

Jan. 22, 1952

M. P. FRENCH

2,583,368

COUPLING MEANS FOR SCAFFOLDING BARS

Filed June 11, 1947

4 Sheets-Sheet 1

Fig. 1

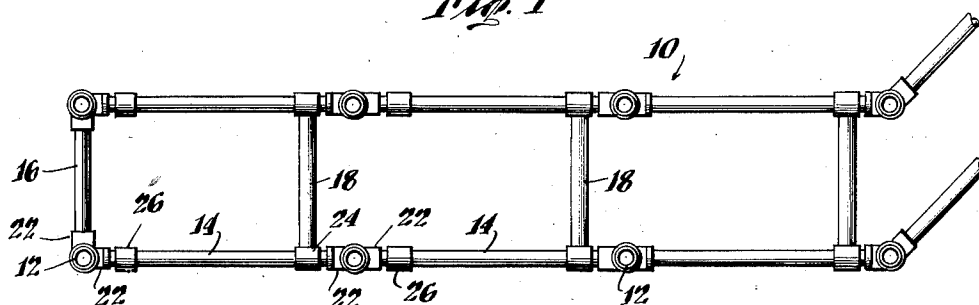
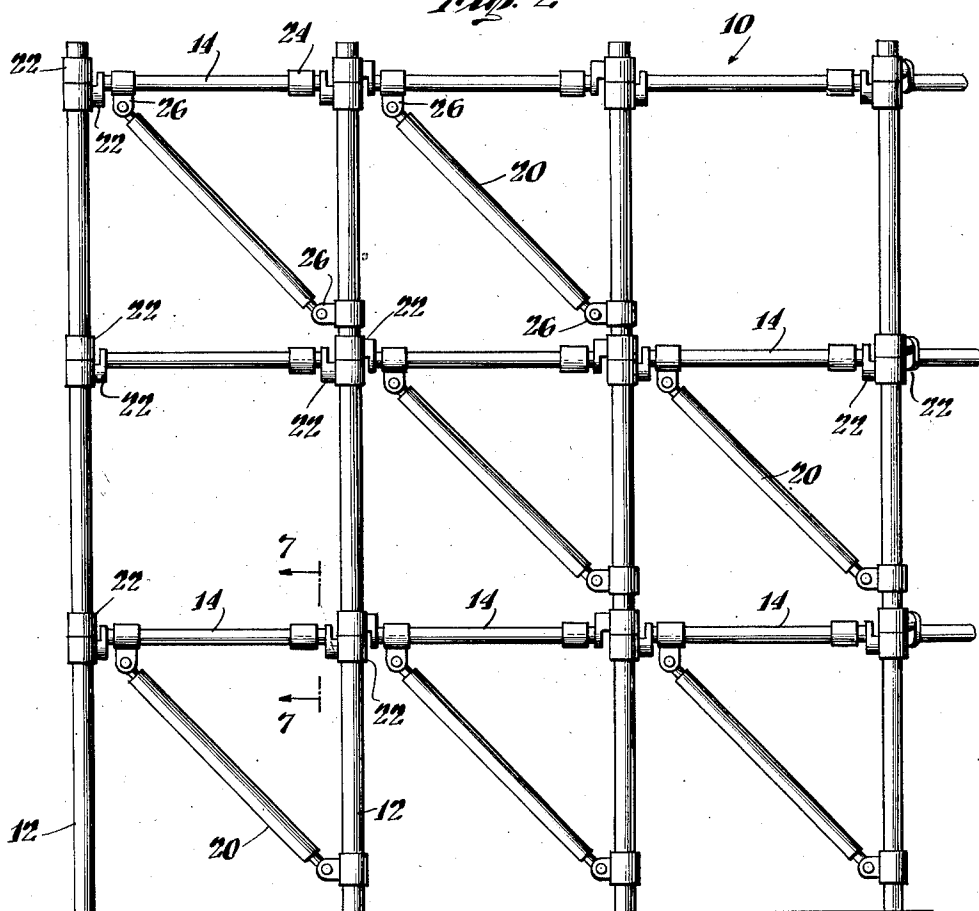


