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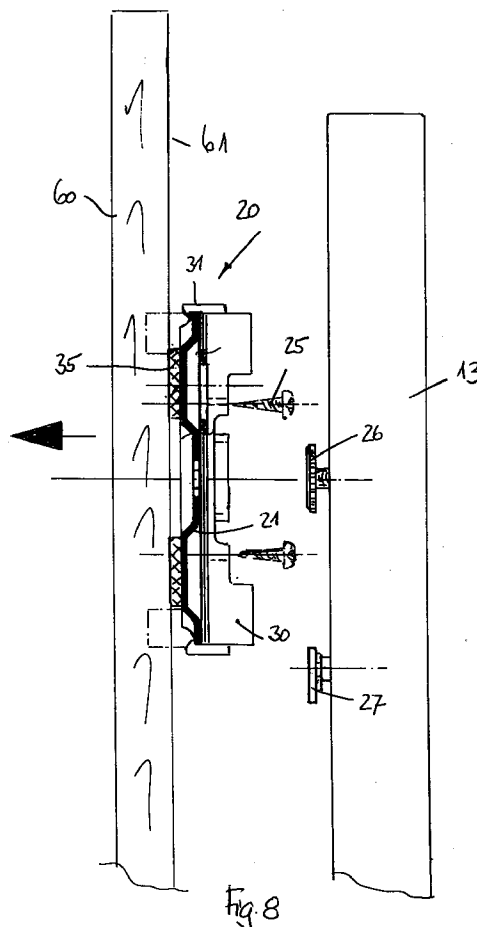
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(54) **Method of applying a door leaf to the door of a built-in domestic appliance**

(57) The invention relates to a method of mounting a door leaf (60) on the appliance door (13) of a domestic built-in appliance such as a refrigerator, deep-freeze or dishwasher incorporated in a furniture compartment, there being built into the appliance door (13), in the region of opposed sides, respectively at least one adjusting member (26,27) for a shifting fitting (20) which is adjustable in the vertical, lateral and depth directions, said fitting (20) being capable of being brought into an effective connection with the rear side of the door leaf (60) and with associated adjusting members of the appliance door (13). By means of adhesive strips (35) and of connector plates (21) as shifting fittings (20), prepared in advance, and secured in spacers, mounting of the door leaf (60) on the appliance door (13) of the built-in domestic apparatus is enabled without a template or the like and is thus substantially simplified and facilitated.



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## Description

The invention relates to a method of mounting a door leaf on the appliance door of a domestic built-in appliance, such as a refrigerator, deep freeze or dishwasher, installed in a furniture compartment, there being built into the appliance door, in the region of opposed sides, respectively at least one adjusting member for a shifting fitting which is adjustable in the vertical, lateral and depth directions, said fitting being capable of being brought into effective connection with the rear side of the door leaf and with associated adjusting members of the appliance door.

A method of this kind and a device for carrying out the method are known from EP 0 168 672 B1. In this known method, installation is made more difficult and fastening points on the working side have to be established in advance on the appliance door by means of a template or by dimensioning or pre-boring. In addition, the transfer of the fastening points to the rear side of the door which is to be attached is made more difficult.

From DE 44 43 851 C1 a method of attaching a door leaf to the door of a built-in domestic appliance is known on which no template is necessary for the installation of the door leaf. An additional adjusting member for setting the lower edge of the door leaf at the desired height just has to be delivered with the appliance. With this method, however, complicated shifting fittings are required, and the door leaf has to protrude over the vertical sides of the appliance door on all sides by a predetermined width, corresponding at least to the structural height of the shifting fitting in the plane of the appliance door, plus the desired stop width of the door leaf on the unit framework.

The object underlying the invention is to create a method of the initially mentioned kind for mounting a door leaf on the appliance door, such that no template is necessary for attaching the shifting fittings, even if the adjusting members for the simple, known, shifting fittings are securely built into the appliance door.

This object is achieved according to the invention in that a support member, which may be set at the desired height of the lower edge of the door leaf, is attached to the lower edge of the appliance door and the shifting fittings, positioned and held in readiness, are pushed on to the adjusting members of the appliance door, in that the door leaf is set down laterally aligned with the supporting member of the built-in domestic appliance and pressed against the shifting fittings held on the appliance door, in that the door leaf is connected in readiness with the positioned shifting fittings via exposed adhesive surfaces of adhesive strips applied to the facing sides of the shifting fittings, in that the door leaf with the shifting fittings is taken away from the adjusting members and the supporting member and the shifting fittings are screwed to the rear side of the door leaf, and in that the door leaf with the securely screwed-on shifting fittings is brought into effective connection with the

adjusting members of the appliance door, when the supporting member is removed, and aligned by means of the adjusting members in respect of its height, side and depth.

The shifting fittings are delivered loose and are simply pushed on to the adjusting members projecting on the front side of the appliance door and thus positioned and held in readiness on the appliance door. The lower edge of the door leaf is brought to the desired height by means of the supporting element and, as the door leaf is pressed against the door, provided with the shifting fittings in position, of the domestic appliance built into the furniture compartment, on the exposed adhesive surfaces of the adhesive strips attached to the shifting fittings, the shifting fittings are connected in readiness with the rear side. When the door leaf is taken away, the shifting fittings can then be screwed to the door leaf, and the positioning is transferred. The supporting member can be removed from the appliance door and the door leaf with the positioned and securely attached shifting fittings is brought into effective connection with the adjusting members of the appliance door. The door leaf can then be aligned in known fashion in respect of height and depth and at the sides and be stopped, the spacers having been removed previously.

