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(54) **Pull-out basket-type dishwasher and basket therefor**

(57) A pull-out basket dishwasher (1) having at least one basket (4, 5) defined by a drawer (6) located inside a wash chamber (2a), and by a handle (7) fixed to the drawer (6) and by which to slide the basket (4, 5) manually in and out of the wash chamber (2a) of the dishwasher (1); and a detergent holder and dispensing device (14) in turn having a detergent compartment (15) formed in

the body of the handle (7) of the basket (5), a detergent release conduit (16) connecting the detergent compartment (15) to the outside, a water feed conduit (17) connecting the detergent compartment (15) to a pressurized-water source (9, 13), and a controlled open-close, on/off valve (18) for regulating fluid flow to the detergent compartment (15).

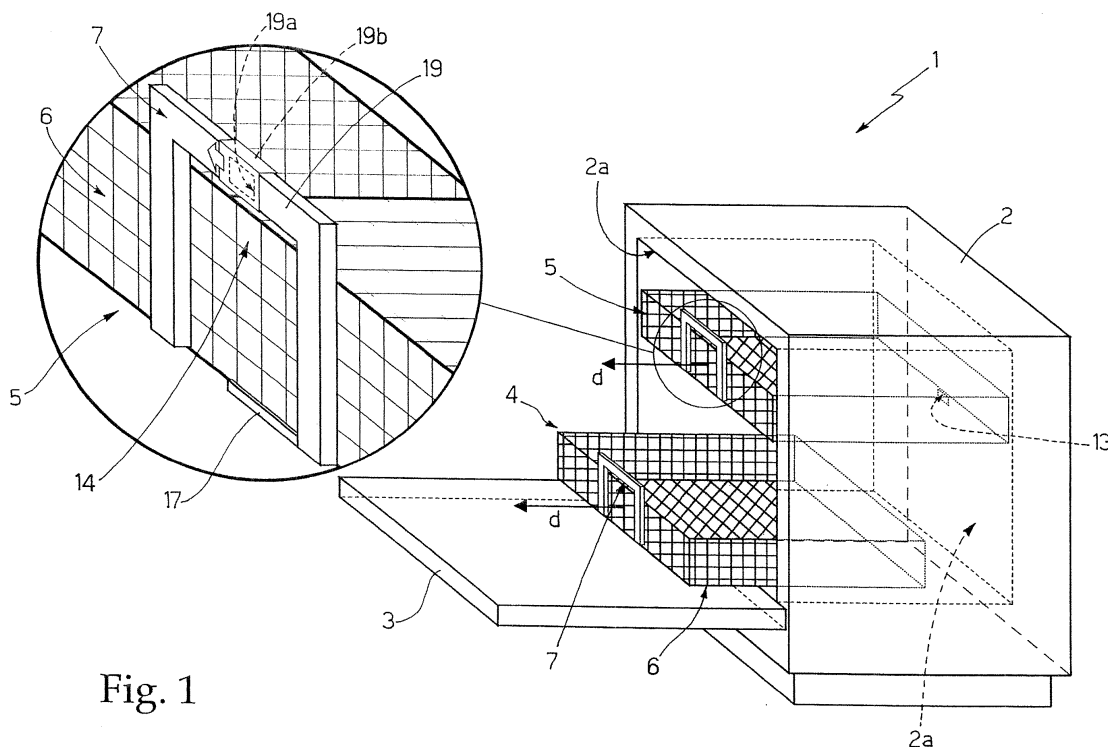


Fig. 1

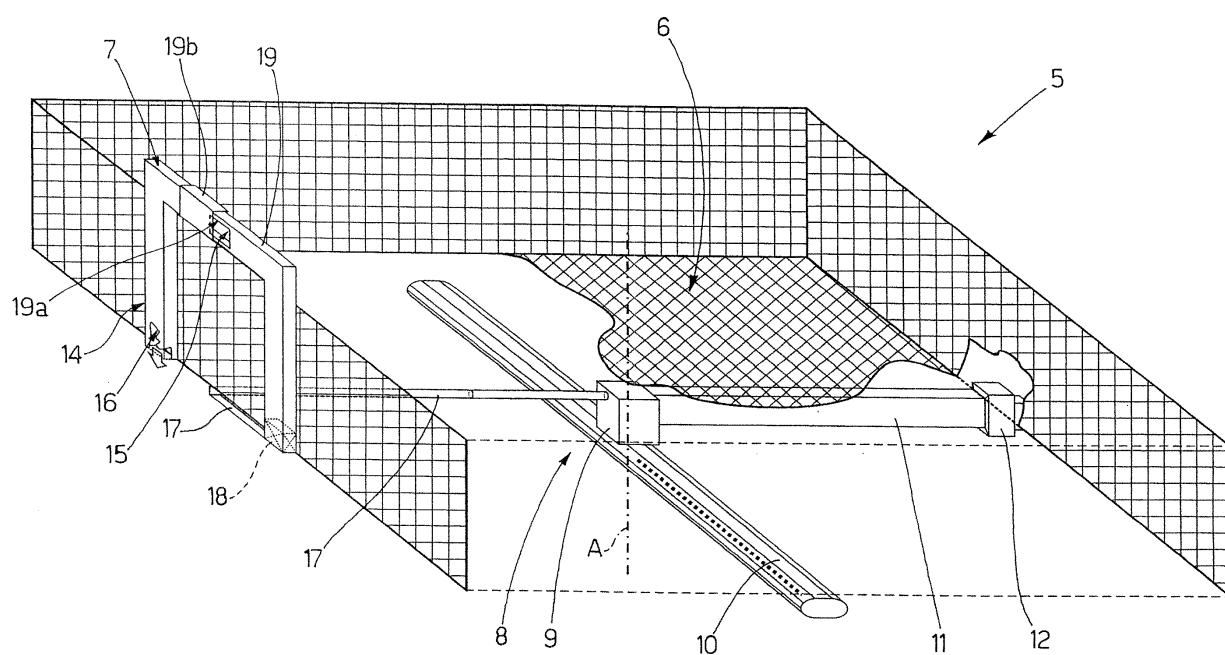


Fig. 2

Description

[0001] The present invention relates to a pull-out-basket dishwasher and relative basket.

[0002] As is known, most currently marketed home dishwashers comprise a substantially parallelepiped-shaped outer casing enclosing a wash chamber communicating with the outside through an opening formed in one of the vertical lateral walls of the casing; a door hinged to the casing, just beneath the wash chamber access opening, to rotate about a horizontal axis of rotation to and from a substantially vertical closed position resting against the lateral wall of the casing to hermetically close the wash chamber access opening; and two baskets housed one over the other inside the wash chamber and resting on runners by which to slide the baskets out.

[0003] Dishwashers of the above type also comprise two rotary spray wash members mounted to rotate inside the wash chamber and having a number of nozzles designed to direct pressurized-water jets onto the two baskets inside the wash chamber.

[0004] More specifically, one of the rotary wash members is mounted to rotate freely at the bottom of the wash chamber, while the other is integrated in the top basket, with its nozzles oriented to only direct water jets onto the top basket.

[0005] Currently marketed dishwashers also comprise a detergent holder and dispensing device for temporarily storing and then releasing a given amount of detergent normally sufficient for one wash cycle, and which in most currently marketed models is integrated in the dishwasher door.

[0006] More specifically, the detergent holder and dispensing device normally comprises a small detergent compartment normally sized to hold enough detergent for one wash cycle, and which is recessed inside the dishwasher door to face the wash chamber when the door is closed; a detergent compartment lid fitted to the dishwasher door to move to and from a work position closing the inlet of the detergent compartment and isolating the compartment from the wash chamber; and a click-open device which, on command, releases the lid from the work position to connect the detergent compartment directly to the wash chamber.

