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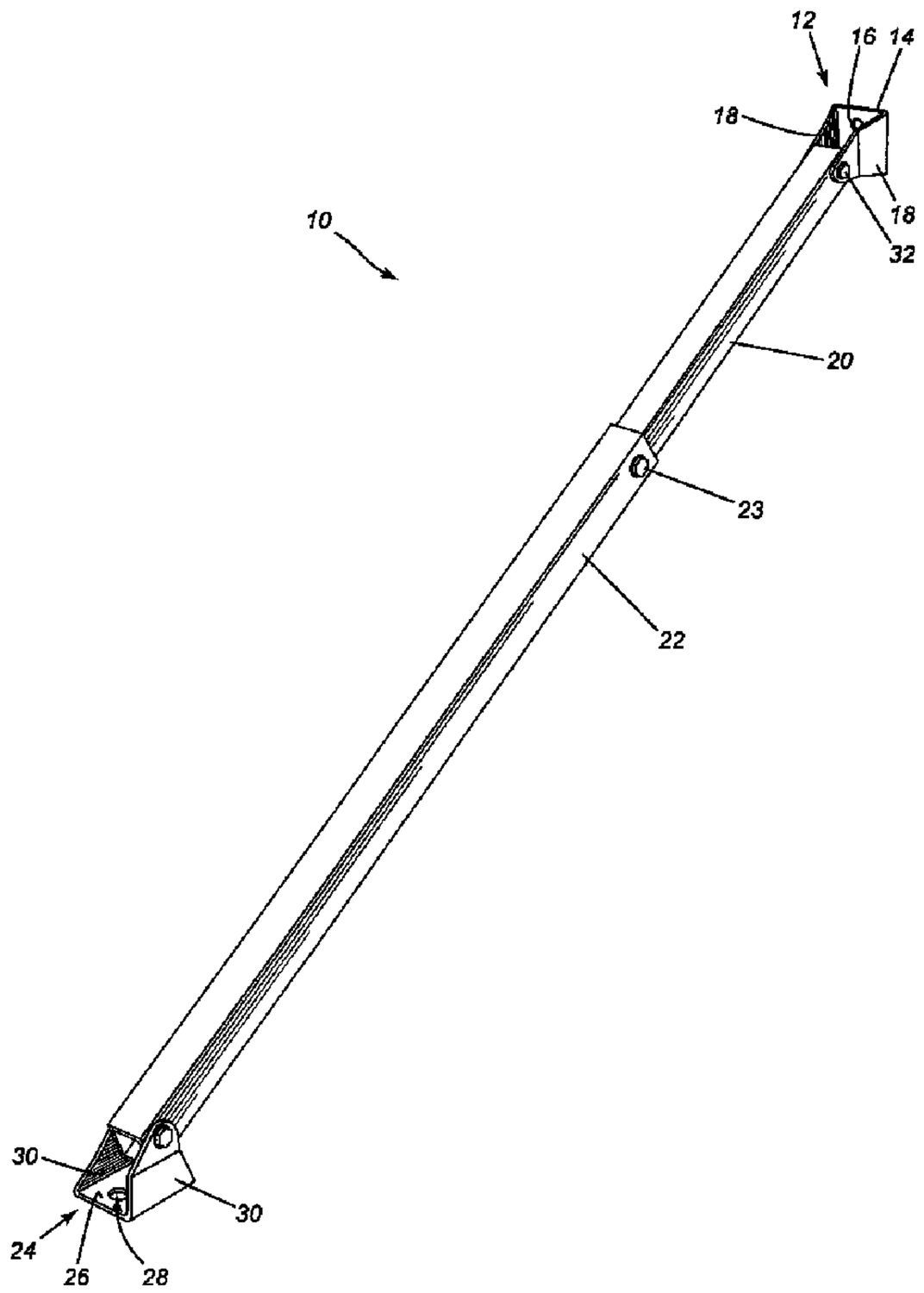
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(54) Title: ADJUSTABLE BRACE



(57) Abrégé/Abstract:
An improved reconstructed pallet rack structure wherein one of the diagonal braces is replaced, the diagonal brace having first and second members which are telescopically arranged and secured to the other in a desired position, a first bracket mounted on either

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(57) Abrégé(suite)/Abstract(continued):
a first upright post or a horizontal beam and a second bracket mounted on the second post, the arrangement being such that a longitudinal center line of the brace passes through, at each end, a point of joinder between a post and a beam.

ABSTRACT

An improved reconstructed pallet rack structure wherein one of the diagonal braces is replaced, the diagonal brace having first and second members which are telescopically arranged and secured to the other in a desired position, a first bracket mounted on either a first upright post or a horizontal beam and a second bracket mounted on the second post, the arrangement being such that a longitudinal center line of the brace passes through, at each end, a point of joinder between a post and a beam.

ADJUSTABLE BRACE

FIELD OF THE INVENTION

The present invention relates to a pallet rack structure and more particularly, relates to an adjustable brace suitable for use in repairing a pallet rack structure.

