

- [54] **FACING WALLS OF BUILDINGS**
- [76] Inventor: **Jack Kenneth Dixon**, 23, Dunstan Road, London, N.W. 11, England
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- [51] Int. Cl.**E04f 13/08, E04c 2/22**
- [58] Field of Search.....**52/204, 385-387, 52/390-392, 394, 506, 518, 521, 542, 529, 530, 536, 592**

[57] **ABSTRACT**

A panel wall in which each panel has a substantially rectangular body provided with a flange extending along the top and down one side edge of the body, the front face of the flange, except for a portion of the corner thereof, lying in a plane through the rear edge of the body of the panel and the corner portion being set back rearwardly so that its front face lies in a plane through the rear face of the remainder of the flange. Each panel comprises a shell moulded in glass fiber reinforced polyester and fitted with an internal frame of wood or alternatively filled with concrete. The panels are arranged in a regular formation aligned horizontally and vertically with the body of each panel overlapping the flanges of adjacent panels. At the corner junction between four contiguous panels, the end of the flange on the lower right panel overlaps part of the corner portion of the lower left panel, the end of the flange on the upper left panel overlaps another part of the corner portion of the lower left panel, and the body of the upper right panel overlaps the flanges on the lower right and upper left panels including the ends thereof which overlap parts of the corner portion of the lower left panel. The panels are secured together by bolts extending through the flange and overlapping body of each pair of adjacent panels.

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Primary Examiner—Alfred C. Perham
 Attorney—Alvin Browdy and Sheridan Neimark

