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D-80539 München (DE)(54) **Improvement of steam generators for household use.**

(57) Improvements for steam generators for household use. These machines are made up of a casing (1) which includes a water deposit (2) with an external inlet for filling and an internal conduit that leads to a boiler (8) with a heating element (9). An injection pump (5) has been placed in this conduit so that water can be sent to the boiler even when pressure inside the boiler builds up. A level meter (12) has been placed inside the boiler, and it activates or turns off the pump if the level drops or depending on the pre-established level inside the boiler. A steam

outlet (14) goes from the boiler through a line valve to the outside, this line valve is regulated with the controls on the panel on the casing. Since the water deposit and the boiler are independent, the machine can be filled even when it is being used and the time needed to heat the water is reduced since the boiler where the steam is produced has less capacity. A vacuuming device has also been added on and it picks up the dirt dissolved in the condensed water sending it to an expansion chamber.

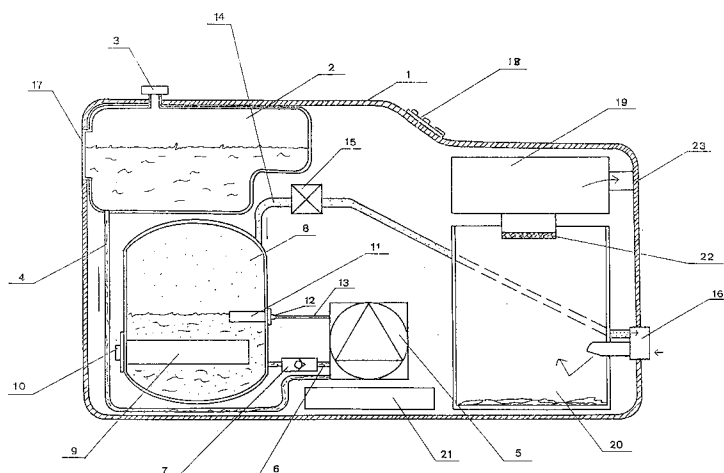


FIG. 1

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AREA OF APPLICATION OF THE INVENTION

The improvements mentioned for steam generators for household use would apply to those machines which produce steam for cleaning, ironing and other household chores, and that use either steam pistols, high pressure brushes or other cleaning accessories, or a steam iron for ironing clothes.

Due to the special preparation for vacuuming the dirt dissolved in the condensed water used, it can be used in many more areas.

STATE OF TECHNOLOGY

There are various steam generators for household use and all of them use the same system: only one boiler with a heat generator that produces the vaporization of the water placed in the mentioned boiler.

This means that it is necessary to use security plugs or other types of safety systems. Every time the internal pressure inside the container reaches an internal pressure of around 2 to 4 bar it can not be opened until the pressure in the boiler goes down.

These boiler systems or systems with only one container need an electrical heating element that produces the adequate temperature of around 110° or 135° and time is wasted on heating the water so that it reaches the temperature necessary to produce enough steam to work with. The amount of time wasted depends on the capacity of the container.

A container with a three litre water capacity, needs around 20 minutes to reach working temperatures and when the water is all used up, before refilling it, it is necessary to safely and slowly eliminate the pressure built up inside. This takes at least another 10 minutes, so by the time it's filled up again both procedures have taken up at least 30 minutes.

Moreover after cleaning, when using these units it is necessary to go through a second procedure, of picking up waste, condensed water etc... using other accessories. These pick-up systems are not always totally satisfactory, apart from the inconvenience of having to replace these accessories like rags and cleaning clothes.

All these problems are solved with the improvements which this statement mentions. Noticeably improving the machines which are now in use.

DESCRIPTION OF THE INVENTION

Improvement of steam generators for household use, specifically achieved by using a general external casing on which the controls, connections,

handle for its use etc... are placed. A general water deposit has been placed inside. This water deposit has a window that indicates the water level, therefore allowing the user to visually check the water level from the outside. This deposit is connected to the boiler by a pump which sends water into the boiler even when the pressure in the boiler has reached a certain level.

An electrical heating element has been placed inside the boiler and is in charge of elevating the water temperature to 135°, therefore producing the vaporization of the water and the necessary pressure build up needed to be able to use the steam with the accessories fitted on the steam outlet. A level meter placed inside the boiler activates the pump when the water level falls beneath the pre-established level. This pump works to refill the boiler until the indicated level is reached again, so the pressure necessary to use the machine is always maintained without inconveniences. Also, the deposit can be refilled without having to turn off the machine since the main water deposit is maintained at normal temperature and pressure levels. This is possible since the water in the boiler can't get back into the general deposit because a one way valve has been placed between the boiler and the pump that sends the water to the boiler.

