Dec. 13, 1960 R. C. SCHROEDER 2,963,992

FREIGHT BRACING STRUCTURE

Filed Sept. 27, 1956

2 Sheets-Sheet 1

FIG. 1

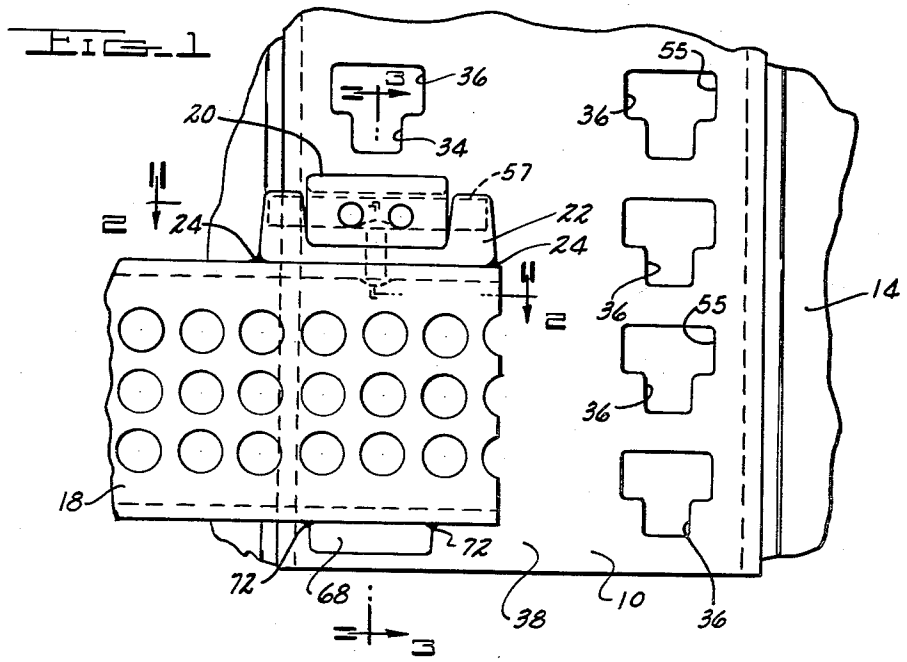



FIG. 2

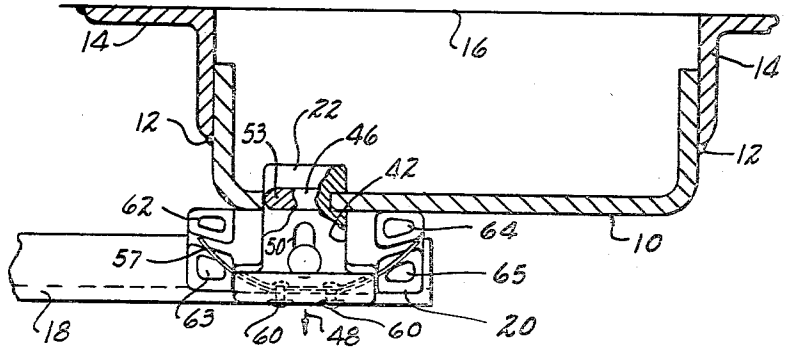
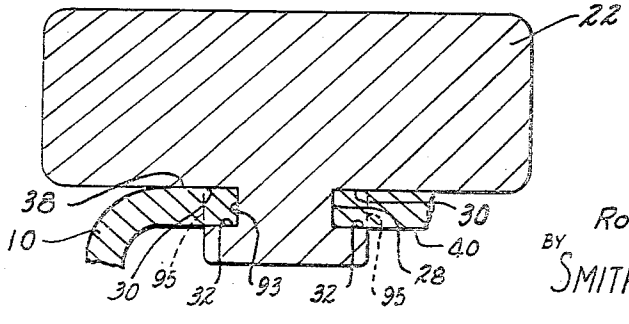



