Sept. 11, 1951 G. D. STOUGH 2,567,658

CARGO-BRACING STRUCTURE

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FIG. 1

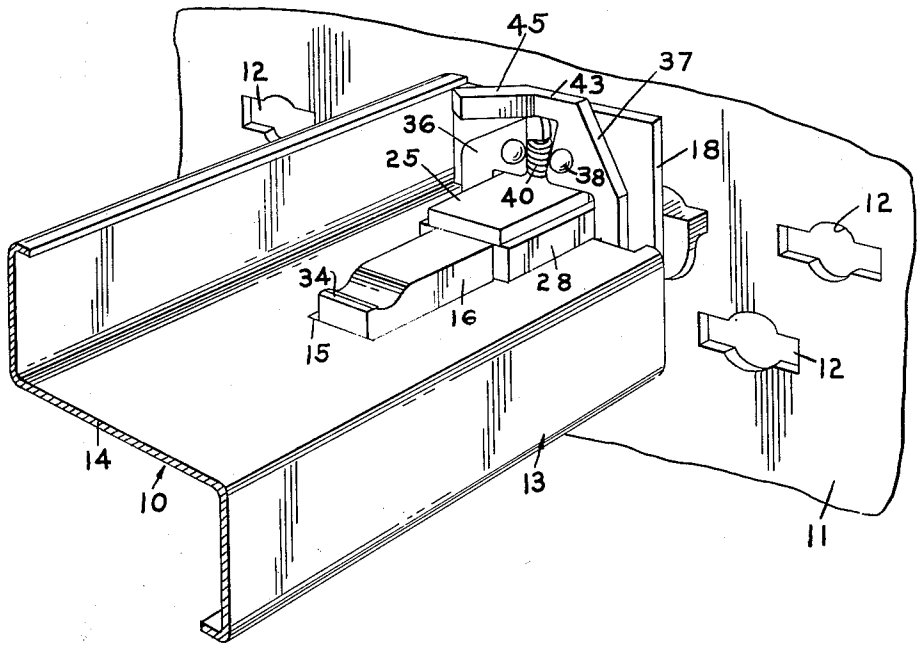
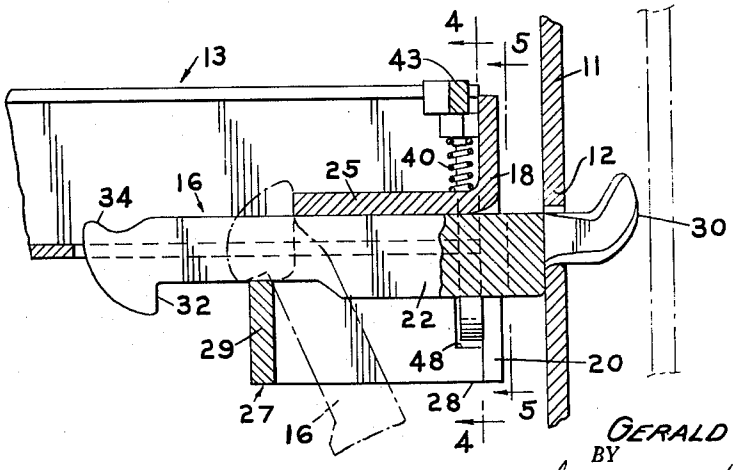


