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

(11) EP 1 374 754 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.01.2004 Bulletin 2004/01

(51) Int Cl.[7]: **A47L 15/42**, A47L 15/44

(21) Application number: **02425427.8**

(22) Date of filing: **28.06.2002**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(71) Applicant: **CANDY S.p.A.**
I-20052 Monza (Milano) (IT)

(72) Inventor: **Fumagalli, Silvano**
20052 Monza (IT)

(74) Representative: **Falcetti, Carlo et al**
Perani Mezzanotte & Partners
Piazza San Babila 5
20122 Milano (IT)

(54) Built-in dishwasher machine with increased load capacity

(57) Built-in dishwasher machine in which the useful load volume is increased, with respect to that of built-in hidden machines, with only modifications in the loading door which is formed by a front panel (1) surrounded by a peripheral frame (2) with an increased height and coupled with a counterdoor liner flange (3), in turn the liner being deep-drawn into recess to exploit the greater space left by the front panel.

The production of the machines can be diversified, without duplications of the productive process, to meet different requirements and further advantages are gained, like the possibility of using electromechanical programming devices, innovative detergent dispensers, housed in the upper part of the loading door and an rotating sprayer with a greater diameter which ensures a greater effectiveness of wash.

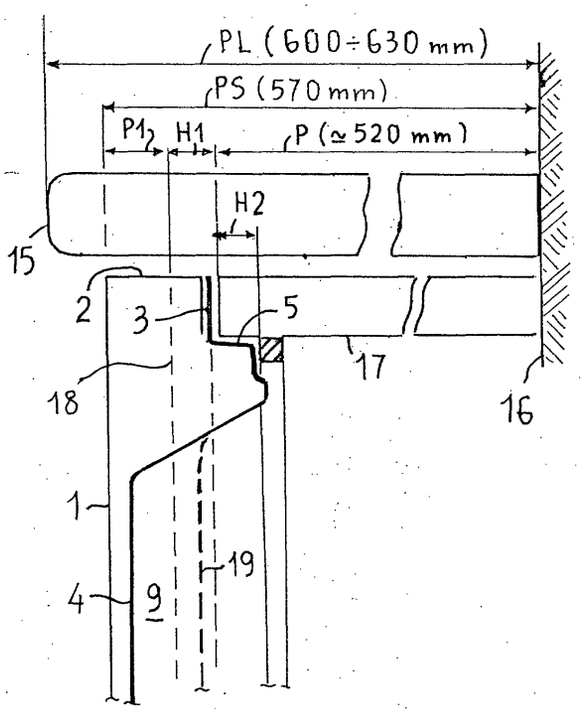

FIG. 2

EP 1 374 754 A1

Description

[0001] The present invention relates to a built-in dishwasher machine with increased load capacity.

[0002] Built-in dishwasher machines installed within modular kitchen structures which, for pure aesthetic reasons, are hidden by a front panel (identical to the other front panels of the modular structure) which is coupled with the loading door of the machine are already known and widely used.

[0003] This purely aesthetic requirement involves great limitations in the encumbrance of the machine and limits its performance.

[0004] The encumbrance of the machine is not just limited in height, to allow it to be housed under a work surface of the modular structure and in width (typically 600mm, possibly 450mm) to respect the modular characteristics of the structure.

[0005] It is also necessary to limit the encumbrance in depth of the machine (to be understood to mean horizontal length or distance of the front of the machine from a rear wall of juxtaposition) to allow the coupling of the front loading door with a masking panel which is flush with the other front panels of the structure.

[0006] Since typically the encumbrance in depth of kitchen modular structures is 570mm, it is therefore necessary that the encumbrance in depth of dishwasher machines is not greater than 550mm and preferably 540mm to allow the superposition onto the loading door of a masking panel with a thickness of no less than 20mm (generally between 20 and 30mm).

[0007] The overall volume of the machine is thus limited by these three parameters: height, width, depth and, even more so, the useful or load volume of the washing chamber, which must be housed between insulated walls of a certain thickness and must leave a certain free volume for housing the electrical, mechanical and hydraulic members of the machine, is necessarily lower than the volume available.

[0008] Many efforts have been made to improve the ratio between useful load volume and overall encumbrance of the machine, in the dimensional limits defined by the built-in modular structure.

[0009] Nevertheless, the ever increasing demand for a greater load capacity, for some users, makes these efforts uneffective and would require the development and - production of new models of machines, incompatible with a built-in modular structure or, if compatible, for example with a modular width of 90cm, substantially different from current production.

[0010] The production of such different models, to satisfy the different types of user would involve substantial fixed plant costs, operating costs and material costs for activating the different production lines which it is desirable to avoid.

[0011] The present invention at least partly satisfies this requirement and solves the problem of avoiding the activation of different production lines with simple dimensional variations which involve just the structure of the loading door of a conventional built-in dishwasher machine (and just the removable inner accessories) and allow, with minimal fixed investments and additional operating costs, two different models of dishwasher machines to be offered to the market: a conventional built-in one installed in a modular structure and a second innovative one with increased useful load volume, still for built-in installation but in this case "in view" with the possibility of coordinating the aspect of the machine with that of the modular structure in an aesthetically satisfying manner.

[0012] Moreover, the invention allows the introduction into the machine of constructive teachings proposed recently which further increase its load volume and significantly improve its ergonomic characteristics.

[0013] These results are obtained with a dishwasher machine as defined by the attached claims.

[0014] To adopt this constructive approach which substantially foresees an increase in the volume of the loading door, obtained with a greater depth thereof, in which a deep-drawn space, open at the inner face, of greater depth is formed, it is necessary to solve the technological problem of reconciling the intrinsic limits of the deep-drawing operations with this new requirement.

