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(54) Equipped cover panel for electric household appliances

(57) A top cover panel (3) for an electric household appliance (1), for closing the top of the appliance body (2) and forming a supporting surface; the bottom face (5) of the panel, which in use is positioned facing inwards of the appliance body, presenting at least part of the electrical wiring (6) of the appliance, at least some of the electromechanical components (12) of the appliance, and fastening and supporting means (10) for the same; and the panel also being fitted integral with an electric supply cable (8) extending outside and from the rear edge of the panel.

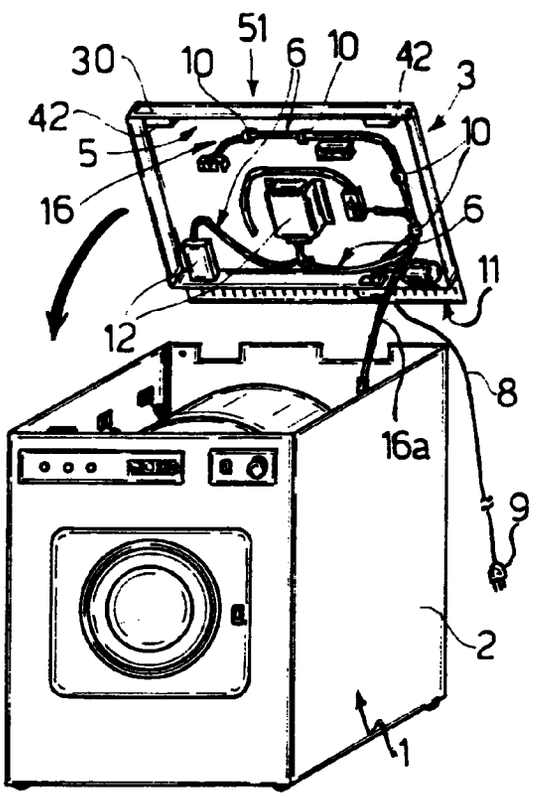

Fig.1

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Description

The present invention relates to a panel fittable to, and for closing the top of, the body of an electric household appliance, so as to form a top cover for the appliance as well as a supporting surface or worktop for the user. More specifically, the present invention relates to a cover panel of the above type, which is so equipped as to simplify assembly of the appliance.

At present, electric household appliances are assembled by fitting the electromechanical components directly on to the inside of the appliance body (normally made of sheet metal) which is open at the top to simplify assembly, and to which, after assembling the components, a fluidtight finish panel is fitted - normally screwed - to close the top of the body and which forms a top cover for the appliance as well as a supporting surface or worktop for the user.

Bearing in mind that the power supply cable of the appliance is normally fitted to the base of the body, whereas most of the electronic components (e.g. the programmer of a washing or dishwashing machine, etc.) are fitted near the top of the body, the above assembly method is awkward, is relatively time-consuming and hence expensive, and makes automated assembly extremely difficult.

It is an object of the present invention to provide a low-cost preassembled unit enabling troublefree fitment to the appliance, and designed to overcome the aforementioned drawbacks.

According to the present invention, there is provided a top cover panel for an electric household appliance, fittable to the appliance body to close the top of the body and at the same time form a supporting surface; characterized in that the bottom face of the panel, which in use is positioned facing inwards of the appliance body, presents electrical wiring forming at least part of the electric circuit of the appliance, and means for fastening and supporting the wiring; the panel also being fitted integral with an electric supply cable extending outside and from the rear edge of the panel.

As opposed to being left hanging or secured by makeshift means (clamps, adhesive tape, etc.) to the inside of the body, most of the electrical wiring of the appliance may thus be preassembled off-line to the panel, arranged neatly on said bottom inner face, and later connected at leisure to the rest of the electric circuit when fitting the cover panel to the appliance body.

The fastening and supporting means on the bottom face of the cover panel also support respective electromechanical parts of the appliance, thus forming a functional unit which may be assembled easily off-line, and most of the parts of which may also be tested.

To further simplify preassembly of the parts to the panel and subsequent connection, during assembly, to the rest of the electric circuit of the appliance, the electric wiring on said bottom face of the panel comprises at least one wire portion of predetermined length, left hanging from said bottom face of the panel, and at least a respective fast-fit connector on the free end of said wire portion.

