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(54) **A condensation laundry dryer with arrangements for collecting condensation water in a container**

(57) A laundry dryer of the household type having a top-loading rotating drum (3) and condensation water collecting capabilities, wherein an upper handhole bezel (19) of the laundry dryer forms an access slip and an accommodation pan (17,20) for a condensate collecting tank (5), disposed between the machine front wall (6) and the rotating drum (3), the tank collector (5) being received removably within said accommodation pan (17,20) through the handhole slip (19), without hindering access to the loading door (4) of the drum, the pan (17,20) being provided with a gutter (22) for catching any overflow from the tank and any condensate on the tank exterior, in communication with a condensate collecting pan (13) associated with a condenser (10).

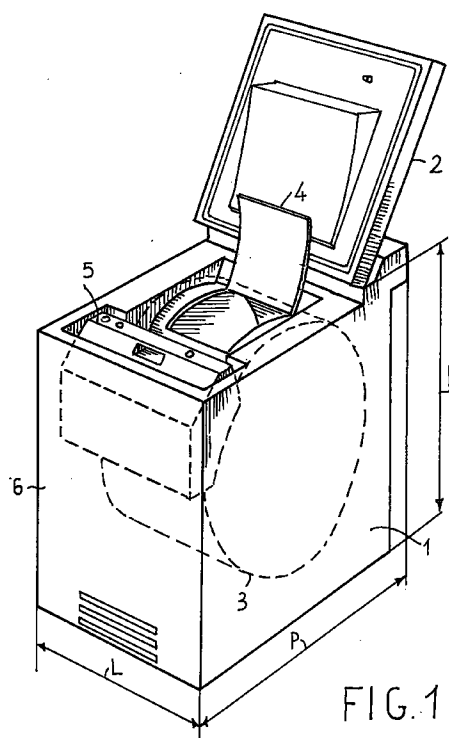


FIG. 1

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Description

This invention relates to a laundry dryer for household use, being of the top-loading type with arrangements for collecting condensation water in a container.

Known are condensation laundry dryers which do not require to be installed close to a water system connection, and which usually have some rinse, cooling or condensation water draining arrangements associated therewith, since steam (not to be released to the environment) is caused to condensate from the drying process therein by a stream of cooling air.

Such machines include of necessity a condensate collecting tank whose capacity is at least equal to the volume of condensate produced by one drying cycle when in maximum load conditions and which requires to be emptied periodically, so that it must be provided detachable.

Several alternative constructions have been proposed and used. In many instances the tank has been placed in the lower area of the laundry dryer at a lower level than the condenser, such that the condensation water would flow into the collecting tank by gravity without pump assistance.

The tank is taken out through a front door in the machine by a horizontal sliding movement.

This solution is economical but has some disadvantages: the tank is awkward to remove, from an ergonomic standpoint, and is not safeguarded against spillage when overfilled.

While the problem may be overcome by having the level of fill displayed, a visual check of the level would still be inconvenient to effect.

Viable automatic arrangements for monitoring the filled up and overflow state would be expensive and additional to the protection arrangements already made to ensure the laundry dryer general operability.

A further disadvantage comes from the liquid being possibly spilled out of the condensation water collecting tank housing compartment, open to the front.

Front loading laundry dryers have also been provided with the tank placed in the upper area of the machine, inside an open front compartment whence the tank can be slid out. This does make for easier tank handling and water level checking, but is at clash with the consumer's aesthetic demands and cannot provide full protection against overflow and spillage, just as when the tank is installed in the lower area.

Furthermore, top loading machines, i.e. machines having no front doors, have been proposed which have the tank placed between the machine top cover and the rotating laundry-drying basket.

This is an attractive solution, but has a drawback in that a large portion of the tank surface is left exposed to the heated, relatively moisture-laden air which would surround the basket in the event of the drying circuit being made less than perfectly tight. This surface is bound to act as a particularly active condensing surface and to significantly degrade the machine efficiency.

Since the tank undersurface next to the dryer drum is cylindrically concave, the risk exists of an amount of condensate building up by gravity in the lowermost area thereof, with the result that water may drip onto the drum and be scattered around the dryer body interior to initiate corrosive processes on any inadequately protected metal and electric parts.

Also, the tank is inconvenient to handle because it requires that both hands be used and a non-negligible reach.

From the engineering standpoint, moreover, it is necessary that the tank be provided with automatic closure tight fittings for connection to a condensate delivery line.

Furthermore, to gain access to the drying drum the tank must be removed, or alternatively, hung from the top cover.

In the former case, to reach the drying drum, dual cover lifting and tank removing operations are to be completed, which may inconvenience the user.

In the latter case, the weight of the tank, which may be partly or completely filled with condensation liquid, would burden the cover so that, to lift the cover, the user is to apply a non-negligible force which is to some extent unforeseeable in that it is bound to vary with the extent of the tank filling and, therefore, psychologically more influential.

The present invention obviates all these drawbacks and provides a top loading laundry dryer with collecting tank for the condensation water, wherein the condensate collecting tank is accommodated within the volume available between the front wall and the drying drum, and can be withdrawn upwardly by opening the loading cover of the laundry dryer and displacing the tank in an upward direction and partway toward the rear of the laundry dryer, without involving any rotation or angular change in its attitude.

The tank is received into a containment pan which ensures, on the one side, containment of any overflow and its catching and returning to the condensation circuit, while on the other side, it significantly prevents direct exposure of the tank walls to the moisture-laden warm flow induced by the drying drum, and the formation of condensation water thereon.

According to a further aspect of the present invention, the tank is filled through a delivery pipe, inside the tank and open to the tank interior at a higher level than that of an overflow opening.

According to a further aspect of the present invention, the tank is provided with a float-type of level indicator cooperating with at least one light guide mounted in the cover to provide on the cover exterior an indication of the tank being overfilled.

According to a further aspect of the present invention, to enhance drying efficiency and minimize the condensing phenomena over the interior walls of the dryer, the drum loading door is provided with a resilient sealing gasket.

