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## (54) LIQUID DISPENSER AND METHOD OF ADMINISTERING AN ADDITIVE

(57) A liquid dispenser (1), e.g., for tinting pastes. The dispenser (1) comprises at least one container for holding the liquid to be dispensed. The container has a headspace section (15) with an additive inlet (20), such

as a nozzle. A method of administering an additive to the liquid in the container, in particular a disinfectant. The additive is introduced into the headspace (15) of the container through an additive inlet (20), such as a nozzle.

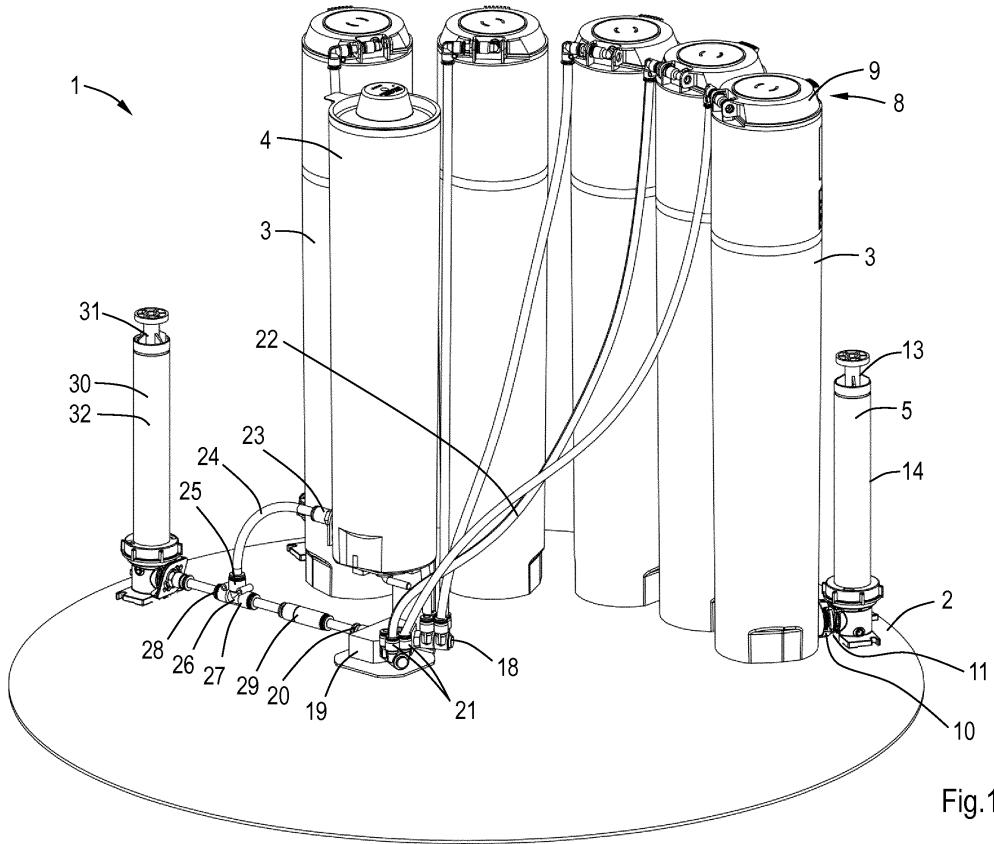


Fig.1

## Description

### TECHNICAL FIELD

**[0001]** The present disclosure relates to a liquid dispenser comprising at least one container for holding a liquid to be dispensed, such as a water borne emulsion or dispersion, in particular a pigment dispersion, e.g., a paint colorant or tinting paste. The container has a headspace section, i.e. the part of the container's interior above a maximum level of the contained liquid.

### BACKGROUND

**[0002]** Tinting pastes are concentrates of organic or inorganic pigments used for tinting base paints, for instance at a point of sale or a car refinish body shop. The dispensers typically comprise one or more canisters with a dispense nozzle, e.g., at a bottom side of the canister, and a refill opening, e.g., at the headspace section of the canister. The canister may comprise a pump or can selectively be connected to a pump to dispense a selected amount of the tinting paste. Optionally, the canister is provided with a stirrer.