FIG. 3



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FIG. 4

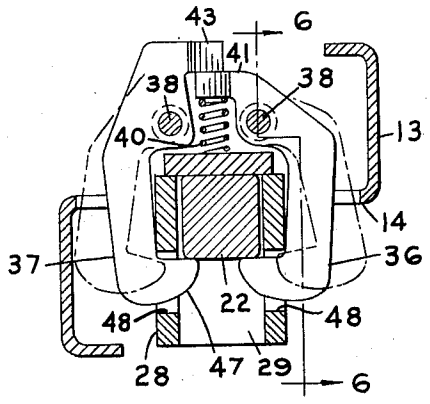


FIG. 5

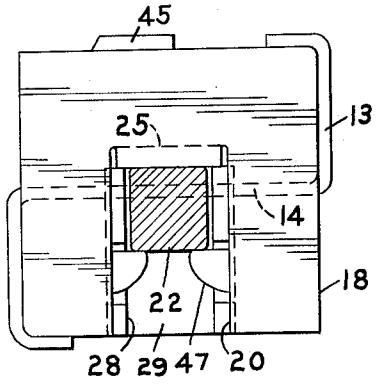


FIG. 2

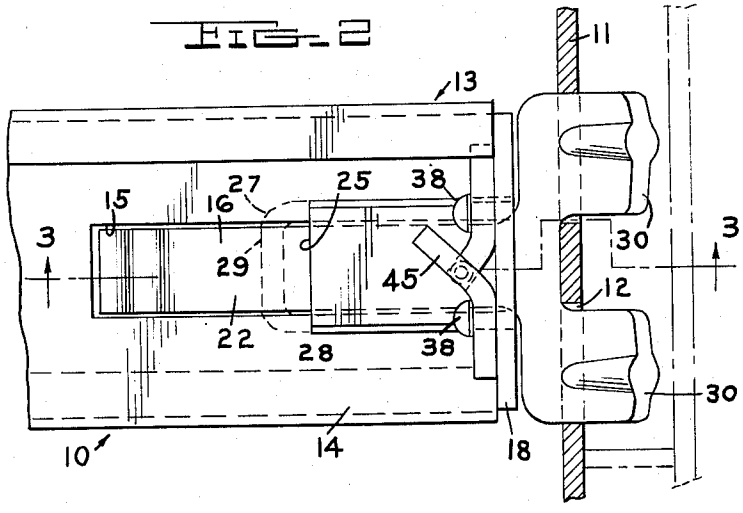
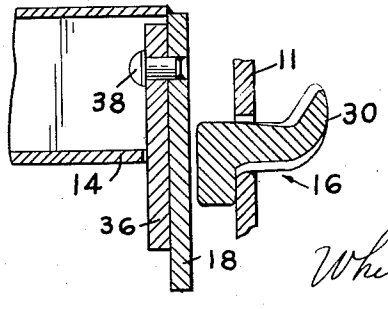


FIG. 6



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CARGO-BRACING STRUCTURE

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Application October 18, 1948, Serial No. 55,198

26 Claims. (Cl. 105—369)

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The present invention relates to crossbar structure and more particularly to crossbars or cargo braces designed to extend between and interconnect perforated panels provided along the opposite sides of freight cars, trucks or the like.

It is an object of the present invention to provide crossbar structure of the character described which interlocks with but permits a certain amount of relative movement with respect to the perforated panel structure where relative movement results from motion of the vehicle.

It is a further object of the present invention to provide an improved crossbar structure characterized by its simplicity, the economy with which it may be manufactured and its efficiency in use.

It is a feature of the present invention to provide crossbar structure comprising a bar having an elongated hook bolt carried at the end thereof which is mounted for longitudinal sliding movement relative to the crossbar and for vertical rocking movement during engagement with the perforated panel.

It is a further feature of the present invention to provide a crossbar of the character described comprising releasable latch means for retaining a hook bolt in horizontally extended position while at the same time permitting longitudinal sliding movement thereof.

Other objects and features of the invention will become apparent as the description proceeds, especially when considered in conjunction with the accompanying drawings, wherein:

Figure 1 is a fragmentary perspective view showing an end of a crossbar secured to a perforated wall structure;

Figure 2 is a plan view of the end of the crossbar showing the panel structure in section;

Figure 3 is a section on the line 3—3, Figure 2;

Figure 4 is a section on the line 4—4, Figure 3;

Figure 5 is a section on the line 5—5, Figure 3; and

Figure 6 is a section on the line 6—6, Figure 4.

Referring now to the drawings, the crossbar designated generally at 10 is designed to extend between and interconnect confronting panels 11 which are provided with a multiplicity of openings or perforations 12 adapted to receive appropriately shaped hook bolts carried by the crossbar 10. The crossbars are useful in supporting freight and they are adapted to be rigidly interlocked between the panels 11 so as to support lateral or vertical thrust. When the plates 11 are provided at opposite sides of the freight cars, trucks or the like it is impossible to avoid a certain amount of relative motion between the panels which results from the motion of the vehicle. In the past, crossbars of this general type have been provided in which no provision was made for permitting limited relative approach and separation between the confronting panels. Accordingly, the hooks which were provided at the ends of the crossbars were subjected to heavy stresses which in many cases sheared the pins on which the hooks were mounted.

