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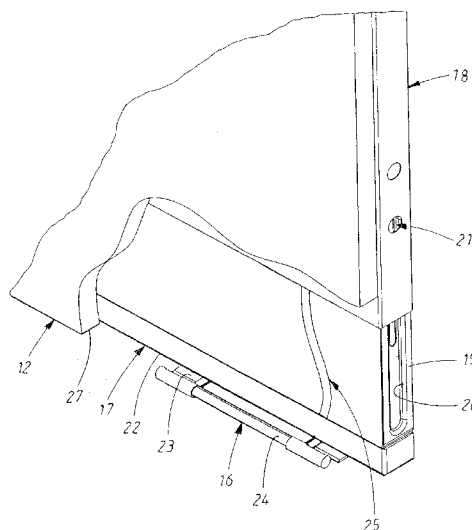
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(54) Title: INDICATING DEVICE FOR INDICATING STATUS IN A DOMESTIC MACHINE



(57) Abstract: Indicator device for indicating status in a domestic appliance in the form of a dishwasher, washing machine or drier, or alternatively a cooker, refrigerator/freezer, and arranged to treat household items in an inner chamber having an opening which can be closed off with a door. The said door consists of a basic part and a decorative part (12) fitted outside the basic part. The indicator device is an indicator unit (16), which is fitted to the outer side of the domestic appliance for external light indicator of the status of the appliance. The light indicator unit (16) is adjustably fitted to the bottom of the basic part of the door by means of a holder (23) below a bottom longitudinal edge (27) of the decorative part (12). The unit can be adjusted in a direction relative to the container of the appliance for adaptation to a chosen height position of the bottom edge of the decorative part.

## TITLE

INDICATING DEVICE FOR INDICATING STATUS IN A DOMESTIC MACHINE

## TECHNICAL FIELD

The present invention relates to an indicator device for indicating status in a domestic appliance in the form of a dishwasher, washing machine or drier, or alternatively a cooker, refrigerator/freezer, according to the preamble to Patent Claim 1.

## BACKGROUND ART

Various technical solutions have previously been devised for the purpose of producing a status indicator which is both discreet and easy to read in, for example, a kitchen environment in which it is wished to avoid dominant signal panels.

Through EP 1 332 708 A2, for example, it is previously known to indicate with a single internal indicator element, by means of coded light information, the status of a domestic appliance, i.e. the program sequence in which the appliance is operating. The indicator element is integrated with the panel, which is situated at the top of the front of the appliance and which traditionally forms a signal panel for the appliance. This solution cannot therefore be used in appliances having a front of the so-called fully integrated type, i.e. having a whole uniform front up to the top edge of the appliance. According to this known document, the external indicator is also combined with an internal light indicator generated by the internal lighting of the appliance.

WO 2004/057636 A1 shows an indicator device which can be used in domestic appliances of the fully integrated type by virtue of it being constituted by a light source which, on the one hand, is fitted beside the front

face of the appliance and, on the other hand, projects a light signal outside the appliance, for example onto the floor. The readability of the indicator is, however, largely dependent on the character of the projection surface, for example the information can be difficult to interpret on a tiled floor or if a base is installed in which the light projection surface ends up behind the base.

## DISCLOSURE OF INVENTION

The object of the present invention is to provide an indicator device which is situated outside the uniform front face and in which the readability is not dependent on the character of other surfaces or whether a base is installed.

The said object is achieved by means of the indicator device according to the invention, the characteristics of which emerge from the following Patent Claim 1.

By choosing an indicator device according to the invention, a domestic appliance, for example a dishwasher, can be constructed with a totally unbroken front, without foregoing the requirements for a clear status indicator.

## BRIEF DESCRIPTION OF DRAWINGS

The invention will be described below with reference to the following drawings, in which:

Fig. 1 shows a domestic appliance from the side, provided with a combined internal and external light indicator, and

Fig. 2 shows a partially broken perspective view of a bottom corner portion of an appliance door, on which an external indicator unit according to the

invention is fitted.

