Jan. 22, 1957 Z. J. JAGIEL 2,778,693

SECTIONAL SCAFFOLDING CONSTRUCTION

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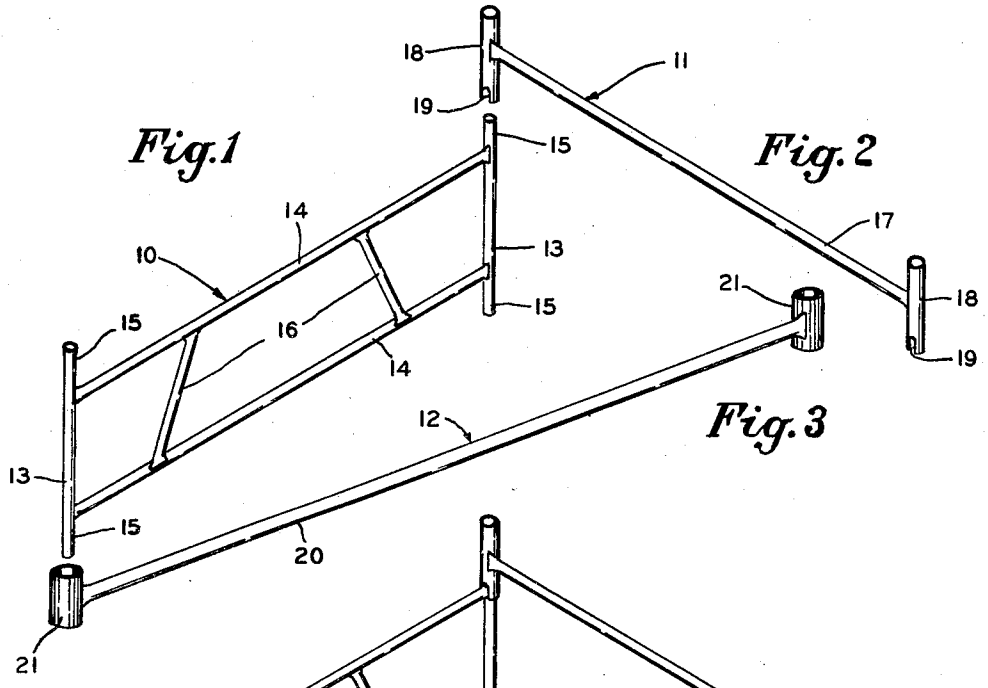