[0007] Housing the detergent holder and dispensing device inside the dishwasher door poses a number of major problems, foremost of which is undoubtedly the noise level of the appliance. The detergent inside the detergent compartment, in fact, is removed by the action of the pressurized-water jets produced by the two rotary spray wash members, and impact of the water jets on the dishwasher door produces a pulsating, low-frequency noise that can only be deadened by inserting a thick layer of soundproofing material inside the door, with all the disadvantages this entails in terms of manufacturing cost.

[0008] In addition, necessarily housing the detergent

compartment of the detergent holder and dispensing device inside the dishwasher door further increases the minimum thickness of the door, with all the problems this entails in terms of weight and size. Most dishwasher doors, in fact, are over 5 centimetres thick.

[0009] It is an object of the present invention to provide a pull-out-basket dishwasher designed to eliminate the aforementioned drawbacks.

[0010] According to the present invention, there is provided a pull-out-basket dishwasher as claimed in Claim 1 and preferably, though not necessarily, in any one of the dependent Claims.

[0011] According to the present invention, there is provided a basket as claimed in Claim 12 and preferably, though not necessarily, in any one of the dependent Claims.

[0012] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a view in perspective, with parts removed for clarity, of a pull-out-basket dishwasher and a basket, both in accordance with the teachings of the present invention;

Figure 2 shows a view in perspective, with parts in section and parts removed for clarity, of the Figure 1 basket;

Figure 3 shows a side section of a detail of the Figure 1 dishwasher;

Figure 4 shows, schematically, a variation of the dishwasher in Figures 1-3.

[0013] Number 1 in Figure 1 indicates as a whole a pull-out-basket dishwasher, which substantially comprises a preferably, though not necessarily, parallelepiped-shaped outer casing 2 enclosing a wash chamber 2a communicating with the outside through an opening formed in one of the vertical lateral walls of casing 2; a door 3 hinged to casing 2, alongside the access opening to wash chamber 2a, to rotate, about a preferably, though not necessarily, horizontal axis of rotation, to and from a closed position resting against the lateral wall of casing 2 to hermetically close the access opening to wash chamber 2a; and one or more baskets housed one over the other inside wash chamber 2a and resting on known runners (not shown) by which to slide the baskets out through the access opening to wash chamber 2a.