## PREFERRED MODE FOR CARRYING OUT THE INVENTION

The indicator device according to the invention is shown in Fig. 1 fitted on a domestic appliance 1, which in the shown example is a dishwasher, but can be a washing machine or a drying unit, for example a drying cabinet or a tumble drier, or alternatively a combined washing machine and tumble drier, or cooker, refrigerator/freezer or the like. In the shown example, the indicator device is provided with a combined internal and external light indicator, but can alternatively have only an external indicator of the operating status of the appliance.

The domestic appliance 1, in this case the dishwasher, is substantially constituted by a box-shaped container 2, which expediently is module-adapted for installation in a fitting, such as a kitchen fitting or laundry room. The container has, apart from side walls 3, rear wall 4, a top portion 5, a bottom portion 6 and a front portion 7. The latter essentially consists of a door 8, which is intended to close off a container opening 9 to a container chamber 10 in which the household items are to be treated in various process steps, i.e. dishes shall essentially be washed, rinsed and dried.

The door 8 consists of a basic part 11, which is an openable, tight-fitting part, which is articulately connected with a hinge 28 to the container 2 and is intended to, in the closed position, fit tight against the container opening 9. The basic part 11 usually consists of a double-walled frame construction having an inner sheet-metal wall, which creates the outwardly sealed surface. Edge portions over at least three sides and an outer sheet-metal wall create an interspace which can accommodate electric wiring, electronics, ventilation, etc. Outside the basic part 11 there is fitted a decorative part 12 in the form of a cover plate made of, for example, wood or sheet-metal, which can be configured as a cupboard door which integrates

the domestic appliance with other fittings in, for example, a kitchen. The appliance is advantageously of the so-called fully integrated type, i.e. it has in the shown example a substantially front-enveloping decorative part 12, which substantially covers the whole of the front face and in which only a distance to the floor is left for a base portion 13 similar to a conventional other fitting.

Like domestic appliances in the more exclusive segment, the appliance is provided, in the shown example, with an internal lighting for illuminating the container chamber 10, so that a person can see to handle, for example, the dishes. The internal lighting can be extinguished once the door is closed, but the appliance can alternatively be entirely without internal lighting.

As is indicated in the shown example, the internal lighting can also serve as an internal light indicator of the status of the appliance, by emitting program-controlled light signals.

In the example according to Fig. 1, the combined internal lighting and internal light indicator is realized as an internal light indicator unit 14, which can be seated in the top of the container chamber, the unit being shown entirely schematically without physical placement in Fig. 1. The placement can be in the top portion 5, in the top of the rear portion 4, or as two units at the top of both side walls. The unit is advantageously encapsulated in a liquid-tight manner behind a transparent glass. The internal light indicator unit 14 is realized as a three-colour electronically controlled light-diode unit, either an integrated unit or three interacting light diodes 14a, 14b, 14c, arranged to emit green, red and blue light when supplied with electric voltage. They can be controlled by means of an electronic control unit 15 for chosen combinations for the creation of coded colour signals, either fixed colour signals or dynamic colour signals, flashing signals, or colour signals with, for example, continuous colour transition or different intensity levels, either steplessly or in various steps. The colour signals are intended to be reflected

against surfaces in the chamber and be thereby mixed and read indirectly by a user. The control unit is controlled from or is integrated with the process-controlling programmer so as to indicate the status, for example for the treatment of the washware by the appliance. The place in time within a process step can be indicated with a coded light signal having, for example, a continuous colour transition, continuous change of intensity or continuous change of flashing frequency.

The indicator device according to the invention comprises an external light indicator, i.e. light indicator on the outer side of the appliance. This is achieved by the placement of an outer light indicator unit 16 at the bottom of the door 8 of the appliance 1. This unit is situated below the front face 7 of the appliance, so that the said front face can be freely configured without regard to the indicator unit. The decorative part 12 can therefore be realized rectangularly, for example, or can extend such that with its top longitudinal edge 26 forms the top edge of the front face and with its bottom edge 27 forms the bottom edge thereof, without cutouts or the like. Usually the decorative part is rectangular with horizontal top edge and bottom edge.

