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METHOD AND APPARATUS FOR RAPIDLY ESTABLISHING  
AN ELEVATED WORK PLATFORM

3,442,351

Filed Jan. 20, 1967

Sheet 1 of 3

Fig. 1.

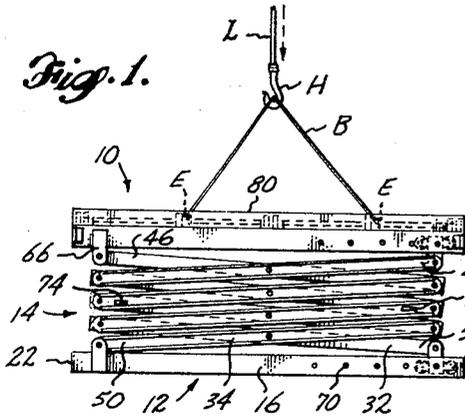


Fig. 3.

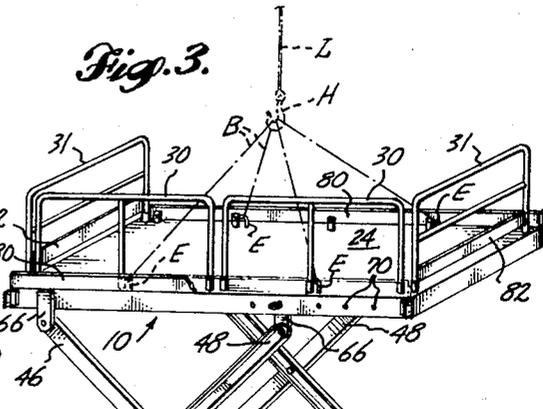


Fig. 2.

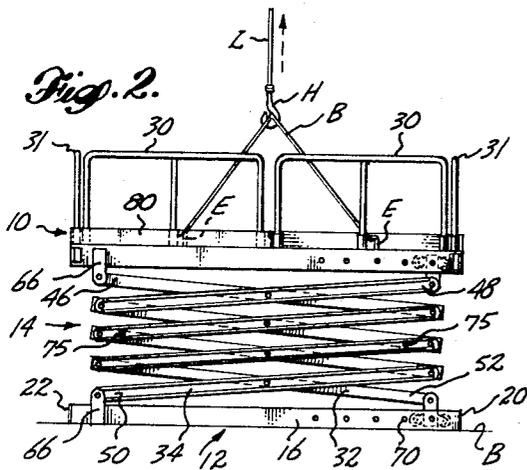


Fig. 4.

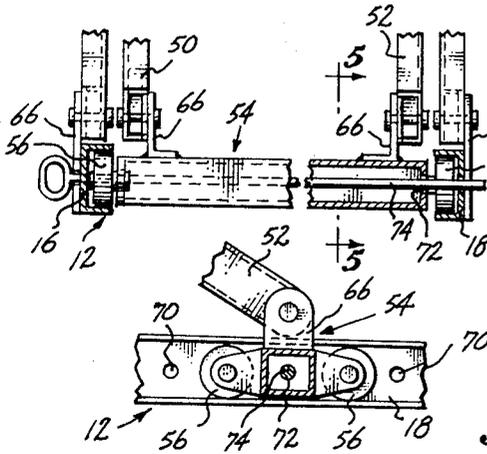
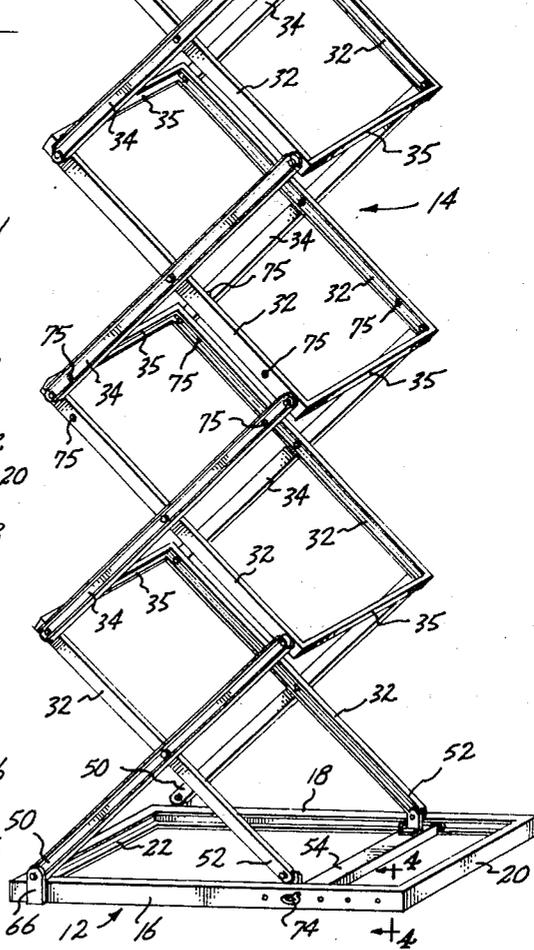