[0014] More specifically, in the example shown, dishwasher 1 comprises two baskets 4 and 5 housed one over the other inside wash chamber 2a, and each substantially comprising a rigid, substantially rectangular drawer 6, with a perforated or mesh bottom and lateral walls, which is positioned inside wash chamber 2a and rests on known runners (not shown) by which to slide the drawer 6 out through the access opening to wash chamber 2a; and a handle 7 located on the side of drawer 6 facing door 3 when door 3 is closed, and by which to slide basket 4, 5 manually in and out of wash chamber 2a.

[0015] With reference to Figures 1 and 2, dishwasher 1 also comprises at least one rotary spray wash member, which is housed inside wash chamber 2a, is connected to and supplied with pressurized water by the dishwasher hydraulic circuit (not shown), and has a number of spray nozzles designed to direct pressurized-water jets onto baskets 4 and 5 inside wash chamber 2a, so as to wash the dishes inside the baskets.

[0016] More specifically, in the example shown, dishwasher 1 comprises two rotary spray wash members, the first of which (not shown) is located at the bottom of wash chamber 2a, and comprises a hub projecting from the bottom of wash chamber 2a, and an impeller fitted to the hub to rotate freely about a vertical axis of rotation, and having a number of spray nozzles designed to direct pressurized-water jets onto baskets 4 and 5 inside wash chamber 2a. Pressurized water is supplied to the impeller along a feed conduit formed inside the hub.

[0017] The second rotary spray wash member - hereinafter indicated 8 - is integrated in the top basket 5, and comprises a hub 9 projecting from the bottom of drawer 6 of basket 5 and facing the bottom of wash chamber 2a (and therefore bottom basket 4); and an impeller 10 fitted to hub 9 to rotate freely about an axis of rotation A, which is locally perpendicular to the plane of the bottom of drawer 6, and is preferably, though not necessarily, vertical and aligned with the axis of rotation of the impeller of the first rotary spray wash member.

[0018] Like the impeller of the first rotary spray wash member, impeller 10 has a number of spray nozzles designed to direct pressurized-water jets onto drawer 6 of top basket 5 and possibly onto drawer 6 of bottom basket 4, and hub 9 has an inner conduit for feeding pressurized water to impeller 10.

[0019] With reference to Figure 2, rotary spray wash member 8 also comprises a pressurized-water feed pipe 11 projecting from hub 9, parallel to the bottom of drawer 6 of basket 5, i.e. horizontally, and shaped at the end to form a fast-fit connector 12 connectable to a pressurized-water outlet 13 on the surface of a vertical wall of casing 2 defining wash chamber 2a, so as to feed water from the outlet to the inner conduit of hub 9.

[0020] More specifically, pressurized-water feed pipe 11 extends parallel to the insertion and extraction direction $\underline{d}$ of top basket 5, and pressurized-water outlet 13 is located, on the surface of the vertical wall of casing 2 defining wash chamber 2a, on the opposite side to the access opening to the wash chamber, and is connected in known manner to the dishwasher hydraulic circuit (not shown).

[0021] With reference to Figures 1 and 2, dishwasher 1 also comprises a detergent holder and dispensing device 14 for temporarily storing and then releasing a predetermined amount of detergent preferably, though not necessarily, sufficient for one wash cycle, and which is preferably, though not necessarily, defined by a predetermined amount of powdered detergent compacted into one substantially parallelepiped-shaped tablet.

[0022] Detergent holder and dispensing device 14 is located on top basket 5, and substantially comprises a closed detergent compartment 15 formed in the body of handle 7 of basket 5, and a detergent release conduit 16 connecting detergent compartment 15 to the outside.

[0023] Detergent compartment 15 is obviously sized to hold said predetermined amount of detergent, and detergent release conduit 16 is formed in the body of handle 7 of basket 5 so that the outlet of the conduit faces downwards, i.e. faces the bottom of wash chamber 2a, and the end portion of the conduit extends substantially vertically inside the body of handle 7.

[0024] With reference to Figures 2 and 3, in addition to the above, detergent holder and dispensing device 14 also comprises a water feed conduit 17 connecting detergent compartment 15 inside handle 7 to a pressurized-water source; and an on/off, controlled open-close valve 18 for regulating fluid flow to detergent compartment 15.

[0025] In the example shown, handle 7 of basket 5 is defined by a substantially U-shaped, preferably, though not necessarily, rectangular-section tubular body 19 fixed rigidly to the side of drawer 6 of basket 5 so that the central segment is horizontal, and the two lateral segments are vertical with both ends of tubular body 19 facing the bottom of drawer 6 and, therefore, the bottom of wash chamber 2a housing baskets 4 and 5 in use. One of the two ends of tubular body 19 is sealed fluidtight, while the other end communicates directly with the outside.

[0026] The central segment of tubular body 19 defines detergent compartment 15, and the lateral segment of tubular body 19 immediately upstream from the open end defines detergent release conduit 16.

[0027] With reference to Figures 1 and 2, in the example shown, the body of handle 7 of basket 5, i.e. tubular body 19, also comprises an auxiliary access opening 19a, which connects detergent compartment 15, i.e. the cavity in the central segment of tubular body 19, directly to the outside, and is sized to permit insertion of said predetermined amount of detergent inside detergent compartment 15; and a cover 19b fitted slidably to tubular body 19 and movable manually to and from a work position closing opening 19a in fluidtight manner.

