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(54) A wine bottle storage and multiple dispensing apparatus

(57) A wine storage and multiple dispensing apparatus contains a plurality of bottles (3) of wine and is equipped with a tapping device (4) which, by supplying the bottles with a fluid under pressure, enables tapping and dispensing of the wine through feed lines (41, 42) alternately connected to an external dispensing tap (5). The apparatus comprises one or more dispensing modules (6), each including a Peltier cell (2) controlled by an electronic unit (7) in such a way that it can absorb or give out heat within the bottle (3) storage compartment (8) by very simply switching from one operating mode to another, thus keeping the compartment at a desired optimum temperature at all times.

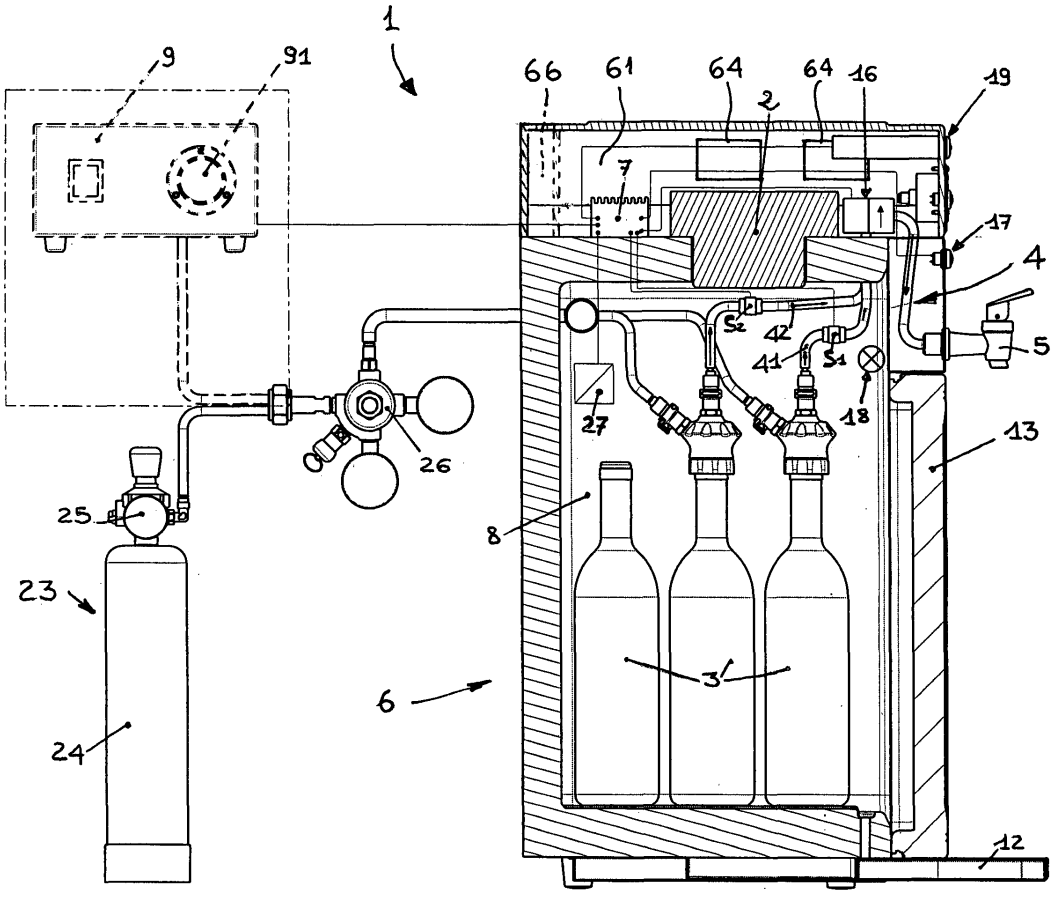

FIG. 1

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Description

[0001] The present invention relates to a wine storage and multiple dispensing apparatus.

[0002] Prior art apparatus of this type, designed to hold a plurality of bottles of wine, comprises a wine tapping device which in turn comprises, at each bottle from which wine is to be dispensed, a first duct for supplying each bottle with a fluid under pressure, and a wine feeding line. The fluid under pressure forces the wine out of the bottle and into the feeding line which is in communication with a dispensing tap fitted outside the apparatus.