BACKGROUND OF THE INVENTION

Pallet racks are well known and are widely used in warehouses wherein typically they extend in a plurality of rows for substantially the height of the building with space being provided between the rows for fork lift trucks to operate. The fork lift trucks will remove pallets from the shelves as required for the shipping of the product thereon and/or for further processing.

More recently, the trend has been to open large warehouse or "big box" stores to the public. In such stores, pallet racks are used to display the merchandise.

Inherently, there are dangers in such a system and safeguards against collapse must be provided. Numerous accidents have occurred over the years and injuries and death have occurred as a result of the collapse of the pallet racks.

To date, most of the safety concerns have centered around the various design criteria to ensure that the pallet racks are capable of accepting the loads to which they are subjected. The conventional pallet rack is of a knock down design wherein the vertical posts are provided with horizontal beams which are secured to the posts. Diagonal bracing extending between posts may then be provided to further ensure a rigid structure.

While the engineering of the pallet racks provides sufficient safety for normal use, the racks are very susceptible to damage. Inherently, the loaded pallets must be lifted onto

the racks by fork lift trucks. Due to the often limited spaces, an accident wherein the fork lift truck will collide with one of the vertical posts occurs sufficiently frequently. With the very high loads which the pallet racks carry, this is a dangerous situation and any post even slightly damaged has to be replaced.

In order to replace a damaged post, the load of pallets must be removed from the structure and the rack disassembled. After new rack components are installed, the pallets must be reloaded on the structure. As will readily be understood, this is both an extensive and time consuming process.

It has been suggested in the art that pallet rack repair systems can be provided and which systems overcome the above disadvantages. An example of such a system is shown in Canadian Patents 2,232,178 and 2,280,645.

While the above mentioned pallet repair systems function very well, frequently there is a need to replace a diagonal brace which extends between two levels of the pallet. However, to merely provide a conventional diagonal brace which is secured to the vertical posts does not necessarily add sufficient rigidity to the structure.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a diagonal brace for use in the repair of pallet rack structures.

According to one aspect of the present invention, there is provided in a pallet rack structure comprising four corner posts, a plurality of beams extending between the corner posts, a plurality of diagonal braces extending between the corner posts, the improvement comprising at least one of the diagonal braces extending between first and second corner

posts, the diagonal brace having first and second members, the first and second members being telescopically arranged, means for securing the first and second members together in a fixed position, a first bracket mounted on the first post, and a second bracket mounted on the second post, the arrangement being such that an extended longitudinal center line of the brace passes through, at each end, a point of joinder of a post and a beam.

According to a further aspect of the present invention, in a pallet rack structure comprising four corner posts, a plurality of beams extending between the corner posts, there is provided a plurality of diagonal braces extending between the corner posts, the improvement comprising at least one of the diagonal braces extending between first and second corner posts, the diagonal brace having first and second members, the first and second members being telescopically arranged, means for securing the first and second members together in a fixed position, a first bracket mounted on a beam, and a second bracket mounted on a post, the arrangement being such that an extended longitudinal center line of the brace passes through, at each end, at a point of joinder between post and a beam.

According to a still further aspect of the present invention, there is provided in a method of repairing a pallet rack structure wherein a reinforced base portion is installed on the pallet rack structure, the improvement comprising the step of replacing a diagonal brace above the reinforced base portion, including the steps of attaching a first bracket to one of a horizontal beam or a vertical post, attaching a second bracket to a vertical post, securing a telescopic brace to the first and second brackets, the arrangement being such that an extended longitudinal center line of the brace passes through, at each end, a point of joinder between a post and a beam.

The improvements of the present invention are designed to be used in the repair of pallet racks. As aforementioned, such pallet rack repair systems are shown in Canadian Patents 2,280,645 and 2,232,178, the teachings of which are hereby incorporated by reference.

In the prior art patents, typically a portion of a front and optionally a rear post are replaced depending upon the damage and the desired results. The present invention is designed to be used to replace the diagonal brace immediately above the repaired section. In this arrangement, there is always a horizontal beam which is replaced.

According to the present invention, the diagonal brace is arranged such that an extended longitudinal center line of the brace passes through a point of joinder of a post and beam. This occurs at both the upper and lower extremities of the brace.

The lower end of the brace may be secured either to a post or alternatively, to a beam. In either case, the arrangement of the bracket is such that the extended longitudinal center line of the brace extends through the point of joinder of the beam and post.

In the case of the upper bracket, it is always secured to the post.

BRIEF DESCRIPTION OF THE DRAWINGS

Having thus generally described the invention, reference will now be made to the drawings illustrating embodiments thereof, in which:

Figure 1 is a perspective view of a replacement brace according to the present invention;

Figure 2 is an end elevational view of a portion of a pallet rack utilising the replacement brace of the present invention;

Figure 3 is a side elevational view of a bracket secured to a vertical post of a pallet rack;

Figure 4 is a cross sectional view through a post having a bracket secured thereto;

Figure 5 is an end elevational view of a portion of a pallet rack utilising the replacement brace as a horizontal beam; and

Figure 6 is an end elevational view of use of a replacement brace in a pallet rack.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings in greater detail and by reference characters thereto, there is illustrated in Figure 1 a replacement brace assembly which is generally designated by reference numeral 10.