[0028] With reference to Figures 2 and 3, conduit 17 connects the cavity in tubular body 19 to the inner conduit of hub 9 of rotary spray wash member 8, so as to supply the cavity in tubular body 19 with part of the water supplied to hub 9 by pipe 11, and is therefore fixed rigidly to the bottom of drawer 6 of basket 5, like hub 9.

[0029] On/off valve 18 is located at the closed end of tubular body 19 defining handle 7 of basket 5, and is designed to assume an open configuration permitting pressurized-water flow from conduit 17 to the cavity in tubular body 19, or a closed configuration preventing pressurized-water flow from conduit 17 to the cavity in tubular body 19.

[0030] With reference to Figure 3, in a first embodiment, on/off valve 18 is a conventional controlled open-

close solenoid valve, which is normally closed, and which opens when supplied with electric current; and dishwasher 1 comprises a power coil 20 housed in door 3 to face on/off valve 18 and, hence, tubular body 19 when door 3 is closed, and which is designed to power on/off valve 18 by induction.

[0031] Alternatively, coil 20 may be designed to generate, when supplied with electric current, a magnetic field capable of directly moving the movable shutter of on/off valve 18 from the closed position.

[0032] In an alternative embodiment, on/off valve 18 is mechanically operated; and dishwasher 1 comprises an electrically controlled servomechanism 20' (shown by the dash line in Figure 3) housed in door 3 in place of coil 20, and which comprises a control shaft projecting from the surface of door 3 into wash chamber 2a, and designed to connect mechanically to on/off valve 18 to open or close it on command.

[0033] Operation of dishwasher 1, as described above, will now be described assuming detergent compartment 15, i.e. the central segment of tubular body 19, has already been filled with detergent.

[0034] In actual use, when the time comes to use the detergent inside detergent holder and dispensing device 14, the electronic central control unit (not shown) of dishwasher 1 opens valve 18 to allow pressurized water to flow along conduit 17, into detergent compartment 15 (i.e. tubular body 19) to dissolve the detergent inside, and then out, together with particles of detergent, into wash chamber 2a of dishwasher 1 via detergent release conduit 16 (i.e. tubular body 19).

[0035] The advantages of dishwasher 1 are obvious : given the design of detergent holder and dispensing device 14, release of the detergent into wash chamber 2a no longer calls for directing pressurized-water jets onto door 3, thus drastically reducing the noise level during the wash cycle.

[0036] Moreover, since the detergent holder and dispensing device need no longer be housed in the door, dishwasher 1 may be fitted with a much thinner door 3 than currently marketed dishwashers.

[0037] Clearly, changes may be made to dishwasher 1 as described and illustrated herein without, however, departing from the scope of the present invention.

[0038] For example, with reference to Figure 4, as opposed to branching off from the inner conduit of hub 9, water feed conduit 17 of detergent holder and dispensing device 14 extends from handle 7 to hub 9 of rotary spray wash member 8, and inside pressurized-water feed pipe 11 to fast-fit connector 12. In which case, pressurized-water outlet 13 comprises two independent outlets, one connected to the main conduit of pressurized-water feed pipe 11, and the other to the end of conduit 17; and on/off valve 18 is located immediately upstream from the outlet of pressurized-water outlet 13 connectable to conduit 17, and is defined by a normal controlled open-close solenoid valve.

[0039] According to an other embodiment not shown,

dishwasher 1 comprises a second detergent holder and dispensing device which is located on bottom basket 6. Likewise detergent holder and dispensing device 14, the second detergent holder and dispensing device comprises a detergent compartment formed in the body of handle of basket 6, a detergent release conduit connecting detergent compartment to the outside, a water feed conduit connecting the detergent compartment inside the handle to a pressurized-water source, and an on/off, controlled open-close valve for regulating fluid flow to the detergent compartment formed in the body of handle of basket 6.

Claims

1. A pull-out basket dishwasher (1) comprising a casing (2) enclosing a wash chamber (2a) communicating with the outside through an opening formed in one of the lateral walls of the casing (2), at least one basket (4, 5) substantially defined by a drawer (6) located inside said wash chamber (2a), and by a handle (7) fixed to said drawer (6) and by which to slide said basket (4, 5) manually in and out of the wash chamber (2a), and a detergent holder and dispensing device (14) for storing and then releasing a predetermined amount of detergent; said dishwasher (1) being **characterized in that** said detergent holder and dispensing device (14) comprises a detergent compartment (15) formed in the body of the handle (7) of said basket (5), a detergent release conduit (16) connecting the detergent compartment (15) to the outside, a water feed conduit (17) connecting the detergent compartment (15) to a pressurized-water source (9, 13), and a controlled open-close, on/off valve (18) for regulating fluid flow to said detergent compartment (15) .
2. A dishwasher as claimed in Claim 1, **characterized by** also comprising at least a first rotary spray wash member (8), which is fixed to the bottom of the drawer (6) of said basket (5), receives pressurized water from the hydraulic circuit of the dishwasher, and directs pressurized-water jets onto the drawer (6) of said basket (5).
3. A dishwasher as claimed in Claim 2, **characterized in that** said first rotary spray wash member (8) comprises a hub (9) projecting from the bottom of the drawer (6) of said basket (5), and an impeller (10) fitted in rotary manner to the hub (9) and having a number of spray nozzles designed to direct pressurized-water jets onto said drawer (6); the hub (9) having an inner conduit for conducting said pressurized water to said impeller (10).
4. A dishwasher as claimed in Claim 3, **characterized in that** said first rotary spray wash member (8) also comprises a pressurized-water feed pipe (11) pro-

