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I-33170 Pordenone (IT)(54) **Household dishwashing machine.**

(57) The wash tank (3) is adapted to be closed by means of a front door assembly (4) and accommodates two baskets (7, 8) arranged one above the other. The whole of the inner surface (6) of said door assembly (4) is receding outwards and the baskets (7, 8) extend to an identical depth which is equal to the full inner depth of the wash tank. The detergent and rinse aid dispensers (14, 15) and the programme sequence control device (10) of the machine are mounted on the outside of the door assembly (4) in a space comprised between the wash tank (3) and the worktop (2).

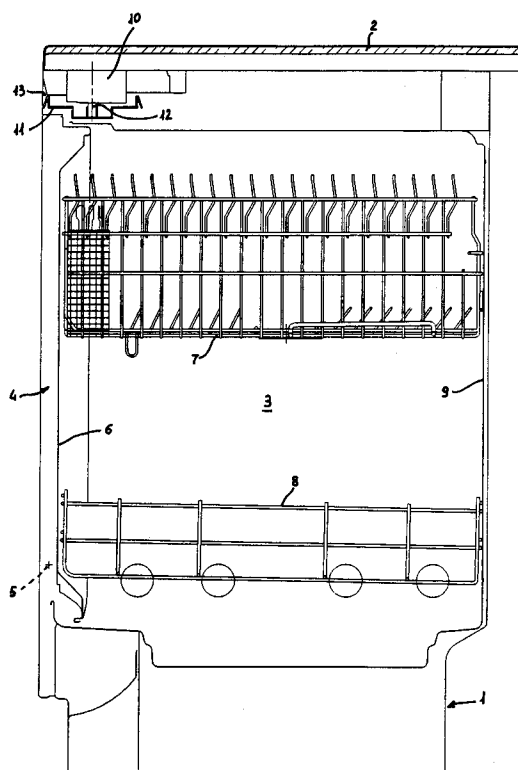


Fig. 1

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This invention relates to a household-type dishwashing machine, particularly such one with a large load capacity.

Household-type dishwashing machines have standard overall and installation dimensions and they are generally made as substantially disclosed in IT-A-1 159 635, with a wash tank accommodating an upper basket and a lower basket provided to support the washload items which are then washed by means of spray nozzles that are associated to the baskets. The wash tank has a front opening that is normally closed by a hollow door assembly comprising a door liner protruding inwards into the wash tank. More precisely, an upper portion of the hollow door assembly is assigned a greater depth so that it is capable to accommodate control and setting elements of the machine, as well as any other operational member or element of the machine which the user should be able to reach as conveniently as possible, such as for instance detergent and rinse aid dispensers.

Such a thicker portion of the door assembly, which is protruding inwards, causes the greatest allowable depth of the upper basket to be reduced correspondingly, so that said upper basket has usually a smaller depth than its lower counterpart and this in turn causes the overall load capacity of the dishwashing machine to be undesirably reduced.

In order to enable the baskets to be manufactured in a more rational manner, the above cited IT-A-1 159 635 discloses a concept according to which the lower basket is made up by various complementary portions that are adapted to be coupled to each other, ie. a first portion having the same dimensions as the upper basket, and at least a second portion which can be hooked up frontally to said first portion and can possibly be used for supporting cutlery pieces.

Dishwashing machines have been proposed recently which have a standard height of 91 cm instead of the usual 86-cm height. It is therefore possible in this case to increase the height of the wash tank in which, above the upper basket, a further basket with a reduced height can be accommodated for holding cutlery and similar items. Such an embodiment is described for instance in DE-A-4 028 908.

A dishwashing machine is also known from DE-A-4 022 269 to comprise a third cutlery-holding basket which is attached directly to the door liner, in correspondence with the lower, shallower portion of the door assembly.

It is of course obvious that the structure of said third basket is made complicated by the need to provide it with a removable lid in order to prevent cutlery items from falling down when the door is being closed.

In any case, known types of dishwashing machines comprising such additional baskets, if on the one side they actually enable the loading capacity of the machine to be increased, on the other side they cause the machine structure to be undesirably complicated. In particular, they require the use of auxiliary spray nozzles in order to be able to effectively wash the items arranged in such additional baskets; the structural and functional complications resulting therefrom are quite apparent.

It is therefore an object of the present invention to provide a household-type, large-capacity dishwashing machine which is able to combine structural simplicity and efficient performance capabilities.

More precisely, it is an object of the present invention to provide a household type dishwashing machine having a simple water circulating circuit of a substantially traditional type and being capable to wash a large amount of tableware items.

According to the present invention, such an aim is reached in a household type dishwashing machine including the features and characteristics as claimed in the appended claims.