Fig. 5.



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Sheet 2 of 3

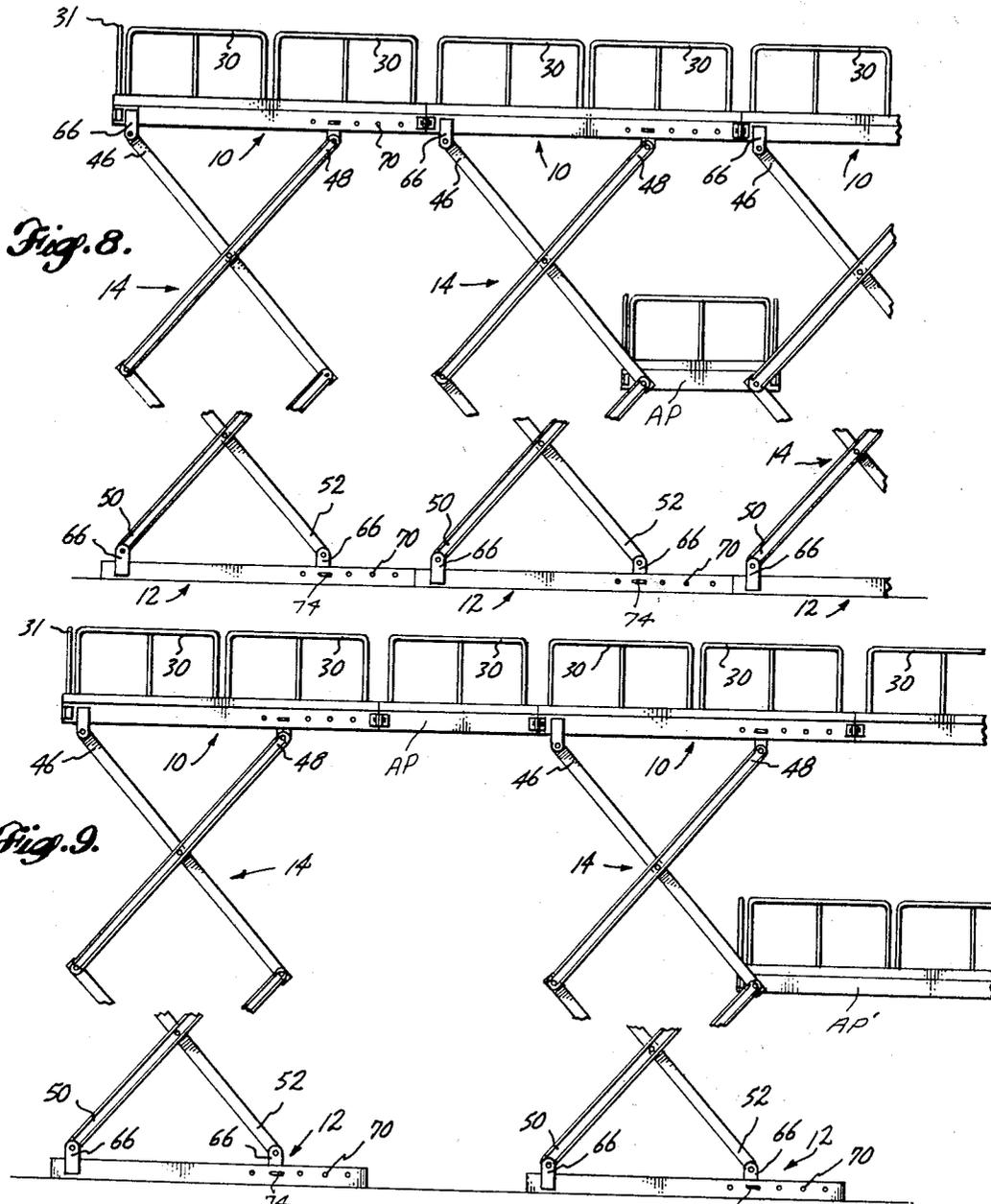


Fig. 9.

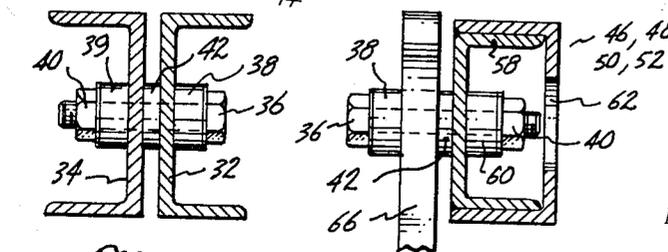


Fig. 6.

Fig. 7.

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3,442,351

**METHOD AND APPARATUS FOR RAPIDLY ESTABLISHING AN ELEVATED WORK PLATFORM**

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U.S. Cl. 182-141

14 Claims

**ABSTRACT OF THE DISCLOSURE**

(1) A work platform connected to a base by a passive lazy tong mechanism; (2) a lazy tong mechanism comprising a plurality of side member and cross brace assemblies, of rigid "box" form, and a plurality of single side members completing same, all members being of channel iron; (3) a lazy tong mechanism narrowing from bottom to top; and (4) transporting the platform apparatus in a collapsed condition to the work site by an overhead lifter, then lifting said platform, and extending said lazy tong mechanism, by use of said lifter, and then locking said lazy tong mechanism in its extended position.

**BACKGROUND OF THE INVENTION**

*Field of the invention*

This invention relates to the field of scaffolds comprising a platform and an extensible supporting means.

*Description of the prior art*

In the repair and maintenance of large ships, and in building construction, for example, it is often necessary to provide elevated work platforms for the workmen at shipside or next to the building. It is customary to erect a system of scaffolding on the dock or ground to provide the elevated platforms. Such scaffolding provides a satisfactory elevated work platform, but requires a relatively large amount of time and labor for its erection and removal. Also, a major reconstruction of the scaffolding is required in order to merely change the height of the platform. Conventional scaffolding comprises a plurality of tubular member sections which must be fitted together and securely