20 Claims, 7 Drawing Figures

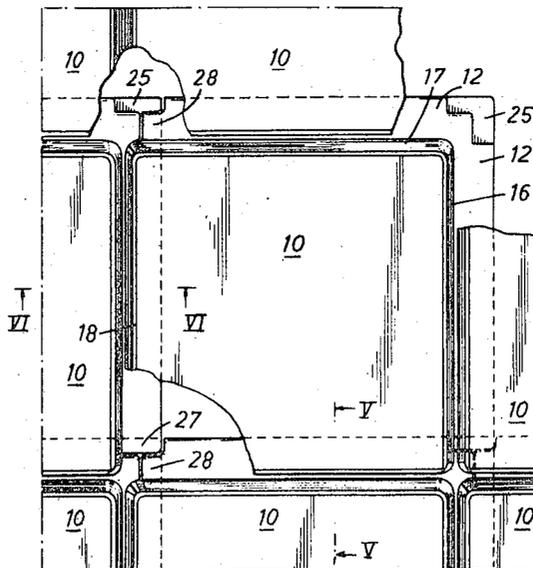


FIG. 1

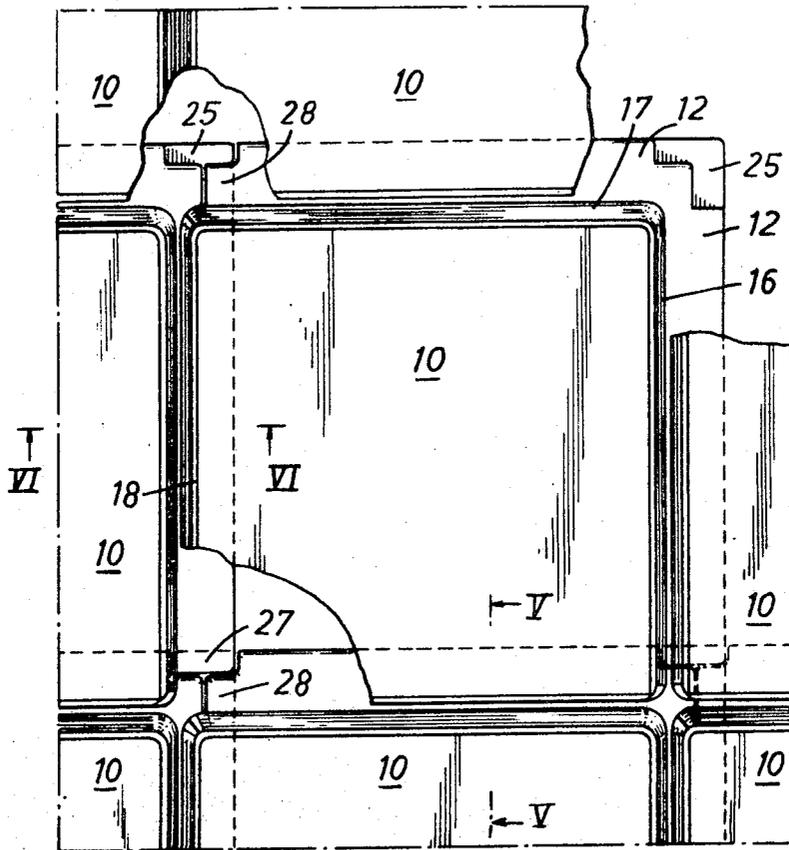
