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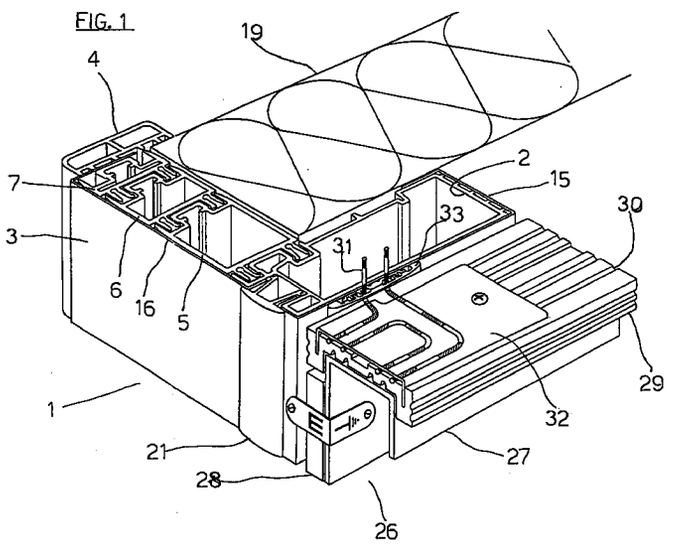
## (54) Door frame for cold room realized with sectional modular elements in plastic material

(57) Door frame of a refrigeration cell, comprising two upright elements and a superior crosspiece element connecting the two upright elements, each of such elements having a substantially "L" shaped section, a base connecting the upright elements to the floor being further provided, characterised in that the upright elements (1) and the superior crosspiece element (20) are realised in a modular manner by parts which can be assembled between themselves (2,5,6,7).

FIG. 1

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## Description

The present invention refers to a door frame, in particular for refrigeration cells, comprising two upright elements and a superior crosspiece element connecting the two upright members; each of such elements having a substantially "L" shaped section, and further comprising a base connecting the upright elements to the floor.

As known, refrigeration cells being of large dimensions, be it for preserving fruit, or for preserving and freezing meat, are constituted by a chamber with insulating walls, which may also be arranged within a masonry chamber.

For access to the interior of the refrigeration cell an opening is provided, which is closed by a door that can normally be opened as a book or by sliding on guides.

It is known that for the assembly of the door it is necessary to arrange for a frame to be fixed to the refrigeration cell, which also has the function of covering the edges of the opening.

At the present said frames are made up of two upright elements and by a superior crosspiece element; such elements are each realised by two strips of wood perpendicularly assembled between themselves and making up a substantially "L" shaped section.

Said strips are fixed between themselves by way of nails and are then finished with a shaped and painted sheet covering.

The upright elements and the superior crosspiece are assembled on the opening edge of the cell, one side of the "L" section is placed in contact with the external face of the cell and the other side is placed in contact with the internal face of the opening of the cell.

Said strips must be realised in such a way that their surfaces be flat and parallel, be it for their inter-coupling and for coupling to the opening to the refrigeration cell.

Such precision requires accurate workmanship with high time and equipment costs.

Furthermore the assembly system of the upright elements between themselves requires material and time costs.

Moreover not all wall thicknesses of refrigeration cells are the same; they vary in function of the use of the cell, i.e. based on the internal temperature of the cell.

In fact, for preserving fruit, where the necessary temperatures are higher than zero, the insulating walls of the cell may be thin while, for preserving or freezing meat, where the necessary temperatures have to be lower than minus 18° C, the insulating walls have to be of a greater thickness.

Therefore during the construction of the elements making up the door frame it is necessary to consider such thicknesses this means that the side of the upright located inside the opening of the cell, has to be of variable dimensions, i.e. more or less as long as the thickness of the wall.

The variations of dimensions of the sections of the uprights and crosspiece do not allow for a standard and continuous production, but have to be adapted to the type of uprights and crosspiece necessary for a determined refrigeration cell.

This causes a loss of time in the change of production means, a greater amount of time used for the production and the necessity of having a stock of strips being of different dimensions, all of which causing an increase in the industrial costs.