fastened at a large number of joint locations. In most cases a substantial portion of the scaffolding must be erected above the dock level by workmen having nothing to stand on other than the previously erected portion of the scaffolding. For maximum economy the ratio of the time required to set up and take down any means for providing a temporary elevated work platform, to the time of actual use of such platform, should be small. In many instances involving the use of conventional scaffolding composed of tubular member sections this ratio is relatively high. A principal object of the present invention is to provide a method and apparatus of rapidly establishing an elevated platform, for temporary use, which results in such ratio being very small.

Briefly, the elevated platform apparatus of the present invention comprises the platform proper, a supporting base, and a passive lazy tong means (i.e. without a self-contained actuator) interposed between said platform and said base. One of the upper end portions of the lazy tong means is pivotally connected to its end of the platform, and the lower end portion of the lazy tong means at the corresponding end of the base is pivotally connected to the base. The other upper end portion and the other lower end portion of the lazy tong means are mounted for sliding movement longitudinally of the platform and base, respectively.

Typical prior art platform raising means of the lazy tong type are disclosed by Trent U.S. Patent No. 900,237; Steed U.S. Patent No. 3,160,228; and Gridley U.S. Patent No. 3,259,369. The lazy tong mechanisms of these patents are not passive; they each comprise a built-in lifting means. Hence, they are each locked into a specific mode of inherent operation and without modification are incapable of being used as a tool in the techniques of the present invention. In addition, as apparatuses they are more intricate and costly to manufacture.

