United States Patent [19]

Termohlen et al.

[11] **3,822,522**

[45] **July 9, 1974**

[54] **METHOD OF ERECTING A MULTI-LEVEL BUILDING OF CURTAIN WALL CONSTRUCTION**

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[22] Filed: **Oct. 13, 1972**

[21] Appl. No.: **297,504**

Related U.S. Application Data

[60] Division of Ser. No. 156,634, June 25, 1971, Pat. No. 3,729,878, which is a continuation-in-part of Ser. No. 876,407, Nov. 13, 1969, abandoned.

[52] **U.S. Cl.** **52/745,** 52/126, 52/235, 52/236, 52/747

[51] **Int. Cl.** **E04g 21/14**

[58] **Field of Search** 52/79, 126, 127, 206, 208, 52/210, 234, 235, 236, 238, 745, 747, 271, 579, 588, 595, 508, 509, 475, 83, 66

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Primary Examiner—Frank L. Abbott
Assistant Examiner—Leslie A. Braun
Attorney, Agent, or Firm—Townsend and Townsend

[57] **ABSTRACT**

A curtain wall construction and process of erecting the construction is provided for a building which has each of its floors constructed at ground level and thereafter raised to the floors respective elevated positions. Modular curtain wall sections are fastened to frameworks attached to the floor edges when each building floor is at ground level. Thereafter, when the floor is raised to its elevated position, the top edge of the framework attached to the elevated floor keys into the bottom edge of the overlying framework attached to the floor above for a sliding engagement and the contiguous edges of the curtain walls overlap one another to provide a continuous weather surface on the exterior of the building. Thus, each floor is completely enclosed upon being raised to its final elevational position.

3 Claims, 15 Drawing Figures

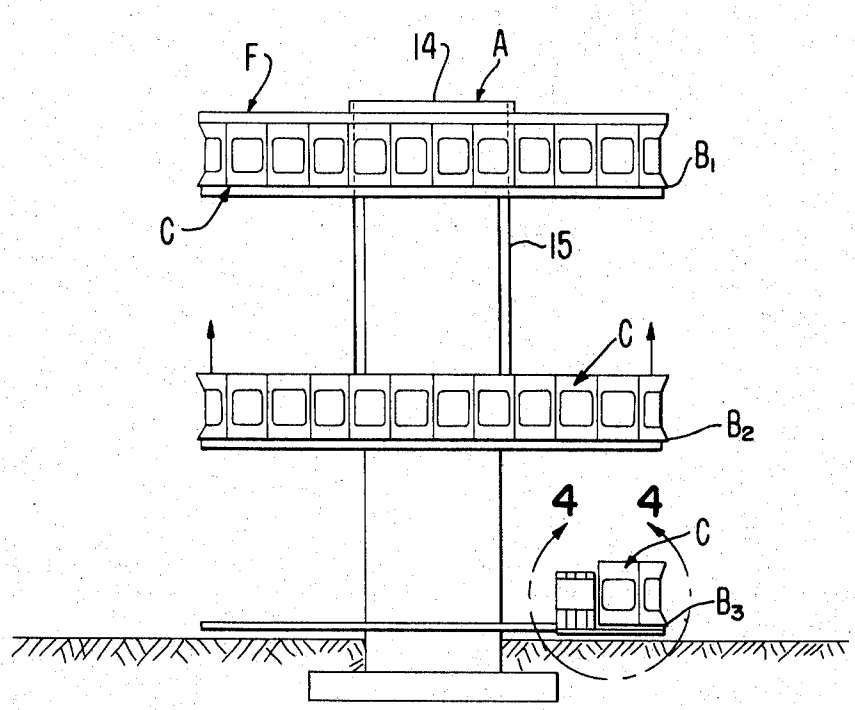
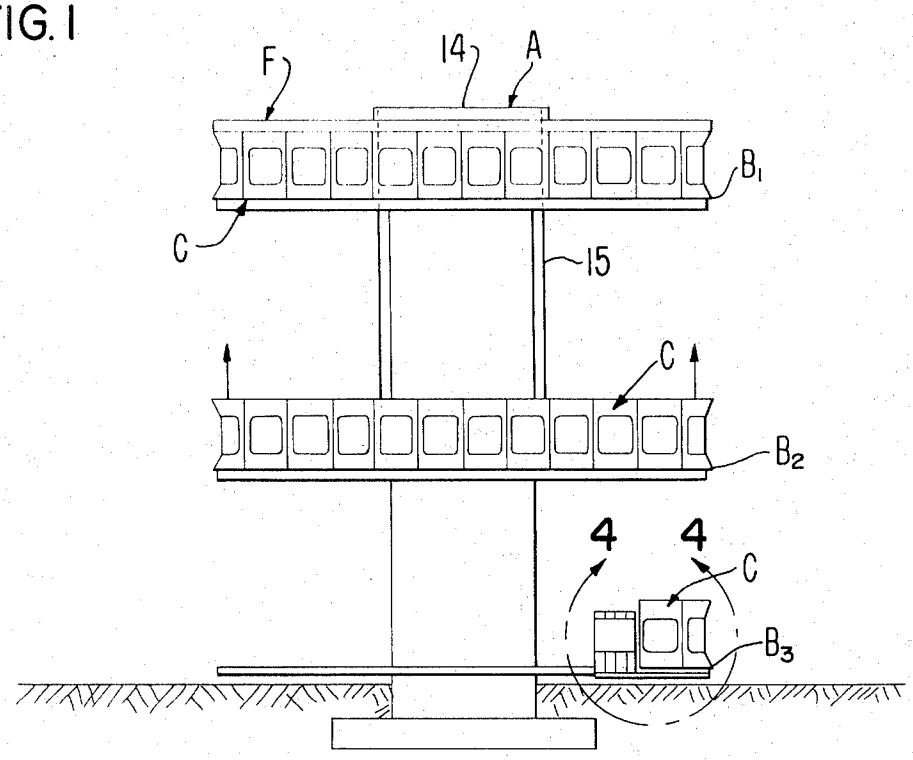


