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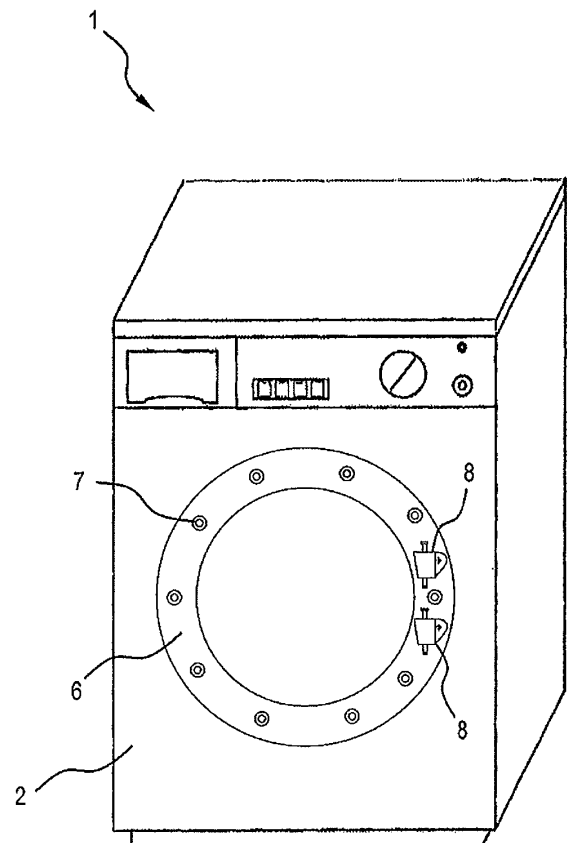
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(54) **Hinge part and household appliance**

(57) The invention relates to a hinge part 8 for holding a door 3 at a front 2; 6 of a household appliance 1, 9, comprising a pivot element 10 and a mounting means 11 for mounting the hinge part 8 to the front 2, 6, wherein said mounting means 11 is connected to said pivot element 10 and comprises a contact area 13 for contacting an outer surface 2 of the front 2, 6 and a flange 14 located spaced apart (d) from and at least partly adjacent to the contact area 13. Said flange 14 is an elastic member 14 to be bendable upon mounting to the front 2, 6, and said flange has a protrusion 15 for engaging with an inner surface of the a front 2; 6 opposite to the outer surface 2 to fix said hinge part 8 to the front 2; 6. The household appliance 1, 9 comprises two such hinge parts 8 and a door 3 pivotable around these hinge parts 8.



**FIG 2**

## Description

**[0001]** The invention relates to a hinge part for holding a door at a front of a household appliance, comprising a pivot element and a mounting means for mounting the hinge part to the front, wherein said mounting means is connected to said pivot element and comprises a contact area for contacting an outer surface of the front and a flange located spaced apart from and at least partly adjacent to the contact area.

**[0002]** Likewise, the invention relates to a household appliance comprising at least two hinge parts that are separately fixed to a front of said household appliance, and a door pivotable around said at least two hinge parts, each of said hinge parts comprising a pivot element and a mounting means for mounting the hinge part to said front, wherein said mounting means is connected to said pivot element and comprises a contact area contacting an outer surface of said front and a flange located spaced apart from and at least partly adjacent to the contact area. In particular, the invention relates to such household appliance embodied in a washing machine or clothes dryer.

**[0003]** Such hinge part and such household appliance are disclosed in U. S. Patent 4,914,781. The hinge part shown comprises a pivot element, in this case a protrusion having a hole for insertion of a corresponding pivot, and a mounting means formed to contact an outer surface of the front and being screwed to the front by a screw inserted from an inner surface which opposes the outer surface. In addition, the hinge part has a flange protruding from the mounting means and located spaced apart from a contact surface of the mounting means contacting the outer surface, to rest on the outer surface as the hinge part is mounted thereto, and the flange has a tab inserted into a corresponding hole in the front. The disclosure of the said document also comprises a household appliance having a door pivotable around two such hinge parts separately fixed to a front of the appliance. It is noted that, in the present context, a "front" of an appliance needs not to be oriented in a vertical fashion. Rather, the front is understood the region where a door or a similar access to an interior of the appliance is provided.

**[0004]** WO 2007/065793 A1 discloses a door for closing a washing machine which can be loaded from the front or a tumble dryer of this type that is connected to the housing by means of a hinge in such a way that the door can be pivoted over a great opening angle and terminates flushly or approximately flushly to the outside with the front face of the housing. To this end, the door-side hinge part is installed and fastened in a recessed receptacle between the frame parts and of the door. The hinge parts and each have a crescent-shaped base plate and which extends along the door frame and reaches beyond the lateral apertures and the bearing blocks which are provided in the frame.

