

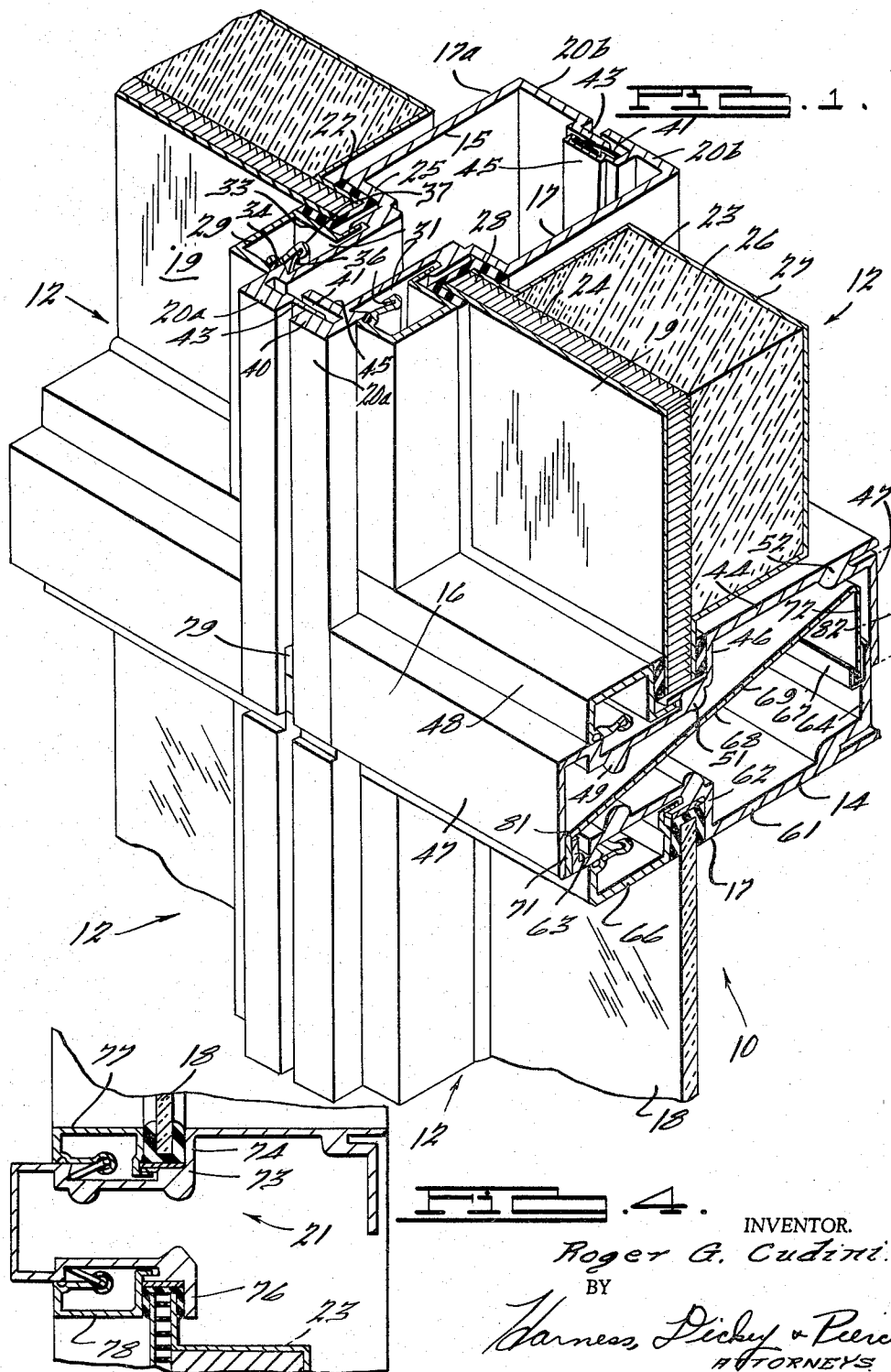
Dec. 6, 1960

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WALL STRUCTURE

2,963,126

Filed Oct. 31, 1956

2 Sheets-Sheet 1



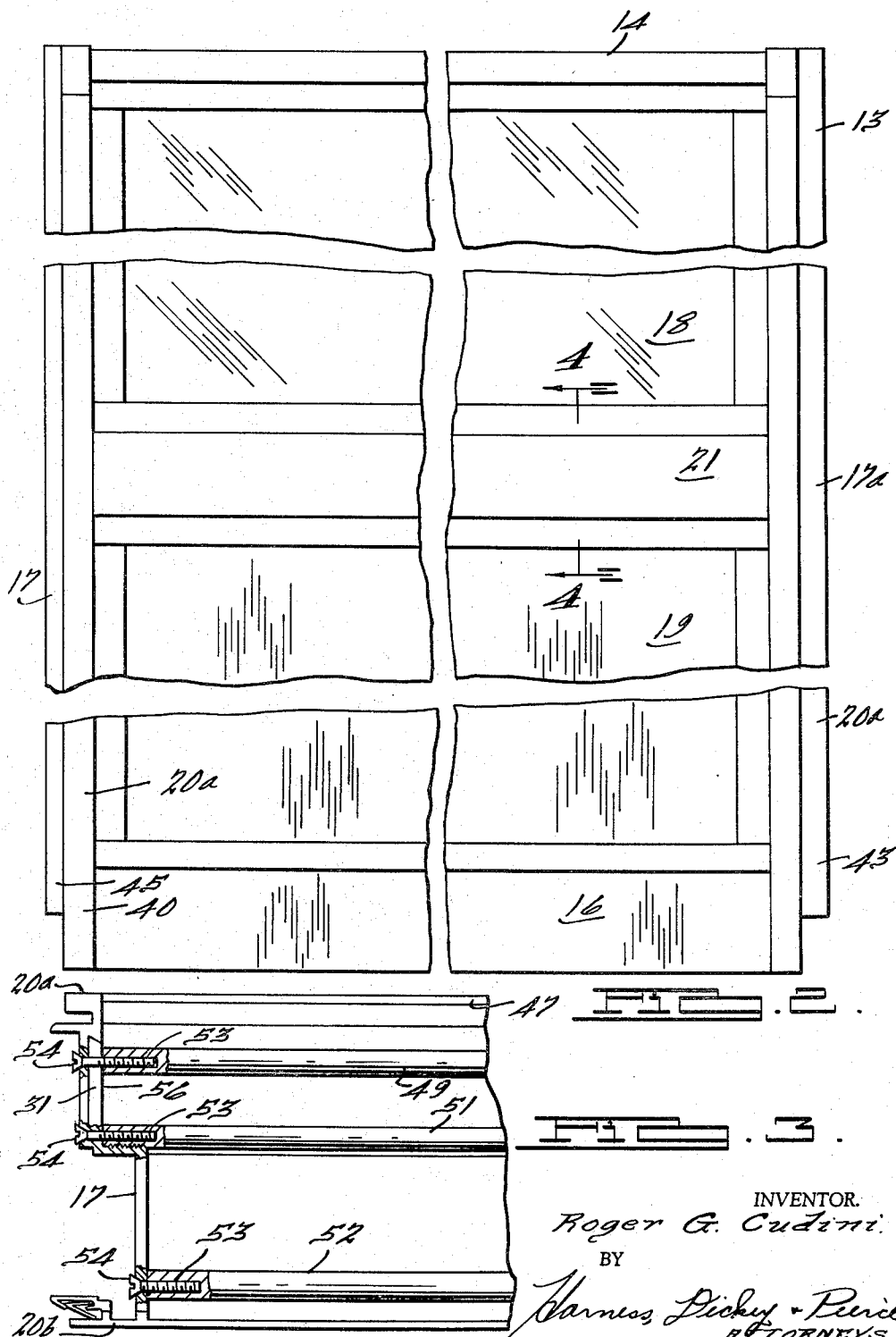
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WALL STRUCTURE

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3 Claims. (Cl. 189—34)

This invention relates generally to improvements in building structures and more particularly to a building wall structure.

An increasing number of modern buildings are being constructed of interfitting wall sections provided with aluminum or other metal frames. The advantage of such a wall structure is that the sections, which are more or less uniform and vary only slightly for different buildings, may be fabricated at the plant for assembly at the building site. Since the wall sections expand and contract considerably in response to temperature changes, by virtue of the metal construction of the frames, the sections must be assembled for relative movement. Such an assembly creates an opportunity for travel of moisture through the wall to the interior of the building. Also there is always an opportunity for moisture to travel into a wall section at the bottom ends of the windows and other wall forming panels.

