March 20, 1973 D. M. SCHMIDT 3,721,200

FREIGHT RESTRAINING BAR

Filed April 2, 1971 2 Sheets-Sheet 1

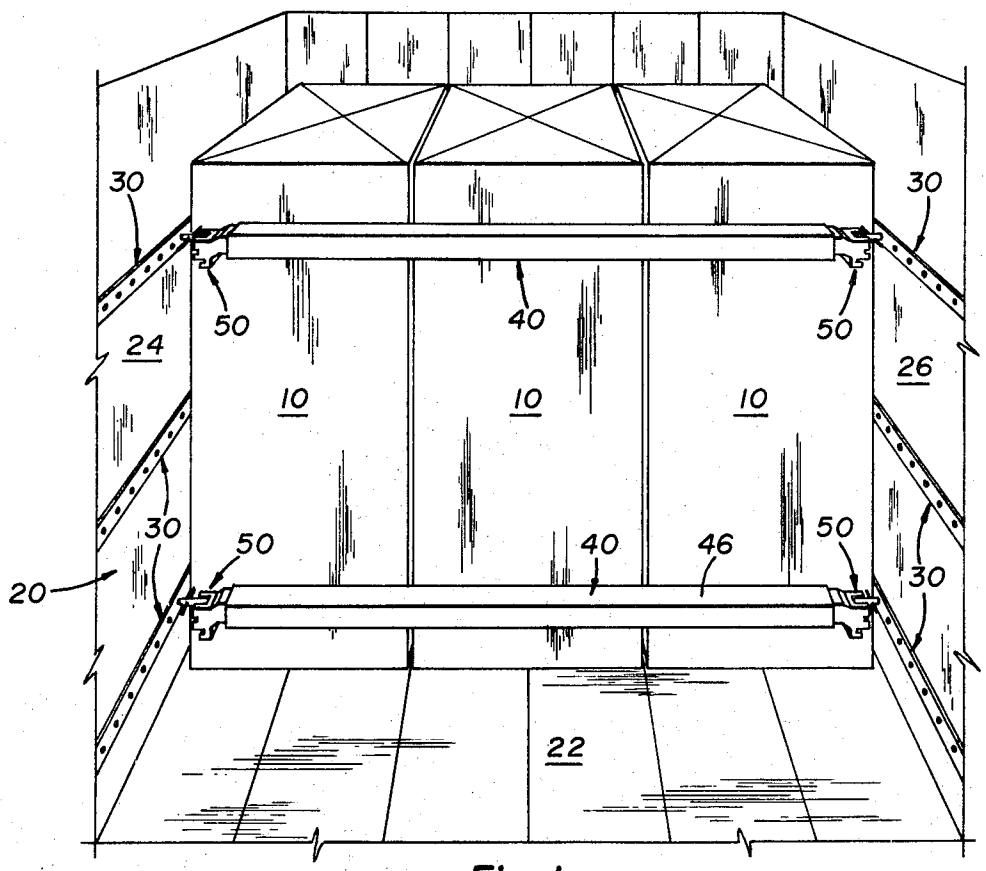


Fig. 1

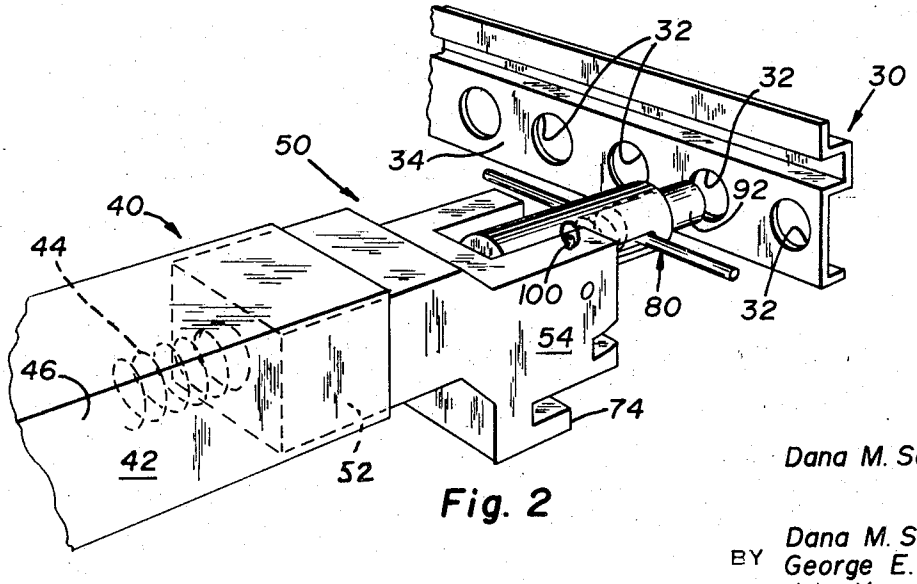


Fig. 2

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FREIGHT RESTRAINING BAR

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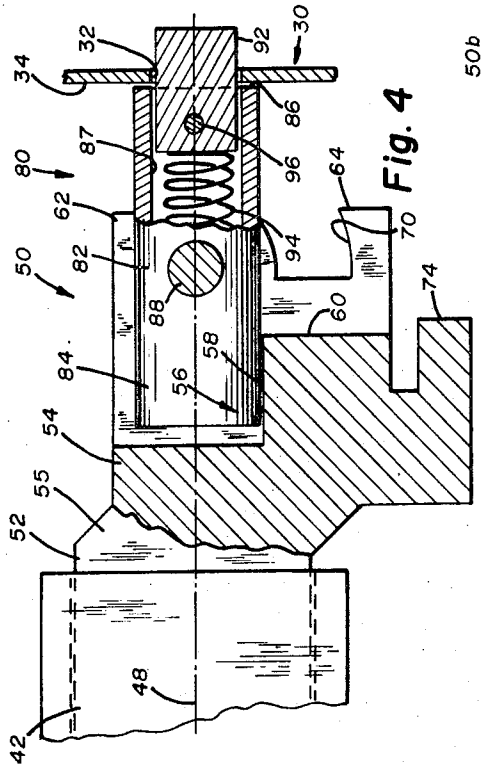


