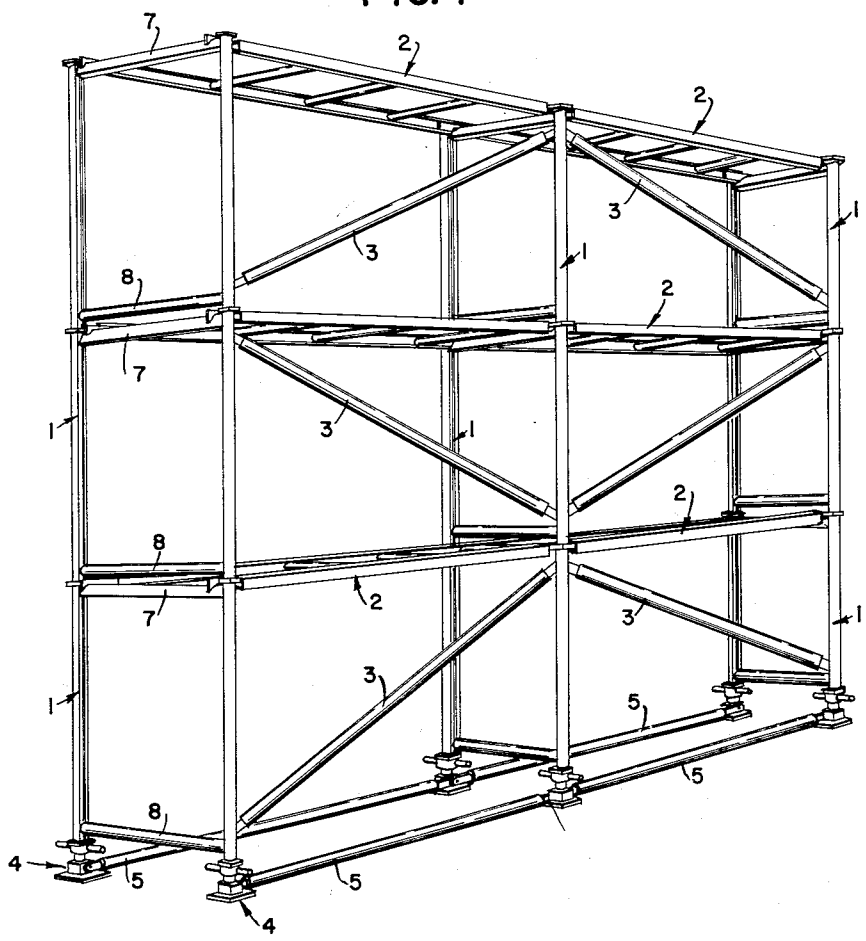
March 6, 1962 E. M. HUNNEBECK 3,023,833

SCAFFOLD

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FIG. 1



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FIG. 2