Fig. 1

Fig. 2

Fig. 3

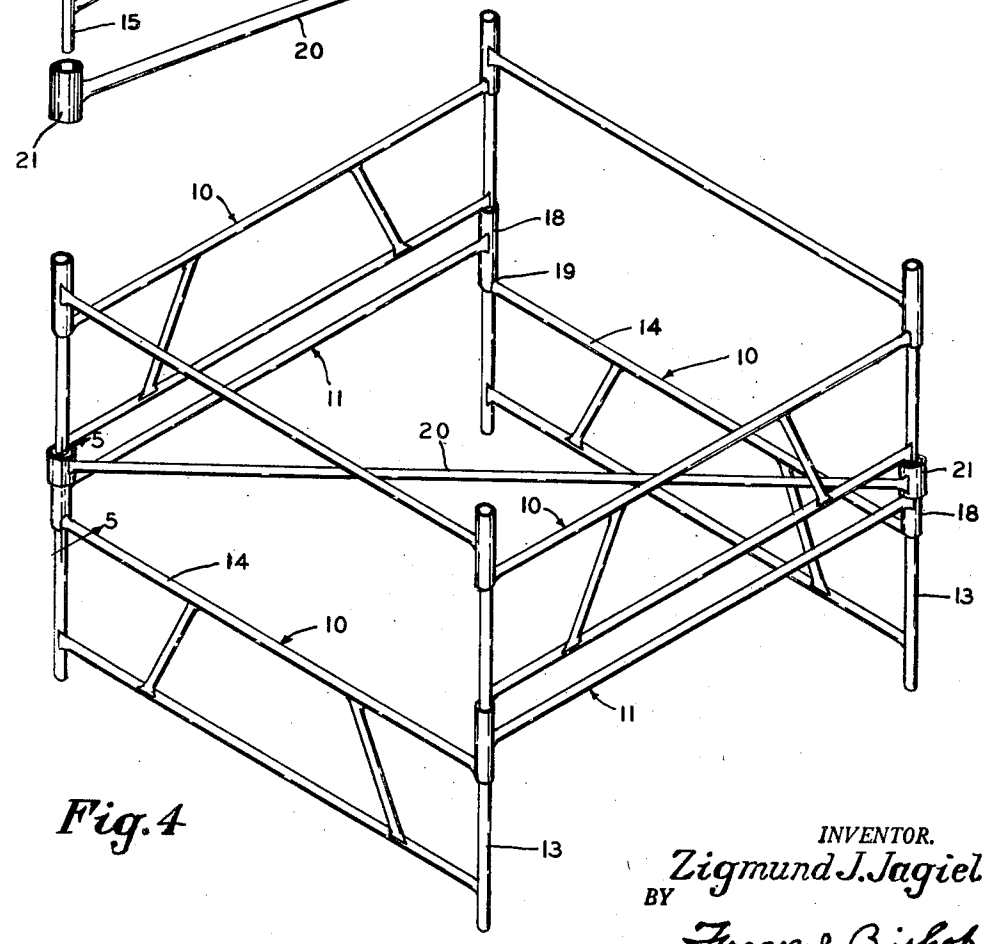


Fig. 4

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Fig. 6

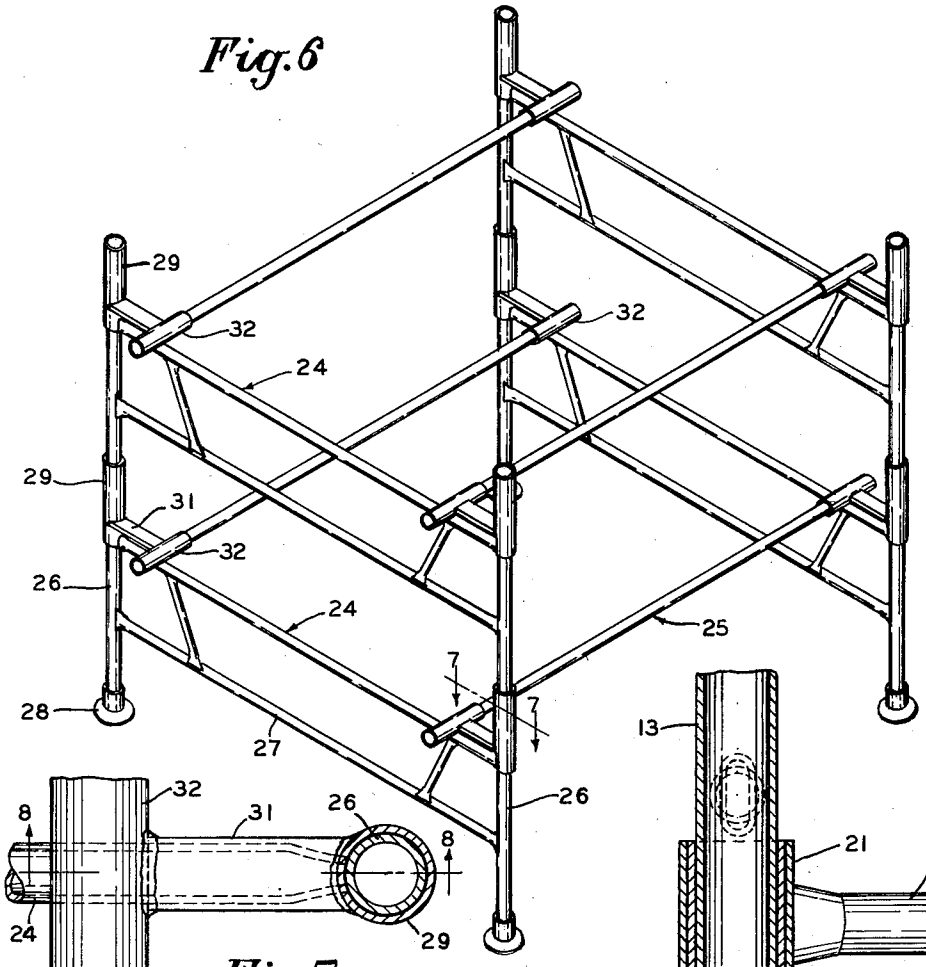


Fig. 7

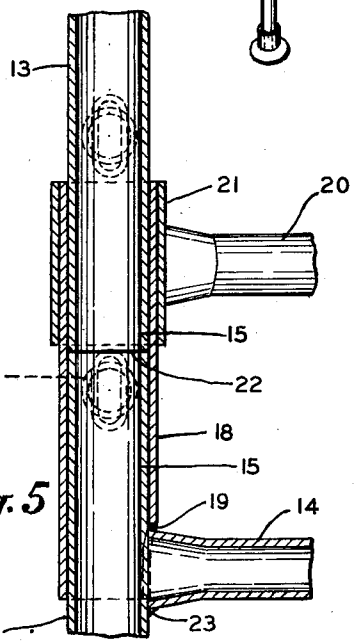


Fig. 5

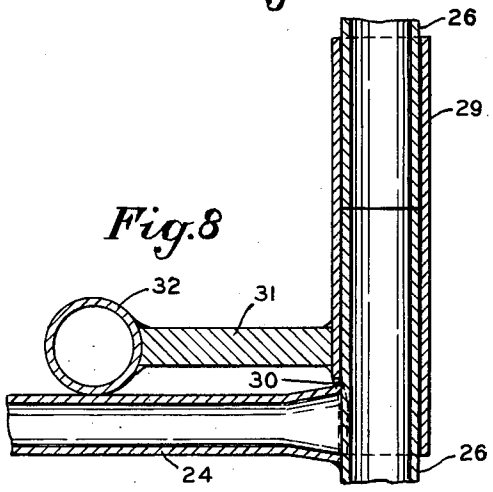


Fig. 8

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SECTIONAL SCAFFOLDING CONSTRUCTION

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2 Claims. (Cl. 304—2)

This invention relates to a sectional scaffolding construction and more particularly and specifically to scaffolding construction composed of plural different and separable members interconnectable in a variety of arrangements to permit assembly of the most suitable scaffolding arrangement for the needs of each particular and different job encountered.

In certain prior scaffolding constructions which include separable members capable of assembly in the form of vertical posts or struts and horizontal braces and platform supports wherein such vertical posts or struts consist of plural superimposed elements, certain locking arrangements such as locking pins, bolts, cam-type locks and the like are used to secure the plural sections of the vertical posts or struts in superimposed alignment and against lateral displacement.

These prior constructions have been found to be undesirable in that such locking arrangements substantially increase the amount of time and labor necessary for the erection and assembly of the resultant scaffolding, and such locking arrangements are extremely susceptible to damage both during storage and shipment of the parts as well as during the assembly thereof. Additionally, such complex locking arrangement constructions greatly increase the costs of manufacture of the scaffolding units.

Certain other prior scaffolding constructions include mating pin and socket arrangements between the superimposed parts forming a vertical post or strut for the purpose of maintaining said superimposed parts in vertical alignment and against lateral displacement.