The purpose of the present invention is that of overcoming the aforementioned problems and in particular to indicate a door frame, in particular for refrigeration cells, comprising two upright elements and a superior crosspiece element connecting the two upright members; each of such elements having a substantially "L" shaped section, and further comprising a base connecting the upright elements to the floor, that can be realised in such a way that it results in being simple, convenient, safe and economical.

For reaching such purposes, the present invention has as its subject a door frame, in particular for refrigeration cells, comprising two upright elements and a superior crosspiece element connecting the two upright elements, each of such elements having a substantially "L" shaped section, and further comprising a base connecting the upright elements to the floor, characterised in that the upright elements and the superior crosspiece element are realised in a modular manner by parts which can be assembled between themselves.

Further purposes and advantages of the present invention shall result in being clear from the following detailed description and annexed drawings supplied purely as an explanatory and non limiting example, wherein:

- figure 1 represents a prospective sectioned view of the assembly of an upright element of the frame according to the invention;
- figure 2 represents a prospective sectioned view of a face of the upright element of the frame according to the invention;
- figure 3 represents a prospective sectioned view of an assembly module of the internal face of the upright element of the frame according to the invention;
- figure 4 represents a frontal prospective view of a frame assembled within an opening for the door of a refrigeration cell;
- figure 5 represents a prospective view of a frame according to the invention, in the assembly phase;
- figure 6 represents in detail the coupling of the upright elements and the crosspiece element.

The present invention is based on the acknowledgement of the fact that such purposes can be reached by realising the upright elements and the superior crosspiece element in a modular manner and of materials being different from wood, which is the material currently used.

In particular extrudsed or drawn elements of a plastic material are used, a material that well adapts to the

hygiene requirements of products used in the food industry.

In figure 1, that represents a prospective sectioned view of the assembly of an upright element of the frame according to the invention, number 1 indicates an upright element (from herein on referred to as upright), number 2 indicates the front face of the upright, while 3 indicates the internal face of the upright. A wall of the refrigeration cell in the door opening zone is schematically indicated with number 39.

With number 4 an aluminium profile is indicated for fixing the frame, with known means such as screws, to the internal walls of the refrigeration cell and for closing the air passage between the frame and the walls; such profile follows the entire development of the frame.

As can be seen from the figure, the internal part 3 of the upright 1 is made up of a number of profiles 5, 6 and 7, which are snap fitted together, until the desired size of the internal face of the upright is reached.

Said profiles 5, 6 and 7, one of which is illustrated in detail in figure 3, vary between themselves only with regards to their length.

It may not be necessary that the internal part of the upright be realised with three profiles of a different size, but may be realised with a different combination, i.e. three identical profiles or two identical profiles and one being different or only two different profiles or a single profile, inasmuch there use depends on the thickness of the wall of the cell, that as said varies according to the specific cases, with a possibility of size increases of 10 mm starting from 20 mm (20-30-40-50-60-etc.).

Said profiles, one of which is represented in figure 3, on one side for the entire height extension, provide lateral centring wings 8 and central elastic clipping wings 9.

At the extremity of said central elastic wings a hooking tooth 10 is provided. Whereas on the other side, for the entire height extension of the profiles, at least two channels 11 are provided.

At the bottom of the internal lateral wall of said channel 11 a hooking tooth recess 12 is realised.

Also on the external part 2 of the upright, represented in figure 2, on an extremity of the side that partially contacts the external wall of the cell channels 13 are provided, along the entire height extension, and where on the bottom of the internal wall of the channels a hooking tooth recess 14 is obtained.

The dimensions of channels 13 and the hooking teeth are the same as the channels and hooking teeth of the profiles that comprise the side 3 of the upright.

Assembly of the upright 1 is carried out in the following manner:

- cutting to a desired length the profile of part 2 of the upright 1,
- cutting to a desired length the modules necessary for realising the necessary width of the internal part 3 of the upright 1. such length is less than that of the profile of part 2 of the upright for allowing coupling to the superior crosspiece element,
- making up part 3 of the upright 1, sliding the wings 8 and 9, present on one side of the module, in the channel 11 of the successive module, then using pressure the teeth 10 are hooked to the hooking teeth recesses 12 located at the bottom of the channels,
- part 3 of the upright 1 realised in this way is then hooked to part 2 in the same way in which the various modules of part 3 were hooked, i.e. by sliding the wings 8 and 9 of the last module, into the channels 13 of part 2 and with pressure hooking the teeth 10 to the hooking teeth recesses 14.

