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(71) Applicant: **Pistoia, Luigi**

**55044 Marina di Pietrasanta (LU) (IT)**

(72) Inventor: **Pistoia, Luigi**

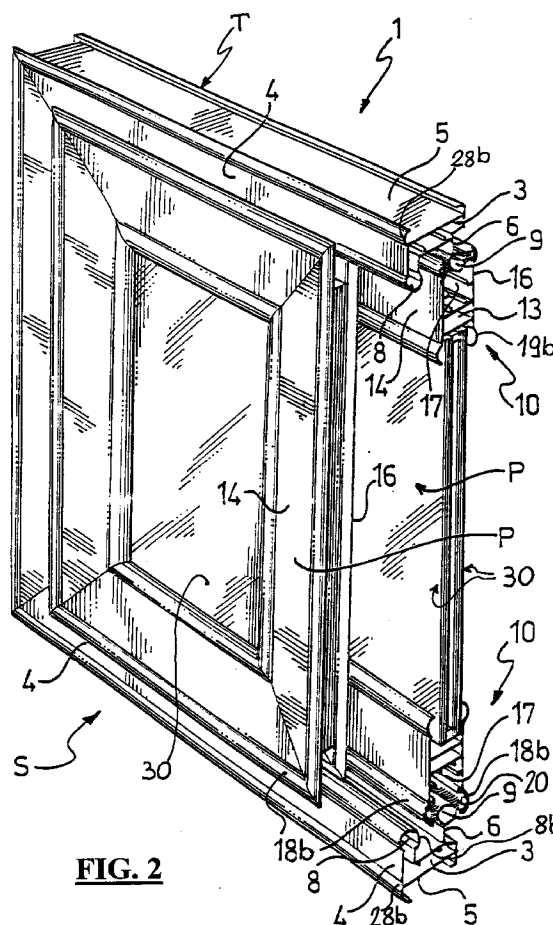
**55044 Marina di Pietrasanta (LU) (IT)**

(74) Representative: **Celestino, Marco**

**ABM, Agenzia Brevetti & Marchi,  
Via A. Della Spina 40  
56125 Pisa (IT)**

**(54) Guide extruded profile and extruded profile to it associated for sliding doors and windows**

(57) Guide extruded profile (1) and extruded profile to it associated (10) for the sliding engagement between panels (P) and fixed frame (T) of a sliding door or window (S). The guide extruded profile (1) comprises at least a guide head (8,9) and the associated extruded profile (10) comprises a housing (17) in which the head (8,9) engages. Friction contact means are provided for, between the guide head (8,9) and the housing (17), comprising brush means (20) that engage with a convex surface (8b,9b), which are preferably formed on the guide head (8,9) and advantageously have a coating layer (25). The guide extruded profile and the extruded profile to it associated preferably also present external walls having further convex portions (18b,19b,28b). All these convex portions (8b,9b,18b,19b,28b) have the function of diverging the bristles of a brush seal (20) without causing a permanent bending thereof, decreasing the braking friction when opening and closing a sliding door or window, and increasing the friction sliding surface between the brush seal and the guide extruded profile.



**FIG. 2**

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## Description

The present invention relates to the field of windows and door frames and more precisely it relates to a guide extruded profile for sliding doors and windows and to a profile associated to it.

The expression sliding doors and windows for a person skilled in the art generally indicates the various types of windows, doors and the like comprising two or more panels, usually glazed panels, that engage slidably parallel to one another on a fixed rectangular frame. Normally, the fixed frame is an extruded composite profile from whose perimeter guides protruding towards the inner side of the sliding door or window extend. The panels, normally having structure consisting in extruded profile elements, engage with the guides by means of grooves or housings provided for on their outer perimeter. More precisely, the guides provided for on two opposite sides of the frame have the function of rails for the panels, whereas the guides provided for on the other two opposite sides have the function of stop and seal.

In more detail, in the housings of the extruded profiles of each panel having the function of rail, in which the guides engage, sealing elements and rolling elements, for example wheels, are provided for, whereas in the other housings sealing elements and shoulder elements, for example cushion rubber elements, are provided for. Among the sealing elements there are friction elements which help in the control of the transversal balance of panels, prevent dust from entering and help in the seal of the housing with respect to the outside. The friction elements may be fixed to the panels housings thus sliding against the guides sides or, on the contrary, they may be fixed to the guides sides thus sliding against the inner walls of the panels housings.

In some types of sliding doors or windows, the guides may be provided for in the sliding panels and not in the fixed frame, the latter, in this case, would comprise grooves or housings, contrarily to what above stated.

To sum up, in both cases they are extruded profiles engaging with one another, one having function of guide and the other having function of housing, provided for respectively in the frame and in the panels, and vice versa.

Moreover, sliding doors or windows having glazed panels both sliding on one another are known. Also in this case there is a direct contact between two extruded profiles, by means of sealing friction elements.

At present, sealing friction elements are used consisting in strips made of textile fibre, such as felt, or, alternatively bristle elements, known in the field as brush seals. Felt, however, is subject to wear and should for this reason be frequently changed, and this is not easy. Brush seals, on the contrary, in use are subject to lose their original shape. In fact, the frequent alternate reciprocal movement of extruded profiles,

which is a consequence of the panel sliding on the frame, causes either an alternate bending of the bristles against the guides or a permanent oblique bending (see figure 1A) that in the long run causes their yielding and permanent deformation with remarkable decrease of sealing power and with the subsequent need, also in this case, of frequently changing them.

