

PATENT SPECIFICATION (11)

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(54) TRANSOM CONSTRUCTION FOR CURTAIN WALLING

(71) We, YOSHIDA KOGYO K.K., a corporation duly organized under the laws of Japan and existing at No. 1, Kanda Izumicho, Chiyoda-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be particularly described in and by the following statement:

This invention relates generally to spandrel panel assemblies for use in a curtain wall construction, and more particularly to a lower horizontal transom for spandrel panel assemblies.

In the art of curtain wall construction which are used for an exterior nonloadbearing wall of a building, a wide variety of spandrel panel assemblies have been heretofore proposed to conceal the outer ends or edges of floor slabs from external view mainly for aesthetical reasons. Water often tends to be trapped on a lower transom due to leakage around the spandrel panel and/or due to moisture condensation on the interior surface of the spandrel panel. Any known lower transom for such use therefore is provided, in most cases, with drain holes for draining the collected water out of the building. To facilitate good drainage, the drain holes should be sufficiently large in size. However, the trapped water in the lower transom is often sprayed back into the interior of the spandrel panel assembly when strong wind blows in through such drain holes. This phenomenon is commonly referred to as "spouting". This condition is undesirable because it prevents drainage of water and creates an unsightly spraying of water on the interior surface of the spandrel panel. One of the primary problems encountered with the prior art lower transoms under consideration has been the difficulty of providing for effective, spouting-free drainage without affecting the appearance of the spandrel panel assembly.

The present invention therefore seeks to provide a transom construction, for example for spandrel panel assemblies for mounting between adjacent vertical mullions, which construction will provide effective drainage without affecting the appearance of the spandrel panel assembly.

According to the invention there is provided a transom construction comprising an elongate element of hollow construction having a channel on its upper face at one side for receiving a panel, an upwardly extending flange on the side of the upper face of the element opposite to the panel channel, forming a second channel with the inner edge of the panel channel, a plurality of first drain holes in the upper face of the element between the panel channel and the flange for communication with the interior of the element, a plurality of second drain holes in a side face of the element for communication with the interior of the element and overlying means extending from the flange at a spacing from the hollow part of the element in overlying relationship to the plurality of first drain holes, the outer extremity of the overlying means being spaced from the element by a narrow gap to define a narrow longitudinal space between the overlying means and the element.

Preferably the outer extremity of the overlying means forms a narrow longitudinal space between itself and the upper edge of the panel channel.

The invention will now be described in greater detail, by way of example, with reference to the drawings, in which:—

Figure 1 is a vertical cross-sectional view of a lower transom according to the invention incorporating a cover member;

Figure 2 is a view substantially similar to Figure 1, but showing a modified cover member; and

Figure 3 is a fragmentary, perspective view of the lower transom of Fig. 1 showing a further modified cover member.

Each spandrel panel assembly of a curtain wall construction comprises an upper and a lower horizontal transom (only the lower one 10 of which is shown in the drawings) each secured at its opposite ends to adjacent vertical mullions (not shown) by means of brackets (not shown), and a spandrel panel member 11 supported within a rectangular opening defined by the upper and lower transoms and the adjacent mullions.

Figure 1 shows the lower transom 10

which is made preferably of extruded aluminium and includes a hollow body 10a of generally rectangular cross section having an upper portion 12, a lower portion 13, and a pair of inner and outer connecting portions 14, 15 connecting the upper and lower portions 12, 13 at their inner and outer ends or edges, respectively. The upper portion 12 comprises a first horizontal plate having a pair of inner and outer vertical flanges 17, 18 extending upwardly therefrom in spaced apart relationship to form a panel-receiving channel 19 extending along the length of the lower transom body 10a. The lower portion 13 comprises a second horizontal plate 20 and a plate 21 of generally inverted L-shaped cross section formed integrally with and extending upwardly from the second horizontal plate 20 adjacent to the inner end or edge thereof to provide a stepped configuration as shown in Figure 1.

