Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).
The present invention refers to a household dishwashing machine with front loading door.

Household dishwashing machines are largely known to be provided with substantially standardized overall dimensions, i.e. with a width that generally amounts to either approx. 60 cm or approx. 45 cm, and a height that generally amounts to either approx. 90 cm or approx. 85 cm.

In any case, household dishwashing machines comprise an outer casing accommodating a washing vessel made of metal and/or plastics in its interior, said vessel being open frontally and being further arranged to be closed, through the interposition of a sealing gasket, by means of a door that is hinged on its lower side on to a horizontal axis, such as this is for instance described in GB-B-2 166 790 and the Italian utility model no. 221 380 (and corresponding GB-A-2 238 576), the latter concerning in particular a dishwashing machine of the type for built-in installation.

The loading door has a hollow construction and usually accommodates, further to the various control and regulation means, dispensing means for the wash and rinse agents and aids, with the related wiring harnesses, which are accessible through respective apertures that are appropriately provided in an intermediate portion on the internal surface of the door, such as this is for instance described in US-A-5 330 102. According to these solutions, however, such wash and rinse aid dispensers are practically poorly and inconveniently accessible by the user, while both manufacturing and assembly of the whole machine turn out to be undesirably complicated.

In view of reducing the drawback of such a poor accessibility of said wash and rinse aid dispensers, i.e. of making it more convenient for said dispensers to be accessed by the user, a solution has been proposed calling for said dispensers to be housed below the control and regulation means in an upper portion of the door, duly enlarged and protruding towards the interior of the washing vessel. In this case, however, the need quite obviously arises for greater space requirements by said enlarged portion, due to an increased depth dimension (and possibly also height dimension) thereof, to be duly coped with, thereby reducing the useful space actually available in the interior of the washing vessel. This in turn undesirably reduces the load capacity of the machine.

A solution has also been proposed, such as this is described for instance in EP-A-0 671 143, which calls for the control organs and the aid dispensers to be included in the outer cabinet of the machine, in a front position thereof comprised between the washing vessel and the worktop of the machine. According to this solution, in particular, the wash and rinse aid dispensers are of the pull-out drawer type.

On the other hand, since the worktop of a dishwashing machine usually protrudes frontally by a few centimeters, it substantially covers said drawer-like dispensers, even when the latter are in their pulled-out position, thereby making them inconveniently or even poorly visible and accessible by the user. The same considerations of course apply to the control organs.

From FR 2 593 697 a dishwashing machine is known, having a door comprising at the top portion thereof a control panel structure housing wash and rinse aid dispensing means; however said devices are complicated and curdensedome in the production phase, and unreliable during operation due to the moderate thickness of the upper door in which they are lodged.

Therefore, the present invention in particular refers to a household dishwashing machine of the preferred type, in which the upper portion of the loading door is substantially constituted by a box-like control panel structure housing at least the main control and regulation organs of the machine, such as this is described for instance in the above cited Italian utility model no. 221 380.

The main purpose of the present invention to provide a dishwashing machine of the above cited kind, in which at least the main control and regulation organs, as well as the wash and rinse aid dispensers, are grouped in a conveniently accessible position on the front loading door, without this contributing to substantially decrease of the load capacity of the machine.

According to the present invention, these and further aims are reached by a household dishwashing machine as specified in the independent claim.

The invention is particularly suitable for application in a dishwashing machine having a height dimension of approx. 90 cm. However, it similarly applies also to dishwashing machines having a different height.

Preferred embodiments are specified in the dependent claims.

The invention will be more readily and clearly understood from the description that is given below by way of non-limiting example with reference to the accompanying drawings, in which

- Figure 1 is a schematical, perspective view of a preferred embodiment of the dishwashing machine with the loading door thereof partially opened, wherein the worktop of the machine is shown in a disassembled, i.e. removed position for reasons of greater clarity;

- Figures 2 through to 4 are schematical views of respective variants of the dishwashing machine embodiment shown in Figure 1;

- Figure 5 is a schematical, enlarged-section view of the upper front portion of the dishwashing machine shown in Figure 1, with the loading door closed.