It is an object of the present invention to overcome these drawbacks by providing a guide extruded profile and an extruded profile to it associated, for sliding doors and windows of the type above described, which allows an effective use of friction sealing elements and with sealing power that lasts the more possible.

It is a particular object of the present invention to provide a guide extruded profile and an extruded profile to it associated which, contrarily to the known art:

- allows diverging of the bristles of brush seals without that they lose permanently their shape;
- increase the contact surface between the brush seals and the guide extruded profile;
- facilitates opening and closing of sliding doors or windows.

These objects are achieved by a guide extruded profile and an extruded profile to it associated as defined by the appended claims.

Further characteristics and advantages of the guide extruded profile and of the extruded profile to it associated according to the present invention will be made clearer with the following, but not limitative, exemplifying description of several exemplifying embodiments thereof, with reference to the attached drawings, wherein:

- figure 1A shows as above stated a guide extruded profile engaging with an associated extruded profile according to the known art;
- figure 1B shows a guide extruded profile coupled to an associated extruded profile according to the present invention;
- figure 2 shows a perspective view of a sliding door or window comprising extruded profiles according to the invention ;
- figure 3 shows a cross sectional view of a guide extruded profile of the sliding door or window of figure 2, engaging with the extruded profile to it associated;
- figures 4a, 4b and 4c show the extruded profiles of figures 1A and 3 in operative conditions;
- figure 5 shows a cross sectional view of a friction engagement of two panels similar to those of the sliding door or window of figure 2;
- figure 6 shows a full cross sectional view of the guide extruded profile of figure 3 with function of rail for two associated extruded profiles;
- figures 7A and 7B show a different embodiment of the guide extruded profile shown in figures from 2 to

4;

- figure 8 shows another embodiment of the guide extruded profile and of the associated extruded profile of figures from 2 to 4;
- figure 9 shows a preferred embodiment of a brush seal fixed to the extruded profiles according to the invention.

With reference to figure 2, a guide extruded profile according to the invention is generally indicated with 1 and forms the fixed frame T of a sliding door or window S, in which two panels P, forming its four sides, i.e. its upper and lower sides and its two posts, can slide.

A cross section 2 of guide extruded profile 1 is shown in figure 3 and comprises a central chamber 3, defined by two walls 4 and a wall 6, which are adjacent and parallel to one another and are orthogonal to transversal walls 5 of cross section 2. Walls 4 and wall 6 have at their ends heads 8 and 9, respectively, having a cusp shaped upper perimeter 8a, 9a and two lateral curved convex portions 8b, 9b radiused with the corresponding walls 4 and 6.

Always with reference to figure 3, cross section 2 of guide extruded profile 1 is shown coupled to that of the two associated extruded profiles 10 forming the perimeter of panels P of figure 1. The cross section 12 of associated extruded profiles 10 also comprises a substantially rectangular central closed chamber 13, defined by external walls 14 and 16 and inner transversal walls 15. Walls 14, 15 and 16 define a housing 17 for wheels or cushion elements according to the different function of associated extruded profile 10. The wheels, which are indicated with 11, are shown in figure 6, whereas the cushion elements, indicated with 21, are shown in figure 1B.

Walls 14 and 16 are suited to house, as shown in figures 5 and 6, the glasses 30 of panels P, in a traditional way and for this reason not described in further detail. At the opposite ends, walls 14 and 16 have housings 18 for a corresponding brush seal 20 that faces towards housing 17.

In a fully coupled position, shown in figures 1B, 3 and 4C, each guide extruded profile 1 engages with associated extruded profiles 10 with heads 8 and 9 set between brush seals 20, which frictionally engage with convex portions 8a or 9a.

After a comparison between figure 1A and figure 1B the difference of shape of the bristles of brush seal 20 in the two cases is clear. According to the invention, the curved convex perimeter, i.e. a rounded perimeter, of portions 8b and 9b of heads 8, 9 of figure 1B, above all achieves one of the above objects, that is the fact of always causing a diverging of the bristles of brush seal 20, without that they are bent permanently in the way of figure 1A. The bristles, moreover, are arranged in a substantially symmetric way with respect to the boundary of portions 8b, 9b, with increase of the surface of guide extruded profile effectively swept by brush seal 20.

It must be noted that the contact between bristles 20 and guide 8,9 occurs differently in the following two cases: the guide extruded profiles form the upper/lower end and the guide extruded profiles form the posts of the frame T of the sliding door or window S.

The coupling of extruded profiles of guide 1 forming the posts of frame T occurs in the way shown in figures 4A, 4B and 4C in respective successive phases. In fact, when panel P is at its travel end, head 8 (or, similarly, head 9), gradually urges on brush seals 20 of associated extruded profiles 14, 16. Initially (fig. 4A), the bristles of brush 20 contact cusp 8a (o 9a); then (fig. 4B) bend sliding against portions 8b (o 9b), and then (fig. 4C), thanks to convex curved surface of the latter, they set themselves symmetrically against portions 8b (o 9b) when panel is at its travel end against cushion elements 21 of figure 1A.

The guide extruded profiles that form the upper and lower sides of the frame T, on the other hand, have the function of rail for wheels 11 (fig. 6) of associated extruded profiles 10 of panels P. For this reason, their brush seal 20 have bristles always fully engaging with the heads 8 and 9 and evenly located by virtue of the convex curved shape of lateral portions 8b and 9b.

In this second case, the use of brush seals 20 having curved concave perimeter 20a, shown in figure 9, is advantageous. Their shape perfectly engages with the curved convex perimeter of portions 8b and 9b of heads 8, 9. This allows to achieve another among the above objects: friction sliding of bristles is lighter, because bristles bend less than in the known art. As a consequence, also stress and wear to which bristles are subject by the friction with guide extruded profile are decreased, increasing bristles life and allowing a light closing and opening of the sliding panels.

