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(54) APPARATUS FOR WASHING BOTTLES

(57) An apparatus for washing bottles is provided with a main body (2) comprising a support (2a) and at least one first duct (3) leading to the support (2a) of which at least one first end (3a) is configured to communicate with a supplier and to receive therefrom a flow of a liquid, and at least one second end (3b) is configured to deliver

the liquid; positioning means (14) of at least one bottle (80), provided with at least one housing (13; 17; 22) for at least one bottle (80), configured to arrange it so that a neck (81) of the bottle (80) is vertically aligned with a second end (3b), and at least one frame (15) configured to receive the positioning means (14).

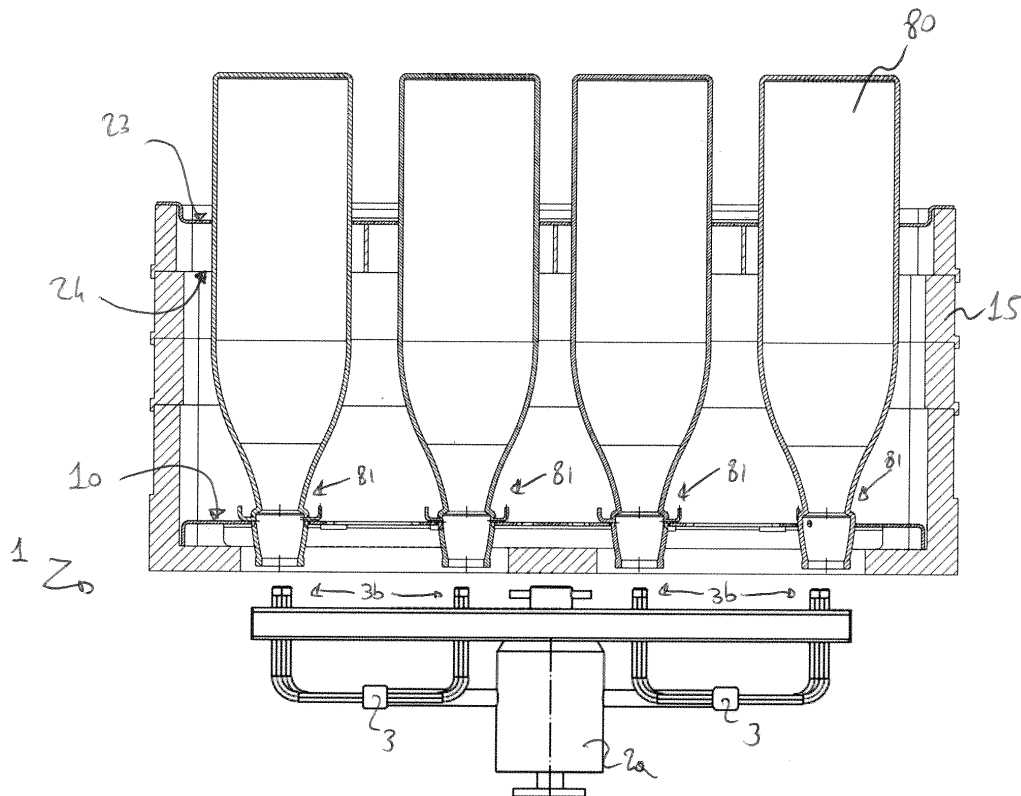


Fig. 5

Description

[0001] The present invention relates to an apparatus for washing bottles.

[0002] Nowadays, reusable products are increasingly used with respect to single-use products. In particular, bottles and similar containers must be subjected to a washing and disinfection process to allow their subsequent use. Due to their special shape, a complete and effective washing in a short time is one of the recurring problems in the food service industry, in the food industry as well as in the pharmaceutical industry.

[0003] The solutions currently used are based on standard front-loading dishwashers, comprising one or more ducts, with a nozzle installed at the end and a basket providing one or more seats for bottles.

[0004] The user places the basket inside the dishwasher and loads it by hand, bottle by bottle, placing each bottle in a washing position: in that position the nozzles are inside the bottles themselves. Therefore, the washing liquid arrives directly into the bottles. Afterwards, there is a final rinsing phase.

[0005] One problem with the solutions of the state of the art is that the inside of bottles is not thoroughly washed, especially in the portion proximal to the nozzle, corresponding to the neck of the bottle.

[0006] Another problem with such systems is the loading of the basket, which must be done by hand by the user, bottle by bottle. This is time consuming.

[0007] The aim of this invention is therefore to eliminate the above-mentioned disadvantages.

[0008] The invention, as it is characterized by claims, achieves its aim through a structural modification of the washing apparatus.

[0009] The main advantage of this invention is that it allows for a complete and thorough cleaning of bottles.

[0010] Furthermore, the invention allows a user or an automated system to load and unload bottles for washing in a short time.

[0011] In addition, the invention can be easily integrated into a hood-type dishwasher.

[0012] Finally, the invention can ensure effective bottle rinsing.

[0013] Further advantages and features of the invention will be more apparent in the detailed description which follows, with reference to the accompanying drawings, which show an example, non-limiting embodiment, in which:

- figure 1 shows a side perspective view of an first version of the invention;
- figure 2 shows an exploded view of a portion of the invention;
- figure 3 shows an overview of the invention in an operating condition;

- figure 4 shows a top-plane view of the invention of figure 3;

- figure 5 shows a view in longitudinal section according to the VV plane shown in figure 4;

- figure 6 shows a side-view perspective of a second version of the invention;

- figure 7 shows an exploded view of the invention of figure 6;

- figure 8 shows a section view of the invention of figures 6 and 7;

- figure 9 shows a top view of the second version of the invention;

- figure 10 shows a magnification of a detail in figure 9;

- figure 11 shows a side perspective view of a third version of the invention;

- figure 12 shows an exploded view of a detail of the invention of figure 11;

- figure 13 shows a magnification of a detail of figure 11;

- figure 14 shows a top-plane view of a device comprising the invention.

[0014] As shown in the figures, the invention concerns an apparatus 1 for washing bottles. In figure 1, it can be seen that it comprises a main body 2, provided with a support 2a and at least one first duct 3, leading to the support 2a, in which it is possible to distinguish at least one first end 3a, configured to communicate with a supplier and to receive therefrom a flow of liquid, and at least one second end 3b configured to deliver the liquid.

[0015] By way of example, the dispenser can be assimilated to a water network or it can be an assembly of a pump connected to a tank, in which is inserted a solution dedicated to washing, as is known to the skilled person.