A vacuuming system has also been added on to this machine, and it picks up the dirt dissolved in the condense water sending it to a special deposit made up of cylinder shaped receptacle with a lateral inlet on one of its sides. Which takes the vacuumed air through a sinuous and expansive path that causes the water carried by the vacuumed air to be deposited at the bottom of the receptacle, while the air carrying solid waste, goes through an axial conduit on the deposit, to another receptacle where a paper bag has been placed. The porosity of the bag lets the clean air out.

All of these improvements, perfect the total cleaning process. Once the machine is turned on and it reaches the pressure level needed, steam is projected through the specific accessory required by each special chore. Since a vacuum has been added on, while steam is projected directly over the surface, the condensed water is vacuumed up during the cleaning process pulling the dirt of the surface leaving it clean. The condensed water and the dirt are sent to the deposit, where they fall to the bottom without entering the vacuum thus eliminating the possible escape of these elements since a filter separates the waste chamber and the vacuum.

The vacuum does not have to be used with steam. This means it can be used as a normal vacuum without having to turn on the steam generator.

The combined use of the steam and the vacuum eliminates the dirt that always sticks onto the humidity left on the surface. Therefore the surface is completely cleaned and the results are unsurpassable.

A detailed description of the improvements for steam generators for household use follows. The figures attached will be referred to only for the purpose of explanation, but they do not in any way limit the invention and any detail can be modified in any way as long as this doesn't fundamentally alter the essential characteristics mentioned in this statement.

Figure 1: Shows a perpendicular section with respect to the base of the machine and the general layout of the machine.

Figure 2: Shows vertical section of the area of the machine where water and solid waste is picked-up in a deposit.

According to the make-up represented the improvements for steam generators for household use that are claimed are achieved by placing inside the general casing (1) a water deposit (2). A filling conduit (3), placed at the top of the casing, pierces the casing (1) letting water in through a conduit (4) to an injection pump (5) where it is then sent through another conduit (6), where a one way valve (7) has been placed, finally reaching the boiler (8) where a heating element has been placed (9) with a thermostat (10) and or pressurestat that maintains the temperature or pressure needed inside the mentioned boiler. The water level inside the boiler is controlled with a level meter (11) with its corresponding thermostat (12) that is electrically connected (13) to the injection pump (5).

At the top of the boiler (8) there's a steam outlet (14) with a line valve (15) connected to the outlet (16) on the casing (1) where the accessories used with the steam generator are fitted on: cleaning brushes, steam pistol and a conduit for the household steam iron.

A special vacuum can be fitted on (19) and has an external air outlet (23). Vacuuming takes place in a lower area (22) towards an intermediate area (20) which will be described later on and where the condensed water is deposited and dragged towards a collector (16).

This special vacuuming device is made up of a cylinder shaped deposit (24) which has a lateral inlet on one of its sides (25) and which is connected to the vacuuming record (16) through means correctly sealed and fitted. This deposit (24) has an axial outlet (26) on its base, and on its top edge a cover (27) with an lateral inlet (28) has been placed. An additional cover (29), which encloses the unit on the top part, has also been added on.

Inside the cover (27) a deflector (30) dome shaped pointed at the center and with interior sides (31) which form a larger diameter than that of the axial conduit (26) of the deposit (24). This places the deflector within its inside borders and the inside part of the cover becomes a round inlet ring, while the round interior sides and the axial conduit make up another round inlet ring which forces the vacuumed air towards the top part of the cover (27) forcing it through a sinuous path around the deflector (30) towards the top part of the axial conduit (26). During this process the water that has been carried with the vacuumed air is deposited at the bottom of a receptacle (24), and since a porous paper bag (31) has been placed in the second enclosure, and filters (15) the air picking-up the solid waste while letting the air go through towards the turbine (19) where it goes through an outlet (23) to the exterior.

Inside the deposit (24) where the water is picked up, a toric buoy (32) has been placed around the axial conduit (26). One of its sides has been specially designed so that when it starts sinking it fits itself into the top edge of the round ring between the sides (31) and the top opening of the axial conduit obstructing it so that when the maximum level of water in the deposit is reached, vacuuming is stopped since the air can not get through.

An automatic coiler for the electrical cord has also been installed (21) the pick up system for the cord is like those already used in these types of appliances.

