May 1, 1962 C. W. BOPP 3,032,213

PEDESTAL STRUCTURE FOR LOAD-HANDLING EQUIPMENT

Filed May 22, 1958 2 Sheets-Sheet 1

FIG. 1

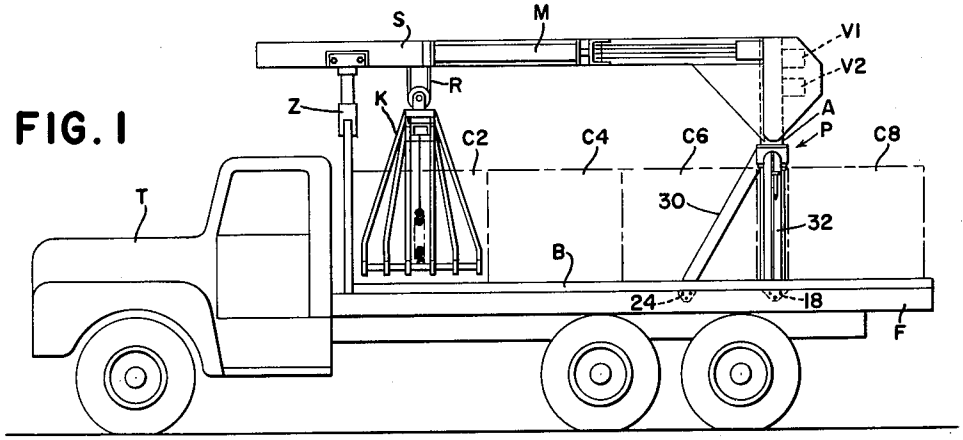

FIG. 2

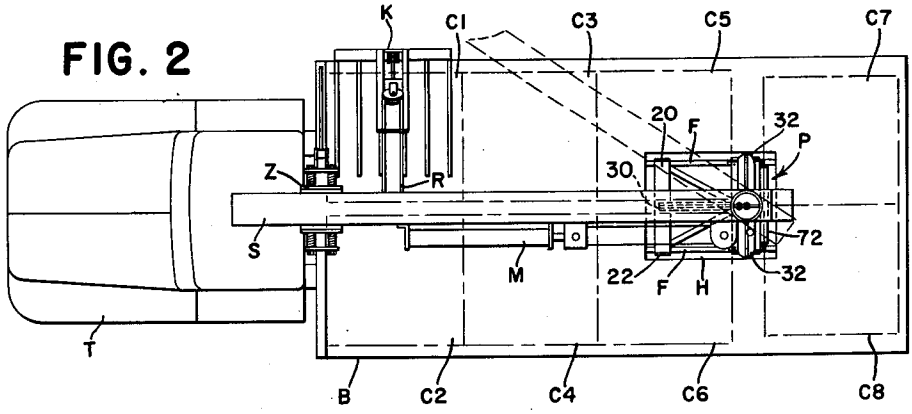

FIG. 7

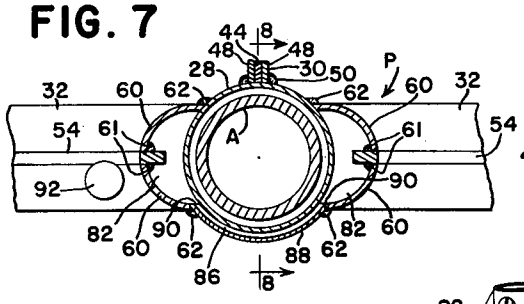

FIG. 8

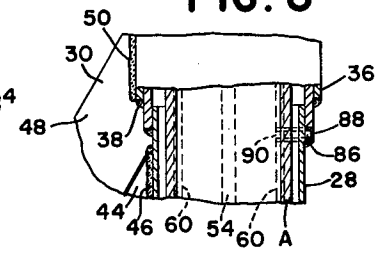

FIG. 9

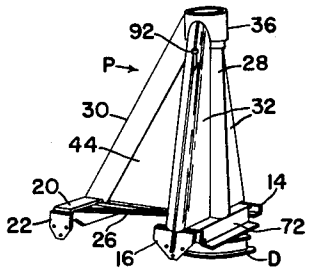

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FIG. 3

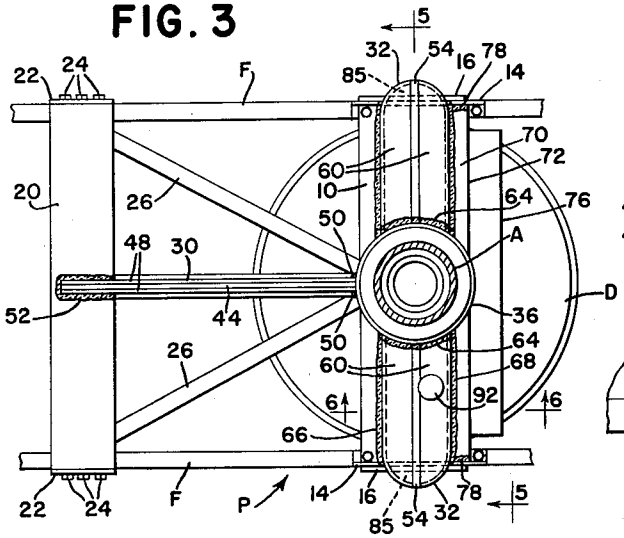


FIG. 6

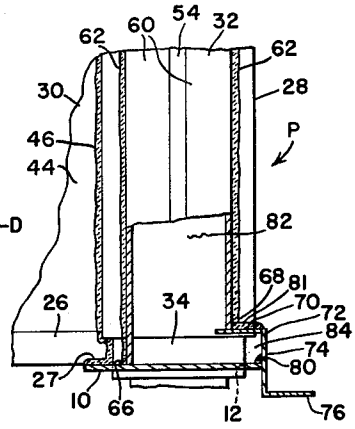


