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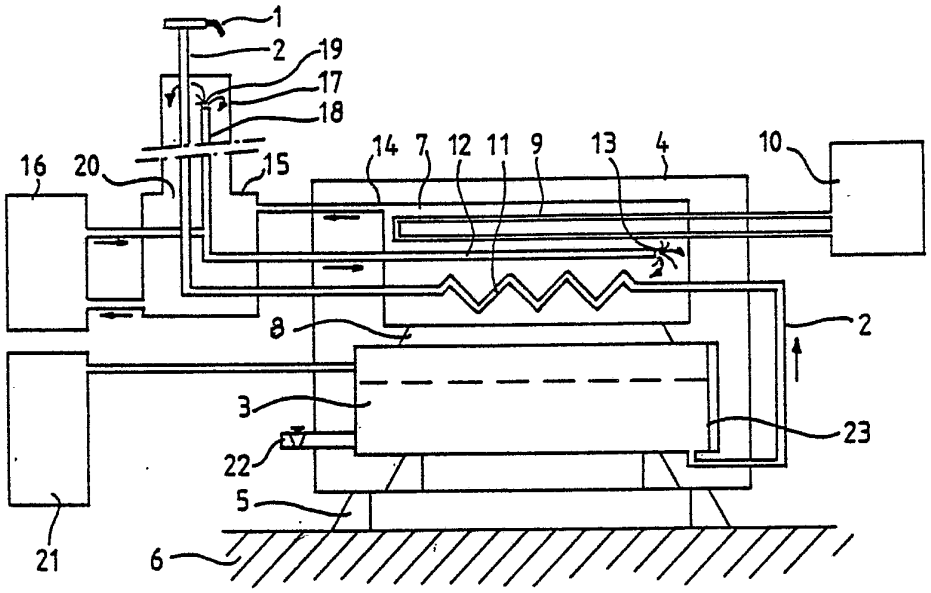

(57) Abstract

System for tapping cooled beer embodying at least one tapvalve (1) and a beerpipe (2) (python) having a jacket, which connects the tapvalve(s) with a beertank (3) installed inside a closed cool-store (4), characterized in that inside the cool-store next to the beertank(s), there is a hollow closed cooling-unit (7) which is connected, maintaining a proper heat-conduction, to the outer surface of the beertanks in which unit there is a pipe (9) for a coolant, for example freon, and a beerpipe that can be connected at one side to the beertank and on the other side to the beerpipe in the python, and is at least partly formed as a throttle spiral (11) inside the cooling-unit, as well as the space inside the jacket of the python, form a part of a closed cooling water-circuit (15, 16, 12).

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Device for tapping beer

The invention relates to a device for tapping beer having at least a tapvalve, a beertank and a beerpipe connecting the tapvalve with the beertank, to a beerpipe suitable for the use in such a device and to a closed cool-store for such a device containing the beertank.

Installations of this kind are often used in pubs, restaurants and bars, situated in a building, for example in a hotel or a restaurant, as well as installed temporarily at events. In particular at said events it is often difficult to maintain the beer, drawn from temporary taps, sufficiently cool. Besides it is often difficult for the operator to estimate the real amount of beer which must be ready to serve for consumption, in particular to estimate how many glasses per hour have to be drawn. When using the usual barrel, with a content of ± 50 litre, the barrels have to be replaced frequently.

Changing the barrels takes a lot of timeduring which time consequently tapping is not possible. This is the reason that there is usually an extra installation. Moreover it is necessary to let a certain amount of beer to run, prior to serving the customers. This amount of beer is lost and means an increase of costs for the undertaking. To solve these problems the alternative is using tanks with larger capacity, from example from 500 up to 1000 litre but specifically in these cases a problem of cooling arises. In this case the tank has to be cooled very well and in spite of a very good cooling in the beer-pipes leading from the tank to the tapping valve(s) is a substantial warming-up of the beer cannot be prevented, which is of course undesirable. In the stationary installations, in pubs, restaurants and hotelbuildings these problems appear also, although to a smaller extent. At present a lot of undertakings make use of tanks with large contents for

example from 500 up to 1000 litre. In the undertakings where a large amount of beer has to be drawn usually two of the above said tanks are installed next to each other.

