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(71) Applicant: **Zanussi Elettrodomestici spa**
Via Giardini Cattaneo, 3
I-33170 Pordenone-C.P. 147(IT)

(72) Inventor: **Lucchetta, Silvio**
Via Vallona 1
I-33170 Pordenone(IT)

(74) Representative: **Patentanwälte Grünecker, Dr. Kinkeldey, Dr. Stockmair, Dr. Schumann, Jakob, Dr. Bezold, Meister, Hilgers, Dr. Meyer-Plath**
Maximilianstrasse 58
D-8000 München 22(DE)

(54) Door for a refrigerator.

(57) A door of a refrigerator, particularly of the cupboard-type for domestic use. comprises an outer door panel, an insulating panel of a foamed plastics material, and an inner door panel formed with means for supporting bottles, food packages and the like on said door. According to prior art, the inner door panel is secured to the main body of the door by means of additional fastener elements, such as threaded fastener elements, so that the releasable mounting of the inner door panel requires not only such additional fastener elements, but also time-consuming and costly manual operations.

According to the invention, the insulating layer is provided with a moulding frame embedded therein and formed with a seat for a foot portion of the door sealing gasket, and a seat for a rim portion of said inner door panel. The latter seat is of a V-shaped configuration the open side of which is partially closed by a ledge. The rim portion of the inner door panel is likewise of V-shaped configuration having a rearwards bent outer leg adapted to engage said ledge from within said seat. The construction permits the inner door panel to be releasably mounted on the door by resilient snap-engagement of said outer leg, and to be replaced in case of damage without replacement of any other parts of the door and with a minimum of manual labour.

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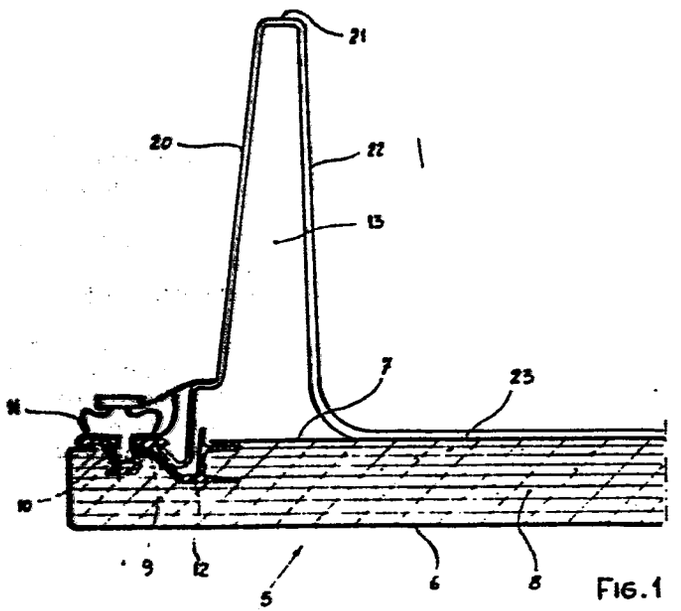

FIG. 1

Description

The present invention relates to a door for a refrigerator, particularly for a refrigerator of the cupboard type, provided with profiled elements for releasably securing a shaped inner door or "counterpanel" to its inner surface.

As generally known, the inner side of the door of an appliance of this type is provided with a peripherally extending sealing gasket and an inner door panel shaped to support bottles, containers or other goods to be refrigerated.

It is also known that the sealing gasket and the inner door panel are releasably secured to the door so that they can be substituted in case of damage. One solution for so securing the gasket and inner door panel provides for the gasket to be fitted onto the edges of the inner door panel which is then secured to the body of the door by means of screws.

This solution is disadvantageous with regard to assembly operations, as it requires numerous manual operations, and also with regard to maintenance and repair in use, where the substitution solely of the sealing gasket requires a great number of screws to be loosened and then retightened.