FIG. 1



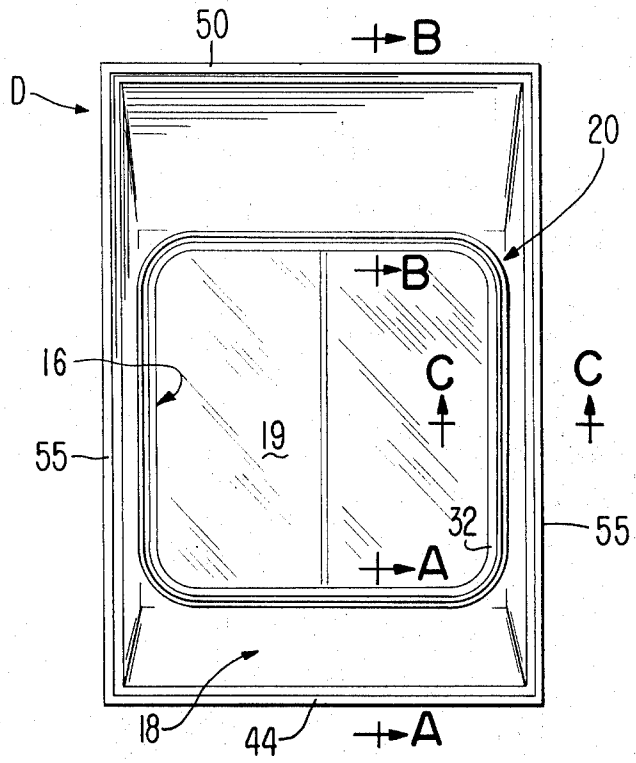


FIG. 2

FIG. 3

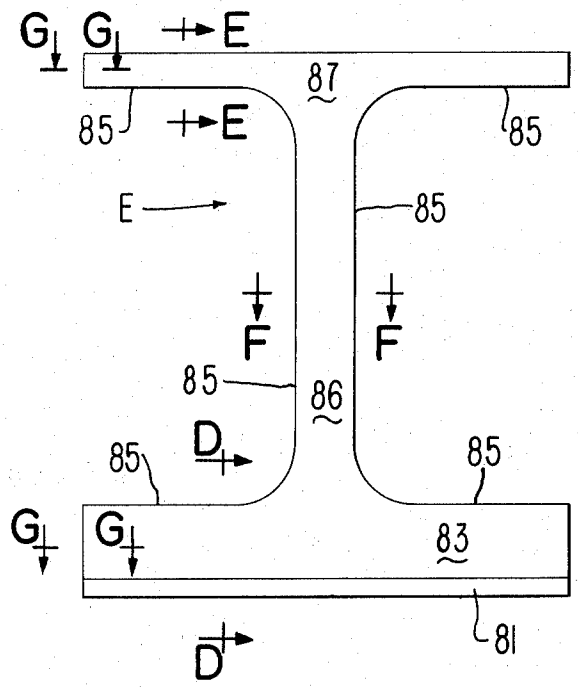


FIG.8

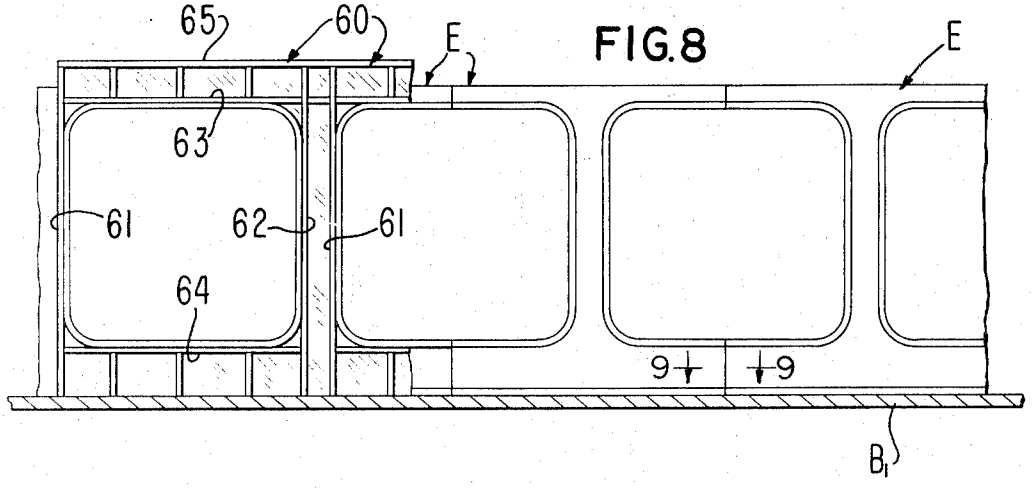
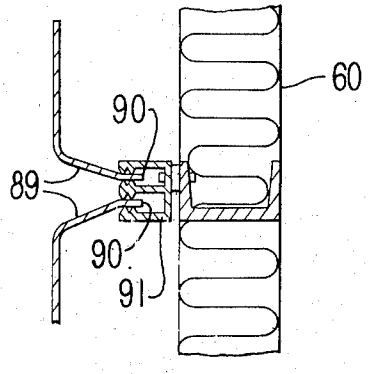