According to a particularly advantageous development, the shifting fittings consist of a connector plate and a spacer, the connector plate being positioned in the spacer and the spacer being positioned by means of holding flanges on the appliance door. This positioning comes about automatically when the shifting fitting is pushed on to the adjusting member or members of the appliance door.

The transfer of the shifting fittings to the rear side of the door leaf from their position in readiness on the adjusting members of the appliance door is made simpler through the fact that the adhesive strips are provided with double-sided adhesive surfaces and that they are held by means of one exposed adhesive surface to the connector plates of the shifting fittings. The positioning of the shifting fittings is thereby also transferred.

The spacers of the shifting fittings have to be removed before the alignment of the door leaf.

The invention is explained in greater detail with the aid of an embodiment, given by way of example and shown in the drawings. These show:

Fig. 1 in perspective view, a built-in domestic appliance with adjusting members for shifting fittings inserted in the appliance door and bores for attaching a supporting member,

Fig. 2 a two-piece supporting member with graded adjustability,

Fig. 3 a supporting member for a fixed preset adjustment height,

- Fig. 4 a partial view with a door leaf set down on a supporting member attached to the door of the appliance,
- Fig. 5 a shifting fitting comprising connecting plate and spacer, in perspective view,
- Fig. 6 a section through the shifting fitting according to Fig. 5,
- Fig. 7 a side view from which it is possible to recognise a shifting fitting which is held in readiness on the appliance door and transferred when the door leaf is pressed on,
- Fig. 8 a side view with the shifting fitting held in readiness on the rear side and
- Fig. 9 a side view with the shifting fitting screwed on to the rear side of the door leaf and brought into effective connection with the adjusting members built into the door of the appliance.

Fig. 1 shows a built-in domestic appliance 10 as delivered to the installation site. Adjusting members 26 and 27 for shifting fittings 20 according to Figs. 5 and 6, which members protrude on the front side of the appliance door 13, are built into said door 13 which is linked to the framework of the appliance with hinges 14 and 15.

Along the vertical sides 16 and 17 there are disposed in pairs adjusting members 26 and 27 at the top and adjusting members 26 only at the bottom, via which the shifting fitting can be moved from top to bottom, from left to right and the other way round, and at a spacing from the appliance door. It is also possible to arrange the adjusting members along the lower and upper side 18 of the appliance door 13. Fastening the built-in domestic appliance 10 in the furniture compartment is effected via the fastening tabs 11 attached to the front side of the appliance framework, at the base, and the fastening strips 12 attached at the top. Bores 19 are inserted in the front side of the appliance door 13, in the region of the lower side 18, via which bores a supporting member according to Fig. 2 or 3 can be attached as an assembly aid. The supporting member 50 can be adjusted with a supporting plate 56 to the desired height of the lower edge of the door leaf 60 which is to be attached. The supporting member 50 according to Fig. 2 is in two parts, there being attached to the appliance door 13 a holder 51 in which an adjusting plate 55 can be moved vertically in steps in a T-groove 52. Sets of toothings 54 and 59, which engage with one another and determine the step size of the movement, are provided in the T-groove 52 of the holder 51 and on the rear side of the adjusting plate 55. The height of the supporting element 50 can be locked, at the height set, with a lock-

ing screw 62 which is guided in a slot 58 of the adjusting plate 55 and may be screwed into a thread receiving means 63 of the holder 51.

As Fig. 3 shows, the supporting member 50 can also be of one piece and be set out at a predetermined fixed height. Fastening to the appliance door 13 is achieved via tap-in pegs 53 which can be led into the bores 19 of said door 13. The door leaf 60 can be set down on the supporting plate 56 of the supporting member 50, as will be explained, in order to connect this door leaf with the shifting fittings 20 positioned in readiness and held on the appliance door 13.

The shifting fittings 20, as Figs. 5 and 6 show, consist of a connector plate 21 and a spacer 30 and are realised substantially as known and delivered with the built-in domestic appliance 10 but separately from it. The connector plate 21 has offset steps 22 and 23 for screwed connections as well as guide receiving means 24 to provide a guide and an effective connection with the adjusting members 26 which are used for the depth alignment, for example. The connector plate 21 is held positioned in the spacer 30 since stop shoulders 31 of the spacer 30 hold the connector plate 21 securely. Holding flanges 32 moulded on to the spacer 30 are in contact with the sides 16 or 17 of the appliance door 13 when the shifting fitting 20 is pushed on to the adjusting member 26, it being possible for the spacer 30 to be provided with a corresponding plug-in receiving means 34. On the spacer 30 there are moulded further holding flanges 33 which protrude from the side of the shifting fitting 20 facing the door leaf 60 and form lateral stops for the lateral prior alignment of the door leaf 60, as can be seen from Fig. 7, when the door leaf 60 is pressed against the shifting fittings 20 held in readiness on the appliance door 13. Two adhesive strips 35 are attached to the connector plate 21 and are glued to the connector plate 21 on one side. The sides of the adhesive strips 35 facing the door leaf 60 are here previously freed of their protective layers 36 so that the door leaf 60 can be connected in readiness with the shifting fitting 20. During this installation step, the door leaf 60 rests at the correct installation height on the supporting plate 56 of the supporting member 50. The stops 57 prevent the door leaf 60 from "slipping down" whilst it is being placed on the supporting plate 56.