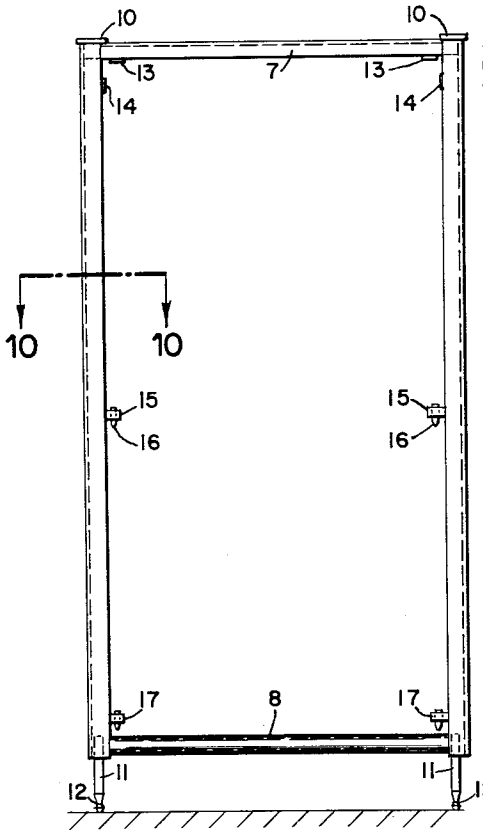


FIG. 3

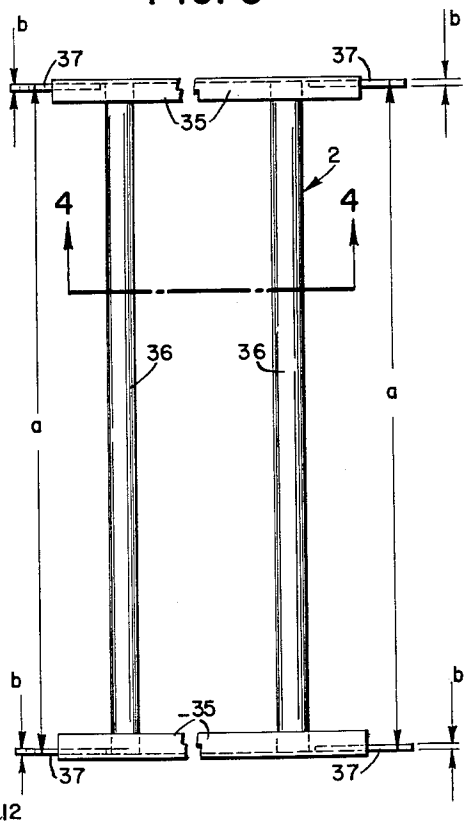
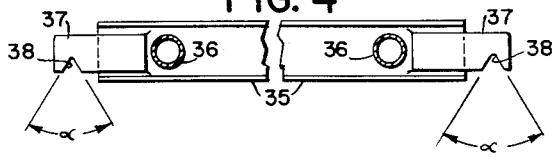


FIG. 4



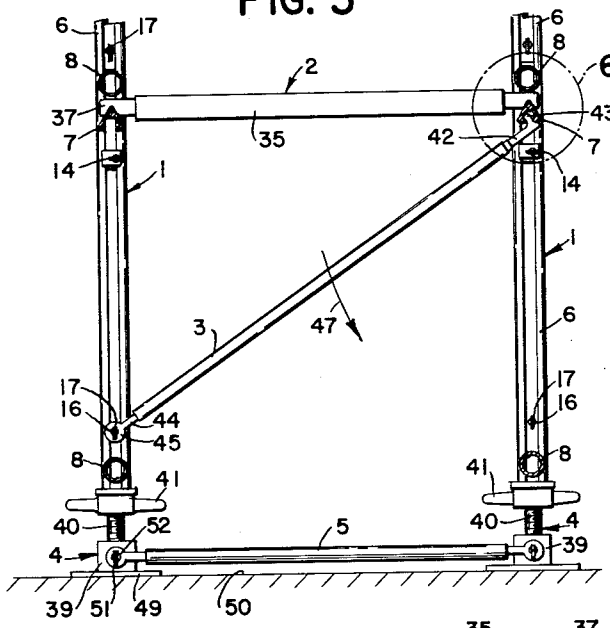
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FIG. 5