Other widely employed solutions for the fastening problem provide for the incorporation in a foamed plastics panel of the door of a suitably profiled peripheral element adapted to receive therein a base portion of a profiled sealing gasket and of an edge portion of the inner door panel which may be secured in place by means of an arrangement of threaded fasteners (as for instance in German Utility Model 6,940,257) or by means of an edge portion of a peripheral strip pressure-fitted into or onto the profile element (as for example in German Utility Model 6,911,963). The first of these solutions is also disadvantageous as it involves the use of numerous threaded elements, while the second solution requires the employ of an additional fixing

strip which has to be secured in an additional manual assembly operation.

Also known is the use of fastener profiles formed with a seat for a foot portion of the sealing gasket besides a plurality of resilient lips for releasably retaining an edge portion of the inner door panel, as described for instance in German Utility Model No. 6,940,482.

This solution permits the inner door panel to be mounted in an automatized operation by simple pressure, and if so required to be dismounted by resiliently bending the retaining lips apart.

It is to be noted, however, that the retaining force of the resilient lips may sometimes be surmounted by the inertial forces exerted on the door as it is closed by the inner door panel and the goods supported thereby, so that the inner door panel may strike the door frame of the refrigerator with a sometimes considerable force.

It may also happen that the retaining lips are subjected to fatigue after extended use so as to loose their initial resiliency, or that they are irreparably damaged on dismounting of the inner door panel.

For avoiding the above noted undesirable occurrences, the edge portions of the inner door panel as well as the resilient retaining lips have to be designed with an abundant thickness so as to prevent one or the other from yielding to the strains and stresses acting thereon.

On the other hand it is obvious that such overdimensioning reduces the resiliency of the retaining lips and results in an undesirable increase of the amount of material required for the inner door panel and the fastener profile.

In view of the above noted shortcomings of prior art it is a main object of the present invention to provide a door for a cupboard-type refrigerator which permits an inner door panel having an additional support function to be

releasably mounted by an assembly operation not necessarily requiring manual intervention and sufficiently simple to be carried out in a fully automatic manner.

Another object of the invention is the provision of a door of the type defined above which permits an inner door panel to be releasably, and thus replaceably, mounted thereon without the use of additional fastener elements such as screws, fastener strips and the like.

It is finally an object of the invention to provide a door for a refrigerator which in addition to the advantages noted above permits the inner door panel to be releasably secured with the aid of securing means associated with the releasable element itself, so that it is not necessary to bodily replace the door itself in case of the resilient securing means being damaged in the course of dismounting the inner door panel, such resilient securing elements being suitably located in the peripheral zone of the door.

These and other objects are attained according to the invention by a door for a refrigerator, particularly a refrigerator of the cupboard-type for domestic use, comprising a panel formed of foamed plastics material and enclosed between an outer lining sheet and an inner cover sheet and provided at its inner surface with a peripheral moulding embedded in said panel and formed with respectve seats for releasably retaining the foot portion of a sealing gasket and an edge portion of an inner door panel, said door being characterized in that said seat for releasably retaining said inner door panel in said moulding is of V-shaped cross-sectional configuration having its open side partially closed by a ledge, and in that said inner door panel is formed with rim portions projecting towards the interior of the door and located adjacent the fastening edge portions of the inner door panel, said rim portions being likewise bent into a V-shaped configuration for snap-engagement with said V-shaped seat of said moulding, so that said inner door panel is clampingly mounted on said door by constrain-

ing said rim portions between the inner edge of said ledge and the inner wall of the door.

The davantages of the door according to the invention will become more clearly evident from the following description given by way of example with reference to the accompanying drawings, wherein:

fig. 1 shows a cross-sectional view of a part of a door according to the invention,

fig. 2 shows an enlarged cross-sectional view of the connection of an inner door panel to a door as shown in fig. 1, and

fig. 3 shows a partially sectioned perspective view of a lower corner portion of the door shown in fig. 1.

Shown in fig. 1 is a cross-sectional view of a part of a vertical door 5 of a cupboard-type refrigerator, comprising in a per se known manner an outer sheet metal liner 6 and an inner covering sheet 7 made for instance of cardboard, a foamed plastics material 8 being injected therebetween for thermal insulation and mechanical rigidification of the overall structure. Adjacent the inner peripheral border of door 5 insulating panel 8 carries an arrangement of mouldings 9 embedded therein and bonded to one another so as to form a substantially rectangular frame adapted to resiliently receive and releasably retain a foot portion 10 of a sealing gasket 11 and a rim portion 12 of an inner door panel 13 formed of a plastics material in a configuration permitting it to support bottels and other food containers.