The features and advantages of the present invention will become apparent from the following description and the accompanying drawings, in which:

Figure 1 is an overall perspective view of a laundry dryer according to the present invention;

Figure 2 is a functional diagram of the architecture of the laundry dryer according to the present invention;

Figure 3 is a fragmentary front-to-rear section view of the laundry dryer in Figure 1;

Figure 4 is a front-to-rear midsection view of a preferred embodiment of a condensate collecting tank for the dryer in Figure 1;

Figure 5 is a sectional view of the tank in Figure 4, taken in a first parallel plane to that of Figure 4;

Figure 6 is a second sectional view of the tank in Figure 4, taken in a second parallel plane to that of Figure 4;

Figure 7 is a fragmentary sectional view of an advantageous embodiment of a loading nozzle for the tank in Figure 4;

Figure 8 is a perspective view showing schematically an overflow indicator for the laundry dryer in Figure 1;

Figure 9 is a view from above of a preferred embodiment of a handhole bezel and receiving frame for a condensation liquid collecting tank.

Referring to Figure 1, shown therein is an overall perspective view of a laundry dryer embodying this invention.

The dryer is compact in size and comprises a box-type body 1, generally of enamelled sheet metal, in the form of a right parallelepipedon having a depth P, illustratively of 60 cm, height H of 85 cm with the cover closed, and width L of 40 cm.

Depth and width refer to the normal conditions of installation and use anticipated for the machine.

The box-type body 1 is closed at the top by a cover 2, shown in an open position, which is hinged rearwardly to the top of the box-type body, near a control panel.

The box-type body accommodates a cylindrical drum 3 rotating about a horizontal axis and being provided on its periphery with an unlockable door 4, also shown in an open position, through which laundry is introduced into the rotating drum or basket 3 for drying.

The drum has a diameter and an axial length such that most of the box-type body inside volume is occupied by the drum which, for easy introduction of the laundry, should be placed with its peripheral top as close as possible to the cover.

A collecting tank 5 for the condensation liquid is accommodated removably inside the box-type body 1 between the periphery of the drum 3 and the front wall 6 of the box-type body. The tank can be removed from the box-type body, once the cover 2 is opened, by an

upward directed movement slightly oriented toward the rear wall of the machine.

As explained hereinafter, the tank 5 is suitably shaped to make best use of the available interior volume of the machine.

Mounted in the lower portion of the front wall 6 is a ventilation grid which allows cooling air for an internal condenser to be drawn in (or even blown out).

Alternatively, the suction or ejection could take place through the machine bottom, if held off the floor by rest feet, but with the inflow and outflow substantially separated from each other.

Provided in the lower portion of the box-type body, not shown in Figure 1, are a heat exchanger/steam condenser, a condensation fluid collecting pan, and motive members for driving rotatively the drum, suction fans and a condensation liquid transfer pump.

Figure 2 shows in block diagram form the construction of the laundry dryer of Figure 1.

A stream of heated air is flowed in a closed loop through the drum 3, it being admitted through a side wall 7 or tympan end of the drum and discharged through the opposite wall 8. The heated air vaporises the liquid with which the laundry is soaked.

The stream is induced by a fan 9 which directs the moisture-laden warm air into a heat exchanger/condenser 10.

The exchanger is crossed, in counterflow or cross-flow relationship, by a stream of cool air, drawn in from the environment, induced by a fan 11, so that the moist warm air is cooled and moisture condensed in the exchanger.

The moisture-free cool air is introduced, in closed loop circulation, back into the drum 31 after being heated by electric resistance heaters 12, while the heated condensation air is exhausted to the environment.

The condensation liquid which forms in the heat exchanger is discharged to a collecting pan 13, which may be integral with the condenser, and by means of a pump 14 is directed into the condensation liquid collecting tank 5.

The operation of the laundry dryer is controlled by a programmer 15 which operates the various electrical and mechanical members and detects the liquid level in the pan 13 by means of a pressure switch 16 or an equivalent sensor, to cease operation on the occurrence of anomalous conditions, such as the pan 13 being overfilled.

Other safety devices, not shown, e.g. related to the closed state of the cover 2, may be suitably provided.

Advantageously, the condensation liquid collecting tank 5 is accommodated within an overflow and condensation dewdrop collecting pan 17 which discharges any overflow and condensate to the pan 13, preferably under a head where the pan 13 is in communication with the air of the drying circuit,

The importance of the collecting pan 17 and its drain connection 18 to the pan 13 will be explained hereinafter.

Figure 3 is a front-to-rear sectional view of the upper portion of the laundry dryer to bring out some of its constructional details.

The box-type body 1 is provided at the top with a handhole bezel 19, preferably a plastics moulding, having at its center a rectangular access slip to provide access to the drying drum, with walls which lead funnel-like on four sides to a location close to the outer surface of the drum 3.

In the vicinity of the front wall 6, the handhole bezel is sunk into the box-type body to form a containment pan 20 of the condensation liquid collecting tank 5.

The pan is bounded forwardly (again, with reference to the normal conditions of use of the laundry dryer) by a flat wall in contact with the front wall 6, and rearwardly by a wall in the form of a sector of a cylindrical annulus adjacent to the outer wall of the drum 3.

Upwardly of the pan 20, the handhole bezel is completed by a front molding 21 which is connected to the remainder of the bezel adhesively or simply by superposition, perhaps through an overlap joint.

Alternatively, the molding 21 may be formed integral with the remainder of the handhole bezel 19, and the pan 20 formed separately and attached to the bezel.

The pan 20 is closed laterally by two vertical walls and downwardly by a collecting gutter 22 into which a discharge port 23 opens which is connected by a pipe 24 to the condensation liquid collecting pan.

Removably received in the pan 20 is the collecting tank 5, preferably blow-molded from a plastics material such as polyethylene, or fabricated by thermowelding together two molded half-shells of polystyrene, polyethylene, acrylic resins.

The tank 5 is substantially prismatic in shape and is received, with the prism axis laid horizontally, in the pan 20 and can be removed therefrom by displacing it slightly obliquely upwards in the direction of arrow 25.

To this end, the tank 5 is suitably provided with an upper handle, integral with the tank.