[0015] This aspect, as well as the characteristics and the advantages of the invention, shall become clearer from the following description of a preferred embodiment and its variants, made with reference to the attached drawings in which:

- figure 1 is an exploded perspective view of a loading door for a built-in hidden washing machine of the prior art;
- figure 2 is a front-rear median section view of a portion of a dishwasher machine in accordance with the present invention;
- figure 3 is a schematic front-rear median section view of the upper part of a built-in hidden dishwasher machine of the prior art;
- figure 4 is a front-rear median section view of a dishwasher machine in accordance with the present invention;
- figure 5 is a schematic front-rear section view of the upper part of a loading door for a dishwasher machine in accordance with the present invention;
- figure 6 is a schematic front-rear section view of a variant of the loading door of figure 5;
- figure 7 is a section view according to the section I-I of figure 6 of the loading door of figure 6;
- figure 8 is an overall perspective view of an embodiment of a built-in dishwasher machine in accordance with the present invention, with a loading door which protrudes with respect to the front plane of the built-in modular structure;
- figure 9 is a schematic front-rear section view of a detergent metering/dispensing device for a dishwasher machine in accordance with the present in-

vention;

- figure 10 is a schematic front-rear section view of the automatic closing kinematics of a discharge shutter of the metering/dispensing device of figure 9;
- figure 11 is a schematic front-rear section view of automatic closing kinematics of the discharge hatch of the metering/dispensing device of figure 9, slaved to the opening of a cover of the metering/dispensing device.

[0016] To better understand the invention it is advisable to consider first of all the structure of a loading door for a conventional built-in hidden dishwasher machine, as represented in the exploded perspective view of figure 1. The door is formed from an outer front panel 1, generally made from sheet metal (or alternatively moulded from plastic), with the edges double-folded to form a strengthening frame 2, with a C-shaped section, which couples, through attachment screws, with a peripheral flat flange 3 of a liner or counterdoor panel 4, generally made out of stainless steel, conveniently shaped by deep-drawing to form the flange 3 and a frame with an upper side 5, lateral sides 6, 7 and a lower side 8.

[0017] In the lower part the counterdoor panel is deep-drawn into recess and forms a housing 9 which increases the useful volume of the washing chamber.

[0018] Clearly, the depth of the recess 9 cannot be greater than the sum of the height H1 of the frame 2 of the front panel and of the height H2 of the counterdoor frame and in general is somewhat less to allow the thermal and acoustic insulation (through interposition of suitable insulating materials) of the counterdoor panel 4 from the front panel 1.

[0019] In the interspace between the front panel 1 and the upper part of the counterdoor 4 are housed command devices, a keypad and possible luminous displays, globally indicated with 10, accessible and visible on the upper side of the frame 2.

[0020] In the interspace between the front panel 1 and the upper part of the counterdoor there is also housed a detergent and additive metering/dispensing device 11, accessible from inside the loading door.

[0021] The loading door is hinged ,below to the body of the dishwasher machine through support arms 12, 13, to take on a vertical closed position or a substantially horizontal open position.

[0022] When the loading door is closed the counterdoor frame penetrates into the loading opening of the body of the machine and couples watertight, along the line 14 represented with a broken line, with a suitable gasket of the loading opening of the body of the machine, protruding on the walls of the washing chamber.

[0023] The lower side of the counterdoor frame is generally also itself equipped with a sealing gasket 15.

[0024] To reduce to the minimum the protrusion of the gasket on the loading opening it is necessary that the counterdoor frame has outer walls 5,6,7,8 which are substantially perpendicular to the plane of the counterdoor panel.

[0025] This limits the height H2 of the counterdoor frame, obtained by deep-drawing, to 20-30mm.

[0026] A deeper drawing would indeed take the counterdoor material beyond its yield point and consequently would lead to it breaking.

[0027] On the other hand, the deep-drawn recess 9 can have inclined peripheral walls, which allows a much deeper drawing, still -limited however by the interference which there would be between the base of the recess 9 and the front panel.

[0028] In this conventional structure there are two substantial limits.

[0029] The counterdoor recess 9 which is limited in depth and vertical development, modestly increases the useful load capacity.

[0030] Moreover, the detergent and additive loading operation is not ergonomic, because it notoriously requires the arrangement of the loading door completely open, practically horizontal and very close to the floor, forcing the user to bend down to carry out the operation. To avoid these drawbacks it has recently been proposed (European patent N 01 830 512 8) to extend the deep-drawing into recess 9, substantially for the entire height of the counterdoor, obtaining a housing of greater capacity, and to house the detergent and additive metering/dispensing devices in the volume between the front panel and the upper side of the counterdoor frame.

[0031] At the same time a metering/dispensing device, with a loading cover separate from the discharge shutter and open on the upper face of the upper side of the counterdoor frame, has been proposed so as to allow the loading of detergent and additives with the loading door in a practically vertical position.

[0032] Also in this case, however, the increase in useful volume of the washing chamber is insufficient to satisfy the ever increased demand for greater capacity, because the depth of the counterdoor recess is limited.

[0033] This limitation is overcome by the present invention increasing the encumbrance in depth of the loading door and consequently the depth in recess only by giving up the front panel, in the case of a built-in dishwasher machine, without any modification to the machine body and with marginal modifications to the structural components of the loading door, fully compatible with the productive technologies currently used.

[0034] Figure 2 schematically represents a front-rear section view of a portion of built-in machine in accordance with the present invention and clearly highlights its simple structural differences with the built-in machines of the prior art.

[0035] A modular kitchen structure comprises a work surface 15 with a depth PL which is standardised with respect to an adjoining wall 16 and which is between 600 and 630mm

[0036] Under the work surface are housed (possibly

with interposition of a beading) modular cupboards and/or drawers with a standardised nominal depth PS of 570mm, including the thickness of the front panels for closing the cupboards and/or drawers indicated with P1 and comprised between 20-30mm.

[0037] Dishwasher machines for built-in hidden installation therefore have a machine body 17 which has encumbrance in depth, indicated with P, of no greater than 520mm (in general 510mm).

[0038] The loading opening of the machine is closed by a loading door, like the one represented in figure 1, which increases the encumbrance in depth of the machine by the amount H1 of between 20 and 30mm which can have a front masking panel placed over it, with thickness P1 so that the overall encumbrance in depth is equal to that of the other units, with the masking panel flush with the others.

[0039] In figure 2 the encumbrance of the loading door of a conventional machine is represented by the broken line 18.

[0040] As already observed, this limits the depth of the counterdoor recess which cannot exceed the plane of the peripheral counterdoor flange by more than 15-20mm.