FIG. 8




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FIG. 3

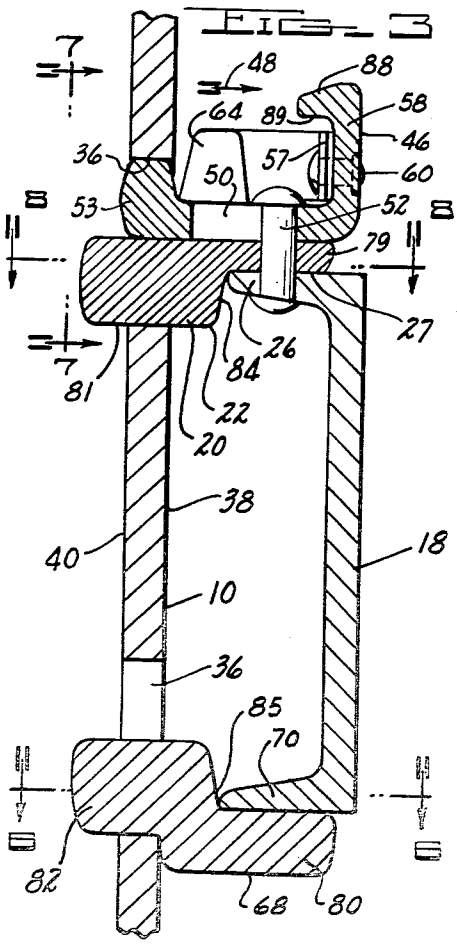



FIG. 7

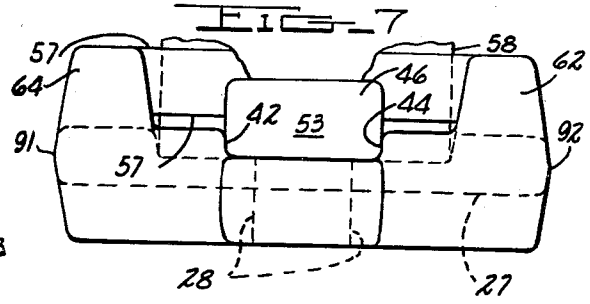



FIG. 4

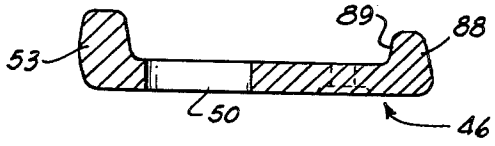



FIG. 5

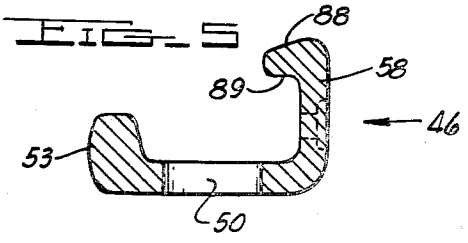
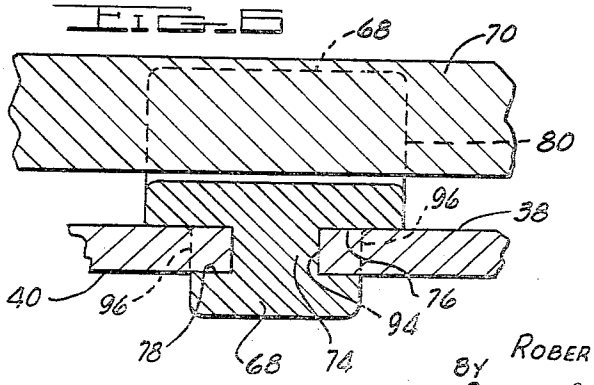



FIG. 6




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# FREIGHT BRACING STRUCTURE

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9 Claims. (Cl. 105—369)

This invention relates to freight bracing apparatus of the type which includes a plurality of horizontal rail members positioned along opposite walls of a freight-storage area; the purpose of the rail members being to mount horizontal freight-supporting cross members at various positions of vertical and horizontal adjustment.

Objects of the invention are singly and collectively to provide rail members of the above-mentioned type wherein:

(1) the rail members are releasably locked adjacent the storage area walls by an economically constructed locking mechanism,

(2) the locking mechanism is of such design as to require minimum machining operations in the formation of its component parts,

(3) the locking mechanism is of such design as to enable formation of its component parts by economical forging operations,

(4) the locking mechanism employs a spring mechanism which is shielded by portions of the locking mechanism against inadvertent damage or displacement,

(5) the locking mechanism is of such design that it is easily disengaged from its "locked" position with a minimum likelihood of "parts jamming,"

(6) the locking mechanism is of such construction that in the locked position there is no "play" or movement of the rail member.

Other objects of this invention will appear in 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.