[0016] The apparatus 1 also comprises positioning means 14 of at least one bottle 80, as shown in figure 2.

[0017] The positioning means 14 are made so that a neck 81 of the bottle 80 is in proximity to a bottom grid of these positioning means 14, as shown in figure 5.

[0018] The positioning means 14 are configured to arrange the bottle 80 so that the neck 81 is vertically aligned with a second end 3b of duct 3, as shown in figure 5.

[0019] The positioning means 14 may include at least one housing 13 configured to receive the neck 81 of a bottle 80 and/or at least one housing 17 configured to receive a bottom of a bottle 80 and/or at least one housing 22 configured to receive an intermediate portion of a

bottle 80.

[0020] By way of example and without any limitation, the positioning means 14 may include one or more grids, fixed or mobile, provided with bottle housings 13, or removable baskets. For example, the positioning means 14 of figure 2 comprise at least one bottom grid 10, comprising a first plurality of housings 13 configured to receive a neck 81 of a bottle 80; at least one top grid 23; comprising a second plurality of housings 17 configured to receive a bottom of a bottle 80; at least one additional grid 24, placed between the bottom grid 10 and top grid 23, comprising a third plurality of housings 22, configured to receive an intermediate portion of a bottle 80.

[0021] The positioning means 14 may also comprise housings configured to receive at least one cap of a bottle 80, for example a swing-top cap, which is also intended to be washed by the apparatus 1.

[0022] In addition, apparatus 1 comprises at least one frame 15, as shown in figures 2, 3 and 5, configured to receive the positioning means 14. In particular, figure 5 shows the apparatus 1 in an operational condition, wherein the positioning means 14 comprise the bottom grid 10 in which a plurality of necks 81 of bottles 80 is inserted, the top grid 23, in which a plurality of bottoms of bottles 80 is inserted, and the additional grid 24, in which a plurality of intermediate portions of bottles 80 is inserted.

[0023] The frame 15 and the positioning means 14 can be realized in one piece. The frame 15 is configured to receive the positioning means 14 for bottles of varying sizes.

[0024] Therefore, the functioning of the apparatus 1, shown in figure 5 as a section and in figure 3 as a frontal view, requires the preliminary installation of the positioning devices 14 inside the frame 15 and the leak-tight connection of the first end 3a of the first duct 3 with a supplier; then the insertion of one or more bottles 80 into the positioning means 14, and the start of the washing process.

[0025] During the washing process, the liquid dispensed from the supplier is directed through the second end 3b of the first duct 3 directly into the neck 81 of the bottle 80. Unlike the known technique of bottle washing, the liquid jet is delivered at a certain distance from the bottle 80 since the second end 3b is located below the neck 81 of the bottle 80. This allows a complete washing of the bottle 80; in particular, the area relating to neck 81 of the bottle 80 is also thoroughly cleaned.

[0026] The start of the washing process can also be carried out automatically: in this case, the frame 15 comprises at least one presence sensor 21, configured to detect the presence of at least one bottle 80 in the positioning means 14.

[0027] In a preferred version, the frame 15 may also comprise moving means 19 for the positioning means 14 configured to move the same positioning means 14, and at least one control unit 20, preferably programmable, configured to operate the moving means 19.

[0028] In this case, when the user starts the washing process, the control unit 20 operates both the moving means 19 and the positioning means 14 so that the neck 81 of the bottle 80 is vertically aligned with the second end 3b.

[0029] The main body 2 may comprise a plurality of first ducts 3, having in common the first end 3a, but having different second ends 3b. Therefore, the apparatus 1 comprises a plurality of second ends 3b. The number of second ends 3b determines the number of bottles 80 that can be washed simultaneously in a single wash cycle. Accordingly, the positioning means 14 comprise a number of housings 13 and/or 17 and/or 22, each of which configured to receive a bottle 80, equal to the number of second ends 3b.

[0030] In a further version, each second end 3b can consist of one nozzle. As an example, in figure 1 it is shown a main body 2 comprising sixteen second ends 3b, arranged symmetrically to two first ducts 3.

[0031] Once the positioning means 14 are loaded, the alignment of these and consequently of the bottles 80 with the second ends 3b can be carried out automatically by the control unit 20 via the moving means 19, when present. This allows for quick loading of the bottles to be washed, since an operator or an automatic system can load the bottles in a standard way, without paying attention to the precise position of each bottle 80 with respect to each second end: this adjustment is automatically made by the apparatus 1.

[0032] The same apparatus 1 may be equipped with more than one type of positioning means 14, since there exist bottles 80 of different sizes, for example water or wine bottles. The control unit 20, when present, recognizes the type of positioning means 14 used, in this case by specific sensors, for example presence sensors, and operates accordingly the moving means 19. Therefore, the apparatus 1 according to the invention is highly versatile.

[0033] In a further preferred version, shown in figure 6 and in an exploded view in figure 7, the invention also comprises at least one second duct 30, preferably a plurality of second ducts 30, each of which comprising at least one first end 30a, preferably located in proximity of the first end 3a and configured to communicate with a supplier and receive from it a flow of liquid, and at least one second end 30b, preferably located in proximity of the second end 3b, configured to deliver the liquid.

[0034] To sealably connect the first ducts 3 and the second ducts 30, the apparatus 1 preferably comprises sealable linking means 50, shown in figure 7.

[0035] Figure 9 shows a top view of the version of apparatus 1 shown in figures 6 and 7. Figure 8 shows a cross-sectional view of apparatus 1, according to plan VIII-VIII shown in figure 9, figure 10 shows a magnified detail of the liquid delivery.

[0036] As it is possible to see in figures 8 and 10, the first ends 30a, 3a are made close together but are separated. In this way, a first liquid and a second liquid can be

taken from different suppliers and directed directly towards the neck 81 of the 80 bottles one after the other.

[0037] The apparatus 1 may comprise a number of second ends 30b of the second ducts 30 equal to the number of second ends 3b of the first ducts 3, resulting configured to wash at the same time a maximum number of bottles 80 equal to the number of second ends 3b, 30b.

[0038] Preferably, the second ends 30b are configured to deliver liquid in the same direction as the second ends 3b.

[0039] Always preferably, the second ends 30b are positioned externally in a contiguous way with respect to the second ends 3b, as shown in figure 10.