[0003] Apparatus of this kind, however, has several disadvantages.

[0004] More particularly, prior art apparatus is designed to cool only the chamber which houses the bottles of wine, normally aligned in a single row, and only that row is used to dispense the wine from as many taps as there are aligned bottles, each tap being connected to one bottle.

[0005] The cooling system used always includes customary components, normally consisting of a compressor, a fan, a condenser and an evaporator.

[0006] Systems of this kind, although they are very efficient in terms of cooling, occupy a great deal of space when installed. Moreover, the repeated on/off operation of the cooling system has the serious disadvantage of transmitting vibrations to the wine.

[0007] Further, when one of the bottles is finished, it must be replaced immediately to guarantee the continuity of the service of the dispensing apparatus.

[0008] The present invention therefore has for an aim to overcome the above mentioned disadvantages by providing a wine storage and multiple dispensing apparatus which is compact, simply structured and functional, especially for quality wines and which, if necessary, may also be used to warm the wine (for example, in the case of certain types of red wine and/or under certain environmental conditions) .

[0009] These and other aims, which will become more apparent in the description which follows, are achieved in accordance with the invention by a wine storage and multiple dispensing apparatus having the structural and functional characteristics described in the appended independent claims, while other embodiments of the apparatus according to the invention are described in the dependent claims.

[0010] The invention will now be described in more detail with reference to the accompanying drawings, which illustrate a non-limiting preferred embodiment of it and in which:

- Figure 1 is a schematic side view, with some parts cut away in order to better illustrate others, of the apparatus according to the invention;
- Figure 2 is a schematic front view of the apparatus according to the invention;
- Figure 3 shows an apparatus according to the invention, consisting of a plurality of modules forming part of the apparatus itself;
- Figure 4 is a plan view of a single module in an alternative embodiment, positioned against a wall and differing from the modules shown in Figure 3.

[0011] Figure 1 shows a wine storage and multiple dispensing apparatus of the type containing a plurality of bottles (3) of wine and comprising a device (4) for tapping the wine. At each of the bottles (3) that is required to dispense wine, the device (4) is equipped with a first duct for supplying each bottle with a fluid under pressure used to force the wine out of the bottle and into a feeding line (41 or 42) which is in communication with a dispensing tap (5) fitted outside the apparatus (1). The fluid under pressure may consist of carbon dioxide if the wine to be tapped is a sparkling wine but, especially in the case of quality wines, it preferably consists of nitrogen, which is a totally inert fluid. The fluid referred in the rest of this specification, describing a preferred non-restricting embodiment, is an inert fluid.

[0012] The apparatus basically comprises at least one wine dispensing module (6) including a Peltier cell (2), controlled and powered by an electronic unit (7) which controls it in such a way that it absorbs or gives out heat within a bottle storage compartment (8) simply according to the direction of the current passing through the Peltier cell (2). Thus, the compartment (8) within the module (6) is kept at the optimum temperature selected according to the type of wine stored in the compartment (8) and the temperature measured in the compartment (8) itself.

[0013] Further, the Peltier cell (2) of each module (6) is positioned above the compartment (8) where the bottles (3) of wine are stored.

[0014] More particularly, the bottom surface of the Peltier cell (2), as clearly shown in Figure 1, is advantageously in direct contact with the compartment (8), whilst its top surface is thermally insulated from the compartment (8) and in contact with elements (64) for exchanging heat with the outside environment.

[0015] For each tap (5) of each module (6), there are at least two bottles (3) of wine, a main bottle and a stand-by bottle, both connected to the tapping device (4) through at least two respective feed lines (41, 42). Emptying of the main bottle (3) switches off the corresponding main feed line (41) and simultaneously activates one of the other stand-by feed lines (42).

[0016] The electronic unit (7) controls hydraulic means (16) designed to connect to the dispensing tap (5) one or the other of the two wine feed lines (41, 42), each of which is equipped with a sensor (s1, s2) for detecting the flow of wine within the feed line and to activate a suitable external indicating device (17) accordingly.

[0017] For each tap (5) of each module (6) there is also provided at least one additional bottle of wine (3) which is not connected to the tapping device (4) but which may be connected in lieu of the main empty bottle (3) during the period of time in which the stand-by bottle (3) is being

used.

