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(54) Double walled slat for roller shutters or for wall cladding

(57) End strips (3,4) for longitudinal edges of a double walled panel (1,2) to be used in facade cladding or in roller shutter doors e.g. for garages, are provided with formations (6,6′) which extend along the length of webs (5,5′) and engage with a complementary formation (6′,6) on an adjacent strip. Each formation (6,6′) is disposed on one side edge of the web (5,5′) with an adjoining flange (7,7′) at an acute angle relative to the web, to co-operate with the adjoining cover plate (2) of the panel.

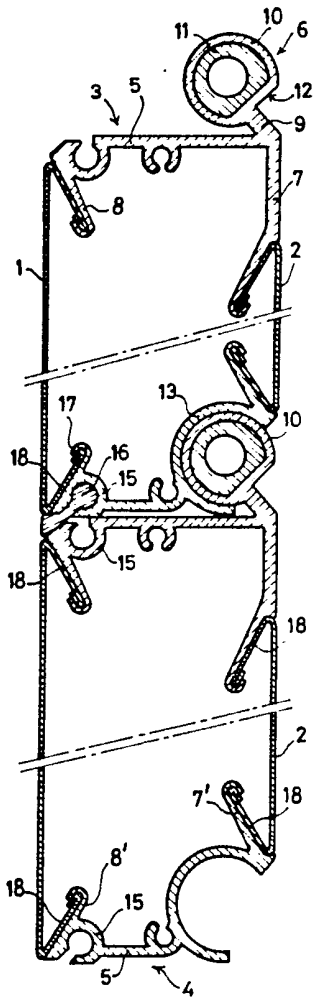

Fig. 2.

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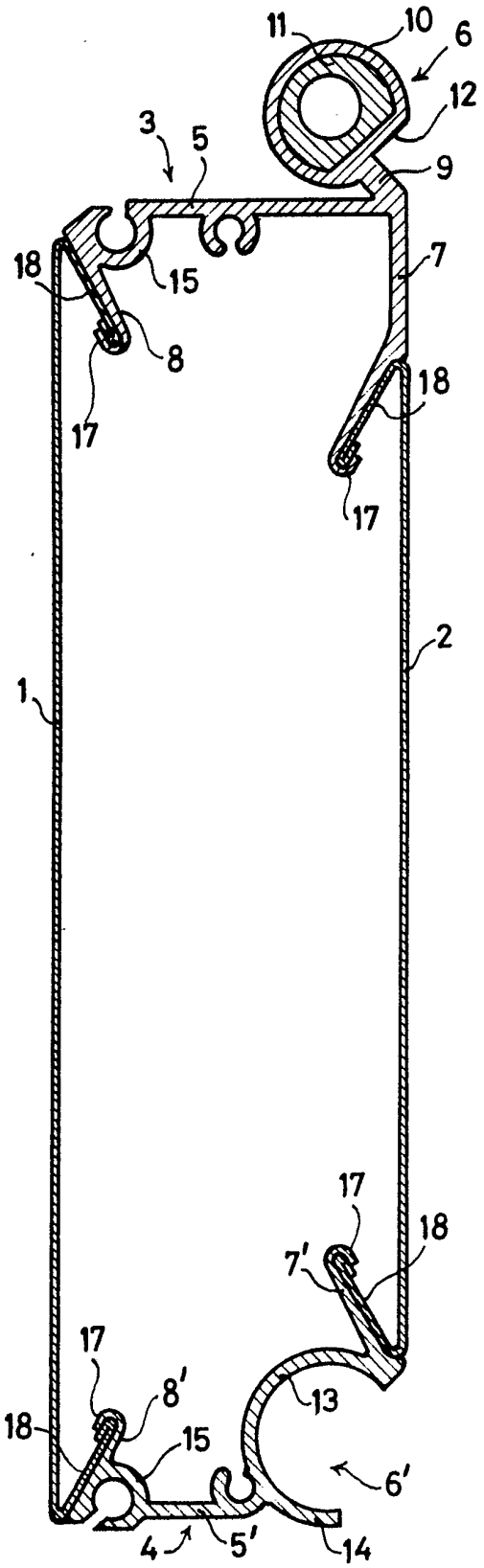

Fig: 1.