With particular reference to Figures 1 and 5,
the dishwashing machine according to the present invention can be noticed to mainly include an outer casing 1 provided with two opposite side walls 2, and provided as well with a frontally protruding worktop 3 on top thereof.

[0016] Said outer casing 1 houses a substantially parallelepiped-shaped washing vessel 4 having the front side thereof open and capable of being closed, through the interposition of a sealing gasket 5, by means of a door 6 which is hinged on its lower side on to the outer cabinet about a horizontal axis. In the example described below, the dishwashing machine is of the so-called "built-in" type, with the outer surface of the door 6 entirely covered by a decorative panel 7.

[0017] In a per se known manner, the door 6 comprises on its upper side a substantially box-shaped control panel structure 8, which is preferably made of plastics and houses at least the main control and regulation organs of the machine. Such organs are generally indicated at 9, comprise preferably push-button type devices and are accessible, when the door 6 is opened, in correspondence of the top surface of said box-shaped control panel structure 8. When the door 6 is closed, said organs 9 are on the contrary concealed by the protruding worktop 3.

[0018] The washing vessel 4 has a substantially plane top wall 10, the front edge 11 of which is made to include at least a recess (indicated at 12) with respect to the front edge 13 of the side walls 2. In a preferred manner, said recess 12 extends full-width between said side walls 2, and the wall 10 has a substantial thickness (of some centimeters, for instance) enabling some contrivances to be implemented, as described in greater detail further on.

[0019] In the section comprised between the side walls 2, the box-shaped control panel structure 8 is protruding towards the interior of the washing vessel 4, wherein the recess 12 of the top wall 10 is adapted to accommodate a corresponding upper portion of said control panel when the door 6 is closed. This makes it possible for the control panel structure 8 to be given a particularly large, i.e. largest than normal useful volume, without any need arising for the inner volume of the washing vessel 4 to undergo any corresponding reduction. In fact, as it clearly emerges from the illustration in Figure 5, when the loading door 6 is closed the upper portion of said control panel 8 is situated above the upper inner surface of the washing vessel and is partially accomodated in the recess 12 of the top wall 10. According to the invention, therefore, for a same internal size as in the case of a dishwashing machine with a traditional control panel construction, the control panel structure 8 can be given an additional volume delimited by: side walls 2, thickness of the top wall 10, and depth of the recess 12. In other words, said additional volume is equal to the volume of the recess 12.

[0020] According to a feature of the present invention, appropriate advantage can be taken of the above cited additional volume by using said control panel structure 8 to also house wash and/or rinse aid dispensing means therein, said dispensing means, which can be of any appropriate type for the intended application and purpose, being generally indicated at 14 in the Figures. In a preferred manner, said dispensing means 14 are of the type provided with filling lids on top, which are therefore readily and conveniently accessible to the user as soon as the door 6 is opened as shown in Figure 1.

[0021] In a preferred manner, furthermore, the control panel structure 8 is capable of accommodating also a locking and releasing mechanism for the door 6, which is generally indicated at 15 in the Figures and may for instance be of the type described in GB-B-2 238 576.

[0022] In any case, all of the above cited operational component parts of the machine are advantageously grouped in the control panel structure 8, which may be pre-assembled and tested separately.

[0023] As this has already been stated earlier in this description, the top wall 10 of the washing vessel may have a substantial thickness and may at least partly be made of plastics. As a result, said wall 10 may be made to include at least a recess and/or cavity adapted to substantially accomodate further operational component parts of the machine.

[0024] For instance, the lower surface of the wall 10 may include a recess 16 in which at least an auxiliary rotating spray arm 17 may be accomodated without it protruding in the interior of the washing vessel 4 to any substantial extent.

[0025] Alternatively, or in addition thereto, at least a spray nozzle 18 may be provided in correspondence of the wall 10, said nozzle being then capable of spraying a jet of water towards the interior of the washing vessel and being associated to a respective water supply conduit, the end portion 19 of which extends through the space comprised in the largest overall thickness of the wall 10.

[0026] Should the dishwashing machine be provided with a (per se known and, therefore, not shown) drying system of the type comprising at least a condenser for the removal of the steam that develops in the washing vessel 4, said condenser may ion an advantageous manner be arranged in said wall 10, in correspondence of a respective recess 20.