The door leaf 60 is then, as Fig. 8 shows, detached from the appliance door 13 and taken away from the supporting member 50. The shifting fittings 20, previously placed in position, are then screwed securely to the rear side 61 of the door leaf 60 by means of screws 25, the fastening bores in the offset regions 22 and 23 of the connector plate 21 being used.

Finally, as Fig. 9 shows, when the supporting member 50 has been taken away, the door leaf 60 is brought into effective connection with the adjusting members 26 and 27 or 28 of the appliance door 13, located in housings 40 of said door 13, the spacers 30 being removed from the connector plates 21. Adjusting members 26

stand in the guide receiving means 24 and form, with adjusting members 28, stops for setting the depth and for stopping the door leaf 60 in the aligned end position. Adjusting member 27 engages with an eccentric or the like on the lower edge of the connector plate 21 and serves to make the height alignment. The lateral alignment of the door leaf 60 has already been carried out via the spacers 30 as the shifting fittings 20 were transferred from the appliance door 13 to the door leaf 60 by the holding flanges 33 of the spacer 30. The supporting member 50 can be used again as an assembly aid when other built-in domestic appliances 10 are being installed.

## Claims

1. Method of mounting a door leaf on the appliance door of a domestic built-in appliance, such as a refrigerator, deep freeze or dish-washer, installed in a unit compartment, there being built into the appliance door, in the region of opposed sides, respectively at least one adjusting member for a shifting fitting which is adjustable in the vertical, lateral and depth directions, said fitting being capable of being brought into effective connection with the rear side of the door leaf and with associated adjusting members of the appliance door,  
**characterised in that,**  
 on the lower edge (18) of the appliance door (13) there is attached a supporting member (50) which may be set at the desired height of the lower edge of the door leaf (60), and the shifting fittings (20), positioned and held in readiness, are pushed on to the adjusting members (26, 27) of the appliance door (13),  
 in that the door leaf (60) is set down laterally aligned with the supporting member (50) of the built-in domestic appliance (10) and pressed against the shifting fittings (20) held on the appliance door (13), in that the door leaf (60) is connected in readiness with the positioned shifting fittings (20) via exposed adhesive surfaces of adhesive strips (35) applied to the facing sides of the shifting fittings (20),  
 in that the door leaf (60) with the shifting fittings (20) has been taken away from the adjusting members (26, 27) and the supporting member (50) and the shifting fittings (20) are screwed to the rear side (61) of the door leaf (60), and  
 in that the door leaf (60) with the securely screwed-on shifting fittings (20) is brought into effective connection with the adjusting members (26,27) of the appliance door (13), when the supporting member (50) is removed, and aligned by means of the adjusting members (26,27) in respect of its height, side and depth.

2. Method according to claim 1,

## characterised in that

the shifting fittings (20) consist of a connector plate (21) and a spacer (30), the connector plate (21) being positioned in the spacer (30) and the spacer (30) being positioned by means of holding flanges (32, 33) on the appliance door (13).

3. Method according to claim 1 or 2,

## characterised in that

the adhesive strips (35) are provided with double-sided adhesive surfaces and are held on the connector plates (21) of the shifting fittings (20) by means of one exposed adhesive surface.

4. Method according to claim 2,

## characterised in that

the spacers (30) are removed before the door leaf (60) is aligned on the shifting fittings (20).