[0040] The presence of two differentiated duct systems allows the apparatus 1 to perform a first washing step via, for example, the second ducts 30 and a subsequent second rinsing step via the first ducts 3. Preferably, the second ducts 30 dedicated to washing are configured to support and deliver a greater flow rate than that dispensable from the first ducts 3.

[0041] This is advantageous as the rinsing step is optimized: having two separate circuits for washing and rinsing ensures that, during the transition from one step to the other, there is no risk of introducing residual liquid from the previous step into the ducts.

[0042] As is clear to the skilled person, the first ducts 3 and second ducts 30 may be arranged in a different way from the version of the invention shown in figures 6, 7, 8 and 9; for example as shown in figures 11, 12 and 13. The latter shows an alternative mode for liquid delivery, which can be adjusted to increase or limit the wash and/or rinse jet in order to change the flow rate.

[0043] The apparatus 1 according to the invention can be easily used as a stand-alone machine, or it can be integrated into an industrial washing line, such as the one shown in figure 14.

Claims

1. Apparatus for washing bottles provided with a main body (2) comprising a support (2a) and at least one first duct (3) leading to the support (2a) of which at least one first end (3a) is configured to communicate with a supplier and to receive therefrom a flow of a liquid, and at least one second end (3b) is configured to deliver the liquid; the apparatus (1) being **characterized by** comprising positioning means (14) of at least one bottle (80), provided with at least one housing (13; 17; 22) for at least one bottle (80), configured to arrange it so that a neck (81) of the bottle (80) is vertically aligned with a second end (3b), and at least one frame (15) configured to receive the positioning means (14).
2. Apparatus according to claim 1, **characterized by** comprising moving means (19) for the positioning means (14) and at least one control unit (20), con-

figured to operate the moving means (19).

3. Apparatus according to claim 1 or 2, **characterized in that** the main body (2) comprises a plurality of first ducts (3), having the first end (3a) in common, and having different second ends (3b), the apparatus (1) being configured to simultaneously wash a maximum number of bottles (80) equal to the number of second ends (3b).
4. Apparatus according to any one of claims from 1 to 3, **characterized in that** the second end (3b) consists of a nozzle.
5. Apparatus according to any one of claims from 1 to 4, **characterized in that** the frame (15) comprises at least one presence sensor (21).
6. Apparatus according to any one of claims from 1 to 5, **characterized by** comprising at least one second duct (30), including at least one first end (30a), configured to communicate with the supplier and to receive a flow of liquid from it, and at least one second end (30b) configured to deliver the liquid.
7. Apparatus according to claim 6, wherein the main body (2) comprises a number of second ends (30b) of the second ducts (30) equal to the number of second ends (3b) of the first duct (3), whereby the apparatus (1) is configured to simultaneously wash a maximum number of bottles (80) equal to the number of second ends (3b, 30b).
8. Apparatus according to claim 6 or 7, **characterized in that** each second end (30b) of the second ducts (30) is configured to deliver the liquid in the same direction as one second end (3b) of the first ducts (3).
9. Apparatus according to any one of claims from 6 to 8, **characterized in that** the second ends (30b) of the second ducts (30) are contiguous with respect to the second ends (3b) of the first ducts (3).
10. Apparatus according to any of claims from 6 to 9, **characterized in that** the second ducts (30) are dedicated to washing and are configured to support and deliver a greater flow rate than the one which can be supplied by the first ducts (3), which are dedicated to rinsing.
11. Apparatus according to any one of claims from 1 to 10, **characterized in that** the positioning means (14) comprise at least one bottom grid (10), comprising a first plurality of housings (13) configured to receive the neck (81) of the bottle (80); and/or at least one top grid (23), comprising a second plurality of housings (17) configured to receive a bottom of the bottle (80); and/or at least one further grid (24), placed between

the bottom grid (10) and the top grid (23), comprising a third plurality of housings (22), configured to receive an intermediate portion of the bottle (80).

- 12.** Industrial washing line comprising at least one apparatus for washing bottles according to any one of claims from 1 to 11. 5

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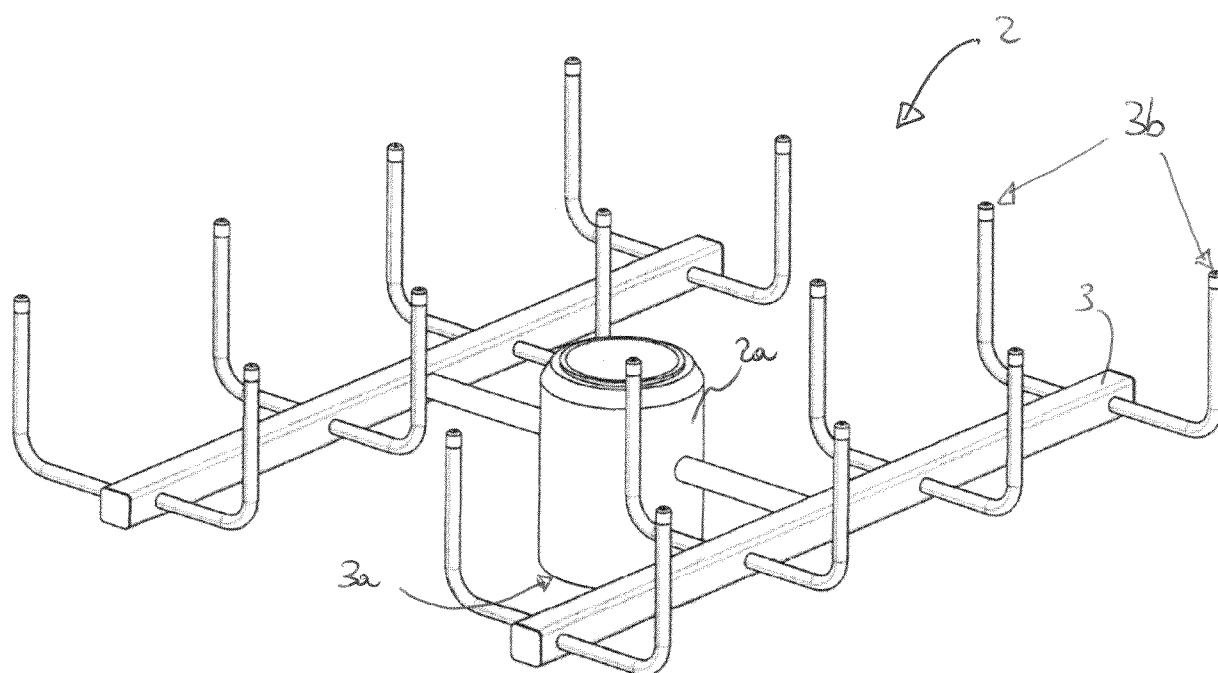


