(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 300 577**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **88201528.2**

(51) Int. Cl.[4]: **A61H 33/06**

(22) Date of filing: **15.07.88**

(30) Priority: **24.07.87 IT 2207887 U**

(43) Date of publication of application:
25.01.89 Bulletin 89/04

(84) Designated Contracting States:
DE ES FR GB IT

(71) Applicant: **TEUCO GUZZINI S.r.l.**
Via Passionisti, 40
I-62019 Recanati (Macerata)(IT)

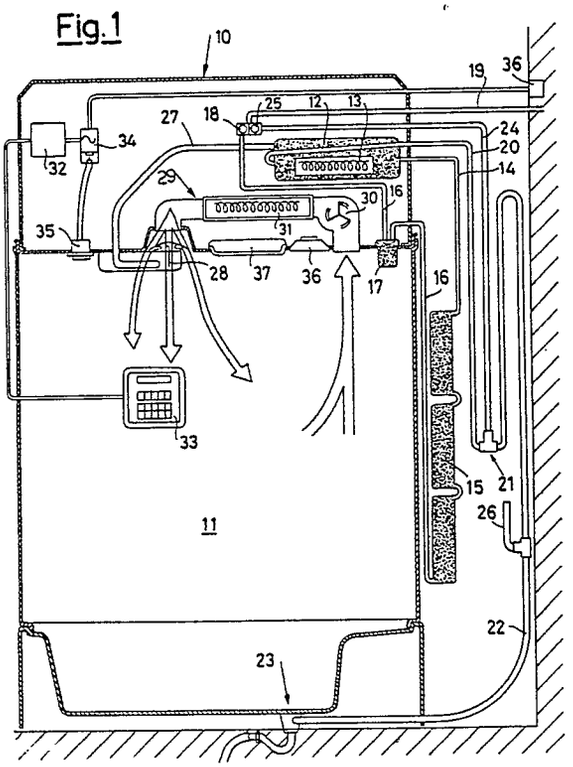
(72) Inventor: **Guzzini, Virgilio**
Via Duomo, 13D
I-62019 Recanati (Macerata)(IT)

(74) Representative: **Faraggiana, Vittorio, Dr. Ing. et al**
Ingg. Guzzi e Ravizza S.r.l. Via Boccaccio, 24
I-20123 Milano(IT)

(54) Steam bath with steam generator system located in a dome applied above the cabinet.

(57) A steam generating device comprises an electric steam boiler (12) with first electrical resistances (13), for water-heating for the generation of steam and a pipe (27) connecting the said boiler to steam inlet ports (28) for sending steam to the interior of a steam bath cabinet (11) installation. Said device is wholly contained within a generally box-shaped container (10) having base dimensions equal to the dimensions of the upper part of the said cabinet on top of which the said container is applied, so forming with the cabinet a single whole.

Fig.1



EP 0 300 577 A1

STEAM BATH WITH STEAM GENERATOR SYSTEM LOCATED IN A DOME APPLIED ABOVE THE CABINET

When installating cabinets equipped for use as saunas, or steam baths, one of the chief problems is how best to lay out the ensemble represented by the steam generator and its various control devices. The said ensemble is generally separate from the structure of the cabinet and, for its installation and connection to the cabinet, a considerable amount of building work is often necessary in order to dispose the different lines conveying the steam from the steam generator to the cabinet and also the electric wiring permitting control and regulation of the steam generator. So as not to have to perform such building work, the lines and wiring are, alternatively, disposed externally and thus, remaining in view, give a very unsatisfactory result in point of general appearance.

In addition, the location of the steam generator separate and, frequently, a considerable distance from the cabinet means that the lines conveying the steam to the cabinet run a course that facilitates heat dispersion and thus jeopardizes the performance of the sauna as a whole.

The overall object of the present invention is to obviate the above-mentioned difficulties by embodying a steam generator which, complete with its control devices, can be installed directly above a steam bath cabinet, thus minimizing the number of electrical and hydraulic linkages external to the whole and necessary for its functioning, and also minimizing the lenght run by the electrical and hydraulic linkages between steam generator and cabinet, in this way embodying a steam bath cabinet installation which is both compact and without other visible elements.

To attain the said object, the present invention embodies a steam generator of the type comprising an electric steam boiler for steam generation and a pipe connecting the said boiler to steam inlet ports within a steam bath cabinet, wherein the whole is completely contained in a generally box-shaped container the dimensions of the base of which are the same as those of the upper portion of the said cabinet onto the top of which the said container is applied, forming with it a single whole.