According to a preferred variation, the front edge of the panel according to the present invention presents a front panel projecting perpendicularly in relation to said bottom face of the panel, and supporting electromechanical or electronic components of the appliance on the inner side, and respective means for manually controlling said components on the outer side opposite said inner side.

It is a further object of the present invention to provide an effective, low-cost support for said preassemblable unit.

According to the present invention, there is provided a top cover panel for an electric household appliance, fittable to the appliance body to close the top of the body and at the same time form a supporting surface; characterized in that the bottom face of the panel, which in use is positioned facing inwards of the appliance body, presents cable fastening hooks projecting perpendicularly from said bottom face of the panel; and electromechanical component fastening plates also projecting from said bottom face of the panel.

A number of non-limiting embodiments of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic view of an electric household appliance featuring an equipped cover panel in accordance with the present invention;

Figure 2 shows an exploded lateral section of the "basic" panel according to the invention, without the electric components;

Figure 3 shows a larger-scale detail of a variation of the Figure 2 panel;

Figure 4 shows an electric household appliance according to a preferred variation of the panel according to the invention;

Figure 5 shows a larger-scale underside view of the Figure 1 panel.

With reference to Figures 1, 2 and 5, number 1 indicates an electric household appliance of any type (in the non-limiting example shown, a washing machine, though the following description also applies to any other type of appliance, such as a dishwashing machine, refrigerator, freezer, oven, etc.).

Appliance 1 comprises a preferably sheet metal body 2, for example, in the form of a parallelepipedon, forming at least part of the outer "bodywork" and at least partly supporting the functional components of the appliance; and a top cover panel or element 3. Body 2 is open at the top to enable assembly of said functional components inside, and is fittable in known manner (e.g. by means of screws, not shown) to panel 3 which is so formed as to mate with the top opening of body 2. In the example shown, panel 3 is substantially in the form of a rectangular plate of substantially the same size as the base of body 2, and provides for closing the top of body

2 while at the same time forming a supporting surface or worktop for the user.

According to the present invention, the bottom face 5 of panel 3, which in use is positioned facing inwards of body 2, presents electric wiring 6 forming at least part of the known electric circuit (not shown) of appliance 1; and fastening and supporting means 10 for wiring 6. According to the invention, panel 3 is also fitted integral with an electric supply cable 8 - in the example shown, fitted with a plug 9 - extending externally from the rear edge 11 of panel 3.

As described later on, face 5 is also fitted via fastening means 10 with respective electromechanical components 12 of appliance 1, which, as shown in Figure 5, may for example comprise (in the case of a washing machine) a control module 12a, a condenser 12b, a solenoid valve 12c, and a pressure switch 12d complete with a tube 12e.

Wiring 6 comprises at least one electric cable or wire portion 16 of predetermined length, left hanging from bottom face 5 of panel 3; and at least a respective single or multiple fast-fit connector 17 of any known type, fitted to the free end of hanging electric cable or wire portion 16.

In the non-limiting example shown relative to a washing machine, there is provided a long first cable portion 16a terminating with a multiple connector 17a for connection to the appliance motor (in the example shown, the motor for rotating the drum, but in the case of a refrigerator or dishwashing machine the motor, for example, for driving the compressor or pump) which, being the heaviest component is normally located at the base of body 2 for reasons of stability. Provision is also made for fairly short multiple cables 16b and 16c terminating with multiple female Faston connectors 17b and 17c for connection to the appliance timer (not shown); and a number of wires 16d terminating with female Faston connectors 17d for connection to the door lock and thermostat (not shown) of washing machine 1.

Together with wiring 6 and electromechanical components 12 fitted to bottom face 5, panel 3 thus forms a unit 20 which may be preassembled off-line, and most of the components of which may also be off-line tested by connecting connectors 17 to a bench testing device for ensuring correct connection and operation of substantially all of components 12.

Panel 3 forms the mechanical support of unit 20, for which purpose, face 5 (Figures 2, 3, 5) presents cable fastening hooks 21 projecting perpendicularly from face 5 and for securing wiring 6 (and tube 12e); and fastening plates 22 for fastening electromechanical components 12 and also projecting from face 5 of panel 3.

