April 2, 1963 J. A. ISBELL 3,083,787

SCAFFOLD STRUCTURE

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FIG. 2.

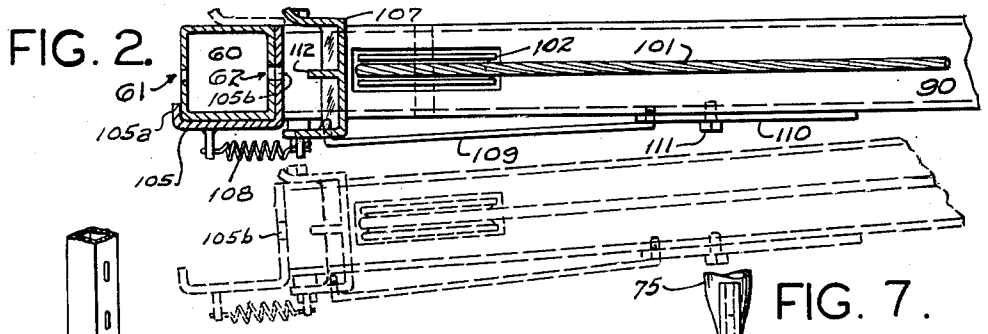
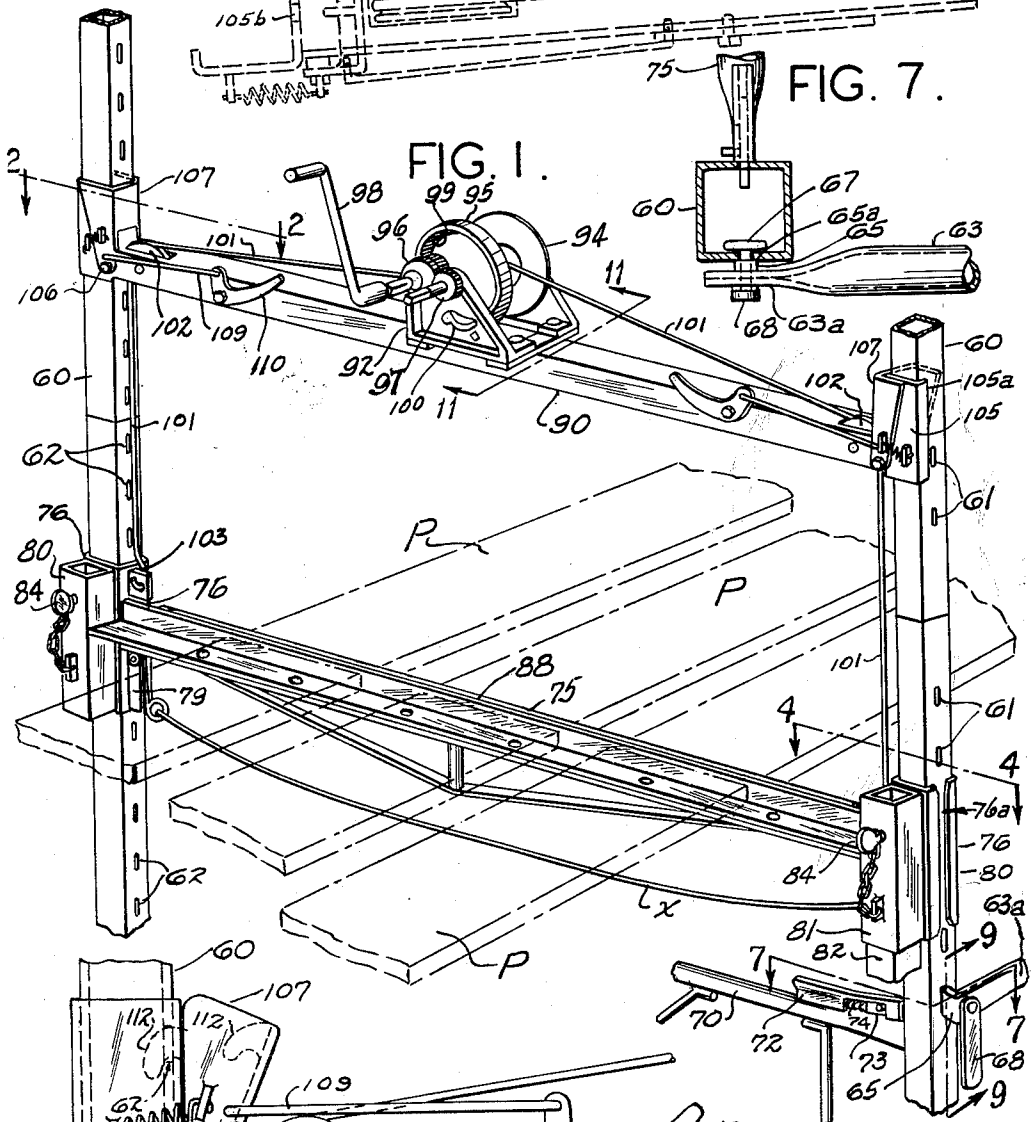