The object of the invention, and its advantages over the known art, will become more apparent from an examination of the following description thereof, with reference to the appended drawings, in which:

- Figure 1 is a vertically sectioned diagrammatic view of a steam bath cabinet embodied according to the innovative principles of the invention;

- Figure 2 is a vertically sectioned diagrammatic view of a steam bath cabinet embodied according to the invention, showing the circulation of a steam within it;

- Figure 3 is a diagrammatic illustration of an automatic drain-trap type water discharde device in the unprimed condition;

- Figure 4 is a diagrammatic illustration of the water discharge device of Figure 3 with the drain-trap in the primed condition;

- Figure 5 is a diagrammatic illustration of the water discharge device of Figure 3 in the discharge condition.

With reference to the Figures, a sauna or steam bath cabinet installation, embodied in accordance with the innovative principles of the invetion, comprises a generally box-like container 10 which holds all the control and steam generation devices and which is realized, for example, with fibreglass-reinforced acrylic material and is disposed on the top of a cabinet (shower cubicle) into which the steam produced by the said generating devices is conveyed.

The generally box-like container 10 has base dimensions that cover, with a perfect closure, the upper part of the cabinet.

For the sake convenience, reference will hereinafter be made to a particular system for generating and controlling steam, such system being contained in the container 10, without thereby in any way limiting the scope of the invention.

As Figure 1 shows, the said system consists of an electric steam boiler 12 featuring armoured electrical resistances 13 and connected by means of a pipe 14 to water-purification cartridges 15 which are connected in series (e.g. three in number: two being ion-exchange resin cartridges for water decalcification and the third containing activated charcoal for water dechlorination). From the cartridges 15 a pipe 16 leads to a container 17 for salt (for regenerating the resins in the ion-exchange cartridges) and from this to a supply solenoid 18 which by means of a pipe 19 supplies the above-described system with cold water from the mains. A pipe 20 from the boiler 12 connects the boiler to a drain-trap 21 which is in turn connected by a pipe 22 to a drain 23 and, by a pipe 24, to a second discharge or drain solenoid 25, also connected to the pipe 19. An air intake 26 is located intermediately between the drain-trap 21 and the drain 23. As the cartridges 15 and the drain-trap 21 are supplemental components of the steam generation and control system proper, they are not incorporated in the container 10; given their small bulk, they can readily be hidden from view by replacing

them for example in a hollow space between the back wall of the steam bath cabinet and the wall abutting this; such components are in any case the only ones external to the container 10 and, moreover, in any embodiment different from that here given as an exemplification of application of the innovative principles of the invention, they can either not feature at all or else be replaced by functionally equivalent devices placed within the container 10.

In the exemplifying embodiment here described, a tube 27 conveys the steam generated in the boiler 12 to a delivery port 28 communicating with the interior of the cabinet 11. Within the container 10 there is also a system for recirculating the atmosphere in the cabinet 11, consisting of a duct 29 containing a fan 30 and series-connected electrical resistances 31. At its ends, the duct 29 communicates with the interior of the cabinet 11: the first end (closest to the fan) communicates directly therewith and the second end communicates with the interior of the cabinet proximally to the steam delivery port 28.

The manner of operating of the entire installation in question is controlled by an electronic control unit 32 operated by a device 33 inside the cabinet 11. The unit 32 and the operating device 33 are fed, through an electric switch 34 controlled by a mechanical pushbutton 35 located on the ceiling of the steam bath cabinet, through the intermediary of an electrical connection 36 to an external electric line.

The unit 32 and the corresponding operating device 33 can be realized in any manner and can operate with any desired cycle, compatibly with the operational requirements of the steam generator system. Hereinafter the manner of operating of the steam bath cabinet installation will for the sake of convenience be referred to a specific embodiment on an electronic control unit and of a corresponding operating device embodied incorporating a microprocessor system to the programmed special functions of which reference will be made, though this is not limiting as regards the invention overall or as regards the scope of its claims and should be understood as exemplifying a possible practical embodiment.

The manner of operating of the steam bath cabinet installation in question, employing the said microprocessor system, is as follows.

