

Oct. 6, 1953

R. K. DEGENER

2,654,487

STORAGE RACK

Filed Aug. 22, 1950

FIG. 1

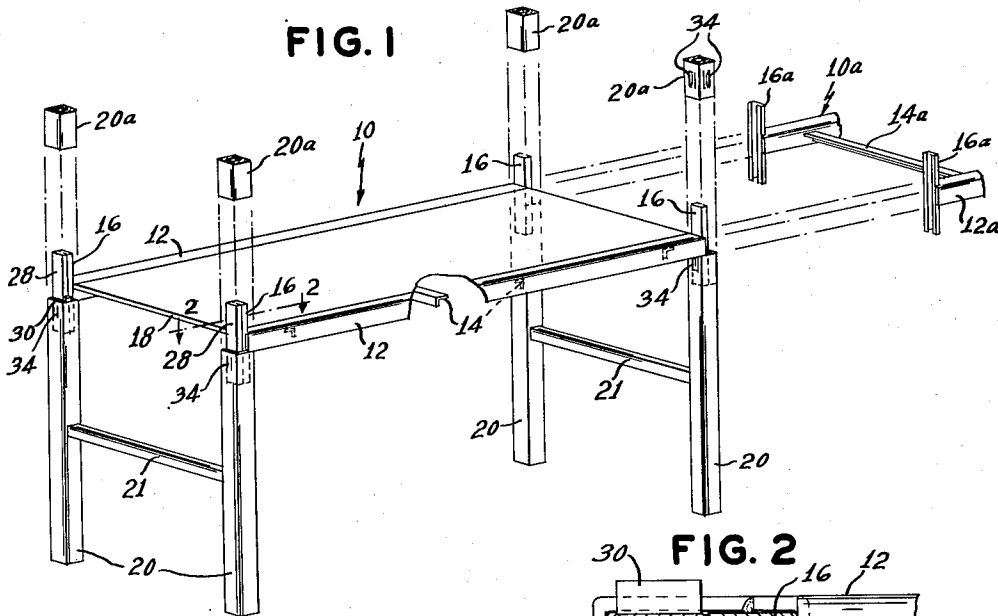


FIG. 2

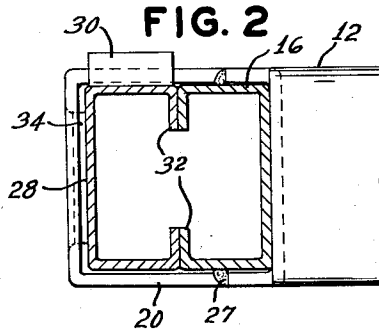


FIG. 3

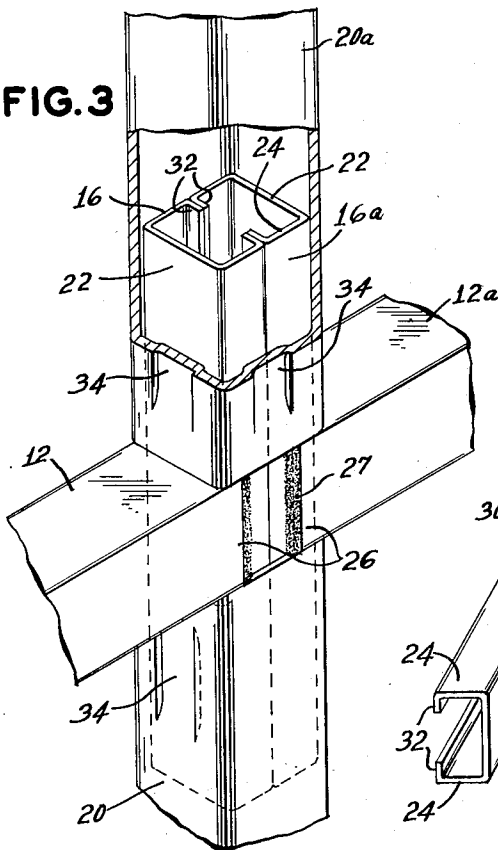
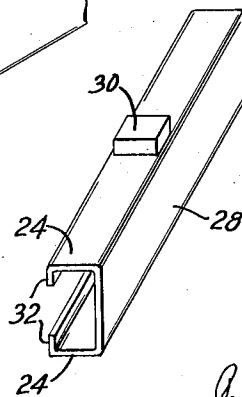


FIG. 4



INVENTOR
Richard K. Degener
BY
Carril, Lamond, Milton and Barrows
ATTORNEYS

UNITED STATES PATENT OFFICE

2,654,487

STORAGE RACK

Richard K. Degener, Grosse Pointe Woods, Mich.,
 assignor to American Metal Products Company,
 Detroit, Mich., a corporation of Michigan

Application August 22, 1950, Serial No. 180,727

3 Claims. (Cl. 211-148)

1

This invention relates to improvements in metal storage rack structures of a type which may be readily assembled and taken down without the use of bolts and without cutting or welding.