A cover is hinged to the rearward side of the handhole bezel and closes the box-type body top and the access slip formed by the bezel 19.

Expediently, the cover also is a box-type construction formed of a flat top plate or cover 26 of enamelled sheet metal, and a bottom wall or inner cover 27 of moulded plastics which may be formed with a housing for a sealing gasket. Expediently, the inner cover is not flat, but has a raised central zone which is sunk into the slip of the handhole bezel, and merges with the walls of the latter and a rear wall of the tank 5.

Expediently for reasons to be discussed, the bottom wall of the central zone of the inner cover is inclined with a downward slope from the rear to the front portion which may be continuous or interrupted by steeper segments for reasons to be explained.

A condensation liquid delivery pipe 28 is received between the cover 26 and the inner cover 27.

The pipe 28 is led into the compartment between the cover 26 and the inner cover 27 by a flexible fitting 29 close to the cover hinge, and extends almost to the front edge of the cover where, after going through the inner cover, it is terminated with a downward aimed discharge nozzle 30 which fits into a top opening for filling the tank 5.

The front edge of the cover is completed by a molded plastics grille 31 which is expediently formed with a handle for opening the cover.

The drying drum 3 is conventionally provided with a door 4 hinged about a generatrix line 32 of the drum. The door 4 is conventionally provided with an opening handle 33 which also functions as a lock when in the closed position.

Advantageously, but not necessarily, the door 4 is provided with a resilient lip seal 34 to ensure a substantially tight fit of the door 4 to the drum 3.

It will be appreciated from Figure 3 that, with the cover opened, the slip formed by the handhole bezel is freed internally so that the door 4 can be opened to introduce laundry or withdraw dried items from the drum 3, with no need to have the tank 5 preliminarily removed.

The opened cover also allows the tank 5 to be lifted up, with any dewdrops or overflow dripping from the tank caught directly in the pan 20, whence they are redirected to the collecting pan 13 without affecting the inner walls of the box-type body 1 or the outer walls of the components accommodated therein.

The withdrawal of the tank 5, additionally to being particularly ergonomic because the tank can be accessed to near the front and there is no need to stretch one's arms out in order to remove it, is effected without rotating its position, so that there can be no risks of spillouts, even if the loading opening and any second vent opening are open.

Before discussing further advantageous expedients contemplated by the invention, it pays to consider some major technical problems solved by the invention.

As previously mentioned, the sides of the drum, mounted for rotation about a center shaft, are perforated near the shaft to admit heated air into the drum and exhaust moisture-laden air from the drum.

The drying air delivery and return channels are connected to the drum by means of seals, preferably labyrinth seals, whose fit, if less than perfect, may let out a minimal volume of relatively moist warm air past the seals.

Additional to this, there may be moist air leaking out past the loading door 4.

The warm air which surrounds the drum is dragged into rotation by friction against the walls and centrifuged toward the drum periphery.

Thus, an airflow is created at the drum periphery which generates convective motion in the space between the drum and the cover, within the loading slip.

The pattern of this motion is as indicated by arrows 36, when the drum 3 turns at the top in the direction of arrow 35.

The presence of a condensation liquid collecting tank, at room temperature and with large heat capacity, due to the liquid contained therein, disposed between the cover and the drum, as proposed by the state of the art, therefore would cause dewdrops to form on the tank bottom wall which fall onto the drum during the drying operation and are dragged around by the drum and scattered all over the interior parts of the machine to cause the aforementioned problems. Also, on completion of the drying process, it may cause dripping outside the washing machine as the tank is manipulated for removal.

By contrast, in the embodiment of Figure 3, the interspace between the inner cover and the cover, perhaps as enhanced by the use of thermal and sound insulation, provides effective thermal insulation between the inner cover and the environment, thereby allowing the inner cover to become heated by the heat being transferred by the convective motion of the air within the slip. This avoids the formation of condensate over the bottom wall of the inner cover.

It should also be noted that, thanks to the particular shape of the inner cover with the downward sloping bottom wall, even on the occurrence of malfunctions, with wet leakouts from the drying circuit or in the presence of splashes from the basket rotation, the collected liquid will tend, by the combined effects of gravity and the mechanical convection action, to move toward the front wall of the inner cover and to fall into the gutter 20 where it is collected.

Also with reference to Figure 3, it can be seen that any condensation phenomena with formation of dewdrops would mainly affect one face of the tank oriented in a practically vertical plane and being swept by downward oriented convective air movements, in an optimum condition for promoting the aggregation of drops and their fall by gravity into the pan 20 where they are collected.

In this way, on completion of the drying process, any dewdrops left on the outer wall of the tank 5 would be a negligible amount, and the tank removal involves no risk of dripping, also because the tank withdrawal operation is carried out, on account of the particular shape of the tank and location of its center of gravity relative to the withdrawal handle, with the tank outer wall exposed to the risk of formation of condensate contacting and rubbing against the edge 37 of the pan 20 which acts like a window wiper.

Advantageously, to enhance this effect, there may be provided, at or close to the edge 37, a resilient lip 37A, obviously interrupted by preferably oblique grooves to admit the flow toward the gutter 22.

Figures 4, 5, 6 are three sectional views of a preferred embodiment of the tank 5 taken at different depths in the front-to-rear direction.

Figure 4 is a mid-section and shows that the tank 5 is arranged upwardly, in the dihedral formed by the two upper prismatic faces of a handle 40, integral with the tank, which can be readily obtained by blow or spin molding.

Figure 5 is another sectional view, parallel to the former, showing the tank filler 41, which may be internal as shown, or external, or formed integrally with the tank, or thermowelded or adhesively applied thereto.

To prevent the tank 5 from becoming pressurized while being filled, or vacuumized while being manually emptied, a second vent opening for compensation and any overflow must be provided to limit the filling to within a maximum level.

This opening may consist of a nozzle such as 42 in Figure 5, formed near the filler 41 and closeable by a plug, or preferably, as shown in Figure 6, consist of an overflow pipe 43 mounted inside the tank and open at its upper end and having its lower end joined to the tank bottom, such that the excess liquid introduced is caused to flow back into the collecting gutter 22 of the pan 20 (Figure 3).