Replacement brace assembly 10 includes a first bracket 12 which, in the illustrated embodiment, is shown at an upper end of the replacement brace assembly 10. First bracket 12 has a back wall 14 with an aperture 16 formed therein. Extending outwardly from back wall 14 are a pair of side walls 18.

Replacement brace assembly 10 includes a first brace member 20 and a second brace member 22. First brace member 20 and second brace member 22 are sized to be in a telescopic arrangement with first brace member 20 fitting within second brace member 22. A bolt 23 extends through both first brace member 20 and second brace member 22 to hold the brace members in the desired position and having the desired length.

At the lower end of second brace member 22, there is provided a second bracket 24. Second bracket 24 is similar to first bracket 12 and thus includes a back wall 26 having an aperture 28 formed therein and a pair of side walls 30.

As shown in Figure 2, a typical pallet rack will include vertical posts 40, and 42 along with horizontal beams 44, 46. In the embodiment of Figure 2, a replacement brace assembly 10 is secured between vertical posts 40 and 42. As may be seen in Figures 3 and 4, a plate member 48 is placed on an exterior wall of vertical posts 40 and a bolt 50 passes through vertical post 40 and through aperture 16 of back wall 14 and is held in place by means of a nut 52. A similar arrangement is provided at the lower end of second brace member 22.

First brace member 20 is secured to first bracket 12 by means of a bracket bolt 32 which extends through the side walls 18 and through first brace member 20.

As will be seen in the Figures, a center line 56 of first brace member 20 and second brace member 22 extends such that it passes through the center of vertical post 40 where horizontal beam 44 meets the first vertical post 40. A similar arrangement exists at the other end where second bracket 24 is arranged such that the center line of the brace members also terminates proximate the center of vertical post 42.

As seen in Figure 5, the brace of the present invention may also be used as a horizontal member with brackets 12 and 24 being secured to posts 40 and 42.

In the embodiment of Figure 6, bracket 12 is secured to a horizontal beam B in lieu of a vertical post.

It will be understood that the above described embodiments of illustration only and that changes and modifications may be made thereto without departing from the spirit and scope of the invention.

The embodiments of an invention in which an exclusive property or privilege is claimed is defined as follows:

1. In a pallet rack structure comprising:

four corner posts;

a plurality of beams extending between said corner posts;

a plurality of diagonal braces extending between said corner posts;

the improvement comprising:

at least one of said diagonal braces extending between first and second corner posts, said diagonal brace having first and second members, said first and second members being telescopically arranged, means for securing said first and second members together in a fixed position, a first bracket mounted on said first post, and a second bracket mounted on said second post, the arrangement being such that an extended longitudinal center line of said brace passes through, at each end, a point of joinder of a post and a beam.

2. The improvement of Claim 1 wherein each of said first and second brackets comprises a bracket back wall, first and second bracket side walls extending outwardly therefrom, an aperture formed in each of said bracket side walls, and a locking member extending through said apertures in said side walls and an end of one of said members forming said diagonal brace.

3. The improvement of Claim 2 wherein said locking member comprises a nut and bolt.

4. The improvement of Claim 2 wherein said means for securing said first and second members comprises a nut and bolt extending through said first and second members.

5. In a pallet rack structure comprising:

four corner posts;

a plurality of beams extending between said corner posts;

a plurality of diagonal braces extending between said corner posts;

the improvement comprising:

at least one of said diagonal braces extending between first and second corner posts, said diagonal brace having first and second members, said first and second members being telescopically arranged, means for securing said first and second members together in a fixed position, a first bracket mounted on a beam, and a second bracket mounted on a post, the arrangement being such that an extended longitudinal center line of said brace passes through, at each end, at a point of joinder between post and a beam.

6. The improvement of Claim 5 wherein each said first and second brackets comprises a bracket back wall, first and second bracket side walls extending outwardly therefrom, an aperture formed in each of said bracket side walls, and a locking member extending through said apertures in said side walls and an end of one of said members forming said diagonal brace.

7. In a method of repairing a pallet rack structure wherein a reinforced base portion is installed on said pallet rack structure, the improvement comprising the step of replacing a diagonal brace above said reinforced base portion, including the steps of attaching a first bracket to one of a horizontal beam or a vertical post, attaching a second bracket to a vertical post, securing a telescopic brace to said first and second brackets, the arrangement being such that an extended longitudinal center line of said brace passes through, at each end, a point of joinder between a post and a beam.

