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71 Applicant: **Stoakes, Richard Lewis**
Willowmere Farm, Mapleton Road, Four Elms
Edenbridge, Kent TN8 6PN(GB)

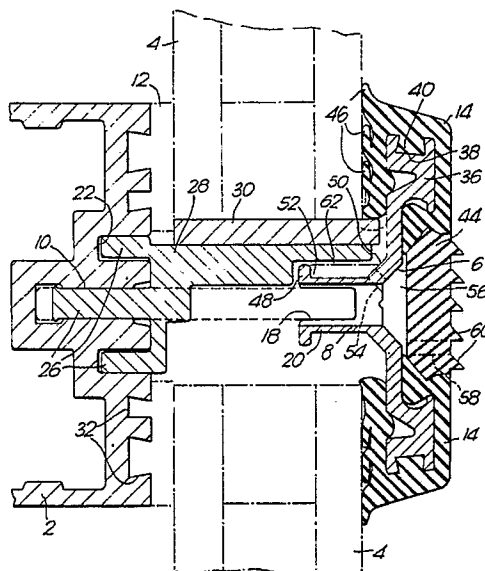
72 Inventor: **Stoakes, Richard Lewis**
Willowmere Farm, Mapleton Road, Four Elms
Edenbridge, Kent TN8 6PN(GB)

74 Representative: **Gura, Henry Alan et al**
MEWBURN ELLIS 2 Cursitor Street
London EC4A 1BQ(GB)

54 **Improvements in wall structures.**

57 A curtain wall structure has infill panels (4) supported on a main frame structure through a series of support plates (28). At the periphery of each cell, sealing gaskets (12,14) engage the inner and outer faces of the infill panel. Sealing pressure is applied by auxiliary frame members (6) on which the external sealing gaskets (14) are mounted. The horizontal auxiliary members (6) at the transoms and sills are each provided with a channel (52) to collect any

water that may have penetrated the outer seals (14,44). Drillings (54,58) in the auxiliary members and the outer seals allow the collected water to drain away from the wall. The penetration of water to the interior of the building clad by the wall is thus prevented, even though the external sealing means may have become less efficient with the passage of time.



IMPROVEMENTS IN WALL STRUCTURES

This invention relates to wall structures. It is particularly, but necessarily exclusively, concerned with structures for curtain walling.

There have been problems when curtain walling systems have become pervious to driving rain and moisture has been able to penetrate through the wall. This has not been uncommon over a period of time and remedial work, if the defect occurs, is both expensive and disruptive. It is therefore often stipulated that a curtain walling system should be provided in which failure of an external seal does not mean that moisture passing that seal can penetrate freely to the interior of the building. The present invention relates to a system of that kind.

According to the invention, there is provided a wall structure, comprising at least one cell or space in which an infill panel is placed and a series of auxiliary frame members which are secured to a supporting structure to retain the panel in place, first sealing means carried by the auxiliary frame members sealing against the panel in its cell, further sealing means sealing between the panel and the supporting structure, the auxiliary frame members, at least at the bottom of the cell, extending inwards past said first sealing means and comprising in that inward extension an upwardly open channel arranged to receive moisture that has penetrated from the exterior part of the first sealing means, drainage means from said channel leading towards the exterior through said auxiliary frame member.

The auxiliary frame members are commonly made by extrusion and the extruded profile can provide raised forward and rearward edges of the channels. In that case, the ends of the channels can conveniently be bounded by deposits of sealant fluid which bond onto the surface of the extruded member and set to provide end barriers containing liquid within the channel.

Preferably, the structure has support means projecting forwards from the supporting structure below the infill panel to provide cantilevered support for the panel, as described in my earlier Patent Application EP 194779. As also described there, the auxiliary frame members can be spaced forwards of the supporting structure and can be connected to that structure by elements that allow the spacing of the auxiliary frame members from the structure to be controllably adjusted.

The invention will be described by way of example with reference to the accompanying drawing, which is a vertical cross-section at a transom 2 of a supporting framework structure for a curtain wall, illustrating the mounting and sealing means

for infill panels 4 (here indicated as double-glazed units) forwards of the main framework structure.

The construction shown in the drawing has a number of similarities with the construction shown in my earlier Patent Application EP 194779 to which reference can be made for further details. The supporting structure thus comprises a main framework of extruded mullions, transoms and top and bottom sills which form rectangular cells that are enclosed by the infill panels. The panels are clamped in place by auxiliary frame members 6 secured by screws (not shown) driven through apertures 8 in the webs of the auxiliary members to engage slots 10 in the front faces of the members of the main framework. The infill panels are thus sandwiched at their edges between inner and outer sealing gaskets 12,14 so as to form a weathertight seal around each cell. The auxiliary members 6 are spaced some distance in front of the main frame members such as the transom 2 and are at least initially located relative to the main frame members by plastics plates (not shown) wedged in the central slot 10 of the main members and an opposed channel 18 in rear web 20 of the auxiliary members.

