United States Patent [19]

Balogh

[11] **3,752,328**

[45] **Aug. 14, 1973**

[54] **MOBILE DERRICK**

[75] Inventor: **Roy Balogh,** Ladue, Mo.

[73] Assignee: **McCabe-Powers Body Company,** St. Louis, Mo.

[22] Filed: **Nov. 9, 1971**

[21] Appl. No.: **197,033**

Related U.S. Application Data

[62] Division of Ser. No. 835,445, June 23, 1969, Pat. No. 3,643,815.

[52] **U.S. Cl.** ..... **212/145,** 212/59 R, 280/106 R

[51] **Int. Cl.** **B66c 23/62**

[58] **Field of Search** ..... 212/145, 59, 8; 214/75 H; 280/106 R

[56] **References Cited**

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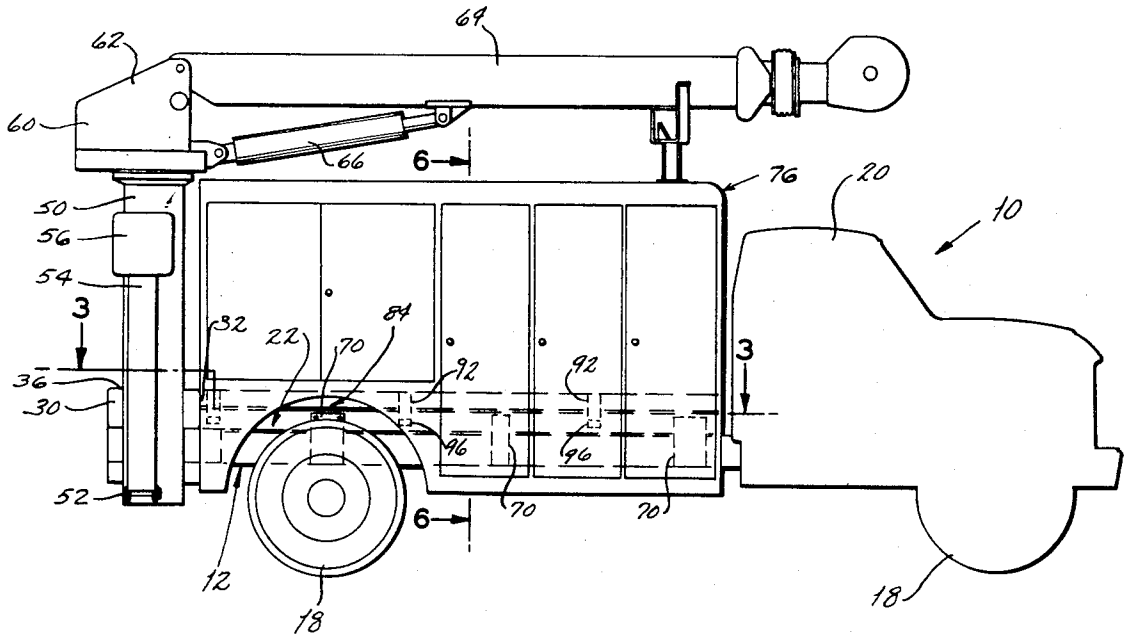
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Primary Examiner—Harvey C. Hornsby
Assistant Examiner—Merle F. Maffei
Attorney—John D. Pope

[57] **ABSTRACT**

A mobile derrick includes a chassis frame and a mast frame having a rectangular front section rigidly mounted on the chassis frame. A mast is rigidly secured to the mast frame by means of a cross-beam provided at one end of the rectangular front section such that the mast extends upwardly therefrom for supporting a derrick at its upper end. A body is mounted over the chassis frame in a manner which permits it to be free from rigid connection with the mast so as to allow the mast, mast frame, and chassis frame to deflect independently of the body.

