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(54) **Built-in domestic appliance with decorative panel applied to the door**

Haushaltseinbaugerät mit an die Gerätetür angeordneter Vorsatzplatte

Appareil électroménager à encastrer avec avant-plaque appliquée sur la porte

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Description

[0001] The present invention relates to built-in domestic appliances having the door lined with a decorative panel, and in particular to domestic appliances installed in kitchen furniture which completely encloses them (so-called "fully integrated"). Reference will be made hereafter to a dishwasher while it is clear that what is said applies to any other domestic appliance having a similar door hinged along its bottom side, e.g. a washing machine.

[0002] This type of decorative panel is known to be used to camouflage a built-in appliance so that it blends with the kitchen furniture. This is achieved by applying to the door of said appliance, by various means, a panel having the same appearance of the other doors. In this way there is no visible element allowing to distinguish the appliance from the other members which make up the kitchen, its controls being accessible only when the door is open.

[0003] However, the presence of this panel poses a particular problem in the case of installation inside a piece of furniture, i.e. when the dishwasher rests on the bottom of the furniture and is placed flush with the side walls thereof. In fact in this case the panel must also cover the front edge of said side walls, same as normally occurs with the other doors. But in this way it would interfere with the walls when the dishwasher door is opened and the panel moves back into the space behind the plinth.

[0004] FR-A-2.464.689 discloses an example of such an appliance with a decorative panel pivoted at the bottom to the appliance door, so as to allow the user to access the controls on the door. The panel is also connected to the door at the top through a sliding coupling to allow relative movement of the two members upon opening of the door, since they are hinged at different heights and therefore slide one with respect to the other when rotating.

[0005] The solutions presently available to prevent such an interference are only those of forming a recess in the side walls or of hinging the panel directly to the piece of furniture which contains the dishwasher. In the first case it is required to carry out a significant work of furniture adaptation to form in the sides the space for receiving the panel when the door is opened. In the second case it is necessary to mount a spacer on the bottom of the furniture and to find the exact hinging level for a smooth operation of the panel. Moreover, the plinth cannot be applied and must be replaced by an underlying element, such as the front face of a bottom drawer, to cover the spacer and the hinges mounted thereon.

[0006] In both cases these additional workings make the installation long and costly, and moreover the direct mounting on the furniture causes a further drawback. In fact the presence of the spacer on the furniture bottom makes complicated to pull the dishwasher out of the furniture if need arises for a maintenance intervention,

since it is necessary to take away and then put back in place the spacer on the furniture as well as the panel on the dishwasher door.

[0007] It should be noted that these mounting solutions cannot even be standardized, in that the required working changes depending on the panel height and therefore on the hinging level which corresponds to the position of the panel flush with the kitchen top when the door is closed.

[0008] Moreover, in the case of mounting on the door of panels having a height greater than the standard height of 720 mm the panel must be mounted higher on the door. This is necessary to prevent the interference of the panel with the dishwasher base at the end of the door opening, otherwise the door could not open completely to 90°. This implies not only a poor accessibility to the controls located along the top edge of the door due to the projecting panel, but even the need to raise the kitchen top and therefore introduce a supporting structure in the space which is created between said top and the dishwasher top.

[0009] Therefore the object of the present invention is to provide a domestic appliance provided with a mounting system for the decorative panel suitable to overcome the aforementioned drawbacks.

[0010] This object is achieved by means of a domestic appliance in which the panel is mounted through a top sliding coupling between the panel and the door and a bottom parallelogram hinge secured to the base of the machine itself, preferably through a height-adjustable support.

[0011] The main advantage of the domestic appliance with the panel mounting system according to the present invention is the possibility of easily and quickly carrying out the installation inside the furniture without requiring any modification of the latter.

[0012] A further advantage of this solution is that of being able to mount also panels of greater height simply by adjusting the position of the bottom hinge support without affecting neither the housing furniture nor the accessibility to the controls.