Fig. 4

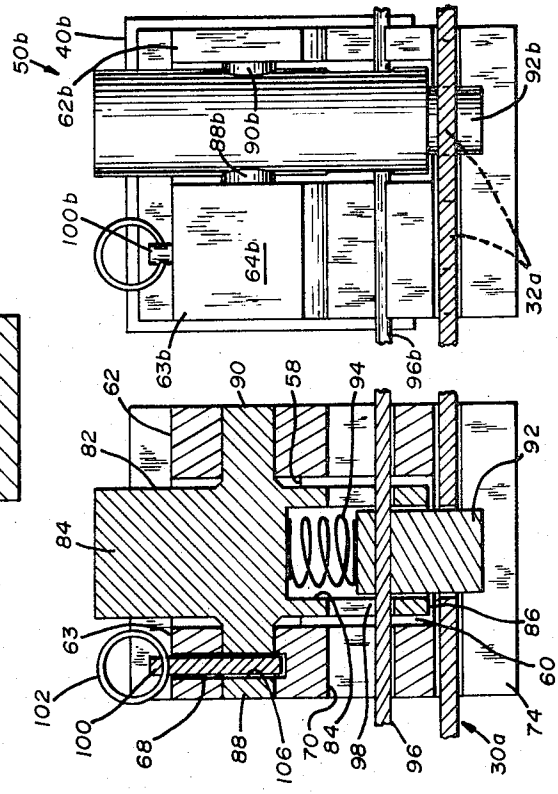


Fig. 7

Fig. 6

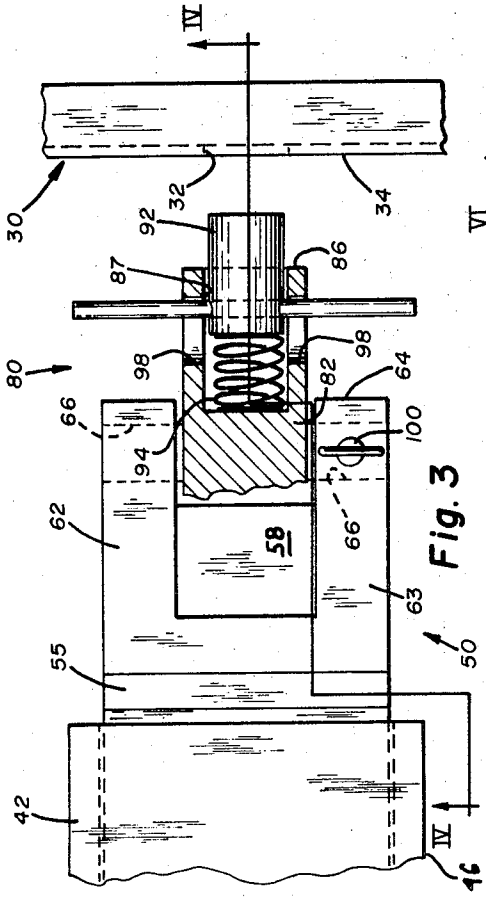


Fig. 3

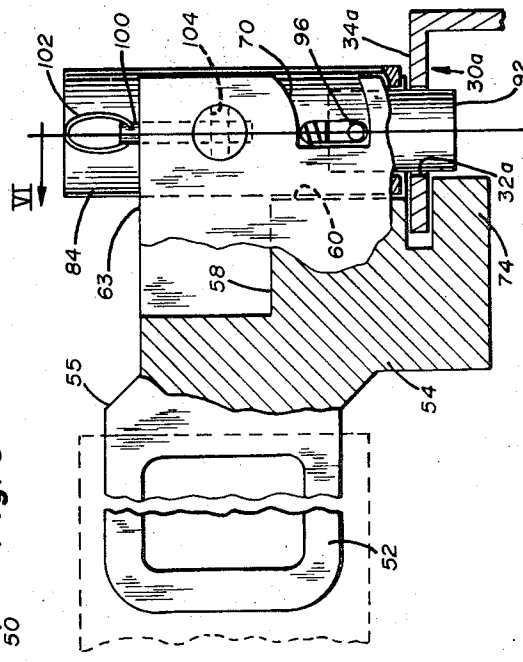


Fig. 5

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FREIGHT RESTRAINING BAR

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Int. Cl. B61d 45/00; B60p 7/16
U.S. Cl. 105—369 B 25 Claims

ABSTRACT OF THE DISCLOSURE

A freight-restraining bar and head wherein a single rail-engaging member is used to connect the head with two different, alternatively used, securing means in the freight chamber. The rail-engaging member is pivoted to rotate between the two positions it must take to penetrate the two differentially oriented securing means. Locking provisions are provided to prevent accidental dislodging of the heads, once engaged.

BACKGROUND OF THE INVENTION

In the shipment of freight there has long been the need for restraints to hold the freight from movement in the chamber carrying the freight, during transit. Conventionally, this is most commonly accomplished by the use of rigid restraining bars which are clamped to, or engaged by, securing rails attached to the walls of the chamber, such as a freight car. In the railroad industry, the ends of the bars which accomplish this engagement are called "heads," and many attempts have been made to design an adequate head. Difficulties in these designs arise from the fact that the various different railroads have different types of securing rails totally lacking in uniformity. Copending U.S. patent application Ser. No. 79,583 filed Oct. 9, 1970, entitled "Cargo Restraining Bar," now abandoned and refiled as Ser. No. 255,872 on May 9, 1972, having a common assignee with the instant application, depicts a number of such rails. Until relatively recently, the approach to this nonuniformity was to provide a different head for each different type of rail. At the railroad loading yards, these heads and their bars often are stored with others of different types, the resulting mixture creating search problems when still another different type of freight car has to be loaded.

Thus there has long been a need for a so-called "universal" head for use in most, if not all, railroad freight restraining bars. Because of the nonuniformity of the rails, attempts to provide such a head in the past have resulted in rather bizarre and complicated structures. Such complicated structure is expensive to manufacture and difficult to use. One example of such structure is shown in U.S. Pat. No. 2,725,826. More recently, simplification has been provided by the head disclosed in the aforesaid patent application, wherein two simplified, albeit separate, means are used to engage either a vertically-faced rail or a horizontally-faced rail. As most rails are so structured, universality is thus achieved.