The primary object of the present invention, therefore, is to provide an improved building wall structure which overcomes the above objectionable features inherent in prior wall structures of the above type.

Another object of this invention is to provide a building wall structure which includes a moisture diverting member arranged between vertically adjacent wall sections for directing moisture outwardly of the building.

A further object of this invention is to provide a building wall structure in which moisture within the wall is directed outwardly of the building between horizontally adjacent wall sections.

Still another object of this invention is to provide a building wall structure which is simple in construction, economical to manufacture and assemble, and positive in use in preventing travel of moisture through the wall structure into the building.

Further objects, features and advantages of this invention will become apparent from a consideration of the following description when taken in connection with the accompanying drawing in which:

Fig. 1 is a fragmentary perspective view of a portion of the wall structure of this invention, showing adjacent corner portions of four wall sections;

Fig. 2 is a foreshortened front elevational view of a wall section in the wall structure of this invention;

Fig. 3 is a fragmentary bottom view of one end portion of a wall section; and

Fig. 4 is a transverse sectional view looking along the line 4—4 in Fig. 2.

With reference to the drawing, the wall structure of this invention, indicated generally at 10, includes a plurality of similar wall sections 12, four of which are illustrated in Fig. 1, which are arranged in superposed horizontal rows in the formation of a wall. As best appears in Figs. 1 and 2, each wall section 12 includes a substantially rectangular frame 13, preferably formed of aluminum, having an upper portion 14 and a lower portion 16 connected by upright side portions 17 and 17a. Each frame 13 supports one or more panels of a wall forming

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material such as a glass plate 18 and/or a porcelain finish metal plate 19, illustrated in Fig. 1. The number and arrangement of the glass and metal plates 18 and 19, respectively, for a particular frame 13 are determined by the ultimate design of the particular building being constructed. In some instances, of course, some of the glass plates 18 are movably supported in the frame 13 to provide windows which may be opened. For convenience of description, the plates 18 and 19 are illustrated in the drawing as being mounted in fixed positions in the frame 13, with each frame 13 including a single glass plate 18 and a single metal plate 19 separated by a supporting unit 21 (Fig. 3) extended between the side portions 17 and 17a for the frame 13.

The frame side portions 17 and 17a are of a generally U-shape in transverse section (Fig. 1) having an irregularly shaped base 15 and outwardly extended legs 20a and 20b, with the legs 20a being at the outside and the legs 20b at the inside of the wall structure 10. The base 15 is shaped to form a shoulder 25 to provide an abutment for a U-shape resilient sealing strip 22 positioned about each of the wall forming plates 18 and 19. As best appears in Fig. 1, each wall forming metal plate 19 forms the outer side of a panel unit 23 which includes a first layer of insulation 24 secured to the plate 19 and a second thicker insulation layer 26 attached to the layer 24 by a plate 27 of an irregular shape. By virtue of the irregular shape of the plate 27, the panel 23 has a boundary portion 28, of a thickness equal to the combined thicknesses of the plates 19 and 27 and the insulation 24, and therefore of a size to be received in a sealing strip 22.

A panel retaining strip 29 extended into a groove 31 formed in the base 15 between the leg 20a and the shoulder 25 has a portion 33 which bears against the sealing strip 22 to positively clamp a strip 22 between a shoulder 25 and a retaining strip portion 33. The retaining strip 29 includes a weather seal 34 positioned against the base 15 and a spring 36 extended between a leg portion 37 on the strip 29 and the base 15 at one end of the groove 31 for releasably maintaining the strip 29 in an operative position. The strips 29 are particularly described in my co-pending application Serial No. 539,757 filed October 11, 1955 now Patent No. 2,867,856 and by themselves form no part of the present invention.

The legs 20a and 20b on the frame portion 17 terminate in spaced portions 40 and 45 to form grooves 41 arranged in a facing relation with and adapted to receive a corresponding pair of tongues 43 at the terminal ends of the legs 20a and 20b for the frame portion 17a. The side frame portions 17 and 17a on a pair of horizontally adjacent frame sections 12 (Fig. 1) are thus movable into an interfitted relation in which the tongues 43 are received in the grooves 41. As best appears in Fig. 2, the tongue 43 corresponding to a front leg 20a terminates at a position above the lower end of a frame 13 for a purpose to appear later. Likewise, the groove forming leg portion 45 for a front leg 20a, which projects outwardly further than the portion 40 terminates above the frame lower end on a level with the terminal end of the corresponding tongue 43.

The bottom portion 16 of a frame 13 is also of a U-shape (Fig. 1) in transverse section, having an irregularly shaped base 44 provided with a building panel engaging shoulder 46 and a pair of downwardly extended legs 47. A retaining strip 48, like the retaining strips 29, cooperates with the shoulder 46 to hold the building panel 23 or a glass plate 18 in a fixed position on the bottom portion 16.

As best appears in Figs. 2 and 3, a bottom portion 16 is formed with three transversely spaced longitudinally extended ribs or boss portions 49, 51 and 52 which are

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provided at their ends with longitudinally extended tapped openings 53. In connecting a bottom portion 16 to the side portions 17 and 17a, screws 54 are extended through the side portions 17 and 17a into the openings 53 in the ribs 49, 51 and 52. Between the rib 51 and the leg 47, a bottom portion 16 is of a length providing for the spacing of the ends 56 thereof (only one of which is shown in Fig. 3) from the side portions 17 and 17a (Fig. 3) for a purpose to appear later. In other words, a bottom portion 16 communicates at its ends 56 with the vertically extended grooves 31 in the bases 15 for the corresponding side portions 17 and 17a.

The top portion 14 of a frame 13 is likewise of a substantial U-shape in transverse section having an irregularly shaped base 61 provided with a shoulder 62 and a pair of upwardly extended legs 63 and 64. The shoulder 62 cooperates with a retaining strip 66 like the retaining strips 29 for holding a panel 23 or a glass plate 18 in a fixed position against the shoulder 62. As best appears in Fig. 1, the front or outer leg 63 for the portion 14 is relatively short compared to the rear or inner leg 64 which is provided with an L-shape transverse projection 67. The legs 63 and 64 are spaced apart a distance to be received between the corresponding downwardly projected legs 47 on a lower frame portion 16.

A moisture diverting member 68 (Fig. 1), arranged between upper and lower portions 14 and 16 on adjacent frames 13, has a continuous plate portion 69 and a pair of downturned leg portions 71 and 72. The leg portion 72 is supported on the projection 67 on the leg 64 for the upper portion 14 and the plate portion 69 at the leg portion 71 is supported on the shorter front leg 63 for the portion 14. As a result of the relative arrangement of the projection 67, leg 63 and diverter member leg portions 71 and 72, the diverter plate portion 69 is inclined downwardly and outwardly of the supporting frame 13 in the supported position of the diverter member 68.

In the assembly of a frame 13 to form a wall section 12, a panel 23 is supported on the frame lower portion 16 and a window plate 18 is supported on the side frame portions 17 and 17a against the top portion 14, with a supporting strip 21 extended between the side portions 17 and 17a in engagement with the top side of the wall panel 23 and the bottom side of the window plate 18. As best appears in Fig. 4, the supporting strip 21 includes a single metal frame element 73 extended between and secured to the side frame portions 17 and 17a. The frame element 73 includes upper and lower shoulder portions 74 and 76 which cooperate with the pair of retaining strips 77 and 78, respectively, like the retaining strips 29 described above, to retain a panel 23 and a plate 18 against the strip 21.

In the assembly of a plurality of wall sections 12 to form the wall structure 10 (Fig. 1), the sections 12 are arranged in horizontal rows having the tongues 43 and grooves 41 in adjacent sections arranged in an interfitted relation. As best appears in Fig. 1, the tongues 43 are spaced from the bottoms of the grooves 41 to allow for expansion of the frames 13 in response to temperature changes. Such spacing also provides for an opening 79 between the front legs 20a for horizontally adjacent frames 13. The necessary number of moisture diverter members 68 are assembled on the upper portions 14 for the frames 13 in a row, with each diverter 68 being preferably of a length to overlap horizontally adjacent sections 13 so that the joint between adjacent diverter members 68 is not located between adjacent sections.

Vertically adjacent rows of the sections 13 are independently supported on the building for relative vertical movement. For example, the rear leg 47 for the lower portion 16 of each frame 13 may be connected to the corresponding building floor frame, indicated in dotted lines at 82 in Fig. 1. Any attachment of adjacent frames 13 is by means of slotted connections or the like

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which will not interfere with relative movement of the frames.

The lower portions 16 of the frames 13 in a row are assembled on the upper portions 14 of the frames 13 in the row therebelow (Fig. 1) so that the diverter members 68 therebetween are concealed and so that the tongues 43 and groove forming leg portions 45 in the upper row terminate above the diverter members 68. Such an arrangement provides an opening 79 (Fig. 1) between each pair of horizontally adjacent frames 13 with each opening being adjacent the lower end 81 of the diverter plate portions 69. As a result, any moisture traveling onto the diverter members 68 in a row flows downwardly and outwardly of the wall structure 10 through the outlet openings 79 in the row. Also, any moisture traveling around the seal for a panel 23 travels onto the frame lower portion 16 and off the ends 56 thereof downwardly through the grooves 31 in the side frame portions 17 and 17a (Fig. 3). From the grooves 31, the moisture travels onto the diverter members 68 for outward travel through the outlet openings 79.

From the above description, it is seen that this invention provides a wall structure 10 which is formed of identical wall sections 12 arranged in horizontal rows. Each wall section 12 is arranged in an interfitted relation with the adjacent sections 12 to provide for a ready assembly of the sections into a final wall structure. The arrangement of the frame lower portions 16, diverter members 68 and outlet openings 79 provides passages for the outward flow of moisture to positively prevent any travel of the moisture through the wall to the inside of the building.

Although the invention has been described with respect to a preferred embodiment thereof, it is to be understood that it is not to be so limited, since changes can be made therein which are within the scope of the invention as defined by the appended claims.

What is claimed is:

1. In a building wall structure formed of a plurality of separate upright wall sections arranged in superposed horizontal rows, each of said sections including an expandable and contractible substantially rectangular frame having horizontal upper and lower portions and upright side portions, with each of said frame portions including a base and outwardly projected legs, moisture diverting members inclined downwardly and outwardly of said wall structure and supported on the legs of the upper frame portions between a pair of adjacent rows and between the legs for the lower frame portions in the upper one of said pair of rows, with the base for each lower portion in a frame being spaced from the frame side portions for travel of moisture from the base onto the diverter member therebelow, and coating tongue and groove connecting means on the legs for adjacent frame side portions in a row, said connecting means providing for limited expansion and contraction of said wall sections while maintaining said sections in connected positions, said coating means terminating above the lower ends of the frames for providing moisture outlet openings for moisture on said diverter members.

2. In a building wall structure formed of a plurality of separate upright wall sections arranged in superposed horizontal rows, each of said sections including an expandable and contractible substantially rectangular frame having horizontal upper and lower portions and upright side portions, with each of said frame portions including a base and outwardly projected legs, moisture diverting members inclined downwardly and outwardly of said wall structure and supported on the legs of the upper frame portions between adjacent rows, with the base for each lower portion in a frame being spaced from the frame side portions for travel of moisture from the base onto the diverter member therebelow, and interfitted means on the legs for adjacent frame side portions in a row providing a connection for said side portions and movement of said

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side portions toward and away from each other, said interfitting means being spaced above the diverter member therebelow to provide a moisture outlet opening below said interfitting means for said diverter member.

3. In a building wall structure formed of a plurality of separate upright wall sections arranged in superposed horizontal rows, each of said sections including an expandable and contractible substantially rectangular frame having horizontal upper and lower portions and upright side portions, with each of said frame portions including a base and outwardly projected legs, the legs on the upper portion of each frame projecting upwardly into the space between the downwardly extending legs on the lower frame portion thereabove, a moisture diverting member inclined downwardly and outwardly of said wall structure and supported on the legs of the upper frame portions between adjacent rows, means in each section providing passages for moisture to flow off said frame lower portion onto the diverter member there-

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below, and interfitting means on the adjacent frame side portions in a row providing a connection for said side portions permitting movement of said side portions toward and away from each other, said interfitting means being spaced above the diverter member therebelow to provide a moisture outlet opening for said diverter member below said interfitting means.

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