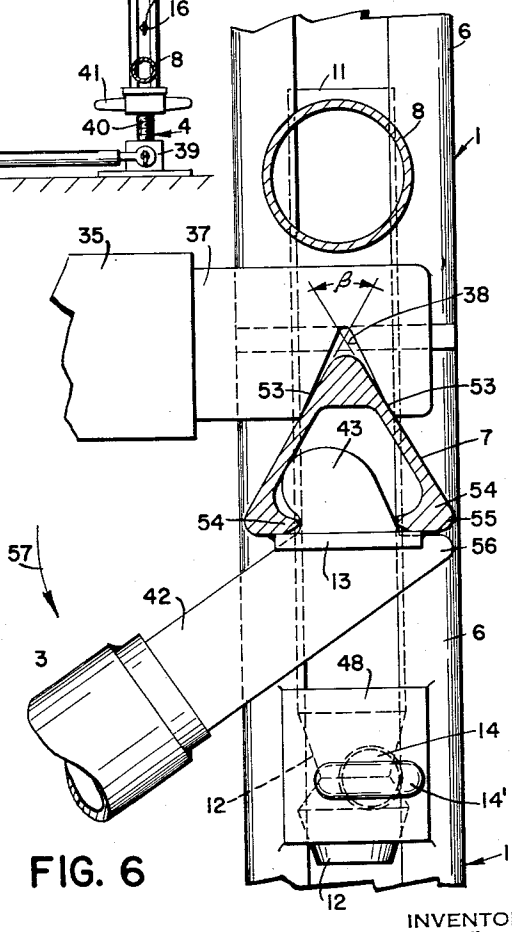


FIG. 6

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FIG. 7

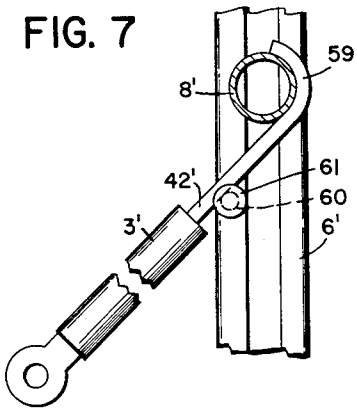


FIG. 8

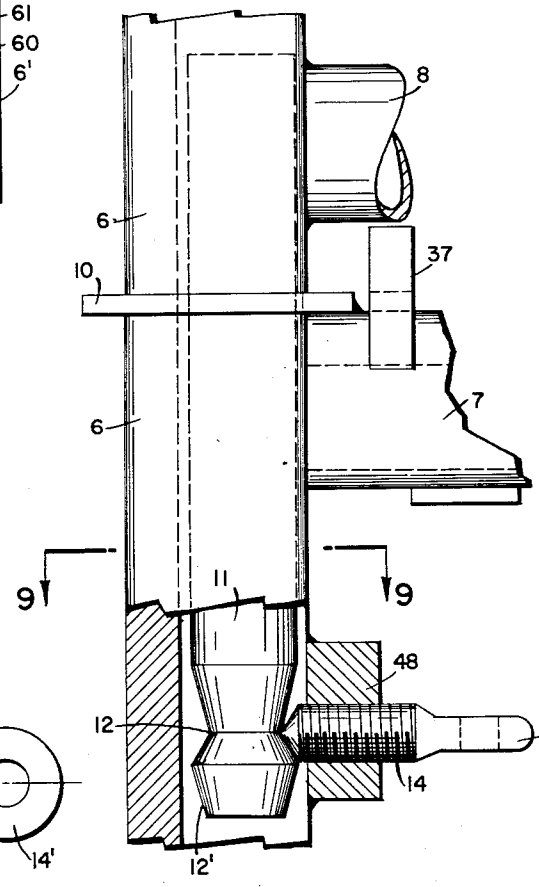
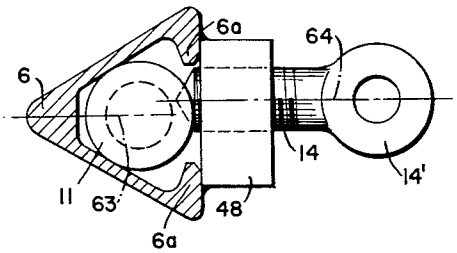


FIG. 9



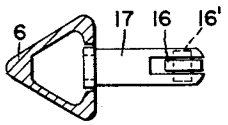


FIG. 10

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3,023,833

SCAFFOLD

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Filed Apr. 25, 1960, Ser. No. 24,552
Claims priority, application Germany Apr. 25, 1959
2 Claims. (Cl. 182—178)

This invention relates to a framework assembled from uprights, cross braces and diagonal braces in such a way that it can readily be dismantled. Scaffolds of this type up to now have consisted primarily of tubular poles connected with each other by tubular or angular cross braces. Tubular or angular bars are employed also for the diagonal bracing; and many detachable couplings are known for connecting the individual frame members with one another. However, a serious drawback of scaffolds of this type is that because of their complicated manufacture the tubular frame members, in themselves torsion-resistant, are very expensive. A further disadvantage is that the connecting elements for the tubular frame members are also of complex design.