FIG. 7.

FIG. 1.



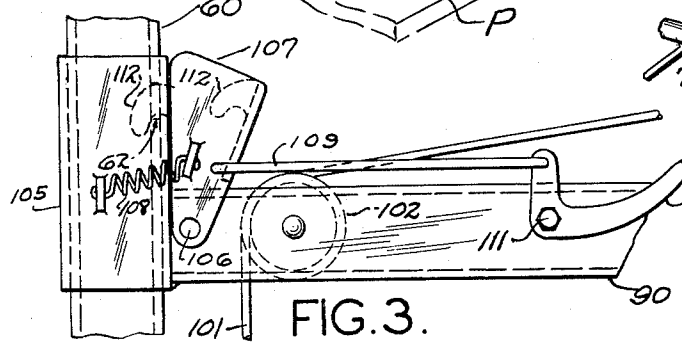


FIG. 3.

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FIG. 4.

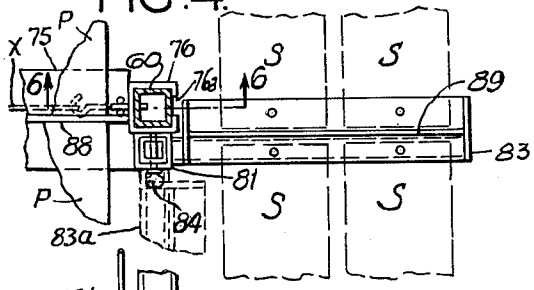


FIG. 11.

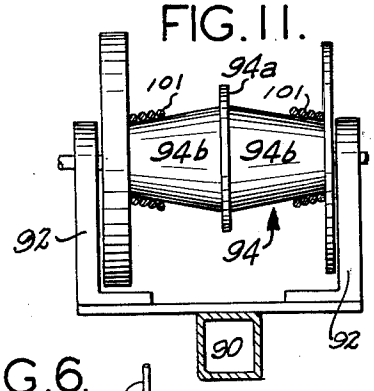


FIG. 5.

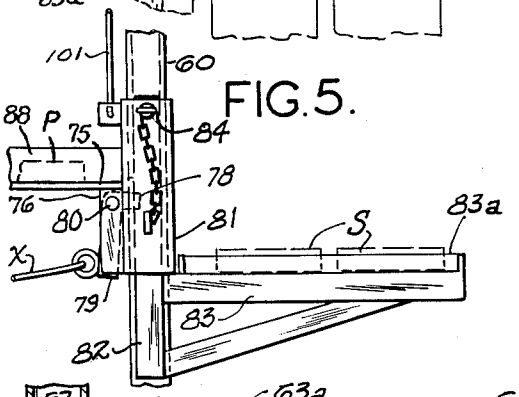
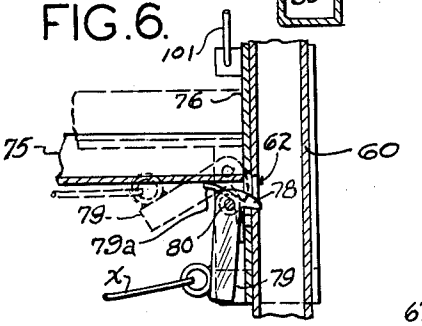


FIG. 6.