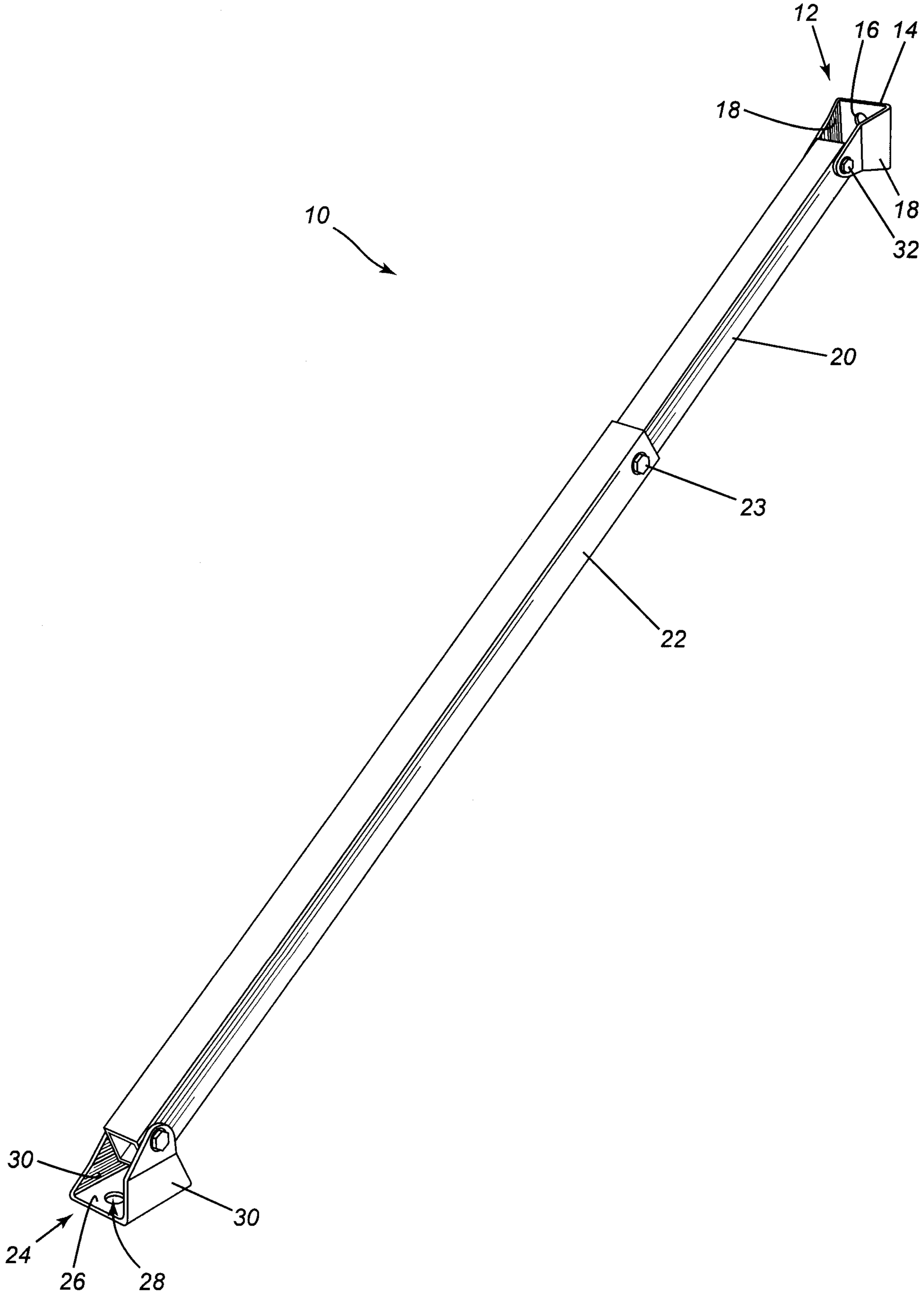


FIG. 1

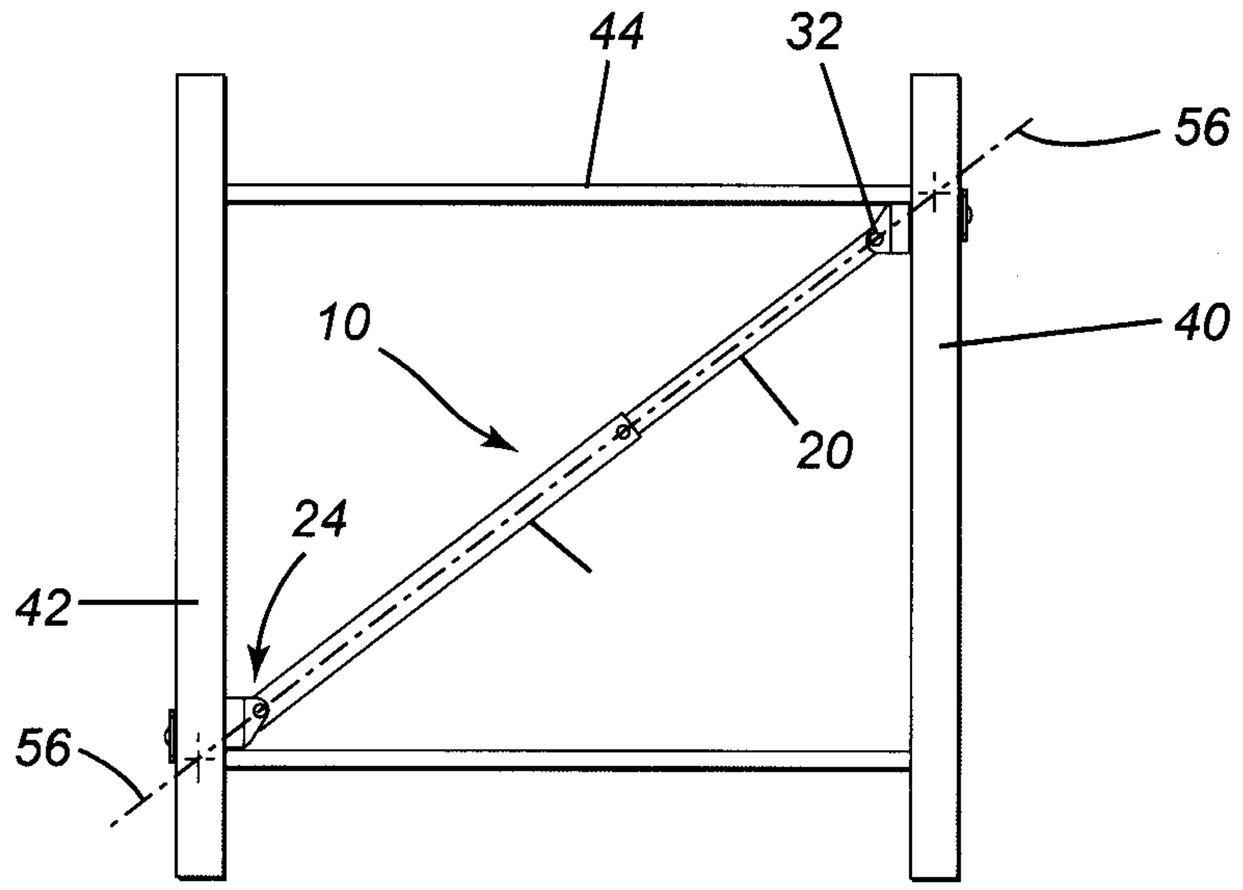