To keep the contents of said tanks cool, cooling-units inside the tank are used, for example coolingspirals or cylinders with double walls, between which flows cooling water. Due to a good isolation of the tanks and of the connecting pipes to the tapping valves, the problems are solved partially, but using cooling water remains unavoidable. To prevent the use of cooling water or at least to reduce it, it has also been suggested to install the tanks inside closed cool-stores which are built for example in a cellar. Even then it is not possible to avoid water-cooling. The cooling of the water needed is until now in general obtained by conducting the water through pipes which are wound as spirals and which are in open basins filled with water, cooled by a coolant, circulating in spirals which are also located in the waterbasin and which are connected to another cooling system, for example with a compressor. Although part of the cooling-system is in fact a closed system, the cooling basin is always open. For that reason contamination and bacteries develop easily. Although the water in this cooling-basin is not direct in contact with the beer, it is obvious that contamination and growing bacteries is not admissable, also because of legal regulations.

Beer is always conducted from the tank to the tap under a pressure of about 1.5 and 2.5 bar, no matter whether the beer is in a small barrel or in a large tank. In order to draw a glass of beer properly it is necessary to open and close the valves quickly. When closing the tap quickly a shock-wave occurs inside the beerpipe. Besides the fact that the shock-wave causes a mechanical strain to the system, also the quality of the beer decreases. To reduce this shock-wave from old times a shockdamping so

called throttle-down spiral is installed between the tank and the tap-valves. The diameter and the number of windings of such a spiral depends on the pressure applied to the beer and on the distance between the throttle-down spiral and the reservoir and on the distance between the throttle-down spiral and the taps. For the construction of such a spiral the data needed are empirically obtained and are recorded on a chart. In the beerpipe sometimes two or more spirals are used.

Due to the large surface of the spirals, especially these spirals must be cooled perfectly. Therefore in most installations the spirals are located in a waterbasin in which also the cooling spirals for the cooling water are located. This basin is located close to the tapvalves, so that the dampingspirals can be placed close to the taps. The distance between the open water in the basin and the tapvalves is therefore always small as a result of which it is difficult to meet the very high standards of cleanness. Therefore it is necessary to renew the water in the basin regularly and very frequently.

Because the distance between the open waterbasin and the beertank is usually quite long, it is usual to install the beerpipe(s) together with the pipe of the coolingwater, which runs to the supply beertank, next to each other in a jacket which is provided with an insolation cover. This is mostly called "python"; this word will be used in the following text. Hence, such a python always contains a supply pipe and a return pipe, beside the beerpipe. The number of beerpipes in the python depends of course on the number of taps and on the number of beertanks. The circulation in the watercircuit is produced by a pump.

Practise has shown that although a python as described before provides an improvement, it does not guarantee that the beer, especially in cases of a larger

distance between reservoir and tap, will come out of the tap sufficiently cool. This applies especially when a new supply barrel or supply tank is connected. It then takes quite a long time before the beer reaches the desired temperature.

By a tapping device for beer according to this invention the disadvantages as described above are mainly avoided and other advantages, which will be explained later, are obtained.

A device according to the invention for tapping beer has at least a tapvalve, a beer-pipe (python) enclosed in a jacket, which connects the tapvalve(s) with a beertank, which is installed inside a closed cool-store, and is characterized in that inside the cool-store next to the beertank(s) there is a hollow closed cooling-unit which is connected, maintaining a proper heat-conduction, to the outer surface of the beertank(s) and in which unit there is a pipe for a coolant, for example freon, as well as a beerpipe which can be connected at one side to the beertank and on the other side to the beerpipe in the python, and is at least partly formed as a throttle spiral inside the cooling-unit and whereby the space in the cooling-unit, as well as the space inside the jacket of the python form a part of a closed cooling-water circuit.

With a device according to the invention an open water basin as is used until now, is completely avoided. At the same time it provides a very good cooling of the beerpipe between reservoir or supply tank(s) and the taps. The beerpipe in the python, which in this case can be called a wet python, is cooled very well, because the cooling water circulates along the beerpipe(s) on all sides. To create a good circulation in the cooling-unit as well as in the python, according to a preferred design of the invention, the cooling water is being supplied through a supply pipe, installed inside the hollow cooling-unit

or the python, which carries the water in the jacket of the cooling-unit or the python to the end of it (seen in the flow-direction), thus cooling according to the principle of opposite direction-flow.

