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(54) **Draught beverage dispensing font and method for manufacturing it**

(57) The invention concerns a draught beverage dispensing font, comprising a font casing, and cooling means associated with said casing, said cooling means being suitable for producing either condensate or frost on at least one outer surface of said casing. Advanta-

geously, said cooling means are structurally distinct from said casing and they are arranged in heat exchange relationship with at least one surface of said casing. The invention also concerns a method for manufacturing such a font.

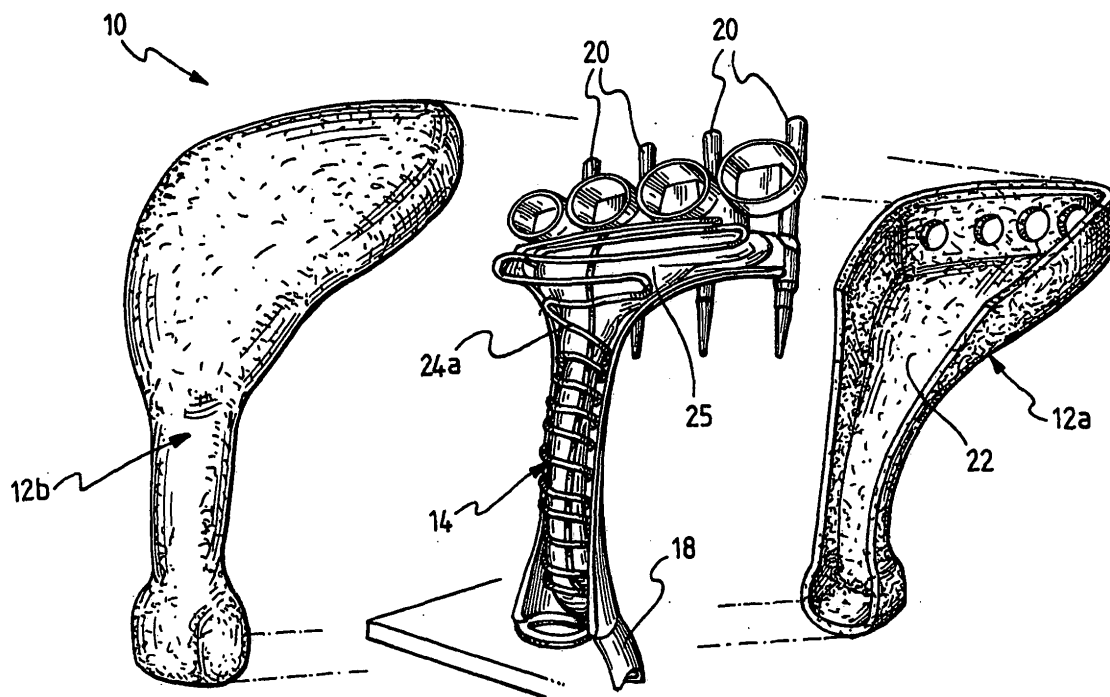


Fig.3

Description

[0001] The present invention concerns a draught beverage dispensing font.

[0002] The present invention also concerns a method for manufacturing such a font.

[0003] Draught beverage dispensing fonts are well-known in the art, and they are in particular used to dispense alcoholic beverages, like for example beer.

[0004] Furthermore, so-called cooled fonts are known, in which either condensate or frost is produced on the outer surface of the font casing, as a visual indication of the cool temperature of the beverage being dispensed. In this way, it has been shown that the sales of the beverages, especially of cold draught alcoholic beverages, are significantly boosted. In other words, causing the dispensing fonts to appear to be cold themselves (either running with condensed water or shrouded in frost), drives the consumers to buy the cold beverage.

[0005] The casing of such cooled fonts is expressly designed to produce either condensate or frost on the outer surface thereof. In particular, the casing's walls themselves are cooled by a piping which is integrally formed inside such walls, said piping defining an evaporator unit of a cooling apparatus which carries out a closed refrigeration cycle.

[0006] Although advantageous from the point of view of the obtained effect of condensate or frost, the Applicant has found that a draught beverage dispensing font manufactured according to the aforementioned prior art has some drawbacks, the main one of which is linked to the fact that, when it is desired to convert an existing non-cooled font to a cooled font, it is necessary to substitute at least all the existing casing with the aforementioned cooled-type casing.

[0007] The technical problem at the basis of the present invention is to provide a draught beverage dispensing font that allows a cheap conversion of existing non-cooled font, so as to overcome the drawbacks aforementioned with reference to the prior art, in a simple and effective manner.

[0008] Therefore the present invention, in a first aspect thereof, concerns a draught beverage dispensing font, comprising a font casing, and cooling means associated with said casing, said cooling means being suitable for producing either condensate or frost on at least one outer surface of said casing, characterised in that said cooling means are structurally distinct from said casing and they are arranged in heat exchange relationship with at least one surface of said casing.

[0009] The aforementioned font can be advantageously fitted to the design of an existing non-cooled font, so that existing non-cooled fonts can be converted to cooled types without the need for a new font design. In other words, the cooling means of the font of the present invention can be retro-fitted into fonts that have not been initially designed with this feature of condensate or frost in mind.

[0010] Advantageously, in the font of the present invention the control over the temperature of the font surface is simple and automatic, guaranteeing the desired either condensation or frosting, independent of surrounding environmental conditions.