According to this set up the steam generator works in the following way: a filling tap (3) for the deposit is used to fill the deposit (2) with water, at room temperature, till the level required is met and visually checked through the window (17) on the casing (1). The water then goes through a conduit (4) towards the pump (5). Since the boiler (8) is empty the pump is activated and water is forced into the boiler till the level marked by the level meter is reached (11).

Once the controls on the control panel (18) placed on the casing are used to turn the machine on, the heating element (9) starts to heat the water up until the established temperature and pressure necessary to produce steam is reached. The accessory needed for each special case is fitted on the casing.

Once the water inside the boiler (8) reaches the adequate level, the pump (5) automatically shuts off since a level meter (11) is in charge of shutting off or activating this pump during the use of this machine if the level falls beneath the pre-established level in the boiler. So the precise temperature and level needed for the correct working conditions are always maintained.

If the level in the deposit (2) drops it's not necessary to turn off the machine or to wait till the pressure level goes down since the deposit has been separated from the boiler and is only used to fill the boiler with water. So by opening the filling cap (3) the deposit can be filled whenever necessary without wasting time or having to interrupt the cleaning process. Since the boiler has a reduced capacity and it is continuously being filled up, the time needed to heat the water up is noticeably reduced when compared to the machines used up until now.

When using the control panel (18) to include the function of the vacuum, with the steam that is projected through the accessory fitted on the outlet, the vacuuming effect produced by the turbine (19) picks up the dirt and waste dissolved in the water condensed on the surface being cleaned. This dirt and waste is sent towards a deposit (24) forcing the air through a deflector (30) and the corresponding winding and expansive path, so that the water is picked up at the bottom of the deposit (24) while the air with solid waste is sent towards a paper bag (31) which picks-up the solid waste letting the air out through an outlet (23).

The control panel (18) has been set up so that the machine can be used either as a steam generator or a vacuum or both at the same time depending on the necessity of each chore.

The shape, the materials used and dimensions can be modified, and generally everything that is accessory or secondary can always be modified as long as it doesn't alter or modify the essence of the improvements described.

Claims

1. Improvement of steam generators for household use, characterized by the general casing, inside which a water deposit has been placed, with a filling conduit and a window used to check the water level. The Deposit is connected to the boiler by a pipe. An injection pump is placed between the deposit and the boiler in order to force the water into the boiler even if pressure has built up in the boiler.
2. Improvement of steam generators for household use in accordance to the claims stated in the first section due to the fact that a heating element has been placed in the boiler along with a level meter, this device is electrically connected to the pump activating it every time the level drops or shutting it off when the correct level is reached.
3. Improvement of steam generators for household use in accordance to the claims stated in

the first and second sections, characterized by a steam outlet placed in the boiler that leads to an external outlet on the casing where the accessories are fitted on. A line valve controlled with the control panel has been placed in this conduit.

4. Improvement of steam generators for household use in accordance to the claims stated in the first, second and third sections, characterized by adding a vacuum to the steam generator. A special filter connects the vacuum outlet to a waste chamber. The steam outlet goes through this chamber, which has a collecting system, and is connected to the accessory used on the machine and the inlet for vacuumed air. Therefore the dirt dissolved in the condensed water used for cleaning is picked up here.
5. Improvements of steam generators for household use in accordance to the claims stated in the first, second, third and fourth sections, and characterized by to the fact that the deposit or waste chamber is made up of a deposit that picks up the water and that has a lateral inlet on one of its sides, a cover and a second cover which make up the expansion chamber. A deflector has been placed over the opening of the deposit. It is pointed dome shaped and its edges are placed near the interior sides of the deposit forming a cylinder like skirt, which overlaps on the central axial outlet of the deposit, forcing the air to go through a winding and expansive path. Water is deposited at the bottom of the deposit, while the air that carries solid waste is forced to go through the base of the axial conduit towards a second receptacle, where a paper bag picks up the solid waste letting the air through.
6. Improvements of steam generators for household use in accordance to the claims stated in the first, second, third, fourth and fifth sections, and characterized by the fact that the deposit or waste chamber is easily detached from the casing and therefore can be emptied and cleaned making it possible to use only the vacuum or steam generator one at a time or both at the same time by fitting on the appropriate handle.