[0018] The inert fluid needed to dispense the wine may come from a single system (23), including a customary cylinder (24) with a pressure reducer (25) and at least one micro-reducer (26) on the pressurised fluid supply line, as shown in Figure 1.

[0019] The area of Figure 1 drawn with the dashed lines represents a preferred embodiment which includes an inert gas generator (9) which extracts the gas directly from the ambient air by distillation.

[0020] The inert gas generator (9) is controlled by the electronic unit (7) which switches it on and off according to the pressure measured by the gauge (91), thus producing the required fluid under pressure to be supplied to each bottle (3) for dispensing the wine.

[0021] As shown in Figure 2, each module (6) has a sloping surface (61) connecting its lateral surfaces (62) to the top horizontal surface (63) that houses the heat exchange elements (64) of the Peltier cell (2). The sloping surface (61) of each module (6) forms, together with the opposite sloping surface (61) of an adjacent module (6) and the bottom surfaces (65) of one or more modules (6) above it, a respective heat dispersing duct (10) leading to the outside environment.

[0022] Thanks to its compactness owing largely to the use of the Peltier cell (2) and thanks also to its special design, as described above, the apparatus (1) according to the invention, as shown in Figure 3, may be easily made up of a plurality of modules (6) placed side by side and/or stacked, all fed by a single inert gas generator (9) [or by a single system (23)] and forming heat dispersing ducts (10) for exchanging heat with the outside environment.

[0023] In another embodiment of the apparatus, shown in Figure 4, each module (6) has at least one groove (66) at the back of it, preferably extending in a substantially vertical direction and housing the heat exchange elements (64) for the Peltier cell (2). This groove, in conjunction with a wall (11) against which the modules (6) are positioned, forms at least one respective heat dispersing duct (10). The groove (66) might also be horizontal, as shown in Figure 1.

[0024] At the bottom of each module (6) there is a removable, pull-out drip tray (12).

[0025] Figure 2 shows a hinge-mounted door (13) of the compartment (8) turnable about either one or the other of the two opposite and parallel axes of rotation (14, 15). The door (13) is made preferably of a transparent material, while a lighting system illuminates the interior of the compartment (8).

[0026] Figure 2 also shows schematically an outer opening (19) for inserting a means of activating the apparatus (1), such as, for example, a magnetic card, a coin or a key. The control panel also mounts a thermostat (20) connected to the electronic unit (7) for controlling the temperature inside the compartment (8) and one or more display units (21) indicating the temperature and relative humidity detected by respective sensors (27) located inside the compartment (8). An indicator (22) showing the pressure of the inert fluid is preferably also provided. The invention achieves important advantages in addition to the obvious structural simplicity making the apparatus very economical to produce.

[0027] Indeed, the invention provides an apparatus that minimises vibrations during normal operation, which is especially important for quality wines, and that, if necessary, can be used not only to cool the wine but also to warm it by simply reversing the heat exchange function.

[0028] Another advantage is the possibility of producing extremely compact modules that can be very easily adapted to suit the space requirements of different users. This compactness, combined with the design of the single modules, makes it easier to arrange the modules in different configurations to create modular dispensing apparatuses which allow effective ventilation and quickly disperse the heat produced without negatively affecting the operation of the adjacent modules.

[0029] Yet another advantage of the apparatus is the use of a single independent source of fluid under pressure which simultaneously supplies all the modules making up the apparatus and which either extracts the fluid directly from the environment or draws it from customary storage means.

[0030] Another no less important advantage is the long period of operation permitted by the presence of a stand-by bottle that is connected up automatically when the main bottle is empty, as well as other bottles which are not connected to the dispensing device but which can be stored at the required temperature and be ready to substitute the empty bottles.

[0031] Since, the modules are self-contained units, relatively complex apparatuses can be created where the different modules can be used to store and dispense wines that differ considerably from each other not only in terms of taste and quality but also in terms of storage temperature.

[0032] It will be understood that the invention can be adapted and modified in several ways without thereby departing from the scope of the inventive concept that characterise it.

[0033] Moreover, all of the details of the invention may be substituted by technically equivalent elements.

[0034] In practice, the embodiments of the invention may be made from any material, and in any size, depending on requirements.

