Feb. 6, 1968 W. C. WELTMAN, JR 3,367,693

LEAK-PROOF JOINT STRUCTURES

Filed Dec. 1, 1964

Fig. 1

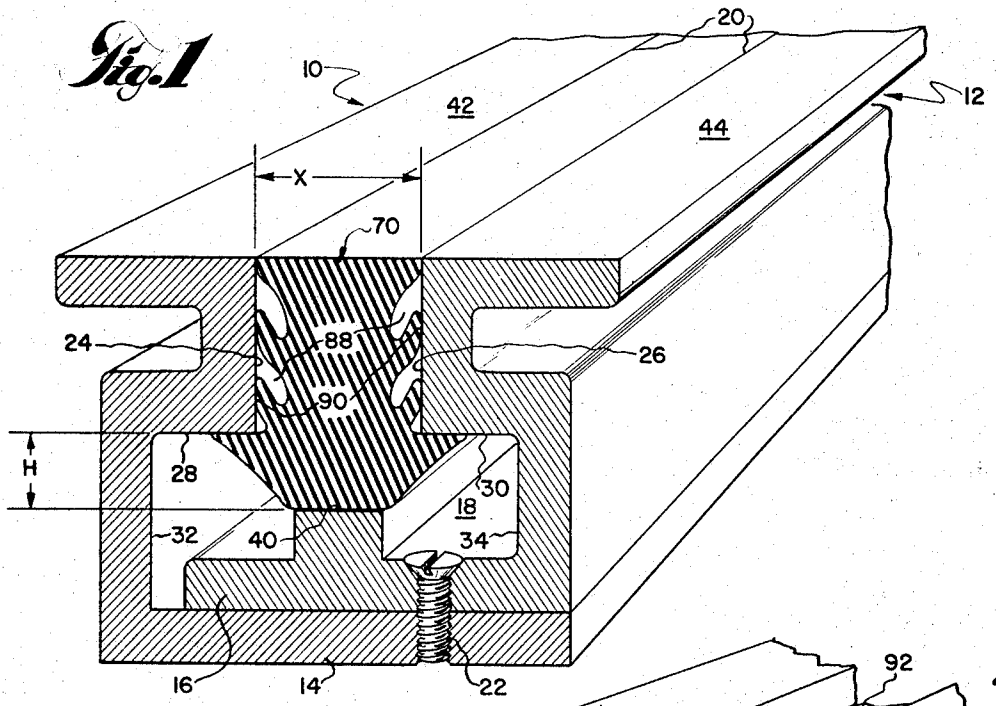


Fig. 2

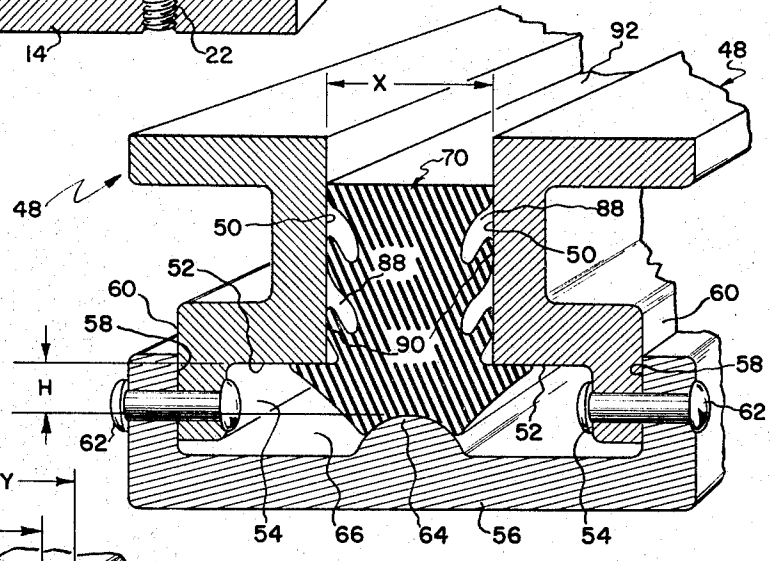
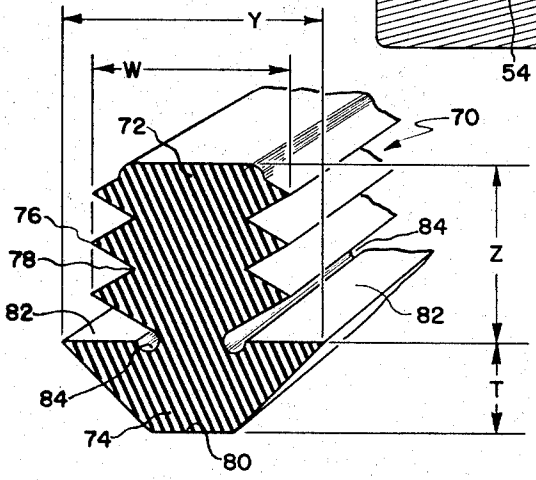