In the non-limiting example shown, panel 3 comprises a substantially rigid, peripheral outer frame 30 formed, for example, in one or more pieces from synthetic plastic material or metal section and presenting an L-shaped cross section; a flat board 31 of resin-coated chipboard fitted inside frame 30; and assembly and sealing means for assembling board 31 and frame 30 in fluidtight manner. In the example shown, the bottom outer surface of board 31 is therefore so located as to define face 5 of panel 3 (Figure 2); and the assembly and sealing means comprise a second frame 32 also made in one or more pieces and inserted inside frame 30 to secure board 31 therein, and a continuous bead of sealing adhesive 35 which, originally applied about the perimeter of face 5 (as shown in Figure 2), is eventually interposed between frames 30, 32 and board 31 to secure all three together in fluidtight manner.

According to the present invention, to enable straightforward, low-cost production of fastening means 21 and 22, these are formed integral in one piece with, or separately and clicked on to, frame 32. More specifically, frame 32 comprises a number of frame elements 10 made of synthetic plastic material, fitted inside frame 30 on the opposite side of board 31, and each presenting a number of integral cable fastening hooks 21 and plates 22. In the non-limiting example shown, frame elements 10 are formed integral in one piece with one another, so as to define frame 32 (according to a variation not shown, frame elements 10 may of course be formed separately and form a single unit with frame 30 and board 31 by means of adhesive 35).

The fastening and supporting means 10 provided according to the invention on face 5 thus comprise frame elements 10, and form an integral part of said assembly and sealing means, by virtue of frame 32 being formed (originally or by means of adhesive 35) by the integral whole of frame elements 10.

With reference to Figures 2 and 5, at least one of elements 10 comprises a tab 36 adjacent and parallel to the rear edge 11 of panel 3, and projecting perpendicular from bottom face 5. Tab 36 presents known means for the snap-on connection of a known cable clamping device 38 (shown schematically in Figure 5) for supply cable 8 and preferably integrated in a known terminal board 39 (also shown schematically in Figure 5) for distributing supply from cable 8 to wiring 6. As shown in Figure 2, said connecting means may for example comprise an opening 40 formed through tab 36 and cooperating in known manner with known flexible teeth on terminal board 39.

In the example shown, tab 36 extends along the full length of edge 11, and, together with the rest of frame 32, presents fastening means for locking panel 3 to body 2 and which, in the example shown, comprise seats 41 (Figure 5) for assembly screws (not shown). Lock teeth 42 (Figure 5) cooperating in known manner with mating elements on body 2 are also provided on the frame element/s 10 forming part of frame 32 along the front edge 51 of panel 3 parallel to and opposite edge 11.

In the Figure 4 variation - in which any details similar to those already described are indicated using the same numbering system - panel 3 according to the invention and as already described may present, along front edge 51, a front panel 55 formed in one piece with, snapped on, screwed or otherwise fastened to panel 3, projecting perpendicularly from bottom face 5, and fitted on the

inner side 56 with known electromechanical or electronic components (not shown) of appliance 1 such as said timer, and on the opposite outer side 57 with means 60 for manually controlling said components; in which case, body 2 of appliance 1 is obviously modified as compared with the traditional Figure 1 design, and presents, for example, a front recess 62 for receiving front panel 55 (recess 62 may however be dispensed with and front panel 55 superimposed on the front wall of body 2). The resulting preassemblable unit 20 is thus maximized by all the components of appliance 1 - with the exception of the motor and associated driven parts - being transferred to panel 3.

The Figure 3 variation of panel 3 shows how the invention may also be applied to traditional panels featuring, as opposed to frame 32, a frame 32a with no fastening means. In this case, frame elements 10 with fastening means 21 and 22 may be fitted directly to face 5 or, if formed into a single one-piece frame 10a, may be inserted and locked, e.g. by interference or in snap-on manner, inside frame 32a.

As shown in Figures 2 and 5, tab 36 may be formed slightly inwards of edge 11 so that this projects transversely from it; and edge 11 may be provided with known snap-on fastening means 80 (shown schematically in block form) for cable 8 and other components (e.g. the drain hose in the case of a washing machine) for simplifying packing of appliance 1.

