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3,335,524

THERMAL BREAK DOOR

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2 Sheets-Sheet 1

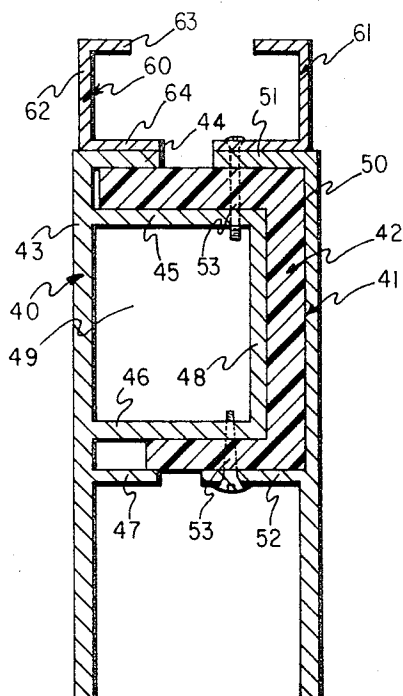


FIG. 3

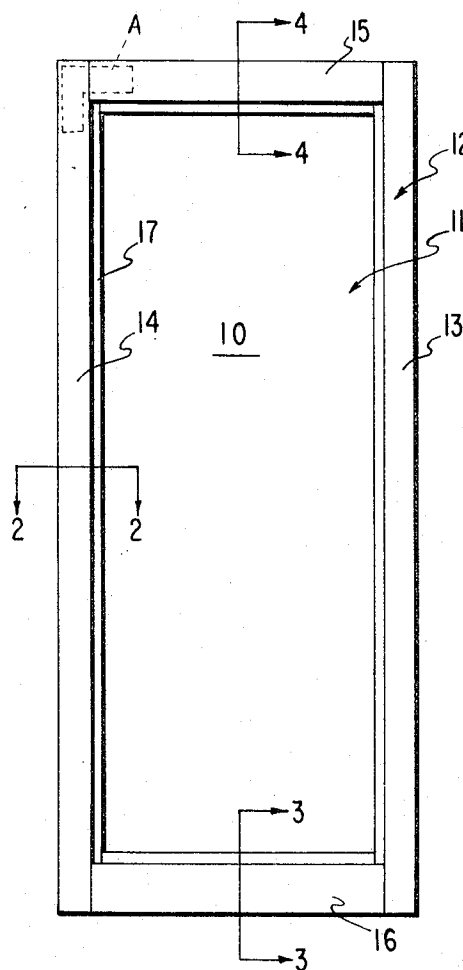


FIG. 1

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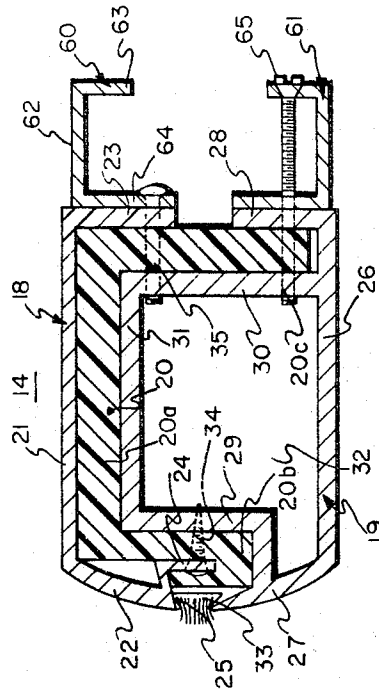


FIG. 2

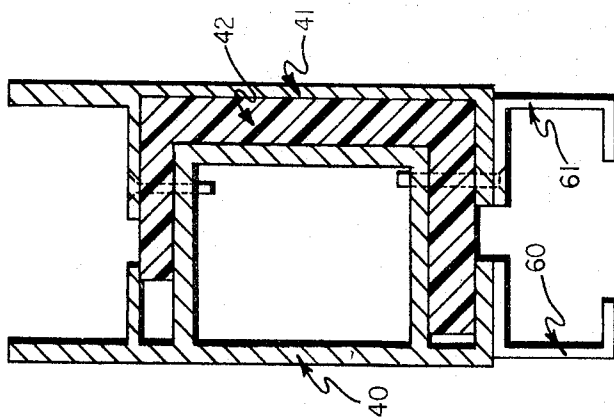


FIG. 4

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3,335,524

THERMAL BREAK DOOR

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931,829

7 Claims. (Cl. 49—501)

ABSTRACT OF THE DISCLOSURE

The frame structure includes a pair of members each having a spaced pair of flanges affixed thereto. The pair of members are secured together with the spaced flanges of the respective members in overlapped relationship and with a thermal insulating material disposed between the overlapped flange portions to reduce heat transfer between the members. Screw fasteners extend through the overlapped flange portions to secure the pair of members together. An additional flange member extends between the free outer ends of one of the spaced pair of flanges thereby providing a box-like structure which gives added rigidity to the frame. Channel members are secured to the respective frame members to provide an enclosure for receiving the edge of a panel.

This invention relates a structural member comprising a pair of detachably secured together metallic members having a thermal barrier interposed therebetween. In one specific aspect, the invention is concerned with a frame for a door, such frame including a pair of metallic members having a face disposed respectively one on each side of the plane of the door and interconnected and having a thermal barrier interposed therebetween thermally to isolate one from the other to retard formation of condensation when the opposed faces are subjected to a temperature differential.

It is an object of the present invention to provide a multi-part structure member having a thermal barrier interposed therebetween and wherein such unit is substantially rigid and relatively simple to construct. There are numerous known similar structures, however, in most instances there is metallic contact between the inner and outer members and accordingly they are not thermally isolated. Furthermore in known structures difficulties have been encountered in rigidly securing one to the other while having a thermal barrier interposed therebetween.

In one aspect of the invention there is provided a multi-part structural member comprising a pair of metallic members detachably secured together and having a thermal barrier disposed therebetween thermally to isolate one from the other, each of said members having a face portion and a pair of flanges disposed substantially normal thereto in spaced relationship, the flanges on one member overlapping respective ones of the flanges on the other member and thereby providing means to secure one member to the other at a pair of spaced positions disposed respectively one on each of a pair of opposed edges normal to said face, associated ones of said flanges on the respective members being disposed in spaced relation and having a portion of the thermal barrier interposed therebetween, said thermal barrier having a further portion extending from one associated pair of flanges of the respective members to the other associated pair of flanges.

In a still further aspect of the invention there is provided a door comprising a central panel and a rigid frame disposed above the periphery thereof and engaging the marginal edges of said panel to provide a support therefor, said frame comprising a first and second pair of mem-

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bers defining respectively an inner and outer face about the periphery of said door, each of said members having a pair of spaced flanges projecting therefrom and disposed substantially normal to said faces, said frame further including an insulating member interposed between said members to retain the same in spaced relationship and thermally isolate one from the other and thereby retard the formation of condensation when said inner and outer face is subjected to a temperature differential, said spaced pair of flanges on one member overlapping the flanges on the other member to provide means for securing one member to the other at a pair of spaced positions disposed respectively at opposed spaced edges normal to said faces.

The invention is illustrated by way of example in the accompanying drawings wherein:

FIG. 1 is a vertical elevational view of a door constructed in accordance with the present invention,

FIG. 2 is a section along 2—2 of FIG. 1.

FIG. 3 is a section along 3—3 of FIG. 1.

FIG. 4 is a section along 4—4 of FIG. 1.