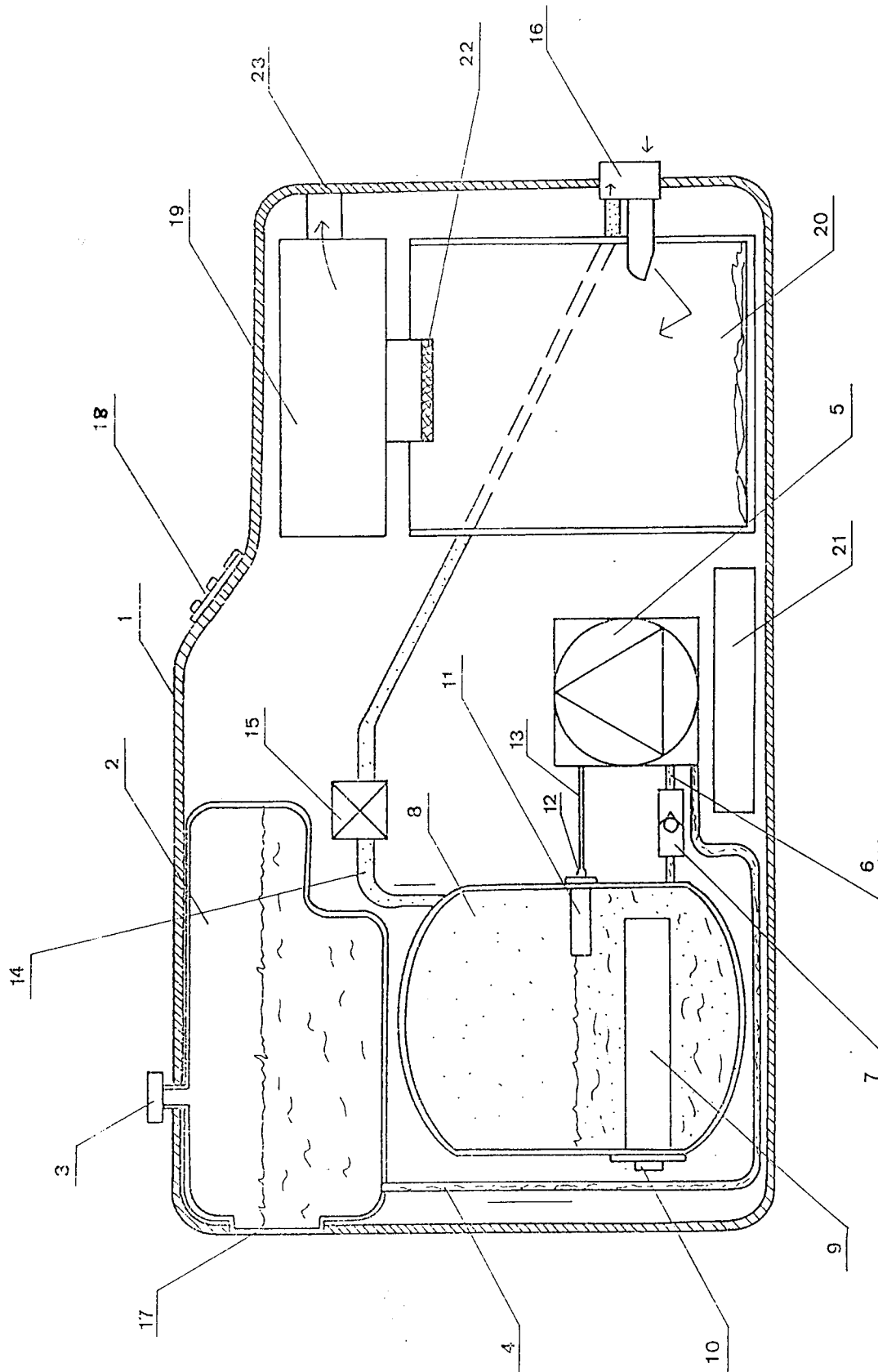
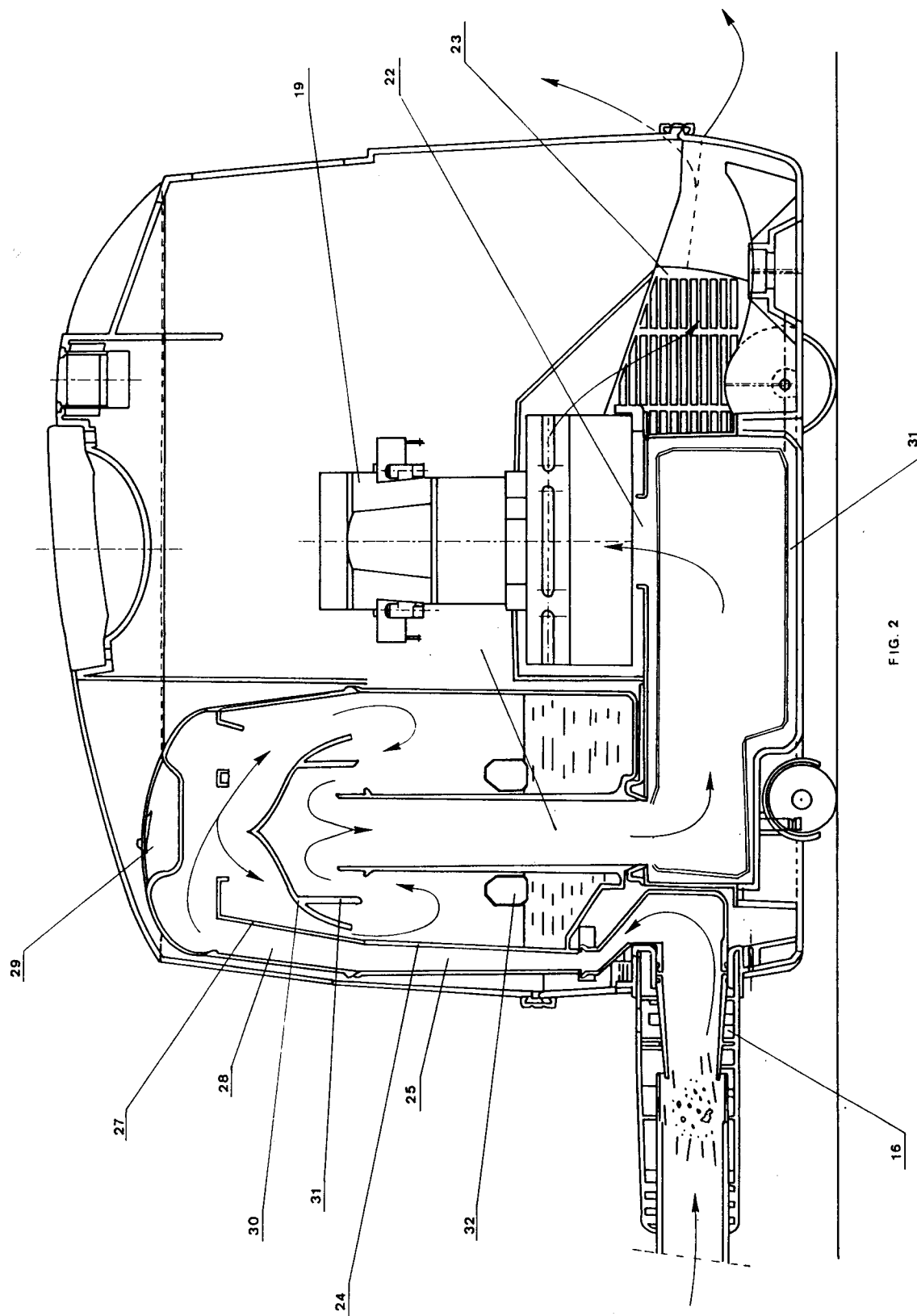


