Feb. 26, 1963 H. E. ROLFE, JR 3,078,813

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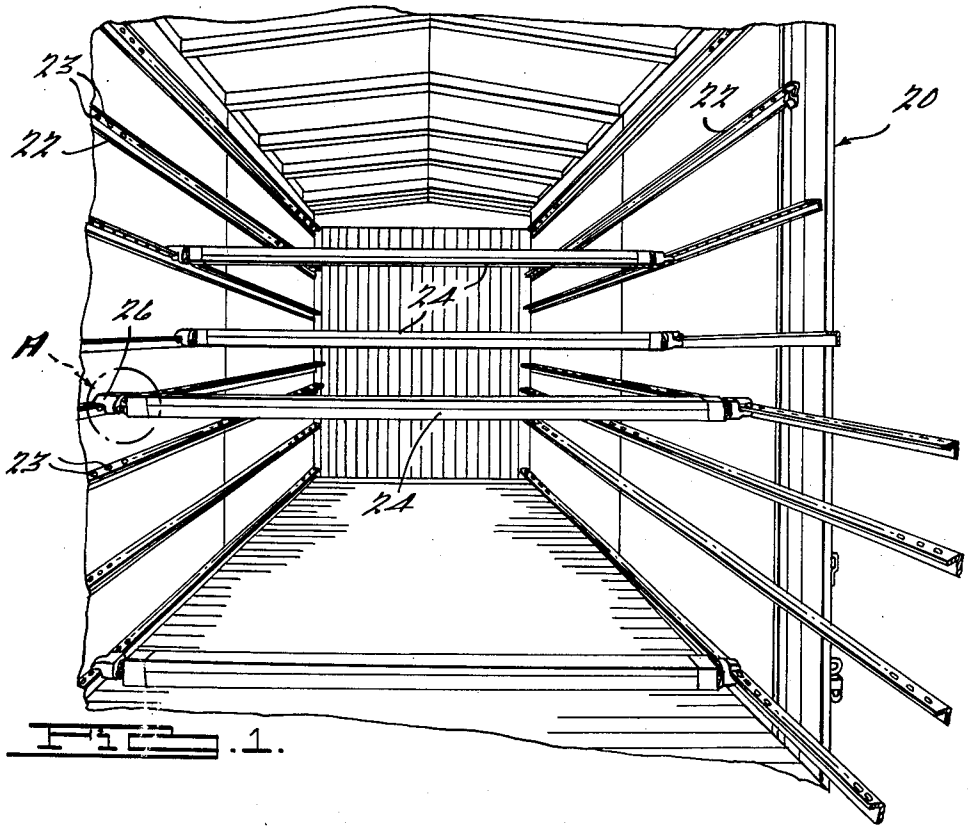


FIG. 1.

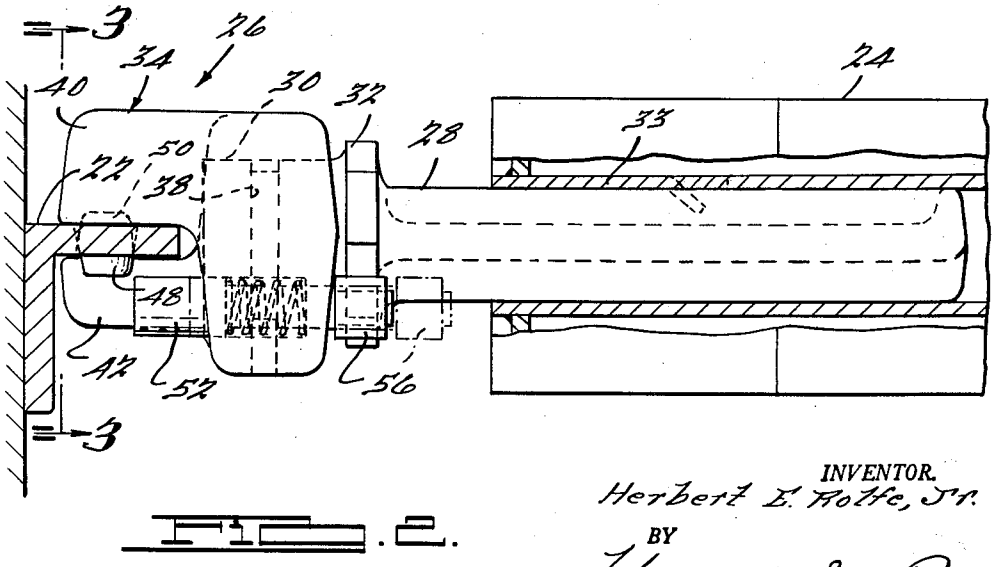


FIG. 2.

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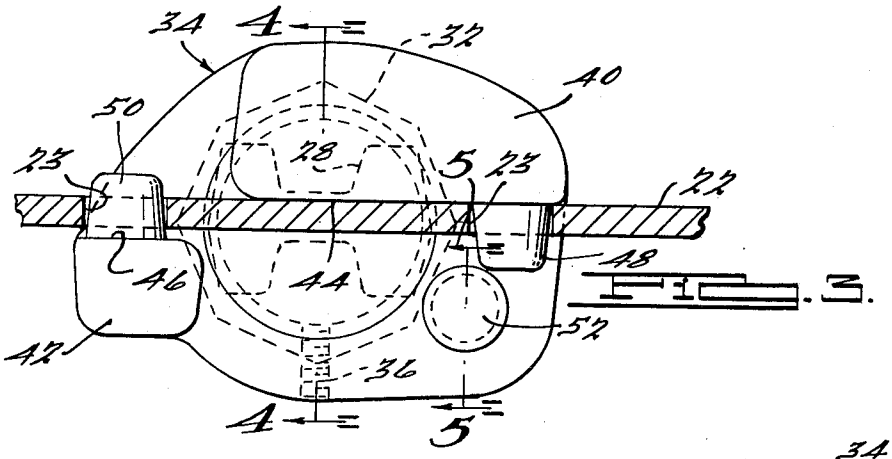


FIG. 3.

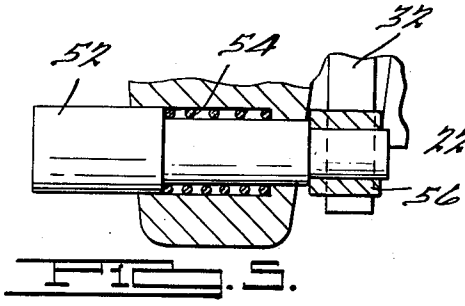


FIG. 5.

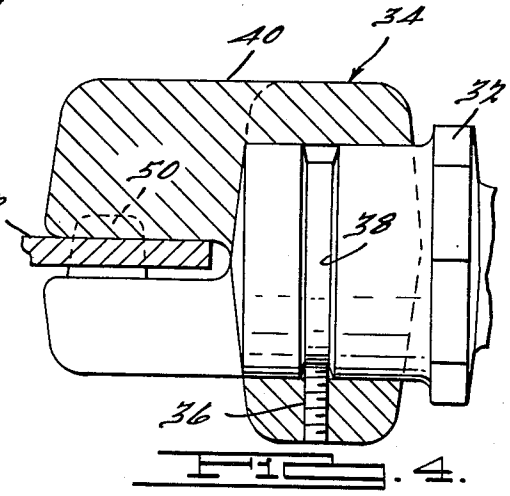


FIG. 4.