For enabling such assembly, the various profiles that make up the upright are realised in a thermoplastic material, for instance PVC.

The upright realised in this way (figure 1 for simplicity illustrates only one of the two uprights as the other is symmetrical to the first), are covered with covering plates 15, 16.

Such covering is divided in two parts 15 and 16, so as to avoid heat transmission between the colder interior of the cell towards the warmer exterior with the consequent dispersion and energy wastage.

The covering plate 15 covers the external face of part 2 of the upright and an extremity of which is hooked to the contact part of the upright 1 to the external wall of the cell, while the other extremity is hooked to a wall 18 of a channel 17 located on a side of part 2 of the upright 1.

The covering plate 16 covers the external face of part 3 of the upright 1 and an extremity is hooked to the extremity of the part 3 located towards the interior of the cell and held in position by the profile 4, while the other extremity is hooked to opposite wall 19 of the channel 17 located on a side of part 2 of the upright 1.

The channel 17 has within its interior teeth 20 for the snap fitting of a profile of a plastic material 21 for the closure of such channel 17.

Number 22 indicates in figure 4 a crosspiece element (from herein on referred to as crosspiece) connecting the uprights, the section of which is the same as that of the uprights and is realised in the same way as that of the uprights.

The assembly of the crosspiece 22 to the uprights 1 is realised by way of two coupling elements 23 inserted within the frontal profile of the crosspiece, one in each extremity of the crosspiece.

Said coupling elements 23, realised in a rigid plastic material, have two integral threaded pins 24, upon which the two uprights in which two holes for the passage of the threaded pins have been obtained are assembled; at this point it is sufficient to block the uprights to the crosspiece by way of two threaded nuts.

For constructive requirements in other cases said assembly can be inverted, i.e. the coupling elements 23

assembled to the extremities of the uprights 1 and bolted to the crosspiece 22.

So as to avoid clamping between two plastic components, that could cause the risk of deforming the components, an iron plate 25 is inserted in the uprights.

Number 34 indicates a closing plug of the upper and lower extremities of the uprights.

With number 26 a joining base of the two uprights of the frame is indicated.

Said base 26 is constituted by an iron profile 27 of an upturned "U" shape and fixed to the uprights, by way of known means such as screws or bolts, with a spacer 28 (note fig. 1) being interposed.

The spacer 28 enables the fitting on profile 27 of a profile 29 being of a rigid plastic material.

The profile 29 has channels 30 apt at housing a wire resistance 31, which is protected and held in position by a stainless steel threshold cover 32; said threshold cover 32 having laterally, along its entire length, two limbs bent to 90°.

Said threshold cover 32 is held in position over profile 29, both by way of the insertion of the lateral limbs within two channels obtained on the profile 29, and by way of screws.

The resistance 31, apart from being positioned on the profile 29, follows the entire profile of the frame and runs within an aluminium profile 33, made up of two parts that fit together.

The profile 33 has internal channels for housing the resistance so as to avoid its damage upon closing the two parts of the profile.

Said profile 33, apart from having the function of containing and housing the resistance, also has the function of distributing the heat produced by the resistance, to the painted sheet covering of the external face of the uprights and crosspiece.

The resistance 31 is used for avoiding the freezing of the rubber seals of the door in the cases in which the refrigeration cell is used at low temperatures (< -10°C) and as a consequence the risk of breaking the seals upon opening the door.

The characteristics of the door frame for refrigeration cells according to the present invention, from the present description and annexed drawings result therefore in being clear, as do its advantages; in particular represented by:

- ease of assembly, in that the components making up the uprights are snap fitted without the use of additional fixing means such as nails or other,
- reduction of costs, due to eliminating the necessity of wood working, requiring specialised personnel and long set-up times,
- ease of realising frames for different grades of thickness of the walls of the cell, and the possibility of simultaneous realisation,
- ease of supplying and storing materials,
- better hygiene for the system.

