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(54) **Elastically deformable vertical guide track for roll-up doors having a sliding flexible closure sheet**

(57) A guide track (14) for a roll-up door of the type comprising a flexible closure sheet (10) having side edges (10') sliding within elastically deformable vertical guide tracks (14) to allow the dislodgement of the closure sheet (10) when subjected to an impact or external forces. Each

of the guide tracks (14) comprises a base member (15) and a guide channel (16) for the closure sheet (10), in elastomeric material, and an elastically yielding protective wing (24) extending from the base member (15) on the front side and along the guide channel (16) of the track.

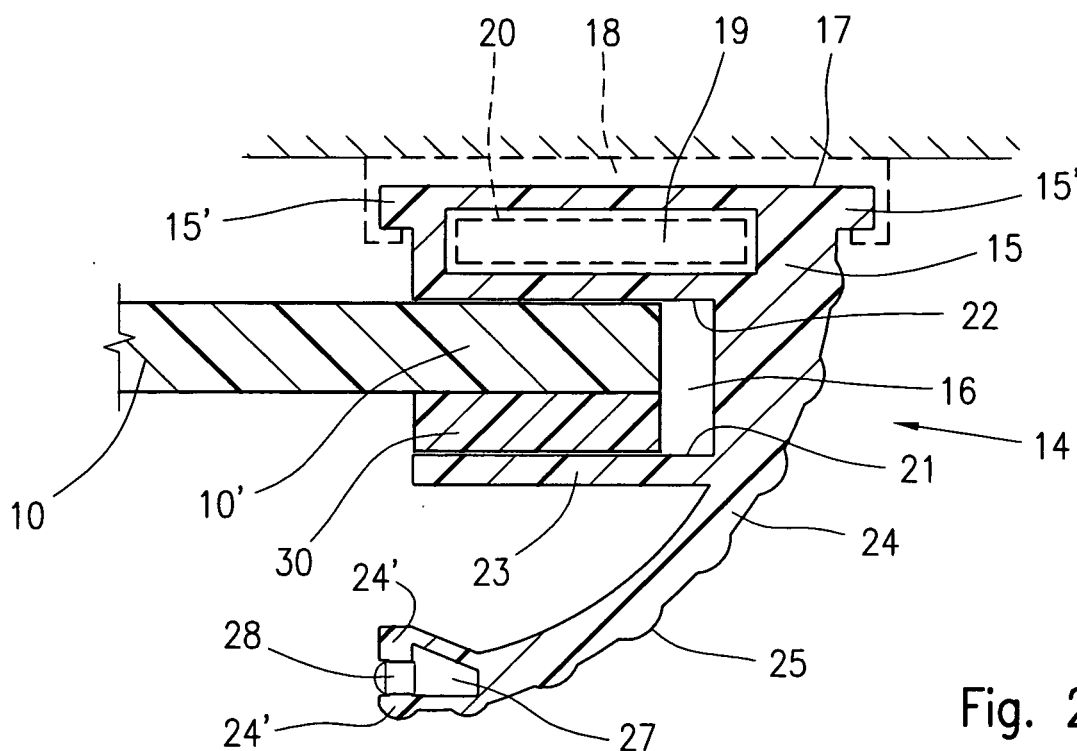


Fig. 2

Description

BACKGROUND OF THE INVENTION

[0001] This invention refers to roll-up or sliding doors of the type comprising a flexible closure sheet slidably movable along vertical guides, and in particular is directed to an improved guide structure provided with a suitable protective system, as well as to a roll-up door comprising side guide tracks for the closure sheet, according to the invention.

STATE OF THE ART

[0002] Roll-up doors comprising a closure sheet or flexible screen having lateral edges sliding in vertically extending guide trucks, are widely known and used for closing access apertures to industrial sheds, or for sectioning extensive commercial and/or industrial environments into separate areas.

[0003] Usually, they comprise a closure sheet or screen that can be wounding onto a roller operatively connected to an electric motor, which can be operated automatically and/or by an appropriate control device to slide upwards and downwards the closure sheet, usually along metal guides.

[0004] While the metal guides on one hand are structurally resistant and facilitate the sliding of the closure sheet, preventing it from slipping out, on the other they have the drawback of becoming irreparably damaged consequently damaging the same closure sheet or screen whenever, due to accidental causes, they are subject to the thrust of external forces, for example whenever the closure sheet or the same guides are hit by a moving vehicle.