It has also been found that mating pin and socket connections are undesirable because of their susceptibility to damage. The protruding pins are often bent or fractured during handling and storage of the parts, while the sockets are subject to mashing or distortion by the same causes. Such injuries or damage to the pins and/or sockets result in a failure of proper engagement between the pins and sockets in the assembly and erection of a scaffolding construction composed of such parts. It has also been found that the costs of manufacture are relatively high in acquiring and maintaining the close and accurate tolerances necessary between pins and sockets in such constructions.

Additionally, it has been found that the majority of these prior constructions of the same general type as that constituting the present invention, when assembled in a vertical scaffolding construction, are subject to lateral twisting, tilting and collapse when uneven or heavy loads and stresses are encountered, thus creating a decided safety hazard to personnel working on these assembled constructions.

Further disadvantages are inherent in most prior scaffolding constructions of this general type wherein the arrangement and complexity of the numerous different parts constituting these assembled constructions prevent the use of uniform pipe or tube sizes throughout the construction. This factor necessarily increases the time and labor

involved in assembly of such constructions, and at the same time, substantially increases the manufacturing costs of such constructions.

Still further disadvantages in prior constructions consisting of numerous different and separable parts are evidenced by the fact that the utilization of large numbers of parts of different construction reduces the adaptability and versatility of the construction when such versatility is a required and desirable factor in erecting scaffolding to meet the specific needs and requirements of the many and varied jobs encountered.

It is therefore a general object of the present invention to provide a sectional scaffolding construction which substantially avoids and eliminates the many disadvantages and problems which are inherent in the manufacture and use of prior scaffolding constructions of the same general type as that constituting the present invention.

It is a primary object of the present invention to provide a scaffolding construction which is of extremely simple design and arrangement and thus capable of extremely rapid and efficient assembly and of extremely relatively low cost manufacture as compared to prior constructions.

It is a further object of the present invention to provide a scaffolding construction of such simple and inexpensive design which has maximum strength and durability, and which, in assembly, affords safe and firm vertical support, strong structural arrangements resisting and preventing lateral twisting and tilting and avoids lateral collapse of the assembled construction at the joints between the several separable parts constituting the assembled construction.

Still another object of this invention is to provide a scaffolding construction which consists of a minimum number of different parts constituting the entire assembly of the construction. Thus, the numerous and varied structural arrangements which may be assembled with these different parts are obtainable at a substantial reduction in the costs and labor involved in assembly of the construction and with substantially increased versatility of assembly over similar prior scaffolding.

Still another object of the present invention lies in the provision of a scaffolding construction which utilizes uniform and standard sized tubing throughout the parts thereof thus facilitating assembly of the construction and reducing the costs of manufacture.

Still a further and important object of the present invention resides in the provision of a sectional scaffolding construction which is capable of assembly and erection to form pallet racks or storage stands for parts of materials.

These and other objects are accomplished by the parts, constructions, arrangements, combinations and subcombinations comprising the present invention, the nature of which is set forth in the following general statement, and preferred embodiments of which—illustrative of the best modes in which applicant has contemplated applying the principles—are set forth in the following description and illustrated in the accompanying drawings, and which are particularly and distinctly pointed out and set forth in the appended claims forming a part hereof.

The new and improved sectional scaffolding construction constituting the present invention may be described in general terms as including a plurality of superimposed units, each unit including four vertical corner posts, truss bars integrally interconnecting adjacent posts in opposite pairs to form generally two opposed side frame members, sleeve members telescopically enclosing the upper ends of said posts, said sleeve members being provided upwardly from their lower ends with slotted openings, said slotted openings being engaged downwardly over the truss bars immediately therebeneath supporting the sleeves vertically on the posts and preventing rotation thereof about said

posts, each of said sleeve members extending for a spaced distance above the upper end of its associated post, tie bar means interconnecting the sleeve members on the posts of one frame member with the corresponding sleeve members on the corresponding adjacent posts of the opposite frame member, and preferably a diagonal tie bar having enlarged sleeve members at each extremity thereof positioned with the sleeve members thereof telescopically engaged over the first defined sleeve members on the diagonally opposed posts of the two frame members, and a second unit positioned with the lower ends of the posts of the two frame members thereof telescopically received in the upper extended portions of the sleeve members on the lower frames to bring the lower ends of the upper posts in superimposed abutment with the lower posts within the sleeves to be retained therein against lateral displacement.