Claims

1. A wine storage and multiple dispensing apparatus of the type containing a plurality of bottles (3) of wine and comprising a wine tapping device (4) which in turn comprises, at each bottle (3) from which wine is to be dispensed, a first duct for supplying each bottle (3) with a fluid under pressure, and a wine feeding line, the fluid under pressure forcing the wine

out of the bottle and into the feeding line which is in communication with a dispensing tap (5) fitted outside the apparatus (1), the apparatus being **characterised in that** it comprises at least one wine dispensing module (6) including a Peltier cell (2), controlled and powered by an electronic unit (7) which controls it in such a way that it absorbs or gives out heat within a bottle storage compartment (8) simply according to the direction of the current passing through the Peltier cell (2), thereby keeping the compartment (8) in the module (6) at a desired optimum temperature at all times according to the type of wine stored in the compartment (8) and the temperature measured in the compartment (8) itself.

2. The apparatus according to claim 1, **characterised in that** for each tap (5) of each module (6), there are at least two bottles (3) of wine, a main bottle and a stand-by bottle, both connected to the tapping device (4) through at least two respective feed lines (41, 42), the emptying of the main bottle (3) switching off the corresponding main feed line (41) and simultaneously activating one of the other stand-by feed lines (42).

3. The apparatus according to claim 2, **characterised in that** for each tap (5) of each module (6) there is also provided at least one additional bottle (3) of wine which is not connected to the tapping device (4) but which may be connected in lieu of the main empty bottle (3) during the period of time in which the stand-by bottle (3) is being used.

4. The apparatus according to claim 1 or 2 or 3, **characterised in that** it comprises a system (23) including a cylinder (24) containing the fluid under pressure to be supplied to each bottle (3) for dispensing the wine, a pressure reducer (25) and at least one micro-reducer (26) on the pressurised fluid supply line.

5. The apparatus according to claim 1 or 2 or 3, **characterised in that** it comprises an inert fluid generator (9) that extracts the fluid directly from the ambient air and that supplies the fluid under pressure to each bottle (3) for dispensing the wine.

6. An apparatus **characterised in that** for each tap (5) of each module (6), there are at least two bottles (3) of wine, a main bottle and other stand-by bottles, all connected to the tapping device (4) through respective feed lines (41, 42), the emptying of the main bottle (3) switching off the corresponding main feed line (41) and simultaneously activating one of the other stand-by feed lines (42).

7. An apparatus **characterised in that** it comprises an inert fluid generator (9) that extracts the fluid directly from the ambient air by distillation and that supplies the fluid under pressure to each bottle (3) for dispensing the wine.

8. The apparatus according to any of the foregoing claims, **characterised in that** the Peltier cell (2) of each module (6) is positioned above the compartment (8) where the bottles (3) of wine are stored, the bottom surface of the Peltier cell (2) being in direct contact with the compartment (8), whilst its top surface is thermally insulated from the compartment (8) and in contact with elements (64) for exchanging heat with the outside environment.

9. The apparatus according to claim 8, **characterised in that** each module (6) has a sloping surface (61) connecting its lateral surfaces (62) to the top horizontal surface (63) that houses the heat exchange elements (64) of the Peltier cell (2), so as to form, together with the opposite sloping surface (61) of an adjacent module (6) and the bottom surfaces (65) of one or more modules (6) above it, a respective heat dispersing duct (10) leading to the outside environment.

10. The apparatus according to claim 8, **characterised in that** each module (6) has at least one groove (66) at the back of it housing the heat exchange elements (64) for the Peltier cell (2), so as to form, together with a back wall (11) against which the modules (6) are positioned, at least one respective heat dispersing duct (10).

11. The apparatus according to any of the foregoing claims, **characterised in that** it comprises a removable, pull-out drip tray (12) at the bottom of each module (6).

12. The apparatus according to any of the foregoing claims, **characterised in that** the compartment (8) of each module (6) comprises a hinge-mounted door (13) turnable about either one or the other of the two opposite and parallel axes of rotation (14, 15).

13. The apparatus according to any of the foregoing claims from 2 to 12, **characterised in that** the electronic unit (7) controls hydraulic means (16) designed to connect to the dispensing tap (5) one or the other of the two wine feed lines (41, 42), each of which is equipped with a sensor (s1, s2) for detecting the flow of wine within the feed line and to activate a suitable external indicating device (17) accordingly.