FIG. 2

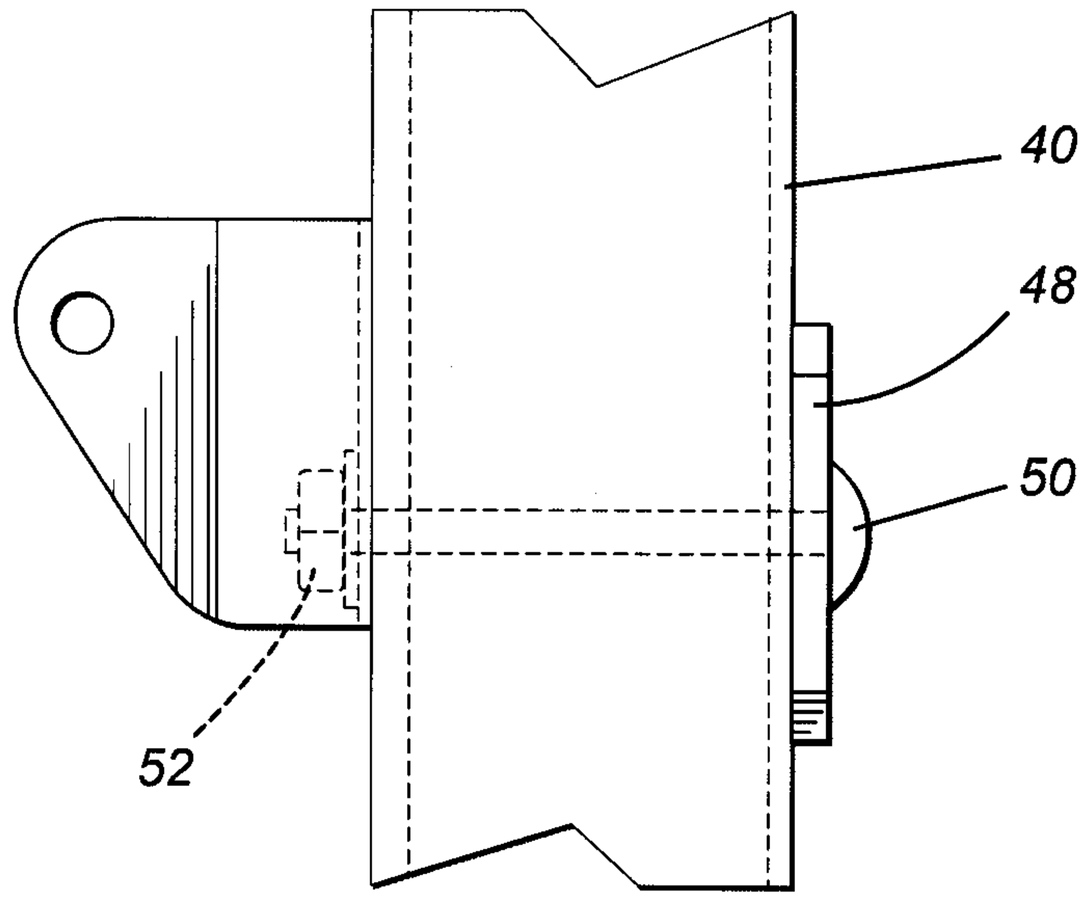


FIG. 3

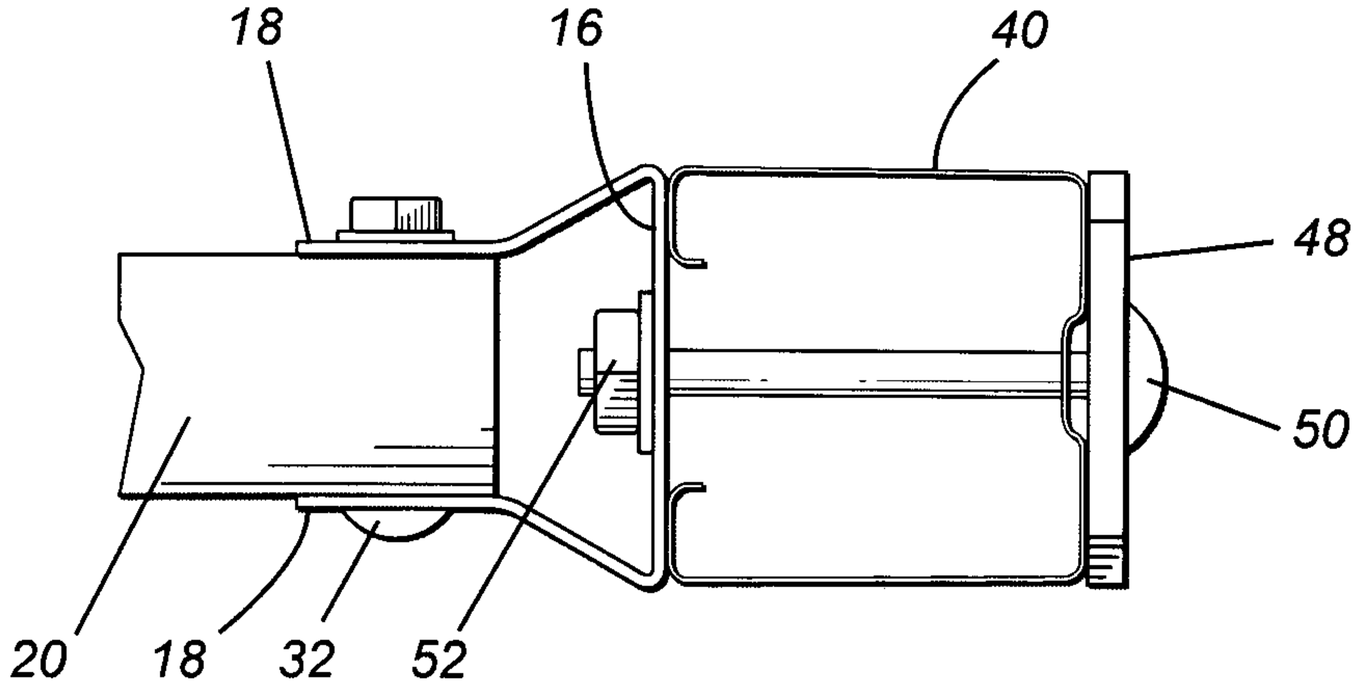


FIG. 4

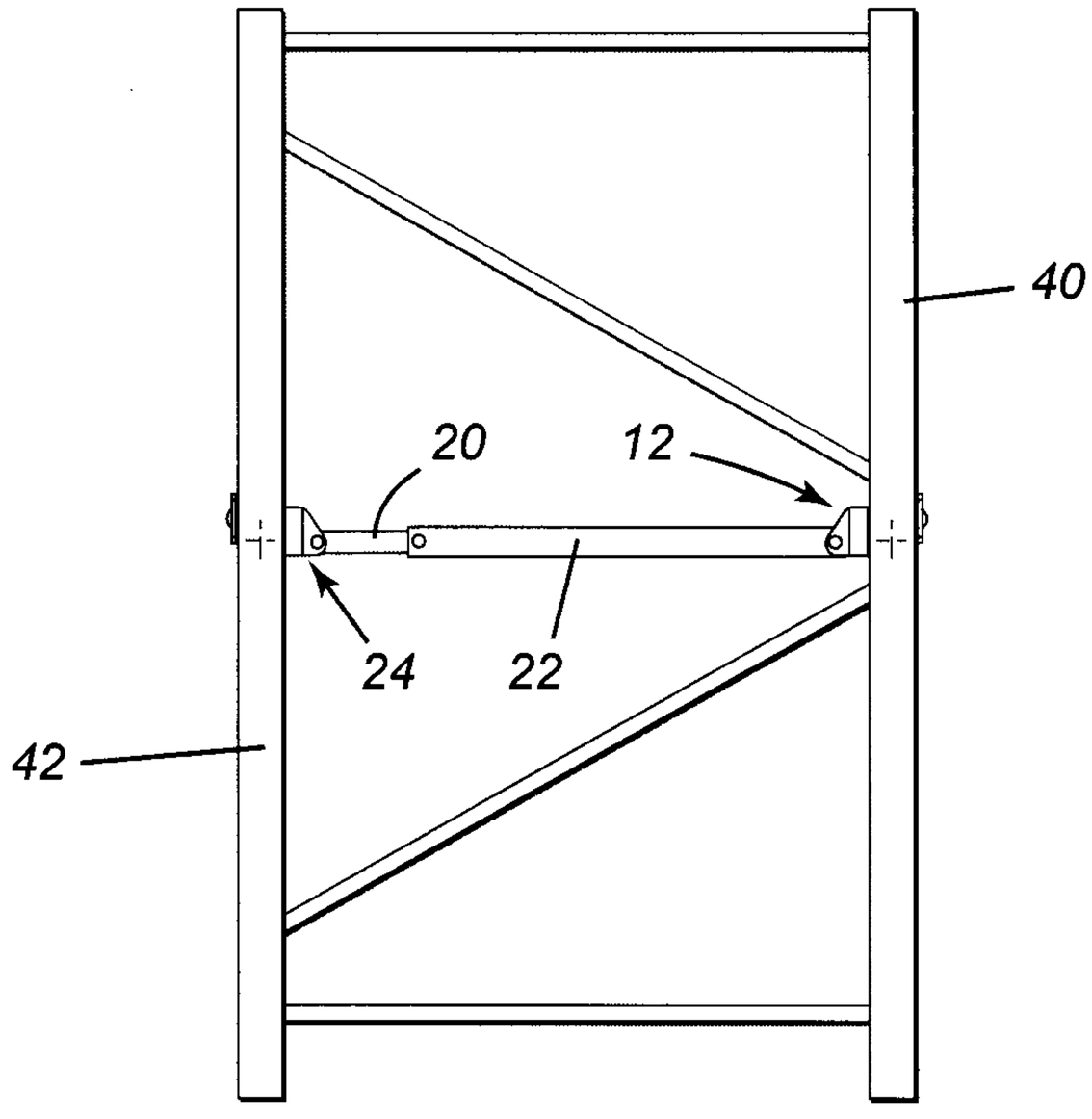