By way of example an embodiment of the improved sectional scaffolding construction constituting the present invention is illustrated in the accompanying drawings forming a part hereof wherein:

Figure 1 is a perspective view of one of the side frame members;

Fig. 2 is a perspective view of the tie bar and sleeve members secured integrally at the extremities thereof;

Fig. 3 is a perspective view of the diagonal tie bar and its associated sleeve members;

Fig. 4 is a perspective view of a two-stage assembly of the improved scaffolding construction;

Fig. 5 is a vertical section taken on line 5—5, Fig. 4;

Fig. 6 is a perspective view of the pallet rack scaffolding construction forming a modification of the instant invention;

Fig. 7 is a horizontal section taken on line 7—7, Fig. 6; and,

Fig. 8 is a vertical section taken on line 8—8, Fig. 7.

Referring now to the accompanying drawings in which like numerals indicate similar parts throughout the several views, a sectional scaffolding construction constituting one possible embodiment of the instant invention is shown in Fig. 4 as including a plurality of like side frame members **10** (Fig. 1), a plurality of tie bar members **11** (Fig. 2) and a diagonal tie member **12** (Fig. 3).

As seen in Fig. 1 the main or side or truss frame members **10** each consist of a pair of end or corner column members or posts **13** each having the same length and formed of tubular stock. These end posts **13** are interconnected by a pair of truss bars **14**, also of tubular stock, which are attached to the posts by welding or the like.

The truss bars **14** are spaced apart longitudinally of the posts and secured thereto at equally spaced distances inwardly from the opposite ends thereof providing each post with equal end extension portions **15** beyond the spaced truss bars **14**.

The spaced truss bars **14** are connected together intermediate their ends by inclined tubular truss or brace members **16** spaced apart longitudinally of the truss bars and secured at their ends to the truss bars by welding or the like.

Each of the tie bar members **11**, as seen in Fig. 2, consists of an elongated tubular bar **17** which is provided at each end with a sleeve member **18** disposed perpendicularly crosswise of the end of the bar **17** and secured thereto by welding or the like. The ends of said sleeves **18** are located equidistant from the axial center line of the bar member **17**. The inside diameter of the tubular sleeves **18** is such that the sleeve members will telescopically engage with slight clearance over the extended portions **15** of the post members **13** of the side frames **10**.

The same, or corresponding, ends of each of said sleeve members **18** are provided with a longitudinally extending slotted opening **19** in the sleeve side wall, with the slotted opening in each sleeve being disposed 90° from the axis of the bar member **17** and with the slotted openings of the two sleeves on a single tie bar extending in the same direction from the bar member **17** and in parallel.

The slotted openings **19** in the sleeve members **18** extend longitudinally from corresponding ends of the sleeves for a distance substantially of the posts **15** at the point of their attachment to said posts. Likewise, the breadth of the slotted openings **19** in the sleeve members **18** laterally of the sleeve members is slightly greater than the thickness of the truss bar members **14** laterally of the axis of the posts **15** at their points of attachment to said posts.

As is best seen in Fig. 5, the ends of the truss bars **14** and of the bar member **17** of the tie bar **11** are flattened laterally to bring the entire circumferential surface of the open end of these bars into flush contact with the side walls of the posts **15** or the sleeves **18** as the case may be, thus avoiding the necessity of laterally contouring the ends of these tubular members in order to insure a close continuous engagement between their open ends and the posts or sleeve members, as the case may be, when they are welded to these posts or sleeve members.