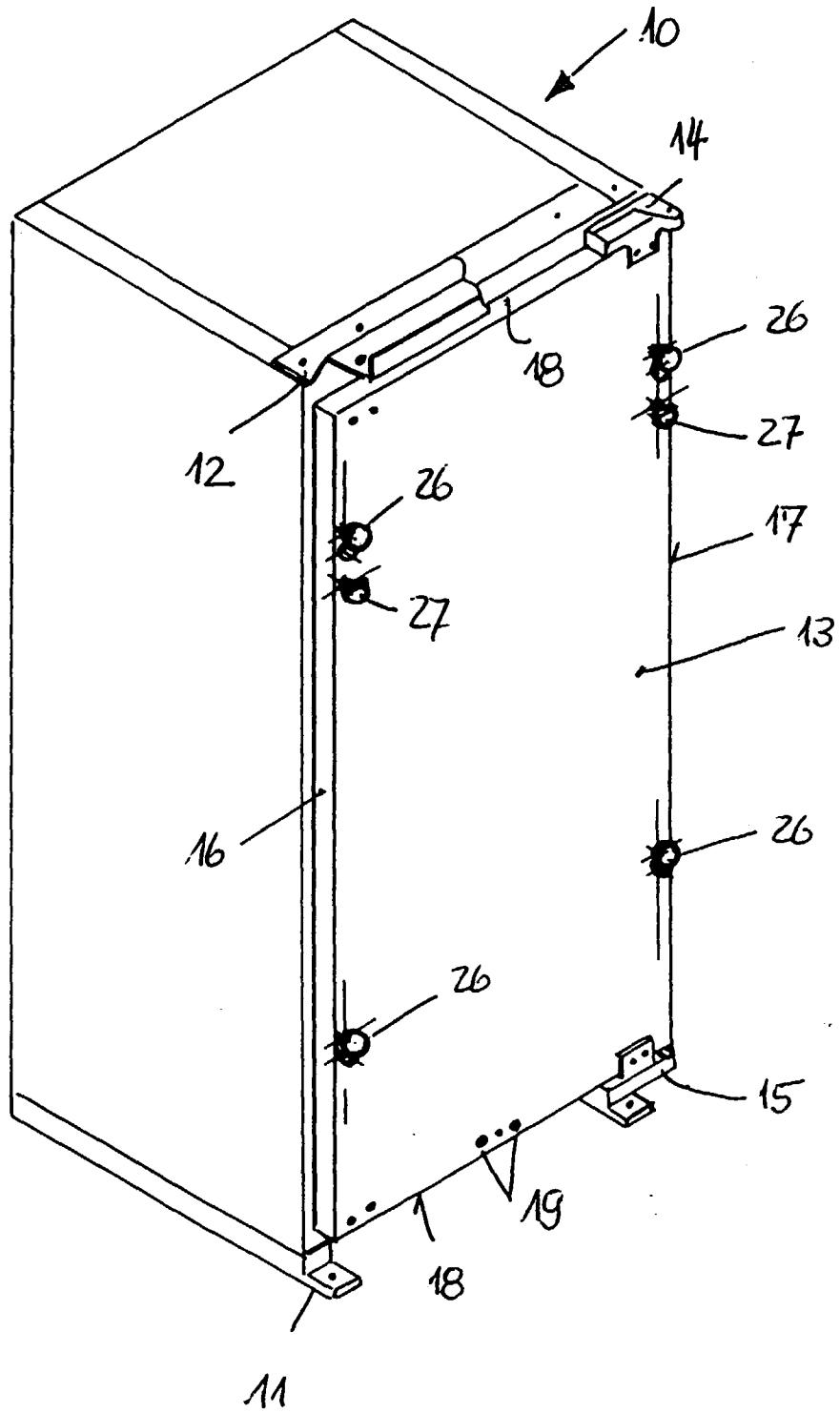
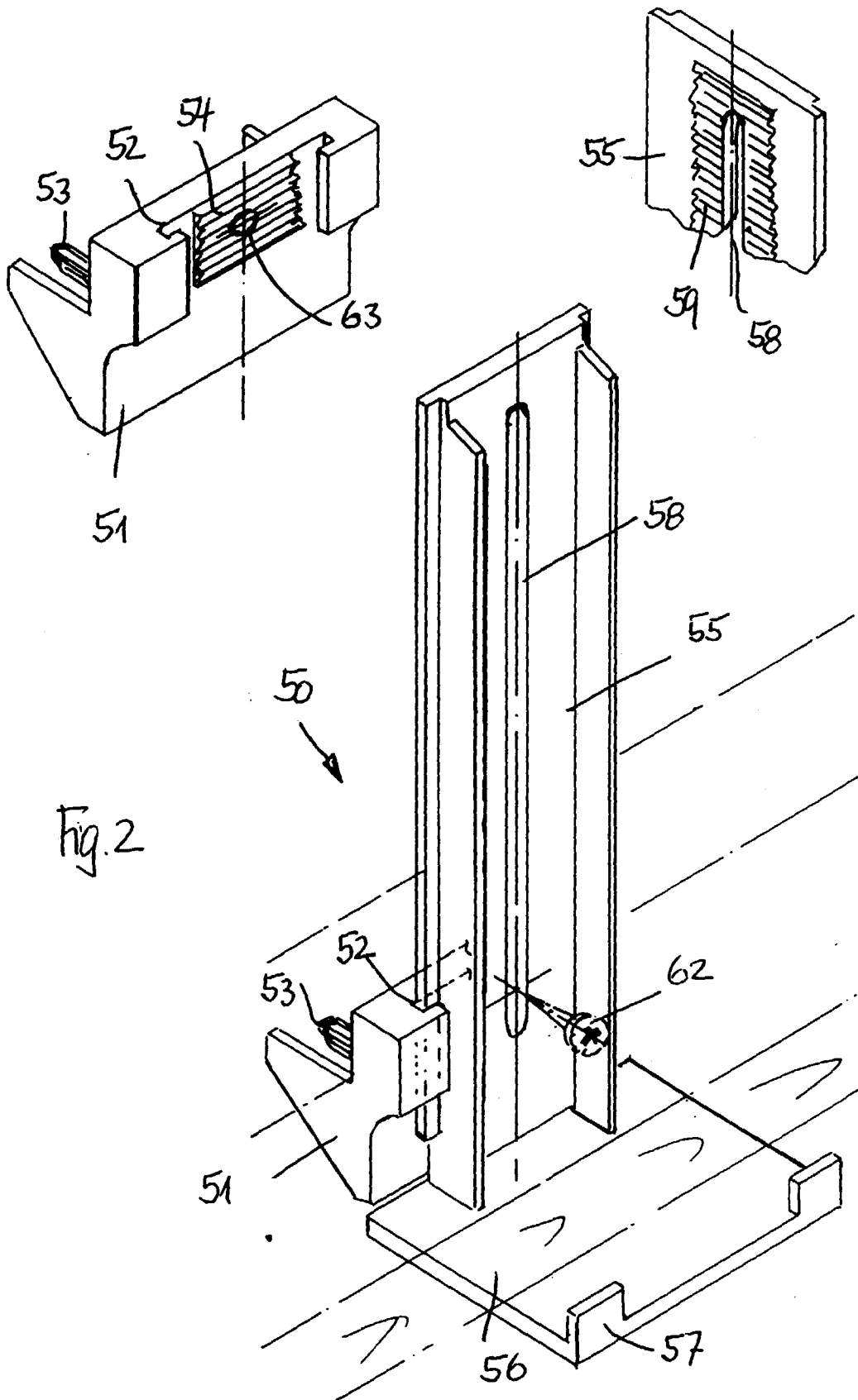