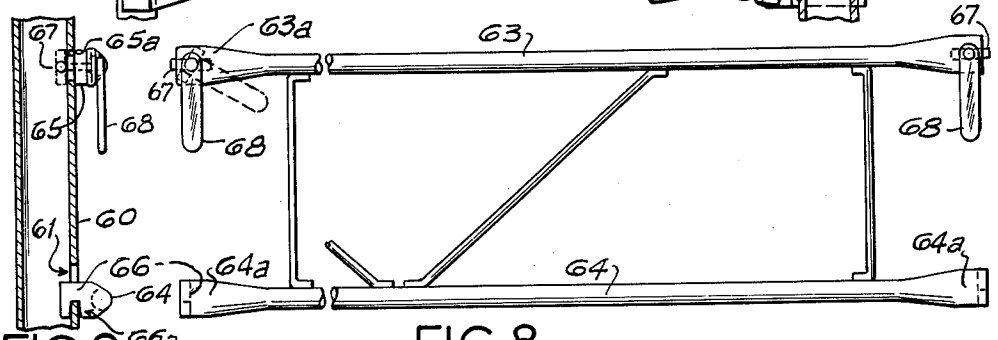


FIG. 9.

FIG. 8.

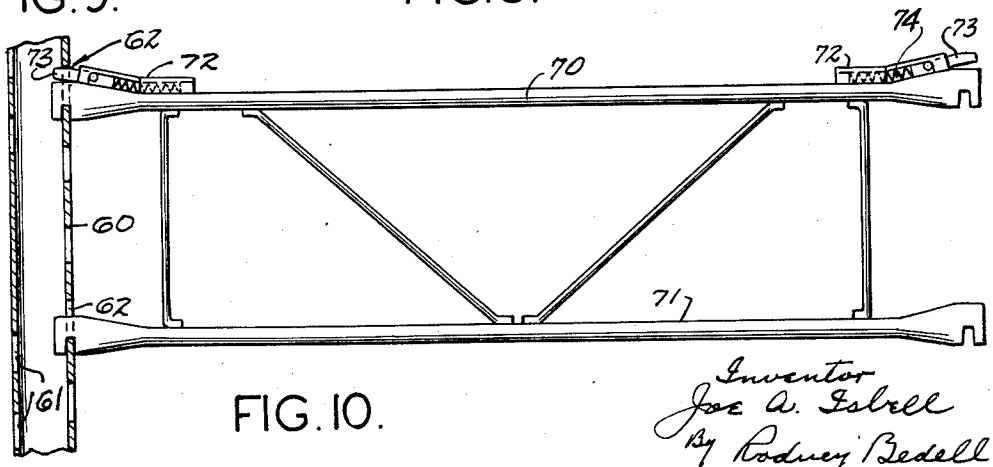


FIG. 10.

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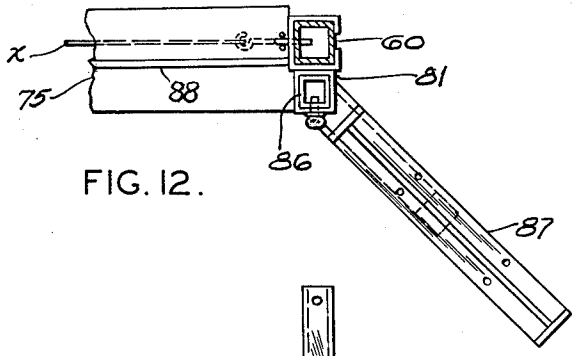


FIG. 12.