It is clear that numerous variants are possible by the skilled man, to the door frame described as an example, without for this departing from the scope of novelty inherent in the inventive idea.

For instance, before insertion of the various modules for making up the frame, so as to increase the holding power between the modules and reduce the passage of air, one can apply to the channels of the modules and to the wings a coat of glue.

It is however obvious that, remaining with the principles of the invention, numerous variants are possible to the constructive characteristics of the frame described as an example, without for this departing from the novelty principles inherent in the inventive idea, as it is clear that in the practical realisation of the invention the shapes and sizes of the components may be different and may be substituted with technically equivalent elements.

## Claims

1. Door frame of a refrigeration cell, comprising two upright elements and a superior crosspiece element connecting the two upright elements, each of such elements having a substantially "L" shaped section, a base connecting the upright elements to the floor being further provided, characterised in that the upright elements (1) and the superior crosspiece element (20) are realised in a modular manner by parts which can be assembled between themselves (2,5,6,7).

2. Door frame of a refrigeration cell, according to claim 1, characterised in that the modular parts (2,5,6,7) of the upright elements (1) and of the crosspiece element (22) are profiles of a thermoplastic material.

3. Door frame of a refrigeration cell, according to claim 2, characterised in that for fixing said profiles (5,6,7) between themselves, lateral centring wings (8), central elastic hooking wings (9) and hooking teeth (10) are provided.

4. Door frame of a refrigeration cell, according to claim 2, characterised in that for fixing said profiles (5,6,7) between themselves, channels (11) are provided in which at the bottom of the internal wall of said channels (11) teeth (12) are provided.

5. Door frame of a refrigeration cell, according to claim 2, characterised in that for fixing said profiles (5,6,7) with a frontal profile (2), lateral centring wings (8), central elastic hooking wings (9) and hooking teeth (10) are provided.

6. Door frame of a refrigeration cell, according to claim 2, characterised in that for fixing said profiles (5,6,7) with a frontal profile (2), channels (13) are provided

in which at the bottom of the internal wall of said channels (13) teeth (14) are provided.

**7.** Door frame of a refrigeration cell, according to claim 2, characterised in that said profiles (5,6,7) that make up a side of the upright elements are of different heights.

**8.** Door frame of a refrigeration cell, according to claim 2, characterised in that for fixing said profiles (5,6,7) between themselves and for sealing the passage of air, a coat of glue is provided.

**9.** Door frame of a refrigeration cell, according to claim 1, characterised in that the modular parts (2,5,6,7) of the upright elements (1) and of the crosspiece element (22) are covered by sheet covering plates (15,16).

**10.** Door frame of a refrigeration cell, according to claim 9, characterised in that the sheet covering plate (15,16) is made in two parts for interrupting the heat transmission from the colder interior of the cell towards the warmer exterior.

**11.** Door frame of a refrigeration cell, according to claim 10, characterised in that a part (15) of the sheet covering plate covers the external face of the external part (2) of the uprights (1) and is hooked at an extremity to the contact part of the upright (1) to the external wall of the cell and the other extremity is hooked to a wall (18) of a channel (17) of the external part (2) of the upright (1).

**12.** Door frame of a refrigeration cell, according to claim 10, characterised in that a part (16) of the sheet covering plate covers the external face of the internal part (3) of the uprights (1) and is hooked to an extremity of the internal part (3) of the upright (1) and is held in position by the profile (4) fixing the upright to the cell and the other extremity is hooked to a wall (19) of a channel (17) of the external part (2) of the upright (1).

**13.** Door frame of a refrigeration cell, according to claims 11 and 12, characterised in that a plastic profile (21) is provided for the closure of the channel (17) provided on the external part (2) of the upright.

**14.** Door frame of a refrigeration cell, according to one of the previous claims, characterised in that in the channel (17) of the external part (2) of the upright hooking teeth (20) are provided for the snap fixing of the plastic profile (21).

**15.** Door frame of a refrigeration cell, according to claim 1, characterised in that a resistance (31) is provided for protection against freezing of the door seals of the cell and that said resistance (31) follows in particular the entire profile of the frame and of the base.