[0005] In order to at least partially obviate this drawback, some time ago use has been suggested of non-deformable guides of elastically yieldable material, conformed to allow the closure sheet to slip out of the guide tracks without being damaged, while maintaining the possibility of being subsequently reinserted into the tracks to restore the running of the door.

[0006] Roll-up doors with elastically yieldable slide guides are found for example in US-A-4,016,920, EP-A-0.992.650 and EP-A-1.223.300.

[0007] In particular, US-A-4,016,920 discloses a roll-up door in which the guides for sliding the closure sheet consist of a simple U-shaped channel, of elastomeric material, secured to a supporting structure by a structural steel section; the securing steel section and the channel for the sliding of the closure sheet, are once again exposed to the risk of being directly hit and damaged by a moving vehicle, thereby jeopardising the correct operation of the door; moreover, guide tracks of this kind do not offer any protection against damage or possible injuries caused by the moving sheet or by its dislodgement from the tracks.

[0008] EP-A-0.992.656 in turn illustrates a flexible door

having guide tracks each composed of two opposite steel sections to which a flexible strip of synthetic fabric material is secured, which whenever necessary, becomes deformed allowing the side edges of the closure sheet to protrude; as before, no protection is provided for these slide guides either.

[0009] Lastly, EP-A-1.223.300 suggests the use of a slide guide which, on one side, becomes deformed and, on the other side, is of elastically yieldable material, following an impact; once again, neither protection for the guide, nor any safety for people and/or objects is disclosed with this guide system.

[0010] Although the use of deformable guide tracks tends to solve the problem of dislodgement of the closure sheet, as mentioned previously, the safety problem and protection in these types of guides is however not tackled or taken into consideration. In fact, during the upward and downward movements of the closure sheet there is a serious risk that, due to lack of attention or for other reasons, people approaching the guide with their hands or bodies could be struck by the moving sheet, injuring themselves more or less seriously; moreover, since the guides are completely uncovered and exposed to the external environment, they are liable to accumulate dirt and dust which, with the passing of time, tend to hinder or prevent the sliding of the closure sheet.

OBJECTS OF THE INVENTION

[0011] The main object of this invention is to provide a guide track for vertically movable roll-up doors, of the aforementioned kind, conformed in such a way as to provide a high protection and safety degree both of the guide track itself and against damage or injury to people and/or objects that may accidentally find themselves in the vicinity or come into contact with the door during the upward and downward movement of the closure sheet, or caused by an accidental dislodgement of the sheet from the sliding tracks.

[0012] A further object of the invention is to provide a guide track for vertically movable roll-up doors, conformed in such a way as to provide an appropriate protection of the fastening means to a wall or a supporting structure.

[0013] A further object of the invention is to provide a guide track for vertically movable roll-up doors, of the aforementioned kind, which is shockproof, structurally simple, easy to install, appropriately protected against dirt, highly thermally insulated, easy to clean and not subject to oxidation.

[0014] A still further object of the invention is to provide a door of the roll-up type, comprising flexible guide tracks characterised by a high safety and protection degree and improvements, as mentioned above.

BRIEF DESCRIPTION OF THE INVENTION

[0015] The foregoing can be achieved by a flexible

guide track according to claim 1, and by a roll-up door of vertically movable sliding type according to claim 11.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] These and further features of the guide track structure, and of a vertically movable roll-up door according to the invention, will be more clearly evident from the following description and drawings in which:

Fig. 1 is a front view of a vertically movable roll-up door;

Fig. 2 shows an enlarged cross-sectional view of a first embodiment of a guide track in accordance with the invention, along the lines 2-2 of figure 1;

Fig. 3 shows a cross sectional view similar to that of the preceding figure 2, for a second embodiment;

Fig. 4 shows a cross sectional view similar to that of figure 3, for a third embodiment;

Fig. 5 shows a partial view of a closure sheet for a vertically movable roll-up door according to figure 1, with strengthened edges.