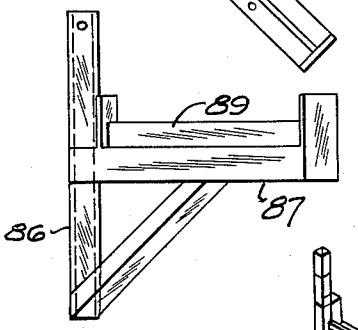
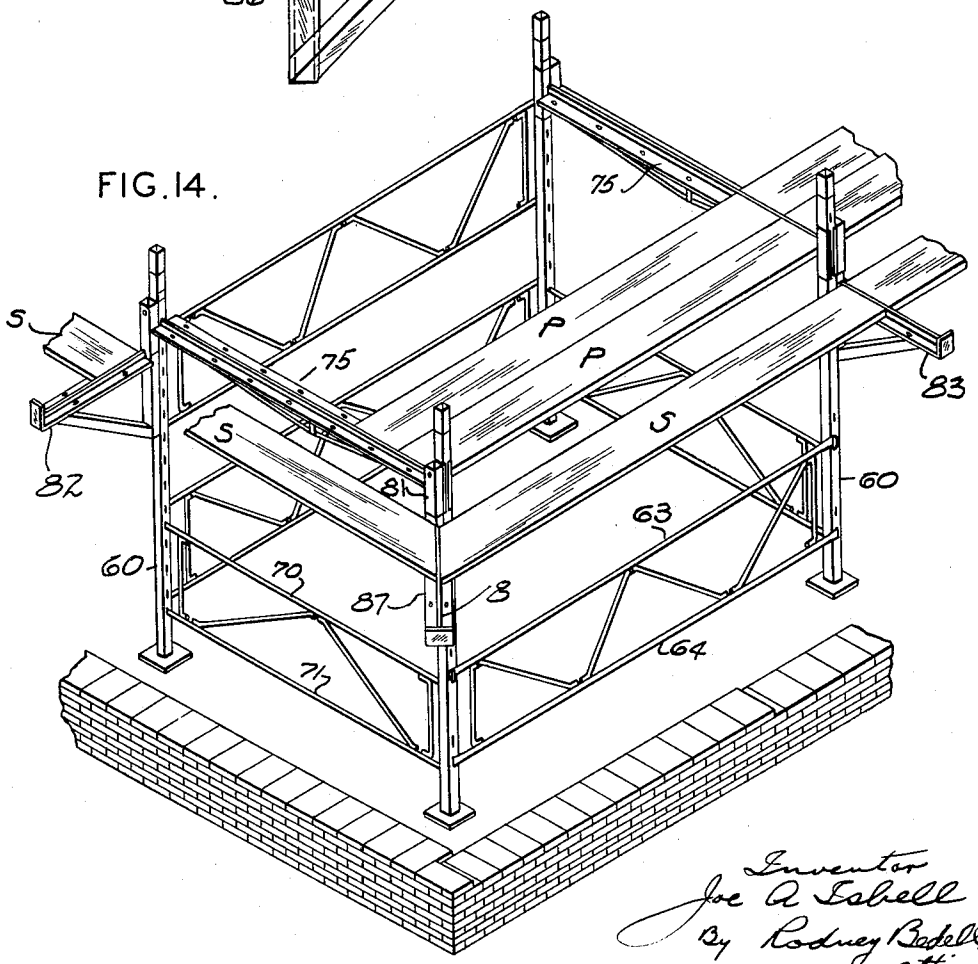


FIG. 13.

FIG. 14.



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SCAFFOLD STRUCTURE

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Filed Oct. 15, 1959, Ser. No. 846,742
10 Claims. (Cl. 182—143)

The present invention relates to scaffolds such as are used in erecting or repairing buildings and is particularly adapted, but not limited, for use in erecting masonry, or other building walls in which it is necessary for the workman to function at successive heights and accordingly must use a scaffold which is adjustable vertically.

Among the objects of the invention are to facilitate assembly and disassembly of the scaffold which is set up and taken down repeatedly and the expense of such operations is a continual one and is far more important than the cost of the scaffolding; to lighten the scaffold without affecting its stability or safety; to mount a platform and a platform winch on the scaffold uprights so that they are readily shifted independently of each other; to adapt the scaffold uprights and the winch for ready application to and removal of the winch from the uprights at different levels along the latter; to utilize all parts of the scaffold platform during its adjustment to different levels, thus avoiding the unloading and reloading of flooring, material and workmen during adjustments; and to provide a smooth continuous platform and a smooth continuous sidewalk and otherwise promote safety of workmen during adjustment and during work on the building. Other detail objects will appear from the following description and from reference to the drawings forming part of this specification in which:

FIGURE 1 is a perspective of one end portion of a scaffold structure embodying the invention.