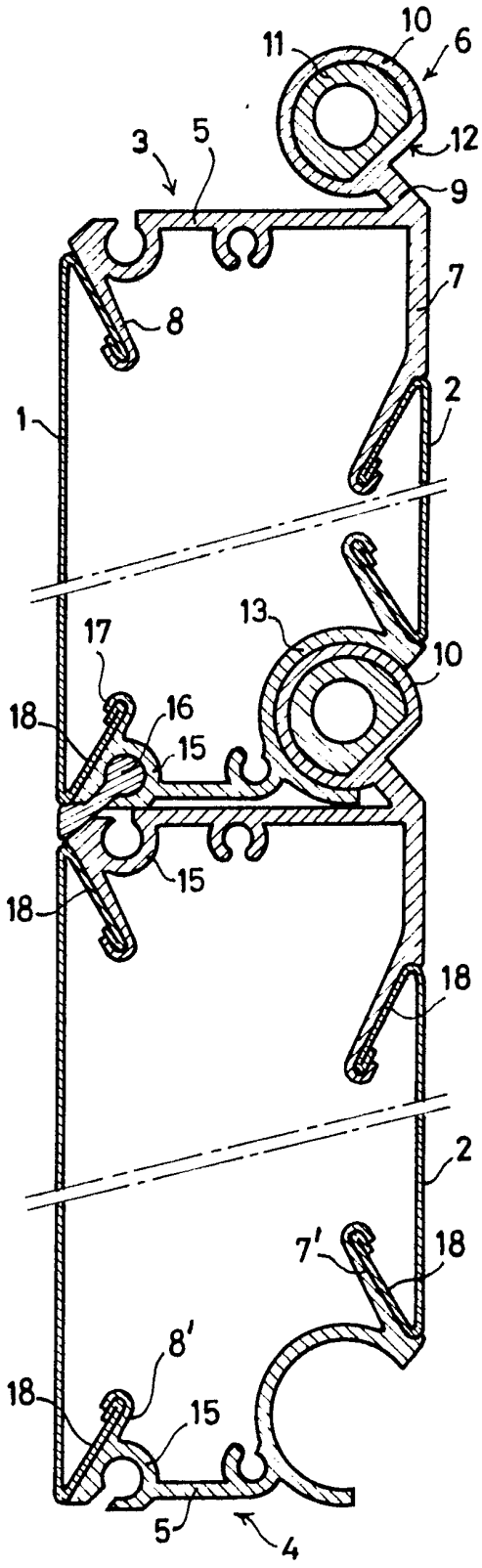

Fig: 2.

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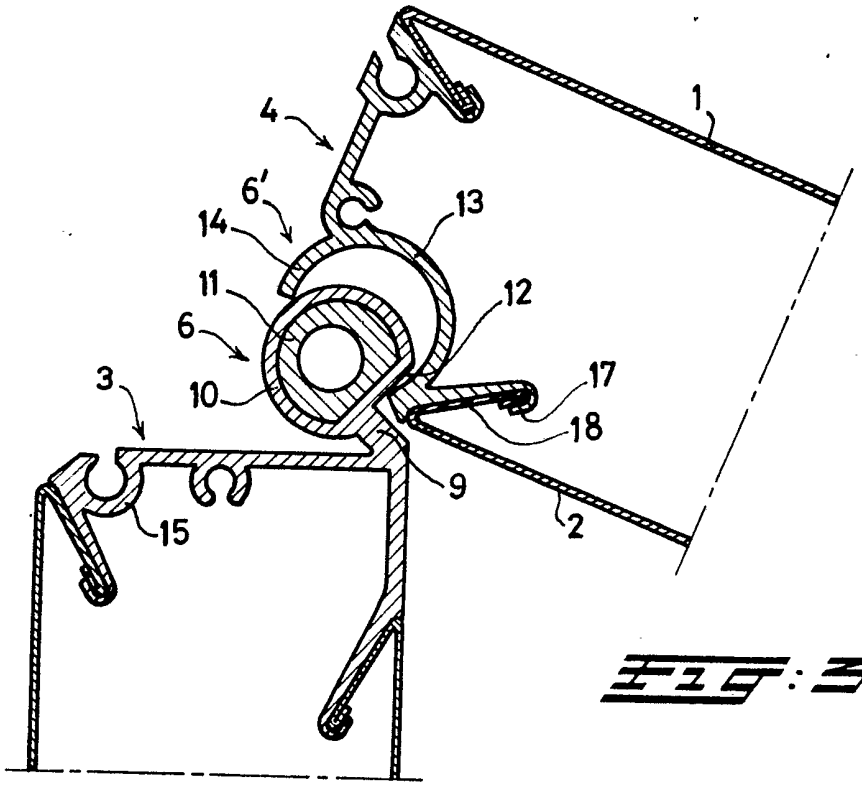

Fig: 3.

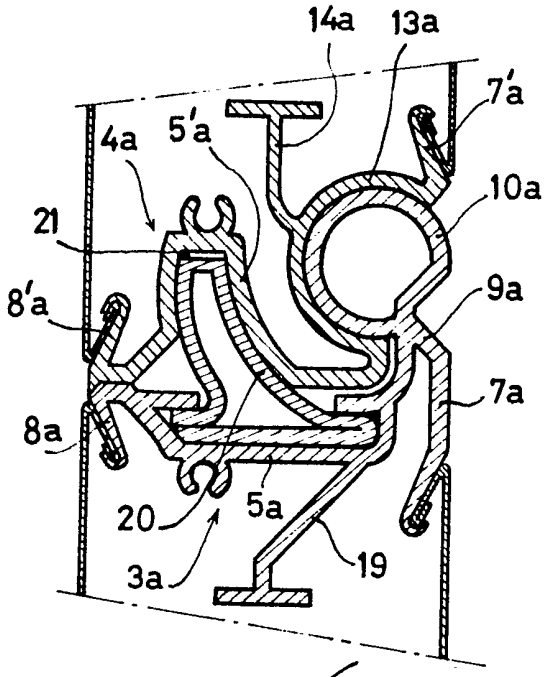

Fig: 4.

SPECIFICATION

Sandwich panels and end strips therefor

The invention relates to an end strip for a longitudinal edge of a sandwich panel, comprising a web provided with a lug extending along the length of the web and arranged to engage with a lug of complementary shape on another strip.

These sandwich panels are used in the horizontal position to close access openings in factory buildings or garages, and the panels can be hinged to one another by their strips and be placed between rails which may extend in the horizontal direction above the access opening, so that, when raised, the panels can come into the horizontally extending portion of the guide rails.

However, these sandwich panels can also be used, either in the vertical or in the horizontal position, as facade cladding. Various types of these panels are e.g. known for use as garage doors, and they usually consist of a U-shaped or H-shaped section provided with lugs capable of serving as hinges. The cover plates of the panel are then, however, placed behind the flanges of the end strips and foam plastic is cast into the interior space.

It is a shortcoming of these known strips that they must be fastened to the foam plastic over a very small area, whereas the full load of the panels must be able to be suspended on these strips. The strips are then also usually fastened with the aid of blind rivets through their flanges and the steel or aluminium cover plates lying behind them. Another shortcoming of these known end strips is that during the casting with foam plastic the cover plates bulge out at the flanges because of their thickness, so that the panels are not taut on the outside.

The invention seeks to provide an end strip which need not be fastened to the panel with the aid of separate rivets of screws, while the cladding plates maintain a very taut panel exterior even after foam plastic has been cast into the interior.

It is another object of the present invention to provide an extremely light end strip, which nevertheless provides sufficient resistance to deflection as the result of wind pressure.

According to the invention, this is achieved with an end strip of the type as described above, wherein the lug is disposed on one side edge of the web, with an adjoining flange which is disposed, entirely or partially, at an acute angle relative to the web.

According to the invention the end strip is preferably so constructed that the web is likewise provided, on the side edge opposite to that where the lug is disposed, with a flange disposed, entirely or partially, at an acute angle relative to the web. In a practical embodiment the end strip is so constructed on one side that the flange disposed at an acute angle relative to the web is situated on that side of the web which is intended to face away from the sandwich panel, this flange merging at its free edge into a thickened portion of circular cross-section, the flange and the thickened portion together forming a lug, while on the other side it is so constructed that the web is shaped as part of a cylinder wall merging into a flange, the junction of the portion shaped as part of a cylinder wall with the flange, being situated in a position where the side surface of the sandwich panel is situated. The invention therefore concerns an assembly of strips formed by one strip with a lug consisting of a flange with a thickened portion, and one strip with a lug in the form of a part of a cylinder wall, the portion of the one strip which is in the form of a cylinder wall fitting around the thickened portion on the flange of the other strip.

The invention further relates to a sandwich panel formed of two cover plates with filling material between them and, on both longitudinal edges, a strip, which panel according to the invention is so constructed that on one longitudinal edge there is disposed a strip having a lug in the form of a flange having a thickened portion and, on the other longitudinal ege, a strip having a flange in the form of a part of a cylinder wall. With these sandwich panels it is possible to form doors the panels of which can be hinged relative to one another with the aid of the strips.

The invention will now be explained more fully, by way of example only, with the aid of the accompanying drawings, in which:

Figure 1 is a cross-section through a sandwich panel provided with end strips according to the invention;

Figure 2 is a cross-section through two adjoining panels which are hooked to one another with the aid of the end strips;

Figure 3 shows a part of two panels, illustrating the hooking-together of these panels; and

Figure 4 is a cross-section through two adjoining end strips of another type, which is particularly suitable for the production of plastic end strips.

For the sake of clarity, the cast foam plastic is omitted from the panel in Fig. 1. The panel is formed of a cover plate 1 of aluminium or steel on the outer side, and a plate 2, likewise of aluminium or steel or the inner side of a door which is to be assembled from these panels. The end strips for the longitudinal edges of the sandwich panel are referenced 3 for the top side, and referenced 4 for the bottom side of the panel. Each end strip consists of a web 5, 5′ and is provided with a lug 6 and 6′ respectively, which extends along the length of the web 5, 5′ and is arranged to engage with a complementarily shaped lug on the other strip, as can be seen