Advantageously, in order to avoid the possibility of liquid overflowing from the overflow pipe 43 during the tank removal, a shut-off valve, such as a moving ball plug 44 is provided in the lower portion of the pipe 43.

A finger 45 provided in the gutter 22 of the collecting pan holds the valve open as the tank 5 is inserted into its housing.

Lacking the thrust from the finger, the valve is closed by the simple effect of the ball weight, to which there may be added the effect of the hydraulic load applied by the liquid present in the pipe and any due to a spring bias to the closed position.

As shown in Figure 7, the same constructional expedient may be used to feed the tank 5 with condensation liquid, which is introduced into the tank 20 by means of the connection, evidently with a sealing gasket 46, of a nozzle 47, being supplied from the pump 41 (Figure 2), to the lower end of a loading pipe 48 inside the tank 5 which opens to the bottom thereof.

This loading pipe does not require of necessity a closure ball valve and may have none without this resulting in any risk of spilling liquid during the tank removal, if the upper free edge of the pipe 48 locates at a level above the overflow and maximum fill level of the tank.

Before taking into consideration other advantageous detailed aspects of the tank, it pays to close with the discussion of some functional aspects mentioned above.

Prior art laundry dryers equipped with a collecting tank have been said to require inherent protection to discontinue the machine operation on the occurrence of an overfill condition of the tank.

To provide this protection, devices have been proposed which are either responsive to the tank weight or the level of the liquid therein to operate warning and stop electric switches, additional to the protection

devices and consisting of the pressure switch 16 (Figure 2) which controls the level of the liquid in the collecting pan 13, perhaps provided integral with the exchanger 10.

In the laundry dryer of the present invention, these additional protective devices are unnecessary and their function is performed by the pressure switch 16.

This is made possible by the return conduit 18 (Figure 2) draining any overflows from the tank 5 into the pan 13. It is apparent that if an overflow condition of the tank 5 occurs and the volume of the condensation liquid increases due to a drying operation being carried out, the level in the collecting pan 13 will rise causing the pressure switch 16 to be operated and the machine to be stopped.

It is apparent that to avoid permanent shutdowns of the machine, the programming device which controls the machine operation should include a startup dead time when the pump 14 is operated and any operation of the pressure switch 16 unrecognized, so that, if the tank 5 has been emptied, re-start of the machine and the transfer of excess liquid from the pan 13 by pumping into the tank 5 can be allowed.

The overflow or near-so condition of the tank 5 may advantageously be revealed to the user, even before the stop condition occurs, by a lighted level indicator that would not require that the cover be opened to be seen.

Figure 8 is a perspective view showing schematically a preferred embodiment of the maximum level indicator for the tank 5.

The template 31 which forms the front edge of the cover accommodates a light guide 50 made of a clear material having a high refractive index, such as that known as "lucite", basically in the form of a cylindrical or elongate prism element, which receives, through its lateral surface, the light radiation present in the environment and directs it to one of its ends, intensifying it. The end 51 of the light guide is opposite the side of a clear tower 52, formed in the top wall of the tank 5, wherein a float 53 provided with a reflective flag 54 is received freely slidable in the vertical direction.

As the level of the condensation liquid reaches or exceeds a predetermined height in the tank 5, the reflective flag comes in line with the end 51 of the light guide 50 to reflect the light issuing therefrom to a second light guide 55, also accommodated within the front grille 31.

The second light guide directs the light radiation to the cover front, at a terminal 56 which acts as a light indicator.

Alternatively, the flag 54 could operate, rather than as a reflective element, as an opaque shutter which, with the tank in an unfilled condition, cuts off the light radiation from the light guide 51 to the light guide 55, and with the tank filled, allows it through.

Apparently, instead of using ambient light, a light source could be provided inside the machine which would radiate the tower 52 either directly or through a light guide.

In a laundry dryer of the type described above, the collecting tank capacity is a crucial factor.

In order to ensure collection of the condensed liquid in a complete drying operation with the machine fully loaded and in the worst anticipated conditions of wetting, it is necessary that the collecting tank has a capacity of at least 3 liters, preferably larger than that, so as to offer an adequate safe margin to overflow.

With conventional laundry dryers, it is very difficult to improve on this limit.

By converse, with the embodiment described, "dead angles" of the box-type body can be advantageously utilized to increase the capacity of the tank collector.

This embodiment is shown in Figure 9, which is a top view of the handhole bezel 19 of the machine in Figures 1 and 3.

The bezel 19 has a flat peripheral band 60 mating with a sealing gasket on the cover (alternatively, the sealing gasket could be mounted on this band) and narrows down in its rearward portion into a drum access slip having a width L1 which of necessity is related to the axial length of the drum.

In its forward portion, the slip formed by the bezel widens out and spans substantially the full width of the box-type body, forming an access and accommodation slip for the tank 5 having a width L2 somewhat greater than the former.

For example, if L1 is illustratively 28 cm, then L2 can be increased up to 34-36 cm, giving a percent increase of about 25%.

The collecting tank 5 may correspondingly have a longer length, for a given cross-section, to yield a capacity increase of the same order, or a capacity of up to 3.8-4 liters while ensuring ample margin for safety.

Claims

1. A laundry dryer with a condensation liquid collecting tank (5) and top loading facilities through an openable top cover (2) and a handhole slip (19) underlying the cover, comprising an accommodation pan (17,20) to accommodate said tank, formed in said handhole (19) between a front wall (6) of said laundry dryer and the drying drum of said laundry dryer, said accommodation pan (17,20) being provided with an overflow liquid and dewdrop drain (24), connected to a collection pan (11) collecting condensed liquid from a condenser (10), said tank (5) being accommodated in said accommodation pan (17,20) and removable through said cover (2) and said handhole slip (19), said drying drum (3) having an openable door (4) in said handhole slip (19) for loading said drum (3) without removing said tank (5) from said accommodation pan (17,19).
2. The laundry dryer of Claim 1, wherein said tank (5) has the general form of a prism received in said

accommodation pan (17,19) with its axis horizontal and provided with a handgrip (40).