DETAILED DESCRIPTION OF THE INVENTION

[0017] Figure 1 shows, by way of example, a generic vertically movable roll-up door comprising a closure sheet or flexible screen 10 of any type, which can be wound onto a roller 11 operatively connected to an electric motor 12 which can be automatically operated by a remote control, or locally, for example, by a control device 13.

[0018] The closure sheet 10 can slide along two vertically extending guide tracks 14, between a raised or open and a lowered or closed position, in a plane defined by the aforesaid guide tracks 14.

[0019] Figure 2 of the drawings shows a first embodiment of a guide track structure according to the invention, viewed along the cross-sectional line 2-2 of figure 1.

[0020] In the case of figure 2, the guide track 14 is extruded in one piece by plastic material, for example an elastomeric material, either rigid or semi-rigid; the guide track 14 comprises a base member 15 for securing the track to a wall or a supporting structure, conformed with a guide channel 16 open on one side, for the sliding of one edge 10' of the closure sheet 10.

[0021] The base member 15 in turn has a flat back surface 17 for securing the track 14 directly to the wall or supporting structure, or by a "C"-shaped steel section 18 having inwardly folded side edges engaging with corresponding side edges 15' of the base member 15.

[0022] The base member 15 for securing the guide track 14 can also be provided with a slot 19 which longitudinally extends to one side of the guide channel 16, into which a stiffening and/or fastening steel section 20 can be arranged, alternatively or in combination with the fastening steel section 18. From the above, it will be noted that both the steel sections 18 and 20 are appropriately

protected against impact and damage, by the base member 17 of the guide track 14 of elastomeric material.

[0023] As mentioned previously, the guide channel 16 serves to allow the sliding of a side edge 10' of the closure sheet 10. The guide channel 16 can have any cross sectional shape; in the case shown the guide channel 16 has a rectangular outline delimited by flat side surfaces 21, 22 in which the surface 21 on the outer side of the channel 16, is provided by an elastically yieldable and outwardly bending wall 23, to allow the edge 10' of the closure sheet 10 to slip out when accidentally subject to the action of external forces, for example when accidentally hit or pushed with a certain force by a vehicle or moving body. This expedient, already adopted in the past with guides of different structures, under certain conditions, serves to safeguard the integrity both of the closure sheet and of the guide track 14 itself.

[0024] However, as mentioned previously, there are other risks and other causes of possible malfunctioning of vertically movable roll-up doors; therefore, according to one feature of the invention, the guide track 14 has also been provided with a suitable protective flexible wing 24 which, from the bottom side of the channel 16, extends longitudinally along the front side of the channel 16 itself, spaced apart from the same channel 16 and the plane in which the closure sheet 10 slides.

[0025] In the embodiment of figure 2 and the subsequent figure 3, the protective wing 24 and the base member 15 defining the body of the guide track 14, are made in one piece, for example by extrusion from a same plastic material, or by co-extrusion of plastic materials having different elastic characteristics.

[0026] The protective wing 24 can have any cross-sectional outline; in the example shown the wing 24 has an archshaped profile which extends by an angle of approximately 90° from the bottom side of the channel 16, and provided on the outside with a plurality of longitudinal strengthening ribs 25.

[0027] The protective wing 24 extends frontally in a position spaced apart from the guide channel 16 for the closure sheet 10, by a sufficient space to allow a bending of the outer wall 23, and a possible dislodgement of the edge 10' of the closure sheet 10.

[0028] The protective wing 24 in general must have an outline and a cross sectional shape to allow bending if accidentally hit or subjected to external forces, in such a way as to dump any impact, avoiding damages to the guide track; moreover, the protective wing 24 must be made in such a way as to reduce the risk of a person accidentally suffering injury to the hands or other parts of the body that could possibly come into contact with the moving sheet 10.

[0029] Therefore, the protective wing 14 can extend up to open side of the channel 16, as shown in figure 2, or beyond the channel itself as shown in the embodiment of figure 3 and by 24" in figure 4, in which the protective wing 24 extends by an arch of more than 90°, or continue for a short length in a plane parallel to the closure sheet

10.

[0030] Depending upon the characteristics of the closure sheet 10 and of the guide track 14, as shown in figure 2, the internal surfaces of the guide channel 16 and of the closure sheet 10 could come directly into contact each other; alternatively, as shown in the example of figure 3, the channel 16 could be provided with an internal lining 26 of low frictional material, for example self-lubricating "Teflon" or "nylon".