[0027] It will be appreciated that the above described dishwashing machine may be the subject of a number of modifications without departing from the scope of the present invention, as specified in the claims.

[0028] For instance, other operational component parts than the above described ones may be arranged in correspondence of the wall 10. Furthermore, the same dishwashing machine may be of a different type, such as for instance of the so-called free-standing type shown in Figure 2, i.e. without the front decorative panel 7. In this case, the control and regulation organs 9 of the machine can be accessible on the front side of the control panel structure 8, which may be provided also with...
a handle 21 for actuating the locking and releasing mechanism 15 of the door 6.

Alternatively, the dishwashing machine may be of the built-in type shown in Figure 3, in which the outer surface of the door 6 is only partially covered by a decorative panel 7, below the control panel 8. In this case, for a same overall size, the control panel structure 8 may have a still greater depth and, therefore, feature a still greater volume adapted to accommodate the respective component parts, according to the invention.

At least the top wall 10 of the washing vessel 4 may of course be of the traditional type substantially made of thin sheet-metal material, as shown in Figure 4, with a front cross-piece 22 provided for stiffening and support purposes and made for instance of plastic material to a larger thickness than the wall itself. In such a case, the recess 12 is provided on the front edge of said cross-piece 22.

Claims

1. Household dishwashing machine comprising an outer casing (1) with two vertical side walls and accommodating a substantially parallelepiped-shaped washing vessel (4) having an open front side capable of being closed by means of a door (6) hinged on to said outer casing (1) and provided with wash and rinse aid dispensing means (4), said door comprising at the top portion thereof a control panel structure (8) housing said wash and rinse aid dispensing means (4), as well as the main control and regulation organs (9) of the dishwashing machine, characterized in that the washing vessel (4) has a top wall (10) being so disposed relative to the side walls (2) that a recess (12) is defined between the front edge (11) of said top wall (10) and the front edges (13) of said side walls (12), said recess (12) being adapted to accommodate, when the door (6) is closed, a corresponding upper portion of the control panel structure (8) protruding towards the interior of the washing vessel (4).

2. Household dishwashing machine according to claim 1, characterized in that the top wall (10) of the washing vessel (4) is made to include at least a further recess (16; 20) adapted to substantially house further operational component parts (17; 18; 19) of the machine.

3. Household dishwashing machine according to claim 2, characterized in that said top wall (10) of the washing vessel (4) comprises on the lower side thereof at least a cavity (16) in which there is arranged at least a rotating spray arm (17), this cavity constituting the further recess.

4. Household dishwashing machine according to claim 2 or 3, characterized in that in correspondence of said top wall (10) of the washing vessel (4) there is provided at least a spray nozzle (18) adapted to direct a jet of water towards the interior of the same vessel and associated to a respective water supply conduit, the terminal portion (19) of which extends in the space comprised in the largest overall thickness of said top wall.

5. Household dishwashing machine according to claim 2, comprising a drying system of the type having at least a steam condenser, characterized in that said steam condenser is arranged in said top wall (10) of the washing vessel (4).

6. Household dishwashing machine according to claim 1, wherein said top wall (10) of the washing vessel (4) includes a portion having a thickness and at least a front stiffening and support cross-piece having a thickness greater than that of said portion, characterized in that said recess (12) adapted to accommodate a corresponding portion of the control panel structure (8) is provided on the front edge of said cross-piece (22).

