United States Patent [19]

Spillman

[11] **3,826,334**

[45] **July 30, 1974**

[54] **MOBILE AERIAL PLATFORM**

[76] Inventor: **Robert L. Spillman,** 221 S. Cassady Ave., Columbus, Ohio 43209

[22] Filed: **July 7, 1972**

[21] Appl. No.: **269,811**

[52] **U.S. Cl.** **182/2,** 182/63

[51] **Int. Cl.** **B66f 11/04**

[58] **Field of Search** ..... 182/2, 63, 141; 280/150 G

[56] **References Cited**

UNITED STATES PATENTS

489,628	1/1893	Colleret	280/150 G
1,975,119	10/1934	Oates	280/150 G
2,969,849	1/1961	Grant	182/2
3,016,973	1/1962	Williamson	182/148
3,078,949	2/1963	Hoard	182/2
3,196,979	7/1965	Garnett	182/2
3,283,850	11/1966	Jones	182/2
3,415,339	12/1968	Range	182/2

Primary Examiner—Reinaldo P. Machado

Attorney, Agent, or Firm—LeBlanc & Shur

[57] **ABSTRACT**

The platform includes an upstanding support structure carried by a wheeled vehicle. A boom is pivotally connected at one end to the upper end of the support structure. A platform is pivotally carried by the boom at its opposite end. At least one fluid cylinder connects between the support structure and the boom to raise and lower the boom and platform. A pair of flexible lines are fixed at opposite ends to the support structure sides and the platform, respectively and are reaved over sheaves on the boom whereby the platform is partially supported thereby and maintained in a horizontal position throughout the full range of pivotal movement of the boom. The platform is mounted on a vehicle, for example, a truck, trailer, fork-lift truck, and the like.

14 Claims, 8 Drawing Figures

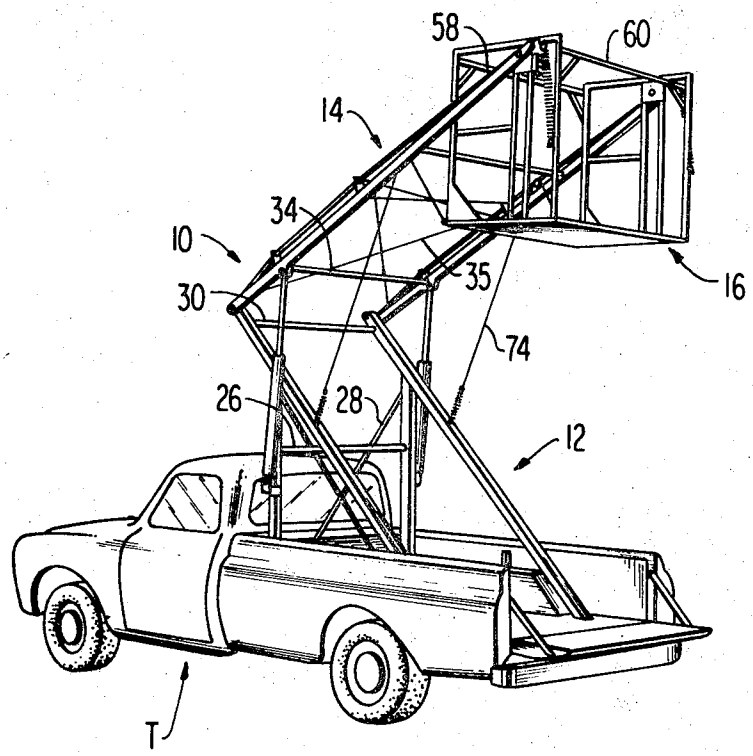
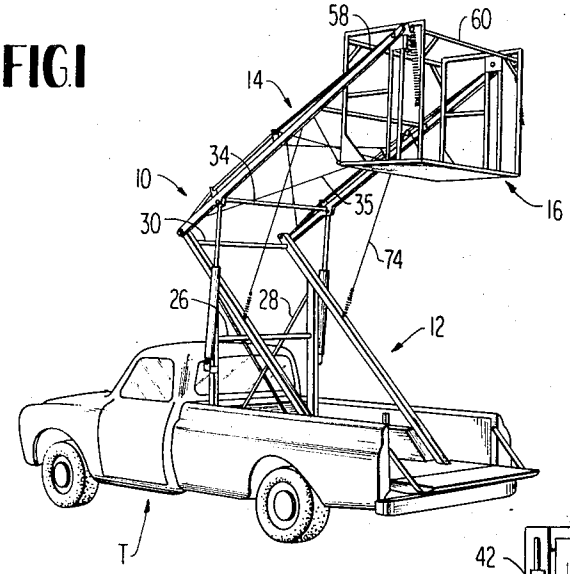


