

[54] WALL CONSTRUCTION

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 [58] Field of Search **287/189.36 A; 52/235, 495, 52/496, 732, 731, 496, 476, 475, 656, 664**

[56] **References Cited**

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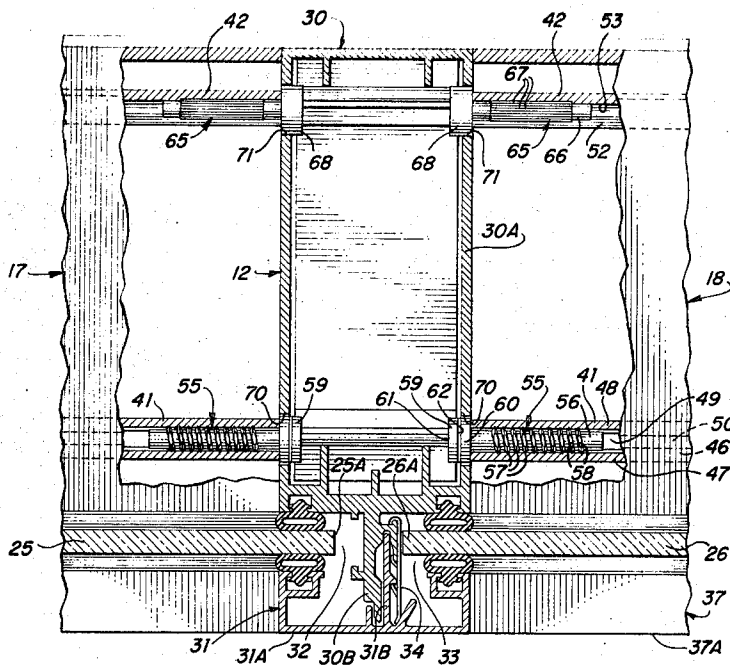
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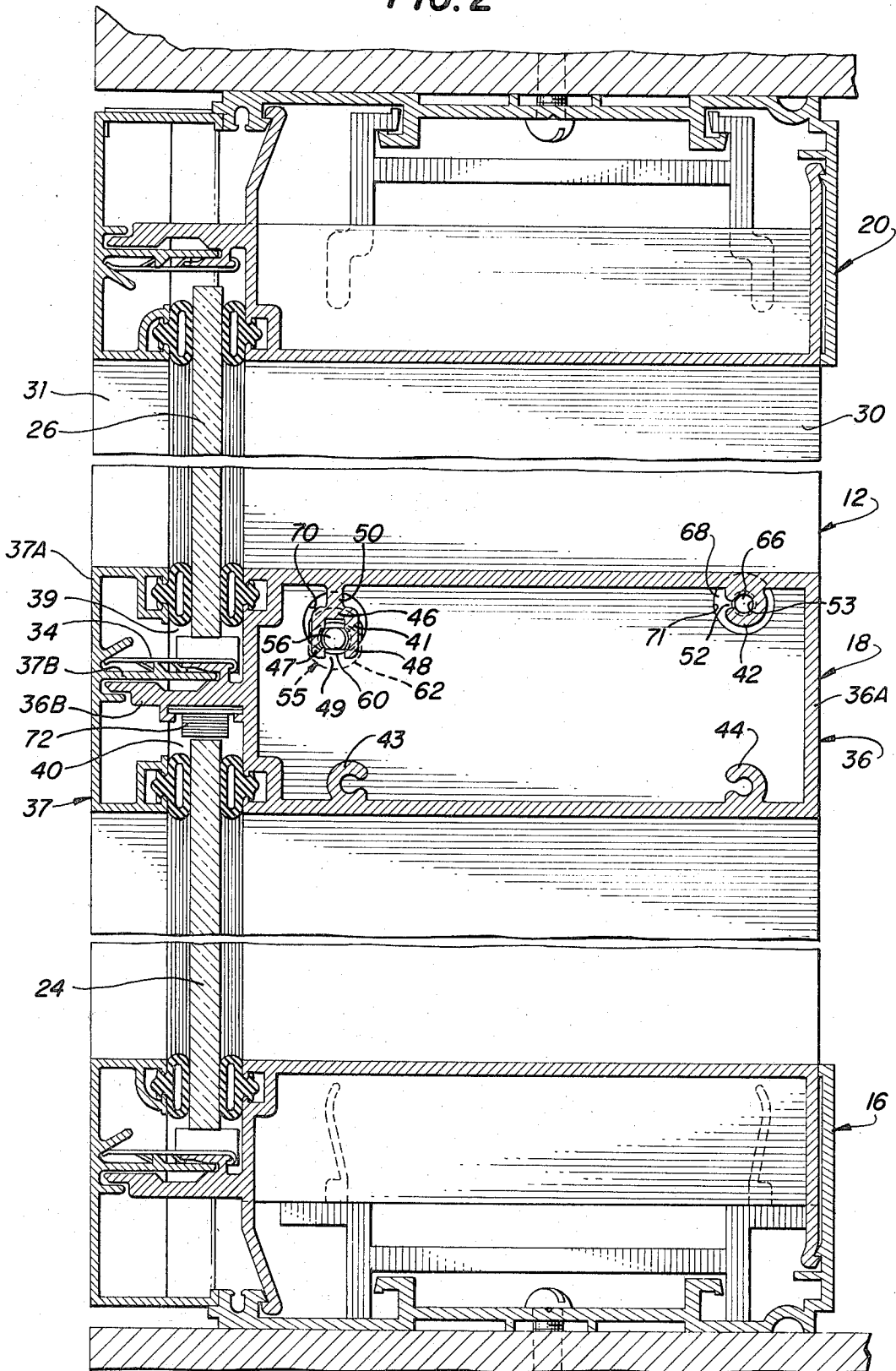
[57] **ABSTRACT**

