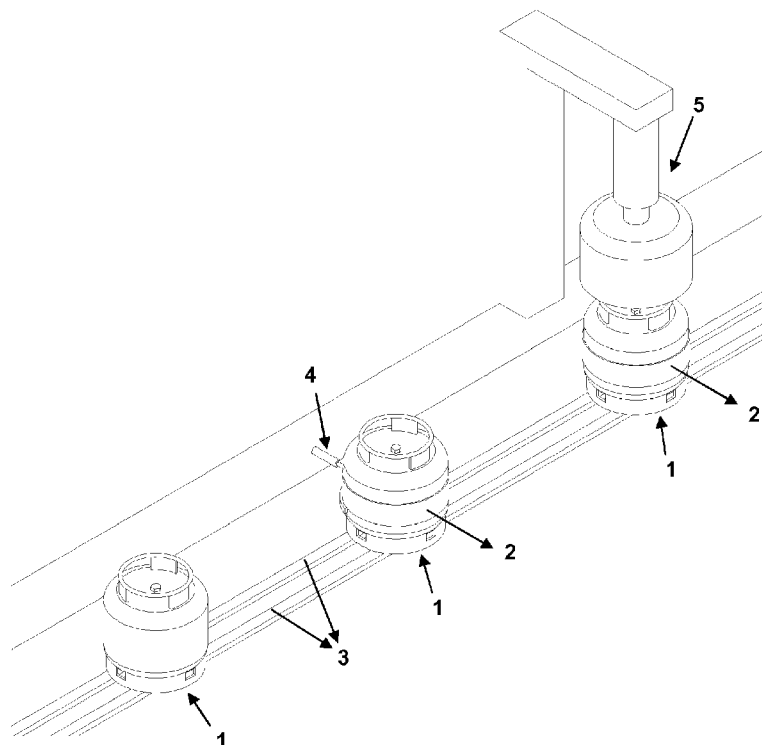


Figure - 1

(57) **Abstract:** A film fixation system for fixing a heat-shrinking film (2) onto a cylinder (1) according to the present invention comprises at least one conveyor band (3) suitable to place at least one cylinder (1) thereon to move the cylinder along a line; at least one aligning device (4) to align the film (2) worn around the periphery of the cylinder (1) standing on the conveyor band (3) with respect to the cylinder (1); and at least one heating unit (5) suitable for heat-shrinking the film (2) aligned with respect to the cylinder (1) by means of the aligning device (4) to provide the fixation of the film (2) on the cylinder (1).

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DESCRIPTION

A SYSTEM TO FIX FILM SLEEVES

5 Field of Invention

The present invention relates to a system developed for the fixation of a film label to the body of an industrial or household gas cylinder.

10 Prior Art

Film labels indicating e.g. the producer of a gas cylinder can be provided on the body of industrial gas cylinders and/or household gas cylinders (e.g. 12 kg kitchen cylinders or 2 kg camping cylinders). These films (or film labels) can be fixed to the cylinder body in different manners. One of the methods according to the prior art is adhering a film label to the cylinder body, e.g. as disclosed in the utility model document CN201382259Y. In adhesion-based methods, however, some difficulties are encountered such as the length of time required for the adhesive to dry, removing a previous film label to adhere a new one when an emptied cylinder is to be refilled, etc.. In order to avoid these difficulties, some films are used which are affixed to a cylinder in a surrounding or encircling manner and are then shrunk by heat application. However, these films are shrunk manually under heat application and therefore lengthen the process time.

Brief Description of Invention

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A film fixation system for fixing a heat-shrinking film onto a cylinder according to the present invention comprises at least one conveyor band suitable to place at least one cylinder thereon to move the cylinder along a line; at least one aligning device to align the film worn around the periphery of the cylinder on the conveyor band with respect to the cylinder; and at least one heating unit suitable for heat-shrinking the film aligned with respect to the cylinder by means of the aligning device to provide the fixation of the film on the cylinder.

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The film fixation process is conducted in a rapid manner in the film fixation system according to the present invention by virtue of moving the cylinders on the conveyor band. Additionally, the fixation process is performed in a reliable and practical manner using the aligner device and the heating unit.

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Object of Invention

The object of the present invention is to develop a film fixation system for fixing a film label to a cylinder.

10

Another object of the present invention is to develop a film fixation system for fixing a heat-shrinking film label to a cylinder.

A further object of the present invention is to develop a film fixation system in which a film label to be fixed to a cylinder is heated in an automatic manner.