When the mechanically operated pushbutton 35 is depressed, voltage is supplied to the elctronic control unit 32 and to the corresponding operating device 33 which, for example, consists of a membrane keyboard (which is thus impermeable as required) and an alphanumeric display, for example employing liquid crystals. When the pushbutton 35 has been depressed so as to supply the system with voltage, depression of a pushbutton marked SAUNA on the keyboard of the electronic control unit 32 activates the supply solenoid 18 and thus flowing through the pipe 16 the mains water reaches, through the pipe 19, the salt container 17, passes through this and through the cartridges 15 where it is dechlorinated and decalcified and, lastly, reaches the boiler 12. When a minimum water level has been attained in the boiler 12, so that the armoured electrical resistances 13 are covered (which level is detected by an appropriate first sensor, not shown, inside the boiler, which sends the information to the electronic control unit 42), the armoured electrical resistances 13 are activated by the electronic control unit 32. When a maximum water level is reached (this also being detected by a suitable sensor, not shown), the electronic control unit 32 de-energizes the supply solenoid 18, so interrupting the mains water supply to the boiler. The water thus present in the boiler is heated by the armoured resistances 13 and, after a certain time (approximately 6 to 7 minutes), steam begins to form in the boiler 12. This steam, flowing through the pipe 27, is introduced through the delivery port 28 into the cabinet 11. Once the steam has been delivered into the cabinet, to prevent it from cooling and condensing, the fan 30, activated by the electronic control unit 42, aspirates the mixture of steam and air in the cabinet and conveys it to the inside of the duct 29 where it is heated on coming into contact with the electrical resistances 31 and is then delivered once again to the interior of the steam bath cabinet from the other end of the duct proximal to the delivery port 28 and thus mixes with the steam coming from the boiler 12. There is in this way obtained and air/steam mixture similar to that diagrammatically illustrated in Figure 2, which shows how the said forced-circulation system enables the steam to pervade the entire interior of the cabinet in an evenly distributed manner.

Through the agency of the operating device 33 it is then possible to select the desired climate inside the steam bath cabinet (for example: temperate, medium, hot, etc.); this selection is carried out by the electronic control unit 32 which appropriately controls the different electrical resistances (13, 31) in the system so as to keep the selected climate constant inside the steam bath cabinet. A sauna cycle with steam generation terminates either when the water in the boiler reaches the minimum level (detected by the first sensor of suitable type) or when the electronic control unit 32 is informed of the depression of a key marked STOP on the keyboard of the operating device 33. Alternatively, provision can be made for a timer in the electronic control unit 32, which timer is programmable through the agency of the operating device

33 for a desired operating period. On expiry of the pre-set time, the said timer starts-up the same procedure obtained by the depression of the STOP key.

In whatever manner the end of the said sauna cycle is brought about (minimum water level in the boiler, depression of the STOP key, expiry of the pre-set timer time), the electronic control unit 32 then deactivates all the heating resistances in the system and starts-up a system rinsing cycle. This cycle consists of activation of the drain solenoid 25 which permits the mains water from the pipe 19 to reach the drain-trap 21 through the pipe 24. The drain-trap 21 is composed (as is shown in Figure 1 and, more clarly, in Figure 3, 4 and 5) of three pipes 20, 22, 24 interconnected by a T-joint and bent upwards so as to be parallel and vertical for a certain section before again bending so as to reach, as already stated, the following: the pipe 20 reaches the boiler 12; the pipe 24 the discharge or drain solenoid 25; the pipe 22, by its downward bend, the drain 23. As can be seen from Figure 3, which illustrates the drain-trap in the unprimed condition when the sauna or steam bath cabinet installation is inoperative (switched off), a condition of equilibrium is obtained in the three pipes forming the drain-trap, which remain filled with water up to the level indicated by A-A. Figure 3 also illustrates the condition existing when the steam bath cabinet installation is in operation, when the pressure set-up by the steam in the boiler is transmitted through the pipe 20 to the drain-trap and the water-levels in the drain-trap are modified, reaching the levels indicated by B-B. The length of the sections of the pipes 20 and 22 that are directed straight upwards before bending again in such that, both when the steam bath cabinet installation is inoperative and when it is operative, i.e. steam is being generated, the water levels within such sections, as indicated respectively by A-A and B-B, never reach the highest point where the three rectilinear pipe-sections again bend, ending the vertical parallel disposition.