**16.** Door frame of a refrigeration cell, according to claim 15, characterised in that a profile (33) is provided for containing said resistance (31) and that said profile (33) is made up in particular of two parts that are snap fixed together and that channels for housing the resistance (31) are provided.

FIG. 1

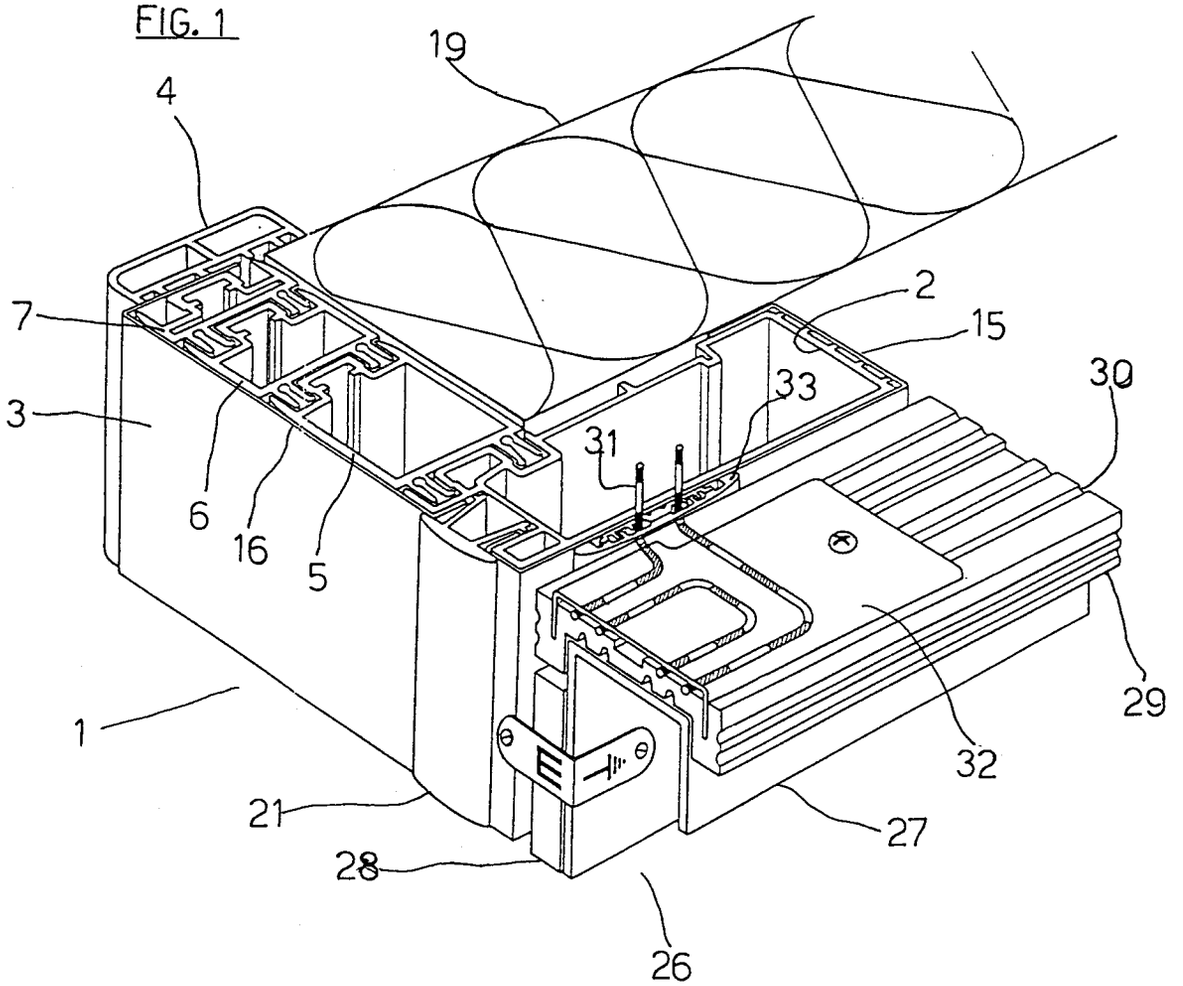



FIG. 2

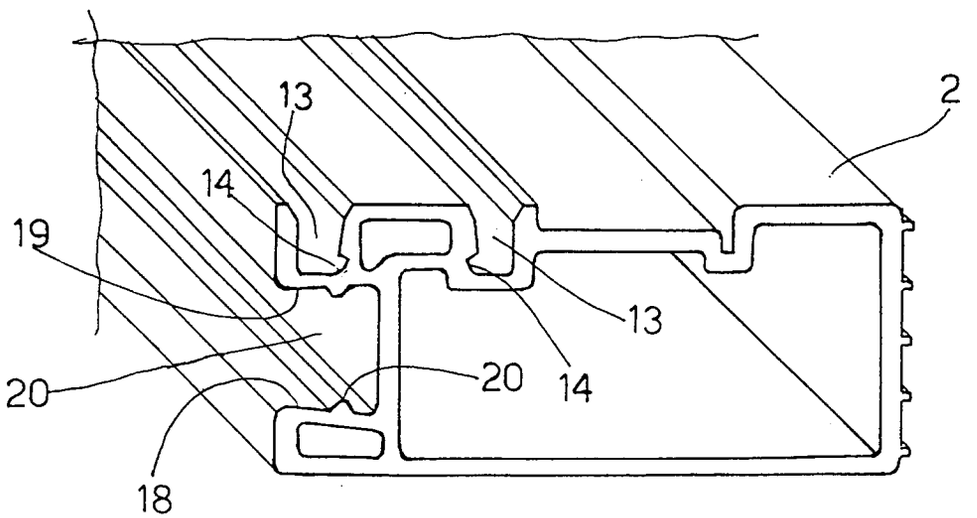