As can best be seen from Fig. 2, the outer indicator unit 16 is fitted in such a way that it is adjustable in at least one direction relative to the basic part 11 of the door and is hence adaptable to different dimensions, such as the height measurement of the decorative part 12 of the door. This is achieved by the basic part 11 having at the bottom an extension part 17 in the form of an adjusting frame, which is displaceably fitted to the basic part and is adjustable in the height direction, depth direction and side direction. In the example, the adjusting frame has, along both side edges 18 of the basic part, rails 19, having an adjusting function in the form of, for example, slots 20, through which adjusting screws 21 extend. The indicator unit is fixed to the bottom edge 22 of the adjusting frame 17 by a holder 23 arranged to hold the indicator unit 16 somewhat prominently in front of the basic part 11 and somewhat below the decorative plate 12, more precisely the bottom

longitudinal edge 27 thereof, so that a user can observe the unit without bending. The holder 23 itself is expediently adjustable in at least one direction, apart from in the height direction, also in the depth direction, i.e. outwards/inwards relative to the base portion 13, for adaptation to different thicknesses of the decorative plate 12, and possibly also in the side direction along the bottom edge 22 of the adjusting frame. In the example, the unit is realized as a light guide 24, whilst the light source in the form of, for example, three-colour light diodes is built into the holder at one end, or alternatively at both ends, of the light guide. The light guide 24 is advantageously elongated, straight, bent or angled, for example, as in the shown example, rod-shaped or L-shaped. In the curved or angled case, the light guide, and hence the light source, can be given a more recessed placement. The light guide is arranged, apart from to conduct the light in the longitudinal direction along the light guide, also to emit light in a transversely directed manner, which is ensured by suitable treatment of the surface with a large number of reflective surfaces, so that the total reflection within the light guide is reduced. Either this treatment is done only on the forward and outward facing side, or alternatively the inner side can be coated with a reflective surface. An electric current cable 25 extends within the basic part 11 for onward feeding to the electric light source.

Apart from generally informing the user about the status of the appliance, for example the stage reached in the process, the aim of a dynamic light indicator can be that a user acquires information on the possibility of adding items after the start, either in terms of laundry, dishes or articles to be dried, whilst still obtaining an acceptable result. The light indicator is here advantageously chosen with psychological/educational aspects, so that the user intuitively interprets the signal without reading a manual or without the signal needing to be configured as a text or designed symbol. Examples of this are the choice of colour, for example a red-coloured indicator for stop or warning, green or white corresponds to a ready signal, flashing, i.e. an intermittent signal, can mean a call for certain special attention, in which

case the flashing frequency can be given certain significance, in the same way as intensity, regardless of whether the signal is fixed or intermittent.

Concrete examples of dynamic light indication can be:

	White	Green	Red	Blue
Dish-washer	Ready for washing	Started + possibly add more load	In progress, warm, no more dishes	Ready, clean
Washing machine	Flashing white: Started + possibly add white wash	Flashing green: Started + possibly add coloured wash		
Drier	Ready for drying		Warm and damp violet = synthetically dry both colours pass gradually to yellow as the drying proceeds	Dry and ready

The invention is not limited to the examples described above and shown in the drawings. In certain cases, for example, the external light indicator is sufficient, in which case the internal indicator can be omitted and possibly replaced with a conventional monochrome internal lighting. Apart from the treatment situation, a status indicator can also be an alarm indicator of faults



or a clogged filter or a call for various measures. Where a light indicator and internal lighting are appropriate, these functions can be separate. The door can be openable in a different way, for example side-hung. Other similar domestic units may also be appropriate.