Racks of the type under consideration are particularly adapted for use as pallet racks for the storage of merchandise in warehouses, so that it can be stacked in tiers, for ready access and removal.

The primary object of the invention is to provide a metal storage rack structure which is comprised of a relatively few different elements, which may be readily assembled and expanded either lengthwise or vertically, and which can be made of standard metal stock.

The improved storage rack structure, according to the invention, comprises a bed unit having an attachment member at each of a plurality of support points for the bed unit, a tubular upright for each support point engaging the attachment member thereat, each attachment member being secured to the bed at right angles to, and with at least one end portion thereof projecting from the plane of the bed, the projecting end portion of said member extending into the top of the tubular upright therefor with the bed proper resting on the top edge of the upright, and means for effecting a rigid connection between each tubular upright and the portion of the channel-shaped attachment member extending thereinto.

In an advantageous construction, provision is made for assembling a plurality of bed units in a rack structure for vertical and lengthwise expansion. Each bed unit, therefore, preferably comprises a pair of parallel horizontally extending metal stringers tied together by cross pieces welded thereto, and a vertically extending attachment member welded to each end of each stringer so that the portions of each member project respectively above and below the stringer to which it is welded.

In a preferred construction, the attachment members are channel-C-shaped in cross-section and formed so that when two such members are mounted face-to-face, they provide a regular symmetrical figure, for example, a square, a circle or an oval in cross-section, which will fit into a similar opening in a tubular post or upright. The downwardly extending portions of a pair of complementary face-to-face channel members, serve to anchor adjacent corners of two beds to a supporting post, while the upwardly projecting portions serve to anchor the lower end of a post for supporting the adjacent corner or corners of one or two beds of an upper tier.

The tubular uprights or posts are advantage-

2

ously provided with pressed-in indentations adjacent their ends so as to provide a tight fit for the channel-shaped members when inserted in the ends of the uprights.

In this application, one structural form of pallet or storage rack is illustrated and described in detail, but it is to be understood that other structural forms may be made which employ the features of the present invention. The accompanying drawings which form a part of this application show this embodiment.

In the drawings:

Fig. 1 is a general perspective view with certain parts shown in expanded relation to illustrate the manner in which the rack structure may be expanded lengthwise and vertically.

Fig. 2 is an enlarged fragmentary view partly in section, taken on the line 2-2 of Fig. 1.

Fig. 3 is a broken perspective view showing a completed connection joint for both lengthwise and vertical expansion of the rack structure.

Fig. 4 is a perspective view of the filler inserts used for completing the joints at the ends of the rack structure.

Referring to the drawings, the improved metal rack structure comprises a bed or shelf unit 10 including a pair of spaced parallel square metal rails or stringers 12 secured together by a plurality of spaced angle-iron cross pieces 14 and a channel-shaped attachment member 16 secured intermediate its ends to each end of each stringer 12, at a right angle to the plane of the bed. The angle-iron cross pieces 14 are welded to the stringers 12 with one of their flat sides off-set with respect to the top of the stringers, as shown in Fig. 1, so that deck material 18 of the desired thickness may be laid on the cross pieces 14 between and flush with the surface of the stringers 12. The cross pieces 14 adjacent the ends of the bed unit are set back somewhat from the ends of the stringers.

The bed unit 10 is supported by similar tubular open-ended posts or uprights 20 respectively engaging the downwardly projecting portions of the channel-shaped members 16. The uprights 20 are square and may have the same dimensions as the stringers 12, and each pair is tied together by being welded to an angle-iron cross piece 21.

Each of the channel-shaped members 16 shown more in detail in Figs. 2 and 3 are block-C-shaped in cross-section and have an outside dimension across the solid back wall 22 which is slightly less than the inside dimension of the posts 20, while the dimensions across the short sides 24 are slightly less than one-half the inside dimension of the posts, so that two of the members 16 mounted face-to-face, will fit in the posts.

The members 16 are secured to the ends of the stringers 12 by cutting out a portion of the top and bottom of the ends of the stringers to leave the projecting sides 26, which extend approximately half way across the sides 24 of the members 16 and are welded thereto by a weld 27. The members 16 are sufficiently long so that they extend substantially, and about equally, above and below the stringers 12. The bed unit 10, as shown in Fig. 1 of the drawings, has a member 16 welded to each end of each rail with a portion extending above and below the stringers 12 for insertion into supporting posts 20, upon the top edges of which the ends of the stringers 14 are adapted to rest. The upwardly projecting portions of the members 16 are adapted to be inserted into similar posts or uprights when it is desired to form an upper tier or tiers above the bed 10.