As seen in the cross-sectional view of fig. 2, each moulding 9 has a horizontal outer lip 14 partially overlapping sheet metal liner 6, and a vertical inner lip 15 projecting above inner covering sheet 7 of door 5.

Adjacent outer lip 14 in the direction towards inner lip 15 moulding 9 is formed with a first recess 16 forming a seat for foot portion 10 of gasket 11, and adjacent thereto

with a second recess 17 forming a seat for rim portion 12 of inner door panel 13.

Seat 17 is of V-shaped cross-sectional configuration, with its open side partially closed by a ledge 18 defining a restricted entrance for receiving and retaining rim portion 12 of inner door panel 13.

Edge portion 12 itself is likewise bent backwards into a V-shaped configuration conforming to that of seat 17 and having a suitably dimensioned outer leg 19 for engaging the lower surface of ledge 18 from within seat 17.

Thanks to this construction the inner door panel 13 may be mounted by simply exerting pressure on its peripheral border region.

During this operation, the backfolded rim portion 12 of inner door panel 13 is introduced into the restricted entrance of seat 17 while being guided by upstanding lip 15, until outer leg 19 has passed ledge 18 and is restored to its relaxed configuration as shown in figs. 1 and 2, so as to engage the lower surface of ledge 18 from within seat 17. In this type of inner door panels for a refrigerator, the region for the storage of foods is usually bordered by shelves or ridges projecting towards the interior of door 5 and formed of an outer web 20 extending from the junction between the door and the inner door panel substantially at right angles to the plane of the door, a narrow end face 21 parallel to the plane of door 5, and an inner web 22 connected to the bottom wall 23 of the inner door panel. In the case of the inner door panel 13 according to the invention, outer web 20, inner web 22 and end face 21 are configured to create a biasing force between the point of support of inner door panel 13 on inner covering sheet 7 of door 5 and the point of engagement between outer leg 19 of rim portion 12 and the inner surface of ledge 18, whereby webs 20, 22 and end face 21 are always kept under tension so as to ensure a sufficiently rigid engagement of inner door panel 13 below ledge 18 of moulding 9.

At the same time this resilient engagement does not prevent inner door panel 13 from being replaced in case of damage thereof during use. The dismounting of inner door panel 13 may in fact be carried out by pulling it away from the remainder of door 5 with sufficient force to bend or straighten outer leg 19 of rim portion 12 so as to release it from engagement with ledge 18 of moulding 9. To this purpose inner door panel 13 may be formed with suitable gripping portions.

Adjacent the lower corners of the door the profile of the inner door panel is shaped in the manner shown in fig. 3, so that the weight of the inner door panel does not rest on the outer leg 19 of the lower rim portion, as this would lead to a reduced stability of the connection and a continual and undesirable load on this outer leg portion.

As particularly shown in fig. 3, the lower end portion of inner door panel 13 adjacent the corners of the door is formed with a planar rim 24 abutting the edge 25 of ledge 18, so that the weight of the inner door panel and any goods carried thereby rests on ledge 18 which is sufficiently strong for this purpose. In this manner the mounting of the inner door panel on the door is stabilized.

From the above description it is evidetn that the invention enables the inner door panel 13 to be mounted on door 5 by a simple process not necessitating any manual operations and thus capable of being carried out in a fully automatic manner so as to facilitate the overall assembly operation.

Between the door 5 and the inner door panel 13 there is a releasable connection which does not require any additional fastener elements and is capable of being released in a particularly simple manner.

A further advantage of at least similar importance results from the fact that the resilient elements required for mounting the inner door panel on the door are exclusively associated with the former, so that it may be replaced without having to replace the entire door.