18 Claims, 9 Drawing Figures



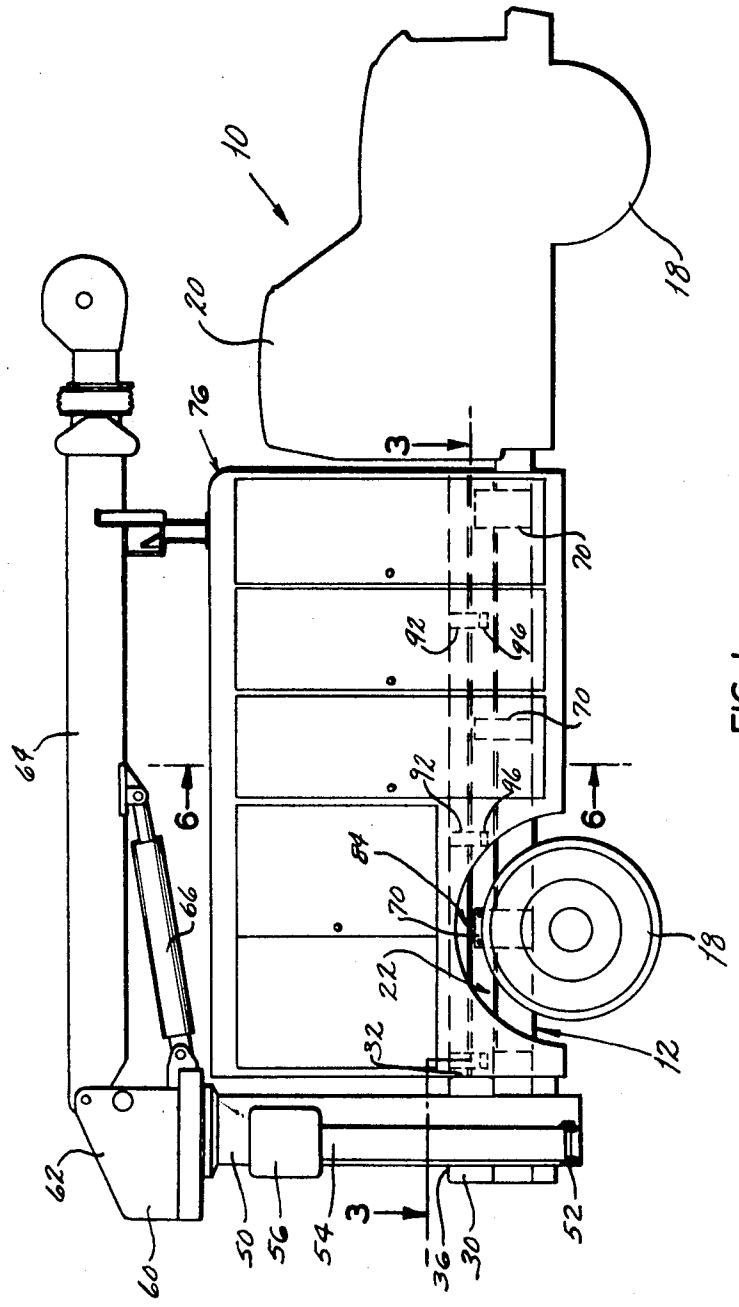

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FIG. 1

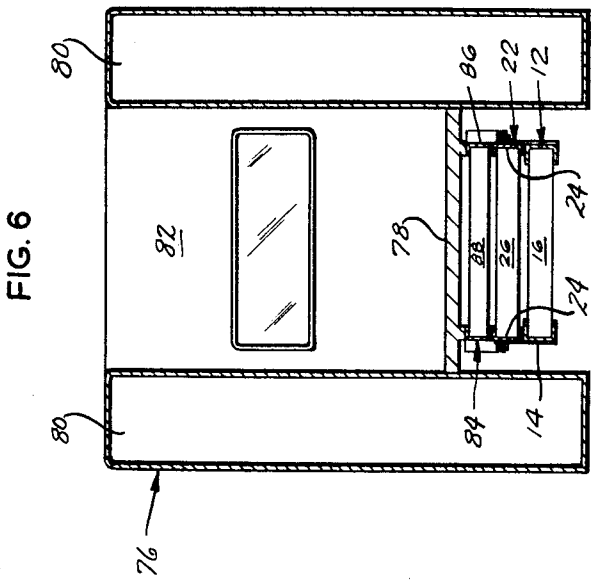

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FIG. 6

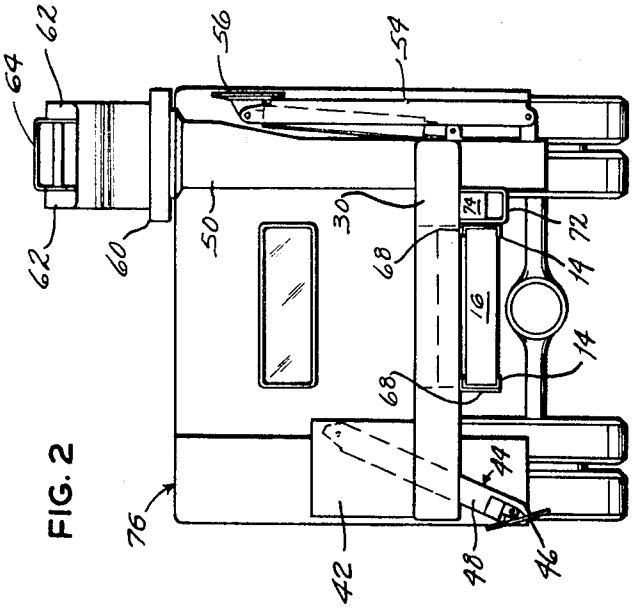

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FIG. 2

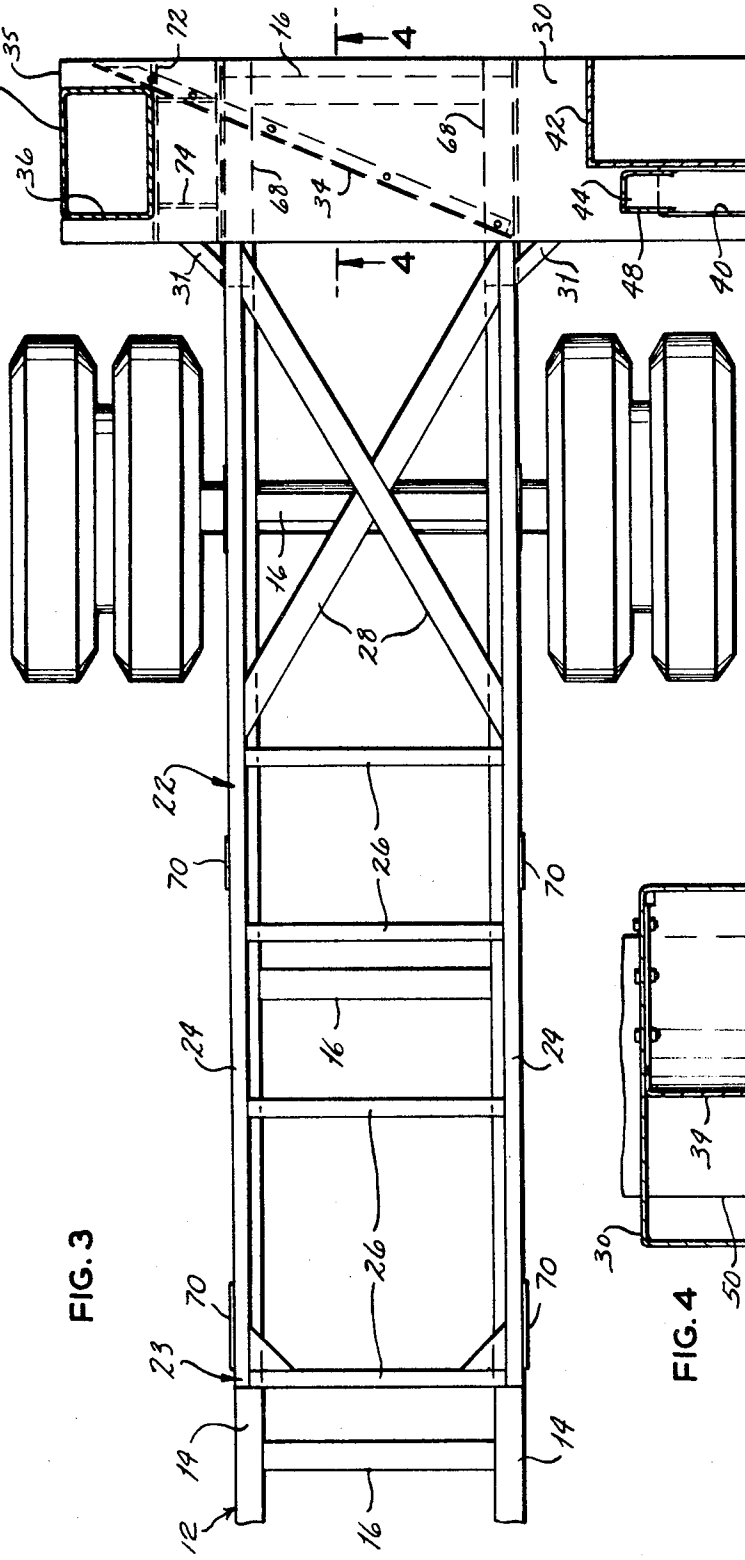

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FIG. 3

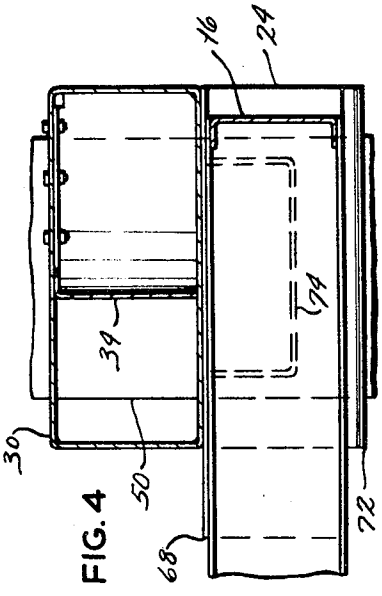

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FIG. 4

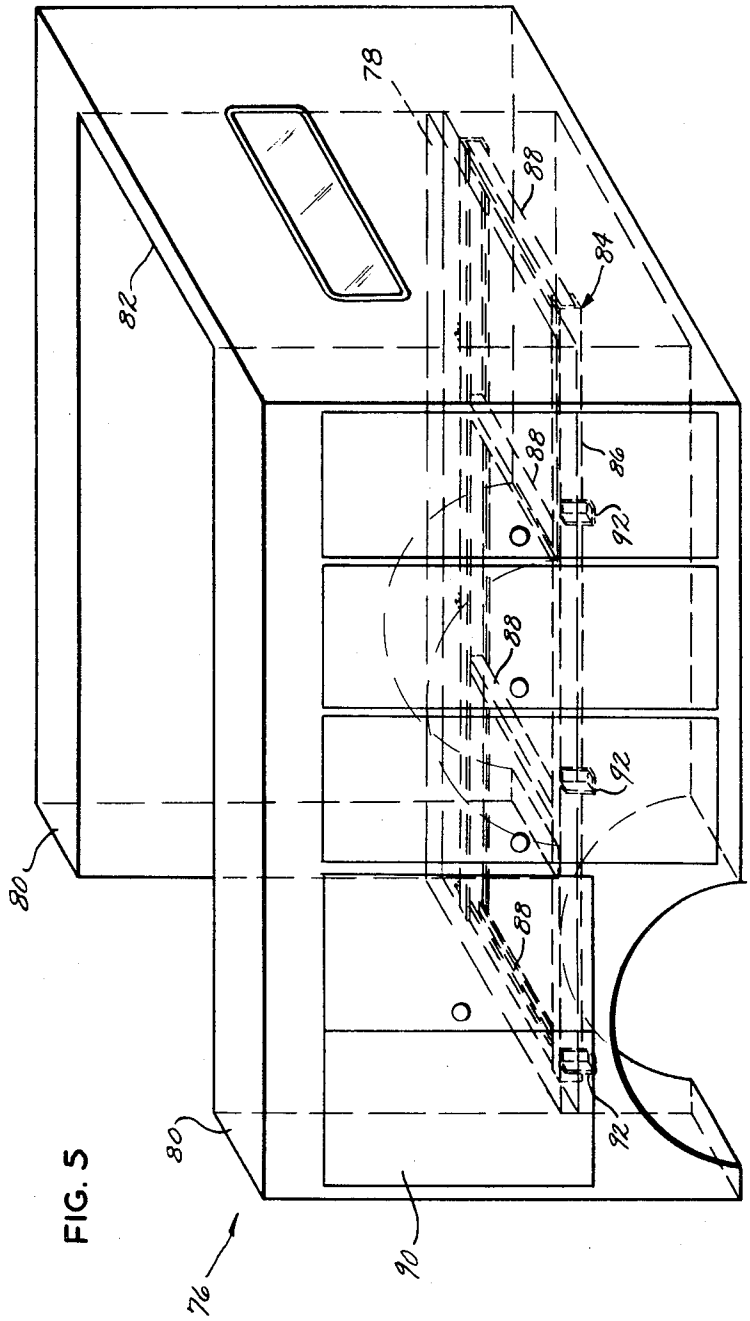


FIG. 5

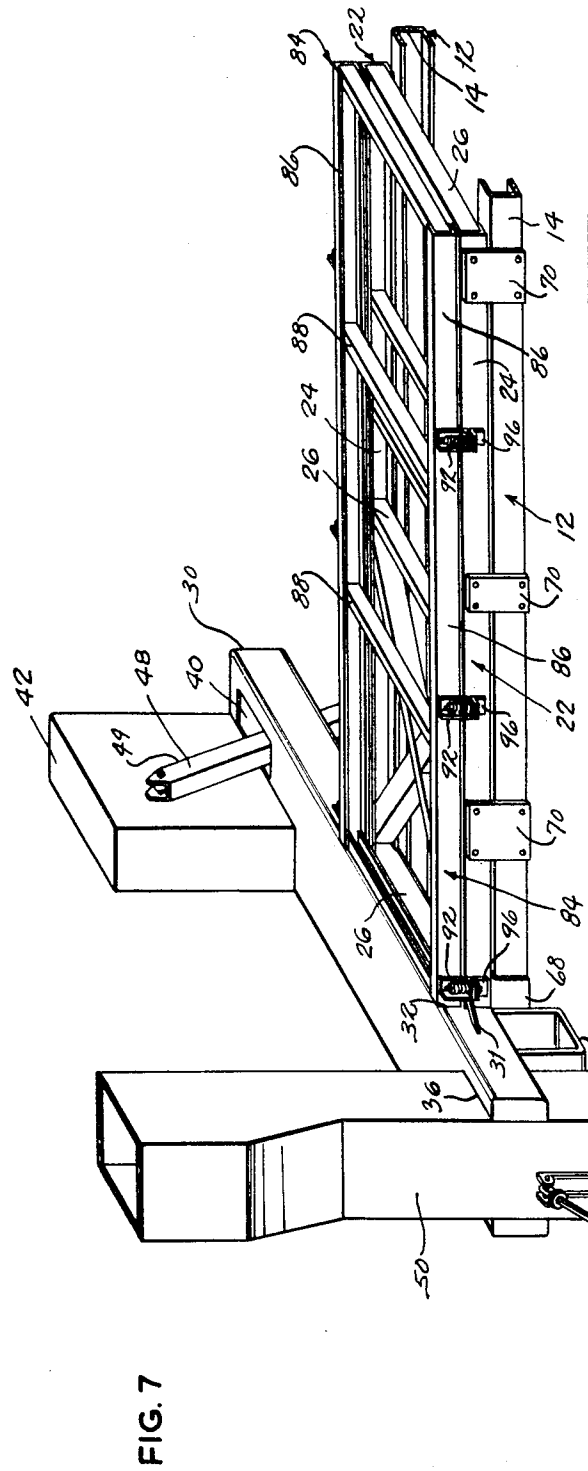


FIG. 7

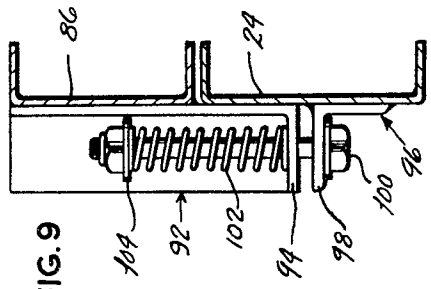


FIG. 9

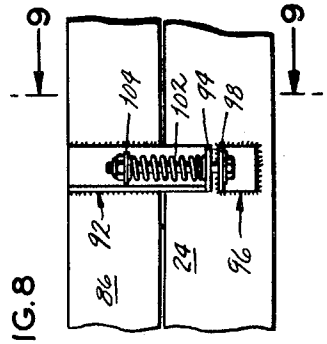


FIG. 8

MOBILE DERRICK

This is a division of my copending application Ser. No. 835,445, filed June 23, 1969 now U.S. Pat. No. 3,643,851 issued 2-22-72.