As shown in figure 3, associated extruded profiles 10 have walls 14 and 16 having at their ends convex curved portions 18b and 19b, substantially of the same shape of portions 8b and 9b of heads 8 and 9, and having similar function of those described above. In fact, with reference to figure 5, a direct sliding engagement between the two panels P is also possible. In this case, always according to the invention, on the two curved portions 19b of walls 14 or 16 of extruded profiles 10 which form panels P a brush seal 120 slidingly engages, fixed in housings 118 of extruded profiles of a support 130, fitted with extruded profiles 10. Also in this case the advantages of diverging the bristles of brush seal 120, increasing the contact surface between the brush seal and the extruded profile, and allowing a light opening and closing of the sliding door or window, are achieved.

The rounded perimeter of curved portions 18b of walls 14 or 16 of extruded profiles 10 allows, moreover, the creation of a auxiliary housing 18a parallel to housing 18 for seal 20. This housing 18a, whose cross section is shown in figures 1B, 6 and 8, is suited to engage with brackets 40 thus strengthening the corners of extruded profiles 10 which form panels P. Without said

auxiliary housing, according to the known art, brush seals were shorter than necessary, to make room in favour of brackets 40, with decreased friction sliding surface.

With reference now to figure 6, rounded portions 18b of walls 14 and 16 of associated extruded profiles 10 may also have the function of engaging with a brush seal 220, fixed between the two heads 8 and 9. Also in this case, the rounded surface diverges the bristles without causing their permanent bending and without that they excessively brake the sliding of panels.

Curved portions 18b and 19b, as well as portions 8b and 9b and further portions 28b provided for at the outer end of wall 4 of guide extruded profile 1, thanks to their rounded shape, do not present sharp edges that would be easily subject to oxidise or to be scratched. Moreover, they improve the overall aesthetic effect of the sliding door or window, thanks to the embossed plat-band formed by curved portions on the panel frame, as clearly shown in figure 2.

According to a possible different embodiment of the invention, portions 8b,9b,18b,19b,28b, instead of being shaped rounded, as above illustrated, may have a convex, advantageously radiused, peaked perimeter. In figure 8 are in this sense shown extruded profiles 1 and 10 with portions 8b, 9b, 18b, with peaked radiused perimeter. Also in this embodiment, in fact, the boundary of each convex portion, even if peaked, has the function of diverging the bristles, like the rounded portion above illustrated, decreasing the braking friction effect and increasing the friction sliding surface.

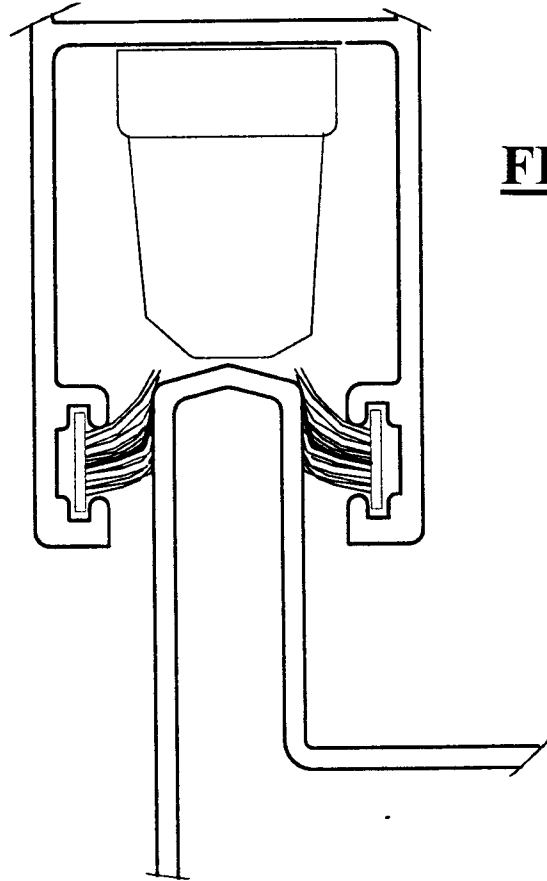
According to another different embodiment of the invention, shown in figures 6, 7A and 7B, a layer 25 coating heads 8 and 9 is provided for. Layer 25 is preferably fixed to the heads by means of slits 26, shown only in figure 7B, extending along curved portions 8b and 9b. In more detail, layer 25 has ribs 27 engaging in slots 26. Preferably, layer 25 is made of stainless steel, even if it could also be made of other metals or plastic material. Layer 25 has the task of protecting cusps 8a and 9a of heads 8,9 from the stresses to which the latter is subject by rolling wheels or by the impacts of the panel of the sliding door or window reaching its travel end. Layer 25, on the other hand, does not affect the curved or peaked shape of portions 8b and 9b, thus not reducing the advantages above described.

