Jan. 23, 1951 K. G. ZUMMACH 2,538,931

BOW AND TACKING STRIP ASSEMBLY

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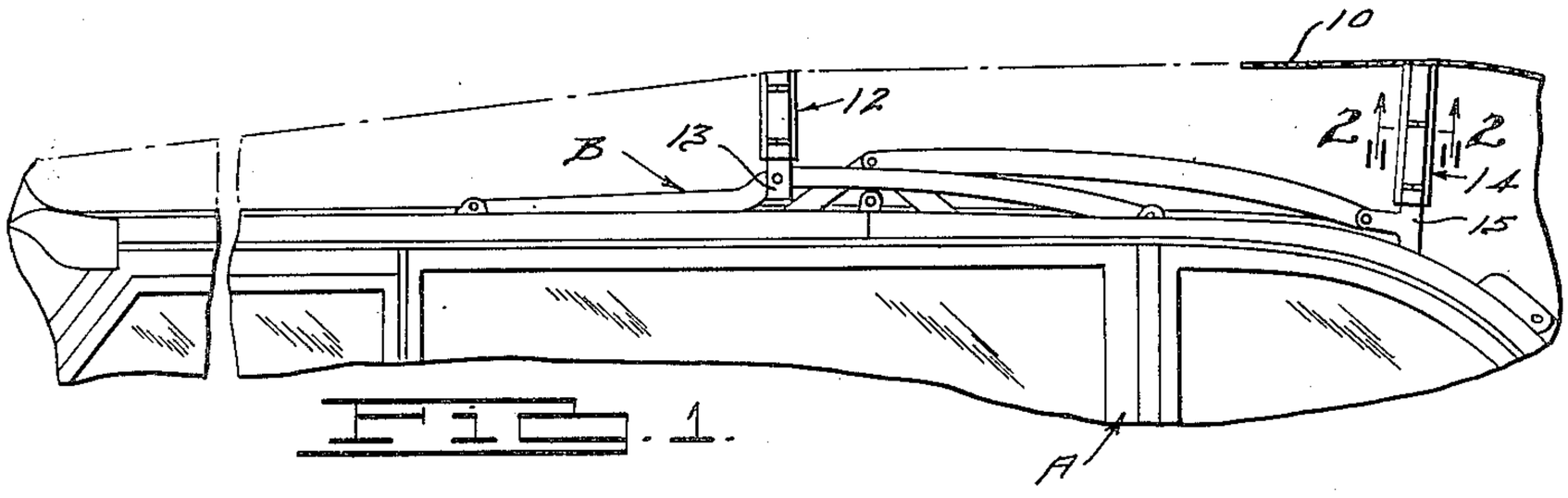


FIG. 1.

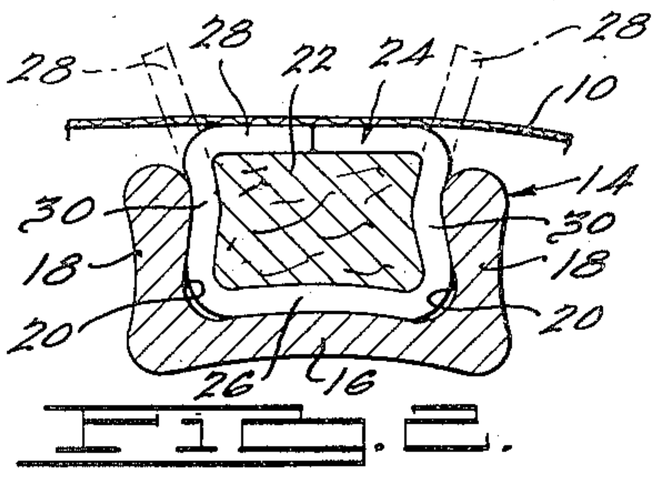


FIG. 2.