- jecting from the hub (9), parallel to the bottom of the drawer (6) of said basket (5), and shaped at the end to form a fast-fit connector (12) connectable to a pressurized-water outlet (13) on a vertical wall of the casing (2) defining said wash chamber (2a), so as to feed the water from the pressurized-water outlet (13) to the inner conduit of said hub (9).
5. A dishwasher as claimed in Claim 3 or 4, **characterized in that** said water feed conduit (17) connects the detergent compartment (15) to the inner conduit of said hub (9).
 6. A dishwasher as claimed in Claim 5, **characterized in that** said on/off valve (18) is located inside said handle (7, 19).
 7. A dishwasher as claimed in Claim 4, **characterized in that** said water feed conduit (17) extends from the handle (7) of said basket (5) to said fast-fit connector (12); said pressurized-water outlet (13) having two independent outlets, one connected to the main conduit of said pressurized-water feed pipe (11), and the other to the end of said water feed conduit (17); said on/off valve (18) being located upstream from said pressurized-water outlet (13).
 8. A dishwasher as claimed in any one of the foregoing Claims, **characterized by** comprising a door (3) hinged to said casing (2) to rotate to and from a closed position resting against the lateral wall of the casing (2) and hermetically closing the access opening to the wash chamber (2a).
 9. A dishwasher as claimed in Claims 5 and 8, **characterized in that** said detergent holder and dispensing device (14) comprises valve control means (20, 20') for selectively activating said on/off valve (18); and **in that** said valve control means (20, 20') are housed in said door (3).
 10. A dishwasher as claimed in any one of the foregoing Claims, **characterized in that** the handle (7) of said basket (5) comprises a substantially U-shaped tubular body (19) fixed to the side of the drawer (6) of said basket (5), so that its central segment is substantially horizontal, and its two lateral segments are substantially vertical with the two ends of the tubular body (19) facing the bottom of the wash chamber (2a); the central segment of said tubular body (19) defining the detergent compartment (15) of said detergent holder and dispensing device (14).
 11. A dishwasher as claimed in any one of the foregoing Claims, **characterized in that** the body (19) of the handle (7) of said basket (5) comprises an auxiliary access opening (19a) connecting the detergent compartment (15) of said detergent holder and dispensing device (14) directly to the outside; and a cover (19b) for selectively closing the opening (19a) in said body (19).
 12. A dishwasher basket (5) comprising a drawer (6) located inside a wash chamber (2a) of a dishwasher, and a handle (7) fixed to said drawer (6) and by which to slide said basket (5) manually in and out of said wash chamber (2a); the basket (5) being **characterized by** comprising a detergent compartment (15) formed in the body of the handle (7) of said basket (5) for receiving a predetermined amount of detergent, a detergent release conduit (16) connecting the detergent compartment (15) to the outside, and a water feed conduit (17) connecting the detergent compartment (15) to a pressurized-water source (9, 13).
 13. A basket as claimed in Claim 12, **characterized by** also comprising a rotary spray wash member (8), which is fixed to the bottom of the drawer (6), receives pressurized water from the hydraulic circuit of the dishwasher, and directs pressurized-water jets onto the drawer (6) above; said rotary spray wash member (8) comprising a hub (9) projecting from the bottom of the drawer (6), and an impeller (10) fitted in rotary manner to the hub (9) and having a number of spray nozzles designed to direct pressurized-water jets onto said drawer (6); the hub (9) having an inner conduit for conducting said pressurized water to said impeller (10).
 14. A basket as claimed in Claim 13, **characterized in that** said rotary spray wash member (8) also comprises a pressurized-water feed pipe (11) projecting from the hub (9), parallel to the bottom of the drawer (6), and shaped at the end to form a fast-fit connector (12) connectable to a pressurized-water outlet (13) on a vertical wall of the casing (2) defining said wash chamber (2a), so as to feed the water from the pressurized-water outlet (13) to the inner conduit of said hub (9).
 15. A basket as claimed in Claim 13 or 14, **characterized in that** said water feed conduit (17) connects the detergent compartment (15) to the inner conduit of said hub (9).
 16. A basket as claimed in Claim 14, **characterized by** also comprising a controlled open-close, on/off valve (18) for regulating fluid flow to said detergent compartment (15); said on/off valve (18) being located inside said handle (7, 19).
 17. A basket as claimed in Claim 14, **characterized in that** said water feed conduit (17) extends from the handle (7) to said fast-fit connector (12).