FIG.9



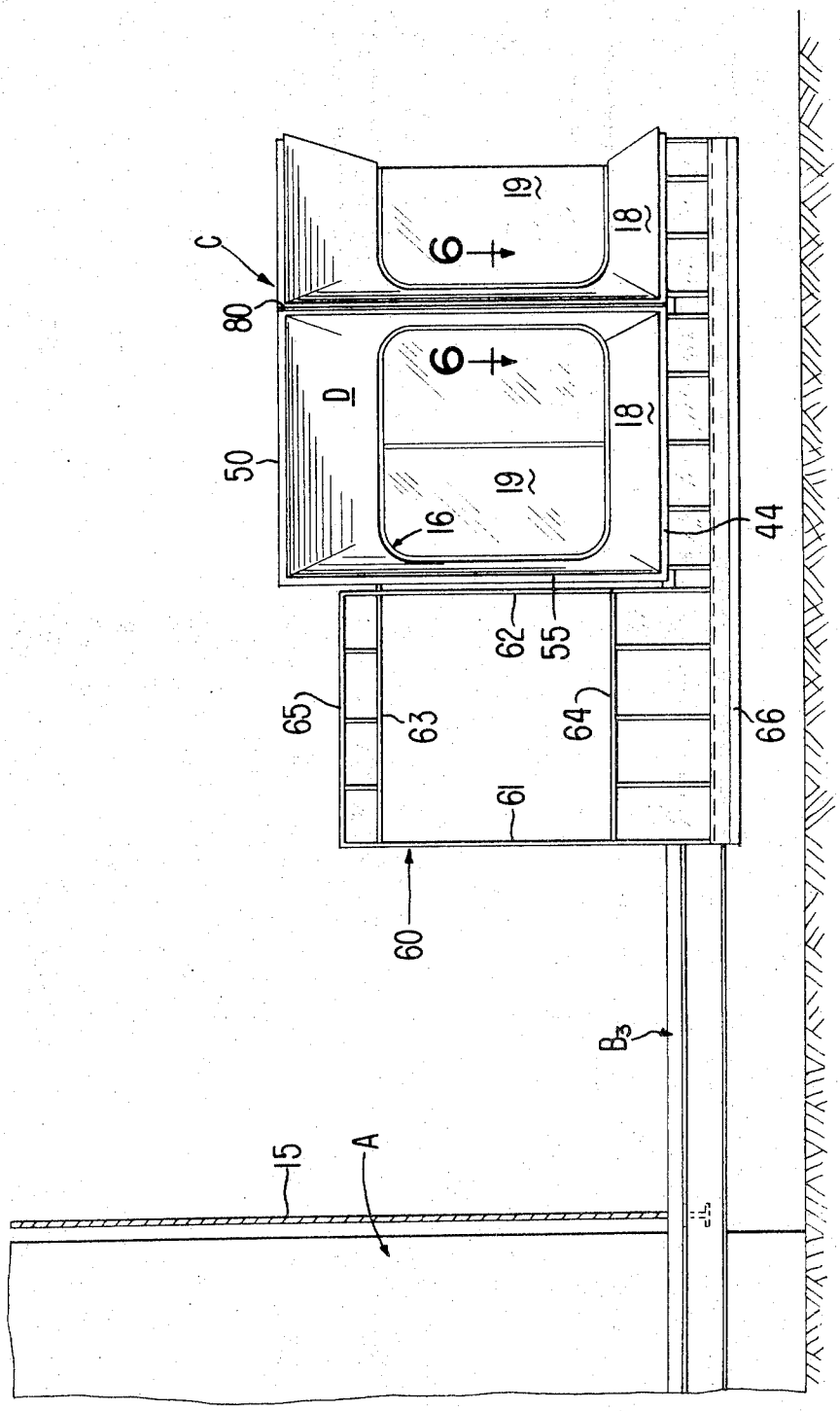


FIG. 4

FIG. 5

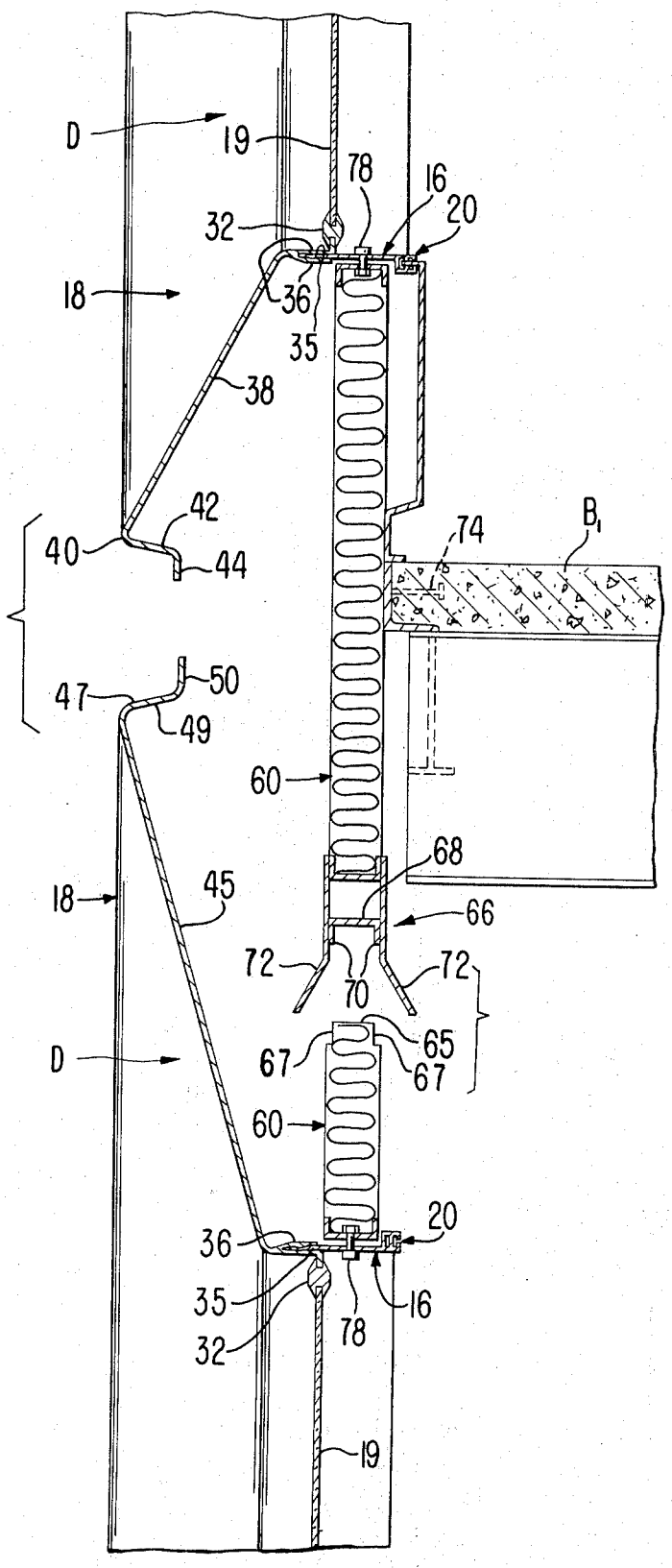

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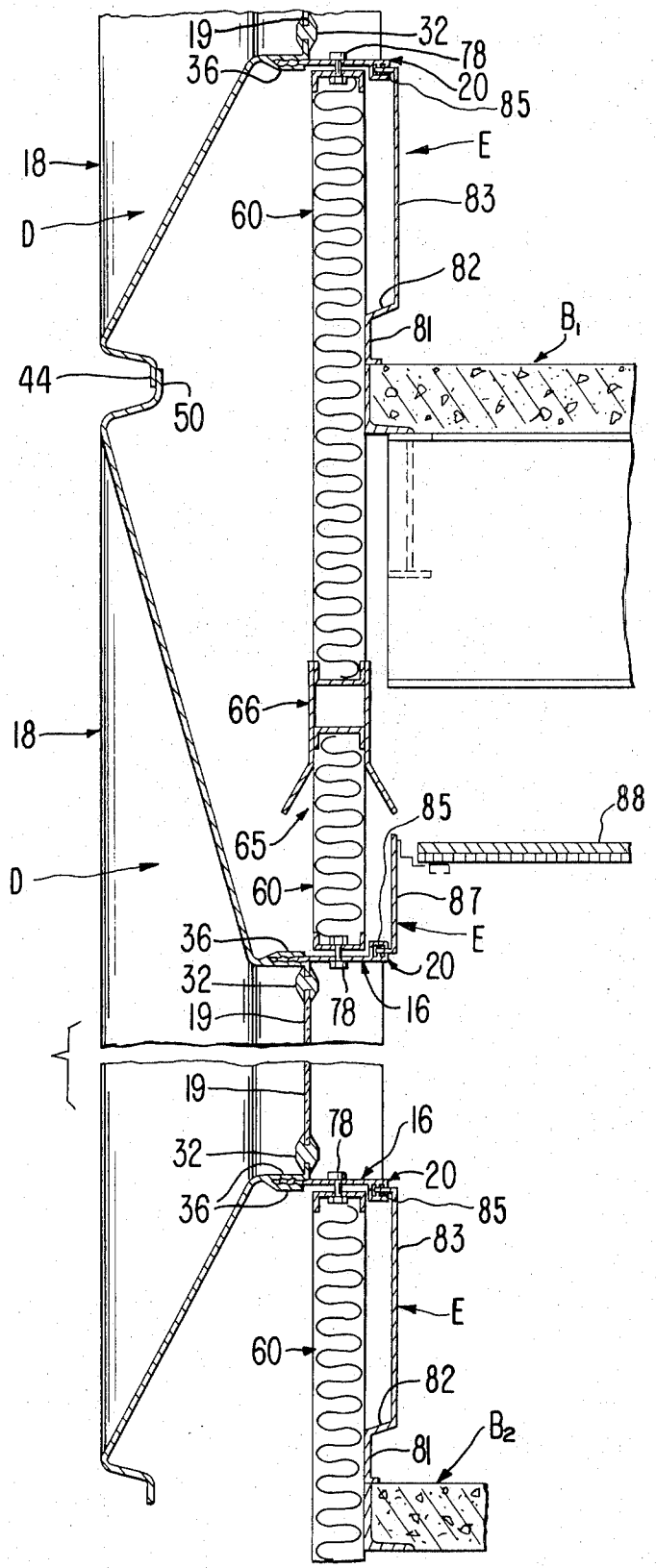
FIG. 6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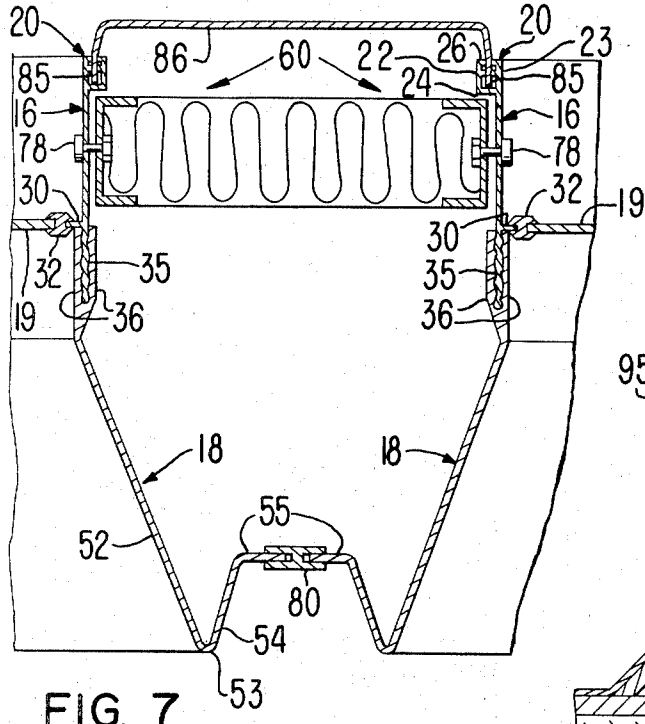