This flattening of the ends of the truss bars **14** and bar members **17** of the tie bars **16** accounts for the elongated, narrow, U-shaped configuration of the slotted openings **19** which, in manners to be hereinafter described, slidably engage vertically over these tubular bar members.

Referring to Fig. 3, the diagonal tie bar **12** consists of an elongated tubular bar member **20**, the ends of which are flattened laterally, as described with respect to bar members **14** and **17**, and welded centrally to a pair of sleeves **21** which are disposed perpendicularly endwise of the bar **20**. The inside diameter of the sleeves **21** is such that the sleeves will telescopically engage over the sleeve members **18** of the tie bar members **11**.

In constructing or assembling a scaffolding arrangement utilizing a plurality of the separable elements shown in Figs. 1 through 3 and described above to provide a vertical tower type of scaffold such as shown in Fig. 4, the separable and different elements above noted are assembled as follows:

A pair of end frames **10** are arranged with their end posts **13** in vertical position and with the frames generally disposed in parallel opposition and spaced apart a distance equal to the end-to-end length of said frames.

A pair of tie bar members **11** are positioned with the sleeves **18** of each member telescopically engaged downwardly over the upper extended projections **15** of the adjacent, corresponding end posts **13** of the two side frames, thereby forming a square unit.

When the sleeve members **18** of the tie bar members **11** are telescoped downwardly over the extended portions **15** on the side frames the slotted openings **19** therein slidably engage downwardly over the upper truss bars **14** of each of the frames whereby the two side frames **10** are rigidly interconnected by the tie bars **11**, and the slotted openings **19** engaging with the upper truss bars **14** of these frames securely lock the sleeves against lateral rotation or twisting relative to the end post extended portions **15**.

When the sleeve members **18** are so positioned and locked on the end posts of the side frames, the sleeves will extend upwardly for a spaced distance above the upper extremity of the upper extended portions **15** of end posts on each of the frames to provide a socket for purposes to be hereinafter described.

The final assembly feature in the first stage or tier of the scaffolding tower preferably is the positioning of the diagonal tie member **20** with the sleeves **21** thereof telescopically engaged downwardly over the upper extended portions of the sleeve members **18** on the diagonally opposed end posts **13** of the two oppositely positioned end frames **10**.

The vertical depth of the sleeves **21** on the diagonal tie members **20** is such that the lower ends of the sleeves will rest on the tie bar members **17** extending outwardly from the sleeve members **18** with the upper ends of the sleeves **21** lying in the same horizontal plane with the upper ends of the inner sleeve members **18**.

Having thus completed the first stage or tier of the scaffolding tower assembly, the second tier, which is substantially identical with the first, is superimposed upon the first by placing a second pair of side frames **10** with the lower extended portions **15** thereof telescopically engaged downwardly in the upwardly disposed socket portions of the sleeve members **18** of the tie bar members **11** in the lower stage or tier assembly.

The uppermost pair of side frames **10** may be mounted or positioned directly above the side frames **10** of the lower stage or tier or, by reason of the equal length of the tie bar members **11** and the side frames **10**, the upper pair of side frames **10** may be positioned perpendicularly to the side frames of the lower stage or tier with the lower extended portions **15** of each of these frames received downwardly into the sleeve members **18** on the adjacent and corresponding end posts of the two frames of the lower pair thus alternating or staggering the side frames **10** in each successive tier or stage of the tower construction.

The upper pair of side frames **10** are alternated (Fig. 4) in the second tier so that the tie bar members **11** in the second tier arrangement are positioned above the side frame members **10** of the first stage or tier and perpendicularly of the tie bar member **11** of the lower stage or tier.

Referring to Fig. 5, wherein there is shown in greater detail the interconnection and locking assembly of the three separable elements constituting the scaffolding construction shown in Fig. 4, the end posts **13** of the upper and lower frame members superimposed one above the other with the upper end of the extended portion **15** of the lowermost post receiving the lower extended portion **15** of the upper post in endwise abutment as at **22** whereby the lowermost post member **13** firmly supports the uppermost post **15** in a vertical direction as a column.

