

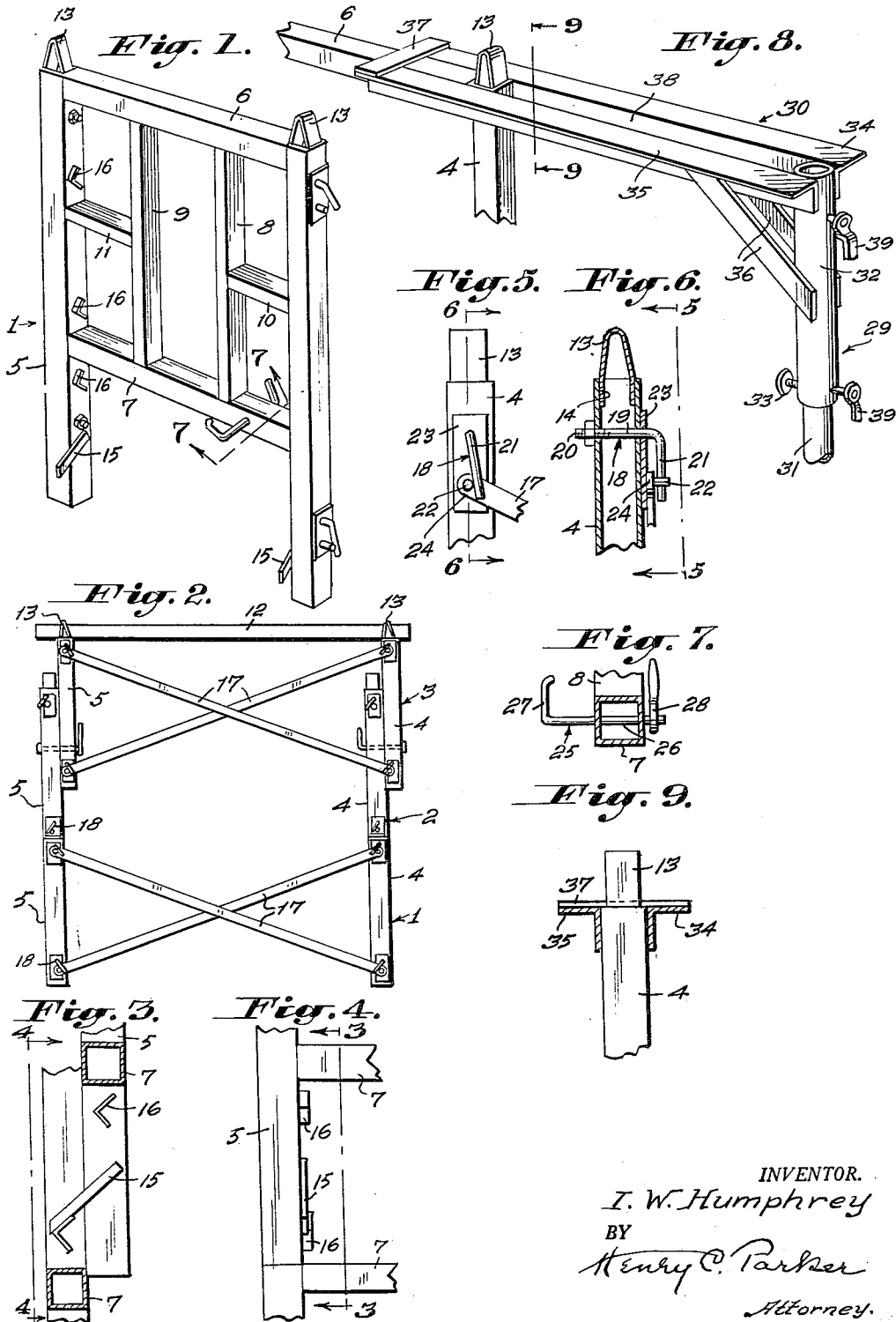
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METAL SCAFFOLDING