**SUMMARY OF THE INVENTION**

The present invention relates to a method and apparatus for rapidly and easily establishing a temporary platform for workmen at an elevated work site, such as at a side portion of a moored ship many feet above the level of the dock at which such ship is moored.

According to the present invention, the apparatus as described is stored in a collapsed condition, and in such condition is a relatively small and compact package, requiring only a small amount of storage space. The technique of the present invention involves transporting such apparatus by means of an overhead power lifting tool, such as a crane, for example, which has been provided at the work site for general use. The apparatus is picked up and moved from its place of storage to the dock, ground or other base surface immediately below the elevated work site. During such transportation the lazy tong means is locked in its retracted position. After placement of the apparatus on the base surface the locking means is removed or released, and then the same lifting tool is used for lifting the platform to the desired height, with the lazy tong means following. The lazy tong means is then locked into its extended position, and the crane or other lifting tool is removed from the scene. The scaffold is lowered and the apparatus stored by a reversal of these steps.

Accordingly, it is an object of the present invention to provide a platform elevating apparatus which is simple in construction and easy to operate, but yet sturdy, durable and safe, and which includes no intricate power plant of its own, to add both weight and cost.

Another object of the present invention is to provide a technique of utilizing this or a similar apparatus to rapidly provide an elevated platform, and of handling such apparatus by means of a power lifting tool that is already at the general work area, and thus is not an added equipment cost.

A further object of the present invention is to provide a complex of elevated platforms comprising a plurality of apparatuses of the character described related end-to-end and interconnected together, and also that method of establishing such complex. The platforms may be placed close together, and their adjacent ends directly interconnected, or they may be spaced apart and interconnected by means of an auxiliary platform.

A still further object of the present invention is to provide an elevated platform complex with includes at least one auxiliary platform interconnected between intermediate cross-brace portions of the lazy tong means, to provide an elevated work station at an intermediate level.

Yet another object of the present invention is to provide a scaffold raising apparatus of the character described wherein the lazy tong mechanism comprises a pair of spaced apart side lazy tong structures, each of which is composed of a series of pairs of crossed channel members. The members of each pair are pivotally connected together where they cross, and every other opposed pair of side members are provided with interconnecting end channels, forming a rigid, closed "box" structure there-

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with. Except at the upper and lower ends of the mechanism, the end portions of such members are pivotally connected to the end portions of the next pair of members. Preferably, at each such pivot joint the closed sides of the channel members face each other.

These and other objects, features and advantages of the present invention will be apparent from the following description, appended claims and annexed drawings.

#### BRIEF DESCRIPTION OF THE DRAWING

Referring to the drawing wherein like reference characters designate like parts throughout the several views:

FIG. 1 is a side elevational view of a substantially collapsed platform assembly typifying the present invention being lowered by a hook and line of an overhead lifting device, onto a base surface, and showing the guardrail sections stored;

FIG. 2 is a view like FIG. 1, but showing the guardrail sections righted in their sockets, and the overhead lifting device being used for raising the platform;

FIG. 3 is a perspective view of the platform fixed in an elevated position;

FIG. 4 is a cross-sectional view taken through the base substantially along line 4—4 of FIG. 3, and showing a typical carriage for the movable lower end portion of the lazy tong means, a portion of which is broken away for clarity of illustration of certain parts;

FIG. 5 is a sectional view through such carriage taken substantially along line 5—5 of FIG. 4, and showing more details of the mounting means for the movable lower end portion;

FIG. 6 is a sectional view taken through the structural members making up one pair of the lazy tong members, such view being taken closely adjacent the pivotal connection of such member;

FIG. 7 is a fragmentary detail view, partly in section, showing a typical manner of connecting the outer end portions of the lazy tong members to the supports therefor on the platform and the base;

FIG. 8 is a side elevational view of a complex of elevated platforms, showing adjacent platforms directly connected together, and an auxiliary platform bridging between intermediate stations of the two lazy tong means, and with the lazy tong means being broken away between their ends to indicate intermediate length;

FIG. 9 is a view similar to FIG. 8, but showing the adjacent staging units spaced a further distance apart, and an auxiliary platform being used to bridge between and interconnect the main platforms;

FIG. 10 is a top plan view of fragmentary portions of two platforms, showing the manner of stowing the guardrail sections, and a typical manner of securing the platforms together; and

FIG. 11 is an end elevation view of an extended modified form of platform apparatus.

