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(54) **AN EQUIPMENT FOR FILLING A CONTAINER WITH A RESPECTIVE PRODUCT**

(57) An equipment (10) for filling a container with a respective product, said product in particular being in the form of a liquid, semi-liquid, or pasty product, especially the product is in the form of a food product, in particular a plant-based food product, such as a tomato-based product, i.e., a pulp, a strained tomato puree, a concentrate of tomato or other product derived from tomato, or in the

form of a fruit or vegetable juice, i.e., in the form of a product from the dairy industry, for example, milk, yoghurt, or other, comprises support means (12) for means (14) to fill the same container and having a respective zone (120) to fill the respective container and/or to deliver the same container. Said means (14) to fill said container define means for extracting the respective container.

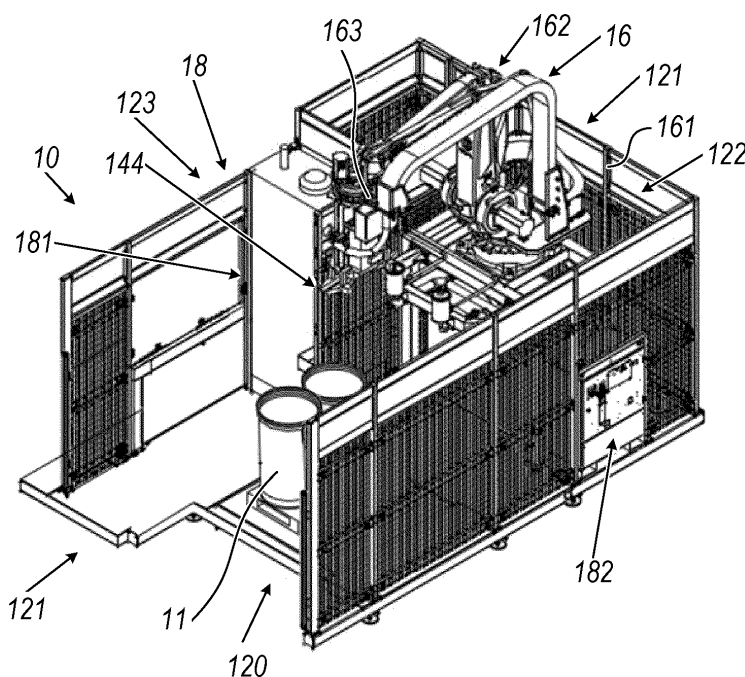


FIG. 1

Description

[0001] The present invention relates to an equipment for filling a container with a respective product.

[0002] In particular, said container being of the type having a container body made of a flexible material, i.e., defined by a corresponding film, especially in a corresponding layered material, which preferentially can be placed in a corresponding secondary or outer packaging, preferably rigid or load-bearing, i.e., inside a collecting secondary packaging, such as a box or other, or the container body being in a rigid or self-supporting material, for example, plastic or metal.

[0003] Equipment for filling a container with a product, in particular in the form of a pulp, of tomato, which comprise support means for means to fill the same container, operating in a respective zone to fill the respective container and to deliver the same container to a secondary rigid packaging is known.

[0004] However, such known equipment has the drawback of employing oversized equipment for an automatic loading of containers, making them excessively complex and correspondingly expensive, or they require that an entirely manual loading of the same containers is performed, resulting in excessive personnel time and significant production costs.

[0005] Moreover, the actual filling operations performed according to the known technique are generally excessively slow.

[0006] Therefore, the present invention aims to propose a new and alternative solution to the solutions known so far, and in aims to propose to obviate one or more of the drawbacks or problems referred to above and/or to meet one or more needs referred to above, and/or anyhow felt in the art, and particularly as can be inferred from the foregoing.

[0007] Therefore, an equipment for filling a container with a respective product is provided, said product in particular being in the form of a liquid, semi-liquid, or pasty product, especially the product being in the form of a food product, in particular a plant-based food product, such as a tomato-based product, i.e., a pulp, a strained tomato puree, a concentrate of tomato or other product derived from tomato, or in the form of a fruit or vegetable juice, i.e., in the form of a product from the dairy industry, for example, milk, yoghurt, or other; the equipment comprises support means for means to fill the same container, and the equipment, i.e., said means for supporting the equipment, having a respective zone to fill the respective container and/or to deliver the same container, in particular to a corresponding secondary or outer packaging; the equipment being characterized in that said means to fill said container define means for extracting the respective container.

[0008] In this manner, it is possible to make so that the containers to be filled can be used without making the equipment overly complex and expensive, which therefore features a suitably essential configuration.

