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(54) Built-in dishwasher machine with increased load capacity
Einbaufähige Geschirrspülmaschine mit erhöhter Belastungsfähigkeit
Lave-vaisselle encastrable avec une capacité de charge augmentée

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(56) References cited:

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

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.

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

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.

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.

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).

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.

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.

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.

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.

GB 2189136 A discloses a dishwasher comprising the features of the preamble of claim 1.

The present invention 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.

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.

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

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.

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;
washer machine in accordance with the present invention;
- 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.

[0017] 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 from 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.

[0018] 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.

[0019] Clearly, the depth of the recess 9 cannot be greater than the sum of the depth H1 of the frame 2 of the front panel and of the depth 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.

[0020] In the interspace between the front panel 1 and the upper part of the counterdoor 4 are housed command devices, a keypad and possibly luminous displays, globally indicated with 10, accessible and visible on the upper side of the frame 2.

[0021] 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.

[0022] 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 open position.

[0023] 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.

[0024] The lower side of the counterdoor frame is generally also itself equipped with a sealing gasket 14.

[0025] 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.

[0026] This limits the depth H2 of the counterdoor frame, obtained by deep-drawing, to 20-30mm.

[0027] A deeper drawing would indeed take the counterdoor material beyond its yield point and consequently would lead to it breaking.

[0028] 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.

[0029] In this conventional structure there are two substantial limits.

[0030] The counterdoor recess 9 which is limited in depth and vertical development, modestly increases the useful load capacity.

[0031] 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.

[0032] 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.

[0033] 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.

[0034] 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.

[0035] 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.

[0036] 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.

[0037] Under the work surface are housed (possibly with interposition of a beading) modular cupboards
and/or drawers with a standardised nominal depth PS of 570 mm, including the thickness of the front panels for closing the cupboards and/or drawers indicated with P1 and comprised between 20-30 mm.

[0038] 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 520 mm (in general 510 mm).

[0039] 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 30 mm 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.

[0040] In figure 2 the encumbrance of the loading door of a conventional machine is represented by the broken line 18.

[0041] As already observed, this limits the depth of the counterdoor recess which cannot exceed the plane of the peripheral counterdoor flange by more than 15-20 mm.

[0042] In figure 2 the base wall of the recess is in this case represented by the broken line 19.

[0043] 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 = 570 mm 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. 600-630 mm.

[0044] 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 50-60 mm and even more.

[0045] 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 H1-10 mm, to leave a thermal and acoustic insulation interspace, and in any case lesser than H1-20 mm to exploit as best as possible the greater volume available.

[0046] 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.

[0047] We shall return later to particular embodiments of solutions of dispensers specifically designed to exploit as far as possible the greater volume available.

[0048] 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.

[0049] 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.

[0050] Typically, if the width of the washing chamber can be between 560 and 580 mm (to leave an interspace with the outer walls of the unit which has a standardised width of 600 mm), the maximum depth, on the other hand, is between 500 and 520 mm, 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.

[0051] 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.

[0052] 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.

[0053] Such a solution is complex and expensive.

[0054] 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.

[0055] 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.

[0056] 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.

[0057] 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.

[0058] In the machine of figure 3 the depth of the machine is 540-550 mm to allow it to be built-in flush with the masking panel.

[0059] 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.

[0060] 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.

[0061] In the machine of figure 4, the depth of the machine is at least 570mm and can even reach 600mm.

[0062] 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.

[0063] 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).

[0064] 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.

[0065] 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.

[0066] This in addition to the greater load capacity of the machine.

[0067] 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.

[0068] Figure 5 schematically represents a front-rear section view of the upper part of the loading door.

[0069] 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.

[0070] 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.

[0071] 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.

[0072] 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 EP10049) or with a rotating diaphragm shutter, as taught by EP780087.

[0073] 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.

[0074] 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).

[0075] 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.

[0076] 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.

[0077] The corners between the different sides of the frame 2 can, in a known manner, be welded and minted.

[0078] Alternatively, the front panel 1 and the relative frame 2 can be obtained by moulding of plastic material.

[0079] This allows convex barrel profiles to be obtained, to satisfy the aesthetic requirements with greater flexibility.