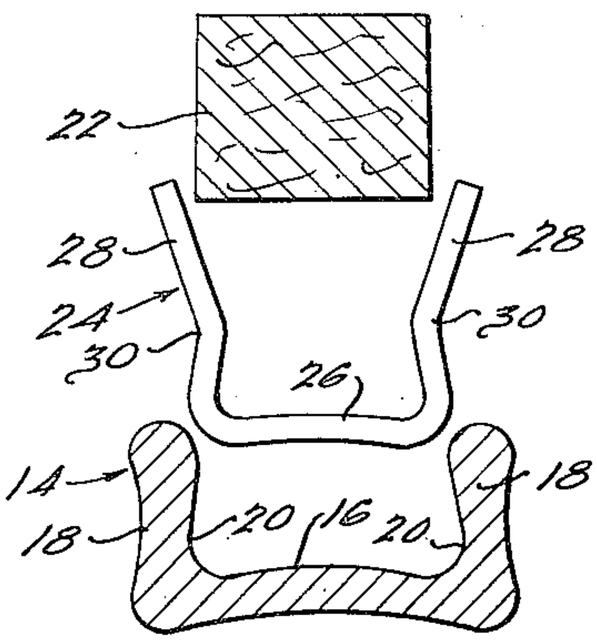


FIG. 3.

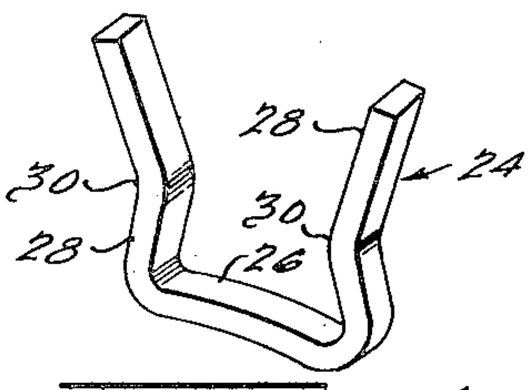


FIG. 4.

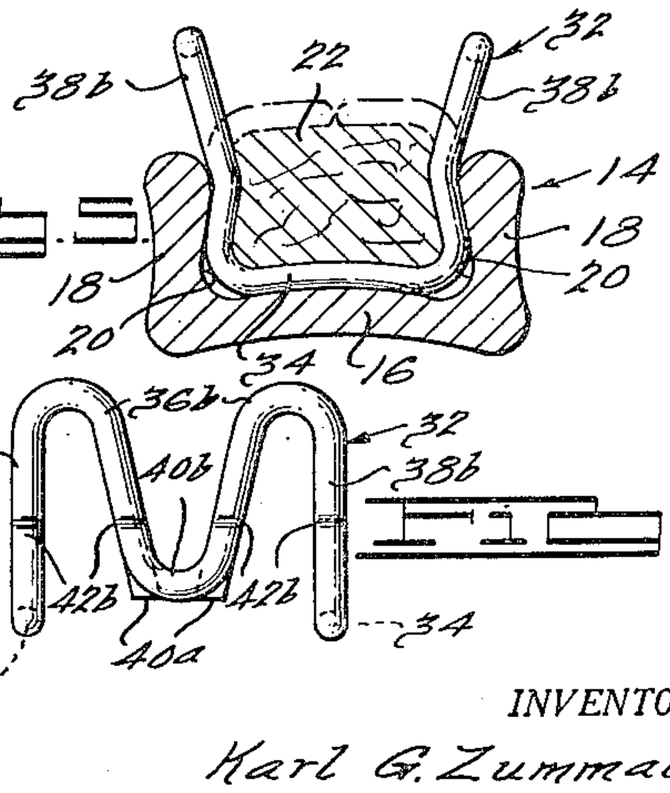


FIG. 5.

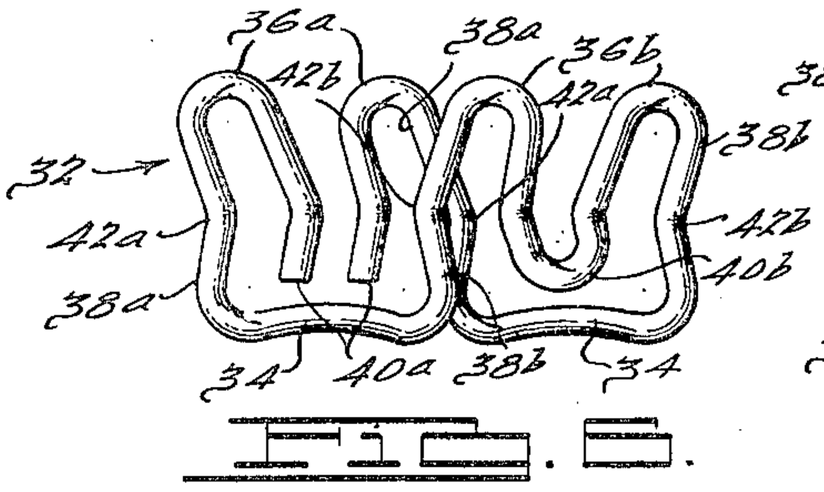


FIG. 6.