When the discharge or drain solenoid 25 is activated by the electronic control unit 32, the condition illustrated in Figure 4 subsists: flowing through the pipe 24, the water reaches the drain-trap 21 and branches off into the pipes 20 and 22, in this way reaching, through the pipe 20, the boiler 12 which it rinses; then, through the pipe 22, it reaches the discharge system at 25, priming the drain-trap 21. The discharge or drain solenoid 25 remains activated for sufficiently long to ensure that the priming takes place (for example 10 seconds) and then the electronic control unit 32 deactivates it. When this occurs the drain-trap system 25 enters the water discharge phase as illustrated in Figure 5. In this phase the pipe 24 is closed at its upper end by the solenoid 25 and is therefore extraneous to the functioning of the drain trap while the water in the pipes 20 and 22 flows (as a result also of the air intake 26 in the descending section of the pipe 22) to the drain 23, at the same time drawing off the water present in the boiler 12 and so emptying it. The system is in this way rinsed out and emptied of all residual water in an effective and completely automatic manner. The system is therefore at once ready for providing another steam bath cycle or else for total deactivation, i.e. by depression of the pushbutton 35 on the ceiling of the cabinet so as completely to cut-out the power feed to the steam bath electrical system. This is done through the agency of the switch 34.

In addition to improving steam circulation inside the steam bath cabinet, the duct 29 containing the fan 30 and the electrical resistances provides other useful and convenient possibilities: it is for example thereby possible to activate the fan and the resistances separately from the steam generation system and so cause warm air to circulate in the cabinet, which is useful for pre-heating the cabinet pending the start of steam generation (i.e. while the water in the boiler 12 is being heated), or, on completion of the steam bath cycle, to dry the bather and/or the interior of the cabinet.

The microprocessor operated electronic control system makes readily available an entire series of functions additional to the basic functions for steam bath operation simply by storing in the memory of the system, during manufacture, the appropriate programme. Such additional functions augment practicality and facility of use. In the first place, provision can be made for a wide variety of messages which indicate on the alphanumeric display on the operating device 33 the different enable functions or functions that can be enabled, for example the phase of the steam bath cycle can be indicated by phrases such as: WAIT FOR STEAM; STEAM READY; PIPE RINSING; etc. In addition, the type of climate selected and the instantaneous temperature inside the steam bath cabinet (measured by a suitable sensor located in the cabinet and connected to the electronic control unit 32). Moreover, should the installation malfunction, provision can be made for self-diagnosis messages which are of great help to technical assistance personnel for rapid identification and repair of the fault. Such messages are also advantageous for the purpose of routine maintenance. For example, the container 17 requires to be periodically topped up with salt to regenerate the resins in the cartridges 15. A low salt level in the container 17 can be automatically indicated on the alphanumeric display by means of a suitable phrase that appears after a certain number of steam bath cycles. This prevents personnel oversights and ensures timely salt refurnishment.

The very considerable advantages brought by the steam bath cabinet installation in accordance with the invention are thus evident.

The incorporation of all the components forming the steam generation device and related controls in a container to be fitted above the cabinet (the dimensions of the container 10 can of course vary in relation to the cabinet used, as is also the case with the disposition within the container 10 of the different elements constituting the steam bath system) makes it possible to obtain a steam bath cabinet installation of very moderate dimensions, the necessary surface area for the installation being practically that of the base of the cabinet. The said incorporation also brings considerable aesthetic advantage in that, apart from the cabinet itself, there is no other element in view (and thus no steam pipe in view), this being achieved without the need for building works for installing pipes other than the water discharge system pipes. Installation time and costs are in consequence reduced. Other advantages are an optimal steam circulation obtained by means of the duct 29 which not only keeps the steam circulating, thus aiding even distribution within the cabinet, but also maintains it at the preset temperature. The duct 29 can be used, also separately from the steam bath function, to preheat the cabinet and to dry it.

The previously described water-discharge system employing a drain-trap means that a steam bath cabinet installation can be embodied that calls for no manual operation for filling and emptying the boiler 12, at the same time ensuring that after use of the steam bath cabinet the steam generation system can be rinsed, all this being achieved with a very economical drain-trap device.

Lastly, the control unit employing a microprocessor permits, at low cost, a wide range of additional functions which the bather can make use of without difficulty. One of such additional functions, previously described, is the reading of the internal temperature of the steam bath cabinet.

Further, the fact that a container is available immediately above the cabinet makes it possible to add, readily and with a minimum of connections, various other devices that can be disposed in the space within the said container that is not occupied by the steam generation system and its control devices. For example, provision can be made for a radio receiver system controllable by the microprocessor system capable, for instance, of memorizing a certain number of radio channels through the agency of the previously mentioned operating device 33 with keyboard; the sound diffusion can be readily disposed in the ceiling of the steam bath cabinet. Another possible device is a lamp 37 for lighting the interior of the steam bath cabinet that can for instance be fed through the intermediary of the switch 34 and will also seve as a clearly visible indication that the steam bath cabinet installation electrical system is on.