[0031] In the case of figure 3, the open side of the guide channel 16 comprises inwards facing edges 16', designed to retain the lining 26. Conversely, the same lining 26 could be made with shaped edges for retaining the closure sheet 10, in order to allow the standardisation of the guide track 14, regardless of the configuration and characteristics of the closure sheet 10.

[0032] Figures 2 and 3 show another feature of the guide track 14 according to the invention, in which the fore side of the protective wing 24, is provided with a longitudinal slot 27 having elastically diverging edges 24'; one or more sensing devices 28 such as photoelectric cells or other electric and/or electronic devices, for alarm or safety systems, or for other possible functions can be disposed into the slot 27. The sensing devices 28 can be positioned at any desired height along the slot 27; the shape and depth of the slot 27 can be such as to house both the sensing devices 28 or similar devices, and the electric wires for connection to a control unit. In this way it is possible to use the guide tracks 14 of the closure door to create, for example, an alarm system, or an automatic safety system which stops the movement of the sheet.

[0033] As mentioned previously, in the examples of figures 2 and 3, the base member 15 and the protective wing 24 are made in one piece, with the consequent simplification of the guide structure and reduction of the manufacturing costs.

[0034] Conversely, figure 4 shows a further embodiment in which the base member 15 and the protective wing 24 are made as separate parts; in this case the rear edge of the wing 24 and the base member 15, are provided with reciprocal engaging means.

[0035] In particular, one of the two parts, for example the wing 24, is provided with a longitudinal rib 30, of circular or dovetailed shape, which engages into an identically shaped longitudinal slot 31 in the base member 15 of the guide track 14.

[0036] The protective wing 24 and the base member 15 also have reciprocal front 32 and rear 33 shoulder surfaces preventing any rotational movement of the wing 24 with respect to the base member 15.

[0037] As mentioned previously, the roll-up closure sheet 10 can be made in any way whatsoever; for example, it can be composed of a single screen of PVC, with detachable sections, of opaque or transparent material, or other suitable material; the closure sheet 10 may be provided with horizontal pockets 29, as shown in figure 1, for the insertion of stiffening bars and wind resistant

weights, or a rubber- or PVC-backed fabric can be used.

[0038] According to a further feature of the invention, as shown in figure 5, along its side edges the closure sheet 10 can be provided with stiffening elements conformed as to nevertheless allow a certain flexure degree of the closure sheet; for example, they may comprise sliders or flat pieces 34 of plastic or other suitable material, fastened to the edges 10' of the closure sheet 16 and longitudinally spaced apart by a short length 35, which can slide within the channel 16 in such a way as to guide the sheet 10 in its upward and downward movements, while allowing the same closure sheet 10 to be wound up on the roller 11.

[0039] From what has been described and shown in the accompany drawings, it will be evident therefore that a guide track structure for vertically movable roll-up doors, and a vertically movable roll-up door have been provided having specific innovative features in accordance with the invention however, other modifications may be made to the guide tracks and to the same door, without thereby departing from the accompanying claims.

Claims

1. A guide track (14) for a vertically movable roll-up door comprising a flexible closure sheet (10) having side edges (10'), in which the guide track (14) comprises:

a base member (15) of elastomeric material; a guide channel (16) for the closure sheet (10), on one side of the base member (15); and means (17; 18) for fastening the base member (15) to a wall and/or a support structure, **characterised in that** elastically yieldable protective wing (24) is extending from the base member (15), spaced apart on the front side and along the guide channel (16) of the track (14).

2. The guide track (14) according to claim 1, **characterised in that** the base member (15) and the protective wing (24) of elastomeric material are made in one single piece.

3. The guide track (14) according to claim 1, **characterised in that** the base member (15) and the protective wing (24) are made in separate parts; and connecting means (30, 31) to engage the base member (15) to the protective wing (24).

4. The guide track (14) according to claim 3, **characterised in that** said connecting means comprises a ribbing (30) and a similarly shaped engaging slot (31).

5. The guide track (14) according to claim 3, **characterised in that** the base member (15) and the pro-

tective wing (24) are provided with opposite shoulder surfaces (32, 33).