[0080] 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.

[0081] 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.

[0082] 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.

[0083] This solution is represented schematically in the section view of figure 9.

[0084] 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.

[0085] The container 33 extends downward in a hopper 34, also housed inside the counterdoor frame.

[0086] The container 33 is closed below by a shutter 35 hinged on a pin 36, arranged near to the front panel 1.

[0087] 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.

[0088] 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.

[0089] 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.

[0090] 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.

[0091] Opening is allowed only if the loading door of the machine is slightly open.

[0092] Otherwise the side 41 of the cover interferes with the machine body which hinders its rotation on the pin 39.

[0093] 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.

[0094] To reduce the friction and to avoid wear, the cover 38 can be equipped with a bearing roller 52.

[0095] 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.

[0096] Figure 10 schematically represents a kinematic mechanism suitable for this purpose.

[0097] 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.

[0098] With the loading door slightly open the rod takes on the maximum extension outside of the frame, as represented in the figures.

[0099] With the loading door closed the rod is pushed completely inside the frame 2.

[0100] 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.

[0101] 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.

[0102] 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.

[0103] 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.

[0104] 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.

[0105] During the course of the wash cycle, the releas-
hopper (34) housed inside the counterdoor liner, and is closed below by a shutter (35) hinged on a pin (36) arranged near to the front panel (1); said shutter (35) being biased in open position by a spring and resting upon a side (37) of said hopper (34), allowing a free discharge of detergent in the washing tank; in its excursion from a closed position to the open position said shutter (37) remaining housed entirely or substantially in said hopper (34); and wherein said peripheral frame (2) of said outer panel (1) has an encumbrance in depth (H1) of no less than 570 mm minus the encumbrance in depth (P) of said machine body (17), said recess (9) extending with said bottom wall towards said outer panel (1), relative to the plane of said flange (3), for a depth of no less than the encumbrance in depth (H1) of said peripheral frame (2) minus 20mm, and wherein said recess (9) has a depth of no less than the encumbrance in depth (H1) of said peripheral frame (2) minus 20mm substantially for the whole height of said loading door.

2. Machine according to claim 1 wherein the vertical (6,7) and upper (5) sides of said liner frame have substantially the same cross section.

3. Machine according to claim 1 wherein said shutter (35) is actuated electrically into the opening position.

4. Machine according to claim 3 wherein said shutter is actuated automatically into the closing position if not already closed, with the opening of the loading door.

5. Machine according to claim 3 or 4 wherein said detergent container is closed by a cover (38) opened and closed again automatically with the opening and closing of the loading door, respectively.

6. 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).

7. Machine according to any one of claims 1 to 5 wherein said front panel (1) is moulded in plastic material.

8. Machine according to claim 7 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.

9. Machine according to any one of claims 1 to 7 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.

10. 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.

11. 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.