The circulation of cooling-water preferably is created by using a pump.The cooling-water produced by this pump can be divided in two parallel branches, one flowing through the cooling-unit and the other flowing through the python. However, it is also possible to design the construction in such a way that same water passes through the cooling-unit as well as through the python. This method can offer constructive benefits.

The closed cool-store according to the invention can be a closed container, for example made of stainless steel , in which the beertank(s) and cooling-unit are mounted.

Because of hygienic considerations (often legally imposed) and to maintain the pure taste of the beer, the beertanks are mostly made of stainless steel. Stainless steel has as a matter of fact almost no influence on beer when in contact with it.

The good heat-conductive connection between the cooling-unit and the beertank can be realized in case the cooling-unit is installed in some distance from the beertank in the cool-store, by means of a material with a good heat-conductive property, for example an aluminium beam section, which is connected between the cooling-unit and the outer wall of the beertank.

In case two beertanks are installed in one cool-store it is possible to use only one cooling-unit to cool both beertanks. In this case the cool-unit has to be connected, by means of two beam sections, for example aluminium beam sections, to the outer side of the tanks.

If there are two tanks installed in a cool-store, which is mostly the case, according to this invention a

special profitable, economical, and elegant construction, design and lay-out for excellent cooling can be achieved, particularly when the two beertanks are oblong cylinders and installed practically parallel. The space formed between at least a part of the beertanks is then used as a cooling-unit. This space is bounded by two opposite parts of the walls of the beertank, by two opposite plates, which are connected to the beertank in a fluid-tight manner and by two sealing plates at both ends of the cooling-unit. In the cooling-unit, formed in this way, are, as indicated above, a pipe for a coolant and the beerpipes, furnished with throttle-down-spirals, which are connected to both tanks. The space in the cooling-unit is connected to a water-inlet and a water-outlet whereby the cooling-water can be supplied resp. be carried off. According to a special advantageous design of such a cooling-space mounted between two beertanks this space is divided into an upper space and a lower space, each containing a beerpipe, each pipe provided with a throttle-spiral. The spaces in both parts are connected at one side together, so that the cooling-water can flow in both parts of the space in opposite directions. According to a special design of such a cooling-unit each of both parts of the separated spaces has a pipe for a coolant, for example freon.

The pipe for the coolant, for example freon, can have at its outer side surface-enlarging, for example wire-like, heat-conducting elements. This type of pipes is available on the market for example under the name "Spiro-elements".

The cool-store in which the beertanks are installed is isolated, preferably at its inner surface, with a heat-isolating material.

According to the invention the wet python contains preferably a stainless steel pipe. The jacket of

the python can be made of synthetic material. Similar to the known so called "dry pythons" also the wet python has preferably a jacket of good heat isolating material.

On the closed cool-store which as said before preferably is made of stainless steel it is possible to place distribution boxes with different connection-ports for the cooling-water, the beer, the coolant and the wet python. These distribution boxes are provided with the necessary valves for switching on or off certain parts of the different circuits.

The pressure at which the beer is supplied from the beertanks to the tapvalves can be produced by a compressor or with gasbottles. As beer is vulnerable to air, in general carbonic acid gas is used from the bottles. It is possible to use air supplied by a compressor to generate pressure in case of utilizing known plastic bags which are placed in the beertanks. The air pressure is then put between the metallic wall of the beertank and the plastic bag. A new clean bag has to be used each time the beertank is filled. This plastic bag has to be placed in the tank air sealed. For this purpose there is a manhole-lid in the beertank as well as in the wall of the cooling-store. Both lids can be made into a whole. This manhole-lid preferably is made of transparant synthetic, for example acrylic resin.

An arrangement according to this invention further has the special advantage that the space under the tapbox (bar) remains empty and also mounting the entire installation is very simple and so for example can also easily be carried out at events. In the tapbox only the wet python has to be connected which at the other end has to be connected to the closed cooling-store.

In case two beertanks are installed inside the closed store, the tanks can be filled by using a supply pipe (hose), which can be connected in turn to the one or the other tank. Filling of larger tanks for example with

a volume of 500 litre up to 1000 litre nowadays takes place almost exclusive from tank-trucks. These tanks can be connected to the beertanks by a hose-connection.

The invention will now be described in detail with reference to a drawing with three figures in which:

Fig. 1, to illustrate the principle of the invention, shows a drawing in outline of a complete device according to the invention;

Fig. 2 shows a cross-section of a preferred arrangement of a cool-store with two beer-tanks;

Fig. 3 shows a picture of an opened-up part of a wet python.