Patentansprüche

1. Haushaltsgeschirrspülmaschine, das ein äußeres Gehäuse (1) mit zwei vertikalen Seitenwänden umfasst und welches einen im wesentlichen parallelepipedförmigen Waschbehälter (4) aufnimmt, der eine offene Vorderseite aufweist, die mittels einer an dem äußeren Gehäuse (1) schwenkbar angebrachten mit Wasch- und Spülhilfespendemitteln (4) versehenen Tür (6) verschlossen werden kann, wobei die Tür an ihrem oberen Abschnitt einen Bedienfeldaufbau (8) aufweist, der die Wasch- und Spülhilfespendemittel (14) sowie die Hauptsteuer- und Regulierungseinrichtungen (9) der Geschirrspülmaschine aufnimmt, dadurch gekennzeichnet, dass der Waschbehälter (4) eine obere Wand (10) aufweist, die relativ zu den Seitenwänden (2) angeordnet ist, dass eine Vertiefung (12) zwischen der vorderen Kante (11) der oberen Wand (10) und den vorderen Kanten (13) der Seitenwände (12) definiert wird, wobei die Vertiefung (12) so angepasst ist, dass sie, wenn die Tür (6) verschlossen ist, einen entsprechenden oberen Abschnitt des Bedienfeldaufbaus (8) aufnehmen kann, der zum Innern des Waschbehälters (4) hin vorsteht.

2. Haushaltsgeschirrspülmaschine nach Anspruch 1, dadurch gekennzeichnet, dass die obere Wand (10) des Waschbehälters (4) so gefertigt ist, dass sie wenigstens eine weitere Vertiefung (16; 20) enthält, die so angepasst ist, dass sie im wesentlichen
Revendications

1. Machine domestique pour laver la vaisselle, comprenant une enceinte extérieure (1) avec deux parois latérales verticales et recevant une cuve de lavage (4) sensiblement parallélépipédique ayant une face avant ouverte pouvant être fermée au moyen d'une porte (6) articulée sur ladite enceinte extérieure (1) et munie de moyens (14) de distribution de produit de lavage et de rinçage, ladite porte comprenant, dans sa partie supérieure, une structure (8) formant panneau de commande recevant lesdits moyens (14) de distribution de produit de lavage et de rinçage ainsi que les principaux organes de commande et de régulation (9) de la machine à laver la vaisselle, caractérisée en ce que la cuve de lava-

gé (4) a une paroi supérieure (10) placée de telle manière par rapport aux parois latérales (2) qu'un renforcement (12) est défini entre le bord frontal (11) de ladite paroi supérieure (10) et les bords frontaux (13) desdites parois latérales (12), ledit renforcement (12) étant adapté pour recevoir, quand la porte (6) est fermée, une partie supérieure correspondante de la structure (8) formant panneau de commande faisant saillie en direction de l'intérieur de la cuve de lavage (4).

2. Machine domestique pour laver la vaisselle selon la revendication 1, caractérisée en ce que la paroi supérieure (10) de la cuve de lavage (4) est réalisée pour comprendre au moins un autre renforcement (16 ; 20) adapté pour recevoir sensiblement d'autres composants opérationnels (17 ; 18 ; 19) de la machine.

3. Machine domestique pour laver la vaisselle selon la revendication 2, caractérisée en ce que ladite paroi supérieure (10) de la cuve de lavage (4) comprend, sur son côté inférieur, au moins une cavité (16) dans laquelle est placé au moins un bras pulvérisateur rotatif (17), cette cavité constituant l'autre renforcement.

4. Machine à laver la vaisselle de type ménager selon la revendication 2 ou 3, caractérisée en ce qu'en correspondance de ladite paroi supérieure (10) de la cuve de lavage (4), il est prévu au moins une buse de pulvérisation (18) adaptée pour envoyer un jet d'eau en direction de l'intérieur de la même cuve et associée à un conduit d'arrivée d'eau respectif, dont la partie terminale (19) s'étend dans l'espace compris dans la plus grande épaisseur globale de ladite paroi supérieure.

5. Machine domestique pour laver la vaisselle selon la revendication 2, comprenant un système de séchage du type ayant au moins un condenseur de vapeur, caractérisée en ce que ledit condenseur de vapeur est placé dans ladite paroi supérieure (10) de la cuve de lavage (4).

6. Machine domestique pour laver la vaisselle selon la revendication 1, dans laquelle ladite paroi supérieure (10) de la cuve de lavage (4) comprend une partie ayant une épaisseur et au moins un élément transversal de renfort et de soutien ayant une épaisseur supérieure à celle de ladite partie, caractérisée en ce que ledit renforcement (12), adapté pour recevoir une partie correspondante de la structure (8) formant panneau de commande, est prévu sur le bord frontal dudit élément transversal (22).