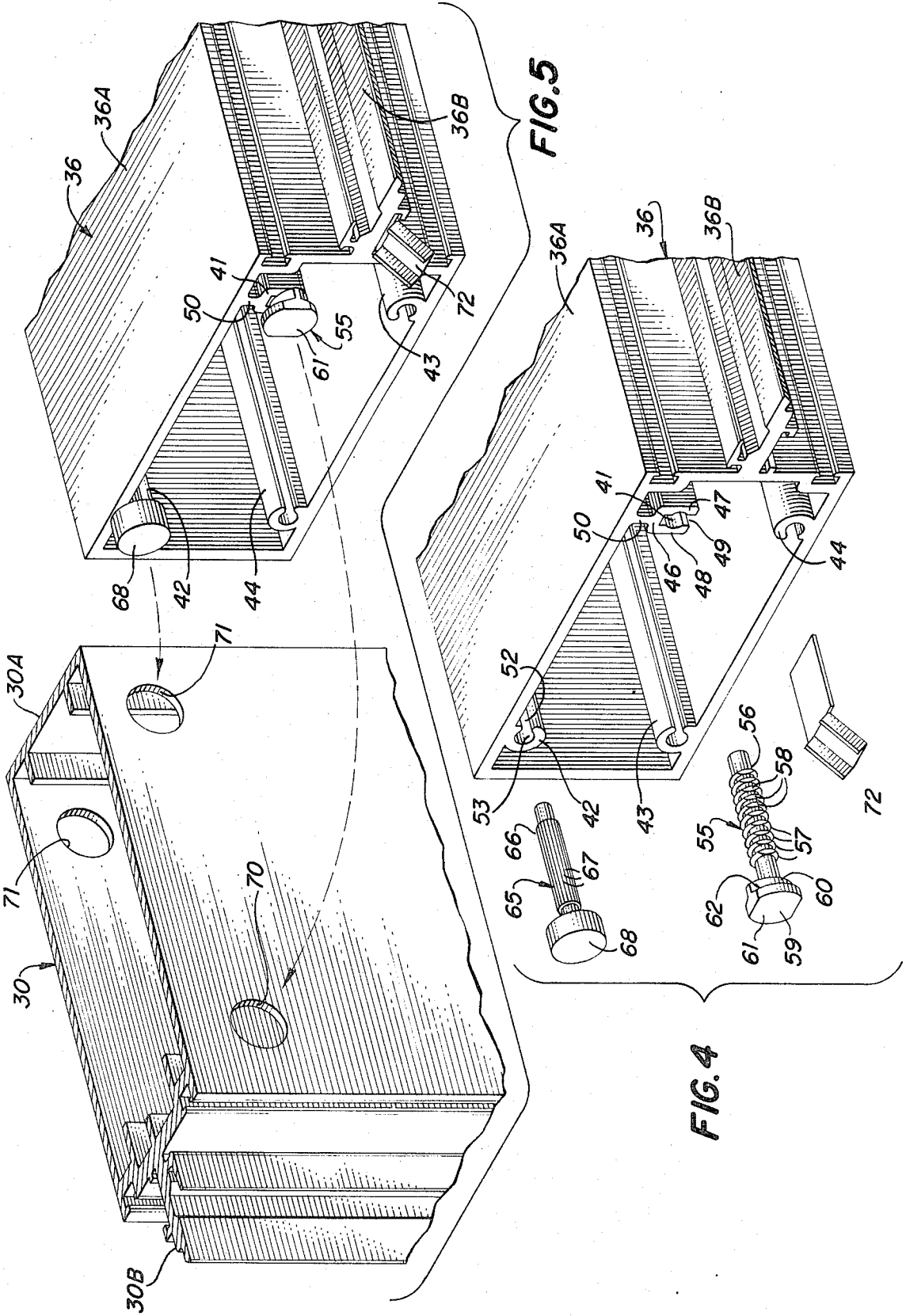
There is provided an improved wall construction including a vertical mullion assembly and a horizontal member assembly. Both assemblies are formed of interlocking gutter and face sections defining opposed glazing channels. The horizontal member assembly is provided with a pair of longitudinally extending screw splines. The assemblies may be joined in accordance with an improved shear pin system wherein the vertical mullion assembly is prepared for attachment of a horizontal member by drilling holes to receive the head of a shear pin and a dowel pin. The horizontal members are prepared by the insertion of a shear pin into one of the screw splines formed in the horizontal member and by the insertion of a dowel pin into the other of the screw splines formed in the horizontal member assembly. The horizontal member is then attached to the vertical by installing the heads of the shear pin and the dowel pin into the holes previously drilled for them.