FIGURE 2 is a top view and horizontal section on line 2—2 of FIGURE 1 and showing one end of the winch carrying base.

FIGURE 3 is an elevation of the structure shown in FIGURE 2.

FIGURE 4 is a detail horizontal section on line 4—4 of FIGURE 1.

FIGURE 5 is an elevation of the structure shown in FIGURE 4.

FIGURE 6 is a vertical section on line 6—6 of FIGURE 4.

FIGURE 7 is a detail horizontal section on line 7—7 of FIGURE 1.

FIGURE 8 is a detail of a side brace one end of which is shown in FIGURES 1 and 7.

FIGURE 9 is a vertical section through a scaffold upright to which one end of the brace shown in FIGURE 8 is attached and the section is taken approximately on line 9—9 of FIGURE 1.

FIGURE 10 is a detail of an end brace one end of which is shown in FIGURE 1 and the figure includes a vertical section through a scaffold upright to which the brace is attached.

FIGURE 11 is a side elevation of the winch drum shown in FIGURE 1 and includes a vertical section through the winch carrier base.

FIGURE 12 corresponds to FIGURE 4 but illustrates another form of sidewalk-supporting bracket.

FIGURE 13 is a side view of the bracket shown in FIGURE 12.

FIGURE 14 illustrates a scaffolding arrangement for working on an "inside corner" wall and utilizing the brackets shown in FIGURES 12 and 13.

Scaffolding uprights 60 are tubular and sectional and have their lower ends, supported as shown in FIGURE 14, resting on the ground. An outboard side of each upright is provided with a series of slots 61 arranged in vertically spaced pairs, each slot being elongated vertically and being relatively narrow. The opposite inboard side of each upright 60 is provided with a continuous spaced series of similar slots 62.

The upright sections are on the order of four foot lengths with a reduced end part for insertion into the next lower section. Each side brace, FIGURE 8, preferably comprises a lattice girder in which upper and lower tubular chords 63, 64 respectively, have flattened terminals 63*a*, 64*a* (FIGURE 7), with lateral lugs 65, 66 (FIGURE 9) received in selected slots 61 in the uprights and seated on the lower ends of the slots. The lugs are shouldered at 65*a*, 66*a* to hold the chords spaced from the uprights for a purpose described below. Locking keys 67 are pivoted in upper lugs 65 and each key is elongated and has a rigid handle 68 by which the key may be turned manually to a vertical position, shown in broken lines in FIGURE 9, parallel to a slot 62 to be inserted through the slot, or may be turned to a horizontal position, shown in full lines in FIGURES 7, 8. Handle 68 is at right angles to the length of key 67 and is elongated in one direction from the key and when the key is vertical, gravity tends to swing the handle downwardly to frictionally clamp the side brace to the upright. The rotatable keys facilitate the quick application and removal of the side brace for assembly and disassembly of the scaffold and dispense with time-consuming bolts and nuts as usually required.

Each end brace (FIGURE 10) is generally similar to the side brace and the flattened ends of its upper and lower chords 70, 71 are notched on their lower faces to slip into slots 62 and to seat on the lower ends of the slots. A housing 72 on each end portion of top chord 70 receives a slidable latch 73 which, when projected, enters slot 62 and fills the gap between the top of the chord lug and the upper end of the slot and prevents the raising and removal of the end brace. Springs 74 thrust the latches into projected position. When latches 73 are withdrawn, the brace is easily applied to or removed from the uprights, by spreading the uprights, for assembly and disassembly of the scaffold.