Claims

1. A top cover panel for an electric household appliance, fittable to the appliance body to close the top of the body and at the same time form a supporting surface; characterized in that the bottom face of the panel, which in use is positioned facing inwards of the appliance body, presents electrical wiring forming at least part of the electric circuit of the appliance, and means for fastening and supporting the wiring; the panel also being fitted integral with an electric supply cable extending outside and from the rear edge of the panel.

2. An electric household appliance cover panel as claimed in Claim 1, characterized in that said fastening and supporting means on said bottom face of the panel also support respective electromechanical components of the appliance.

3. An electric household appliance cover panel as claimed in Claim 1 or 2, characterized in that said electrical wiring on said bottom face of the panel comprises at least one wire portion of predetermined length, left hanging from said bottom face of the panel; and at least a respective fast-fit connector fitted to the free end of said wire portion.

4. An electric household appliance cover panel as claimed in one of the foregoing Claims, and comprising a substantially rigid, outer peripheral frame; a flat board made of resin-coated chipboard and housed inside said frame; and assembly and sealing means for securing the board and frame together in fluidtight manner; characterized in that said fastening and supporting means form part of said assembly and sealing means, and comprise frame elements formed from synthetic plastic material, fitted inside said frame on the opposite side of said board, and each presenting integral cable fastening hooks projecting perpendicularly from said bottom face of the panel, which bottom face is defined by the bottom face of said board.

5. An electric household appliance cover panel as claimed in Claim 4, characterized in that said frame elements present respective integral fastening plates for electromechanical components and also projecting from said bottom face of the panel.

6. An electric household appliance cover panel as claimed in Claim 4 or 5, characterized in that at least one of said frame elements comprises a tab facing said rear edge of the panel and projecting perpendicularly from said bottom face of the panel; said tab presenting snap-on connecting means for a cable clamping device for said supply cable; and said device preferably being integral with a terminal board for distributing supply from said cable to said wiring.

7. An electric household appliance cover panel as claimed in Claim 6, characterized in that said tab presents fastening means for securing the panel to the body of the appliance.

8. An electric household appliance cover panel as claimed in one of the foregoing Claims from 4 to 7, characterized in that said frame elements are integral with one another so as to define a second frame for gripping the board against said peripheral frame; a continuous bead of sealing adhesive being interposed between said frames and the board.

9. An electric household appliance cover panel as claimed in one of the foregoing Claims, characterized in that, along its front edge, it presents a front panel projecting perpendicularly in relation to said bottom face of the panel, and fitted on the inner side with electromechanical or electronic components of the appliance, and, on the opposite outer side with respective means for manually controlling said components.

10. A top cover panel for an electric household appliance, fittable to the appliance body to close the top of the body while at the same time forming a supporting surface; characterized in that the bottom face of the panel, which in use is positioned facing

inwards of the body, presents cable fastening hooks projecting perpendicularly from said bottom face of the panel, and fastening plates for electromechanical components and also projecting from said bottom face of the panel.

11. An electric household appliance comprising an open-topped load-bearing body defining at least part of the outer bodywork of the appliance; characterized in that it also comprises a cover panel as claimed in any one of the foregoing Claims and fitted so as to close the body.

