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STORAGE RACK

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FIG. 1

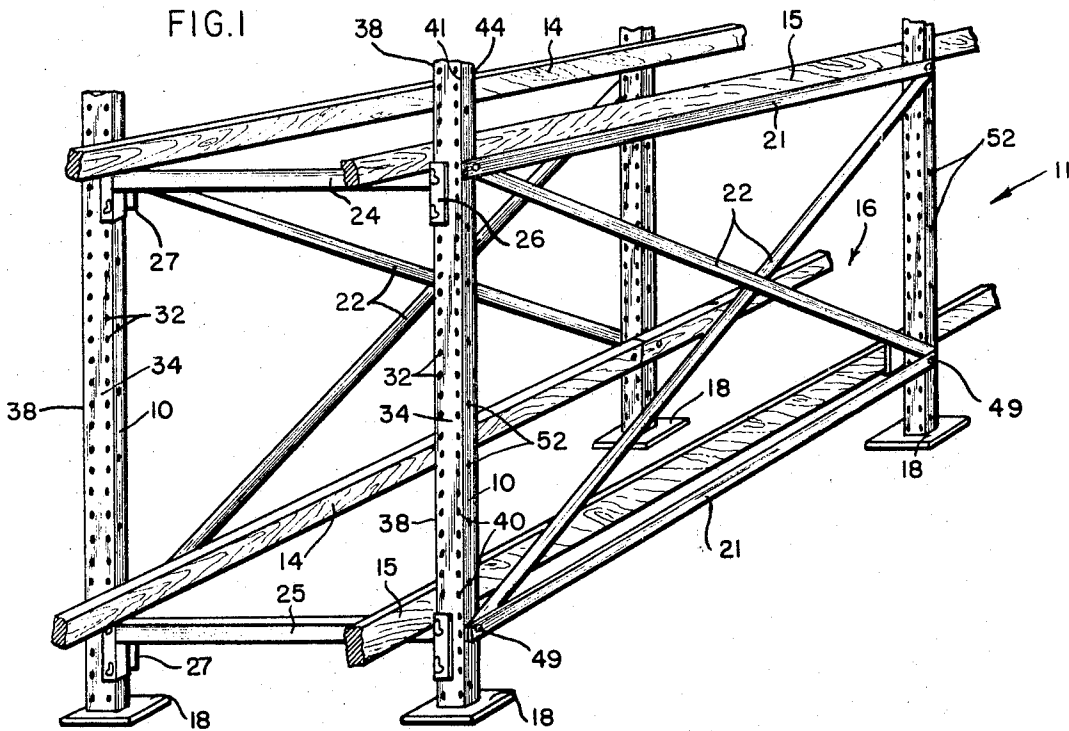
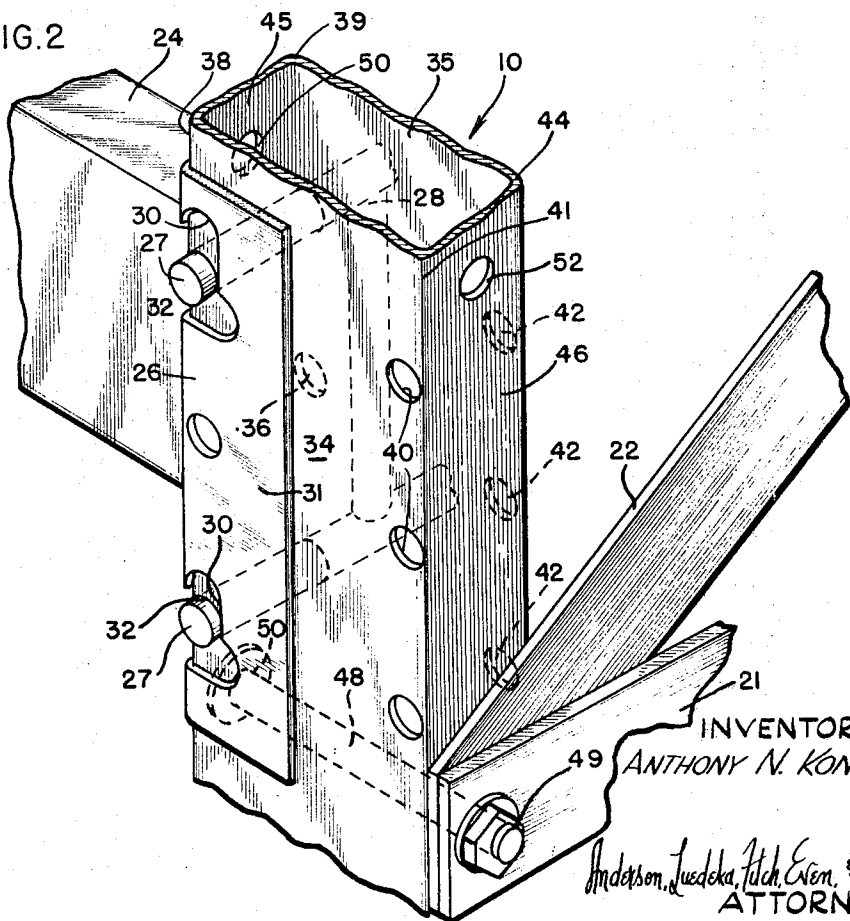


