June 4, 1957 J. R. MILES 2,794,558

SCAFFOLD ERECTING AND DISMANTLING APPARATUS

Filed June 8, 1956 2 Sheets-Sheet 1

FIG. 1.

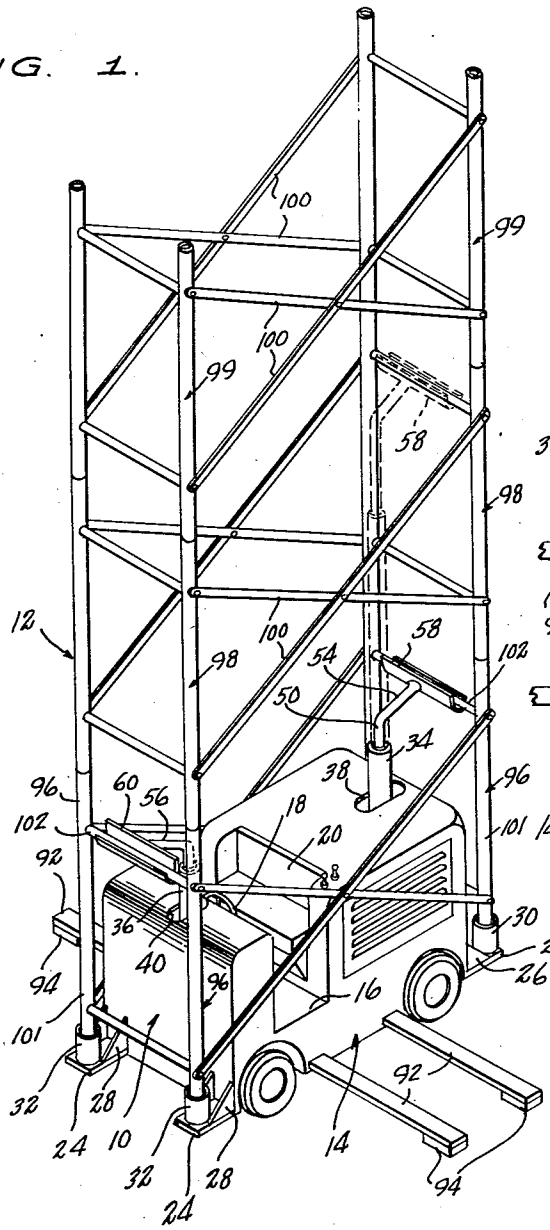
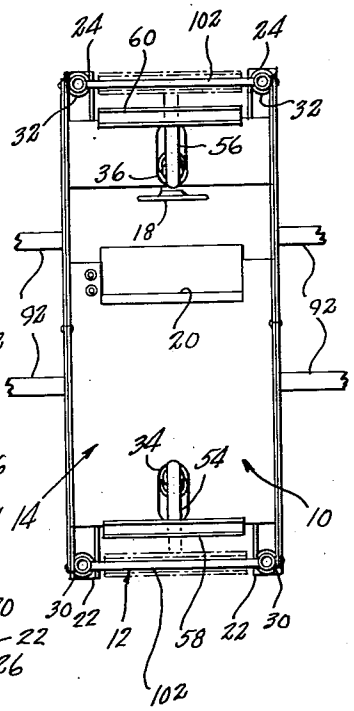


FIG. 5.