FIG. 7

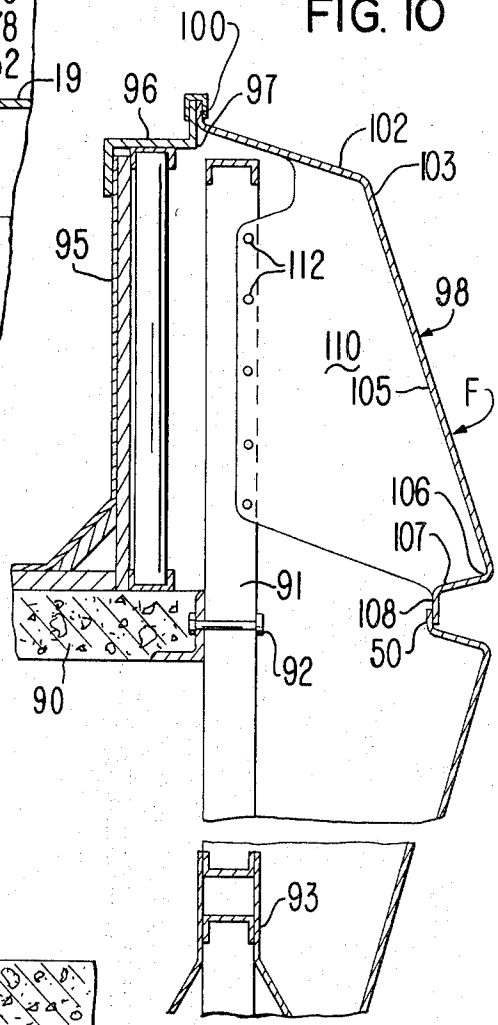
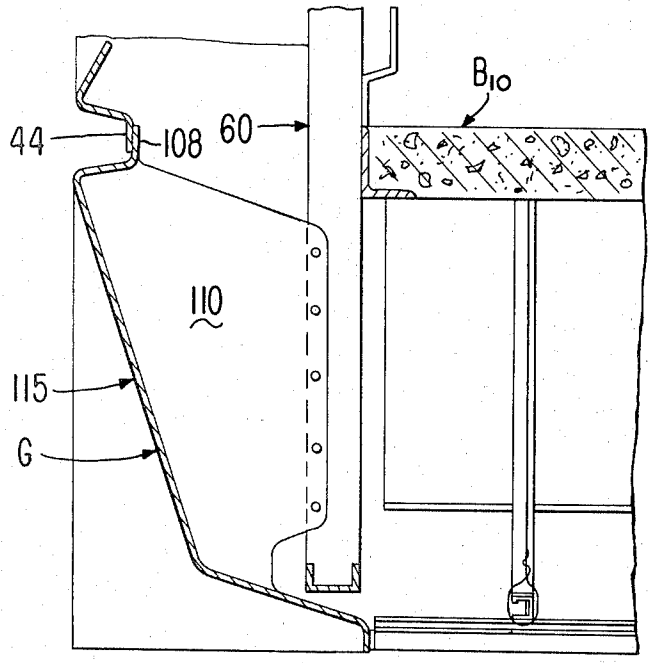


FIG. 10

FIG. 11



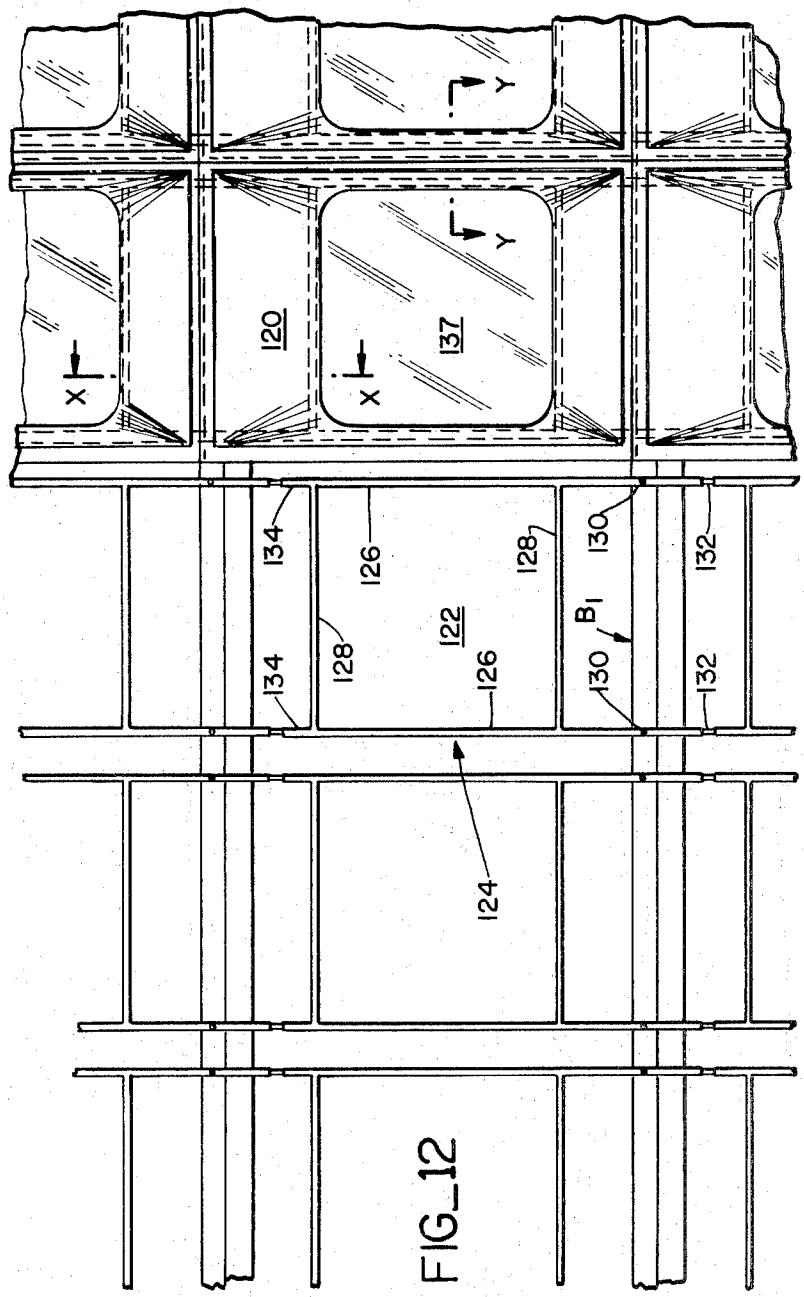

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FIG_12

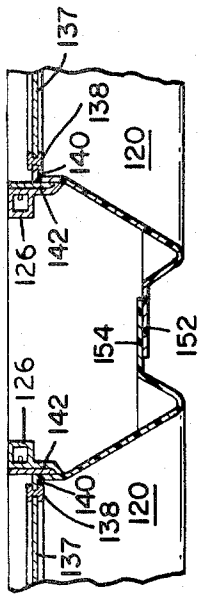
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FIG_15

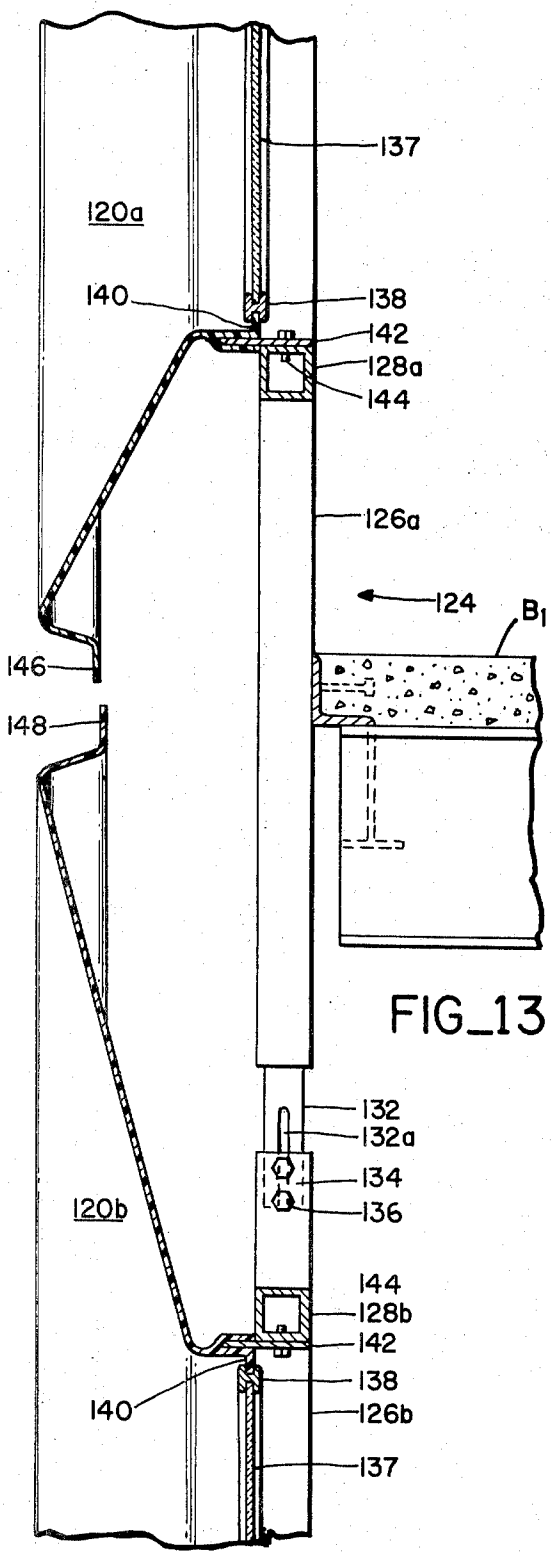
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FIG_13