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In the present case the crossbar comprises a generally Z-shaped metal bar 13 having a horizontal web 14. The web 14 at its end is provided with an inwardly extending slot 15 in which the locking hook bolt 16 is movable. A transverse flat metal plate 18 is secured to the end of the bar 13 and is provided with a downwardly opening slot 20 in which the shank 22 of the hook bolt 16 is vertically movable. Preferably the slot 20 is provided by cutting out a flange 25 from the material of the plate 18 and bending the flange 25 rearwardly, as best illustrated in Figure 3.

The housing plate 27 of U-shaped cross section is secured to the inner surface of the plate 18. The housing plate includes side portions 28 which lie along the sides of the flange 25 and an inner portion 29, the top edge of which is located beneath and inwardly from the inner end of the flange 25. The housing plate 27 and the flange 25 together provide a housing for the hook bolt 16 which is open at the end of the bar and at the underside of the bar and which also is provided with an opening between the upper edge of the housing portion 29 and the inner edge of the flange 25.

The hook bolt 16 is provided with a shank 22 of generally square cross section and has a pair of interlocking elements 30 shaped to enter the openings 12 in the panel and to interlock therewith so as to retain the bar in its predetermined position. At the inner end the shank 22 is provided with a shoulder 32 which is adapted to engage the inner surface of the inner portion 29 of the housing plate so as to limit outward movement of the hook bolt 16 relative to the bar. In addition, the upper surface of the shank 22 is provided with a finger 34 which forms an abutment effective to engage the inner end of the flange 25 so as to limit downward rocking movement of the hook bolt 16 substantially to the position illustrated in dotted lines in Figure 3.

At the inner side of the end plate 18 there are provided a pair of hook-shaped latch members 36 and 37. As illustrated in Figure 4, these members are mounted for rocking movement about

pivot pins 38 extending from the inner side of the end plate 18. A compression spring 40 engages under an arm 41 extending from the lever 36 and biases the lever toward the full line or locking position illustrated in Figure 4. The lever 37 is provided with a finger 43 which engages the finger 41 so that the compression spring 40 is effective to bias both levers 36 and 37 toward latching position. The finger 43 has an extension 45, as best seen in Figure 1, to facilitate manual release of the latch members. The lower portion of the latch members have inwardly extending hook portions 47 which are adapted to pass through openings 48 provided in the side portions 28 of the housing plate 27 and to underlie the shank 22 of the hook bolt 16. It will be apparent that pressure applied to the projection 45 of the latching member 37 will effect simultaneous release of the latch members 36 and 37.

When the latch members 36 and 37 are released, the weight of the hook 16 causes the same to rock downwardly substantially to the dotted line position illustrated in Figure 3. Further downward movement of the hook is prevented by the engagement between the shoulder 32, the finger 34 and the cooperating surfaces of the housing member 27 and the flange 25. At this time the interlocking elements 30 are located below and do not project substantially beyond the end of the bar structure. The bar may be moved to a position somewhat above the position which it is to occupy in use and the interlocking elements 30 may be moved outwardly to enter the openings 12 in the panel. Obviously, of course, the interlocking elements 30 at one end of the panel will be introduced first and thereafter the interlocking elements at the opposite end of the bar will be introduced. As the weight of the bar is permitted to come upon the hooks 16 it will cause the hooks to rock upwardly toward the full line position illustrated in Figure 3. This rocking motion is limited by engagement between the upper surface of the hook bolt 16 and the under surface of the flange 25. The weight of the bar thus retains the hook bolt 16 in the full line position, upward force being applied to the hook by the end portion 29 of the housing plate 27 and the underside of the opening 12 in the panel, the weight of the bar being transmitted to the hook through the flange 25. At this time and as the hook bolt 16 is rocked upward to the full line position shown in Figure 3, the latching members 36 and 37 are automatically caused to engage at the underside of the shank 22 of the hook bolt, thereby retaining the hook bolt firmly against further rocking movement until subsequently released by manipulation of the finger 45. However, latch members 36 and 37 permit continued longitudinal sliding movement of the hook bolt 16 relative to the bar so that no strain is placed upon the elements of the bar structure by relative approach and separation between the confronting apertured panels 11. At the same time the hook bolt 16 is firmly interlocked with the panels, since it will be observed that the upper ends of the interlocking elements 30 are located above the top of the openings 12.