In fig. 1 1 indicates a tapvalve which is connected to the beertank 3 by the beerpipe 2. This beertank 3 is installed inside the closed cool-store 4. This cool-store has a wall of for example stainless steel with an isolated inside surface. The cool-store is supported by legs 5 on the floor 6. Inside the cool-store is the hollow closed cooling-unit 7 which contains a pipe 9 for a coolant, for example freon, and is connected to a cooling installation 10, for example a compressor-cooling-system. The pipe 9 may, if desired, also have the form of a spiral and may be provided with surface-enlarging elements, for example a wire system which has a good heat conducting contact with the surface of pipe 9. The beerpipe as shown in the drawing runs through the cooling-unit 7 and has partly the form of a throttle-spiral 11. With 12 a supply-pipe for cooling water is shown, which is open at the end 13 and brings water into the cover of the cooling-unit 7. This cooling water is carried off at 14. The pipe of cooling-water 12 and the return 14 are connected to a pump for the cooling-water 16 by way of distributor-box 15.

The connection providing heatconduction between the cooling-unit 4 and the beertank 3 is obtained by the element 8, for example made of an aluminium beam section.

The reason for choosing aluminium is that aluminium is a very good heat-conducting material. In case in the cooling-store two beertanks are installed next to each other, each tank can be connected with cooling-unit 7 by a good heat conducting connection according to part 8.

The beerpipe 2 is running from the cooling-store 4 through the wet python 17 to the tapvalve 1. There is a pipe 18 for cooling-water supply inside the jacket of the python 17. This pipe is open at the end 19 and the cooling-water then washes up the beerpipe 2 inside the python. At 20 the cooling-water flows back in the distribution box and further to the pump 16. There are two circuits of cooling-water circuits in the drawing, namely one flowing through cooling-unit 7 and the other one flowing through python 17. These two circuits can form one unit if desired. It is also possible to design the distribution box 15 in such a way that these changes can be made later when desired. The python 17 is connected to box 15 by means of a flange. This is of course necessary because the cooling-unit and the tap are installed usually far from each other. The python has such a construction, for example by using flexible cooling-water pipes and beerpipes, that the python can be installed at the most appropriate place. This is very important for temporary installations at events.

The beer is supplied through the beerpipe 2 with the spiral part 11, to the tap 1, by means of pressure of, for example carbonic acid gas, from the equipment 21. The equipment 21 can be an aircompressor or contain bottles of carbonic acid gas. If, as mentioned before, a plastic bag is used inside the tank 3 the installation can function with air. The part 22 is a filling valve for the supply of beer from for example a tank-truck. The righthand part of the beerpipe 2 near the tank in the drawing lies outside the cooling-store 4. This beerpipe 2 can of course also be installed inside the cool-store. The number 23 indicates the manhole lid giving access to the interior of the tank

3. This is especially necessary if a plastic inner bag has to be used and for the cleaning of the tank.

The operation of the system as described can be summarized as follows. After cleaning the interior of the tank 3 and possibly putting the plastic-bag in the tank, beer is delivered from a tank-truck through the supply-valve 11. As a matter of course a relief-valve is necessary at a suitable place. For simplicity reason this is not shown in the drawing. After filling the tank 3 the cooling-water circuit and beercircuit are turned on (if not turned on yet). Because of the cooling-water circulating around the beerpipe in the cooling-unit 7 as well as in the python 17 the whole beerpipe will be cooled. After some time the cooling-unit has reached a certain chosen temperature. Because of the heattransfer through the beam 8 the beertank gradually reaches also the same temperature. With the system as is described, beer will attain a very constant temperature at the tapvalve. As a result of the compact structure of the whole installation and because of the very effective cooling, the efficiency of this system is very high, which makes an energy-saving of 50% possible. For an arrangement using two beertanks of 500 litre it is sufficient to engage a cooling-compressor of 0.5 HP and a pump of 1.25 A to circulate the cooling-water.

A big advantage of the described installation according to the invention is that, if the installation is already cooled, only a short interruption of drawing is needed, to refill the tank with fresh beer.

Fig. 2 shows a cross-section of a cool-store with two beertanks. The material of the wall of the cool-store is for example of stainless-steel, which has an isolation cover 25 at the inside surface. The two beertanks are indicated with the numbers 26 and 27. The cooling-unit is formed here by the space between beertanks 26 and 27. This space is closed at the top with a plate 28 and at the

bottom with a plate 29. These plates are joined in fluid-tight manner to the beertanks, for example by welding. At both top-ends this space is also closed in fluid-tight manner, for example by a welding joint, with the plates 28 and 29 and with the wall of the beertanks 26 and 27. The space is divided into two sections by a partition 30. At one end this partition does not reach the closing plate of the cooling-unit. In the space between the partition 30 and the plate 28 is a pipe for a coolant, for example freon. In the same space is a beerpipe of which the throttle-spiral is indicated with 32. The other space also has a beerpipe of which the throttle-spiral is indicated with 33. The cooling-water will be supplied by a pipe which is indicated with 34. Through the opening between both spaces of the cooling-unit at that end which is turned away from the spectator, the water flows to the upper space and is carried off through pipe 35. The further arrangement of the installation can be substantially the same as shown in fig. 1. The operation of the device is also completely similar to the operation of the embodiment as shown in fig. 1.

Fig. 3 shows a worked-open sketch of a wet python for the use of two beertanks and two taps. In this figure 36 is the jacket of the python, for example made of synthetic resin, for example polytheen. Round this jacket 36 is the isolation layer 37. Inside the jacket 36 are two beerpipes 38 or 39. Beer flows through these pipes, during drawing, in the direction of the arrows. With 40 a cooling-water supply-pipe is indicated which at the righthand side is connected with a pump for the cooling-water. At the lefthand side end this supply-pipe for cooling-water 40 is open so that the water can flow from pipe 40 into the space inside the jacket 36 from left to right. For the sake of clearness the jacket in the drawing 36 is cut short; in reality the jacket 36 is extended further to the left and

is closed there. The beerpipe 40 ends at some distance before this closing. The beerpipes 38 and 39 are passed in fluid-tight manner through this closing plate. The cooling-water which flows to the right between the pipes 38, 39 and 40 and the jacket 36 is carried back to the pump-installation by a pipe which is not shown here, for example as shown in fig. 1.

In a tapdevice according to the invention, many more parts are needed and sometimes legally prescribed, among other things for rinsing the installation, for measuring the pressure, for measuring the amount of consumed beer, etc. These are not shown in the drawing because they can be of conventional design. In most cases it also may be desired to mount a number of valves to make connections between the various parts of the system.

Claims

1. Device for tapping beer, having at least a tapvalve, a beerpipe (python) enclosed in a jacket, which connects the tapvalve(s) with a beertank which is installed inside a closed cool-store, characterized in that inside the cool-store next to the beertank(s) there is a hollow closed cooling-unit which is connected, maintaining a proper heat-conduction, to the outer surface of the beertank(s) and in which unit there is a pipe for a coolant, for example freon, as well as a beerpipe which can be connected at one side to the beertank and on the other side to the beerpipe in the python, and is at least partly formed as a throttle-spiral inside the cooling-unit and whereby the space in the cooling-unit, as well as the space inside the jacket of the python, form a part of a closed cooling-water circuit.

2. Device for tapping according to claim 1, characterized in that the space for cooling-water inside the cooling unit and inside the python together form a closed circuit for cooling-water.

3. Closed cool-store suitable for using in a device according to claim 1 or 2, characterized in that there are two separate cylindrical beertanks installed substantially parallel to each other inside the cool-store and there is present a cooling-unit which is in good heat-conducting connection with both beertanks.

4. Closed cool-store according to claim 3, characterized in that the cooling-unit is formed by at least a part of the space between the beertanks.

5. Closed cool-store according to claim 4, characterized in that the space of the cooling-unit is bounded by two opposite parts of the walls of the beertanks, by two opposite plates, which are connected to the beertanks in a fluid-tight manner and by two sealing

plates at both ends or the cooling unit.

6. Closed cool-store according to claim 4 or 5, characterized in that the space inside the cooling-unit is divided in an upper space and a lower space, each containing a beerpipe being provided with a throttle-spiral.

7. Closed cool-store according to claim 6, characterized in that the spaces in both parts are in connection with each other at one side, so that the cooling-water can flow in both spaces in opposite directions.

8. Closed cool-store according to claim 6 or 7, characterized in that each of both parts of the cooling unit has a coolant-pipe, containing for example freon.