On the other hand, compression members for trusses and the like are known that have a hollow triangular section, presenting the cross section of an equilateral triangle with reinforced edges, and open on one side. These sections offer the advantage over tubular rods that while having nearly the same bearing strength and the same twisting resistance, they can be produced much more cheaply by a simple rolling operation.

Starting out from this state of the art, it is proposed, in accordance with the invention, to produce scaffolds by the use of the bars of triangular section described. This, however, makes it necessary to provide suitable couplings for joining the individual uprights and braces since the connecting elements used with tubular scaffolds are not suited for the purpose. The invention therefore provides particularly for detachable couplings between the vertical and horizontal frame members and for the diagonal braces. According to the invention, the horizontal frames are fitted with hooked fishplates that come to lie on the top cross brace of the vertical frame and are held in place by reason of the fact that the bottom cross brace of the next-higher vertical frame—inserted in the vertical frame beneath it by means of pegs—is arranged just slightly above the hooked fishplates. This arrangement offers the advantage that the desired scaffold can be erected to any height and width by means of but two structural components, namely, the vertical frame and the horizontal frame. The only additional structural components are the diagonal braces which, though not novel as such, are terminated in a hook at one end and in an eye at the other for the purpose of adapting them to the triangular section of the frame members. The plug coupling, not novel in itself, for the vertical frame is also adapted to the triangular section in that each of its uprights is fitted at its lower end with a peg and at its upper end with a plate set upon the triangle, with the pegs presenting a circular kerf, and with each upright having associated with it a screw that may be made to engage the kerf.

Additional features of the invention relate to the special design of the frame parts, of the diagonal bracing and of a base for the scaffold, and these features are described in the subclaims.

The invention is described in greater detail below with the aid of an embodiment serving as an example. In the drawing,

FIG. 1 shows schematically a scaffold designed in accordance with the invention;

FIG. 2 is a side elevation of a vertical frame according to FIG. 1;

FIG. 3 is a top view of a horizontal frame according to FIG. 1;

FIG. 4 shows the object of FIG. 3 in cross section along line IV—IV;

FIG. 5 shows a vertical longitudinal section through the object of FIG. 1;

FIG. 6 is a detail view on an enlarged scale of a portion of FIG. 5;

FIG. 7 represents another embodiment of the object of FIG. 5;

FIG. 8 shows the juncture between two vertical supports;

FIG. 9 shows the object of FIG. 8 in cross section along line IX—IX; and

FIG. 10 shows the object of FIG. 2 in section along line X—X.

The scaffold shown in FIG. 1 essentially consists of several vertical frames **1**, horizontal frames **2**, diagonal braces **3** and bases **4** that are braced against each other by means of braces **5**. These form the basic elements from which the scaffold is assembled. The embodiment shown in FIG. 1 is composed of nine vertical frames **1**, six horizontal frames **2**, six diagonal braces **3**, six bases **4** and four braces **5**. Additional frame elements may, of course, be added to the top and on the sides, so that the scaffold can be erected to any desired height and width with the aid of identical structural elements. The required number of diagonal braces **3** is variable. Thus, one or more adjacent scaffold sections may dispense with such bracing.