When it is desired to release the crossbar structure it is only necessary to press down upon the finger 45, thereby releasing both of the latch members 36 and 37, thus permitting relative downward swinging movement of the hook bolt 16. This is accomplished by raising the end of the crossbar structure, which will force the hook bolt 16 to rock downwardly and will cause the

shaped end portion thereof to be withdrawn from the opening in the panel.

The drawings and the foregoing specification constitute a description of the improved crossbar structure in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. A cargo brace adapted to extend between and be anchored within a pair of aligned openings provided in spaced apart walls, including an elongated bar, means at opposite ends of said bar engageable in said openings comprising a support element, a fixed pivot support mounted on said bar inwardly of the adjacent end of said bar and underlying said element, said element being supported thereby for both sliding movement longitudinally of said bar with respect to said pivot support and pivotal movement about said pivot support, an abutment above said support element located intermediate said pivot support and the adjacent end of said bar to limit upward swinging of said support element, said support element being movable between a supporting position and a retracted position relative to an opening in one of said walls, said element having a hook shaped portion adapted when said element is in supporting position to project through and extend laterally beyond an edge of an opening in one of said walls, and a latch carried by said bar and engageable with said element for retaining said bar and element in supporting position.

2. A cargo brace adapted to extend between and be anchored within a pair of aligned openings provided in spaced apart walls, including an elongated bar, means at opposite ends of said bar engageable in said openings comprising a support element, a fixed pivot support mounted on said bar inwardly of the adjacent end of said bar and underlying said element, said element being supported thereby for both sliding movement longitudinally of said bar with respect to said pivot support and pivotal movement about said pivot support, an abutment above said support element located intermediate said pivot support and the adjacent end of said bar to limit upward swinging of said support element, said support element being movable between a supporting position and a retracted position relative to an opening in one of said walls, said element having a hook shaped portion adapted when said element is in supporting position to project through and extend laterally beyond an edge of an opening in one of said walls, and a spring pressed latch carried by said bar and engageable with said element for retaining said bar and element in supporting position.

3. An elongated cargo brace adapted to extend between and be detachably secured in selected openings in opposed walls of a vehicle, including an elongated bar provided at each end thereof with an element having a hook shaped end portion adapted to be inserted in an opening in one of said walls to anchor and support said bar relative to said walls, a fixed pivot support mounted on said bar inwardly of the adjacent end of said bar and underlying said element, said element being supported thereby for both sliding movement longitudinally of said bar with respect to said pivot support and pivotal movement about said pivot support, an abutment above said support element located inter-

mediate said pivot support and the end of said bar, and said bar being also provided adjacent each of said elements with a pivoted latch for latching engagement with the element adjacent thereto to hold said bar in anchored and supported relation with respect to said opposed walls.

4. An elongated cargo brace adapted to extend between and be detachably secured in selected openings in opposed walls of a vehicle, including an elongated bar provided at each end thereof with means adapted to be inserted in an opening in one of said walls to anchor and support said bar relative to said walls, the means at one end of said bar being an elongated element, a fixed pivot support mounted on said bar inwardly of the adjacent end of said bar and underlying said element, said element being supported thereby for both sliding movement longitudinally of said bar with respect to said pivot support and pivotal movement about said pivot support, an abutment above said support element located intermediate said pivot support and the adjacent end of said bar, said support element having a hook shaped portion adapted to project through and extend laterally beyond an edge of an opening in one of said walls, and a movable latch carried by said bar for latching engagement with said element to hold said bar in anchored and supported relation to said opposed walls.

5. An elongated cargo brace adapted to extend between and be detachably secured in selected openings in opposed walls of a vehicle, including an elongated bar provided at each end thereof with an elongated element having a hook shaped portion adapted to be inserted in an opening in one of said walls to anchor and support the bar relative to said walls, a fixed pivot support mounted on said bar inwardly of the adjacent end of said bar and underlying said element, said element being supported thereby for both sliding movement longitudinally of said bar with respect to said pivot support and pivotal movement about said pivot support, an abutment above said support element located intermediate said pivot support and the adjacent end of said bar, means cooperating with said elements to hold said bar in anchored and supported relation to said opposed walls, including spring biased movable latches carried by said bar adjacent the ends thereof and engageable respectively with said elements.

6. An elongated cargo brace adapted to extend between and be detachably secured in selected openings in opposed walls of a vehicle, including an elongated bar provided at each end thereof with means adapted to be inserted in an opening in one of said walls to anchor and support said bar relative to said walls, the means at one end of said bar being an elongated element, a fixed pivot support mounted on said bar inwardly of the adjacent end of said bar and underlying said element, said element being supported thereby for both sliding movement longitudinally of said bar with respect to said pivot support and pivotal movement about said pivot support, an abutment above said support element located intermediate said pivot support and the adjacent end of said bar, said support element having a hook shaped end portion adapted to project through and extend laterally beyond an edge of an opening in one of said walls, and a movable latch carried by said bar for latching engagement with said element to hold said bar in anchored and supported relation to said opposed walls.

7. An elongated cargo brace adapted to extend between and be detachably secured in selected openings in opposed walls of a vehicle, including an elongated bar provided at each end thereof with means adapted to be inserted in an opening in one of said walls to anchor and support said bar relative to said walls, the means at one end of said bar consisting of a single elongated element, a fixed pivot support mounted on said bar inwardly of the adjacent end of said bar and underlying said element, said element being supported thereby for both sliding movement longitudinally of said bar with respect to said pivot support and pivotal movement about said pivot support, an abutment above said support element located intermediate said pivot support and the adjacent end of said bar, said support element having a portion shaped to project through and extend laterally beyond an edge of an opening in one of said walls, and means cooperating with said element to hold said bar in anchored and supported relation to said opposed walls, including a movable latch carried by said bar for latching engagement with said element.

8. A load securing crossbar for interlocking engagement with a perforated side plate of a freight car or the like, comprising an elongated bar having a bolt mounted on and secured to an end portion thereof to extend longitudinally with freedom for limited longitudinal movement relative thereto and also freedom for angular movement in one plane only, a support element, a fixed pivot support mounted on said bar inwardly of the end of said bar and underlying said bolt, said bolt being supported thereby for both sliding movement longitudinally of said bar with respect to said pivot support and pivotal movement about said pivot support, an abutment above said bolt located intermediate said pivot support and the adjacent end of said bar, a hook on the outer end of said bolt adapted in an angular position thereof for insertion through a perforation in said side plate and for preventing disengagement therefrom in the non-angular position of the bolt, and means on said bar for restraining said bolt from angular movement.

9. The construction of claim 8 in which a latch member forms the restraining means for said bolt automatically engaging therewith when moved into non-angular position.

10. The construction of claim 8 in which a pair of pivotal latch members on opposite sides of said bolt form the restraining means therefor, automatically engageable therewith upon movement from angular to non-angular position.

11. The construction as in claim 10 provided at the upper end of said latch members with means for simultaneously moving the same to release the bolt.

12. A load securing crossbar for freight cars and the like having a perforated plate at one side thereof comprising a bar having an end bearing portion presenting spaced side faces, a top face and a bottom face spaced below and inward from the inner end of said top face, said bearing being open at its outer end and also at the bottom outward from said bottom face, and a bolt extending between said side faces below said top face and above said bottom face, said bolt having an upturned hook at its outer end and a detent at its inner end, the lat-

ter preventing outward withdrawal from between said top and bottom faces while permitting downward angular movement between said side faces to a position in which said hook is withdrawn within the length of said bar and is insertable through a perforation of said plate, and means automatically engaging said bolt when moved into non-angular position for restraining angular movement thereof while permitting a limited longitudinal movement, said hook in this position of the bolt interlocking with said perforated plate to prevent withdrawal of the bolt therefrom.

