

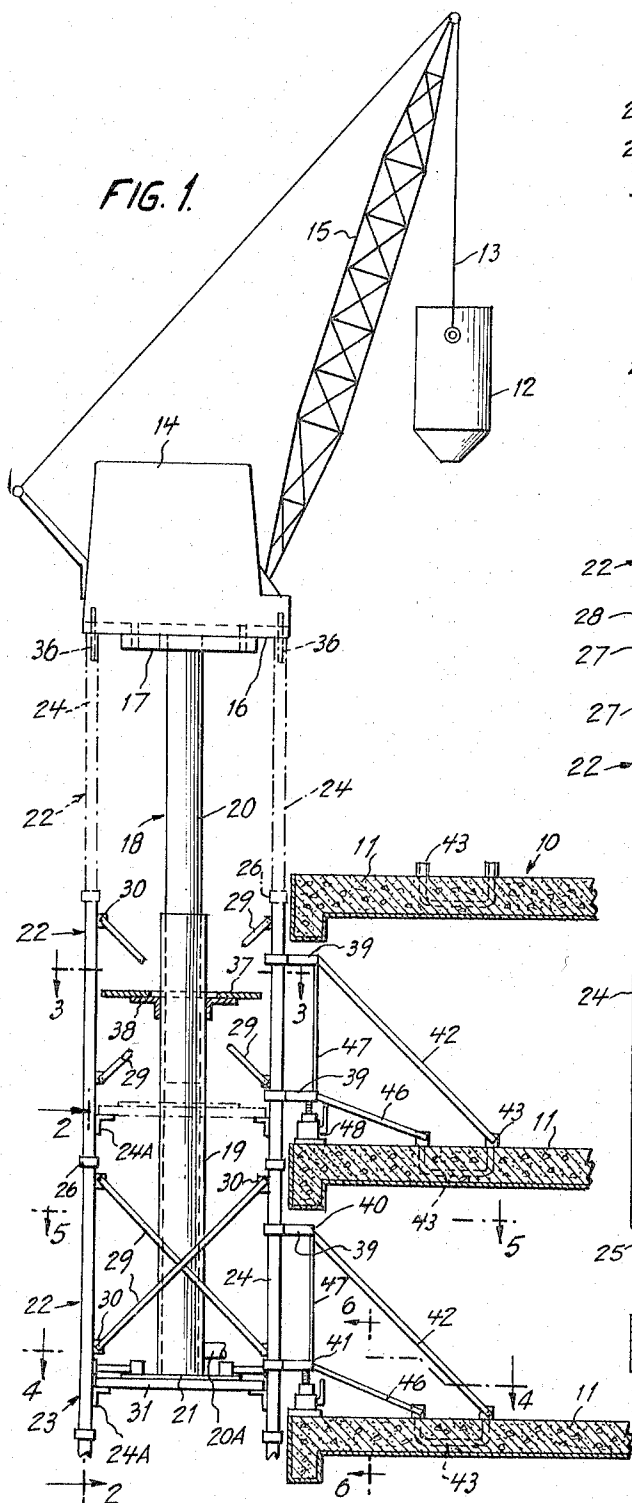
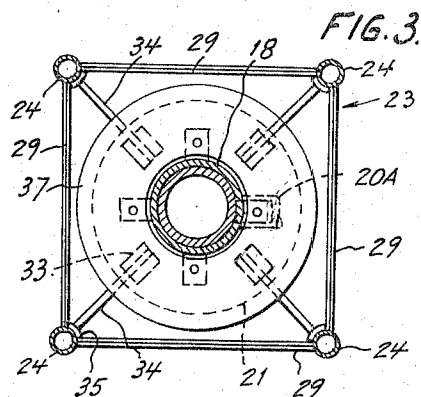
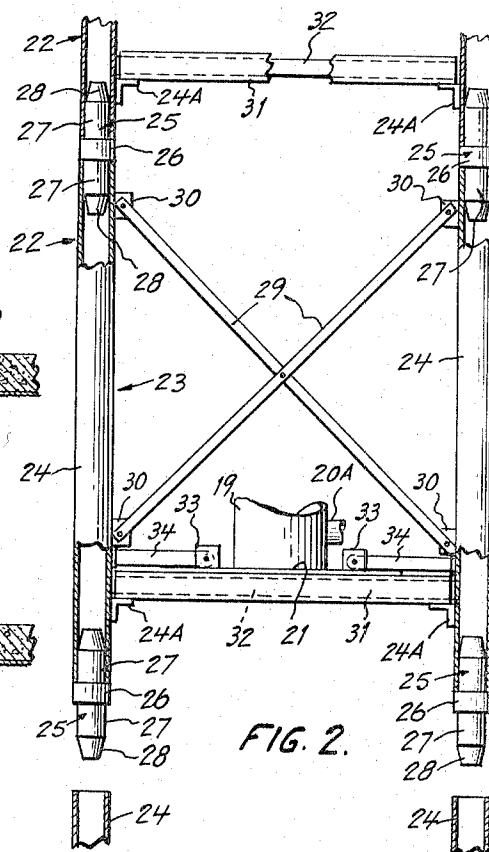
Feb. 7, 1967

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DERRICK SCAFFOLD STRUCTURE

3,302,749

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2 Sheets-Sheet 1



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FIG. 5.

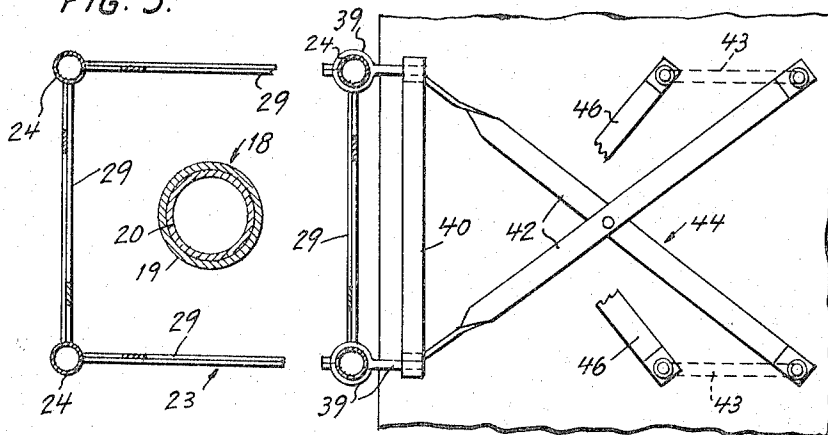


FIG. 8.

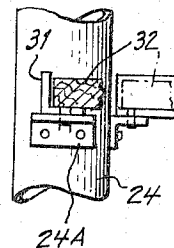
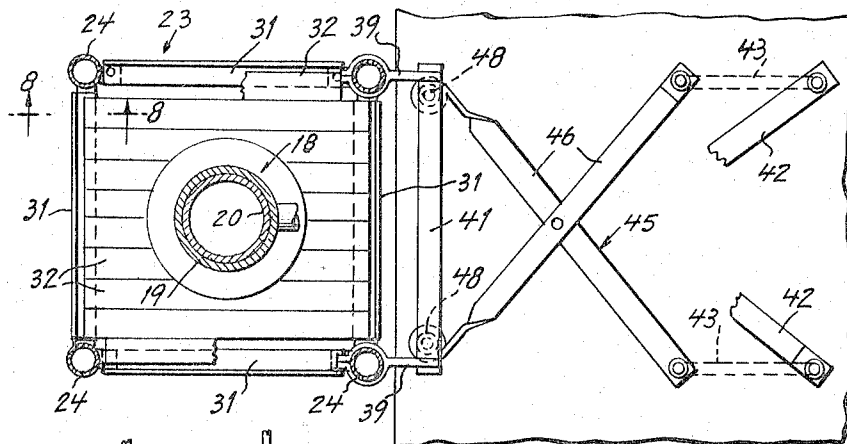


FIG. 4.

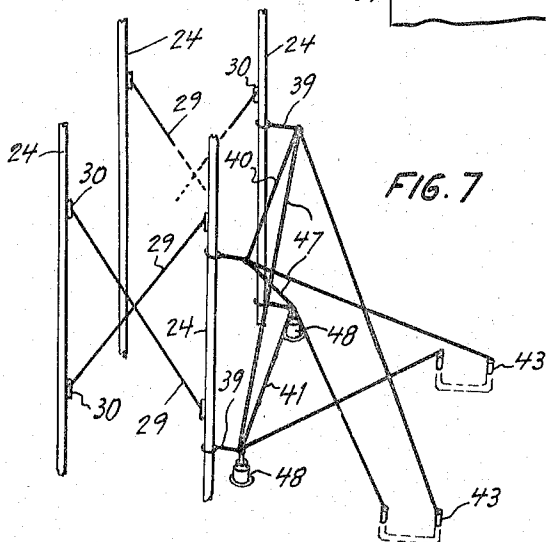


FIG. 7.

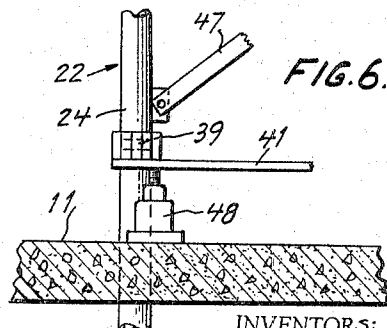


FIG. 6.

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3,302,749

DERRICK SCAFFOLD STRUCTURE

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8 Claims. (Cl. 182-82)

This invention relates to scaffolding means and in particular to one used in building construction to support a derrick or hoist.

A particular object of the invention is to provide a scaffold structure that can be supported from the floors of a building under construction so that a derrick can be raised in stages to do away with the necessity of having a ground supported derrick with a long cumbersome boom.

A further object of the invention is to provide a scaffold structure that can be erected in sections corresponding to the distance between floors and which can be made up or assembled by workmen operating from said floors.

In the pouring of concrete floors in buildings under construction, the practice has been to hoist the concrete bucket from the ground to each successive floor with an increasing strain on the hoist cables and diminishing maneuverability of the derrick boom in swinging the bucket in over the floor to be poured. In very high buildings this had resulted in the buckling of the boom or severance of the cables with disastrous results. Where the derrick is mounted on the steel work of a floor and has to be raised as the steel work rises, delays in pouring the floors has resulted thereby adding to the cost of the structure.

Further objects of the invention therefore are: to provide sectional stages that can be built up by a minimum number of workmen to raise the derrick a selected number of floors at a time; to provide a scaffold structure the parts of which can be readily assembled to provide a sturdy structure; to provide cantilever means at each floor of simple form for supporting each scaffold section so that the weight of the scaffold is largely supported on the floors of the building and the entire scaffold is braced at each floor for rigid support of the derrick; and to provide a scaffold in which the derrick can be raised at intervals as required, with a minimum amount of labor, fixtures, adjustments and time.

The closest art of which the applicants are aware are Patents 2,423,167, 2,582,528 and 2,830,853. Patent 2,423,167 shows a scaffold mounted on a supporting frame carried on a vehicle. Patent 2,582,528 shows a frame mounted on the legs of an oil well derrick and a platform. Patent 2,830,853 shows staging platforms with supporting frame structure. None of these patents show a scaffold made in units built up and assembled floor by floor in building construction for support by each floor for gradually raising a derrick to obviate the necessity of using a long or high boom.

With the foregoing objects in view, the invention comprises certain constructions hereinafter described and then particularly pointed out in the claims and a preferred embodiment of our invention is illustrated in the accompanying drawings, in which:

FIGURE 1 is a view in side elevation of a scaffold on which a hoisting derrick is supported, parts being shown

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diagrammatically to illustrate the progressive formation of the scaffold structure,

FIGURE 2 is an enlarged side view of one of the sections or stages of the scaffold showing assembly of the parts and the mounting means for the derrick,

FIGURE 3 is a section taken on the line 3-3 of FIGURE 1 showing a working platform in relation to other parts of the structure,

FIGURE 4 is a section taken on the line 4-4 of FIGURE 1 showing a section of the scaffold and one of the means for supporting the same,

FIGURE 5 is a view taken on the line 5-5 of FIGURE 1 showing one of the supporting means for the scaffold section or stage,

FIGURE 6 is an enlarged section taken on the line 6-6 of FIGURE 1 showing one jack means of a pair used for adjusting the cantilever means that supports a stage of the scaffold,

FIGURE 7 is a diagrammatic view in perspective showing the relative arrangement of the posts or pipes, guy wires, cross bars and struts that make up the structure of the scaffolding means, and

FIGURE 8 is a fragmentary detail showing how the flooring is mounted in the scaffold sections.

Referring to the drawings in detail, 10 indicates a partly constructed building having concrete floors 11 poured in the usual manner from a bucket 12 on one end of a cable 13 passing from the cab of a derrick 14 and over a swinging boom 15. The cab is provided with a bottom flooring 16 which is secured to the upper unit 17 of a hydraulic or compressed air lift means 18 including a cylinder 19, piston 20, foot plate 21 and a source of pressure 20A controlled in any suitable manner for raising and lowering the derrick. The latter is mounted successively on every second or third staging unit 22 of a scaffold 23 so that the boom can swing in over successive floors to be poured without placing the boom under excessive stress, as would be the case if the derrick was on the ground and the bucket 12 of concrete had be lifted successively higher as each floor was poured.

Each unit 22 of the scaffold 23 is built as the successive floors are poured and the derrick 14 is elevated as the units are assembled. Each unit consists of four corner posts or pipes 24 of suitable vertical length, corresponding to the front opening of the floor, vertically connected and aligned by connector and guide pins 25 each having a central separator hub 26, projecting upper and lower stud extensions 27, and tapered ends 28 (FIGURE 2). At opposite sides of the units, the pipes 24 are connected by diagonally disposed cross braces 29 secured at the ends thereof to suitable brackets 30 bolted, welded or otherwise secured to the pipes 24.

The progressive build up of the scaffold is best illustrated by reference to FIGURE 1 where the lowermost unit 22 shown, is any one in the erection of the scaffold, and shows the use of angle strip members 31 connecting the pipes 24 through brackets 24A and providing supports for flooring 32 for supporting the mechanics that are assembling the unit and for subsequently supporting the foot plate 21 of the lift means 18. The foot plate 21 has secured to the upper surface thereof trunnion brackets 33 in which are pivoted steadying arms 34 which may be twisted at their free ends or cut off plain or may have saddle end means 35 for engaging the pipes 24 to prevent

excessive swaying of the derrick and cab. These arms 34, being pivoted, can be swung back out of the way when the derrick unit is to be elevated.

The cab of the derrick contains the usual cable drum and engine or motor as well as the usual cable and boom controls all of which are well known and need not be illustrated. The cab also has at each of the four corners of its floor 16 suitable openings through which can be lowered guide pins 36 the upper ends of which may be secured by chains to the interior walls of the cab so that when dropped through the holes they will depend below the bottom of the cab to fit into the upper ends of the pipes 24. This is shown diagrammatically in FIGURE 1 to indicate the positioning of the cab on the upper ends of the pipes of a subsequently placed unit 22. These pins prevent sway of the cab and also resist the turning force that would occur as the result of swinging of the boom.

In addition to the flooring 32 which is laid by the workman on the angle members 31 there is provided a working platform 37 which is secured to brackets 38 attached to the outer surface of the cylinder 19. When four posts or pipes 24 are put in position atop the next adjacent lowest stage unit 24, sufficient flooring is laid to let the workman raise the cylinder 19, after the internal pressure is relieved, and rest the foot plate 21 on added or completed flooring. This has been done as shown in FIGURE 1 and pressure has elevated the derrick 14 when the posts 24 of the uppermost stage have been fitted to the posts or pipes 24 of the next lowest stage 22 by the guide pins 36 and connector pins 25. The placing of the derrick is controlled by operation of the lift means 18 with suitable control valves or other means not shown. When the posts or pipes are first positioned they are connected by clamp brackets 39 to upper and lower cross bars 40 and 41, respectively.

As seen in FIGURE 5, the cross bar 40 has pivotally secured to each of the opposite ends thereof the ends of pivotally connected cross struts 42 which are disposed obliquely downward to be secured at their lower ends to the upper projecting ends of U-shaped bolts 43 that are embedded in the concrete floor when the latter was poured. This forms an upper cantilever structure or frame 44 which coacts with a similar lower cantilever structure or frame 45 (FIGURE 4) which consists of cross-struts 45 each pivotally secured at one end to the opposite ends of the lower cross bar 41. These struts 46 and the struts 42, where they join the cross bars 40 and 41 are connected by bracing rods 47 (FIGURE 7) arranged in crossing relation.

The struts 46 are pivoted at their point of crossing as are struts 42 and extend downward obliquely to be secured at their lower ends to the upper projecting ends of the U-shaped bolts 43. These lower struts 46 constitute the lower cantilever frame 45 while the upper struts 42 constitute the upper cantilever frame 44 for the purpose of suspending each staging unit 22 individually so that, as the scaffold is gradually built up, the weight thereof is distributed on the floors of the building. The strut frames 42 and 46 are vertically adjustable at the ends thereof that hold the unit 22 by jacks 48 disposed beneath the outer ends of the lower cross bar 41. These jacks function to take up any slack in the connections of the cantilever frames and to adjust the height and position of each stage, closely.

The novelty of the invention resides in the use of cantilever frames anchored to the floor of the building for supporting each section of the scaffold so that good solid support will be given to the derrick which hoists a heavy load of cement from the ground. The structure is particularly adapted to high buildings and saves wear and tear on the derrick while allowing complete maneuverability of the bucket or the load being lifted thereby. The use of a concrete carrying bucket is used as an illustration, it being understood that the scaffold structure and derrick combination may have a variety of uses. The cantilever

means likewise might be secured to any flooring or steel work of the building and not necessarily to the U-bolts shown and the scaffold may be used for the erection of a hoist.

Our invention is not to be restricted to the precise details of construction shown since various changes and modifications may be made therein without departing from the scope of the invention or sacrificing the advantages to be derived from its use.

What we claim is:

1. A supporting structure for a derrick comprising staging units each including corner posts, means for connecting the posts to provide a rectangular open frame section, means connecting said posts for supporting removable flooring means, one of said frame sections at its upper end being adapted to mount the cab of a derrick, guide pins detachably connecting the cab to the frame section, a power operated lift unit depending from the cab including a movable foot plate supported on the flooring means for raising and lowering the cab, means associated with said lift unit for steadying engagement with said corner posts, and means for suspending each of said units outside a building and from one of the floors of the latter.

2. A supporting means for a derrick comprising staging units each including corner posts having hollow ends, cross-braces for connecting the posts at their upper and lower ends to provide rectangular, vertically disposed open frame sections, floor supporting means connecting said corner posts, removable floor means for mounting the cab of a derrick on the upper end of the uppermost frame section, derrick moving means supported on a frame section for raising and lowering the derrick including a working platform movable successively through said units as the derrick is moved, a bottom foot plate for supporting the moving means on said removable floor means, upper and lower cantilever means including upper and lower cross-braces for suspending each of the frame sections from the adjacent floor of a building under construction means for adjusting said cantilever means to provide for rigid support of said frame section by said cantilever means, and retractable steadying arms on said plate for engaging said posts to guard against shift of said bottom plate.

3. A supporting means for a derrick as set forth in claim 2 in which said means for connecting the posts consists of connector pins having stud portions for engaging the hollow ends of said posts and separator hub portions on said pins for spacing said posts vertically.

4. A supporting means for a derrick as set forth in claim 2 in which said means for mounting the cab of the derrick on the uppermost end of the uppermost frame section includes guide pins extending through the floor of the cab for detachable engagement in the open ends of the corner posts.

5. A supporting means for a derrick as set forth in claim 2 in which said power means includes a cylinder supported on said foot plate to which fluid is supplied and piston means depending from said cab means and disposed in said cylinder.

6. A supporting structure for a derrick as set forth in claim 1 in which means for steadying engagement includes radially extending arms pivoted to said foot plate for engagement at their outer free ends with said posts, and said arms being retractable when the foot plate is to be moved.

7. A supporting means for a derrick as set forth in claim 2 in which said section suspending means includes upper and lower sets of cross struts constituting a cantilever means, means for connecting the upper set of struts to the upper ends of adjacent posts, means for connecting the lower set of struts to the lower ends of the same adjacent posts, and means for securing the sets of cross struts or cantilever means to said floor of the building.

8. A derrick scaffold structure comprising staging units adapted to be assembled in vertical floor by floor relation alongside the outside of a building under construction, each of said units comprising corner post means, floor

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supporting means connecting said post means, cross-braces joining said posts, said floor supporting means and cross-braces leaving a rectangular open space within each unit, removable floor means providing a bottom in each unit, derrick moving means supported on said removable floor means, said derrick moving means including a working platform movable successively through said units as the derrick is moved, a bottom plate for supporting the moving means on said removable floor means, and retractable steadying arms on said plate for engaging said posts to guard against shift of said bottom foot plate, cantilever means for suspending each unit from an adjacent floor, and means for adjusting said cantilever means to provide rigid support for each unit.

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