In order to provide a rigid structure in the joints at the end of a rack, such as the left end of the rack illustrated in Fig. 1, filler inserts 28, shown in Fig. 4, having the same dimensions and structure as the members 16, are inserted in the tops of the end posts 20 directly facing and engaging the members 16. These filler inserts or holding members are pushed in with a press fit, thereby providing a rigid structure at the end of the rack. These inserts 28 have a stopper plug 30 welded to one of its narrower sides 24 and adapted to engage the top edge of the post 20 when the insert 28 is directly opposite one of the members 16. The channel-shaped members 16 and 28 are advantageously provided with inturned flanges 32 to provide a firm engaging surface when the ends of these members are inserted face-to-face in the posts 20.

Fig. 1 illustrates the method of applying the present invention when it is desired to extend the rack lengthwise and vertically. In making a lengthwise extension, a second bed unit 10a, exactly like the bed unit 10, is brought into endwise alignment with the bed unit 10 and the lower ends of the adjacent members 16a are respectively inserted in the tops of the right hand posts 20, so that they face the members 16. As many bed units as desired may be employed to form a rack of any given length by providing additional bed units and posts 20. Fig. 3 shows the completed assembly with one post 20 supporting two adjacent corners of the two bed units 10 and 10a.

Upper tiers may be provided above the bed unit 10 in Fig. 1, by setting open-ended posts 20a over the upwardly projecting portions of the two sets of members 16 and 28 at the left end of the rack, and over the upwardly projecting portions of each of the sets of members 16 and 16a at the right end of the bed unit 10. When the posts 20a are in place another bed unit like the unit 10 is mounted thereon in the same manner as the bed unit 10 on the posts 20. A rack structure may, therefore, be readily assembled to provide the desired number of tiers and the desired number of sections lengthwise. When the desired length is attained the filler inserts 28 are used in the end posts at each bed unit in the same manner as that shown at the left in Fig. 1.

While the members 16 and 28 may fit tightly in the ends of the posts the assembly of the rack structure may be facilitated and rigidly secured if the C-shaped channel sections are made so that two of them, face-to-face, have slightly smaller outside dimensions than the inside dimensions of the posts. With this structure, rigidity and a press fit between the posts and channel

sections are obtained by providing inwardly-extending projections or pressed-in indentations 34 on one side of and adjacent the ends of each post. The indentation 34, for example, in a two-and-one-half-inch post, may be one and one-half inches wide, one-eighth inch deep and one and one-half inches long. As the two C-shaped channel sections are inserted in the end of a post, with the indentation opposite one of the wide surfaces 22, the inserted ends of the channel sections are pushed past the indentation, which forces the channel sections together and the back of one of them against the opposite wall of the tubular post. Thus, the channel section which engages the indentation acts as a holding member to hold the other channel section in place within the tubular post. This opposite wall is not provided with an indentation, but is maintained flat so that the channel section has a solid bearing against the post wall for its entire length extending into the post. Where the two posts are joined together by a cross bar 21, as shown in Fig. 1, each post requires only one indentation, but where the posts are employed without cross bars and each must stand alone, they are indented near each end on two adjacent sides, as shown, for example, for the post 20a in Fig. 3 of the drawings.

The structure shown in Fig. 3 provides a rigid joint since the pair of face-to-face channel members are pressed together by both of the posts 20 and 20a. At the same time the ends of the posts engaging the pair of channel members are rigidly anchored, especially since the posts are transversely closed, that is, have no open longitudinal seam, and cannot yield when the ends of the attachment members are inserted into them.

In a particular instance of a storage rack structure constructed in accordance with the present invention, the bed stringers 12 were two-and-one-half-inch square tubes one-hundred and three inches long, joined together by welding in one-and-three-quarter inch angle irons, to provide a bed forty-four inches wide. The posts were of the same tubular stock as the stringers, three feet long, and joined together in pairs by welding in a one-and-three-quarter-inch angle-iron. The posts were indented adjacent each end in the manner described above with the indentations facing toward the same side. The channel members 16 welded to the ends of the stringers 12 were block-C-shaped in cross-section, eighteen inches long and projected equally above and below the stringers.

The storage rack structure of the present invention is made of relatively few elements, the principal one of which is the unitary bed structure having the channel-shaped attachment members secured thereon. The uprights are conveniently assembled in pairs, as shown in Fig. 1, and the only other element required is the filler insert for use at the ends of the rack. The elements of the rack structure are readily assembled or taken down without the use of bolts or rods and without cutting or welding.

The bed rails may be made of any suitable stock such as channels, tubes, or two or more tubes may be employed, depending upon the span and the weight to be carried. Likewise the posts or uprights may be of any desired height, or of varying heights, depending upon the goods to be stored.