[0011] Furthermore, the font of the present invention allows for the transfer of the cooling means from one font to another - with minor adjustments - should the favoured design of font change over time.

[0012] Preferably, the aforementioned cooling means are arranged inside said casing and in heat exchange relationship with at least one inner surface of said casing.

[0013] In this way, advantageously, the external design of a retro-fitted cooled font remains unchanged.

[0014] More preferably, the aforementioned cooling means define an evaporator unit of a cooling apparatus adapted to carry out a closed refrigeration cycle.

[0015] Such an evaporator unit is advantageously easy to be controlled, intervening on the known parameters of the closed refrigeration cycle, so as to produce the desired condensate or frost on the outer surface of said casing.

[0016] Even more preferably, the aforementioned cooling means comprise at least one pipe which is at least partially coil-shaped.

[0017] In the present patent application, by "coil-shaped pipe" it is meant a pipe whose longitudinal axis substantially has the shape of a coil or of a zigzag line.

[0018] The coil-shaped pipe has the advantage of increasing the heat exchange surfaces.

[0019] Preferably, the font of the present invention, when the cooling means are arranged inside said casing, further comprises at least one draught beverage line arranged inside said casing, and the aforementioned pipe is at least partially wound around said at least one draught beverage line.

[0020] More preferably, insulating means are interposed between said at least one draught beverage line and said pipe.

[0021] In any case, the font casing of the present invention is preferably heat conductive, and more preferably is made from a cast metal.

[0022] In a second aspect thereof, the present invention concerns a method for manufacturing a cooled draught beverage dispensing font comprising a font casing, the method comprising the steps of:

- providing cooling means structurally distinct from said casing;
- arranging said cooling means in heat exchange relationship with at least one surface of said casing, so as to produce either condensate or frost on at least one outer surface of said casing. In the present patent application, by "method for manufacturing a cooled draught beverage dispensing font" it is also meant a method for retro-fitting a draught beverage dispensing font in a cooled draught beverage dis-

pensing font.

[0023] Preferably, the cooled font - manufactured by the aforementioned method - separately or in combination has all of the structural and functional characteristics discussed above with reference to the aforementioned font of the present invention and therefore it has all of the aforementioned advantages.

[0024] In particular, the aforementioned arranging step of the method of the present invention is preferably performed arranging said cooling means inside said casing and in heat exchange relationship with at least one inner surface of said casing.

[0025] More preferably the aforementioned method further comprises the step of providing a cooling apparatus adapted to carry out a closed refrigeration cycle, wherein said cooling means define an evaporator unit of said cooling apparatus.

[0026] Even more preferably, the aforementioned arranging step of the method of the present invention is also performed at least partially shaping like a coil at least one pipe comprised in said cooling means.

[0027] Furthermore, the aforementioned arranging step of the method of the present invention is preferably performed at least partially winding said at least one pipe around at least one draught beverage line arranged inside said casing.

[0028] More preferably, the method of the present invention further comprises the step of interposing insulating means between said at least one draught beverage line and said at least one pipe.

[0029] Further characteristics and advantages of the present invention shall become clearer from the following detailed description of preferred embodiments thereof, made with reference to the attached drawings and given for indicating and not limiting purposes. In such drawings:

- figure 1 schematically represents a perspective back view of a draught beverage dispensing font according to the present invention;
- figure 2 schematically represents a perspective front view of the draught beverage dispensing font of figure 1;
- figure 3 schematically represents an exploded perspective back view of the draught beverage dispensing font of figure 1;
- figure 4 schematically represents a diagram of a closed refrigeration cycle, whose evaporator unit is part of the draught beverage dispensing font of figure 1;
- figure 5 schematically represents a more detailed diagram of the closed refrigeration cycle of figure 4;
- figure 6 schematically represents a more detailed

diagram of the closed refrigeration cycle of figure 5, operating in condensing mode;

- figure 7 schematically represents a more detailed diagram of the closed refrigeration cycle of figure 5, operating in frosting mode.

[0030] With initial reference to figures 1-3, a draught beverage dispensing font in accordance with the present invention is shown. Such a font is globally indicated with 10 and it is preferably made from cast metal.

[0031] The font 10 comprises a font casing 12 and cooling means 14 associated with the casing 12, such cooling means 14 being suitable for producing either condensate or frost on a outer surface 16 of the casing 12. The font 10 comprises one or more draught beverage line 18 arranged inside the casing 12, which ends with one or more draught beverage distributor 20 (four distributor 20 are shown in figure 3). The beverage lines are connected to a beverage tank.

[0032] According to the present invention, the cooling means 14 are structurally distinct from the casing 12 and they are arranged in heat exchange relationship with a surface of the casing 12. In particular, the cooling means 14 are in relationship with an inner surface 22 of the casing 12.

[0033] The casing 12 shown in figure 3 is formed by a front shell 12a and a rear shell 12b.

[0034] The cooling means 14 define an evaporator unit 24 of a cooling apparatus 26 adapted to carry out a closed refrigeration cycle.

[0035] In particular, as shown in figure 4, the cooling apparatus 26 comprises the evaporator unit 24 and a condensing unit 28 connected together through refrigerant fluid tubes 30 so as to define a gas-tight, closed refrigeration cycle. The refrigerant fluid tubes 30 are flexible narrow gauge tubes, i.e. capillary gauges. The expansion step of the closed refrigeration cycle is carried out in the capillary gauges (in other words, the closed refrigeration cycle is of the so-called "direct expansion" type).

[0036] The evaporator unit 24 is preferably of the coil type (or of the plate type), and it comprises a matrix designed to suit the particular shape of the available inner volume of the font 10. Preferably, the pipe 24a of such a coil is wound around the draught beverage line 18, so as to realize a bespoke evaporator. Insulating means 25 are interposed between the draught beverage line 18 and the aforementioned pipe 24a of the coil. Preferably, the insulating means 25 are part of the aforementioned matrix.

[0037] The condensing unit 28, preferably of the vapour compression refrigeration type, comprises an hermetic compressor, a forced air condenser coil (with possible electric fan), a heat exchanger/receiver cylinder and associated connecting tubing and electrical controls.

[0038] Preferably, within the condensing unit 28, two pressure switches are mounted in the suction line of the compressor. One is set at a safety pressure, to protect

the compressor, and equivalent to an evaporating temperature of -20°C , which is sufficient to freeze the outer surface 16 of the font 10. The other switch is set at a pressure equivalent to an evaporating temperature of -5°C , which is sufficient to create condensation on the outer surface 16 of the font 10 under all practical ambient conditions.

[0039] A selector switch in the electrical control circuit allows one or other of these switches to control the operation of the compressor, offering a choice between the frozen effect and the condensing effect.

[0040] In figure 4 the concept of the cooling apparatus 26 is shown. Air cooled condensing unit 28 ejects heat energy to atmosphere and the refrigerant fluid carries heat energy away from font 10, so that moisture condenses out of air onto the cold outer surface 16 of the font 10.

[0041] In order for the font 10 to "sweat", the temperature of the outer surface 16 must be below the dew point of the surrounding air.

[0042] Therefore, in order to ensure that "sweating" will occur reliably, the outer surface 16 of the font 10 needs to be cooled to the dew point of air at 18°C and 30% RH (Relative Humidity). This means that the outer surface 16 of the font 10 needs to be kept at just above 0°C .

[0043] Figure 5 shows the operating principles of the cooling apparatus 26.

[0044] The pressure in the evaporator unit 24 is controlled by the compressor. The evaporating temperature (or boiling point) is controlled by the pressure, according to the known "Charles Law".

[0045] In order to maintain the outer surface 16 of the font 10 at 0°C the cooling apparatus 26 needs to maintain an evaporating temperature of around -7°C . For instance, with the refrigerant fluid R134a, this corresponds to a pressure of 18 psig (about 1.24041 bar).

[0046] Switching the compressor on and off using the pressure switch allows the cooling apparatus 26 to maintain this condition.

[0047] Figure 6 shows the operation in condensing mode of the cooling apparatus 26.

[0048] The pressure in the evaporator unit 24 is controlled by the pressure switch 32.

[0049] Left to its own devices the compressor will continue to draw vapour from the evaporator unit 24 until a pressure of around 5 psig (about 0.34456 bar) is reached. For instance, with the fluid refrigerant R134a, this corresponds to a temperature of -18°C .

[0050] Over-riding the pressure switch 32 allows the cooling apparatus 26 to run continuously and maintain this condition.

[0051] Figure 7 shows the operation in frosting mode of the cooling apparatus 26.

[0052] The pressure in the evaporator unit 24 is controlled by the compressor. The pressure switch 32 is over-ridden.

[0053] When frosting, the heat flown into the font 10

from the air equals the amount of heat being extracted by the condensing unit 28 at an ambient air temperature of around 25°C . Once the air temperature rises above this point, the frost will slowly melt and the unit will revert to "sweating" until the temperature drops again.

[0054] The functioning of the cooling apparatus 26 is described below.

[0055] To put the apparatus 26 into operation, a rocker switch can be provided, which is set to a "frosting" position. The power to the apparatus 26 is turned on at the mains outlet.

[0056] The apparatus 26 is allowed to run for approximately 15 minutes in this condition. If the desired effect is frosting, the apparatus 26 has to continue to run. The pressure switch 32 is now over-ridden and the outer surface 16 of the font 10 will start to frost.

[0057] After the initial 15 minute period, if condensation is required on the outer surface 16 of the font 10, the rocker switch has to be switched to a "condense" position.

This brings the pressure switch 32 into circuit and the apparatus will maintain the font temperature at just above freezing.

[0058] Depending on conditions, the condensation will start to form on the font in 10-15 minutes, whereas the frost will start in 20-30 minutes.

[0059] The apparatus 26 uses a very small quantity of fluid refrigerant, preferably R134a, which has a zero ODP (Ozone Depletion Potential).

[0060] The present invention also concerns a method for manufacturing a cooled draught beverage dispensing font, comprising the steps of providing cooling means structurally distinct from the font casing, and arranging the cooling means in heat exchange relationship with a surface of the casing, so as to produce either condensate or frost on the outer surface of the casing.

[0061] Of course, a man skilled in the art can bring numerous modifications and variants to the draught beverage dispensing font and to the method for manufacturing a cooled draught beverage dispensing font described above, in order to satisfy specific and contingent requirements, all of which are however covered by the scope of protection of the present invention as defined by the following claims.

Claims

1. Draught beverage dispensing font, comprising a font casing, and cooling means associated with said casing, said cooling means being suitable for producing either condensate or frost on at least one outer surface of said casing, **characterised in that** said cooling means are structurally distinct from said casing and they are arranged in heat exchange relationship with at least one surface of said casing.
2. Font according to claim 1, wherein said cooling means are arranged inside said casing and in heat

exchange relationship with at least one inner surface of said casing.

3. Font according to any one of the previous claims, wherein said cooling means define an evaporator unit of a cooling apparatus adapted to carry out a closed refrigeration cycle. 5
4. Font according to claim 3, wherein said cooling means comprise at least one pipe which is at least partially coil-shaped. 10
5. Font according to claim 4 when depending on claim 2, further comprising at least one draught beverage line arranged inside said casing, wherein said at least one pipe is at least partially wound around said at least one draught beverage line. 15
6. Font according to claim 5, wherein insulating means are interposed between said at least one draught beverage line and said at least one pipe. 20
7. Font according to any one of the previous claims, wherein said casing is heat conductive, and preferably is made from a cast metal. 25
8. Method for manufacturing a cooled draught beverage dispensing font comprising a font casing, the method comprising the steps of: 30
 - providing cooling means structurally distinct from said casing;
 - arranging said cooling means in heat exchange relationship with at least one surface of said casing, so as to produce either condensate or frost on at least one outer surface of said casing. 35
9. Method according to claim 8, wherein said arranging step is performed arranging said cooling means inside said casing and in heat exchange relationship with at least one inner surface of said casing. 40
10. Method according to any one of claims 8 to 9, further comprising the step of providing a cooling apparatus adapted to carry out a closed refrigeration cycle, wherein said cooling means define an evaporator unit of said cooling apparatus. 45
11. Method according to claim 10, wherein said arranging step is also performed at least partially shaping like a coil at least one pipe comprised in said cooling means. 50
12. Method according to claim 11 when depending on claim 9, wherein said arranging step is performed at least partially winding said at least one pipe around at least one draught beverage line arranged inside said casing. 55

13. Method according to claim 12, further comprising the step of interposing insulating means between said at least one draught beverage line and said at least one pipe.

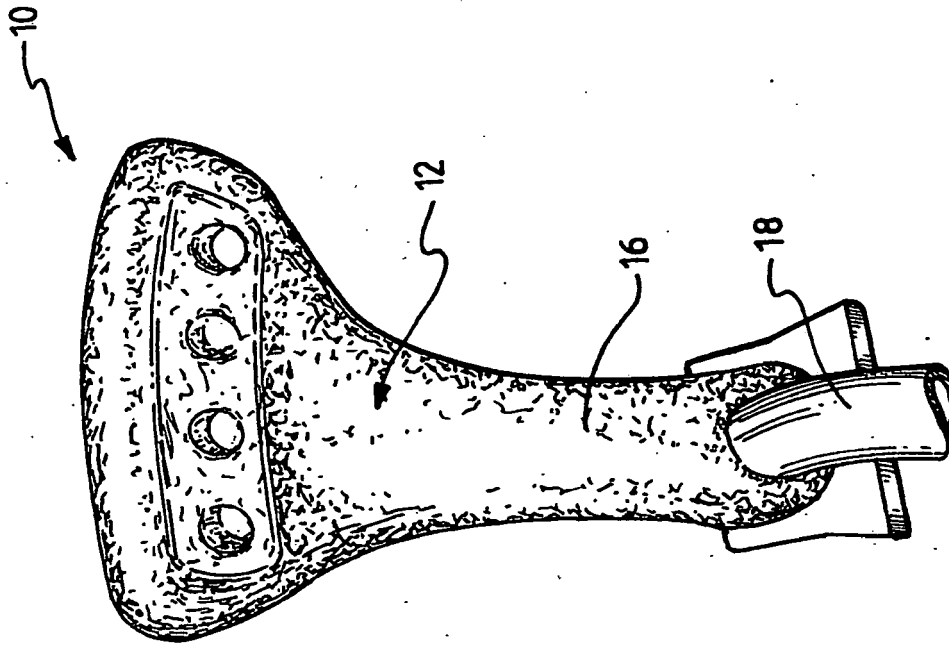


Fig. 2

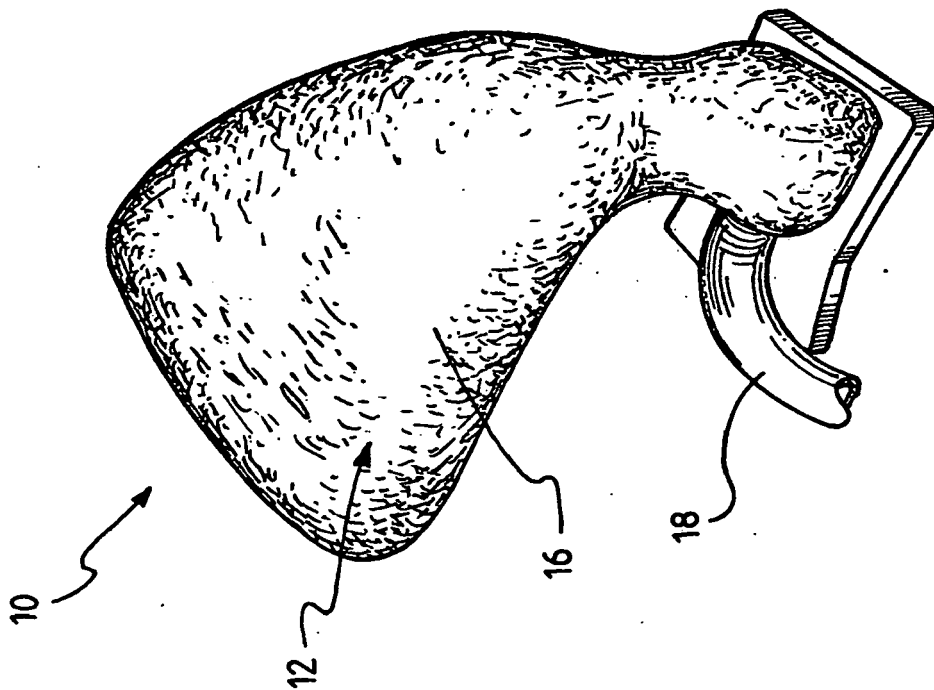


Fig. 1

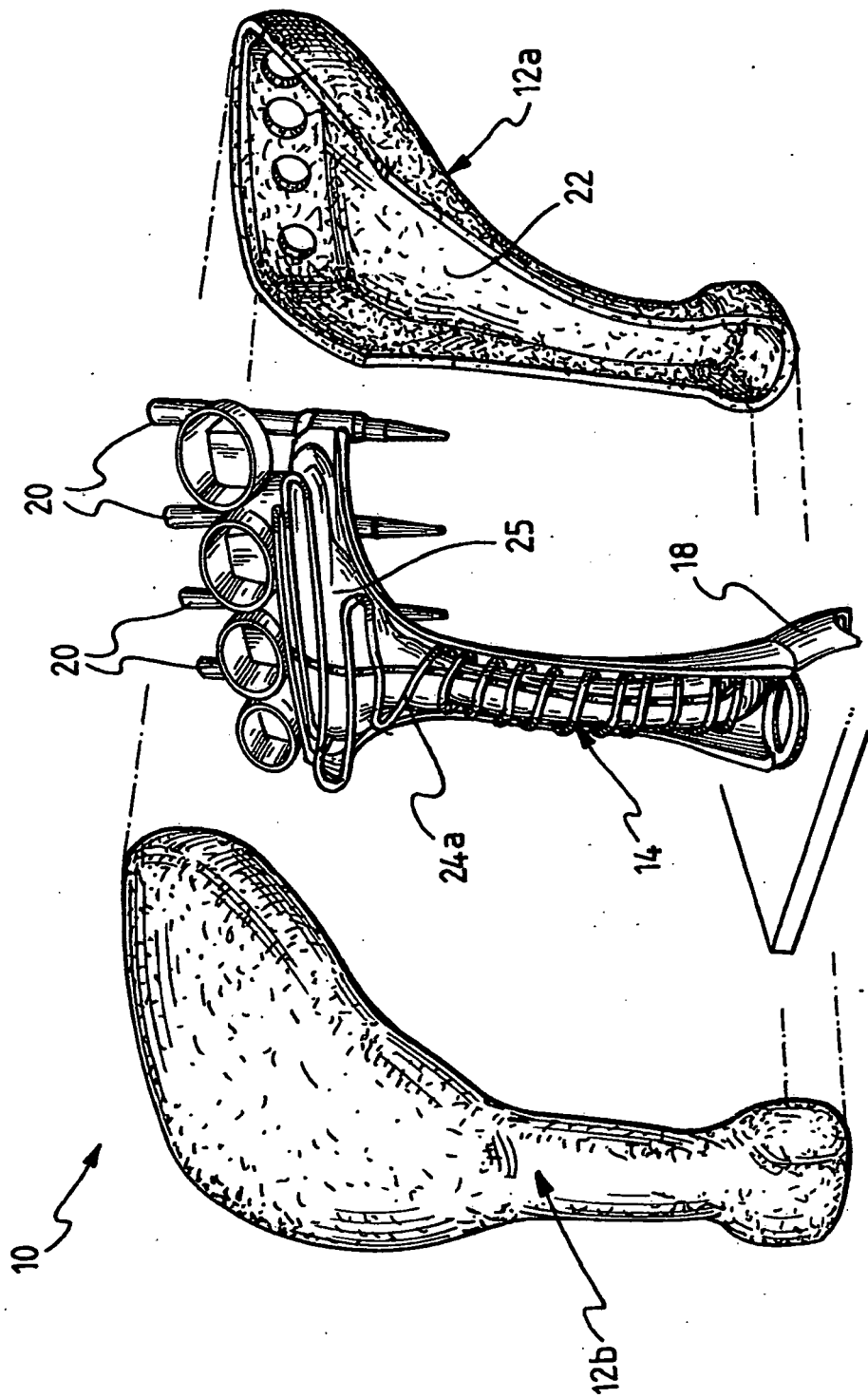


Fig.3

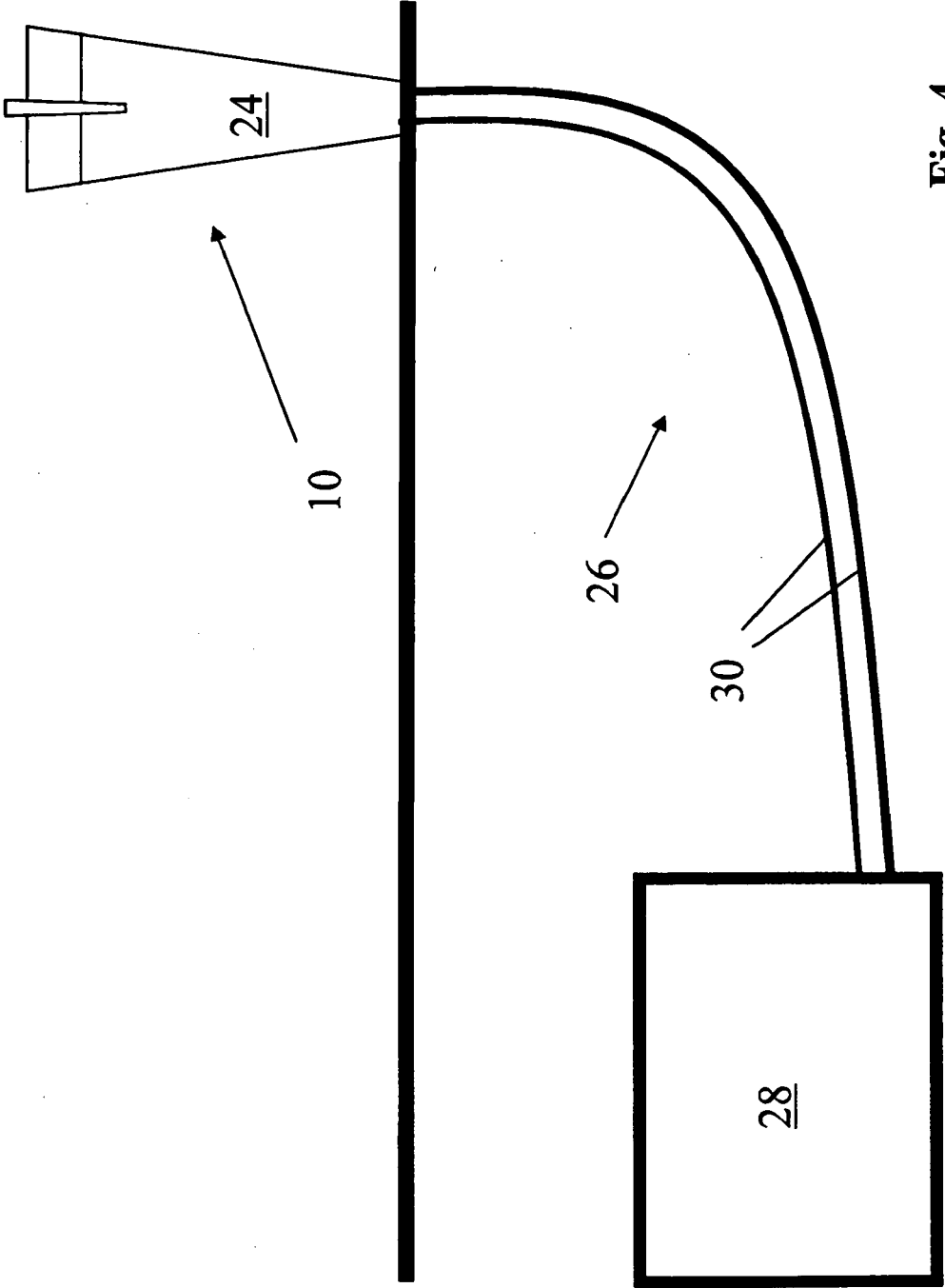


Fig. 4

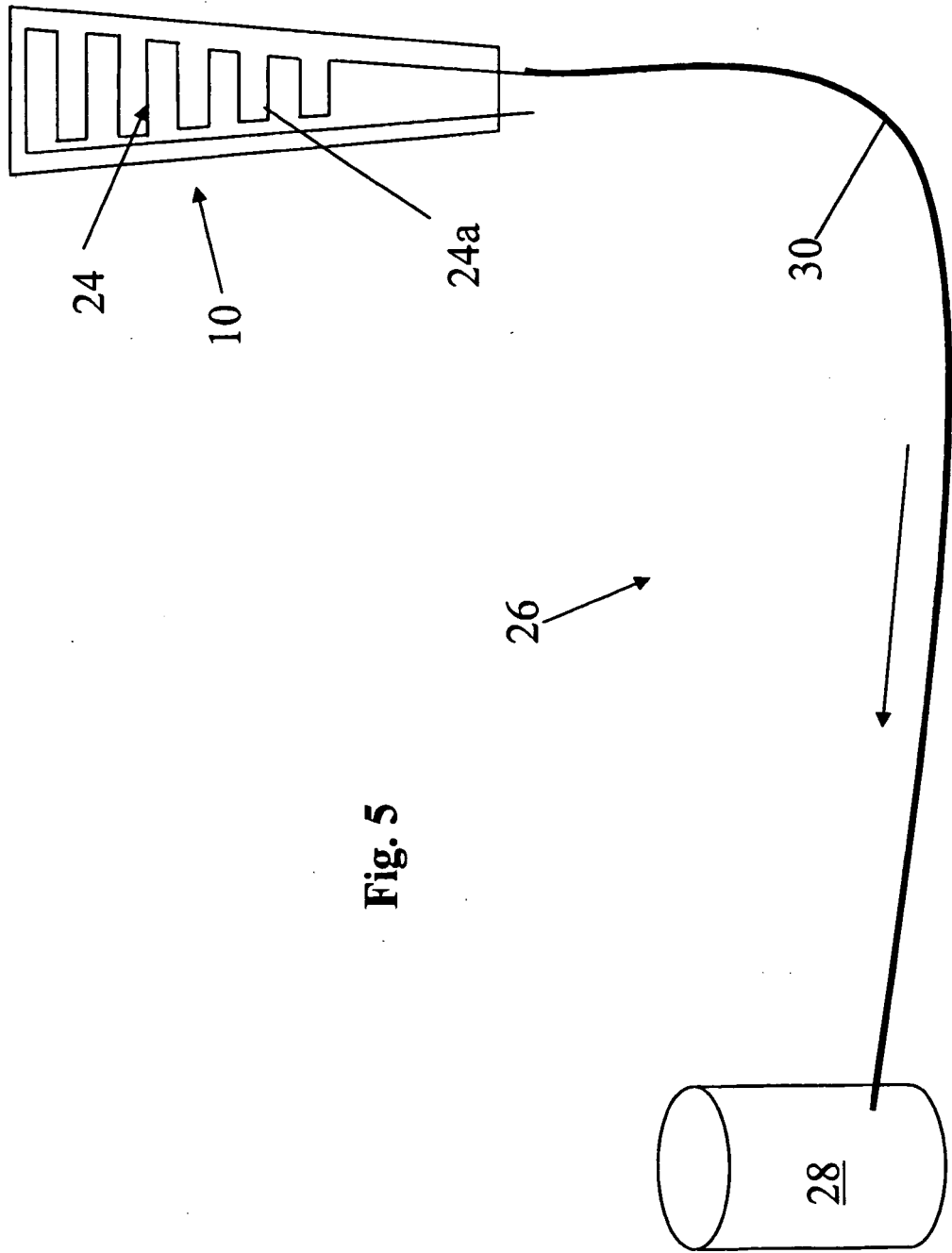


Fig. 5

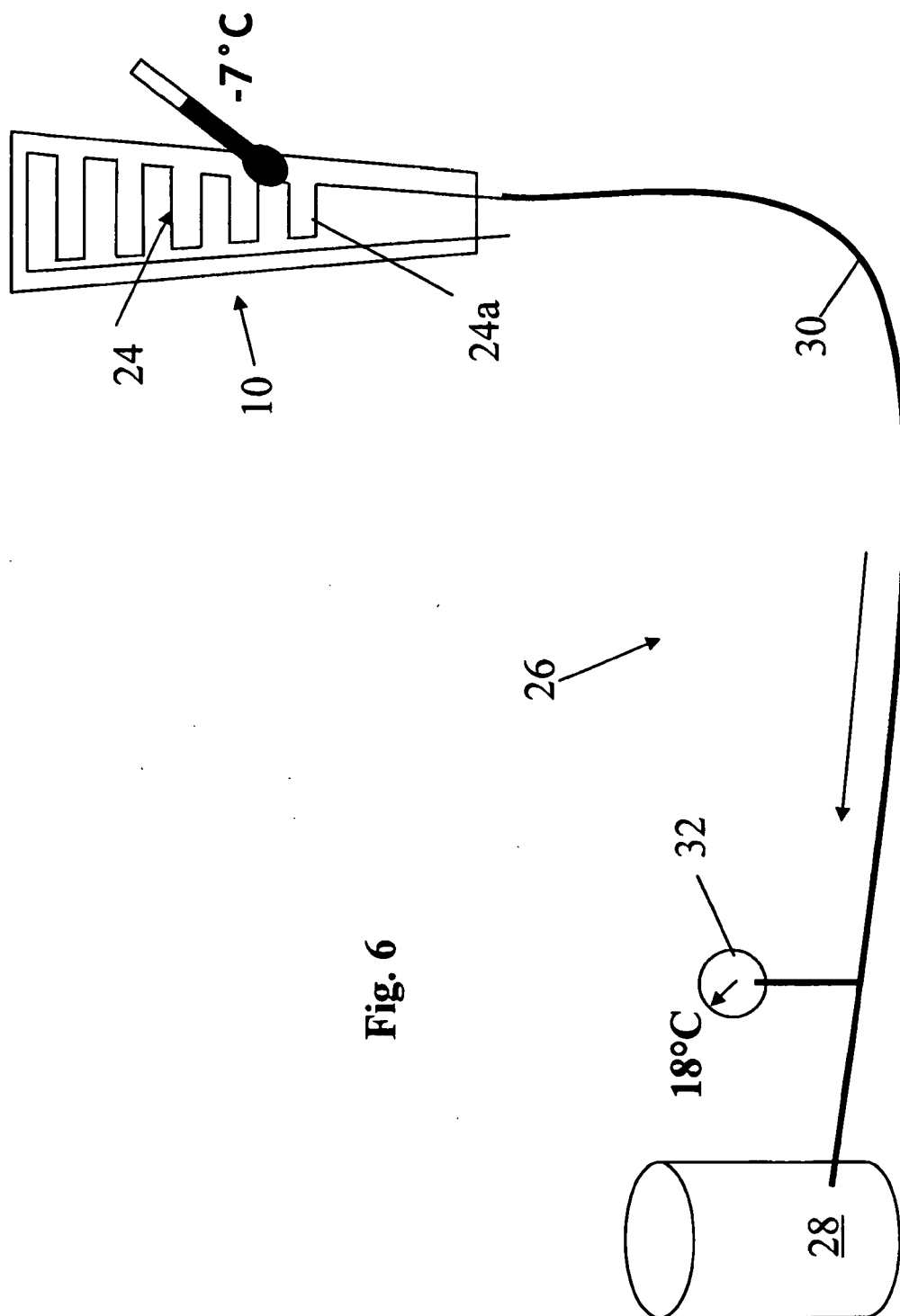


Fig. 6

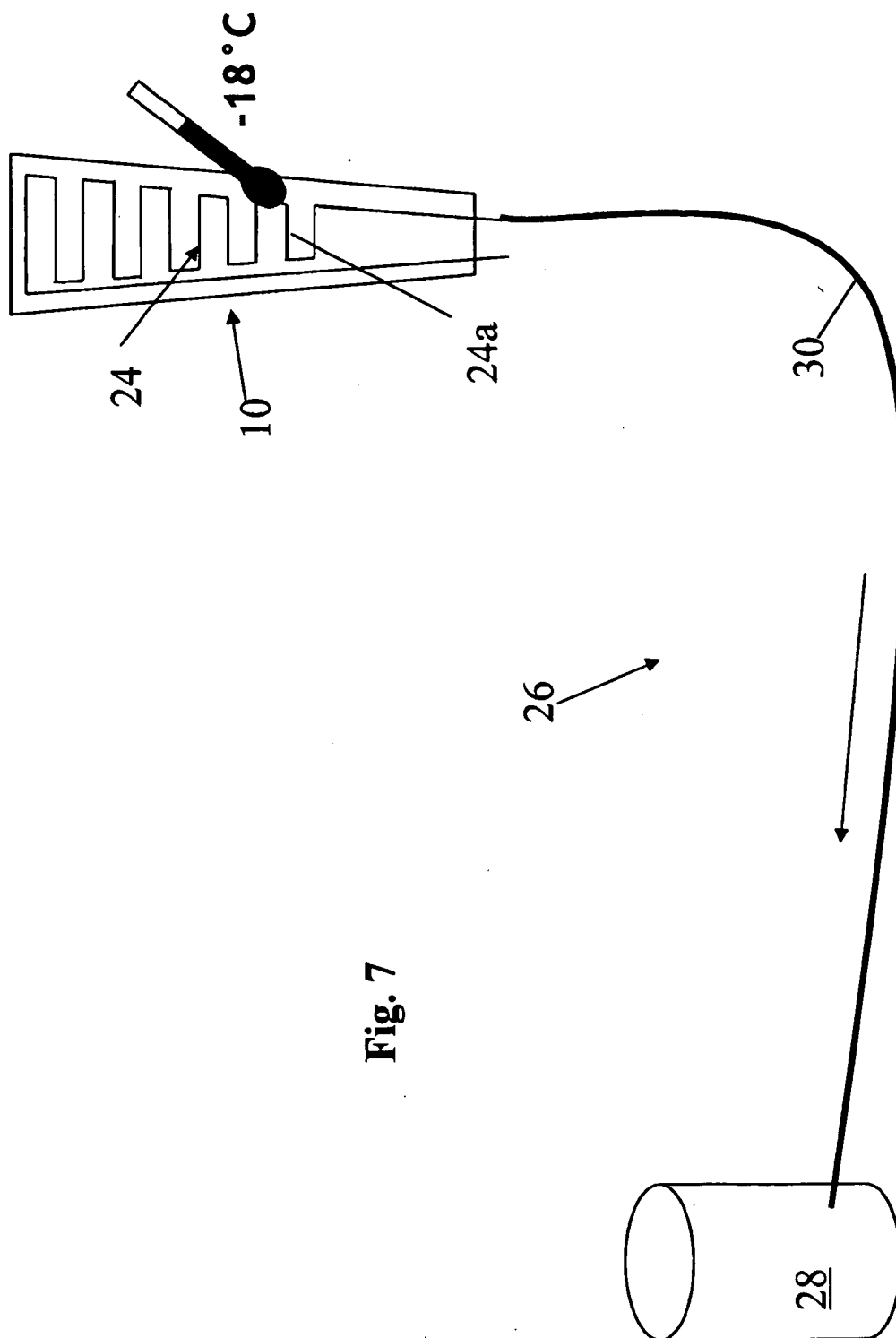


Fig. 7



EUROPEAN SEARCH REPORT

Application Number
EP 08 02 1022

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 2 401 423 A (IMI CORNELIUS [GB]) 10 November 2004 (2004-11-10) * page 6, line 24 - page 8, line 5; figure *	1-4,7-11	INV. B67D1/08 B67D1/06
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 16 October 2009	Examiner Müller, Claus
CATEGORY OF CITED DOCUMENTS 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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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 02 1022

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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16-10-2009

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