9. Closed cool-store according to claim 3, 4, 5, 6, 7 or 8, characterized in that in the cooling-unit next to the beerpipe and the pipe for the coolant, for example freon, there is a pipe for watersupply which ends at the input-side outside the cooling-unit and the cool-store and at the other side ends in the cooling unit, so that supply-water washes around the beerpipe and the throttle-spiral formed therein, as well as the pipes for coolant, for example freon, and flows back through a return pipe.

10. Closed cool-store according to claim 3, 4, 5, 6, 7, 8 or 9, characterized in that the pipe for the coolant, for example freon, has at its outer side surface-enlarging, for example wire-like, heatconducting elements.

11. Beerpipe (python) for a device according to claim 1 or 2, characterized in that inside the jacket next to the beerpipe(s) there is a watersupply-pipe, with ends openly close to each tap-valve within said jacket, so that supplied water washes around the beerpipe(s) when the water returns.

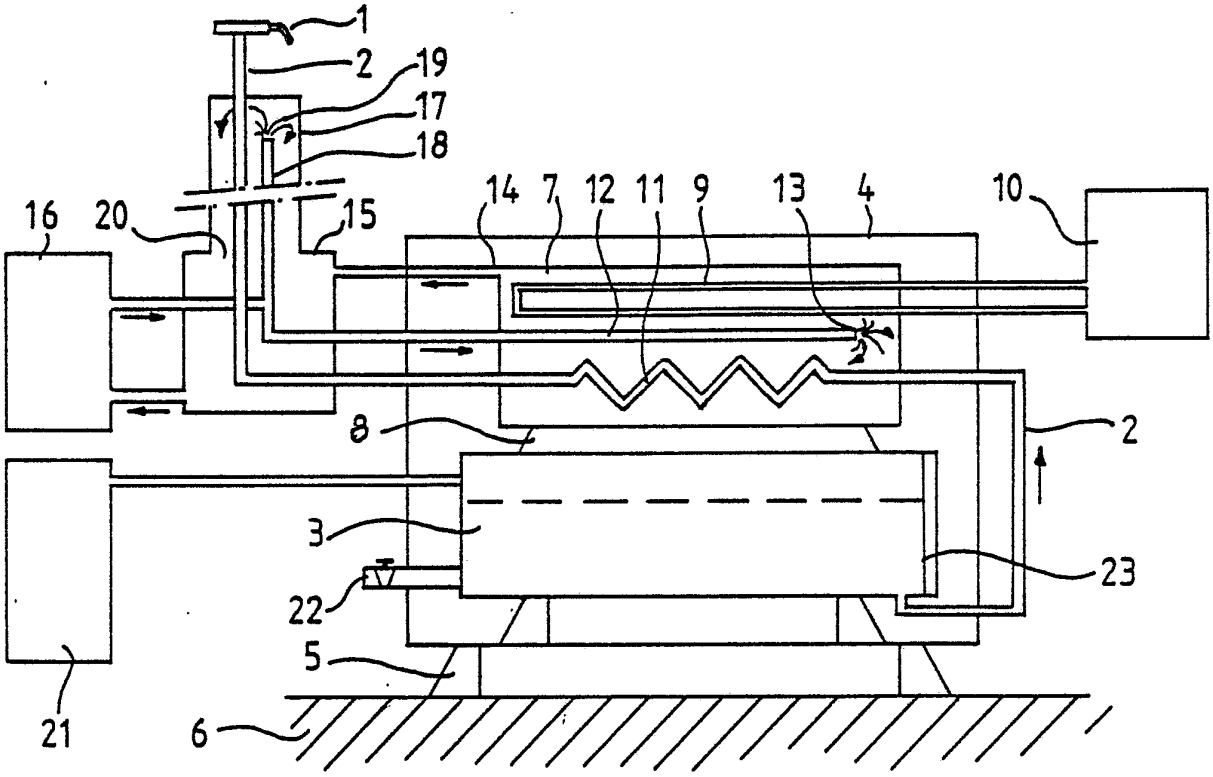
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FIG. 1