FIG. 4

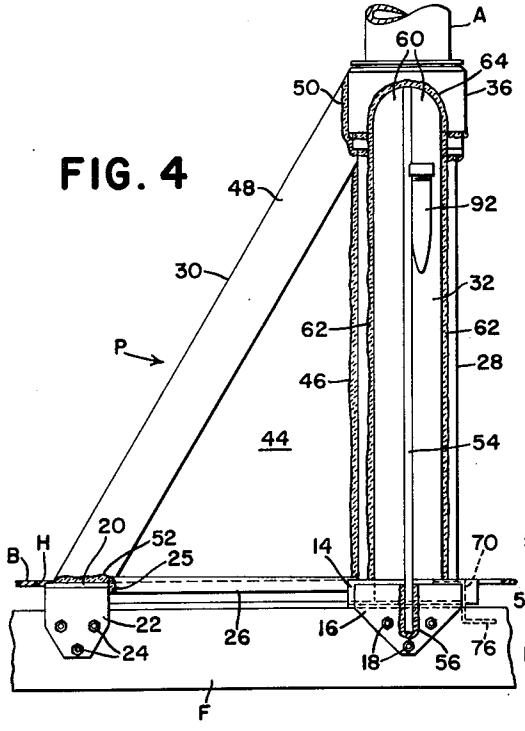
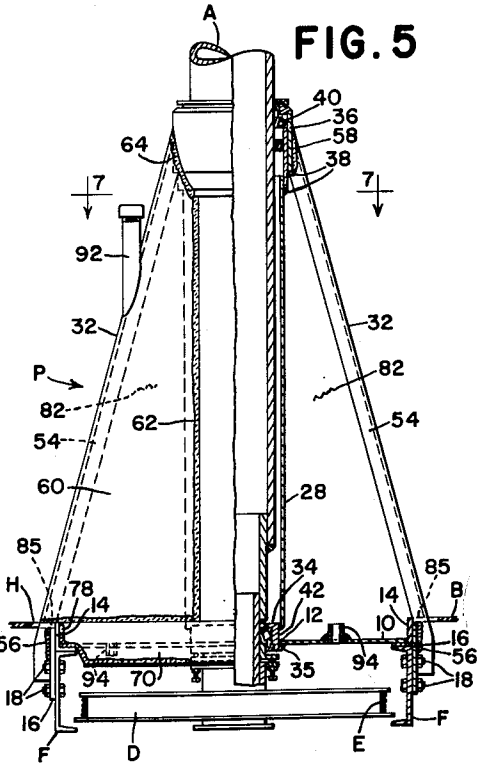


FIG. 5



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PEDESTAL STRUCTURE FOR LOAD-HANDLING EQUIPMENT

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12 Claims. (Cl. 214—75)

This invention relates to a load-handling and -carrying vehicle and more particularly to improved means for mounting on the bed of such vehicle a horizontal swinging boom used in loading and unloading material to and from said bed.