Claims

1. Steam generating device of the type comprising an electric steam boiler with first electrical resistances, for water-heating for the generation of steam and a pipe connecting the said boiler to steam inlet ports for sending steam to the interior of a steam bath cabinet installation, wherein the said device is wholly contained within a generally box-shaped container having base dimensions equal to the dimensions of the upper part of the said cabinet on top of which the said container is applied, so forming with the cabinet a single whole.

2. Steam generating device as described in claim 1, wherein the said generally box-shaped container also houses a duct which at its ends communicates with the said steam bath cabinet and containes an aspiration fan and second electrical heating resistances for the recirculation and heating of the atmosphere in the said cabinet.

3. Steam generating device as described in claim 1 or 2, wherein the said water is taken off directly from a water mains by operating a supply or feed solenoid.

4. Steam generating device as described in any of the preceding claims, wherein the water, before being introduced into the said boiler, is passed through resins possessing decalcifying and/or dechlorinating properties.

5. Steam generating device as described in any of the preceding claims, wherein control of the feed to the said first and second resistances of the said supply solenoid and the said aspiration fan is effected by means of an electronic timer circuit.

6. Steam generating device as described in claim 5, wherein the said electronic timer circuit can be programmed by means of a control device to provide a variable time during which the said steam is to be generated and a variable steam bath cabinet internal temperature.

7. Steam generating device as described in claim 6, wherein the said control device is disposed inside the said cabinet.

8. Steam generating device as described in claim 6 or 7, wherein the said control device and said electronic circuit are realized as a whole, which employs a programmable microprocessor.

9. Steam generating device as described in claims 6, 7 or 8, wherein the said control device is realized incorporating an impermeable membrane type keyboard.

10. Steam generating device as described in claim 8 or 9, wherein the said control device also features an alphanumeric display.

11. Steam generating device as described in claim 10, wherein the said microprocessor ensemble displays on the said alphanumeric display, by means of a programme contained in the ensemble, messages relating to the operation of the said system generating device and said microprocessor system.

12. Steam generating device as described in any of the prececding claims, wherein the electric feed to such device can be cut-off by means of an electric switch controlled by a mechanically operated pushbutton located externally on the base of the said generally box-shaped container.

13. Steam generating device as described in any of the preceding claims, wherein there is connected to the said boiler a water discharge system consisting of the T-junctioning of three pipes which are connected at their other ends respectively as follows: a first pipe to the said boiler, a second pipe to a water discahrge system and a third pipe to a discharge or drain solenoid connected to the water mains and controlled by the said electronic circuit which, by energizing it, makes it possible for the mains water to fill the said three pipes and thereafter to reach the said boiler and to prime a water-trap effect that permits the water contained in the said three pipes and in the said boiler, when the said discharge or drain solenoid is thereafter de-energized, to flow through the said third pipe into the drain, emptying the said three pipes and the said boiler.