This invention relates to derricks and more specifically to mobile derricks.

Many companies such as utility companies are currently using vehicles which have derricks mounted on them so as to make possible the quick and easy transportation of the derricks to the place where they are needed. These mobile derricks are usually mounted on a mast which is rigidly secured to the vehicle. The derricks are adapted to swing about vertical and horizontal axes during their use. For working on utility lines it is advantageous to locate the mast on the rear right-hand side of the vehicle so that when the vehicle is parked on the right-hand side of the street the derrick will be located on the side of the vehicle facing the utility lines. Most masts used for supporting derricks are secured at their lower ends to the frame of the vehicle and include a forwardly extending diagonal brace which is tied into the body of the vehicle. The weight of the derrick causes torque to be applied to the mast, and this torque sets up many stresses and strains within the mast as the derrick moves to its various positions. The mast often tilts in response to these stresses and strains, thereby twisting and deflecting the vehicle frame, the diagonal brace and the body. Twisting of the body is undesirable because doors become jammed and bent, and permanent distortion of the body's shape often results. This invention provides a means for supporting a mast wherein the mast is disassociated completely from the body of the truck and is supported solely by the frame so that the body will not be deflected by movement of the mast.

Among the several objects of the present invention may be noted the provision of a mobile derrick which includes a mast supported independently from the vehicle body; the provision of a mobile derrick which permits the mast and the frame to deflect independently from the body; the provision of a mobile derrick which includes a mast and frame for supporting the derrick and for withstanding distorting forces and torques of high magnitude; the provision of a mobile derrick which includes a mast rigidly connected to a mast frame and additionally tied in with the chassis frame; the provision of a mobile derrick which includes outriggers connected to the frame and disconnected from the body so that they will support the frame independently from the body; and the provision of a mobile derrick which is durable in use and economical to manufacture. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

FIG. 1 is a side elevational view of a mobile derrick; of FIG. 1;

FIG. 3 is a sectional view taken along line 3—3 of FIG. 1; of FIG. 3;

FIG. 5 is a perspective view of the vehicle body; of FIG. 1;