The inner and outer connecting portions 14, 15 comprise respective vertical webs of different lengths connecting the first horizontal plate 12 and the inverted L-shaped plate 21 at their inner ends or edges, and the first and second horizontal plates 12, 20 at their outer ends or edges, respectively, the inner and outer connecting plates 14, 15 extending at a right angle to the first and second horizontal plates 12, 20. Formed integrally with and extending downwardly at a right angle from the outer end or edge of the second horizontal plate 20 is a first vertical plate 22 which cooperates with the outer vertical flange 18 and the outer connecting portion 15 to jointly provide a planar exterior surface of the lower transom 10.

Formed integrally with and extending upwardly at a right angle from the first horizontal plate 12 at its inner end or edge is a second vertical plate 23 which defines a water collection channel 24 together with the inner vertical flange 17 and that portion of the first horizontal plate 12 which lies inwardly of the inner vertical flange 17, the water collection channel 24 extending along the length of the transom body 10a. Formed integrally with and projecting outwardly at a right angle from the second vertical plate 23 adjacent to its upper end or edge is a horizontal flange 25 on which a perforated board member 26 is mounted in a vertical plane, the horizontal flange 25 terminating short of the plane of the inner vertical flange 17. A mounting channel 27 is vertically disposed in cross section and connected to the outer end or edge of the horizontal flange 25 by a chase 28. The lower arm 29 of the mounting channel 27 is disposed at a level above the top edge 30 of the inner vertical flange 17 to define a longitudinal opening 31 therebetween.

The spandrel panel member 11 may be

for example a pane of opaque glass or any other suitable decorative panel and has its lower edge received in the panel-receiving channel 19. The panel member 11 is held in a vertical plane by means of a pair of supporting elements 33, 34 received in the channel 19 in close contact with the interior and exterior lower peripheral margins of the panel member 11, respectively. A gasket member 35 is interposed between the outer vertical flange 18 and the spandrel panel member 11 to provide a fluid-tight seal therebetween. The transom body 10a has a pair of end plates 36 secured respectively to its opposite ends by means of screws or similar fastening means (not shown) which extend through the end plates 36 into the chases 28, 37, 38, 39.

The transom body 10a has its opposite ends fixedly secured to the adjacent mullions by means of a pair of brackets of L-shaped cross section (not shown), one arm of each bracket being fixed to the inner end portion of the second horizontal plate 20 and the other arm to the corresponding mullion.

The first vertical plate 22 cooperates with a structural member (not shown) secured to the lower portion 13 to glaze an upper edge of a transparent glass pane (not shown) at the adjacent lower floor, the transparent glass pane lying in the plane of the spandrel panel member 11.

The first horizontal plate 12 has a plurality of drain holes 40 formed through that portion thereof which lies between the inner vertical flange 17 and the second vertical plate 23 for draining the water collected in the water collection channel 24, the water resulting from rainfall leakage through the panel member 11 and from moisture condensation on the interior surface of the panel member 11. The drain holes 40 are spaced along the length of the transom body 10a. The first horizontal plate 12 has also a plurality of drain apertures 41 formed therethrough, disposed intermediate the inner and outer vertical flanges 17, 18, and spaced along the length thereof for draining water collected in the panel-receiving channel 19.

The outer connecting plate 15 has a plurality of drain openings 42 formed through the lower marginal portion thereof adjacent to the second horizontal plate 20 and spaced longitudinally along the length thereof for draining the water from the water collection and panel-receiving channels 24 and 19 externally of the transom 10.

A one-piece cover member 43 of generally inverted L-shaped cross section covers the longitudinal opening 31 to vertically divide that portion of the interior of the spandrel panel assembly disposed upwardly of the first horizontal plate 12 into an enclosed space section 44 and a water collec-