Patentansprüche

1. Geschirrspülmaschine für den Einbau in eine modulare Küchenanordnung mit einer standardisierten Tiefe (PS) der Module von 570 mm nominell, umfassend:
   - einen Maschinenkörper (17) mit einer größten Tiefe (P) von höchstens 520 mm, und
eine vordere Einfüllöffnung, die von einer zu öffnenden Einfülltür verschlossen wird, die an der Unterseite des Körpers angelemt ist, wobei diese zu öffnende Einfülltür von einer äußeren Platte (1) mit einem Umfangsrahmen (2) und von einer metallischen Gegentürauskleidung (4) gebildet wird, die einen ebenen Flansch (3) aufweist, der mit dem Umfangsrahmen (2) verbunden ist, wobei die mettallische Gegentürauskleidung (4) tiefgezogen ist, um Folgendes auszubilden:
   - einen Auskleidungsrahmen mit einer oberen Seite (5), lateralen Seiten (6, 7) und einer unteren Seite (8) zur abgedichteten Verbindung mit der Einfüllöffnung, und
einem Auskleidungsrahmen eine Vertiefung (9) mit einer Bodenwand, dadurch gekennzeichnet, dass
ein allgemein parallelepiped-förmiger Reinigungsmittelbehälter (33) in einem Volumen zwischen der Frontplatte (1) und der oberen Seite (5) der Gegentürauskleidung untergebracht ist, wobei sich dieser Reinigungsmittelbehälter (33) nach unten in einen in der Gegentürauskleidung untergebrachten Trichter (34) erstreckt und unten von einer Klappe (35) verschlossen wird, die an einen Zapfen (36) angelemt ist, der nahe der Frontplatte (1) angeordnet ist; wobei diese Klappe (35) in geöffneter Stellung durch eine Feder vorgespannt ist und auf einer Seite (37) des Trichters (34) aufliegt, wodurch sie ein freies Entladen von Reinigungsmittel in den Spülbehälter ermöglicht; wobei diese Klappe
(37) bei ihrer Auslenkung aus einer geschlossenen Stellung in die geöffnete Stellung vollständig oder im Wesentlichen in dem Trichter (34) untergebracht bleibt;
und wobei der Umfangsrahmen (2) der äußeren Platte (1) eine größte Tiefe (H1) von mindestens 570 mm minus der größten Tiefe (P) des Maschinenkörpers (17) aufweist, wobei sich die Vertiefung (9) mit der Bodenwand zur äußeren Platte (1) relativ zur Ebene des Flanschs (3) für eine Tiefe von mindestens der größten Tiefe (H1) des Umfangsrahmens (2) minus 20 mm erstreckt, und wobei diese Vertiefung (9) im Wesentlichen für die ganze Höhe der Einfülltür eine Tiefe von mindestens der größten Tiefe (H1) des Umfangsrahmens (2) minus 20 mm aufweist.

2. Maschine nach Anspruch 1, bei der die obere (5) und die senkrechten (6, 7) Seiten des Auskleidungsrahmens im Wesentlichen den gleichen Querschnitt haben.

3. Maschine nach Anspruch 1, bei der die Klappe (35) elektrisch in die Öffnungsstellung bewegt wird.

4. Maschine nach Anspruch 3, bei der die Klappe, wenn sie nicht schon geschlossen ist, mit dem Öffnen der Einfülltür automatisch in die Schließstellung bewegt wird.

5. Maschine nach Anspruch 3 oder 4, bei der der Reinigungsmittelbehälter von einem Deckel (38) verschlossen wird, der mit dem Öffnen beziehungsweise Schließen der Einfülltür automatisch geöffnet und wieder geschlossen wird.

6. Maschine nach einem der vorhergehenden Ansprüche, bei der die Frontplatte (1) aus einem zum Ausbilden des Umfangsrahmens (2) geschrittenen und gefalteten Metallblech besteht.

7. Maschine nach einem der Ansprüche von 1 bis 5, bei der die Frontplatte (1) aus Kunststoffmaterial geformt ist.

8. Maschine nach Anspruch 7, bei der die Frontplatte (1) zylindrisch oder ellipsenbogenförmig mit einer vertikalen Achse ist und in ihrem Mittelabschnitt der Abstand ihrer Außenfläche von der Ebene des Flanschs (3) mindestens 600 mm - P beträgt.

9. Maschine nach einem der Ansprüche von 1 bis 7, bei der die Frontplatte (1) im Wesentlichen plan ist, wobei der Abstand ihrer Außenfläche von der Ebene des Flanschs (3) mindestens 600 mm - P beträgt.

10. Maschine nach einem der vorhergehenden Ansprüche, die ein mit einem oberen Geschirrkorb (22) verbundenes drehbares Sprühbelement (23) mit einem Durchmesser von mindestens 520 mm umfasst.

11. Maschine nach einem der vorhergehenden Ansprüche, die eine elektromechanische Programmierrichtung (25) umfasst, die in der Oberseite (5) des Gegentäuschungsrahmens untergebracht ist.

Revendications

1. Lave-vaisselle pour installation à encastrement dans un meuble de cuisine modulaire avec une profondeur standardisée des modules (PS) théoriquement de 570 mm, comprenant :

- un corps de machine (17) avec un emboîtement en profondeur (P) non supérieur à 520 mm, et
- une ouverture de chargement frontale fermée par une porte de chargement ouvrable articulée au niveau du bas dudit corps, ladite porte de chargement ouvrable étant formée par un panneau extérieur (1) avec un châssis périphérique (2) et un chemisage métallique de contre-porte (4) ayant une bride plate (3) accouplée avec ledit châssis périphérique (2),

ledit chemisage métallique de contre-porte (4) étant embouti pour former :

- un châssis de chemisage avec un côté supérieur (5), des côtés latéraux (6, 7) et un côté inférieur (8) pour l’accouplement étanche avec ladite ouverture de chargement, et
- dans ledit châssis de chemisage, un évidement (9) avec une paroi de fond,

caractérisé en ce que

- un récipient de produit détergent (33), généralement en forme de parallélépipède, est logé dans un volume entre le panneau frontal (1) et le côté supérieur (5) du chemisage de contre-porte,

ledit récipient de produit détergent (33) s’étend vers le bas dans une trémie (34) logée à l’intérieur du chemisage de contre-porte et est fermé au-dessous par un obturateur (35) articulé sur une goulotte (36) agencée près du panneau frontal (1) ; ledit obturateur (35) étant sollicité en position ouverte par un ressort et reposant sur un côté (37) de ladite trémie (34), permettant une décharge libre de produit détergent dans la cuve de lavage ; dans son excursion d’une position fermée à la position ouverte, ledit obturateur (37) restant logé complètement ou sensiblement dans ladite trémie (34) ;
et dans lequel ledit châssis périphérique (2) dudit panneau extérieur (1) a un encombrement en profondeur (H1) non inférieur à 570 mm moins l’encombrement en profondeur (P) dudit corps de machine (17), ledit évidement (9) s’étendant avec ladite paroi de fond vers ledit panneau extérieur (1), par rapport au plan de ladite bride (3), sur une profondeur non inférieure à l’encombrement en profondeur (H1) dudit châssis périphérique (2) moins 20 mm, et dans lequel ledit évidement (9) a une profondeur non inférieure à l’encombrement en profondeur (H1) dudit châssis périphérique (2) moins 20 mm sensiblement sur toute la hauteur de ladite porte de chargement.

2. Lave-vaisselle selon la revendication 1, dans lequel les côtés verticaux (6, 7) et supérieur (5) dudit châssis de chemisage ont sensiblement la même section transversale.

3. Lave-vaisselle selon la revendication 1, dans lequel ledit obturateur (35) est actionné électriquement dans la position d’ouverture.

4. Lave-vaisselle selon la revendication 3, dans lequel ledit obturateur est actionné automatiquement dans la position de fermeture, s’il n’est pas déjà fermé, avec l’ouverture de la porte de chargement.

5. Lave-vaisselle selon la revendication 3 ou 4, dans lequel ledit récipient de produit détergent est fermé par un couvercle (38) ouvert et refermé automatiquement respectivement avec l’ouverture et la fermeture de la porte de chargement.

6. Lave-vaisselle selon l’une quelconque des revendications précédentes, dans lequel ledit panneau frontal (1) est réalisé à partir d’une tôle métallique découpée et pliée pour former ledit châssis périphérique (2).

7. Lave-vaisselle selon l’une quelconque des revendications 1 à 5, dans lequel ledit panneau frontal (1) est moulé en matériau plastique.

8. Lave-vaisselle selon la revendication 7, dans lequel ledit panneau frontal (1) est profilé en forme d’arc cylindrique ou elliptique, avec un axe vertical et, dans sa section centrale, la distance de sa surface extérieure par rapport au plan de ladite bride (3) n’est pas inférieure à 600 mm - P.

9. Lave-vaisselle selon l’une quelconque des revendications 1 à 7, dans lequel ledit panneau frontal (1) est sensiblement plat, avec la distance de sa surface extérieure par rapport au plan de ladite bride (3) non inférieure à 600 mm - P.

10. Lave-vaisselle selon l’une quelconque des revendications précédentes, comprenant un pulvérisateur tournant (23), accouplé avec un panier supérieur (22), avec un diamètre non inférieur à 520 mm.

11. Lave-vaisselle selon l’une quelconque des revendications précédentes, comprenant un dispositif de programmation électromécanique (25) logé dans le côté supérieur (5) du châssis de chemisage de contre-porte.
REFERENCES CITED IN THE DESCRIPTION

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