A truss-type beam 75 (FIGURES 1, 6) for supporting the scaffold platform P extends between two end uprights 60 and terminates at each end in a vertically elongated open-end sleeve 76 slidably receiving an upright. The outboard side of sleeve 76 is slotted vertically at 76*a* to slide past lugs 65, 66 on side brace chords 63, 64 and thereby accommodate the vertical moving of beam 75 past the side brace. This feature makes possible the use of side braces 63, 64 above and below each beam 75 while the latter is being adjusted and the workman may use the side braces as safety devices at such and all other times. L-shaped detents with short upper legs 78 and longer depending legs 79 are pivoted at 80 to ears on sleeves 76. Normally their short legs 78 project into the adjacent slots 62 and their long legs 79 engage the sides of sleeves 76, thus locking the beam against lowering. When the beam is raised, the curved cam-like upper-faces of the short horizontal legs 78 contact the upper ends of the slots and are moved downwardly to swing legs 78 out of the slots and the sleeves may slide up the uprights. Or the beam may be lifted slightly to relieve legs 78 of their load and the long vertical legs 79 may be swung inwardly manually by a pull element such as a rope X, to hold legs 78 out of the slots, and the beam may be lowered. Upon release of rope X, gravity will swing longer legs 79 toward the uprights and as the beam moves downwardly, short legs 78 will enter the next lower slots and the cross beam is again locked to the uprights. Preferably a torsion spring 79*a* on each detent pivot 80 is used

to assure a snap action of the detent into the slot in the upright.

At one side of each sleeve **76** and fixed thereto is an open end box section housing **81** adapted to receive the upright leg **82** of a detachable bracket, the horizontal leg **83** of which supports boards S which form a sidewalk for workmen at a convenient level below platform P carried directly on beams **75**. A detachable thumb screw **84** is inserted through a hole in the outer side wall of housing **81** and through holes in leg **82**, and is threaded into the inner side wall of housing **81**. Bracket **82, 83** is readily detached from the scaffold by removal of screw **84**. The bracket may be turned ninety degrees from the position shown in full lines in FIGURE 4 to the position shown in broken lines **82***a* to support sidewalk planks parallel to beam **75** (see left hand side of FIGURE 14). FIGURES 12, 13, 14 show a corner bracket in which the upright leg **86** corresponds to leg **82** but the horizontal leg **87** extends diagonally of the sides of leg **86**. The sidewalk boards S are beveled to fit the diagonal horizontal leg.

Above each cross beam **75** is an elongated winch-carrying base or cross member **90** detachably secured at its ends to uprights **60** as will be explained below. Upstanding brackets **92** on the middle portion of base **90** journal a spool or drum **94** and the shafts of gears **95, 96, 97**. Two of the gears have squared shafts for selective insertion into a crank handle **98**, according to the desired ratio or turning force to the load to be raised. Gear **95** has ratchet teeth **99**. A reversible pawl **100** pivoted to the bracket, holds the drum against rotation in either direction. The drum has a transverse web **94***a* intermediate its ends and the drum has conical winding faces **94***b* at opposite sides of the web. Two cables **101** are each secured at one end to the narrow portion of one of the cones and extends therefrom over a free sheave **102** journaled on the end of base **90**, and then downwardly to a hook connection **103** to sleeve **76** on platform beam **75**. Upon clockwise rotation of drum **94**, cables **101** lift crossbeam **75** and the platform thereon. The cones over which the cables wind insure that both cables will wind evenly as each successive coil will tend to abut the preceding coil and thus avoid the coils overlapping each other. Hence, the ends of the crossbeam will be evenly raised and the sliding faces of uprights **60** and sleeves **76** will not bind as they might readily do if the drum faces were cylindrical and one cable would tend to overlap a preceding coil while the other cable would be coiling over its drum face.

To facilitate the application of the winch base to the uprights at any height and not necessarily to the top ends of the uprights only, each end of base **90** has fixed thereon a three-sided vertically elongated sleeve **105**, (FIGURES 2, 3) two sides of the sleeve being as wide as the full width of the upright and the third side of each sleeve being relatively narrow as shown at **105***a*. Pivoted at **106** to sleeve **105** is a latch **107**, U-shaped in cross section and spring-connected at **108** to be yieldingly held in the position shown in FIGURE 1. A link **109** connects each latch **107** to a bell crank **110** pivoted at **111** to base **90**. Latch **107** has a hook-like lug **112** movable through a slot **105***b* in sleeve **105** into a selected slot **62** in the upright and, when seated on the bottom of the slot, supporting one end of the base. When cables **101** are tightened under load, hooks **112** are thrust tightly against the lower ends of the slots. When tension on cables **101** is released, i.e., when crossbeam **75** is supported solely by its detents **78**, base **90** may be lifted manually and bell cranks **110** rotated to move latches **107** to the position indicated in solid lines in FIGURES 2 and 3 and the winch unit may be readily shifted vertically on the uprights or moved laterally away from the uprights and applied to other uprights at the opposite end of the platform, or elsewhere, at any height and irrespective of its relation to the upper ends of the uprights. The uprights may be extended in height by using additional sections or members **75** and base **90** may be lowered and the uppermost upright section removed.

If the unit is removed from the uprights, and laid on the platform, workmen may move freely lengthwise of the platform to platforms on adjacent sections of scaffolding. An adjacent section may be erected by using two uprights spaced from uprights **60** and connected to uprights **60** by additional side braces, similar to that shown in FIGURE 8, without interfering with the operations of beam **75**, bracket **82, 83** or winch base **90** and the mechanism mounted on it. Preferably bracket arm **83** is wide enough (FIGURE 4) to directly support individually the spaced apart end portions of planks S when the planks are arranged end to end instead of the planks overlapping each other as is the common practice. The same general arrangement is present in crossbeam **75** and in corner bracket **86, 87**. To better accommodate this disposition of the planks beam **75** and bracket arms **83, 87** have upstanding ribs **88, 89** intermediate their edges against which the ends of the planks may abut to prevent shifting of the planks lengthwise. This facilitates movement of wheelbarrows or other equipment along the planks and reduces the hazard of stumbling over the upstanding ends of planks.

Obviously the wide plank-support elements are not essential and narrower, less expensive supports may be used if desired. Indeed brackets **82, 83** and **86, 87** may be eliminated in some installations where sidewalks below the level of the main platforms are not useful.

When the platform carrying beam is raised or lowered, the detents **78, 79** automatically enter the next higher or lower slots in the uprights and positively check the movement of the platform carrier. The same result would follow if the crank **98** were to slip from the workman's hand or if a cable **101** should fail.

While the winch drum is carried at the middle of the truss the actual load on the winch beam is applied thereto by cable **101** lengthwise of the winch base and the base may be made much lighter than would be required if it were directly loaded between its ends. This construction and the use of a single drum, ratchet and crank makes shifting the winch unit an easy operation. Since the beam may be applied to and removed from the uprights transversely of its length the workman does not need to reach over his head as would be necessary to mount the winch base on the tops of the uprights. Nor is it necessary to actuate drums or pulleys at opposite sides of the platform alternately and thereby tilt the platform along the beam or, to avoid this, require two workmen to actuate separate winches. A workman on the sidewalk can install the next higher side brace, then he can move to the main platform and adjust the winch beam, then raise the platform and then insert a plank on the end crossbeam and install the next higher end brace. The winch beam can be installed at the same level as a side brace and moved up or down past the brace. The side brace strengthens the scaffold above the platform and may be used as a guard rail by the workmen.

Numerous variations in details of the structure other than those mentioned above may be made without departing from the spirit of the invention and exclusive use of those modifications within the scope of the claims is contemplated.

I claim:

1. In a scaffold structure, spaced hollow uprights each having in one wall a series of transverse apertures spaced apart one above the other, a vertically adjustable horizontal brace extending between said uprights and having a narrow lug at each end projecting laterally into a selective one of said apertures and terminating within the upright and provided with a downwardly facing notch receiving a wall of the upright at the bottom of the slot, a platform-carrying horizontal crossbeam extending transversely of said brace and said upright and having a vertically elongated sleeve unit at its end enclosing and slidable vertically upon said upright, one side of said sleeve unit having a slot extending from top to bottom of the sleeve side

and adapted to receive and slide past said brace lug.

2. A scaffold structure according to claim 1 in which a detent is pivotally mounted on the end of the crossbeam and includes a normally horizontal leg rotatable into a selected aperture in the upright and having a downwardly facing edge to engage the lower end of the aperture and support the crossbeam, a spring normally thrusting said leg into said aperture, said leg having an upwardly facing cam surface engageable with the upper end of the slot as the crossbeam is raised to cam said leg downwardly and out of the slot and permit the crossbeam to be moved upwardly.

3. A scaffold structure according to claim 2 in which the detent is L-shaped and is pivoted at its corner to the beam with the one leg projected horizontally from the pivot, to enter an aperture in the upright, and the other leg depending from the pivot and bearing against a vertical face of the scaffold to hold the horizontal leg from upward movement but accommodating the downwardly cammed movement of the horizontal leg out of the aperture.

4. A scaffold structure according to claim 3 including detents as described at opposite ends of the crossbeam and in which a pull element is secured at its opposite ends to the lower ends of the depending legs of said detents for manual manipulation of both detents simultaneously, out of the slots, upon raising the crossbeam, to permit lowering the crossbeam on the uprights.

5. In combination with a pair of scaffold uprights of angular cross section, a cross member extending between said uprights and terminating at each end in a vertically elongated hollow sleeve normally enclosing the upright but having one side formed by a latch having a horizontal pivot on the sleeve and movable about said pivot to extend across the open side of the sleeve to one position to enclose the upright and to another position to clear the upright, and a down-turned hook on the latch and movable therewith about the latch pivot through aligned slots in the side of the sleeve and in the upright to seat on the lower end of the slot in the upright to support the beam and to hold the latch against pivotal movement to clear the upright.

6. A scaffold unit comprising an elongated horizontal base terminating at its ends in upstanding rigid sleeves each having a laterally open side for application horizontally to a scaffold upright at any point in the height of the latter, and a latch pivoted at one end to each sleeve and movable on its pivot to one position to overlie the open side of the sleeve and engage an upright therein and to another position to clear the open side of the sleeve and facilitate removal of the base laterally of the scaffold upright, a winch drum journaled on the base intermediate its ends, sheaves journaled on the ends of the base independently of the latches, and cables each secured at one end to the drum and extending therefrom to the end of the base and then downwardly over one of said sheaves.

7. A scaffold unit comprising an elongated horizontal base terminating at its ends in upstanding sleeves of channel cross section each adapted to receive a scaffold upright through the open side of the sleeve and seat against three sides of the latter, and a latch having a pivot on each sleeve and being movable about its pivot to one position to completely clear the open side of the sleeve and to another position to close the sleeve and seat the fourth side of the upright, a drum rotatably mounted on the base and operable independently of the latches, sheaves on the ends of said base, and a cable windable on said drum and extending therefrom over said sheaves and downwardly therefrom and supporting a platform below the level of said base.

8. A scaffold unit comprising a rigid elongated base, upstanding brackets mounted on the middle portion of said base, a drum journaled on the upper portions of said brackets, means for rotating the drum, sheaves journaled on the end portions of said base, and cables individually anchored to said drum and extending therefrom angularly of said base and directly to and over said sheaves and then downwardly and having individual load engaging elements at their ends for directly supporting horizontally spaced portions of a platform carrier, the drum having two conical winding surfaces tapering toward opposite ends of the drum and each cable being secured at one end to the smaller diameter portion of an individual one of the conical winding surfaces, whereby the cables will be coiled evenly and equally along the respective conical winding surfaces independently of each other as the drum is rotated and the outer ends of the cables will be lifted simultaneously and their load will be raised equally.

9. A hoist comprising spaced hollow uprights of cross section, a cross member extending between said uprights and terminating at each end in an upright sleeve partially surrounding one of said uprights but having an open side receiving the upright laterally, a latch pivoted at each end of the beam to open and close said side and retain the sleeve on the upright whereby, with the latch retracted, the cross member may be applied to each upright in a direction transversely of its length, the latch having an inner rigid hook adapted, when the latch is projected, to extend into a slot in the adjacent upright and engage the lower end of the upright slot to support that end of the cross member, and drum and cable means on said cross member for suspending a load from near the ends of the cross member at varying heights determined by the winding of the cable means on the drum.

10. A scaffold upright and cross member assembly according to claim 5 in which a latch and hook as described is provided at each end of the cross member with their pivots extending transversely of the member and swinging thereon to project the hooks through selected slots in the respective uprights, a link extending from each latch toward the middle of the cross member for manual control of both hooks by a person positioned intermediate the ends of the cross member whereby both latches may be actuated and the cross member applied to and removed from the uprights in a horizontal direction.

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