Fig. 2



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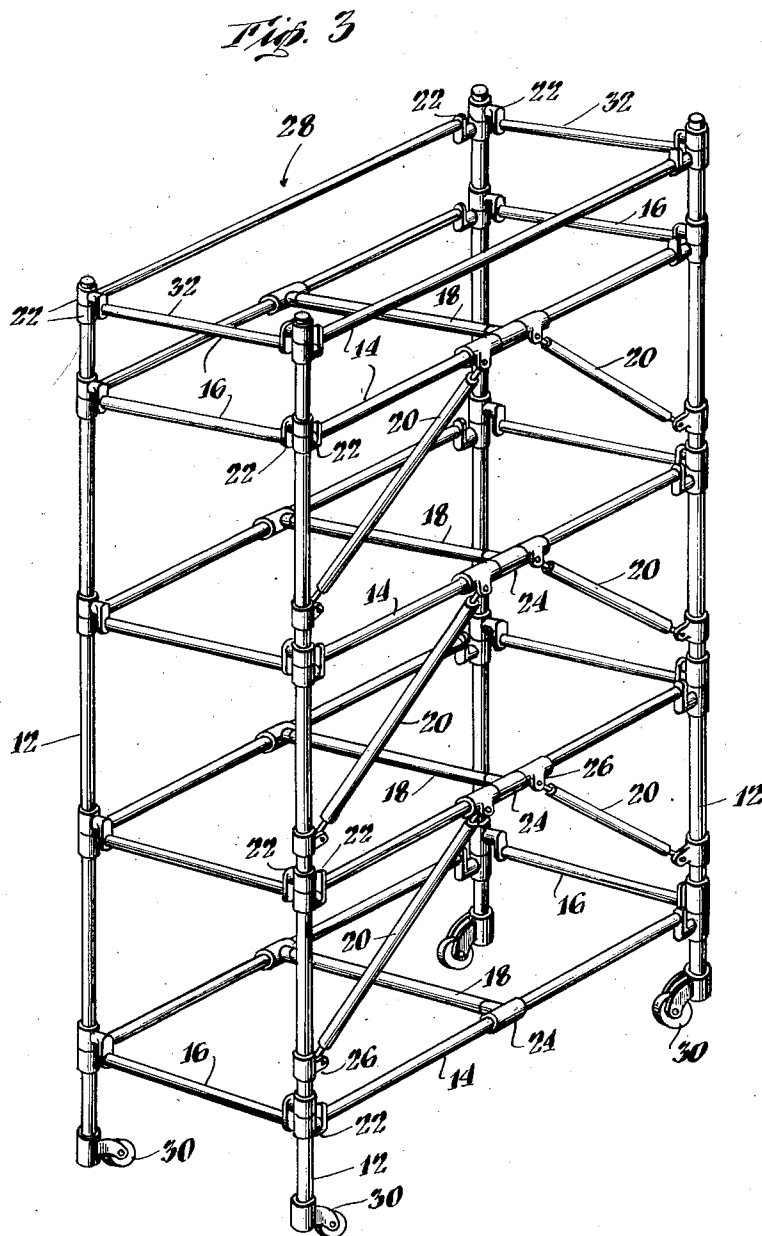
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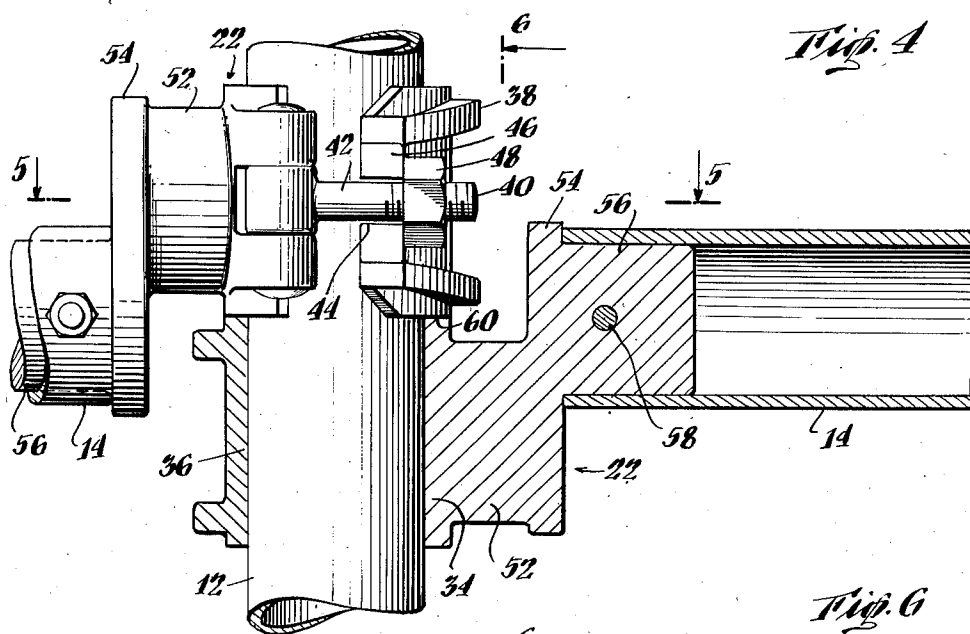