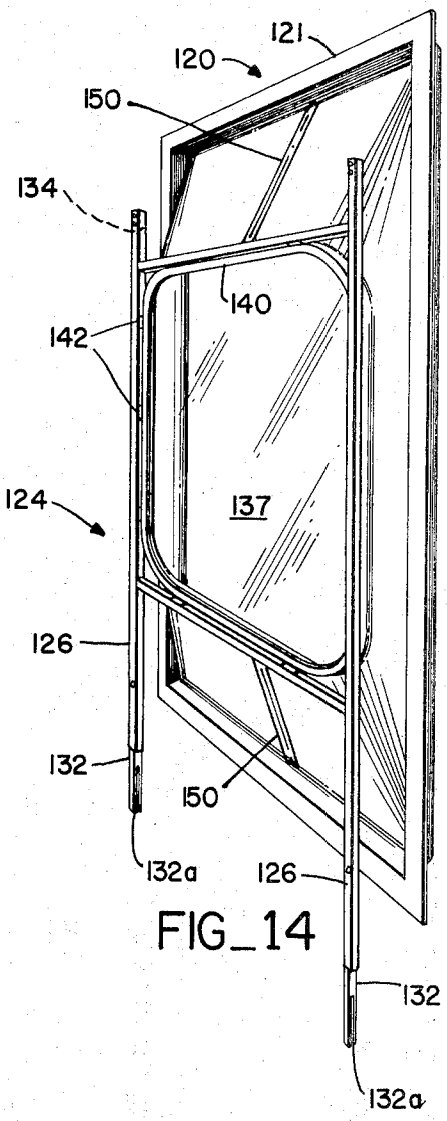
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FIG_14

METHOD OF ERECTING A MULTI-LEVEL BUILDING OF CURTAIN WALL CONSTRUCTION

This invention relates to walls and, more particularly, to a non-load bearing curtain wall construction for a multi-storied building and process for erecting said walls. This is a division of application Ser. No. 156,634 filed June 25, 1971 now U.S. Pat. No. 3,729,878 copending Pat. application Ser. No. and which is a entitled CURTAIN WALL CONSTRUCTION, filed Nov. 13, 1969 now abandoned.

In my copending Pat. application Ser. No. 866,707, entitled SUSPENDED BUILDING CONSTRUCTION filed Oct. 15, 1969, a building construction technique is therein described. This technique includes the process of erecting a central supporting pier or tower, constructing floors about the tower at ground level and thereafter raising the floors to their finished elevational position about the pier or tower. The floors are raised into their elevated position by means of various well known jacking systems, typical of which is that disclosed in U.S. Pat. No. 3,028,143 issued to Cheskin. When in their elevational position, the floors are each pendulously suspended by depending vertical support members from the top of the pier or tower to permit relative movement of the individual floors during severe dynamic loading such as that caused by an earthquake. The present application discloses a curtain wall construction which is a non-load bearing exterior weather and heat shield especially advantageous for this type of building.

Heretofore, the placement of the walls on the exterior of a building has been made only when the framework of the building is completed. Unfortunately, the exterior sidewalls of the building must be fastened to the sides of the building framework at high, inaccessible locations. Moreover, in the fastening of such sidewalls, workmen are frequently required to effect sidewall placement from precarious locations on the outside of the building framing. In these locations, the ability of workmen to quickly perform the manipulation necessary for the fastening of the walls is encumbered by safety harnesses and the like.

Moreover, until placement of such sidewall sections is made in the construction of the ordinary buildings, the frame shells of such buildings are typically unprotected. Inclement weather conditions such as wind and rain often interrupt work on such structures.

Accordingly, an object of this invention is to disclose a curtain wall construction that can be fastened to a floor at ground level and thereafter raised with the floor to key into a finished placement on the exterior sidewalls of a building.

An advantage of this construction is that the attached sidewalls of each floor completely enclose the floor once it is fully elevated. Finishing construction can continue on the interior of the building without interruption from inclement weather.

A further advantage of this curtain wall construction is that the enclosure of the building is effectively finished at ground level; no suspension of workmen and sidewall members at elevated locations along the outside of the building framing is required.

A still further advantage of this invention is that the floor is used as the transporting vehicle for raising intact sidewalls into a keyed and finally fastened position.

Yet another advantage of this invention is that the sidewalls effectively enclose the floor during its raising to a final elevated position. This enclosure obviates the necessity of placing safety lines and the like about the floor edges.

An additional object of this invention is to disclose a framework attachment for a modular curtain wall panel comprising a resilient rim fastened about a central window in which the framework is attached to an edge of the building floor and the curtain wall is affixed to the framework by attachment of the rim only at points adjacent the periphery of the centrally disposed window.

An advantage of the central attachment of the curtain wall unit is the ability of the resilient curtain wall rim to undergo deflection under normal loading such as due to high winds without substantial movement of the contained window.

Yet another object of this invention is to provide the curtain wall frameworks at the upper and lower edges with keys and keyways to obtain a sliding engagement between each curtain wall unit and overlying and underlying curtain wall sections.

An advantage of this key and keyway engagement is that it imparts to the curtain wall construction of each floor a strength which such wall construction would not have independently.

An additional advantage of this construction is that the building curtain walls as keyed one to another are capable of predetermined amounts of relative movement without becoming detached from the building. This relative movement of the curtain wall sections allows one building floor to move with respect to remaining building floors when the building undergoes dynamic loadings and movements such as those experienced during earthquake or high winds without destruction or damage to the exterior building surface.

An additional object of this invention is to provide a window frame construction on the exterior curtain wall which will accommodate and make fast the interior panelling on the inside of the building.

An advantage of this construction is that both the interior and exterior of the curtain wall construction can be fabricated from preformed panels.

Other objects, features and advantages of this invention will become more apparent after referring to the following specification and attached drawings in which:

FIG. 1 is a side-elevation of the construction of a multi-storied building according to this invention illustrating the uppermost building floor and its curtain wall in their elevated position, the second uppermost building floor with its curtain wall being raised to its elevated position below the uppermost floor, and the third uppermost building floor shown at ground elevation with its curtain wall being attached;

FIG. 2 is an elevation of the exterior curtain wall panel of FIG. 1, the view here illustrating the inside surface of the exterior curtain wall panel to show the placement of the curtain wall window frame with respect to the curtain wall rim side edges and window;

FIG. 3 is an elevation of an inside panel for finishing the curtain wall interior of the building of FIG. 1, the view here taken from the exposed side of the panel;

FIG. 4 is an expanded side elevation of the detail 4—4 of FIG. 1 illustrating the placement of the curtain

wall sections of FIG. 2 to the edges of the respective floors at ground level;

FIG. 5 is a side elevation section of the curtain wall construction of FIGS. 1–4 illustrating the curtain walls immediately before a lower floor is elevated into its final position below an upper and overlying floor;

FIG. 6 is a side elevation section similar to FIG. 5 illustrating the sliding engagement of the respective wall sections after a lower floor is elevated into its final position below an upper and overlying floor;

FIG. 7 is a plan section taken along line 6—6 of FIG. 4;

FIG. 8 is an elevation view of the curtain wall interior illustrating the placement of the interior panel section of FIG. 3;

FIG. 9 is a section taken along lines 9—9 of FIG. 8 illustrating the juncture between two interior panel sections similar to those of FIG. 3;

FIG. 10 is a side elevation section illustrating the parapet construction;

FIG. 11 is a side elevation section illustrating the soffit construction;

FIG. 12 is a side elevation of another embodiment of the curtain wall construction of the present invention with several of the curtain wall units removed to illustrate the placement of the supporting frameworks on the edges of the respective floors and the engagement of vertically adjacent frameworks;

FIG. 13 is a side elevation section of the curtain wall construction of FIG. 12 taken along lines X—X illustrating the sliding engagement of the frameworks on vertically adjacent floors and the overlapping relationship of vertically contiguous edges of the curtain walls attached to the frameworks just prior to full engagement;

FIG. 14 is a perspective view of a framework and attached curtain wall according to FIG. 12 taken from the interior of the building; and

FIG. 15 is a plan section of the curtain wall of FIG. 12 taken along line Y—Y and illustrating the overlapping relationship of horizontally contiguous edges of curtain wall rims attached to the same building floor.