FIG.1



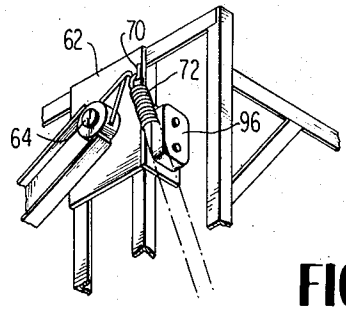


FIG.4

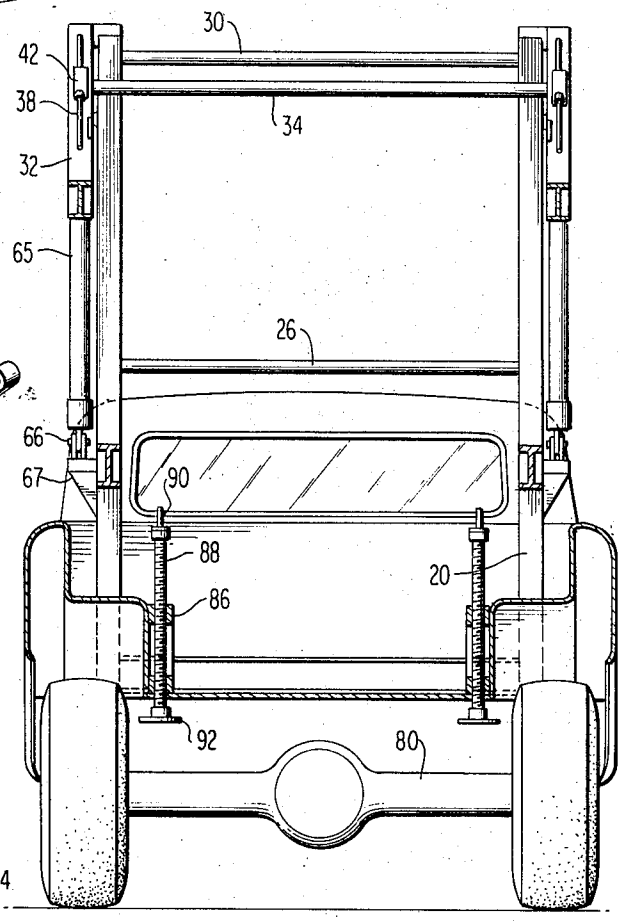


FIG.3

FIG.8

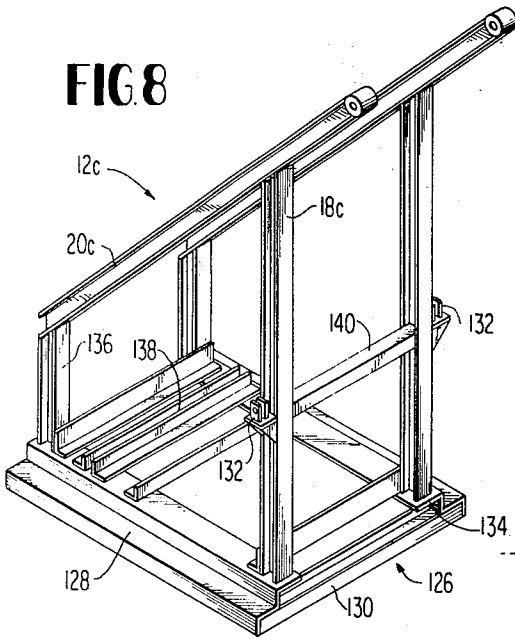


FIG 2

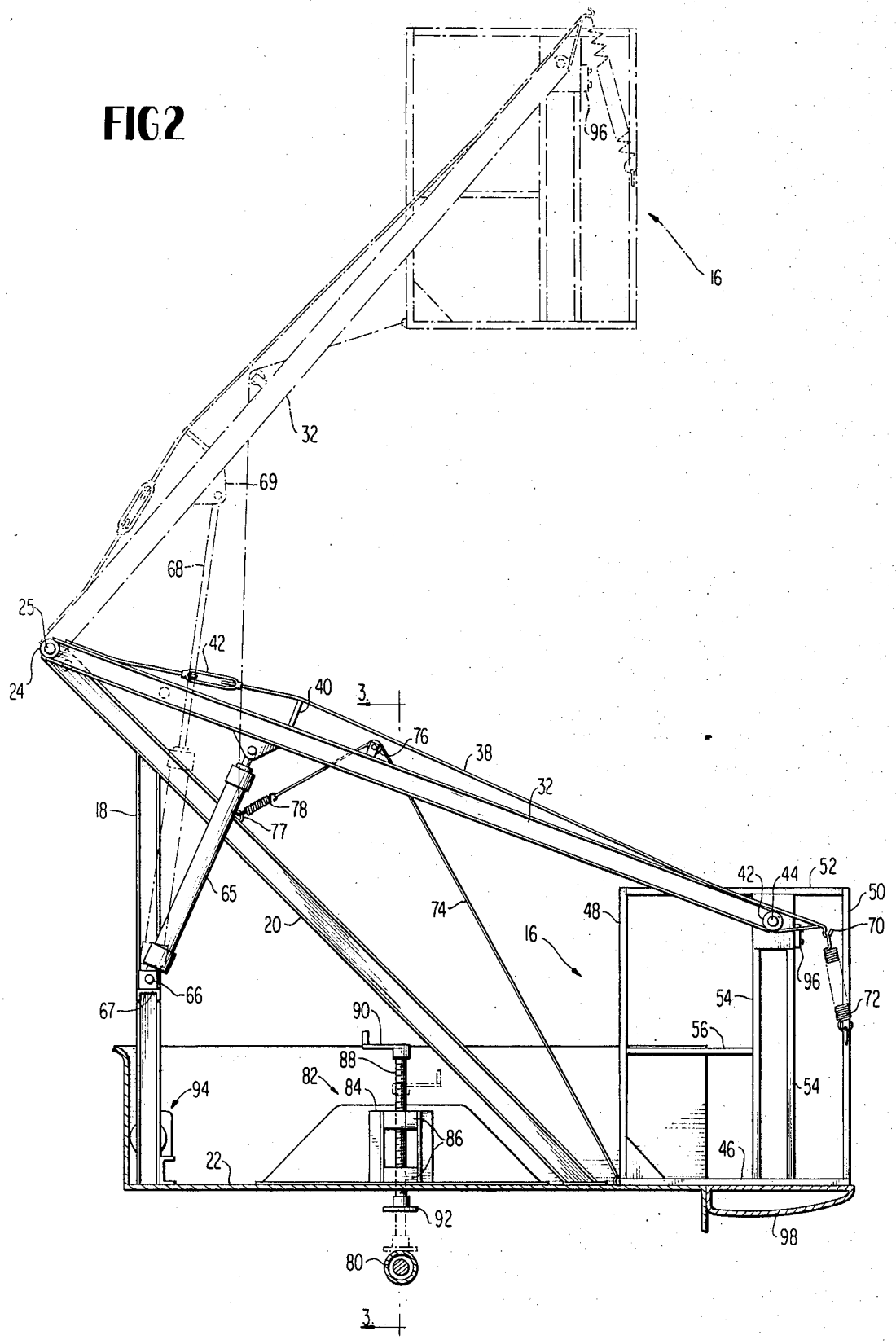
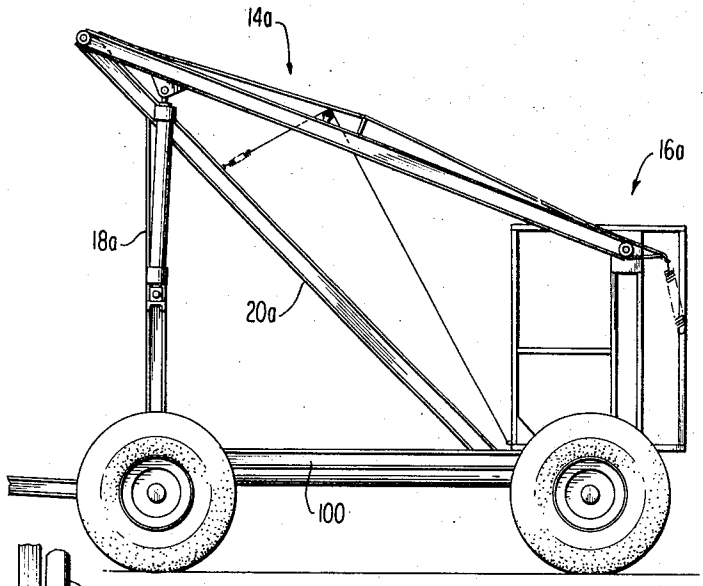