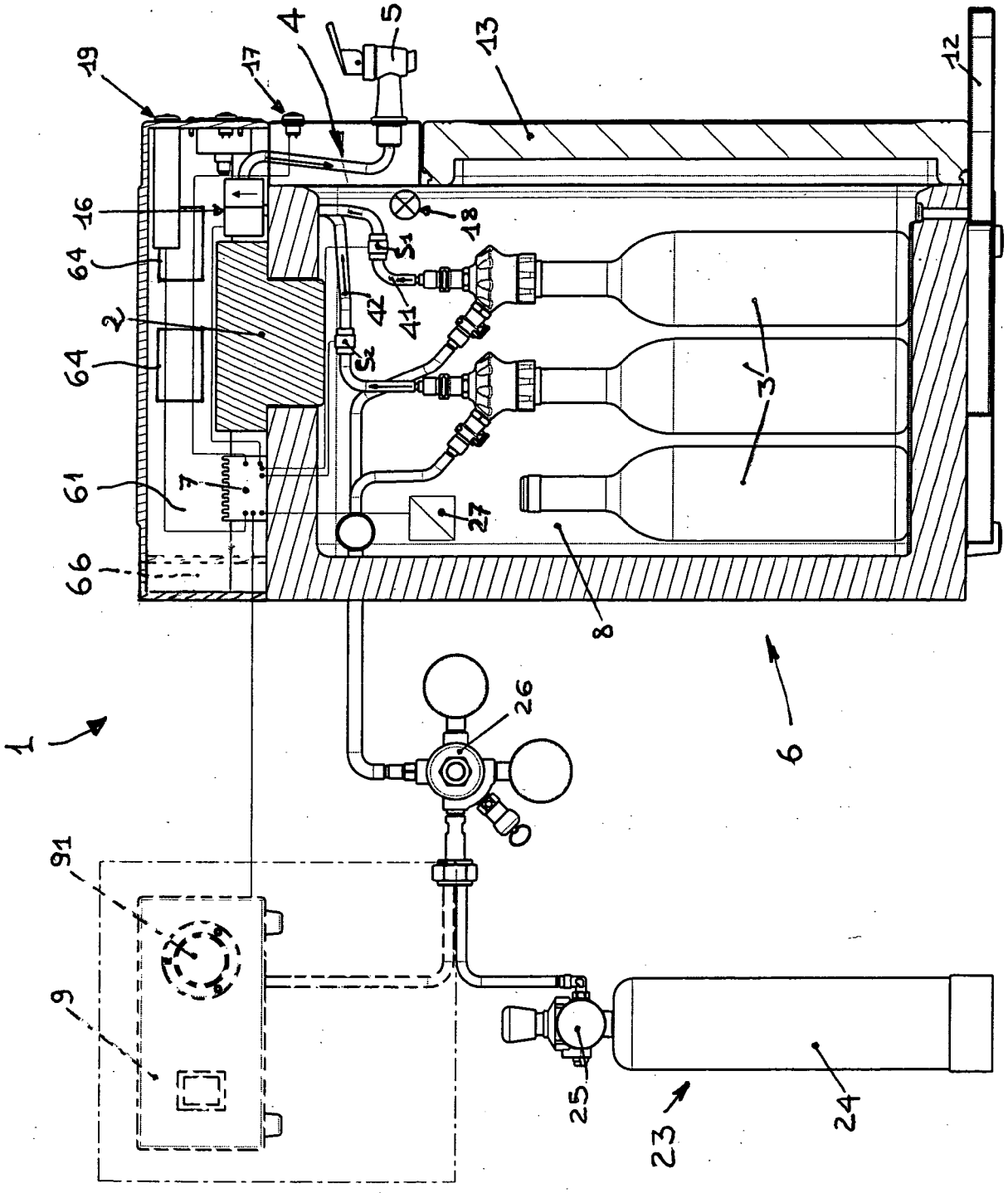
14. The apparatus according to any of the foregoing claims from 5 to 13, **characterised in that** the electronic unit (7) can measure the pressure of the inert gas generator (9) and switches the latter on or off according to the pressure measured.