With reference to FIG. 1, a building having a central pier or tower A is shown with a series of floors B1, B2 and B3. Floor B1 with its curtain wall C attached is shown raised to its fully elevated position adjacent to the top of tower A. As is set forth in copending application Ser. No. 866,707, entitled SUSPENDED BUILDING CONSTRUCTION, this floor is permanently attached to a beam 14 at the top of tower A by depending supporting members and raised to its final elevated position by apparatus including cables 15.

Floor B2 is illustrated being elevated to its erected position. This floor has its curtain wall C fastened to the edge thereof. As the edge of floor B2 underlies the edge of floor B1, the curtain wall C of floor B2 will immediately underlie the curtain wall C of floor B1. As will appear more fully hereinafter, the upper edge of curtain wall C of floor B2 is configured for a keyed sliding engagement with the lower edge of curtain wall C of floor B1.

Floor B3 is shown at ground level. Referring to the detail 4—4, curtain wall C is illustrated being attached to the edge of the floor. As can be seen in the view of FIG. 1, attachment of the curtain wall C to the floor B3 occurs at grounds level; thereafter, the curtain wall C is raised with the floor when the floor is moved to its elevated position.

Having set forth the broad principles of this invention, its constructional details according to two embodiments thereof will now be set forth. For convenience of the reader an outline of these details in order of their discussion will be set forth at this point. First, the details of construction of the outside or exterior curtain wall panels D as illustrated in FIGS. 2 and 7 will be set forth. Thereafter, the attachment of these exterior curtain wall panels D to the outside of the building will be discussed with reference to FIGS. 4, 5 and 6. Interior finishing of the curtain wall construction with interior panels E will then be described with reference to FIGS. 3, 8 and 9. Next, the parapet F and soffit G will be set forth with reference to FIGS. 10 and 11, respectively. Finally, an alternative framework and curtain wall construction will be discussed with reference to FIGS. 12–15.

Exterior Curtain Wall Panels

Exterior curtain wall panels D are unitary members consisting of three basic portions. First, they each include a frame 16. Secondly, attached to the frame and extending outwardly from it in a manner not unlike the frame around the edges of a picture is a unitary fiberglass rim 18. Thirdly, and mounted to the interior of each frame 16 is window glass 19.

The construction of frame 16 can best be illustrated with reference to FIGS. 2 and 7. Referring to FIG. 2, frame 16 is formed from an aluminum extrusion bent into the shape of the frame. Referring to FIG. 7, the section of the frame 16 is illustrated. As this section is the same at all points along the frame, the section of FIG. 7 will be sufficient for complete understanding.

Referring to FIGS. 2 and 7, it will be seen that frame 16 defines at its edge adjacent the inside sidewalls of the building annular lip 20. Lip 20 includes a peripheral wall 22 on the exterior of the frame, interior wall 23 forming the inside wall of the frame, and interconnecting section 24 connecting the lower portion of wall 22 to interior wall 23.

Extending into the spatial interval between exterior wall 22 and interior wall 23, are a series of protrusions 26. As will hereinafter become apparent, protrusions 26 are the members by which the interior panel E of curtain walls C are fastened.

Fastening of glass 19 to the interior of frame 16 is provided by a single inwardly extending flange 30. Typically, H-shaped zipper type glazing 32 fastens the glass plate 19 to the flange 30. As can be seen in FIG. 7, flange 30 is captured between two of the four legs of H-shaped glazing 32. Likewise, glass 19 is captured between the remaining two legs of H-shaped glazing 32. As glazing 32 extends the entire periphery around the inside of frame 16, the glass is conveniently and rigidly fastened interior of the frame.

Immediately exterior of the flange 30, frame 16 terminates towards the exterior of the curtain wall construction in corrugated member 35. Member 35 is given a corrugated surface so that it can readily fasten to the molded fiberglass construction of rim 18, which rim is fastened to the periphery of frame 16.

Rim 18 is fabricated about and fastened to frame 16 by techniques well understood in the fiberglass art. Typically, the frame is held overlying a fiberglass mold. Thereafter, fiberglass is laid against the mold and up against the frame and cured so that frame 16 and rim

18 become unitary by attachment of the fiberglass about corrugated member 35.

Referring to FIG. 2, it will be seen that exterior curtain wall panel D has three main cross-sectional variations. These variations are shown taken across the bottom edge A—A, top edge B—B and side edge C—C.

Referring to FIGS. 2 and 5. the cross-section of the bottom portion of rim 18 at section A—A is illustrated. Rim 18 adjoins frame 16 at fiberglass 36 on both sides of corrugated member 35. Thereafter, the section extends divergingly outward from frame 16 at lower wall 38. Wall 38 terminates at curvature 40 adjacent the lower edge of the outside curtain wall panel. At curvature 40, the panel extends inwardly back towards the interior of the curtain wall C at inwardly extending member 42. Member 42 in turn terminates at downwardly protruding lip 44.

Referring to FIGS. 2 and 5, the cross-sectional configuration B—B of the upper portion of rim 18 of curtain wall panel D can be described. At the upper portion of frame 16 corrugated member 35 is captured between two cured fiberglass sections 36. Thereafter, wall 45 diverges upwardly and away from frame 16, terminating at an upward curvature 47. At curvature 47, the edge of the wall diverges inwardly towards the interior of the curtain wall C at interiorly extending member 49. At the most interiorly extending portion of member 49, the exterior curtain wall section terminates in upwardly extending lip 50.

One important observation about the configuration of lower lip 44 of the upper exterior curtain wall panel D relative to the upper lip 50 of the lower exterior curtain wall panel D can be made. It will be noted that the inwardly extending member 49 is slightly longer than the inwardly extending member 42. This additional length of member 49 relative to member 42 permits upwardly extending lip 50 to be inside of downwardly extending lip 44 when one curtain wall panel underlies another curtain wall panel. Such a disposition of the respective lips 44 and 50 is illustrated in FIG. 6.

Referring to FIG. 7, the side section C—C of rim 18 of the exterior curtain wall panel D illustrated in FIG. 2 can be seen. As this side rim construction is the same for both sides of the panel, only one section C—C will be described here.

Similar to section A—A and B—B, rim 18 of the panel fastens to corrugated member 35 at overlapped fiberglass sections 36 on either side of frame 16. From frame 16, outwardly diverging wall 52 extends away from the frame terminating in curvature 53. At curvature 53, an inwardly diverging wall section 54 extends towards the interior of the curtain wall section terminating at side lips 55.

Fastening of the Exterior Curtain Wall Panel to the Floor Edges

Referring to floor B3 in FIG. 1 and to the expanded detail of this section in FIG. 4, the fastening of the exterior curtain wall to the floor edges can be understood. Generally, this fastening consists of two steps. First, framework 60 is fastened to the floor edges. Thereafter, the exterior curtain wall sections at their frames 16 are bolted to the framework 60.

Framework 60 includes paired vertical studs 61 and 62 spaced so as to receive the side edges of frame 16 therebetween. Likewise, framework 60 includes an overhead horizontal member 63 and an underlying horizontal member 64. These horizontal members 63 and 64 are spaced so as to receive therebetween the upper and lower edges of frame 16.

Framework 60 is designed with upper edge 65 forming a key and lower edge 66 forming a keyway through which the respective frameworks 60 attached to the respective floors can key into a sliding engagement when one floor is raised into position below and underlying a previously elevated floor. The construction of key 65 and keyway 66 can best be illustrated with reference to FIG. 5.

Referring to the lower portion of FIG. 5, upper edge 65 is illustrated in detail. Edge 65 is of rectangular section extending the length of framework 60 across the top edge thereof. Edge 65 includes two rectangular indentations 67 within the section of framework 60. Each of the indentations 67 is of small dimension and extends horizontally on each upper side edge of the framework 60.

Immediately overlying upper edge 65 illustrated in FIG. 5, is lower edge 66 of framework 60. This edge 66 is configured with a keyway complementary to the key of upper edge 65.

Framework 60 at lower edge 66 is provided with an inverted channel bar 68 whose downwardly protruding side channels 70 are designed to fit into the indentations 67 on either side of the key formed at upper edge 65 of framework 60. Diverging outwardly and below U-shaped channel bar 68 are two gathering plates 72. During raising of the respective floors with their frameworks 60 attached, gathering plates 72 attached to the bottom edge 66 of each framework 60 gather upper edge 65 of underlying framework 60 and align the keys and keyway into a precision interconnection.

Frameworks 60 are fastened to the edges of the respective floors. As illustrated in FIG. 5, bolts 74 embedded in the side edge of floor B1 extend into one or more of the members of a framework 60. These bolts effect an interconnection of the floor B1 with respect to framework 60 to fasten curtain wall C during raising of the floor from ground level to its finished elevational position on the building and to maintain the curtain walls in place.

Referring to FIG. 4, the fastening of the exterior curtain wall section to framework 60 can be readily understood. Typically, the exterior curtain wall section is lifted with its frame 16 extending interiorly of the building and towards framework 60. Thereafter, each exterior curtain wall panel D is moved so that frame 16 fits interior of the rectangular aperture defined by framework members 61–64. In this position, frame 16 is bolted to members 61–64 by bolts 78 illustrated in FIGS. 5 and 7. It will thus be seen that frame 16 as bolted to the interior of framework 60 supports both glass 19 and rim 18 of the exterior curtain wall panel D.

When two exterior curtain wall members are fastened in side-by-side relation to the edge of a floor, it is necessary to join their side lips 55 at the side edges of the panel. This is done with an H-shaped gasket 80 (see FIGS. 4 and 7). As is apparent the H-shaped gasket 80 grips lips 55 on either side of the parallel members of the H and furnishes a weather-tight seal between adjoined exterior curtain wall panels D.

The keyed engagement of both the frameworks 60 and exterior curtain wall panel D with overlying frameworks 60 and overlying exterior curtain wall panel D can be understood with references to FIGS. 5 and 6.

Typically, when floor B2 is raised towards floor B1, the upper edge 65 of framework 60 attached to floor B2 fits interior of the U-shaped channel bar 68 on lower edge 66 of the overlying framework 60. Thus, the respective frameworks attached to the floors B1 and B2 will be aligned into a final keyed sliding engagement illustrated in FIG. 6.

In addition to the alignment of frameworks 60, lip 44 extending across the lower edge of the upper exterior curtain wall panel will overlap lip 50 extending across the upper edge of the lower exterior curtain wall panel. This overlap of the lips 44 and 50 will function in a manner precisely analogous to the overlap between two shingles; a weather seal will be formed and inclement weather will be prevented from penetrating interior of exterior curtain wall panels D.

Inside Panels

Inside panel E can be seen with reference to FIG. 3. Similar to rim 18 of exterior curtain wall panel D, this panel is a unitary fiberglass member fabricated from a mold by techniques well understood in the fiberglass art. Inside panel E is an I-shaped member which at the central member of the I extends over the spatial interval between two windows and together with the top and bottom horizontally extending members of the I frames one-half of each window periphery. The cross-sectional configuration of this unitary fiberglass member at sections D—D, E—E, F—F and G—G can be understood with reference to FIGS. 3, 6, 7 and 9.

Referring to FIGS. 3 and 6, the cross-sectional configuration of the inside panel E along lines D—D can be understood. Inside panel E includes L-shaped member 81 which extends across the entire bottom edge of the panel in a manner similar to the kick plate on the bottom of most cabin constructions. This member at bottom angle of the L bears against the floor slab. The vertical member of the L is against framework 60. The top vertical member of the L is connected to the reaminder of the modular panel construction. From the top portion of L-shaped member 81 the panel E flares angularly upwardly a preselected spatial interval from framework 60 at angle member 82. At the outward end of angle member 82, the interior panel extends parallel to framework 60 along surface 83 at a preselected spatial interval of separation. At the uppermost edge the panel again terminates. This termination occurs at a window engaging edge 85.

It will be noted that window engaging edge 85 extends around the interior of the panel member at all points where it borders frame 16. This construction enables inside panel E to fit interiorly of the groove defined by lip 20 of frame 16. When placed interior of the groove, the inside panel is held rigidly in place.

Referring to section E—E of FIG. 3, and FIG. 6, the upper or top section of I—shaped inside panel E can be understood. Panel E includes an upper surface 87 which extends across the entire upper edge of the panel. This surface terminates at its upper point inside the ceiling plenum defined between the upper edge of ceiling panel 88 and the lower edge of the overlying floor. At the bottom edge of the horizontal surface 87, frame engaging edge 85 is disposed. When this edge is placed interior of the groove defined by lip 20 of the frame, inside panel E can be fastened at its upper portion to the inside surface of the curtain wall construction.

With reference to FIGS. 3 and 7, the section of the interior panel member along lines F—F can be understood. Typically, the panel includes a vertically extending surface 86 which conjoins the two surfaces 83 (at the bottom) and 87 (at the top). Surface 86 is raised a preselected spatial interval from two conjoined frameworks 60 and serves to overlap their respective edges. At either side of surface 86, frame engaging edges 85 are disposed.

Referring to FIGS. 3 and 9, the sectional construction of the interior panel along lines G—G can be understood. Typically, in the fabrication of the panel, it is necessary that it be fastened to the framework 60 along the vertically extending edges defining the side limits of the lower horizontal surface 83 and upper horizontal surface 87. This is accomplished by providing two edges 89 which extend angularly away from the edges and towards frameworks 60. At their innermost portion of each of edges 89, groove engaging surface 90 is provided; this edge 90 extends into and engages a double channeled member 91 fastened to framework 60 and having each of its channels opening outwardly and towards inside panel E. As is apparent, the vertically extending edges of lower horizontal surface 83 and upper horizontal surface 87 are all of identical construction.

With reference to FIG. 8, the placement of the inside panel E can be understood. Panels E can be placed either when the floors are in their erected relation, or before the floors are finally hoisted from ground level to their elevated position in the building. As is apparent, these inside panels will be placed after the outside panels have been installed. This is necessary since the groove of lip 20 on frame 16 forms the point of attachment of the inside panel sections at their edges 85.

Typically, inside panel E is placed so that vertically extending surface 86 overlaps the spatial interval between two adjoining windows. Thereafter, the panel is urged into engagement between its respective edges 85 and the groove in lip 20 about frame 16. L-shaped member 80 engages the floor. Likewise, grooves 90 are engaged in double channel members 91 thus fastening the panel to the curtain wall at all outside surfaces save and except the upper edge of horizontally extending surface 87.

Parapet Construction

At the topmost portion of the building, a parapet construction F is provided. This construction shown in FIG. 1 is illustrated specifically in section in FIG. 10.

Ceiling slab 90 has fastened at the side edges thereof framework 91 secured by bolts 92 embedded in the side edges of the ceiling slab. Framework 91 includes at its lower edge 93 a female keyway precisely identical to that keyway 66 defined along the lower edge of framework 60. For the purpose of supporting both the parapet and a trolley for the window washing system of the building, roof slab 90 has mounted to the side edges thereof an upwardly protruding rail 95. Rail 95 has trolley rail 96 with an upwardly extending vertical channel 97.

The parapet construction includes a plurality of unitary and molded fiberglass members 98. Members 98 in their construction are very similar to the lower surface 38 of the exterior curtain wall section.

Parapet section 98 includes a vertically extending upper lip 100 which parallels the upper and vertically

extending leg of the trolley rail **96.** From this member, an outwardly diverging and sloped surface **102** is provided terminating at a downward slope **103.** From slope **103** the parapet molding extends divergingly outward and downward at sloped member **105** to its outermost extremity at curvature **106** along the lower edge of the panel. From curvature **106** parapet section **98** slopes inwardly along surface **107** and finally defines a downwardly extending lip **108.**

Fastening of the parapet to the parapet framework **91** is accomplished by a template **110.** Typically, when the exterior parapet molding **98** is formed, parapet template **110** is integrally laid into the structural fiberglass and provided with a series of apertures **112** at its inside edge. These apertures **112** form the points of attachment of parapet molding **98** to the parapet framework **91.** Thus, template **110** serves to place the parapet section **98** outwardly at the desired spatial interval.

It will be seen that downwardly extending vertical lip **108** is spaced from the parapet framework **91** so as to overlap the upwardly extending lip **50** of the exterior curtain wall section immediately below. Thus a weather seal is formed between the parapet molding **98** and the underlying curtain wall.

It will be understood, that the parapet can be mounted either before or after the underlying curtain wall is placed.

Soffit Construction

Referring to FIG. **11** the mounting of a soffit panel **115** along the bottom edge of the lowermost floor is illustrated. This soffit panel **115** is mounted to the lower protruding edge of the bottom-most floor **B10** in a manner which is precisely analogous to the mounting of the parapet panel **98**; the only difference being that the panel **98** is inverted and the lip **108** faced outwardly from the framework **60** so as to be interior of the lower lip **44** of the overlying exterior curtain wall section. As in the case of the parapet construction illustrated in FIG. **10,** a template **110** rigidly fastens the parapet to the framework **60.**

Alternate Curtain Wall and Framework Construction

Referring now to FIGS. **12** through **15,** another embodiment of the curtain wall and framework construction of the present invention is shown wherein each curtain wall unit **120** is fastened adjacent the periphery of the window contained therein to an individual framework **124** which is attached to the edge of a building floor **B1.**

Each framework **124** includes a spaced pair of vertical members **126** and a spaced pair of horizontal members **128** which together define a rectangular aperture **122** of a size which is slightly larger than the curtain wall window. Vertical framework members **126** are attached at their lower end to the edge of floor **B1** by bolts **130** embedded therein.

Vertical framework members **126** each include at their lower end a downwardly projecting male extension **132** having formed therein an axially extending slot **132***a*. The upper ends of vertical framework members **126** include a female recess **134** formed to slideably receive male projection **132** extending downwardly from the framework immediately above which is attached to the overlying floor. Downwardly extending male projections **132** and complimentary female recesses **134** form a system by which the frameworks **124** attached to vertically adjacent floors can key into sliding engagement when one floor is raised into position below an underlying and previously elevated floor. It will be seen that the only point of fixed rigid connection between the curtain wall units and the building structure occurs at the individual floor edges by means of bolts **130** which fasten the bottom portions of vertical framework members **126** to the floor edges.

The means of attachment of framework **124***a* to building floor **B1** as well as the sliding interengagement between framework **124** attached to floor **B1** and vertically underlying framework **124** attached to building floor **B2** (not shown), can be seen with reference to the section view of FIG. **13.** FIG. **13** also shows the overlapping weather seal between the bottom and top edges of vertically adjacent curtain walls. The attachment of the curtain wall unit **120** to its supporting framework **124** is shown both in the section view of FIG. **13** and in the perspective view of FIG. **14.**

As described above, vertical framework members **126** are provided at their lower end with downwardly extending male projections **132** and at their upper end with complementary female recesses **134.** As floor **B2** is raised into its final position below overlying floor **B1,** recesses **134** slideably engage projections **132.** In addition, bolts **136** extending through the interior of recess **134** in a direction transverse to the axis of vertical member **126** slideably engage axial slot **132a** formed in projection **132.** This sliding interengagement of frameworks **124***a* and **124***b* allows relative movement of the vertically adjacent frameworks should the floors to which they are attached experience relative movement with respect to one another due to dynamic loads impressed on the building structure.

The method of attachment of curtain wall unit **120** to framework **124** will now be discussed in relation to FIGS. **13** and **14.** Curtain wall **120** includes a rim **121** having two side edges and a top and bottom edge in a design similar to the curtain wall shown in FIG. **2** with the difference that frame **16** is eliminated. Instead, window **137** is attached to curtain wall rim **121** directly by means of an H section rubber gasket **138** which joins the periphery of window **137** with lip **140** formed as an integral part of curtain wall **121** at the interior terminus of its edges.

Curtain wall **120** either with or without window **137** mounted therein is attached to framework **124** by means of metal fastening clips **142** which are embedded in the interior edge of curtain wall **120** by various bonding methods well known in the fiberglass art. Clips **142** are disposed at various locations around and immediately adjacent to the periphery of window **137.** Clips **142** are located so as to fit within framework aperture **122** and contact the inner surfaces of members **126** and **128** which define framework aperture **122.** Metal clips **142** are fastened to framework members **126** and **128** at staggered locations around the inner periphery of framework central aperture **122** as by metal screws **144.** Thus it can be seen that curtain wall **120** is mounted on building structure by attachment of rim **121** to framework **124** only at locations immediately proximate the periphery of window **137.**

As can be seen in FIG. **13,** the bottom edge of curtain wall **120***a* attached to framework **124***a* is provided with an inwardly and downwardly extending lip **146.** Similarly, the upper edge of curtain wall **120***b* attached to underlying framework **124***b* is provided with a complimentary inwardly and upwardly extending lip **148.** Lip **148** extends inwardly a short distance beyond lip **146**

to provide an overlapping weather-tight seal between lips **146** and **148** when framework **124***b* is elevated into its final position in engagement with overlying framework **124***a*. Where the curtain wall units are formed of fiberglass this overlapping arrangement becomes especially easy to achieve by taking advantage of the inherent resiliency of the material. One lip is merely deflected to slip behind the other. The two lips may optionally be sealed together as by a rubber gasket or zipper or light adhesive material.

Ribs **150** are formed in the top and bottom edges of curtain wall **120** to impart added strength to the curtain wall structure.

While the embodiments shown herein employ a curtain wall rim of molded fiberglass construction the present invention contemplates any material having enough resiliency to accomodate deflections due to normal wind loading or other forces while still providing the required amount of structural rigidity. For example, a rim of aluminum sheet material would also suffice.

Referring now to FIG. **15,** the overlapping relationship of horizontally adjacent curtain wall units attached to the same floor in order to provide a weather-tight seal is shown. The left edge of curtain wall **120** as viewed from the exterior is provided with an inwardly and leftwardly extending lip **152.** Similarly, the right edge of curtain wall **120** is provided with an inwardly and rightwardly extending lip **154.** Lip **154** extends inwardly a slight amount more than does lip **152** with the result that contiguous side edge lips on adjacent curtain walls attached to the same floor overlap to provide a weather-tight seal. The combination of the overlap between lips **146** and **148** on curtain wall **120** bottom and top edges respectively and lips **152** and **154** on curtain wall **120** side edges provides a continuous weather surface on the exterior of the building.

These and other modifications of our invention may be practiced, it being understood that the form of our invention as described above is to be taken as a preferred example of the same. Such description has been by way of illustration and example for purposes of clarity and understanding. Changes and modifications may be made without departing from the spirit of our invention.

What is claimed is:

1. In a process of constructing a building having an exterior non-load bearing wall with non-structural interior supports, said process comprising the steps of: erecting at least one central supporting tower; constructing a plurality of floors about the tower at ground level, each floor defining about each tower an aperture and extending outwardly from said tower at said aperture to floor edges wherein outward edges of overlying floors substantially vertically overlying corresponding underlying edges on underlying floors; mounting first curtain wall supporting frames to said an upper floor at said floor edges, said frames having means for slidably engaging corresponding frames fastened to corresponding underlying floor edges; providing curtain wall panels, each panel including a central glass panel surrounded by a flexible unitary rim having a top edge, a bottom edge and two side edges; mounting said curtain wall panels to said first frames proximate said windows only whereby said flexible unitary rim protrudes peripherally outward from said window as said curtain wall panel is held to said frame; raising and fastening said first floor to said tower at a preselected height along the side walls of said tower; mounting second curtain wall supporting frames to a lower floor at said floor edges, said frames having means at their upper edge for slidably engaging overlying corresponding first curtain wall supporting frames fastened to said overlying floor; mounting curtain wall panels to said second frames proximate said windows only whereby said flexible unitary rim protrudes peripherally outward from said windows as said curtain wall panel is held to said frame, raising and fastening said second floor to said tower at a preselected height below said first floor to register in sliding engagement with first frame to said second frame and to juxtapose the lower edge of said unitary rim on one curtain wall panel on said first frame with a correspondent upper edge of a unitary rim on another curtain wall panel on an underlying second frame.

2. The process of constructing a building shown in claim **1** including the step of fastening said juxtaposed edges of said curtain wall panels.

3. The process of constructing a building according to claim **1** and including the step of overlapping said edges of said curtain wall panels as said edges are juxtaposed.

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