Freight Restraining Bar
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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. Pending 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 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 also 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, universally 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 rails 30 in eight-chambered, 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 the head 50 of the rail 52 away from 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 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 is generally cubical in shape, except where especially formed as hereafter described, and is integrally connected to the tail portion by a neck 85.

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 removeably alter the position 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 surface 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 a 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 a cross-sectional circular shape of 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 towards the rail 30 and wall, thus maintaining the 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 FIG. 6. A ring 102 is mounted in the head of the pin for rail 52 away from the head outwardly away from the ring 102. To engage the rail, the head is inserted into the 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 member 54 is generally cubical in shape, except where especially formed as hereafter described, and is integrally connected to the tail portion by a neck 85.

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 towards the rail 30 and wall, thus maintaining the 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.

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gage the rail 30a. 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 30a, 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 pin 92 is lined up with the hole 32a, handle pin 96 is released (FIG. 5) and spring 94 biases the pin 92 downwardly towards the floor and the rail 30a. The horizontally extending rail 30a 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 59 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 30a is one in which it is an integral, unitary part of the chamber walls, face 34a 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 30a, 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 59 which projects down far enough so as to interfere with outwardly projecting portions of rail 30a 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 50b 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 64b) side 63b is thicker than side 62b, pivot pins 88b and 90b being adjusted in length accordingly. The precise amount of greater thickness is that which positions engaging pin 92b so as to fall half-way between holes 32a from the position pin 92 would take if mounted as in FIG. 6. Thus, with the head at the other end of member 40 (not shown) being a "left-handed" head, if the load is not tightly held when the pin 92b is positioned in the last possible hole 32b 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 42b against the load. Pins 96b and 100b 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 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 said 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 alternately 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 of 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 comprising said engaging member 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 acting or substantially vertical plane.

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 locating pin and means for securing said locating 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 pivotally mounting said pin in said head for movement from a position wherein said pin is in contact 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 pivotally 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 of 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 secure means engageable 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 of 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 pivotally 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 pivotally 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 of which of the two different securing means is present in the chamber.

References Cited

UNITED STATES PATENTS

3,554,136 1/1971 Falk 105—369 B
3,367,615 2/1968 Turpen 105—369 A

DRAYTON E. HOFFMAN, Primary Examiner