in Figs. 2 and 3. The lug 6 or 6′ is disposed on one side edge of the web 5 or 5′, with an adjoining flange 7 or 7′, these flanges being disposed, entirely or partially, at an acute angle relative to the respective web 5 or 5′. The web 5, 5′ is likewise provided, on its side edge opposite to that where the lug 6 or 6′ is disposed, with a respective flange 8 or 8′ entirely or partially disposed at an acute angle relative to the web. The end strip 3 is so constructed that the flange 9, which is disposed at an acute angle relative to the web 5, is situated on that side of the web 5 which is intended to face away from the sandwich panel, this flange 9 merging at its free edge into a thickened portion 10 of circular cross-section, this flange 9 and the thickened portion 10 together forming a lug 6. The thickened portion 10 is made hollow and a reinforcing tube 11 fits into it. The thickened portion 10 of circular cross-section is provided with a flattened portion 12 next to the flange 9, and this flattened portion forms a right angle with a flank of the flange 9 for a purpose which will be described later on. The web 5 of the strip 3 thus has three flanges 7, 8 and 9 disposed entirely or partially at an acute angle; one of these flanges (9) serves to form the lug 6, while the other two flanges 7 and 8 on the side of the web 5 opposite to that where the lug 6 is disposed are arranged for fastening to cover plates of the sandwich panel. The web 5′ of the end strip 4 merges, by means of a part 13 of a cylinder wall, into a flange 7′, while the junction of the part 13 in the form of a cylinder wall with the flange 7′ lies in a position where the side face of the sandwich panel is situated. The part 13 formed in the shape of a cylinder wall is provided, next to the web 5′ of the strip 4, with a freely projecting flange 14. The freely projecting flange 14 forms an extension of the web 5′ and has a similar curvature forming a continuation of the part 13 in the form of a cylinder wall, this part also forming a lug 6′ on the strip 4. On the side edge opposite that where the lug 6 or 6′ is situated the web 5 of 5′ merges, by means of a part 15 of a cylinder wall, into a respective flange 8 or 8′. The parts 15 serve to receive a sealing strip, for example of rubber, as denoted in Fig. 2 by numeral 16. On the side of the web which is intended to face the sandwich panel, the flanges 7, 8, 7′ and 8′ are provided at their free edges with a hook-shaped portion 17 for a purpose which will be explained later on.

Thus the invention concerns an assembly of strips, as can be clearly seen in Figs. 2 and 3, this assembly being formed by a strip 3 having a lug 6 consisting of a flange 9 with a thickened portion 10, and a strip 4 with a lug 6′ in the form of a part 13 of a cylinder wall, the part 13 in the form of a cylinder wall of the one strip 4 fitting around the thickened portion 10 on the flange 9 of the other strip 3. The size of the lug 6 is now so great that the lug 6′ can be hooked around the lug 6 only in the position shown in Fig. 3, which purpose is served by the flattened portion 12. This position, however, is far outside the hinge range of the two panels when they are in the position of use. A pin provided with a guide roller can be inserted into the reinforcing tube 11, and fits into guide rails over the side ends of the panels. The guiding of doors, consisting of panels, by means of a roller in rails is generally known and need not be described in greater detail.

From the foregoing it will be clear that the invention also relates to a sandwich panel formed of two cover plates 1 and 2, with filling material between them, and with respective strips 3 and 4 on the two longitudinal edges, one longitudinal edge being provided with a strip 3 having a lug 6 in the form of a flange 9 with a thickened portion 10, and the other longitudinal edge being provided with a strip 4 having a lug 6′ in the form of a part of a cylinder wall. The cover plates 1 and 2 have turned-back edges 18, which lie against flanges 7, 8, 7′ and 8′ formed on the strips 3 and 4 and disposed at an angle relative to the web, and which engage by an edge with hook-shaped edges 17 of these flanges. Consequently it is not necessary to use additional fastening means in the form of rivets or screws after foam plastic has been cast into the cavity of the panel and expanded. Very taut panels are produced in this manner.

Fig. 4 shows a similar assembly of strips, which, however, instead of being made of, for example, extruded aluminium, may consist of extruded plastics. The respective components are given the same reference numerals as in Figs. 1, 2 and 3, however, followed by the letter "a". It is observed that the part 13a corresponding to a portion of a cylinder wall also has a freely projecting flange 14a, which lies close to the web 5′a, but in this case this flange 14a serves to ensure good fastening to the foam plastic. A simular flange 19 is disposed on the web 5a of the strip 3a. For reinforcement purposes the web 5a contains a chamber in which is disposed a comb-like reinforcing section 20 of metal. This comb-shaped section fits into a cavity 21 in the web 5′a of the sealing strip 4a. The cover plates are once again fastened in the same manner as previously explained with reference to Figs. 1, 2 and 3.