GRUNECKER, KINKELDEY, STOCKMAIR & PARTNER

PATENTANWÄLTE
EUROPEAN PATENT ATTORNEYS

A. GRUNECKER DR. ING.
DR. H. KINKELDEY DR. ING.
DR. W. STOCKMAIR DR. ING. (CALTECH)
DR. K. SCHUMANN DR. PHIL.
P. H. JAKOB DR. ING.
DR. G. BEZOLD DR. CHEM.
W. MEISTER DR. ING.
H. HILGERS DR. ING.
DR. H. MEYER-PLATH DR. ING.
DR. M. BOTT-BODENHAUSEN DR. RER. NAT.
DR. U. KINKELDEY DR. RER. NAT.

PATENTANWÄLTE IN BERLIN

8000 MÜNCHEN 22
MAXIMILIANSTRASSE 58

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Door for a Refrigerator

Patent Claims

1. A door for a refrigerator, particularly for a refrigerator of the cupboard-type for domestic use, comprising a panel of foamed plastics material enclosed between an outer lining sheet and an inner covering sheet and provided at its inner surface with a peripheral moulding frame embedded in said panel and including respective seats for releasably receiving the foot portion of a sealing gasket and a rim portion of an inner door panel, characterized in that said seat (17) for releasably mounting said inner door panel (13) in said moulding (9) is of V-shaped cross-sectional configuration the open side of which is partially closed by a ledge (18), and in that said inner door panel (13) is formed with shelves (20, 21, 22) projecting towards the interior of said door (5) adjacent the fastener rim portions (12) of said inner door

panel (13), said rim portions (12) being likewise turned back into a V-shaped configuration adapted to be received in said V-shaped seat (17) of said moulding (9) in a snap fit engagement for pressure-mounting said inner door panel (13) on said door (5) by setting up a biasing force in said shelves between the interior edge of said ledge (18) and the inner wall surface (7) of said door (5).

2. A door according to claim 1, the inner door panel of which is provided with seats for supporting goods to be refrigerated, characterized in that adjacent the lower corners of said inner wall panel (13) the peripheral rim portion (12) thereof is formed with a planar rim (24) projecting into abutting engagement with an edge (25) of said ledge (18) so that the weight of said inner door panel (13) together with the goods supported thereby is supported by said ledge (18).