4 Claims, 5 Drawing Figures



SHEET 2 OF 3
FIG. 2





WALL CONSTRUCTION

The present invention relates to a new and improved wall construction, and more particularly, to a new and improved exterior wall construction for building fronts and the like.

It has already been proposed to provide a wall construction of the type including a vertical mullion assembly and a horizontal member or mullion assembly joined to the vertical mullion by means of shear pins. In such a known wall construction the vertical mullion is first prepared for attachment of the horizontal member by drilling one or more holes for receiving suitable shear pins. The horizontal member is formed with integrally attached screw splines, and the horizontal member is prepared by the insertion of the shear pins into the ends of the screw splines. The horizontal member is then attached to the vertical mullion by inserting the heads of the shear pins through the holes previously formed in the vertical mullion, and then tapping the horizontal member downwardly until the shear pins bottom in the holes. The heads of the shear pins are formed with a suitable bearing surface and are shaped so as to provide suitable bearing area and to wedge the horizontal members tightly against the vertical mullions. The shear pin method of assembly is more fully described and claimed in the copending application filed Aug. 9, 1972 by S. E. Hubbard and Lawrence F. Biebuyck, Ser. No. 279,066, and assigned to the same assignee as the present invention.

Difficulty has been experienced with the shear pin type of installation when the glass or panels of the wall system does not lie along a plane between the shear pins, in that the weight of the glass or other panels will apply a torque to the horizontal member which may tend to twist the horizontal mullion section and to prevent bottoming of all the shear pins associated with the section.

Accordingly one object of the present invention is to provide a new and improved wall construction which combines structural efficiency with economical erection characteristics of the shear pin system.

Another object of the present invention is the provision of a new and improved wall construction which overcomes the above mentioned difficulties.

Yet another object of the present invention is the provision of a new and improved wall construction.

Yet another object of the present invention is the provision of an improved outside glazed shear pin wall system.