Instead of the comb-like reinforcing section 20 of metal this comb-like section can also be made of plastics and in such a case the section 20 forms part of the web. The part of the web indicated with the reference numeral 5a can then be omitted as the comb-like section will also be filled with expanded foam plastic from the recess of the sandwich panel.

CLAIMS

1. An end strip for location on a longitudinal edge of a sandwich panel, the strip comprising a web provided with a lug extending along the length of the web and arranged to engage with a lug of complementary shape on another strip, the lug being disposed on one side edge of the web, and an adjoining flange at least part of which is disposed to extend at an acute angle relative to the web.

2. An end strip as claimed in Claim 1, wherein another flange is disposed on that side of the web which is intended to face away from the sandwich panel, the other flange merging at its free edge into a thickened portion of circular cross-section, the other flange and the thickened portion together forming the lug.

3. An end strip as claimed in Claim 2, wherein the thickened portion of circular cross-section is provided near the adjoining flange with a flattened portion which, together with one flank of the adjoining flange, defines a right angle.

4. An end strip as claimed in any of the preceding claims, wherein, on the side edge opposite to the side edge on which the lug is disposed, the web is provided with a further flange at least part of which is disposed to extend at an acute angle relative to the web.

5. An end strip as claimed in Claim 4, wherein the adjoining flange and the further flange are each disposed on the side of the web remote from the lug for the purpose of fastening to cover plates of the sandwich panel.

6. An end strip as claimed in Claim 1, wherein the web merges, by means of a part-cylinder wall, into the adjoining flange, the junction of the part-cylinder wall with the adjoining flange being arranged to be positioned at the location of a side face of the sandwich panel.

7. An end strip as claimed in Claim 6, wherein the part-cylinder wall is provided with a freely projecting flange near the web of the strip.

8. An end strip as claimed in Claim 7, wherein the freely projecting flange forms an extension of the web and has the same curvature as, to be a continuation of, the part-cylinder wall, the latter forming the lug of the strip.

9. An end strip as claimed in Claim 7 or 8, wherein the freely projecting flange extends from the side face opposite to that on which the lug is disposed.

10. An end strip as claimed in any of Claims 6 to 9, wherein a further flange is disposed on that side of the web which is intended to face the sandwich panel, and each of the adjoining flange and the further flange are provided with a hook-shaped portion at its free edge.

11. An assembly of end strips for location on longitudinal edges of sandwich panels, said assembly comprising a pair of strips each having a web provided with a lug extending along the length of the web and arranged to engage with a lug of complementary shape on another strip, the lug being disposed on one side edge of the web, and an adjoining flange at least part of which is disposed to extend at an acute angle relative to the web, one of the strips being provided with another flange disposed on that side of the web which is intended to face away from the sandwich panel, the other flange merging at its free edge into a thickened portion of circular cross-section, the other flange and the thickened portion together forming the lug, and the other of the strips having the web merging, by means of a part-cylinder wall, into the adjoing flange, the junction of the part-cylinder wall with the adjoining flange being arranged to be positioned at the location of a side face of the sandwich panel, whereby the part-cylinder wall of said other strip fits around the thickened portion of said one strip.

12. A sandwich panel formed of two cover plates with filling material therebetween, and, along one longitudinal edge a strip as claimed in any of Claims 2 to 5, and along the other longitudinal edge a strip as claimed in any of Claims 6 to 10.

13. A sanwich panel as claimed in Claim 12, wherein turned-back edges of the cover plates lie against the flanges provided on the strips and disposed at an angle relative to the web, and engage by an edge in hook-shaped edges of the flanges.

14. An end strip for location on a longitudinal edge of a sandwich panel, substantially as hereinbefore described with reference to the accompanying drawings.

15. An assembly of end strips substantially as hereinbefore described with reference to the accompanying drawings.

16. A sandwich panel substantially as hereinbefore described with reference to the accompanying drawings.

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