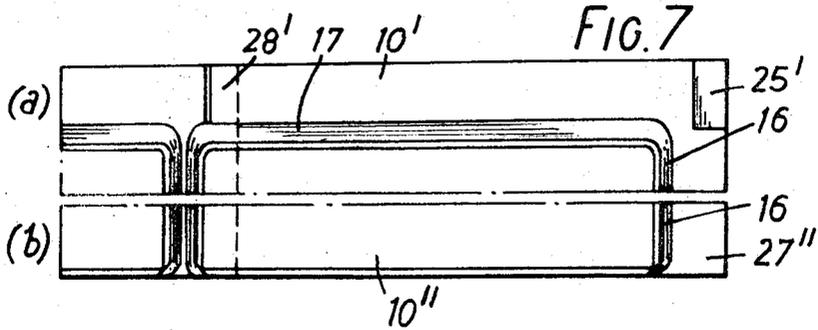


FIG. 7



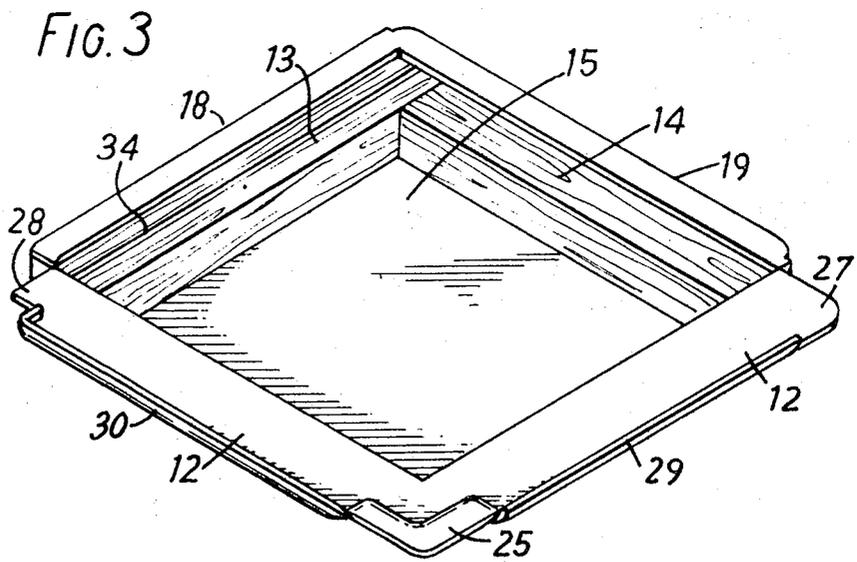
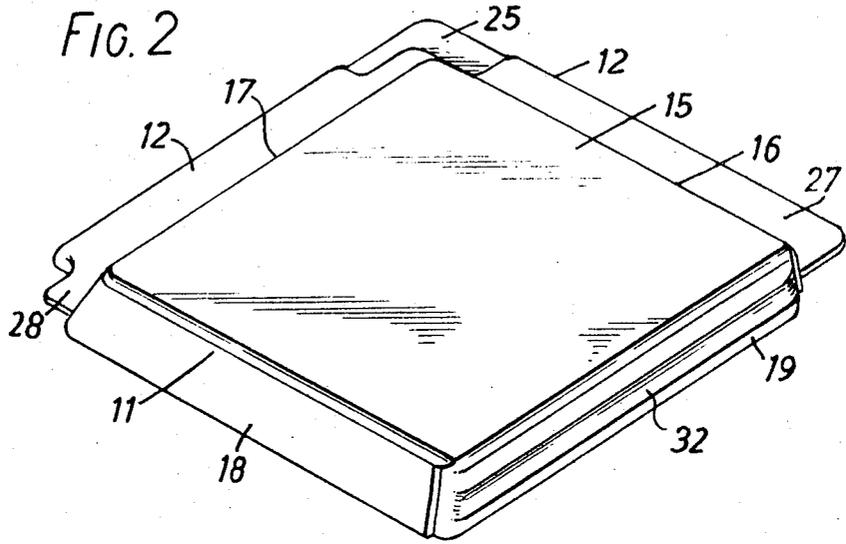