96
16
32
69
68
25
24
42
40
3
76
38
32
18
78
77
65
20
74
48
16
42
44
52
50
70
96
72
54
56
54
46
67
66
90
88
82
84
86
94
22
92
80
98
3

FIG.5



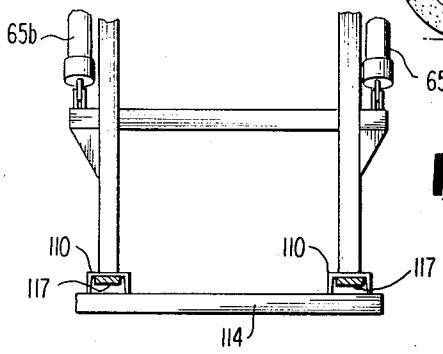


FIG.7

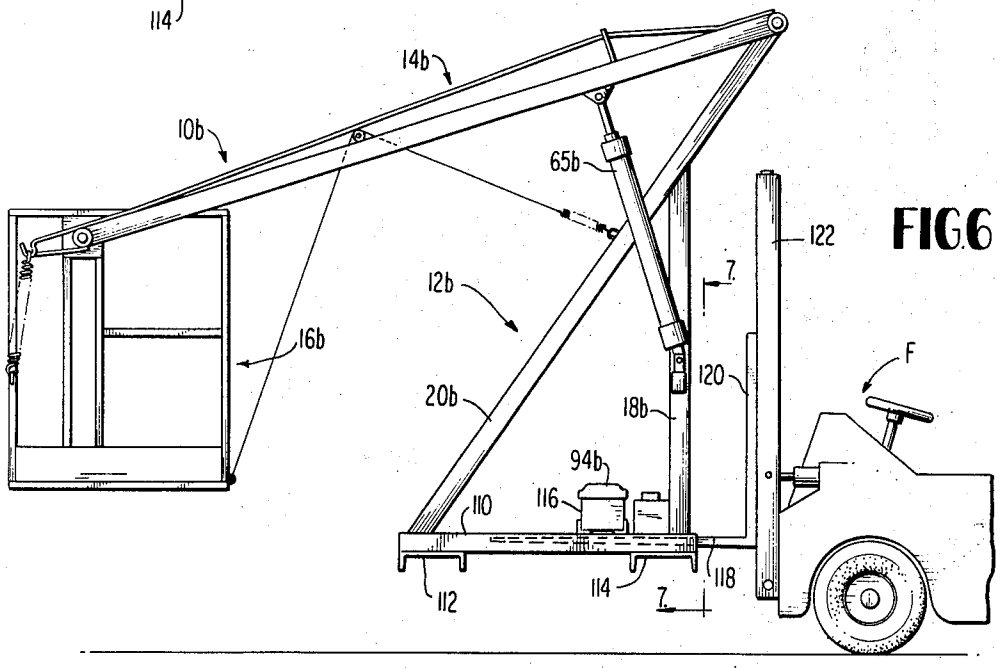


FIG.6

MOBILE AERIAL PLATFORM

The present invention relates to a vehicle mounted elevatable platform and particularly relates to a platform for lifting workmen and/or materials to work areas elevated above ground level.