Further objects and advantages of the present invention will become apparent as the following description precedes and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

In accordance with these and other objects of the present invention there is provided an improved wall construction including a vertical mullion assembly and a horizontal member or mullion assembly joined to the vertical mullion. The vertical mullion is first prepared for attachment of the horizontal member by drilling one or more holes for receiving suitable shear or dowel pins. In accordance with the present invention the horizontal member is formed with at least a pair of integrally attached screw splines, and the horizontal mullion is prepared by the insertion of a shear pin into the

end of one of the screw splines, and the insertion of a dowel pin into the other of the screw splines. The head of the dowel pin conforms to the size and shape of the hole in the vertical mullion.

Advantageously any off center wall load on the horizontal member will tend to pivot the horizontal member about the head of the dowel pin, and with the shear pin located intermediate the wall load and dowel pin, the shear pin will react with the vertical mullion, applying the down loads into the vertical mullion. Thus twisting of the horizontal member will be prevented.

For a better understanding of the present invention, reference may be had to the accompanying drawings wherein:

FIG. 1 is an elevational view of a storefront or wall construction according to the present invention;

FIG. 2 is a vertical cross sectional view of the wall construction of FIG. 1, taken along line 2—2 of FIG. 1;

FIG. 3 is a horizontal cross sectional view of the wall of FIG. 1, taken along line 3—3 of FIG. 1;

FIG. 4 is an exploded end view of a horizontal mullion illustrating the position of the shear and dowel pins; and

FIG. 5 is an exploded view of the joint between a horizontal member and a through vertical mullion.

Referring now to the drawings, and particularly to FIG. 1, there is illustrated a typical wall construction formed of a plurality of spaced vertical mullion assemblies 11, 12, 13 and 14, base assemblies 15 and 16, a plurality of intermediate horizontal member assemblies 17, 18, 19, and a head assembly 20. As illustrated, the vertical mullions 11, 12, 13 and 14 are through, and the horizontal members 17, 18, and 19 extend therebetween. The interconnecting members form a plurality of openings including a door opening 22, and additional openings or frames for supporting suitable panels such as glass panels 23, 24, 25, 26, and 27.

Referring now to FIG. 3, there is illustrated the vertical mullion assembly 12 which may be considered typical. The vertical mullion assembly 12 may be similar to that described and claimed in U.S. Pat. No. 3,081,949 granted Mar. 19, 1963 to S. Eugene Hubbard, and assigned to the same assignee as the present invention, and which, briefly, includes a pair of interlocking snap in extruded frame sections comprising a gutter frame section 30 and a face frame section 31 interfitted and interlocked to form a pair of oppositely opposed glazing channels 32, 33. The gutter frame section 30 is adapted to be secured to the building while the face frame section 31 is adapted to be snapped together with the gutter frame section 30 securely holding the edge of the glass or panel 25, 26 previously placed in position. The panels 23 and 24 have their adjacent edges 25A, 26A respectively within the openings in aligned spaced apart position. As illustrated in FIG. 3, the frame sections 30 and 31 are secured laterally together by a clip member 34 clinched to the gutter frame section 30.

In order to form the glazing channels 32, 33, the gutter frame section 30 includes a face portion 30A of generally tubular shape and a main web 30B extending longitudinally thereof in a transverse direction intermediate the ends of the face member 30A. Similarly the face frame section 31 is provided with a face portion 31A, here shown as a bar, and a main web 31B running longitudinally of the face frame section and extending

transversely toward the gutter frame section 30 intermediate the ends of the face portion 31A. The main webs 30A, 31A are interfitted in like manner as the mullion illustrated and described in the above mentioned Hubbard patent. The clip member 34 interlocks the main webs 30A, 31A to prevent disassembly thereof.

The intermediate horizontal member assembly 18, best illustrated in FIG. 2, may be taken as typical. Briefly the horizontal member 18 is similar to the vertical mullion 12 and includes a gutter frame section 36 and a face frame section 37. The gutter frame section 36 includes a face portion 36A, here shown as of tubular configuration, and a main web 36B running longitudinally of the gutter frame section 36 extending transversely thereof and intermediate the ends of the face portion 36A. Similarly the face frame section 37 includes a face portion 37A, here shown as a bar shape, and a main web 37B running longitudinally thereof intermediate the ends of the face portion 37A and extending transversely toward the gutter frame section 36. The main webs 36A, 36B are interfitted and interlocked, and the clip member 34 prevents disassembly of the gutter frame section 36 and the face frame section 37. Opposed glazing channels 39, 40 are defined between the frame sections 36A, 37A.