Fig.1

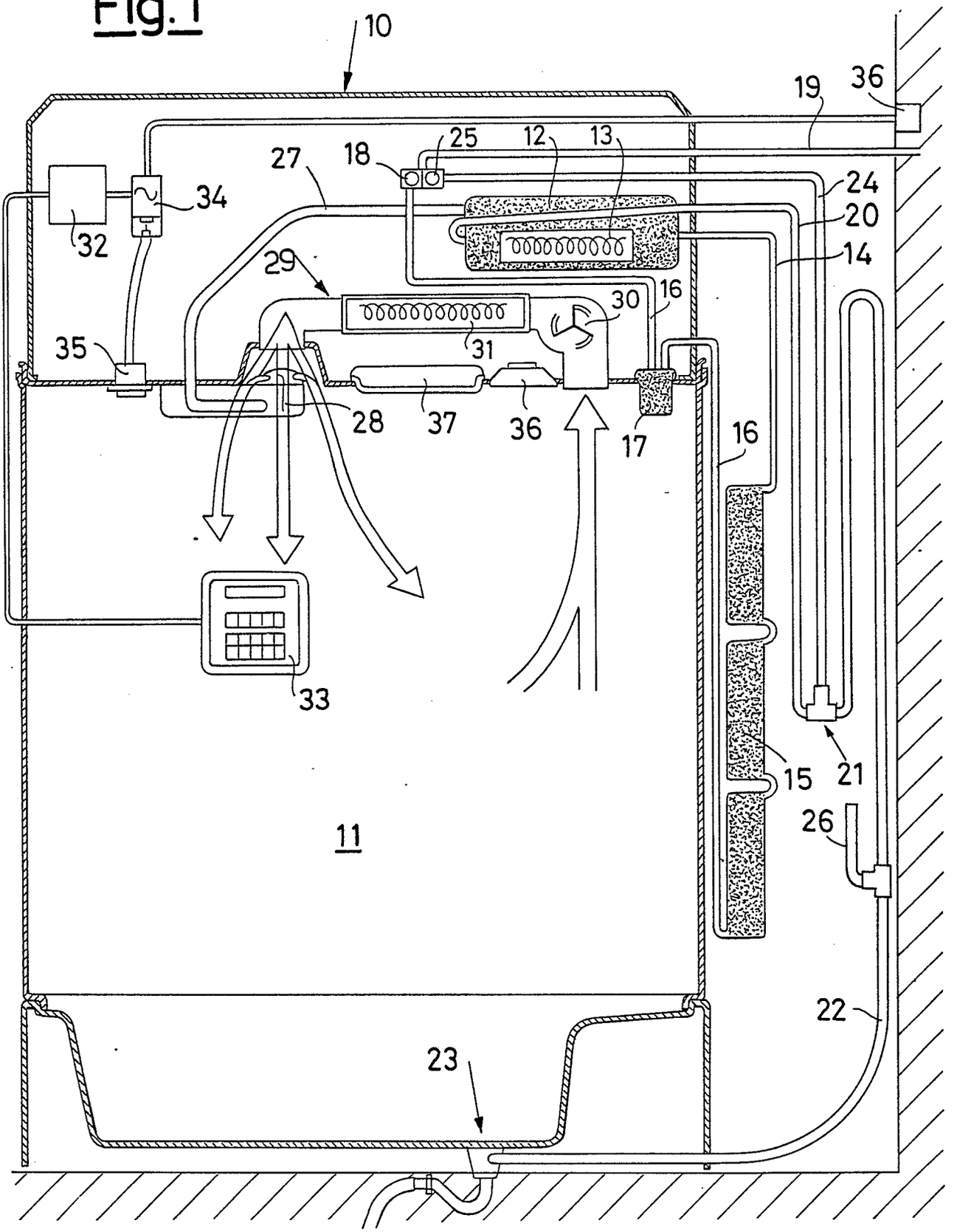

10
19
36
25
12
13
27
18
24
34
20
32
14
29
16
30
35
31
28
37
36
17
16
33
15
21
11
26
22
23