#### DETAILED DESCRIPTION

Referring more specifically to the several figures of the drawing, the platform assembly is shown to comprise a platform 10, a base 12 of comparable size, and a passive lazy tong mechanism 14 interposed between the two.

By way of typical and therefore nonlimitive example, the base 12 may be made up of two side channel members 16, 18 and two end channel members 20, 22, welded together at their ends to form a rectangular frame, and all opening inwardly.

The platform 10 may include a similar frame, and a suitable decking 24 on such frame. The platform 10 may also be provided with a plurality of vertically oriented sockets 26 on the sides and ends of the frame. The sockets 26 are provided primarily for the reception of mounting post portions 28 (FIG. 10) of removable guardrail sections 30, 31.

The lazy tong mechanism may comprise a pair of

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spaced apart lazy tong side structures. In preferred form, the lazy tong side structures are composed of a series of pairs of crossed structural members 32, 34. The members 32, 34 are pivotally connected together where they cross, and each is pivotally connected near its ends to either an end portion of another member 32 or 34 or to a mounting component carried by either the platform 10 or the base 12. As best shown by FIG. 6, at each pivot point intermediate the ends of the lazy tong mechanism 14 the closed sides of the channel members 34 face inwardly towards each other. As an important feature of the invention, opposed pairs of the members 32 are rigidly interconnected at their ends (except where connected to the platform 10 or the base 12) by cross-members 35, also of inwardly opening channel pieces. Members 32, 35 are welded or otherwise firmly secured together to form a rigid and sturdy "box" like frame (FIG. 3).

The pivotal connections (FIG. 6) may each comprise a bolt 36 extending through apertured bosses 38, 39 welded to the channel webs. A thrust washer 42 is positioned between the channel members 32, 34, and the bosses 38 are provided with internal bronze bushings, or the like. A nut 40 may be used to retain the bolt 36 in place.

The lazy tong means 14 has two end portions 46, 48 at its upper end and two end portions 50, 52 at its lower end which are free of connection to other channel members 34. The ends of the two members 32 making up the upper end portion 46 are pivotally connected to a fixed position on the platform 10. At a location below, at the same end of the platform assembly, the ends of the members 34 making up the end portion 50 are pivotally connected to a fixed position on the base 16. During extension and retraction of the lazy tong means 14, the end portion 48 moves lengthwise of the platform 10, and the end portion 52 moves lengthwise of the base 16.

By way of typical and therefore nonlimitive example, the end portions 48, 52 may be mounted for such movement by means of a carriage 54 (FIGS. 4 and 5) which includes rollers 56 at its ends adapted to ride between the flanges of the channel side members.

The ends of the channel members 34 which make up the end portions 46, 48, 50, 52 may be constructed in the manner shown by FIG. 7. More specifically, at each such end a section 58 of a smaller channel material may be positioned in the manner illustrated and welded in place to give such ends a box-like form. A boss 60, similar to bosses 38 and including an internal bushing may be welded to the inner side of the web portion of such channel section 58. Each end portion 46, 48, 50, 52 is pivotally connected directly to a mounting pad 66 which includes a bushing carrying boss 38. A thrust washer 42 is positioned between each such end portion and its mounting pad 66, and a bolt 36 extends through the bushing in boss 38, the mounting pad proper, the thrust washer 42, the web of channel section 58 and the bushing in boss 60, and is retained in place by a nut 40. An enlarged opening 62 may be provided in the web portion of channel member 34 to provide access for a wrench or the like into the interior of the end portion, for use in tightening or loosening the nut 40.

In the case of the end portions 46, 50, the mounting pads 66 are welded or otherwise firmly secured to the platform 10 and base 16, respectively. At the end portions 48, 52 the mounting pads 66 are mounted onto the carriages 54.

Referring now to FIGS. 1—5 in particular, a series of longitudinally spaced openings, some of which are designated 70, are formed in the web portions of the side channel members of the platform 10 and the base 12. Each such opening 70 is aligned across the platform 10 or the base 12 with a counterpart opening 70 in the web portion of the opposite side channel member. Each carriage may be provided with at least one opening 72 which is alignable between each opposed pair of openings 70. The lazy tong mechanism 14 may be locked into position

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by inserting a large, husky pin element 74 through a selected pair of the openings 70 and also through the openings in the eye elements 72. The pin element 74 may be constructed in the nature of a bolt, so that a retaining nut (not shown) can be placed at its nonheaded end.

According to the preferred technique of the present invention, the above-described platform assembly, or a functionally equivalent apparatus, is stored in a completely collapsed condition, and is a relatively small and compact package, requiring little space. When a need for a temporary elevated platform arises, a crane or other overhead lifting device is used to pick up the platform assembly and transport it to the dock, ground or other base surface below the elevated work site. FIG. 1 shows a lifting line L leading down from a crane, or the like, being used for setting the retracted or collapsed platform assembly down onto the base surface B. The line L is shown to have a hook H at its end which engages a pair of bridles B, each of which is slackly interconnected between opposed eyes E on opposite sides of the platform 10. The eyes E are welded to the side channels of the platform frame.

According to the invention, the staging unit is locked in position in its collapsed condition. This may be done by inserting at least one of the rod elements 74 through openings in web portions of certain ones of the members 34 which are aligned all the way across the lazy tong mechanism 14 when it is fully collapsed (FIG. 1, for example). The openings 75 (FIGS. 2 and 3) are located between the end and middle pivot points, so that the rod element 74 prevents the members 34 from moving apart. Once the staging unit is positioned on the base surface B below the elevated work site, the guardrail sections are set upright in the sockets 26, and are secured in place, such as by inserting a locking pin through aligned openings in the sockets and posts.

As shown by FIG. 10, the guardrail sections may be laid flat on the platform, with the end section 31 on the bottom and the side section 30 on top. The end 28 of the side sections center post may be slipped into one of the eyes E and retained therein during storage of the unit by a crosspin. Eye E may be made deep enough to receive the center posts of two side sections 30 elevated by two end sections 31 located below them.

After the lazy tong mechanism 14 is unlocked, and the guardrail sections have been secured in place, the lifting line L, which is still attached, is used for lifting the platform, with the passive lazy tong mechanism 14 merely following. When the platform 10 is at or near the desired height the opening 72 of the lower carriage 54 is aligned with the nearest pair of openings 70 and one of the pin elements 74 is inserted through the entire set of aligned openings. The other rod 74 may be similarly employed at the upper end of the assembly to affix the upper carriage 54 to the platform 10. After the platform 10 has been readied for use, the hook and bridle elements B may be removed.

A toe rail 80 is preferably provided along each side of the platform 10 to prevent dropped tools, etc., from being inadvertently kicked therefrom. A similar toe rail 82 may be permanently secured to each end section 31, so that it is removable with the end section 31.

As is conventional with tubular section scaffolding, a sectional or telescopic ladder may be provided for use by the workmen in climbing up onto and down from the scaffold 10.

As will be evident, dismantling of the elevated platform 10 involves practicing the foregoing steps in reverse order.

According to the invention, plural staging units may be utilized together to form a complex of interconnected elevated work platforms. FIG. 8 shows a series of the staging units abutted together end-to-end. The adjoining ends of the platforms 10 are preferably secured together, such as

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by inserting a bolt 78 (FIG. 10) or the like through aligned openings in a pair of brackets 79. Obviously, other ways of interconnecting the two adjacent platforms 10 may be used. For example, horizontal angle iron straps may be used to bridge between the platforms 10 at their sides, and toggle pins or bolts used to secure such straps to the platform frames. If such straps are employed, they may also be used to bind the collapsed assembly together in lieu of the pin elements 74.

As shown by FIG. 9, the staging units may be spaced a further distance apart, and the platforms 10 interconnected by an auxiliary platform 10'. The auxiliary platform 10' might simply have a pair of brackets 79 at each of its ends which are spaced to be matchable with the brackets 79 on the platforms 10.