Fig. 1

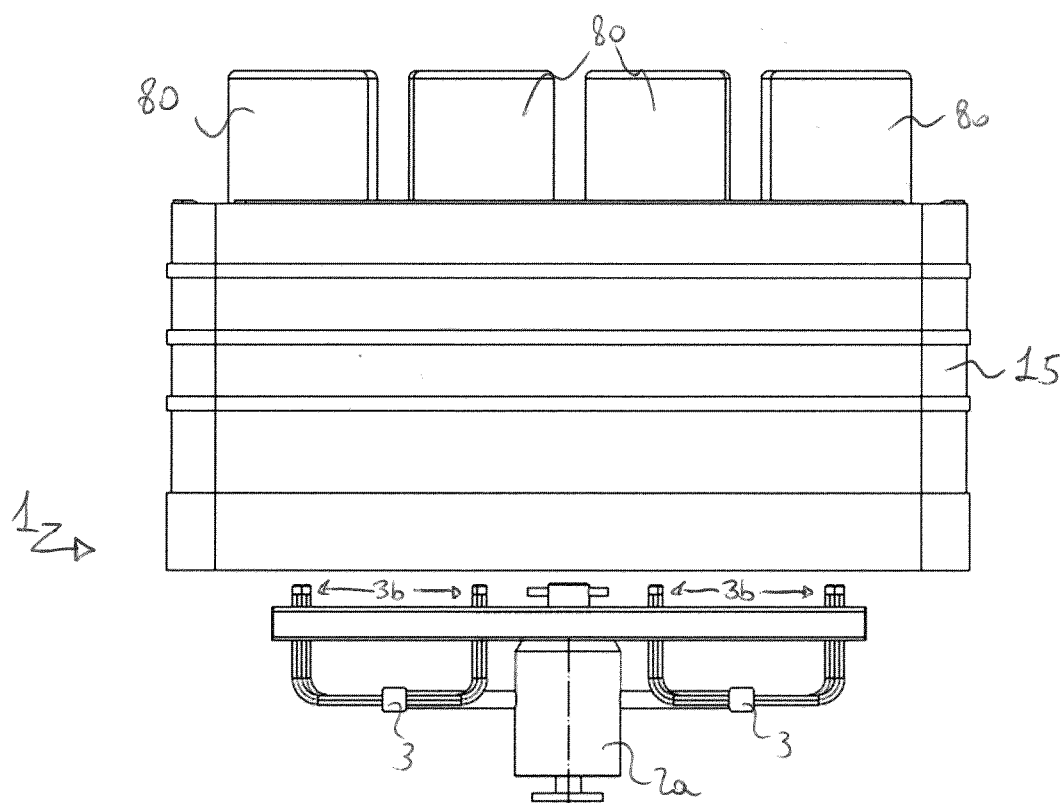


Fig. 3

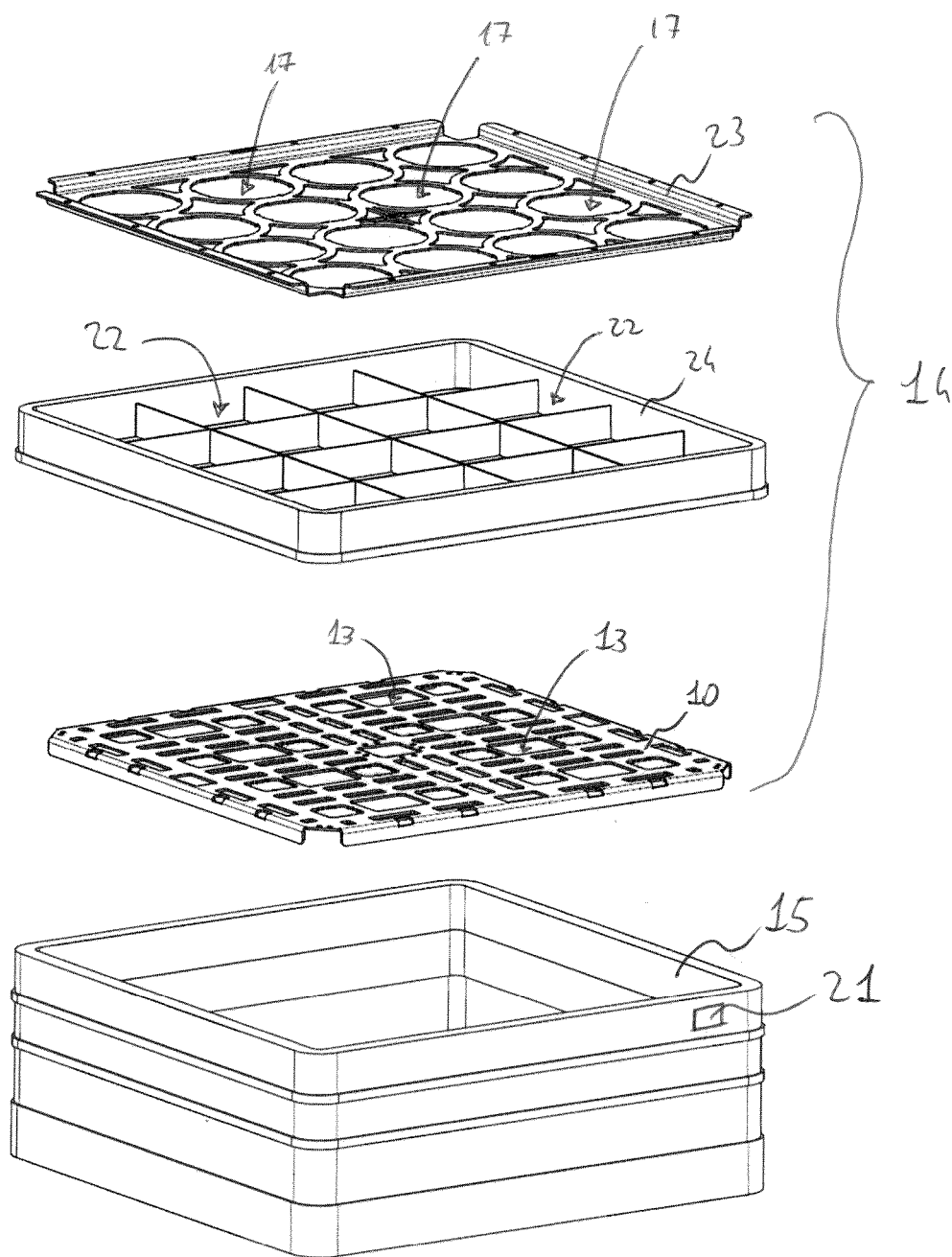


Fig. 2

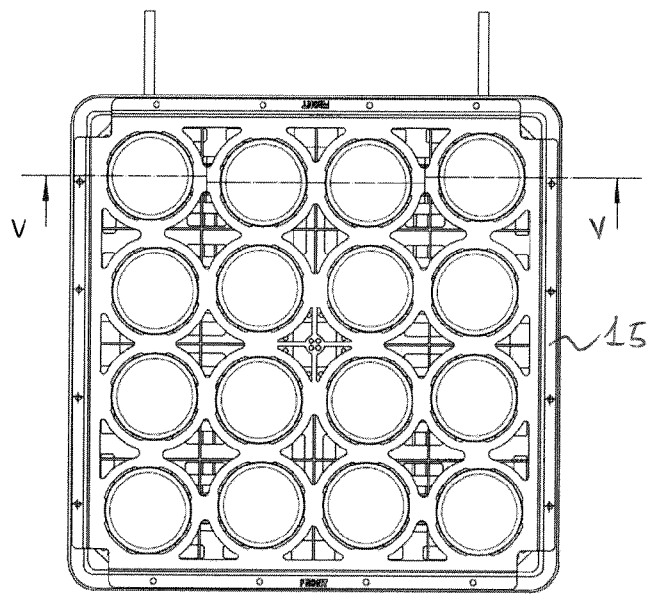


Fig. 4

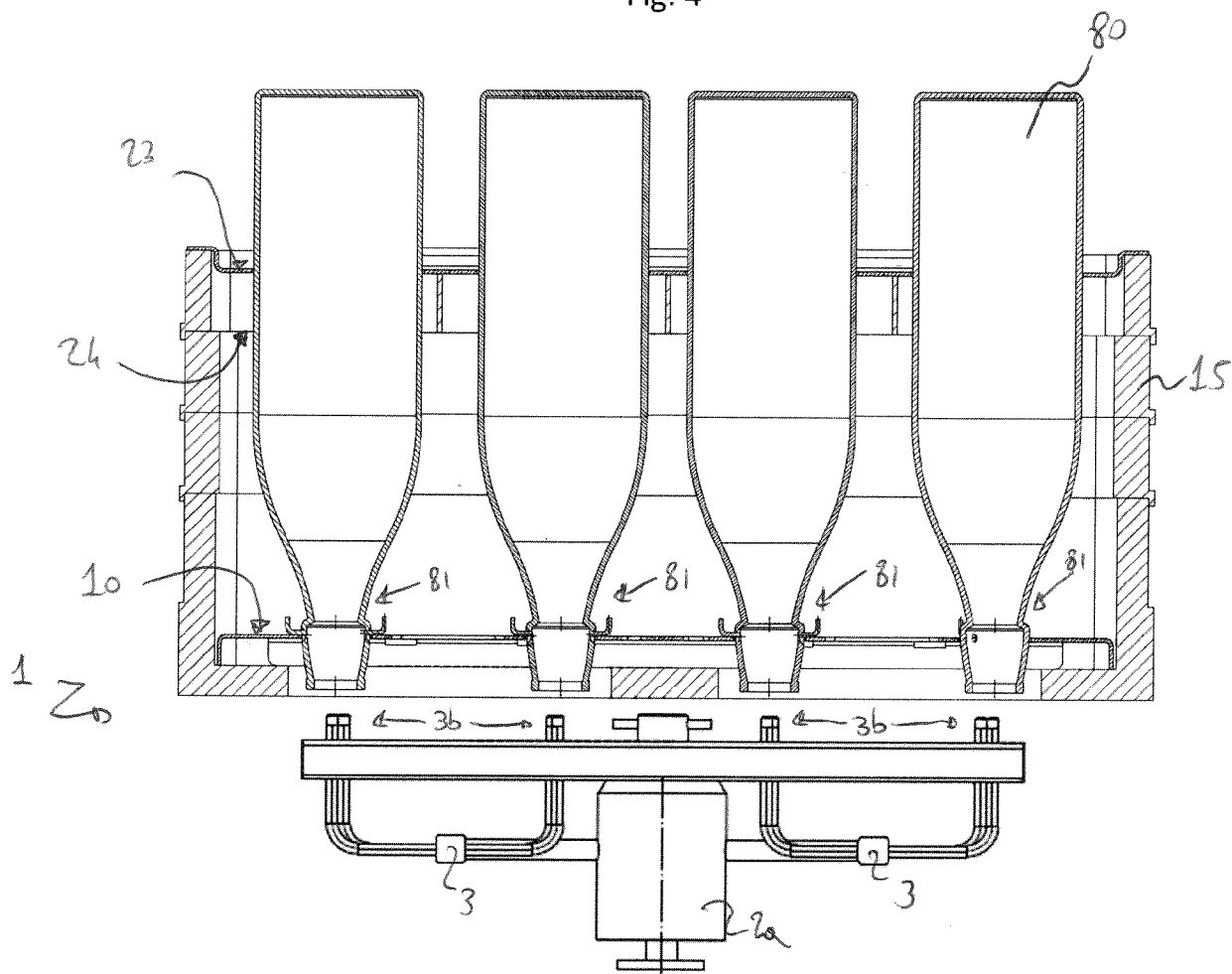


Fig. 5

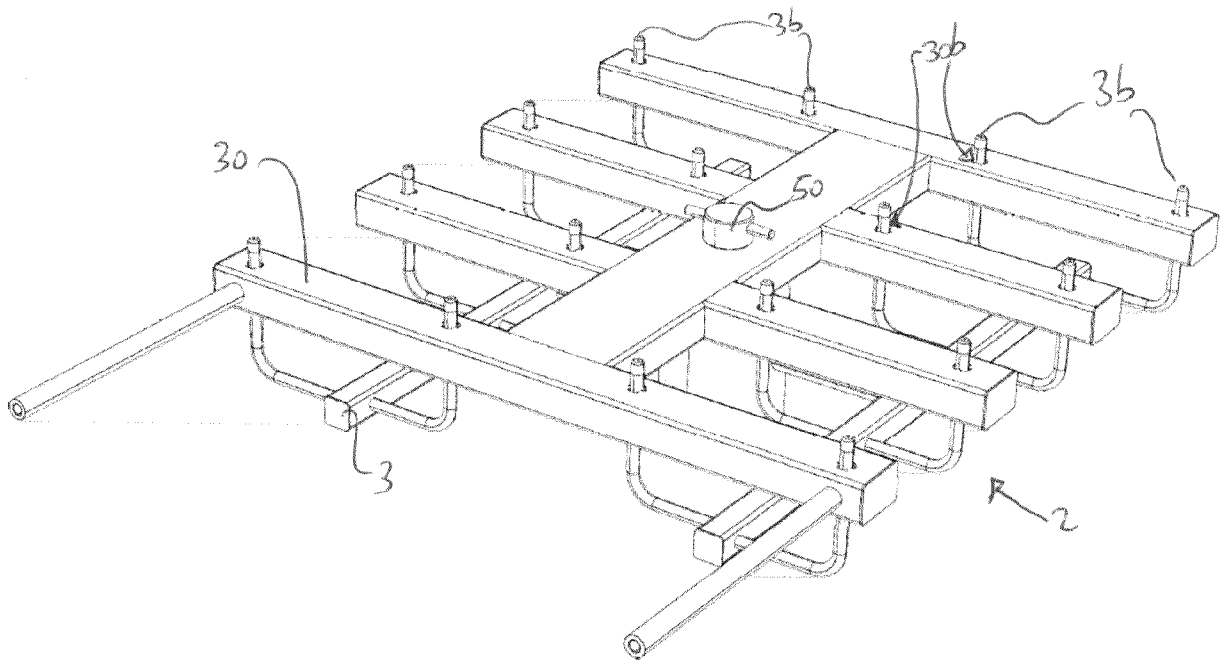


Fig. 6

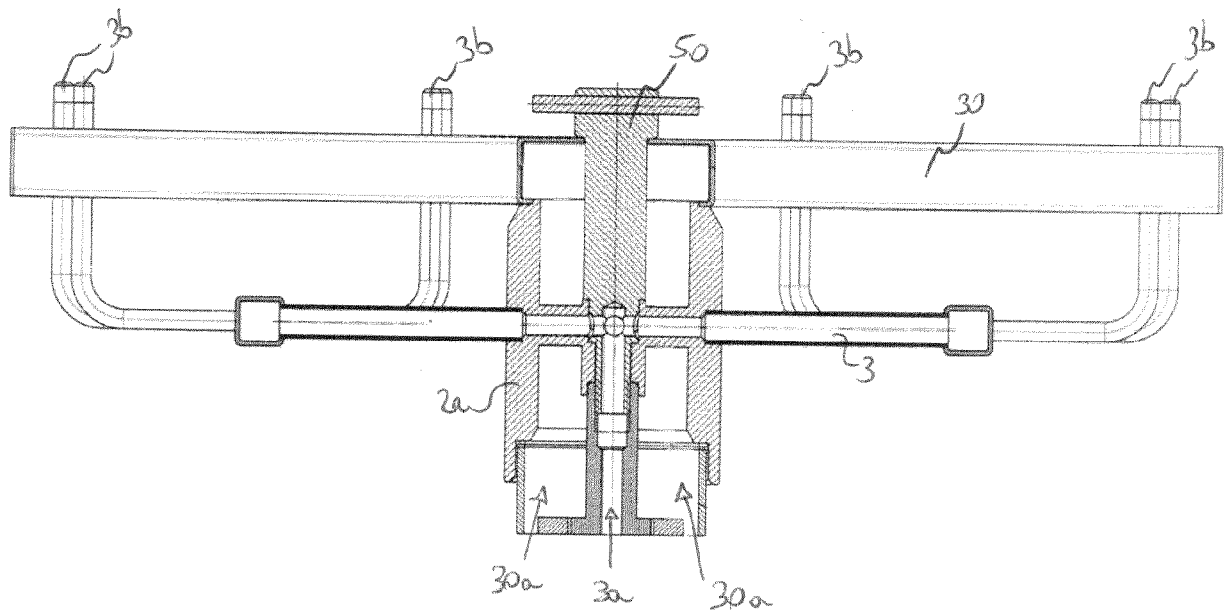
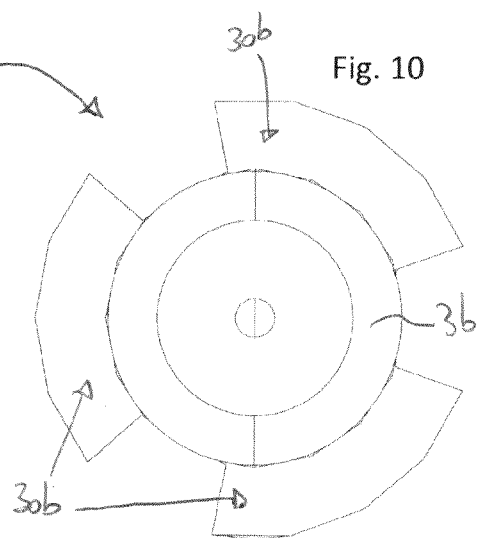
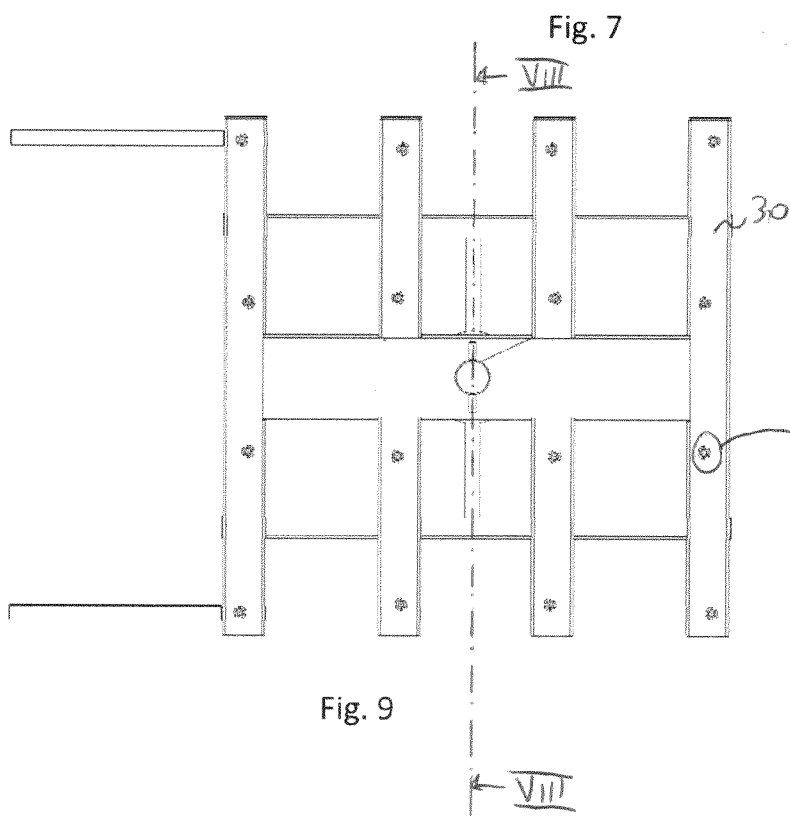
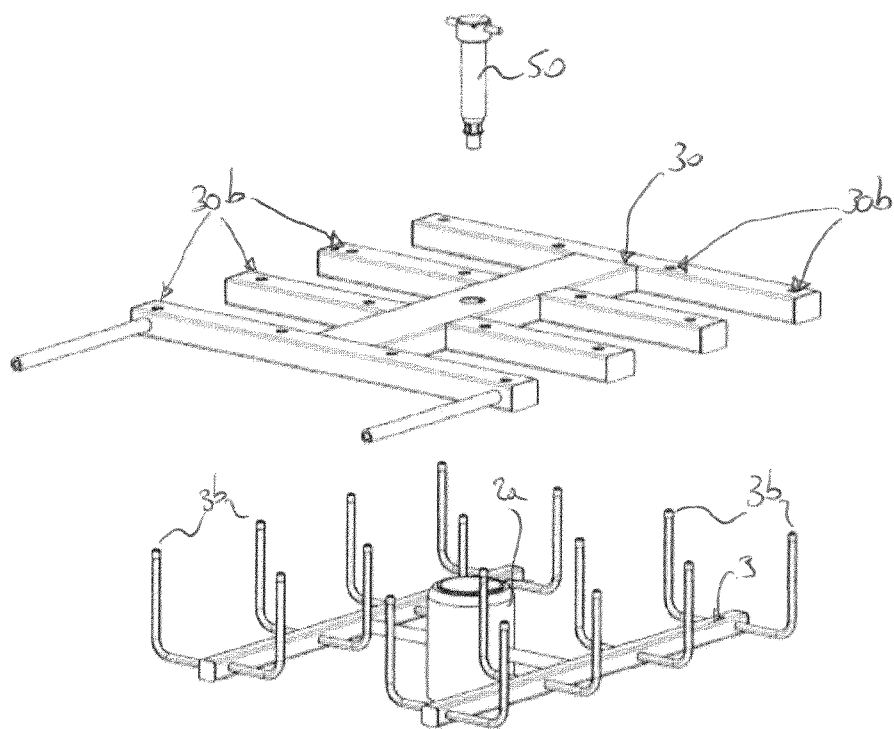


Fig. 8



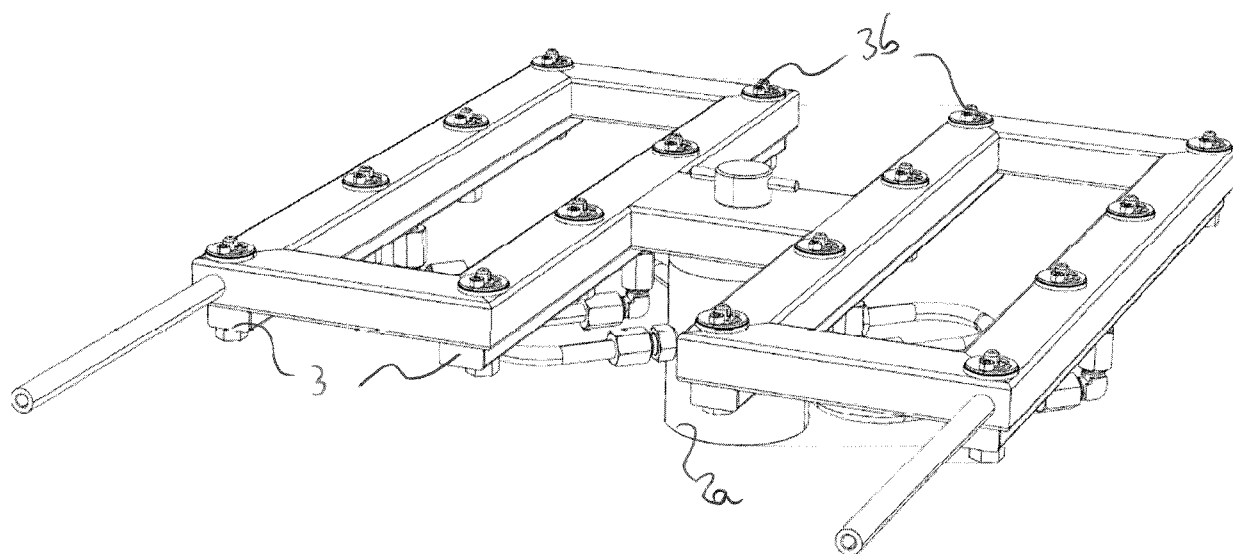


Fig. 11

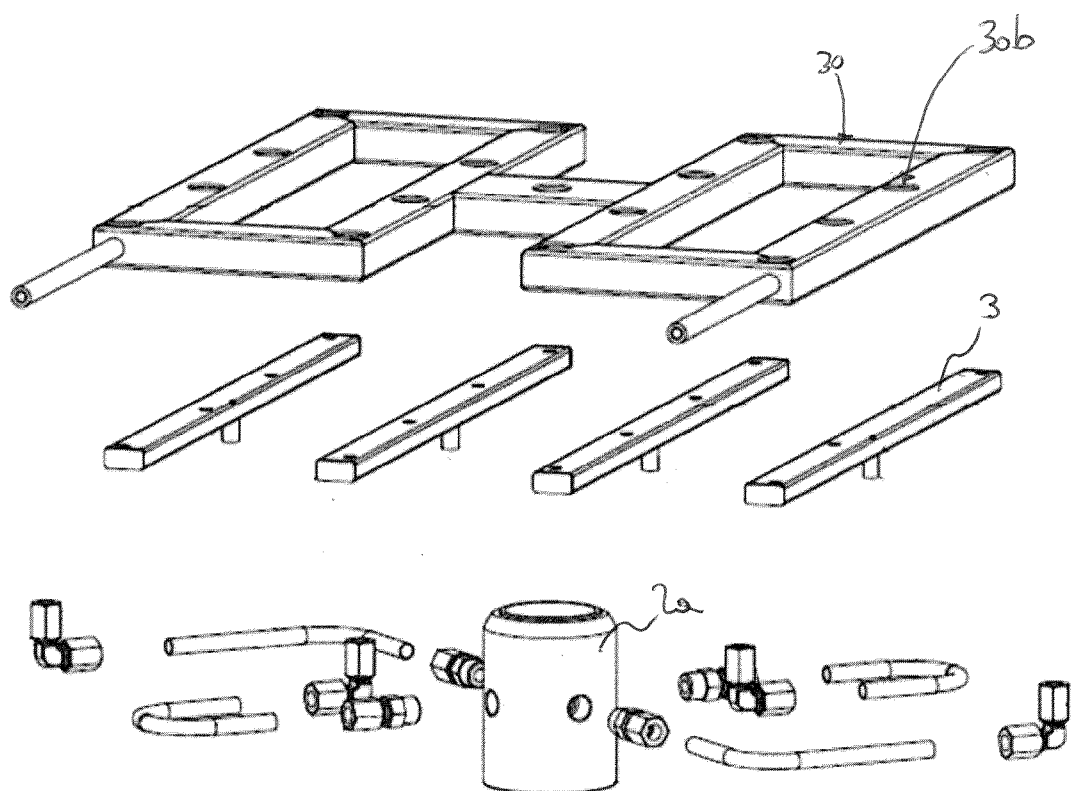


Fig. 12

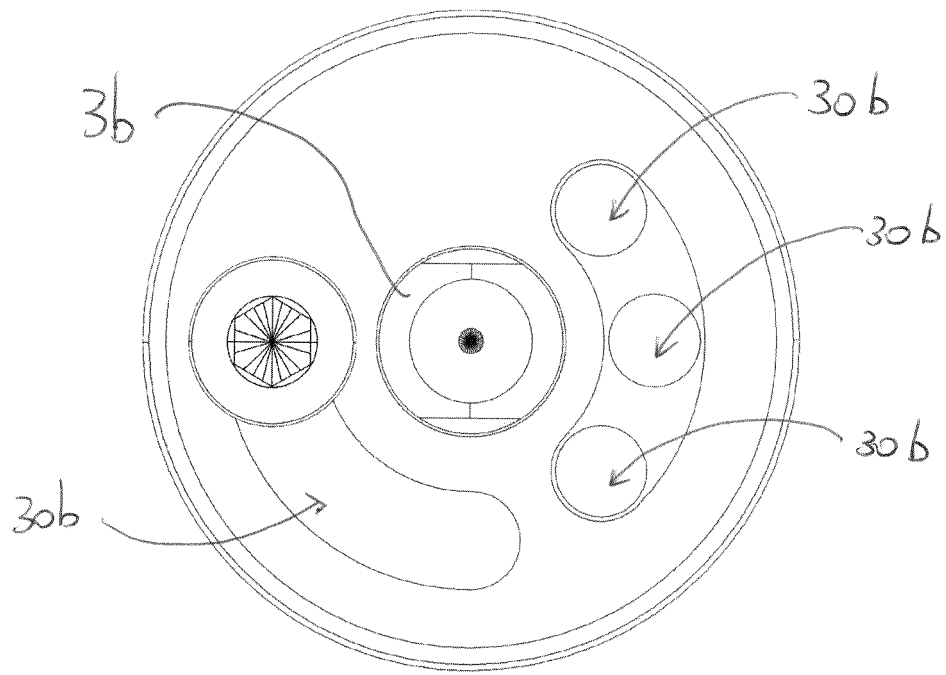


Fig. 13

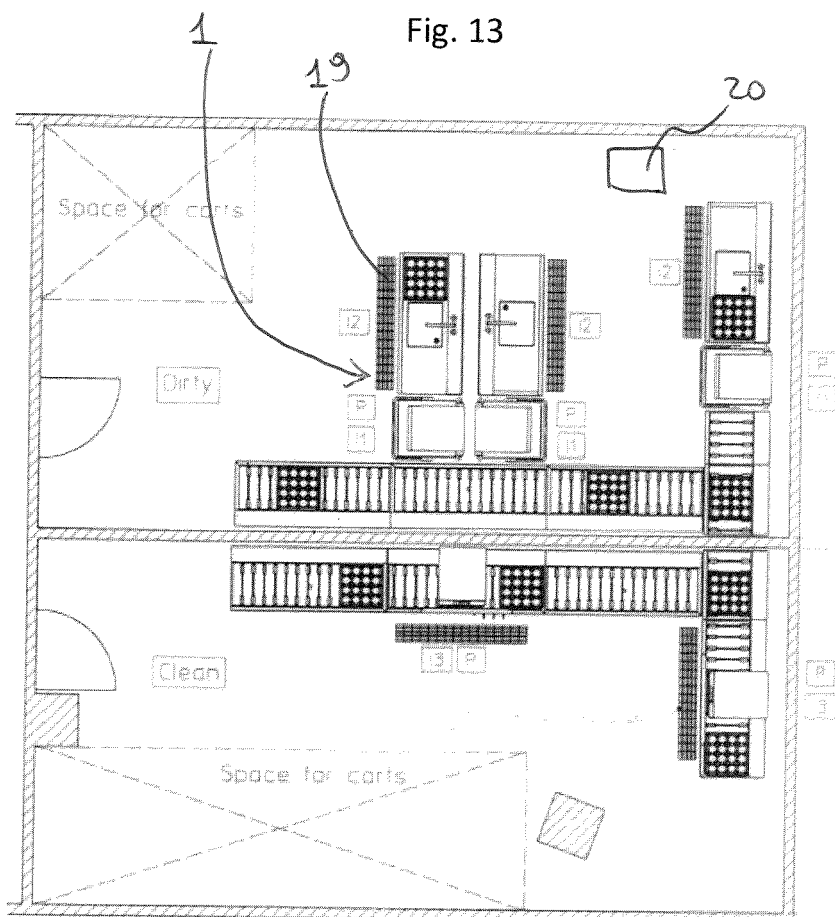


Fig. 14



EUROPEAN SEARCH REPORT

Application Number

EP 24 02 0306

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		27 February 2025	Stroppa, Giovanni
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X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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