FIG. 7.

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## BOW AND TACKING STRIP ASSEMBLY

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9 Claims. (Cl. 296—118)

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The present invention relates to vehicle bodies and more particularly to improvements in the transverse bow construction of the folding or collapsible top of the so-called convertible type automobile and to improved means for securing the fabric or other flexible covering material of the top to the transverse bow.

It has been customary prior to the present invention to support the fabric or flexible covering material of the conventional convertible type automobile top by means of a plurality of spaced transverse bows suitably supported at their downwardly bowed ends by the side rails or links of the folding top structure. Such bows are provided with longitudinally extending upward opening channels which receive a packing of felt or like material for engaging and supporting the flexible cover material in the raised position, or which receive tough fibrous tacking strips to which the flexible cover material is secured by tacks or staples.

A difficulty commonly experienced in the use of such channel bow constructions has been the eventual loosening of the packing or tacking strip and the displacement thereof from the retaining channel in the course of operation of the convertible top. Accordingly, the problem of providing a simple, efficient, and economically manufactured and installed means for retaining the packing or tacking strips in place within the channels therefor has long confronted the art.

A primary object of the present invention is to overcome the foregoing difficulty by providing an improved channel type transverse bow and means cooperable therewith for efficiently retaining the packing or tacking strips within the channels.

Another important object is to provide an improved transverse bow construction and cooperable strip retaining means of the foregoing character which are simple in construction, highly efficient in operation, and economically manufactured and installed.

Another and more specific object of the present invention is to provide an improved transverse bow construction having an upward opening channel running longitudinally of the bow and having formed channel sides adapted to interlock with formed clips insertable into the open channel mouth, the transverse bow being adapted for economical manufacture in accordance with conventional practice and the clips being adapted for economical fabrication from bar or wire stock by conventional wire bending machinery, for example.

Other objects of this invention will appear in

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the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

The above and other objects are accomplished in a preferred embodiment of the present invention comprising a transverse top bow having an upward opening channel extending essentially the length of the bow with a generally U-shaped transverse cross-section and undercut interior sides. A plurality of generally U-shaped retaining clips shaped to conform substantially to the interior cross-sectional contour of the channel are inserted into the channel at intervals spaced longitudinally of the bow so as to interlock with the undercut channel sides and resist upward displacement therefrom. As will be apparent from the following, the retaining clips may be formed in various ways, either from rigid or resilient material, and may be readily inserted into the channel of the bow from above upon turning the U-plane of the clip at an angle to a plane normal to the longitudinal axis or length of the bow if the clip is of rigid material, or by suitably flexing the clip if it is of resilient material. Upon insertion of each clip into the channel, the clip is arranged with its U-plane transverse to the length of the bow if the clip is of rigid material, or released from its flexed condition if the clip is of resilient material, so that in either event the U-plane of the clip will lie transversely to the bow within the channel thereof and with the lateral edges of the clip conforming and interlocking with the undercut channel sides to resist outward displacement therefrom.

Thereafter the packing strip of felt or other suitable material, or the tough fibrous tacking strip, as the case may be, is inserted into the channel of the bow in the usual manner. The packing or fibrous strip is packed snugly against the body of each clip so as to restrain the same from movement longitudinally of the bow. Accordingly, upon insertion of the packing, the clips become embedded into the latter and may not be readily turned angularly within the channel, or flexed, and released from their interlocking engagement with the channel sides. Thus the clips will be locked within the channel of the bow.

The upper ends of each clip at the U-mouth thereof preferably extend sufficiently above the mouth of the channel when the clips are interlocked therein, so as to provide end portions which may be bent toward each other and tightly downward on the upper surfaces of the pack-

ing within the channel, thereby providing simple and efficient means for permanently retaining the packing within the channel therefor.

A preferred embodiment of the present invention is illustrated by way of example in the drawings wherein:

Fig. 1 is a fragmentary side elevation, partly broken away, of a collapsible or foldable top for a vehicle body and employing transverse bows and retaining clips constructed in accordance with the present invention.

Fig. 2 is an enlarged fragmentary transverse section through one of the transverse bows, taken in the direction of the arrows substantially along the line 2—2 of Fig. 1.