15. The apparatus according to claim 12, **characterised in that** the door (13) is made of a transparent material, while a lighting system illuminates the interior of the compartment (8).

16. The apparatus according to any of the foregoing claims, **characterised in that** it comprises a plurality of modules (6) placed side by side and/or stacked, all fed by a single inert gas generator (9) and all forming heat dispersing ducts (10) leading to the outside environment.

17. The apparatus according to any of the foregoing claims, **characterised in that** it comprises an outer opening (19) for inserting a means of activating the apparatus (1) itself.

FIG.1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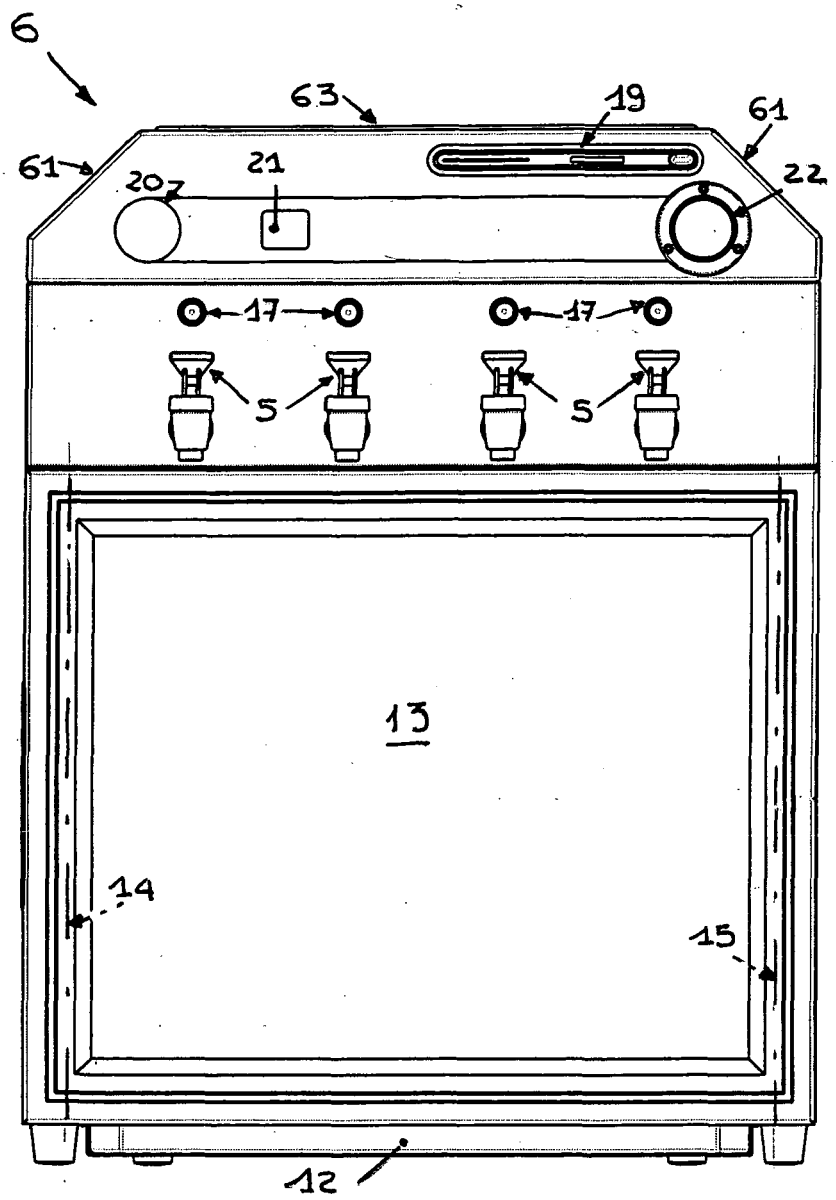