Fig. 3



INVENTOR.
WILLIAM C. WELTMAN, JR.
BY S. Ernest Low
ATTORNEY

United States Patent Office 3,367,693
Patented Feb. 6, 1968

3,367,693

LEAK-PROOF JOINT STRUCTURES

William C. Weltman, Jr., Pittsburgh, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa., a corporation of Pennsylvania

Filed Dec. 1, 1964, Ser. No. 415,092
10 Claims. (Cl. 287—189.36)

This invention relates in general to joint structures and is addressed in particular to joints between the marginal edges of elongate rigid structural members configurated in the area constituting the joints therebetween to permit receiving and retention of an elongate resilient sealing strip against ingress and egress of moisture and vapor through the joints.

As distinguished from joining practices in which in situ caulking compounds are employed as the means for sealing off integrated but otherwise moisture and vapor permeable joint assemblies, the present invention provides a joining practice in which adjacent marginal edges of members to be joined in assembly are profiled or configurated to provide therebetween a cavitated joint environment receptive and retentive of a preformed resilient sealing strip.

It is therefore an object of the invention to provide a vapor and moisture proof joint structure or assembly between adjacent members secured against separation and capable, in the absence of a resilient sealing strip, of vapor and moisture leakage or penetration between said adjacently joined members.

Another object of the invention is to provide an integrated joint assembly between elongate structural members adjacent marginal edges of which are profiled in a manner to provide an open entrance re-entrant cavity for receiving and retaining a preformed elongate resilient sealing member or strip in transformably compressively displaced relationship against wall areas of the cavity to prevent vapor and moisture penetration through the joint assembly.

Other objects and advantages of the invention will be appreciated and understood by those skilled in the art to which the present invention appertains on consideration of the following description and illustrations, in which:

FIG. 1 illustrates a perspective view in transverse elevational cross-section of a joint structure depicting characteristic features of the invention;

FIG. 2 illustrates a perspective view in transverse elevational cross-section of a further embodiment of joint structure falling within the scope of the invention; and

FIG. 3 illustrates a perspective view in transverse elevational cross-section of an elongate resilient sealing strip of the invention prior to its transformation following incorporation in the joint structures of FIGS. 1 and 2.

In general, joint structures of the invention essentially comprise elongate members having configurated marginal edges in adjacently secured relationship to present transversely or laterally separated surfaces or areas defining an open top channel entrance therebetween into a cavity below the channel entrance. The cavity is defined in whole or in part by the configurated marginal edges of the members of the joint structures of the invention and includes at least one surface-defining wall thereof formed by overlying contact of a surface of one of the members with a coextensive underlying surface of the joint, which condition subjects the joint to vapor and moisture leakage between the aforesaid overlying contacting surfaces including at least one surface-defining wall of the prevailing cavity.

The cavity in question is also structurally characterized by having a surface-defining wall remote to the channel entrance thereto, and spaced below the same, which supports or carries an upstanding projecting rib, web or abutment substantially centrally disposed in the plane of the axis bisecting the transverse width of the entrance channel, which latter wall can be the aforesaid wall subject to leakage.

A preformed elongate resilient sealing strip having a stem portion and opposite laterally extended head portion, which generally defines a T-section, is forcibly entered head-first into the open top channel entrance to the cavity of joint structures falling within the practices of the invention to dispose or position an underside surface of the head portion in compressive abutment against the aforesaid upwardly projecting rib in the cavity to compressively force the laterally extending head portions of the sealing strip, remote to its underlying surface, against coextensive laterally extending wall areas of the cavity contiguous with and angularly offset in respect to the laterally separated surfaces forming the open top channel entrance to the cavity. Forcible entry of the sealing strip into the cavity as here described, also reacts to provide compressive contact between lateral side surfaces of the stem portion of the resilient sealing strip against the separated surfaces forming the channel entrance to the cavity of joint structures falling within the scope and intent of the invention.

It will be appreciated from the above general description of joint structures and practices of the invention that otherwise substantially rigid or static joints between two or more members, incorporating coextensive contacting surface areas defining at least one wall of the cavity incorporated in such joints, are sealed against vapor and moisture leakage by forcible transformation and retention of the resilient sealing strip employed therewith into coextensive compressive contacting relationship of sealing strip defining and joint defining surfaces.

In more specific terms, and referring to the appended illustrations, the joint structure of FIG. 1 comprises two elongate members **10** and **12** adjacent marginal edges of which are profiled or configurated over their axial lengths to provide overlapping surface contacting base flanges **14** and **16**, respectively, defining the bottom interior wall of a re-entrant cavity **18** laterally expanded in respect to an open top entrance channel **20** in communication therewith. The overlapping flanges **14** and **16** are mechanically and positively secured, as by the fasteners or screws **22** at axially spaced intervals along the length of the cavity **18**, to insure positive assembled relationship between the members **10** and **12**.