Devices for lifting men and materials, vehicle mounted or otherwise, are well known. Many such devices, however, are heavy, complicated in construction, expensive and due to their sheer size and bulk do not permit in most instances, use of a vehicle such as a truck for its intended purpose, i.e., for carrying materials etc. That is to say, while many of these lifting devices are mounted on light vehicles, i.e., pickup-type trucks, the lifting devices per se occupy a substantial part of the space in the truck and preclude its use for carrying substantially anything other than the lifting device itself. Furthermore, many of the prior art elevatable platforms require the use of outrigger assemblies for stabilizing the platform particularly when it is elevated to its maximum height. While outriggers are effective to stabilize the platform, they have the disadvantage of preventing movement of the vehicle on which the elevatable platform is mounted. In other words, it is necessary to disengage the outriggers prior to moving the vehicle and this normally entails lowering the platform before the vehicle is moved to another position. Still further, many prior devices of this type utilize complicated linkages and power-assisted assemblies for maintaining the platform level throughout its range of elevation, all of which add to the size and cost of the vehicle.

Moreover, prior lifts of this type are normally designed for a specific installation, i.e., in a specified type and size of truck. These designs are not readily adapted to other types of vehicles nor provide for any interchangeability of parts.

The present invention provides an elevatable platform adapted for mounting on a vehicle which minimizes and/or eliminates the above-noted and other disadvantages of prior vehicle-mounted platforms and provides a novel and improved vehicle-mounted elevatable platform having various advantages in construction, mode of operation, and use in comparison with such prior platforms. Particularly, the present invention provides an upstanding support structure comprised principally of a pair of upstanding generally triangular frames spaced laterally one from the other and adapted at its base for securement to a vehicle. In one embodiment of this invention, the frames are secured to the bed of a pickup truck. In another embodiment, the frames are secured to a base having channel-shaped elements for receiving the tines of a fork-lift whereby the platform is mountable on a fork-lift truck. The upper ends of the support structure pivotally mount one end of a boom which pivotally carries a platform at its opposite end. One or more cylinders are pivotally coupled between the support structure and the boom whereby the platform can be selectively raised and lowered.

Further, the platform is pivotally carried by the boom about an axis offset rearwardly of the center of gravity of the platform. To maintain the platform level at each elevation, the present invention provides a pair of cables connected at one end to the support structure and at their opposite end to the lower forward edge of the pivoted platform and forwardly of the center of gravity

of the platform. The cables are reaved over sheaves carried by the movable boom. Coil springs connect between boom extensions and the rear ends of the platform on the rearward side of its pivotal axis. The platform is thus tensioned between the spring and the cables at each elevation of the platform whereby it is maintained substantially level at each elevation thereof. Moreover, the cables are located at predetermined positions along the boom, support structure and platform as to remain substantially constant in length as the platform is raised and lowered. The foregoing arrangement of the cables, springs and offset pivotal mounting for the platform also reduces the moment about the cylinders and permits use of smaller cylinders than would otherwise be the case.

It is a feature of the present invention that the platform hereof, when mounted on a pickup-type truck, occupies such minimum space that over 90 percent of the normal usable space in this type of truck remains available for carrying materials, tools and the like. To accomplish this, the fluid pumps and associated equipment are mounted at the front of the vehicle bed. Also, the platform per se, in this embodiment hereof, is formed of a substantially open frame. Moreover, the support frames are mounted along opposite sides of the truck. Accordingly, when the platform lies in its lowermost position adjacent the end of the truck overlying the open tailgate, the bed of the pickup truck is readily accessible through the open platform and remains substantially free for the storage of materials and the like as desired.

It is a further feature hereof that the vehicle on which the platform is mounted in one embodiment hereof carries a device for bypassing the suspension of the vehicle whereby the support structure is rigidly mounted on the vehicle wheels for stabilization while simultaneously the vehicle is permitted to be moved if desired. Particularly, the vehicle is provided with a pair of rods threaded to the vehicle frame. The rods carry a support at their lower ends for engagement with the rear axle of the vehicle. Under normal conditions of road travel, the support is spaced from the axle. When it is desired to bypass the vehicle suspension, the rods are threaded downwardly such that the support bears against the axle and raises the vehicle frame sufficiently to support the platform directly from the axle. Thus, swaying of the platform due to the vehicle suspension is entirely eliminated. Also, the vehicle is free for travel on its wheels with the platform elevated whereby the location of the platform relative to a work area can be changed in a minimal time and safety.

It is a still further feature that an embodiment of the present invention permits the elevatable platform to be mounted on a fork-lift truck whereby the combined elevating capacity of the platform and fork-lift are achieved. To this end, the support frames mounted on a base have channel-shaped slots for receiving the tines of a fork-lift truck. The fluid pumps and ancillary equipment therefor are carried on the base. Thus, the overall height capacity of the fork-lift truck is increased by the height capacity of the platform. Moreover, with the foregoing described base, the platform is readily mounted on and demounted from the fork-lift truck whereby the additional capacity of the platform can be obtained as desired.

Accordingly, it is a primary object of the present invention to provide a novel and improved vehicle-mounted aerial platform.

It is another object of the present invention to provide a vehicle-mounted aerial platform wherein the platform and its supporting structure and elevating devices are designed to minimize the space occupied thereby and to maximize the usable space available in the truck with the platform carried thereby for carrying materials, tools and the like.