## Claims

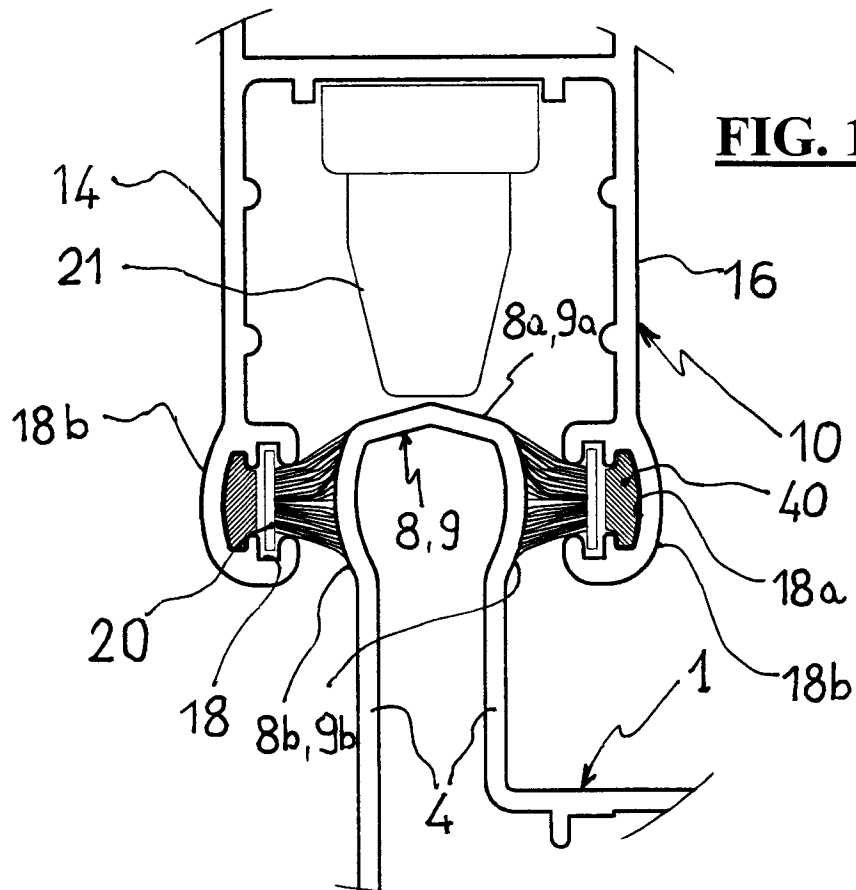
1. Guide extruded profile (1) and extruded profile to it associated (10) for the sliding engagement between panels (P) and fixed frame (T) of a sliding door or window (S), said extruded profile comprising at least a guide head (8,9), said associated extruded profile (10) comprising a housing (17) in which said head engages (8,9), friction contact means being provided for between said guide head (8,9) and said housing (17), characterised in that

said friction contact means comprises brush means (20) engaging with a convex surface (8b,9b).

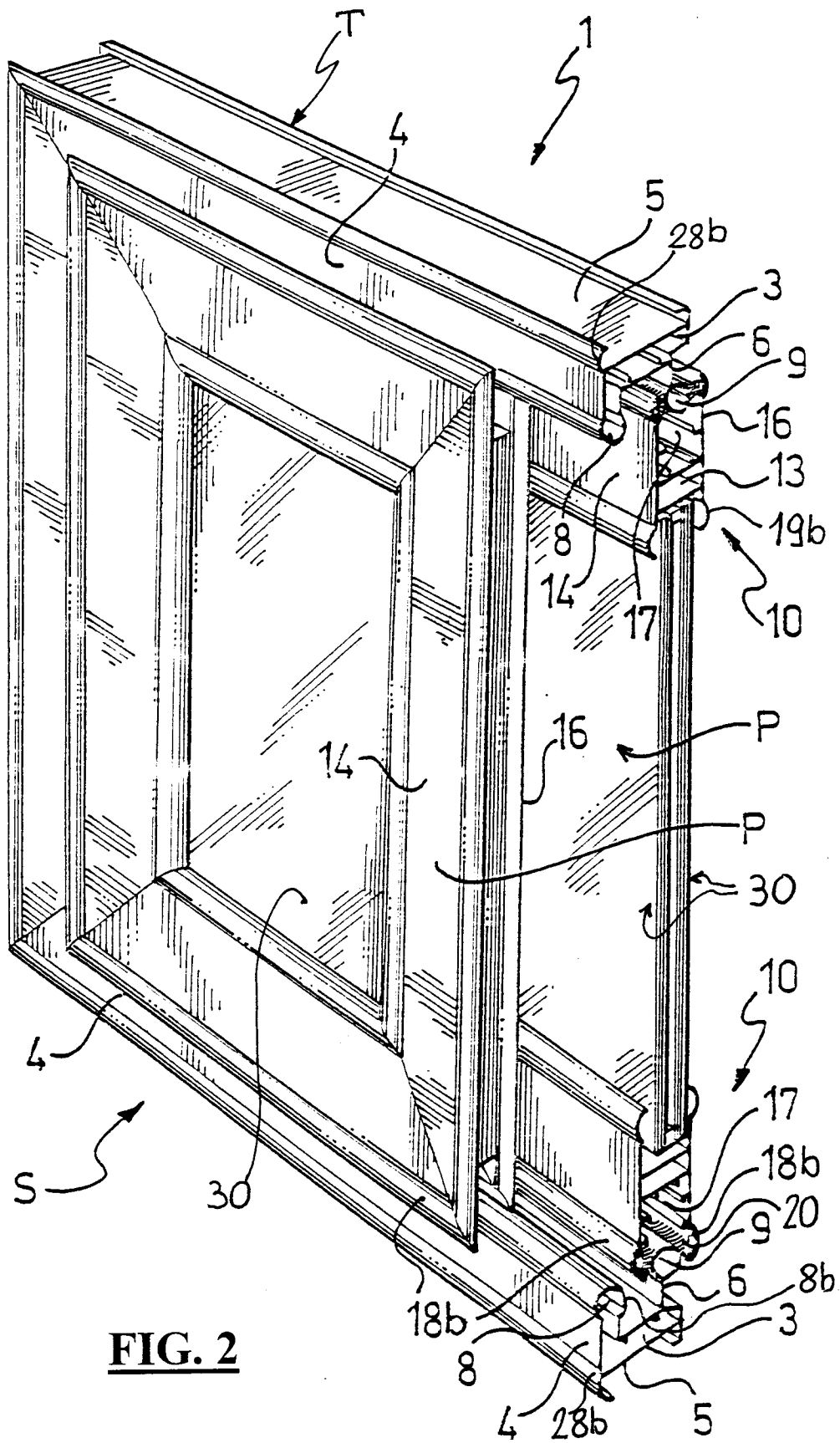
2. Guide extruded profile and extruded profile to it associated according to claim 1, wherein said convex surface (8b,9b) is formed on said guide head (8, 9), said brush means (20) being fixed to said associated extruded profile (10) inside said housing (17).
3. Guide extruded profile and extruded profile to it associated according to claim 1, wherein said convex surface (8b,9b) is formed on said housing, said brush means (20) being fixed to said associated extruded profile (10) inside said housing (17).
4. Guide extruded profile and extruded profile to it associated according to the previous claims, wherein said brush means (20) have concave sliding surface associated to said convex surface (8b,9b).
5. Guide extruded profile and extruded profile to it associated according to the previous claims, wherein said associated extruded profile comprises external walls having convex portions (18b,19b).
6. Guide extruded profile and extruded profile to it associated according to the previous claims, wherein said head (8,9) comprises a coating layer (25).
7. Extruded profiles forming the panels of a sliding door or window (S), comprising external walls (14,16) and friction contact means between two adjacent panels (P1,P2), characterised in that said friction contact means comprises brush means (120) engaging with a convex surface (18b,19b) formed on said external walls (14,16).
8. Extruded profiles according to claim 7, wherein, internally to said convex surfaces (18b,19b) of said external walls (14,16), housings (18a) for brackets (40) are provided for.
9. Extruded profiles according to the previous claims, wherein said convex portions (8b,9b,18b,19b) are curved.
10. Extruded profiles according to the previous claims, wherein said convex portions (8b,9b,18b,19b) are peaked.



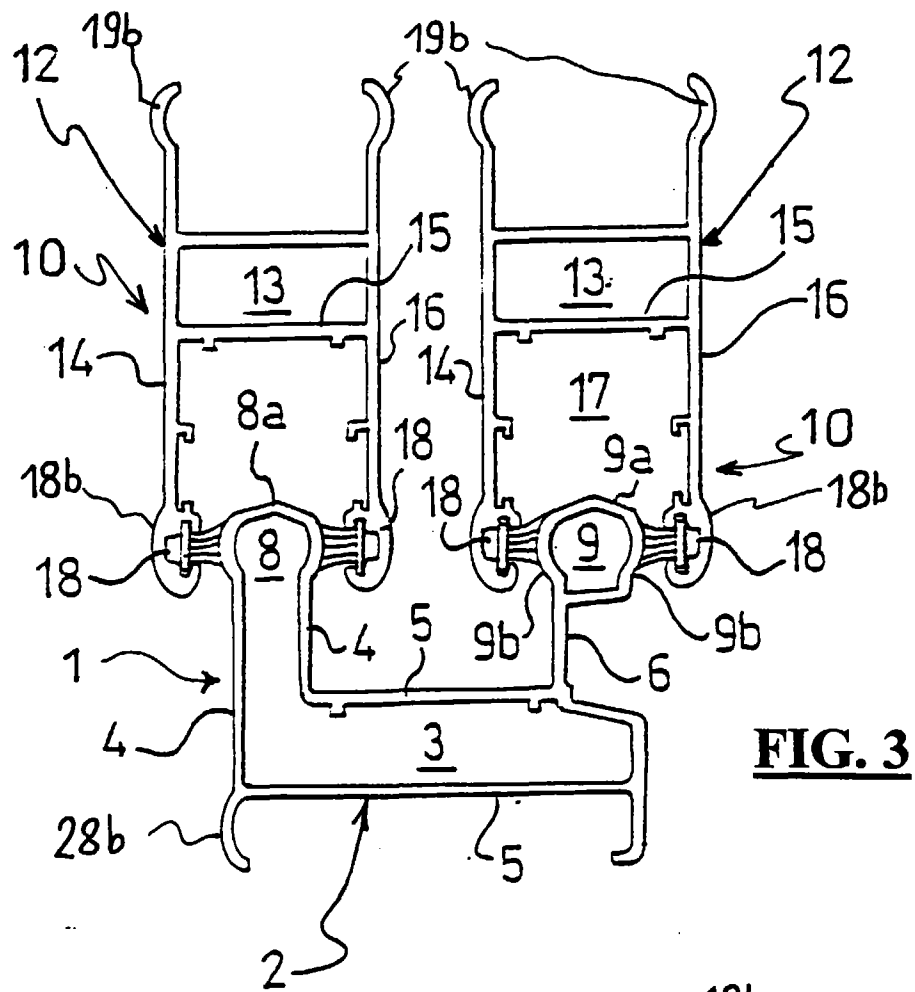
**FIG. 1A**



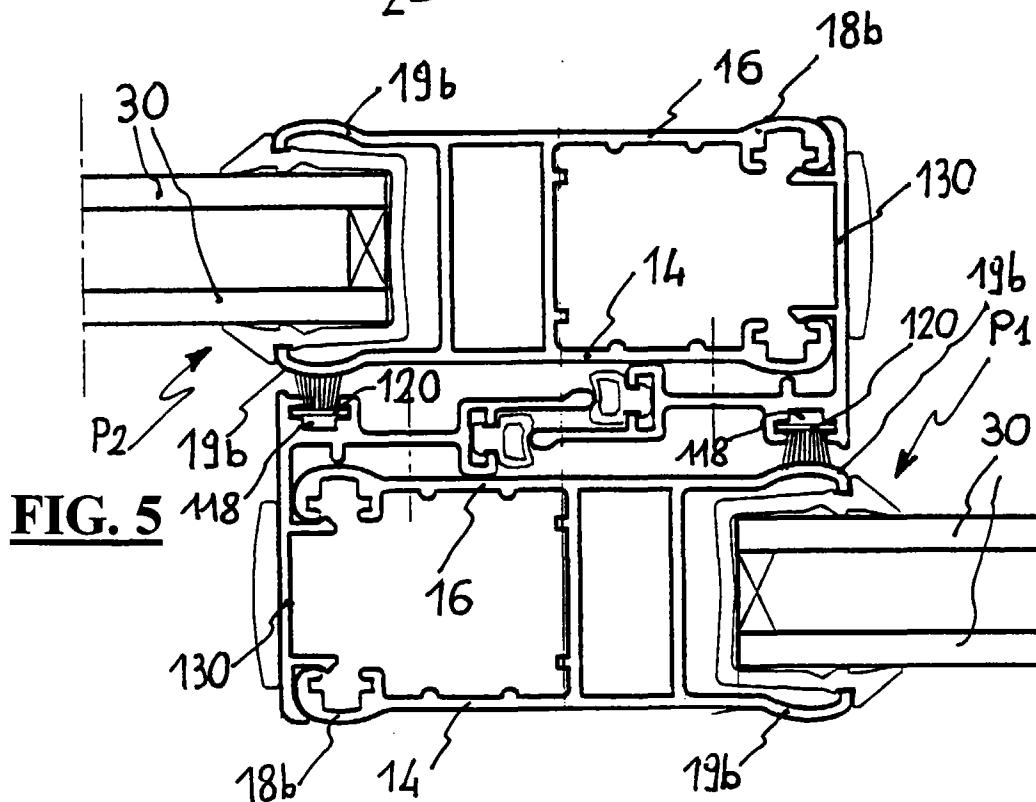
**FIG. 1B**



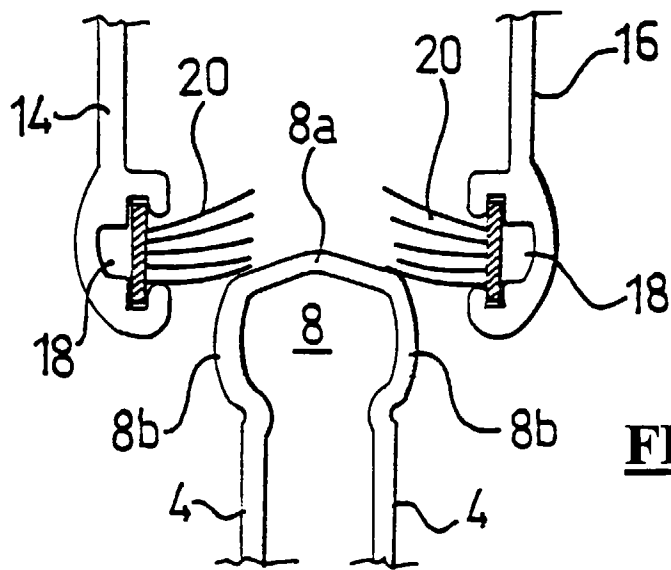
**FIG. 2**



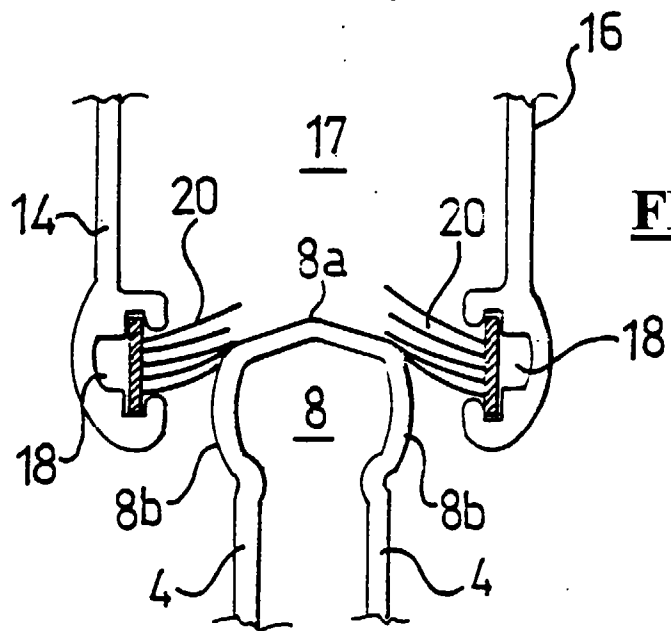
**FIG. 3**



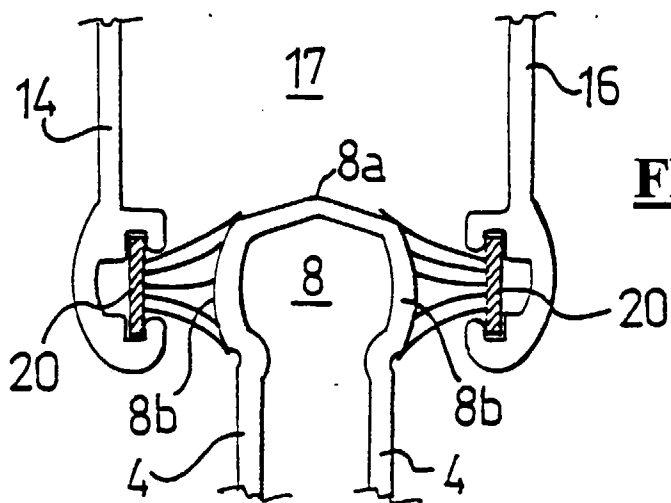
**FIG. 5**



**FIG. 4A**



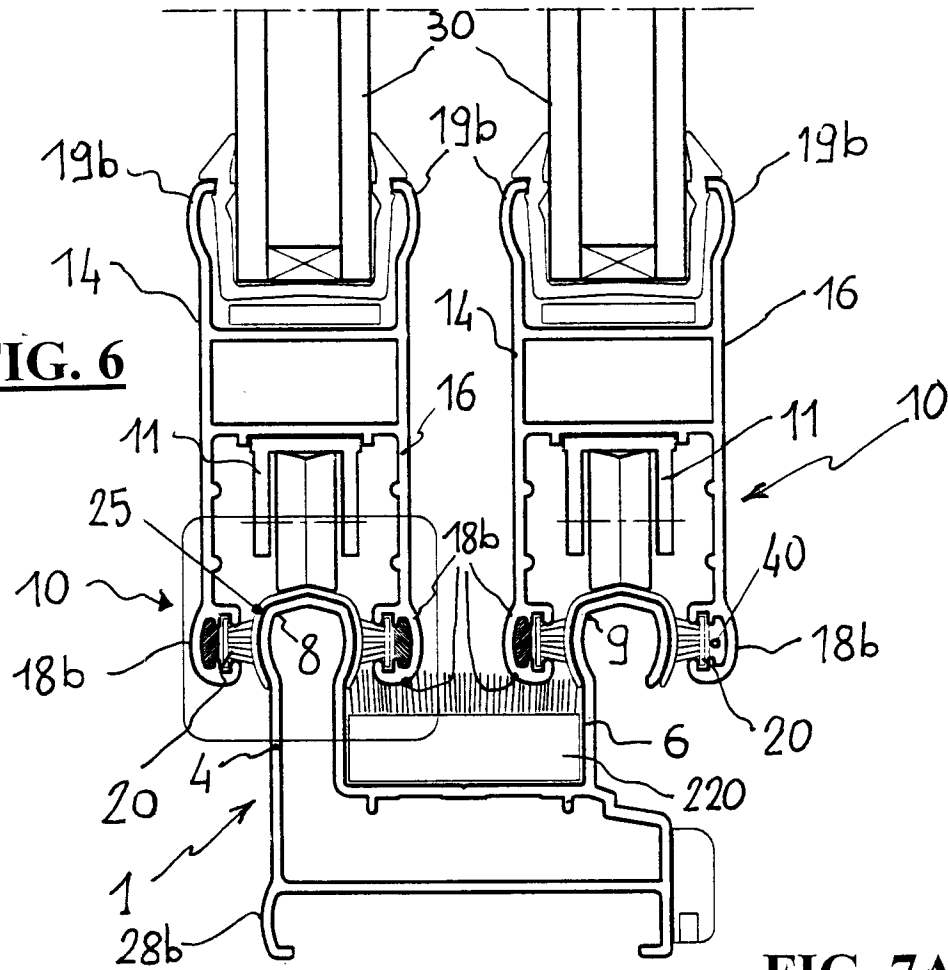
**FIG. 4B**



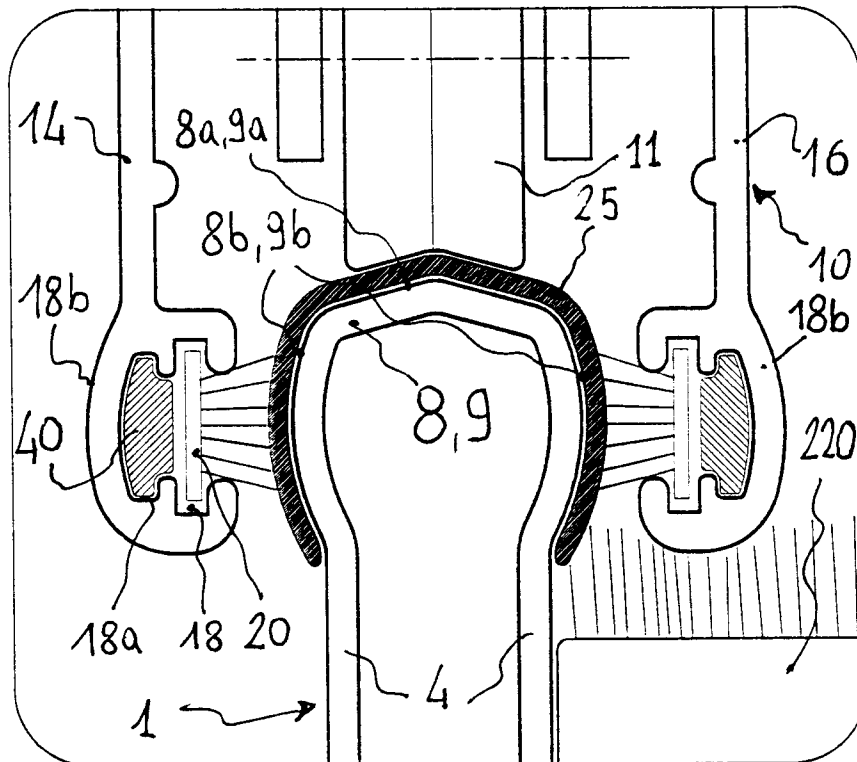
**FIG. 4C**

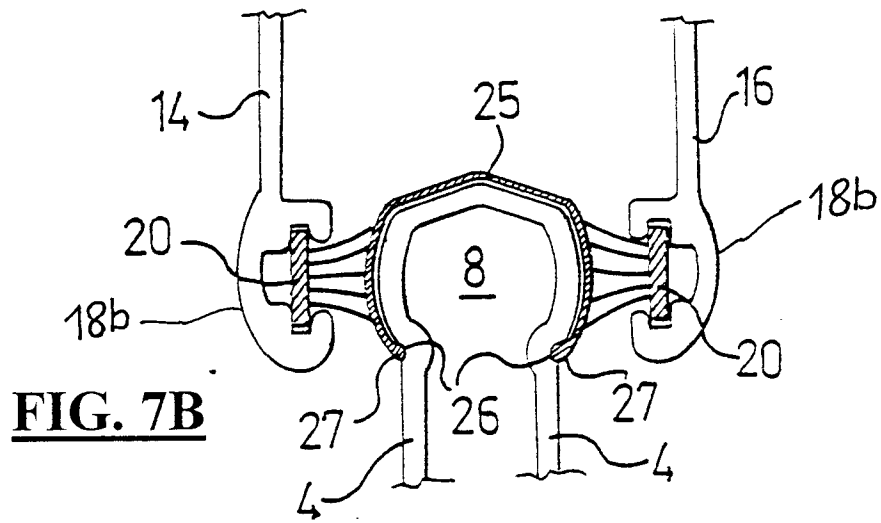


**FIG. 6**

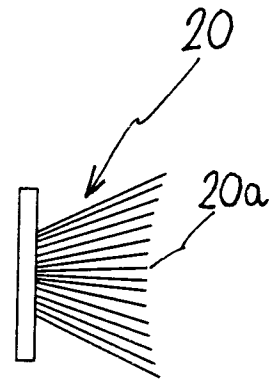


**FIG. 7A**

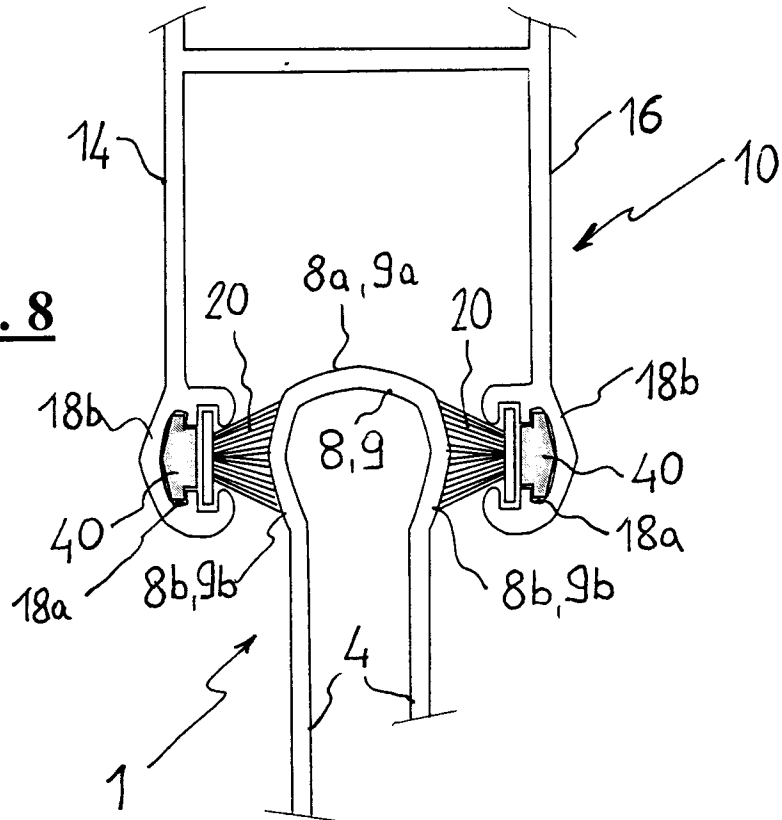




**FIG. 9**



**FIG. 8**





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# EUROPEAN SEARCH REPORT

Application Number  
EP 96 11 4282

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)
A	DE 84 05 419 U (GARDINIA-FENSTER-PROFIL-SYSTEME) * the whole document *	1-3,7,8	E06B3/46
A	DE 73 10 834 U (REHAU-PLASTIKS) * the whole document *	1-3,7,8	
A	AT 274 320 B (JUL. HÄDRICH) * the whole document *	1-3,7,8	
A	DE 84 36 880 U (EXTE-EXTRUDIERTTECHNIK) * figures 2,4 *	1,7	
A	US 4 202 137 A (R. P. RANDALL) * figure 3 *	1,5,7	
X	FR 2 309 700 A (H. ORIOL) * page 7, line 29-31; figures 7,12,13 *	1,7	
A	FR 2 634 512 A (J. FIGUERA) * figure 2 *	1	
A	GB 2 163 801 A (L. G. BRIGGS ET AL) * page 2, line 72-79; figure 1 *	1,6	E06B
A	FR 2 451 446 A (G. ONGARO) * figures 2,4 *	1,7,10	
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 11 February 1997	Examiner Krabel, A
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	
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			

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