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Still a further object of the present invention is to develop a reliable, rapid-running and practical film fixation system.

Description of Figures

20

Illustrative embodiments of a film fixation system according to the present invention are illustrated in the accompanying figures briefly described hereunder.

Figure 1 is a perspective illustration of a film fixation system according to the present invention.

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Figure 2 is a perspective illustration of an aligning device comprised by the film fixation system according to the present invention.

Figure 3 is a perspective illustration of the aligning device of the film fixation system according to the present invention as viewed from another angle.

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Figure 4 is a front illustration of a heating unit comprised by the film fixation system according to the present invention.

Figure 5 is a front illustration of the heating unit comprised by the film fixation system according to the present invention as viewed from another angle.

The components in said figures are individually referenced as following.

| | | |
|----|-----------------|----------|
| | Cylinder | (1) |
| | Film | (2) |
| | Conveyor band | (3) |
| 5 | Aligning device | (4) |
| | Body | (4a, 5a) |
| | Moving member | (4b, 5b) |
| | Holder member | (4c) |
| | Heating unit | (5) |
| 10 | Heating cap | (5c) |

Description of Invention

Film labels provided with various information (e.g. producer data, instructions on use and safety, cylinder content, etc.) are used on industrial and/or household type gas cylinders. These films (or film labels) can be made so as to be fixed to a cylinder in a manner surrounding or encircling the same. A system is developed according to the present invention for fixing a film of this type to the periphery of a gas cylinder.

As illustrated in Figure 1, the film fixation system according to the present invention comprises at least one conveyor band (3) suitable to place at least one cylinder (1) thereon to move the cylinder (1) along a line; at least one aligning device (4) to align a heat-shrinking film (2) preferably with a circular structure worn around the periphery of the cylinder (1) on the conveyor band with respect to the cylinder (1); and at least one heating unit (5) suitable for heat-shrinking the film (2) aligned with respect to the cylinder (1) by means of the aligning device (4) to provide the fixation of the film (2) on the cylinder (1). Said conveyor band (3) can either have a band structure made of a composite material to place the cylinders (1) thereon, or a chain structure having at least one holding member to which a lower part of the cylinder (1) is placed (not illustrated in the figures).

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In the film fixation system according to the present invention, the film (2) is worn on a cylinder (1) on the conveyor band (3) preferably from the top of the cylinder (1) in a manner surrounding the periphery of the cylinder (1). Then, the cylinder (1) advanced on the conveyor band (3) is brought to the aligning device (4). The position of the film (2) with

respect to the cylinder (1) is adjusted in the aligning device (4). The step of wearing the film (2) on the cylinder (1) and/or of aligning the film (2) can either be made manually, or by means of an autonomous system. Following this step, the cylinder (1) is moved again on the conveyor band (3) and is brought to the heating unit (5). The film (2) is heated in the heating unit (5). The heated film (2) shrinks down and thus becomes tightly fixed on the cylinder (1) on which it was previously worn from the periphery. Then the cylinder (1) is preferably advanced again on the conveyor band (3) and transferred to another unit (e.g. storage or transport unit).

10 In a preferred embodiment according to the present invention, the aligning device (4) which is shown in figures 2 and 3 in a detailed manner preferably comprises at least one body (4a) with a fixed structure (e.g. mounted to a fixed surface) and at least one moving member (4b) provided with at least one holder member (4c) which is capable of moving relative to said body (4a) to approach to and move away from a cylinder (1) standing on the conveyor band (3) and makes contact with the cylinder (1), and is shaped in conformance (e.g. in a curved fashion) to the part of the cylinder (1) to which it contacts. In this embodiment, when the cylinder (1) on the conveyor band (3) comes in alignment with the aligning device (4), said moving member (4b) moves relative to the body (4a) and approaches the cylinder (1). This approaching motion can either be triggered manually using a switch (not illustrated in the figures), or triggered with the detection of the presence of a cylinder (1) by means of at least one sensor (not illustrated in the figures) provided on the aligning device (4). As illustrated in Figure 2, when the holder member (4c) comes to a position to contact the cylinder (1), the film (2) worn on the cylinder (1) is moved on the cylinder (1) until a lower portion thereof makes contact with the holder member (4c). Thus, any films (2) worn on the cylinders (1) are aligned among themselves. After the film (2) is aligned on the cylinder (1), said moving member (4b) is moved away from the cylinder (1) as illustrated in Figure 3. Thereafter the cylinder (1) is kept moving on the conveyor band (3). In this embodiment, the aligning device (4) preferably has a piston structure, wherein the movement of the moving member (4b) relative to the body (4a) is ensured by means of a pneumatic system.