13. A load securing crossbar for the purpose described comprising a metallic beam having a horizontal web portion with a slot extending therein from one end thereof, a bolt within said slot having an upturned hook at its outer end, a housing secured to said web within said slot and forming a bearing for said bolt permitting a limited longitudinal movement thereof, and also downward movement into an angular position where said hook is within the length of said bar, and latch means mounted on said housing for automatically engaging said bolt when moved from angular to non-angular position and for restraining it in the latter position without interfering with said limited longitudinal movement thereof.

14. The construction as in claim 13 including a pair of latch members pivotally connected to said housing to extend respectively on opposite sides of said bolt, an operating portion of one of said latch members engaging the other member for simultaneously disengaging the same from said bolt, and resilient means for automatically engaging said latch members with said bolt.

15. A load securing crossbar for the purpose described comprising a metallic beam having a horizontal web portion with a slot extending therein from one end thereof, a bolt within said slot having an upturned hook at its outer end, a housing secured to said web and forming a bearing for said bolt permitting a limited longitudinal movement thereof, said housing including an end plate bifurcated to embrace said bolt and having a flange extending inward therefrom forming a top bearing for the bolt, a U-shaped member beneath and secured to said flange to extend on opposite sides of said bolt, the cross bar of the U being beyond the inner end of said flange and cut away for the passage of the bolt therethrough, the inner end of said bolt having a head portion for restraining withdrawal from said housing while permitting a limited longitudinal movement with respect thereto, a pair of latch hook members pivotally mounted on said plate to extend on opposite sides of said bolt into engagement therewith and to hold the same in horizontal position, and means for operating said latch members to release said bolt permitting the dropping of the same into angular position where said hook is within the length of said bar.

16. A construction as in claim 15 and in which the beam is of Z-bar cross section with the central web thereof extending horizontally.

17. An elongated cargo brace adapted to extend between and be detachably secured in selected openings in opposed walls of a vehicle, including an elongated bar provided at each end thereof with means adapted to be inserted in an opening in one of said walls to anchor and support said bar relative to said walls, the means

at one end of said bar being an element mounted on said bar for both sliding and pivotal movements, said sliding movement being lengthwise of said bar, said pivotal movement being in substantially a vertical plane, said element being provided at its outer end with a hook shaped portion adapted to be inserted in an opening in one of said walls, to anchor and support said bar relative to said walls, said bar having portions at the top, sides and bottom of said element for guiding said element during sliding movement thereof, the portions at the top and bottom of said element being engageable by one or more portions of said element to limit both downward and upward pivotal movement of said element, the portion at the bottom of said element being engageable by a part of said element to limit outward sliding movement of said element, and means operable to hold said element against downward pivotal movement, including a latch carried by said bar for latching engagement with said element, said latch cooperating with the portion aforesaid at the bottom of said element to assist in the guiding the said element during sliding movement thereof.

18. An elongated cargo brace adapted to extend between and be detachably secured in selected openings in opposed walls of a vehicle, including an elongated bar provided at each end thereof with means adapted to be inserted in an opening in one of said walls to anchor and support said bar relative to said walls, the means at one end of said bar being an element mounted on said bar for both sliding and pivotal movements, said sliding movement being lengthwise of said bar, said pivotal movement being in substantially a vertical plane, said element being provided at its outer end with a hook shaped portion adapted to be inserted in an opening in one of said walls to anchor and support said bar relative to said walls, said bar having portions at the top, sides and bottom of said element for guiding said element during sliding movement thereof, the portions at the top and bottom of said element being engageable by one or more portions of said element to limit both downward and upward pivotal movement of said element, and means operable to hold said element against downward pivotal movement, including a latch carried by said bar for latching engagement with said element.