FIG. 7 is a perspective view showing the body frame mounted on the mast frame and chassis frame;

FIG. 8 is a detailed side elevational view of the means for mounting the body frame to the mast frame; and of FIG. 8.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings

Numeral **10** designates a vehicle for carrying derricks. A chassis frame **12** includes two parallel chassis side members **14** which extend along the length of vehicle **10** and which are joined by a plurality of chassis cross-ties **16.** Side members **14** are C-shaped in cross-section with their cross-sectional open ends facing one another. Forward and rear wheel and axle assemblies **18** are mounted to chassis frame **12** in a conventional manner. On the front of chassis frame **12** is mounted a conventional vehicle cab **20.**

Rigidly mounted above chassis frame **12** behind cab **20** is a mast frame **22.** Mast frame **22** includes a rectangular front section **23** (FIG. 3) formed by two mast side members **24,** a plurality of mast cross-ties **26,** and two diagonal ties **28.** Rigidly secured across the extreme rear end of front section **23** is a cross-beam **30.** Gussets **31** reinforce the securement between cross-beam **30** and rectangular front section **23.** Cross-beam **30** is rectangular in cross-section and hollow along its length. It has a vertical thickness approximately twice that of the vertical thickness of rectangular front section **23.** Rectangular front section **23** is mounted to the lower half of cross-beam **30** so that cross-beam **30** forms a forwardly facing abutment **32** (FIGS. **1** and **7**), which projects above the extreme rear end of rectangular front section **23.** Extending within cross beam **30** and bolted to the top thereof is a reinforcing diagonal **34** which is L-shaped in cross-section (FIG. **4**). Diagonal **34** reinforces cross-beam **30** so that it will minimize deflection of cross-beam **30** when stresses are exerted on one end thereof. At the right end **35** of cross-beam **30** is a rectangular mast cutout **36.** Mast cutout **36** is three-sided with its fourth side being open at right end **35.** The left end **38** of cross-beam **30** includes a vertically disposed outrigger cutout **40.** Welded to the upper surface of cross-beam **30** immediately behind outrigger cutout **40** is a rectangular control box **42** which extends upwardly from cross-beam **30.** Mounted to the rear of control box **42** and extending downwardly through outrigger cutout **40** is an extensible outrigger **44.** Extensible outrigger **44** includes an extensible foot **46** which is adapted to extend from an outrigger casing **48** so that it will engage the ground to support vehicle **10** when the derrick is in operation.

Rigidly mounted in mast cutout **36** is a vertically disposed mast **50** which is rectangular in cross-section and which fits snugly within mast cutout **36** where it is welded. The lower end of mast **50** protrudes a short distance below cross-beam **30.** At the extreme lower end of mast **50** on its outwardly disposed side is an outrigger pivot mount **52** to which is pivotally secured an articulated outrigger **54.** Articulated outrigger **54** includes a foot **56** on its extreme outer end and is swingable about a horizontal axis from a folded position wherein it is vertically disposed alongside mast **50** to an unfolded position wherein foot **56** engages the ground. A hydraulic drive means **58** is pivotally secured at one of its ends to articulated outrigger **54** and at the other of its ends to mast **50.** As hydraulic drive means **58** extends, it causes articulated outrigger **54** to move from its folded position to its unfolded position.

At the extreme upper end of mast 50 is mounted a turrent 60 which is adapted to rotate on mast 50 about a vertical axis. Turrent 60 includes flanges 62 which pivotally support a derrick 64 for swinging movement about a horizontal axis. A hydraulic cylinder 66 is pivotally connected at its opposite ends to turrent 60 and derrick 64, respectively, and is adapted to extend and retract to cause swinging movement of derrick 64 about a horizontal axis. The particular type of derrick which is mounted on mast 50 does not comprise a part of this invention. Any type of derrick may be mounted on the extreme upper end of mast 50.

Mast frame 22 is mounted above chassis frame 12 with mast side members 24 resting on chassis side members 14 and with cross-beam 30 resting across the extreme rear ends of chassis side members 14. Welded between cross-beam 30 and chassis side members 14 are a pair of tie plates 68. Tie plates 68 are L-shaped in cross-section and are welded so that they embrace the upper and outer surfaces of chassis side members 14, thereby tying cross-beam 30 to side members 14. Mast frame 22 is further secured to chassis frame 12 by a plurality of securing plates 70 which are bolted and welded across the outer surfaces of mast side members 24 and chassis side members 14.