According to the invention, an auxiliary platform 10'' may be interconnected between intermediate portions of the spaced apart lazy tong mechanisms 14. The platform 10'' may have a downwardly opening hooklike element (not shown) at each of its ends which is adapted to nest over one of the lateral braces 35 of the lazy tong mechanisms 14.

FIG. 11 shows a modified form of platform assembly constructed according to the present invention. It includes a platform 10' and a base 12' which are similar to platform 10 and 12, respectively, of the earlier form. The lazy tong mechanism 14' is of the passive type, like in the earlier form, but its members are arranged such that the mechanism narrows somewhat from bottom to top. This is done by simply placing each relatively upper pair of side members 32' or 34' to the inside of the pair of such members immediately below them.

As a result of this arrangement, the flat sides of the channel webs are not together at all of the pivot locations. Thus, at the pivot locations where the open side of a channel member faces inwardly, a piece of smaller channel stock (such as illustrated by FIG. 7) or a flat plate must be welded in place to provide a flat inwardly facing surface. As in the earlier form, the lazy tong mechanism 14' is laterally braced by channel members which span between, and are rigidly secured to, the ends of some of the side members. As will be apparent, this construction results in a lowering of the center of gravity of the assembly, enhancing its stability.

Referring more specifically to FIG. 11, lazy tong mechanism 14' is shown to comprise a first lower pair of opposed side members 90 pivotally connected at their lower ends to the distant end of the base 12', at their centers to a second lower pair of opposed side members 92, and at their upper ends to the lower ends of an intermediate pair of side members 94. Side members 94 are pivotally connected at their centers to another pair of intermediate side members 96. Side members 96 are positioned inwardly of the side members 94, rather than outwardly thereof as is the FIG. 3 embodiment. The next upper pair of opposed side members 100 are situated to the inside members 96 and are crossed with side members 98. Side members 98 are connected at their upper ends to members 104, and members 100 at their upper ends to members 102. Members 102 and members 104 cross and are pivotally connected at their centers. The upper ends of members 102 are pivotally connected to the platform 10', and the upper ends of the members 104 are mounted by a carriage 54' for lengthwise movement along platform 10'. The pivotal connections at the ends of the various side members are formed by pin elements carried by cross members 106 and extending through both of the side member end portions at each joint. Although not illustrated, bushings and thrust washers are preferably employed at each pivot joint.

As heretofore mentioned, when the platform apparatuses of the present invention are not being used they are stored in a collapsed condition. The toe rails 80 are made high enough (FIG. 1, for example), so that the stored rail sections 30, 31 do not extend above their upper

edges, making it possible for several collapsed apparatuses to be stacked one upon the other.

Having thus described the invention, it is clear that the objects as stated have been attained in a simple and practical manner, while particular embodiments of the invention have been shown and described, it is understood that changes may be made in the construction and arrangement of the various parts, and in the order of the manipulative steps, without departing from the spirit and scope of the invention as expressed in the following claims.

What is claimed is:

1. A method of rapidly providing a work platform adjacent an elevated work site, comprising:

locating said platform on a passive extensible-retractable column means capable of functioning as a sturdy support column when locked in an extended position, and said column means on a base;

positioning said base and the extensible-retractable means and platform thereon onto the base surface below the elevated work site, with said column means retracted;

lifting the platform and extending the column means by use of an overhead power lifting tool, such as a crane, attached to said platform; and

locking the column means in such extended position.

2. The method of claim 1, wherein said column means is a lazy tong mechanism having two lower end portions which move relatively together or apart during operation of such mechanism, and wherein said locking comprises fixing both of said end portions in position on said base.

3. The method of claim 1, comprising positioning the platform, the column means, and the base by moving them with said overhead power lifting tool, as an assembly in which the column means is retracted.

4. The method of claim 2, wherein the positioning of the platform, the lazy tong means and the base comprises picking them up with said overhead power lifting tool from a site remote from the base surface below said elevated work site, and moving them through the air, as an assembly in which the lazy tong means is collapsed to make such assembly compact, and then setting such assembly down on said base surface.

5. The method of claim 2, wherein location of said lazy tong means onto said base comprises hinge connecting one lower end portion of said lazy tong means to its end of said base, and wherein the locking of said lazy tong means in an extended position comprises securing the other lower end portion of said lazy tong means to said base, after elevation of the platform.