Fig. 3 is an exploded section showing the retaining clip and packing of Fig. 2 prior to their insertion into the channel of the bow.

Fig. 4 is an isometric view of one of the retaining clips embodying the present invention.

Fig. 5 is a sectional view similar to Fig. 2, but showing a modified form of the present invention.

Fig. 6 is a perspective view of the clip shown in Fig. 5.

Fig. 7 is a side elevation of the clip shown in Figs. 5 and 6, taken perpendicularly to the U-face thereof.

Before explaining the present invention in detail it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring particularly to Figs. 1–4, a convertible vehicle body A is shown with a collapsible or foldable top structure B adapted to be folded into a compartment, not shown, located at the rear of the body A. The folding construction of the top B forms no part of the present invention and is accordingly not described in detail herein.

In accordance with conventional practice, the central portions of the flexible fabric or cover material 10 of the top B are supported by a plurality of transverse top bows, two bows indicated generally by the numerals 12 and 14 being shown in the present instance and being suitably secured at their downwardly bowed ends to the upright legs 13 and 15 respectively of the foldable top structure B, being thereby operatively supported so as to maintain the flexible cover portion 10 taut when in the raised or unfolded position.

With the exception of minor structural details, the transverse bows 12 and 14 are similar, so that a discussion of one will suffice for both. As indicated in Figs. 2 and 3, the bow 14 is formed with a longitudinally extending upward opening channel having a base 16 arched transversely of the length of the bow for structural reinforcement and also having generally upright lateral sides 18 undercut at 20 on the interior of the channel to permit a strip of packing material 22 to be inserted within the channel and anchored therein.

The bows 12 and 14 may be formed in any suitable manner, as for example from extruded metal channel strips, or from rolled sheet steel. The bow supporting legs 13 and 15 fit within the downward curved ends of the channels of the bows 12 and 14 respectively and are suitably secured thereto, as by rivets for example. The inserted packing strip 22 projects somewhat above the upper edges of the sides 18 for supporting engagement with the flexible covering 10. The packing strips 22 may be formed of customary materials, as for example felt or the like to prevent chafing of the flexible covering 10 on the bows 12 and 14 or of tough fibrous tacking material to which the covering 10 may be suitably tacked or stapled in accordance with conventional practice.



In order to prevent dislodgement of the inserted packing 22, the present invention provides a plurality of metal clips indicated generally by 24 and formed preferably from bar or wire stock so as to fit into the channels of the bows 12 and 14 in the manner described hereinafter. As indicated in Figs. 3 and 4, each clip 24 is generally U-shaped, having an arcuate base 26 adapted to conform generally to the arcuate channel base 16 and also having upright arms 28 curved inwardly at 30 so as to conform generally to the undercut channel sides 18.

In the assembled position, with the plane of the U-face of the clip 24 transverse to the length of the bow 14 and with the clip base 26 and sides 28 adjacent the channel base 16 and sides 18, the lower lateral portions of the clip 24 will fit into the undercut or recessed portions 20 of the bow 14, and the upper side portions of the bow 14 will fit into the inwardly bent clip portions 30, Fig. 2. Accordingly, the clip 24 will be anchored within the channel with the clip arms 28 interlocked with the channel sides 18 against outward or vertical displacement.

In application of the present invention, a plurality of the clips 24 are inserted into the channel of the bow 14 at longitudinally spaced intervals prior to insertion of the packing 22. This is readily accomplished by turning the plane of the U-face of each clip 24 obliquely with respect to a transverse plane through the bow 14. Thereafter, the plane of the U-face of each inserted clip 24 is turned to the transverse position shown in Fig. 2, whereat the clip 24 is locked against vertical displacement. At this stage, the clip arms 28 extend generally upright from the channel as indicated in phantom, Fig. 2. The packing strip 22 is then pressed firmly into the channel substantially throughout its length and between the arms 28 of each clip 24, snugly against the body portions of the latter within the channel. Thereafter, the extending upper portions of the arms 28 are bent toward each other firmly against the upper surface of the packing 22 to the final position shown in Fig. 2, locking the packing 22 within the channel.

It is apparent that with the packing 22 in place, the clips 24 will be embedded into the packing strip 22 and restrained against accidental displacement from their transverse positions, i. e. the clips 24 cannot be readily turned to the oblique position required to avoid the interlocking engagement between the arms 28 and channel sides 18. Thus the clips 24 and strips 22 will be permanently locked within the channel against displacement during the normal course of operation of the convertible top B.