[0009] This and other novel aspects, or respective advantageous implementations, are anyhow set forth in the attached claims, the specific technical characteristics of which can be found, together with corresponding advantages achieved, in the following description, illustrating in detail a merely exemplary, non-limiting embodiment of the invention, and which is given by reference to the attached drawings, in which:

- Fig. 1 illustrates a schematic, perspective view of a preferred implementation of equipment according to the present invention;
- Fig. 2 illustrates a schematic top view in plan of the preferred implementation of equipment according to the present invention;
- Fig. 3 illustrates a schematic front elevation view of the preferred implementation of equipment according to the present invention;
- Fig. 4 illustrates a schematic side elevation view of the preferred implementation of equipment according to the present invention;
- Fig. 5 illustrates a schematic side elevation view of the preferred implementation of equipment according to the present invention, without the protection walls of the equipment.

[0010] A preferred implementation 10 of equipment for filling a container with a respective product is illustrated in the attached Figures.

[0011] In particular, the container has a container body made of a flexible material, i.e., defined by a corresponding film, especially in a corresponding layered material, which preferentially can be placed in a corresponding secondary or outer packaging, preferably rigid or load-bearing, 11, i.e., inside a collecting secondary packaging, such as a box or other. However, it is understood that, according to another embodiment, said container body could also be in a rigid or self-supporting material, for example, plastic or metal.

[0012] The container has a respective filling opening, preferably defined by a mouth, in particular generally cylindrical in shape, particularly protruding from the body of the container, especially in a plastic material, and having a closure cap, which can be opened and closed, for example, through a corresponding axial pull or push.

[0013] In particular, the product is in the form of a liquid, semi-liquid, or pasty product, with or without solid particles embedded within it, and is especially of the type that can be pumped through corresponding conveying means upon the impulse of corresponding pumping means.

[0014] The product preferably is in the form of a food product, in particular a plant-based food product, such as a tomato-based product, i.e., a pulp, a strained tomato puree, a concentrate of tomato or other product derived from tomato, or in the form of a fruit or vegetable juice, i.e., in the form of a product from the dairy industry, for example, milk, yoghurt, or other.

[0015] As is clear from the Figures, the equipment 10 comprises support means 12 for means 14 to fill the same container.

[0016] In particular, the equipment, i.e., said means 12 for supporting the equipment, has, or have, a respective zone 120 to fill the respective container and/or to deliver the same container, in particular to a corresponding secondary or outer packaging.

[0017] Advantageously, as illustrated, in the equipment 10, said means 14 to fill said container define means for extracting the respective container.

[0018] In this manner, it is possible to make so that the containers to be filled can be used without making the equipment overly complex and expensive, which therefore features a suitably essential configuration.

[0019] Advantageously, as is clear from said Figures, said means 14 to fill said container are adapted to extract said container in any position of said support means 12 of the equipment and/or of a respective zone 121 for feeding the respective container.

[0020] In this manner, it is possible to make so that the containers to be filled can be provided without a particular positioning accuracy, i.e., operating in an easier and faster manner, particularly for the operator in charge.

[0021] In an appreciably advantageous manner, said filling and extraction means 14 are adapted to move said container to said zone 120 to fill the respective container and/or to deliver the same container, in particular to a corresponding secondary or outer packaging 11, according to a path comprising at least one horizontal displacement component and/or at least one vertical displacement component.

[0022] As is clear from said Figures, advantageously, said filling means 14 are adapted to fill said container during the transfer of the same container to said zone 120 to fill the respective container and/or to deliver the same container, in particular to a corresponding secondary or outer packaging, especially with said container that is being filled, i.e., that is in the filled condition.

[0023] In this manner, said filling operation is made faster.

[0024] Advantageously, said filling means 14 are adapted to fill said container during the transfer of the same container from said zone 121 for feeding the respective container to said zone 120 to fill the respective container and/or to deliver the same container, in particular to a corresponding secondary or outer packaging, especially with said container that is being filled, i.e., that is in the filled condition.

[0025] In this manner, said filling operation is made faster.

[0026] With appreciable advantage, said filling and extraction means 14 are adapted to fill the same container during a respective path that has at least one horizontal displacement component.

[0027] As is clear from said Figures, advantageously, said means 14 to fill the same container comprise means 142 for dispensing the product to said container.

[0028] Advantageously, as is clear from said Figures, said means 14 to fill the same container comprise means 141 for opening, and in particular for closing, said container.

[0029] With advantage, as is clear from said Figures, said means 141 for opening, and in particular for closing, said container and/or said means 142 for dispensing the product to said container are carried by a respective supporting head 143.

[0030] As is clear from said Figures, advantageously, said head 143, defining said means 141 for opening, and in particular for closing, said container and/or said means 142 for dispensing the product to the container, is in the form of a hermetic containment closed body for said means 141 for opening, and in particular for closing, said container and/or for said means 142 for dispensing the product to said container.

[0031] Advantageously, as is clear from said Figures, said hermetic containment closed body 143' for said means 141 for opening, and in particular for closing, said container and/or said means 142 for dispensing the product to said container has a mouth for dispensing the product to said container and, as will nevertheless be more clearly evident from the following description, for a coupling with the opening or mouth of the same container.