Fig.2

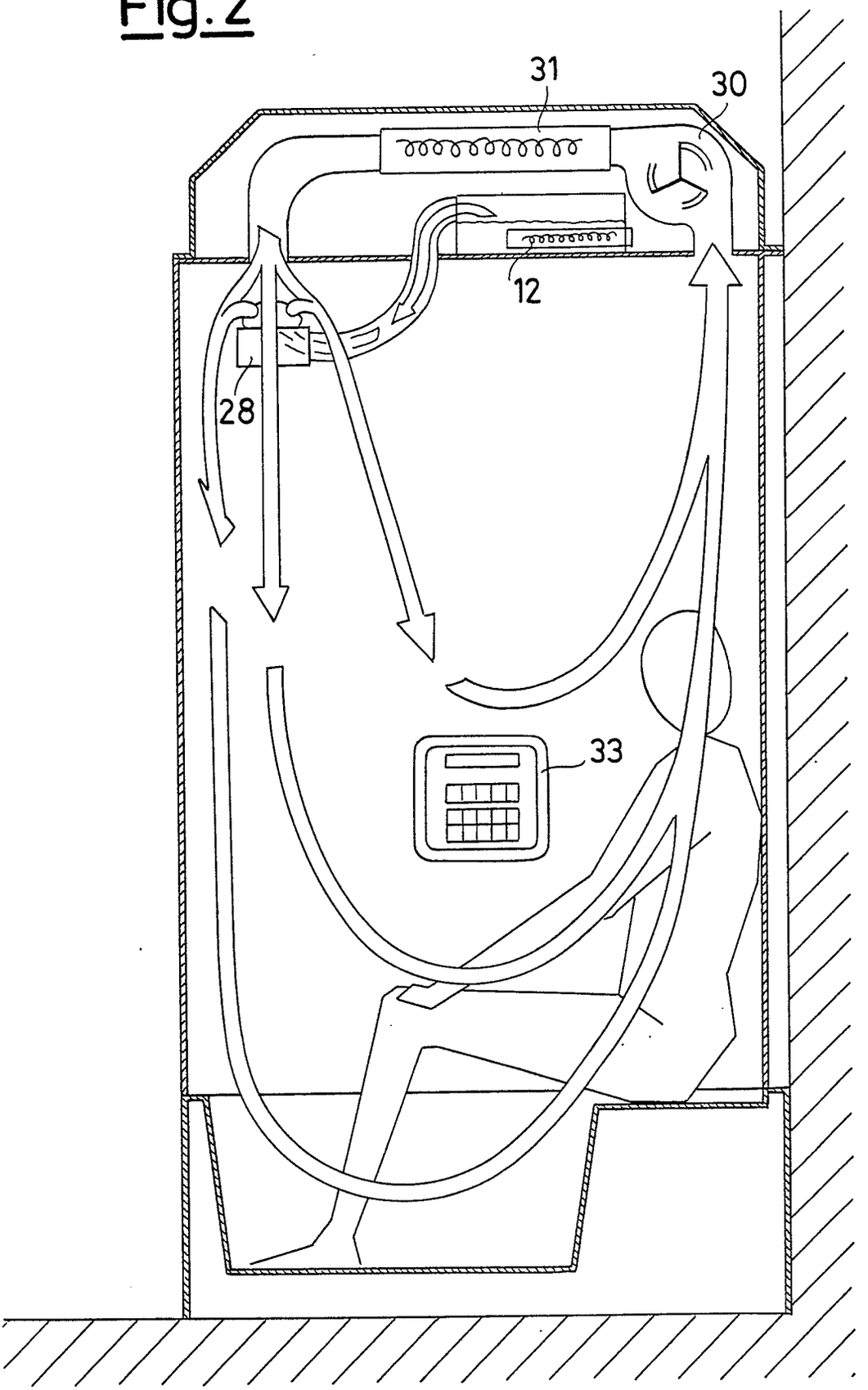


Fig.5

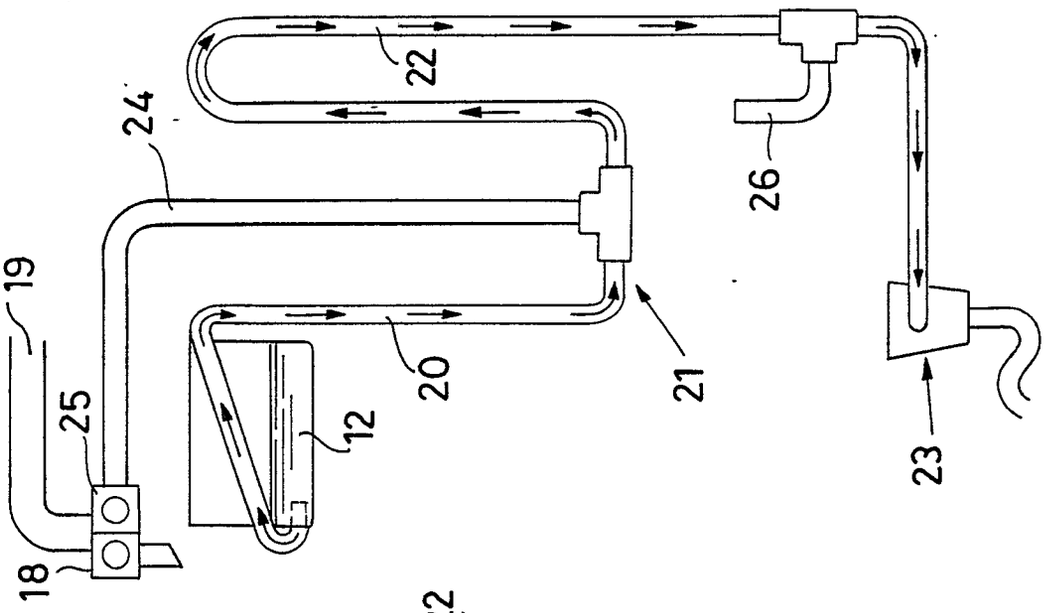


Fig.4

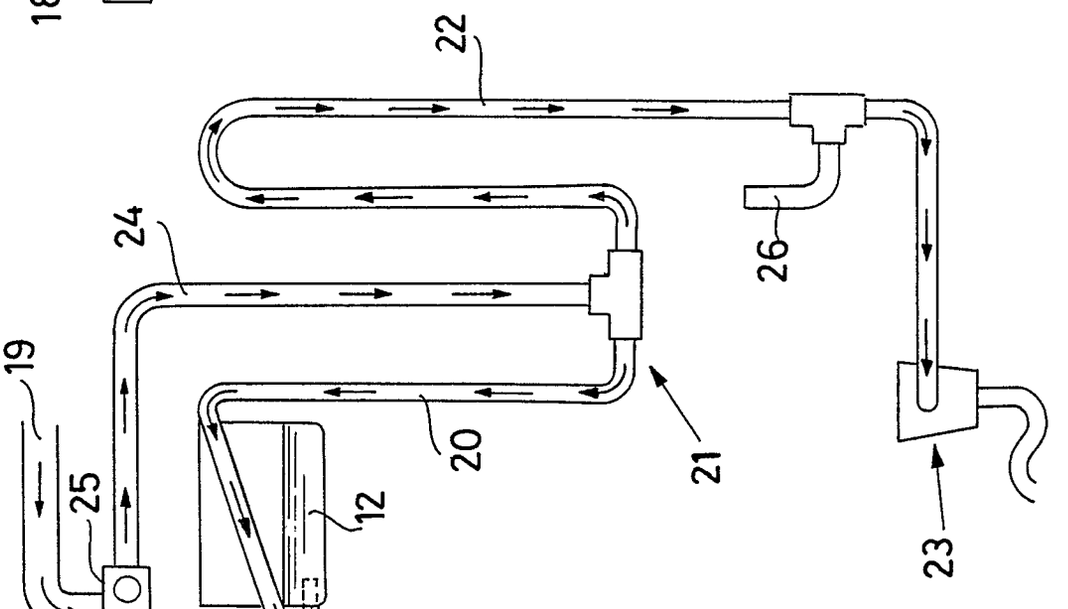
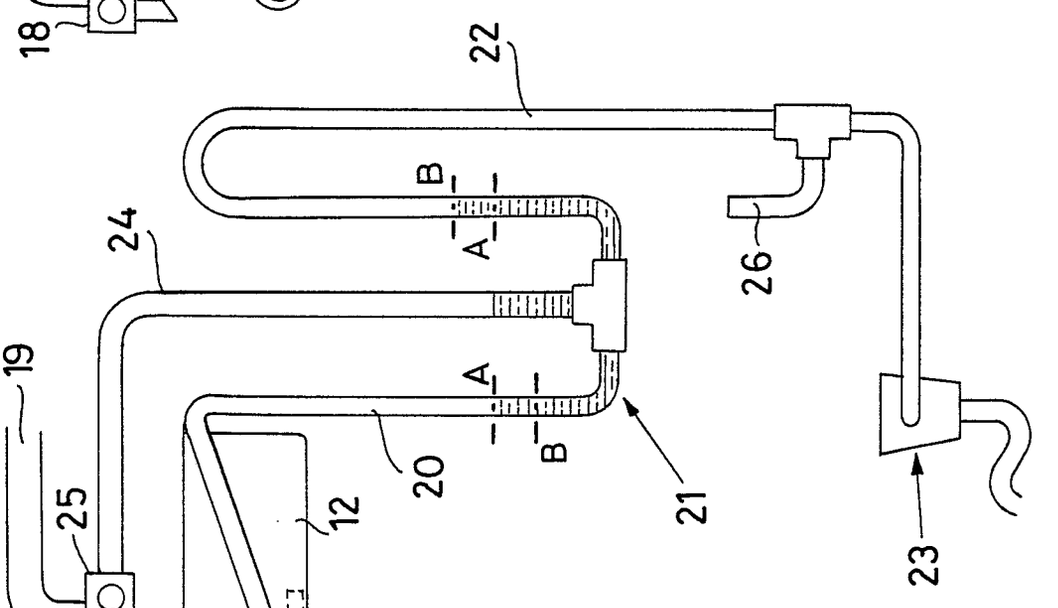


Fig.3



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 20 1528

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.4)
A,P	DE-U-8 711 541 (EOS-WERKE) * claims 1-3, figures 1,2 *	1,2	A 61 H 33/06
A	DE-A-3 319 232 (SCHIEFELBUSCH) * abstract, claims 1, 6, 8, 9, figures 1, 2 *	1,2	
A	EP-A-0 059 407 (SCHÜSSLER) * claims 8, 10, 11 *	1,3,4	
A	WO-A-8 703 194 (YLI-KOVERO) * claims 1, 3, figure *	1,2	
A	DE-A-3 615 194 (JANSON) * page 4, line 15 - page 5, line 1, claims 1, 3, 4, figures 1a, b , 2 *	1,2,4,7 ,13	
A	DE-A-3 511 436 (WELLA AG) * claims 1-12, figures 1, 3-6 *	1,5-11	
A	DE-U-8 631 342 (HOESCH) * claims 1, 2, figures 1, 2 *	1,9,10	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

A 61 H 33/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	23-09-1988	MICHELS N.

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 (P0401)