## CLAIMS

1. Indicator device for indicating status in a domestic appliance (1) in the form of a dishwasher, washing machine or drier, or alternatively a cooker, refrigerator/freezer, and arranged to treat household items in an inner chamber (10) having an opening (9) which can be closed off with a door (8) consisting of a basic part (11) and a decorative part (12) fitted outside the basic part, wherein the indicator device comprises an indicator unit (16), which is fitted to the outer side of the domestic appliance for external light indicator of the status of the appliance, characterized in that the light indicator unit (16) is adjustably fitted to the bottom of the basic part (11) of the door by means of a holder (23) below a bottom longitudinal edge (27) of the decorative part (12) so as to be adjustable in at least one direction relative to the domestic appliance for adaptation to a chosen position of the bottom edge of the decorative part.

2. Indicator device according to Patent Claim 1, wherein the basic part (11) has at the bottom a height-adjustable extension part (17) for adaptation to different height positions of the bottom edge (27) of the decorative part (12), characterized in that the external light indicator (16) is fitted to the bottom of the extension part (17) and is arranged to accompany the extension part when this is adjusted in height, whereby the light indicator unit can be given an unaltered position relative to the bottom edge of the decorative part (27) regardless of the height position thereof on the door (8).

3. Indicator device according to Patent Claim 2, characterized in that the external light indicator unit (1) is fitted to the extension part (17) by means of the holder (23), which is arranged to position the light-emitting elements (24) of the unit which are visible to the user in front of the bottom edge (22) of the extension part (17).

4. Indicator device according to Patent Claim 1, characterized in

that the holder (23) of the light indicator unit (16) is arranged to allow adjustment in the depth direction.

5. Indicator device according to Patent Claim 3, characterized in that the light-emitting element is realized as a light guide (24) extending along the bottom edge of the decorative part (12), below the same.

6. Indicator device according to Patent Claim 5, characterized in that the light guide (24) is arranged, apart from to conduct the indicator light in the longitudinal direction, also to emit light in a transversely directed manner through its shell surface.

7. Indicator device according to Patent Claim 5, characterized in that the light guide (24) is arranged to direct the outgoing light substantially outwards from the base (13) of the appliance.

8. Indicator device according to Patent Claim 5 or 6, characterized in that the light guide (24) is elongated.

9. Indicator device according to Patent Claim 8, characterized in that the light guide (24) is rod-shaped or L-shaped.

10. Indicator device according to any one of the preceding patent claims, characterized in that the indicator device also comprises an internal indicator unit (14) situated in the chamber (10) and consisting of at least three light elements (14a, 14b, 14c) arranged to emit light of the three primary colours, red, green and blue, as well as an electric control unit (16) arranged to command the three light elements to emit a dynamic indicator and illuminating light which is emitted in the chamber in dependence on the current status of the appliance, wherein for a certain status a chosen character of the light is defined with regard to colour in the colour spectrum, flashing character or light intensity, or alternatively a combination of these.