[0032] In an advantageous manner, as is clear from said Figures, said hermetic containment closed body 143' for said means 141 for opening, and in particular for closing, said container and/or said means 142 for dispensing the product to said container has sterilization means, in particular in the form of a high-temperature gas, i.e., of a corresponding water vapor, or gas or vapor having corresponding sterilizing chemical agents, and which is respectively emitted within the same closed body, which is emitted within the same closed body 143, in particular in modo tale da consentire così l'esecuzione di un riempimento del said container in condizione sterili.

[0033] As is clear from said Figures, advantageously, said means 14 to fill the same container comprise means 144 for engaging the opening and/or the mouth to fill said container.

[0034] Advantageously, as is clear from said Figures, said means 144 for engaging the opening and/or the mouth to fill said container are carried by said head 143 defining said means 141 for opening, and in particular for closing, said container and/or said means 142 for dispensing the product to the container.

[0035] In a particularly advantageous manner, as is clear from said Figures, said means 14 to fill the same container comprise means 16 for handling said means 141 for opening, and in particular for closing, said container and/or of said means 142 for dispensing the product to said container, and/or of said means 144 for engaging the opening and/or the mouth to fill said container, i.e., of said head 143 defining said means 141 for opening, and in particular for closing, said container

and/or said means 142 for dispensing the product to the container and/or said means 144 for engaging the opening and/or the mouth to fill said container.

[0036] As is clear from said Figures, advantageously, said handling means 16 are in the form of corresponding robot means 16.

[0037] Advantageously, as is clear from said Figures, said robot means 16 are in the form of a single robot 16, in particular in the form of an anthropomorphic robot, for example, of the type having four or six rotational axes.

[0038] In an appreciably advantageous manner, as is clear from said Figures, said robot means, i.e., the single robot 16, have, or has, a respective base 161, from which an articulated arm 162 extends, which ends in a free end, or wrist, 163, adapted to carry said means 141 for opening, and in particular for closing, said container and/or said means 142 for dispensing the product to said container, and/or said means 144 for engaging the opening and/or the mouth to fill said container, i.e., said head 143 defining said means 141 for opening, and in particular for closing, said container and/or said means 142 for dispensing the product to the container and/or said means 144 for engaging the opening and/or the mouth to fill said container.

[0039] Advantageously, as is clear from said Figures, the equipment comprises means 18 for determining the position of the opening or mouth to fill the same container.

[0040] As is clear from said Figures, advantageously, said means 18 for determining the position of the opening or mouth to fill the same container comprise means 181 for detecting the position of the opening or mouth to fill the same container.

[0041] With appreciable advantage, as is clear from said Figures, said means 181 for detecting the position of the opening or mouth to fill the same container comprise corresponding video camera means 181, in particular including a single video camera 181.

[0042] Advantageously, as is clear from said Figures, said means 18 for determining the position of the opening or mouth to fill the same container comprise corresponding control means, in particular electronic processor means, especially defined by the control means of the equipment, which control means receive corresponding signals, i.e., one or more images of the container, from said means 181 for detecting the position of the mouth to fill the same container and determine the position of said opening or mouth to fill the same container.

[0043] As is clear from said Figures, advantageously, the equipment 10 comprises means 182 which drive said means 16 for handling said means 141 for opening, and in particular for closing, said container and/or of said means 142 for dispensing the product to said container and/or of said means 144 for engaging the opening and/or the mouth to fill said container, i.e., of said head 143 defining said means 141 for opening, and in particular for closing, said container and/or said means 142 for dispensing the product to the container and/or said means 144 for engaging the opening and/or the mouth to

fill said container.

[0044] With advantage, as is clear from said Figures, said means 182 which drive said handling means 16, following the determination of the position of the opening or mouth to fill the respective container, in particular by said means 18 for determining the position of the opening or mouth to fill the same container, drive the same handling means 16 to bring said means 144 for engaging the opening and/or the mouth to fill said container, i.e., the head 143 that supports them, at the same position of the opening or mouth to fill the container.

[0045] Advantageously, as is clear from said Figures, said means 182 which drive said handling means 16 are defined by corresponding control means, in particular electronic processor means, especially defined by the control means of the equipment 10.

[0046] As is clear from said Figures, advantageously, said support means 12 have a support zone 122 for said means 14 to fill the same container, i.e., for said means 16 for handling said means 141 for opening, and in particular for closing, said container and/or said means 142 for dispensing the product to said container, i.e., of said supporting unit 143, which is located posteriorly to said zone 120 to fill the respective container and/or to deliver the same container, in particular to a corresponding secondary or outer packaging.

[0047] In an advantageous manner, as is clear from said Figures, said zone 121 for feeding the respective container is arranged next to said zone 120 to fill the respective container and/or to deliver the same container, in particular to a corresponding secondary or outer packaging.