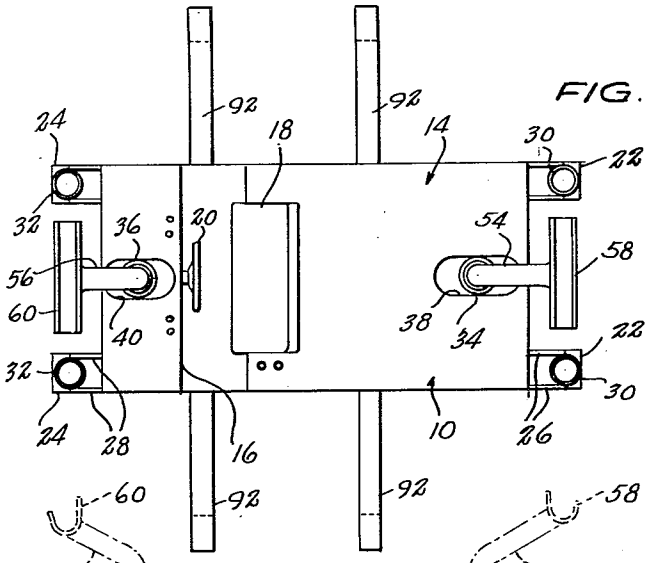
INVENTOR.
JOSEPH R. MILES,
BY
McMorrow, Berman & Davidson
ATTORNEYS.

June 4, 1957 J. R. MILES 2,794,558

SCAFFOLD ERECTING AND DISMANTLING APPARATUS

Filed June 8, 1956 2 Sheets-Sheet 2

FIG. 2.



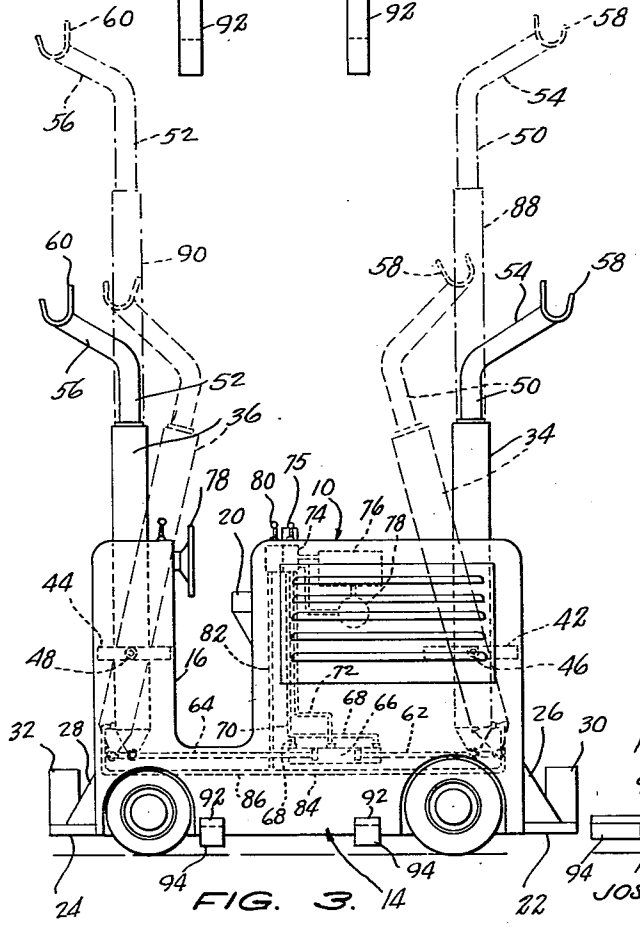
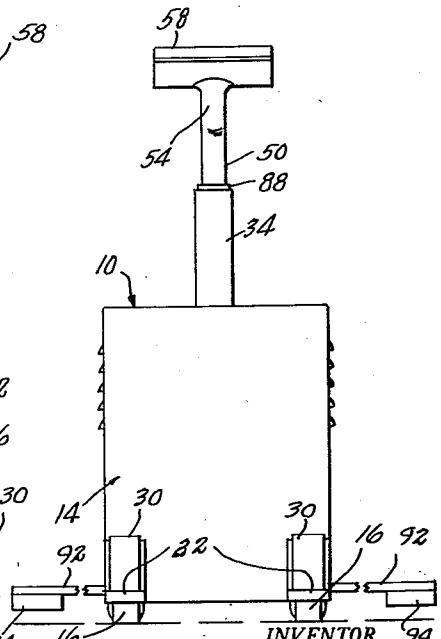


FIG. 3.

FIG. 4.