SUMMARY OF THE INVENTION

This application concerns a freight restraining bar and the heads for the bar wherein the same engaging member is utilized to engage two different types of rails. More specifically, there is provided a freight restraining bar having a head for connecting the bar to either of at least two different, alternatively used securing means mounted as part of the wall of a freight chamber, the head comprising an engaging member for removably engaging the head with either one of the securing means, and means for alternatively and removably positioning that same engaging member within the head so as to permit the engaging member to engage either of the securing means, depending upon which one is used in that freight chamber. A convenient construction is a pivotal mounting of a single spring-biased pin so as to pivot it substantially 90° within the head, thus permitting engagement with either a horizontally-faced rail or a vertically-faced rail.

Accordingly, it is an object of the invention to provide a freight restraining bar and head capable of engaging most of the securing rails used in freight chamber, by the manipulation of the same member in the head in each case.

Another object of the invention is to provide such a bar and head which will be usable on the majority of freight cars provided by the various railroads in the shipment of freight.

It is a related object of the invention to provide such a bar and head wherein the engagement with the different rails requires the manipulation of only a single engaging pin.

It is a further object of the invention to provide such a bar and head wherein the construction insures that the engaging member will be locked in engagement until removal is desired.

Other objects and advantages will become apparent upon reference to the following drawings and detailed discussion.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary, perspective view of one end of a freight car utilizing the railroad restraining bar of the invention;

FIG. 2 is a fragmentary, somewhat schematic perspective view of a bar and head constructed in accordance with the invention, about to connect to one type of rail;

FIG. 3 is a fragmentary plan view, partly in section, of the bar and rail shown in FIG. 2;

FIG. 4 is a fragmentary sectional view taken along the line IV—IV of FIG. 3;

FIG. 5 is a fragmentary side elevational view, partly in section, similar to FIG. 4 but illustrating the bar and head as they are used on a different type of securing rail;

FIG. 6 is a fragmentary, sectional view taken generally along the line VI—VI of FIG. 5; and

FIG. 7 is a fragmentary end view partly in section, similar to FIG. 6 but illustrating a different embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As used throughout this application, "horizontal," "vertical," "upwardly," "downwardly," and "outwardly" means orientations of the element in question during actual use of the freight-restraining member to restrain shipped freight.

The invention relates to an improved freight-restraining member for securely holding cargo in transporting vehicles such as railroad cars. More specifically, referring to FIG. 1, the invention is shown as a means of restraining boxed cargo **10** from movement within a railroad freight car chamber **20** comprising a floor **22**, two generally vertical walls **24** and **26**, and a ceiling (not shown). The restraining members **40** are positioned strategically at the top and bottom of the cargo and engage securing means **30** mounted along or as part of the walls **24** and **26**. Conventionally, the securing means **30** comprise rails with generally circular holes **32** therein, and as shown in FIGS. 1 and 2 rails **30** are of the type which have a generally vertically oriented cross-section. The holes **32** are in a vertical face **34** thereof, the center lines of the holes **32** extending substantially horizontally. A completely equivalent construction utilizes a freight chamber wherein

the walls themselves are perforated, thus avoiding the need for the attachment of securing rails **30** thereto. However, both the perforated wall and the vertically-faced rails **30** are to be contrasted with other different rails, such as horizontally faced rails, which are alternatively used to the exclusion of rails **30** in other freight chambers, generally those owned by other railroad lines.

Turning now particularly to FIGS. 2–4, the restraining members **40** comprise a restraining portion or bar **42** which is generally hollow, a rail-engaging head **50** at either end of the bar **42**, and conventionally the member **40** includes means such as a compression spring **44** biasing at least one of the heads by pressing the tail **52** of the head outwardly away from the bar. This latter relationship is schematically illustrated in FIG. 2. The bar **42** is provided with generally flat freight-abutting surfaces **46**, and conveniently the bar **42** is constructed with at least one order of symmetry about a central axis **48** (FIG. 4).

In accordance with one aspect of of the invention, each head **50** comprises the tail portion **52**, a frame portion **54**, a saddle stop portion **56** (FIG. 4), a locking flange **74**, a pivotally-mounted rail-engaging member **80**, and a locking pin **100**. The tail portion **52** conveniently is machined or otherwise formed to have an I-bar configuration, as shown in FIG. 5. The frame portion **54** is generally cubical in shape, except where especially formed as hereafter described, and is integrally connected to the tail portion by a neck **55**.