In another preferred embodiment according to the present invention, the heating unit (5) which is shown in figures 4 and 5 in a detailed manner preferably comprises at least one body (5a) with a fixed structure (e.g. mounted to a fixed surface) and at least one moving

member (5b) provided with at least one heating cap (5c) which is capable of moving relative to said body (5a) to approach to and move away from a cylinder (1) standing on the conveyor band (3) and to heat a film (2) provided on the cylinder (1). Preferably, said heating cap (5c) has a structure (preferably a hollow cylindrical structure) which completely surrounds the periphery of the film (2) provided on the cylinder (1) when the moving member (5b) is moved to approach to the cylinder (1). Thus, the heater cap (5c) heats up the complete film (2) in a uniform manner and shrinks it (2) in smoothly without wrinkling the film. In this embodiment, when the cylinder (1) on the conveyor band (3) comes in alignment with the heating unit (5), said moving member (5b) is moved so that the heating cap (5c) surrounds the film (2) (and therefore the cylinder (1)) as illustrated in Figure 4. This movement can either be triggered manually using a switch (not illustrated in the figures), or triggered with the detection of the presence of a cylinder (1) by means of at least one sensor (not illustrated in the figures) provided on the heating unit (5). Once the heating cap (5c) surrounds the film (2), it applies heat to the film (2) so that the film (2) shrinks down. Then, as illustrated in Figure 5, the moving member (5b) is moved so that the heating cap (5c) is moved away from the cylinder (1) and the cylinder (1) is kept moving on the conveyor band (3).

In a further preferred embodiment according to the present invention, said heating cap (5c) is configured to blow hot vapor (preferably 120-130°C, 2 bars) so that a film (2) disposed on the cylinder (1) is heated up. By virtue of carrying out the heating process using hot vapor instead of using conventional heaters (e.g. resistor or gas heaters) in this embodiment, both the film (2) is prevented from overheating and burning/melting, and the cylinder (1) is prevented from burning/exploding by avoiding the use of high temperatures based on the fact that the cylinder (1) contains inflammable gas. Thus, the method can be operated safely.

The film fixation process is conducted in a rapid manner in the film fixation system developed according to the present invention by virtue of moving the cylinders (1) on the conveyor band (3). Additionally, the fixation process is performed in a reliable and practical manner using the aligner device (4) and the heating unit (5).

CLAIMS

1. A film fixation system for fixing at least one heat-shrinking film (2) onto a cylinder (1), characterized by comprising
 - 5 – at least one conveyor band (3) suitable to place said cylinder (1) thereon to move the cylinder (1) along a line;
 - at least one aligning device (4) to align a film (2) worn around the periphery of the cylinder (1) standing on the conveyor band (3) with respect to the cylinder (1); and
 - 10 – at least one heating unit (5) suitable for heat-shrinking the film (2) aligned with respect to the cylinder (1) by means of the aligning device (4) to provide the fixation of the film (2) on the cylinder (1).

2. The film fixation system according to Claim 1, **characterized in that** said conveyor band (3) is configured in the form of a band made of a composite material on
15 which a cylinder (1) is placed.

3. The film fixation system according to Claim 1, **characterized in that** said conveyor band (3) is configured in the form of a chain comprising at least one holding
20 member to which a lower part of the cylinder (1) is fitted.

4. The film fixation system according to Claim 1, **characterized in that** said aligning device (4) comprises at least one body (4a) and at least one moving member (4b) provided with at least one holder member (4c) which is capable of moving relative
25 to said body (4a) to approach to and move away from a cylinder (1) standing on the conveyor band (3) for making contact with the cylinder (1), and is shaped in conformance to the part of the cylinder (1) to which it contacts.