6. The guide track (14) according to claim 1, in which the guide channel (16) is provided with an open side, **characterised in that** the protective wing (24) extends from the base member (15) up to the open side of the guide channel (16). 5
7. The guide track (14) according to claim 1 in which the guide channel (16) is provided with an open side, **characterised in that** the protective wing (24) extends from the base member (15), beyond the open side of the guide channel (16). 10
15
8. The guide track (14) according to claim 1, **characterised in that** the protective wing (24) is provided with a longitudinal slot (27), and sensing means (28) arranged in said longitudinal slot (27). 20
9. The guide track (14) according to claim 1, **characterised in that** a stiffening element (20) is longitudinally extending in the base member (15) of the track (14). 25
10. The guide track (14) according to claim 1, **characterised in that** a low-frictional lining (26) is provided inside the guide channel (16).
11. The guide track according to claim 1, **characterised in that** the protective wing (24) has an arch shaped crosswise profile. 30
12. The guide track according to claim 1, **characterised in that** the protective wing (24) has longitudinal stiffening ribs (28). 35
13. A vertically movable roll-up door comprising a flexible closure sheet (10), a winding roller (11) for winding up the closure sheet (10) operatively connected to a control device (12), and a guide track (14) on each side of the closure sheet (10) **characterised in that** said guide tracks (14) comprise a base member (15) a guide channel (16) and a protective wing (24) according to claim 1. 40
45
14. A vertically movable roll-up door according to claim 11, **characterised in that** the closure sheet (10) comprises stiffening elements (34), spaced apart along its side edges. 50

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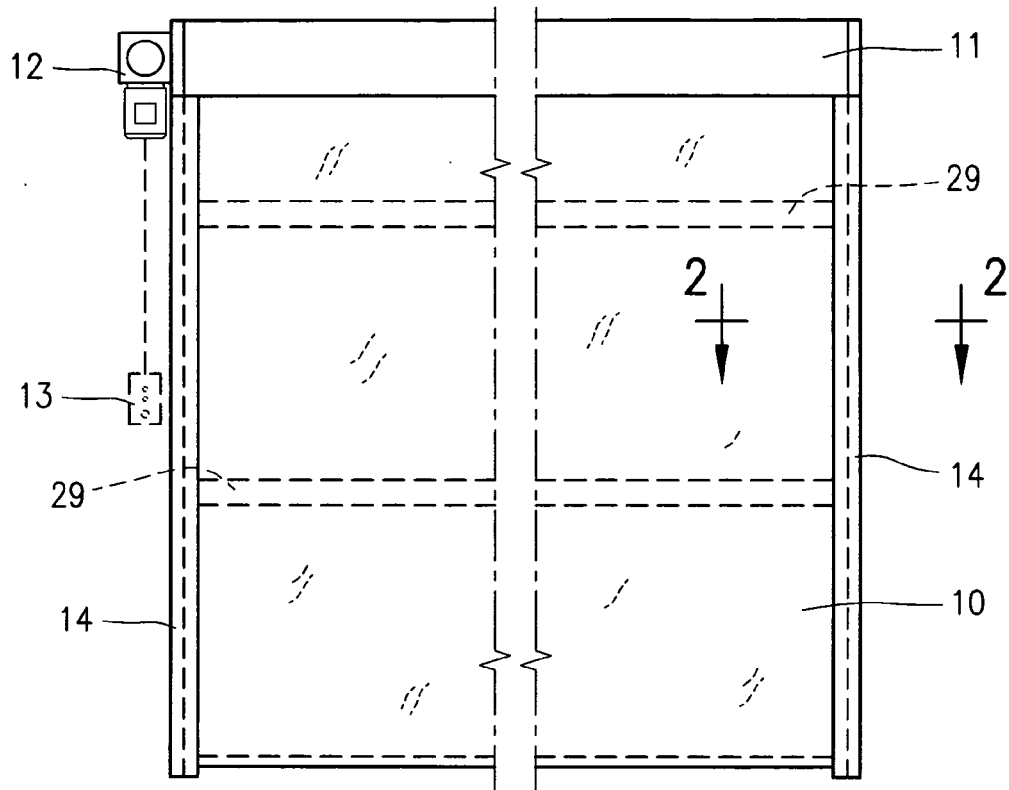


Fig. 1

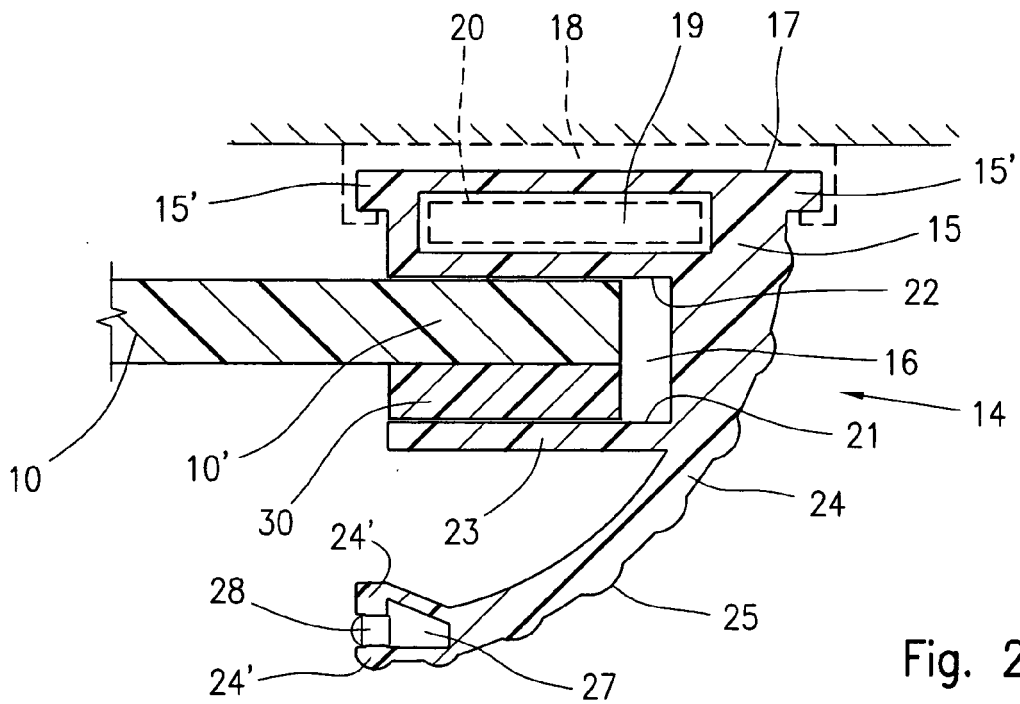


Fig. 2

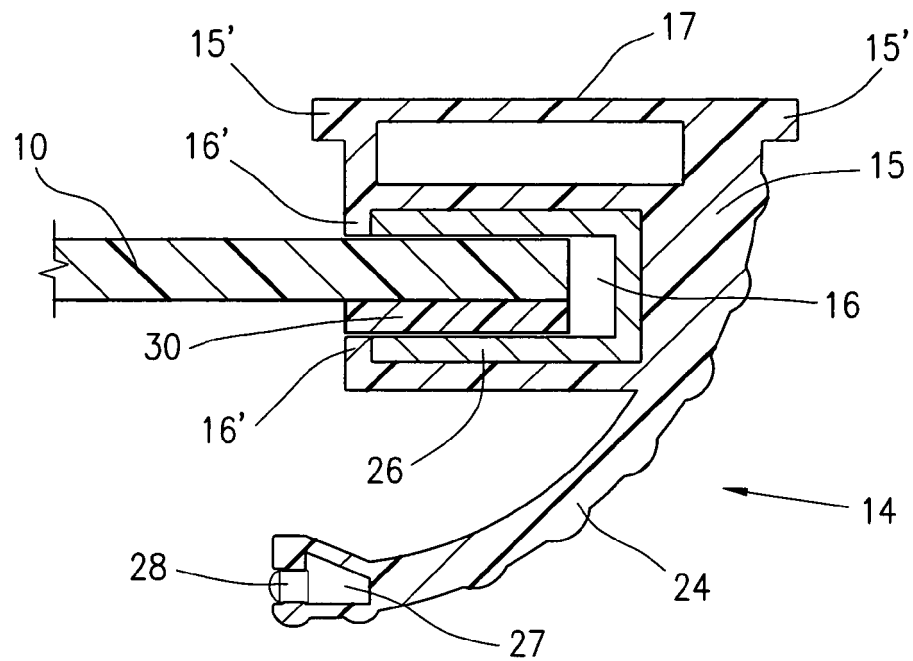


Fig. 3

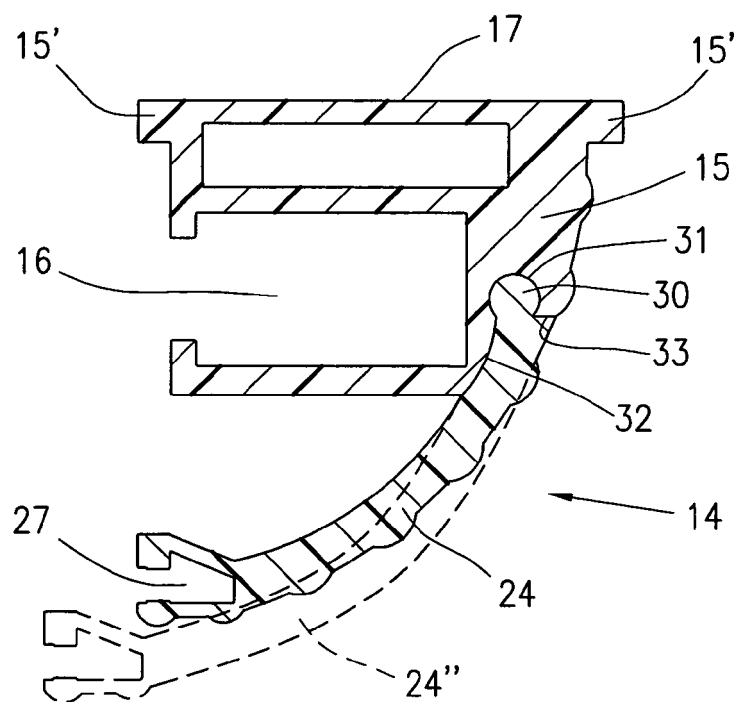


Fig. 4

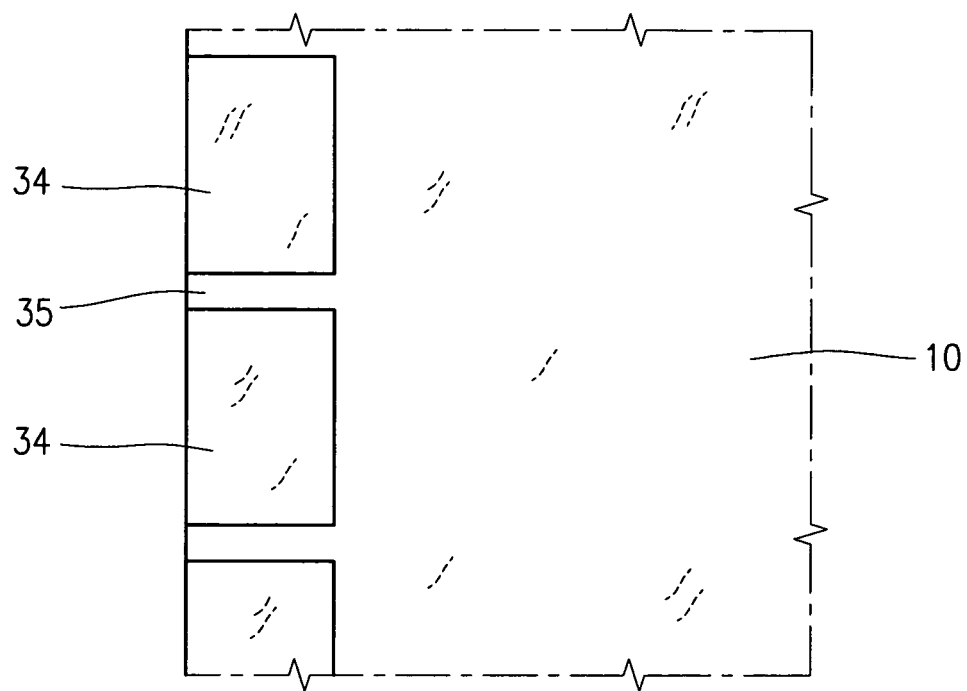


Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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