Turning now to FIGS. 3 and 4, the saddle stop portion **56** comprises a generally horizontal stop shoulder **58** centrally formed within the frame portion **54** and opening upwardly, and an adjacent vertical stop shoulder **60** also centrally formed and opening outwardly. The remaining part of the frame portion **54** comprises upstanding sides **62** and **63** which terminate in the extreme outer end surfaces **64** of the head **50**. To removably alter the positioning of the rail-engaging member **80**, these sides **62** and **63** are provided with co-axial, generally circular openings **66** which are drilled, machined, or otherwise formed therein, for pivotally accommodating the rail-engaging member as described below. A smaller hole **68** is also drilled at the top of side **63** for the locking pin, also hereinafter described (see FIG. 6). The extreme end surfaces **64** of the sides **62** and **63** are formed with a groove **70** (FIG. 4), shaped as a portion of an arc, to accommodate the movements of the handle of the rail-engaging member.

Depending from the bottom of the frame portion **54** is locking flange **74**, which extends generally horizontally and is spaced from the frame portion a distance sufficient to accommodate a horizontally faced rail, as described hereinafter.

Turning now to the rail-engaging member **80**, this comprises a pivotal mounting member **82** which is conveniently cast or machined as a round pin solid at one end **84** and open at the other end **86** (FIG. 3). The opening in end **86** comprises a hole **87** centrally formed therein extending approximately half-way back of the mounting member **82**. Further, the member **80** includes two pivot pins **88** and **90** preferably welded to the solid end **84** and extending generally horizontally therefrom (FIG. 6), a single rail-engaging pin **92**, and a compression spring **94** biasing the pin **92** outwardly from the mounting member. A handle pin **96** conveniently is inserted through the engaging pin **92**, and to permit the handle pin to be withdrawn relative to the mounting member **82**, openings **98** (FIG. 3) are formed in the latter. The engaging pin **92** bears generally the same cross-sectional circular shape and a size slightly smaller than, that of the holes **32** in the rail **30** into which the pin is to be inserted.

Referring now particularly to FIG. 4, it will be apparent that, to engage the rail **30**, the head **50** is operated by pivoting the engaging member **80** on its pivot pins **88** and **90** until the mounting member **82** stops with its end **84** abutting against the stop shoulder **58**. In this position, the member **80** is angularly oriented so as to line up the pin **92** with the center line of the holes **32** of the rail, permitting insertion therein. To complete the engagement, the end **86** of the mounting member rests against the vertical exposed face **34**, being biased thereagainst by the action of spring **44**. The spring **94** serves to bias the pin **92** outwardly towards the rail **30** and wall, thus maintaining pin **92** in engagement with the rail **30**. To disengage the head, handle pin **96** and pin **92** are simply pulled back against the bias of the spring **94**.

The rail-engaging member **80** is held in its generally horizontal, angular position as shown in FIG. 4 by means of the locking pin **100**, the pin itself being shown in greater detail in FIG. 6. A ring **102** is mounted in the head of the pin for easy handling, and a chain (not shown) may permanently attach the pin **100** to the head to prevent loss when the pin is disengaged. To permit the pin **100** to penetrate in a locking manner the pivot pin **88**, the latter is drilled with two perpendicularly oriented holes **104** and **106** (FIGS. 5 and 6). Hole **104** is perpendicular to the axis of engaging pin **92**, and accordingly it encompasses pin **100** when the latter is inserted into the pivot pin **88** to lock member **80** in the generally horizontal position shown in FIG. 4. Hole **106** is used to lock member **80** in the other, generally vertical position described hereafter in connection with FIG. 6.