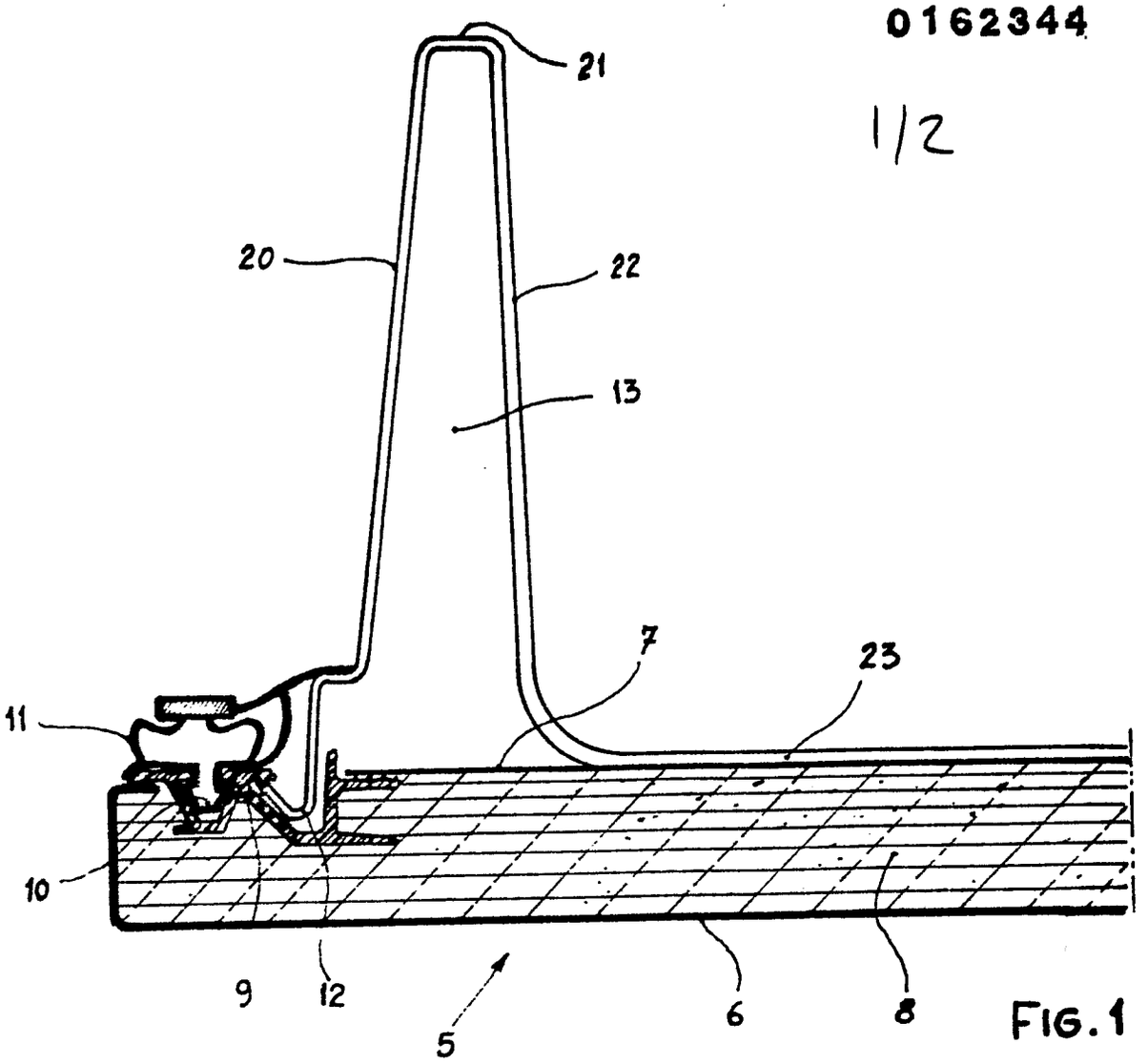

FIG. 1

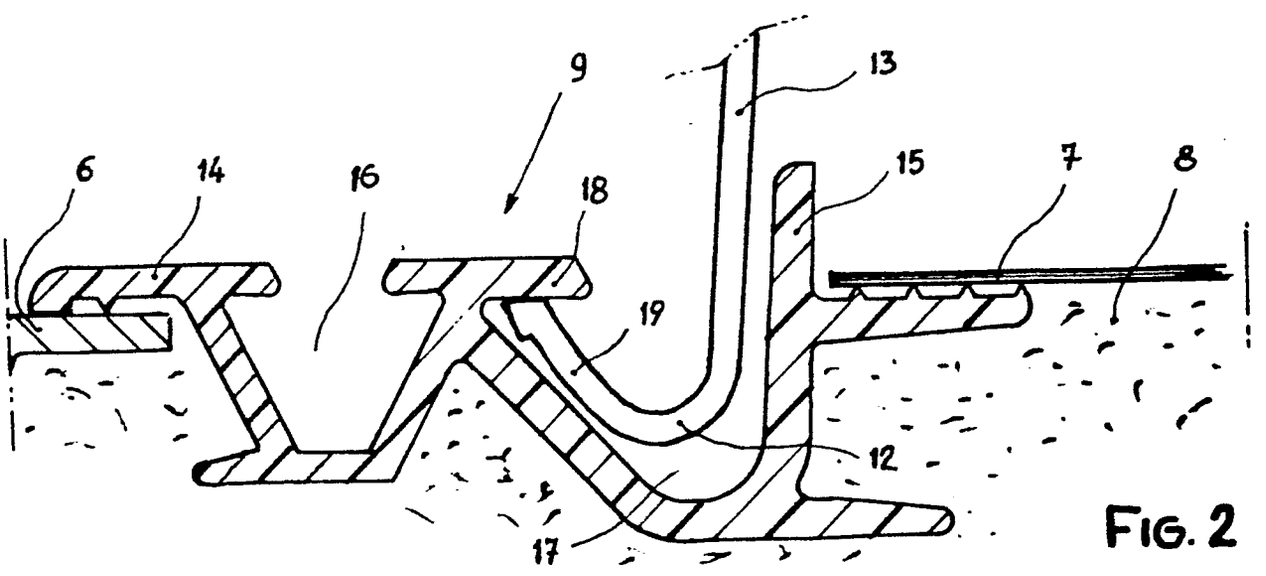

FIG. 2

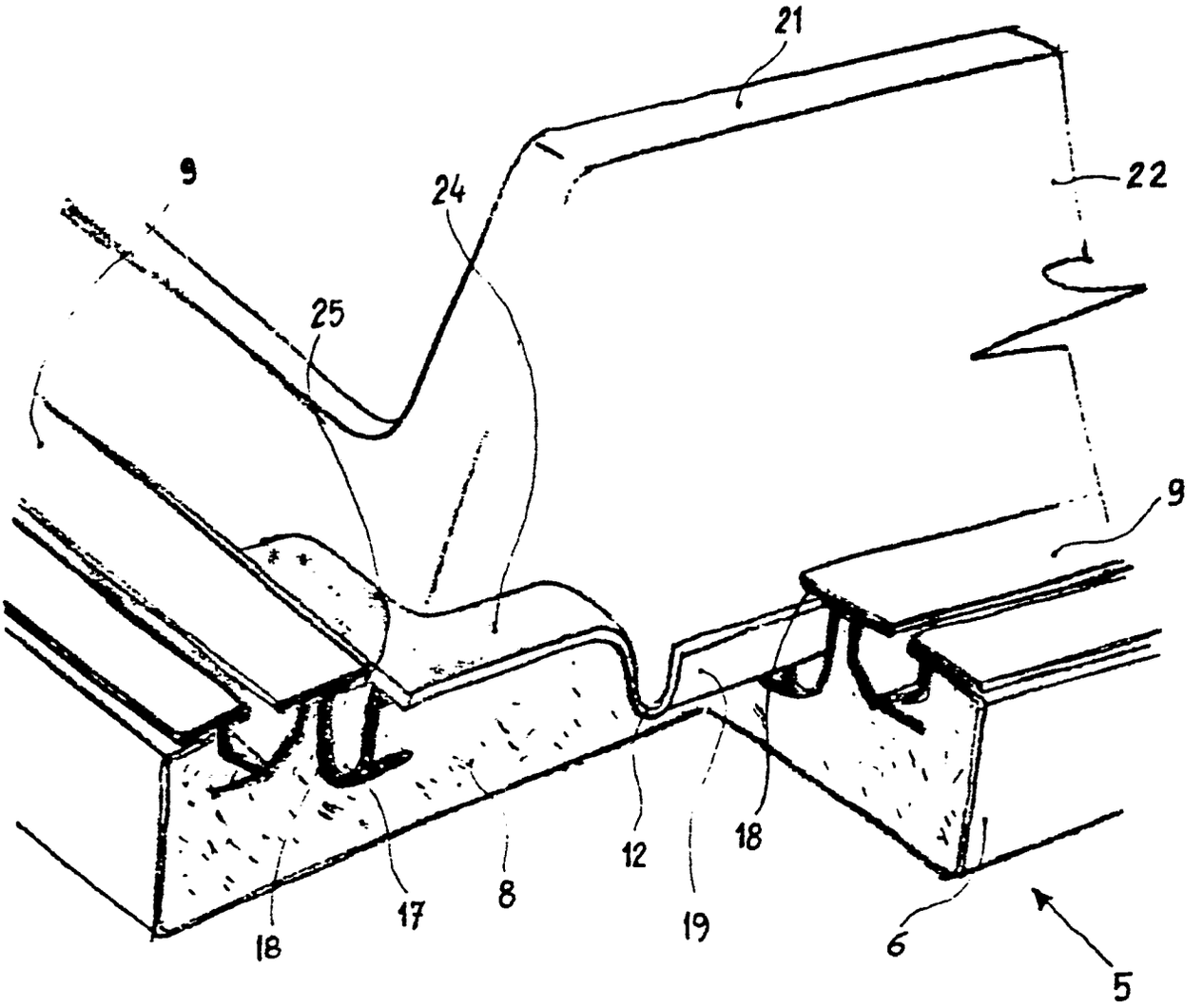

FIG. 3