The channel entrance **20** is preferably formed or defined by the separated or laterally spaced preferably flat parallel surfaces **24** and **26**, respectively, of the members **10** and **12**, and the cavity **18** therebelow and in communication with the channel entrance **20** is completed or enclosed by angularly offset coplanar shoulder surface areas or interior walls **28** and **30** contiguous respectively with the aforesaid surfaces **24** and **26** in combination respectively with the oppositely disposed inwardly facing wall or surface areas **32** and **34** contiguous with the upwardly directed surfaces of the overlapped flanges **14** and **16**, respectively. It will thus be observed that the marginal edge of each of the members **10** and **12**, forming the cavity **18** therebetween, is configurated to present a substantially or generally C-shaped interior profiled surface below the channel entrance defining surfaces **24** and **26**.

In addition, the upper surface of the inwardly extending overlying contacting flange **16** of the joint member **12** carries an upstanding abutment, web or rib **40** extending over the axial length thereof, the aforesaid web or rib **40** being disposed in substantial central registry with the plane of the vertical axis bisecting the transverse width dimension of the channel entrance **20**. The rib **40** is otherwise terminated below the plane of the coplanar offset shoulder surface areas **28** and **30** for rea-

sons to be hereinafter described and explained in more detail.

Outwardly exposed surfaces of flanges 42 and 44 of the respective members 10 and 12 may be employed to serve as supporting surfaces for sheathing, or the like, attached thereto, or the flanges 42 and 44 may also be extended in transverse width to provide individual structural panel widths having opposite marginal edge profiles identical to the joint structure thus far described between adjacently assembled and jointed panel widths, as in a wall, roof, deck or floor construction.

In FIG. 2, the joint structure illustrated therein is formed between two elongate members 48 of identical marginal edge configuration. Therein each member or section 48 provides a depending preferably flat surface area 50 in contiguous outwardly offset or angular connection to a shoulder surface area 52 terminating in a downwardly depending contiguous surface area 54.

The identical edge profiled members 48 are mechanically and positively secured in separated or spaced assembled relationship by means of a channel member 56, the inwardly and oppositely disposed surface areas 58 of the opposite flanges of which are in overlying contact with outwardly directed surface areas 60 of the identical members 48, with rivets or similar axially spaced fasteners 62 completing unitary rigid jointure between the adjacent members 48.

The inner surface of the web of the channel connector member 56 carries an upstanding rib, web or abutment 64 substantially centrally located in the plane of the axis bisecting the transverse width dimension between the oppositely disposed flat marginal surface areas 50, the upwardly directed surface of the rib 64 being here shown as of transverse curvilinear trace and terminating below a plane containing the oppositely outwardly directed coplanar offset shoulder surface areas 52.

It will thus be observed that the joint structure of FIG. 2, thus far described, comprises an open top entrance channel formed between the oppositely disposed flat, preferably parallel, marginal surface areas 50, in communication with an underlying laterally expanded or re-entrant cavity 66 having an interior bottom defining surface or wall carrying the upstanding rib 64 remote to and below the offset coplanar shoulder surface areas 52.

In both of the joint structures (FIGS. 1 and 2) above described, overlying coextensive contacting surface areas have prevailed, within a wall of the cavity incorporated therein, which exhibit vapor and moisture leakage propensities. Incorporation in the joint structures of FIGS. 1 and 2 of an elongate resilient sealing strip 70 of FIG. 3 has substantially, and in most cases, completely eliminated this vapor and moisture permeability problem from both sides of the joint structures.

Examination of the resilient sealing strip 70 will disclose that it comprises a substantially centrally disposed stem portion 72, of generally rectangular transverse cross-section, subtended by a laterally extending symmetrical head portion 74 of isosceles trapezoidal transverse cross-section. Opposite lateral exposed surfaces of the stem portion are preferably serrated, within the aforesaid substantially rectangular trace or outline, to provide alternate triangular shaped projections 76 and intervening substantially similar shaped triangular valleys 78. The head portion 74 provides an underlying exposed flat surface 80 and oppositely directed coplanar lateral base shoulder areas 82 relieved in their contiguous blended connection with the stem portion 72 by means of axially extending grooves 84 in substantial tangential contiguity with the lowermost triangular projections defining connection of the stem and head portions of the resilient sealing strip 70.

In the preferred practice of the invention, the resilient sealing strip 70 is transversely dimensionally proportioned and selected in minimum width dimension W of its stem portion 72, and in minimum thickness dimension T of the head portion 74 thereof (FIG. 3), to permit of and require cross-sectional displacement and transformation thereof in response to head-first forcible entrance through the open top channel entrance to joint structures made in accordance with the invention, and described hereinabove (FIGS. 1 and 2), to position or dispose the head portion 74 of the sealing strip within the cavity below the channel entrance thereto in each instance.