19. An elongated cargo brace adapted to extend between and be detachably secured in selected openings in opposed walls of a vehicle, including an elongated bar provided at each end thereof with means adapted to be inserted in an opening in one of said walls to anchor and support said bar relative to said walls, the means at one end of said bar being an element mounted on said bar for both sliding and pivotal movements, said sliding movement being lengthwise of said bar, said pivotal movement being in substantially a vertical plane, said element being provided at its outer end with a hook shaped portion adapted to be inserted in an opening in one of said walls to anchor and support said bar relative to said walls, said bar having portions at the top, sides and bottom of said element for guiding said element during sliding movement thereof, the portions at the top and bottom of said element being engageable by one or more portions of said element to limit both downward and upward pivotal movement of said element, the portion at the bottom of said element being engageable by a part of said element to limit outward

sliding movement of said element, and means operable to hold said element against downward pivotal movement, including a latch carried by said bar for latching engagement with said element.

20. Structure as defined in claim 1 comprising a spring biasing said latch toward latching position and retaining said latch in the path of movement of said element from retracted to supporting position, said latch being displaceable by said element upon such movement to effect automatic latching of said element.

21. A cargo brace adapted to extend between and be anchored within a pair of aligned openings provided in spaced apart walls, including an elongated bar, means at opposite ends of said bar engageable in said openings comprising a support element mounted on said bar both for pivotal movement about an axis transverse to said bar between supporting and retracted positions relative to an opening in the adjacent wall and for sliding movement longitudinal of said bar, said element having a hook shaped end portion adapted to project through and extend laterally beyond an edge of an opening in the adjacent wall, and a latch carried by said bar and engageable with said element for retaining said element in supporting position relative to said bar.

22. A cargo brace adapted to extend between and be anchored within a pair of aligned openings provided in spaced apart walls, including an elongated bar, means at opposite ends of said bar engageable in said openings comprising an elongated support element mounted on said bar both for bodily pivotal movement about an axis transverse to said bar between supporting and retracted positions relative to an opening in the adjacent wall and for bodily sliding movement longitudinally of said bar, said element having a hook shaped end portion adapted to project through and extend laterally beyond an edge of an opening in the adjacent wall, and a latch carried by said bar and engageable with said element for retaining said element in supporting position relative to said bar.

23. A cargo brace adapted to extend between and be anchored within a pair of aligned openings provided in spaced apart walls, including an elongated bar, said bar having a transverse wall spaced inwardly from one end thereof, said wall having an opening therein, an abutment located above said opening and outwardly thereof, an elongated support element having a hook shaped outer end, a head at its inner end, and an intermediate shank both slidable and swingable in said opening, the head limiting outward sliding movement of said element, and said abutment limiting upward swinging movement of said element.

24. Structure as defined in claim 23 in which said abutment serves as the top closure of said opening and the inner edge of said abutment is located outwardly from said transverse wall, said

head being engageable with the bottom edge of said opening and with the inner edge of said abutment to limit downward swinging movement of said element when in its outermost position.

25. An elongated cargo brace adapted to extend between and be detachably secured in selected openings in opposed walls of a vehicle, including an elongated bar provided at each end thereof with an element having a hook shaped portion adapted to be inserted in an opening in one of said walls to anchor and support the bar relative to said walls, said element being mounted on said bar for both bodily sliding movement longitudinally of said bar and bodily swinging movement, and means cooperating with said elements to hold said bar in anchored and supported relation to said opposed walls, including spring biased movable latches carried by said bar adjacent the ends thereof and engageable respectively with said elements, said latches comprising a pair of members at opposite sides of said element pivoted to swing on said bar in planes transverse thereto and including hooks shaped to engage beneath said element.

26. An elongated cargo brace adapted to extend between and be detachably secured in selected openings in opposed walls of a vehicle, including an elongated bar provided at each end thereof with an element having a hook shaped portion adapted to be inserted in an opening in one of said walls to anchor and support the bar relative to said walls, said element being mounted on said bar for both bodily sliding movement longitudinally of said bar and bodily swinging movement, and means cooperating with said elements to hold said bar in anchored and supported relation to said opposed walls, including spring biased movable latches carried by said bar adjacent the ends thereof and engageable respectively with said elements, said latches comprising a pair of members at opposite sides of said element pivoted to swing on said bar in planes transverse thereto and including hooks shaped to engage beneath said element, one of said members having an operating arm thereon for swinging said member to release said element, and cooperating means on said members effective to swing said other member to release position upon corresponding movement of said one member.

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