In the drawings:

Fig. 1 is an elevational view of a horizontal rail member locked against a vertical stationary member by a locking mechanism constructed according to the present invention.

Fig. 2 is a plan view of the Fig. 1 mechanism with parts broken away along lines 2—2 in Fig. 1.

Fig. 3 is an enlarged sectional view on line 3—3 in Fig. 1.

Fig. 4 is a sectional view through a latch element employed in the Fig. 1 embodiment, taken prior to its being bent into its final configuration.

Fig. 5 is a sectional view of the Fig. 4 element after being bent to its final configuration.

Fig. 6 is a sectional view on line 6—6 in Fig. 3.

Fig. 7 is a fragmentary view on line 7—7 in Fig. 3 but with parts removed for illustration purposes.

Fig. 8 is a sectional view on line 8—8 in Fig. 3.

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.

In the drawings there is shown a vertical support member or pillar structure 10 which is welded at 12 to two vertical angle members 14. Members 14 are in turn fixedly secured to wall 16 of a railroad freight car or other similar freight storage structure.

Positioned parallel with wall 16 is a rail member 18 which corresponds in structure and function with rail member 5 shown in copending application, Serial No. 564,445, filed February 9, 1956. In practice of the invention rail member 18 is releasably secured at both of its ends on two support members 10, only one of which is shown in the drawings.

Securement of member 18 on member 10 is effected by locking mechanism 20. Mechanism 20 includes a catch element 22 welded at 24 to flange 26 of member 18, with surface 27 of element 22 seated on the upper face of flange 26. Element 22 is provided with a narrow neck portion 28 which forms two shoulder portions 30 and 32. In the "locked" position of the locking mechanism neck portion 28 seats within an opening 34, which actually constitutes one portion of a larger keyhole opening 36; shoulder portions 30 and 32 seat against opposite faces 38 and 40 of member 10 so as to anchor element 22 against movement at right angles to surfaces 38 and 40.

Element 22 is centrally recessed on its upper face to provide two shoulder portions 42 and 44. These shoulder portions serve as guide surfaces for insuring straight line movement of a latch element 46 in the arrow 48 direction. Element 46 is provided with a slot 50, and a headed pin in the form of a rivet 52 projects from element 18 through element 22 and slot 50 so as to prevent removal of element 46 from element 22 while allowing the arrow 48 movement.

Element 46 includes an enlarged end portion 53 which is adapted to be positioned within an opening 55. Opening 55 constitutes the enlarged portion of keyhole opening 36 not occupied by neck portion 28. In order to retain end portion 53 within opening 55 there is provided a leaf spring 57. The central portion of spring 57 is secured to the upturned portion 58 of element 46 by means of rivets 60. The end portions of spring 57 are positioned between the shoulder-forming projections 62 through 65 formed as integral parts of element 22. The positionment of spring 57 between projections 62 through 65 causes the spring to urge element 46 to its Fig. 3 position with the right end of slot 50 abutting against the right surface of rivet 52.

In order to most rigidly hold member 18 in position adjacent member 10 a catch element 68 is carried on the lower face of flange 70; said element 68 being welded to flange 70 as at 72. Element 68 includes a narrow neck portion 74 which is adapted to be received within the smaller portion 34 of any of the T-shaped keyhole openings 36. Neck portion 74 serves to define shoulder portions 76 and 78 which are adapted to seat against surfaces 38 and 40 of member 10 so as to anchor element 22 against movement at right angles to surfaces 38 and 40.

Both of catch elements 22 and 68 have their channel-engaging portions 79 and 80 offset from their member 10-engaging portions 81 and 82 so as to form shoulders at 84 and 85. These shoulders serve to accurately position catch elements 22 and 68 on member 18 prior to their being welded in place; as a result member 18 is insured of taking its correctly designed position with respect to member 10. The operation of locking rail 18 in its illustrated position is accomplished by initially moving rail 18 toward members 10 and causing enlarged portions 81 and 82 to be moved through openings 55;

during this operation enlarged portions 53 strike surfaces 38 above openings 55 and spring 57 yields to permit entrance of portions 81 into openings 55 without interference from enlarged end portions 53. The locking operation is completed by allowing rail 18 to drop downward so as to put neck portions 28 and 74 within openings 34; enlarged end portion 53 automatically snaps into opening 55 under the influence of spring 57.

