

[54] **REMOVABLE GUARD RAIL STANCHION**

3,480,257 11/1969 Bourn et al. .... 182/113  
3,084,759 4/1963 Squire ..... 182/113

[75] Inventors: **Richard Charles Mocny**, Prospect Heights; **Francis B. Mueller**, Downers Grove, both of Ill.

*Primary Examiner*—Jordan Franklin  
*Assistant Examiner*—Conrad L. Berman  
*Attorney*—Watson D. Harbaugh et al.

[73] Assignee: **Waco Scaffold & Shoring Co.**, Division of **Bliss & Laughlin Industries, Inc.**, Schiller Park, Ill.

[22] Filed: **Apr. 20, 1972**

## [57] ABSTRACT

[21] Appl. No.: **245,992**

An economical removable guard rail stanchion having a high safety factor and being adjustable to the thickness of a floor with a loose telescoping relationship in fixed half increments and a screw jack to engage one surface of the floor at spaced points and the opposite surface at a point on a vertical line of projection passing adjacent to the midpoint between the spaced points and including a post disposed on the vertical line of projection to support guard rails including a toe board.

[52] U.S. Cl. .... **256/59, 248/226 A, 256/65, 182/113**

[51] Int. Cl. .... **E04h 17/14**

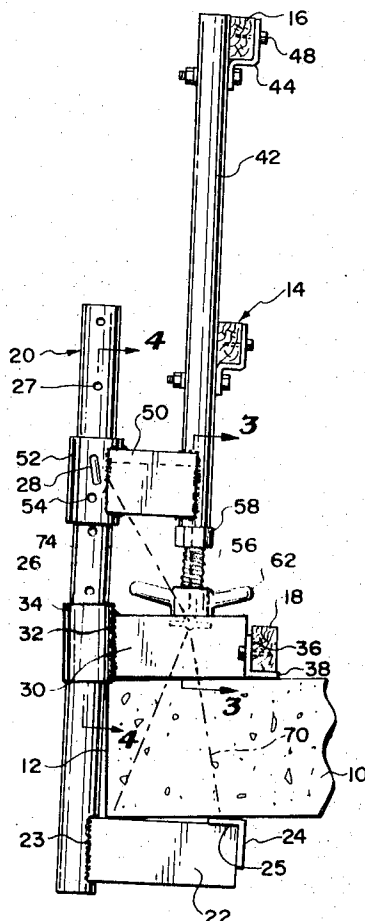
[58] Field of Search ..... 256/59, 65, 1; 182/113; 24/263 PJ, 263 C; 248/316 A, 226 A, 226 B, 226 C

