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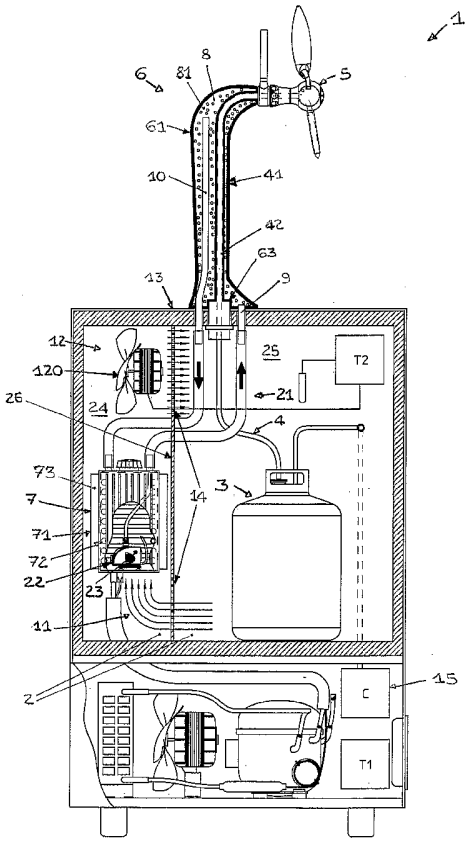
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(54) **Title:** DEVICE FOR DISPENSING LIQUIDS



(57) **Abstract:** Described is a beverage dispensing device (1) of the type comprising a cooled storage compartment (2) and a beverage dispensing line (4) . The compartment (2) is cooled at least by a first cooling medium and houses at least one beverage container (3) . The dispensing line (4) extends from the beverage container (3) to a tap (5) located on a dispensing head (6) . The device (1) characteristically comprises at least one first cooling circuit (11) that uses first movement means (12) to circulate the first cooling medium and one second cooling circuit (21) that uses second movement means (22) to circulate a second cooling medium that is in thermal contact with the beverage dispensing line (4) . The first and second cooling mediums are fluid dynamically isolated from each other and the two cooling circuits (11/21) exchange heat with a single cooling element (7) .

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Description

Device for dispensing liquids

Technical Field

This invention relates to a device for dispensing liquids, such as beverages.

Background Art

Dispensing devices can be used for dispensing beverages of many different kinds, especially in pubs or restaurants.

Patent EP1289874 describes a device comprising a guide tube that defines an outside channel and an inside channel. The inside channel also accommodates the beverage dispensing tube and, adjacent to the dispensing tap, communicates with the outside channel. This creates a path for the cooling medium along the intercommunicating inside and outside channels so that the beverage is cooled until it is near the dispensing station. A beverage container is placed in a storage compartment cooled by the same medium that cools the beverage in the dispensing column, this storage compartment communicating directly with the inside and outside channels.

Dispensing devices of this kind are not free of disadvantages.

In particular, since the cooling medium is preferably air, heat exchange efficiency is considerably reduced. Use of other fluids with very low melting points as the cooling medium would, however, create a different problem, since such fluids reach very low temperatures and are in direct contact with the beverage, creating a risk of the beverage freezing in the part of the dispensing tube that is inside the column. This problem occurs especially if an extended length of time elapses between one dispensing and next.

Disclosure of the Invention

The present invention therefore has for an aim to overcome

the above mentioned disadvantages by providing a dispensing device with optimised control of the cooling means, thus saving energy and reducing costs.

Another aim of the invention is to provide a dispensing device that permits cool beverage to be dispensed irrespective of the length of time the beverage remains in the part of the dispensing line outside the insulated compartment in which the beverage container is stored.

These and other aims, which will become more apparent in the description which follows, are achieved in accordance with the invention by a dispensing device having the structural and functional characteristics described in the appended independent claims, while other embodiments of the device according to the invention are described in the dependent claims.

Brief Description of the Drawings

The invention will now be described in more detail with reference to the accompanying drawings, listed below, which illustrate a non-limiting preferred embodiment of it.

Figures 1 and 2 are schematic side views, with some parts in cross section and others cut away, of the liquid dispensing device according to the invention.

Figures 3, 4a, 4b, 4c are perspective views of parts of the liquid dispensing device according to the invention.

Figures 5, 6a, 7 and 8 are side views of a part of the liquid dispensing device in a particular open configuration.

Figure 6b is a cross section of the part of the device illustrated in Figure 6a in a closed configuration.

Detailed Description of the Preferred Embodiments of the Invention

In Figures 1 and 2, the numeral 1 denotes a beverage dispensing device of the type comprising a cooled storage compartment 2 and a beverage dispensing line 4. The compartment 2 is cooled at least by a first cooling medium and houses at least one beverage container 3. The dispensing line 4 extends from the beverage container 3 to a tap 5 located on a dispensing head 6. The device 1 characteristically comprises at least one first

cooling circuit 11 that uses first movement means 12 to circulate the first cooling medium using, and one second cooling circuit 21 that uses second movement means 22 to circulate a second cooling medium that is in thermal contact with the beverage dispensing line 4. The first and second cooling mediums are fluid dynamically isolated from each other and the two cooling circuits 11, 21 exchange heat with a single cooling element 7 that cools both mediums. The single cooling element advantageously comprises an evaporator 71 and/or may have external cooling fins 73 to facilitate heat exchange with the first cooling medium. The evaporator 71, as shown in Figures 1 and 2, forms part of a cooling system with which the device 1 is equipped.