18. A basket as claimed in any one of Claims 12 to 17,
characterized in that said handle (7) comprises a
substantially U-shaped tubular body (19) fixed to the
side of said drawer (6), so that its central segment
is substantially horizontal, and its two lateral seg- 5
ments are substantially vertical with the two ends of
the tubular body (19) facing the bottom of the wash
chamber (2a); the central segment of said tubular
body (19) defining said detergent compartment (15). 10
19. A basket as claimed in any one of Claims 12 to 17,
characterized in that the body (19) of said handle
(7) comprises an auxiliary access opening (19a) con-
necting said detergent compartment (15) directly to 15
the outside; and a cover (19b) for selectively closing
the opening (19a) in said body (19). 20

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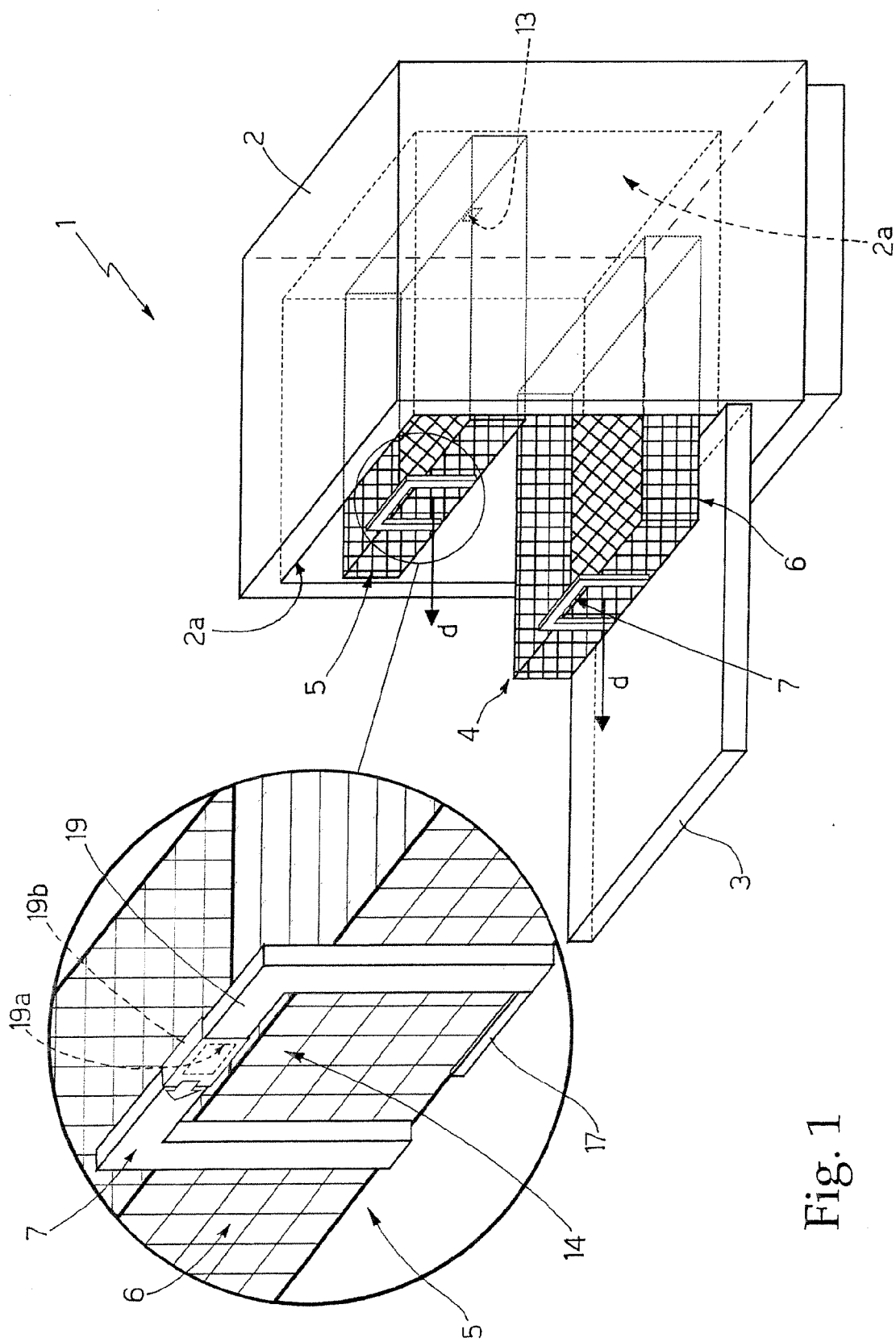