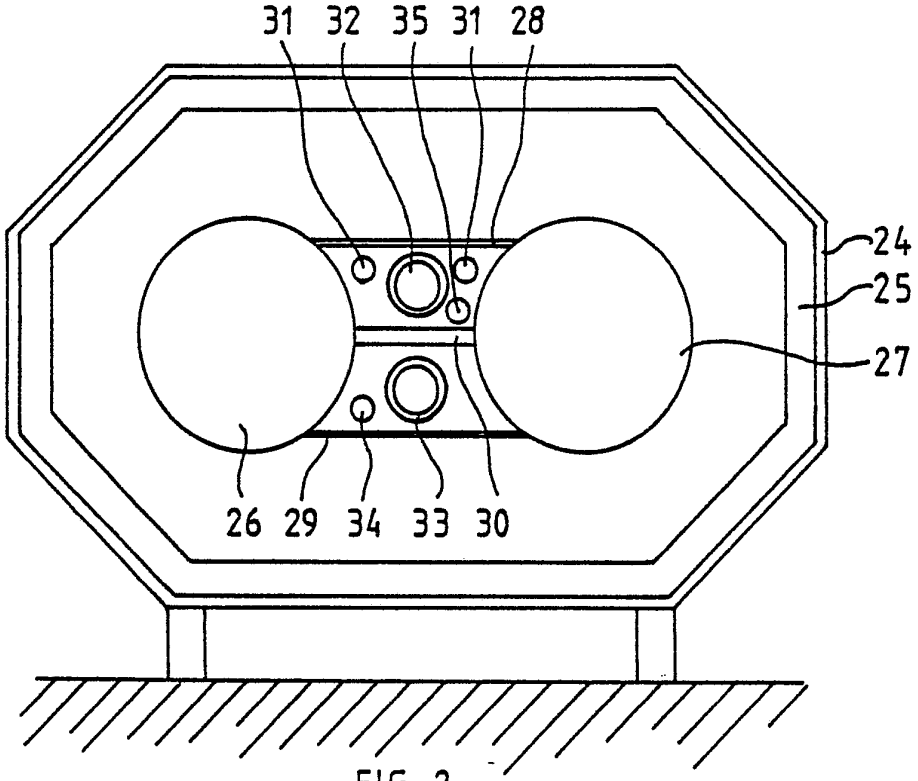
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FIG. 2

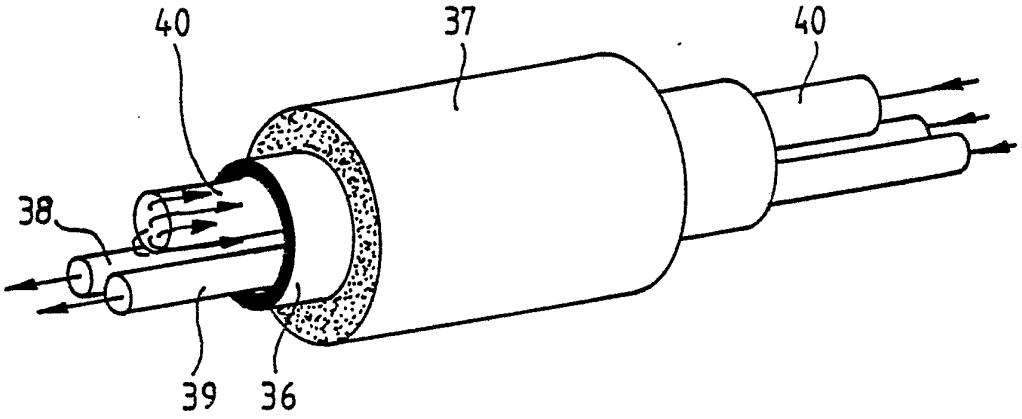

FIG. 3

INTERNATIONAL SEARCH REPORT

International Application No PCT/NL 85/00020

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [5]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC[4]: B 67 D 1/08; F 25 D 31/00

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC[4]	B 67 D F 25 D

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
A	US, A, 2065949 (SANDELL) 29 December 1936, see column 1, line 42- column 2, line 36; figures 1,2	1
A	US, A, 2618938 (BOOTH) 25 November 1952	
A	FR, A, 972415 (PANNETIER) 30 January 1951, see page 1, column 1, line 29- column 2, line 17; figure 6	1

* Special categories of cited documents: [10]

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
25th July 1985	22 AOUT 1985
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	G.L.M. Kruydenberg

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON

INTERNATIONAL APPLICATION NO. PCT/NL 85/00020 (SA 9658)

This Annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 08/08/85

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 2065949		None	
US-A- 2618938		None	
FR-A- 972415		None	