Surrounding the abutted post portions **15** is the tie bar sleeve member **18** which extends for a spaced distance above and below the abutted post portions **15** and from which extends the bar member **17** perpendicularly from a central portion thereof. The upper truss bar member **14** of the lowermost side frame **10** has its flattened end portion welded as at **23** to the lowermost post portion **15** and the slotted opening **19** in the sleeve member **18** is slidably engaged downwardly over the flattened end portion of the truss bar **14** to lock the sleeve against lateral rotation and twisting relative to the lower post member **15**.

The diagonal tie member **12** is positioned with sleeve **21** thereon telescopically engaged downwardly over the upper end of the sleeve member **18**, this diagonal tie member being positioned prior to the superimposition of the upper frame members as described above, so that the lower end of the sleeve member rests on the uppermost portion of the flattened end portion of the tie member **17** extending perpendicularly to the sleeve member **18** and with the upper end of the sleeve member **21** coinciding with the upper end of the sleeve member **18**.

It is possible using the general arrangement as shown in Fig. 4, the details of each corner post joint being shown in detail in Fig. 5, to construct a scaffolding tower having four corner posts and four sides of equal length to any desired height within multiple increments of the length of posts **13** of the side frame members **10**.

It is also possible using structural elements similar to those above described to construct a pallet or rack or storage stand for materials in an assembly as generally shown in Fig. 6.

In this modified scaffolding construction for the provision of a pallet rack, a pair of end frame members generally indicated at **24** are disposed in parallel opposition and are interconnected by a pair of tubular putlog members, generally indicated at **25**, which serve to maintain the frames in vertical positions and which also serve to

support materials or material-carrying pallets stacked thereacross.

In providing the pallet rack construction the end frames **24**, which are similar in construction to the side frame members **10** described above, include a pair of end posts **26**, formed of tubular stock, which are interconnected by a pair of truss bars **27** extending in parallel spaced relationship between the end posts **26** and which are welded at their ends to said posts by constructions identical with those described above with respect to such attachment.

In the end frames **24** of this modified construction, the lowermost truss bar may be spaced at a greater distance from the lower ends of the end posts **26** than the spacing of the uppermost bars from the upper ends of the posts in order to provide a frame of greater elevation than the side frame members **10**, and conventional foot members **28** may be carried on the lower extended ends of the end posts of these frame members.

Sleeve members **29**, similar to sleeve members **18** in the construction of Fig. 2, having slotted openings **30** extending longitudinally upwardly from the lower ends thereof are adapted to slidably engage downwardly over the uppermost truss bar on the side frame to lock the sleeves on the end posts against lateral rotation and twisting, and said sleeve members **29** are of such a length as to extend for a spaced distance upwardly beyond the upper ends of the end posts **26** to form sockets for the reception of the lower ends of the end posts of a second frame positioned above said first frame with the lower ends thereof in superimposed abutment upon the upper ends of the posts of the lower frame.

Each of the sleeve members **29** has a flat bar member **31** welded thereto to extend perpendicularly therefrom in horizontal position inwardly above the end frame member therebeneath, and the extended end of each of said members **31** has a tubular member **32** welded crosswise thereof in a horizontal plane and in such a manner so that the lowermost portion of the tubular member **32** will rest on and extend perpendicularly of the uppermost truss member of the end frame **24** immediately therebeneath.

Thus in assembling a pallet rack, sleeve members **29** will be telescopically engaged downwardly over the upper ends of the end posts of each of the two opposed end frame members **24**, with the bar members **31** extending in opposition to each other on each end frame member and with said tubular members **32** supported by the sleeve members on corresponding and adjacent posts of the two frame members in axial alignment and between said frame members in order that a pair of tubular putlogs **25** may be slidably inserted in said aligned pairs of tubular members to derive end support therefrom, and at the same time to afford longitudinal support for the rack maintaining the end frame members in their vertical positions.

Likewise, when the putlog members are positioned between two aligned pairs of tubular members **32** these putlogs serve as spaced lateral supports for stacking or piling material or pallets thereon or for receiving planking or the like to form a platform therebetween for the reception and support of materials thereon.

Additionally, as in the case of the first embodiment of the present invention above described, a second pair of end frame members **24** may be superimposed upon the first and lower pair with the upwardly disposed socket portions of the sleeve members **29** serving to receive the lower ends of the upper frame member and posts therein in end-to-end abutment with the uppermost ends of the end posts **26** of the lower frame members. Additional sleeve members **29** carrying tubular members **32** thereon are attachable to the upper ends of the uppermost frame members to form a second deck or tier for the pallet rack.

It is possible using the general arrangement as shown

in Figs. 6 through 8 to construct a pallet rack of multiple superimposed tiers.

The general arrangements and constructions described above provide a sectional scaffolding construction utilizing a minimum number of parts, and provide a maximum number of arrangements of scaffolding with the maximum of safety and strength, all at minimum costs of manufacture and assembly.

By utilizing sleeve members having slotted openings therein vertically of the sleeves engaging over horizontal bar members throughout the construction, lateral twisting rotation and collapse of the resultant assembled scaffolding is avoided since the perpendicular sides of the scaffolding are rigidly and securely locked against relative movement.

The provision of the diagonal tie member in the construction affords additional rigidity for the scaffolding construction.

Further advantages of strength and safety are inherent in the use of the sleeve members in the above-described constructions to receive the lowermost ends of superimposed units therein thus maintaining them against lateral displacement as they are vertically supported upon the upper ends of the columns or posts of the lower unit immediately therebeneath.

Thus with a minimum number of parts and constructions of maximum simplicity, applicant has acquired the ultimate in strength and safety in a scaffolding construction which is of extremely low cost of manufacture, which is extremely versatile in its ability to assume unlimited assembly arrangements to meet the requirements of the many and varied jobs encountered, and which is of extremely low cost of manufacture.

In the foregoing description, certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved construction illustrated and described herein are by way of example, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention, the construction, the operation and use of preferred embodiments thereof, and the advantageous new and useful results obtained thereby; the new and useful constructions, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

I claim:

1. A sectional scaffolding structure including four upright corner posts each composed of sections superimposed on one another in end-to-end abutment, truss bar means integrally interconnecting adjacent lower post sections to form a first pair of opposite similar side frame members, sleeve members telescopically engaging over the upper ends of the post sections of the first pair of side frame members and supported on the truss bar means immediately therebeneath, said sleeve members extending for a spaced distance above the upper ends of said lower post sections, a second pair of similar side frame members similar to said first pair of side frame members above the first pair of side frame members, the lower ends of the post sections of the second pair of side frame members being telescopically received in said sleeve members and laterally retained and supported in superimposed abutment on the upper ends of the post sections of the first pair of side frame members, each of the sleeve members being provided with a longitudinally extending slotted opening extending upwardly for a spaced distance from the bottom of the sleeve member, the slotted opening in each of said sleeve members downwardly engaging over the truss bar means extending from the post section immediately therebeneath; whereby the sleeve members are vertically supported and retained against lateral twisting relative to said post sections, and tie bar means rigidly interconnecting the sleeve members on one side frame member of the first pair thereof with the sleeve members on the adjacent corresponding post sections of the other side frame member of the first-named pair.

2. A sectional scaffolding structure as defined in claim 1 wherein the sleeve members on diagonally opposed post sections of said first pair of side frames are provided with additional sleeve members telescopically engaged downwardly over the upper ends of said first-named sleeve members and resting on the tie bar means extending therefrom, and a tie bar rigidly interconnecting these additional diagonally located sleeve members.

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