As shown, the stop preventing improper rotation of the mounting member **82** beyond the two positions wherein the pin **92** is operable to engage either of the two rails, comprises the stop shoulders **58** and **60**. The construction of the head **50** has dispensed with a separate hook for "locking" onto the vertically faced rail **30**. Since the pivot pins **88** and **90** are between the stop shoulders and the extreme end surface **64** of the head **50** beyond which pin **92** extends as shown in FIG. 4, it is necessary that forces causing the restraining bar **40** to rotate about pin **92** be stabilized, as otherwise mounting member **82** would tend to rotate clockwise (FIG. 4) out of its horizontal position. For this reason, the pivot pins **88** and **90** must be mounted with their pivot axes lying no lower than a horizontal plane extending through the central axis **48**. In this arrangement, any moment of force due to horizontal load forces acting on the freight restraining portion **42** also tend to "lock" the mounting member **82** in its position in FIG. 4 with end **84** against shoulder **58**, thus preventing accidental disengagement of the pin **92** from the rail.

Elimination of this moment of force will even further reduce the risk of twisting of the bar to the point at which clockwise rotation of member **80** (FIG. 4) causes it to disconnect from the rails. To this end, pivot pins **88** and **90** are preferably, but not exclusively, mounted with their pivot axes lying in the above described horizontal plane. This provides the further advantage of reducing the length of pin **92** which otherwise would be needed.

It will be readily appreciated that an equivalent construction can be provided by pivoting the mounting member **82** so that the shoulder **58** is downwardly directed and positioned between the pivot pins and the end surface **64**. In that case, the pivot axes of the pins **88** and **90** must not be any higher than the horizontal plane through the axis **48**.

Turning now to FIGS. 5 and 6, an alternative form of the wall securing means is illustrated, which form is characterized by having its operative face horizontally oriented. Parts similar to those previously described bear the same reference numeral to which the distinguishing suffix "*a*" has been added. Thus rail **30***a* which is part of the chamber walls is characterized by an angle of which its operative face **34***a* is horizontal and directed upward. Holes **32***a*, therefore, have center lines which extend generally vertically (not shown). Therefore, the center lines of holes **32***a* define an angle of substantially 90° with respect to the generally horizontal orientation of the center lines of holes **32** in rail **30**. It is this vertical orientation of holes **32***a* with which mounting member **52** and pin **92** must be colinear, if the head **50** is to en-

gage the rail **30***a*. This is accomplished from the horizontal orientation illustrated in FIG. 4 in the following manner. Locking pin **100** is removed, and pin **92** disengaged from rail **30**. If the restraining member **40** is to be transferred to a freight car provided with rails **30***a*, then prior to attempting engagement therewith the mounting member **82** is pivoted substantially 90° upon its pivot pins **88** and **90**. Stop shoulder **60** prevents the pivoting rotation from carrying the member **82** and the pin **92** beyond a generally vertical position (FIG. 5). The handle pin **16** moves into the groove **74**, which is cut sufficiently wide to permit the handle pin to reciprocate within the member **82**. When engaging pin **92** is lined up with the desired hole **32***a*, handle pin **96** is released (FIG. 5) and spring **94** biases the pin **92** downwardly towards the floor and the rail **30***a*. The horizontally extending rail **30***a* is thus engaged within the space defined by the flange **74** and the bottom of frame portion **54**, the flange extending under the rail. Flange **74** serves to resist any unlocking rotation of the restraining member **40** which might be caused by load forces acting against the bar **42**. The final locking of the member **40** and the head **50** in the position shown in FIGS. 5 and 6 is accomplished by inserting pin **100** into the side **63** and through the hole **106** in the pivot pin **88**.

It will be appreciated that an equivalent construction of rail **30***a* is one in which it is an integral, unitary part of the chamber walls, face **34***a* constituting the upwardly-directed side of a shoulder projecting integrally from the wall.

Thus, the above-described structure results in the same mounting member **82** and a single engaging pin **92** being used to engage two different, alternatively used, securing rails **30** and **30***a*, by pivoting the mounting member **82** between its two operative positions. A further advantage of the above construction is that, when member **82** is in the angular position shown in FIGS. 5 and 6, there is no portion of the head **50** which projects down far enough as to interfere with outwardly projecting portions of rail **30***a* which commonly exist at freight car door openings.

FIG. 7 illustrates an alternate embodiment which permits the so-called "pitch splitting" function. Parts similar to those previously described bear the same reference numeral to which the distinguishing suffix "*b*" is applied. Thus, the head **50***b* is identical with previous construction except that it is not symmetrical about the center axis of the restraining bar. Rather, it can be described as being right-handed as its "right" (as seen looking outwardly away from end surface **64***b*) side **63***b* is thicker than side **62***b*, pivot pins **88***b* and **90***b* being adjusted in length accordingly. The precise amount of greater thickness is that which positions engaging pin **92***b* so as to fall half-way between holes **32***a* from the position pin **92** would take if mounted as in FIG. 6. Thus, with the head at the other end of member **40***b* (not shown) being a "left-handed" head, if the load is not tightly held when the pin **92***b* is positioned in the last possible hole **32***b* given the load configuration, the restraining member **40** need only be rotated 180° and the pitch split will permit a snug fit of the bar **42***b* against the load. Pins **96***b* and **100***b* function exactly as in the previous embodiment.

All of the embodiments described above, and particularly pin **92**, are preferably constructed from high strength metal, such as steel. Particular processing details will be readily apparent to the skilled metal worker from the given construction design.

Although the invention has been described in connection with certain preferred embodiments, it is not intended that it be limited thereto. For example, it is not limited to railroad cars but can be applied to any freight-carrying vehicle having two different wall securing means for restraining the freight. Thus, it is intended that the invention cover all alternatives, equivalent arrangements and embodiments as may be included within the scope of the following claims.

What is claimed is:

1. A head especially adapted for use with a freight-restraining member spanning a freight chamber and to removably connect the member to either of two different alternative securing means either of which may be positioned as part of the walls of the chamber to the exclusion of the other, said head comprising an engaging member for removably engaging said head with either one of the securing means and means for alternatively and removably positioning said engaging member in two different positions within said head to permit said engaging member to engage either of the securing means, whereby said head and the freight-restraining member may be connected to the chamber walls regardless which of the two different securing means is present in the chamber.

2. In combination with either of two different alternative securing means either of which may be positioned as part of the walls of a freight chamber to the exclusion of the other, the head as defined in claim **1**, wherein the different securing means comprise portions of the walls having holes therein, each of the two different means being characterized by the center lines of said holes being oriented at an angle with respect to the center lines of the holes of the other alternative securing means, and wherein said engaging member is pivotally mounted in said head for rotation through said angle defined by the different orientations of said center lines.

3. The head as defined in claim **2**, wherein said angle is substantially 90°.

4. The head as defined in claim **3**, wherein one of said different securing means comprises a portion of the wall having substantially horizontally oriented holes in a vertical face, and the alternative securing means comprises a portion of the wall having substantially vertically oriented holes in a substantially horizontally oriented shoulder, and wherein said angle extends from a substantially horizontal plane to a substantially vertical plane.

5. The head as defined in claim **2**, and further including stop means for preventing said engaging member from being positioned beyond those positions in which said engaging member may be removably engaged with either of said securing means.

6. The head as defined in claim **5**, wherein the freight-restraining member includes a freight engaging portion having a central axis therethrough, said stop means includes a shoulder, and said engaging member includes at least one pivot pin extending therefrom between said shoulder and the extreme outer end of said head, said pivot pin being horizontally mounted within said head no lower than in a horizontal plane extending through the central axis of the freight-restraining portion.

7. The head as defined in claim **6**, wherein said pivot pin lies with its pivot axis substantially within said horizontal plane, whereby horizontally-directed forces against the freight-restraining portion create essentially no moment of force tending to rotate the freight holding member about said engaging member.

8. The head as defined in claim **7**, and further including a single locking pin and means for securing said locking pin within said pivot pin to lock the same in either of its two positions defined by the limits of said angle.

9. The head as defined in claim **1**, wherein said engaging member is characterized by a single pin and means for pivotably mounting said pin in said head for movement from a position wherein said pin is engageable with one of said alternative securing means, to a position wherein said pin is engageable with the other of said securing means.

10. The head as defined in claim **9**, and further including means for biasing said pin either outwardly or downwardly toward one of the securing means, as determined by which of said positions is occupied by said pin, whereby said pin can be retracted against said biasing means away from the one securing means.

11. The head as defined in claim 1, and further including a single locking pin and means for securing said locking pin within said engaging member in either of its positions in which said engaging member may be connected to either of the two different securing means.

12. A head especially adapted for use in a freight-restraining member spanning a freight chamber and to removably connect the member to either of two different alternative securing means either of which may be used as part of the walls of the chamber to the exclusion of the other, said head comprising an engaging member characterized by a single pin, and means for pivotably mounting said pin in said head for movement from a position wherein said pin is engageable with one of said alternative securing means, to a position wherein said pin is engageable with the other of the securing means, whereby said head and the freight-restraining member may be connected to the chamber walls regardless which of the two different securing means is present in said chamber.

13. The head as defined in claim 12, wherein said engaging member includes at least one pivot pin extending therefrom and further including in said head a support shoulder positioned with said pivot pin between the shoulder and the extreme securing means-engaging end of said head, said shoulder defining one of said positions and being located such that a portion of said engaging member rests thereupon when said single pin is in said one position.

14. The head as defined in claim 13, wherein said freight-restraining portion has a central axis therethrough, said pivot pin being horizontally mounted within said head no lower than in a horizontal plane extending through said central axis.

15. The head as defined in claim 12, and further including means for biasing said pin either outwardly or downwardly towards one of the securing means, as determined by which of said positions is occupied by said pin, whereby said pin can be retracted against said biasing means away from the one securing means.

16. The head as defined in claim 15, wherein said pin and said biasing means are movably contained at least partially by a mounting member, said mounting member being pivotally mounted within said head by a pair of pivot pins integrally extending therefrom which penetrate into at least a portion of said head, and further including a stop for preventing said mounting member from pivoting beyond at least one of said positions.

17. The head as defined in claim 16, and further including a single locking pin and means for securing said locking pin within one of said pivot pins when said single pin is in either of said positions.

18. The head as defined in claim 12, and further including stop means for preventing said pin from being moved beyond either of said positions.

19. In a freight-restraining member adapted to span a freight chamber and to restrain freight therewithin, the chamber having either of two different alternative securing means either of which may be positioned as part of the walls of the chamber to the exclusion of the other, the member including a freight-restraining portion and at least one head, the improvement comprising said head being characterized by an engaging member for removably engaging said head with either one of the securing means, and means for alternatively and removably positioning said member in two different positions within said head to permit said engaging member to engage either of the securing means whereby said head and said freight-restraining member may be connected to the chamber walls regardless which of the two different securing means is present in the chamber.

20. In combination with either of two different alternative securing means either of which may be positioned as part of the walls of the chamber to the exclusion of the other, the improved freight-restraining member as defined in claim 19, wherein the different securing means comprise portions of the walls having holes therein, each of the two different means being characterized by the center lines of said holes oriented at an angle with respect to the center lines of the holes of the other alternative securing means, and wherein said engaging member is pivotally mounted in said head for rotation through said angle defined by the different orientations of said center lines.

21. The improved freight-restraining member as defined in claim 20, and further including stop means for preventing said engaging member from being positioned beyond those positions in which said engaging member may be removably engaged with either of said securing means.

22. The improved freight-restraining member as defined in claim 21, wherein said freight engaging portion has a central axis therethrough, said stop means includes a shoulder, and said engaging member includes at least one pivot pin extending therefrom between said shoulder and the extreme outer end of said head, said pivot pin being horizontally mounted within said head no lower than in a horizontal plane extending through the central axis of the freight-restraining portion.

23. The improved freight-restraining member as defined in claim 19, wherein said engaging member is characterized by a single pin and means for pivotably mounting said pin in said head for movement from a position wherein said pin is engageable with one of said alternative securing means, to a position wherein said pin is engageable with the other of said securing means.

24. The improved freight-restraining member as defined in claim 19, and further including a single locking pin and means for securing said locking pin within said engaging member in either of its positions in which said engaging member may be connected to either of the two different securing means.

25. In a freight-restraining member adapted to span a freight chamber and to restrain freight therewithin, the chamber having either of two different alternative securing means either of which may be positioned as part of the walls of the chamber to the exclusion of the other, the member including a freight-restraining portion and at least one head, the improvement comprising said head being characterized by a single pin and means for pivotably mounting said pin in said head for movement from a position wherein said pin is engageable with one of the alternative securing means, to a position wherein said pin is engageable with the other of the securing means, whereby said head and said freight-restraining member may be connected to the chamber walls regardless which of the two different securing means is present in the chamber.

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