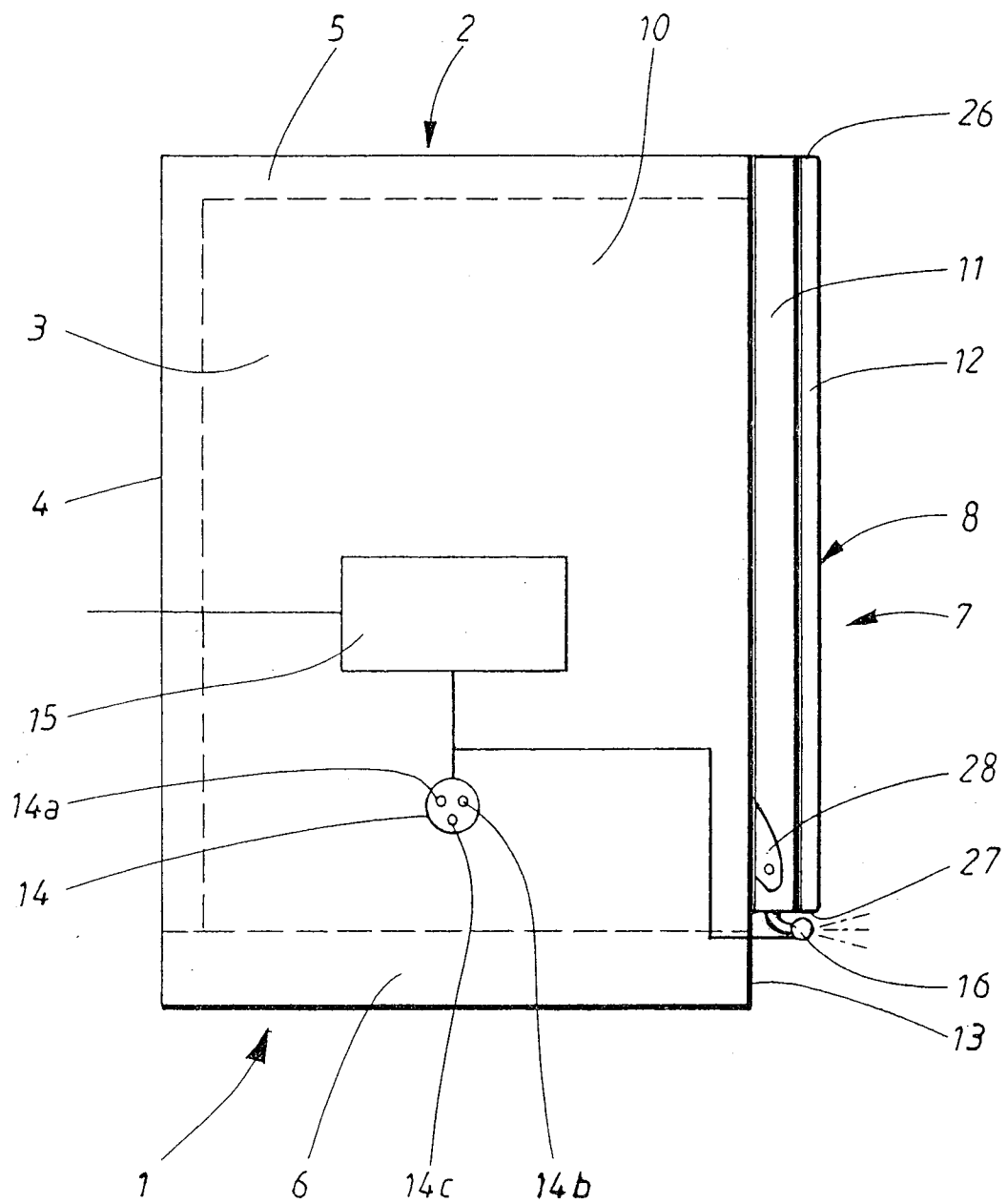


FIG. 1

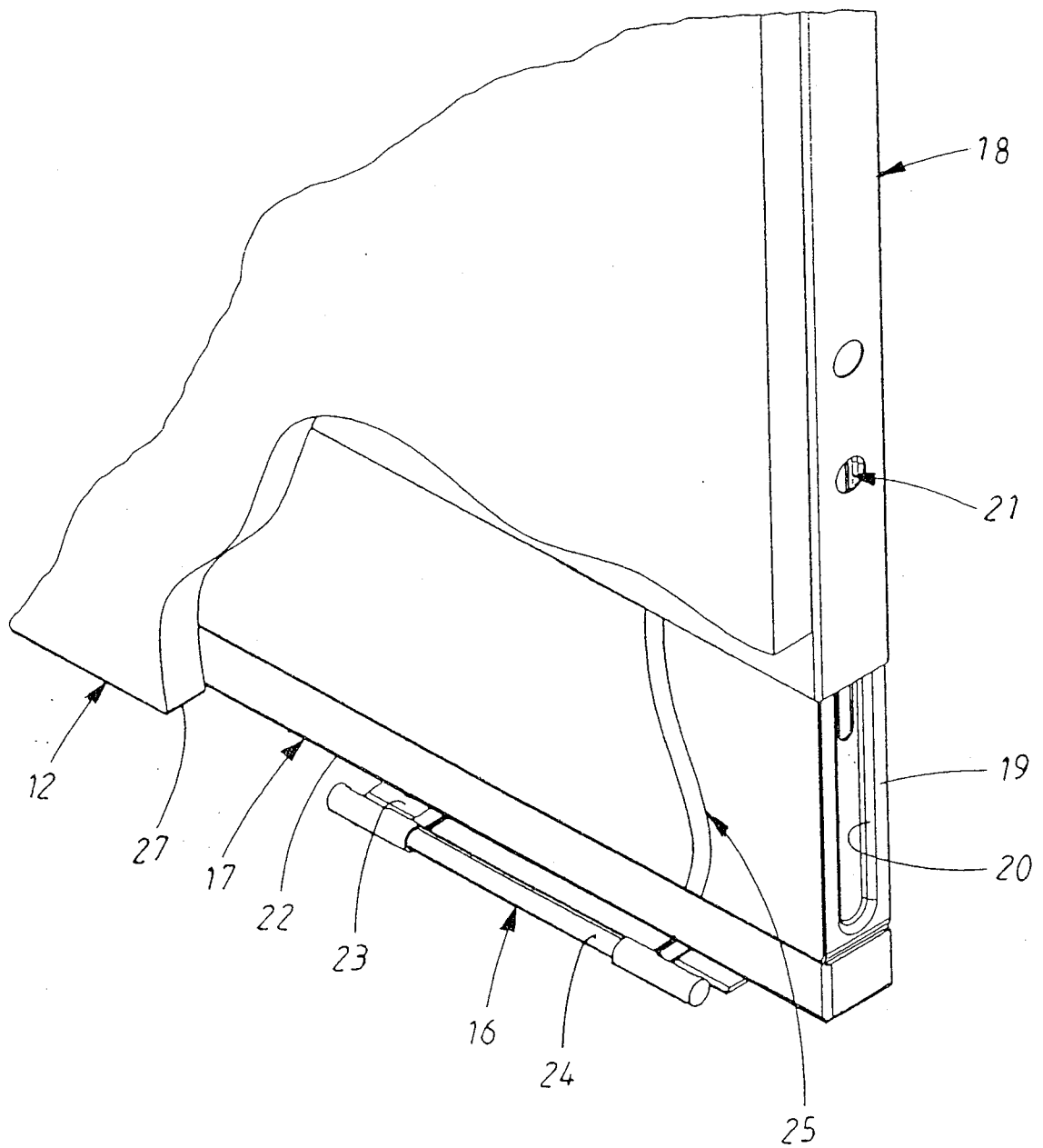


FIG. 2

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2007/050995

## A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A47L, D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1532917 A1 (ELECTROLUX HOME PRODUCTS CORPORATION N.V.), 25 May 2005 (25.05.2005), abstract --	10
A	DE 10259763 A1 (BSH BOSCH UND SIEMENS HAUSGERÄTE GMBH), 1 July 2004 (01.07.2004), figure 1, abstract --	1-9
A	US 20060232997 A1 (ROSENBAUER M), 19 October 2006 (19.10.2006), figure 2, abstract, paragraph [0030] --	1-9

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

7 February 2008

Date of mailing of the international search report

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2007/050995

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	GB 2256580 A (ZANUSSI ELETTRODOMESTICI S P A), 16 December 1992 (16.12.1992), figure 1, abstract  -----	1-9

**International patent classification (IPC)**  
**A47L 15/42 (2006.01)**

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Cited literature, if any, will be enclosed in paper form.



## INTERNATIONAL SEARCH REPORT

Information on patent family members

29/12/2007

International application No.

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