The operation of unlocking rail 18 is accomplished by manually withdrawing element 46 from its Fig. 3 position in the arrow 48 direction; this withdrawing operation is facilitated by the provision of a lip portion 88 on element 46, said lip portion forming an interior surface 89 which can be readily engaged by the workman's fingers to prevent them from slipping out of engagement with upturned portion 58. Lip portion 88 also serves to shield spring 57 from inadvertent damage or displacement, it being appreciated that rails 18 encounter rough handling and tumbling about during use. After end portion 53 is out of opening 55 rail 18 is raised to put portions 81 and 82 within openings 55; thereafter rail 18 is moved horizontally away from surface 10 to complete the unlocking operation.

The design of elements 22 and 46 is such that element 46 is smoothly guided in its movement by surfaces 42 and 44. The direction and manner in which element 46 is moved insures against element 46 inadvertently becoming "jammed" in the locked position or inadvertently shifting out of the locked position except under manual pressure against wall portion 58.

The design of elements 22 and 68 is such that said elements can be economically formed by forging operations; very little machining operations are required. In this connection it will be noted that the side surfaces of element 22 and its projections 62 through 65 are tapered slightly from a straight line through points 91 and 92 (see Fig. 7). This surface tapering, together with the inherent "non-crevice" design of element 22, permits formation of the element by a forging operation. However, in order to insure an accurate "snug" fit between elements 22, 68 and 10 surfaces 30, 32, 93, 76, 78 and 94 are machined; for this reason the forged pieces 22 and 68 initially include the surfaces indicated by dotted lines 95 and 96, the neck portions 28 and 94 being subsequently formed by machining operations.

The design of element 46 is such that it can be formed by forging and bending operations. Initially the element is forged to the Fig. 4 configuration, and subsequently the element is bent into the Fig. 5 configuration.

I claim:

1. Freight bracing structure comprising a stationary member having two opposite faces and a keyhole opening extending therebetween; a rail member adjacent one face of the stationary member; a catch member projecting from the rail member through the smaller portion of the keyhole opening; said catch member including a relatively narrow neck portion engaging the side walls defined by the narrow portion of the keyhole opening and relatively wide shoulder portions engaging opposite faces of the stationary member whereby to prevent any play of the catch member in the opening; and a reciprocably mounted latch element positioned adjacent the catch member for movement into and out of the larger portion of the keyhole opening; said latch element being of such size and placement as to prevent separation of the rail member from the stationary member when it is located within the larger portion of the keyhole opening.

2. Freight bracing structure comprising vertical stationary mechanism having two horizontally spaced openings at substantially the same level along one wall of a freight storage area; each of said openings including a relatively large opening portion and a relatively small opening portion; an elongated horizontal rail member extending parallel to said one wall between said openings; catch elements immovably projecting from the rail member through respective ones of the openings; said catch elements having narrow neck portions seated in the small opening portions and enlarged end portions in anchoring engagement with face portions of the stationary mechanism remote from the rail member; latch elements movably carried by the rail member adjacent respective ones of the catch elements; and spring means urging the latch elements horizontally into the stationary mechanism, whereby to prevent removal of the rail member from its position adjacent the stationary mechanism except when the latch elements are withdrawn from the stationary mechanism against the action of the spring means; said latch elements terminating adjacent the outer limits of the rail member in the latched position so as not to unduly project into the freight storage area.

3. Freight bracing structure comprising a stationary member having an opening formed therein; said opening including a relatively large opening portion and a relatively small opening portion; a rail member adjacent the stationary member; a catch element projecting from the rail toward the stationary member; said catch element having a relatively narrow neck portion projecting through the small portion of the opening and having an enlarged end portion in anchoring engagement with the face of the stationary member remote from the rail member; a latch element slidably positioned on one face of the catch element and having a slot extending in the direction of its movement; a headed pin projecting from the catch element through the slot; said catch element being provided with an integrally formed shoulder portion projecting from said one face along one side surface of the latch element whereby to guide said latch element in its slidable movement; and spring means urging the latch element into the large portion of the stationary member opening, whereby to prevent removal of the rail member from its position adjacent the stationary member except when the latch element is withdrawn from the opening against the action of the spring means.

4. The combination of claim 3 wherein the end of the latch element remote from the opening is turned in a direction away from the catch element and then parallel thereto whereby to form a hand-engageable portion for facilitating easy withdrawal of the latch element out of the opening.

5. The combination of claim 4 wherein the catch element is provided with a pair of integrally formed projections extending from said one face at each side of the latch element; and the spring means includes a bowed leaf spring secured at its center portion to the turned portion of the latch element and having its end portions positioned between the projections in each pair so as to exert a force tending to flatten the leaf bow and thereby cause the center portion to be biased toward the rail member opening.

6. Freight bracing structure comprising a stationary member having first and second vertically spaced openings formed therein; each of said openings including a relatively large opening portion and a relatively small opening portion; a horizontal channel member positioned adjacent the stationary member with its web portion parallel with the plane of the openings and with its flange portions extending toward said stationary member; a first catch element carried on the upper flange portion of the channel member and projecting toward the stationary member; said first catch element having a relatively narrow neck portion projecting through the small portion of the first opening and having an enlarged end portion in anchoring engagement with the face of the stationary member remote from the channel member; a second catch element carried on the lower flange portion of the channel member and projecting toward the stationary member; said second catch element having a relatively narrow neck portion projecting through the

small portion of the second opening and having an enlarged end portion in anchoring engagement with the aforementioned remote face; a latch element movably carried on the upper face of said first catch element; and spring means urging the latch element into the large portion of the first opening, whereby to prevent removal of the channel member from its position adjacent the stationary member except when the latch element is withdrawn from said first opening against the action of the spring means.

7. The combination of claim 6 wherein each of the catch elements includes an integrally formed shoulder portion seated against the edge of the adjacent flange portion whereby to accurate locate the rail member with respect to the stationary member.

8. The combination comprising a vertical freight storage area wall; pillar means thereon having two horizontally spaced vertical rows of openings; a horizontal elongated rail extending between said rows of openings parallel to the storage area wall; catch elements extending from said rail, and including narrow neck portions locatable within selected openings in each row and laterally directed catch wall portions engageable with surfaces of the aforementioned pillar means remote from the rail to prevent direct horizontal movement of the rail away from the storage area wall; the neck portions of said catch elements within the openings being of lesser lateral dimension than the openings to enable the rail to be shifted parallel with the storage area wall for putting the catch elements in positions susceptible to being withdrawn horizontally through the openings by movement of the rail on which they are carried; and manually operable reciprocable latch elements movably carried by said rail for projection into and out of selected openings to releasably retain the catch elements in positions preventing the aforementioned shifting movement of the rail parallel to the storage area wall; said latch elements extending from the rail in the direction of the storage area wall substantially lesser distances than the catch elements, whereby the rail can be installed at vertically adjusted positions along the storage area wall by a simple horizontal thrusting movement thereof to place the catch elements within selected openings without obstruction by the latch elements and without need for manual retraction of the latch elements; said latch elements having their manual actuator portions located substantially within the vertical confines of the rail in the latched positions so as not to project unduly into the freight storage area.



9. The combination comprising a vertical freight storage area wall; pillar means thereon having two horizontally spaced vertical rows of openings; a horizontal elongated rail extending between said rows of openings parallel to the storage area wall; two catch elements extending from said rail adjacent each end thereof so as to be introduced through selected openings in each row; each catch element including a narrow neck portion locatable within a selected opening and a laterally extending catch wall portion engageable with a surface of the aforementioned pillar means remote from the rail so as to provide a rigid four point seating of the rail on the pillar means and to prevent direct horizontal movement of the rail away from the storage area wall; the portions of said catch elements within the openings being of lesser vertical dimension than the vertical dimensions of the openings to enable the rail to be shifted upwardly for putting the catch elements in positions susceptible to being withdrawn horizontally through the openings by movement of the rail on which they are carried; and a manually operable reciprocable latch element movably carried by said rail adjacent each end thereof for projection into and out of selected openings to releasably retain the catch elements in positions preventing the aforementioned upward shifting movement of the rail; said latch elements extending from the rail in the direction of the storage area wall substantially lesser distances than the catch elements, whereby the rail can be installed at vertically adjusted positions along the storage area wall by a simple horizontal thrusting movement thereof to place the catch elements within selected openings without obstruction by the latch elements and without need for manual retraction of the latch elements; said latch elements having their manual actuator portions located substantially within the vertical confines of the rail in the latched positions so as not to project unduly into the freight storage area.


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