FIG. 2

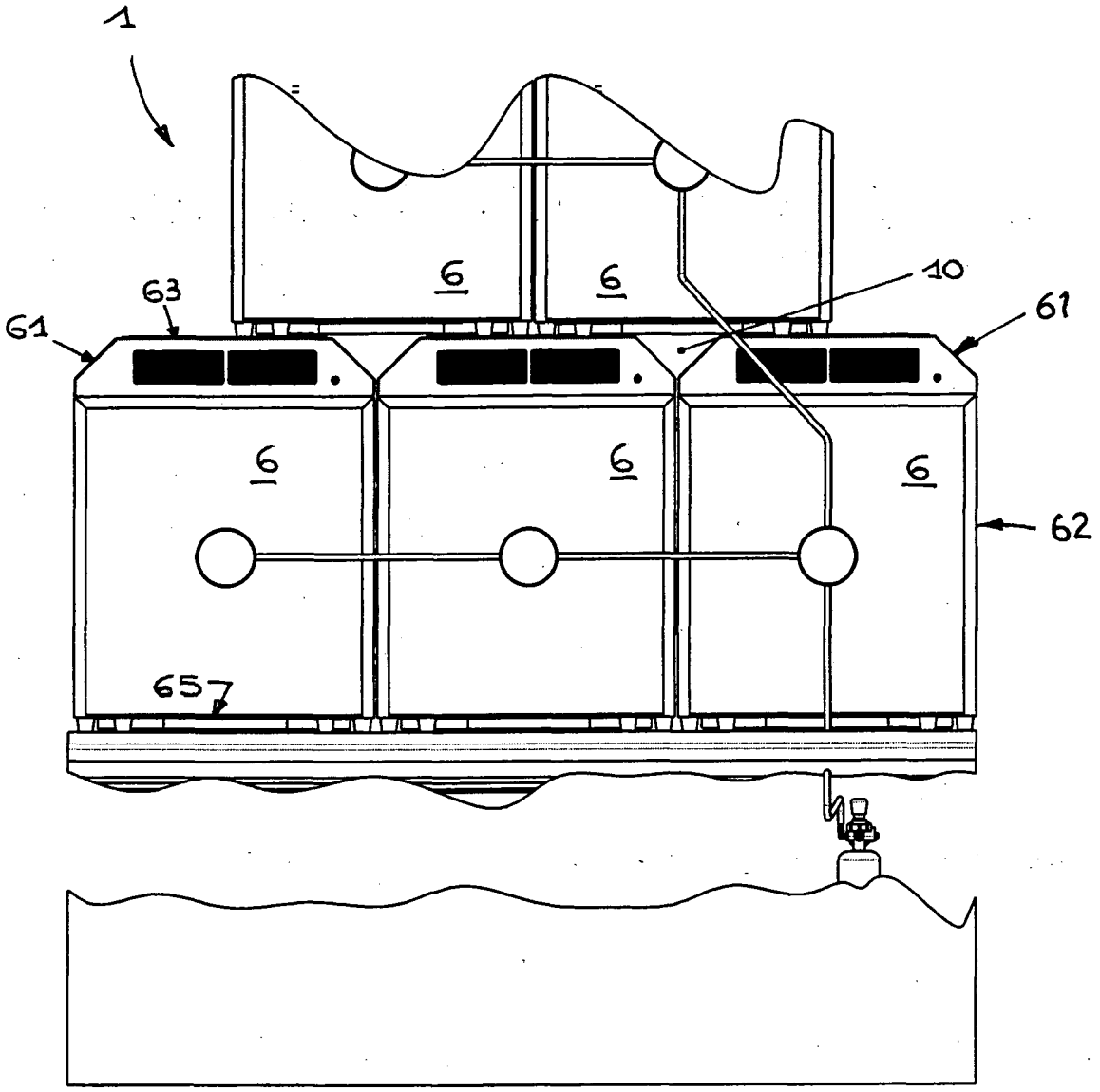

FIG. 3

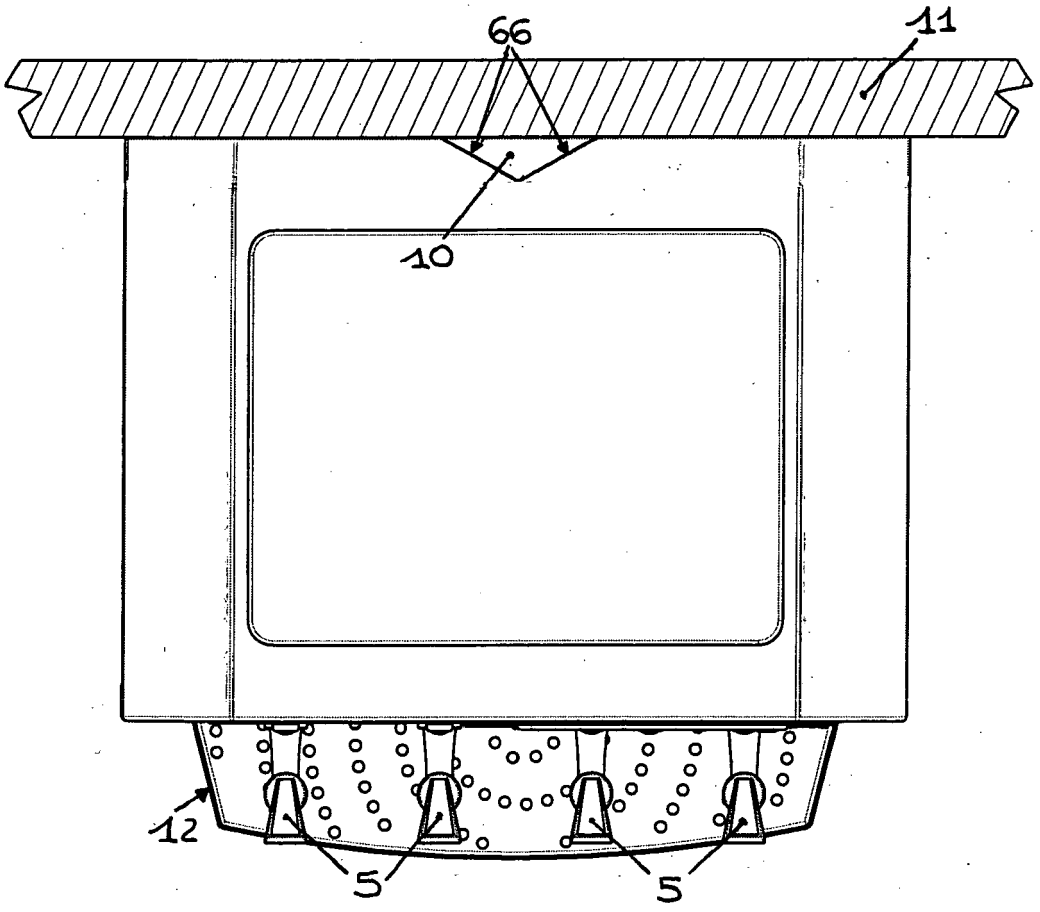

FIG. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 42 5730

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	US 2003/213814 A1 (PHELPS JOHNE ET AL) 20 November 2003 (2003-11-20) * paragraphs [0029], [0030], [0034], [0090], [0099] - [0101] *	1,4,5,8, 11-15	B67D1/08 B67D1/12 B67D1/04
Y	DE 199 50 211 A1 (EXIMA EXPORT-IMPORT GMBH) 14 December 2000 (2000-12-14) * column 4, lines 26-33 * * column 8, line 68 - column 9, line 20; figure 8 *	1,4,5,8, 11-15	
Y	DE 10 38 937 B (DIPL.-BR.-ING. JOSEF KRIEGLMEYER) 11 September 1958 (1958-09-11) * column 3, line 5 - line 19 *	4	
Y	WO 95/12543 A (FURNESS, GEOFFREY, MILES) 11 May 1995 (1995-05-11) * page 13, column 19, line 23 - column 20, lines 18-21 *	13	
A	EP 0 322 729 A (HUBER, KARL) 5 July 1989 (1989-07-05) * column 3, line 11 - line 29 *	13	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B67D

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	7 February 2005	Desittere, M

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

EPO FORM 1503 03.82 (P04C01)

European Patent Office

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-5, 8-17

European Patent Office

LACK OF UNITY OF INVENTION SHEET B

Application Number
EP 04 42 5730

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-5,8-17

   Multiple wine dispenser with reversible Peltier cell for heating or cooling the wine.

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2. claim: 6

   Multiple wine dispenser with device for changing from an empty to a full bottle.

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3. claim: 7

   Apparatus for distillating air and supplying the obtained fluid to wine bottles.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 42 5730

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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07-02-2005

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82