Fig. 1

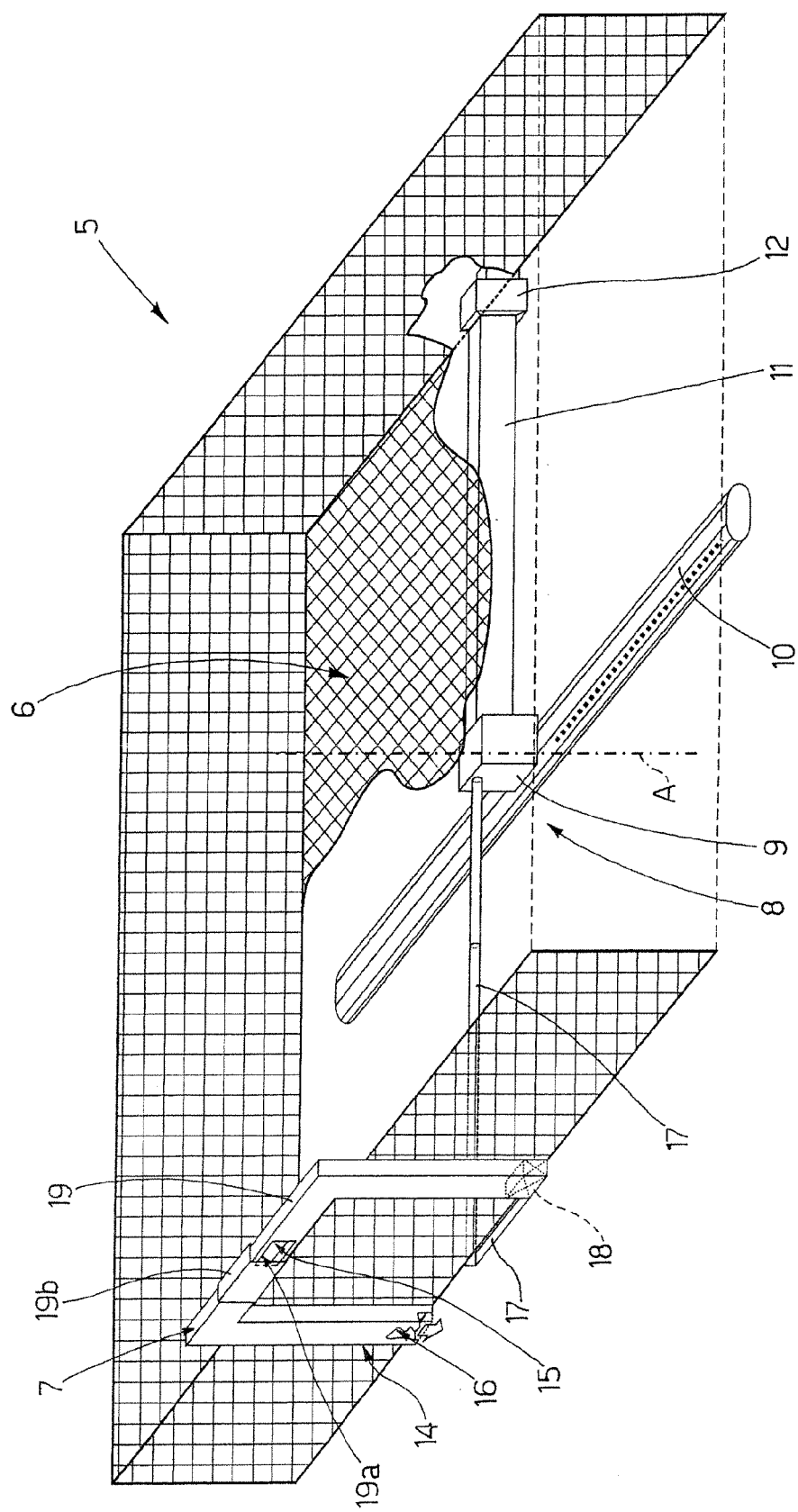
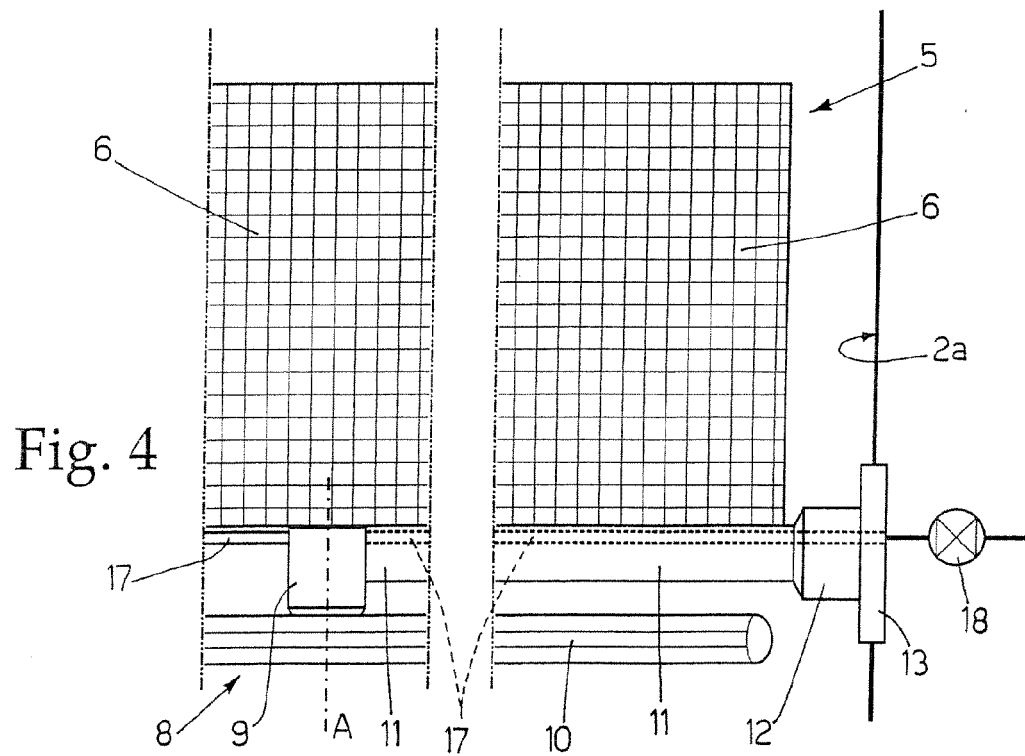
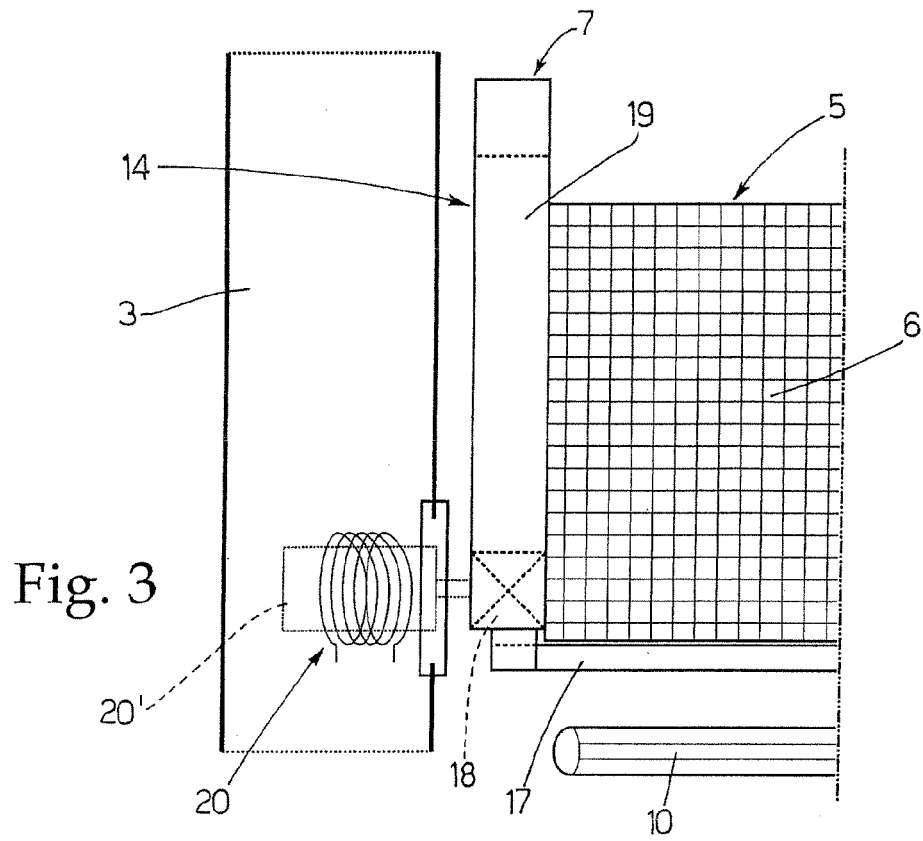