The first cooling circuit 11 enables the cooling medium to circulate between the single cooling element 7 and the beverage container 3, whilst the second cooling circuit 21 enables the cooling medium to circulate between the single cooling element 7 and the dispensing head 6.

The first means 12 for moving the first cooling medium preferably comprise a fan 120 driven by an electric motor in such a way as to produce forced circulation of the first cooling medium to facilitate heat exchange.

Advantageously, the first cooling circuit 11 also includes means 14 for guiding and channelling the first cooling medium for the compartment 2. These comprise a wall 26 that divides the compartment 2 into a first zone 24 where the evaporator 71 is located and a second zone 25 where the beverage container 3 to be cooled is located. The wall 26 has openings made in it, preferably but not necessarily both at the top and bottom of it. Thus, as shown in Figures 1 and 2, the fan 120 creates a unidirectional flow between the two zones 24 and 25.

The second means 22 for moving the second cooling medium may comprise a submersible pump 23 located inside a coil 72 of the evaporator 71 (see Figure 1). Alternatively and advantageously, in a second constructional embodiment illustrated in Figure 2, the second means 22 for moving the second cooling medium comprise a pump 231 located outside and, in particular, downstream of the single cooling element 7 (which might be the evaporator 71). Thus,

the size and capacity of the pump are independent of the evaporator 71.

As shown in Figures 1 and 2, the cooled compartment 2 is inside a unit 13 that is insulated to minimise heat loss and thus reduce power consumption. The dispensing head 6, on the other hand, is located outside the insulated unit 13.

The dispensing head 6 comprises a cooling chamber 8 in fluid communication with an inlet duct 9 and with a delivery duct 10 for the second cooling medium, the inlet duct 9 and the delivery duct 10 for the second cooling medium letting the second cooling medium into the chamber 8 and delivering it from the chamber 8.

The delivery duct 10 extends into the cooling chamber 8 and reaches the top 81 of the chamber. Thus, when the second cooling medium flows into the initially empty cooling chamber 8, it forces all the air out. The air flows out through the delivery duct 10 and does not remain trapped in the dispensing head 6. This is because the second cooling medium starts "flooding" the dispensing head 6 from the bottom and rises gradually towards the top of it. As shown in Figures 1, 2 and 3, the dispensing head 6 comprises a column 61 and the cooling chamber 8 is made inside the column 61, in thermal contact with the beverage dispensing line 4. This guarantees that the beverage in the parts of the dispensing line 4 outside the cooled, insulated compartment 2 are also cooled.

In the constructional embodiments shown in Figures 5, 6a, 6b, 7 and 8, the dispensing head 6 comprises an internal housing 610 for accommodating the dispensing line 4, the dispensing line 4 being in thermal contact with the cooling chamber 8. As shown in Figures 5, the dispensing head 6 comprises a mobile part 600 to facilitate fitting and removal of the beverage dispensing line 4 to and from the housing 610.

The dispensing head 6 comprises a door 611 providing access to the housing 610. The door 611 may coincide with the mobile part 600. The mobile part 600 facilitates maintenance, cleaning and substitution of the dispensing line 4 in order to guarantee the maximum level of hygiene for the dispensing line 4 itself. The mobile part 600 can be connected to the rest of the dispensing head 6 by fastening means 66: in Figures 7 and 8, for example, the

fastening means 66 comprise a hinge 661; in Figures 5 and 6a, on the other hand, the mobile part 600 is completely removable from the dispensing head 6 and the fastening means 66 comprise a protrusion 662 that can be inserted into a matching hole or socket. In both cases, the fastening means 66 comprise means 664 for latching and unlatching the door 611 to and from the rest of the dispensing head 6.

As shown by the dot-dashed line in Figures 5, 6a, 6b and 7, the dispensing head 6 optionally but preferably also comprises a protrusion 612 extending into the housing 610. The protrusion 612 at least partly defines a hole 613 through which the beverage dispensing line 4 can pass. The protrusion 612 advantageously constitutes means for positioning the beverage dispensing line 4 against the cooling chamber 8. This improves heat exchange between the second cooling medium in the cooling chamber 8 and the beverage flowing in the dispensing line 4. It also improves heat exchange between the second cooling medium and the beverage which, between one dispensing and the next, remains in the part of the dispensing line 4 at the head 6. As illustrated in Figures 5, 6 and 7, the protrusion 612 is advantageously attached to the door 611. Advantageously, the cooling chamber 8 is mounted in a fixed position. For example, the cooling chamber 8 may be attached to a dispensing counter.

Figures 4a, 4b and 4c, on the other hand, illustrate other non-restricting embodiments in which the dispensing head 6 comprises a column 61 and the cooling chamber 8 is made outside the column 61, but again in thermal contact with the beverage dispensing line 4. Thermal contact is guaranteed by the use of metal or other good thermally conductive materials between the cooling chamber 8 (which is positioned against the column 61) and the beverage dispensing line 4.

As shown in Figures 1 and 2, the column 61 comprises a channel 41 for guiding the beverage dispensing line 4. The channel 41 extends from a base 63 of the column 61 to the dispensing tap 5 and defines an internal space 42 that houses the beverage dispensing line 4 and is fluid dynamically isolated from the cooling chamber 8.