Characteristics and advantages of the present invention will in any case be better understood from the following description which is given by way of non-limiting example with reference to the accompanying drawings in which:

- Figure 1 is a schematical, cross-sectional view of a preferred embodiment of the dishwashing machine according to the present invention; and
- Figure 2 is a schematical view showing partially a cross-sectioned elevational view of the dishwashing machine shown in Figure 1. For a simpler and clearer description, the worktop plate of the dishwashing machine is always shown as being separated from the machine.

Referring now to the above mentioned Figures, the dishwashing machine is shown to comprise an outer casing 1 with a worktop plate 2, and has standard overall dimensions with a height which is preferably, but not exclusively, of approx. 90 cm.

The outer cabinet 1 houses a wash tank 3 which is substantially parallelepiped in its shape and has an open front side that can be closed tightly by means of a door assembly 4 which is hinged on a horizontal axis 5 and is preferably hollow in its structure. The outer surface of said door assembly 4 is substantially flush with the front edge of the machine. In contrast with all traditional solutions, substantially the whole of the inner surface, or door liner 6, of the door assembly 4 is receding outwards, as this is apparent in Figure 1.

In the wash tank 3 there are accommodated an upper basket 7 and a lower basket 8 which, in a

per se known manner, are both substantially horizontal, capable of being slidably drawn out, adapted to support the tableware items to be washed, and associated to respective rotary spray arms (not shown for greater simplicity).

According to a further feature of the present invention, when the door assembly 4 is closed, the baskets 7, 8 are housed in the wash tank where they extend to a substantially similar depth corresponding substantially to the full inner depth of the wash tank 3 as defined between said inner surface 6 of the door assembly and the rear wall 9 of the tank. By using an increased load capacity of the upper basket 7, it is therefore possible to advantageously increase the number of standard table settings that can be accommodated in the wash tank 3 for washing, without any need arising to provide for additional baskets. This in practice again enables optimum washing performance capabilities to be obtained without it being necessary to undesirably complicate the water circulating circuit of the machine. In particular, in contrast to prior-art solutions, it is not necessary that additional spray nozzles be provided.

The door assembly 4 has a relatively reduced thickness, so that it is not possible to accommodate user-accessible operational elements, such as for instance control means for the operation of the machine and washing and rinse aid dispensing means, inside it. According to a further feature of the present invention, therefore, at least part of such user-accessible operational means of the machine are arranged in the outer casing 1 of the machine, on the outside of the door assembly 4, preferably above the wash tank 3, in a reduced-height space extending between said wash tank 3 and the worktop 2.

In particular, said control means for the operation of the machine may include a programme sequence control device 10 of the electromechanical type comprising a shaft 12 that is actuatable by means of a knob 11. For space-saving reasons, said shaft 12 and knob 11 are preferably arranged with their axis substantially vertical. In this case, the side surface of the knob 11 is accessible from the outside through a front opening 13 provided in the outer casing of the machine, much in the same way as described in GB-A-2 269 002.

Quite obviously, in the dishwashing machines of a more sophisticated type said programme sequence control device may be of an electronic type, actuatable through push-buttons or keypads and having particularly reduced space requirements. In this case, said programme sequence control device can be mounted in any suitable location and position inside the outer casing 1 of the machine, ie. even in the door assembly 4 as this is described for instance in GB-A-2 238 576.

In any case, washing and rinse aid dispensing means are located outside the door assembly 4, as previously mentioned. In a preferable manner, such wash and rinse aid dispensing means include a detergent dispenser 14 and a rinse aid dispenser 15, and both of them are accessible from the front side of the machine. For instance, said dispensers 14 and 15 may be of the sliding drawer type, with one or more compartments, as they are typically used in automatic clothes washing machines, and they communicate with the inside of the wash tank 3 through respective openings 16, 17. Similarly in a *per se* known manner, at least the detergent dispenser 14 is adapted to be operated by the programme sequence control device 10 through operational connections that are generally indicated with 16 in Figure 2.

In the preferred case in which both the programme sequence control device 10 and the detergent and rinse aid dispensers 14 and 15 are installed on the outside of the door assembly 4, the latter may advantageously be free from any wire harness or cable, which should notoriously be adequately flexible and would give rise to manufacturing complications, as well as reliability and electrical insulation problems. The door assembly 4 can therefore be made in a particularly simple way and lends itself to the provision of a most complete and effective noise deadening insulation.

It will of course be appreciated that the above described dishwashing machine may be the subject of anyone of a number of modifications that may be considered to be suitable without departing from the scope of the present invention. By mere way of example, it may be remembered here that at least one of the baskets 7, 8 may be constituted by a plurality of complementary portions that are adapted to be coupled to each other, as this is described in the afore cited specification IT-A-1 159 635.