The central slot 10 of each transom frame members 2 and a pair of smaller slots 22 above and below it receive the tongues 26 rigid metal support plates 28 on which the infill panel 4 rests through pads 30. In the illustrated example, the forward region of the support plate 28 is cut away so as to be at a spacing from the rear of the auxiliary frame member 6, but it is also possible to arrange for these two parts to be in contact, provided a space remains between the front of the support plate 28 and the web 20 of the auxiliary frame member.

The inner gasket 12 for each cell is made up as a closed loop, with bonded mitred joints for the corners of the cell, before the structure is assembled on site. The front face of the main frame members to each side of the slots 10,22 has dovetail recesses 32 in which complementary portions of the gasket 12 can be forced to lock the gasket in place.

The outer gaskets 14 for each cell are similarly made in a closed-loop form to extend unbroken around the periphery of the cell. They are formed with an extruded section that embraces a front flange 36 of the auxiliary frame member which has a dovetail locking slot 38 for a complementary portion 40 of the gasket. The opposite front flanges of the member 6 hold the gasket sections associated with adjacent cells. When both the gasket sections have been put in place on the two flanges,

there is a spacing between them which is closed and sealed by a zipper strip 44, also of an elastomeric material, applying a compression force to the gaskets in known manner. The rear face of the gasket section is formed with a series of parallel ribs 46 to improve its sealing efficiency.

The rear web 20 of the auxiliary frame member section has a main parallel portion terminated at the rear by oppositely directed lips 48. For the auxiliary frame members associated with the horizontal support structure members (ie. the transoms and sills) one lip 48 is on the top face of the web and, together with the sloping face 50 adjoining the root of the web, that lip forms an open-topped channel 52 along the length of the frame member. While the same section auxiliary frame member is used for all sides of the cells, in those members associated with the transoms and sills of the supporting structure, drainage holes 54 are drilled through the root portion of the web leading from the bottom of the channel 52 and the web section may be so formed that the bottom of the channel slopes downwards towards these holes 54.

The holes 54 lead from the channel into the space 56 bounded by the front of the auxiliary frame member and the rear of the zipper strip 44. From the bottom of each space 56 at least one further drainage hole 58 extends through its zipper strip 44 to the exterior of the building. To protect that latter drainage hole from driving rain, a shielding deflector can lie above the front exit of the hole. In the illustrated example the deflector is one of a series of projections 60 running longitudinally along the extruded zipper strip.

At the ends of each cell, the channel 52 formed by the auxiliary member rear web has closing sills 62 to prevent trapped moisture running off the ends of the member. These sills 62 can be formed simply by applying an amount of settable sealant at the appropriate points during the assembly of the structure. Such closing sills can provide containments for the ends of the channel 52 at the top of each cell of the wall structure, so there is drainage at the level of each transom and sill. It is alternatively possible to allow trapped liquid from the upper cells to fall from the ends of their associated channels 52 and eventually reach the bottom sill of the structure the escape through the drainage holes 54 there.

The manner of assembly of the structure is generally similar to that described in my earlier patent application EP 194779. The sealing pressure is determined by the unillustrated clamping screws that pass through the apertures 8 into the slots 10 to secure the auxiliary frame members in place. The drainage holes 54 in the auxiliary members can be pre-drilled, but preferably the zipper strip drainage holes 58 are made after assembly.

Since the auxiliary frame members are not required to support the infill, maintenance work on the drainage system can be carried out easily during the service life of the structure. It is simply necessary to remove the zipper strip, whereupon the drainage holes in the auxiliary members are accessible. The front gaskets can then also be easily released from the auxiliary member at any transom. It is therefore possible to remove one or more of the auxiliary members, if that is required to clean out the channels, without otherwise disturbing the wall.

In use, because of the communication provided by the drainage spaces and holes 52,54,56,58, the pressure in the space around the edges of the infill panels is substantially equalised with the exterior pressure. The outer sealing gaskets 14 therefore have to withstand a much smaller pressure differential to be effective. In the event of any leakage past the outer seal, however, moisture will fall into the drainage channels on the rear webs of the auxiliary members and be led from there to the exterior again. The inner sealing gaskets act as a pressure seal between interior and exterior and it will be seen that penetrating moisture is caught before it can move inwards to that main seal.

Claims

1. A wall structure comprising at least one cell or space in which an infill panel (4) is placed, and a series of auxiliary frame members (6) which are secured to the structure to retain the panel in place, first sealing means (14,44) carried by the auxiliary frame members sealing against said panel in its cell, further sealing means (12) sealing between the panel and the supporting structure, at least at the bottom of said cell there being at least one auxiliary frame member (6), extending inwards past said first sealing means, characterised in that said inward extension of the auxiliary frame member comprises an upwardly open channel (52) arranged to receive moisture that has penetrated from the exterior past the first sealing means (14,44), drainage means (54) through said auxiliary frame member leading from said channel towards the exterior.

2. A wall structure according to claim 1 wherein each said auxiliary frame member (6) is an extruded section having said channel (52) formed integrally therein.

3. A wall structure according to claim 2 wherein opposite ends of the channel (52) have retaining barriers formed by settable sealing means (62).