FIG. 5

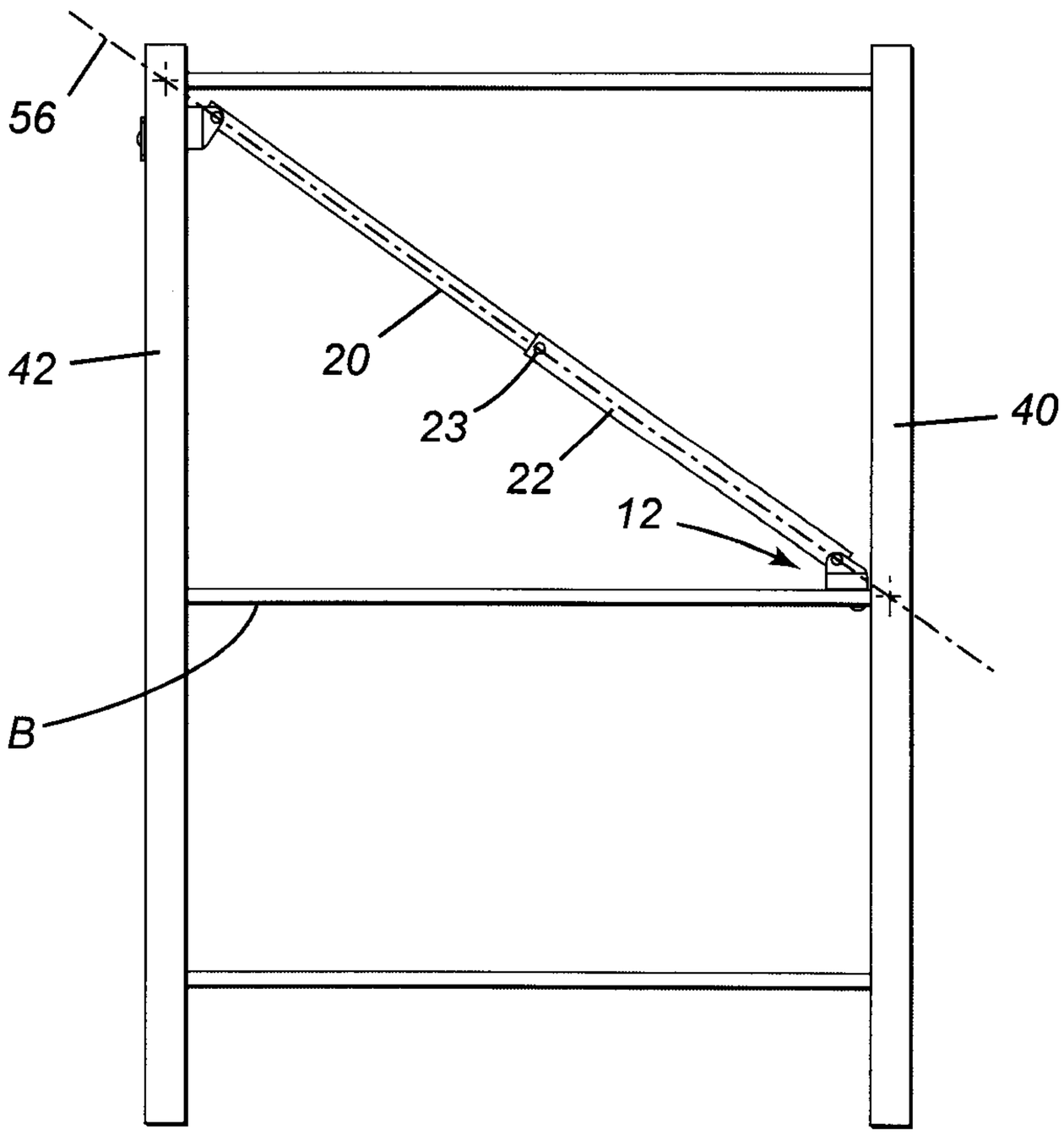
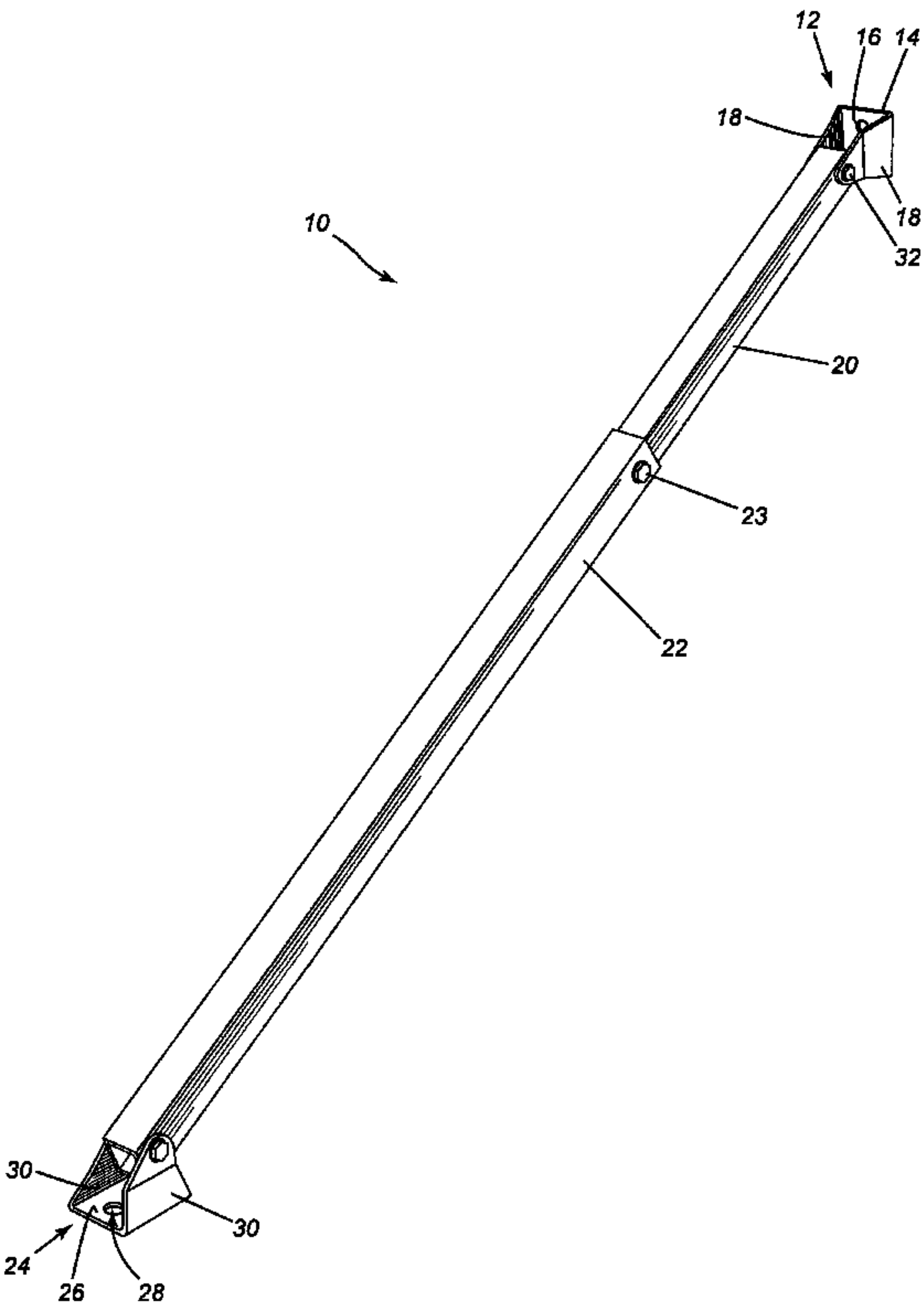


FIG. 6


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