**[0005]** WO 2006/122842 A1 relates to a door lock for frontally loading a washing machine, a drier or similar devices, which is mounted on the machine front wall,

wherein said door lock comprises a stop knob and a locking segment provided with an undercut, the front wall comprises an aperture and a stop opening, the locking segment, in the operating position thereof, is connected by behind to the opposite edges of the aperture and the undercut, and the stop knob is inserted into the stop opening. The invention is **characterized in that** the peripheral contour of the undercut is at least partially rounded, thereby enabling the locking segment to be rotatable in the aperture.

**[0006]** Another kind of door hinge is situated towards the inside of the household appliance, and thus the door opening angle is more restricted. Such a hinge is usually formed as one large component and may be cast from a zinc alloy like an alloy specifically developed for injection moulding comprising zinc as a base component with additions of aluminium, magnesium, and, optionally, copper, and known under the specification Zamak.

**[0007]** It is an object of the present invention to provide a door opening and closing mechanism that provides a wide swing radius and corresponding large opening angle of the door, and at the same time can be produced at low cost.

**[0008]** This object is achieved by a hinge part and a household appliance according to the respective independent claim. Preferred embodiments are described in dependent claims, with preferred embodiments of the hinge part implying preferred embodiments of the appliance and vice versa, regardless if such preferred embodiment is specified expressly herein or not.

**[0009]** According to the invention, the hinge part for holding a door at a front of a household appliance, comprising a pivot element and a mounting means for mounting the hinge part to the front, wherein said mounting means is connected to said pivot element and comprises a contact area for contacting an outer surface of the front and a flange located spaced apart from and at least partly adjacent to the contact area. Said flange is an elastic member to be bendable upon mounting to the front, and said flange has a protrusion for engaging with an inner surface of the a front opposite to the outer surface to fix said hinge part to the front.

**[0010]** According to the invention, the household appliance comprises at least two hinge parts that are separately fixed to a front of said appliance, and a door pivotable around said at least two hinge parts, each of said hinge parts comprising a pivot element and a mounting means for mounting said hinge part to said front, wherein said mounting means is connected to said pivot element (and comprises a contact area contacting an outer surface of said front and a flange located spaced apart from and at least partly adjacent to the contact area. Said flange is an elastic member to be bendable upon mounting to said appliance, and said flange has a protrusion for engaging with an inner surface of said front opposite to said outer surface to fix said hinge part to said front.

**[0011]** According to the invention and because of the front side attachment of the hinge parts, a wide swing

angle / opening angle is possible for the door while at the same time simple and easy to manufacture hinge parts are employed.

**[0012]** The invention may also include a further exploitation of plastic materials for use in hinge parts for household appliances. Accordingly, the invention provides the application of an element which has a considerable and dedicated elasticity, to improve the fixing of the hinge part to the appliance by applying an elastic force. To that end, the invention includes a modification of the flange not to rest on the outer surface but on the inner surface, to provide a type of clamp gripping the front with the said elastic force, to provide an additional and effective fixing for the hinge part. The protrusion at the clamp assists in creating this elastic force, whereby the protrusion may act as a notch to positionally align the hinge part or to clamp the hinge part to the household appliance.

**[0013]** According to the invention, there is created a space between the contact area and the flange where part of a panel or other wall-like region of the household appliance may be accommodated while fixed to the wall-like region. Likewise, the door swing is relocated towards the exterior of the appliance while retaining the door frame diameter. Thereby, an extended opening angle for the door is achieved, as compared to prior art systems.

**[0014]** According to a preferred embodiment of the invention, the pivot element is a pivot. More preferably, the pivot comprises a spindle.

**[0015]** Preferably, the contact area is at least partly planar.

**[0016]** Preferably, the distance between the contact area and the flange (width of the space) is equal to or slightly smaller than the thickness of the wall-like attachment region. This ensures a firm seat of the hinge part while easy assembly is still ensured.

**[0017]** Preferably, the flange functions as a nose.

**[0018]** Preferably, the flange reaches over the contact area.

**[0019]** In accordance with another preferred embodiment of the invention, the hinge part further comprises a fixing means for fixing the hinge part to the household appliance, e. g., a screw hole, an adhering plane, a welding zone etc.