Claims

1. Household-type dishwashing machine comprising an outer casing housing a substantially parallelepipedal wash tank having an open front side adapted to be closed by means of a door assembly, at least a first and a second basket provided to support the items to be washed being accommodated inside said wash tank horizontally one above the other, said dishwashing machine further comprising user-accessible operational elements, such as detergent and rinse aid dispensing means and control means for the operation of the machine, **characterized in** that substantially the whole of the inner surface (6) of the door assembly (4) is receding outwards and said

baskets (7, 8) are housed inside the wash tank (3) extending to a substantially identical depth which is substantially equal to the full inner depth of said wash tank being defined between said inner surface (6) of the door assembly, when said door assembly (4) is closed, and the rear wall (9) of the wash tank (3), at least part of said user-accessible operational elements (10, 14, 15) of the machine being mounted on the outer casing (1) of the machine outside the door assembly (4).

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2. Household-type dishwashing machine according to claim 1, **characterized in that** said operational elements (10, 14, 15) are mounted on the outer casing (1) of the machine above said wash tank (3).
3. Household-type dishwashing machine according to claim 2, in which said control means comprise an electromechanical programme sequence control device with a shaft actuatable by means of a knob, **characterized in that** said shaft (12) and said knob (11) of the programme sequence control device (10) are arranged with their axis substantially vertical.
4. Household-type dishwashing machine according to claim 3, **characterized in that** the outer surface of the knob (11) is accessible from the outside through an opening (13) provided in the outer casing (1) of the machine.
5. Household-type dishwashing machine according to claim 1, **characterized in that** said dispensing means (14, 15) are of the drawer type that can be pulled out from the front side of the machine.

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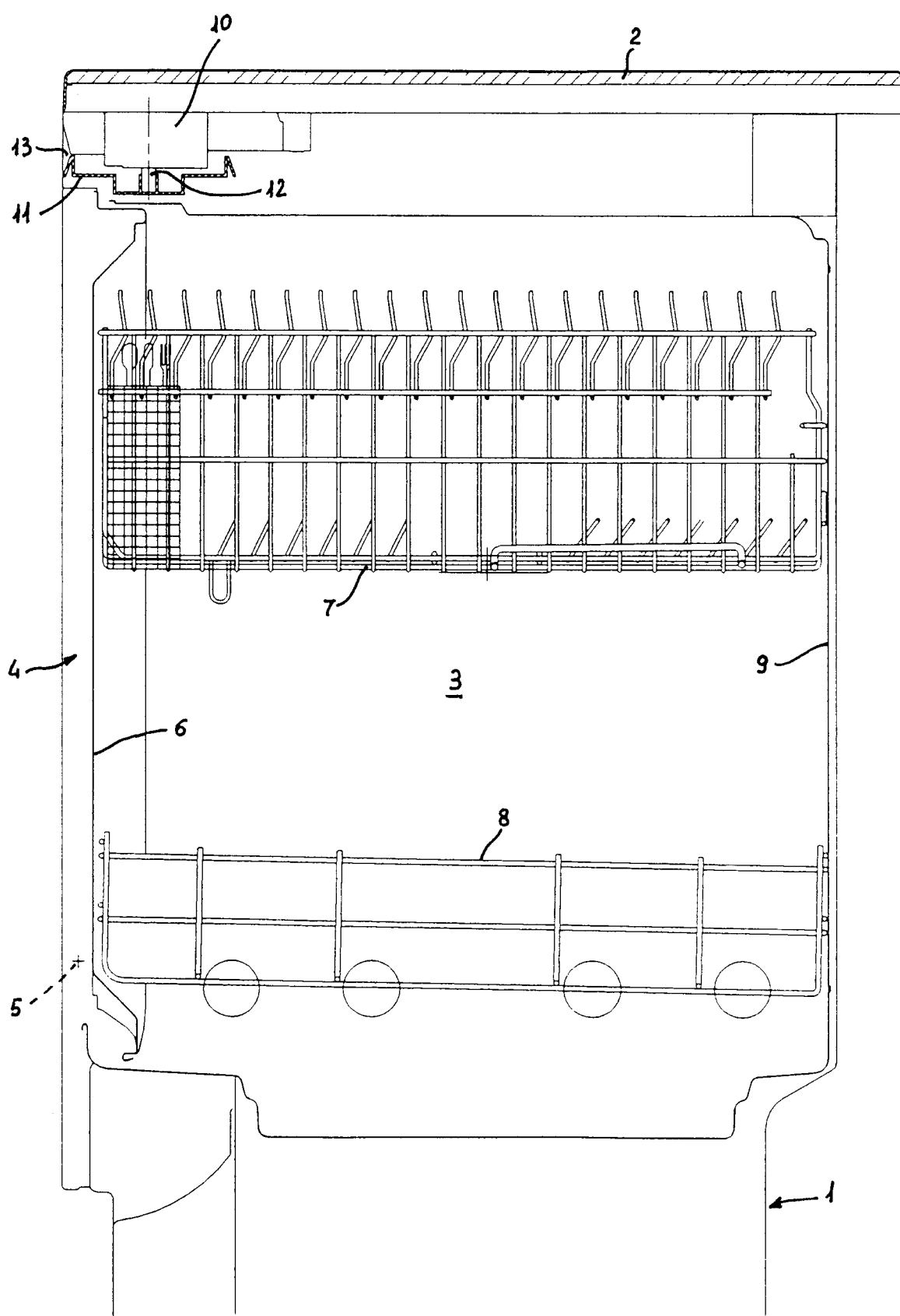