It is still another object of the present invention to provide a vehicle-mounted aerial platform wherein the platform deck is maintained in a substantially horizontal position throughout its full range of movement by a pair of cables connected at predetermined locations along the platform support structure and which cables also support a part of the load carried by the platform.

It is a further object of the present invention to provide a novel and improved truck-mounted aerial platform including a device for bypassing the suspension of the truck and thereby supporting the platform directly from the axle of the truck and eliminating instabilities caused by the truck suspension.

It is a related object of the invention to provide a mobile platform having the foregoing characteristics which is electrically insulated from ground.

It is a still further object of the present invention to provide a novel and improved vehicle-mounted aerial platform which is selectively mountable on a fork-lift truck whereby increased elevations are obtainable, together with valuable horizontal reach possibilities.

It is a related object of the present invention to provide a novel and improved vehicle-mounted aerial platform which is simple and inexpensive in construction, light in weight, reliable in service, safe, requires no set-up time, and utilizes electrical systems conventionally provided the vehicles on which the platform is mounted or systems which maybe self-contained as desired.

These and further objects and advantages of the present invention will become more apparent upon reference to the following specification, appended claims and drawings wherein:

FIG. 1 is a perspective view of an aerial platform constructed in accordance with the present invention and mounted on a pickup-type truck;

FIG. 2 is an enlarged cross sectional view of the aerial platform and portions of the truck illustrated in FIG. 1 with the platform illustrated in elevated and lowered positions.

FIG. 3 is a cross sectional view thereof taken generally about on line 3—3 in FIG. 2;

FIG. 4 is a fragmentary enlarged perspective view of the tip of the boom illustrating the pivotal mounting for the platform;

FIG. 5 is a side elevational view of an aerial platform constructed in accordance with the present invention and mounted on a trailer;

FIG. 6 is a side elevational view of an aerial platform constructed in accordance with the present invention specifically adapted for use with a fork-lift-type truck;

FIG. 7 is a cross sectional view thereof taken generally about on line 7—7 of FIG. 6; and

FIG. 8 is a perspective view of a still further form of aerial platform hereof specifically adapted for use in conjunction with a fork-lift truck.

Referring now to the drawings, particularly to FIG. 1, there is illustrated an aerial platform generally designated **10** and mounted on a truck T. Platform **10** comprises a base support structure generally indicated **12** carrying a boom generally indicated **14**, the end of which pivotally carries a platform **16**. Base structure **12**, as best illustrated in FIG. **2**, includes a pair of laterally spaced side frames each including an upstanding support **18** and an upwardly inclined support **20**, supports **18** and **20** being suitably secured at their lower ends to the truck bed **22**. Thus, the support **20** in each side frame forms the hypotenuse of a generally right triangle which, in the embodiment illustrated in FIGS. **1–4**, includes, as one of its lower legs, the truck bed **22**. Each support **20** is suitably secured to the upper end of the corresponding support **18** and extends forwardly thereof terminating in a hub **24** for pivotally mounting the boom **14** described hereinafter. Support structure **12** includes a support **26** between upright supports **18** as well as crossed tensioned rods **28**. For reasons hereinafter noted, the area between the triangular side frames is open and without cross-bracing, the upper end of supports **20** being provided a cross support **30**. Supports **18** and **20** as well as various of the other support structure described herein may comprise I-beams.

Boom **14** comprises a pair of laterally spaced support arms **32** pivotally coupled at their forward ends about pins **25** received in hubs **24** on supports **20** and also in hubs **37** formed on the ends of arms **32**. Support arms **32** are suitably cross-braced at spaced locations by transverse braces **34** and crossed tensioned rods **35**. Boom **14** is thus a substantial rigid integral structure. Along the top of each arm **32** there is provided a truss rod **38** spaced above arm **32** by a torsion rod brace **40**. A turnbuckle **42** is also provided each rod **38** whereby the rods are maintained under tension providing additional strength to the boom **14**. The distal ends of support arms **32** terminate in hubs **42** for receiving pins **44** also carried by the platform **16** whereby platform **16** is pivotally carried at the tip of boom **14**.

Platform **16** is comprised of a lower deck **46** having upstanding sides including front and rear uprights **48** and **50**, respectively, a longitudinally extending member **52** connecting the upper ends of uprights **48** and **50**, a pair of closely spaced uprights **54** spaced closer to rear upright **50** that to front upright **48**, and a cross brace **56**. The sides, are, in turn, secured one to the other by transversely extending front and rear braces **58** and **60**, respectively, secured at the upper ends of front and rear uprights **48** and **50**. For reasons previously noted, the platform is substantially open in a front to rear direction between the sides thereof without any cross-bracing except transverse braces **58** and **60**. Adjacent the upper end of each pair of intermediate uprights **54**, there is provided a support bracket **63** for carrying the pin **44** received in hubs **42** on arms **32**, pins **44** being suitably secured in place as desired. As noted from the drawings, the pivotal axis of platform **16** is located rearwardly of its center of gravity and this is advantageous, as set forth hereinafter, in the system for maintaining the platform level at each elevation thereof and in reducing the moment about the cylinder whereby cylinders of less capacity may be utilized.

