Nov. 29, 1960 L. H. BEST 2,962,170

STORAGE RACKS

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Fig. 1

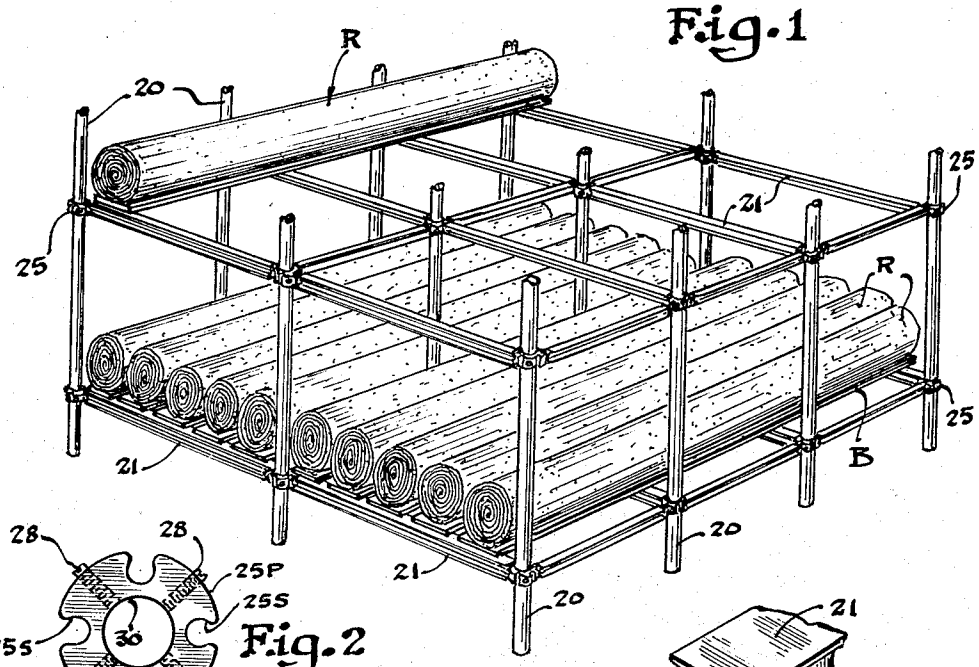


Fig. 2

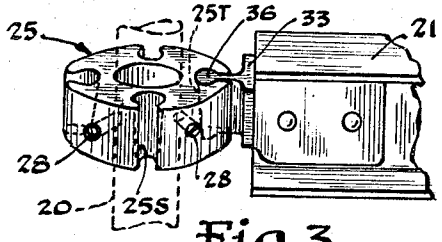


Fig. 3

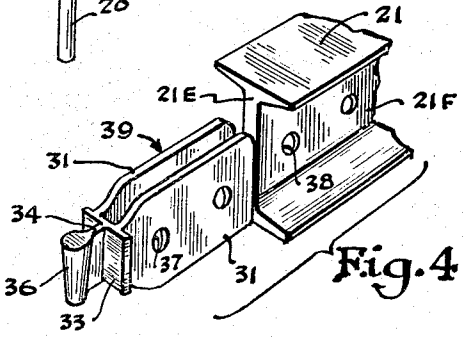
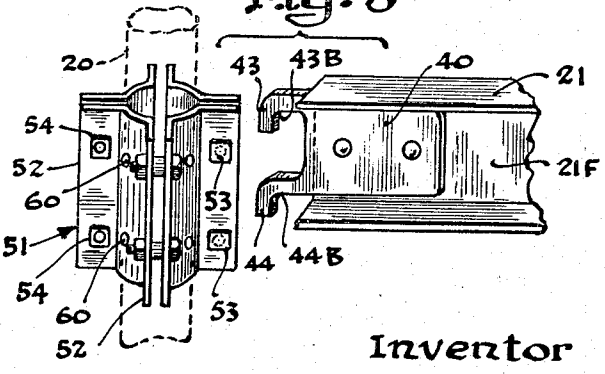