FIG. 4

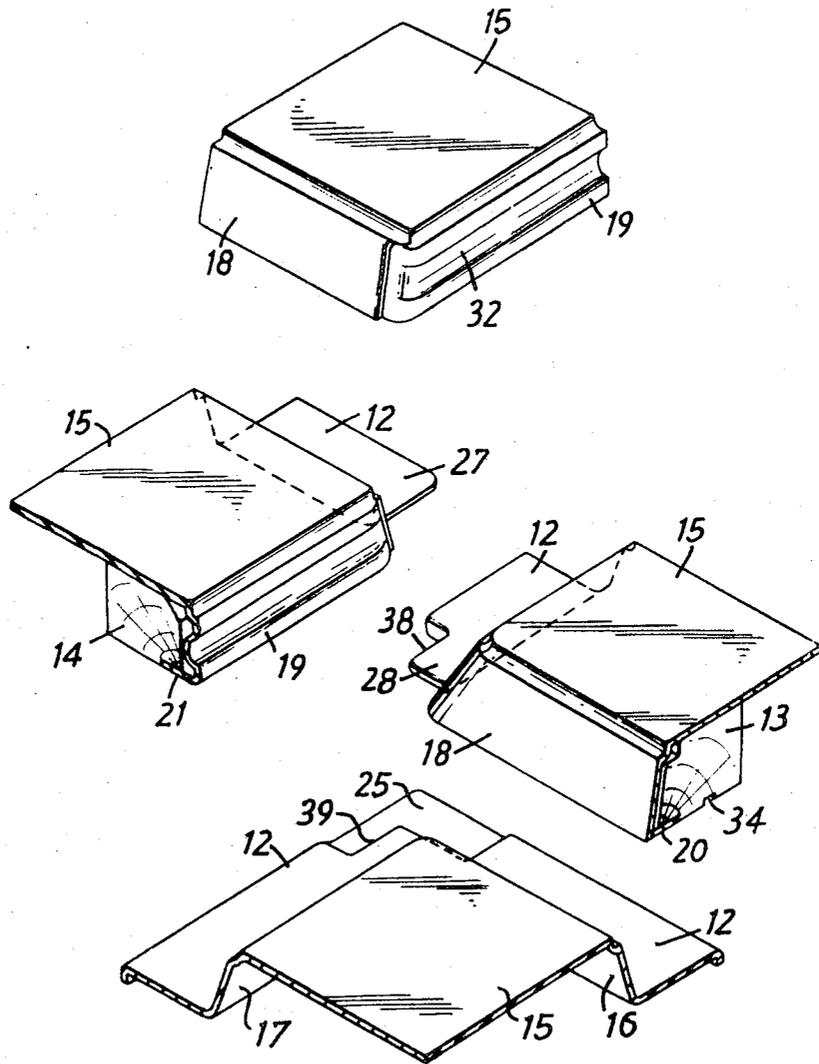


FIG. 5

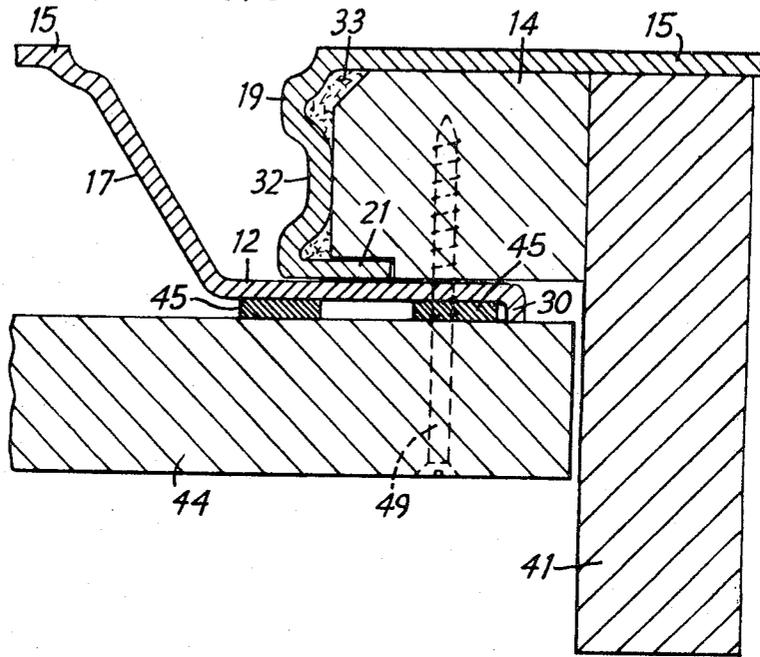
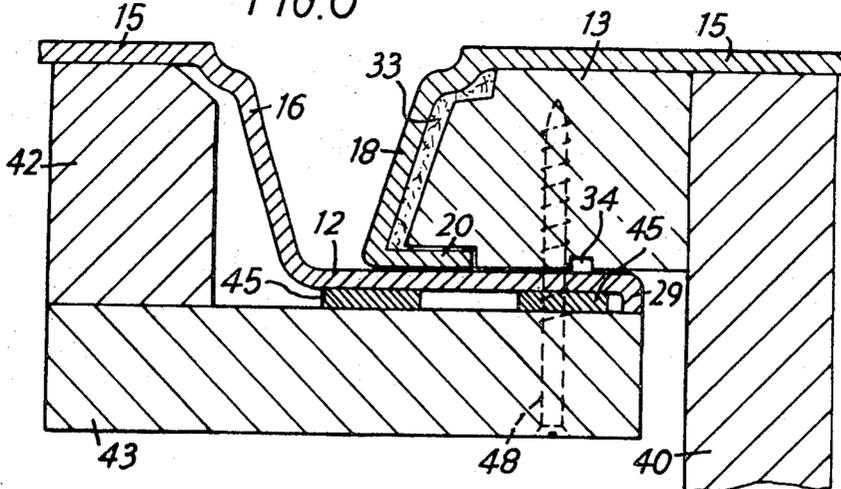


FIG. 6



FACING WALLS OF BUILDINGS

This invention relates to panel walls comprising structural cladding panels arranged in overlapping relationship and forming facing walls of a building.

The object of the invention is to provide an improved construction of panel wall in which four contiguous panels overlap in a common corner junction.