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METAL SCAFFOLDING

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This invention relates to metal scaffolding; and it comprises in combination a plurality of end frames or panels secured together by cross braces, said end panels comprising a pair of spaced vertical posts of square cross section usually having a height of about 4 feet, said posts having square sockets at their lower ends and upstanding interfitted male couplings at their upper ends to enable vertical stacking of the end panels, a pair of spaced horizontal main beams connecting said posts, one of said beams connecting said posts at their upper ends while the other connects the posts at a point about 1 foot above their lower ends, at least one intermediate vertical bracing beam connecting said horizontal beams and spaced inwardly from the posts, a third horizontal bracing beam connecting said intermediate vertical beam with one of the posts and positioned midway between the main vertical beams so that the horizontal beams form in effect the rungs of a ladder, a pair of spurs mounted diagonally on the inside faces of the posts close to their lower ends, said spurs having lower ends which protrude diagonally beyond the posts, several pairs of cooperating diagonal lugs mounted above said spurs on each of the inside faces of the posts, said lugs being spaced about 1 foot apart and so positioned that one panel can be attached to another in juxtaposed position with the spurs of one engaging the lugs of the other in at least two steps differing in height by about 1 foot, a pair of pins protruding from each of the outer faces of said posts at spaced points, a pair of cooperating elbow bolts having arms journaled horizontally in the posts just above said pins and provided with other arms at right angles to said horizontal arms of sufficient weight to drop by gravity into locking position against said pins, and two pairs of cross braces or links adapted to join said end panels in spaced apart relationship, said cross braces having eyes at their ends adapted to fit over said pins and to be locked into position by the arms of said elbow bolts dropping into locking position, said panels also advantageously being provided with clamps mounted on the lower horizontal beams and adapted to engage one of the beams of an adjacent panel when the two panels are attached in juxtaposed position; the scaffolding also including advantageously extensions comprising an extensible vertical post provided at its upper end with a horizontal bracket arm constructed advantageously from spaced-parallel angle irons spaced apart sufficiently to slip over the male couplings of the posts of the end panels and to embrace the upper horizontal bars of said end panels, the said extensions being adapted to be used in pairs attached to end panels at one side of the scaffold with their bracket arms in line with and forming an extension of the top horizontal beams of the end panels to hold additional boards of a platform mounted on said scaffold; all as more fully hereinafter set forth and as claimed.

Many types of metal scaffolding have been developed and used in the art. Several of these have made use of a plurality of end frames or panels held together with cross braces and provided with cylindrical posts and interfitted

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couplers to permit vertical stacking. The end panels are usually 4 feet in height and hence this type of scaffolding rises in steps of four feet each. While some of the end panels have been provided with intermediate vertically spaced horizontal bars to serve as mountings for partial platforms, to my knowledge no scaffolding has been produced the upper panels of which can be adjusted vertically in small steps to serve as a mounting for a full-width platform.

I have found that several advantages are obtained by using end panels equipped with posts of square cross section instead of round. Clamps and attachments are more easily secured to square posts. Cross beams are more readily welded to square posts. And the use of square posts enables the use of a simple height adjusting means which I have developed with which it is possible to secure two panels together in juxtaposed position at different heights, for example in steps of one foot each. This means that the top panels of the scaffolding can be used to support a platform which can be raised or lowered in steps of one foot. The use of square posts on the panels also enables the use of a convenient extension which can be attached on either side of an end panel to widen the supporting upper cross beam which is used as a supporting surface for a platform.

My invention can be described in greater detail by reference to the accompanying drawing which shows more or less diagrammatically a scaffolding within the present invention.

Fig. 1 is a perspective view of one of my end frames or panels,

Fig. 2 is a side elevation showing a scaffolding consisting of a vertical assembly of panels with the uppermost panels attached in juxtaposed position and off-set from those beneath in order to raise the top platform slightly,

Fig. 3 is a partial view of the inside faces of two end posts the panels of which are secured together in juxtaposed position and showing the securing means, the horizontal beams of the panels being in section, taken along the line 3-3 of Fig. 4,

Fig. 4 is another partial view taken at right angles to that of Fig. 3 along the line 4-4 of Fig. 3,

Fig. 5 is a partial side elevation of the top of one of the corner posts, taken along the line 5-5 of Fig. 6, and showing the latching mechanism for securing the cross braces,

Fig. 6 is a section through the top of the same post, taken along the line 6-6 of Fig. 5,

Fig. 7 is a vertical section through one of the horizontal beams of one of my end panels taken along the line 7-7 of Fig. 1 and showing the details of an auxiliary clamp for holding the panels in juxtaposed position,

Fig. 8 is a perspective partial view of an extension which can be used to widen the scaffold to support a wide platform, the extension being attached to one of the posts of a panel, while

Fig. 9 is a partial vertical section of the same post with extension attached, taken along the line 9-9 of Fig. 8.

In the various figures of the drawing like parts are designated by the same reference numerals. In Fig. 1 a side panel is shown generally at 1 while in Fig. 2 the intermediate and top panels are shown generally at 2 and 3, respectively. As shown best in Fig. 1 each of the panels is provided with vertical end posts 4 (right) and 5 (left), these posts being connected at their tops by horizontal beam 6 and, at a point about 1 foot from the bottom, by horizontal beam 7. The two horizontal beams 6 and 7 are connected by two intermediate vertical beams 8 and 9 while horizontal cross beams 10 and 11 are secured between the intermediate beams and adjacent end posts at points about midway between the main horizontal beams. When constructed in this fashion the horizontal beams or

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braces form in effect the rungs of a ladder which workmen can use to climb up to a platform 12 (Fig. 2) at the top of the scaffolding.