tion chamber section 45. The cover member 43 functions to prevent the water in the channel 24 from spraying backwards into the enclosed space 44 when strong wind blows through the drain openings 42 and holes 40 into the channel 24 as indicated by an arrow A in Figure 1. More specifically, in such a condition, a spray of water blown from the collected water in the channel 24 impinges upon the interior surface of the cover member 43 so that the intrusion of the water into the enclosed space 44 is prevented. The inverted L-shaped cover member 43 is made of an extruded material such as vinyl chloride, synthetic rubber or aluminium, and includes a relatively thick horizontal portion 46 of uniform cross section, a vertical portion 47 of thinner cross section reducing in thickness progressively toward its distal or lower end, and a curved portion 48 interconnecting the horizontal and vertical portions 46, 47. The vertical portion 47 is disposed slightly outwardly of the inner vertical flange 17, and has its distal or lower end spaced upwardly a small distance from the top edge 30 of the inner vertical flange 17 to provide a narrow longitudinal space 49 therebetween for permitting the passage therethrough of the water in the enclosed space 44 into the water collection channel 24 as indicated by an arrow B in Figure 1, the water resulting for example from moisture condensation on the interior surface of the panel 11. The horizontal portion 46 has its inner end formed into a thickened portion 50 which is complementary in shape to the interior of the mounting channel 27 so as to be snugly received and retained therein.

Figure 2 shows a modified form of the invention in which a generally cross-sectionally inverted L-shaped cover member 43a is made of a flexible material, and its vertical portion 47a has its distal or lower end 51 made slightly longer than that of the first-mentioned vertical portion 47 and directed inwardly as indicated in a solid line in Figure 2. As described above for the cover member 43, the vertical portion 47a is decreasing in thickness progressively toward its distal or lower end 51 so that the inwardly directed end portion 51 is sufficiently flexible to bring its distal tip end into close contact with the top end 30 of the inner vertical flange 17, as shown in dotted lines in Figure 2, to thereby cover completely the narrow longitudinal space 49 when heavy wind blows through the drain openings 42 and holes 40 into the water collection chamber 45 to increase the air pressure in the latter.

According to a further modified form of the invention shown in Figure 3, the continuous cover member 43 of generally inverted L-shaped cross section may be re-

placed by a plurality of cover members 43b of identical cross section but of substantially shorter length. The shorter cover members 43b have their thickened ends 50a received in the mounting channel 27 as described above for the cover member 43, and are spaced along the length of the water collection channel 24 with their horizontal portions 46b disposed respectively in vertical registry with the drain holes 40 correspondingly spaced along the length of the water collection channel 24.

With any of these constructions, the cover member 43, (43a), (43b) can advantageously be easily attached to the transom body 10a with the thickened end 50, (50a) of the horizontal portion 46, (46b) received in the mounting channel 27.

WHAT WE CLAIM IS:—

1. A transom construction comprising an elongate element of hollow construction having a channel on its upper face at one side for receiving a panel, an upwardly extending flange on the side of the upper face of the element opposite to the panel channel, forming a second channel with the inner edge of the panel channel, a plurality of first drain holes in the upper face of the flange for communication with the interior element between the panel channel and the of the element, a plurality of second drain holes in a side face of the element for communication with the interior of the element and overlying means extending from the flange at a spacing from the hollow part of the element in overlying relationship to the plurality of first drain holes, the outer extremity of the overlying means being spaced from the element by a narrow gap to define a narrow longitudinal space between the overlying means and the element.
2. A transom assembly as claimed in claim 1, wherein the outer extremity of the overlying means forms a narrow longitudinal space between itself and the inner edge of the panel channel.
3. A transom construction according to claim 1 or 2, in which said upwardly extending flange has its upper end portion disposed at a level above said upper end of said panel channel, mounting means being provided for receiving the inner extremity of said overlying means.
4. A transom construction according to claim 3, in which said overlying means comprises a plate member of generally inverted L-shaped cross section having a horizontal section overlying the longitudinal opening of said second channel and a vertical section disposed outwardly of the inner edge of the panel channel.
5. A transom construction according to claim 4, in which said vertical section of said plate member has its distal end directed