Fig. 4

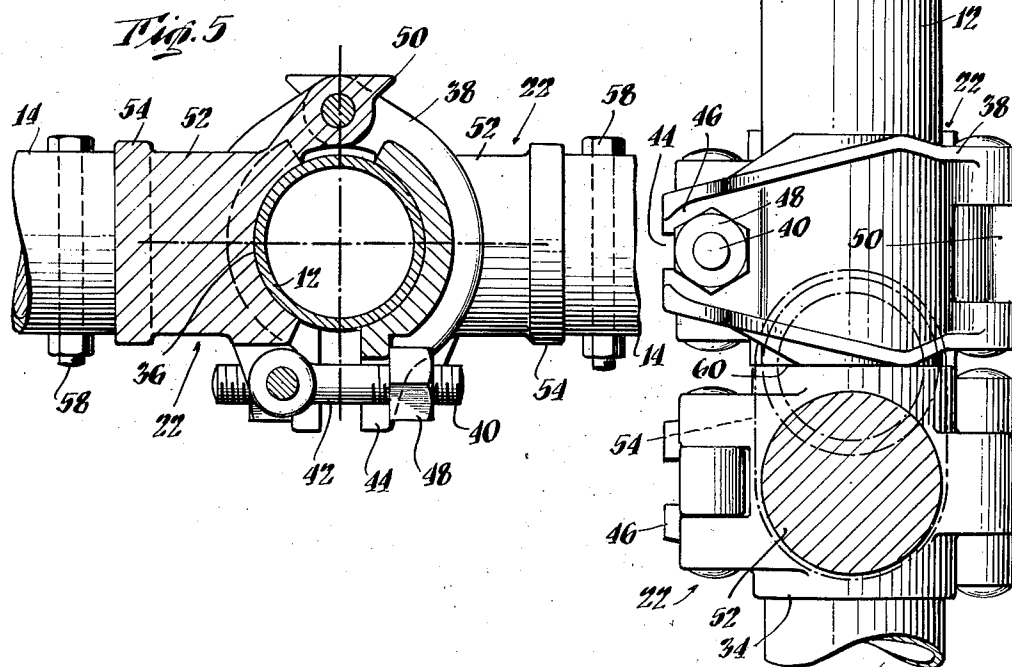


Fig. 5

Fig. 6

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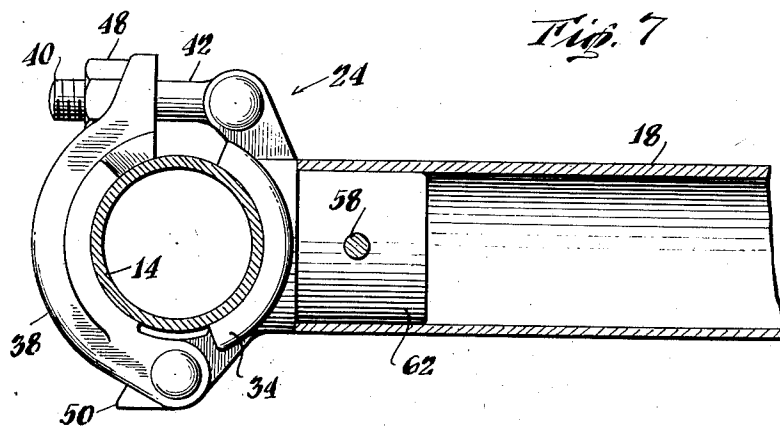
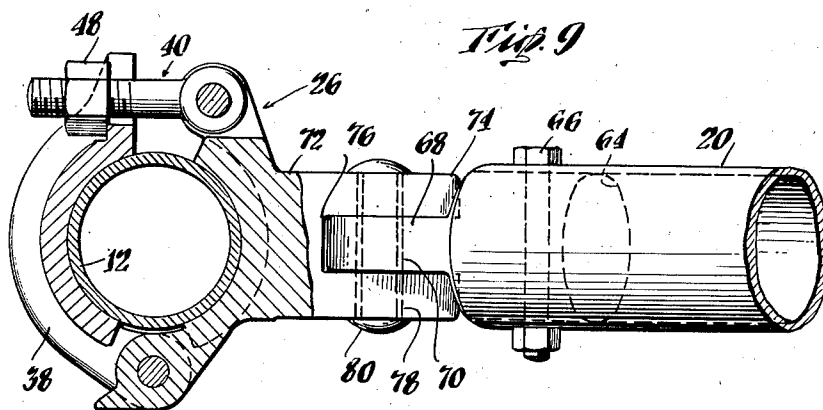
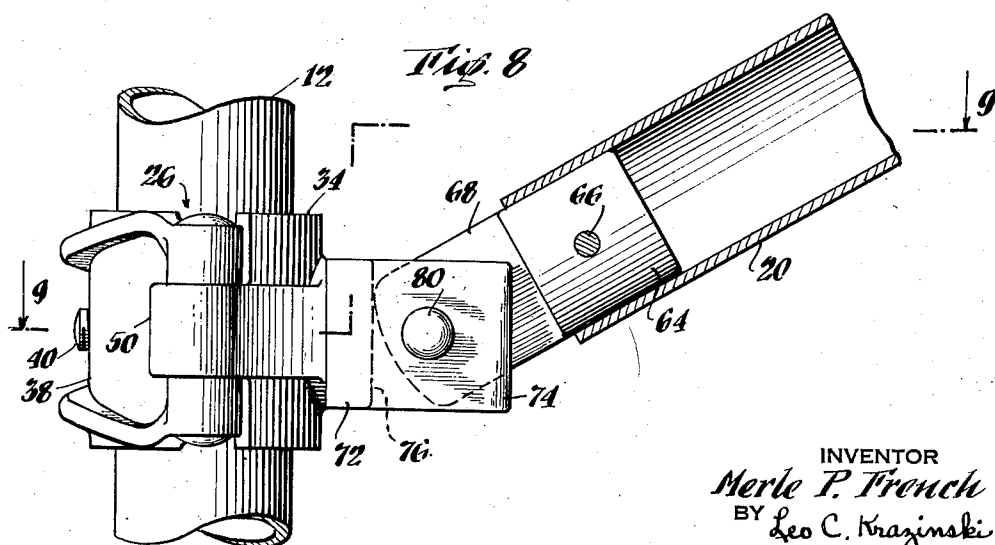
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COUPLING MEANS FOR SCAFFOLDING BARS

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UNITED STATES PATENT OFFICE

2,583,368

COUPLING MEANS FOR SCAFFOLDING BARS

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Application June 11, 1947, Serial No. 753,991

6 Claims. (Cl. 304-40)

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This invention relates to scaffolds, particularly to metallic type scaffolds employing tubular frame members for supporting material and workmen in building operations, and has for its primary object to provide a quickly erectable scaffold in which the vertical and horizontal frame members are adapted to be interconnected with their axes intersecting each other.