Fig. 2





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 11 7832

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 755 650 A1 (WHIRLPOOL EUROP [NL] WHIRLPOOL CO [US]) 29 January 1997 (1997-01-29) * column 1, lines 9-33 * * column 2, lines 16-29 * * column 3, line 28 - column 4, line 26; figures 1-3 *	1-6,8,9, 11-17,19	INV. A47L15/50 A47L15/44
Y	-----	7,10,18	
Y	EP 1 236 431 A2 (ELECTROLUX HOME PROD CORP [BE]) 4 September 2002 (2002-09-04) * figure 2 *	7	
Y	EP 1 582 136 A1 (ELECTROLUX HOME PROD CORP [BE]) 5 October 2005 (2005-10-05) * paragraphs [0012], [0013] *	10,18	
A	DE 10 2004 053914 A1 (AWECO APPLIANCE SYS GMBH & CO [DE]) 17 November 2005 (2005-11-17) * paragraphs [0035], [0050]; figures 1-5 * -----	1,12	TECHNICAL FIELDS SEARCHED (IPC) A47L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 29 December 2006	Examiner PAPADIMITRIOU, S
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 11 7832

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29-12-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0755650 A1	29-01-1997	DE 69527058 D1	18-07-2002
		DE 69527058 T2	31-10-2002
		ES 2176268 T3	01-12-2002
EP 1236431 A2	04-09-2002	SE 0100679 A	29-08-2002
EP 1582136 A1	05-10-2005	AT 335433 T	15-09-2006
DE 102004053914 A1	17-11-2005	NONE	

EPO FORM P0459

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