3. The laundry dryer of either Claim 1 or 2, wherein said handhole slip (19) has a first slip width (L1) for loading said drum, and near said machine front wall (6), a second slip width (L2) greater than said first width (L1) to allow said tank (5) to be removed, said tank fully spanning said second width (L2). 5
10
4. The laundry dryer of either Claim 1 or 2 or 3, wherein said cover (2) includes an inner cover (27) which is sunk into said handhole slip (19) with a monotonic downward inclination from the machine rear toward the front (6). 15
5. The dryer of Claim 4, wherein said inner cover is formed with ribs and said monotonic inclination is variable. 20
6. The dryer of the preceding claims, wherein said tank (5) is provided upwardly with a filling slip (41) and said cover (2) accommodates a fill pipe (28) having a nozzle (30) for connection to said slip (41). 25
7. The dryer of Claims 1, 2, 3, 4, 5, wherein said tank is provided with a filling slip open to a bottom wall of said tank and connected, inside said tank, to an upward extending fill pipe (48), and said accommodation pan (20) is provided with a nozzle (47) for tight connection to said slip. 30
8. The laundry dryer of the preceding claims, wherein said tank is provided with an internal overflow pipe (43) open to a bottom wall of said tank through a plug valve (44) actuatable from outside. 35
9. The laundry dryer of the preceding claims, wherein said openable drum (3) door (4) is provided with a resilient sealing gasket (34). 40
10. The dryer of the preceding claims, wherein said accommodation pan (20) is provided with a resilient dewdrop-wiping lip (37A) acting on an outer wall of said tank during its removal. 45
11. The dryer of the preceding claims, wherein said tank (5) is provided with a float (53) type of level indicator (52) inside said tank cooperating with at least one light guide (56) to provide a visual indication of the maximum level on said machine front. 50
12. The dryer of Claim 11, comprising a second light guide (50,51) for conveying and concentrating diffused ambient light toward said level indicator (52). 55