A modification of the clip 24 is shown by way of example in Figs. 5–7 and comprises a clip indicated generally by the numeral 32, Fig. 6, which is preferably formed from resilient wire stock. The clip 32 has a generally U-shaped transverse section, Fig. 5, adapted to conform to the interior contour of the channel of a bow 12

or 14 generally for the purpose and in the manner described in connection with the clip 24.

The clip 32 is provided with the pair of transverse base portions 34, arched similarly to the base 16 and spaced longitudinally of the bow 14 by the convoluted generally M-shaped side portions 36*a* and 36*b*, Figs. 6 and 7. The legs 38*a* of the M-portion 36*a* extend generally upright from the corresponding ends of the base portions 34 on one side of the U-clip 32. Similarly, the legs 38*b* of the M-portion 36*b* extend generally upright from the opposite corresponding ends of each base member 34 on the other side of the U-clip 32. Since each clip 32 is preferably formed from a single length of wire stock having two terminals 40*a*, the central dip or body of the lateral M-portion 36*a* will be open, whereas the body or central dip of the lateral M-portion 36*b* will complete a continuous loop 40*b*. This latter feature is not critical to this present invention, since convoluted side portions of other shapes may be utilized if desired in place of the M-portions 36*a*, 36*b* shown.

Similarly to the inwardly bent portions 30 of the clip 24, the lateral M-portions 36*a* and 36*b* are bent at 42*a* and 42*b* respectively to conform to the undercut channel sides 18 in the manner of the clip 24. Thus the clips 32, when assembled within the channel as shown in Fig. 5, with the base portions 34 transverse to the length of the bow 14 and resting on the channel base 16, and with the lateral M-portions 36*a* and 36*b* adjacent the channel sides 18, the lower lateral portions of the clip 32 will fit into the undercut or recessed portions 20, and the upper side portions of the bow 14 will fit into the adjacent inwardly bent clip portions 42*a* and 42*b*. Accordingly the clip 32 will be anchored within the channel with the lateral M-portions 36*a* and 36*b* interlocked with the channel sides 18 against vertical displacement.

The application of the clips 32 is likewise similar to that of the clips 24. A plurality of clips 32 are inserted into the channel of the bow 14 at longitudinally spaced intervals prior to insertion of the packing 22. This is readily accomplished by pressing diagonally opposed ends of the base portions 34 of each clip 32 toward each other so as to narrow the transverse width of the latter sufficiently to clear the narrowed channel mouth of the bow 14. Thereafter, the clip 32 is released to resume its unflexed shape, Fig. 5, by virtue of its inherent resiliency. At this stage, the upper portions of the lateral M-portions 36*a* and 36*b* extend generally upright from the channel as indicated in Fig. 5. The packing strip 22 is then pressed firmly into the channel according to conventional practice and snugly against the body portions of the clips 32. Thereafter, the extending upper portions of the lateral M-portions 36*a* and 36*b* are bent toward each other and firmly against the upper surface of the packing 22 to the final position indicated in phantom, Fig. 5, locking the packing 22 within the channel.

It is apparent that with the packing 22 in place, the clips 32 will be restrained against accidental displacement from their interlocking engagement with the channel sides 18, i. e., the packing 22 with the clips 32 embedded therein will restrain the clips 32 against distortion to the flexed position required for insertion or removal thereof into or out of the channel. Thus the clips 32 and strip 22 are locked against displacement from the channel during the normal course of operation of the convertible top B.



I claim:

1. In a foldable top for a vehicle body, a transverse bow having an upward opening channel extending longitudinally of the bow for the reception of a packing strip, the sides of said channel having longitudinally extending lateral recesses at the junctures thereof with the base of the channel, and a plurality of upward opening generally U-shaped retaining clips insertable into said channel prior to insertion of said packing strip and having outwardly converging side portions adapted to interlock with said lateral recesses, said clips having portions adapted to be bent over said packing strip to retain the same within the channel when said clips and packing strip are inserted within the channel between said converging side portions.