Between the right-hand chassis side member 14 and the lower end of mast 50 is a U-shaped channel 72 which has one of its sides welded to tie plates 68 and the other of its sides welded to the inwardly disposed surface of mast 50. Extending transversely between the upwardly disposed walls of U-shaped channel 72 is a transverse channel 74 (FIGS. 2 and 3). U-shaped channel 72 and transverse channel 74 reinforce the lower end of mast 50 so as to prevent pivoting of mast 50 within mast cutout 36 of cross-beam 30. The weight of derrick 64 causes a torque to be applied to mast 50 with mast cutout 36 acting as a fulcrum. This torque would break or seriously weaken the securement of mast 50 to cross-beam 30 were it not for the stabilizing effect which channels 70 and 74 provide. U-shaped channel 72 serves as a step when the vehicle is fully assembled and in use.

A vehicle body 76 (FIGS. 1 and 5) includes a floor 78, two lateral walls 80, a forward wall 82, and a body frame 84 mounted below floor 78. Body frame 84 includes two parallel body side members 86 which are joined by a plurality of body cross-ties 88. Lateral walls 80 are provided with a plurality of compartments 90 having doors therein for storing tools and other equipment. Body frame 84 is of substantially the same rectangular shape as rectangular front section 23 of mast frame 22. Body 76 rests on top of mast frame 22 and chassis frame 12 with body frame 84 coinciding with and resting on top of rectangular front section 23 of mast frame 22. The extreme rear end of body frame 84 abuts against the forwardly facing abutment 32 of cross-beam 30.

Secured to the outer faces of body side members 86 are a plurality of body suspension brackets 92. Each body suspension bracket 92 is comprised of a vertically disposed channel which is L-shaped in cross-section and which includes a horizontal flange 94 at its lower end. Body suspension brackets 92 extend downwardly below the lower edges of body side members 86 and slidably embrace the outwardly facing surfaces of mast side members 24, thereby holding body frame 84 against lateral movement with respect to mast frame 22. A plurality of lower mounting brackets 96 are mounted on mast side members 24 immediately below and in alignment with body suspension brackets 92. Lower mounting brackets 96 include a horizontal flange 98 which faces horizontal flange 94 of suspension brackets 92. A bolt 100 extends slidably upwardly through apertures in horizontal flanges 98, 94, of body suspension brackets 96, 92. A coil spring 102 surrounds bolt 100 and extends between flange 94 and a washer 104 at the extreme upper end of bolt 100. This structural configuration provides spring mounting for body 76. As mast frame 22 and chassis frame 12 twist and deflect, springs 102 will permit movement to take place between body 76 and the mast and chassis frames. The mounting of mast 50 so that it is spaced apart from and disconnected from body 76 eliminates the twisting of body 76 resulting from deflection and twisting of mast 50, mast frame 22 and chassis frame 12. Cross-beam 30, mast 50, mast frame 22 and chassis frame 12 are free to twist and deflect independently from body 76.

The portion of mast 50 which extends above floor 78 of body 76 is completely free from connection or engagement with body 76. There is no diagonal brace extending from mast 50 downwardly alongside lateral walls 80 of body 76 as in previous devices. This previous means of mounting the mast tied it structurally into the body and caused twisting of the body whenever movement of the mast took place. With the structual configuration of this invention, movement of mast 50 will impart little or no deflection to body 76.

Outriggers 44, 54, are mounted on mast frame 22 and are not tied in with body 76. Thus when the outriggers are in use, the stabilizing support they provide is confined to mast frame 22 and they exert no stresses or strains on body 76.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in limiting 46 sense.

What is claimed is:

1. A mobile derrick for a vehicle comprising an elongated chassis and a vehicle body supported by said chassis, said chassis being drawn by said vehicle, said chassis having an elongated longitudinal axis and including opposite longitudinal end portions, an elongated beam member provided on said chassis separate from said vehicle body and being rigidly mounte across said chassis at one of said longitudinal end portions, said beam member having a cutout portion and an elongated lateral axis intersecting the longitudinal axis of said chassis, said derrick further including an elongated derrick mast having a polygonal periphery extending upwardly through the cutout portion in said beam member, said cutout portion being of complementary cross-section with the polygonal periphery of said derrick mast such that the periphery of the cutout portion in said beam member embraces a predetermined length of the polygonal periphery of said derrick mast in keylike fashion whereby the engagement of said cutout portion and the predetermined length of said derrick mast resists twisting of said derrick mast with

respect to said beam, said derrick mast being rigidly secured within the cutout portion in said beam membr such that said derrick mast is nondisplaceable vertically within the cutout portion of said beam member and stresses imposed on said derrick are transmitted through said derrick mast to said beam member and said chassis.

2. A mobile derrick as claimed in claim **1,** said derrick mast including a tail portion extension depending from said beam member such that twisting movement of said tail portion extension is restrained by said chassis.