Fig. 4

Fig. 5



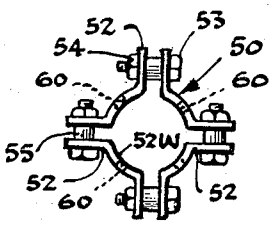


Fig. 6

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Fig. 7

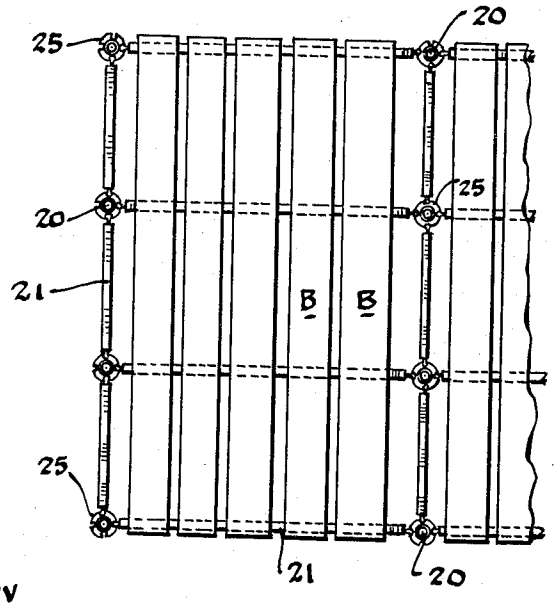


Fig. 6A

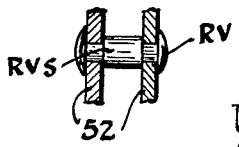


Fig. 6B

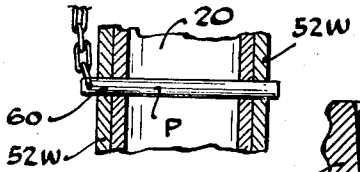


Fig. 10

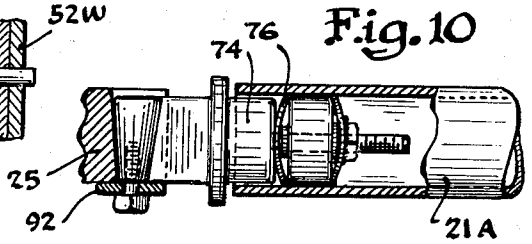


Fig. 8

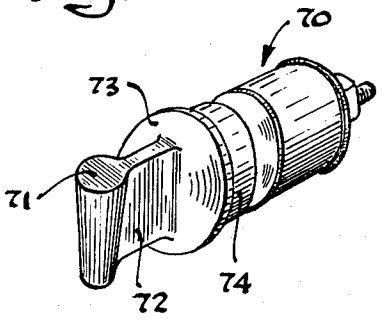
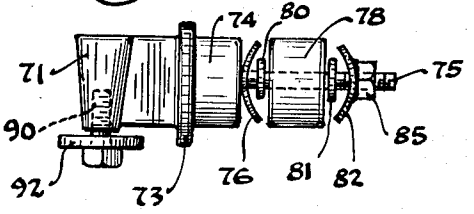


Fig. 9



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STORAGE RACKS

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2 Claims. (Cl. 211—182)

This invention relates to the construction of a storage rack for large rolls of linoleum, broadloom carpeting and the like.

The proper storage of rolled floor coverings of the foregoing kind presents many problems in view of the heavy and bulky nature of the rolled material, and various forms of expensive and complicated storage rack structures have been resorted to in endeavoring to facilitate such storage. Additionally, it is sometimes difficult to properly orient a large storage rack for such bulky material within the availabilities of floor area in the warehouse.

The primary objects of the present invention are to enable a storage rack for broadloom carpeting, linoleum and the like to be easily set up and constructed from a minimum number of parts, and to be able to enlarge the rack structure in any one of four directions at will.

Specifically, it is an object of the present invention to construct a storage rack of the foregoing kind preferably from tubular uprights, horizontal tie members which can be of different shapes, and four-socket couplers which can be mounted on the uprights in selected vertical positions, the sockets of which are configured to receive complemental attaching elements at the ends of the tie members. The sockets in the couplers are located at 90° positions about the periphery of each coupler, and accordingly the tie members can radiate in any one of four directions.

Other objects of the present invention are to provide attaching head structure of a particular kind at the ends of the tie members so that the latter can be quickly and expeditiously joined to the couplers with minimum effort but with assurance of a rigid interconnection.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show preferred embodiments of the present invention and the principles thereof and what is now considered to be the best mode contemplated for applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is a perspective view of a rack constructed according to the present invention;

Fig. 2 is a plan view of one of the couplers embodied in the rack of Fig. 1;

Fig. 3 is a perspective view showing the manner in which one of the horizontal tie members in the rack of Fig. 1 is connected to the aforesaid coupler;

Fig. 4 is a perspective view showing one way in which a horizontal tie member can be provided with a head;

Fig. 5 is a perspective view showing another form of coupler and attaching head;

Fig. 6 is a top plan view of the coupler shown in Fig. 5;

Figs. 6A and 6B are detail sectional views of modifications contemplated for the coupler of Fig. 6;

Fig. 7 is a fragmentary top plan view of the rack of the present invention;

Fig. 8 is a perspective view of another modified form of head attachment;

Fig. 9 is a side elevation of the head attachment shown in Fig. 8; and

Fig. 10 is a sectional view showing operative placement of the head attachment of Fig. 9.

A rack constructed in accordance with the present invention is illustrated in Figs. 1 and 7 as arranged for the storage of rolls R of broadloom carpeting, linoleum and the like, and this rack is constructed from tubular uprights 20 and horizontal tie members 21 which are connected to the uprights in a manner to be explained below. The horizontal tie members are what in effect space the uprights, and hence the space between the uprights will be dependent on the dimensions of the horizontal tie members. Advantageously, the tie members can be located in selected vertical position relative to the uprights as will be explained, and boards B are conveniently laid on the uprights to afford shelves for as many tiers of the material R as is convenient. It will be realized that the boards B are merely one convenient form of shelving, and can of course be eliminated especially if the rolled material is relatively rigid as in the instance of linoleum. However, where it is expected that the rolled material will lay in the rack for prolonged periods, it is important to resort to shelving of one kind or another laid on the horizontal tie members.

In relating the tie members to the uprights, circular or 360° couplers are secured to the uprights, and these couplers are provided with 90° spaced apart sockets for receiving complemental attaching elements afforded by attaching heads at the opposite ends of the horizontal tie members. Several different forms of couplers can be used as will be explained, and the attaching heads also can be constructed in different ways. In any event, it is preferred that the couplers be movable to selected vertical locations on the uprights so as to be capable of varying the plane or planes in which the rolled material will lie above the level of the warehouse floor.

Thus, referring to Figs. 2 to 4, there is illustrated in detail a coupler 25 which is the form of the coupler used in constructing the rack of Figs. 1 and 7. This particular coupler 25 is of cast iron, being a one-piece cast part, cast to have the various sockets and openings to be described. It should be pointed out, however, that a coupler as 25 could be cast from malleable iron to afford a blank which can then be machined and drilled to include the various openings and sockets to be described.

The coupler 25 is of circular 360° form having a truly circular outer periphery 25P, and at 90° equidistantly spaced locations about the periphery, the coupler 25 is formed with identically shaped and dimensioned sockets 25S. These sockets open at the peripheral outer wall of the coupler 25 and extend from the upper flat face to the lower flat face thereof. Additionally, each socket includes means to prevent downward displacement of an attaching element therein, and such securement is afforded by providing the sockets 25S with interior walls that are tapered from top to bottom as indicated at 25T. The wide end of the taper wall is upper-most and the narrow end is lower-most when a coupler 25 is properly mounted on an upright 20.

In mounting the coupler 25 on an upright, the coupler is formed with a relatively large opening 30 at the geometric center thereof, and this opening extends between and opens at the flat upper and lower faces referred to. The opening 30 has a diameter somewhat greater than the outer diameter of the uprights 20 to

enable the coupler 25 to move freely thereon, but the coupler 25 at locations between the sockets 25S is tapped to receive set screws 28, and the tapped openings are extended to the center opening 30 so that when a coupler 25 has been mounted on an upright 20 the set screws can be turned in to tightly clamp the upright and hold the coupler in a selected vertical position.

The holding surface afforded by the tapered wall in each sockets 25S is configured complemental to a corresponding tapered attaching element constituting part of an attaching head at each end of the horizontal tie members. The latter can be of different form, and in the present instance are disclosed as I-beams as will be noted in Fig. 4. The attaching head 39 illustrated in Figs. 3 and 4 is the attaching head used in constructing the rack in Fig. 1, and it will be observed that the attaching head 39 includes a pair of spaced or bifurcated arms 31 which are dimensioned to closely embrace the vertical flange 21F of the I-beam 21. The attaching head 39 is provided with a stop plate 33 integral with the arms 31 and which will engage flush against the planar end surface 21E of the I-beam 21. Integral with and extending forwardly from the stop 33 in normal relation thereto is a spacer plate 34, the end of which is provided with an integral tapered plug or pin 36.

The arms 31 of the attaching head 39 are formed with a pair of spaced apertures 37, and there are adapted to register with spaced apertures 38 formed at what constitutes the attaching end of the tie member 21. When so registered, rivets, plug welds or any other convenient type of fastener is then afforded between the registered openings 37 and 38 to rigidly join the attaching head 39 to the horizontal tie member 31, and it will be realized that the end of each horizontal tie member is provided with such an attaching head.

As mentioned, the tapered socket 25S and the attaching element or pin 36 are complementally shaped, and hence, as shown in Fig. 3, an attaching element 36 can be inserted into a tapered socket 25S from the upper wide end thereof to join one end of a horizontal tie member to a coupler 25. This type of connection is repeated for each tapered socket 25S that is to be utilized, and the various tie members will of course radiate from the couplers in right angular relation. In this connection, it will be realized that the rack illustrated in Fig. 1 can be enlarged fore or aft, left or right, and this is of particular advantage in engineering a rack of the present invention in accordance with allocated or available floor area in a warehouse.

Modifications of the coupler and the attaching head are illustrated in Figs. 5 and 6, and in Fig. 5 the horizontal tie member 21 is again in the form of an I-beam described above.

The attaching head illustrated in Fig. 5 includes a plate 40 located on one side or the other of the flange 21F of the I-beam 21, and openings as 37 and 38 referred to above are utilized in rigidly joining the attaching head 40 to the attaching end of the tie member 21. The plate 40 in the free end thereof outwardly of the end of the tie member 21 is formed with a pair of hooks 43 and 44 with the hook ends bent downwardly, and these hook ends constitute the attaching elements of the attaching head 40 to be associated with a coupler 50 now to be described.

The coupler 50 is also of closed or 360° form and is constructed from four symmetrical shaped plates 51. Each such plate includes a pair of spaced flat vertical flanges 52 which extend outwardly at right angles one to another as clearly shown in Fig. 6, and these flanges are joined by an arcuate web 52W having a concave inner curvature complemental to that of the tubular upright 20. In joining the plates 51 to complete construction of the coupler 50, pairs of bolts 53 are passed horizontally through a corresponding pair of openings in the adjacent flanges 52 of a pair of adjacent plates 51, and the exposed threaded ends thereof are provided with nuts 54. Spacers or bosses 55 are mounted concentric about the shank portions of the bolts 53 between the inner faces of the flanges 52 of an opposed pair of coupler plates 51, and in securing the coupler 50 to an upright the nuts and bolts are turned until the concave inner faces of the arcuate webs 52W tightly clamp the outer surfaces of the related upright 20.

The spacers 55 are located sufficiently outwardly of the inner faces of the webs 52W to enable the hooks 43 and 44 to be passed downwardly in the socket space between the inner faces of the flanges 52 of an opposed pair of plates 51 with the bights 43B and 44B of the hooks resting on the curved surfaces of the spacers 55. In this way, the rigid spacers 55 within the sockets afforded by the spaced flanges 52 present downward displacement of the hooks 43 and 44.

As mentioned, fixing of the coupler 50 relative to the uprights is accomplished as an incident to tightening the nuts and bolts 53 and 54. As an alternative mode of construction, these nuts and bolts can be eliminated and replaced by special rivets RV, Fig. 6A, having enlarged spacer shanks RVS equivalent to the spacers 55. This will be course result in a rigid assembly in which event spaced openings 60 formed in the webs 52W can be aligned with like spaced openings in the uprights 20 to receive retainer pins P, Fig. 6B, passed through the aligned openings from one side of the upright to the other to hold the couplers 50 in the desired selected position on the related upright.

In Figs. 8 to 10 inclusive there is disclosed a separable attaching head which includes a resilient sleeve of rubber or the like adapted to be placed under compression within a tubular form of a horizontal tie member 21A, Fig. 10.

The attaching head, 70 in this instance, is of the type to be used with the couplers 25 of the kind shown in Fig. 2 and thus includes a tapered pin or plug 71 at the outer end thereof, this pin being joined by a web 72 to a circular or disc shaped stop 73. The stop 73 in turn is cast integral with a boss 74 of reduced diameter adapted to be disposed within the tubular horizontal tie member 21A as shown in Fig. 10.

An elongated stud 75 is cast medially in a normal relation on the rear side of the boss 74 so as to project in an inward direction away from the free end of the boss 74. Arranged concentric about the stud 75 is a dished plate or washer 76 located adjacent the free face of the boss 74. A cylindrical rubber block 78 is mounted concentric on the stud 75, and a pressure washer 80, mounted concentric on the stud 75, is interposed between the washer 76 and the rubber block 78. Another pressure washer 81 is mounted concentric on the stud 75 on the side of the block 78 opposite the washer 80, and a second dished washer 82 on the convex outer side thereof is welded to a nut 85 which is turned up on the threaded end of the stud 75. If desired, such welding can be replaced by a lock washer between nut 85 and plate 82 to prevent turning of the latter.

The dished washers 76 and 82 in their uncompressed state are of somewhat less outside diameter than the rubber expander block 78, and it will be observed that these washers have their concave sides facing toward the flat end surfaces of the rubber cylinder 78.

The rubber cylinder 78 and the two washers 76 and 82 have diameters enabling these to be easily placed into the open end of the hollow tie member 21A. The nut 85, being secured to the washer 82, will be held against rotation by first twisting the rigid parts of the attaching head 70 to bring about initial engagement of the sharp edges of the washer 82 with the rear or flat inner face of the cylinder 78 just prior to inserting the assembly into the tube 21A, and advantageously the washer 82 has a pronged or toothed periphery. After this initial

slight tightening has been accomplished and insertion made, the parts **71**, **72**, **73**, **74** and **75** are twisted as a unitary body causing the nut **85** to in effect run up on the threaded portion of the bolt **75** toward the washer **80** thereby squeezing the cylinder **78** between the four identified washers, and eventually the cylinder **78** is compressed to such a state as to sufficiently enlarge its outer diameter to cause tight binding with the tube **21A**, thereby resulting in a secure attachment of the attaching head **70** to the tube **21A**.

In order to provide a safeguard against accidental upward displacement of the pin **71** out of the related socket **25S** in a coupler **25**, the narrow bottom end of the tapered pin **71** is tapped to receive a fastening bolt **90**. A retainer element in the form of a plate **92** is interposed between the head of the bolt **90** and the flat lower end of the pin **71**. The plate **92** is of wider dimension than the narrow lower end of the pin **71**, such as to engage the flat solid surface at the bottom of a coupler **25** in the area surrounding the narrow lower end of the socket **25S**. The plate **92** is of course, not secured in place until after the pin **71** is in place.

It will be seen from the foregoing that under the present invention a storage rack for bulky rolled material of heavy nature can be conveniently set up and constructed from vertical uprights and horizontal tie members, the latter being secured to the uprights through the medium of the couplers and attaching heads herein described. The arrangement is further such that interconnections are available at 90° positions. The couplers are capable of being moved to selected vertical positions on the uprights and fixed in such selected positions, and in all instances the attaching elements on the attaching heads can be quickly and easily associated and disassociated with the sockets of the couplers, and means are afforded within the sockets to hold the attaching elements against downward displacement.

Hence, while I have illustrated and described preferred embodiments of my invention, it is to be understood that these are capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a storage rack of the kind described, vertical uprights and horizontal hollow tie members, couplers mounted on said uprights and attaching elements provided at the opposed ends of said tie members, said couplers being of 360° form surrounding said uprights and having axial openings therein enabling the couplers to be moved vertically on said uprights, said couplers having four 90° displaced elongated sockets located about and opening at the periphery thereof, said sockets in each coupler having open upper ends and extending longitudinally generally parallel to the axial opening therein, said attaching elements being fitted in said sockets from the upper ends thereof and means holding said elements in the sockets against downward displacement, attaching heads mounting said attaching elements on said tie members, each attaching head comprising a boss member formed on the attaching element, a threaded stud rigidly associated with and projecting from the boss member, a first dished washer slidable on the stud, a second dished washer attached to a nut so as to be axially movable along said stud by relative rotation between the washer and stud, a resilient expander block concentrically disposed on the stud between said dished washers and compressible into frictional engagement with the interior of a hollow tie member by rotation of the stud within the expander block and second washer to thereby mount the attaching element on the tie member, and means for securing the couplers in selected vertical position on the uprights.

2. A storage rack according to claim 1 wherein the second dished washer has a toothed periphery for engaging said resilient retainer block to prevent relative rotation therebetween.

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