In accordance with the present invention, there is provided an improved arrangement for joining the horizontal members or mullions to the vertical mullions. The horizontal member assemblies, such as assembly 18, may suitably be formed of extruded material, such as aluminum, and has formed therewith a plurality of screw splines 41, 42, 43 and 44. One of the screw splines, here shown as screw spline 41, is of the configuration better illustrated in the above mentioned Hubbard and Biebuyck application, and briefly is of general U-shape in cross-section and includes a bight portion 46 and side leg portions 47, 48 defining opposed side walls forming a screw receiving channel 49. The screw receiving channel 49 is non-circular in cross section; however in the illustrated embodiment the inner opposed side walls are formed with longitudinal, concentric, arcuate confronting recesses adapted for receiving a self-threading shear pin. An extruded neck portion 50 integrally joins the screw spline 41 with a wall of the tubular face portion 36A of the gutter frame section 36.

The remaining screw splines 42, 43 and 44 are similar in configuration and accordingly the screw spline 42 will be described as typical. The screw spline 42 is generally cylindrical in cross-section, having a longitudinal slit 52 to provide a screw receiving channel 53 of generally open, circular cross-section.

A typical shear pin 55 may be similar to that more fully described in the above mentioned Hubbard and Biebuyck pending application, and, briefly, includes a threaded shank portion 56, FIG. 4, having segmented thread sections 57 along opposed sides, with the thread sections removed along sides normal thereto to provide parallel flattened sides 58. Accordingly a plurality of self tapping cutting edges are formed of the leading edge of each of the segmented thread sections at the flattened sides 58 thereof. Each shear pin 55 additionally includes a head portion 59 having a pair of opposed arcuate inner bearing sections 60 for seating on the side wall of a vertical mullion assembly and eccentrically formed with respect to the shank portion. The head

portion additionally includes an enlarged head 61 having a seating surface 62 facing toward the shank portion and tapering outwardly from the shank thereof. The shear pin 55 may be readily assembled in a screw spline 41 by the mere insertion of the shear pin with the flattened sides 58 thereof parallel to the side leg portions 47 and 48 of the screw splines, and given a quarter turn to the position illustrated in FIGS. 2 and 3. The lead of the threads 57 will draw the shear pin 55 up tight against the end of the horizontal member.

The screw spline 42 is adapted for receiving a dowel pin 65 which may have any suitable configuration, and in the embodiment best illustrated in FIG. 4 includes a shank portion 66 having an enlarged knurled section 67 extending from an enlarged head portion 68. The dowel pin 65 is adapted to be press fit into the screw receiving channel 53 with only the head portion 68 thereof extending beyond the end of a horizontal member assembly 18, as best illustrated in FIGS. 5 and 3.

To provide for the joining of a horizontal member assembly, such as member assembly 18, the through vertical member 12 is first prepared for the attachment of the horizontal by drilling suitable holes 70, 71, FIGS. 2 and 5, for receiving the heads of the pins 55 and 65. The hole 70 is sufficiently large to permit insertion of the head portion 59 of the shear pin 55 and desirably may have the same radius as the radius of the arcuate bearing surface 60 thereby to provide a good bearing surface after assembly. The hole 71 has a radius of approximately equal to the radius of the head portion 68 of the dowel pins 65 thereby to provide an assembled fit of the head portion 68 within the hole 71. Conveniently the holes 70 and 71 are of the same size, and accordingly the head portion 68 and the arcuate bearing section 60 would have the same radius.

The horizontal section 36 is installed on the vertical member 12 by inserting the head portion 68 of the dowel pin 65 into the hole 71, and at the same time passing the head 61 of the shear pin 55 through the hole 70. The horizontal member 18 may then be tapped downwardly and pivoted about the head portion 68 of the dowel pin 65 until the shear pin 55 bottoms in the hole 70. Thus the shear pin provides good bearing, and additionally the tapered seating surface 62 is effective to wedge the horizontal member tightly against the vertical mullion.