In the erection of rigid scaffolds hinged clamps are usually employed for coupling the vertical and horizontal members together at predetermined points. These clamps are designed to maintain alignment of those horizontal members disposed longitudinally along the exterior of a building with their axes, however, laterally offset from the vertical members to which they are connected, thereby producing a bending moment at each of the joints. It has been proposed heretofore to minimize said bending moment by clamping the horizontal member in contact with its associated vertical member and, while this is an improvement over previous constructions, it is not entirely satisfactory.

It is, therefore, another object of the invention to eliminate the aforesaid bending moment in a tubular frame scaffold.

Since a scaffold is constituted by a series of front and rear vertical frame members interconnected in depth by horizontal tubular members or ledgers, which are used for supporting flooring planks, it has been necessary heretofore, as far as applicant is aware, to arrange the ledgers at a different elevation from that of the horizontal members that continue longitudinally along the building. This is also an unsatisfactory arrangement, particularly in rolling or stationary tower type scaffolds, and it is still another object of the invention to arrange all horizontal members, including the ledgers, on the same level.

In general, the longitudinal members of a scaffold are continued along a straightaway and where the building follows a straight line this is satisfactory. However, in buildings following arcuate or angular lines the straightaway arrangement is not satisfactory since the scaffold length should conform to the contour of the building.

It is thus a further object of the invention to provide universal clamp that is adapted to interconnect the horizontal longitudinal members at any desired angle and also to maintain the transverse members at the same elevation therewith.

It is still a further object of the invention to provide a simple, inexpensive, and readily mountable hinged type clamp for tubular type scaffolds.

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With the above objects in view, a preferred embodiment of the invention discloses a tubular scaffold in which vertical tubular members are connected to horizontal tubular members both longitudinally and transversely by improved clamps, each of which is provided with a hinge for removable engagement with the vertical tubular member and with an offset projection for reception within and fixed attachment to one end of the horizontal tubular member. The center of the projection is offset a predetermined amount from the center of the hinge, so that at a juncture involving one vertical and two horizontal members one clamp is disposed with its projection above the hinge center while the other clamp is disposed with its projection below the hinge center line, thereby placing both projections and their associated tubular members at the same level. At the same time the centers or axes of both horizontal members intersect the center or axis of the vertical member. Ledgers disposed adjacent the junctures are provided with clamps having projections centered with the hinges and when attached to longitudinal members are at the same level therewith.

For bracing the scaffold a swivel type clamp comprising a slotted hinge portion pivotally engageable with a tongue portion is rigidly secured to each end of a tubular member of predetermined length and the tubular brace is hingedly connected at one end to a vertical member and at the other end to a horizontal member. The slotted hinge portion is also adapted for use with ledgers disposed adjacent the vertical members. A more complete understanding of the invention will be obtained from the following description of the preferred embodiment thereof, taken in conjunction with the accompanying drawings in which:

Fig. 1 is a top plan view of a tubular scaffold illustrating closure at one end by a ledger and angular disposition of the longitudinal members adjacent the other end;

Fig. 2 is a front elevational view of the scaffold shown in Fig. 1;

Fig. 3 is a perspective view of a rolling scaffold tower incorporating the features of this invention;

Fig. 4 is a slightly enlarged elevational view, partially in section, of a juncture involving a vertical member and two straightaway horizontal members in which the details of the offset clamp are more clearly illustrated;

Figs. 5 and 6 are sectional views taken along lines 5-5 and 6-6, respectively, of Fig. 4;

Fig. 7 is a slightly enlarged sectional view taken along line 7—7 of Fig. 2 illustrating interconnection between a horizontal member and a ledger or transverse member;

Fig. 8 is a view, partially in section, of a juncture involving a vertical member and a bracing member bringing out more clearly the swivel type clamp; and

Fig. 9 is a sectional view taken along lines 9—9 of Fig. 8.

Referring now to the drawings, particularly to Figs. 1 and 2, there is shown a scaffold 10 comprising a plurality of uprights or vertical members 12 connected to longitudinal members 14 and to transverse or ledger members 16 at one end thereof. Additional transverse or ledger members 18 are shown connected to the longitudinal members 14 adjacent or intermediate the junctures of the longitudinal and vertical members 14 and 12 respectively, while bracing members 20 are interposed, as desired, between a vertical member 12 and a longitudinal member 14 for adding rigidity and strength to the scaffold 10. All members are preferably of tubular design in conformity with conventional present day construction.

For quickly attaching one member to another it is customary to employ hinge type clamps and, as seen in Fig. 2, a clamp 22, termed an offset clamp for reasons that will appear hereinafter, is secured at each end of a longitudinal member 14 and an end ledger member 16. By use of the offset clamp 22 it is possible to install the longitudinal members 14 on a straightaway, that is, with all members 14 in alignment, or to install these members at various angles with respect to each other in conformity with the outline of a building structure (not shown). At the right side of Fig. 1 is illustrated an example of a turning point in the scaffold 10.

Each end of an intermediate ledger 18 is equipped with a straight hinged clamp 24 and each end of a bracing member 20 is provided with a swivel type clamp 26, both of which will be described in greater detail hereinafter. It is, therefore, readily apparent from Fig. 1 that the center lines or axes of the longitudinal members 14 and end ledgers 16 intersect the center lines or axes of the vertical members 12 at their junction points. Thus, the weight of material, workmen, etc. (not shown) carried by the horizontal members 14, 16 and 18 is transmitted vertically to the uprights 12 without any lateral bending moment, as is found in existing scaffolds. It is to be noted, further, that the axes of the bracing members 20 also intersect the axes of the vertical and horizontal members 12 and 14, respectively, thereby eliminating bending moments and side thrusts at junctures therewith.

It is advantageous in scaffolding structures to locate all ledgers and longitudinal members at the same level or elevation in order to facilitate the installation of planks (not shown) as a flooring for supporting material and workmen. As shown in Fig. 2, the end and intermediate ledgers 16 and 18, respectively, are disposed at the same level with respect to each other, as well as with the longitudinal members 14.

Referring now to Fig. 3, in which like parts are identified by like characters, there is shown a rolling scaffold tower 28 in which the features mentioned hereinbefore, particularly the various clamps, are incorporated. Instead of the tower 28 being supported upon casters 30 it may be mounted upon stationary feet or plates (not shown). The assembly of the various component

parts is somewhat similar to that shown in Figs. 1 and 2 and it is not deemed necessary, therefore, to go further into the details thereof. However, in cases where the span between uprights 12 is beyond a predetermined length it is considered preferable to install a pair of braces 20 in the form of a truss, as shown, for each tier. To bring out the details more clearly only the braces 20 nearest the observer are shown, it being understood, of course, that similarly arranged braces would be installed at the opposite side thereof. At the top of the tower 28 there is shown a railing 32 comprising the longitudinal and end ledger members 14 and 16, respectively, connected to free ends of the uprights 12 as a safeguard for the workmen.

In Figs. 4, 5, and 6 details of the offset clamp 22 and its coupling arrangement between the longitudinal members 14 and vertical member 12 are shown. The clamp, in general, comprises a main body portion 34 having an arcuate concave recess 36, complementary to the peripheral surface of the vertical member 12, and an arcuate hinged plate 38 for embracingly engaging the member 12. A bolt 40 is rotatably pinned at one end in the body 34, as shown, and its shank 42 is adapted to be received in a slot 44 provided at a bifurcated end portion 46 of the hinged plate 38. A nut 48, which is threadably engageable with the bolt 40, is adapted to bear against the face of the bifurcation 44 in the closed position of the clamp 22. For limiting the extent to which the hinged plate 38 may be opened, a protuberance or stop 50 is provided, as shown.

A shank 52 extends outwardly from the body 34 and at its extremity there is formed a lug 54 with a projection 56, which is preferably circular and of a size slightly smaller than the inner diameter of the longitudinal member 14 or ledger 16, within which it is adapted to be received and attached thereto in any suitable manner, as by a bolt-nut combination 58. As shown clearly in Fig. 4, the center line or axis of the projection 56 coincides with that of the tubular member 14 and this center line also coincides with the upper edge 60, as viewed in Fig. 4, of the main body 34 of the lower clamp 22. Further, the center line of the projection 56 is offset or spaced from the center line of the main body 34 a predetermined amount, which amount is shown as being one-half the height of the body 34. Thus with this amount of offset it is readily seen that by reversing the positions of the projections 56 with the clamp edges 60 in abutting engagement, as illustrated in Fig. 4, the center lines of the longitudinal members are in alignment and, therefore, the outer peripheral surfaces thereof are at the same elevation. And this same elevation will be obtained regardless of the angle between the two members 14, which in Fig. 5 is shown to be at 180°, that is, on a straightaway. This angle may be 90°, as at the end of a scaffold (see left end of Fig. 1 and ends of Fig. 3), or at an acute or obtuse angle (see right end of Fig. 1.).

It will also be readily seen in Fig. 5 that the center lines of the horizontal members 14 intersect the center line of the vertical member 12 and in view of this intersection any load carried by the horizontal members 14 will be transferred directly to the upright 12 by the vertical force component, the horizontal force component being zero. In present scaffolds employing hinge type clamps, as far as applicant is aware, the horizontal members are disposed at the side of the

upright with a resulting force bending moment or torque existent at the juncture.

Referring now to Fig. 7, there is shown the ledger 18 provided at its extremity with the clamp 24, which differs from the clamp 22 merely by a change in the location of the projection. In the clamp 24 a projection 62 is formed along the axis or center line of the body 34 and this projection is disposed within the ledger 18 and secured thereto by bolt-nut combination 58, thus providing what may be termed a straightaway clamp. It is apparent, therefore, that the ledgers 18 are at the same elevation as that of the longitudinal members 14 and end ledgers 16.

The swivel clamps 26, shown in Figs. 8 and 9 are formed of a male and a female part, the male part comprising a cylindrical member 64, preferably solid, disposed within the tubular brace 20, being secured thereto by a nut-bolt arrangement 66, and a flat tongue member 68 extending from the cylindrical member 64. The tongue 68 is formed with a transverse opening 70, as shown. The female part includes a straightaway projection 72 with a bifurcated end 74 having a slot 76 for reception therein of the tongue 68, the remainder thereof being substantially identical to that shown in Fig. 7. In fact, to reduce the number of parts, clamp 24 and the female portion of clamp 26 may be identical. The bifurcated end 74 is formed with a transverse opening 78, which registers with the opening 70 when the tongue 68 is properly disposed in the slot 76 of the projection 72. A pin or rivet 80 passed through said openings forms a pivot as shown for the tongue 68, which may be rotated with the brace member 20 to any desired angle. From inspection of Fig. 9 it can be seen that the axis of the brace 20 intersects that of the upright 12, so that the load will be transmitted from one to the other along axial lines. While in Figs. 8 and 9 the upright 12 was shown coupled to the brace 20, it is to be understood that the longitudinal member 14 could be substituted for the upright 12 with the same result.

The method of assembling the scaffold 10 will now be described. An upright 12 at one end, say the left rear end of Figs. 1 and 2, is first set up. A longitudinal member 14 of the desired length having a clamp 22 at each end is next clamped at the required height to the upright 12, a right angle being automatically formed at the juncture. As shown in Fig. 2, the offset projection 56 of the clamp 22 is in the upper position, although it could be in the lower position. A second upright 12 is then placed in the recess 36 of clamp 22 while in the open position and the hinge 38 locked into closed position, a right angle being automatically formed at this second juncture. If a building structure is adjacent the proposed scaffold 10, the three assembled parts are usually inclined thereagainst (otherwise these parts are held vertically). The left end ledger 16 is next connected to the first installed upright 12 with clamp 22 thereof placed above and in abutting engagement with the first installed clamp 22, the offset projection 56 of the ledger 16 extending downwardly and, therefore oppositely to that of the latter clamp 22.