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tion chamber section 45. The cover member 43 functions to prevent the water in the channel 24 from spraying backwards into the enclosed space 44 when strong wind blows through the drain openings 42 and holes 40 into the channel 24 as indicated by an arrow A in Figure 1. More specifically, in such a condition, a spray of water blown from the collected water in the channel 24 impinges upon the interior surface of the cover member 43 so that the intrusion of the water into the enclosed space 44 is prevented. The inverted L-shaped cover member 43 is made of an extruded material such as vinyl chloride, synthetic rubber or aluminium, and includes a relatively thick horizontal portion 46 of uniform cross section, a vertical portion 47 of thinner cross section reducing in thickness progressively toward its distal or lower end, and a curved portion 48 interconnecting the horizontal and vertical portions 46, 47. The vertical portion 47 is disposed slightly outwardly of the inner vertical flange 17, and has its distal or lower end spaced upwardly a small distance from the top edge 30 of the inner vertical flange 17 to provide a narrow longitudinal space 49 therebetween for permitting the passage therethrough of the water in the enclosed space 44 into the water collection channel 24 as indicated by an arrow B in Figure 1, the water resulting for example from moisture condensation on the interior surface of the panel 11. The horizontal portion 46 has its inner end formed into a thickened portion 50 which is complementary in shape to the interior of the mounting channel 27 so as to be snugly received and retained therein.

Figure 2 shows a modified form of the invention in which a generally cross-sectionally inverted L-shaped cover member 43a is made of a flexible material, and its vertical portion 47a has its distal or lower end 51 made slightly longer than that of the first-mentioned vertical portion 47 and directed inwardly as indicated in a solid line in Figure 2. As described above for the cover member 43, the vertical portion 47a is decreasing in thickness progressively toward its distal or lower end 51 so that the inwardly directed end portion 51 is sufficiently flexible to bring its distal tip end into close contact with the top end 30 of the inner vertical flange 17, as shown in dotted lines in Figure 2, to thereby cover completely the narrow longitudinal space 49 when heavy wind blows through the drain openings 42 and holes 40 into the water collection chamber 45 to increase the air pressure in the latter.

According to a further modified form of the invention shown in Figure 3, the continuous cover member 43 of generally inverted L-shaped cross section may be re-

placed by a plurality of cover members 43b of identical cross section but of substantially shorter length. The shorter cover members 43b have their thickened ends 50a received in the mounting channel 27 as described above for the cover member 43, and are spaced along the length of the water collection channel 24 with their horizontal portions 46b disposed respectively in vertical registry with the drain holes 40 correspondingly spaced along the length of the water collection channel 24.

With any of these constructions, the cover member 43, (43a), (43b) can advantageously be easily attached to the transom body 10a with the thickened end 50, (50a) of the horizontal portion 46, (46b) received in the mounting channel 27.

WHAT WE CLAIM IS:—

1. A transom construction comprising an elongate element of hollow construction having a channel on its upper face at one side for receiving a panel, an upwardly extending flange on the side of the upper face of the element opposite to the panel channel, forming a second channel with the inner edge of the panel channel, a plurality of first drain holes in the upper face of the flange for communication with the interior element between the panel channel and the of the element, a plurality of second drain holes in a side face of the element for communication with the interior of the element and overlying means extending from the flange at a spacing from the hollow part of the element in overlying relationship to the plurality of first drain holes, the outer extremity of the overlying means being spaced from the element by a narrow gap to define a narrow longitudinal space between the overlying means and the element.

2. A transom assembly as claimed in claim 1, wherein the outer extremity of the overlying means forms a narrow longitudinal space between itself and the inner edge of the panel channel.

3. A transom construction according to claim 1 or 2, in which said upwardly extending flange has its upper end portion disposed at a level above said upper end of said panel channel, mounting means being provided for receiving the inner extremity of said overlying means.

4. A transom construction according to claim 3, in which said overlying means comprises a plate member of generally inverted L-shaped cross section having a horizontal section overlying the longitudinal opening of said second channel and a vertical section disposed outwardly of the inner edge of the panel channel.

5. A transom construction according to claim 4, in which said vertical section of said plate member has its distal end directed

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5 inwardly, and made sufficiently longer and flexible to bring the same into contact with said upper end of said inner edge of the panel channel and thereby close the narrow space when a predetermined outward pressure is applied thereto.

10 6. A transom construction according to claim 3, in which said overlying means comprises a plurality of relatively short plate members of generally inverted L-shaped cross section each having a horizontal section overlying the longitudinal opening of said second channel and a vertical section disposed outwardly of said inner vertical

flange, said short plate members being spaced along the length of said second channel with said horizontal sections disposed respectively in vertical registry with said drain holes correspondingly spaced along the length of said second channel.

7. A transom construction substantially as herein described with reference to the drawings.

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