FRONT-TO-BACK MEMBER FOR BEAM TYPE STORAGE RACKS

Filed Jan. 2, 1969

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FRONT-TO-BACK MEMBER FOR BEAM TYPE STORAGE RACKS


Filed Jan. 2, 1969, Ser. No. 788,499

Int. Cl. A47b 9/00; A47t 5/10

U.S. Cl. 211—148

4 Claims

ABSTRACT OF THE DISCLOSURE

An adjustable beam type storage rack has front and rear posts and beams extending between adjacent front posts and adjacent rear posts. Members are provided extending from front to rear between beams on the same level. These members are channel-shaped with their heights tapering at both ends. Plates at the ends of the members engage the webs of the beams and are attached thereto by bolts. The beams have a connected series of non-circular apertures for receiving the bolts, whereby the members may be adjusted in height to provide for either pallet loading or for decks varying in thickness.

BACKGROUND OF THE INVENTION

Field of the invention

The invention relates to adjustable beam storage racks of the type used in industrial installations for storing palletized loads, or miscellaneous merchandise by means of decks.

Description of the prior art

Conventional beam type industrial storage racks have front and rear posts, adjacent from posts being connected by beams, the rear posts being connected by parallel beams. These beams are spaced apart a distance slightly less than the normal depth of pallets, a standard pallet depth being 48 inches. The pallets are constructed of flat boards which form a deck, cross pieces under these boards, and either full or partial decking on the other side of the cross pieces. The conventional manner of placing these pallets on the beams is to permit them to overlap or extend beyond both the front and rear beams.

Sometimes, however, it is desired that the front or rear of the pallet be flush with its adjacent beam, and this requires careful placing, lest the pallets fail to be fully supported by the beams. Moreover, it is sometimes desired to use shallower pallets, for example, pallets with 36 inch depths, on storage racks made for 48 inch pallets. Beam type storage racks are also sometimes used for miscellaneous storage without pallets and this is done by placing decking such as plywood on the beams.

For all these purposes, front-to-back members between the beams are desired. Various constructions for front-to-back members have been devised but they do not offer the advantages of the present invention.

SUMMARY OF THE INVENTION

According to the claimed invention, a front-to-back member is fabricated of a single channel-shaped piece formed without welding. The outer portions of this member are tapered and the ends are bent over to form end plates. A series of connected diamond shaped apertures are formed in these end plates to receive the square shank of a bolt which also passes through an aperture in the web of the beam. The construction is therefore such that the height of the front-to-back member relative to the top surface of the beams may be adjusted from an upper flush position to positions below the upper position. The front-to-back members may be used to support pallets or to support plywood or other decking of various thicknesses which will be flush with the beams.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of a beam type storage rack incorporating the front-to-back members of this invention, two storage bays being shown; FIG. 2 is a top plan view of one of the storage bays taken along the line 2—2 of FIG. 1 and showing four front-to-back members therein; FIG. 3 is a side elevational view of the storage rack; FIG. 4 is a front elevational view of one of the beams; FIG. 5 is an enlarged cross-sectional view in elevation taken along the line 5—5 of FIG. 2 and showing the construction of one of the front-to-back members and its connection to the beams, the front-to-back member being in its uppermost or flush position; FIG. 6 is a partial top plan view of the front-to-back member of FIG. 5; FIG. 7 is an end elevational view of the front-to-back member taken along the line 7—7 of FIG. 5; FIG. 8 is a partial view similar to FIG. 5 but showing the front-to-back member in a lower position for accommodating a plywood or similar deck; and FIG. 9 is an end elevational view taken along the line 9—9 of FIG. 3 and showing the position of the bolt with respect to the end plate of the front-to-back member.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIGS. 1, 2 and 3 show an industrial type of adjustable beam storage rack generally indicated at 21. This rack has a plurality of pairs of front posts 22 and rear posts 23 connected by cross pieces 24 and diagonal braces 25. A plurality of beams generally indicated at 26 extend between adjacent front posts, and beams generally indicated at 27 extend between adjacent rear posts. The cross-sectional shape of these beams is seen in FIG. 5, each beam comprising upper and lower horizontal flanges 28 and 29, a vertical web 31, and inclined web portions 32 and 33 connecting web 31 with the upper and lower flanges respectively. A pair of connecting members 34 and 35 are secured to the ends of each beam 26 or 27, these connecting members having a plurality of vertically spaced teeth 36 receivably by outwardly pressed vertically spaced slotted portions 37 on posts 22 and 23. This storage rack construction is shown in more detail in U.S. Pat. No. 3,194,408 issued to Klimpton on July 13, 1965.