The vertical frame **1** shown in FIG. 2, which forms one of the basic elements of the scaffold, essentially consists of two uprights **6**, a top cross brace **7** and a bottom cross brace **8**. The two uprights **6** and the top cross brace **7** have a hollow triangular section, not novel in itself, forming an equilateral triangle with reinforcements at the three edges and open on one side. The bottom cross brace **8**, however, is a simple tube. The two uprights **6** and the two cross braces **7** and **8** are arranged at right angles to each other and connected to each other by means of welding or the like. The open sides of the triangular section of uprights **6** and of the top cross brace **7** point inward, that is, the open sides of the two uprights **6** face each other while the open side of the top cross brace **7** faces downward. Moreover, a plate **10** is provided at the upper end of each of the two uprights **6**, whereas at the lower ends of uprights **6** a peg **11** presenting a kerf **12** is arranged, which may be inserted into the upper end of the upright **6** located beneath it. In this way, one vertical frame **1** may be plugged into another, and the scaffold may be erected to any desired height. Moreover, there is associated with each upright **6** a screw **14** which engages the kerf **12** of the inserted peg **11** and holds the two mated frame parts together so that they cannot pull apart. The metal plate **13** arranged on the underside of top cross brace **7** serves as a stop for diagonal brace **3**, described further on. Such plates **13** are provided at both ends of the top cross brace. To permit securing of the diagonal braces **3** at the lower end of vertical frame **1**, the uprights **6** are provided at their lower end, slightly above the bottom cross brace **8**, with bolts **17**.

Another structural element of the scaffold is formed by the horizontal frame **2**, shown in FIG. 3. It essentially consists of two U-bars, connected with each other by two or more tubes or rolled sections **36**. Both bars **35** have at each end a hook-shaped fishplate **37** with a notch **38**. The angle α formed by the edges of said notch **38** is preferably held somewhat smaller than the angle β formed by the sides of the triangular section of the top cross brace **7**.

In erecting the scaffold, the horizontal frame is placed

by its hook-shaped fiishplates **37** onto two vertical frames **1**. Care must be taken that every two abutting fishplates **37**, located on a top cross brace **7**, of two adjacent horizontal frames **2** come to lie side to side.

FIG. 5 shows the transverse connection of two vertical frames **1**, each of which stands on a base **4**, and into each of which another vertical frame **1** is inserted from the top. The brace **3** which serves to brace the vertical frames **1** terminates at one end in a hook **43** which projects into the open underside of the top cross brace **7** of vertical frame **1** between its sides **54**. Said end **42** further presents an enlargement **56** forming a stop **55** for one of the undersides of the top cross brace **7**. The lower end **44** of the diagonal brace **3**, on the other hand, has an eye **45** with which bolt **17** at the lower end of uprights **6** comes to mate. FIG. 10 shows that bolt **17**, set into the open side of upright **6**, has a falling latch **16**, attached to bolt **17** by means of a pin **16'**. Stop **55** is preferably arranged in such a way that the eye **45** of diagonal brace **3** can be connected with the associated bolt **17** at the vertical frame **1** only with elastic deformation of diagonal brace **3** in the direction of arrow **47**.

Another embodiment of the diagonal brace is shown in FIG. 7. In this embodiment, the end **42'** presents a simple hook **59** fitting around a tubular cross brace **8'** that is attached to upright **6'**. A bolt **60** and **61** ensures that in this case, too, the diagonal brace **3'** can be connected to the associated bolt at the other vertical frame only with elastic deformation.

The plug-in coupling for connecting two superimposed vertical frames **1** is shown in FIGS. 5, 6, 8 and 9. FIG. 9 shows the peg **11** inserted in upright **6**. It may be secured by means of a screw **14** having an eye **14'**. Screw **14** turns in a metal plate **48**, welded to upright **6**, and is guided so that its axis **64** may be laterally offset relative to the axis **63** of the peg. FIG. 8 shows how the peg **11** of the vertical frame **1** projects into the top end of the lower vertical frame. The kerf **12** of said peg must be at such a level that the bolt **14** is able to engage it.

FIG. 5 further shows that the horizontal frame **2** comes to be seated by its fishplates **37** firmly on the top cross braces **7** of the vertical frame **1** by reason of the fact that the bottom cross brace **8** of the vertical frame **1** set directly on top of it, and whose peg **11** projects into the vertical frame **1** beneath it, comes to be located slightly above the fishplate **37**, thus preventing the horizontal frame **2** from becoming dislodged or being lifted out.