As shown best in Figs. 5 and 6 a male coupling 13 of square cross section is provided at the top of each post. These couplings can be made from sheet metal cut to size and bent into the form of an inverted U, the depending ends being welded inside the square posts as shown at 14 in Fig. 6. The lower ends of the posts are left empty and form sockets to receive the male couplings 13 when the panels are stacked vertically. The sockets which I employ are such that they will receive and couple with pin couplings of scaffolds constructed of piping, which is an advantage. But I have found that couplings of square or polygonal cross section form tighter joints than those of round cross section. This is due presumably to the greater area of contact and prevention of rotation.

Owing to the square cross section of my posts it is possible to make use of a convenient coupling means adapted to hold the end panels in juxtaposed position at a series of different heights. This coupling means is shown best in Figs. 3 and 4 and consists of spurs 15 welded to the inside faces of the end posts close to their lower ends and cooperating diagonal lugs 16 several of which, as shown in Fig. 1 can be welded in pairs to the inside faces of the posts at different heights. With end panels having a height of 4 feet I usually employ three lugs on each post at such a height that when the spurs of one panel are hooked over the lowest lugs, the hooked-on panel will be about one foot higher than the panel to which it is hooked. When the upper pairs of lugs are used, the hooked-on panel will be two feet and three feet higher, respectively. This means that the platform on top of my scaffolding can be raised one foot at a time by the use of the described coupling spurs and cooperating lugs. I believe that this is the first scaffolding which has been developed which is capable of adjustment in this fashion. It should also be noted, of course, that boards can be placed across cross braces 7, 10 and 11 to make single-board or partial platforms at different heights.

The square cross section of my posts also enables the use of another convenient automatic coupling means for securing to the posts diagonal cross braces 17 which serve to hold the panels in spaced apart relationship. This securing means, as shown best in Figs. 5 and 6, consists of an elbow bolt shown generally at 18. This bolt has one horizontal arm 19 which passes through the end posts, being journaled therein, and terminating in a finger grip 20 (Fig. 6). The other arm 21 of the bolt has sufficient weight to drop by gravity into locking position, as shown in Figs. 5 and 6. A short distance below the elbow bolt a short pin 22 is welded to the post. I usually weld this pin to a plate 23 which is then welded to the post. When one of the cross braces 17 is to be secured to one of the posts it is only necessary to raise the arm 21 of the bolt, then to slip the eye 24 of the cross brace over the pin 22 and let go of the bolt arm. The latter then falls by gravity into locking position, shown best in Fig. 5. The operation of fixing the cross braces to the posts can be done while standing on either side of the posts. Thus if the operator is standing on the scaffold and is therefore in the rear of the posts, he can raise the arm 21 of the elbow bolts by twisting on finger grip 20. It will then lock automatically as soon as the eye of the cross arm is placed over the pin 22 and the finger grip is released.

An auxiliary clamping means can be used if desired to hold the panels together when they are stacked in juxtaposed position. This means is shown best in Fig. 7. This clamp shown generally at 25 comprises a bolt 26 which is swiveled in horizontal beam 7. The bolt is provided with a hook 27 at one end while the other end is threaded to receive a nut 28. When two panels are stacked in juxtaposed position with the spurs 15 of one engaging lugs 16 of the other, the hooks 27 of the upper panel clamps can

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be hooked around cross beam 10, for example, of the lower panel and the nut 28 drawn tight to lock the two panels together.

In the scaffolding art it frequently happens that a wide platform is desired having a height of 4 to 8 feet. My scaffolding provides a platform of this type when use is made of the side extension shown in Figs. 8 and 9. This extension comprises an extensible post shown generally at 29, surmounted by a bracket arm shown generally at 30. The post can be made in two or more telescoping sections 31 and 32 to make it adjustable in height, the sections being clamped in desired position by the hand screw 33. Clamps 39 can be used to secure cross braces between two of the extensions when they are mounted on the same side of a scaffold opposite adjacent panels. The bracket arm 30 is made of two spaced-parallel angle irons 34 and 35 the ends of which are welded at right angles to the top of the post and supported by two diagonal braces 36 which are welded at one end to the post and at the other end to the angle irons. At their far ends the angle irons forming the bracket arm are held together by plate 37 which is welded to the top faces of the angle irons and holds them correctly spaced. The slot 38 between the angle irons is just wide enough to receive the end posts and top horizontal bar of the panels of the scaffolding.

In setting up the extension and attaching it to a scaffold, the length of the lower post 31 of the extension is adjusted so that the bracket arm of the extension is at about the same height as the upper cross bar 6 of the scaffold. The bracket arm is then slipped over the top of coupling 13 of the end post of the scaffold in line with the top horizontal bar of the panel, as shown in Fig. 8, with the plate 37 resting on top of cross bar 6, and the post is then adjusted laterally away from the scaffold until the bracket arm affords sufficient room on which to mount the desired additional boards of the platform. The height of the post is then finally adjusted. Another extension member is attached in similar manner to the other end of the scaffold on the same side and then cross braces are secured between the two extension members using clamps 39 to hold them. If extensions are employed on both sides of a scaffold, the width of the platform can be more than doubled if desired.

While I have described what I consider to be the most advantageous forms of my scaffolding, it is obvious, of course that various modifications can be made in the specific structures which have been disclosed without departing from the purview of this invention. For example the material of which the scaffold is constructed can be made of any metal having suitable strength characteristics. I have been using all steel construction but a lighter metal such as aluminum could be used. However the weight of the steel contributes a certain stability to the scaffold. If made of aluminum the end panels could be made of greater width and/or of greater height. If made of greater height the end panels can be provided with two or more pairs of spurs adapted to hook on to cooperating lugs on juxtaposed panels. While I have described the male couplings at the top of the end posts of the panels as being square in cross section adjacent the tops of the posts, it is evident, of course, that these couplings can be made of other cross sections so long as they fit the square sockets with which they are adapted to couple. The panels which I am now making have a height of 4 feet and a width of 4 feet 10 inches. While I have shown the posts used in my side extension as being made from piping it is evident, of course, that this could be made of tubing having a square cross section, as in the case of my panels. The square cross section of my panel posts is essential, of course, if use is to be made of my spur and lug clamping means and of the other securing and coupling means which have been described. Other modifications of my invention which fall within the scope of the

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following claims will be immediately evident to those skilled in the art.

What I claim is:

1. A scaffold comprising in combination (a) a plurality of end panels, (b) cross braces secured to said end panels in pairs and holding the end panels in a spaced-parallel position, (c) said end panels comprising a pair of spaced vertical end posts, (d) said end posts having a square cross section with square sockets at their lower ends and upstanding male couplings which are of square cross section adjacent the tops of the posts and secured to the upper ends of said posts, (e) said male couplings interfitting with said sockets so as to permit vertical stacking of the end panels, (f) a plurality of spaced horizontal beams connecting the end posts of each end panel, (g) one of said horizontal beams connecting the posts at their upper ends and providing a base on which to rest a platform, (h) at least one intermediate vertical bracing beam connecting said horizontal beams and spaced inwardly from the posts, (i) at least one horizontal bracing beam connecting said intermediate vertical beam with a post which is adjacent thereto, (j) the spacing between the said horizontal beams being such as to form in effect the rungs of a ladder, (k) at least one pair of spurs mounted diagonally flush with the inner faces and close to the lower ends of said posts, (l) said spurs having lower ends which protrude diagonally beyond the posts, (m) several pairs of cooperating diagonal lugs mounted on the inner faces of said posts and spaced vertically at different heights in such manner that one panel can be hooked on to another panel in juxtaposed position with the spurs of one panel engaging the lugs of the other panel and at differing heights, and (n) means for attaching said cross braces to the end posts of said panels.

2. The scaffold of claim 1 wherein said means for attaching cross braces to the end posts consists of pins mounted on the posts, which are adapted to receive eyes provided at the ends of said cross braces, and cooperating non-detachable elbow bolts having a vertical arm passing through and journaled in the posts just above said pins and a second arm at right angles to the first of sufficient weight to swing by gravity over the ends of said cross

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braces to rest against said pins thereby to lock the cross braces to the end posts.

3. The scaffold of claim 1 wherein auxiliary clamps are mounted on one of said horizontal beams of the end panels adapted to engage and clamp to one of the beams of a juxtaposed end panel when two panels are stacked in juxtaposed position.

4. The scaffold of claim 1 wherein said end panels have two spaced intermediate vertical beams between the end posts thereof, said intermediate vertical beams being connected to adjacent end posts by horizontal bracing beams in such fashion that the horizontal beams are spaced apart distances of about one foot to form in effect the rungs of a ladder.

5. The scaffold of claim 1 having a wide platform whose boards rest partly on top of the horizontal beams connecting the upper ends of the end posts of the top panels of the scaffold and partly on a side extension of the scaffold; said side extension comprising a pair of vertical extensible posts mounted at one side of the scaffold in line with the horizontal beams of the end panels of the scaffold, horizontal bracket arms mounted at the tops of the extensible posts and secured to the adjacent end posts of the top panels of the scaffold, the bracket arms being aligned with the horizontal beams of the top panels of the scaffold and supporting part of the boards of said platform, and cross braces attached between said extensible posts.

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