5. The film fixation system according to Claim 4, characterized in that said body (4a)
30 has a fixed structure.

6. The film fixation system according to Claim 4, characterized in that said holder member (4c) has a curved structure.

7. The film fixation system according to Claim 4, characterized by comprising at least one switch for controlling the movement of said moving member (4b) relative to the body (4a).
- 5 8. The film fixation system according to Claim 4, characterized by comprising at least one sensor capable of detecting the presence of at least one cylinder (1) placed on the conveyor band (3) for controlling the movement of said moving member (4b) relative to the body (4a).
- 10 9. The film fixation system according to Claim 4, characterized in that the aligning member (4) has a piston structure.
- 15 10. The film fixation system according to Claim 1, characterized in that said heating device (5) comprises at least one body (5a) and at least one moving member (5b) provided with at least one heating cap (5c) which is capable of moving relative to said body (5a) to approach to and move away from a cylinder (1) standing on the conveyor band (3) and to heat up a film (2) provided on the cylinder (1).
- 20 11. The film fixation system according to Claim 1, characterized in that said body (5a) has a fixed structure.
- 25 12. The film fixation system according to Claim 11, characterized in that said heating cap (5c) has a structure which surrounds the periphery of a film (2) provided on a cylinder (1) when the moving member (5b) is moved to approach to the cylinder (1).
- 30 13. The film fixation system according to Claim 12, characterized in that said heating cap (5c) has a structure which completely surrounds the periphery of a film (2) provided on a cylinder (1) when the moving member (5b) is moved to approach to the cylinder (1).
14. The film fixation system according to Claim 12, characterized in that said heating cap (5c) has a hollow cylindrical structure.

15. The film fixation system according to Claim 11, characterized in that said heating cap (5c) is configured to heat up a film (2) provided on a cylinder (1) by blowing hot vapor thereto.

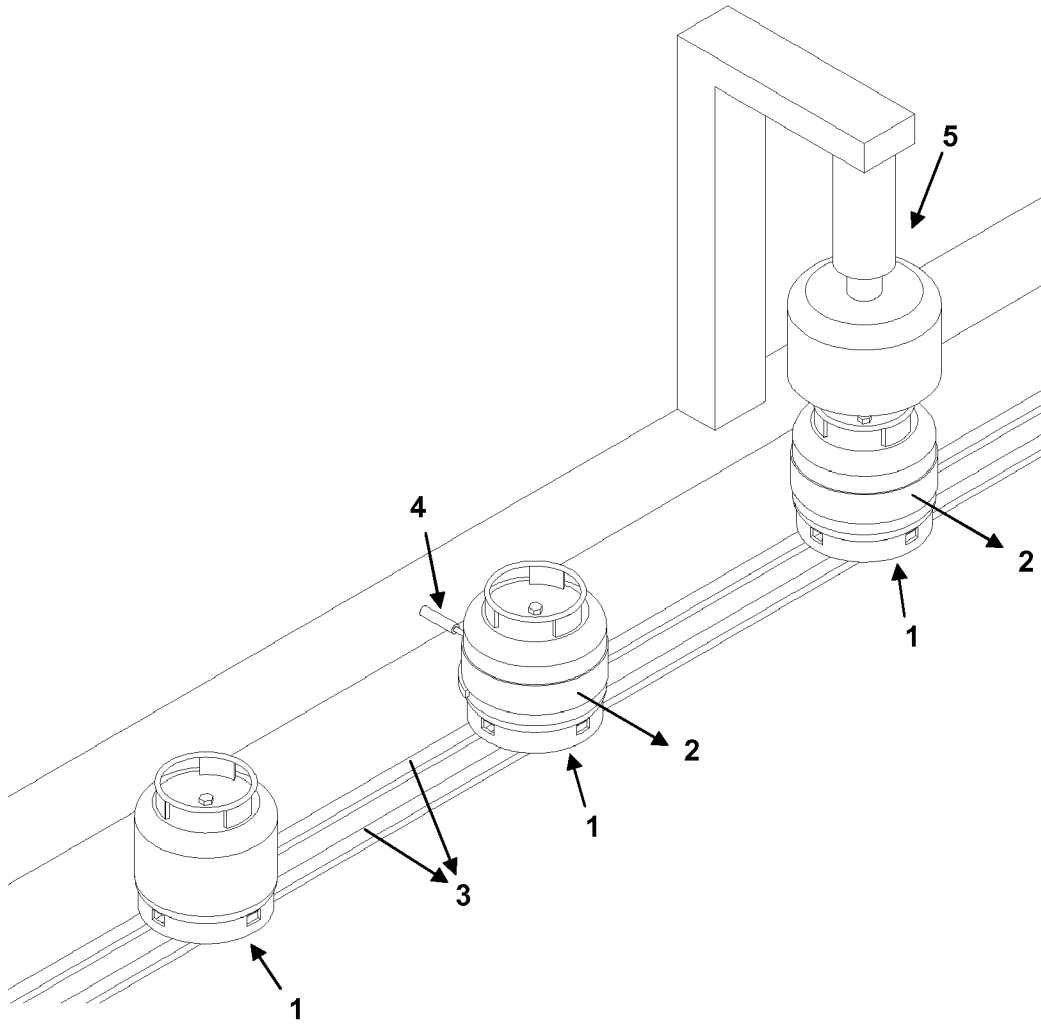


Figure - 1

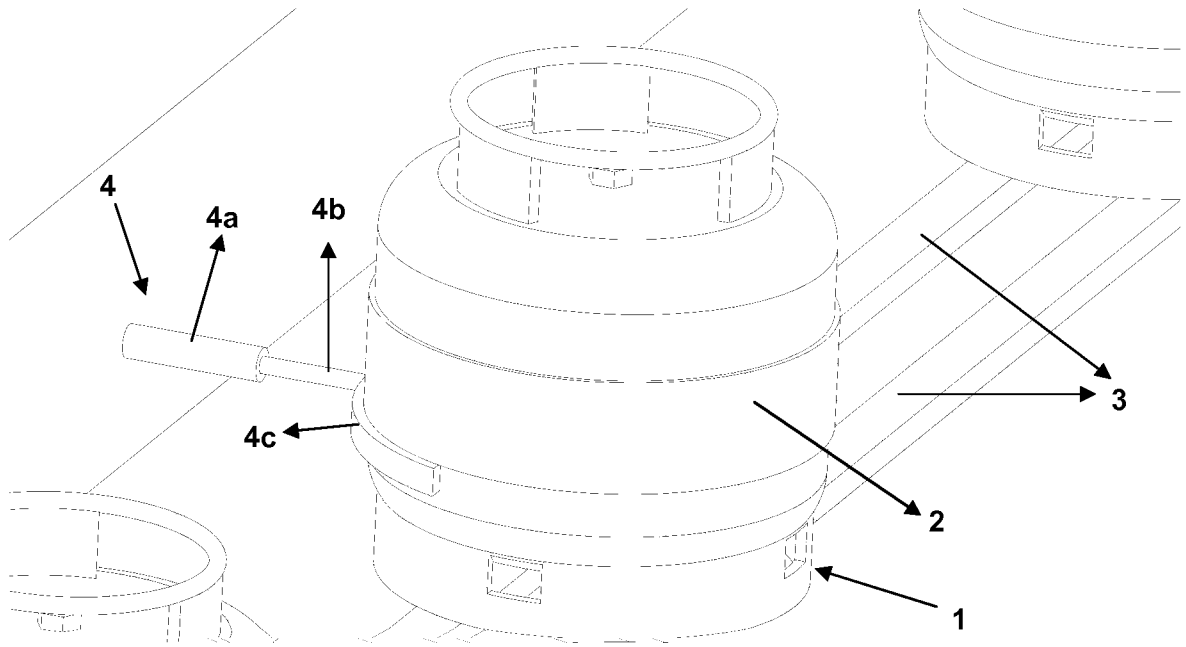


Figure - 2

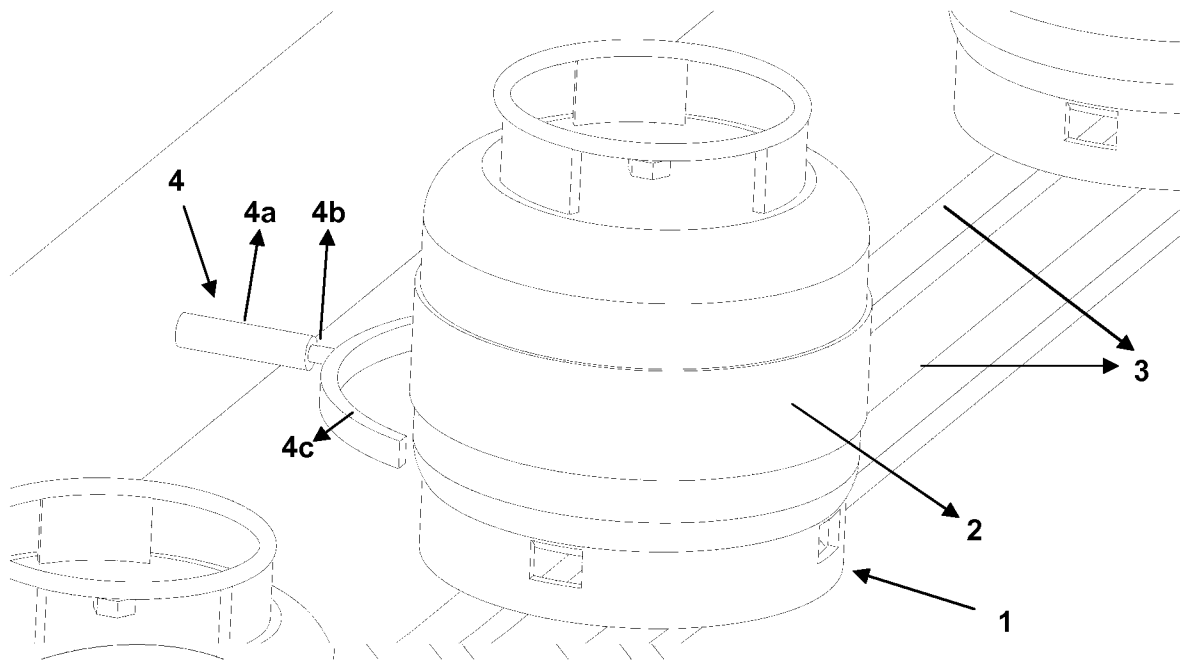


Figure - 3

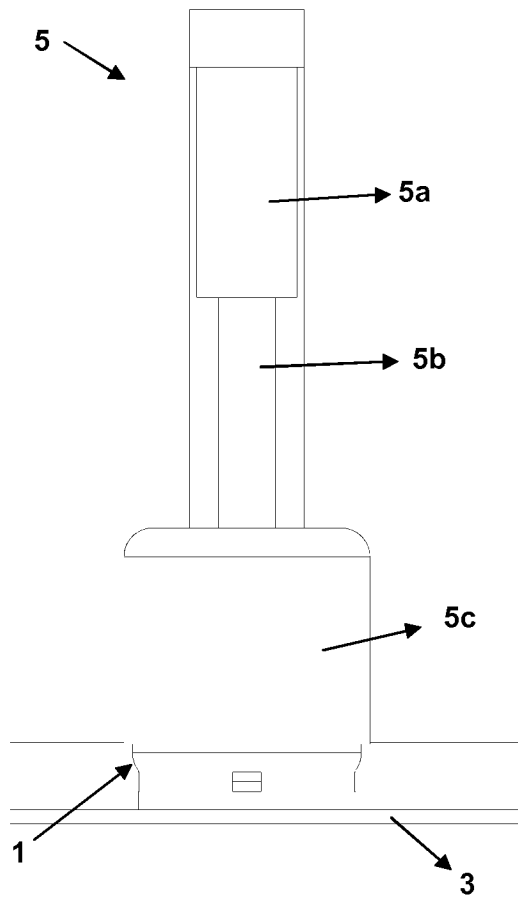


Figure - 4

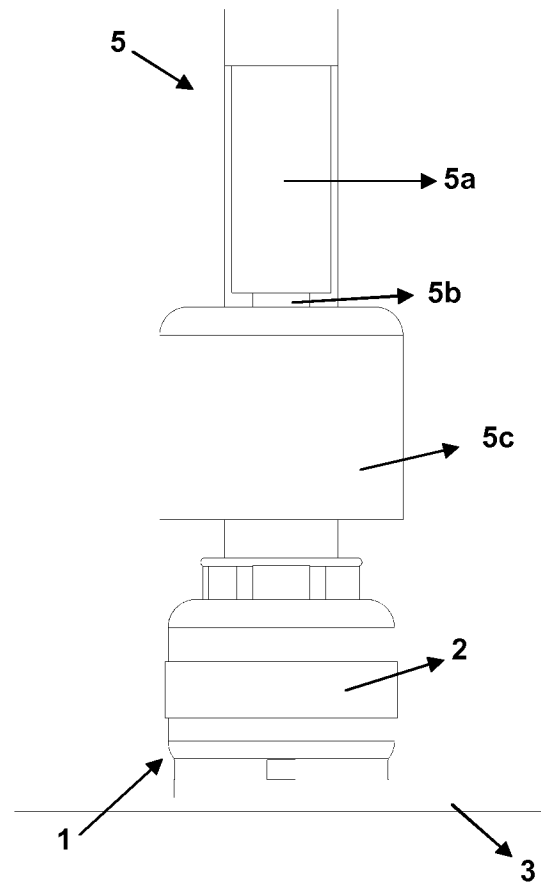


Figure - 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/060511

A. CLASSIFICATION OF SUBJECT MATTER
INV. B29C63/42 B65C3/06 B65C3/16
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)
B29C B65C

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)
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See patent family annex.

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INTERNATIONAL SEARCH REPORT

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