INVENTOR.
JOSEPH R. MILES,
BY
McMorrow, Berman & Davidson
ATTORNEYS.

United States Patent Office

2,794,558

Patented June 4, 1957

2,794,558

SCAFFOLD ERECTING AND DISMANTLING APPARATUS

Joseph R. Miles, Inglewood, Calif.

Application June 8, 1956, Serial No. 590,176

3 Claims. (Cl. 214—1)

The erection of scaffolds, many of which rise to a considerable height, requires the services of a number of workmen, and consumes an excessive amount of time. The main object of the present invention, accordingly, is to provide a device which will facilitate the erection and also the dismantling of conventional scaffolding, in a manner such as to reduce the amount of time required for either of these operations, while reducing at the same time the number of men necessary in the operation. In this way, it is proposed to lower considerably the expense involved in operations of this type.

Summarized briefly, the invention includes a self-propelled, small lift truck which is driven to the location at which the scaffolding is to be erected. On opposite ends of the truck there are mounted upwardly opening sockets, there being a pair of sockets at each end and the sockets of each pair being spaced transversely of the truck. The sockets are thus spaced in a rectangular series, to receive the posts or standards of a scaffolding section. At the front and rear ends of the truck there are mounted therein upwardly projecting hydraulic cylinders, the rams of which are formed with outwardly offset arms terminating at their free ends in upwardly opening, trough-shaped brackets adapted to engage under cross bars of the respective scaffolding sections. Thus, on extension of the rams, a scaffolding section will be lifted out of the sockets, and when elevated to a selected degree, is held in position while the next lower section is inserted in the sockets, the elevated section then being dropped sufficiently to engage in the upper end of the lower section. The operation is repeated until the scaffolding is erected to the desired height. The cylinders, through the medium of a suitable hydraulic control, are simultaneously tilted inwardly and outwardly as desired, to be shifted out of and into position, respectively, in respect to the cross bars of the scaffolding sections.

Among objects of importance are the following:

First, to provide a device of the nature stated which will be usable in erecting or dismantling scaffolding of conventional design, without requiring any modification or redesign of said scaffolding;

Second, to provide a device of the nature described that will be swiftly movable into and out of position, thus to reduce to the maximum degree the length of time required for the operation;

Third, to so form the device as to insure the accurate placement of the respective sections relative to one another, thereby to effect a swift joinder of superposed scaffold sections;

Fourth, to provide a device which will include a truck so designed that the driver thereof has, in readily accessible position, finger tip controls for tilting the cylinders and for extending and retracting the rams; and

Fifth, to provide at opposite sides of the lift truck outwardly projecting arms preventing overturning of the lift truck should the scaffold begin to tilt.

Other objects will appear from the following description, the claims appended thereto, and from the annexed

drawings in which like reference characters designate like parts throughout the several views and wherein:

Figure 1 is a perspective view of a scaffold erecting and dismantling machine formed according to the present invention, as it appears when in use during the erection of a scaffold;

Figure 2 is a top plan view of the apparatus with the scaffold removed;

Figure 3 is a side elevational view of the apparatus, the dotted lines showing the cylinders in tilted position and the chain-dotted lines showing the rams extended;

Figure 4 is an end elevational view of the apparatus as seen from the right of Figure 3; and

Figure 5 is a top plan view of the apparatus with the scaffold included.

Referring to the drawings in detail, the reference numeral **10** generally designates an industrial truck, which is designed, in accordance with the present invention, to include means for erecting and dismantling a conventional scaffolding generally designated at **12**.

The truck includes a rectangular housing **14** adjacent the front end of which there is provided a transversely extending space **16** for an operator, said space having a back wall formed with an operator's seat **20**, a steering wheel **18** being provided for the purpose of permitting control of the apparatus. The truck would be provided with the various controls and mechanisms generally required for starting, stopping, etc., and since these mechanisms are all conventional per se it is not deemed necessary to illustrate the same herein. Rigid with and projecting rearwardly from the truck are horizontally disposed ledges **22**, spaced transversely of the truck, and projecting forwardly from the front end of the truck in the same manner are front ledges **24**. The several ledges are braced by triangular plates or gussets **26, 28** respectively.