[0013] Still another advantage of the present system stems from its extreme structural simplicity which makes it cheap and reliable.

[0014] These and other advantages and features of the domestic appliance according to the present invention will be evident to those skilled in the art from the following detailed description of an embodiment thereof, with reference to the attached drawings, wherein:

Fig.1 is a diagrammatic sectional side view showing a dishwasher according to the invention provided with a standard-size panel;

Fig.2 is a view similar to the preceding one of a dishwasher provided with an oversize panel;

Fig.3 is an enlarged side view of the bottom members of the panel mounting system, with the door in the closed position;

Fig.4 is a view similar to the preceding one with the door in the initial opening phase;

Fig.5 is a view similar to the preceding one with the door fully open;

Fig.6 is an enlarged side view of the top members of the panel mounting system, with the door in the closed position;

Fig.7 is a view similar to the preceding one with the door in the initial opening phase; and

Fig.8 is a view similar to the preceding one with the door fully open.

[0015] With reference to Figs. 1, 3 and 8, there is seen that a dishwasher introduced inside a piece of furniture (only the bottom B of the latter being shown) includes a decorative panel P applied to the door S, the distance between the bottom edge of panel P and the furniture bottom B being covered by a plinth Z. Panel P is applied to the dishwasher through a mounting system including a top sliding coupling R and a bottom parallelogram hinge mounted on an L-shaped support G which is in turn inserted onto a bracket F secured to the dishwasher base M.

[0016] More specifically, panel P carries at its bottom end a bracket H connected through pins C to rods J, K which are in turn connected through pins D at their opposite ends to said support G. The latter is inserted onto bracket F through slide guides (not shown) and secured by screws V whose vertical position can be adjusted within adjustment slots A formed in bracket F. The dotted lines T of Fig.3 illustrate the paths of pins C during the opening movement.

[0017] At the top end, coupling R consists of a pin X, integral with panel P, which slides with bi-directional restraint along a shaped channel Y formed in the top portion of door S. The shape of channel Y is designed to prevent interference between panel P and door S during the opening, due to the relative angle which is formed, and also to keep a proper axial play.

[0018] The simple and effective operation of the present mounting system for panel P is readily understood from the description above with the help of the other figures.

[0019] In the first opening phase from Figs.3 and 6 to Figs.4 and 7, corresponding to about a 30° opening, rods J, K rotate upward around pins D being drawn by bracket H through pins C, while pin X moves along the first portion of channel Y shifting outward to compensate for the different hinging level of door S with respect to panel P.

[0020] Upon complete opening at 90°, pin X is in the top portion of channel Y and panel P has returned to the initial distance from door S, while rods J, K of the bottom hinge have reached a substantially horizontal position.

[0021] From these figures it is clear that in no phase of the movement panel P interferes with plinth Z or moves closer to the dishwasher, whereby there is no problem of interference with the furniture sides. Further-

more, since the whole mounting system is secured to the dishwasher, the latter can be easily pulled out of the furniture for maintenance without requiring the removal of any member.

[0022] Also the adaptation to panels of different heights is simple and readily understood from Fig.2. In this case panel P' has a height greater than the standard panel P, and therefore also plinth Z' is correspondingly lower than plinth Z. However this does not pose any problem since to maintain it flush with the dishwasher top it is sufficient to adjust the position of support G on bracket F, by lowering it along slots A through a distance L equal to the exceeding height of panel P'.

[0023] It is clear that the above-described and illustrated embodiment of the domestic appliance according to the invention is just an example susceptible of various modifications. In particular, the top sliding coupling R may be made in other ways and the same applies to the support/bracket assembly for the bottom hinge as long as the latter is mounted directly on the machine base and positioned so as to keep panel P outside the furniture throughout the opening movement.

Claims

1. A built-in domestic appliance suitable for full integration into a piece of furniture, said appliance having a door (S) hinged along its bottom side and provided with a decorative panel (P) mounted on the appliance through a mounting system including a top sliding coupling (R) between the panel (P) and the door (S), **characterized in that** said mounting system further includes a bottom parallelogram hinge connecting the panel (P) to a support (G) which is in turn carried by a bracket (F), secured to the appliance base (M), said parallelogram hinge being arranged so as in use to keep the panel (P) outside the furniture throughout the movement of the door (S).
2. A domestic appliance according to claim 1, **characterized in that** the position in height of the support (G) on the bracket (F) is adjustable.
3. A domestic appliance according to claim 1 or 2, **characterized in that** the top coupling (R) consists of a pin (X), integral with the panel (P), which slides with bi-directional restraint along a shaped channel (Y) formed in the top portion of the door (S), the shape of said channel (Y) being designed to prevent interference between the panel (P) and the door (S) during the opening.
4. A domestic appliance according to one or more of the preceding claims, **characterized in that** the panel (P) carries at its bottom end a bracket (H) connected through pins (C) to rods (J, K) which are in

turn connected through pins (D) at their opposite ends to said support (G), the latter being L-shaped.

5. A domestic appliance according to one or more of claims 2 to 4, **characterized in that** the support (G) is mounted onto the bracket (F) by means of screws (V) whose vertical position can be adjusted within adjustment slots (A) formed in the bracket (F).

Patentansprüche

1. Einbau-Hausgerät, geeignet für die volle Integration in ein Möbelstück, wobei das Gerät eine Tür (S) hat, die entlang ihrer Unterseite schwenkbar ist und mit einer Dekorplatte (P) versehen ist, die an dem Gerät durch ein Befestigungssystem befestigt ist, welches eine obere Schiebekupplung (R) zwischen der Platte (P) und der Tür (S) aufweist, **dadurch gekennzeichnet, dass** dieses Befestigungssystem des Weiteren ein unteres Parallelogramm-Scharnier aufweist, welches die Platte (P) mit einem Träger (G) verbindet, der seinerseits von einer Stütze (F) getragen wird, die am Gerätesockel (M) befestigt ist, wobei das Parallelogramm-Scharnier so angeordnet ist, dass es im Gebrauch die Platte (P) während der gesamten Bewegung der Tür (S) außerhalb des Möbelstücks hält.
2. Hausgerät nach Anspruch 1, **dadurch gekennzeichnet, dass** die Höhenposition des Trägers (G) an der Stütze (F) einstellbar ist.
3. Hausgerät nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die obere Kupplung (R) aus einem Stift (X) besteht, der mit der Platte (P) fest verbundenen ist, welche mit einer in zwei Richtungen ausgelegten Zwangsführung entlang eines geformten Kanals (Y) gleitet, der im oberen Teil der Tür (S) gebildet ist, wobei die Form des Kanals (Y) so gestaltet ist, dass eine gegenseitige Behinderung zwischen der Platte (P) und der Tür (S) während des Öffnens verhindert wird.
4. Hausgerät nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Platte (P) an ihrem unteren Ende eine Halterung (H) trägt, die durch Stifte (C) mit Stäben (J, K) verbunden ist, die ihrerseits durch Stifte (D) an ihrem gegenüberliegenden Ende mit dem genannten Träger (G) verbunden sind, wobei letzterer eine L-Form aufweist.
5. Hausgerät nach einem oder mehreren der Ansprüche 2 bis 4, **dadurch gekennzeichnet, dass** der Träger (G) an der Stütze (F) mit Hilfe von Schrauben (V) befestigt ist, deren vertikale Position innerhalb von Einstell-Langlöchern (A) eingestellt wer-

den kann, die in der Stütze (F) gebildet sind.

Revendications

1. Appareil domestique encastré adapté à être entièrement encastré dans un meuble, ledit appareil comprenant une porte (S) articulée le long de son côté inférieur et pourvue d'un panneau décoratif (P) monté sur l'appareil par l'intermédiaire d'un système de montage comprenant un couplage coulissant supérieur (R) entre le panneau (P) et la porte (S), **caractérisé en ce que** le système de montage comprend en outre une articulation inférieure en parallélogramme reliant le panneau (P) à un support (G) qui est à son tour supporté par une console (F) fixée à la base de l'appareil (M), ladite articulation en parallélogramme étant arrangée de manière à maintenir, en utilisation, le panneau (P) à l'extérieur du meuble lors du déplacement de la porte (S).
2. Appareil domestique selon la revendication 1, **caractérisé en ce que** la position en hauteur du support (G) sur la console (F) est ajustable.
3. Appareil domestique selon la revendication 1 ou 2, **caractérisé en ce que** le couplage supérieur (R) consiste en une broche (X), réalisée de manière monobloc avec le panneau (P), qui coulisse avec une limite bidirectionnelle le long d'un canal profilé (Y) formé dans la partie supérieure de la porte (S), la forme dudit canal (Y) étant conçue pour empêcher toute interférence entre le panneau (P) et la porte (S) lors de l'ouverture.
4. Appareil domestique selon une ou plusieurs des revendications précédentes, **caractérisé en ce que** le panneau (P) supporte au niveau de son extrémité inférieure une console (H) reliée par l'intermédiaire de broches (C) à des tiges (J, K) qui sont à leur tour connectées par des broches (D) au niveau de leurs extrémités opposées audit support (G), ce dernier étant en forme de L.
5. Appareil domestique selon une ou plusieurs des revendications 2 à 4, **caractérisé en ce que** le support (G) est monté sur la console (F) au moyen de vis (V) dont la position verticale peut être ajustée dans des fentes d'ajustement (A) formées dans la console (F).

Fig. 1

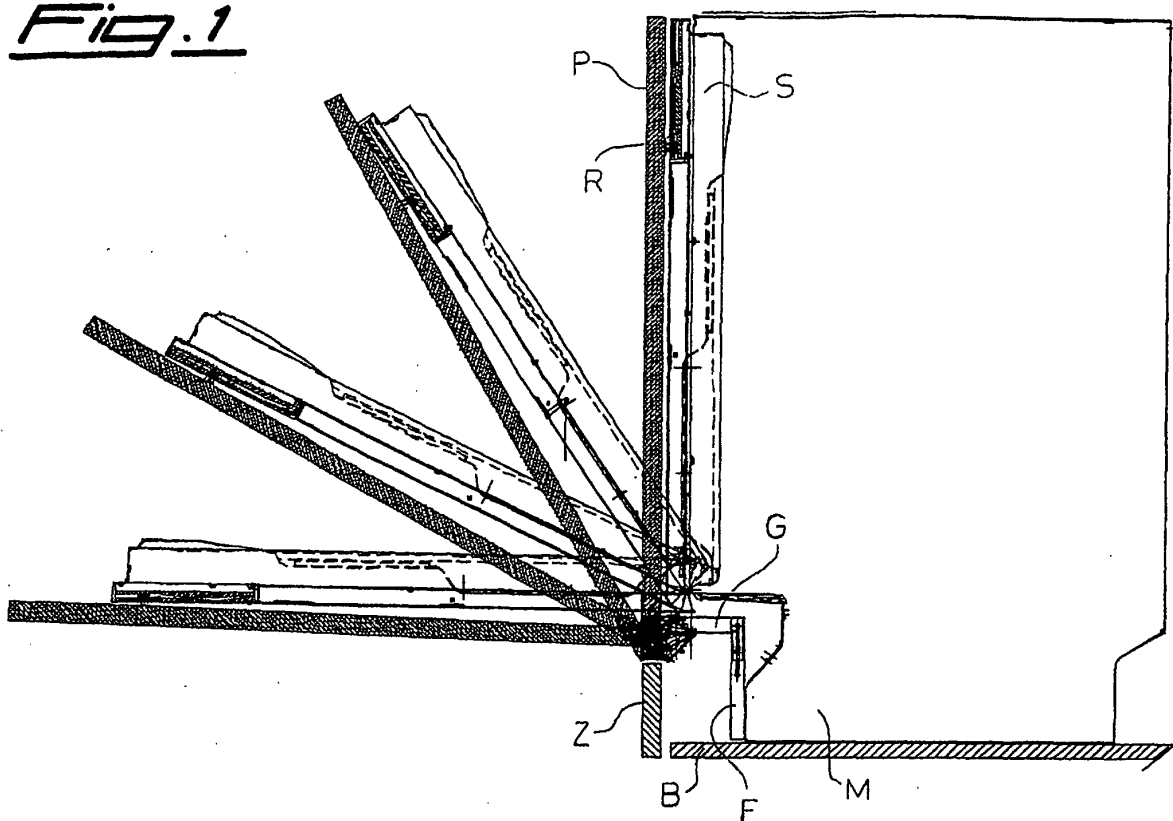
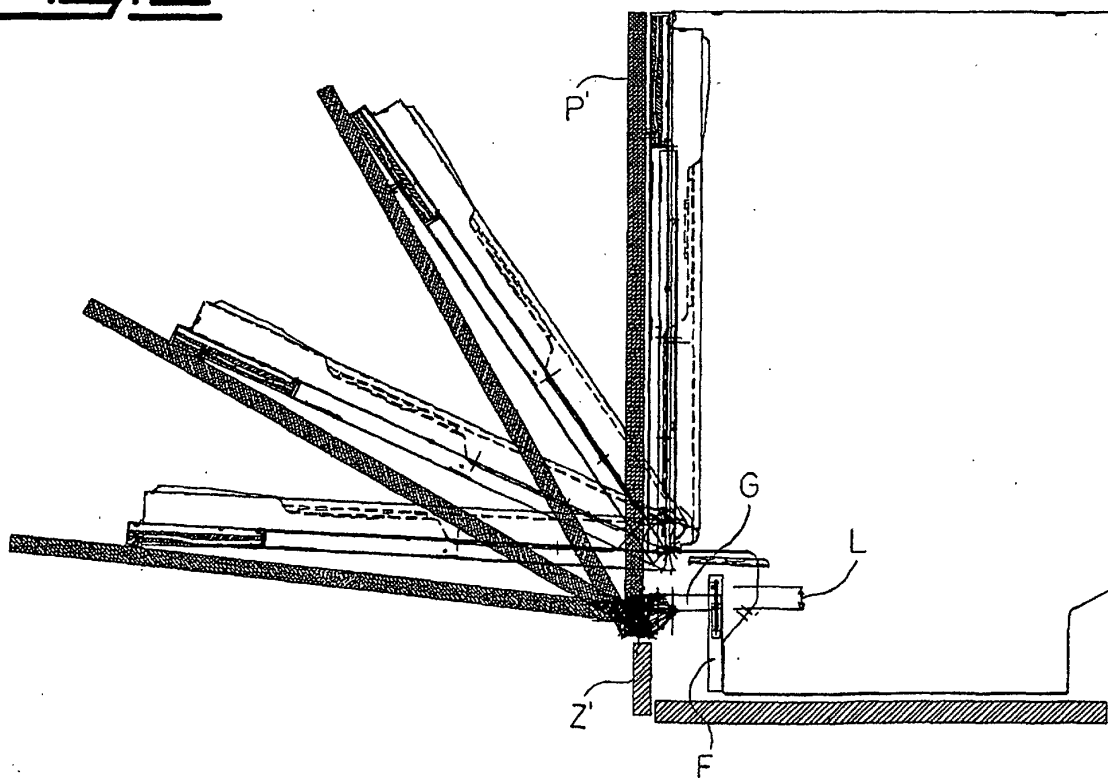


Fig. 2



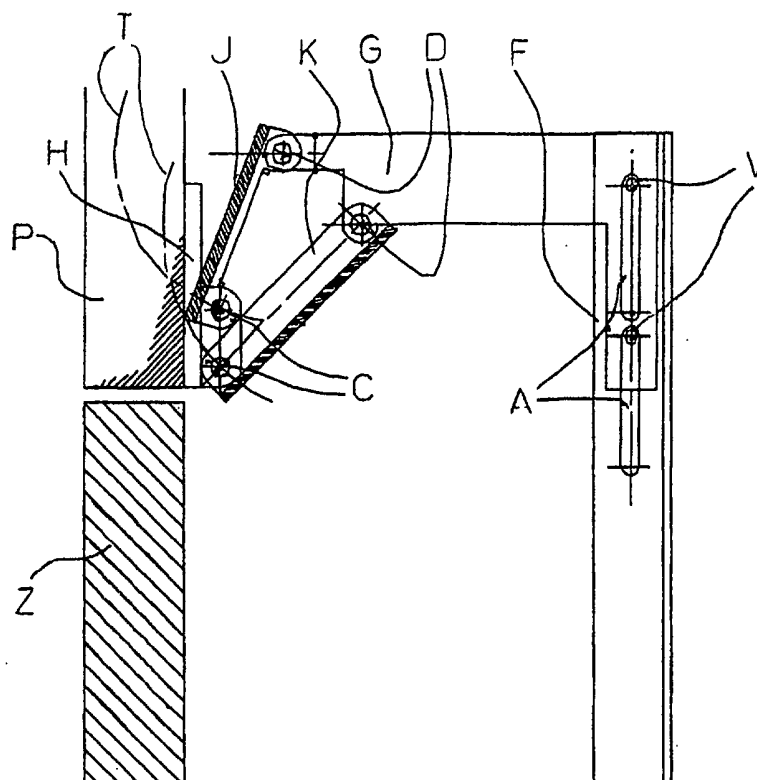


Fig. 3

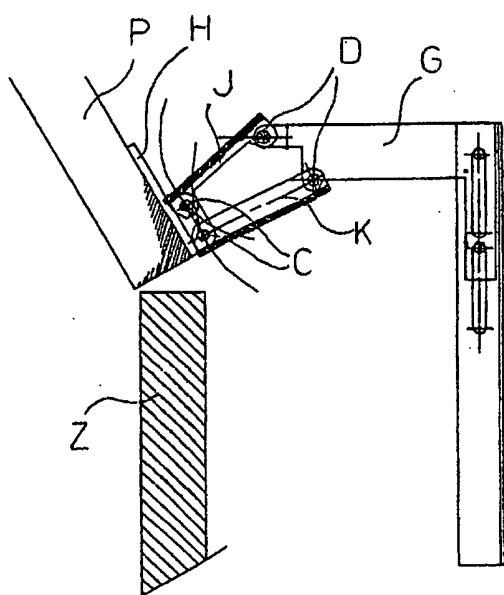


Fig. 4

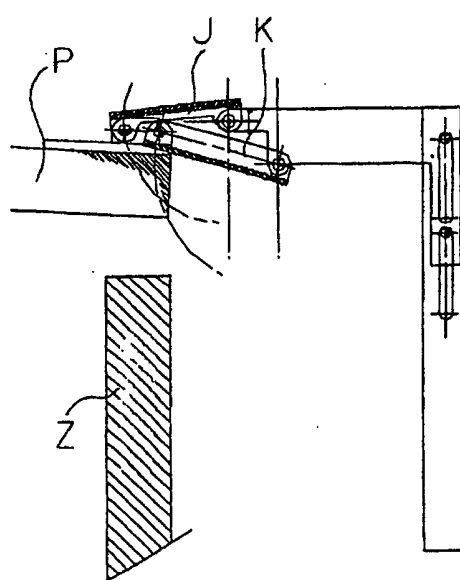


Fig. 5

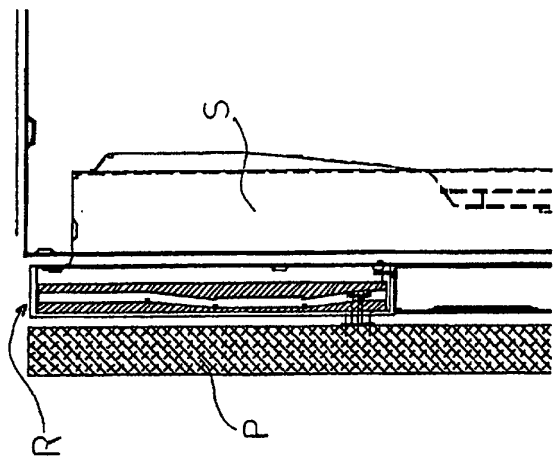


FIG. 6

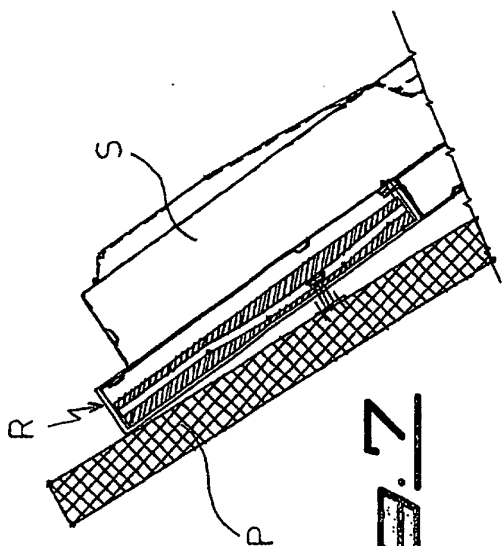


FIG. 7

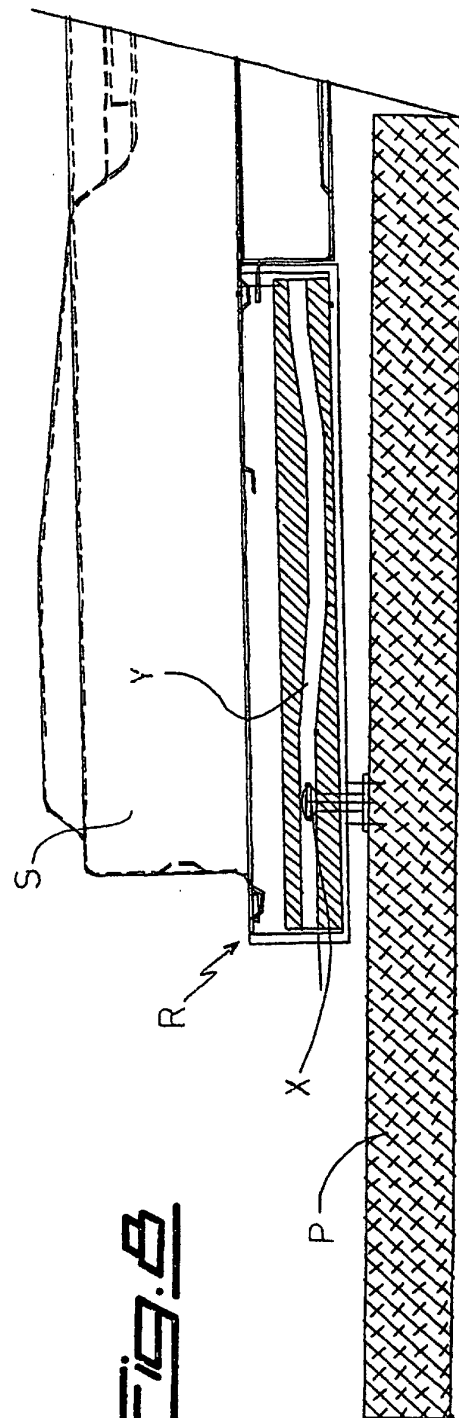


FIG. 8