The front-to-back member of this invention is indicated generally at 38 and is preferably fabricated of a unitary metal blank. The member is basically channel shaped, having a central vertical web 39, an upper flange 41 and a lower flange 42. Flanges 41 and 42 are horizontal along their major extent, but the opposite ends thereof are tapered downwardly as indicated at 43 and 44 for flange 41 and 45 and 46 for flange 42. Assuming that the blank is originally of a rectangular shape, this will result in flanges 41 and 42 being wider at the ends, as seen in FIG. 6. The central portion of the blank which is to form member 38 extends beyond flanges 41 and 42 and is bent over to form vertical end plates 47 and 48. These end plates overlap the edges of flanges 41 and 42 and are spaced apart a distance equal to that between webs 31 of facing beams 26 and 27, as seen in FIG. 5. The total height of member 38 is considerably less than the height of beams 26 and 27 so that the front-to-back members may enter into the space between the beam flanges and engage the beam webs.

Each end plate 47 and 48 is provided with a series of interconnected diamond shaped apertures, five such aper-
tures being shown in the illustrated embodiment and numbered 49, 51, 52, 53 and 54 from top to bottom as seen in FIG. 7. Beams 26 and 27 are likewise provided with diamond shaped apertures 55 in spaced relation along their webs.

The front-to-back member is mounted by using two bolts 56 and 57 with square shanks of a length equal to the combined thicknesses of end plate 47 or 48 and web 31, as seen in FIG. 5. The height of beam 38 with respect to top flanges 28 of the beams is determined by which aperture 49 through 54 receives bolts 56 and 57. If it is desired that the top of member 38 be flush with flanges 28, the lowermost aperture 54 will be used, as seen in FIG. 7. This position will normally be the proper one for storing pallets. The bottom members of the pallet will normally run at right angles to the front to back members, as shown by the pallet in dot-dash lines generally indicated at 58 in FIG. 5. These pallets are normally constructed with upper boards 59 to form the deck, cross pieces 61, and bottom boards 62 forming either a complete or partial deck.

FIG. 5 illustrates a pallet 58 of lesser depth than the distance between beams 26 and 27 so that front-to-back members 28 will support the pallets. The front-to-back members could also, of course, be used with pallets of greater depth. In such cases, the pallets could be stored either flush with the front or rear beams or extending beyond these beams without danger of dropping through because of mis judgment during the storage maneuvering.

Bolts 56 and 57 are secured in place by nuts 63 and by washers 64 which will prevent any yielding of the sides of apertures 49-54. The overlapping nature of apertures 49-54 will mean that less material will be removed from end plates 48 than would otherwise be the case. Apertures 55 will be placed close to the neutral axis of beams 26 and 27 so that any reduction in the capacity of the beams will be minimized.

If it is desired to provide a deck between and flush with beams 26 and 27, the positions of front-to-back members 38 will be lowered as shown in FIGS. 8 and 9. For example, apertures 49 through 54 could be at one-quarter inch increments, thereby permitting the deck to be of any standard plywood thickness. The deck is indicated at dot-dash lines at 65 and because of the location of front-to-back members 38 the top of the deck will be flush with the tops of beam flanges 28. Thus, miscellaneous unpalletedized loads could be placed in a storage rack.

What is claimed is:

1. In a front-to-back member in conjunction with a beam type storage rack having front and rear posts, a front beam connected between adjacent front posts and a rear beam connected between adjacent rear posts, a channel-shaped member having a vertical web and horizontal upper and lower flanges, main portions of said flanges being parallel, the outer portions being tapered toward each other, vertical end plates on said member overlapping the edges of said flanges, a plurality of vertically spaced apertures in said end plates, apertures in said beams, and bolts passing through said beam apertures and receivable by any of said vertically spaced end plate apertures, whereby the height of said front-to-back member with respect to said beams may be adjusted, one of said end plate apertures being such that when it is received by said bolts, the upper surface of said front-to-back member will be flush with the tops of said beams.

2. The combination according to claim 1, said front-to-back member being formed of a unitary blank with the flanges bent from the web of the beam, the web extending beyond the flanges and being bent over to form the end plates.

3. The combination according to claim 1 said apertures being interconnected and diamond-shaped, said bolts having square shanks.

4. The combination according to claim 1, the spacing between said end plate apertures being equal to the differences between standard plywood thicknesses, whereby the end plates may be used to support plywood decking between said beams.

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U.S. Cl. XR.

108—106, 144; 211—176, 177