Referring now in detail to the drawings, shown in FIG. 1 is a door comprising a panel 11 and a peripheral frame 12. The frame 12 includes a pair of spaced vertical stiles 13 and 14 disposed respectively at opposed edges of the door, and upper and lower rails 15 and 16 interconnecting the stiles respectively adjacent the upper and lower edges of the door. The panel 11 is retained by a member 17 disposed about the periphery of the panel in a manner as will become apparent hereinafter. Each of the members 13, 14, 15 and 16 include a thermal barrier interposed therebetween thermally to isolate one member from the other.

Referring specifically now to FIG. 2, the stile 14 at the leading edge of the door consists of a pair of members 18 and 19 detachably secured together and having a thermal barrier 20 interposed therebetween. The thermal barrier although it may be a solid neoprene strip or the like preferably consists of a rigid vinyl, e.g., polyvinylchloride. The thermal barrier is substantially U-shaped in cross-section, having a web portion 20a and a pair of flanges 20b and 20c projecting therefrom adjacent the marginal edge thereof.

The member 18 is substantially U-shaped in cross-section having a web 21 and spaced substantially parallel flanges 22 and 23 projecting from opposed marginal edges thereof. The flange 22 further terminates in a laterally off-set portion 24 which, as will be seen hereinafter, cooperates with member 19 to provide a seal retaining groove 25. Also such off-set flange provides means for concealing screws, bolts or the like, used in joining members 18 and 19 adjacent one edge thereof.

The member 19, likewise, is substantially U-shaped in cross-section having a web 26 with flanges 27 and 28 disposed respectively at opposed ends thereof and projecting therefrom in a direction toward the flanges 22 and 23 of member 18. The member 19 further includes a pair of spaced flanges 29 and 30 projecting towards the other member and these flanges are shown to be interconnected adjacent their outer ends by a further flange 31. The flange 31 may, if desired, be omitted. The web 26, the flanges 29, 30 and 31 effectively define an air-enclosed chamber 32. As clearly evident from the drawings, the space between opposed outer faces of the flanges 29 and 30 is substantially less than that between flanges 22 and 23. The flanges 29 and 30, are of such length as to overlap respective adjacent flanges 22 and 23 and as will become evident, provides means for securing one member to the other.

The thermal barrier or sealing strip 20 which is preferably a rigid vinyl or any other rigid but good insulating material, is substantially U-shaped in cross-section and

is interposed between the flanges 30 and 23 of the respective members, between the web 21 and flange 31 of the respective members and the flanges 22 and 29 of the respective members. The flanges 22 and 27 are arcuate in shape to facilitate pivoting of the door about the edge opposite thereto and it will be noted such flanges are in spaced relation adjacent their free marginal edge; such space, together with the off-set flange 24, defines a groove 25. The groove 25 retains a sealing member 33 to form a weather seal with a door frame.

The members 18 and 19 may be secured together by a plurality of screws 34 or the like projecting through flange 24 into flange 29 and also by further screws 35 projecting through flange 23 into flange 30. From this it will be evident that the two members are secured together at a pair of spaced positions disposed respectively at opposed marginal edges substantially normal to the exposed faces defined by webs 21 and 26 of the door frame. This provides a substantially rigid structure and also the thermal barrier isolates the members such that in the event of a severe differential in temperature between the opposed faces, formation of condensation on the warmer of the two surfaces will be retarded.

Referring now to FIGS. 3 and 4, the upper and lower rails 15 and 16 are substantially identical, one being inverted with respect to the other. These rails consist of the pair of members 40 and 41 having a thermal barrier 42 interposed therebetween. The members 40 consist of a web 43 having a plurality of spaced flanges 44, 45, 46 and 47 projecting outwardly therefrom. The flanges 45 and 46 are interconnected adjacent their outer edges by a further flange 48 and together they effectively define an enclosed air chamber 49. The flange 44 is disposed adjacent one marginal edge of the flange 43, while the flange 47 (although this need not be so) is set inwardly from the opposed marginal edge. Also from the drawings it will be noted that flanges 45 and 46 are substantially longer than their respective adjacent flanges 44 and 47.