[0041] In figure 2 the base wall of the recess is in this case represented by the broken line 19.

[0042] On the other hand, by just leaving out the masking of the machine it is possible to extend the overall encumbrance in depth of the machine at least to PS=570mm and preferably greater (possibly with a suitable rounding of the edges of the outer front panel 1 to join it to the adjacent masking panels) even up to equal to the encumbrance in depth PL of the work surface, i. e. 600-630mm.

[0043] This is obtained simply, without modifications to the machine body and without substantial modifications to the productive process, increasing the height H1 of the frame 2 of the outer front panel 1 at least to (570-P) mm, i.e. to 50-60mm and even more.

[0044] This allows the deep-drawing into recess 9 of the counterdoor panel 4 to be deepened (also in this case without substantial modifications to the productive process and in a way which is compatible with the limits set by the deep-drawing process) to a depth, measured relative to the plane of the counterdoor flange 3, close to H1, preferably H1-10mm, to leave a thermal and acoustic insulation interspace, and in any case lesser than H1-20mm to exploit as best as possible the greater volume available.

[0045] The deep-drawing into recess can be extended for the entire height of the counterdoor, without this involving problems for the housing of the command devices of the machine and of the detergent metering/dispensing devices. Indeed, it is clear, as can be seen in figure 2, that in the interspace between the front panel 1, the upper side of the peripheral frame 2 of the front panel and the upper side 5 of the counterdoor frame, there is a large volume, suitable for receiving command/programming devices and detergent metering/dispensing devices like those described in European patent application N 01830512.8 or even more conventional devices.

[0046] We shall return later to particular embodiments of solutions of dispensers specifically designed to exploit as far as possible the greater volume available.

[0047] Now we shall consider a further advantage offered by the greater depth of the washing chamber, obtained with a deeper drawing of the counterdoor recess.

[0048] In conventional dishwasher machines the difference between depth and width of the washing chamber limits the diameter of the rotating sprayers, which can be housed in the washing chamber, at the lesser of the two dimensions, which is that of the depth.

[0049] Typically, if the width of the washing chamber can be between 560 and 580mm (to leave an interspace with the outer walls of the unit which has a standardised width of 600mm), the maximum depth, on the other hand, is between 500 and 520mm, so that the diameter of the sprayers, in particular of the upper sprayer, normally mounted under an upper rack, can at most be equal to such a depth, to avoid interference with the walls.

[0050] This has the drawback of creating dead zones, not just in the corners but also at the sides of the washing chamber, in which the irrigating action carried out by the sprayer is less effective.

[0051] To avoid this drawback there have been proposed, in document EP-836,829, rotating sprayers with articulated arms or telescopic arms of variable length, to increase the volume which can be directly irrigated.

[0052] Such a solution is complex and expensive.

[0053] On the other hand, it is clear that without constructive complications the increased depth of the counterdoor recess, thus of the washing chamber which is made substantially equal to the width, allows the use, at least for the upper rack, of a sprayer with a greater diameter, reducing the dead zones to the minimum.

[0054] Moreover, this advantage can be achieved without the need for modifications to the machine body, with modifications only needed of the upper rack to best exploit the greater volume available.

[0055] In this way with the same machine body and with productive diversifications which only concern the loading door and few accessories, such as the upper rack and the relative sprayer, two distinct products can be obtained: a conventional built-in hidden dishwasher machine and a built-in dishwasher machine with an increased load volume and significantly improved washing performance.

[0056] These concepts are made clearer from the comparison of the schematic front-rear sections of figures 3 and 4 which respectively represent the upper part of a conventional dishwasher machine and a dishwasher machine obtained from the previous one with just the modification of the loading door and the accessories.

[0057] In the machine of figure 3 the depth of the ma-

chine is 540-550mm to allow it to be built-in flush with the masking panel.

[0058] The encumbrance of the front door, with the counterdoor liner in recess just in the lower part, leaves a useful depth of the washing tank in the upper part, limited to 450-460mm and allows the housing of an upper rack 20 with a depth in the order of 440-450mm.

[0059] The upper sprayer 21 associated with the rack 20 cannot have a diameter greater than 440-450mm, whereas the optimal diameter allowed by the width of the washing chamber would be 540-560mm.

[0060] In the machine of figure 4, the depth of the machine is at least 570mm and can even reach 600mm.

[0061] The increased depth is obtained with just the modification of the loading door, whose counterdoor can be deep-drawn into recess for its whole height.

[0062] With this the depth in the washing chamber, in its upper part can be brought to 530-540mm as a minimum and can possibly reach 560-570mm, without the loading door protruding from the edge of the work surface (600mm depth as the minimum).

[0063] This allows the housing of an upper rack 22 with a depth of 520-550mm, and of an upper sprayer 23, associated with the rack, with a diameter in the order of 520-550mm, practically equal to the optimal diameter allowed by the width of the washing chamber.

[0064] It is therefore clear that with the simple modification of the rack 22, of the sprayer 23 and of the duct 24 for supplying water to the rotor (which must be longer with respect to that of figure 3 to centre the axis of the rotating sprayer in the space available in depth) improved washing performance can be obtained.

[0065] This in addition to the greater load capacity of the machine.

[0066] Now, using some examples, we can tackle the advantageous possibilities offered by a loading door like the one described to house command and detergent dispensing devices, both conventional and innovative ones.

[0067] Figure 5 schematically represents a front-rear section view of the upper part of the loading door.

[0068] In the interspace between front panel 1, upper side of the peripheral frame 2 and upper side 5 of the counterdoor frame, a conventional electromechanical programmer 25, with a horizontal axis, as shown, or a vertical one, can conveniently be housed.

[0069] The command knob 26 can be arranged on the front, as illustrated, or even on the upper side of the frame, or even built in, with just one peripheral portion accessible through a window made on the front, on the upper side of the frame or even on a side of the frame, like for example proposed in EP 728473.

[0070] A detergent metering/dispensing device 27, of the conventional type, with a closing shutter 28, can be housed in the interspace between the front panel 1 and the base 9 of the counterdoor recess, locally shaped to form an interspace of suitable width, with a minimal reduction of the useful load volume.