Although the first and second cooling mediums may be of the same type, they are, advantageously, two different types of fluid. Since the two circuits 11, 21 are separate, the two fluids may have a different flow rate, specific heat and temperature. In particular, the flow rates of the two circuits 11, 21 may be regulated independently of each other by the two movement means 12, 22. This permits greater operating flexibility and keeps the beverage in the column 61 cooled independently of the beverage in the container 3 located in the insulated unit 13 (where the heating effect of the outside environment is lower).

Advantageously and preferably, the first cooling medium is air, whose cost is practically zero, whilst the second cooling medium may be any fluid with a suitable melting point such as, for example, glycol. Air is also used as an operating fluid since an air compressor 15 is used to fill an inflatable jacket which, as it expands, forces the beverage out of the container 3. The inflatable jacket may be either inside or outside the element that actually contains the beverage.

The invention achieves important advantages.

First of all, it is constructionally simple and limits the number of cooling parts required.

Secondly, the cooling medium does not come into direct contact with the beverage dispensing pipe. This makes it possible to use a cooling medium with a melting point below 0°C and minimises the risk of freezing the beverage on the walls of the dispensing line, while at the same enhancing the chilling efficiency of the cooling mediums and enabling low temperatures to be reached. The risk of the beverage freezing along the inside walls of the beverage pipe is greatly reduced.

It will be understood that the invention can be adapted and modified in several ways without thereby departing from the spirit of the invention.

Moreover, all of the details of the invention may be substituted by technically equivalent elements.

In practice, the embodiments of the invention may be made from any material, and in any size, depending on requirements.

Claims

1. A dispensing device of the type comprising:
at least one compartment (2) cooled at least by a first cooling medium, the cooled compartment (2) housing at least one beverage container (3);
a beverage dispensing line (4) extending from the beverage container (3) to a tap (5) located on a dispensing head (6);
the dispensing device being characterised in that it comprises at least one first cooling circuit (11) that uses first movement means (12) to circulate the first cooling medium and at least one second cooling circuit (21) that uses second movement means (22) to circulate a second cooling medium which is in thermal contact with the beverage dispensing line (4) and which is fluid dynamically isolated from the first cooling medium; the two cooling circuits (11, 21) exchanging heat with a single cooling element (7).

2. The dispensing device according to claim 1, characterised in that the first cooling circuit (11) enables the cooling medium to circulate between the single cooling element (7) and the beverage container (3), whilst the second cooling circuit (21) enables the cooling medium to circulate between the single cooling element (7) and the dispensing head (6).

3. The dispensing device according to claim 1 or 2, characterised in that the cooled compartment (2) is located inside an insulated unit (13) and the dispensing head (6) is located outside the insulated unit (13).

4. The dispensing device according to any of the foregoing claims from 1 to 3, characterised in that the single cooling element (7) has fins (73) on the outside of it to improve heat exchange with the first cooling medium.

5. The dispensing device according to any of the foregoing claims from 1 to 3, characterised in that the single cooling element (7) comprises an evaporator (71).

6. The dispensing device according claim 5, characterised in that the evaporator (71) has fins (73) on the outside of it to improve heat exchange with the first cooling medium.

7. The dispensing device according to claim 5 or 6, characterised in that the second means (22) for moving the second cooling medium comprise a submersible pump (23) located inside a coil (72) of the evaporator (71).

8. The dispensing device according to any of the foregoing claims, characterised in that the second means (22) for moving the second cooling medium comprise a pump (231) located outside and downstream of the single cooling element (7).

9. The dispensing device according to any of the foregoing claims, characterised in that the dispensing head (6) comprises a cooling chamber (8) in fluid communication with an inlet duct (9) and with a delivery duct (10) for the second cooling medium, the inlet duct (9) and the delivery duct (10) for the second cooling medium letting the second cooling medium into the chamber (8) and delivering it from the chamber (8), respectively.

10. The dispensing device according to claim 9, characterised in that the delivery duct (10) of the cooling chamber (8) extends into the cooling chamber (8) and reaches the top (81) of the chamber.

11. The dispensing device according to claim 9 or 10, characterised in that the dispensing head (6) comprises an internal housing (610) for accommodating the dispensing line (4), the dispensing line (4) being in thermal contact with the cooling chamber (8).

12. The dispensing device according to claim 11, characterised in that the dispensing head (6) comprises a mobile part (600) to facilitate fitting and removal of the beverage dispensing line (4) to and from the housing (610).

13. The dispensing device according to claim 11 or 12, characterised in that the dispensing head (6) comprises a door (611) providing access to the housing (610) of the dispensing line (4).

14. The dispensing device according to claim 13 when it depends on claim 12, characterised in that the door (611) coincides with the mobile part (600).

15. The dispensing device according to claim 11 or 12 or 13 or 14, characterised in that the dispensing head (6) comprises a protrusion (612) extending into the housing (610), the protrusion (612) at least partly defining a hole (613) through which the beverage dispensing line (4) can pass.

16. The dispensing device according to any of the foregoing claims from 9 to 15, characterised in that the cooling chamber (8) is mounted in a fixed position.

17. The dispensing device according to claim 9 or 10, characterised in that the dispensing head (6) comprises a column (61) and in that the cooling chamber (8) is made outside the column (61) but in thermal contact with the beverage dispensing line (4).

18. The dispensing device according to claim 9 or 10, characterised in that the dispensing head (6) comprises a column (61) and in that the cooling chamber (8) is made inside the column (61) in thermal contact with the beverage dispensing line (4).

19. The dispensing device according to claim 18, characterised in that the column (61) comprises a channel (41) for guiding the beverage dispensing line (4).

20. The dispensing device according to claim 19, characterised in that the guide channel (41) extends from a base (63) of the column (61) to the dispensing tap (5) and defines an internal space (42) that houses the beverage dispensing line (4) and is fluid dynamically isolated from the cooling chamber (8).

21. The dispensing device according to any of the foregoing claims, characterised in that the first means (12) for moving the first cooling medium comprise a fan (120) designed to produce forced circulation of the first cooling medium in order to facilitate heat exchange.

22. The dispensing device according to any of the foregoing claims, characterised in that it comprises means (14) for guiding and channelling the first cooling medium for the compartment (2).

23. The dispensing device according to any of the foregoing claims, characterised in that the first cooling medium is air.

24. The dispensing device according to any of the foregoing claims, characterised in that the second cooling medium is glycol.

25. The dispensing device according to any of the foregoing claims, characterised in that it comprises an air compressor (15) supplying air to an inflatable jacket which, as it expands, forces the beverage out of the container (3).

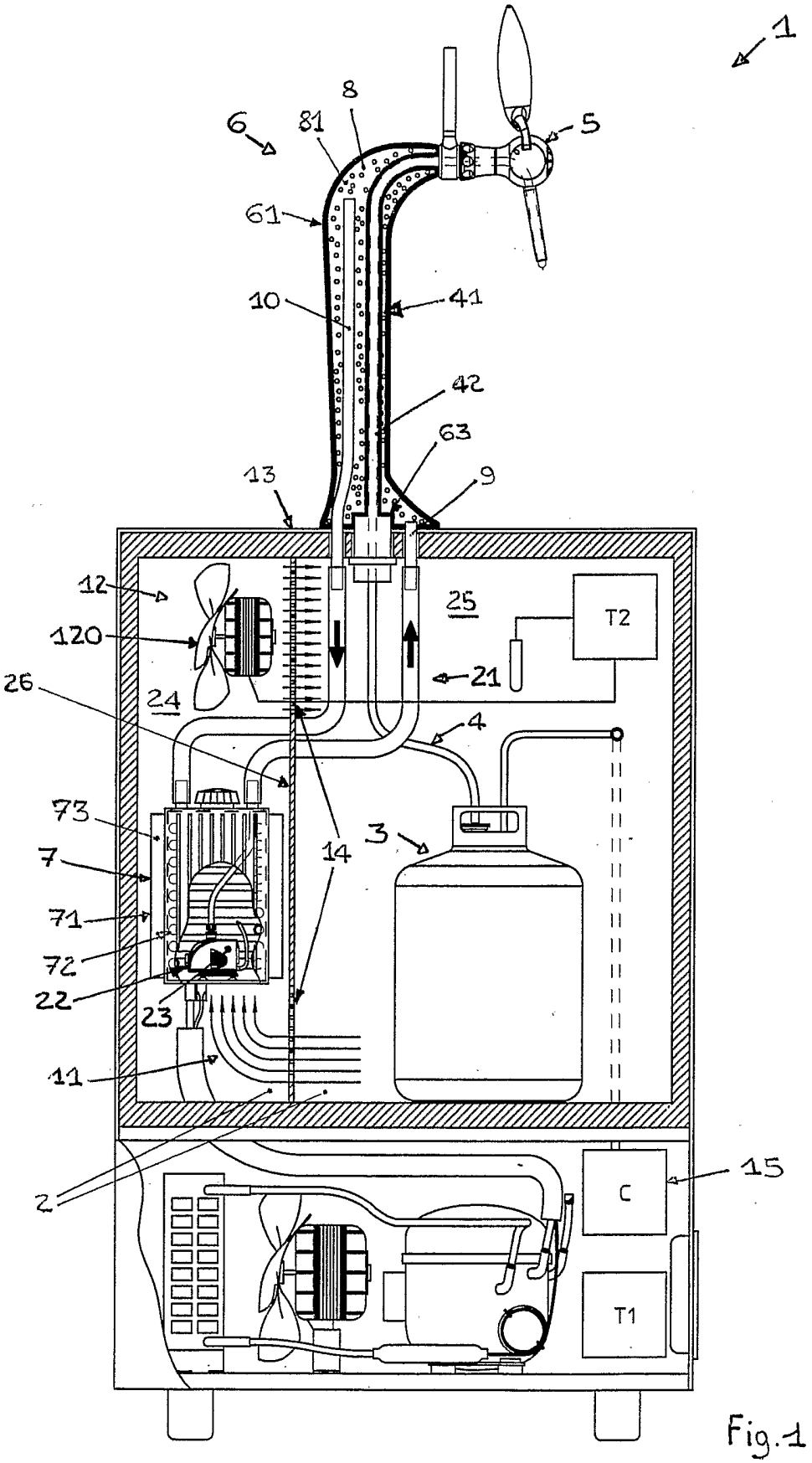

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Fig.1

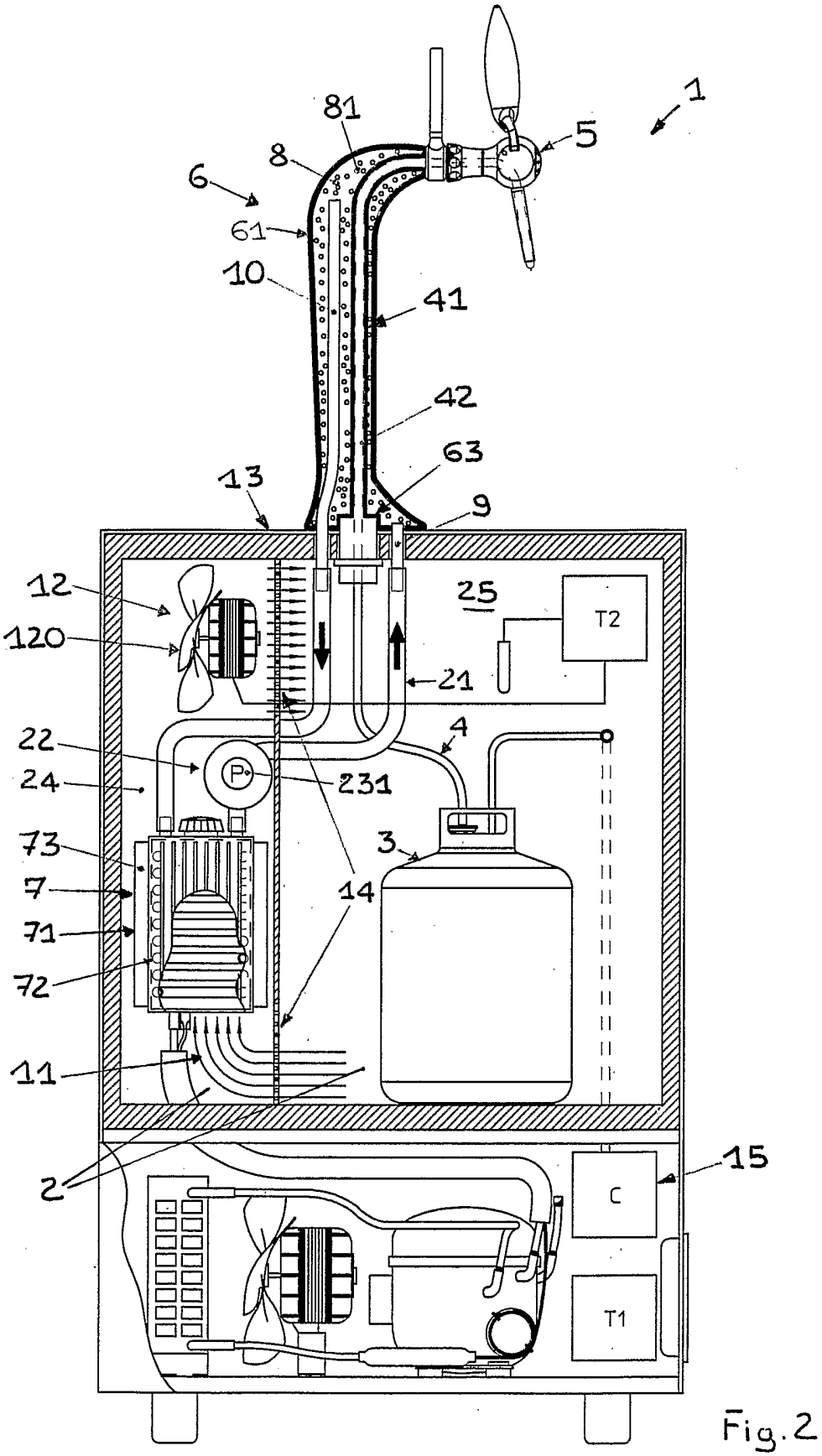

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Fig.2

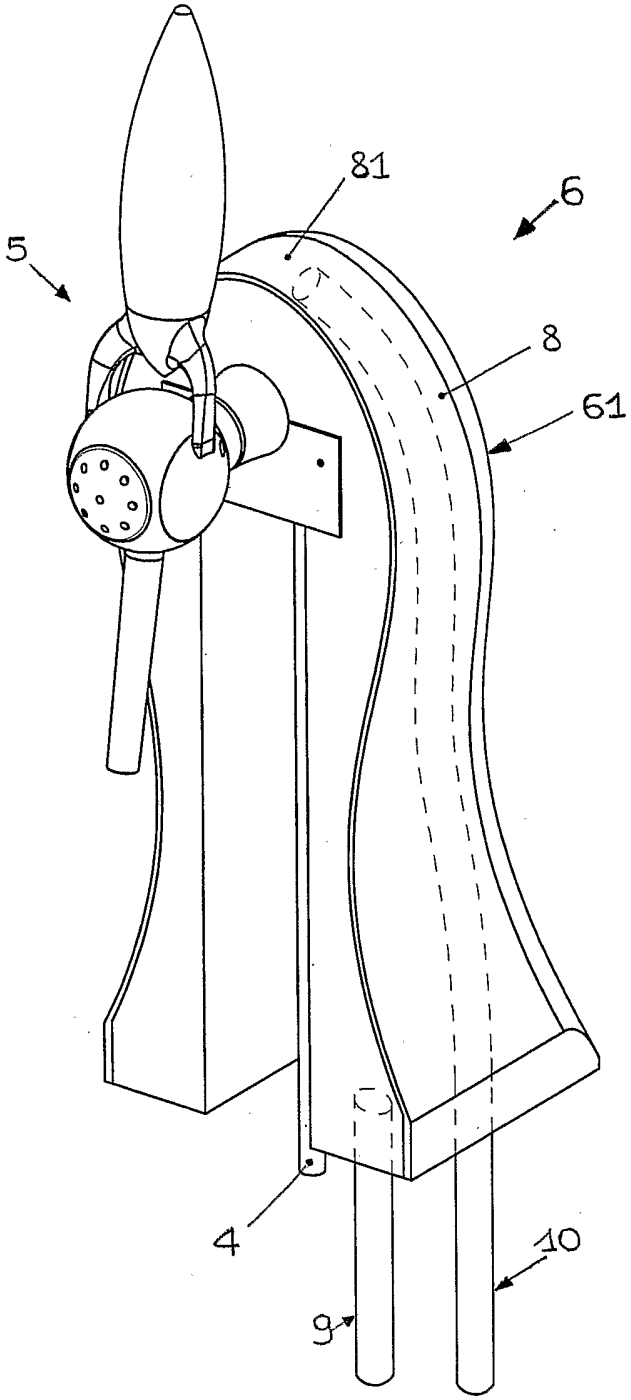