**[0003]** Due to environmental regulations, present day paints and tinting pastes are usually water borne. Such aqueous compositions are sensitive for microbiological activity, in particular growth of mould, algae, bacteria or other microorganisms. This is particularly problematic for tinting pastes, which are typically stored for longer periods in canisters where only occasionally small amounts are dispensed from. Microbiological fouling and mildew can particularly occur in the headspace of such canisters or at the dispensing nozzle.

**[0004]** To inhibit microbiological activity, the tinting pastes usually comprise preservatives, such as biocidal agents or disinfectants. Such preservatives are toxic and cause environmental risks.

**[0005]** It is an object of the invention to inhibit microbiological activity in the canisters, while minimizing hazards for users.

### SUMMARY

**[0006]** The object of the invention is achieved with a liquid dispenser comprising at least one container for holding the liquid to be dispensed, the container having a headspace section with an additive inlet, such as a spraying nozzle or an array of nozzles. The additive is sprayed into the headspace onto the surface of the liquid and optionally also on the interior wall of the container above the liquid level. The additive is not actively mixed into the contained liquid, so the content of the dispensed tinting paste is at an acceptable low level. The headspace is typically directly below a refill opening, e.g., a refill opening which is closed or closable, e.g., by means of a lid.

**[0007]** The additive can be a preservative, such as a

microbiocide or disinfectant, but the system can also be used for other types of additives, including for example water, solvents or co-solvents to compensate for evaporation, anti-settling agents and/or rheological agents.

5 Optionally, the dispenser may have a plurality of additive inlets for different additives.

**[0008]** The dispenser may for example comprise a control unit controlling supply of an additive to the headspace section via the additive inlet. The control unit may for 10 example be programmed to spray a pre-set amount of the additive into the headspace at regular intervals.

**[0009]** To facilitate accurate metering the dispenser 15 may further comprise a metering pump and a supply line between the metering pump and the additive inlet of the container. The metering pump may also be connected to a storage container for storing an amount of the additive, so as to transport an amount additive liquid from the storage container to the container with the dispensable liquid.

20 **[0010]** The pump can for instance be a piston pump, such as the piston pumps disclosed in WO 03/083334 or US 2012/0250451.

**[0011]** A valve system can be used to control the 25 pumped and dispensed flows of additive liquid. The valve system can for example comprise a three-way valve connected to a supply line running from the storage container, a pump line running from the pump, and a dispense line connecting to at least one of the containers holding a liquid to be dispensed. The valve can be selectively moveable between a first and a second position. In the first position the valve closes off the dispense line and facilitates fluid communication between the storage container and the pump. In the second position the valve closes off the line between the valve and the storage 30 container, thus facilitating fluid communication between the pump and the dispense line. The control unit can be programmed to switch the pump into a suction mode when the valve is in the first position, and into a pressure mode when the valve is in the second position. This way, 35 the additive liquid is moved from the pump chamber via the valve into the respective liquid containers. Alternatively, the valve system may comprise a first check valve in the line between the container and the pump and a second check valve in a dispense line of the pump.

40 **[0012]** The dispense line may for example connect to a manifold which is in turn connected to a plurality of distribution lines, each of these lines distributing the additive to an associated container with liquid to be dispensed.

45 **[0013]** In a specific embodiment, the dispenser may 50 comprise a support, such as a turntable or a static platform, and a plurality of said containers for holding liquid to be dispensed, carried by the support. Examples of such supports are disclosed in EP 1 090 679 A1 and EP 2 198 950 A1.

55 **[0014]** In a specific embodiment, each of the containers may comprise a pump, wherein the support comprises a common actuator for selectively operating the pump

associated with the selected container. The storage container and the pump for dispensing the additive can be provided with a similar design as the containers containing the liquids to be dispensed and the associated pumps.

**[0015]** The containers typically have a top end with a removable lid. The lid is removed when the container is to be refilled. The additive inlet facilitates supply of an amount of an additive, also when the container's top end is closed, e.g., by a removable lid.

**[0016]** The additive inlet may for example comprise a nozzle or an array of nozzles. The inlet may be provided in a lid covering the top side of the headspace, and/or it may be provided in a side wall of the container above a maximum liquid level. The nozzles may be directed to the liquid level and/or the inner wall of the container's headspace section.

**[0017]** The disclosure also relates to a method of applying an additive for a liquid in a container, wherein the additive is distributed into a closed headspace of the container through an additive inlet, such as a nozzle, for example using a dispenser of the present disclosure. For example, a predetermined amount of the additive may be sprayed into the headspace at regular time intervals. For instance, per container a weekly amount of about 3 - 5 ml of a regular preservative may be added. Other intervals or doses can also be used, depending on the need for and availability of the additive.

**[0018]** Optionally, different doses can be distributed to different containers. This can for example be realized by providing more additive inlets or larger additive inlets to containers containing a tinting paste that requires a larger dose. In an exemplary embodiment, some containers may comprise three additive inlets connected to the manifold, while other contain only two, one or even zero additive inlets connected to the manifold depending on the specific additive need of the tinting paste contained in the respective containers.

**[0019]** In another embodiment, the control unit may be configured to use the same doses and/or the same intervals for all containers, or it may be programmed to differentiate between the canisters, depending on the type of tinting paste or the filling level.

**[0020]** The additive can be any suitable liquid or dispersed additive, in particular preservative such as a disinfectant or biocide. Additives, e.g., disinfectants, can be used which do not leave significant concentrations in the dispensed tinting paste.

**[0021]** The method and apparatus of the present invention are particularly suitable for use with aqueous tinting pastes or colorants for paints, but can also be used for other liquid dispensing systems requiring the use of additives, such as non-aqueous colorants, paints, or hair dyes.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0022]** The above-described aspects will hereafter be more explained with further details and benefits with ref-

erence to the drawings showing an exemplary embodiment.

5 Figure 1: shows a dispenser according to the invention;

Figure 2: shows a detail of a colorant canister of the dispenser of Figure 1.

#### DETAILED DESCRIPTION OF EMBODIMENTS

10 **[0023]** Figure 1 shows a dispenser 1 for tinting pastes comprising a turntable 2 which is rotatable about a central vertical axis. Although the drawing shows only two canisters, such dispensers typically comprise a series of containers or canisters filling the turntable, each canister containing an amount of a tinting paste of a specific colour. The two canisters shown in Figure 1 include one such a tinting paste canister 3 and an additive canister 4. In practice, the rest of the turn table 2 will be filled with tinting paste canisters 3 and only a single additive canister 4.

15 **[0024]** In the shown exemplary embodiment, the tinting paste canisters 3 are each connected to a pump 5 and a discharge tap 6. In response to a control signal from a control unit (not shown), the turntable 2 is rotated to position the discharge tap 6 of a selected tinting paste canister 3 above a discharge point. Subsequently, the control unit can initiate discharge of a metered amount of the canister's content into a base paint (not shown). The base paint is typically held in a standard paint container or paint can on a platform below the discharge point to facilitate proper discharge of the selected tinting paste or pastes into the base paint. The base paint is usually colourless, e.g., transparent or opaque white. The control unit can be programmed to meter amounts of one or more selected tinting pastes into the base paint in accordance with a calculated paint formulation corresponding to a specific colour selected by an operator via a user interface. Such dispensing systems are typically used in retail or wholesale paint stores or car repair body shops.

20 **[0025]** In the shown embodiment, the tinting paste canisters 3 have a cylindrical body 7 with an open top end 8 covered by a lid 9. Each tinting paste canister 3 has an outlet 10 near the bottom of the canister. A discharge line 11 connects the outlet 10 to the associated pump 5. The tinting paste canisters 3 typically comprise a stirrer 12 (see figure 2) mounted in the canister interior.

25 **[0026]** In the shown embodiment, the pump 5 is a piston pump with a piston 13 moveable vertically within a piston chamber 14. When the piston 13 moves upward, an amount of the tinting paste is moved from the tinting paste canister 3 into the piston chamber 14. A three way valve (not shown) in the discharge tap 6 connects the pump chamber 14 with the canister outlet when the piston 13 moves up. When the piston 13 moves down, the valve closes the discharge line 11 of the tinting paste canister 3 and connects the piston chamber 14 to an outlet of the discharge tap 6 to facilitate discharge of the selected tint-

ing paste.

**[0027]** When the tinting paste canisters 3 are filled a head space 15 (see Figure 2) remains between the liquid level 16 and the canister's lid 9. The tinting paste canisters 3 are typically refilled using standard amounts of tinting paste in standardized packages, resulting in a pre-defined head space 15 of the tinting paste canister 3. Tinting paste material in the headspace 15, i.e. at the liquid level 16 as well as tinting paste material left on the inner canister wall above liquid level, is exposed to air. Particularly since present day tinting pastes are water borne, the tinting paste material may be prone to microbiological decay, in particular by growth of mold. Such decay can be inhibited by the use of a microbiocide additive.

**[0028]** As shown in Figure 2, the lid 9 is a hinging lid provided with three nozzles 17 forming additive inlets. The nozzles 17 are operatively connected to a common inlet 18 at the outside of the canister top end. Alternatively, other types of inlets can be used and/or one or more of the additive inlets can be provided in the canister wall at the headspace section 15. The lid can also be a removable non-hinging lid.

**[0029]** The additive canister 4 is positioned between the tinting paste canisters 3 on the turntable 2. In the shown embodiment, the additive canister 4 is of the same height and similar look as the colorant canisters 3. However, the additive canister 4 is mounted on a bracket 18 above a manifold 19. The manifold 19 has a single inlet 20 and a number of outlets 21. The number of outlets 21 corresponds to the number of tinting paste canisters 3 on the turn table 2. Each outlet 21 of the manifold 19 is connected to one of the tinting paste canisters 3 by a line 22 allowing the dispense of the additive fluid from the manifold 19 to the respective tinting paste canister 3.

**[0030]** The additive canister 4 has an outlet provided with a check valve 23 near its bottom, just above the bracket 18. A discharge line 24 connects the check valve 23 to a first opening 25 of a branch pipe 26. This branch pipe 26 has a second opening 27 connected to the inlet 20 of the manifold 19 via a second check valve 29, and a third opening 28 connected to a piston pump 30. Instead of check valves, the dispenser may be provided with a three-way valve controlled by the control unit.

**[0031]** In the shown exemplary embodiment, the piston pump 30 is of a similar type, shape and size as the piston pumps 5 of the tinting paste canisters, though it does not need to have a dispense tap 6 similar to those of the tinting paste canisters 5. The piston pump 30 has a piston 31 vertically movable in a piston chamber 32. The valve 26 and the pump 30 are controlled by a control unit (not shown), optionally the same control unit as the control unit operating the tinting paste canisters 3.

**[0032]** The control unit can control the piston 31 to move upwardly in order to move a metered amount of additive material from the additive canister 4 to the piston chamber 32.

**[0033]** Subsequently, the control unit can trigger the

piston 31 to move down in order to move additive to the manifold 19. The manifold 19 distributes the dispensed additive via its outlets 21 to the various tinting paste canisters 3.

**[0034]** It is noted that the drawings are schematic, not necessarily to scale and that details that are not required for understanding the present invention may have been omitted. The terms "upward", "downward", "below", "above", and the like relate to the embodiments as oriented in the drawings, unless otherwise specified. Further, elements that are at least substantially identical or that perform an at least substantially identical function are denoted by the same numeral, where helpful individualised with alphabetic suffixes.

**[0035]** The disclosure is not restricted to the above described embodiments which can be varied in a number of ways within the scope of the claims.

**[0036]** Elements and aspects discussed for or in relation with a particular embodiment may be suitably combined with elements and aspects of other embodiments, unless explicitly stated otherwise.

## Claims

- 25 1. A liquid dispenser comprising at least one container for holding the liquid to be dispensed, the container having a headspace section with an additive inlet.
- 30 2. The dispenser of claim 1 comprising a control unit controlling supply of an additive to the headspace section via the additive inlet.
- 35 3. The dispenser of claim 1 or 2, further comprising a metering pump and a dispense line between the metering pump and the additive inlet of at least one of the containers.
- 40 4. The dispenser of claim 3, wherein the metering pump is connected to a storage container for storing an amount of an additive.
- 45 5. The dispenser of claim 4, wherein the connection between the pump and the storage container is provided with a valve system, such as check valves and/or a three way valve, which is further connected to said dispense line.
- 50 6. The dispenser of claim 5, wherein the valve is a three-way valve selectively moveable between:
  - a first position closing off the dispense line and facilitating fluid communication between the storage container and the pump, and
  - a second position closing off the line between the valve and the storage container and facilitating fluid communication between the pump and the dispense line.