The left front upright 12 is then set plumb at the required spacing from the associated left rear upright 12, after which the two rear uprights 12 are brought to a vertical position and the remaining clamp 22 of the ledger 16 coupled to the left front upright 12. The three uprights are self-sustaining at this point and the

left front longitudinal member 14 is then connected to the left front upright 12 with its clamp 22 in abutting engagement beneath the clamp 22 of the ledger 16, the offset projection 56 of member 14 being directed upwardly. The fourth upright 12 is coupled to the free end of its associated longitudinal member 14, after which braces 20 are clamped into position, as shown at the front and back, and an intermediate ledger 18 connected between the two longitudinal members 14. In a similar manner the remainder of the tier or level, as well as the required number of upper tiers, is installed until the entire structure is completed.

While this invention has been shown and described as embodying certain features merely for the purpose of illustration, it is, of course, understood that various modifications may be made in the details thereof without departing from the scope of the invention, as defined in the appended claims.

What I claim is:

1. A scaffold comprising, in combination, a vertical tubular member, a pair of horizontal tubular members connected thereto, and a hinge clamp with an offset portion of one-half the height of the clamp telescopically secured to each of said horizontal members for connecting said horizontal members to said vertical member, said portions being vertically offset on said vertical member in opposite directions to maintain said horizontal members at the same elevation, said clamps being adapted to interconnect said members so that the axes thereof intersect each other.

2. A scaffold comprising, in combination, at least a vertical member, a pair of horizontal members adapted to be connected thereto with the three axes thereof intersecting each other, said horizontal members including a clamping device rigidly attached to each end thereof, said device comprising an offset portion equal to one half of the height of said clamp with an arcuate rotatable hinged plate for frictional engagement with said vertical member, said portions being vertically offset on said vertical member in opposite directions, so that one offset portion balances the other offset portion, thereby maintaining said horizontal members at the same elevation.

3. In a scaffold, the combination with a vertical tubular member and a pair of horizontal tubular members connected at a junction point thereto, of a clamp rigidly secured to an end of each of said horizontal members, said clamp comprising a body vertically offset one-half the height of said clamp from the axis of said horizontal member, and a hinged plate rotatably carried by said body for embracingly engaging said vertical member, said clamp being disposed on said vertical member at said junction point in abutting relation with the bodies offset in opposite directions.

4. In a scaffold, the combination with a vertical tubular member and a pair of horizontal tubular members connected at a junction point thereto, of a clamp rigidly secured to one end of each of said horizontal members, said clamp comprising a body vertically offset one-half the height of said clamp from the axis of said horizontal member, one edge of said body being in alignment with the axis of said associated horizontal member, and an arcuate hinged plate rotatably carried by said body for embracingly engaging said vertical member, said clamp being disposed on

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said vertical member at said junction point in abutting relation with the bodies offset in opposite directions.

5. A coupling for a pair of tubular members comprising, in combination, a body, an arcuate hinged plate rotatably carried upon one side of said body for removably securing one of said members to said body, a shank extending outwardly from another side of said body, a lug extending transversely from said shank, and a projection extending transversely from said lug and parallel with said shank for rigid attachment to the other one of said tubular members, said projection having its center line disposed transversely from the center line of said body one-half the height of said body and said projection being adapted for telescopic attachment to the other one of said tubular members.

6. A coupling for securing a horizontal tubular member to a vertical tubular member comprising, in combination, a body, an arcuate hinged plate rotatably carried upon one side of said body for removably securing said vertical member to said body, a shank extending horizontally from another side of said body, a lug extending vertically from said shank, a projection extending horizontally from said lug for rigid attach-

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ment to said horizontal tubular member, said projection having its horizontal axis disposed vertically from the horizontal axis of said body one-half the height of said body, and means for telescopically attaching said projection to one end of said horizontal tubular member.

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