According to the present invention there is provided a panel wall in which, at a corner junction between four panels, the body of the first panel has a flange projecting laterally outwards and consisting of two side portions at the sides of the body and a corner portion integral with the side portions and extending around the corner of the body, the front face of the corner portion being set back rearwardly with respect to the front faces of the two side portions of the flange, the body of the second panel has a flange on one side thereof, which flange is set back rearwardly with respect to the body of the second panel at said corner junction, the other side of the body of the second panel at said corner junction overlapping one of said side portions of the first panel flange and the second panel flange overlapping one part of the corner portion of the first panel flange, the body of the third panel has a flange on one side thereof, which flange is set back rearwardly with respect to the body of the third panel at said corner junction, the other side of the body of the third panel at said corner junction overlapping the other of said side portions of the first panel flange and the third panel flange overlapping another part of the corner portion of the first panel flange, and the two sides of the body of the fourth panel at said corner junction overlap the flanges on the second and third panels including the parts of said flanges which overlap the corner portion of the first panel flange.

The panel wall of the invention has the advantage that only two flanges are in overlapping relationship at the corner junction, namely the flanges on the first and second panels and the flanges on the first and third panels, and this feature facilitates manufacture of the panels and simplifies weatherproof sealing between adjacent panels. Moreover wide clearance can be provided between the flanges which overlap the corner portion of the first panel while still providing complete cover at the corner junction, so that a wide tolerance can be permitted in the dimensions of the individual panels and in the spacing between adjacent panels.

The front face of the corner portion of the first panel is preferably set back rearwardly with respect to the front faces of the side portions of the first panel flange by a distance substantially equal to the thickness of the flanges on the second and third panels, whereby the front faces of the flanges on the second and third panels lie in a common plane through the front faces of the two side portions of the first panel flange. Such a panel wall presents a neat appearance. The panels can be provided with openings in which window frames can be mounted.

Each panel in the panel wall may be made of any suitable material but can conveniently comprise a rigid shell moulded in glass fiber reinforced polyester or plastics material and shaped to form a concave body and laterally extending flanges integral with the rear edges of the body, the shell being reinforced to resist the wind load acting on the building and also, if desired,

to provide support for other components such as floors or roofs. The reinforcement may comprise inserts of wood or metal moulded into the body of the panel and an additional frame secured to the inserts. Alternatively, the shell may be used as permanent shuttering for concrete or other mouldable material poured into the body of the shell.

The panels are preferably secured together by screws which extend through the flanges of each panel and clamp the flanges to the overlapping bodies of the adjacent panels. In a case in which the panels comprise shells filled with concrete, screw threaded sockets are preferably embedded in the concrete to receive screws extending through apertures in the flanges of adjacent panels, the screws being mounted on pressure plates which overlap the flanges.

While the panel wall of the invention could be used as the only wall of a building, it is preferably provided with an internal lining, or used as cladding to an external wall of a building.

A panel wall formed of structural cladding panels according to the invention will now be described, by way of example, with reference to the accompanying drawings in which:

FIG. 1 is a front elevation view of part of the panel wall;

FIG. 2 is a perspective view of one of the panels showing the front face thereof;

FIG. 3 is another perspective view of the panel of FIG. 2 showing the rear thereof;

FIG. 4 is an exploded view of the corner junction between four adjacent panels of the wall;

FIG. 5 is a sectional view taken along the line V—V in FIG. 1;

FIG. 6 is a sectional view taken along the lines VI—VI in FIG. 1, and

FIG. 7a and b shows the top and bottom edge portions of the panel wall.

The panel wall is formed from an assembly of panels arranged in regular formation with the panels aligned with one another both horizontally and vertically, the adjacent panels being in overlapping relationship and clamped together. All the panels 10 in the center portion of the wall are identical, but the panels 10' and 10'' at the top and bottom of the wall respectively differ slightly from the center panels 10 as hereinafter described.

Each panel 10 comprises a relatively thin outer shell formed of glass fiber reinforced polyester shaped in a mould to form a rectangular concave body 11 having a flange 12 on two adjacent sides thereof, and two wooden inserts 13, 14 mounted in the body 11 and extending along the other two adjacent sides thereof. The convex surface of the body 11 forms the front face of the panel.

The concave body 11 consists of a base 15 and four side walls 16, 17, 18, 19, the flange 12 being integral with the rear edges of the side walls 16, 17. The side wall 18 is provided at its rear edge with an inwardly directed flange 20 (FIG. 6) which engages in a recess in the wooden insert 13, the rear face of the flange 20 being aligned with the rear face of the insert 13. The side wall 19 is provided at its rear edge with an inwardly directed flange 21 (FIG. 5) which engages in a recess in the wooden insert 14, the rear face of the flange 21

being aligned with the rear face of the insert 14. The rear faces of the two flanges 20, 21 and the wooden inserts 13, 14 lie in a common plane parallel to the base 15 of the body 11. The front face of the flange 12, except for a corner portion 25 thereof, lies in the aforementioned common plane through the rear faces of the flanges 20, 21 and inserts 13, 14 and the front faces of the corner portion 25 is offset rearwardly from the front face of the remainder of the flange by a distance equal to the thickness of the flange 12. The corner portion 25 has a stepped configuration as shown in the drawings. The part of the flange 12 on side wall 16 ends in a terminal portion 27 which is spaced a short distance from the end of wall 16, the part of the flange 12 on side wall 17 ends in a stepped terminal portion 28 which is spaced a short distance from the end of wall 17, and the outer edge of the flange 12 between the corner portion 25 and the two terminal portions 27, 28 is turned back to form rear flanges 29, 30 as shown in FIG. 3. It will be noted that, since the two terminal portions 27, 28 do not have rear flanges and the corner portion 25 is offset rearwardly from the front face of the remainder of flange 12 by the thickness thereof, the front face of corner portion 25 and the rear faces of the terminal portions 27, 28 all lie in a common plane. The rear edges of flanges 29, 30 and the rear face of corner portion 25 also lie in a common plane.

The side walls 16, 17, 18 of the body 11 of the panel diverge outwardly and rearwardly, but the side wall 19 which is the bottom of the panel when mounted in position, is shaped to form a channel 32 which serves as a drip for any water flowing down the front face of the panel. The wooden inserts 13, 14 abut against the rear face of the base 15 and are secured to the associated side walls 18, 19 respectively by an adhesive composition 33. The rear face of the wooden insert 13 is formed throughout its length with a longitudinal groove 34 for a purpose hereinafter described.

The shell of the panel is reinforced by a frame consisting of wooden battens 40, 41 secured to the inserts 13, 14 respectively, wooden battens 42, 43 extending along the side wall 16 and associated flange 12, and a wooden batten 44 extending along the flange 12 on side wall 17. Spacer strips 45 having a thickness equal to the depth of flanges 29, 30 are positioned between the battens 43, 44 and the flange 12. The battens 40, 41, 42, 43, 44, have been omitted from FIGS. 2, 3 and 4 to illustrate more clearly other features of the panel.

The panels 10 are arranged with the flange 20 and insert 13 on each panel overlapping the flange 12 on side wall 16 of the adjacent left panel as shown in FIG. 6 and the flange 21 and insert 14 on each panel overlapping the flange 12 on side wall 17 of the adjacent lower panel as shown in FIG. 5, with a wide gap being provided between the side walls 16, 18 and 17, 19 on adjacent panels. At the corner junction between each group of four contiguous panels 10 the stepped terminal portion 28 on the lower right panel overlaps the lower part of the corner portion 25 of the lower left panel, and the terminal portion 27 on the upper left panel overlaps the upper part of corner portion 25 on the lower left panel. The corner of the upper right panel overlaps the terminal portions 27, 28 on the upper left and lower right panels. As shown in the drawings, the terminal portion 28 is spaced with wide

clearance from the inner edge of the corner portion 25 and has a step 38 which is aligned with a step 39 on the inner edge of the corner portion 25.

The panels are secured together by screws 48 which extend through the batten 43 and the flange 12 on side wall 16 and are screwed into insert 13, and by screws 49 which extend through the batten 44 and the flange 12 on side wall 17 and are screwed into insert 14. The groove 34 on the rear face of insert 13 is filled with a sealing compound prior to assembly of the panels, the plastic composition providing a waterproof seal along the vertical junction line between adjacent panels.

Each of the panels 10' at the top of the panel wall is similar in construction to the center panels 10 except that the corner portion 25' is rectangular as shown in FIG. 7a and the terminal portion 28' of flange 12 which overlaps the corner portion 25' of the adjacent panel is also rectangular to conform therewith.

Each of the panels 10'' at the bottom of the panel wall is similar in construction to the center panels 10 except that the terminal portion 27'' extends to the lower end of the side wall 16 as shown in FIG. 7b so that its lower edge is in line with the lower edge of the wall and presents a neat appearance.

The panel wall may be used to form a facing wall on a building frame, in which case the panel wall need only transmit the wind loads to the frame and support the weight of any windows or doors. The panel wall can however be used without a separate frame, the panels then supporting the weight of the roof and floors and resisting the wind loads.

In the panel wall described above, the panels all overlap so that there is no opening through the panel wall, and rain water flowing down the front of the wall will cascade over the overlapping panels and not penetrate the wall. Moreover, the dimensions of each panel can vary within comparatively wide limits without impairing the weathersealing of the panel wall. In addition, since the front face of the flange 12 on each panel lies in a common plane through the rear faces of the flanges 20, 21, and the front face of the corner portion 25 on each panel is offset rearwardly a distance approximately equal to the thickness of flange 12, the front faces of flanges 12 on all the panels lie in the same plane so that the panel wall presents a neat appearance.

I claim:

1. A panel wall forming the facing wall of a building and comprising structural cladding panels arranged in a formation in which the adjacent corners of four contiguous panels overlap in a common corner junction, characterized in that, at said corner junction, the body of the first panel has a flange projecting laterally outwards and consisting of two side portions at the sides of the body and a corner portion integral with the side portions and extending around the corner of the body, the front face of the corner portion being set back rearwardly with respect to the front faces of the two side portions of the flange, the body of the second panel has a flange on one side thereof, which flange is set back rearwardly with respect to the body of the second panel at said corner junction, the other side of the body of the second panel at said corner junction overlapping one of said side portions of the first panel flange and the second panel flange overlapping one part of the corner

portion of the first panel flange, the body of the third panel has a flange on one side thereof, which flange is set back rearwardly with respect to the body of the third panel at said corner junction, the other side of the body of the third panel at said corner junction overlapping the other of said side portions of the first panel flange and the third panel flange overlapping another part of the corner portion of the first panel flange, and the two sides of the body of the fourth panel at said corner junction overlap the flanges on the second and third panels including the parts of said flanges which overlap the corner portion of the first panel flange.

2. A panel wall as claimed in claim 1, wherein the front face of said corner portion is set back rearwardly with respect to the front faces of the side portions of the first panel flange by a distance substantially equal to the thickness of the flanges on the second and third panels, whereby the front faces of the flanges on the second and third panels lie in a common plane through the front faces of the two side portions of the first panel flange.

3. A panel wall as claimed in claim 1 wherein each of said flanges is clamped to the overlapping body of the adjacent panel.

4. A panel wall as claimed in claim 1, wherein the internal edge of the corner portion of the first panel flange is formed with a step and is spaced from the body of the first panel, the end of the flange on the second panel is spaced from the corner of the body thereof and has a step on the outer edge thereof aligned substantially with the step on the internal edge of said corner portion, and the end of the flange on the third panel is spaced from the corner of the body thereof and projects between the two steps on the corner portion of the first panel flange and the end portion of the second panel flange.

5. A panel wall as claimed in claim 1, wherein each panel comprises a shell of synthetic plastics material shaped to form a concave body and laterally extending flanges integral with the rear edges of the body, and reinforcement means mounted inside said body.

6. A panel wall as claimed in claim 5, wherein the shell is formed by moulding glass fiber reinforced polyester.

7. A panel wall as claimed in claim 6, wherein said reinforcement means comprises wooden inserts embedded in the body of the panel.

8. A panel wall as claimed in claim 6, wherein the concave body is filled with a mouldable material which hardens to form a solid core constituting said reinforcement means.

9. A panel wall as claimed in claim 8, wherein the mouldable material is concrete.

10. A panel wall as claimed in claim 5, wherein the rear end of the side wall of the body on each panel which overlaps a flange on an adjacent panel is turned inwards and engages in a recess in the reinforcement means of the panel.

11. A panel wall as claimed in claim 5, wherein the reinforcement means in each panel support screw threaded means which extend through the underlying flanges of adjacent panels and clamp the underlying flanges to the body of the first mentioned panel.

12. A panel wall as claimed in claim 1, wherein the first and second panels are arranged side by side and

the third and fourth panels are arranged side by side directly above the first and second panels respectively.

13. A panel wall as claimed in claim 12, wherein a sealing strip is provided between the body of the second panel and the side portion of the first panel flange which is overlapped by said body.

14. A panel wall as claimed in claim 1, wherein the two side portions of the first panel flange for said corner junction form the flanges for the second and third panels at adjacent corner junctions.

15. A panel wall as claimed in claim 1, wherein at least some of said panels are fitted with windows.

16. A panel wall as claimed in claim 1, wherein the top panels at the top of the wall each comprises a body having a flange projecting laterally outwards and extending substantially along the full length of the top of the body and down one side thereof, a corner portion of said flange having the front face thereof set back from the front face of the remainder of the flange by a distance substantially equal to the thickness of the flange, and an adjacent panel has the body thereof overlapping the flange on said one side of the body of the first mentioned top panel and the adjacent end of the flange thereof overlapping said corner portion of the flange of the first mentioned top panel.

17. A panel wall as claimed in claim 1, wherein the bottom panels at the bottom of the wall each comprise a body having a flange projecting laterally outwards and extending along a side of the body and terminating at the bottom thereof, and an adjacent panel has the body thereof overlapping the flange on said side of the body of the first mentioned bottom panel.

18. A structural cladding panel comprising a substantially rectangular body having a flange projecting laterally outwards from the rear edges of two adjacent sides of the body, said flange having two side portions terminating close to the ends of said sides of the body which are remote from the corner of the body enclosed between said sides, and said flange also having a corner portion extending around said corner of the body, the front face of the corner portion being set back rearwardly with respect to the front faces of the two side portions of the flange by a distance substantially equal to the thickness of said side portions, and said corner portion being of a size such that a group of four such panels may be mounted with corners thereof in overlapping relationship at a corner junction with the second panel having the body thereof overlapping one side portion of the first panel flange and an end of one side portion of the second panel flange overlapping part of the corner portion of the flange on the first panel, the third panel having the body thereof overlapping the other of said side portions of the first panel flange and an end of one of the side portions of the third panel flange overlapping another part of the corner portion of the first panel flange, and the two sides of the body of the fourth panel overlapping side portions of the flanges on each of the second and third panels including the parts thereof overlapping the corner portion of the first panel, with the front faces of the flanges on the second and third panels lying in a common plane through the front faces of the two side portions of the first panel flange.

19. A structural panel as claimed in claim 18 wherein the body and flange comprise a shell of glass fiber rein-

forced polyester shaped in a mould, and reinforcement means are provided in the body.

20. A structural panel as claimed in claim 18, wherein the outer edges of said side portions of the flange are turned over rearwardly and terminate at the plane passing through the rear face of the corner portion of the flange.

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