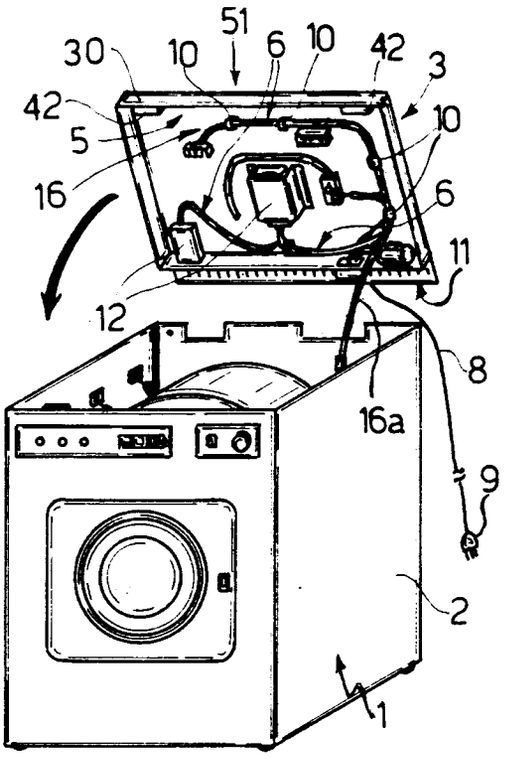


Fig.1

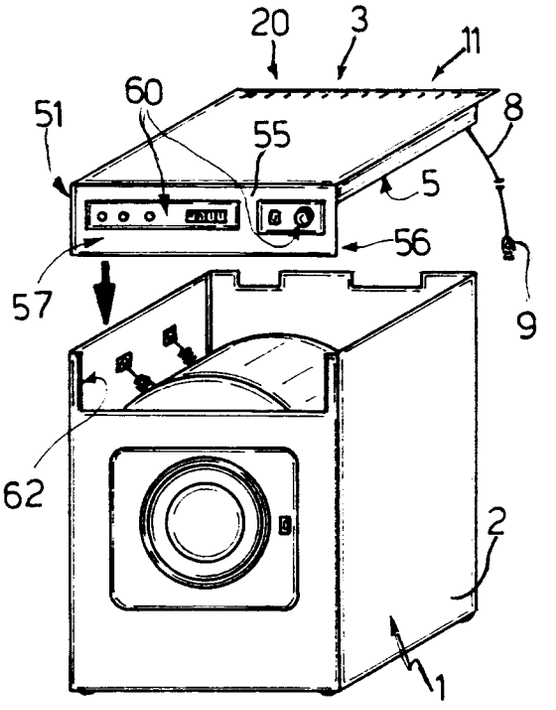


Fig.4

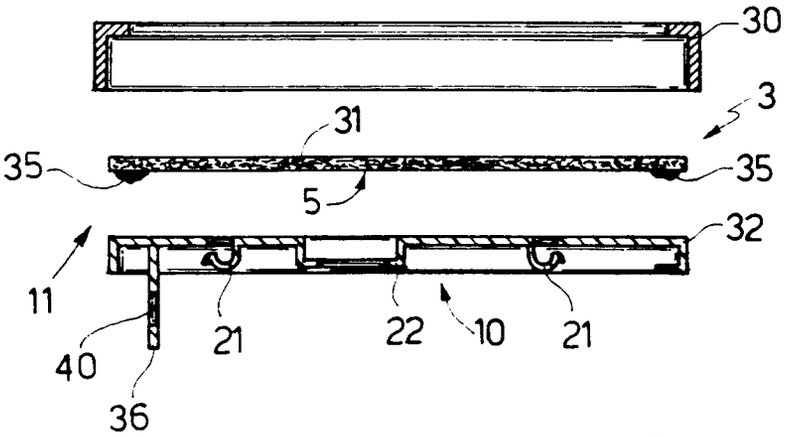


Fig.2

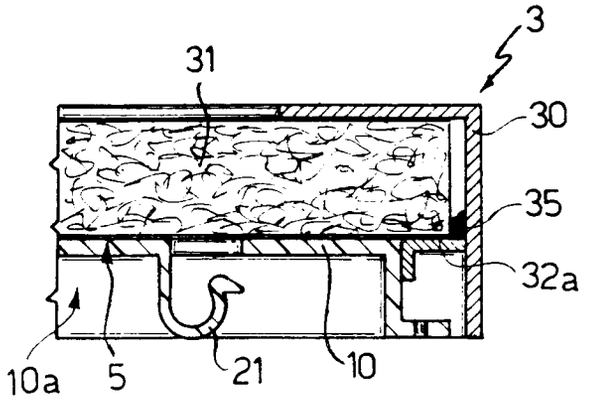
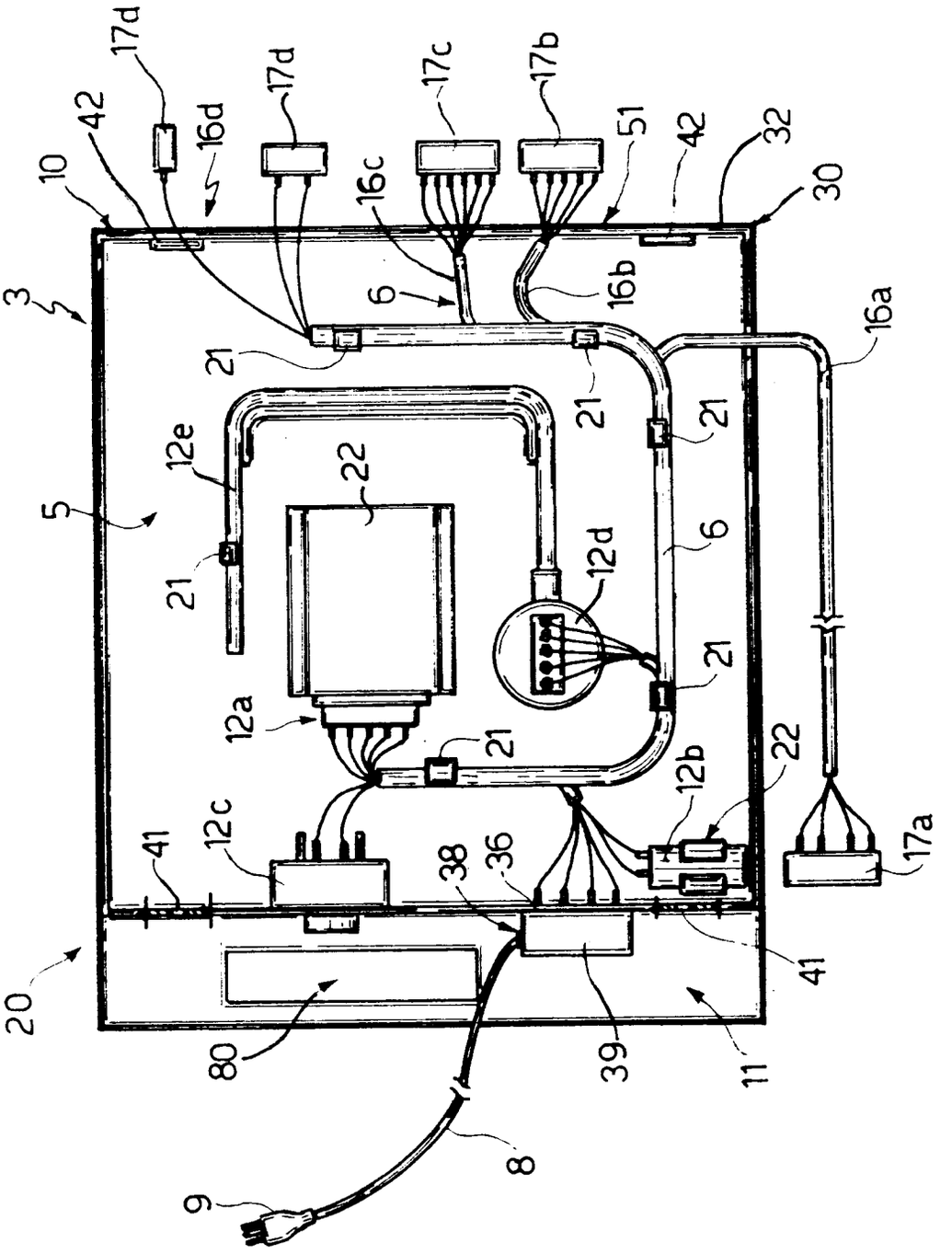


Fig.3

Fig.5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EUROPEAN SEARCH REPORT

Application Number
EP 95 11 1809

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)
A	US-A-3 034 226 (MCGRAW EDISON COMPANY) * column 5, line 54 - line 66; figures 1,3,8 *	1,2,6,7, 9-11	D06F39/12 A47L15/42
A	GB-A-2 120 971 (TOKYO SHIBAURA DENKI KABUSHIKI KAISHA) * the whole document *	1-5,11	
A	PATENT ABSTRACTS OF JAPAN vol. 17 no. 489 (C-1106) ,6 September 1993 & JP-A-05 123492 (MATSUSHITA ELECTRIC IND CO LTD) 21 May 1993, * abstract *	1-3,11	
A	DE-A-18 14 008 (SIEMENS-ELECTROGERÄTE GMBH) * page 3, line 2 - line 12 *	1,2,9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6) D06F A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	20 October 1995	Courrier, G

CATEGORY OF CITED DOCUMENTS

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