[0048] Advantageously, as is clear from said Figures, said support means 12 have a support zone 123 for said means 181 for detecting the position of the mouth to fill the same container.

[0049] As is clear from said Figures, advantageously, said support zone 123 for said means 181 for detecting the position of the mouth to fill the same container is arranged posteriorly to said zone 121 for feeding the respective container.

[0050] In a particularly advantageous manner, as is clear from said Figures, said support zone 123 for said means 181 for detecting the position of the mouth to fill the same container is arranged next to said zone 120 to fill the respective container and/or next to said support zone 122 for said means 14 to fill the same container.

[0051] Advantageously, as is clear from said Figures, the equipment 10 comprises means 149 for feeding the product to said means 142 for dispensing the product to said container, i.e., to said head 143 defining said means 142 for dispensing the product to the container.

[0052] As is clear from said Figures, advantageously, said means 149 for feeding the product to said means 142 for dispensing the product to said container, i.e., to said head 143 defining said means 142 for dispensing the product to the container are in the form of a conduit, or tubing, in particular of the flexible type, for the connection

with a respective source of said product and extending along the arm of said robot means, up to said means 142 for dispensing the product to said container, or to said head 143 defining said means 142 for dispensing the product to the container.

[0053] In practice, as is evident, the technical characteristics illustrated above allow, individually or in a respective combination, achieving one or more of the following advantageous results:

- it is possible to make so that the containers to be filled can be used without making the equipment overly complex and expensive, which therefore features a suitably essential configuration.
- it is possible to make so that the containers to be filled can be provided without a particular positioning accuracy, i.e., operating in an easier and faster manner, particularly for the operator in charge;
- said filling operation is made faster.

[0054] The present invention is susceptible to evident industrial application. A person skilled in the art will be further able to devise a number of modifications and/or variants to be made to the same invention, while remaining within the scope of the inventive concept, as broadly set forth. Furthermore, a person skilled in the art will be able to conceive further preferred implementation of the invention, which comprise or more of the characteristics illustrated above of the preferred implementation referred to herein above, in particular, as set forth in the attached claims. In addition, it should also be understood that all details of the invention may be replaced with technically equivalent elements.

Claims

1. An equipment (10) for filling a container with a respective product, said product in particular being in the form of a liquid, semi-liquid, or pasty product, especially the product being in the form of a food product, in particular a plant-based food product, such as a tomato-based product, i.e., a pulp, a strained tomato puree, a concentrate of tomato or other product derived from tomato, or in the form of a fruit or vegetable juice, i.e., in the form of a product from the dairy industry, for example, milk, yoghurt, or other; the equipment (10) comprises support means (12) for means (14) to fill the same container, the equipment, i.e., said means (12) for supporting the equipment, having said respective zone (120) to fill the respective container and/or to deliver the same container, in particular to a corresponding secondary or outer packaging; the equipment being **characterized in that** said means (14) to fill said container define means for extracting the respective container.
2. The equipment according to claim 1, **characterized**

in that said means (14) to fill said container are adapted to extract said container at any position of said support means (12) of the equipment and/or of a respective feeding zone (121) of the respective container.

3. The equipment according to any one of the preceding claims, **characterized in that** said filling and extraction means (14) are adapted to move said container to said zone (120) to fill the respective container and/or to deliver the same container, in particular to a corresponding secondary or outer packaging, according to a path comprising at least one horizontal displacement component and/or at least one vertical displacement component.
4. The equipment according to any one of the preceding claims, **characterized in that** said filling means (14) are adapted to fill said container during the transfer of the same container to said zone (120) to fill the respective container and/or to deliver the same container, in particular to a corresponding secondary or outer packaging, especially with said container that is being filled, i.e., that is in the filled condition.
5. The equipment according to claim 4, **characterized in that** said filling means (14) are adapted to fill said container during the transfer of the same container from said zone (121) for feeding the respective container to said zone (120) to fill the respective container and/or to deliver the same container, in particular to a corresponding secondary or outer packaging, especially with said container that is being filled, i.e., that is in the filled condition.
6. The equipment according to any one of the preceding claims 4 and 5, **characterized in that** said filling and extraction means (14) are adapted to fill the same container during a respective path that has at least one horizontal displacement component.
7. The equipment according to any one of the preceding claims or according to the pre-characterizing part of claim 1, **characterized in that** said means (14) to fill the same container comprise means (142) for dispensing the product to said container.
8. The equipment according to any one of the preceding claims or according to the pre-characterizing part of claim 1, **characterized in that** said means (14) to fill the same container comprise means (141) for opening, and in particular for closing, said container.
9. The equipment according to any one of the preceding claims 7 and 8, **characterized in that** said means (141) for opening, and in particular for closing, said container and/or said means (142) for dis-

pensing the product to said container are carried by a respective supporting head (143).