It is a further requirement of the invention that the W and T minimum dimensions of the resilient sealing strip 70 provide for and insure compressive displacement and transformation across the W or transverse width dimension of the stem portion 72, as well as similar compressive transformation of the T or thickness dimension of the head portion 74 to develop compressive contact between substantial surface areas of the strip 70 and contacting surfaces of the joint structures adjacent thereto.

In this regard, and referring to the joint structures depicted in FIGS. 1 and 2, it will be clearly observed that the transverse width across the channel entrances formed by the flat parallel surfaces 24 and 26 (FIG. 1) and 50 (FIG. 2) is less than the minimum transverse width dimension W of the stem portion 72 of the resilient sealing strip 70 to the end that the serrated opposite lateral surfaces of the stem 72 have been displaceably transformed to provide generaly angularly upwardly directed or inclined grooves 88 and intervening compressively displaced and transformed flattened areas 90, with the latter in frictional compressive contacting and sealing engagement against the oppositely disposed surfaces 24 and 26, defining the entrance channel 20 in the joint structure of FIG. 1, as well as against the oppositely disposed surfaces 50 forming the channel entrance to the joint structure of FIG. 2. In substantially like compressive displacement and transformation of the head portion 74 of the sealing strip 70, because of its minimum dimension T being greater than the distance between the uppermost surfaces of the ribs 40 and 64 and the coplanar shoulder wall surfaces 28 and 30 (FIG. 1) and 52 (FIG. 2), respectively, the laterally extending surface areas 82 of the head portion 74 of the sealing strip 70 (FIG. 3) are compressively biased into contacting sealing relationship against the aforesaid coplanar cavity walls defining the cavity shoulder surface areas immediately adjacent thereto.

Substantial equilateral triangular configuration for the projections 76 and valleys 78, defining the opposite lateral surface areas of the stem 72 of the resilient sealing strip 70, coupled with the relief grooves 84, have proved highly successful for accomplishing forcible introduction head-first of the sealing strip into the joint structures typified by FIGS. 1 and 2. In addition, a preselected transverse width dimension W (FIG. 3) for the sealing strip 70 substantially greater than the transverse width dimension X across the channel entrance to each of the re-entrant cavities below the same in the joint structures of FIGS. 1 and 2, has functioned with entire satisfaction. Typical joint structures of the invention have also revealed it to be desirable to employ the isosceles trapezoidal configurated head portion 74, for the resilient sealing strip 70, where Y (FIG. 3) is 1.2 to 2 times the aforesaid transverse width dimension X (FIGS. 1 and 2) and T is 1 to 1.2 times the vertical dimension H of FIGS. 1 and 2. The depth Z of the stem 72 is selectable to preferably, but not necessarily, provide substantially flush coplanar installed coincidence with the adjacent spaced or exposed surfaces of joints satisfying the practice of invention, such as the surfaces 42 and 44 of the joint structure of FIG. 1. However, a definite recess 92 may be desirable above the resilient sealing strip 70 for drainage or architectural design purposes, as illustrated in the joint structure of FIG. 2.

In essence, the elongate resilient sealing strip 70 can be enlikened to a unitary member characterized in transverse cross-section as having a substantially rectangular stem portion 72 interconnected to an isosceles trapezoidal

head portion 74, in substantially symmetrical relationship, in which the stem 72 projects away from the longer of the two parallel sides of the head 74. In this respect, the sealing strip 70 is of generally arrowhead cross-section, with the extreme point cropped to provide the underlying flat head surface area 80 thereof.

Various structural materials may be employed in practicing the invention in respect to the members to be marginally edge joined. Metallic structural members, such as aluminum alloy extrusions, have been exceptionally successful for this purpose. So far as the resilient sealing strip 70 is concerned, synthetic and natural rubbers, or similar rubber-like materials, exhibiting a durometer hardness within the range 60 to 90, and preferably 70 to 80, have performed with complete success under displaceable transformation within the elastic limit thereof.

Although specifically selected joint structures have been illustrated and described hereinabove in support of the invention, numerous variations of the selected joint structures will be apparent and are contemplated within the scope and intent of the invention, as hereinafter set forth in the appended claims.

What is claimed is:

1. A joint structure between adjacent members, each of said members being marginally profiled to provide, on marginal edge joint assembly therebetween, a wall surface in oppositely disposed transversely separated relationship constituting an axially extending channel entrance to a laterally expanded cavity below said channel entrance, a wall area of said cavity remote and opposite to the channel entrance thereto having an upstanding axially extending abutment in substantial alignment with the axis bisecting the transverse width of the channel entrance, said abutment having an upwardly directed surface located below a transverse plane defining coplanar wall areas of the cavity, one each of said coplanar wall areas being contiguous with and angularly disposed to one each of the wall surfaces constituting the entrance channel to said cavity, a defining wall of the cavity incorporating overlying contacting surface areas including at least one surface area of one of the members of said joint structure, said overlying contacting surface areas being permeable to vapor and moisture leakage into and out of said cavity; an elongate resilient moisture and vapor sealing strip of axially uniform transverse cross-section comprising a stem portion and laterally extending head portion carried thereby, said sealing strip responding under applied pressure to displaceable transformation within its elastic limit to forcible entrance head-first through the channel entrance to position the head portion thereof within said cavity in compressive abutting contact of an underlying surface of the head portion remote to said stem portion against the upwardly directed surface of the upstanding abutment underlying the same with the stem portion of the sealing strip in compressive engagement with the oppositely disposed wall surfaces constituting the channel entrance, and said head portion of the sealing strip presenting coplanar laterally oppositely outwardly extending surfaces in the plane of attachment to the stem portion thereof, one each of said laterally oppositely outwardly extending surfaces being in compressive sealing contact against one each of the oppositely disposed coplanar wall areas of the cavity adjacent the channel entrance thereto.