Fig. 3

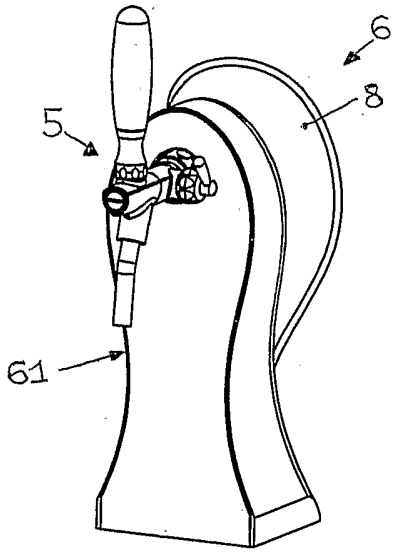


Fig. 4a

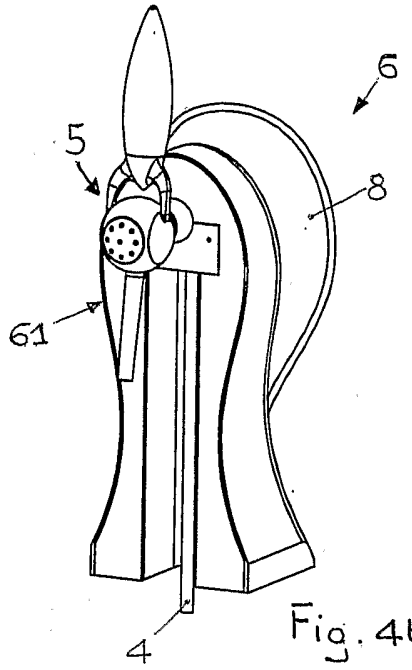


Fig. 4b

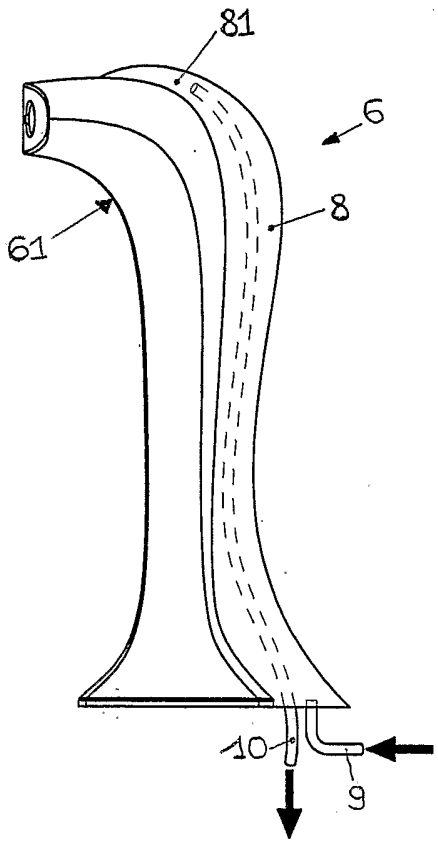


Fig. 4c

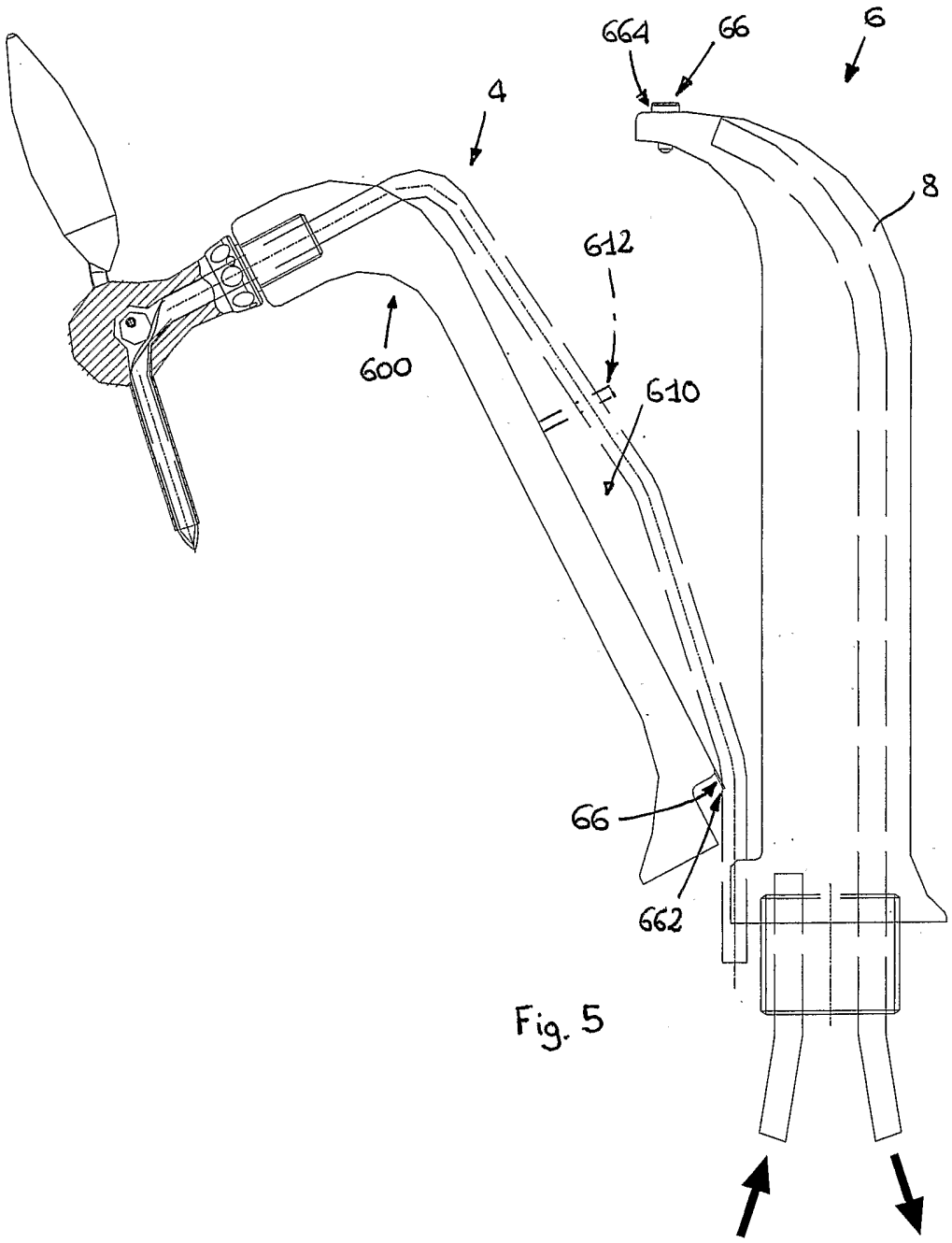


Fig. 5

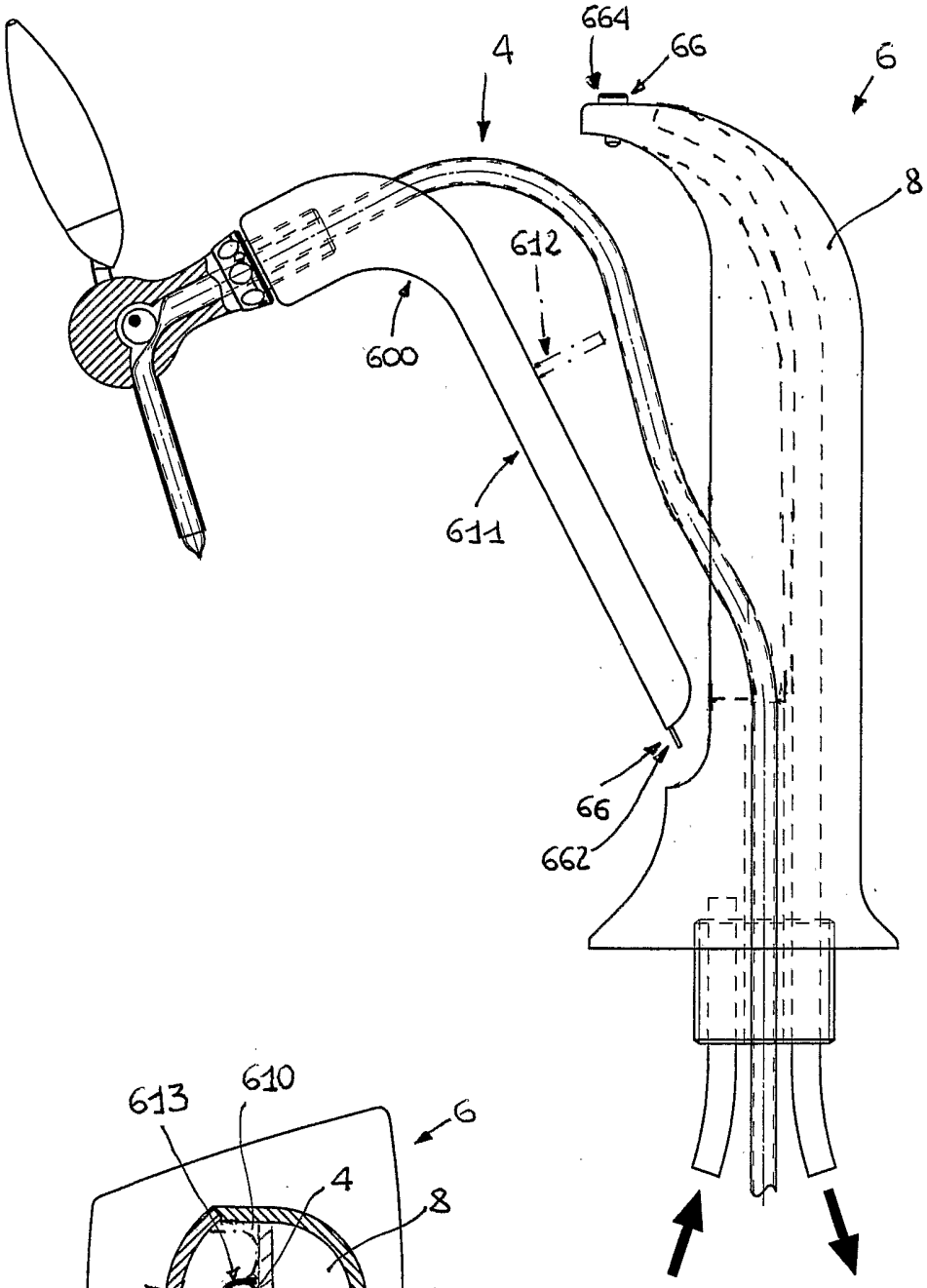


Fig. 6a

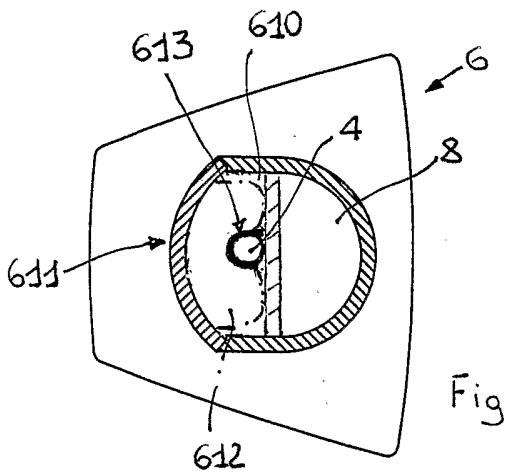


Fig. 6b

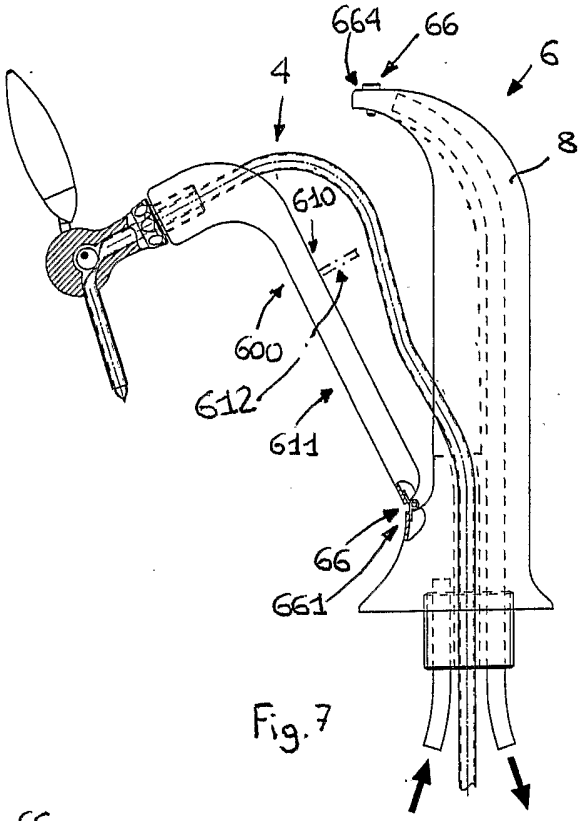


Fig. 7

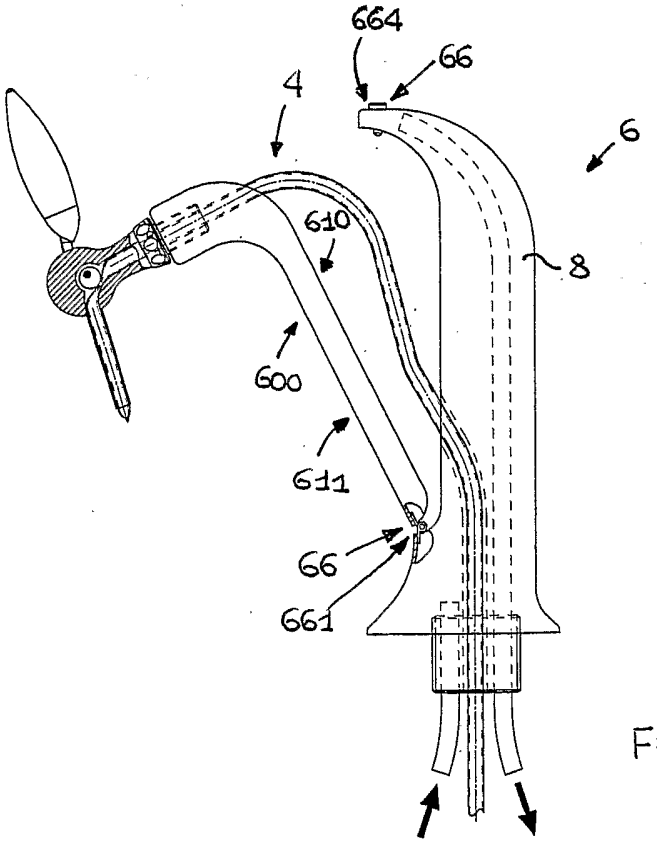


Fig. 8