Fig. 1

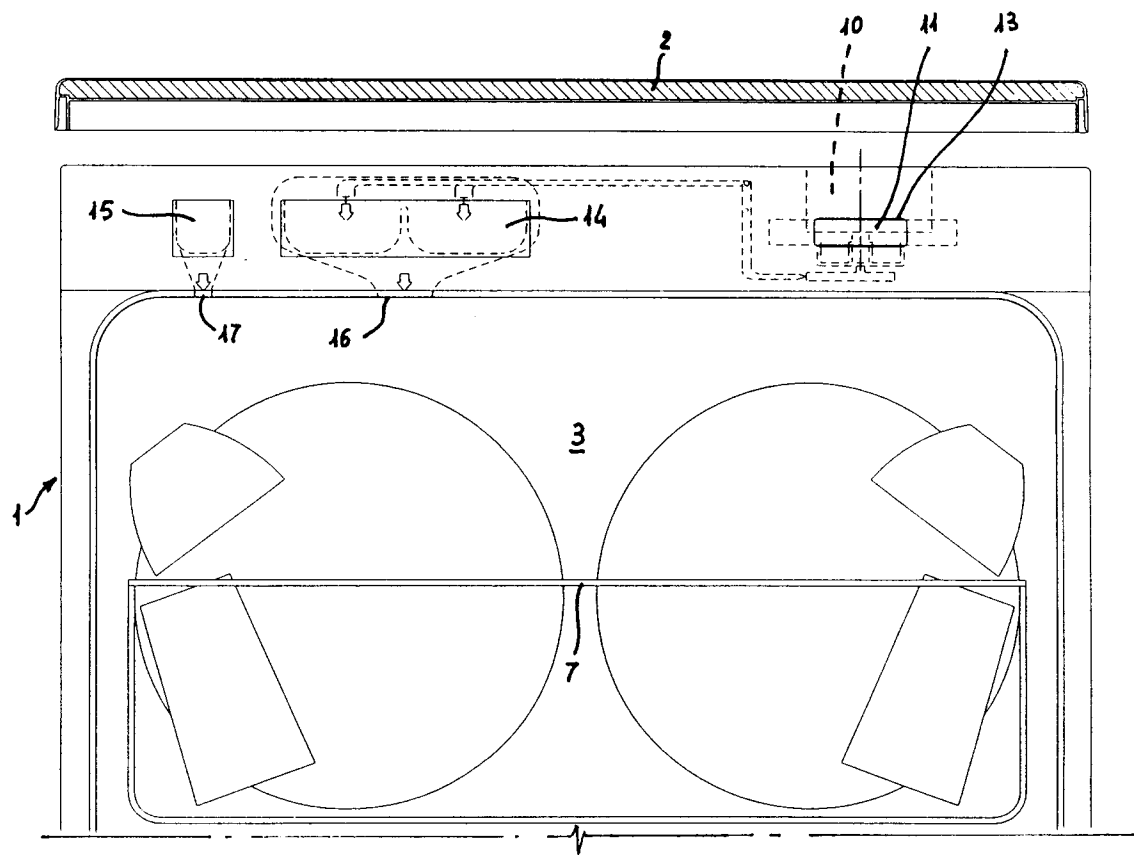


Fig. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 95 10 0470

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	FR-A-2 004 067 (BORGHI,G.) * the whole document * ---	1-3	A47L15/42
A	US-A-4 834 125 (INSALCO.R.W.) * column 3, line 4 - line 50; claim 1; figures 1,2,5 * ---	1	
A	FR-A-1 500 537 (CANDY S.P.A.) * figure 1 * ---	1	
A	FR-A-2 623 825 (INDUSTRIE CANDY S.P.A.) * page 3, line 23 - line 33; figure 2 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A47L D06F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 31 May 1995	Examiner Munzer, E
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	