2. A joint structure between adjacent rigid members, each of said members being marginally profiled to provide, on marginal edge joint assembly therebetween, a wall surface in oppositely disposed transversely separated parallel relationship constituting an axially extending channel entrance to a laterally expanded cavity below said channel entrance, a wall area of said cavity remote and opposite to the channel entrance thereto having an upstanding axially extending abutment in substantial alignment with the axis bisecting the transverse width of the channel entrance, said abutment having an upwardly directed surface located below a transverse plane defining laterally oppositely extending coplanar wall areas of the cavity in adjacent interconnection thereof with the walls of said channel entrance, one each of said last-mentioned wall areas being contiguous with and angularly disposed to one each of the wall surfaces constituting the entrance channel to said cavity, at least one wall defining the cavity incorporating overlying contacting surface areas including at least one surface area of one of the members of said joint structure, said overlying contacting surface areas being permeable to vapor and moisture leakage into and out of said cavity; an elongate resilient moisture and vapor sealing strip of rubber-like material of uniform transverse cross-section having a durometer hardness of 60 to 90, said sealing strip comprising a stem portion and laterally extending head portion carried thereby, the stem portion being laterally serrated on opposite sides normal to said head portion, said sealing strip responding under applied pressure to displaceable transformation thereof within its elastic limit under forcible entrance head-first through the channel entrance to position the head portion thereof within said cavity in displaceably transformed compressive abutting contact of an underlying minimum surface area of the head portion remote to said stem portion against the upwardly directed surface of the upstanding abutment underlying the same with the serrated sides of the stem portion of the sealing strip deformed in compressive engagement with the oppositely disposed parallel wall surfaces constituting the channel entrance, and said head portion of the sealing strip otherwise presenting coplanar laterally oppositely outwardly extending surfaces from the stem portion in the plane of attachment of the stem and head portions of the sealing strip, one each of said laterally extending surfaces of said head portion being in compressive sealing contact against one each of the oppositely disposed coplanar wall areas of the cavity adjacent the parallel wall surfaces of the channel entrance thereto.

3. A joint structure between adjacent members, each of said members being marginally profiled to provide, on marginal edge joint assembly therebetween, a wall surface in oppositely disposed transversely separated relationship constituting an axially extending channel entrance to a laterally expanded re-entrant cavity below said channel entrance, a wall area of said cavity remote and opposite to the channel entrance thereto having an upstanding axially extending abutment in substantial alignment with the axis bisecting the transverse width of the channel entrance, said abutment having an upwardly directed surface located below a transverse plane defining coplanar wall areas of the cavity, one each of said coplanar wall areas being contiguous with and angularly outwardly disposed to one each of the wall surfaces constituting the entrance channel to said cavity, a defining wall of the cavity incorporating overlying contacting surface areas including at least one surface area of one of the members of said joint structure, said overlying contacting surface areas being permeable to vapor and moisture leakage into and out of said cavity; an elongate resilient moisture and vapor sealing strip of uniform transverse cross-section comprising a stem portion of substantially rectangular transverse cross-section and a laterally extending head portion of isosceles trapezoidal transverse cross-section carried thereby, said sealing strip responding under applied pressure to displaceable transformation within its elastic limit to forcible entrance head-first through the channel entrance to position the head portion thereof within said cavity in displaceably transformed compressive abutting contact of an underlying surface of the head portion remote to said stem portion against the upwardly directed surface of the upstanding abutment underlying the same with the stem portion of the sealing strip in displaceably transformed compressive engagement with the oppositely disposed wall surfaces constituting the channel entrance, and said isosceles trapezoidal head portion of the sealing strip presenting coplanar laterally oppositely

outwardly extending surfaces in the plane of attachment to the stem portion thereof, one each of said coplanar laterally oppositely outwardly extending surfaces being in displaceably transformed compressive sealing contact against one each of the oppositely disposed coplanar wall areas of the cavity adjacent the channel entrance thereto.

4. A joint structure between adjacent elongate members, each of said members being marginally profiled to provide, on marginal edge rigid joint assembly therebetween, a wall surface in oppositely disposed transversely separated relationship constituting an axially extending channel entrance to a laterally expanded cavity below said channel entrance, a wall area of said cavity remote and opposite to the channel entrance thereto having an upstanding axially extending abutment in substantial alignment with the axis bisecting the transverse width of the channel entrance, said abutment having an upwardly directed surface located below a transverse plane defining laterally oppositely outwardly extending coplanar wall areas of the cavity in adjacent interconnection thereof with the walls of said channel entrance, one each of said last-mentioned wall areas being contiguous with and angularly disposed to one each of the wall surfaces constituting the entrance channel to said cavity, at least one wall defining the cavity below the channel entrance thereto incorporating overlying contacting surface areas including at least one surface area of one of the elongate members of said joint structure, said overlying contacting surface areas being permeable to vapor and moisture leakage into and out of said cavity; an elongate resilient moisture and vapor sealing strip of rubber-like material of axially uniform transverse cross-section and having a durometer hardness between 60 to 90, said sealing strip in transverse cross-section having a substantially generally rectangular stem portion and an attached laterally extended isosceles trapezoidal head portion, said sealing strip responding under applied pressure to displaceable elastic transformation within its elastic limit under forcible entrance head-first through the channel entrance to position the isosceles trapezoidal head portion thereof within said cavity in displaceably transformed compressive abutting contact of an underlying minimum surface area of the head portion remote to said stem portion against the upwardly directed surface of the upstanding abutment underlying the same with the stem portion of the sealing strip in displaceably transformed lateral compressive engagement with the oppositely disposed wall surfaces constituting the channel entrance, and said isosceles trapezoidal head portion of the sealing strip otherwise presenting coplanar laterally oppositely outwardly extending surfaces in the plane of attachment to the stem portion thereof one each in displaceably transformed compressive sealing contact against one each of the laterally opposite angularly disposed coplanar wall areas of the cavity adjacent the channel entrance thereto.

5. A joint structure between adjacent elongate members, each of said members being marginally profiled to provide, on marginal edge joint assembly therebetween, a wall surface in oppositely disposed transversely separated parallel relationship constituting an axially extending channel entrance to a laterally expanded re-entrant cavity below said channel entrance, a wall area of said cavity remote and opposite to the channel entrance thereto having an upstanding axially extending abutment in substantial alignment with the axis bisecting the transverse width of the channel entrance, said abutment having an upwardly directed surface located below a transverse plane defining laterally oppositely extending coplanar wall areas of the cavity in adjacent interconnection thereof with the walls of said channel entrance, one each of said last-mentioned wall areas being contiguous with and angularly outwardly disposed to one each of the parallel wall surfaces constituting the entrance channel to said cavity, at least one wall defining the cavity below the channel entrance thereto incorporating overlying contacting surface areas including at least one surface area of one of the elongate members of said joint structure, said overlying contacting surface areas being permeable to vapor and moisture leakage into and out of said cavity; an elongate unitary resilient moisture and vapor sealing strip of rubber-like material of axially uniform transverse cross-section and having a durometer hardness between 60 to 90, said sealing strip in transverse cross-section having a stem portion and an isosceles trapezoidal head portion, the stem portion being defined by opposite serrated side surfaces, said sealing strip responding under applied pressure to displaceable elastic transformation within its elastic limit under forcible entrance head-first through the channel entrance to position the isosceles trapezoidal head portion thereof within said cavity in displaceably transformed compressive abutting contact of an underlying minimum surface area of the head portion remote to said stem portion against the upwardly directed surface of the upstanding abutment underlying the same with the opposite serrated side surfaces of the stem portion of the sealing strip in displaceably transformed lateral compressive engagement with the oppositely disposed parallel wall surfaces constituting the channel entrance, and said isosceles trapezoidal head portion of the sealing strip otherwise presenting coplanar laterally oppositely outwardly extending surfaces in the plane of attachment to the stem portion thereof one each in displaceably transformed compressive sealing contact against one each of the laterally opposite angularly disposed coplanar wall areas of the cavity adjacent the channel entrance thereto.