6. The method of claim 1, further comprising duplicating such steps with a second platform assembly at a location adjacent the first, to locate the second platform at approximately the same height as the first platform, and interconnecting said platforms to provide a continuous elevated work station.

7. The method of claim 6, further comprising providing an auxiliary elevated work station below said platform by interconnecting an auxiliary platform between intermediate portions of said lazy tong means.

8. A rapidly elevatable work platform assembly comprising:

a base;

a work platform above said base;

passive lazy tong means situated between said base and said work platform and comprising two upper end portions and two lower end portions;

means at one end of said base pivotally connecting the lower end portion of the lazy tong means at such end to said base;

slide means mounting the lower end portion of the lazy tong means nearest the opposite end of said base for sliding movement lengthwise along the base during extension and collapse of said lazy tong means;

means at the end of said platform above the first mentioned end of said base pivotally connecting the upper end portion of the lazy tong means at such end to said platform;

slide means mounting the upper end portion of the lazy tong means nearest the opposite end of said platform for sliding movement lengthwise along said platform during extension and collapse of said lazy tong means;

means for holding said lazy tong means in at least partially extended position comprising means for adjustably affixing the lower sliding end portion to said base; and

said lazy tong means comprising a plurality of rigid box sections composed of side members interconnected at their ends by end members spanning between the ends of said side members, and rigidly secured thereto, and a plurality of pairs of connecting members, each pivotally connected at its center to a center of one of the side members of one of the box sections, and at each of its ends to the end portion of a side member of one of the other box sections, inwardly of the end member connection thereto, or to the upper or lower platform, or the upper or lower slide means.

9. The platform assembly of claim 8, further comprising a plurality of guardrail sections for bordering said platform, each having post portions at their intended lower ends, a plurality of post receiving sockets on said platform corresponding in size, number and spacing to the posts on said guardrail sections, and pin means for securing the posts in their sockets.

10. The platform assembly of claim 8, wherein said base is provided with a series of pin element openings, longitudinally spaced therealong, and said means for adjustably affixing said sliding end included a pin element insertable through a lower part of said sliding end portion and a selected one of said pin element openings, such arrangement providing selective positioning of said sliding end portion, and in turn selective height adjustment of said platform.

11. In combination, two closely spaced platform assemblies according to claim 8, with their platforms raised to substantially the same height, and an auxiliary platform bridging between and interconnecting said platform.

12. A rapidly elevatable work platform assembly comprising:

a base;

a work platform above said base;

passive lazy tong means situated between said base and said work platform and including a pair of spaced apart passive lazy tong side structures, each comprising a series of pairs of crossed members pivotally connected together at their middles, and pivotally connected at their ends to the ends of the next pair of such members, and said passive lazy tong means includes members laterally interconnecting and bracing said passive lazy tong side structures;

means at one end of said base pivotally connecting the lower end portion of the lazy tong members at such end to said base;

means mounting the lower end portions of the lazy tong members nearest the opposite end of said base for sliding movement lengthwise along the base during extension and collapse of said lazy tong means; means at the end of said platform above the first mentioned end of said base pivotally connecting the upper end portion of the lazy tong members at such end to said platform;

means mounting the upper end portions of the lazy tong members nearest the opposite end of said platform for sliding movement lengthwise along said platform during extension and collapse of said lazy tong means;

means for holding said lazy tong means in at least partially extended position comprising means for ad-

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justably affixing the lower sliding end portion of said base; and  
 coupler means on said platform for receiving a coupler element of an overhead power lifting device, used to raise said platform and extend said passive lazy tong means.  
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 13. The platform assembly of claim 12, wherein the lazy tong members are of channel form, and the lateral bracing members are also of channel form and are rigidly interconnected between the ends of the inner members of each opposed pair of crossed member pairs.  
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 14. The platform assembly of claim 12, wherein all end portions of at least some of the opposed pairs of relatively upper lazy tong members are situated inwardly of the end portions of the relatively lower lazy tong members to which they are pivotally connected, so that the lazy tongs

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column is wider at bottom than at its top, and its center of gravity is lowered.

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