[0071] The detergent metering/dispensing device, instead of with a hinged closing shutter 28, as illustrated, can be of the type with a sliding shutter (as taught by EP780087) or with a rotating diaphragm shutter, as taught by EP10049.

[0072] The upper side 2 of the frame can be equipped, at installation, with a beading 29, made from wood or plastic, coordinated with the modular kitchen structure in which the machine is installed.

[0073] Alternatively, in the variant shown in the section view of figure 6, the upper side of the frame 2 can be inclined, with corresponding inclined arrangement of the programmer 25 and of the relative knob (which can be replaced by an electric programmer and relative keypad).

[0074] In this case, as shown in the section view of figure 7 (according to the view Z/I of fig. 6), the vertical sides of the frame 2 can also be inclined or tapered.

[0075] This can advantageously be to join the surface of the front panel 1 to the modular kitchen structure in a less sudden manner, if this surface protrudes with respect to the plane 30 of the masking panels.

[0076] The corners between the different sides of the frame 2 can, in a known manner, be welded and minted.

[0077] Alternatively, the front panel 1 and the relative frame 2 can be obtained by moulding of plastic material.

[0078] This allows convex barrel profiles to be obtained, to satisfy the aesthetic requirements with greater flexibility.

[0079] For example, figure 8 represents a perspective view of a dishwasher machine according to the invention in which the loading door 31, protruding with respect to the plane of the panels 32, joins to these with a profile having a horizontal approximately elliptical section which masks to a high degree the greater encumbrance of the machine and makes the complex particularly harmonious and pleasing to the eye.

[0080] The interspace between front panel 1, upper side of the peripheral frame 2 and inner upper side of the counterdoor frame, not only allows the easy housing of command and/or detergent dispensing devices as proposed for example in European patent application N 01830512.8, but also offers the possibility of developing devices which fully exploit the space available.

[0081] Whilst in known detergent metering/dispensing devices, which use a hinged closing shutter (like the one represented in figure 1), the rotation of the shutter requires that one foresees, in the washing chamber, a substantial free volume, to allow the opening of the shutter without interference, in a loading door like the one object of the present invention, the substantial free volume can easily be obtained inside the upper side of the counterdoor frame.

[0082] This solution is represented schematically in the section view of figure 9.

[0083] In figure 9 a detergent container 33, generically parallelepiped-shaped, is housed in the volume between front panel 1 and upper side 5 of the counterdoor

frame.

[0084] The container 33 extends downward in a hopper 34, also housed inside the counterdoor frame.

[0085] The container 33 is closed below by a shutter 35 hinged on a pin 36, arranged near to the front panel 1.

[0086] The shutter 35 is biased in open position by a spring not shown and, when open, rests upon a side 37 of the hopper 34, allowing the free discharge of the detergent in the washing tank.

[0087] The closed position of the shutter 35 is ensured by *per se* known and non-illustrated devices, such as a stop pawl, released by an electromagnetic command.

[0088] In its excursion from the closed position to the open position (and vice-versa) the shutter remains housed entirely or substantially in the hopper 34 and does not interfere with the crockery housed in the washing chamber and in particular in the counterdoor recess.

[0089] The container 33 is closed at the top by a cover 38, hinged on a pin 39, which can be opened and can take on the position 40 represented with a broken line.

[0090] Opening is allowed only if the loading door of the machine is slightly open.

[0091] Otherwise the side 41 of the cover interferes with the machine body which hinders its rotation on the pin 39.

[0092] Thus it is clear that the cover 38 can be biased in open position by a spring and can open and close automatically with the respective opening and closing of the loading door.

[0093] To reduce the friction and to avoid wear, the cover 38 can be equipped with a bearing roller 52.

[0094] To reduce to the minimum the duties of the user and to give the maximum ergonomics, the closing of the discharge shutter 35 can also be made automatic and can be subordinated to the opening of the loading door.

[0095] Figure 10 schematically represents a kinematic mechanism suitable for this purpose.

[0096] In the upper side of the frame 2 of the loading door a push rod 42 is housed which, by the effect of a spring 43, comes out of the frame, through an opening of the counterdoor flange 3 and interferes with the machine body.

[0097] With the loading door slightly open the rod takes on the maximum extension outside of the frame, as represented in the figures.

[0098] With the loading door closed the rod is pushed completely inside the frame 2.

[0099] An articulation arm 44 is hinged at its end (preferably forked, to avoid the development of rotation torque) on a pin 45, integral with the rod 42.

[0100] In the other end of the arm 44 a slot 46 is formed in which a pin 47, integral with the discharge shutter, is inserted.

[0101] When the loading door is opened the arm 44 is pushed into the position represented and the coupling between arm 44 and shutter 35 forces the shutter 35 to take up the closed position.

[0102] The shutter remains blocked in such a position by effect of a non-represented snap device, like a common pawl, even if afterwards the loading door is closed.

[0103] Indeed, when the loading door is closed and the arm takes up the position 49, represented with a broken line, the pin 47 can slide freely in the slot 46.

[0104] During the course of the wash cycle, the releasing of the pawl, commanded electromechanically, allows the shutter 35 to rotate freely and to take up the open position.

[0105] In this step the pin 47 slides freely in the slot 46 and the arm 44 rotates on the pin 45 to take up the position 50, represented with a broken line, so that the opening of the shutter 35 takes place without hindrance.

[0106] The opening of the load door at the end of washing takes the system back to the status represented with a continuous line.

[0107] Figure 11 schematically represents an equivalent articulated system in which the rod 42 is made superfluous and its function is carried out by the cover 38 of the detergent container.

[0108] In this case the arm 44 is hinged on a pin 51 arranged in a suitable position on a side of the cover 38.

[0109] The cover 38 can be actuated manually to open or preferably can be taken back to the open position by a spring 52 so as to open automatically with the opening of the loading door.

[0110] Since the kinematic mechanism is identical to the one already described any further explanation is superfluous. It is clear that in place of the kinematic mechanism described other devices, for example using a rack and pinion, with releasable engagement, can be used, just as couplings with a flexible cable between rod/cover and discharge shutter.