FIG. 1





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EUROPEAN SEARCH REPORT

Application Number
EP 93 50 0068

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.5)
X	US-A-2 627 015 (HACKMAN) * column 2, line 43 - column 3, line 25 * * column 4, line 62 - column 5, line 13; figures * ---	1-3	F22B1/28 A47L11/34
X	EP-A-0 478 508 (COSTRUZIONI TECNICHE SAMMARINESI) * the whole document * ---	1-3	
X	WO-A-89 03496 (OZETA ELETTRODOMESTICI) * page 4, line 22 - page 8, line 1; figures * ---	1-3	
X	US-A-4 948 947 (KANG) * the whole document * ---	1-3	
X	US-A-4 327 459 (GILBERT) * column 2, line 19 - column 3, line 48; figures * ---	1,4	
A	US-A-3 559 427 (BAKER) * the whole document * ---	1,3	TECHNICAL FIELDS SEARCHED (Int.Cl.5)
A	GB-A-2 158 210 (NUTT) * page 2, line 105 - line 107; figures * ---	1	F22B D06F A47L
A	US-A-4 314 385 (WINSATT) * column 3, line 34 - line 68 * * column 5, line 10 - line 37; figures * ---	4,5	
A	FR-A-2 577 408 (OESLICK) ---		
A	FR-A-2 544 054 (CAVALLI) -----		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 August 1994	Examiner Van Gheel, J
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 I : document cited for other reasons & : member of the same patent family, corresponding document			