The invention finds special utility in vehicles equipped to handle building blocks of concrete or the like, which are conventionally stacked in what are known as "cubes." Each such cube may normally comprise a series of layers of blocks, say, three blocks wide, six blocks deep and six blocks high, which is typical in cases involving blocks of the 8" x 8" and 16" size. These cubes are loaded on a flatbed truck or the like by means of a truck-mounted boom which is carried for lateral swinging about a vertical axis by mast or pedestal structure conventionally located midway between the sides of the bed and about one-third or one-quarter of the length of the bed ahead of the rear end of the bed. Such vehicle is driven to the building or other unloading site and the boom is used to unload the cubes. It has heretofore been conventional to brace the pedestal by four braces spaced 90° apart, with two braces fore-and-aft and two crosswise, which requires that the cubes adjacent to the pedestal be nested in the four inside corners thus provided. Although this has been generally convenient, the rear brace interferes with use of the rear part of the bed for loads of other types, since such brace breaks up or divides the rear load space. Consequently, the truck is unable to carry large bulky objects such as septic tanks, slabs, etc.

According to the present invention, the foregoing disadvantage is eliminated by the provision of a novel pedestal structure in which the rear brace is not required. This object is achieved by the use of tubular or hollow structural components of adequate size and arrangement so that a single forward brace is sufficient. Another object is to utilize the tubular or hollow structure as one or more fluid containers, such as for hydraulic fluid for the hydraulic system employed to swing the boom, to traverse the carriage, to raise and lower the fork and the like. Further objects reside in improved detail construction whereby a weld-fabricated structure may be used, improved bearing means for mounting the spindle on which the boom is carried, and improved means for mounting the pedestal structure on conventional flat bed trucks or similar vehicles.

The foregoing and other important objects and desirable features inherent in and encompassed by the invention, will become apparent as a preferred embodiment of the invention is disclosed in the ensuing description and accompanying sheets of drawings, the several figures of which are described below.

FIG. 1 is an elevation of a typical vehicle equipped with the improved pedestal or mast.

FIG. 2 is a plan of same.

FIG. 3 is an enlarged plan of the pedestal per se.

FIG. 4 is an elevation of the structure shown in FIG. 3.

FIG. 5 is a rear view, partly in section, as seen on the line 5—5 of FIG. 3.

FIG. 6 is an enlarged fragmentary section on the line 6—6 of FIG. 3.

FIG. 7 is an enlarged section on the line 7—7 of FIG. 5.

FIG. 8 is an enlarged section on the line 8—8 of FIG. 7.

FIG. 9 is a perspective, on a reduced scale, of the pedestal structure.

The vehicle chosen for purposes of illustration is a typical motor truck T having a rear flatbed B defined by front and rear ends and opposite fore-and-aft sides, as will be clear without elaboration. A swingable boom or support S is mounted on the truck via the inventive mast or pedestal structure P for handling load material, here a plurality of "cubes" of concrete building blocks for example, the nature and stacking of which has already been described. As shown in FIG. 2, the bed is carrying eight such cubes, C1, C2, C3, C4, C5, C6, C7 and C8, four at either side of the fore-and-aft median plane of the truck. Also to be noted is that six of the cubes are ahead of the pedestal P and two are behind. For reasons that will become apparent below, the six front cubes are slightly spaced apart laterally and the seventh and eighth cubes C7 and C8 behind the pedestal may abut each other. The boom S is capable of swinging horizontally (dotted lines, FIG. 2) about the upright axis of a spindle or post A carried by the pedestal, but in transport the boom is releasably locked in a fore-and-aft position by any form of suitable lock as at Z.

A fork K of any suitable construction, having tines for penetrating the apertured lower blocks in a cube, is carried by the boom and is raised and lowered by a cable system R under control of a hydraulic motor or cylinder and piston assembly M. The fork is shown in a transport position in FIGS. 1 and 2. A carriage (not shown) supports the fork additionally for travel along the boom and this too may be hydraulically operated, as is also true of the means for rotating the spindle A. For this purpose the lower end of the spindle may have keyed thereto a sheave D for receiving a hydraulically powered cable system, part of which is suggested at E (FIG. 5). These details are not important except as a background establishing the presently-to-be described utility of the pedestal P as a fluid container or reservoir for oil or equivalent hydraulic fluid. Likewise, control of the hydraulic and cable systems may be of any suitable character, and valves V1 and V2 are illustrated schematically in FIG. 1 at the rear part of the boom.