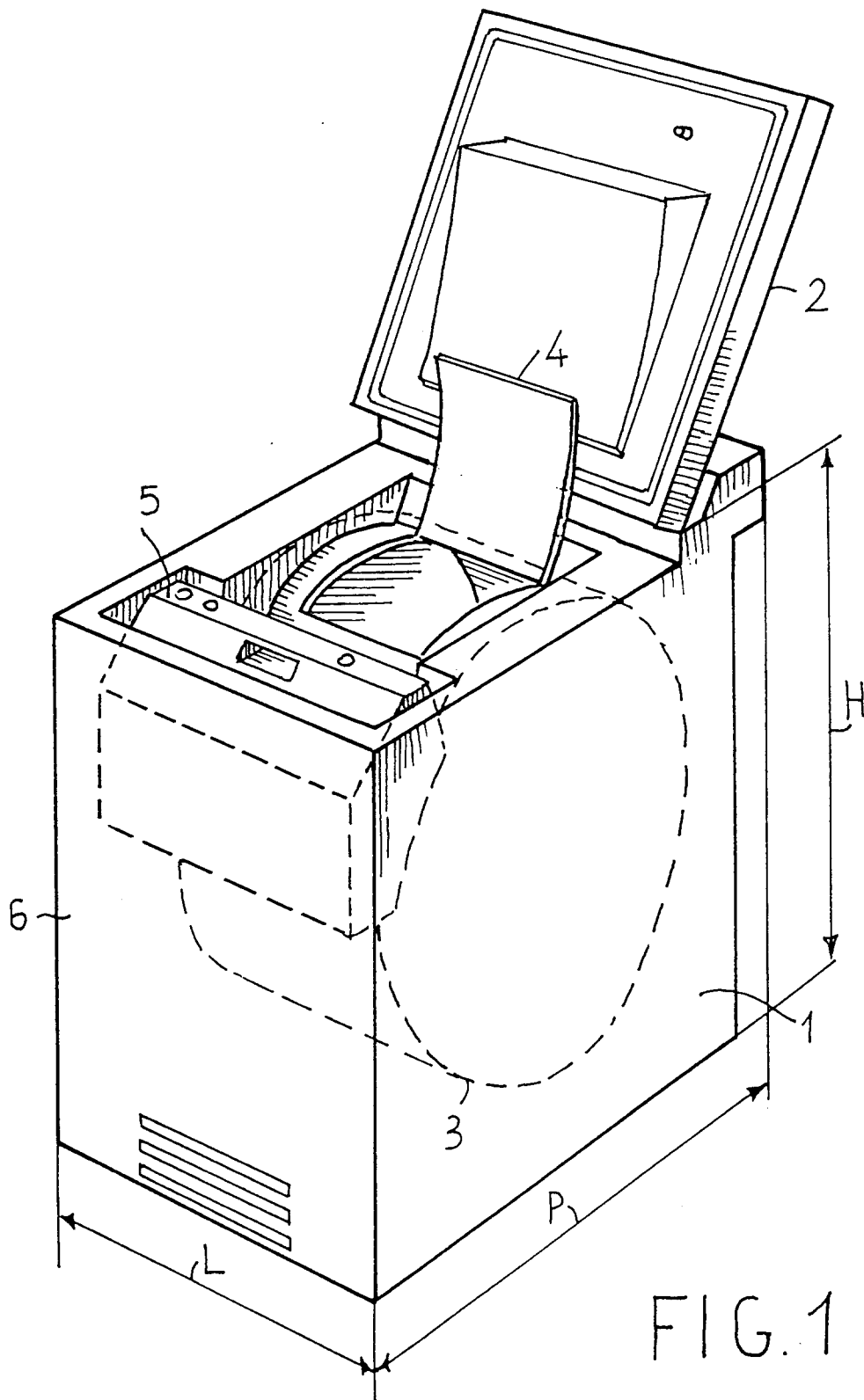


FIG. 2

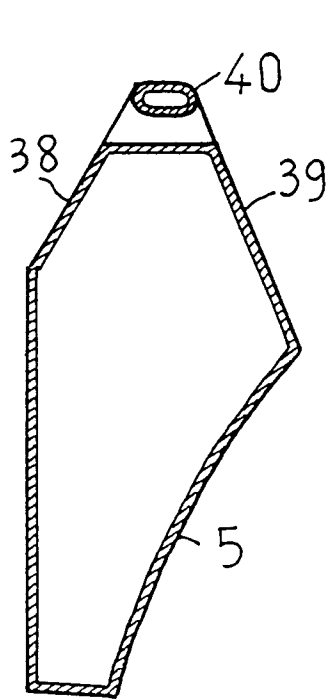
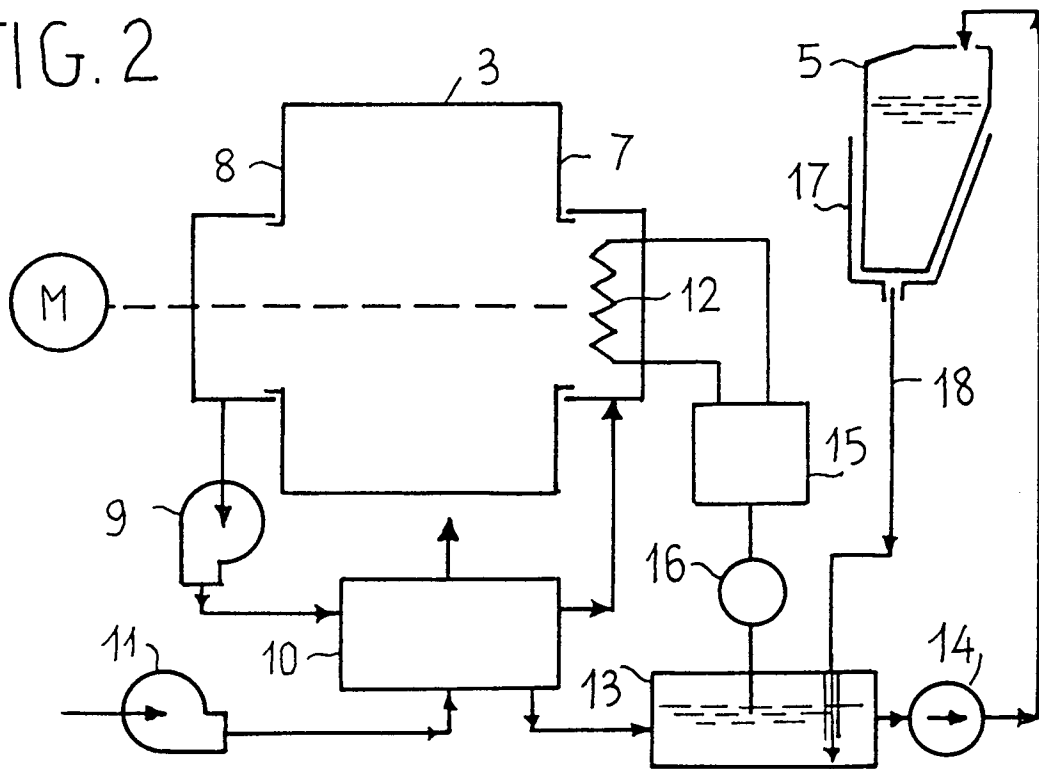