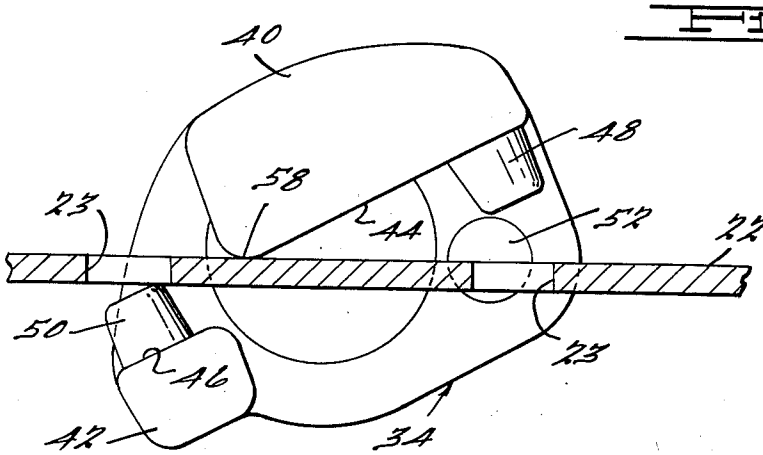


FIG. 6.

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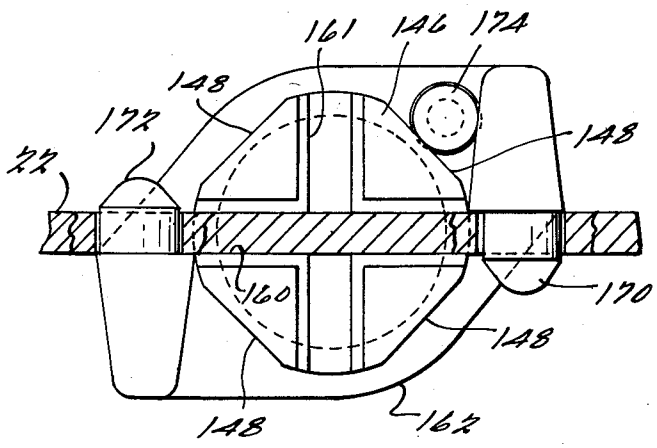


Fig. 12.

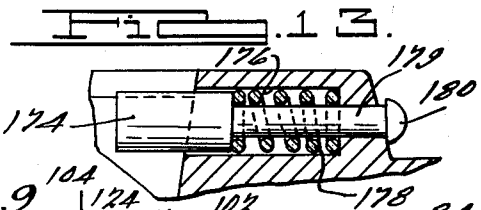


Fig. 13.

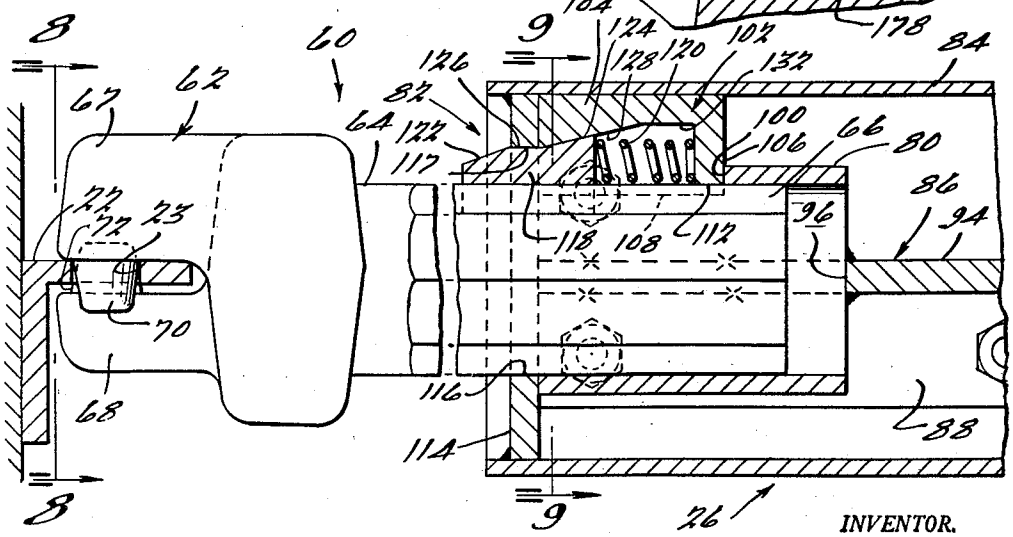


Fig. 1.

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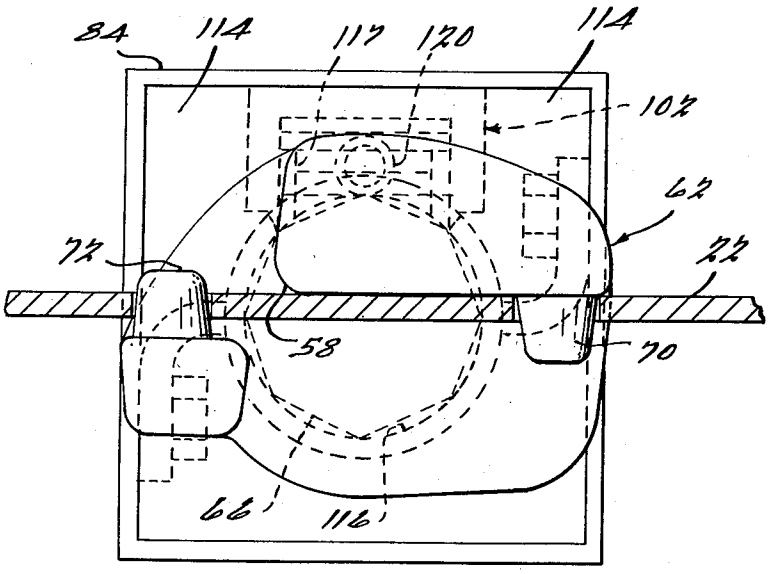


Fig. 8.

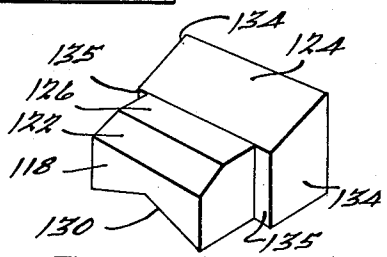


Fig. 14.

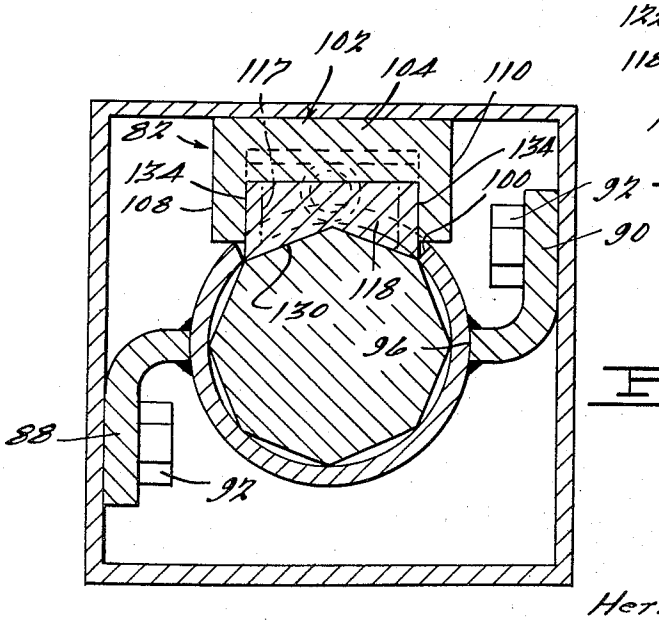


Fig. 9.

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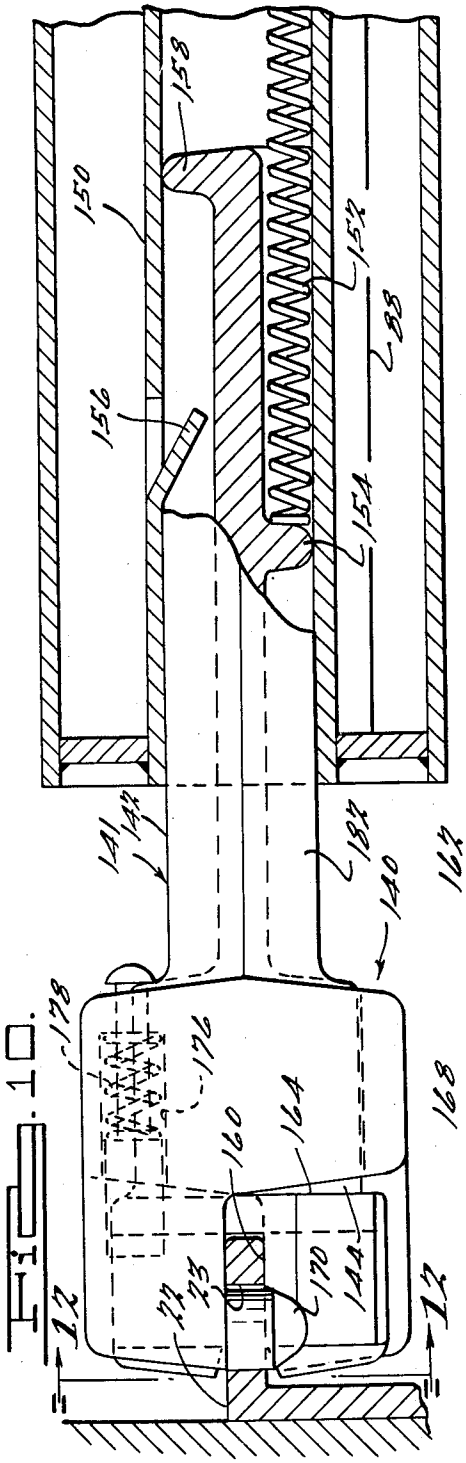


Fig. 10.

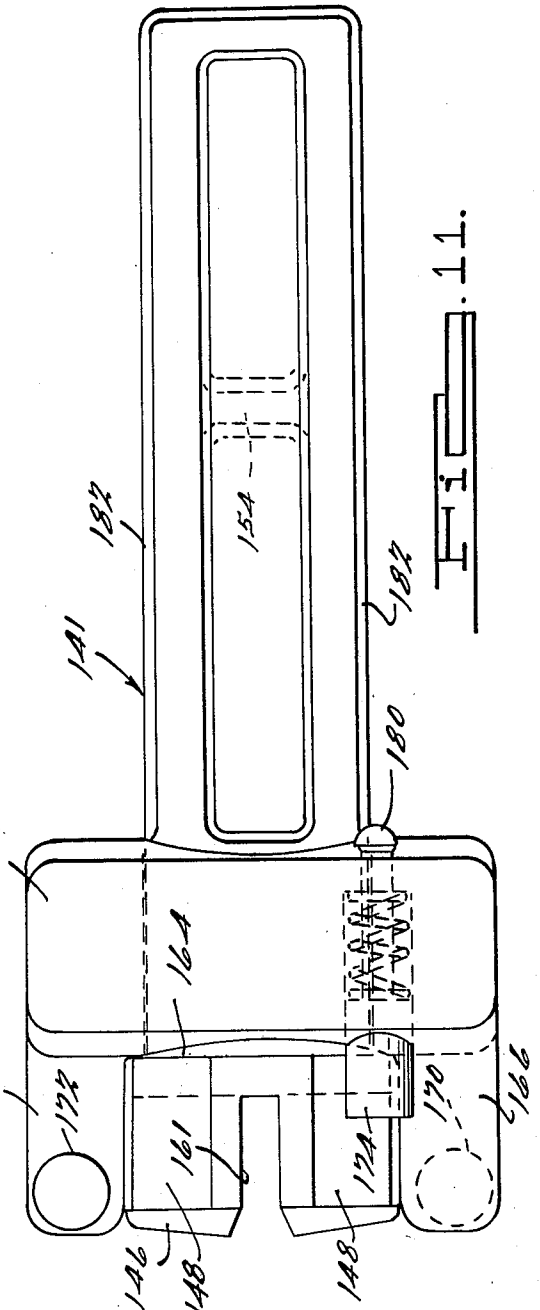


Fig. 11.

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United States Patent Office 3,078,813 Patented Feb. 26, 1963

3,078,813

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Filed May 2, 1960, Ser. No. 26,119
26 Claims. (Cl. 105—369)

This invention relates to freight bracing systems having a plurality of freight bracing bars releasably connected to belt rails secured on opposed side walls of a freight storage space so that the freight bracing bars span between the side walls in position to brace articles of freight. More particularly this invention relates to an improved end fitting for releasably connecting the end of a freight bracing bar to a belt rail.

One example of a popular freight bracing system of the prior art which is used in many railroad box cars comprises a plurality of parallel belt rails secured to opposite side walls of the box car with each belt rail being aligned with a corresponding belt rail on the opposite side wall. A plurality of freight bracing bars are provided which are adapted to span between the side walls and which have end fittings on the ends thereof for releasably connecting the freight bracing bars to the belt rails. The freight bracing bars can be connected to different pairs of belt rails and at many different positions along each belt rail so that they can span the box car at almost any desired point to brace articles of freight within the box car. The end fittings on each end of the freight bracing bar generally have pins projecting therefrom in the same direction which are adapted to fit into holes in the belt rail to connect the end of the freight bracing bar thereto, a suitable releasable latching mechanism being provided to prevent the disengagement of the pins from the holes.

It is one object of the present invention to provide an improved end fitting which can be releasably connected to a belt rail in a simple manner and which slidably supports the bar on the belt rail in a manner to enable a workman to slide the freight bracing bar from one position to another without having to lift and support the entire weight of the freight bracing bar.

It is another object of the invention to provide an end fitting which can be slidably supported on a belt rail to enable the freight bracing bar to be moved to different positions along the belt rail as described above, and which can be rotated through a small angle to be locked to the belt rail.

It is a further object of the invention to provide an end fitting which can be slidably supported on a belt rail and having pin means thereon adapted to be rotated into locking engagement with opposite sides of the belt rail to lock the end fitting against movement along the belt rail, additional means being provided for releasably locking the end fitting against rotation to maintain the pin means in locking engagement with the belt rail.

It is a still further object of the invention to provide an end fitting for releasably connecting the end of a freight bracing bar to a belt rail which can be slidably moved along the belt rail to bring the freight bracing bar into position against an article of freight and which can be rotated relative to the freight bracing bar while the bar is held against the freight to lock itself to the belt rail.

It is a still further object of the invention to provide an end fitting adapted to be telescopically mounted in the end of a freight bracing bar and having a rotatable head thereon adapted to be slidably supported on the belt rail and rotated relative to the belt rail to lock the end fitting thereto.

It is a still further object of the invention to provide an end fitting having an inner end adapted to be telescopically mounted within and releasably locked against

rotation relative to the end of a freight bracing bar and having an integral head on the outer end thereof adapted to slidably rest on the belt rail and having pin means thereon adapted to be rotated into locking engagement with opposite sides of the belt rail by rotating the end fitting relative to the freight bracing bar.

It is a still further object of the invention to provide an end fitting comprising an elongated body having the inner end adapted to be telescopically mounted within the end of a freight bracing bar and the outer end adapted to slidably engage the belt rail in a manner to permit sliding movement along the belt rail and prevent movement perpendicular to the belt rail, and a head rotatably mounted on the body having pin means thereon adapted to be rotated into locking engagement with opposite sides of the belt rail to lock the end fitting against movement along the belt rail.

It is a still further object of the invention to provide an end fitting for releasably connecting the end of a freight bracing bar to a belt rail which is rugged in construction, simple and effective in use and economical to fabricate.

Other objects and features of novelty of the invention will be specifically pointed out or otherwise become apparent when referring, for a better understanding of the invention, to the following description taken in conjunction with the accompanying drawings wherein:

FIGURE 1 is a perspective view of the inside of a box car having a freight bracing system embodying features of the present invention installed therein;

FIG. 2 is an enlarged side view of the structure illustrated in the circle "A" of FIG. 1 with the freight bracing bar partially broken away;

FIG. 3 is an enlarged sectional view of the structure illustrated in FIG. 2, taken along the line 3—3 thereof;

FIG. 4 is a sectional view of the structure illustrated in FIG. 3, taken along the line 4—4 thereof;

FIG. 5 is a fragmentary sectional view of the structure illustrated in FIG. 3, taken along the line 5—5 thereof;

FIG. 6 is a view similar to that of FIG. 3 illustrating the end fitting after it has been rotatably disengaged from the belt rail;

FIG. 7 is a view similar to that of FIG. 2 illustrating another embodiment of the end fitting of the present invention telescopically mounted within the end of a freight bracing bar shown in section;

FIG. 8 is a sectional view of the structure illustrated in FIG. 7, taken along the line 8—8 thereof;

FIG. 9 is a sectional view of the structure illustrated in FIG. 7, taken along the line 9—9 thereof;

FIG. 10 is a side view similar to that of FIG. 7 with the end of the freight bracing bar partially shown in section illustrating still another embodiment of the present invention;

FIG. 11 is a plan view of the end fitting illustrated in FIG. 10;

FIG. 12 is a sectional view of the structure taken along the line 12—12 of FIG. 10;

FIG. 13 is a fragmentary sectional view of the structure illustrated in FIG. 12, taken along the line 13—13 thereof; and

FIG. 14 is a perspective view of the slidable latch member illustrated in FIG. 7.

Referring to FIG. 1, the interior of a railroad box car 20 is illustrated with a freight bracing system installed therein in accordance with the teaching of Patent No. 2,497,683 to S. M. Nampa et al. issued on February 14, 1950. The freight bracing system briefly comprises a plurality of parallel, angle-shaped belt rails 22 mounted on and extending longitudinally of the side walls of the box car. The horizontal flanges of each of the belt rails have a plurality of holes 23 therein, and each of the belt

rails is aligned with a corresponding belt rail on the opposite side wall. A plurality of freight bracing bars 24 span between and are releasably connected to the belt rails by end fittings 26.

The freight bracing bars can span between the side walls in a number of different positions for securing articles of freight within the box car. One or both of the end fittings is preferably telescopically mounted within the end of each freight bracing bar to compensate for variations in the spacing between the side walls at different positions within the box car and to prevent stresses from being imposed on the bars in the event the walls should expand or contract when the box car is humped to another car or subjected to other bumps and jolts.

The present invention specifically relates to an improved end fitting construction for connecting the freight bracing bars to the belt rails in a manner to enable them to be quickly unlocked therefrom and slidably adjusted along the belt rails. An end fitting 26 embodying features of the present invention is illustrated in FIGS. 1–6. It is comprised of a shank 28 having a cylindrical portion 30 on the left end thereof and an enlarged, annular flatted portion 32 at the inner end of the cylindrical portion 30. The shank 28 can be either rigidly affixed or telescopically mounted within the bar 24 so that it can telescope in and out of the end of the bar as previously described. As illustrated in FIG. 2, the shank is telescopically disposed within a tubular socket 33 rigidly mounted within the end of the freight bracing bar. A head 34 is rotatably journaled on the cylindrical portion 30 and has a set screw 36 extending into an annular groove 38 in the cylindrical portion 30 to fix the head against axial movement while enabling it to rotate relative to the cylindrical portion.

A pair of pin-supporting portions 40 and 42 project outwardly from the head 26 and are provided with relatively flat surfaces 44 and 46, respectively, from which pins 48 and 50 project in opposite directions and extend into the holes 23 in the belt rail to lock the end fitting to the belt rail. The flat surface 44 engages the upper surface of the horizontal flange of the belt rail 22 to support the bar 24 thereon, and is relatively wider than the surface 46, extending from one side of the end fitting past the center thereof to provide greater stability.

A locking plunger 52 slidably extends through the head 34 beneath the pin-supporting portion 40 and is spring biased to the left as viewed in FIG. 5 by a suitable spring 54. A bushing 56 is secured to the right end of the locking plunger 52 to limit the projection of the left end of the locking plunger from the head 34. In the position illustrated in solid lines, the bushing 56 engages one of the flats on the annular flatted portion 32 to prevent rotation of the head 34 relative to the cylindrical portion 30 of the shank, and the left end of the locking plunger extends beneath the horizontal flange of the belt rail 22 to prevent the head 34 from rotating through a sufficient angle relative to the belt rail to disengage the pins 48 and 50 from the holes 23.

In this position the end fitting 26 firmly connects the freight bracing bar 24 to the belt rail 22. When it is desired to move the freight bracing bar to a new position, the locking plunger 52 is merely retracted to the position illustrated in phantom in FIG. 2 so that the bushing 56 clears the annular flatted portion 32 and the left end thereof clears the horizontal flange of the belt rail 22. The head 34 is then rotated in a counterclockwise direction as viewed in FIG. 3 to the position illustrated in FIG. 6 wherein the pins 48 and 50 are disengaged from the holes 23. It will be observed that the corner of the pin supporting portion 40 is rounded as at 58 to facilitate this rotary movement. If desired, the juncture between adjacent flats on the flatted portion 32 can be positioned to overlap the end of the bushing 57 to lock the plunger in its retracted position, or the locking plunger can be manually held in its retracted position.

Once the position illustrated in FIG. 6 has been reached, the end fitting can be either completely disengaged from the belt rail or the rounded corner 58 can be maintained in engagement with the upper surface of the horizontal flange to enable a workman to slide the end fitting and freight bracing bar along the belt rails to a new position without having to support the weight of the freight bracing bar. If desired the end fitting may be rotated in a counterclockwise direction as viewed in FIG. 6 beyond the position there illustrated, so that the plunger 52 may be extended above the flange and cooperate with the rounded corner 58 in supporting the end fitting during movement to the new position. When the new position has been reached, the freight bracing bar can be held against the article of freight and the end fitting 26 rotated in a clockwise direction to engage the pins 48 and 50 in a new pair of the holes 23. The locking plunger 52 is then released to snap back to its projected position beneath the flange of the belt rail, the bushing 56 engaging one of the flats to prevent rotation between the head 34 and cylindrical portion 30 of the shank.

In addition to being able to support the weight of the freight bracing bar and end fittings on the belt rails as he slides the freight bracing bar to a new position, the workman can firmly abut the freight engaging face of the freight bracing bar directly against the article of freight to be braced and rotate the heads 34 individually to move the pins 48 and 50 into the holes 23 at the new position as described above. If two workmen are handling the freight bracing bar, one can be stationed at each end of the bar so that they can force the bar firmly against the freight to make certain it is tightly packed against other freight or one of the walls of the box car, and they can hold the freight in this position by means of the freight bracing bar while they each rotate the head 34 at their end of the bar into locking engagement with the holes 23 in the belt rails. Thus, the construction of the end fittings enables the articles of freight to be more firmly braced by the freight bracing bars.

Referring to FIGS. 7–9, an end fitting 60 illustrating another embodiment of the present invention comprises a head 62 and a shank 64 which are integral with one another rather than rotatably connected as in the end fitting 26. The right end of the shank 64 has a plurality of longitudinally extending flats 66 thereon and is telescopically disposed within the end of the freight bracing bar 26 as will be described in greater detail hereinafter.

The head 62 is substantially the same as the head 34 of the end fitting 26 and has longitudinally extending pin supporting portions 67 and 68 having pins 70 and 72 projecting therefrom into the holes 23 in the belt rail 22.

The flatted portion of the shank 64 is telescopically disposed in a tubular socket 80 which is rigidly secured within the end of the freight bracing bar 26, and a latch mechanism 82 is mounted on the tubular socket 80 and is adapted to cooperate with the flats 66 to releasably lock the end fitting 60 against rotation relative to the freight bracing bar 26 as will be described.

The particular freight bracing bar 26, illustrated in FIGS. 7–9 by way of example, briefly comprises a square tubular body 84 having a longitudinally extending Z-shaped reinforcing member 86 secured therein. Legs 88 and 90 of the Z-shaped member are suitably secured to the side walls of the body 84, such as by bolts 92, so that the web 94 of the Z-shaped member lies substantially on the midplane of the freight bracing bar. The outer end of the web 94 is notched as at 96 and the tubular socket 80 is suitably fixed within the notch 96, such as by welding.

The outer end of the tubular socket 80 is also provided with an outwardly presenting notch 100 in the upper portion thereof through which the latch mechanism 82 projects to engage the flatted portion of the shank 64. The

latch mechanism 82 comprises a latch body 102 having an upper wall 104, and downwardly extending rear and side legs 106, 108 and 110, respectively. The rear leg 106 of the latch body 102 is shorter than the legs 108 and 110, as indicated at 112 (FIG. 7), to provide clearance between the latch body and the flatted portion of the shank 64 so that the latch body will not interfere with the rotation of the shank within the tubular socket 80. The side legs 108 and 110 engage the upper side edges of the notch 100 and the rear leg 106 abuts against the rear edge of the notch 100. An end plate 114 is suitably secured within the end of the freight bracing bar 26 is position to cover the open end thereof and to retain the latch body 102 in position. The latch body 102 may be rigidly secured to the socket 80 and the square body 84 of the freight bracing bar 26 or, if desired, it can be mechanically locked in this position by the surrounding elements. The plate 114 is provided with a circular aperture 116 having a slightly larger diameter than the shank 64 so that it will not interfere with the rotation of the shank 64 relative to the freight bracing bar 26. The plate is also provided with a downwardly presenting notch 117 communicating with the upper portion of the aperture 116 and having a width slightly less than the spacing between the side legs 108 and 110 of the latch body 102, the width of the notch 117 being most clearly illustrated in dotted and dashed lines in FIG. 9.

A latch member 118 (illustrated separately in FIG. 14) is slidably disposed within the latch body 102 and is spring urged to the left, as viewed in FIG. 7, by a suitable spring 120 having one end bearing against the latch member 118 and the other end bearing against the rear leg 106 of the latch body. The upper surface of the latch member 118 has sloping surfaces 122 and 124 joined by a horizontal surface 126 therebetween. The front end of the latch member 118 projects through the notch 116 in the plate 114, as illustrated in FIG. 7, and the sloping portion 124 is adapted to engage a similar sloping surface 128 on the underside of the upper wall 104 of the latch body. The lower surface 130 of the latch member 118 has an inverted V-shaped cross section adapted to slidably mate with adjacent flats 66 on the shank 64 to releasably lock the end fitting 60 against rotation relative to the freight bracing bar 26.

When it is desired to rotate the end fitting relative to the freight bracing bar 26, the latch member 118 is urged rearwardly into the latch body 102 until a sufficient clearance is provided between the upper rear edge of the latch member 118 and a flat portion 132 at the rear of the upper wall 104 of the latch body to enable the latch member 118 to be lifted within the latch body in response to the rotation of the end fitting 60 to ratchet past the junctures of the flats 66. As soon as the end fitting has been rotated a sufficient distance to disengage the pins 70 and 72 from the holes 23 in the belt rail 22, the locking plunger 74, of course, being retracted first, as previously described, the latch member 118 can be released to enable the spring 120 to resiliently urge it outwardly of the latch body 102 to again lock the end fitting against rotation and, consequently, to retain the head 62 in a position similar to that illustrated in FIG. 6 where the pins 70 and 72 are disengaged from the holes 23. The end fitting can then slide on the rounded corner 58, as previously described, until a new position is reached. The latch member 118 is then moved rearwardly to enable the flatted portion of the shank 64 to be rotated relative to the latch member until the pins 70 and 72 are engaged in a different pair of the holes 23. The latch member 118 is then released to move outwardly to the position illustrated in FIG. 7 and engage a pair of the flats 66 to again lock the shank 64 against rotation relative to the freight bracing bar, and the locking plunger 74 is released to lock the head 62 against rotation relative to the belt rail 22.

As previously mentioned the width of the notch 117 in the plate 114 is less than the spacing between the legs 108 and 110 of the latch body as most clearly illustrated by the dotted and dashed lines in FIG. 9 which indicate the width of the notch. The front portion of the latch member 118 has substantially the same width as the notch 117, and the rear portion of the latch member 118 has laterally extending wings 134 having substantially the same width as the spacing between the legs 108 and 110 of the latch body. The flanges 134 provide shoulders 135 which are positioned to abuttingly engage the rear face of the plate 114 when the latch member 118 is in the position illustrated in FIG. 7 to limit the movement of the latch member to the left. This prevents the spring 120 from forcing the latch member 118 to the left with a sufficient force to wedge the sloping portions 124 and 128 of the latch member 118 and latch body 102 together in a manner to interfere with the movement of the latch member to the right.

With the construction of the embodiment just described, the head 62 and shank 64 are an integral, one-piece construction and the latch mechanism 82 cooperates with the flats 66 on the shank to releasably lock the end fitting 60 against rotation relative to the freight bracing bar. A further advantage of this construction is that after the end fitting has been rotated to disengage the pins from the holes 23, the latch member 118 can be released to lock the end fitting in its disengaged position and thus facilitate the sliding of the end fitting along the belt rail to a new position.

Referring to FIGS. 10–13, an end fitting 140 is shown which illustrates another embodiment of the present invention. The end fitting 140 comprises an elongated body 141 having a shank 142 on the inner end thereof, and a cylindrical portion 144 near the outer end thereof with an enlarged flatted portion having a plurality of longitudinally extending flats 148 on the outer end thereof. The shank 142 is telescopically disposed within a tubular socket 150 suitably fixed within the end of the freight bracing bar. A suitable spring 152 is disposed within the tubular socket 150 between a downwardly extending flange 154 on the shank 142 and a suitable internal shoulder (not shown) on the freight bracing bar to resiliently urge the shank 142 outwardly of the freight bracing bar. A tab 156 projects downwardly from the top of the tubular socket 150 in position to engage an upwardly extending rear flange 158 on the shank to limit the movement of the shank 142 outwardly of the freight bracing bar.

The flatted end portion 146 has two outwardly presenting diametrical slots 160 and 161 therein. The slot 160 is adapted to fit over and slidably engage the horizontal flange of the belt rail 22 to support the end fitting 140 on the belt rail, and the spring 152 resiliently retains the slot 160 in engagement with the horizontal flange. The slot 161 is provided for engaging a vertical flange as will be described. A head 162 is slipped over the right end of the shank 142 and is rotatably journaled on the cylindrical portion 144 of the body 141 and is adapted to abut against an annular shoulder 164 on the right end of the flatted end portion 146 to limit movement of the head to the left as viewed in FIGS. 10 and 11. A pair of spaced pin supporting portions 166 and 168 project outwardly from the end of the head 162 and have pins 170 and 172 projecting downwardly and upwardly therefrom, respectively, into engagement with the holes 23 in the belt rail.

The pin supporting portions 166 and 168 are spaced apart a sufficient distance to clear the flatted end portion 146 so that the head 162 can rotate on the cylindrical portion 144. A locking plunger 174 is slidably disposed in a bore 176 in the head with a coil spring 178 disposed within the bore about a stem 179 projecting from the right end of the locking plunger to resiliently urge the locking plunger to the left as viewed in FIGS. 10, 11 and 13. The right end of the stem 179 slidably projects through the head 162 and has an enlarged head 180 formed thereon to limit the projection of the locking plunger 174 to the left. In the position illustrated in FIGS. 10 and 11, it will be observed that the locking plunger 174

overlies one of the flats 148 on the flatted end portion to lock the head 162 against rotation on the cylindrical portion 144. Therefore, the end fitting is firmly connected to the belt rail and cannot accidentally be disconnected. To disengage the end fitting from the belt rail, the locking plunger 174 is retracted to clear the flatted end portion 146, and the head 162 is rotated relative to the body 141 a sufficient distance to disengage the pins 170 and 172 from the holes 23. When the head has been rotated a sufficient distance, the locking plunger 174 can be released and the head adjusted slightly so that the locking plunger overlies a flat 148 adjacent thereto to hold the head in this disengaged position.

Since the shank is urged to the left by the spring 152 in the tubular socket 150, the slot 160 in the flatted end portion will remain in engagement with the horizontal flange of the belt rail so that the end fitting will slidably support the freight bracing bar on the belt rail. The end fitting and freight bracing bar can then be moved along the belt rail to a new position without requiring that the workman support the weight of the freight bracing bar and end fittings on the ends thereof. If it is desired to completely disengage the end fitting from a particular belt rail and shift it to a different belt rail, the shank 142 is merely retracted to compress the spring 152 until the flatted end portion 146 clears the horizontal flange of the belt rail 22, after which it can be connected to a different belt rail. If there is sufficient room within the box car, the end fittings can also be disengaged from the belt rails by angling the freight bracing bar relative to the side walls until the end fittings slip on or off the belt rails.

When a new position on a belt rail is reached the locking plunger 174 is again retracted and the head 162 rotated in a clockwise direction as viewed in FIG. 12 to engage the pins 170 and 172 in the holes 23 adjacent thereto as illustrated, and the locking plunger 174 released so that it again overlies the flat 148 and locks the head against rotation. It will also be observed that when the head is rotated to disengage the pins 170 and 172 from the holes 23, the entire head is free to slide rearwardly on the shank 142 a sufficient distance so that the pin supporting portions 166 and 168 clear the horizontal flange 122 in a manner to also enable the end fitting to be shifted laterally without interference from the pins. When the new position is reached the head 162 is merely advanced forwardly until the pin supporting portions 166 and 168 overlie the horizontal flange of the belt rail, and the head rotated to engage the pins in the holes 23 and enable the locking plunger to snap over the flat 148 to lock the head in this position, as previously described. The side edges 182 of the shank 142 are preferably formed on substantially the same center of curvature as the cylindrical portion 144 to facilitate the sliding movement of the head 162 on the shank 142 as described above.

By providing the vertically extending slot 161 in the flatted end portion 146 the crossmember may be used as a stationary load support bar with the horizontal flange of a horizontal belt rail received in the slot 161 when the crossmember body has been rotated through an angle of ninety degrees. Also by providing the slot 161 the end fitting is also adapted to connect the freight bracing bar to a vertically extending belt rail 22. To accomplish this the slot 161 is merely fitted over the flange of the vertical belt rail and the head 162 is rotated substantially 90° from the position illustrated in FIGS. 10–12 to engage the pins 170 and 172 in suitable holes provided in the flange of the vertical belt rail, the locking plunger 174 slipping over another flat 148 to lock the head against rotation. With this construction the flatted end portion prevents horizontal movement of the end fitting relative to the vertical belt rail and the pins 170 and 172 prevent vertical movement of the end fitting along the vertical belt rail.

It will be appreciated by those skilled in the art that crossmembers constructed according to each of the above described embodiments are adapted to be placed in a number of positions and attitudes for use in resisting impact and stationary loads and that the embodiments illustrated in FIGS. 2 and 9 are also adapted for positioning the crossbar body in intermediate positions for engaging odd-shaped loads.

While it will be apparent that the preferred embodiments herein illustrated are well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. An end fitting for connecting the end of a freight bracing bar to a flange of a belt rail, said end fitting having a shank on the inner end thereof adapted to be mounted within the end of the freight bracing bar and a head on the outer end thereof, means projecting from said head in position to overlap opposite sides of the flange, said projecting means including pin means adapted to be rotated into engagement with opposite sides of the flange in response to rotation of said head to lock the end fitting against movement substantially parallel to the plane of the flange, said projecting means locking the end fitting against movement perpendicular to the flange, and locking means for releasably locking said head against rotation relative to said flange to maintain said pin means in locked engagement with the flange.

2. The invention as defined in claim 1 including means on the outer end of said end fitting for engaging the flange of the belt rail in a manner to slidably support the end fitting thereon and to enable said head to rotate relative to the flange to engage and disengage said pin means from the flange to free the end fitting for sliding movement along the flange.

3. An end fitting for connecting the end of a freight bracing bar to an apertured flange of a belt rail, said end fitting having a shank on the inner end thereof adapted to be mounted within the end of the freight bracing bar, means on the outer end of the end fitting adapted to be disposed to overlap opposite sides of said flange and rotated about an axis parallel to the axis of said shank into locking engagement with opposite sides of said flange of said belt rail and into at least one of the apertures thereof to lock the end fitting against movement parallel to the belt rail and perpendicular thereto, and locking means on said end fitting for releasably locking said first named means against rotation relative to the belt rail to maintain said first named means in locked engagement with the belt rail.

4. An end fitting for connecting the end of a freight bracing bar to a belt rail having a plurality of spaced apertures therein, said end fitting having a shank on one end thereof adapted to be mounted within the end of the freight bracing bar and a head on the other end thereof adapted to be releasably connected to the belt rail, means mounting said head on said end fitting for rotation about an axis substantially parallel to the axis of said shank, said head having spaced pin supporting portions projecting outwardly therefrom in position to overlap opposite sides of the belt rail, said pin supporting portions having pin means projecting laterally therefrom and adapted upon rotation of said head to be rotated into apertures in the belt rail, and means for releasably locking said head against rotation relative to said belt rail to hold said pins in the apertures.

5. The invention as defined in claim 4 wherein one of said pin supporting portions has a supporting surface thereon adapted to ride on the side of the flange adjacent thereto to support the end fitting on the flange and to enable it to slide along the flange when the pins are disengaged from the apertures.

6. An end fitting for connecting the end of a freight

bracing bar to a flange of a belt rail having a plurality of spaced apertures therein, said end fitting having a shank on the inner end thereof adapted to be mounted within the end of the freight bracing bar and a head on the outer end thereof adapted to be releasably connected to the flange of the belt rail, means mounting said head on said end fitting for rotation about an axis substantially parallel to the axis of said shank, a pair of spaced pin supporting portions projecting outwardly from said head in position to overlap opposite sides of the flange of the belt rail, a pin projecting laterally from each of said pin supporting portions, said pins facing generally toward one another and lying along lines substantially parallel to one another and disposed on opposite sides of said axis so that upon rotation of said head they can be rotated into spaced apertures in the belt rail, and means for releasably locking said head against rotation relative to said belt rail to hold said pins in the apertures.

7. An end fitting for connecting the end of the freight bracing bar to a belt rail having a plurality of spaced apertures therein, said end fitting comprising an elongated body having a shank on the inner end thereof adapted to be mounted within the end of the freight bracing bar and a cylindrical portion on the outer end thereof with an annular flatted portion adjacent to the inner end of the cylindrical portion, a head rotatably journaled on said cylindrical portion, means for fixing said head against axial movement relative to said cylindrical portion, first and second laterally spaced pin supporting portions projecting longitudinally from said head in position to overlap opposite sides of the belt rail, pin means projecting laterally from each of said pin supporting portions and adapted to be rotated into apertures in the belt rail in response to rotation of said head, and locking plunger means on said head adjacent to said first pin supporting portion and movable between a retracted position and an extended position wherein it overlaps the side of the flange opposite to the side overlapped by said first pin supporting portion to lock the head against rotation relative to the belt rail, said locking plunger means including means for releasably engaging said annular flatted portion of said body when in said extended position to lock the head against rotation relative to the body and to enable said head to rotate relative to the body when said locking plunger means is in its retracted position.

8. The invention as defined in claim 7 wherein each of said pin supporting portions has a flat surface portion, said flat surface portions lying in parallel spaced-apart planes facing toward but laterally offset from one another, and wherein the pin means on each of said pin supporting portions projects perpendicularly from the flat surface portions thereof.

9. The invention as defined in claim 8 wherein one of said flat surface portions is relatively wide and the other surface portion is relatively narrow, said relatively wide surface portion extending from one side of the end fitting to a point beyond the center line of the end fitting to enable it to rest on the flange in a stable manner.

10. In a freight bracing system for securing freight in a storage space having belt rails secured to the side walls thereof and each having a flange having apertures spaced therealong, a freight bracing bar adapted to span between the side walls and having surfaces selectively engageable with freight to be braced, an end fitting for releasably connecting one end of the freight bracing bar to one of the belt rails, said end fitting comprising an elongated body having a shank on the inner end thereof and a head on the outer end thereof, means for telescopically and rotatably mounting said shank within said one end of the freight bracing bar, latch means on said freight bracing bar for releasably latching said shank against rotation relative to said freight bracing bar, and means on said head adapted to be disposed to overlap opposite sides of said flange and adapted upon rotation of said shank relative to said bar to be rotated without movement of said surfaces relative to said freight into locking engagement with opposite sides of the belt rail and into at least one of said apertures to lock the end fitting against movement substantially perpendicular to the belt rail and parallel to the plane defined by the flange and freight bracing bar.

11. The invention as defined in claim 10 wherein said shank has a longitudinally flatted end portion, and said latch means comprises a latch body secured within said one end of the freight bracing bar and overlying said flatted end portion, a latch member slidably disposed within said latch body and slidably engaging said flatted end portion, said latch member being normally resiliently biased to a first position wherein it is wedged between said latch body and flatted end portion in a manner to lock the shank against rotation relative to the freight bracing bar, and a second retracted position wherein it is free to move upwardly within the latch body to enable the shank to be rotated relative to the freight bracing bar, the latch member ratcheting up and down within the latch body in response to the rotation of the shank when in said second position.

12. The invention as defined in claim 11 wherein said latch body and latch member have complementary sloping surfaces thereon with the sloping surface of the latch body being longer than the sloping surface of the latch member, said sloping surfaces abuttingly engaging one another when said latch member is in said first position and being vertically spaced from one another when said latch member is in said second position to enable the latch member to ratchet up and down over said flatted end portion in response to the rotation of the shank.

13. The invention as defined in claim 12 including stop means for limiting the movement of said latch member toward said first position to prevent excessive wedging of said sloping surfaces.

14. In a freight bracing system for securing freight in a storage space having belt rails secured to the side walls thereof, a freight bracing bar adapted to span between the side walls, an end fitting for releasably connecting one end of the freight bracing bar to one of the belt rails, said end fitting comprising an elongated body having a shank on the inner end thereof and an outwardly presenting slot in the outer end thereof adapted to fit over and slidably engage the belt rail, means for telescopically mounting said shank within said one end of the freight bracing bar in a manner to prevent relative rotation therebetween, resilient means for resiliently urging said shank outwardly of the freight bracing bar to resiliently maintain the slot in said outer end in sliding engagement with the belt rail, a head slidably and rotatably mounted on said body near said outer end thereof for sliding movement along and rotation about an axis substantially parallel to said bar, stop means on said body for limiting sliding movement of said head toward said outer end, means on said head adapted to overlie and to be rotated upon rotation of said head into locking engagement with opposite sides of the belt rail to prevent movement of said end fitting substantially parallel to the plane defined by said belt rail and freight bracing bar, and locking means for releasably locking said head against rotation relative to said body to maintain said last mentioned means in locked engagement with said belt rail.

15. In a freight bracing system for securing freight in a storage space having belt rails secured to the side walls thereof, a freight bracing bar adapted to span between the side walls, an end fitting for releasably connecting one end of the freight bracing bar to one of the belt rails, said end fitting comprising an elongated body having a shank on the inner end thereof and an outwardly presenting slot in the outer end thereof adapted to fit over and slidably engage said belt rail, means for telescopically mounting said shank within said one end of the freight bracing bar in a manner to prevent relative rotation therebetween, resilient means for resiliently urging said shank outwardly of the freight bracing bar to resiliently maintain the slot

in said outer end in sliding engagement with the belt rail, a head slidably and rotatably mounted on said body near said outer end thereof, stop means on said body for limiting sliding movement of said head toward said outer end, pin supporting portions projecting outwardly from said head along the sides of said outer end of the body and spaced apart a sufficient distance to clear said body, pin means projecting laterally from each of said pin supporting portions in opposite directions and adapted to be rotated into engagement with opposite sides of the belt rail to lock the end fitting against movement parallel to the plane defined by the belt rail and freight bracing bar, and locking means for releasably locking said head against rotation relative to said body to maintain said last mentioned means in locked engagement with the belt rail.

16. In a freight bracing system for securing freight in a storage space having belt rails secured to the side walls thereof, a freight bracing bar adapted to span between the side walls, an end fitting for releasably connecting one end of the freight bracing bar to one of the belt rails, said end fitting comprising an elongated body having a shank on the inner end and an enlarged annular flatted portion at the outer end thereof with a cylindrical portion adjacent to the flatted portion, means for telescopically mounting said shank within said one end of the freight bracing bar in a manner to prevent relative rotation therebetween, said outer end of said body having an outwardly presenting slot therein adapted to fit over and slidably engage said belt rail, resilient means for resiliently urging said shank outwardly of the freight bracing bar to resiliently maintain the slot in said outer end in engagement with the belt rail, a head rotatably mounted on said cylindrical portion, a pair of pin supporting portions projecting outwardly from said head along the sides of said flatted portion and spaced apart a sufficient distance to clear said flatted portion, pin means projecting laterally from each of said pin supporting portions in opposite directions and adapted to be rotated into locking engagement with opposite sides of the belt rail, and locking plunger means on said head movable from an extended position wherein it overlies said flatted portion in a manner to lock the head against rotation relative to said body to a retracted position wherein it clears said flatted end portion and enables said head to freely rotate relative to said body in order to move said pin means into and out of locking engagement with said one belt rail.

17. The invention as defined in claim 7 wherein said locking plunger means comprises a plunger slidably mounted on said head and adapted to slide between a first position and a second position, and resilient means for normally resiliently biasing said plunger to said first position, said plunger overlying a flat on said annular flatted portion when in said first position to lock the head against rotation relative to said body, and being retracted clear of the annular flatted portion when in said second position to enable said head to freely rotate relative to said body to engage and disengage said pin means from the belt rail.

18. An end fitting for connecting a freight bracing bar to a belt rail, said end fitting comprising an elongated body having a shank on the inner end thereof adapted to be mounted within the end of the freight bracing bar and an outwardly presenting slot in the outer end thereof adapted to fit over and slidably engage the belt rail to support the end fitting on the belt rail for sliding movement therealong, a head slidably and rotatably mounted on said body near said outer end thereof for sliding movement along and rotation about an axis substantially parallel to said bar, stop means on said body for limiting sliding movement of said head toward said outer end, means on said head adapted to overlie and to be rotated upon rotation of said head into locking engagement with the opposite sides of the belt rail to prevent movement of said end fitting substantially parallel to the plane defined by said belt rail and freight bracing bar, and locking means for releasably locking said head against rotation relative to said body to maintain said last mentioned means in locked engagement with said belt rail.

19. An end fitting for connecting a freight bracing bar to a belt rail, said end fitting comprising an elongated body having a shank on the inner end thereof adapted to be mounted within one end of the freight bracing bar and an enlarged annular flatted portion at the outer end thereof with a cylindrical portion adjacent to the annular flatted portion, said outer end of said body having an outwardly presenting slot therein adapted to fit over and slidably engage said belt rail, a head rotatably mounted on said cylindrical portion, a pair of pin supporting portions projecting outwardly from said head along the sides of said annular flatted portion and spaced apart a sufficient distance to clear the annular flatted portion, pin means projecting laterally from each of said pin supporting portions in opposite directions and adapted to be rotated into locking engagement with opposite sides of the belt rail, and locking plunger means on said head movable from an extended position wherein it overlies said annular flatted portion in a manner to lock the head against rotation relative to said body to a retracted position wherein it clears said flatted end portion and enables said head to freely rotate relative to said body in order to move said pin means into and out of locking engagement with said one belt rail.

20. The invention as defined in claim 19 wherein said locking plunger means comprises a plunger slidably mounted on said head and adapted to slide between a first position and a second position, and resilient means for normally resiliently biasing said plunger to said first position, said plunger overlying a flat on said annular flatted portion when in said first position to lock the head against rotation relative to said body, and being retracted clear of the annular flatted portion when in said second position to enable said head to freely rotate relative to said body to engage and disengage said pin means from the belt rail.

21. In a freight bracing system for securing freight in a storage space having belt rails secured to the side walls thereof, a freight bracing bar adapted to span between the side walls, an end fitting for releasably connecting one end of the freight bracing bar to one of the belt rails, said end fitting having a shank on the inner end thereof, means for telescopically mounting said shank within said one end of the freight bracing bar in a manner to prevent relative rotation therebetween, means on the outer end of said end fitting for slidably engaging said one belt rail to support the end fitting for sliding movement therealong and to support the end fitting against movement perpendicular to the belt rail, resilient means for resiliently urging said shank outwardly of the freight bracing bar to resiliently maintain the means on the outer end of said end fitting in sliding engagement with the belt rail, and rotatable means mounted on said end fitting for rotation about an axis substantially parallel to said bar and adapted to be rotated into locking engagement with the belt rail to releasably lock the end fitting against sliding movement relative to the belt rail.

22. An end fitting for connecting a freight bracing bar to a belt rail, said end fitting having a shank on the inner end thereof adapted to be mounted within the end of the freight bracing bar, means on the outer end of said end fitting for slidably engaging the belt rail in a manner to enable the end fitting to slide along the belt rail and to restrict the end fitting against movement perpendicular to the belt rail and perpendicular to said shank, and rotatable means mounted on said end fitting for rotation about an axis substantially parallel to said bar and rotatable into and out of locking engagement with the belt rail to releasably lock the end fitting against sliding movement relative to the belt rail.

23. The invention as defined in claim 22 including locking plunger means on said end fitting for releasably

locking said rotatable means against rotation to maintain the rotatable means in locking engagement with the belt rail.

24. The invention as defined in claim 23 wherein said rotatable means comprises a head rotatably mounted on said end fitting near the outer end thereof, and means on said head adapted to be rotated into and out of locking engagement with opposite sides of the belt rail.

25. An end fitting for connecting the end of a freight bracing bar to a belt rail having a plurality of spaced apertures therein, said end fitting having a shank on one end thereof adapted to be mounted within the end of the freight bracing bar and a head on the other end thereof adapted to be releasably connected to the belt rail, said head having spaced pin supporting portions projecting outwardly therefrom in position to overlap opposite sides of the belt rail, said pin supporting portions having pin means projecting laterally therefrom and adapted to be rotated into apertures in the belt rail, and means for releasably locking said head against rotation relative to said belt rail to hold said pins in the apertures, one of said pin supporting means having a supporting surface thereon adapted to ride on the side of the flange adjacent thereto to support the end fitting on the flange and to enable it to slide along the flange when the pins are disengaged from the apertures, said supporting surface being relatively flat with a rounded portion adjacent one edge thereof, said rounded portion providing a bearing surface for enabling said end fitting to rotate on the flange to engage and disengage the pins from the apertures and to slide along the flange when the pins are disengaged.

26. An end fitting for connecting a freight bracing bar to a belt rail, said end fitting comprising an elongated body having a shank on the inner end thereof adapted to be

mounted within the end of the freight bracing bar and an outwardly presenting slot in the outer end thereof adapted to fit over and slidably engage the belt rail, a head slidably and rotatably mounted on said body near said outer end thereof, stop means on said body for limiting sliding movement of said head toward said outer end, means on said head adapted to overlie and to be rotated into locking engagement with the opposite sides of the belt rail to prevent movement of said end fitting substantially parallel to the plane defined by said belt rail and freight bracing bar, and locking means for releasably locking said head against rotation relative to said body to maintain said last mentioned means in locked engagement with said belt rail, said means on said head comprising pin supporting portions projecting outwardly from said head along the sides of said outer end of the body and spaced apart a sufficient distance to clear said body, pin means projecting laterally from each of said pin supporting portions in opposite directions and adapted to be rotated into engagement with opposite sides of the belt rail to lock the end fitting against movement substantially parallel to the plane defined by the belt rail and freight bracing bar, and wherein said locking means releasably locks said head against rotation relative to said body to maintain said pin means in locked engagement with the belt rail.

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