Fig. 1



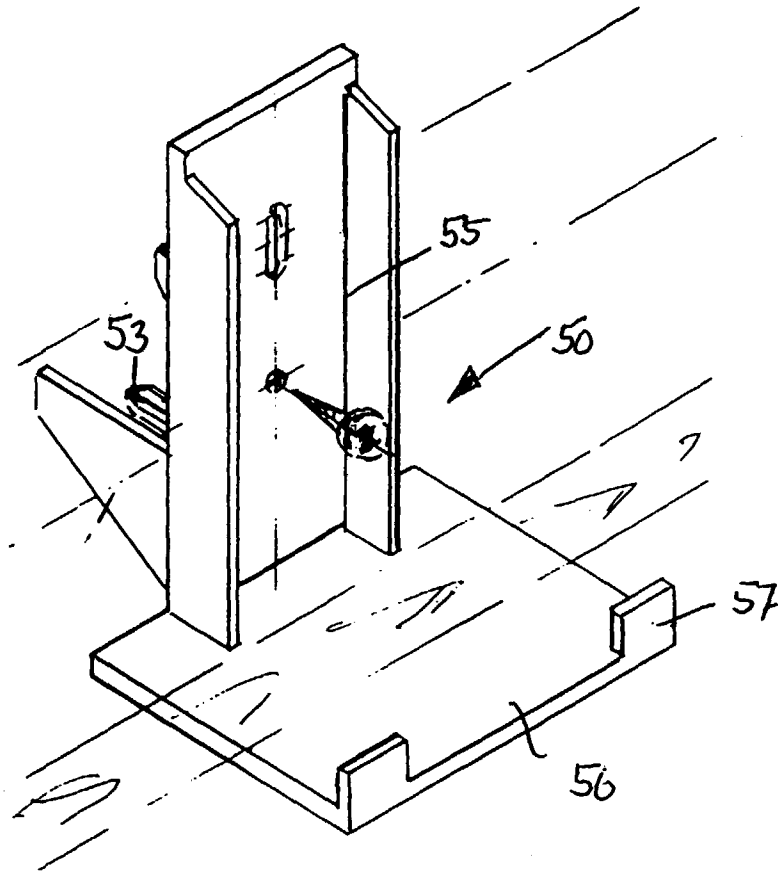


Fig. 3

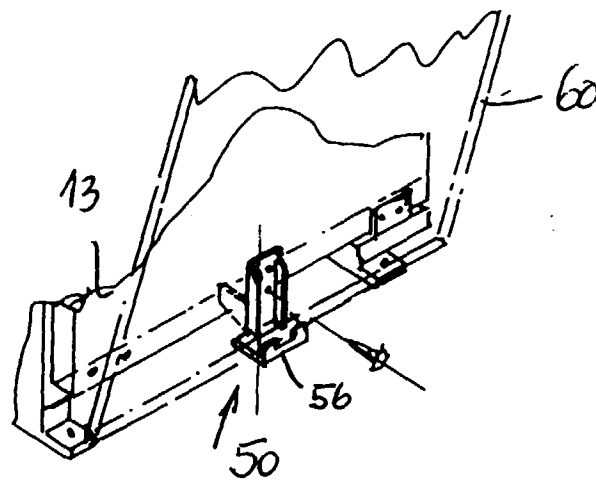


Fig. 4

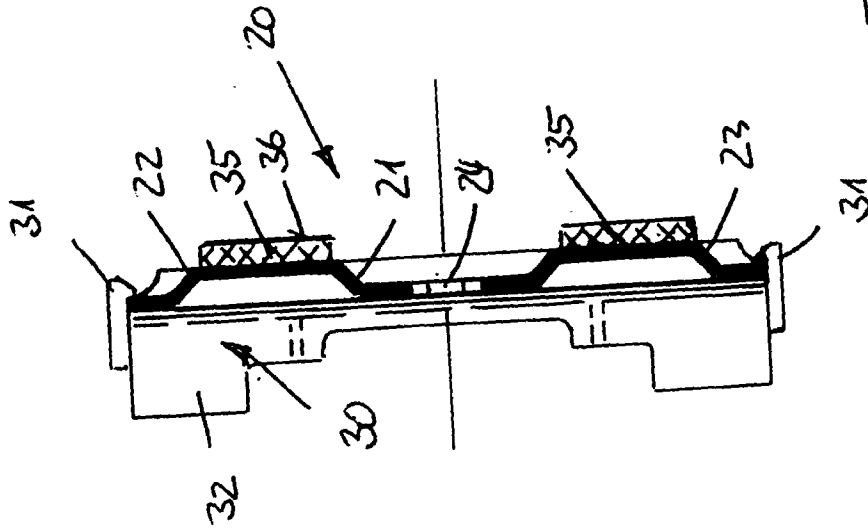


Fig. 6

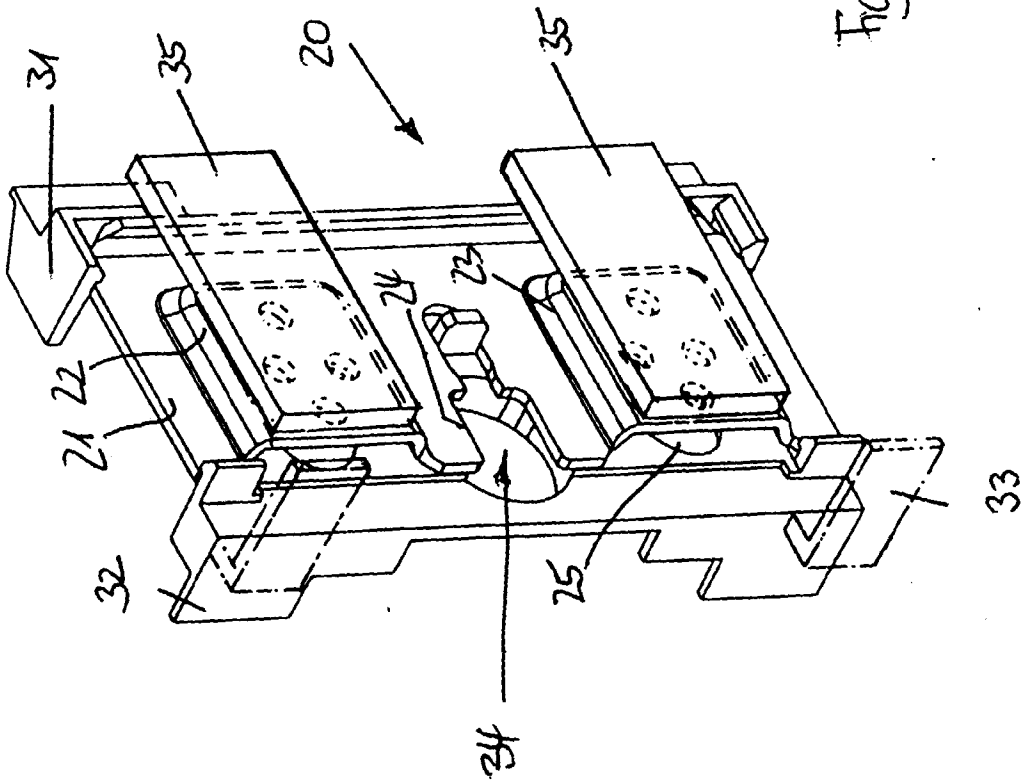


Fig. 5



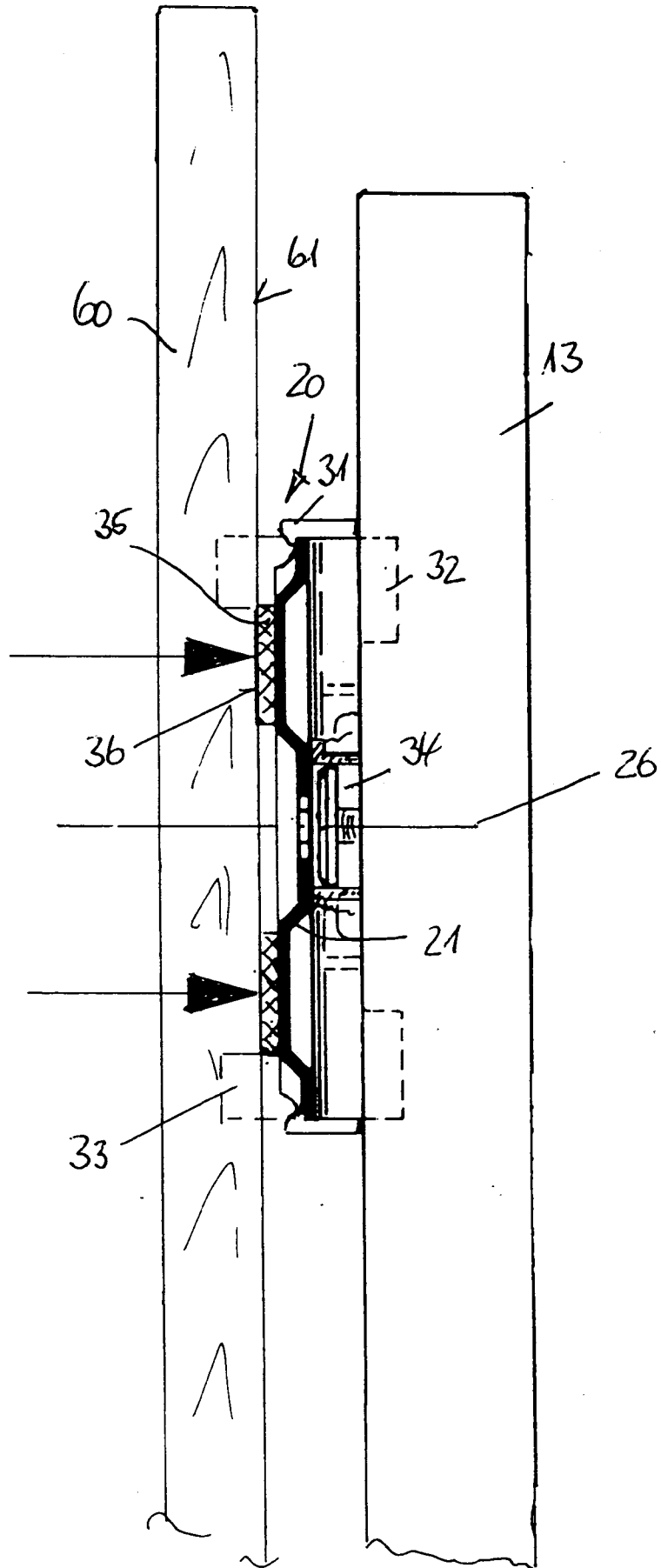


Fig. 7

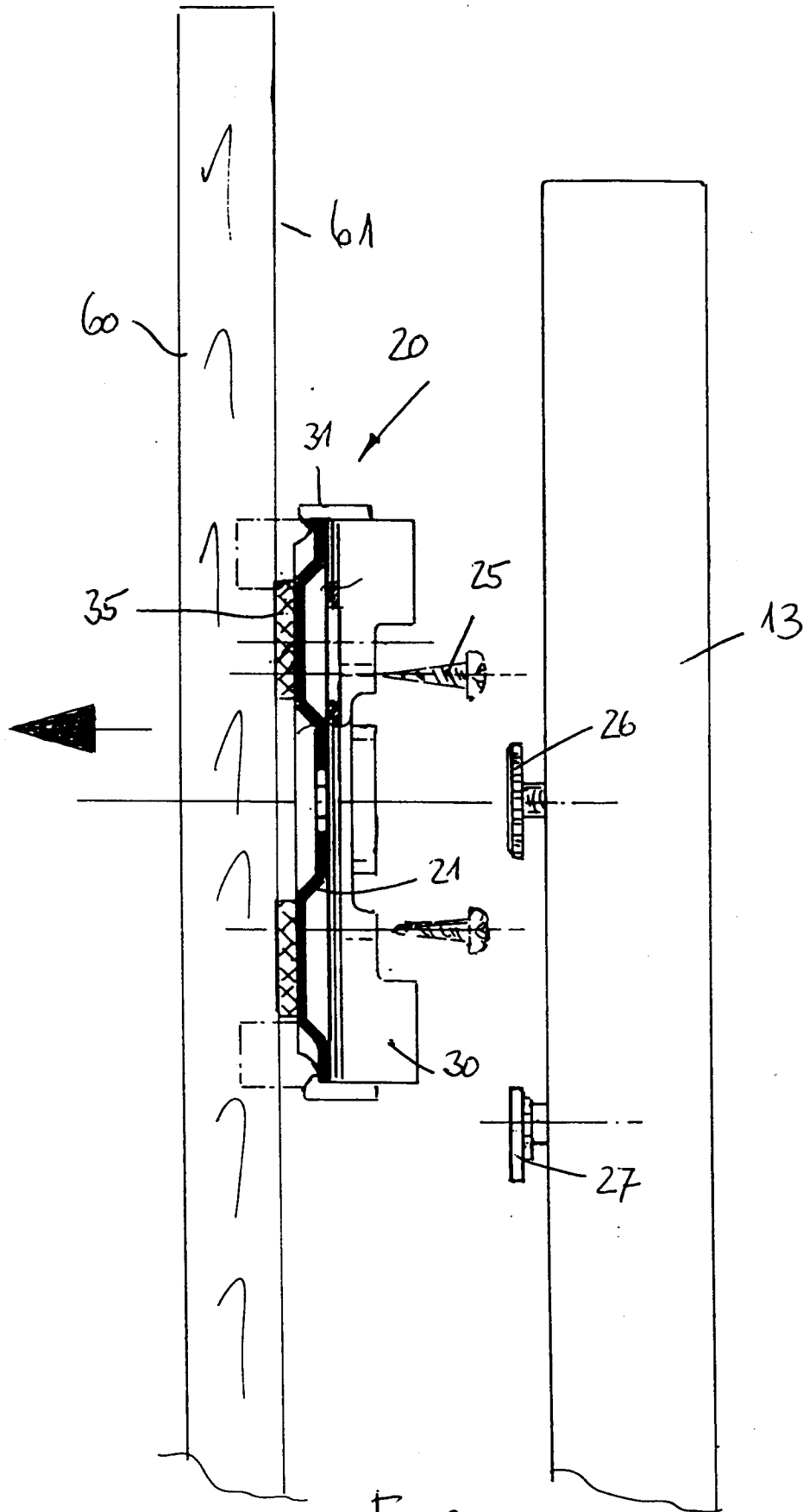


Fig. 8

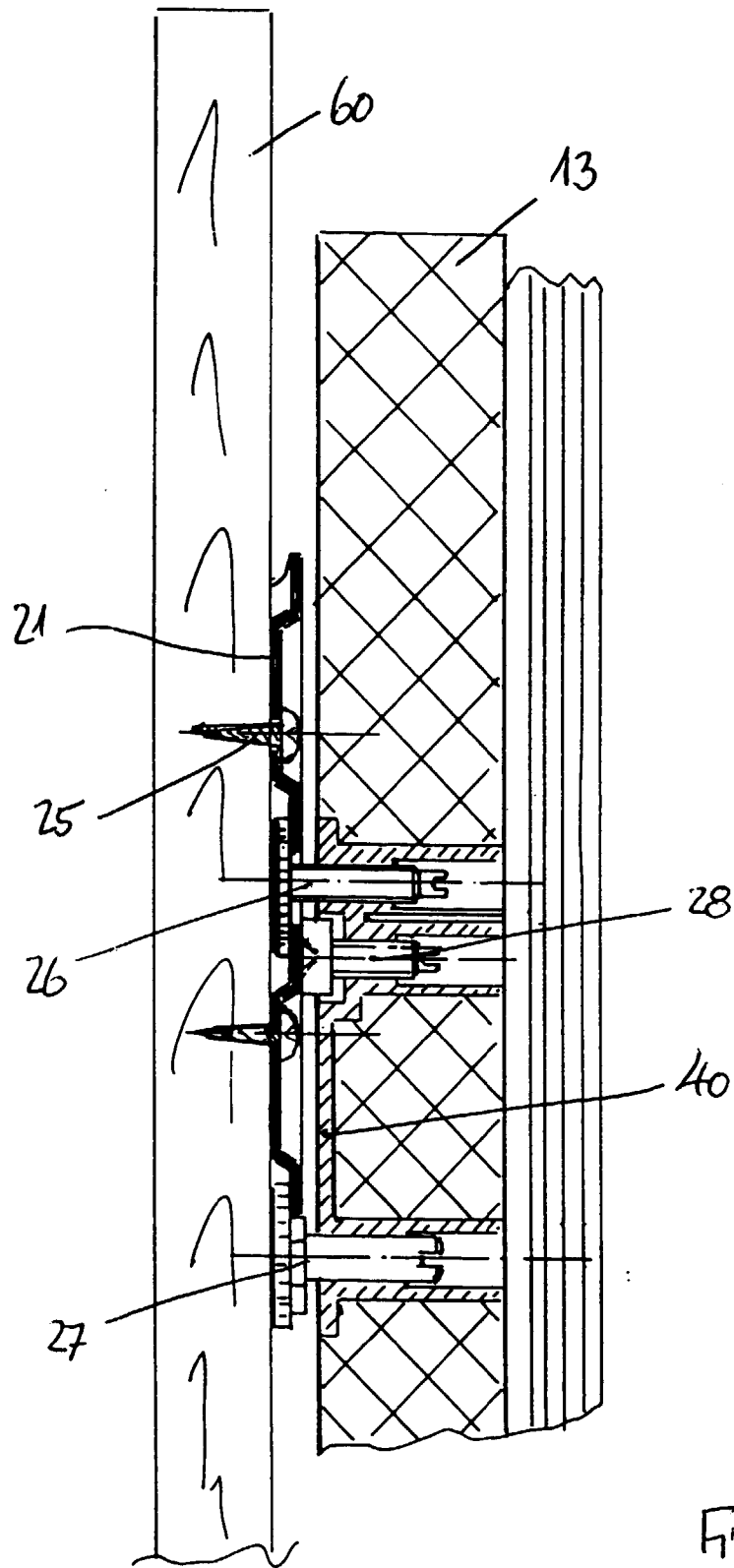


Fig. 9

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## EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 98103754 2
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
X	<u>DE 4443852 C1</u> (BAUKNECHT HAUSGERÄTE GMBH) 07 December 1995 (07.12.95), column 4, lines 24-34, column 4, line 59 - column 5, line 26, fig. 1,3,5. --	1, 3	A 47 B 77/08 E 06 B 5/00
A, D	<u>EP 0168672 B1</u> (BAUKNECHT HAUSGERÄTE GMBH) 22 January 1986 (22.01.86), the whole document. ----		TECHNICAL FIELDS SEARCHED (Int. Cl. 6)  A 47 B 77/00 A 47 L 15/00 E 06 B 5/00
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
WIEN	22-06-1998	VELINSKY-HUBER	
CATEGORY OF CITED DOCUMENTS		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	
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