While the posts or uprights are preferably square, round, oval or oblong rectangular in cross-section, they may be of any other suitable shape

such as Z, the attachment members being selected accordingly, so that two such members when mounted in complementary relation will fit in the particular post or upright to provide a firm joint. The open sides of the channel sections advantageously face out from the bed so that they may be sprung slightly, where necessary, to readily insert them in the ends of the posts. If desired, the cross pieces 14 may be flush with the top of the rails so that the deck material may extend over the upper surface of the stringers.

The bed units may be made so that they are useable either side up and the attachment members may project either upwardly or downwardly or in both directions from the plane of the bed unit.

What is claimed as new is:

1. In a storage rack structure for supporting merchandise in position for ready access, including a plurality of similar rectangular-shaped bed units assembled together, at least two of which are in the same plane, each bed unit comprising a pair of parallel spaced metal rails attached together, an elongated sheet metal channel-shaped attachment member fixed intermediate its ends to each end of each rail, each member being block-C-shaped in cross-section and secured at right angles to the plane of the bed unit with its end portions projecting respectively upwardly and downwardly from the plane of the bed unit proper and its open side facing outwardly from the end of the rail to which it is attached, at least one assembly joint between said two bed units and including an attachment member of one bed unit engaging an attachment member on the other bed unit with the intumed flanges of their open sides facing and engaging each other, a transversely-closed, open-ended tubular upright support rectangular in cross-section receiving the downwardly projecting portions of said engaging members with a press-fit with the adjacent rail ends resting on the upper rim of the upright support, the wall of said tubular upright support having an inwardly-extending projection engaging and urging one downwardly-projecting portion of said attachment members against the other downwardly-projecting portion and said other downwardly-projecting portion against the inside of the opposite wall of the tubular upright support to provide a rigid connection between the ends of the rails and the upright tubular supports, and a second similar upright support the lower end of which extends over and receives the upwardly projecting portions of said engaging members with a press-fit, the upper end of said similar upright support being adapted to receive in its upper end the downwardly projecting portions of two attachment members of two other bed units to provide a tier above said first-mentioned two bed units, said tubular upright supports having similar end structures.

2. In a storage rack structure for supporting merchandise in position for ready access, a plurality of similar bed units for supporting merchandise, each bed unit including a pair of parallel spaced metal rails attached together, an elongated sheet metal channel-shaped attachment member fixed intermediate its ends to each end of each rail for engaging a support, each attachment member being block-C-shaped in cross-section and mounted at right angles to the plane of the bed unit with its open side facing out from the end of the rail to which it is attached, and a transversely-closed tubular metal

open-ended upright support rectangular in cross-section located at each end of each rail, the upper end of some of said supports receiving the downwardly projecting end portions of two attachment members respectively of two adjacent bed units the ends of the rails thereat resting on the top edge of the support, each of the two attachment members extending into the top of said tubular upright support occupying about one-half the internal area of the support, said two attachment members being arranged in said support with their open sides facing each other and with the intumed flanges of one member in engagement respectively with the intumed flanges of the other member to provide firm engagement surfaces between said two members, the tubular upright supports receiving the downwardly-projecting end portions of two attachment members each including an inwardly-extending projection engaging and urging one downwardly-projecting portion of said engaging attachment member against the other downwardly-projecting portion and said other downwardly-projecting portion against the inside of the opposite wall of the tubular upright support to provide a rigid connection between the ends of the rails and the upright tubular supports.

3. A storage rack for storing merchandise in a position for ready access comprising a bed unit including a pair of spaced, parallel metal rails attached together, said metal rails each having a top and side sections, the end portions of the sides of the metal rails extending beyond the top of the rails, an elongated sheet metal attachment member secured to the end of each rail between the extending end portions of the sides of the rail and at right angles to the rail, each attachment member having a portion which extends below the rail to which it is attached, a transversely-closed, open-ended, upright tubular support at each end of each rail receiving a downwardly-extending portion of the attachment member, the extending end portions of the sides of the rails resting on the rims of the upright tubular supports, the tubular supports each having an inwardly-extending projection on the wall thereof opposite the adjacent rail and opposite the attachment member received therein, and a holding member between the projection and the attachment member received in each tubular support, the projection engaging and urging the holding member against the downwardly-projecting portion of the attachment member and the attachment member against the inside of the opposite wall of the tubular support to provide a rigid connection between the rails and the tubular supports.

RICHARD K. DEGENER.

References Cited in the file of this patent UNITED STATES PATENTS

Number	Name	Date
573,428	Yost	Dec. 15, 1896
1,340,562	Sandmann	May 18, 1920
1,728,638	Straubel	Sept. 17, 1929
2,218,175	Mack	Oct. 15, 1940
2,226,763	Geib et al.	Dec. 31, 1940
2,239,483	Cocks	Apr. 22, 1941
2,449,069	Harrison	Sept. 14, 1948

FOREIGN PATENTS

Number	Country	Date
188,785	Great Britain	Nov. 20, 1922