2. In a foldable top for a vehicle body, a transverse bow having an upward opening channel extending longitudinally of the bow for the reception of a packing strip, a plurality of upward opening generally U-shaped retaining clips fitting within said channel at longitudinally spaced locations and being shaped to conform generally to the transverse interior contour of the channel, said clips and the sidewalls of said channel having interengaging portions adapted to resist outward displacement of said clips from said channel, each clip being insertable into said channel prior to insertion of said packing strip and being adapted to be turned with its U-section transversely of the channel to effect interlocking engagement with the sidewalls of the channel, and a packing strip within the channel forced into position between the sides of each clip thereby to embed said sides in the strip and anchor the clip wihin the channel against movement, said clips also having portions bent firmly against the upper portions of said packing strip for retaining the same within said channel.

3. In a foldable top for a vehicle body, a transverse bow having an upward opening channel extending longitudinally of the bow for the reception of a packing strip, the sides of said channel having longitudinally extending lateral recesses, a plurality of retaining clips inserted within said channel and each clip having lateral portions received within said recesses for interlocking with said channel sides against outward displacement, each clip being adapted to be inserted obliquely into said channel prior to insertion of said packing strip and being adapted to be turned thereafter to said interlocking position, and a packing strip within said channel and packed firmly against said clips to resist movement of the latter from their interlocking positions within the channel, said clips also having portions bent firmly against the upper portions of said packing strips for retaining the same within said channel.

4. In a foldable top for a vehicle body, a transverse bow having an upward opening channel extending longitudinally of the bow for the reception of a packing strip, a plurality of generally U-shaped retaining clips insertable into said channel at longitudinally spaced locations and each being formed of resilient material including a pair of base portions and pairs of generally upright sides, said bow and clips having interengaging portions adapted to resist outward displacement of said clips from the channel, said resilient clips being insertable into said channel prior to insertion of the packing strip upon springing said clip base portions obliquely with respect to their normal transverse positions with-

in said channel, and a packing strip within said channel wedged between said side portions in the clips and anchored thereto against movement within the channel.

5. In a foldable top for a vehicle body, a transverse bow having an upward opening channel extending longitudinally of the bow for the reception of a packing strip, a plurality of generally U-shaped retaining clips within said channel at longitudinally spaced locations and each being formed of resilient material including a pair of spaced base portions extending transversely of said channel and pairs of generally upright side portions, said bow and clips having interengaging portions adapted to resist outward displacement of said clips from the channel, said resilient clips being insertable into said channel prior to insertion of the packing strip upon springing said clip base portions obliquely with respect to their normal transverse position within said channel, and a packing strip within said channel and packed firmly against said clips to resist movement of the latter from their position of interengagement within the channel, said side portions having upper portions bent firmly against the upper portions of said packing strips for retaining the same within said channel.

6. In a vehicle body, a supporting channel member adapted to receive a packing strip and comprising a base terminating in side walls having the inner surfaces thereof extending outwardly from the base in converging relation, a generally U-shaped retaining clip having a base terminating in outwardly converging side portions, said clip being insertable into the channel member prior to insertion of said packing strip and being adapted to be turned into position transversely of the channel member to effect interlocking engagement between the converging side portions of the clip and the converging side wall surfaces of the channel member, and a packing strip forced into the channel to wedge the same between said converging side portions of the clip.

7. In a vehicle body, a supporting channel member adapted to receive a packing strip and comprising a base terminating in side walls having the inner surfaces thereof extending outwardly from the base in converging relation, a generally U-shaped retaining clip having a base terminating in outwardly converging side portions, said clip being insertable into the channel member prior to insertion of said packing strip and being adapted to be turned into position transversely of the channel member to effect interlocking engagement between the converging side portions of the clip and the converging side wall surfaces of the channel member, and a packing strip forced into the channel to wedge the same between said converging side portions of the clip, said clip having side portions projecting outwardly of said converging side portions and adapted to be bent over the outer side of the packing strip.



8. In a vehicle body, a channel member having a base terminating in side walls undercut at opposite sides adjacent the base, a generally U-shaped retaining clip having a base terminating in outwardly converging side portions, said clip being insertable into the channel member and turned into position transversely thereof to interlock said converging side portions and the undercut portions of the channel member, and a packing strip wedged into position between said converging side portions.

9. In a vehicle body, a channel member having a base terminating in side walls undercut at opposite sides adjacent the base, a generally U-shaped retaining clip having a base terminating in outwardly converging side portions, said clip being insertable into the channel member and turned into position transversely thereof to interlock said converging side portions and the undercut portions of the channel member, and a packing strip wedged into position between said converging side portions and anchored within the channel member by the upper ends of the side portions of the clip bent over the outer side of the packing strip.

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