10. The equipment according to claim 9, **characterized in that** said head (143) defining said means (141) for opening, and in particular for closing, said container and/or said means (142) for dispensing the product to the container, is in the form of a hermetic containment closed body for said means (141) for opening, and in particular for closing, said container and/or for said means (142) for dispensing the product to said container.
11. The equipment according to claim 10, **characterized in that** said hermetic containment closed body (143') for said means (141) for opening, and in particular for closing, said container and/or said means (142) for dispensing the product to said container has a mouth for dispensing the product to said container.
12. The equipment according to any one of the preceding claims 10 and 11, **characterized in that** said hermetic containment closed body (143') for said means (141) for opening, and in particular for closing, said container and/or said means (142) for dispensing the product to said container has sterilization means, in particular in the form of a high-temperature gas, i.e., of a corresponding water vapor, or a gas or vapor having corresponding sterilizing chemical agents, and which is emitted within the same closed body (143).
13. The equipment according to any one of the preceding claims or according to the pre-characterizing part of claim 1, **characterized in that** said means (14) to fill the same container comprise means (144) for engaging the opening and/or the mouth to fill said container.
14. The equipment according to claim 13, **characterized in that** said means (144) for engaging the opening and/or the mouth to fill said container are carried by said head (143) defining said means (141) for opening, and in particular for closing, said container and/or said means (142) for dispensing the product to the container.
15. The equipment according to any one of the preceding claims or according to the pre-characterizing part of claim 1, **characterized in that** said means (14) to fill the same container comprise means (16) for handling said means (141) for opening, and in particular for closing, said container and/or of said means (142) for dispensing the product to said container, and/or of said means (144) for engaging the opening and/or the mouth to fill said container, i.e., of said head (143) defining said means (141) for opening,

and in particular for closing, said container and/or said means (142) for dispensing the product to the container and/or said means (144) for engaging the opening and/or the mouth to fill said container.

16. The equipment according to claim 15, **characterized in that** said handling means (16) are in the form of corresponding robot means (16).
17. The equipment according to claim 16, **characterized in that** said robot means (16) are in the form of a single robot (16), in particular in the form of an anthropomorphic robot.
18. The equipment according to any one of the preceding claims 16 and 17, **characterized in that** said robot means, i.e., the single robot (16), have, or has, a respective base (161), from which an articulated arm (162) extend, which ends in a fee end, or wrist, (163) adapted to carry said means (141) for opening, and in particular for closing, said container and/or said means (142) for dispensing the product to said container, and/or said means (144) for engaging the opening and/or the mouth to fill said container, i.e., said head (143) defining said means (141) for opening, and in particular for closing, said container and/or said means (142) for dispensing the product to the container and/or said means (144) for engaging the opening and/or the mouth to fill said container.
19. The equipment according to any one of the preceding claims or according to the pre-characterizing part of claim 1, **characterized in that** the equipment (10) comprises means (18) for determining the position of the opening or mouth to fill the same container.
20. The equipment according to claim 19, **characterized in that** said means (18) for determining the position of the opening or mouth to fill the same container comprise means (181) for detecting the position of the opening or mouth to fill the same container.
21. The equipment according to claim 20, **characterized in that** said means (181) for detecting the position of the opening or mouth to fill the same container comprise corresponding video camera means (181), in particular including a single video camera (181).
22. The equipment according to any one of the preceding claims 19 to 21, **characterized in that** said means (18) for determining the position of the opening or mouth to fill the same container comprise corresponding control means, in particular electronic processor means, especially defined by the control means of the equipment, which control means receive corresponding signals from said means (181)

for detecting the position of the mouth to fill the same container and determine the position of said opening or mouth to fill the same container.

23. The equipment according to any one of the preceding claims or according to the pre-characterizing part of claim 1, **characterized in that** the equipment (10) comprises means (182) which drive said means (16) for handling said means (141) for opening, and in particular for closing, said container and/or of said means (142) for dispensing the product to said container and/or of said means (144) for engaging the opening and/or the mouth to fill said container, i.e., of said head (143) defining said means (141) for opening, and in particular for closing, said container and/or said means (142) for dispensing the product to the container and/or said means (144) for engaging the opening and/or the mouth to fill said container. 5
24. The equipment according to claim 23, **characterized in that** said means (182) which drive said handling means (16), following the determination of the position of the opening or mouth to fill the respective container, in particular by said means (18) for determining the position of the opening or mouth to fill the same container, drive the same handling means (16) to bring said means (144) for engaging the opening and/or the mouth to fill said container, i.e., the head (143) that supports them, at the same position of the opening or mouth to fill the container. 10 25
25. The equipment according to any one of the preceding claims 23 and 24, **characterized in that** said means (182) which drive said handling means (16) are defined by corresponding control means, in particular electronic processor means, especially defined by the control means of the equipment (10). 30
26. The equipment according to any one of the preceding claims, **characterized in that** said support means (12) have a support zone (122) for said means (14) to fill the same container, i.e., for said means (16) for handling said means (141) for opening, and in particular for closing, said container and/or said means (142) for dispensing the product to said container, i.e., of said supporting unit (143), which is located posteriorly to said zone (120) to fill the respective container and/or delivering the same container, in particular to a corresponding secondary or outer packaging. 35 40 45 50
27. The equipment according to any one of the preceding claims, **characterized in that** said zone (121) for feeding the respective container is arranged next to said zone (120) to fill the respective container and/or delivering the same container, in particular to a corresponding secondary or outer packaging. 55