FIG. 5 also shows a base, not novel as such, for the uprights **6**. It essentially consists of a plate **49** resting on the floor **50**; a tube section **39** located above it; a spindle **40** and its associated handle **41**. Hinged to the side of each tube section **39** is a bolt **52** onto which are slipped the eye-shaped ends of spacer brace **5**. A cross pin **51** serves to secure the eye-shaped end on the bolt **52**.

To permit the mounting of guards or the like, the uprights **6** of the vertical frame **1** are fitted with one or more bolts **15** that are welded on between the sides of the triangular section of said uprights **6** and fitted with a falling latch.

I claim:

1. A build-up scaffold comprising spaced, vertical assemblies, each of said vertical assemblies consisting of at least two rectangular frames in end to end relation such that the upper of said frames is superposed on the lower of said frames in said assembly, each of said frames being a unitary structure comprising spaced longitudinal members and cross members joining said longitudinal members adjacent the ends thereof, each of said longitudinal members and the uppermost of said cross members having a hollow triangular cross section, one side of each of said longitudinal members and said uppermost cross member having a longitudinal slot therein,

each frace having a peg fixed to the lower end thereof and extending therefrom, said peg being adapted to be inserted into the upper end of the corresponding longitudinal member of an adjacent frame, means on each longitudinal member for releasably securing the peg inserted therein, a horizontal supporting frame extending between said vertical assemblies, said supporting frame having fixed thereto at each end thereof spaced hook-shaped fish plates, said hook-shaped fish plates being adapted to engage an upper cross member of a vertical assembly frame, the lower cross member of the vertical assembly frame superposed on the vertical assembly frame engaged by said fish plates being spaced sufficiently close to the lower ends of the longitudinal members of the superposed frame such that when the vertical assembly and the horizontal frame are in assembled relation the fish plates cannot be disengaged from said cross member, a diagonal brace having a hook on one end thereof, said hook being shaped such that it may be passed through said slot in a member having triangular cross section when said diagonal brace is in one orientation with respect to such member and said hook being shaped such that it is securely engageable within a member having triangular cross section when said diagonal brace is in another orientation with respect to such member, and means on the other end of said brace for securing said brace to another member of said scaffold.

2. A built-up scaffold comprising spaced, vertical assemblies, each of said vertical assemblies consisting of at least two rectangular frames in end to end relation such that the upper of said frames is superposed on the lower of said frames in said assembly, each of said frames being a unitary structure comprising spaced longitudinal members and cross members joining said longitudinal members adjacent the ends thereof, each of said longitudinal members and the uppermost of said cross members having a hollow triangular cross section, one side of each of said longitudinal members and said uppermost cross member having a longitudinal slot therein, each longitudinal member of each frame having a peg fixed to the lower end thereof and extending therefrom, said peg being adapted to be inserted into the upper end of the corresponding longitudinal member of an adjacent frame, said peg having a kerf in that part inserted in the longitudinal member, an internally threaded member secured to the slotted side of the longitudinal member, a screw threaded into said member and through said slot to engage the kerf in said peg and wedge said peg into the angle formed by the sides of said triangular member opposite said slot, a horizontal supporting frame extending between said vertical assemblies, said supporting horizontal frame having fixed thereto at each end thereof spaced hook-shaped fish plates, said hook-shaped fish plates being adapted to engage an upper cross member of a vertical assembly frame, and the lower cross member of the vertical assembly frame superposed on the vertical assembly frame engaged by said fish plates being spaced sufficiently close to the lower ends of the longitudinal members of the superposed frame such that when the vertical assembly and the horizontal frame are in assembled relation the fish plates cannot be disengaged from said cross member.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,023,833 March 6, 1962

Emil Mauritz Hunnebeck

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 1, for "each frace" read -- each longitudinal member of each frame --.

Signed and sealed this 19th day of June 1962.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents