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Grove

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[54] **COUNTERBALANCING CHASSIS FOR AERIAL PLATFORM APPARATUS**

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[52] **U.S. Cl.** ..... **182/141**, 182/2, 280/106 R

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

[58] **Field of Search** ..... 182/2, 63, 141; 280/106 R

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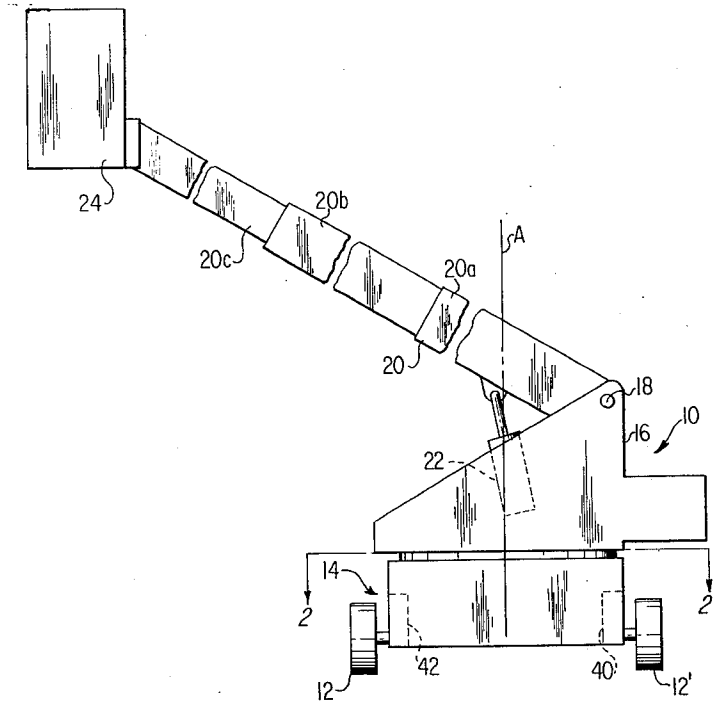
[57] **ABSTRACT**

An aerial platform apparatus includes a chassis supported by wheels, the chassis carrying centrally thereof a boom support revolvable on a vertical axis. A boom carried by the boom support carries a load at its outer end. The chassis is rectangular in plan form, having a pair of transversely spaced, longitudinally extending chassis members which are each unitary, rectangular in vertical cross section and of a thickness greater than required to resist strains to thereby provide an integral counterweight and chassis member.