FIG. 4

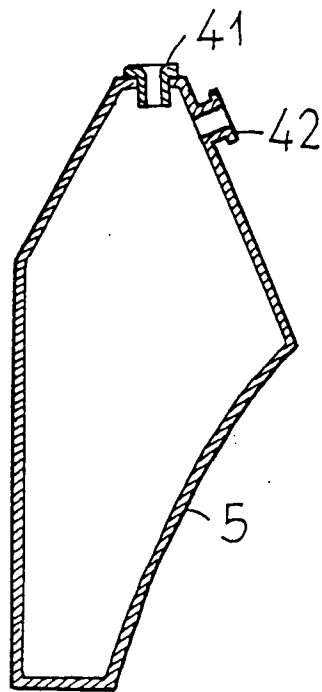


FIG. 5

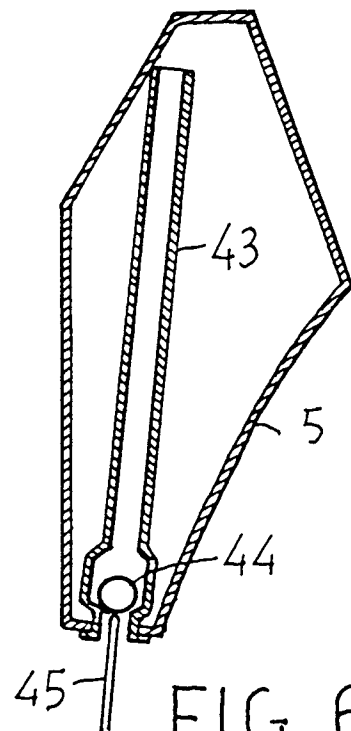


FIG. 6

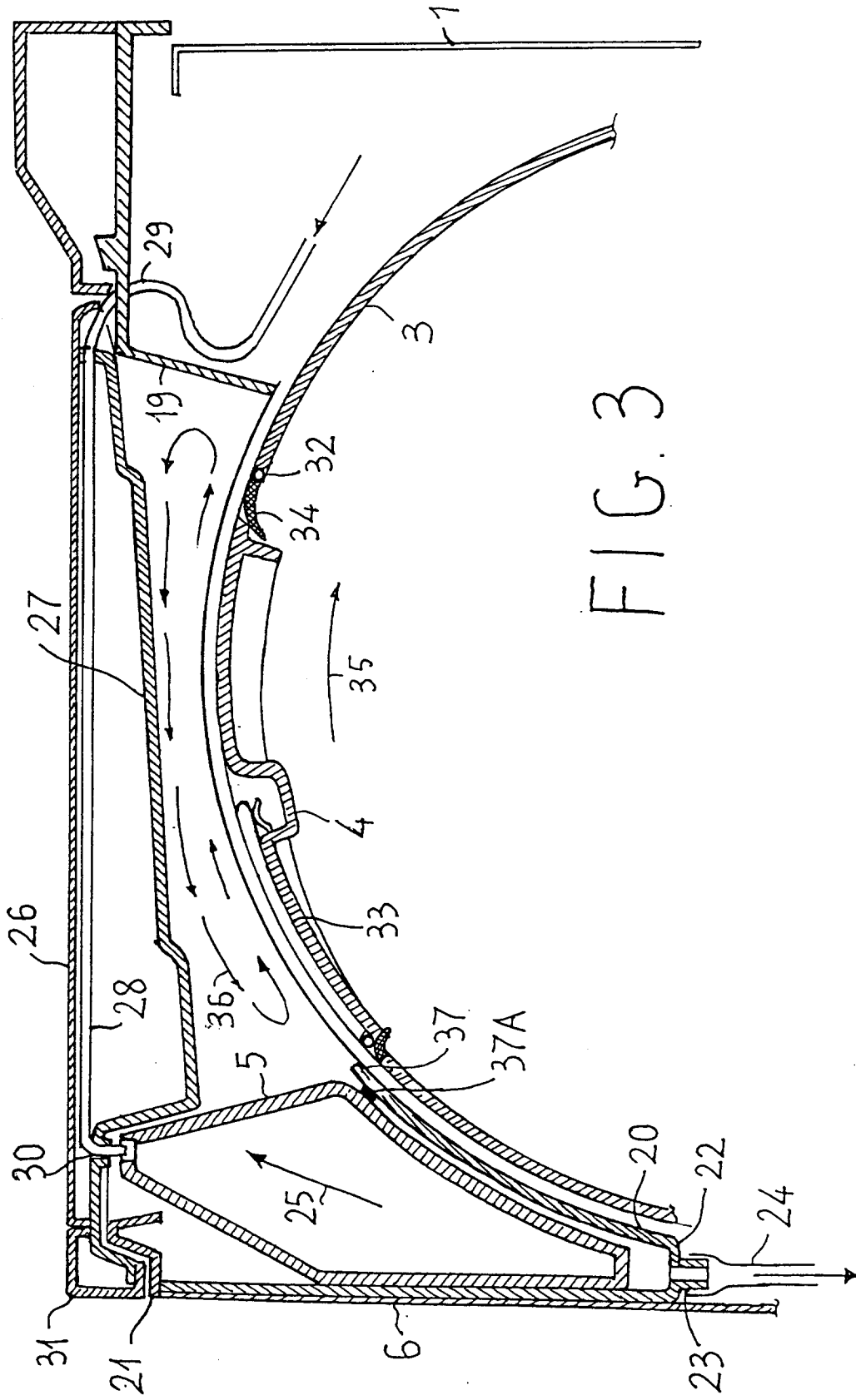


FIG. 3

FIG. 7

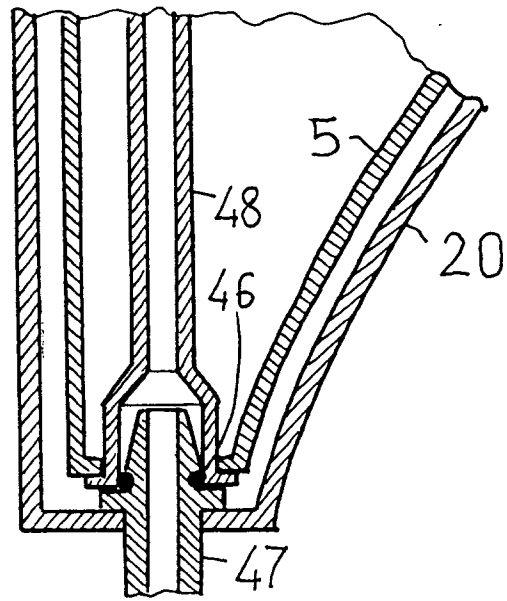


FIG. 8

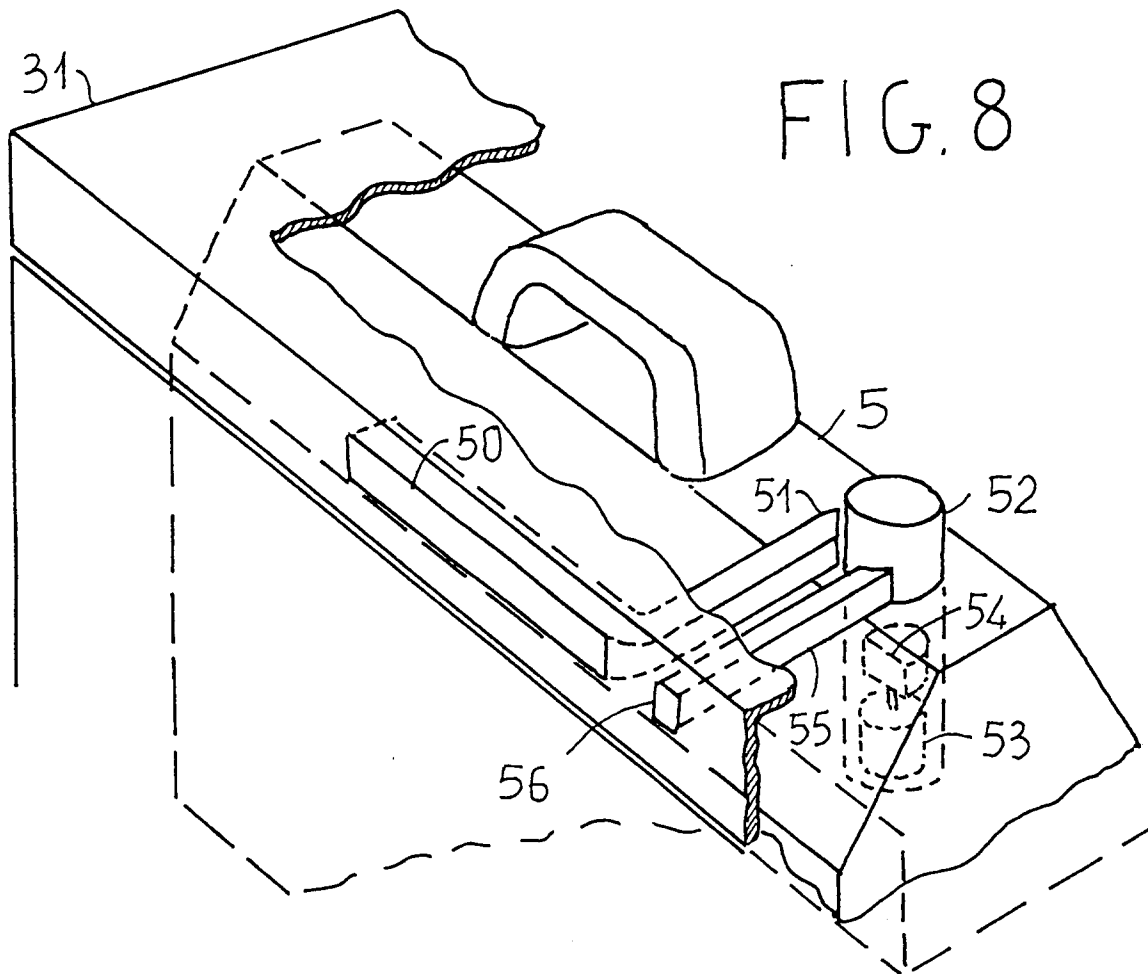
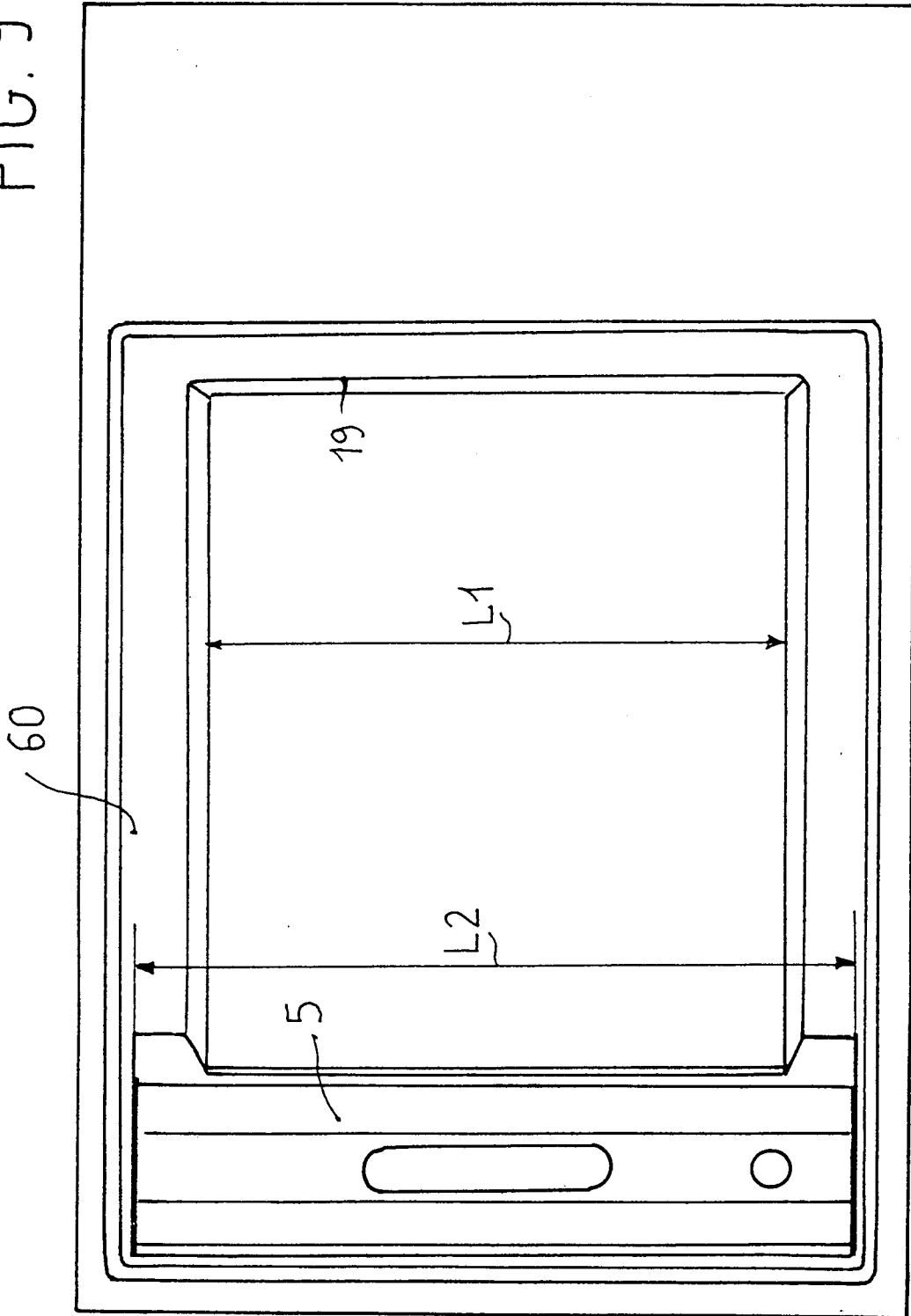


FIG. 9





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 20 2613

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.6)
A	EP-A-0 484 225 (CIAPEM) * claims; figures * ---	1,4,6,10	D06F58/24 D06F39/14
A	EP-A-0 254 018 (INDUSTRIE ZANUSSI S.P.A.) * abstract; figures 1,3 * ---	1,2,6	
A	GB-A-2 115 127 (BOSCH-SIEMENS HAUSGERÄTE GMBH) * page 2, line 23 - line 91; figure 1 * ---	1,2,6	
A	DE-A-29 33 513 (MIELE & CIE GMBH) * claims; figures * ---	1,2,6	
A	DE-A-37 08 516 (BOSCH-SIEMENS HAUSGERÄTE GMBH) * abstract; figures * -----	1,11	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			D06F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10 June 1996	Examiner Courrier, G
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