4. A wall structure according to any one of claims 1 to 3 having supporting means (28) projecting forwards from the supporting structure under

the infill panel (4) to provide a cantilevered support for the panel.

5. A wall structure according to claim 4 wherein said supporting means (28) extend adjacent to said auxiliary member (6) at the bottom of the cell but are spaced from said channel thereon.

6. A wall structure according to any one of claims 1 to 5 wherein the drainage means comprise at least one opening (58) in elastomeric sealing means (44) overlying the exterior of the auxiliary frame member.

7. A wall structure according to claim 6 wherein said opening (58) is provided with rain-shielding means (60) at its exterior.

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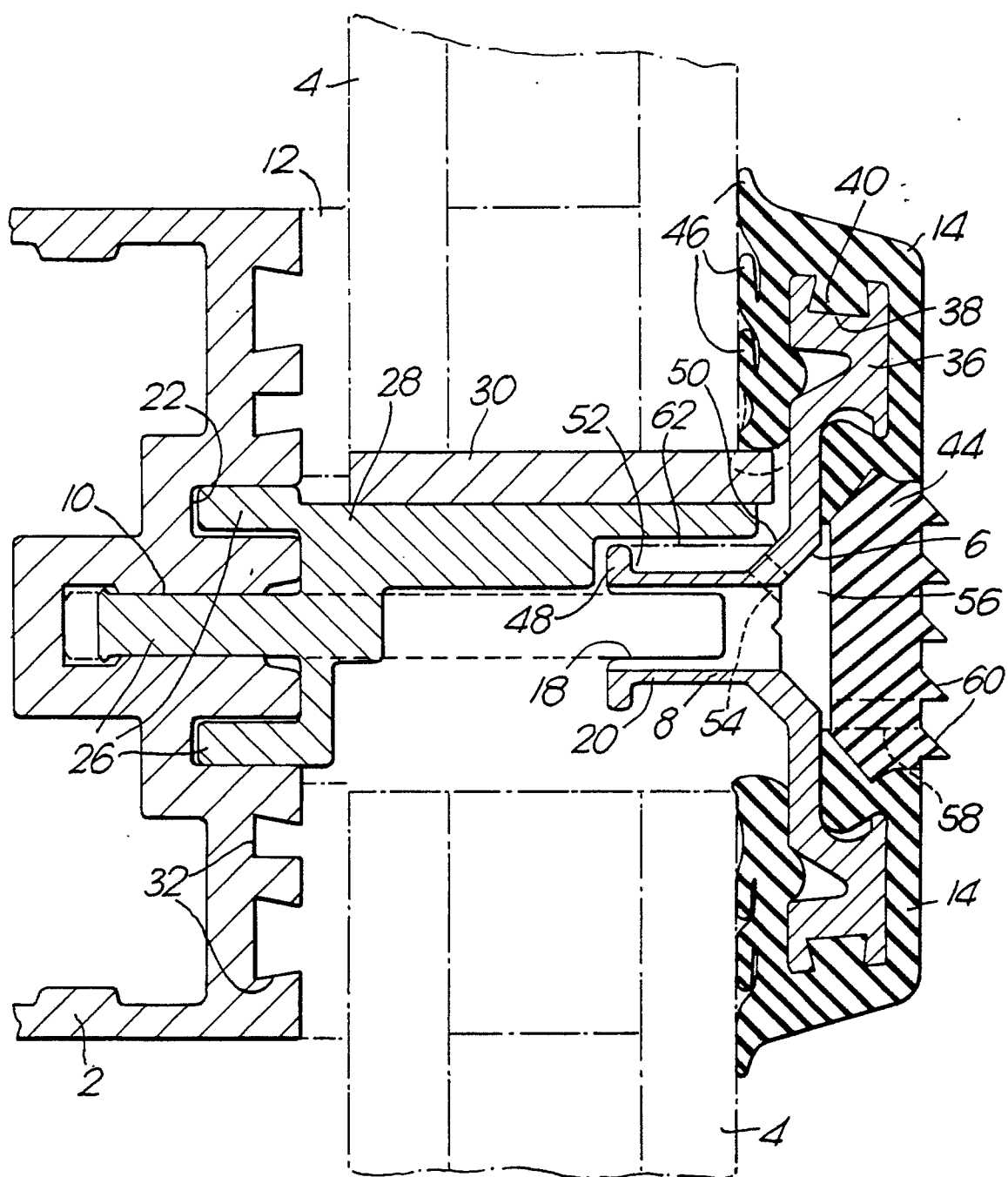
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European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 90 30 6099

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.5)
A,D	EP-A-0 194 779 (STOAKES) * Whole document *	1,4	E 04 B 2/96
A,P	FR-A-2 624 157 (MANUFACTURE ET MAIN-D'OEUVRE DE CONSTRUCTION SARL) * Page 5, line 8 - page 6, line 28; page 8, lines 6-13; fig. *	1,2	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 04 B E 06 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 08-08-1990	Examiner LAUE F.M.
CATEGORY OF CITED DOCUMENTS 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 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			