6. A joint structure between adjacent elongate members, each of said members being marginally profiled to provide, on marginal edge joint assembly therebetween, a wall surface in oppositely disposed transversely separated parallel relationship constituting an axially extending channel entrance to a laterally expanded cavity below said channel entrance, a wall area of said cavity remote and opposite to the channel entrance thereto having an upstanding axially extending abutment in substantial alignment with the axis bisecting the transverse width of the channel entrance, said abutment having an upwardly directed surface located below a transverse plane defining laterally oppositely extending coplanar wall areas of the cavity in adjacent interconnection thereof with the walls of said channel entrance, one each of said last-mentioned wall areas being contiguous with and angularly outwardly disposed to one each of the wall surfaces constituting the entrance channel to said cavity, at least one wall defining the cavity below the channel entrance thereto incorporating overlying contacting surface areas including at least one surface area of one of the elongate members of said joint structure, said overlying contacting surface areas being permeable to vapor and moisture leakage into and out of said cavity; an elongate unitary resilient moisture and vapor sealing strip of rubber-like material of axially uniform transverse cross-section and having a durometer hardness between 70 to 80, said sealing strip being characterized in transverse cross-section by having a stem portion with laterally opposite serrated surfaces and a head portion of isosceles trapezoidal outline, said stem portion extending outwardly away from the longer parallel surface of the isosceles trapezoidal head portion, said sealing strip responding under applied pressure to displaceable elastic transformation within its elastic limit under forcible entrance head-first through the channel entrance to position the isosceles trapezoidal head portion thereof within said cavity in displaceably transformed compressive abutting contact of an underlying minimum surface area of the head portion remote to said stem portion against the upwardly directed surface of the upstanding abutment underlying the same with the opposite serrated surfaces of the stem portion of the sealing strip in displaceably transformed lateral compressive flattened engagement with the oppositely disposed parallel wall surfaces constituting the channel entrance,

and said isosceles trapezoidal head portion of the sealing strip otherwise presenting coplanar laterally oppositely outwardly extending surfaces in the plane of attachment to the stem portion thereof one each in displaceably transformed compressive sealing contact against one each of the laterally opposite angularly disposed coplanar wall areas of the cavity adjacent the channel entrance thereto.

7. An axially coextensive joint structure between adjacent rigid structural members, said point structure comprising at least two elongate members each marginally profiled and providing an axially extending surface area in oppositely spaced facing relationship defining an open top channel entrance to the joint structure therebetween over the axial length thereof, an axial transversely uniform re-entrant cavity below and in communication with said channel entrance, said cavity being transversely defined by laterally outwardly extending coplanar shoulder wall surfaces one each angularly contiguous with one of the oppositely spaced surface areas defining the channel entrance in combination with depending lateral side surface walls one each contiguous with one of each of the coplanar shoulder wall surfaces, and a bottom wall surface completing said cavity, at least one of said so-defined wall surfaces of the cavity having axially extending overlying contacting surface areas permeable to passage of vapor and moisture therebetween, an axially extending abutment upwardly projecting above the bottom wall surface of the cavity axially coextensive therewith and substantially centrally disposed within the axis bisecting the transverse width of the channel entrance; an elongate resilient moisture and vapor sealing strip of axially uniform transverse cross-section comprising a stem portion and an enlarged laterally extending head portion attached thereto, said sealing strip exhibiting a durometer hardness within the range 60 to 90 and responding to displaceable transformation thereof within its elastic limit and forcible entrance head-first through the open top channel entrance to position the head portion thereof within said cavity in compressive abutting contact of an underlying surface of the head portion against the upwardly projecting abutment carried by the bottom wall surface of the cavity with the stem portion of the sealing strip displaceably transformed and compressively engaged against the opposite surface areas defining the channel entrance, and said head portion of the sealing strip presenting coplanar laterally oppositely outwardly extending surfaces in the plane of attachment thereof to the stem portion in displaceably transformed compressive sealing contact against the coplanar shoulder wall surfaces of the cavity.

8. An axially coextensive joint structure between adjacent elongate structural members, said joint structure comprising at least two elongate members each marginally profiled and providing an axially extending surface area in oppositely parallel spaced facing relationship defining an open top channel entrance to the joint structure therebetween over the axial length thereof, an axial transversely uniform cavity below and in communication with said channel entrance, said cavity being transversely defined by laterally outwardly extending coplanar shoulder wall surfaces one each angularly contiguous with one of the oppositely spaced parallel surface areas defining the channel entrance, depending lateral side surface walls one each contiguous with one of each of the coplanar shoulder wall surfaces, and a bottom wall surface completing said cavity, at least one of said so-defined wall surfaces of the cavity having axially extending overlying contacting surface areas permeable to passage of vapor and moisture therebetween, an axially extending abutment upwardly projecting above the bottom wall surface of the cavity axially coextensive therewith and substantially centrally disposed within the axis bisecting the transverse width between the parallel surface areas defining the channel entrance; an elongate resilient moisture and vapor sealing strip of axially uniform transverse cross-section comprising a stem portion and an integrally attached head portion, said stem portion being of substantially rectangular transverse cross-section and the head portion being of isosceles trapezoidal transverse cross-section, a short edge of the rectangular stem being integral with the longer parallel edge of the isosceles trapezoidal head, said sealing strip being symmetrical in transverse cross-section and exhibiting a durometer hardness within the range 60 to 90 responding to transformation thereof within its elastic limit and forcible entrance head-first through the open top channel entrance to position the head portion thereof within said cavity in compressive abutting contact of an underlying surface of the head portion against the upwardly projecting abutment carried by the bottom wall surface of the cavity with the stem portion of the sealing strip compressively engaging opposite surface areas defining the channel entrance, and said head portion of the sealing strip presenting coplanar laterally oppositely outwardly extending surfaces in the plane of attachment thereof to the stem portion in compressive sealing contact against the coplanar shoulder wall surfaces of the cavity.