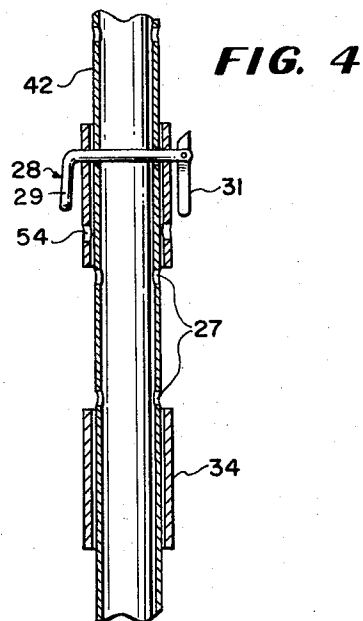
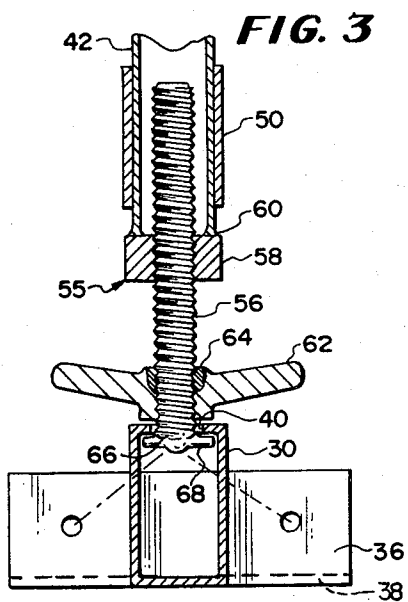
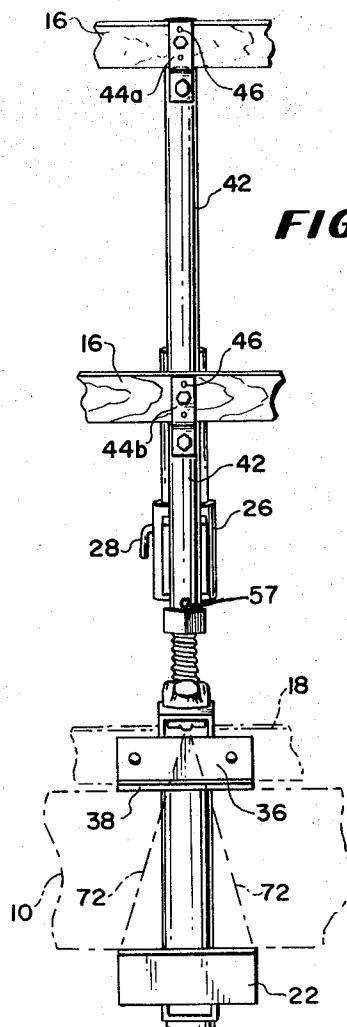
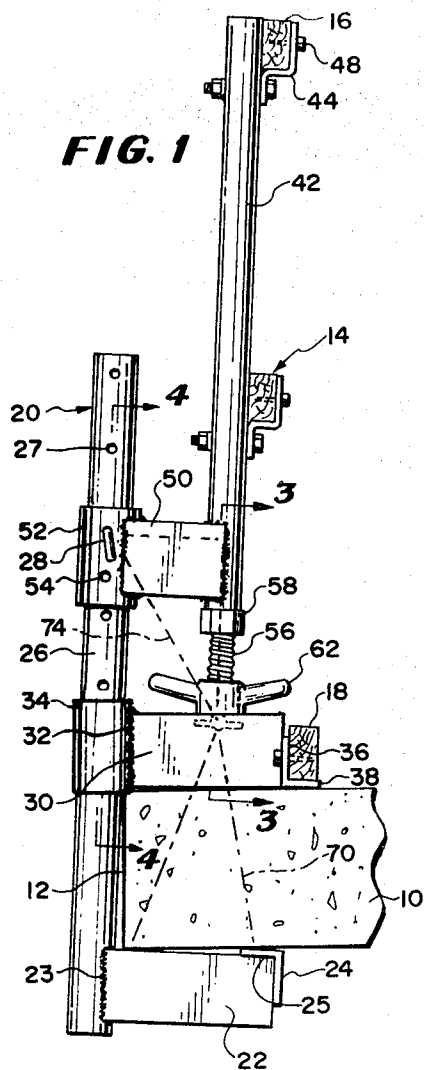
## [56] References Cited

### UNITED STATES PATENTS

3,632,089 1/1972 Smith ..... 256/47

**15 Claims, 4 Drawing Figures**





## REMOVABLE GUARD RAIL STANCHION

### BACKGROUND OF THE INVENTION

Aside from some considerations of providing properly spaced top and middle guard rail and toe boards as required by safety regulations on building sites, the most important thing is the safety itself involved with providing guard rail stanchions that will support the rails under all personnel forces to which they will be normally subjected. The next important consideration is the ease of erection involving savings in time and effort; quick and accurate preadjustment before positioning the stanchion on poured concrete floors with steel and concrete beams of determined thicknesses; and, erected and secured in operative position by a single, simple and brief tightening of a screw jack. It must be useable on different types of buildings, and the stanchion must be cost competitive, and enduring under working conditions to which it is subjected including ease of repairing.

### SUMMARY OF INVENTION

All of these factors are satisfied by the present invention. Assembly is a simple operation. A preadjustment variation is provided for not to exceed two inch increments on the leg portion of an L-shaped frame and may be one inch or less depending on the uniformity of poured floor thicknesses. The floor engaging members triangulate their stress and strain efforts whereby any outward or inward thrust on the stanchion post tends to tighten the securement with an upper arm self-adjustably flat against the upper face of the floor for substantially even pressure throughout its contact length as driven intermediate its ends by a screw jack. The lower face or ceiling of the floor is engaged at two spaced points with the vertical line of projection of the screw jack passing between them whereby main tension forces are essentially triangulated geometrically in a plane normal to the edge of the floor. Moreover, the inner point of contact is elongated along a line parallel to and remote from the floor edge to triangulate the tension forces developed in a plane parallel to the floor edge. The apices of both triangulations is the screw jack located at the bottom end of the post. As the screw jack is being tightened the post portion can be test wiggled horizontally to set the points of contacts firmly. Moreover, the upper arm also has a transverse outrigger at its ends that also compounds the triangulation of the screw jack against lateral tilting of the post while a cross pin prevents relative rotation between the upper arm and the leg portion.

The leg portion of the L-shaped frame is welded at the lower end rigidly to the floor edge end of the foot portion and slidably and rotatably receives loosely as a unit thereon sleeves supporting the upper arm, the post and jack screw. Their position on the leg portion is determined by a toggle pin through one of the sleeves and the leg portion in weight and tension supported relation position the jack screw. Here a triangulated relation is established for the post where the jack screw and the pin-sleeve engagement constitute two corners of the triangle while the corner defined at the welded juncture between the spacer and the post above the jack provides the third corner laterally of the pin.

In establishing these triangulations of forces a looseness can be provided prior to tightening whereby the arm and the post spacer are easily and quickly adjust-

able including slidability and relative rotation until the height pin is inserted. Thereafter, tightening of the screw jack establishes the triangulation of forces and rigidifies the assembly at all previously loose engagements against possible lateral releasing movements of the upper arm that otherwise might yield laterally because of its otherwise loose rotativeness on the leg element. Accordingly, not only does the triangulation rigidify remote portions of the assembly, but they in turn combine to rigidify the apical clamping element and mutually all relations influenced thereby can be easily established merely by a few turns of the jack screw after the stanchion has been erected in position at the floor edge.

The invention is characterized by parts that are fabricated from commercial stock inventory having conventional shape and thickness and are easily disassembled for ease of transportation by the withdrawal of a single toggle pin, easily assembled and preadjusted with the pin for installation and rigidity, and quickly tightened in guard rail supporting position by the screw jack.

Other advantages, objects and structural benefits will appear from the description of the drawings herein in which:

FIG. 1 is a side elevation of the preferred embodiment of the invention;

FIG. 2 is a front elevation of the embodiment shown in FIG. 1;

FIG. 3 is a section taken on line 3—3 in FIG. 1;

FIG. 4 is a section taken on line 4—4 in FIG. 1.

### DESCRIPTION OF PREFERRED EMBODIMENT

Although it will be appreciated that the foot, arm and spacer herein described may be cast of well known ferrous alloys, it is preferred to illustrate the embodiment as fabricated of standard commercial inventory stock of cross-sectionally round and rectangular tube lengths, angle iron and a standard screw jack involving simple cutting, drilling and welding techniques for both fabrication and repair.

Referring to FIGS. 1 and 2 a stanchion 20 is shown which supports vertically spaced guard rails 16 and a toe board 18 to provide a builder's removable guard rail 14 along the edge 12 of a poured concrete floor 10 of a building so that workmen will not fall off and injure themselves and, realizing the strength and effectiveness of the guard rail, will work with reduced apprehensions and greater efficiency.

Each stanchion 20 comprises an L-shaped frame member 21 having a vertical leg portion 26 of cylindrical tubing with a foot portion 22 of rectangular tubing welded at one end 23 to the leg 26 at the lower end thereof and having a section of angle iron 24 welded on the other end with the narrow flange 25 of the angle iron 24 located on top of the foot portion. The leg 26 serves as the back bone of the stanchion and the narrow flange 25 and the one end 23 of the foot portion serve as two spaced-points to engage the bottom face of the floor. The angle iron provides an elongated contact extending laterally on both sides of the foot portion 22.

The leg member 26 is diametrically drilled at points 27 equally spaced to receive a conventional toggle pin 28 bent at one end to form a handle 29 and having a latching link 31 on the other end thereof.

An upper arm 30 employed to engage and support the stanchion on the upper face of the floor 10 com-

prises another length of the same rectangular tubing and is end-welded as at 32 to a short length or sleeve 34 of cylindrical tubing that slidably telescopes on the upright leg portion 26. The outer end of the arm 30 has a like length of angle iron 36 welded thereto but with its narrow flange 38 extending outwardly horizontally and coplanar with the bottom wall of the rectangular tube 30. Its ends also extend laterally well beyond the sides of the arm 30. Thus, the upper arm 30 with its sleeve 34 slides vertical loosely on the leg portion 26 and away from the foot portion 22. The upper wall of arm 30 has an opening 40 (FIG. 3) in it close to its horizontal center.

An upright tubular member herein referred to as the post 42 has upwardly opening angle brackets 44 secured to it, one 44a at the top thereof and the other 44b half way down, to receive two-by-fours therein and support them as railings 16. Holes 46 are provided in the brackets to receive double headed nails 48 to retain the railings in place.

At its lower end the post 42 has welded thereto one end of a spacer or cross brace 50 of like rectangular tubing, but approximately one-half the length of the upper arm 30. At its other end the cross brace 50 has welded to it a cylindrical sleeve 52 like the sleeve 34 but which has two diametrically extending holes 54 there-through spaced a distance that is one-half of the distance between the holes 27. With this arrangement the increment of vertical adjustment can be the distance between holes 54 with the use of the key pin 28 and this minimizes any possible buckling of elements at the threaded point of the jack screw now to be described.

At its lower end of the post 42 a jack screw assembly 55 is mounted which comprises a length of threaded coil rod 56 (FIG. 3) received in a nut 58 that is welded as at 60 concentrically with the lower end of the tube 42 just below the cross brace 50 and a drain hole is provided at 57 just above the nut 58. The upper end of the threaded coil rod 56 may be end-peened to make it difficult to lose but not impossible to withdraw if repair of the bolt is required, but preferably is freely removable to provide a triple sub-assembly for the stanchion. The lower end of the rod 56 is threadedly received in a winged nut 62 to which it is welded with a reduced terminal end portion 66 extending beyond the nut and through said opening 40 in the upper arm 30 where it is journaled. The lower end portion 66 extends appreciably within the rectangular arm and has a cross pin 68 welded to it for it to maintain the journaled relationship so that the upper arm 30, screw 56, and post 42 assembly are preserved when threadably engaged as a slidable unit on the tube 26 for a gross adjustment within an inch or two of the floor thickness with the jack screw 56 retracted. In doing this, the stanchion is laid on the floor and the arm 30 and foot 22 are brought towards each other until the last hole 27 is being passed by one of the holes 54 before the thickness measurement of the floor is reached, whereupon the toggle pin 28 is inserted. Thereafter the stanchion is erected and located in place at the floor edge with the leg 26 against the floor edge 12 and with a few turns of the wing nut 62 and screw down against the upper arm 30, and, the wiggling of the tube 42 laterally, the wing nut 62 is tightened home.

Thus, the stanchion is tightened in place and triangulations of force are set up which have the wing nut 62 as one point of each triangle with broken lines 70 indi-

cating the compression forces exerted at opposite ends of the lower clamp, as shown in FIG. 1. Lines 72 of compression forces diverge to the ends of the angle iron 22 against side sway, and line of compression forces 74 brace the upper tube 42 against fore and aft sway in relation to the forces 70. The apices of the triangulations being at this common point of the wing nut 62 the stanchion position is signified at this point against lateral movement in any direction and in turn through it the other triangle corners with respect to each other are maintained.

Where the word "floor" is indicated at 10 it includes not only a concrete slab, but a spandrel beam at the end thereof and a steel "I" beam with or without a slab thereon.

By way of illustrating, and not by way of limitation, the relative cooperation and looseness of the telescoping parts for the triangulations noted will be further understood from their dimensions for objects stated herein which are particularly under long use or abuse involving caking cement and dirt and long exposure to weather, both in use and storage. The following dimensions are representative in which the post 42 is made of 1 5/8 inch, high strength tubular stock 40" long having a 0.090" wall thickness; the leg 26 is a 39 inch length of 1.90 inch high strength tubular stock having a wall thickness of 0.132 inch with the holes 27 spaced 4 inches; the foot 22 and arm 30 are of 3 x 2 inch rectangular tubular stock (0.120 inch wall) 7 inches long; the cross brace 50 is of like 3 x 2 inch stock 4 inch long with an effective spacing between the post and collar of 2 1/2 inch; the collars 34 and 52 are of 2 1/2 inch O.D. 10 gauge (D.O.M.) round tubing stock 4 inch long with the holes spaced 2 inch; the angle iron members 22 and 36 are 5 inch lengths of 2 x 1 1/2 inch stock three-sixteenths inch thick, each with nail holes spaced 3 inches in the flanges where engaged by wood toeboards, or wood flooring or platform ceiling; and, the jack screw utilizes a 7 inches length of 1 inch threaded coil rod.

What is claimed is:

1. A removable guard rail stanchion comprising, an L-shaped member defining an integrated leg portion and foot portion with the foot portion having spaced means for engaging one of the parallel planar surfaces of a concrete floor solely at two separate spaced places located adjacent the toe and heel ends thereof, a horizontal arm slidably mounted on the leg portion of said member for adjustment with respect to the foot portion to engage the other planar surface of the floor within a vertical projection of the foot portion intermediate said spaced places, a post member adjustably mounted on said leg portion, bracket means on the post member to support vertically spaced horizontally disposed guard rails, means for locating said post member at a predetermined height on the leg portion with respect to the thickness of said floor, and jack screw means interengaging said post member and said arm on a vertical line of projection passing near the midpoint between said two spaced places of the foot portion to support said post against sway movement.
2. The stanchion defined in claim 1 in which said spaced means includes a contact element extending

5

above the foot portion at its end to engage said floor as one of said spaced places.

3. The stanchion defined in claim 2 in which said contact element comprises an elongated member located above the upper surfaces of the foot portion and extending horizontally a substantial distance on opposite sides of the foot portion.

4. The stanchion defined in claim 1 in which said horizontal arm has an opening in its upper face guiding the jack screw means on said vertical line of projection.

5. The stanchion defined in claim 4 in which the lower end of the jack screw is received in said opening, and

means secured to said lower end interlocking said jack screw with said horizontal arm.

6. The combination defined in claim 1 in which said leg portion has openings vertically spaced a predetermined distance, and

said post member includes a sleeve slidably supported on said leg portion and having openings therethrough spaced a fraction of the distance between said vertically spaced openings.

7. A removable guard rail stanchion comprising an L-shaped frame member having an upright leg portion and a lateral foot portion to engage the lower face of a floor and including an elongated member on the end of said foot portion extending laterally a substantial distance on opposite sides of said foot portion,

a horizontal arm slidably mounted on the leg portion, a cross-brace slidably mounted on the leg portion above the horizontal arm for movement with said horizontal arm towards and away from said foot portion,

post means carried by said cross-brace,

jack screw means supported on said horizontal arms and post means for concurrent movement as a unit and for relative movement between them and said foot portion, and

releasable means interconnecting said cross-brace and said leg portion for securing said post means, horizontal arm and jack screw means at a predetermined distance from said foot portion.

8. The combination called for in claim 7 in which said jack screw is supported at the end of said cross-brace and said cross-brace is approximately one-half the length of said foot portion and horizontal arm, and means on the free end of said foot portion confining contact of said lower face of the floor to the ends of said foot portion.

9. In a removable guard rail stanchion having an upright member,

a laterally extending foot member rigidly secured at the lower end of the upright member two laterally extending elements slidably mounted on said upright member in spaced relation with respect to said foot member,

means for locking one of said elements adjustably at predetermined locations on said upright member, adjustable means interconnecting said elements and

6

engaging the other element intermediate its ends for moving said other element with respect to said one element and said foot member, and

post means spaced horizontally from said upright member and mounted on said one element for supporting guard railings.

10. The stanchion defined in claim 9 in which said adjustable means comprises a screw jack in which one of the mating threaded elements is supported by the post and the other threaded element is supported by said other laterally extending element, one of said threaded elements including a winged protuberance for turning it.

11. The stanchion defined in claim 10 in which said threaded elements releasably interconnect said two slidably mounted members for preliminary movement as a unit when threadably engaged.

12. A removable guard rail stanchion comprising a tubular frame member having an upright leg portion and a laterally extending foot portion including an enlarged end member at one end for engaging one of the parallel planar surfaces of a concrete floor over a predetermined area spaced from the edge thereof;

a post member including bracket elements to support vertically spaced horizontally disposed guard rails;

means interconnecting said post member and leg portion to support them in relative movable parallel relation including elongated tubular means slidably mounted on said leg portion, and cross brace means carried by said tubular means at one end and rigidly secured to said post member at the other end;

a jack screw means carried by said post member and arm means to engage the other planar surface of the floor within a vertical projection of said foot portion;

means releasably interconnecting said tubular means and leg portion for locating said post member and jack screw means as a unit at a predetermined height on the leg portion with respect to the thickness of said floor.

13. The stanchion defined in claim 12 in which said jack screw means includes an element elongated in the direction of said laterally extending foot portion to engage said other planar surface within said vertical projection of the foot member with an engagement extending a substantial distance towards the edge of the concrete floor.

14. The stanchion defined in claim 12 in which the axis of said jack means is horizontally spaced from the edge of the concrete floor a distance horizontally less than the innermost contact of said foot portion with said one of the planar surfaces.

15. The stanchion defined in claim 12 in which said interconnecting means includes arm means movable on said leg portion to hold said jack screw means a spaced distance from said leg portion.

\* \* \* \* \*