The members 41 includes a web 50 and a pair of spaced flanges 51 and 52 projecting therefrom in a direction towards the other member. The flanges 51 and 52 are substantially in alignment with respective flanges 44 and 47 of the other member. It will also be noted that the flanges 51 and 52 overlap respective flanges 45 and 46 of the other member and thereby provide a means of securing one to the other by a plurality of screws 53, bolts or the like.

The thermal barrier member 42 is substantially U-shaped in cross-section and is interposed between the flanges 41 and 48 of the respective members as well as flanges 52 and 46 at one edge and flanges 51 and 45 at the other edge. As is the case in member 40, the flange 51 is located at one marginal edge of the flange 50 and the flange 52 is set inwardly from the opposed marginal edge.

The stiles 13 and 14 are interconnected adjacent opposed ends by respective rails 15 and 16. Corner blocks A as indicated in phantom in FIG. 1, rods or the like may be utilized to provide a rigid connection between adjacent members.

As previously mentioned, the panel portion 11 is retained in position by the member 17. This member consists of a pair of U-shaped channels 60 and 61 disposed respectively one on each side of the plane of the panel. Each of the channels 60 and 61 are U-shaped in cross-section having a web portion 62 and a pair of flanges 63 and 64 disposed respectively adjacent opposed marginal edges thereof. The flange 64 is secured to one edge of the frame of the door and is substantially longer than the flange 63. The member 60 in the case of the stiles is secured to the member 18 by the screws 35 located at spaced positions along the length of the stile. The screws 35 extend through the flange 64, through the flange 23 and are threaded into an aperture in the flange 30 of member 19. It will be appreciated that this is the same screw

which retains the members 18 and 19 in an assembled relationship. The member 61 is secured to member 19 by a plurality of screws 65 which extend through both the flanges 63 and 64 into the flange 28 and accordingly the member 61 is detachably securable to member 19. These screws also, if desired, may extend into the flange 30 as illustrated.

The flanges 63 of respective members 60 and 61 are disposed in spaced relation to provide a groove therebetween to receive a marginal edge of the panel 11. When the panel is in assembled position the screws 35 are concealed, however, the screws securing member 61 to member 19 are exposed. This provides for removal of the member 61 for interchangeability of the panel and also facilitates assembly of the door.

The members 60 and 61 are secured to the upper and lower rails in a similar fashion.

From the foregoing it can be seen there is provided a structural member consisting of a pair of metallic members detachably secured together and having a thermal barrier interposed therebetween and furthermore a door frame formed from a plurality of such members.

I claim:

1. A door comprising a panel, a rigid frame disposed about the periphery of said panel and engaging the marginal edges thereof to provide a support therefor, said frame including a stile positioned adjacent each of a pair of opposed, generally parallel marginal edges of said panel, each stile including a first rigid member having a web and a pair of flanges directed outwardly therefrom adjacent a pair of opposed marginal edges thereof and; a second rigid member having a web and a pair of flanges directed outwardly therefrom adjacent a pair of generally parallel opposed marginal edges thereof and disposed substantially in alignment with the outwardly directed flanges of said first member, said second rigid member including a further pair of flanges positioned intermediate said outward directed flanges of said second member and spaced inwardly therefrom, said further pair of spaced flanges extending beyond the outwardly directed flanges of said second member to overlap the outwardly directed flanges of said first member, and a thermal barrier interposed between said first and second rigid members, said thermal barrier being generally U-shaped in cross-section and including a web portion and a pair of spaced leg portions projecting outwardly from opposed marginal edges of said web portion, said web portion and leg portions lying in abutting relation with said web and said outwardly directed flanges respectively of said first rigid member with the legs projecting into the space between the outwardly directed flanges and the further flanges of said second rigid member to thereby isolate said first and second rigid members thermally one from the other, said frame also including upper and lower rails interconnecting said stiles respectively at opposed ends of the latter, said upper and lower rails each comprising a first member and a second member each having a web and a pair of spaced, generally parallel flanges projecting therefrom, the flanges of the first member being generally in alignment with the flanges of the second member, said second member including a further pair of flanges disposed between said first mentioned flanges and projecting outwardly therebeyond to overlap the flanges of said first member, and a thermal barrier interposed between said first and second pair of members of said upper and lower rails, said thermal barrier being generally U-shaped in cross-section and including a web portion and a pair of spaced leg portions projecting outwardly from opposed marginal edges of the web, said web portion and said leg portions being disposed in abutting relation with said web pair of flanges respectively of said first member with said legs extending into respective spaces between adjacent ones of the first mentioned and further flanges of the second member thereby thermally to isolate the first and second members from one another, and means for