9. An axially coextensive rigid joint structure between adjacent elongate structural members, said joint structure comprising at least two elongate members each providing an axially extending surface area in oppositely parallel spaced facing relationship defining an open top channel entrance to the joint structure over the axial length thereof, an axial transversely uniform cavity below and in communication with said channel entrance, said cavity being transversely defined by laterally outwardly extending coplanar shoulder wall surfaces one each angularly contiguous with one of the oppositely spaced parallel surface areas defining the channel entrance in combination with depending lateral side surface walls one each contiguous with one of each of the coplanar shoulder wall surfaces, and a bottom wall surface completing said cavity, at least one of said so-defined wall surfaces of the cavity having axially extending overlying contacting surface areas permeable to passage of vapor and moisture therebetween, an axially extending abutment upwardly projecting above the bottom wall surface of the cavity axially coextensive therewith and substantially centrally disposed within the axis bisecting the transverse width between the parallel surface areas defining the channel entrance; an elongate resilient moisture and vapor sealing strip of uniform transverse cross-section comprising a stem portion and a head portion integrally attached thereto, said stem portion in transverse cross-section having opposite serrated surfaces falling within a substantially rectangular trace with a narrow transverse edge of the rectangular trace coincident with the longer parallel edge of a transverse cross-sectional isosceles trapezoidal head portion, said sealing strip exhibiting a durometer hardness within the range 60 to 90 and being responsive to transformation thereof within its elastic limit and forcible entrance head-first through the open top channel entrance to position the head portion thereof within said cavity in compressive abutting contact of the underlying transversely shorter edge surface of the isosceles trapezoidal head portion against the upwardly projecting abutment carried by the bottom wall surface of the cavity with the serrated surfaces of the stem portion of the sealing strip displaceably and transformably engaging opposite parallel surface areas defining the channel entrance, and said head portion of the sealing strip presenting coplanar laterally oppositely outwardly extending surfaces in the plane of attachment thereof to the stem portion in compressive sealing contact against the coplanar shoulder wall surfaces of the cavity.

10. A joint structure between adjacent members, each of said members being marginally profiled to provide, on marginal edge joint assembly therebetween, a wall surface in oppositely disposed transversely separated parallel relationship constituting an axially extending channel entrance to a laterally expanded re-entrant cavity below

said channel entrance, a wall area or surface of said cavity remote and opposite to the channel entrance thereto having an upstanding axially extending abutment in substantial alignment with the axis bisecting the transverse width of the parallel channel entrance, said abutment having an upwardly directed surface located below a transverse plane defining laterally oppositely outwardly extending coplanar wall areas of the cavity, one each of said last-mentioned wall areas being contiguous with and angularly outwardly disposed to one each of the parallel wall surfaces constituting the entrance channel to said cavity, at least one wall defining the cavity below the channel entrance thereto incorporating overlying contacting surface areas including at least one surface area of one of the elongate marginally profiled members of said joint structure, said overlying contacting surface areas being permeable to vapor and moisture leakage into and out of said cavity; a unitary elongate resilient moisture and vapor sealing strip of rubber-like material of axially uniform transverse cross-section and having a durometer hardness between 70 to 80, said sealing strip comprising an upstanding stem portion, the minimum transverse width of a rectangular trace defining the same being substantially greater than the transverse width dimension across the channel entrance to the cavity, and having an integral laterally extending head portion of minimum thickness 1 to 1.2 times the vertical distance between parallel planes defining the outwardly extending coplanar wall areas of the cavity and the upwardly directed surface of the abutment below said channel entrance, said sealing strip responding under applied pressure to displaceable elastic transformation within its elastic limit under forcible entrance head-first through the channel entrance to position the laterally extended head portion thereof within said cavity in displaceably transformed compressive abutting contact of an underlying minimum surface area of the head portion remote to said stem portion against the upwardly directed surface of the upstanding abutment underlying the same with the stem portion of the sealing strip in displaceably transformed lateral compressive engagement with the oppositely disposed parallel wall surfaces constituting the channel entrance, and said laterally extended head portion of the sealing strip otherwise presenting coplanar laterally oppositely outwardly extending surfaces in the plane of attachment to the stem portion thereof one each in displaceably transformed compressive sealing contact against one each of the laterally opposite angularly outwardly disposed coplanar wall areas of the cavity adjacent the channel entrance thereto.

References Cited

UNITED STATES PATENTS

2,156,681	5/1939	Dewhirst et al.	94—18.2
2,446,323	8/1948	Davis et al.	52—403 X
3,232,395	2/1966	La Barge	189—36

DAVID J. WILLIAMOWSKY, *Primary Examiner.*

HARRISON R. MOSELEY, *Examiner.*

J. K. BELL, *Assistant Examiner.*