Claims

1. Dishwasher machine for built-in installation in a modular kitchen structure with a standardised depth of the modules nominally of 570mm, comprising a machine body (17) with an encumbrance in depth P no greater than 520mm and a front load opening closed by an openable loading door, hinged at the bottom to said body and formed by an outer panel (1) with a peripheral frame (2) and by a counterdoor liner (4) having a flat flange (3) coupled with said peripheral frame (2) and deep-drawn to form a liner frame (5,6,7,8) for sealed coupling with said loading opening and, in said liner frame, a recess (9) with a bottom wall, **characterised in that**
said peripheral frame (2) of the outer panel (1) has a height H1 of no less than 570mm-P and **in that** said recess (9) extends with said bottom wall towards said outer panel, relative to the plane of said flange (3), for a depth of no less than H1-20mm, at least in a portion of said recess.

2. Machine according to claim 1 wherein said recess

(9) has a depth of no less than H1-20mm substantially for the whole height of the loading door.

3. Machine according to claim 2 wherein the vertical (6,7) and upper (5) sides of said liner frame have substantially the same cross section

4. Machine according to claim 2 or 3 comprises a detergent metering/dispensing device housed in the interspace between said front panel (1), said peripheral frame (2) and the upper side (5) of the liner frame.

5. Machine according to claim 4 wherein said metering/dispensing device comprises a detergent loading opening, open in the upper side of said peripheral frame (2) and a discharge opening, closed by a shutter (35) actuated electrically into opening, open in the upper peripheral wall of said recess.

6. Machine according to claim 5 wherein said shutter is actuated automatically into closing, if not already closed, with the opening of the loading door.

7. Machine according to claim 5 or 6 wherein said detergent loading opening is closed by a cover (38) opened and closed again automatically with the opening and closing of the loading door, respectively.

8. Machine according to any one of the previous claims wherein said front panel (1) is made from cut and folded sheet metal to form said peripheral frame (2).

9. Machine according to any one of claims 1 to 7 wherein said front panel (1) is moulded in plastic material.

10. Machine according to claim 9 wherein said front panel (1) is cylindrical or elliptical arc-shaped, with a vertical axis and in its middle section the distance of its outer surface from the plane of said flange (3) is no less than 600mm-P.

11. Machine according to any one of claims 1 to 9 wherein said front panel (1) is substantially flat, with the distance of its outer surface from the plane of said flange (3) being no less than 600mm-P.

12. Machine according to any one of the previous claims, comprising a rotating sprayer (23), coupled with an upper rack (22), with a diameter of no less than 520mm.

13. Machine according to any one of the previous claims comprising an electromechanical programming device (25) housed in the upper side (5) of the counterdoor liner frame.

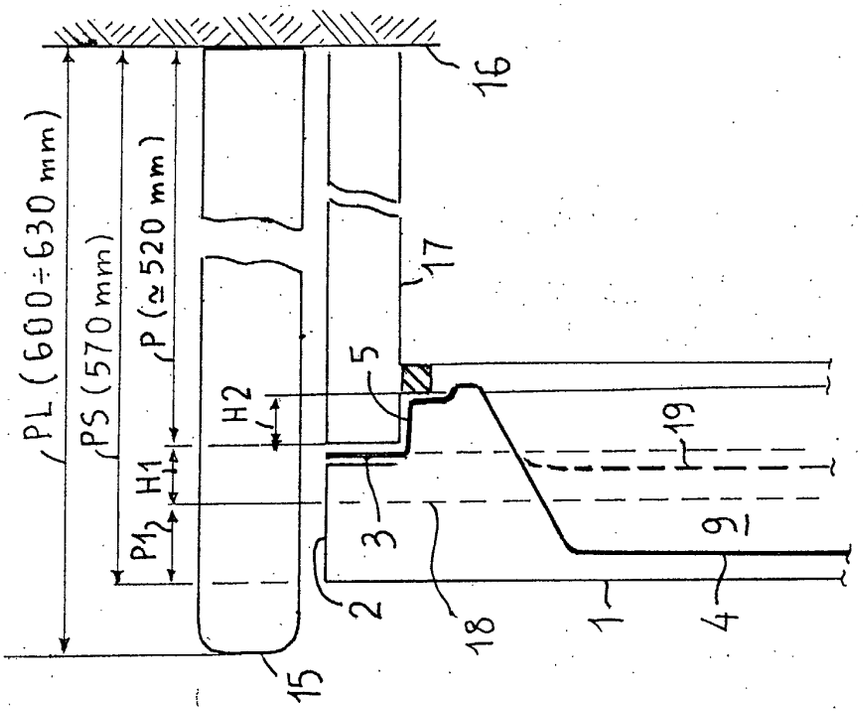
PL (600÷630 mm)
PS (570 mm)
P (≃ 520 mm)
H2
H1
P1/2
16
17
5
19
3
9
2
18
1
4
15

FIG. 2

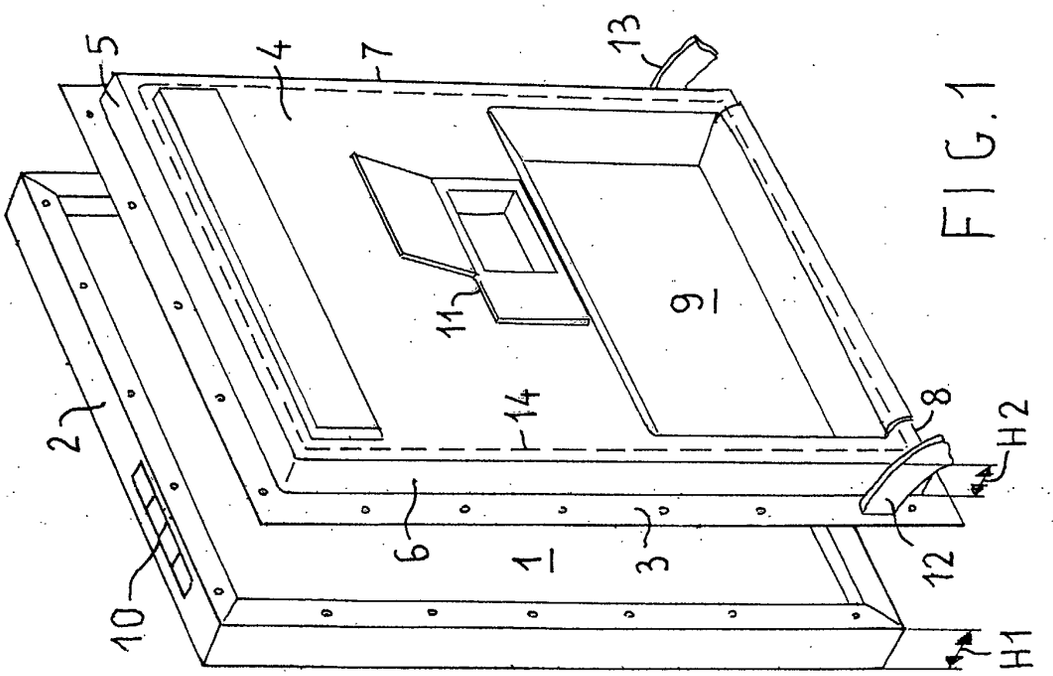
5
4
7
13
11
9
2
14
8
H2
6
1
3
12
10
H1

FIG. 1

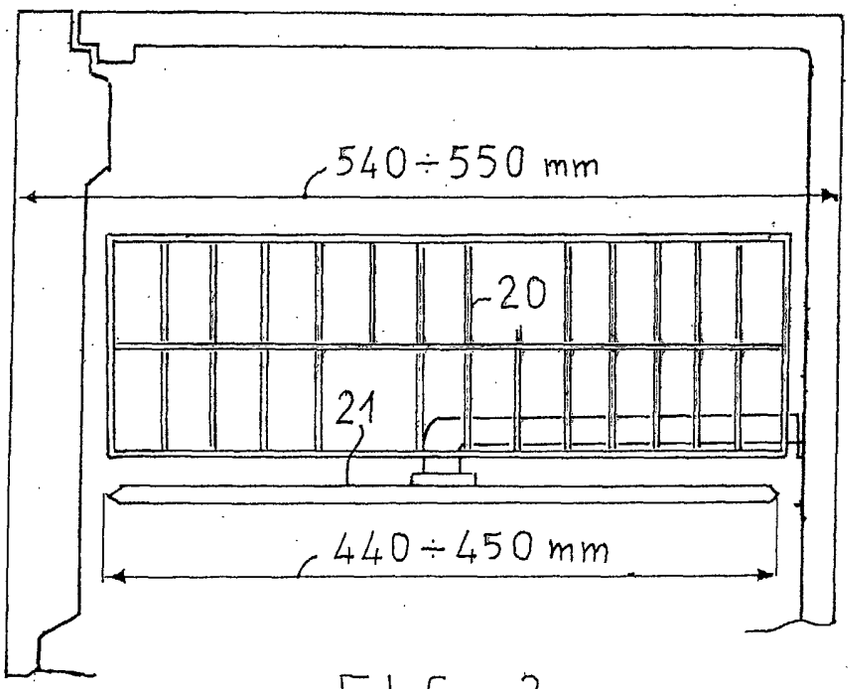

FIG. 3

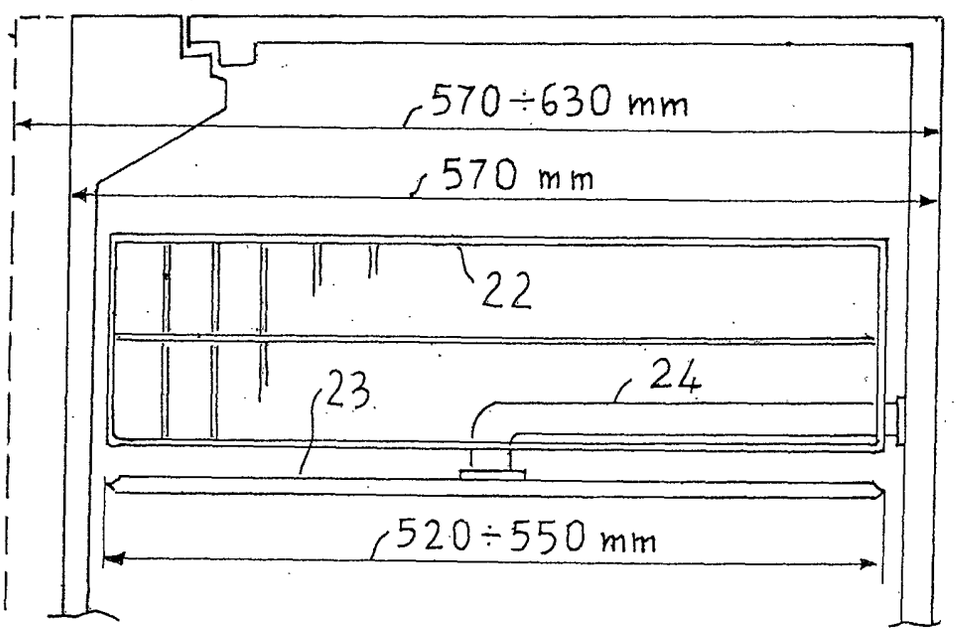

FIG. 4

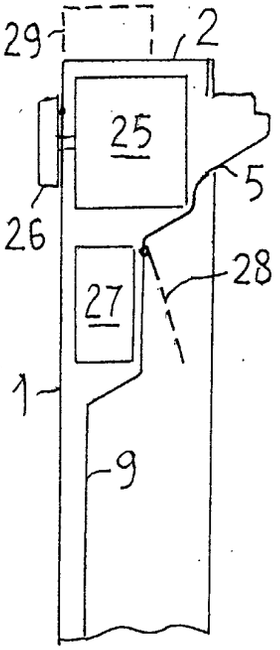

FIG.5

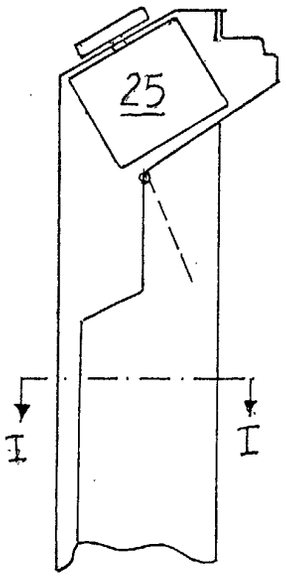

FIG.6

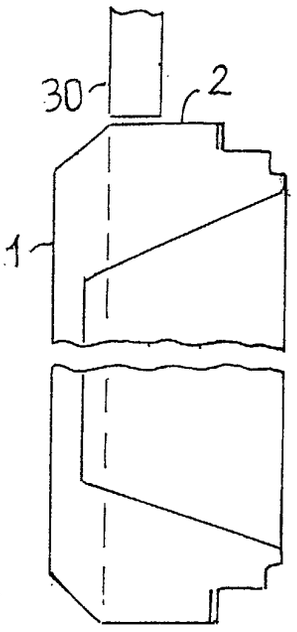

FIG.7

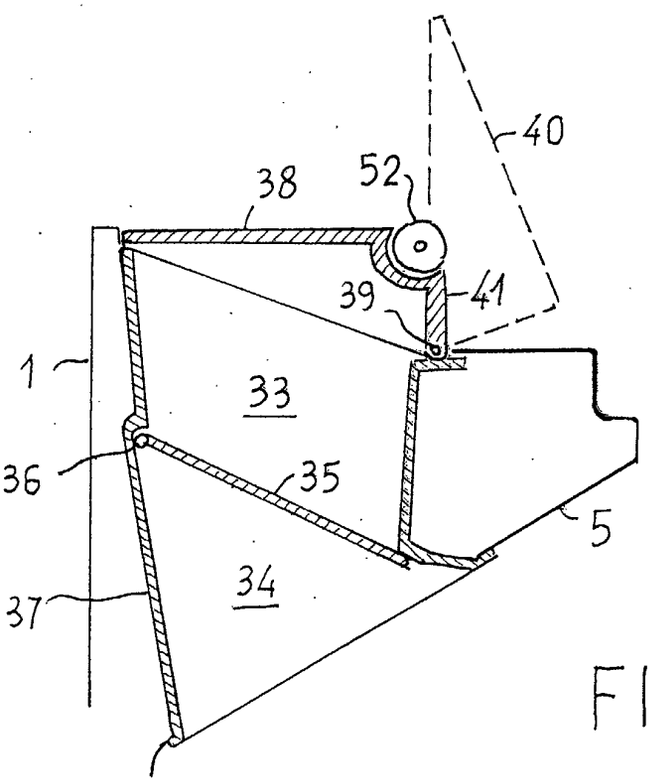

FIG.9

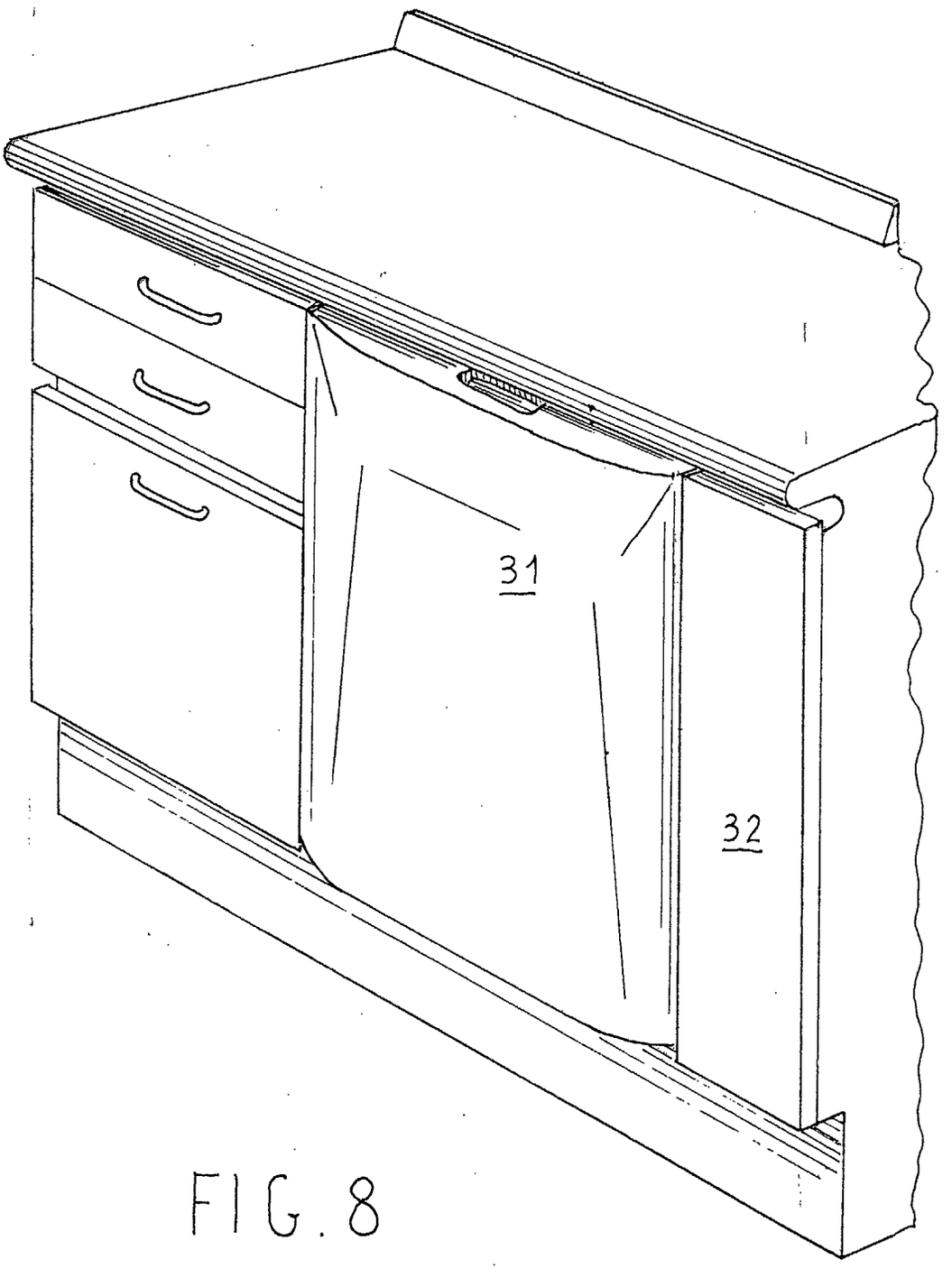

FIG. 8

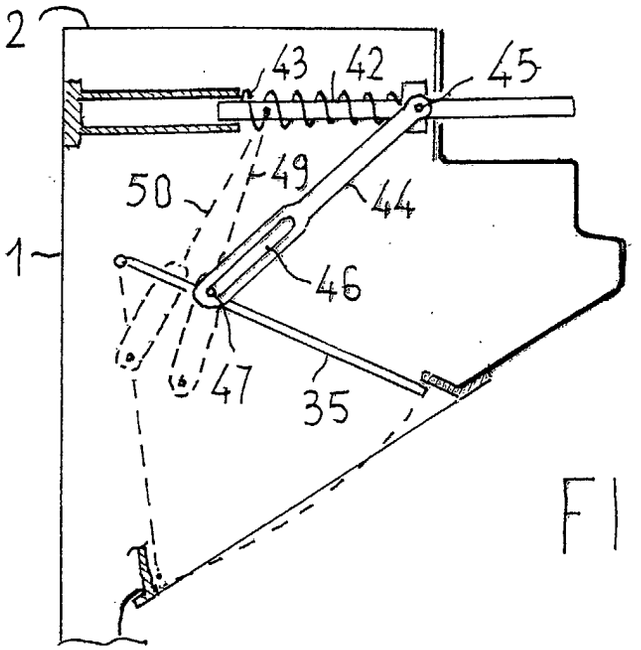

FIG. 10

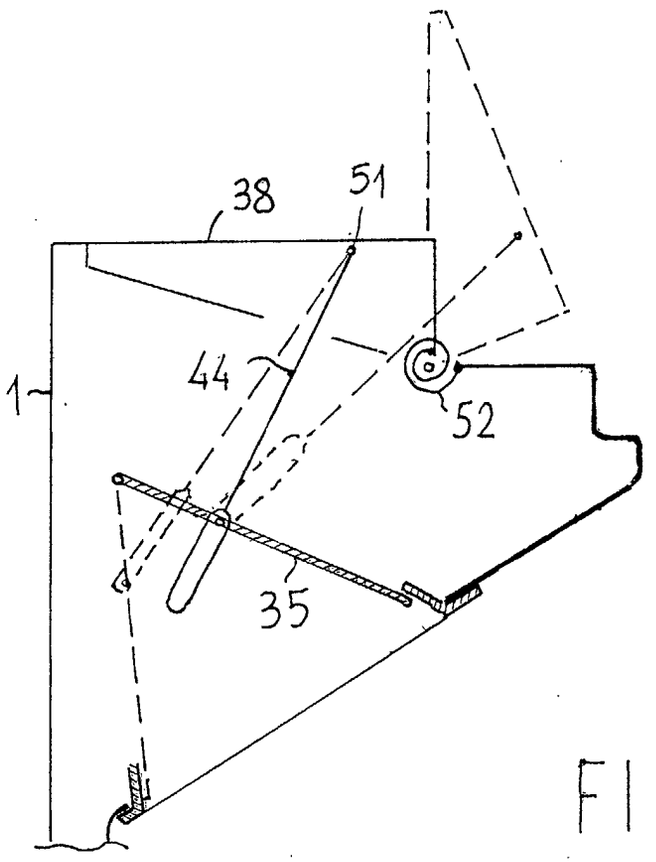

FIG. 11

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5427

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	GB 2 189 136 A (BOSCH SIEMENS HAUSGERAETE) 21 October 1987 (1987-10-21) * the whole document *	1-4,8, 11,13	A47L15/42 A47L15/44
X	EP 0 820 718 A (SHARP KK) 28 January 1998 (1998-01-28) * figures 1,2,4 *	1-3	
A		9,10	
X	US 4 834 125 A (INSALACO ROBERT W) 30 May 1989 (1989-05-30) * the whole document *	1-3	
X	GB 1 515 095 A (BOSCH SIEMENS HAUSGERAETE) 21 June 1978 (1978-06-21) * the whole document *	1,12	
A	FR 2 593 697 A (ELTEK SPA) 7 August 1987 (1987-08-07) * the whole document *	1,2,4-7	
A	EP 0 556 787 A (MERLONI ELETTRODOMESTICI SPA) 25 August 1993 (1993-08-25) * the whole document *	1,9	TECHNICAL FIELDS SEARCHED (Int.Cl.7) A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	2 December 2002	Norman, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 42 5427

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

02-12-2002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2189136 A	21-10-1987	DE 3612683 C1	12-11-1987
		IT 1204511 B	03-03-1989
EP 0820718 A	28-01-1998	JP 10033449 A	10-02-1998
		JP 3316397 B2	19-08-2002
		JP 10117995 A	12-05-1998
		AU 718953 B2	04-05-2000
		AU 2878297 A	05-02-1998
		CA 2210548 A1	26-01-1998
		EP 0820718 A2	28-01-1998
		KR 227175 B1	15-10-1999
		TW 422082 Y	11-02-2001
		US 5904163 A	18-05-1999
US 4834125 A	30-05-1989	NONE	
GB 1515095 A	21-06-1978	DE 2610379 A1	15-09-1977
		FR 2343463 A1	07-10-1977
		IT 1076869 B	27-04-1985
		SE 411421 B	27-12-1979
		SE 7701890 A	13-09-1977
FR 2593697 A	07-08-1987	IT 1187895 B	23-12-1987
		DE 3701404 A1	13-08-1987
		FR 2593697 A1	07-08-1987
EP 0556787 A	25-08-1993	IT 1256523 B	07-12-1995
		IT 1256524 B	07-12-1995
		IT 1256525 B	07-12-1995
		DE 69311819 D1	07-08-1997
		DE 69311819 T2	02-01-1998
		EP 0556787 A1	25-08-1993
		ES 2106208 T3	01-11-1997

EPO FORM P0459

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