FIG. 2



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## STORAGE RACK

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2 Claims

### ABSTRACT OF THE DISCLOSURE

A structural member having pairs of opposing sidewalls is provided with rows of preformed openings in each pair of the opposing sidewalls to facilitate attachment of the member in a structure. The holes in opposing sidewalls are aligned to receive fasteners inserted through them. Beams, horizontal braces, cross braces or the like may be releasably fastened to both pairs of opposing sidewalls by releasable fasteners which will then be disposed at angles to each other as they span the respective pairs of sidewalls.

This invention relates to a structural member for readily assembled and disassembled structures, and more particularly to a structural member having preformed openings for receiving fastening devices.

The present invention is directed to a structural member for use in structures such as that disclosed in Schell, Pat. No. 2,932,368 in which vertical columns of C-shaped cross section have preformed holes to receive locking pins to secure horizontal beams to the column. The locking pins are generally U-shaped with a pair of spaced pin members to fit into preformed openings on an angle plate secured to the beam and into aligned openings in the column so that beams are secured to the columns without the use of special tools. In this structure, however, the horizontal braces and cross braces between columns are welded to the latter after being inserted into the open mouth of the C-shaped cross section columns. These columns, therefore, are readily releasable from the beams with removal of the locking pins but are not readily attached or detached from side braces.

Accordingly, a general object of the invention is to provide a structural member for use in structures, such as that of the foregoing kind, but having preformed openings to facilitate connection of side braces or the like with releasable fasteners.

A more specific object of the invention is to provide a structural member having sufficient strength to serve as a column for a structure such as a storage building, storage rack, storage bin, scaffold or the like while having preformed openings in each of its faces for facilitating the connection of cross braces, beams or the like.

Another object of the invention is to provide a structural member, for use in readily assembled structures, in the form of an elongated tube of rectangular cross section having preformed openings to receive a releasable locking pin, these openings being disposed in a first pair of longitudinal walls having columns of transversely aligned and longitudinally spaced holes, the tube having other preformed openings to receive other releasable fasteners, these latter openings being disposed in columns of holes in the other pair of walls of the tube.

Further objects and advantages will become readily apparent as the disclosure progresses with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a collapsible storage rack employing structural members of the present invention as vertical columns; and

FIG. 2 is a fragmentary, enlarged perspective view of one of the columns of FIG. 1.

As shown in the drawings for purposes of illustration, the invention is embodied in structural members 10 employed as the vertical columns for a structure 11 capable of use as a storage rack to support a stack of pallets, skids, barrels or the like (not shown) with their spaced marginal edges spanning across and resting on a pair of upper or lower horizontal rails 14 and 15. To deposit a pallet in the structure, a pallet (not shown) after being disposed on the fork of a lift truck, is lifted above one of the supporting pairs of rails and the lift truck is driven longitudinally and inwardly through an open right end 16 of the storage structure and then the pallet is lowered to rest its marginal edges on the upper sides of the horizontal rails 14 and 15. In some instances, the columns extend upwardly to support the load of a roof and the columns thus not only must support the load of the items being stored but also the load of the building roof.

Herein, the four upstanding columns 10 rest on base plates 18 and are connected to and stabilized by longitudinally extending horizontal braces 21 and cross braces 22, which are in the form of flat strips of metal and interconnect columns in a fore-and-aft direction. At the closed left end of the structure, the columns 10 are connected to and stabilized by transverse horizontal beams 24 and 25 which are spaced vertically and support the rails and the loads thereon. On the ends of these beams 24 and 25 are welded angle plates 26 which abut vertical sides of the columns 10 and are adapted to receive a readily releasable and insertable locking pin 28, which is of the kind shown in U.S. Pat. No. 2,932,368, to secure the beams to the columns. Only the spaced, parallel pin members of the locking pin are illustrated and, as best seen in FIG. 2, a pair of these pin members 27 on the locking pin are inserted into vertically elongated openings 30 spaced vertically in a leg 31 of the angle plate 26. The openings 30 are generally L-shaped and the edges of this plate at the openings cam against the horizontal locking pins which are inserted through the openings 30 and into aligned preformed openings 32 spaced longitudinally on a column sidewall 34. The pin members 72 extend through the interior of the column to an opposite sidewall 35 having a similar row or columns of openings 36. The openings 32 and 36 are aligned in longitudinal rows or columns disposed adjacent longitudinally extending corners 38 and 39, respectively of the member 10 and the respective openings in one row are transversely aligned with the openings in the other row. In a similar manner, a plurality of openings 40 are preformed in the sidewall 34 and are aligned in a row or column adjacent the vertical corner 41 of the member 10. Receiving the ends of elongated pins inserted through an opening 40 are a series of longitudinally spaced and transversely aligned openings 42, which are preformed in the sidewall 35 adjacent a corner 44 of the member 10. Herein, each of the preformed holes 32, 36, 40 and 42 is disposed in a common transverse plan normal to the longitudinal axis of the column.

In accordance with the present invention, the structural member is in the form of a closed wall tube having opposed sidewalls 45 and 46 to which braces 21 or beams 24 may be detachably connected by a fastener, such as a bolt 48 and a nut 49, the shank of the bolt being inserted through a preformed opening 50 in a sidewall 45 and a preformed opening 52 in the opposite sidewall 46. Herein, the openings 50 and 52 are each aligned longitudinally in respective rows or columns and the openings in one wall are disposed transversely opposite the openings on the other wall to receive a bolt spanning the column. Thus, the structural members not only have preformed openings along their longitudinal edges in the first pair of sidewalls 34 and 35 to receive fasteners of a locking pin kind but also afford longitudinal columns of

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transversely aligned openings 50 and 52 in the other pair of sidewalls to receive fasteners for releasable connecting cross or side braces.

In the present instance, the openings 50 and 52 are circular in shape and are spaced longitudinally and intermediate the openings 32 and 40 in the other pair of sidewalls to avoid weakening of the members, which could occur, if all of the holes were aligned in a single transverse plane. A suitable number of holes 50 and 52 are provided in the columns to allow the proper positioning of the cross braces and side braces.

The closed wall tubular member 10 of rectangular cross section has increased strength over the prior art C-cross-section member because of the additional metal and the joining of the previously unconnected flanges. From the foregoing it will be seen that the structural member is tubular in shape with preformed openings arranged in columns in each sidewall to facilitate the use of the structural member in readily assembled and disassembled structures. Also, it will be seen that the structural member has sufficient strength to be used in a number of different heavy duty environments.

While a preferred embodiment has been shown in the drawings and described herein, it is not intended to limit the invention by such disclosures. Rather, it is intended to cover all modifications and alternative constructions coming within the spirit and scope of the invention.

I claim:

1. A storage rack structure comprising a plurality of spaced vertical columns, each column being in the form of an elongated tube of rectangular cross section designed to serve as a corner post in a rack structure, said tubes each having first and second pairs of parallel sidewalls, said first pair of parallel sidewalls each having two rows of vertically spaced holes located along the respective lateral edges thereof, each of said holes in one sidewall being horizontally aligned in a fore-and-aft direction with a hole in the other of said first pair of sidewalls and being adapted to receive an insertable elongated pin which passes therethrough spanning said first pairs of sidewalls, said pin being part of a pin member designed to connect a horizontal beam to said column at a desired vertical level, said second pair of sidewalls each having a plurality of vertically spaced holes each of which holes in said second pair of sidewalls is laterally aligned with a hole in the other of said second pair of sidewalls and is adapted to receive an elongated fastener extending laterally through said second pair of sidewalls for connecting a brace to said column, a beam extending laterally be-

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tween a pair of said columns at a desired vertical level, an angle-iron connector affixed to both ends of said beam which connector abuts adjoining sidewalls of the respective columns, a pair of openings in said angle-iron connector which are vertically aligned and spaced the same distance as said holes in said first pair of sidewalls, a pair of releasable locking pins each having parallel elongated pin members for insertion through said openings and said holes in said first pair of sidewalls to releasably fasten said beam at opposite ends thereof to said columns, a brace member extending between one of said columns and another such column in a fore-and-aft direction, said brace member having apertures in registration with holes in said second pair of sidewalls of said columns, and a separate fastener extending through a pair of aligned holes in said second pair of sidewalls of each of said columns and through one of said apertures in said brace member to releasably fasten said brace member to the respective column.

2. A storage rack structure in accordance with claim 1 wherein a plurality of brace members in the form of flat metal strips are provided extending fore-and-aft between said columns, said brace members including two parallel horizontal members and two diagonal members arranged in the form of an X, the apertures in each said brace member being aligned with an aperture in another of said brace members, and wherein four of said fasteners are provided to connect said two diagonal and two horizontal brace members to said columns.

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