To pivot boom **14** relative to support structure **12**, there is provided on each side thereof a fluid actuated cylinder **65** pivotally coupled at one end as at **56** to sup-

port bracket **67** mounted on upstanding support **18.** The piston rod **68** of cylinder **65** is pivotally connected at its distal end to a bracket **69** mounted on the underside of support arm **32.** It will be appreciated that extension and retraction of the piston rods **68** relative to the cylinders **65** displaces boom **14** upwardly or downwardly, respectively, carrying platform **16** therewith. Note that the pistons and cylinders are located on the outside of the side support frame thus leaving the space between the support frames unencumbered.

The motor, pump and fluid reservoir for operating the cylinders **65** are indicated **94** and are located toward the front end of truck bed **22** between upright supports **18.** The pumps are connected through suitable fluid lines, not shown, to the cylinders and it will be appreciated that the cylinders are operated in a conventional manner. Also, the controls for raising and lowering the platform are preferably located on platform **16** as indicated at **96.**

To maintain the platform deck **46** level throughout the full range of elevation of platform **16,** the truss rod **38** on each arm **32** is extended beyond the hub **42** and shaped to provide a hook **70.** One end of a coil spring **72** is received over the hook and its opposite end is coupled to the rear upright **60.** In the lowermost position of the platform and hence least extended condition of the springs **72,** platform **16** is biased by springs **72** for movement about hubs **40** in a counterclockwise direction as illustrated in FIG. **2.** To preclude the pivotal movement of platform **16** and to maintain platform deck **46** substantially level at all elevations thereof, there is provided on each side of the device a cable **74** connected at one end to the lower and rearmost part of platform **16,** i.e., connected along the rear edge of deck **46** on one side thereof. Each cable **74** is reaved over a pulley **76** carried on support arm **32** and is connected at its opposite end to an eyelet **77** on support **20.** A spring **78** forms a part of the cables and serves to absorb various shock loadings imposed on the platform during use.

Accordingly, with the foregoing described structure, it will be seen that the platform **16** is tensioned between the springs **72** and cables **74.** That is, with the platform in the lowermost postion, the springs **72** are chosen such that a light force tending to rotate the platform **16** about its pivotal axis is provided, i.e., 100 lbs. This force is counteracted by a like force tensioning cables **74.** It has been discovered that, by locating the cable connections at predetermined locations along the base structure, boom and platform, a constant length of each cable may be provided for maintaining the platform substantially level for each elevation thereof. For example, as the platform is raised, each cable portion between pulley **76** and eyelet **77** increases in length in an amount corresponding to the decrease in length of the cable portion between pulley **76** and the lower rear edge of platform **16.** The locations of the cables along the base structure, boom and platform are thus critical and may be found by applying the following equation;

$$l_1 + l_2/w = [r^2 + s^2 - 2rs/\sqrt{2}\,(\cos\theta - \sin\theta)]^{1/2} + \sqrt{2}\,[1 - \cos(\theta - \alpha)]^{1/2}$$

where

l_1 and l_2 = the lengths of cables **74** respectively between eyelet **77** and pulley **76** and between pulley **77** and lower forward edge of platform **16** at the highest elevation of the platform, the sum of which remains a constant;

w = the distance between the pivotal axis of the platform and pulley **76;**

r = the ratio of the distance between the pivotal axis of the boom and the point of connection of the cables to the support structure to the distance between the point of connection of the cables to the boom and the pivotal connection between the boom and platform;

s = the ratio of the distance between the pivotal connection of the boom and the support structure and the pulley **76** to the distance between the point of connection of the cables to the boom and the pivotal connection between the boom and platform;

θ = the angle the boom makes with the horizontal at an elevated position thereof

α = the included angle formed by a line extending from the pivotal connection of the platform and boom to the point of connection of the cable with the platform and the horizontal.

Accordingly, from the above, it will be appreciated that a proper choice of r and s maintains the change in $l_1 + l_2/w$ to less than one-tenth radians. An illustrated choice of such ratios is $r = 0.95$ and $s = 1.6$.

Furthermore, it will be appreciated from a review of FIG. **2** that the force exerted by the springs tending to rotate platform **16** in a counterclockwise direction increases as the platform increases in elevation. This increasing force is, of course, counteracted by increasing tension in cables **74.** The tensioned cables **74** thus carry part of the loadings imposed on the boom by the weight of the platform **16** and the men and materials carried thereby. The load transferred to the cable acts on the boom at a location closer to the connection between the boom and piston rods **68** than the pivotal axis of the platform relative to the boom thereby reducing the moment about the piston rods. This, in turn, permits a reduction in the capacity of the cylinders utilized than would otherwise be the case.

It will be appreciated that the raising of workmen, tools and/or material at various elevations above truck T, for example, to the height illustrated by the dashed lines at FIG. **2,** may cause the truck and platform **14** to sway in a lateral direction or become generally unstable. This instability is, in part, due to the flexibility of the suspension system normally employed by a truck of this type, i.e., leaf suspension springs. To eliminate this instability, there is provided in accordance with the present invention a device for directly supporting the truck and platform carried thereby from the wheel axles whereby the weight of the truck platform is transferred from the suspension system to the axle and hence directly to the ground through the truck wheels.