7. The dispenser of claims 2 and 6, wherein the control unit is programmed to switch the pump into a suction mode when the valve is in the first position, and in a dispense mode when the valve is in the second position. 5

8. The dispenser of any one of the preceding claims, comprising a support, such as a turntable or a static platform, and a plurality of said containers for holding liquid to be dispensed, carried by the support. 10

9. The dispenser of claim 8, each of the containers comprising a pump, wherein the support comprises a common actuator for selectively operating the pump associated with the selected container. 15

10. The dispenser of claim 8 or 9, wherein one or more of the containers may comprise more than one additive inlet and/or one or more of the containers may be without an additive inlet. 20

11. A method of administering an additive to a liquid in a container, wherein the additive is introduced into a headspace of the container through an additive inlet, such as a nozzle. 25

12. The method of claim 11, wherein the headspace is closed during administration of the additive.

13. The method of claim 11 or 12, wherein the additive comprises a preservative, such as a disinfectant or biocide, and/or water, (co)solvents, and/or rheological agents and/or anti-settling agents. 30

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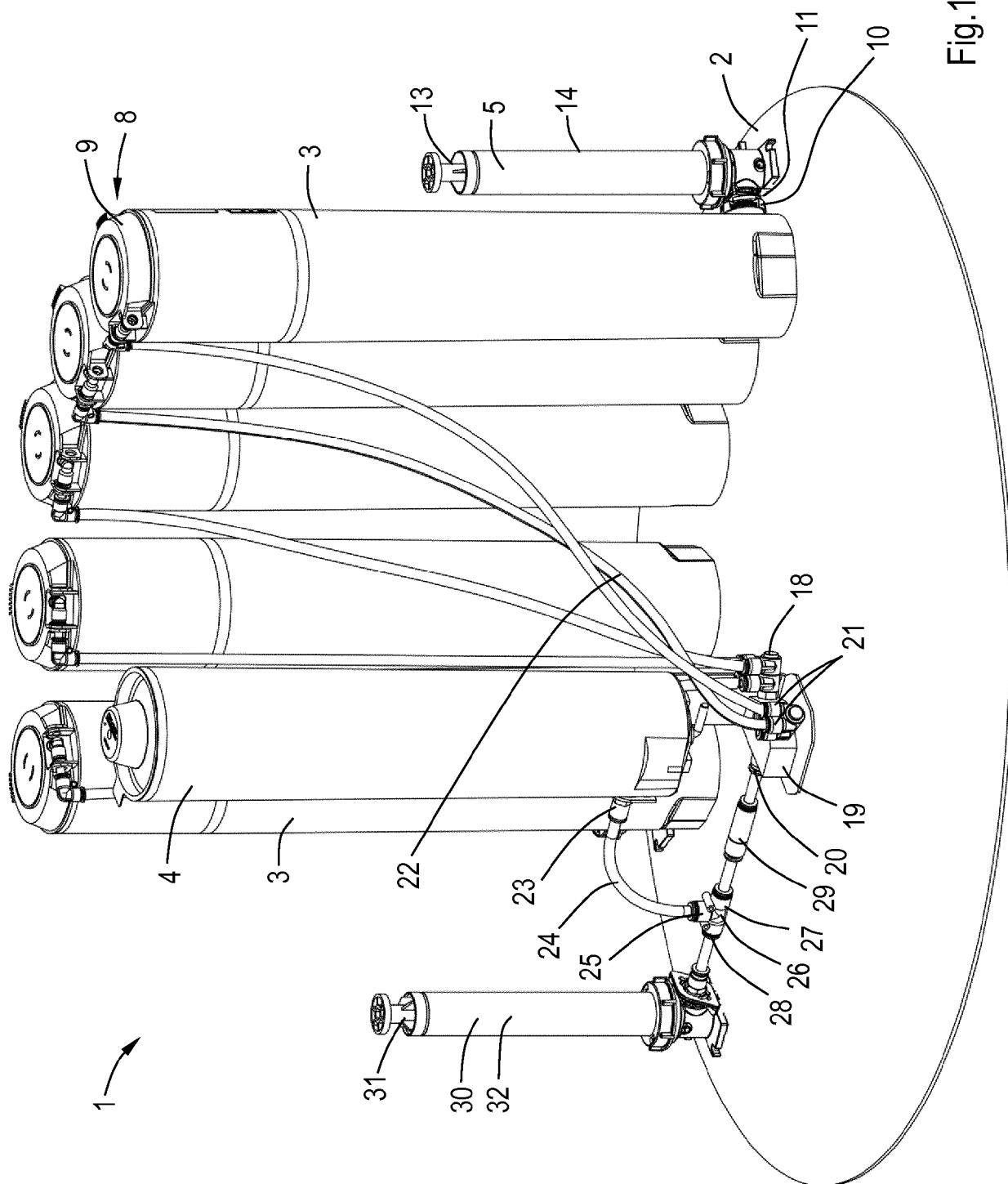