28. The equipment according to any one of the preceding claims or according to the pre-characterizing part of claim 1, **characterized in that** said support means (12) have a support zone (123) for said means (181) for detecting the position of the mouth to fill the same container.
29. The equipment according to claim 28, **characterized in that** said support zone (123) for said means (181) for detecting the position of the mouth to fill the same container is arranged posteriorly to said zone (121) for feeding the respective container. 10
30. The equipment according to any one of the preceding claims 28 and 29, **characterized in that** said support zone (123) for said means (181) for detecting the position of the mouth to fill the same container is arranged next to said zone (120) to fill the respective container and/or next to said support zone (122) for said means (14) to fill the same container. 15
31. The equipment according to any one of the preceding claims 28 and 29, **characterized in that** the equipment (10) comprises means (149) for feeding the product to said means (142) for dispensing the product to said container, i.e., to said head (143) defining said means (142) for dispensing the product to the container. 25
32. The equipment according to claim 31, **characterized in that** said means (149) for feeding the product to said means (142) for dispensing the product to said container, i.e., to said head (143) defining said means (142) for dispensing the product to the container are in the form of a conduit, or tubing, in particular of the flexible type, for the connection with a respective source of said product and extending along the arm of said robot means, up to said means (142) for dispensing the product to said container, or said head (143) defining said means (142) for dispensing the product to the container. 30 35 40 45 50
33. An equipment, **characterized in that** it is made according to any one of the preceding claims and/or as described and illustrated with reference to the attached drawings. 55