retaining said panel in position with respect to said frame, comprising a pair of channel shaped members secured to an inner peripheral edge of the frame and disposed in spaced relation to provide a groove for receiving the marginal edge of said panel, at least one of said members being detachably secured to said stiles and upper and lower rails.

2. A door as defined in claim 1 wherein the flange of one of said stiles on the edge thereof remote from said panel includes an off-set portion to define a groove for receiving and retaining a sealing strip.

3. A multi-part structure comprising a pair of metallic members detachably secured together and having a generally U-shaped thermal barrier including a web portion and leg portions extending therefrom disposed between said metallic members thermally to isolate one from the other, each of said members having a web and a pair of flanges disposed substantially normal thereto in spaced relationship, the flanges on one member overlapping respective ones of the flanges on the other member, means to secure one member to the other comprising fastener means extending between and secured to associated ones of said overlapping flanges, and an additional flange extending between and interconnecting the outer ends of the flanges of said other member thereby to define an enclosed chamber, associated ones of said overlapping flanges on the respective members being disposed in spaced relation and having the leg portions of the thermal barrier interposed therebetween with said web portion of the thermal barrier extending intermediate the web of said one member and said additional flange of said other member.

4. A multi-part structure as defined in claim 3 wherein said other member includes an extra pair of flanges projecting outwardly from opposed marginal edges of the web of said other member and extending generally towards the spaced flanges of said one member in confronting relationship thereby forming a partial enclosure for leg portions of the interposed thermal barrier.

5. A multi-part structure as defined in claim 4 wherein one of the flanges of said one member includes an offset portion adjacent its free outer end with said offset portion arranged to co-operate with the free outer end of one of said confronting extra flanges of said other member to form a groove for receiving and retaining a sealing strip.

6. A multi-part structure as defined in claim 4 further including means for retaining a panel member comprising; first and second channel shaped members each in-

cluding a web having flanges projecting outwardly therefrom adjacent opposed marginal edges of the web, said first and second channel members affixed to one of said flanges of said one member and to one of said extra flanges of said other member respectively with the free ends of the flanges of the channel members in spaced confronting relationship thereby to provide an enclosure for an edge portion of a panel member.

7. A multi-part structure comprising a first member and a second member each having a web and a pair of spaced, generally parallel flanges projecting therefrom, the flanges of the first member being generally in alignment with the flanges of the second member, said second member including a further pair of flanges disposed between said first mentioned flanges and projecting outwardly therebeyond to overlap the flanges of said second member, and a thermal barrier interposed between said first and second pair of members, said thermal barrier being generally U-shaped in cross-section and including a web portion and a pair of spaced leg portions projecting outwardly from opposed marginal edges of the web, said web portion and said leg portions being disposed in abutting relation with said web and said pair of flanges respectively of said first member, with said legs extending into respective spaces between adjacent ones of the first mentioned and further flanges of the second member thereby thermally to isolate the first and second members from one another, and means for retaining a panel in position with respect to said structure, said retaining means comprising first and second channel shaped members secured to respective ones of the aligned flanges of said first and second members and disposed in spaced confronting relation to provide a groove for receiving the marginal edge of said panel, at least one of said channel members being detachably secured to its associated member.

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