7 Claims, 4 Drawing Figures



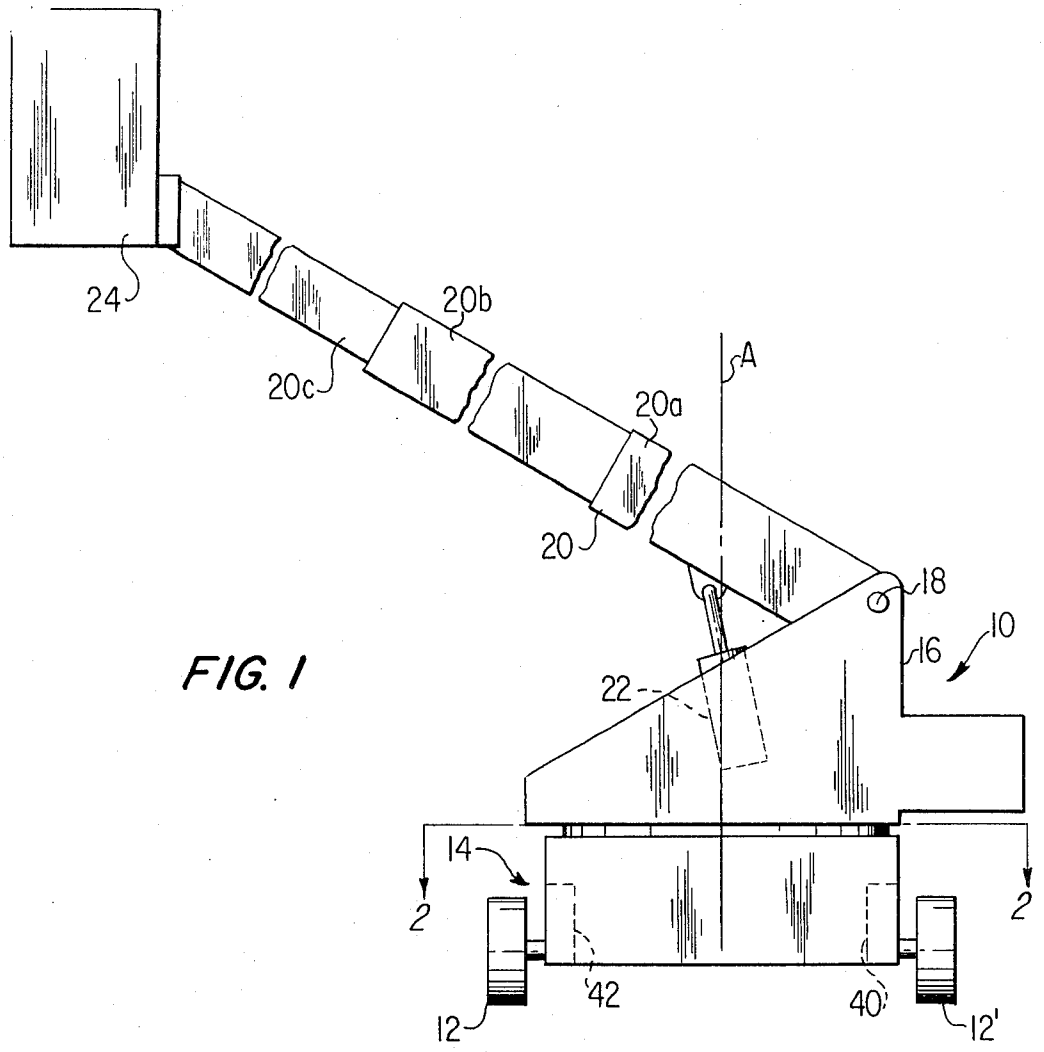


FIG. 1

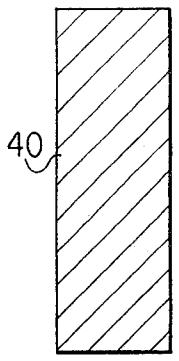


FIG. 4

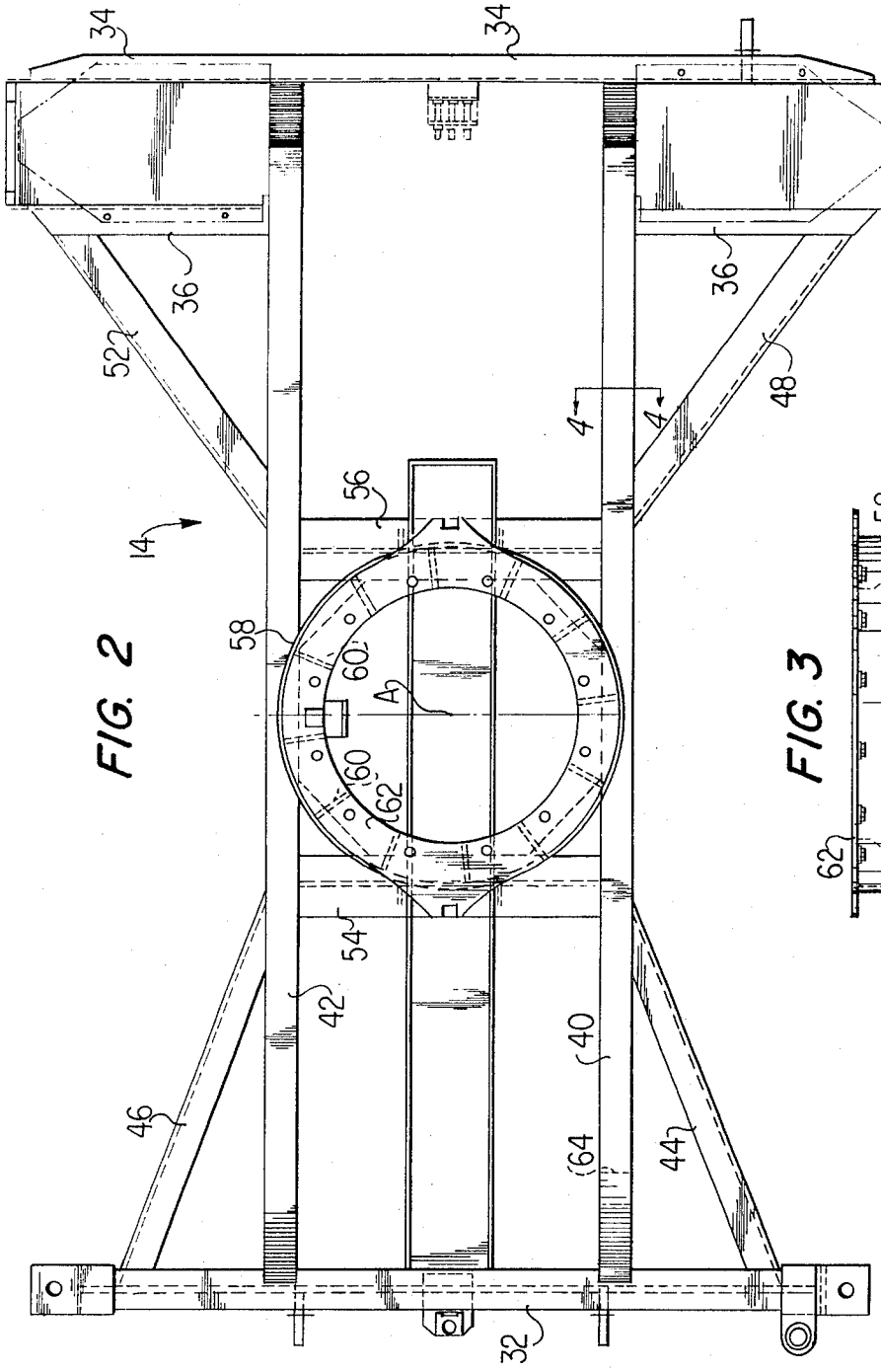

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FIG. 2

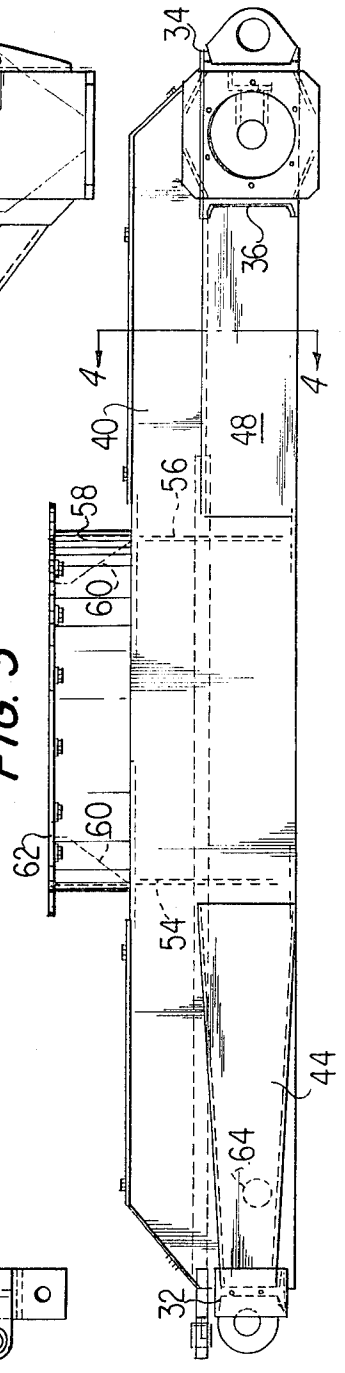
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FIG. 3

COUNTERBALANCING CHASSIS FOR AERIAL PLATFORM APPARATUS

BACKGROUND OF THE INVENTION

The present invention relates to a construction of the chassis of an apparatus having a boom, such as an aerial platform apparatus, or a crane.

Cranes have long been used to lift a load at one location, to move it and then deposit it at another location, these cranes including a boom having a load supporting cable depending from the outer end thereof. The cranes having conventionally been constructed so that the boom could be raised and lowered, as well as rotated about a vertical axis. It is also known to provide such cranes on a mobile chassis, so that they may be moved from place to place.

There have also been provided aerial platform apparatus, which were to some extent similar to cranes, in that they included a mobile chassis, typically mounted on three or four supporting wheels, a boom pivoted on a horizontally extending pivot so that it could be raised and lowered, the boom carrying at its outer end a platform or basket in which a workman was positioned. Typically, such aerial platforms permit turning movement of the boom about a vertical axis, and the boom itself is extensible. Consequently, the workman's platform could be placed at many different positions, due to the rotation of the boom about a vertical axis, its rotation about a horizontal axis and its extensibility along its length.

It has been recognized in connection with both cranes and aerial platforms that when the boom is positioned so that it is substantially transverse to the longitudinal axis of the vehicle or chassis which supports it, is extended its greatest amount, and is as close as possible to the horizontal, there is generated the greatest tipping moment, for a given load or weight supported at the end of the boom. To counteract this tipping moment, cranes are generally provided with a large counterweight on the rotating boom support structure, on the opposite side of the axis of rotation from the boom, and are also provided with extensible outriggers. These measures, including the outrigger, have proven to be satisfactory in connection with cranes, since cranes are relatively fixed at a particular work location. However, in the case of aerial platform apparatus, the use of outriggers is not satisfactory in many instances, such as when the workman on the aerial platform performs tasks of brief duration at locations which are so spaced that it is required that the entire apparatus be moved to enable the workman to have access to each location.

Heretofore, in connection with aerial platform apparatus where the boom reach was up to about sixty feet, the chassis had been made of rolled steel sections, such as I-beams, C-channels and T-bars. Then counterweights were added to the chassis, such as by being bolted to longitudinally extending chassis members made of I-beams. These added on counterweights have been found, however, to increase the cost of production of such machines, and, in addition, created a structure which could be hazardous, since it was possible for a workman to place his leg between the counterweight and another part of the structure, with danger of injury.

SUMMARY OF THE INVENTION

An aerial platform apparatus is provided including a chassis supported by ground engaging wheels, the chassis providing a pair of longitudinally extending members, and front and rear transverse members, there being four wheels supported by the transverse members. A ring element is supported with its center at the center line of the chassis, equally distant between the two longitudinally extending members, and on this ring there is journalled a boom support structure which may be rotated through at least 180° on the vertical axis extending through the ring. The boom support structure includes a horizontal pivot which carries the boom, and the boom is preferably extensible, carrying at its outer end a workman's platform or basket. The chassis is characterized by a pair of laterally spaced and longitudinally extending integral chassis members and counterweights. Each of these chassis members is formed of a slab of metal which is of rectangular cross section in the vertical plane, with the long side of the rectangle extending vertically. These longitudinally extending integral chassis members and counterweights may have other chassis members secured to them, as by welding, and may have discontinuities, such as openings. However, they are characterized by being of substantially greater dimensions than would be required for normal stress considerations.

Among the objects of the present invention are to provide an aerial platform apparatus including a chassis which is counterweighted to counteract sidewise tipping.

Another object of the present invention is to provide an aerial platform apparatus having an integral chassis-strut which is more economical to manufacture than previously manufactured chassis.

Still another object of the present invention is to provide a chassis for an aerial platform apparatus having integral chassis members and counterweights.

Other objects and many of the attendant advantages of the present invention will be more readily understood from the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an elevational view of an aerial platform apparatus in accordance with the present invention.

FIG. **2** is a plan view of the chassis of the apparatus of FIG. **1**, generally taken on the line **2—2** of FIG. **1**.

FIG. **3** is a side elevation of the chassis shown in FIG. **2**.

FIG. **4** is a cross sectional view taken on the line **4—4** of FIG. **2**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, wherein like or corresponding reference numerals are used to designate like or corresponding parts throughout the several views, there is shown in FIG. **1** an aerial platform apparatus generally designated **10**, including a pair of front wheels **12** and **12'**, carried by a chassis **14**. Chassis **14** carries a boom support structure **16**, which is rotatable thereon about vertically extending axis A. Boom support structure **16** includes a horizontal pivot **18**, which pivotally supports a boom **20**. Preferably, boom **20** is an extensible boom including a base section **20***a*, a midsection **20***b* and a fly sectison **20***c*, each being shown broken away. As is conventional, a hydraulic lift cylinder **22** is provided for raising and lowering the boom **20**, by moving it about the pivot **18**. At its outer end, boom **20** carries a workman's platform **24**, and it will

be understood that all movements may be controlled from workman's platform **24**, including specifically the raising and lowering of boom **20**, the rotation of boom **20** and boom support **16** about the axis A and the extension and retraction of boom **20**.

Referring now to FIG. **2**, there is shown an enlarged view of the chassis **14**. Chassis **14** comprises a front chassis member **32** which extends transversely, chassis member **32** being shown in FIG. **3** to be an I-beam. At the rear, there is a rear transversely extending chassis member **34**, which has the cross sectional shape of a channel. Forwardly of the rear chassis member **34** are a pair of rear auxiliary chassis members **36** and **38**, also having a channel-shaped cross section

A pair of transversely spaced longitudinally extending integral chassis members and counterweights **40** and **42** may be seen in FIG. **2**, extending between the front chassis member **32** and the rear chassis member **34**. The auxiliary chassis members **36** and **38** may be seen extending from and connected to the longitudinally extending chassis members **40** and **42**, respectively, being welded thereto. Extending at an angle between the front chassis member **32** and the longitudinal chassis members **40** and **42** are a pair of diagonal braces **44** and **46**, and a similar pair of rear diagonal braces **48** and **52** extend between the longitudinal chassis members **40** and **42** and the auxiliary chassis members **36** and **38**.

A front intermediate transverse member **54** and a rear intermediate transverse member **56** are provided, extending between and joined to the longitudinal chassis members **40** and **42**, as by welding. The parallel members **54** and **56** are spaced apart approximately the same distance as the members **40** and **42**, and each lies the same distance from the front-to-rear center of the chassis **14**. Supported on the members **40, 42, 54** and **56** which have their upper surfaces substantially coplanar, is a cylinder **58** having a plurality of radially extending plates **60** joined to and extending inwardly from the inner wall thereof. The diameter of cylinder **58** is substantially the same as the distance between members **40** and **42**, and members **54** and **56**. The cylinder **58** and plates **60** serve to support a horizontal ring **62** having its axis and that of the cylinder **58** coextensive, and designated A. As will be readily understood, the ring **62** may support a bearing, or the like, so that the boom support structure **16** may rotate thereon, about the axis A. Due to the positioning of the members **54** and **56**, the axis A is at the front-to-rear center of chassis **14**.

There is shown in FIG. **4** a cross sectional view of the longitudinally extending chassis member **40**. This is a vertical cross section, and as may be seen therefrom, the chassis member **40** is rectangular in vertical cross section, having the long side thereof extending in the vertical direction. In practice, the members **40** and **42** are metal slabs approximately two and one half inches in width and approximately fourteen inches in depth. As a consequence, these longitudinal chassis members **40** are of far greater strength than is required for normal stress considerations of the apparatus **10**. However, due to the great weight of the members **40** and **42**, they also serve as counterweights, to counteract tipping moments, such as those occurring when the boom **20** lies in a plane which extends generally perpendicularly to the longitudinal axis of the chassis **14**. The longitudinally extending members **40** and **42** are preferably of uniform size and cross sectional shape throughout their lengths, although as will be understood, the other members may be joined or connected to them, as illustrated in the drawing, and in addition there may be a requirement that there be an occasional discontinuity in one or both of these members, such as the hole **64** in the member **40**.

By making the chassis members **40** and **42** of metal slabs, greater economy is achieved than where rolled steel sections are utilized, and counterweights are bolted or otherwise secured to them.

There has been provided an improved aerial platform apparatus wherein longitudinally extending chassis members function as both stress transmitting members and counterweights, transferring stresses from the boom and boom suppport structure to the ground engaging wheels, through other chassis members. The longitudinally extending chassis members are of substantially greater size than is normally required for conventional stress considerations, the extra size being provided in order to provide an integral counterweight and chassis member.

It will be obvious to those skilled in the art that various changes may be made without departing from the spirit of the invention, and therefore the invention is not limited to what is shown in the drawings and described in the specification but only as indicated in the appended claims.

I claim:

1. Aerial platform apparatus comprising:

a. a chassis and ground engaging wheels supporting said chassis;

b. said chassis comprising:

i. a pair of longitudinally extending chassis members, each being a unitary, integral slab of metal having a vertical rectangular cross section;

ii. front and rear transversely extending chassis members joined to said longitudinally extending chassis members adjacent the ends thereof; and

iii. front and rear intermediate transverse members extending between said longitudinally extending chassis members spaced apart approximately the same distance as said longitudinally extending chassis members and lying adjacent the longitudinal center of said chassis;

c. cylindrical support means extending upwardly from and supported on both said longitudinally extending members and both said intermediate transverse members, said cylindrical support means having a diameter substantially the same as said distance between said members, d. rotatable boom support means on said cylindrical support means, and e. a boom carried by said boom support means and having a platform on the outer end thereof.

2. The aerial platform apparatus of claim **1**, wherein said boom is positionable to extend transversely of the longitudinally extending members, whereby a tipping moment is generated about an axis parallel to the longitudinal axis of the chassis and is counterbalanced by a said longitudinally extending chassis member.

3. The aerial platform apparatus of claim **2**, wherein said boom is extensible.

4. The aerial platform apparatus of claim **3**, said chassis further comprising diagonal braces extending from said longitudinally extending members.

5. The aerial platform apparatus of claim 1, said chassis further comprising diagonal braces extending from said longitudinally extending members.

6. The aerial platform apparatus of claim 1, said intermediate transverse members having upper surfaces substantially coplanar with upper surfaces of said longitudinally extending chassis members.

7. The aerial platform apparatus of claim 6, wherein said intermediate transverse members are structural sections.

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