To this end, there is illustrated at **80** in FIGS. **2** and **3** a wheel axle and a device generally indicated **82** for transferring the truck and platform weight directly to the axle bypassing the truck suspension system. The device **82** includes on each side of the truck a bracket **84** which mounts a pair of internally threaded supports **86** which receive a vertically extending screw rod **88.** The top of rod **88** mounts a handle **90** while its lower end carries a pad **92** for bearing on axle **80.** Upon rotation of rod **88,** the pad **92** is raised or lowered into and out of engagement with axle **80.** Thus, during normal use of the truck, that is, when the truck is en route to a worksite, screw rods **88** are threaded such that pads **92**

are spaced well above the wheel axle **80** whereby the truck is conventionally carried on its suspension. Upon arrival at the worksite, rods **88** are threaded to engage pads **92** against axle **88** thereby limitedly lifting the truck and transferring its weight and the weight of the platform from the suspension system directly to the axis and wheels. Note that this transfer does not inhibit movement of the truck and it is a significant feature hereof that the truck can be moved while stabilized in the manner set forth. This is particularly significant where only a few feet of movement is required as it obviates any necessity to lower the platform in order to move the platform very short distances.

In utilizing the aerial platform hereof, the truck, of course, is driven to the job site with the pads **92** spaced from axle **80.** It will be noted from a review of FIG. **3** that the truckbed **22** is substantially open when the platform is in its lowermost position resting on the rear end of bed **22** and the lowered tailgate **98.** Since the area between the platform is substantially unencumbered and since the support structure **12** for the platform hereof is located adjacent opposite sides of truck bed **22,** the bed per se is available for carrying materials, tools, and the like with very little, if any, interference from the platform. At the job site, the screw threaded rods **88** are threaded in brackets **86** whereby pads **92** are lowered to engage axle **80** and the weight of the truck and platform is transferred directly to the axle bypassing the conventional truck suspension. The workmen may then step onto the platform deck **46** and/or load it with tools, materials and the like. By manipulating controls **96** pistons **68** are extended from cylinders **65** whereby boom **14** is pivoted about hubs **24** to the desired elevation. The controls, of course, may be located at the base of the platform if desired. It will be noted that throughout this elevation, the platform deck is maintained substantially horizontal by means of the constant length wires **74** and springs **72** irrespective of platform elevation. As will be appreciated from a review of FIG. **2,** a shifting of the weight of the workmen and/or materials on the platform to the rearmost edge of deck **46** is counterbalanced by springs **72.** In any shift of weight or workmen, materials, tools, or the like toward the front of the platform, platform deck **46** is restrained from pivoting into a non-horizontal position by the constant length wires **74.** A snoted previously, the truck can be advanced or moved backwards when the platform is elevated and without transferring the weight of the truck, platform and men and/or materials carried thereby back onto the truck suspension system. That is, the truck can be moved forwardly or backwards while pads **92** engage axle **80.** Obviously, for those jobs located at minimum elevation, the suspension bypass system **82** need not be utilized.

Like parts in the following embodiments of the present invention illustrated in FIGS. **5, 6-7** and **8** are respectively designated with like numerals as in the prior embodiment hereof illustrated in FIGS. **1–4** with the letters *a* succeeding the reference numerals.

Referring now to the embodiment hereof illustrated in FIG. **5,** an aerial platform constructed in accordance with the present invention is mounted on a trailer rather than a truck. Boom **14***a* and platform **16***a* are identical in all respects as previously described in the previous embodiment. In this form, however, the lower ends of supports **20***a* and upright supports **18**a are connected directly to a trailer frame designated **100.**

Referring now to the embodiment hereof illustrated in FIGS. **6–7,** there is disclosed an aerial platform generally designated **10***b* specifically adapted for use in conjunction with a forklift truck whereby the elevations achieved by the platform and fork-lift truck separately are combined to obtain significantly greater heights than when utilized separately. To accomplish this, boom **14***b*, raising and lowering mechanism **65***b*, platform **16***b*, are identical in all respects to the respective boom **14,** platform **16,** and mechanism **65** disclosed in the first described embodiment. The support base **12***b*, however, is comprised of a pair of channel-shaped members **110** spaced laterally one from the other. Channels **110** are in turn mounted on front and rear channels **112** and **114** whereby channels **110, 112,** and **114** form a substantially rectangular frame. The lower ends of legs **20***b* are secured to the rear ends of channels **110** while the lower ends of upright supports **18***b* are secured at the forward ends of channels **110.** The power package **94***b* for operating the platform may be carried on forward channel **114** and a suitable cross brace **116.**

It will be appreciated that with the foregoing described rectangular base structure, the channels **110** and **114** form a pair of laterally spaced longitudinally extending slots **117** (FIG. **7**) for receiving the tines **118** of a motorized fork-lift truck generally designated F. The fork-lift is of conventional construction and the tines are carried by a carriage **120** supported for vertical movement on a pair of upstanding guides **122.** In use, the platform **106** can be stored in any out-of-the-way position. When it is desired to utilize the greater height capacity of the combined fork-lift and platform arrangement hereof, the fork-lift F is driven to the location of the platform and the tines **118** inserted into the slots of the base structure. The fork-lift F is then moved to the work area and the carriage **120** and the entirety of the platform **10***b* carried thereby are elevated along guides **122** in a conventional manner. Platform **16**b is then also elevated by actuation of cylinders **65***b*. Thus, in this manner, the height capacity of a conventional fork-lift truck is advantageously augmented without diminution of its normal capabilities since the platform can be readily mounted on and demounted from the tines of the fork-lift.