To prevent water from flowing along the inner surface of the horizontal members, and to direct any water which may have infiltrated into the glazing channel 39 into the verticals, wherein the water may be directed out of the building, there are provided suitable water deflectors 72.

It will be seen that the wall system herein described in detail provides for structural efficiency of the tube frame system with the speed of erection of other systems. Moreover the wall may conveniently be outside glazed with the glazing locked in place by the face sections. The weight of the glass or other panels is reacted by a moment arm between the shear pins 55 and the dowel pins 65, as best illustrated in FIG. 2, without twisting the horizontal members, such as member 18. In the illustrated shear pin system, advantageously the base and head connector members may be continuous, between which the vertical mullions are installed one at a time. Moreover, advantageously, the vertical and horizontal structural element herein described may be used by other known methods of joinery, for example

the described wall system is readily interchangeable with the shear block system and the screw spline systems by the selective use of the screw splines 41, 42, 43, and 44.

Although the present invention has been described by reference to only a single embodiment thereof, it will be apparent that numerous other modifications and embodiments will be devised by those skilled in the art which will fall within the true spirit and scope of the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A wall construction including a through vertical mullion and a horizontal member abutting against said vertical mullion, said horizontal member having at least a pair of longitudinally extending screw splines, a shear pin fastener threaded into the end of one of said screw splines having an enlarged head portion projecting therefrom, said vertical mullion having a pair of spaced holes, said head portion being inserted through one of said holes and bottomed thereon to secure said horizontal member with said vertical mullion, and a dowel pin inserted into the other of said screw splines and received in the other of said holes.

2. A wall construction including a through vertical mullion and a horizontal member abutting against said vertical mullion, said horizontal member having at least a pair of longitudinally extending, transversely spaced screw splines, a shear pin fastener secured into the end of one of said screw splines having a shank and an enlarged head portion projecting therefrom, said head portion including an inner arcuate bearing spacer section eccentric with said shank, said vertical mullion being formed of a member having a transverse web and cross webs, said transverse web having a pair of pin receiving openings of a radius approximately equal to the radius of the arcuate portion of said bearing spacer section, the enlarged head portion of said pin projecting through one of said openings with said arcuate bearing spacer section resting on said transverse web, a dowel pin having a shank installed in the other of said splines and having a head with a radius approximately equal to the radius of said openings and fitted into the other of said openings.

3. A wall construction including a through vertical mullion assembly and a horizontal framing assembly abutting against said vertical mullion assembly, each of said assemblies including a gutter frame section and a face frame section, each gutter frame section including an inner face portion and a main web normal thereto intermediate the ends of said face portion and each face frame section including an outer face portion and a main web normal thereto intermediate the ends of said frame portion, means associated with each of said assemblies interlocking the main webs of the gutter and face portions to define opposed glazing channels, the face portion of said horizontal member having at least a pair of longitudinally extending transversely spaced screw splines; a shear pin fastener threaded into the end of the screw splines closest to said glazing channels and having an enlarged head portion projecting therefrom, said vertical mullion assembly having a pair of spaced holes, said head portion being inserted through one of said holes and bottomed thereon to secure said horizontal framing assembly with said vertical mullion assembly, and a dowel pin inserted into the other of said screw splines and having a head received in the other of said holes, the head of said dowel pin having a radius approximately equal to the radius of said holes.

4. A wall construction including a through vertical mullion assembly and a horizontal framing assembly abutting against said vertical mullion assembly, each of said assemblies including parts defining opposed glazing channels, said horizontal member having at least a pair of longitudinally extending transversely spaced screw splines on one side of said glazing channels; a shear pin fastener threaded into the end of the screw splines closest to said glazing channels and having an enlarged head portion projecting therefrom, said vertical mullion assembly having a pair of spaced holes, said head portion being inserted through one of said holes and bottomed thereon to secure said horizontal framing assembly with said vertical mullion assembly, and a dowel pin inserted into the other of said screw splines and received in the other of said holes.

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