FIG. 3

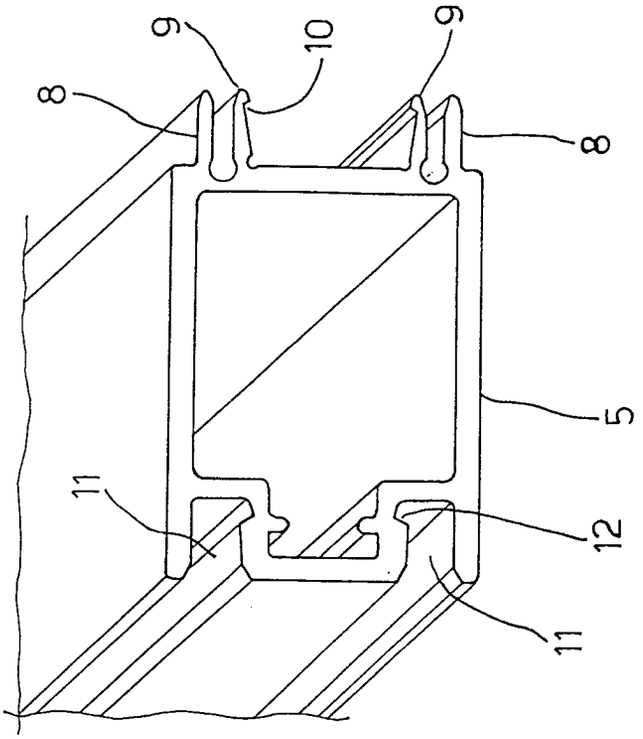



FIG. 4

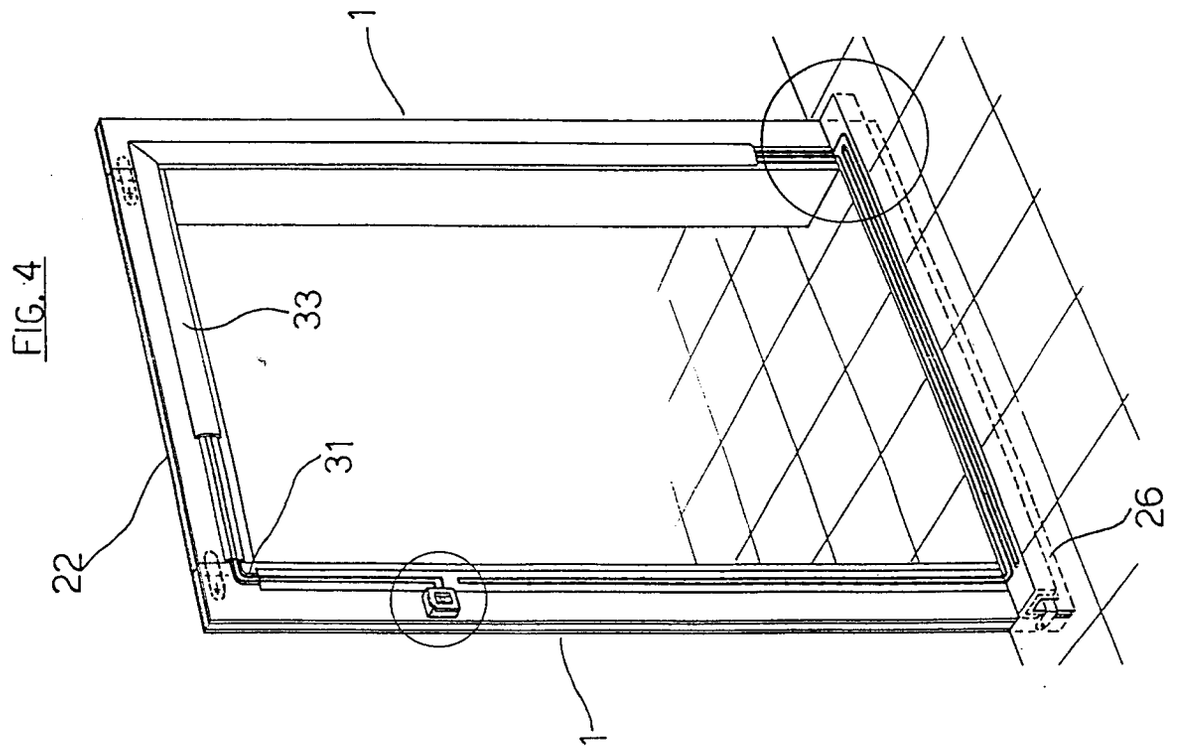


FIG. 5

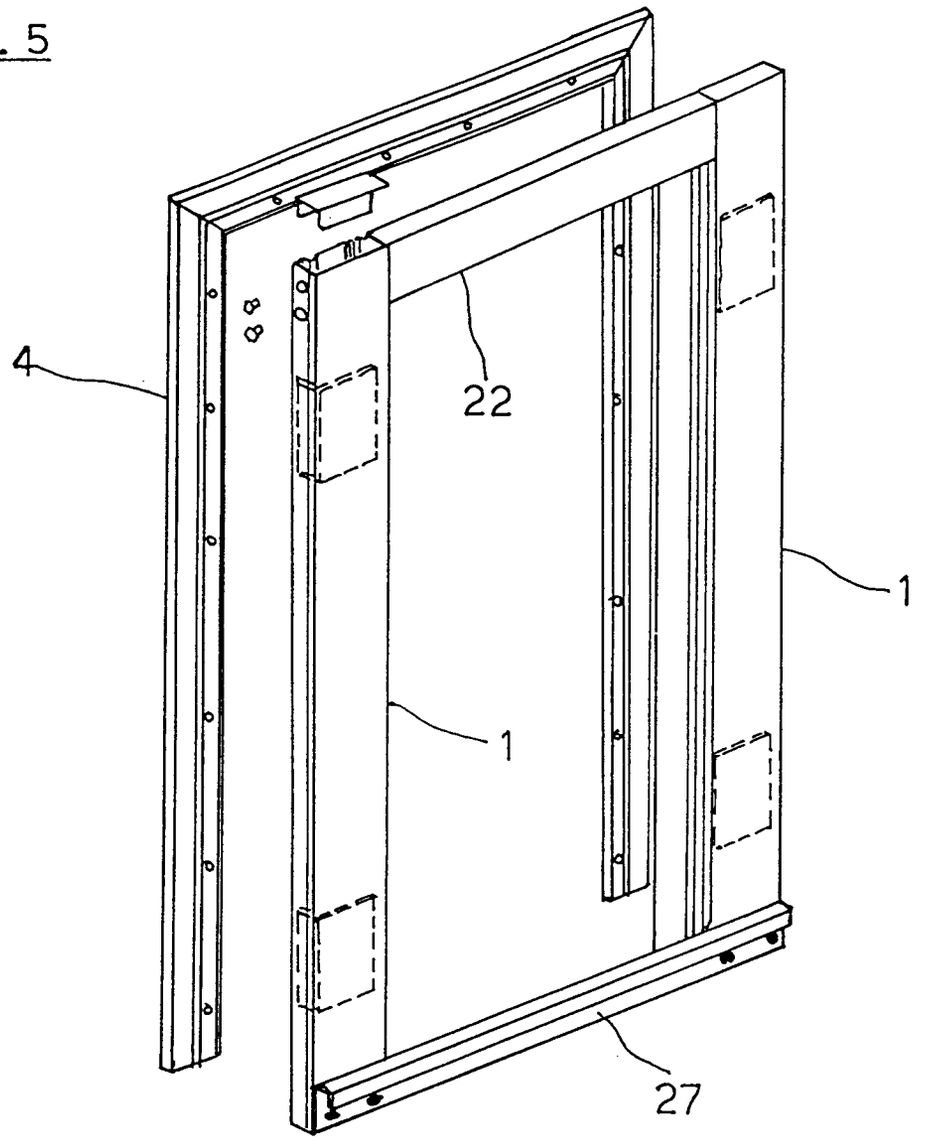
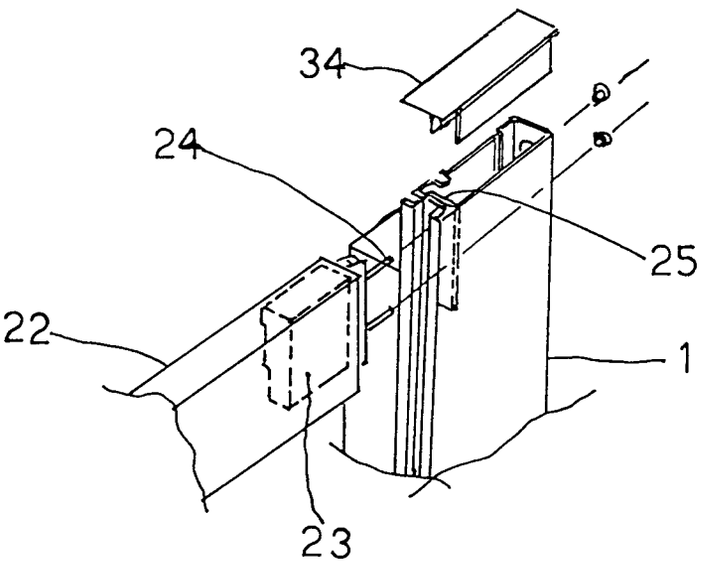



FIG. 6



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# EUROPEAN SEARCH REPORT

Application Number
EP 95 11 0647

## 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) |
|---|---|---|---|
| X | WO-A-89 09868 (RIZZOTTI)<br>* page 7, line 15 - page 8, line 2 *<br>* page 9, line 32 - line 34; figures 1,7 * | 1 | F25D23/00<br>E06B1/30<br>E06B1/34 |
| A | --- | 8 | |
| A | GB-A-1 115 868 (STAMICARBON)<br>* page 1, line 9 - line 14; figures 1,4,5 *<br>--- | 1,2 | |
| A | US-A-4 856 239 (ELSASSER)<br>* column 1, line 5 - line 13; figures 1,2 *<br>--- | 1,2 | |
| A | US-A-3 579 943 (TAM)<br>* figures 1-5 *<br>--- | 3-6 | |
| A | FR-A-2 113 832 (ANTHONY`S MANUFACTURING COMPANY)<br>* page 1, line 1-3; figures 1,3-5,9 *<br>----- | 15 | |

| TECHNICAL FIELDS SEARCHED (Int.Cl.6) |
|---|
| E06B<br>F25D |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| THE HAGUE | 17 July 1996 | Matzdorf, U |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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