**[0020]** It may be preferred to have the hinges fixed into a front panel of the household appliance via a respective recess in the front panel. Alternatively, it may be preferred to have the hinges fixed into a front side of a door frame of the household appliance via a respective recess.

**[0021]** For inexpensive production it is preferred that the hinge parts are made of a plastic base material like the familiar PP and PEEK materials. Then, preferably, the base material may comprise a reinforcement filler material like talc and fibres, e. g., glass or ceramic fibres. Any of these embodiments comprises to replace prior art hinges with large and expensive zinc alloy components by cheap and easy-to-produce plastic parts while retaining the full functionality in addition to the general advantages of the invention specified hereinabove.

**[0022]** The household appliance is preferably one of a washing machine and a clothes dryer, including a combined washer-dryer.

**[0023]** Preferably, the hinge part according to the invention further comprises a side tab adapted for fixing the hinge part to the household appliance, preferably by screwing the tab to the front panel of household appliance, or to its door frame. More preferably, the side tab comprises a screw hole that is aligned with a respective hole in the household appliance.

**[0024]** In the following, preferred embodiments of the invention are described at greater detail. It should be understood that the description of the preferred embodiments is not intended to limit the invention as defined in the claims attached hereto.

**[0025]** To complement the description which is to be made below, and in order to better understand the invention, a schematical drawing comprising several figures is attached to this specification. Same numerals are be used for same or like elements throughout the figures and the subsequent description. In particular,

FIG 1 shows a frontal perspective view onto a washing machine with its door closed;

FIG 2 shows a frontal view onto a door frame with two hinges;

FIG 3 shows a frontal view onto a washing machine according to another embodiment;

FIGs 4A-4C each shows a hinge, in four different views.

**[0026]** FIG 1 shows a front-loading washing machine 1 having a front panel 2 with an opening (not shown) to load a drum of the washing machine 1. The opening is closed by a door 3 into which is inserted a window 4 for viewing the interior of the drum. The door 3 can be opened by pulling a door handle 5. In the closed position, the door 4 fits into a respective door frame 6.

**[0027]** FIG 2 shows the front-loading washing machine 1 with its door missing. The ring-like door frame 6 is mounted to the washing machine 1 by screws 7. At the front side positioned oppositely to the door handle (which is the right side) are mounted two plastic hinge parts 8 for holding the door 3. The door 3 comprises two respective fitting door-side hinge parts. Since their position at the front of the door frame 6, an associated door 3 may swing about an angle of 180° such that in its fully opened position it is situated flushly or nearly flushly with the front panel 2. The frame-side hinge parts 8 are inexpensively manufactured and easily mounted to the door frame, e. g. fixed to the door frame 6 through a respective opening at the most external part of the frame 6, as will be explained in greater detail below.

**[0028]** FIG 3 shows a front-loading washing machine 9 similar to the embodiment of FIG 2. Now, the hinge

parts 8 are directly mounted to the front panel 2 of the washing machine 9.

[0029] FIG 4A to FIG 4D show the hinge part 8 in greater detail. In particular, FIG 4A shows a frontal view, FIG 4B shows a side view, and FIG 4C shows a sectional view along the cut line A-A of FIG 4A of the hinge part 8. The hinge part 8 comprises an uprightly standing pivot 10 formed like a spindle and a mounting means 11 connected to the pivot 10 for mounting the hinge part 8 to the household appliance. The mounting means 11 comprises a body 12 having a contact area 13 for contacting an outer (front) surface of the household appliance and a flange 14 located spaced apart at a distance d from and at least partly adjacent to the contact area 13. The flange 14 is an elastic member and at its distal end comprises a protrusion 15 extending in the horizontal direction towards the contact area 13. Extending sideways from the body 12 and integrally formed with it is a tab 16 that comprises a through hole 17 for inserting a screw for fixing the hinge part 8 to the washing machine 1 or 9. The washing machine 1 or 9 should then comprise a corresponding screw hole that is aligned with the through hole 17.

[0030] Attachment of the hinge part 8 may be easily performed by putting flange 14 into a respective opening of a wall of thickness about d, the distance between flange 14 and contact area 13, and sliding the hinge part 8 downwards until it stops at the connection between body 12 and flange 14. The contact area 13 then planarly contacts the outer surface of the washing machine 1, and the wall is gripped between flange 14 and contact surface 13, to fix or help fixing the hinge part 8 to the wall. Body 12 and flange 14 may be formed integrally. In this mounting position, the protrusion 15 may simply hold the hinge by means of friction, or may be inserted in a respective recess or groove of the wall. To secure the mounting position, the hinge part 8 is then fastened by screwing with a screw using the through hole 17.

[0031] The hinge parts 8 are made of a plastic base material, e. g., PP or PEEK, with or without reinforcement fillers, like fibres.

[0032] The invention is not restricted to the shown embodiments. For example, instead of a washing machine, a clothes dryer may be equipped with the described hinge part / hinge system.

#### LIST OF REFERENCE NUMERALS

[0033]

- 1 washing machine
- 2 front panel
- 3 door
- 4 window
- 5 door handle
- 6 door frame
- 7 screw
- 8 hinge part

- 9 washing machine
- 10 pivot
- 11 mounting means
- 12 body
- 13 contact area
- 14 flange
- 15 protrusion
- 16 tab
- 17 through hole

#### Claims

1. A hinge part (8) for holding a door (3) at a front (2; 6) of a household appliance (1), comprising a pivot element (10) and a mounting means (11) for mounting the hinge part (8) to the front (2; 6), wherein said mounting means (11) is connected to said pivot element (10) and comprises a contact area (13) for contacting an outer surface (2) of the front (2; 6) and a flange (14) located spaced apart (d) from and at least partly adjacent to the contact area (13), **characterized in that** said flange (14) is an elastic member (14) to be bendable upon mounting to the front (2; 6), and said flange has a protrusion (15) for engaging with an inner surface of the a front (2; 6) opposite to the outer surface (2) to fix said hinge part (8) to the front (2; 6).
2. The hinge part as claimed in claim 1, **characterized in that** said pivot element (10) is a pivot (10).
3. The hinge part (8) as claimed in one of claims 1 and 2, **characterized in that** is further comprises a fixing means (16) for fixing said hinge part (8) to the household appliance (1).
4. A household appliance (1) comprising at least two hinge parts (8) that are separately fixed to a front (2; 6) of said household appliance (1), and a door (3) pivotable around said at least two hinge parts (8), each of said hinge parts (8) comprising a pivot element (10) and a mounting means (11) for mounting the hinge part (8) to said front (2; 6), wherein said mounting means (11) is connected to said pivot element (10) and comprises a contact area (13) contacting an outer surface (2) of said front (2; 6) and a flange (14) located spaced apart (d) from and at least partly adjacent to the contact area (13), **characterized in that** said flange (14) is an elastic member (14) to be bendable upon mounting to said appliance (1), and said flange has a protrusion (15) for engaging with an inner surface of said front (2; 6) opposite to said outer surface (2) to fix said hinge part (8) to said front (2; 6).
5. The household appliance (1) according to claim 4, **characterized in that** said hinge parts (8) are fixed

to a front panel (2) of said household appliance (1).

6. The household appliance (1) according to claim 4, **characterized in that** said hinge parts (8) are fixed into a front side of a door frame (6) of said household appliance (1). 5
7. The household appliance (1) according to one of claims 4 to 6, **characterized in that** said hinge parts (8) are made of a plastic base material. 10
8. The household appliance (1) according to one of claims 4 to 7, **characterized in that** it is one of a washing machine (1) and a clothes dryer (1). 15
9. The household appliance (1) according to one of claims 4 to 8, **characterized in that** it further comprises a side tab (16) adapted for fixing the hinge part (8) to said household appliance (1). 20
10. The household appliance according to claim 9, **characterized in that** said side tab (16) comprises a screw hole (17) that is aligned with a respective hole in the household appliance (1). 25

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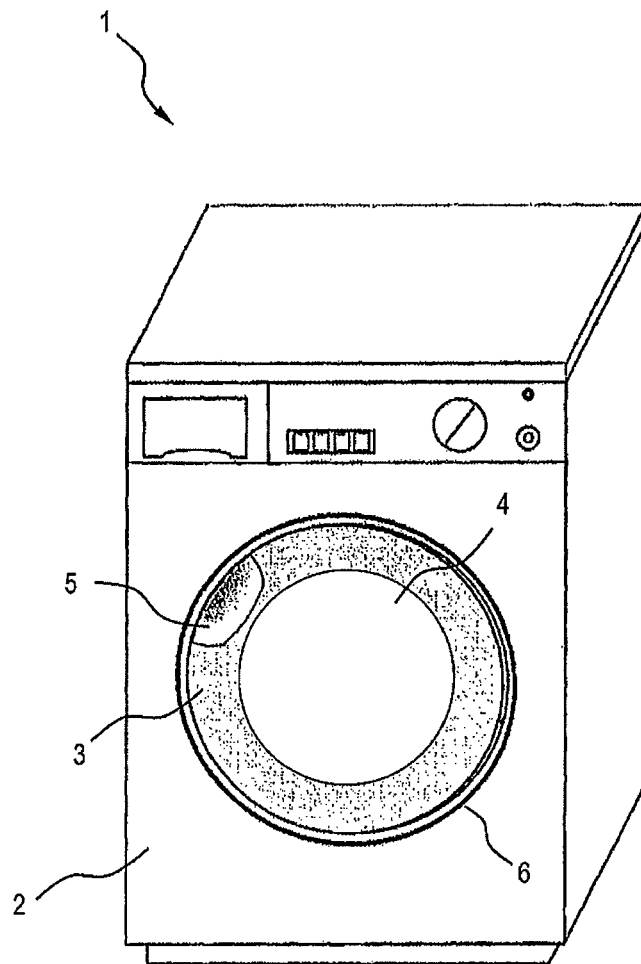


FIG 1

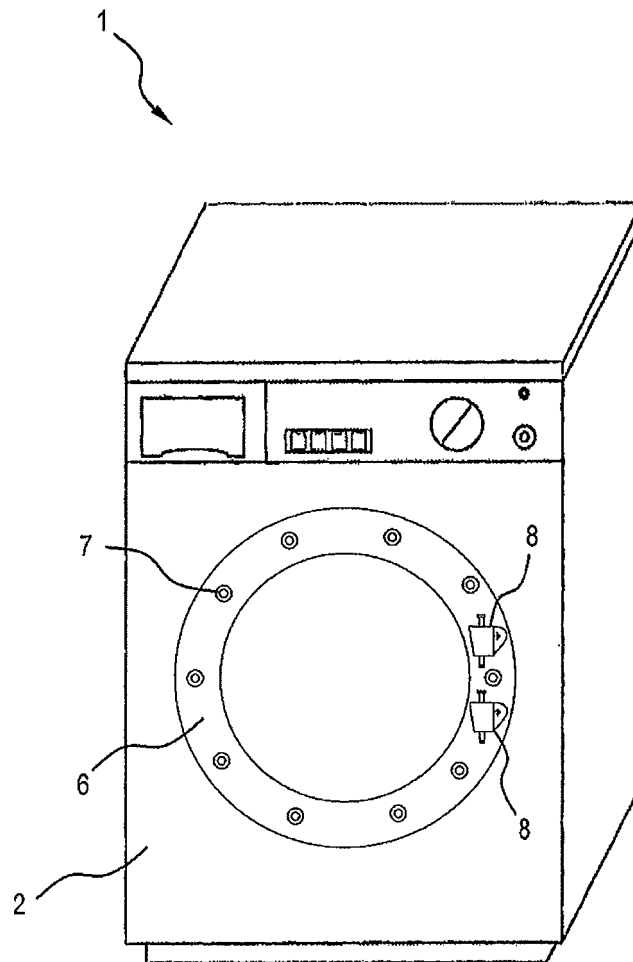


FIG 2

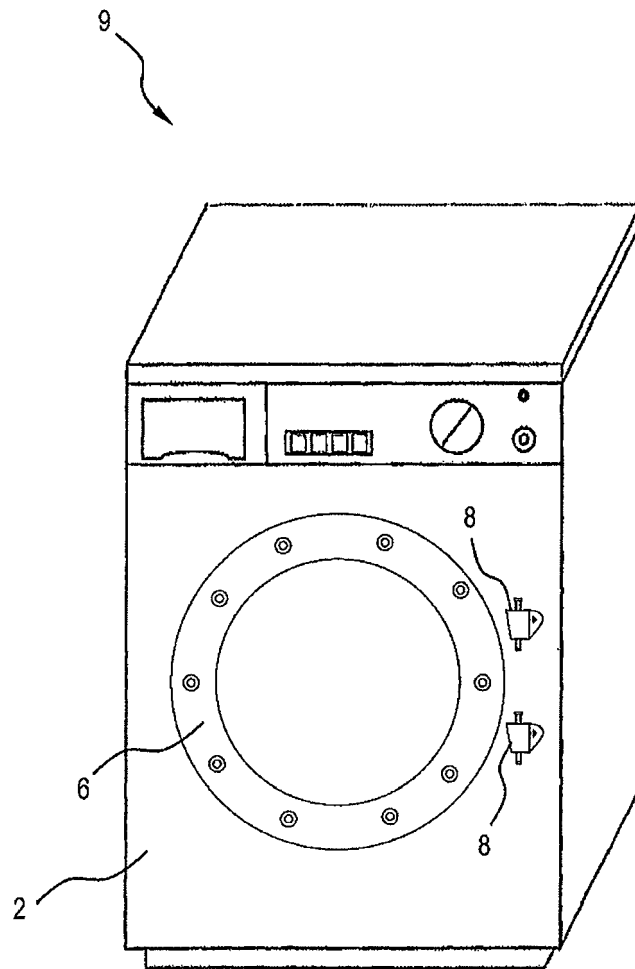


FIG 3



FIG 4A

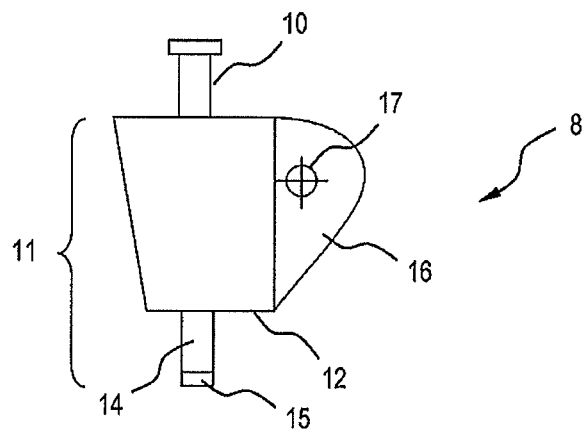


FIG 4B

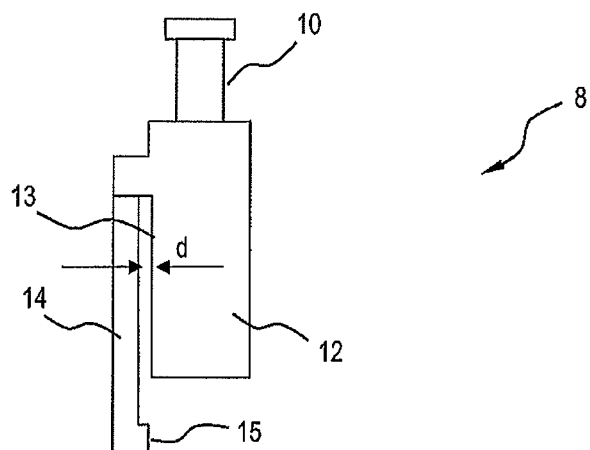
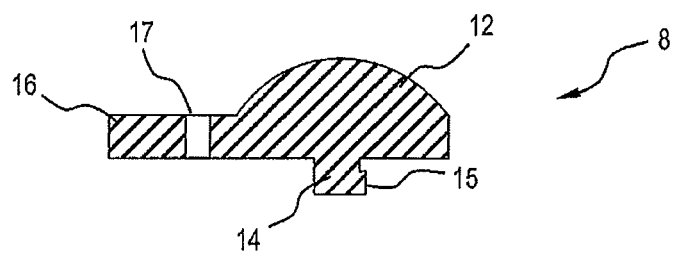


FIG 4C





## EUROPEAN SEARCH REPORT

Application Number  
EP 09 16 5000

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	WO 2005/118995 A (FAREL PLASTIK ELEK K VE ELEKTR [TR]; GOERGUE SAHIN [TR]; ELMAZ SAMET []) 15 December 2005 (2005-12-15)	1-10	INV. E05D7/12 E05D5/02 D06F39/14
Y	* pages 17,18; claims 1-6; figures 1-3 * -----	3,9,10	
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Y	* column 2, line 56 - column 5, line 20; claims 1,2; figures 1-8 * -----	3,9,10	
Y	US 4 914 781 A (SOKN ERICK L [US] ET AL) 10 April 1990 (1990-04-10) * column 2, line 61 - column 3, line 63; claims 1-3; figures 1-7 * -----	3,9,10	
A	US 3 952 369 A (ERICKSON CLIFFORD E) 27 April 1976 (1976-04-27) * column 1, line 61 - column 3, line 15; claims 1-6; figures 1-4 * -----	1-10	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E05D D06F
Place of search		Date of completion of the search	Examiner
Munich		22 October 2009	Balice, Marco
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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  .....  &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 16 5000

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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22-10-2009

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**REFERENCES CITED IN THE DESCRIPTION**

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