

[54] SHEET METAL FACED SLAB DOOR

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[58] Field of Search 52/468, 619, 620, 615,
52/573

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[57] ABSTRACT

A slab door formed of a wood frame having a wide, deep, vertically extending groove formed in the exposed edges of each of the opposite vertical frame stiles, and each face of the frame being covered by a thin sheet of metal whose opposite vertical edges are bent into edge portions, covering the stile edges, and terminating in bent edge flanges which loosely extend into their adjacent groove. The adjacent pair of edge flanges within each groove are spaced apart from each other and from the bottom of the groove. A T-shaped spacer is arranged with its head portion overlapping the adjacent edge portions and its leg inserted between adjacent flanges and terminating in a free barbed end engaged with the groove wall inwardly of the flanges for locking the metal edge portions against springing away from the frame stiles and for forming a thermal insulating between the flanges.

[56] References Cited
UNITED STATES PATENTS

3,153,817	10/1964	Pease	52/619
3,339,329	9/1967	Berg	52/468
3,386,209	6/1968	Starcevic	52/619
3,750,333	8/1973	Vance	52/620
3,786,609	1/1974	DiFazio	52/620

2 Claims, 6 Drawing Figures

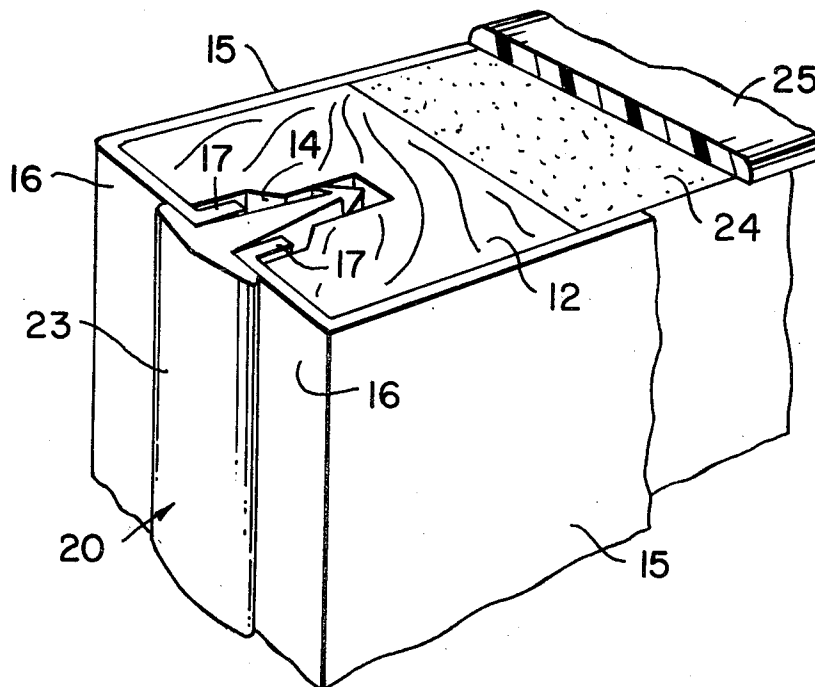


FIG. 1

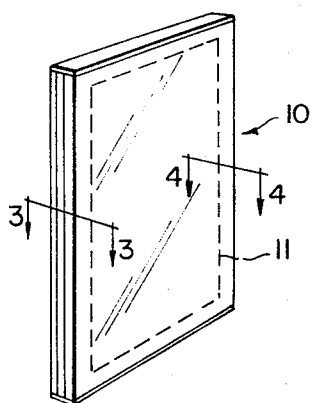
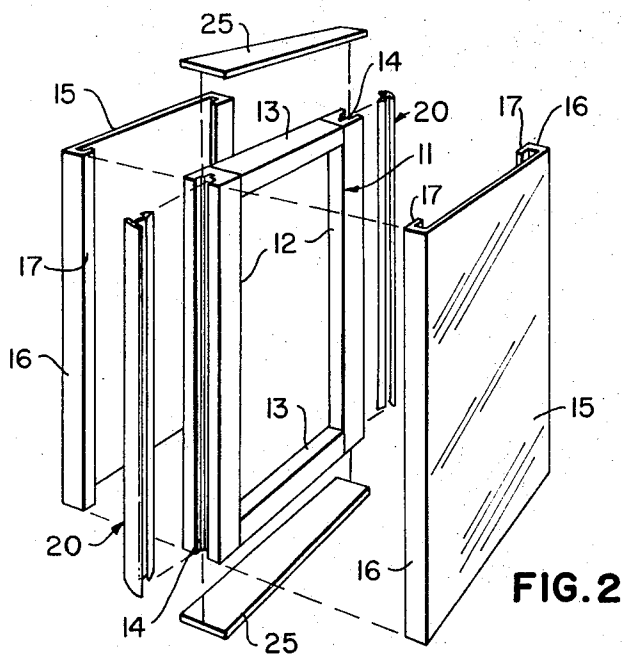