Fig.1

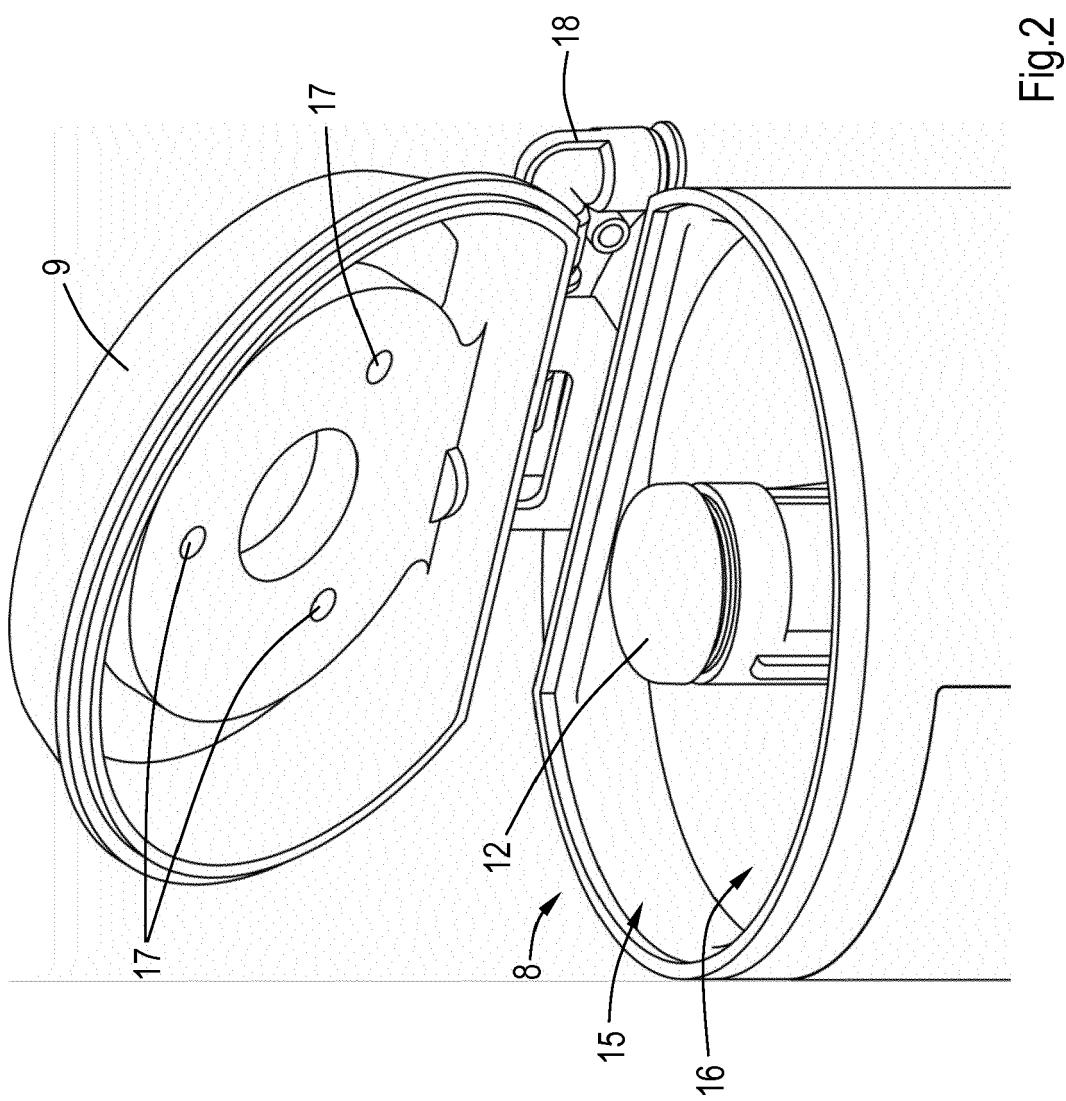


Fig.2



## EUROPEAN SEARCH REPORT

Application Number

EP 19 19 5612

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