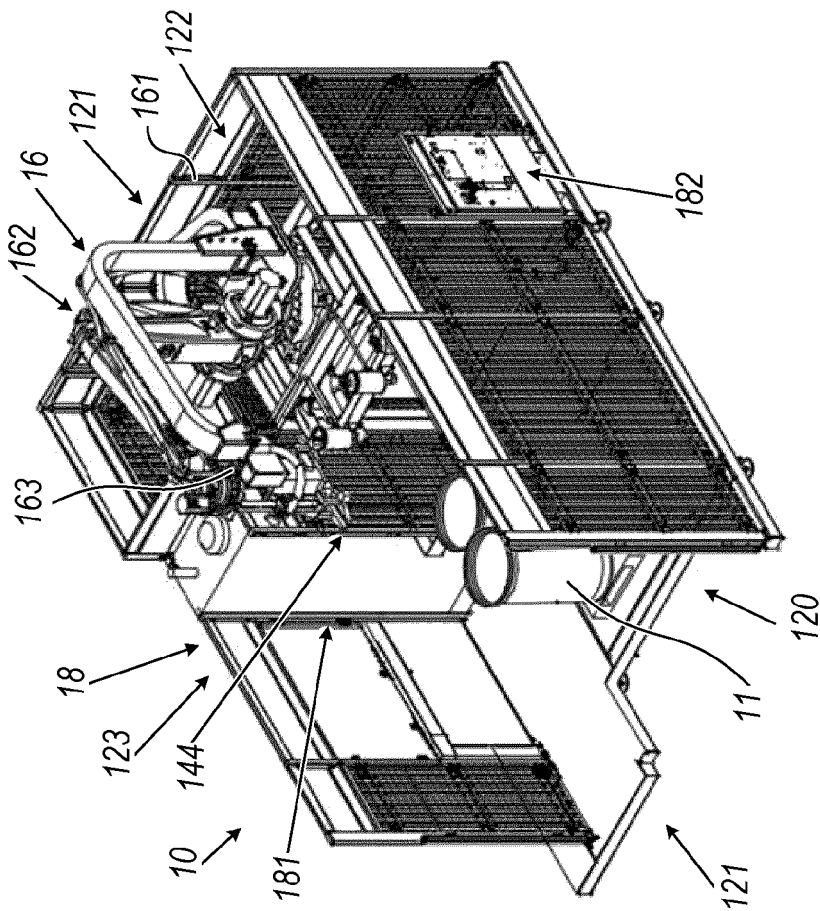


FIG. 1

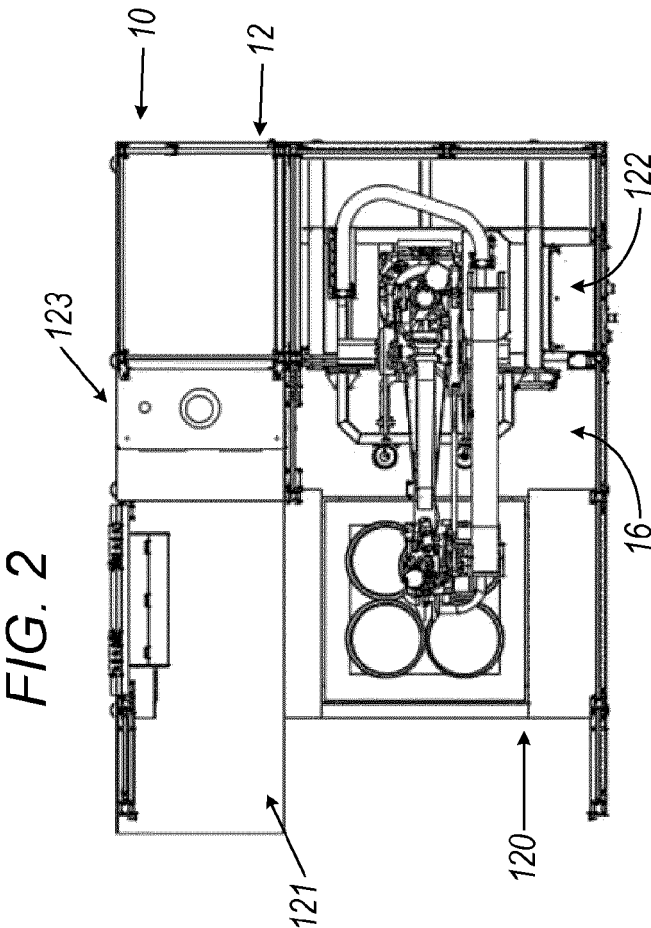


FIG. 2

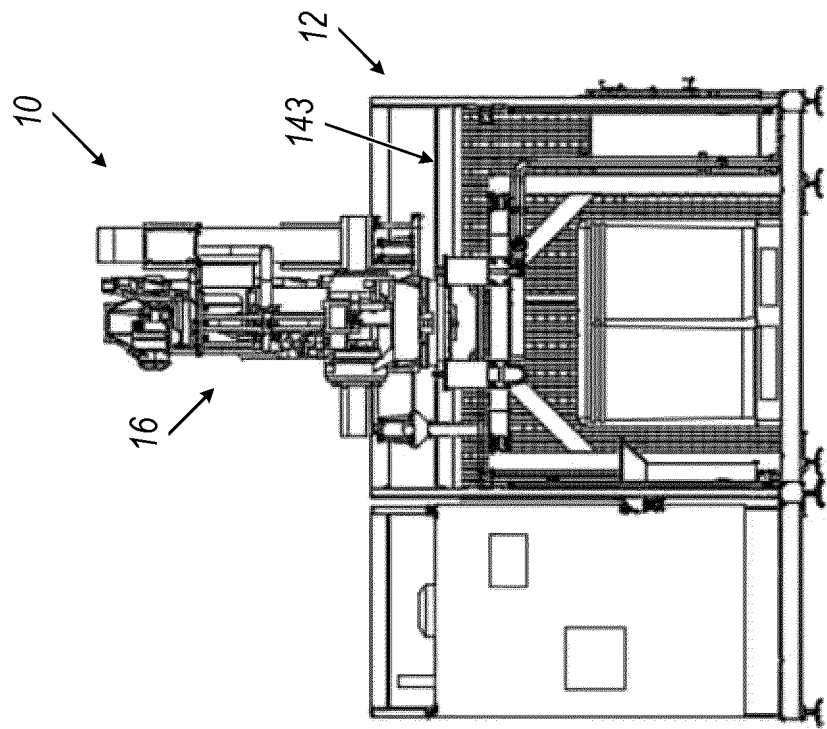


FIG. 3

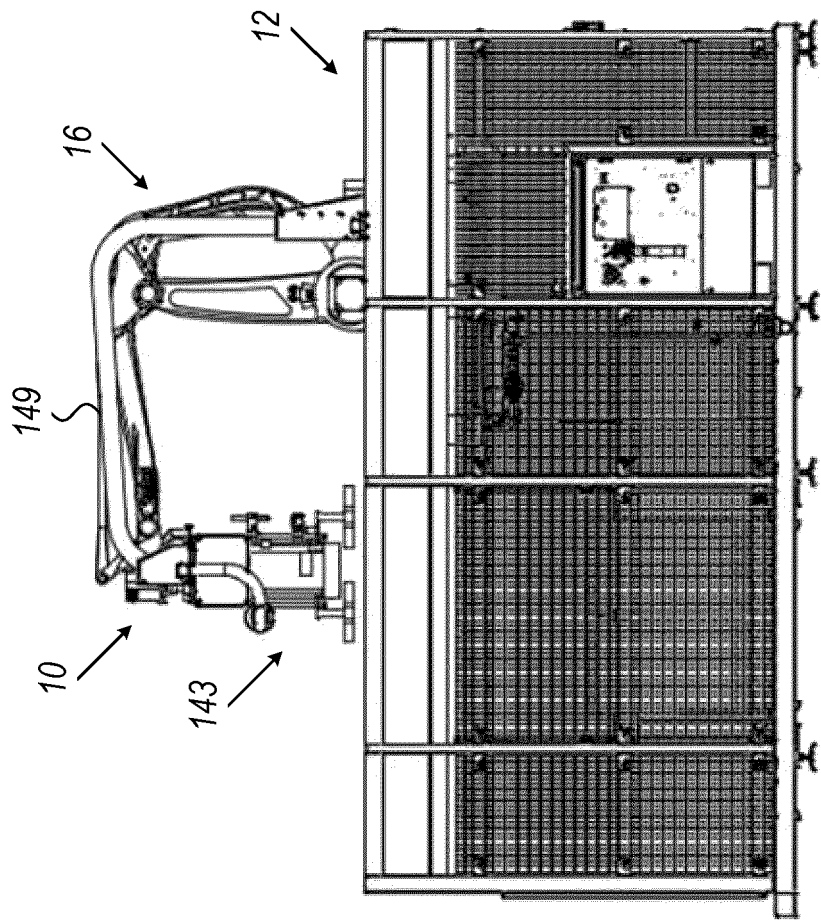


FIG. 4

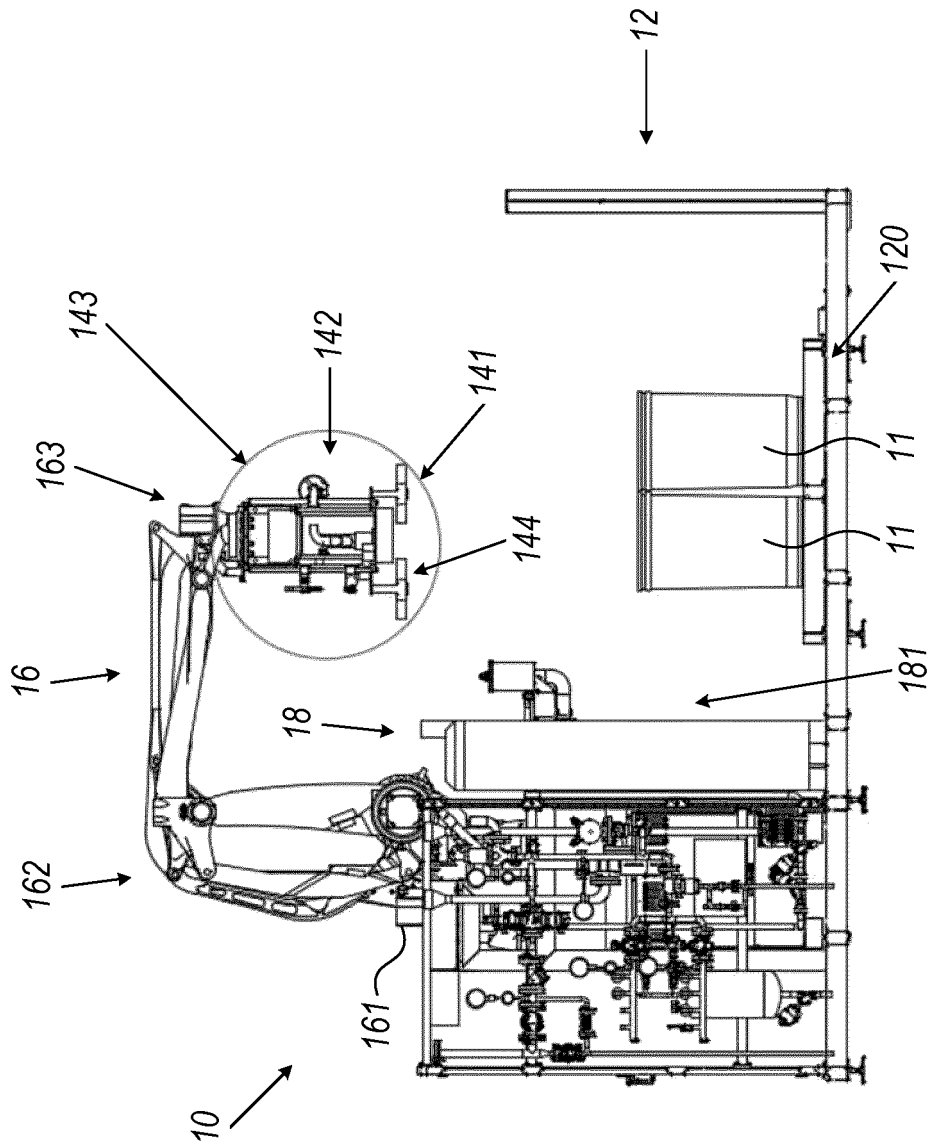


FIG. 5