FIG. 2

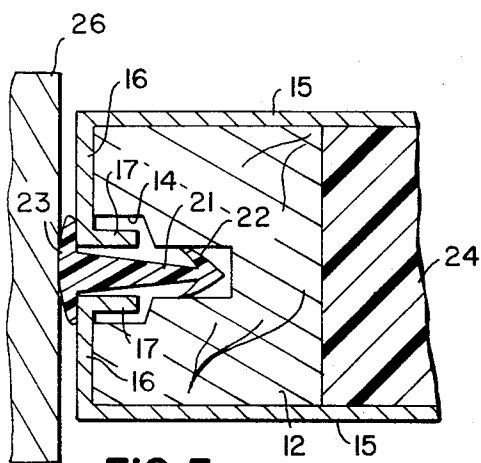


FIG. 3

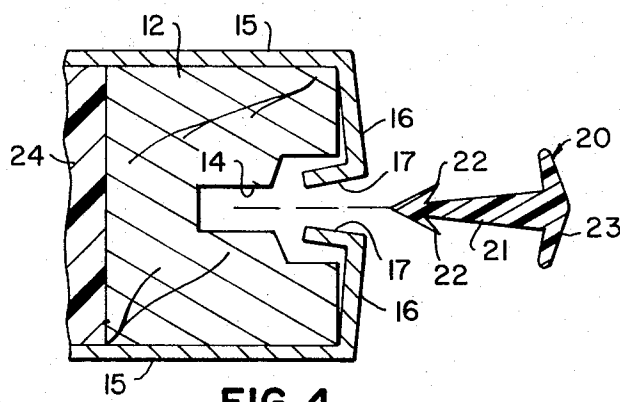


FIG. 4

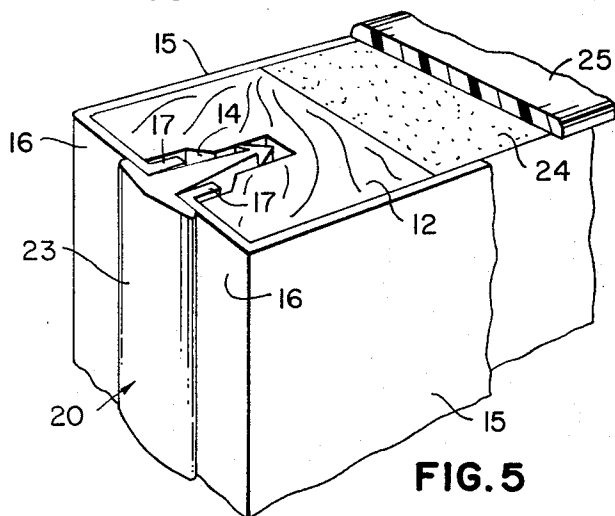


FIG. 5

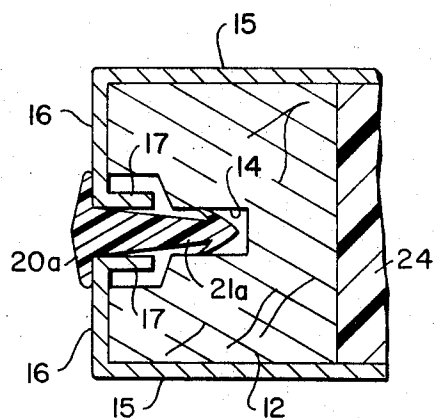


FIG. 6

SHEET METAL FACED SLAB DOOR

BACKGROUND OF INVENTION

The invention herein relates to an improvement of the type of slab doors illustrated, for example, in the U.S. Pat. to Pease, No. 3,153,817 issued Oct. 17, 1964, or in my prior application, Ser. No. 216,053 filed Jan. 7, 1972 now Pat. No. 3,786,609. In this type of construction, a slab door is formed of a wood frame with a sheet metal facing on the opposite sides of the door and with the interior of the frame, between the sheets of metal, filled with a foamed plastic material. The opposite edges of the sheets are bent around the vertical exposed edges of the frame stiles and then are further bent into vertical flanges which are inserted within vertically extending channels formed in the stiles. Thus, the edges of the sheet metal facings are spaced away from each other to form a thermal barrier which prevents heat transfer between the outer and inner metal facings.

In such type construction, the edge portions of the facings, that is the portions overlapping the edges of the frame stiles, tend to bow away from the frame stiles. Although the metal facings and their edge portions are adhesively secured to the frame, including to the stile edges, the tendency of the metal edge portions to bow and separate from the stile edges remains due to the inherent springiness of the metal and the relative movements of the metal and frame caused by normal expansion and contraction thereof. This bowing affects the fit of the door within its frame. It also may cause breaks or gaps in the sealing between the various parts, through which moisture and dirt may penetrate to cause rotting.

Thus, the invention herein relates to an improvement in the means for sealing the metal facing edges of the foregoing type of slab door construction, which obviates many of the above problems.

SUMMARY OF INVENTION

The invention herein contemplates forming a rigid slab door unit out of a wood frame covered with sheet metal facings, with the opposite edges of the sheet metal bent around the exposed vertical stile edges and then further bent into flanges loosely fitted into vertically extending grooves formed in the stiles of the wood frame. The grooves are deeper than the flanges.

Thereafter, the leg of a T-shaped plastic sealing strip is inserted between each adjacent pair of flanges, with the head of the T-shape overlapping the bent metal portions adjacent the flanges. The strip legs extend deeper into the groove, than do the flanges, and their legs terminate in sharp barbs that engage with the groove walls. Thus, the metal edge portions are positively held against the stiles and locked against bowing outwardly therefrom. Meanwhile, the strip legs act as thermal barriers and the strip heads act as seals between adjacent facing edges, over the groove and also, against the door frame. The strip legs may also be wedge shaped to wedge the adjacent flanges apart for tighter locking.

With this construction, wide dimensional tolerances are permissible in forming the flanges and grooves, eliminating the need for accurate construction, while still insuring a rigid, well sealed slab unit.

These and other objects and advantages of this invention will become apparent, upon reading the following

description, of which the attached drawings form a part.

DESCRIPTION OF DRAWINGS

FIG. 1 is a perspective view of a slab door unit.

FIG. 2 is a slightly enlarged, disassembled perspective view of the parts forming the slab door.

FIG. 3 is an enlarged cross-sectional view taken in the direction of arrows 3—3 of FIG. 1, and showing a portion of the door outer frame.

FIG. 4 is an enlarged, partially cross-sectional view taken in the direction of arrows 4—4 of FIG. 1, showing the sheet metal edges bowed, and a sealing strip removed.

FIG. 5 is an enlarged perspective view of the upper left hand corner of the door as illustrated in FIG. 1, but with the corner of the cap strip and a portion of the metal facing removed for illustration purposes.

FIG. 6 is a view similar to FIG. 3, but showing a modified, i.e., wider sealing strip for wedging the flanges.

DETAILED DESCRIPTION

The slab door 10 is formed of a wood frame 11 which comprises vertical wood stiles 12 joined to upper and lower horizontal wood stiles 13 to form the rectangular inner frame. Additional rails may be provided for reinforcement, as necessary, and for mounting of locks, handles and the like.

T-shaped grooves 14 are formed in the vertical, opposite or exposed outer edges of the stiles and extend the full height of each of the stiles.

The opposite faces of the frame 11 are covered with sheet metal pieces 15, each having its opposite edges perpendicularly bent into edge portions 16 overlapping its adjacent stile edge, and terminating in inwardly extending, bent edge flanges 17 which are approximately parallel to the plane of the sheet metal.

The metal sheets are adhesively bonded to the wood frame by means of any suitable adhesive and their edge flanges 17 each extend into the wider or head portion of their adjacent grooves 14. As illustrated in FIG. 3, the edge flanges 17 are loosely inserted within the grooves, i.e., spaced from the groove walls and bottom, so as to readily compensate for misalignment or inaccuracies in dimension.

After assembly of the sheet metal facing pieces adhesively upon the frame, a T-shaped sealing or spacer strip 20 is applied in the space between the bent edge flanges 17 at each of the opposite edges of the slab. The leg 21 of the strip is inserted between the flanges 17 and extends into the narrower part of the groove 14, where sharp barbs 22, formed on the end of the leg, bite into or grip the groove walls. The head 23 of the strip overlaps the areas of the metal edge portions 16 adjacent the flanges. As seen in FIG. 4, the head 23 is somewhat V-shaped before application to the groove, so that it may flatten out and apply a springy pressure against the overlapped sheet metal. Preferably the strip is formed of a plastic material, such as polyethylen, which is somewhat springy or resilient, but stiff enough so that the barbs will grip the wood walls of the groove.

The slab may be filled with a suitable foam plastic filler 24 within the frame and between the metal sheets and bonded thereto to thereby further rigidify and solidify the slab. In addition, upper and lower cap strips 25 are adhesively or mechanically fastened to the

upper and lower edges of the slab, namely, the exposed upper and lower edges of the respective rails 13.

To manufacture the foregoing slab door, first the frames are formed out of suitable wood strips with the stiles grooved. Thereafter, the sheet metal facing pieces are applied. Then the strips 20 are inserted along the vertical edges. Where the foam filling is applied within the slab interior, it may be applied by inserting unfoamed beads of foamable polyurethane or the like plastic which may then be foamed in place by the application of heat to the completed slab for expansion and filling the spaces within the slab and bonding to the metal.

FIG. 4 illustrates, to an exaggerated scale the outward bowing of the metal edges away from the stiles, which could happen in the absence of the strips 20. However, the strips pull and hold the metal against the stile edges due to the leg barbs locking against the groove walls, plus the pressure of the head against the metal edge portions.

Moreover, the strip head portions act as a sealing strip against the vertical members of the outer or fixed frame 26 of the doorway as illustrated in FIG. 3. This simultaneously applies an inward pressure on the strip to keep it well seated in place despite such relative movement of the parts as may occur due to expansions and contractions.

FIG. 6 illustrates a strip 20a whose leg 21a is widened and thus, more wedge shaped, to thereby apply a wedging or separating force against the flanges 17. This further seals the parts against moisture or dirt penetration, particularly since the sheet metal is inherently springy so as to resist such force.

The complete slab unit is rigid, with the metal facings bonded together at their edges to provide a rigid exterior skin but with the bonding material providing a wide thermal joint between the opposite surfaces of the slab to reduce heat transfer therebetween, as well as to seal the edges against moisture penetration.

Having fully described an operative embodiment of this invention, I now claim:

1. In an insulated sheet metal slab door formed of a rectangular shaped wood frame comprising a pair of vertical stiles joined together at their upper and lower edges by horizontal rails, with the opposite vertical exposed edges of the stiles each having a central internal vertical groove extending the full height thereof, each groove being generally T-shaped in cross-section and having wider side walls perpendicular to the stile edge and opening onto the stile edge to form the head of T-shaped groove, said wider side walls tapering inwardly and terminating in narrower side walls parallel to the wider side walls to form the leg of the T-shaped groove

and each of the opposite vertical faces of the frame covered by a metal sheet, which sheets overlap and are secured to the faces of the stiles and rails, and with the opposite edge portions of each of the sheets bent approximately perpendicular to the planes of the sheets to form edge portions overlapping their adjacent stile exposed edges up to the groove head, the improvement comprising:

each of the free edges of said edge portions being bent approximately perpendicularly thereto and inwardly relative to their respective stiles to form a flange arranged approximately parallel to the plane of the sheets and loosely inserted within its adjacent stile groove wider side wall, which is roughly parallel to said flanges and with the wider side walls being of sufficient width so that the adjacent flanges are horizontally spaced apart from each other a considerable distance;

and with the wider side walls of the grooves being of sufficient depth so that said flanges terminate at a considerable distance away from the bottoms of their respective grooves;

each groove having a T-shaped, in cross-section, plastic spacer strip whose leg is inserted between the pair of flanges and having a barbed free end portion extending beyond the pair of flanges towards the bottom of the groove with the barbed portion interlocking with the narrower side walls of the groove near the bottom thereof, and the head of the strip spanning the space between the flanges and overlapping and in contact with the edge portion areas adjacent to the flanges along substantially the full length of the stiles, with the strip extending substantially the full length of the groove; and upper and lower end cap strips secured to and enclosing said horizontal rails and said vertical stiles;

and the strip head holding the said overlapped edge portion areas, and thereby the edge portions, against their stile edges, and holding said flanges between the wider side walls with the barbed leg thus holding and locking the head against outward movement relative to the groove and simultaneously forming a thermal barrier between the flanges, which thermal barrier is sealed by the head contacted against said edge portion areas.

2. A door as defined in claim 1, and each said strip leg being tapered along its cross-section length, with the wide part thereof being at said head, and the opposite faces of said leg engaging its adjacent flange face for thereby wedging said flanges apart and frictionally engaging the legs and flanges together.

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