3. A mobile derrick as claimed in claim **2,** wherein said chassis includes spaced side support members, said derrick further including rigid stabilizer means disposed between the tail portion of said derrick mast and one of said chasses side support members such that one portion of said stabilizer means abuts said chassis and another portion of said stabilizer means abuts said tail portion to restrain twisting of said derrick mast with respect to said beam member and said chassis.

4. A mobile derrick as claimed in claim **3** wherein said derrick mast and said tail portion extension are of generally rectangular cross-section.

5. A mobile derrick as claimed in claim **4,** wherein the abutting portions of said stabilizer means include spaced bearing surfaces arranged to abut said derrick mast and said chassis to restrain said derrick mast from twisting with respect to said beam member and said chassis.

6. A mobile derrick as claimed in claim **3,** wherein said stabilizer means is a channel having opposite side portions constituting said abutting portions.

7. A mobile derrick as claimed in claim **2,** wherein a first end of said beam member extends transversely beyond one of the side support memers of said chassis, said derrick mast extending upwardly through said beam member at said first end.

8. A mobile derrick as claimed in claim **7,** wherein said derrick mast is spaced from said chassis, said derrick further including stabilizer means disposed in the space between said derrick mast and said chassis to restrain twisting of said derrick mast with respect to said beam member.

9. A mobile derrick as claimed in claim **8,** wherein said stabilizer means include a rigid bearing member having one side portion abutting the tail portion of said derrick mast and another side portion abutting said chassis to restrain twisting of said derrick mast with respect to said chassis.

10. A mobile derrick as claimed in claim **9** wherein said derrick mast and said tail portion extension are of generally rectangular cross-section.

11. A mobile derrick as claimed in claim **10,** wherein the abutting portions of said stabilizer means include spaced bearing surfaces arranged to abut said derrick mast and said chassis to restrain said derrick mast from twisting with respect to said beam member and said chassis.

12. A mobile derrick as claimed in claim **9,** wherein said bearing member is a channel having opposite side portions constituting said abutting portions.

13. A mobile derrick as claimed in claim **1,** further including connecting means for rigidly securing said beam member to said chassis, said connecting means comprising an L-shaped plate having one leg disposed between said beam member and said chassis for mutual securance thereto, the other leg portion being anchored to said chassis remote from said beam member.

14. A mobile derrick as claimed in claim **1,** wherein said beam member is hollow having a substantially rectangular cross-section.

15. A mobile derrick as claimed in claim **14,** wherein said beam member includes an internal bracing member diagonally arranged therein and having opposite ends secured to opposite side walls of said beam member.

16. A mobile derrick as claimed in claim **1,** wherein a second end of said beam member extends transversely beyond one of the side support members of said chassis, said derrick including articulated outrigger means provided at said second end of said beam member for stabilizing said derrick.

17. A mobile derrick as claimed in claim **1,** further including a mast frame rigidly mounted to said chassis and extending from said beam member longitudinally of said chassis toward the other said longitudinal end portion.

18. A mobile derrick as claimed in claim **1,** wherein said mast frame includes opposite end portions, one of said end portions being rigidly secured to said beam member, said mast frame further including connecting means for rigidly securing said mast frame to said chassis.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,752,328 Dated August 14, 1973

Inventor(s) Roy Balogh

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

The attorney's name should be --John D. Pope III--.
Column 1, line 3, "3,643,851" should read --3,643,815--.
Columns 1-2, lines 59-66 and lines 1-3 should read:

--Fig. 1 is a side elevational view of a mobile derrick;--

--Fig. 2 is a rear view of the mobile derrick of Fig. 1;--

--Fig. 3 is a sectional view taken along line 3-3 of Fig. 1;--

--Fig. 4 is a sectional view taken along line 4-4 of Fig. 3;--

--Fig. 5 is a perspective view of the vehicle body;--

--Fig. 6 is a sectional view taken along line 6-6 of Fig. 1;--

--Fig. 7 is a perspective view showing the body frame mounted on the mast frame and chassis frame;--

--Fig. 8 is a detailed side elevational view of the means for mounting the body frame to the mast frame; and--

--Fig. 9 is a sectional view taken along line 9-9 of Fig. 8.--

Column 3, lines 2 and 6 "turrent" should read --turret--;
line 3 "Turrent" should read --Turret--.

Continued on Page 2.

ORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,752,328 Dated August 14, 1973

Inventor(s) Roy Balogh

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

Continued from Page 1.

Column 4, lines 44-45, "limiting 46 sense" should read --limiting sense;
line 53, "mounte" should read --mounted--.
Column 5, line 17, "chasses" should read --chassis--.
line 36, "memers" should read --members--.

Signed and sealed this 20th day of November 1973.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

RENE D. TEGTMEYER
Acting Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334