Fixedly mounted upon and projecting upwardly from the several ledges are upwardly opening, cylindrical, elongated rear sockets **30** and front sockets **32**.

Adjacent the rear end of the truck there is provided medially between opposite sides thereof, an elongated hydraulic cylinder **34**, a front cylinder **36** being similarly provided adjacent the front end of the truck. The upper end portions of the cylinders project through slot-like rear and front openings **38, 40** formed in the top wall of the casing **14** as shown in Figure 2, said openings being extended in a fore-and-aft direction and being aligned longitudinally with one another and with the longitudinal center line of the vehicle.

The cylinders are fulcrumed intermediate their ends for pivotal movement about horizontal axes extending transversely of the vehicle, thus pivoting in a common vertical plane.

To provide a pivotal mounting for the respective cylinders, brackets **42, 44** are mounted within the truck as shown in Figure 3, and passing through the brackets are pivot pins or trunnions **46, 48** projecting outwardly from the respective cylinders.

At their upper ends the cylinders are formed open, and projecting through the open ends of the cylinders are rams **50, 52** respectively formed with inclined extensions **54, 56**. The extensions diverge in an upward direction as shown in Figure 3, and are disposed wholly in the vertical plane within which the cylinders are pivoted. At their free, upper ends, the extensions are welded to horizontally extending, elongated, upwardly opening lift brackets **58, 60**. These are of channel shape, that is, they are of approximately U or J shaped cross section as shown in Figure 3, the lift brackets being parallel as shown in Figure 2 and extending perpendicularly to the plane within which the cylinders pivot.

The control means for the cylinders will now be described, and as shown in Figure 3, piston rods **62, 64**

project in coaxial alignment from the opposite ends of a hydraulic cylinder **66**. Within the cylinder **66** the rods are connected to pistons, and adapted to supply pressure fluid simultaneously to both ends of the cylinder **66** is a pair of branch lines **68**, extending from a main fluid supply line **70**. When the fluid is forced under pressure through the line **70**, it flows through the branch lines **68** into the opposite ends of the cylinder, and this causes pressure to be applied to the pistons, tending to shift both pistons simultaneously toward the midlength portion of the cylinder. This retracts both pistons rods **62**, **64** simultaneously, and causes the cylinders to pivot about their axes **46**, **48** from their dotted line positions of Figure 3 to their full line, vertical positions.

Means is also provided for pivoting the cylinders in an opposite direction. To this end, there is a line **72** extending to the midlength portion of the cylinder **66**. The lines **70**, **72** extend to a valve box **74** from which projects a control handle **75**. A sump or reservoir **76** communicates with the valve box **74**, and with a pump **78**, and on operation of the pump, it will be understood that with the valve in one position, fluid would be supplied under pressure through the line **72**. With the pump in operation and the valve in another position, fluid would be supplied through the line **70**. In this way, simultaneous movement of the pistons in a selected direction, that is, either toward or away from each other is provided.

The valve, pump, and reservoir arrangements are all believed clearly within the skill of one working in the art of hydraulics, and accordingly need not be detailed herein. It is mainly important to note that the hydraulic connections are so designed as to cause movement of the piston rods **62**, **64** either away from or toward each other, according to the direction in which the cylinders are to be simultaneously tilted. It will be understood that the rods **62**, **64** at their outer ends have a lost motion pivotal connection to the lower ends of the cylinders, so that the rods may move in straight lines although the lower ends of the cylinders will travel in arcuate paths.

Adjacent the valve means **74**, **75** there is provided a similar valve means **80**, also readily accessible to the operator of the device. Extending from the valve means **80** is a fluid line **82**, terminating at its outlet end in communication with branches **84**, **86** extending into communication with the lower ends of the cylinders **34**, **36** respectively. When fluid is supplied under pressure through line **82**, it is directed against the lower ends of the rams **50**, **52** causing said rams to be extended, as for example to the chain-dotted positions of Figure 3.

The rams are of a telescoping type, including extensible tubes **88**, **90** slidable in the cylinders **34**, **36**, with the rams in turn being slidable within the tubes. This, however, is not critical to the invention, the arrangement being needed only in instances in which maximum extension of the rams is desired in relation to cylinders which are relatively short, that is, shorter than the overall distance the rams are to be projected therefrom.

Rigid with and projecting outwardly from the frame of the truck, at opposite sides of the truck, are horizontally disposed, elongated bars **92**, the outer ends of which are fixedly secured to depending blocks **94**. If the scaffolding **12**, after being erected to a substantial height, should tend to tilt accidentally, the bars **92** will engage the ground surface at their free ends, thus preventing the scaffolding and the truck from being tilted beyond a predetermined, safe distance.

The scaffolding illustrated in Figure 1 is wholly conventional per se, and includes a plurality of sections generally designated at **96**, **98**, **99**. In actuality, the sections are all identical to one another, but different terms of designation are used, for the purpose of facilitating an understanding of the operation of the device.

The section **96** includes a plurality of posts **101**, rectangularly spaced and disposed vertically. The posts at the rear end are connected by horizontally disposed cross bars **102**, the posts at the front end being similarly connected by the cross bars **102**. Bracing the rear and front posts are X-type, removable side braces comprising crossing brace elements **100**.

The arrangement is one which will permit swift direction of a plurality of identically formed scaffold sections. In use, the section **99** would first be placed upon the truck, with the posts thereof seated in the sockets **30**, **32**. The side braces **100** are applied, providing a rectangular, box-like scaffold section. Then, with the brackets **58**, **60** positioned under the cross bars **102**, the valve means **80** is operated to extend the rams. This lifts the section **99** bodily, and when it has been lifted to a predetermined extent, it will be spaced above the sockets **30**, **32** a distance sufficient to permit the section **98** to now be positioned in the sockets. Section **98**, after assembly thereof with the posts engaged in the sockets, is ready to receive the previously elevated section **99**.

As a next step, one permits the rams to retract under the weight of the section **99** a distance sufficient to cause the lower ends of the posts of section **99** to seat in the upper ends of the posts of section **98**. This type of connection between aligned posts is a part of a conventional scaffold construction.

When the section **99** is supported upon the section **98**, the rams are permitted to retract further, to disengage completely from the section **99**. The rams are now tilted to the dotted line positions of Figure 3. With the rams fully retracted, the rams are tilted back to their vertical, full line positions to dispose the brackets **58**, **60** under the cross bars **102** of the section **98**. The rams are now extended to engage the cross bars **102** of section **98** and are extended once again. This lifts the sections **98**, **99** as a single unit.

The sections **98**, **99** are lifted a distance sufficient to permit the section **96** to now be assembled within the sockets **30**, **32** and the operation of causing the elevated sections to be supported upon and connected to the lowest section is now repeated.

The operation may be repeated as often as necessary, to assemble a selected number of scaffolds until the scaffold has been erected to the desired height. Thereafter, the lowest section remains supported upon the truck, with the truck being left in position during the necessary work on an adjacent building or similar structure.

When the scaffold is to be dismantled, the brackets are engaged with the cross bars of the section next above the lowermost section, as shown in dotted lines in Figure 1, this being the section **98**. The brackets are extended sufficiently to lift the section **98**, and hence lift all sections disposed above the same, out of engagement with the lowermost section. The lowermost section is now dismantled, and removed from the sockets after which the structure supported upon the brackets is lowered to dispose the section **98** in the sockets. The operation is repeated until the scaffold has been fully dismantled.

As will be observed, the entire scaffold can be erected from the ground, through the use of a minimum number of workers, and the design of the apparatus and the operational characteristics thereof are such as to permit this to be done not only with a relatively small number of workers, but also, in a comparatively short period of time and without hazard or danger of personal injury so far as the workers are concerned. Still further, if desired the entire scaffold after it has been erected can be moved along the face of a building or other structure being worked upon, merely by driving the truck, with the erected scaffold supported thereupon, to the new location.

It is also a characteristic of the invention that the truck can be removed from a standing scaffold, by using a scaffold section having offset posts on the bottom scaffold-

ing. In this way, the posts would miss the sockets and rest on the ground, permitting the truck to be removed.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claims.

What is claimed is:

1. Apparatus for erecting and dismantling a scaffold of the type composed of superposed, interfitting sections each including rectangularly spaced posts and cross bars connecting some at least of the posts, comprising; a movable support structure; vertically extending, upwardly opening, rectangularly spaced sockets mounted on said structure, two at each end thereof, for supporting the posts of a first scaffold section; hydraulic cylinders mounted on the ends of said structure; rams projecting upwardly from the cylinders and extending in generally vertical paths; channeled, horizontally extending brackets carried by the rams for receiving the cross bars, thus to lift the section out of sockets on extension of the rams and support the lifted section in an elevated position, thereby to permit insertion of the posts of a second section in the sockets in position to support the first section, said cylinders being tiltably mounted on the support structure; and means to simultaneously tilt the cylinders to and from a position in which the brackets are located for receiving the cross bars.

2. Apparatus for erecting and dismantling a scaffold of the type composed of superposed, interfitting sections each including rectangularly spaced posts and cross bars connecting some at least of the posts, comprising: a movable support structure; vertically extending, upwardly opening, rectangularly spaced sockets mounted on said structure, two at each end thereof, for supporting the posts of a first scaffold section; hydraulic cylinders mounted on the ends of said structure; rams projecting upwardly from the cylinders and extending in generally vertical paths; channeled, horizontally extending brackets carried by the rams for receiving the cross bars, thus to lift the section out of the sockets on extension of the rams and support the lifted section in an elevated position, thereby to permit insertion of the posts of a second section in the sockets in position to support the first section, said cylinders being tiltably mounted on the support structure; and means to simultaneously tilt the cylinders to and from a position in which the brackets are located for receiving the cross bars, comprising a hydraulic cylinder mounted on said structure, and piston rods projecting from opposite ends of the last named cylinder and pivotally connected to the first named cylinders, for tilting the first named cylinders responsive to extension and retraction of said piston rods.

3. Apparatus for erecting and dismantling a scaffold of the type composed of superposed, interfitting sections each including rectangularly spaced posts and cross bars connecting some at least of the posts, comprising; a movable support structure; vertically extending, upwardly opening, rectangularly spaced sockets mounted on said structure, two at each end thereof, for supporting the posts of a first scaffold section; hydraulic cylinders mounted on the ends of said structure; rams projecting upwardly from the cylinders and extending in generally vertical paths; channeled, horizontally extending brackets carried by the rams for receiving the cross bars, thus to lift the section out of the sockets on extension of the rams and support the lifted section in an elevated position, thereby to permit insertion of the posts of a second section in the sockets in position to support the first section, said cylinders being tiltably mounted on the support structure; and means to simultaneously tilt the cylinders to and from a position in which the brackets are located for receiving the cross bars, comprising a hydraulic cylinder mounted on said structure, and piston rods projecting from opposite ends of the last named cylinder and pivotally connected to the first named cylinders, for tilting the first named cylinders responsive to extension and retraction of said piston rods, said first named cylinders tilting in a common vertical plane.

References Cited in the file of this patent

UNITED STATES PATENTS

1,782,406	Bureau	Nov. 25, 1930
2,305,563	Uecker et al.	Dec. 15, 1942
2,605,540	Kroll et al.	Aug. 5, 1952
2,705,363	Anderson	Apr. 5, 1955
2,708,012	Talcott	May 10, 1955
2,740,538	Felkner	Apr. 3, 1956

FOREIGN PATENTS

602,904	Great Britain	June 4, 1948