Referring now to FIG. **8,** there is illustrated a further form of platform **10***c* specifically adapted for use with a fork-lift truck in a manner similar to the embodiment illustrated in FIGS. **6** and **7.** In this form, the boom, platform and raising and lowering mechanism for the boom are substantially the same as described with respect to the previous embodiments and therefore are not specifically described or illustrated. However, the base structure **12***c* is modified to provide a more compact unit. To this end, base structure **12***c* includes a substantially rectangular base **126** comprised of longitudinally extending side members **128** interconnected at their front and rear ends by channels or braces **130.** Side members **128** have inwardly directed flanges **132** which define with braces **130** longitudinally extending laterally spaced slots **134** for receiving the tines of the fork-lift truck. The members **128** are short as compared with members **110** in the previous embodiment. Also, upstanding support **20***c* is supported at its lower end in spaced relation from base structure **126** by a pair of uprights **136.** Suitable cross-bracing is provided between members **128** as indicated at **138** and also be-

tween the uprights 18c as indicated at 140. Thus, the foreshortening of the base in this embodiment provides a very compact unit occupying a minimum amount of space when not in use.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. An aerial platform for mounting on a vehicle comprising an upstanding support structure, a boom pivotally carried at one end by said support structure, a platform pivotally carried by said boom adjacent its opposite end and having a deck for carrying a load, means carried by said support structure and coupled to said boom for pivoting the latter thereby to raise and lower said platform relative to said support structure, and means coupled between said support structure, said boom and said platform for maintaining said deck in a substantially horizontal position throughout the range of pivotal movement of said boom relative to said support structure, said coupling means including a flexible line connected at one end to said base structure and extending therefrom continuously for connection at its opposite end to said platform, a sheave carried by said boom, an intermediate portion of said line being reeved about said sheave, whereby the portion of the line between the sheave and said platform decreases in length and the portion of the line between the sheave and said base structure increases in length in response to pivotal movement of said boom in a direction to raise said platform.

2. A platform according to claim 1 wherein said line carries a part of the load carried by said aerial platform, said line remaining substantially constant in overall length throughout the full range of pivotal movement of said boom.

3. A platform according to claim 1 wherein said platform is pivotally connected to said boom adjacent the upper end of said platform, said platform deck forming a leg of a right triangle with the other leg extending from said upper pivotal connection to said platform deck and the hypotenuse extending from the pivotal connection to the connection of said line to said platform.

4. A platform according to claim 1 wherein said pivoting means includes at least one fluid-actuated cylinder having opposite ends pivotally coupled to said base structure and said boom.

5. A platform according to claim 1 wherein said platform is pivotally connected to said boom adjacent the upper end of said platform, said latter pivotal connection lying on one side of the center of gravity of said platform, said line being connected to said platform on the other side of said gravity whereby said line carries a part of the load carried by said platform, said line remaining substantially constant in overall length throughout the full range of pivotal movement of said boom.

6. A platform according to claim 5 including a spring connecting between said boom and said platform biasing the platform for movement about its pivotal connection with said boom in a direction to make said line taut.

7. A platform according to claim 1 mounted on a vehicle having a body, means for securing said support structure to said vehicle body, a suspension for said vehicle, wheels carried by said suspension, and means carried by said vehicle for selectively bypassing said suspension and rigidly coupling said support structure to said wheels.

8. A platform according to claim 7 wherein said wheels are carried by an axle, said suspension including a spring between said support structure and axle, said bypassing means including a support rod movable between a first position spaced from said axle and a second position engageable with said axle, said vehicle being movable on said wheels when said rod lies in either of said positions.

9. A platform according to claim 1 wherein said support structure has a base, said base having a pair of laterally spaced generally longitudinally extending slots for receiving the tines of a fork-lift.

10. A platform according to claim 9 wherein said base comprises a pair of inverted channel-shaped members, cross bracing between said inverted members, and means spanning the underside of said channel-shaped members for retaining said base on the tines.

11. A platform according to claim 1 wherein said support structure includes a pair of laterally spaced frames, said boom including a pair of framing elements respectively pivotally connected at one end to said frames, cross bracing between said elements, said platform being pivotally connected to the opposite end of said elements and lying therebetween, said pivoting means including a fluid actuated cylinder pivotally coupled between the frame and boom element on opposite sides of the platform, said coupling means between said boom and said base structure including a pair of flexible lines respectively connecting at one end said frame and extending continuously for connection at their opposite ends to said platform on opposite sides thereof, a sheave carried by each of said elements, intermediate portions of said lines being reeved about said sheaves respectively whereby the portion of the line between said sheave and said platform on each of the opposite sides thereof decreases in length and the portion of the line between said sheaves and said frame on each of the opposite sides of said platform increases in length in response to pivotal movement of said elements in a direction to raise the platform.

12. A platform according to claim 11 wherein the ends of said elements extend beyond the pivotal connection between said elements and said platform, springs connecting between said element and said platform biasing said platform for pivotal movement in one direction, said lines being connected to said platform at a location whereby said lines are tensioned by said springs.

13. A platform according to claim 12 wherein said lines carry a part of the load carried by said platform, said lines remaining substantially constant in overall length throughout the full range of pivotal movement of said boom.

14. A platform according to claim 13 mounted on a vehicle having a bed defined by upstanding side walls, said support structure being mounted adjacent the forward end of said truck with said platform in its lowermost position overlying said bed at the open rear end of the truck, said platform being defined by upstanding side supports and a deck extending between the lower ends of said side supports and a substantially open framework whereby access to said bed is available through the open framework of said platform.

* * * * *

PO-1050
(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,826,334 Dated July 30, 1974

Inventor(s) Robert L. Spillman

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In Col. 7, line 46, "A snoted" should read --As noted--.

In Col. 8, line 31, "platform 106" should read -- platform 10b --.

Signed and sealed this 3rd day of December 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents