

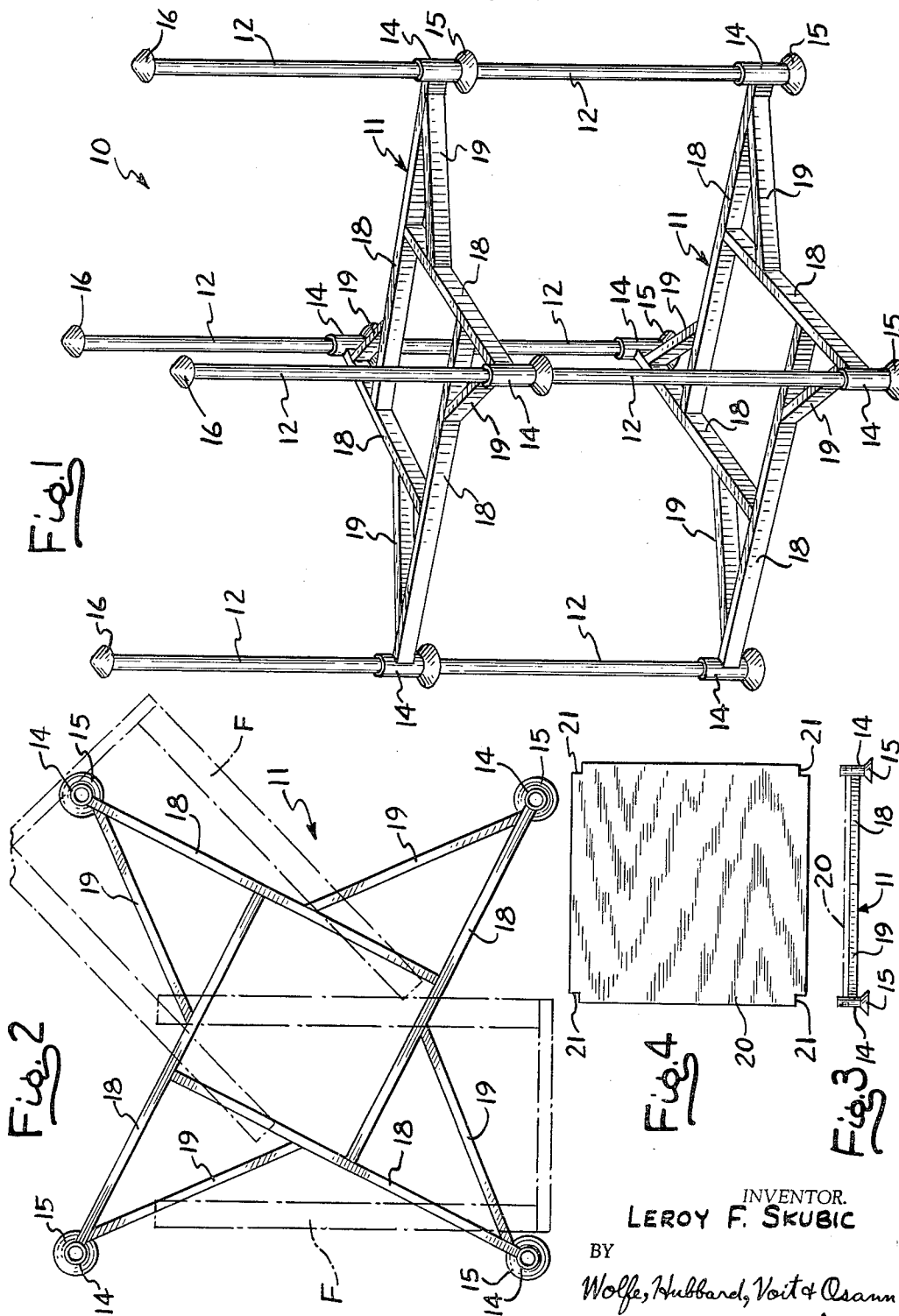
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PORTABLE STACKING UNIT WITH STAR FRAME

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1

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PORTABLE STACKING UNIT WITH STAR FRAME
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The present invention relates generally to materials handling equipment and, more specifically, to a novel portable stacking unit for transporting goods and supporting them in vertical tiers.

Stacking units of the general type with which the invention is concerned are used in warehouses and storage areas for stacking goods on successive levels. Such units must be of suitable configuration and strength to permit transport, handling, and tiering by means of the elevating fork of a forklift truck. They must also be versatile enough to be usable with pallets or with the goods directly.

Heretofore, such stacking units have involved heavy, cumbersome, and often expensive construction or, on the other hand, flimsy, marginal construction which is less expensive but sacrifices safety and tiering capacity.

With the foregoing in mind, it is an object of the present invention to provide a portable stacking unit of the star frame type susceptible of economic construction from relatively lightweight structural stock but possessing exceptionally high strength, ruggedness and tiering stability.

Another object of the invention is to provide a portable stacking unit having a frame which is particularly well adapted for engagement by the elevating fork of a forklift truck, being susceptible of eight-way entry of the fork into such engagement.

A further object is to provide a portable stacking unit of the character set forth which has a maximum of unobstructed or "clear deck" space between vertical supports and is readily usable with pallets, decking, or with the goods directly.

Other objects and advantages will be perceived in the course of the following detailed description, taken together with the accompanying drawing, wherein:

FIGURE 1 is a perspective view of an illustrative portable stacking unit embodying the present invention.

FIG. 2 is a plan view of one of the component frames of the unit shown in FIG. 1.

FIG. 3 is a reduced scale, elevational view of one of the frames of the unit of FIG. 1.

FIG. 4 is a reduced scale plan view of the decking which may optionally be used with the frame shown in the other figures.

While the invention is susceptible of various modifications and alternative constructions, a certain illustrative embodiment has been shown in the drawings and will be described below in considerable detail. It should be understood, however, that there is no intention to limit the invention to the specific form or mode disclosed, but, on the contrary, the intention is to cover all modifications, alternatives and equivalents falling within the spirit and scope of the invention as expressed in the appended claims.

Referring more specifically to FIGURE 1, the invention is there exemplified in a novel portable stacking unit 10 embodying the present invention. In this instance, the unit 10 comprises a pair of superimposed star frames 11, the lower one being supported on the floor and the upper one on vertical posts 12. The upper one of the star frames 11 also carries a set of the posts 12 for supporting one or more additional frames above it. Each of the frames 11 has a plurality of post receiving

2

sockets 14 disposed in spaced apart relation and in this case such spacing defines a square or rectangle. The sockets 14 are adapted to receive the lower ends of the posts 12. The sockets 14 and the tops of the posts 12 are provided with interengaging separable bearing members 15, 16 such, for example, as disclosed in U.S. Patent No. 2,621,879 issued December 16, 1952, on the application of Eugene T. Lundeen.

In accordance with the present invention, each star frame 11 is constructed with a minimal number of relatively lightweight structural members and a minimal number of joints, consistent with the loads involved. Such is achieved, moreover, in a novel manner which results in increased tiering stability of the frame when stacked and loaded.

As shown more specifically in FIGS. 1 and 2, it will be noted that the frame 11 comprises a plurality of cross beams 18. The latter are arranged in opposed pairs disposed in laterally spaced, substantially parallel relation, and with each crossbeam in a pair extending inwardly from diagonally opposed corner sockets 14. Each of the crossbeams 18 is shorter than the distance between adjacent corner sockets 14 and the two opposed pairs of crossbeams 18 are welded or otherwise rigidly joined together in mutually perpendicular relationship. This means that each crossbeam is substantially perpendicular to the ones adjacent to it, leaving a substantially open square in the middle of the frame. The outer ends of the crossbeam 18 are welded or otherwise rigidly secured to respective ones of the corner sockets 14. A plurality of struts 19, in this instance four in number, are also included in the frame 11 and each is disposed at an angle between the outer end of one crossbeam and an intermediate portion of the next adjacent crossbeam. The struts are welded or otherwise rigidly fixed to the crossbeams.

As will be noted upon more particular reference to FIGS. 1 and 2, the struts and crossbeams are so arranged as to give the frame a four-pointed star-shaped configuration in plan view, comprising in this instance a substantially square or rectangular central portion surrounded by four rigid, integrally connected, triangular arms. When the frames 11 are stacked in a tier as shown in FIG. 1, it will be appreciated that each such triangular arm performs a dual function. This includes helping support a load on the frame due to the weight of the goods and, in addition, resisting lateral deflection of the upper portion of the supporting column upon which the arm rests.

In accordance with another aspect of the invention, it will be appreciated that the construction of the frame 11 just described affords eighty-way entry with respect to the elevating fork of a forklift truck. By eight-way entry is meant that the elevating fork may enter into engagement with the bottom of the frame by approaching at right angles to any one of the four sides of the frame, or by approaching diagonally at any one of the four corners of the frame. This also means that the elevating fork, after entering into such engagement, must be able to support and lift the frame with stability, whether loaded or unloaded.

As will be appreciated from reference to FIG. 2, the elevating fork F of a forklift truck is adapted to engage and provide stable support for the frame 11 regardless of whether it enters from any one of the four sides or from any one of the four corners of the frame. The frames 11 are readily adapted to support either loaded or unloaded pallets or various types of goods directly.

In certain instances, depending upon the particular nature of the goods, it might be desirable to utilize the frames 11 with substantial expanses of clear deck area

3

to support goods directly in the absence of pallets. This may readily be accomplished by providing each of the frames 11 with a deck slab 20 of plywood or other sheet material (FIGS. 3 and 4). The latter may be of square or rectangular construction and have its corners notched out at 21 so as to comfortably interfit with its frame 11 and the corner sockets 14. Because of the effective support afforded the decking over a substantial part of its area, the decking may be relatively thin and inexpensive material.

It will be appreciated by those skilled in the art that the portable stacking unit described above eminently fulfills the objectives set forth earlier herein. The unit 10 is readily adaptable for use with pallets, decking, or with the goods directly. It is susceptible of handling by means of a forklift truck and can be tiered vertically into a rigid, reliable structure several units high and capable of safely supporting heavy loads at any level.

I claim as my invention:

1. A portable unit for stacking in vertical tiers and comprising, in combination, four post receiving sockets disposed in rectilinear spaced relation with each other, support feet in the form of separable bearing members on said sockets, four crossbeams respectively projecting inwardly from corresponding ones of said sockets, said crossbeams being disposed each with its inner end substantially perpendicular to the next adjacent crossbeam, and four struts respectively projecting inwardly from corresponding ones of said sockets, each of said struts being disposed with its ends at an acute angle to a pair of adjacent crossbeams, and means for rigidly securing said crossbeams and said struts and said sockets together as a unitary star-shaped assembly.

4

2. In a portable stacking unit adapted for arrangement in vertical tiers, a star-shaped stackable frame having eight-way entry for the elevating fork of a lift truck and comprising the combination of four corner sockets each adapted to receive a supporting post, support feet in the form of separable bearing members on said sockets, four crossbeams disposed in opposed spaced pairs extending inwardly from diagonally opposed ones of said sockets, the crossbeams in each said pair being substantially parallel to each other and said pairs of crossbeams being mutually perpendicular to each other, four struts disposed between the socket ends of respective ones of said crossbeams and intermediate portions of their adjacent crossbeams, said crossbeams, sockets and struts being welded together into a four-pointed star-shaped frame assembly, the latter being supported clear of the ground by said support feet.

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