The pedestal or mast structure is preferably provided as a rigid integrated unit attachable to any vehicle having a bed such as B and for this purpose the vehicle bed is first cut away to afford an opening H exposing bed stringers F. The pedestal has a lower transverse steel plate 10 provided with a central aperture 12 on a vertical axis and having opposite lateral outer ends which are preferably welded to short fore-and-aft angles 14, each of which in turn is welded or otherwise affixed to a side mounting member 16. Each mounting member 16 depends alongside the respective stringer F and is apertured to receive bolts 18 for rigid mounting to the vehicle. A front mounting member 20 takes the form of a cross bar having opposite depending apertured plates 22 for bolting at 24 to portions of the respective stringers F ahead of the attachments at 18. Fore-and-aft rigid means in the form of rearwardly converging floor bars 26 extend between and are rigidly secured as by welding at 25 to the cross bar 20 and at 27 to the plate 10. The fore-and-aft dimension of the plate is greater than the diameter of the aperture 12 so that its front and rear edges lie respectively ahead of and behind that aperture (FIG. 6).

The plate 10, as will be seen, is transverse to the length of the truck bed B, being generally centrally between the sides of the bed and ahead of the rear end of the bed so as to leave a fairly substantial rear area of the bed as a load-carrying space. This plate, plus the front cross bar or member 20 and the fore-and-aft means 26 comprises the base of the pedestal or support element which is further supplemented by a central upright steel tube 28, a forward brace 30 and side members 32. The tube has its lower end rigidly joined as by welding to a coaxial

lower collar 34 which is coaxially received in the aperture 12 in the plate 10 and welded at 35 to the plate in fluid-tight relation about the aperture (FIG. 5). This tube rises from the plate 10 to a terminal upper end represented by an upper coaxial collar or sleeve structure 36, joined to the tube by welding at 38. The upper collar structure contains a thrust bearing 40 and a lower bearing 42 is carried by the lower collar 34 to receive and journal the boom spindle A on an upright axis.

The front brace 30 comprises a generally triangular fin plate 44 having its upright rear edge welded at 46 to the front of the tube 28, and further includes brace bars 48 welded to opposite sides of the fin plate 44 and welded at its upper end at 50 to the upper tube collar 36 and welded at its lower end at 52 to the front cross bar 20.

Each side member 32 has an upwardly and laterally inwardly inclined side bar 54 welded at its lower end at 56 to the respective depending side mount 16 and welded at its upper end at 58 (FIG. 5) to the proximate side of the upper tube collar 36, so that the bars 54 converge upwardly and inwardly to give the support element or pedestal structure P a triangular shape as seen from front or rear. Each side member is supplemented by a pair of complementary half-shell-like members 60, and each pair is welded at 61 to and thus combines with the proximate side bar 54 to constitute related walls establishing each side member as a hollow component of U-shaped section as seen from above (FIG. 7), wherein the bight of the U is established at a lateral outer portion of the structure and the legs of the U extend inwardly to inner upright edges welded at 62 to the proximate side of the tube 28. The U-shaped members thus formed are diametrically opposed, are of lesser fore-and-aft dimension than the tube 28 and plate 10, and are further shaped to conform at their lateral outer portions to the convergent nature of the side bars 54. The members 60 are of appropriate steel plate to add proper structural strength to the unit and combine with the plate 10, tube 28 and bars 54 to afford an integrated box-like or compartmented structure for the pedestal. Upper parts of the members are cut out to accommodate the upper tube collar 36, to which these upper parts are welded at 64 (FIGS. 4 and 5).

Each front half-shell member 60 depends to and is welded at 66 to the bottom plate 10 in fluid-tight relation (FIG. 6) and each rear half-shell member is slightly shorter than its companion front half shell, terminating at and welded at 68 to the upper flange 70 of a cross member 72 of Z-shaped section having a vertical flange 74 and a rear cross flange 76 (FIG. 6). The cross member 72 is notched at its opposite ends and is welded at 78 to the side angles 14 (FIGS. 3 and 5) and is further welded at 80 to the rear edge of the bottom plate 10 (FIG. 6). An intermediate portion of the flange 70 is notched to accommodate the rear surface of the lower part of the tube 28 and is welded at 81 to the tube. These welds, as well as others already described, are fluid-tight because the compartmented structure establishes compartments or reservoirs 82 respectively in the side members 32.

Because of the shape and relation of the rear cross member 72 to the plate 10, tube 28 and side angles 14, it affords a cross passage 84 (FIG. 6) which interconnects the reservoir cavities 82. These cavities are closed at their bottoms by the bottom plate 10 and are separated from each other and from the lower bearing 42 by the lower collar 34. That is, fluid in the cavities 82 cannot leak into the tube 28. Since the side members 32 slightly overhang the side angles 14, filler pieces, as at 85, are welded in place to complete the fluid-tight nature of the reservoir cavities 82 (FIG. 5). The cross passage 84 is the only lower communication between the cavities.

An upper vent passage 86 is established between the cavities 82 by a semicircular angle-section member 88 which interconnects openings 90 respectively in the rear walls of the side members 32 (FIGS. 7 and 8). The member 88 is welded in place as shown beneath the upper collar 36 and the proximate part of the tube 28. A filler neck 92 having a removable cap enables filling of the cavities to a suitable level with hydraulic fluid for the hydraulic system previously referred to.

The bottom plate 10 is apertured in two places to receive welded-in fittings 94 to which hose lines or the like (not shown) can be attached to the reservoir 82—82 for the hydraulic system (FIG. 5).

As best seen in FIGS. 1, 2, 3 and 4, the pedestal P is primarily a "three-legged" structure, in which the halves 32—32 form two legs and the front brace 30 forms the third leg. There is no rear brace, and the front brace acts in both tension and compression. Hence, the rear face of the pedestal is generally flat and since there is no rear brace, the rear load-carrying area of the bed B is uninterrupted. The front brace is relatively narrow and forms with the front face of the structure 32—28—32 a pair of inside front corners in which, as shown here, the two adjacent cubes C5 and C6 are nested. The absence of a rear brace, which is not the case in the prior art, enables the two rear cubes C7 and C8 to be abutted to each other. Of more importance, however, is the fact that the rear area, being free and clear of a rear brace, is able to carry large bulky loads, such as slabs, septic tanks and the like. Thus, the flexibility of the truck is increased. That is to say, the conversion of the truck to a vehicle especially adapted for handling loads such as concrete blocks does not render the truck completely unfit for handling other loads.

The pedestal structure is simple, compact and rigid and serves the added function of a reservoir for hydraulic fluid. The thrust bearing 40 at the top of the pedestal is an ideal support for the spindle. The structural components of the pedestal are adequate to handle the size and weight of the boom and the loads it is calculated to handle.

Features other than those outlined herein will readily occur to those versed in the art, as will many modifications and alterations in the preferred embodiment disclosed, all of which can be achieved without departure from the spirit and scope of the invention.

What is claimed is:

1. In a load-handling and carrying vehicle having a bed including front and rear ends and opposite sides: pedestal means for mounting a boom over the bed for swinging about a vertical axis to load and unload material to and from the bed, comprising a main support element disposed substantially centrally between the dies of the bed and intermediate the front and rear ends of the bed and including a lower portion having means for the rigid affixation thereof to the vehicle, said lower portion being of substantial dimension transverse to the bed and said element rising from said portion to an upper end, said element comprising a central tube disposed upright and a pair of lateral side members respectively of U-shaped section as seen from above and including a laterally outer bight portion and a pair of transverse legs, each leg having an inner upright edge rigidly secured to the tube, said U-shaped members affording a pair of chambers, one at each side of the tube, and said support element further including bottom means closing said chambers at their bottoms to enable said chambers to serve as liquid containers; said element having front and rear transverse faces and said rear face being generally flat and free of rearward bracing so as to leave a portion of the bed rearwardly thereof clear for receipt of load material; a front brace disposed generally in the fore-and-aft median plane of the bed and rigidly secured at its upper end to the upper end of said element and extending downwardly and forwardly therefrom to a lower end proximate to the bed and forwardly of said element, said lower end having means thereon for rigid affixation to the vehicle, said brace

and the front face of the element affording a pair of inside front corners in which load material ahead of the element may be nested; and bearing means on the element for journaling a boom.

2. The invention defined in claim 1, including: duct means interconnecting the chambers.

3. The invention defined in claim 1, in which: the support element includes an interior chamber means adapted to contain liquid.

4. Pedestal structure of the class described, comprising: a transverse horizontal plate means having a central aperture on a vertical axis; a central tube rising from said plate means and coaxial with said aperture; means rigidly securing the tube at its lower end to said plate means in fluid-tight relation about said aperture; a pair of side members of U-shaped section as seen from above, each member having an outer bight portion and a pair of legs and each leg having an inner upright edge, said edges being rigidly secured in fluid-tight relation to the central tube so that the members are disposed above the plate means at diametrically opposite sides of the central tube, said members having bottom portions proximate to said plate means; and means rigidly securing said bottom portions to the plate means in fluid-tight relation whereby said members and tube afford a pair of fluid containers separated by the tube.

5. The invention defined in claim 4, including: side bars having lower ends proximate to the plate means in laterally outwardly spaced relation to the tube and upper ends proximate to an upper part of the tube, said upper ends being secured to said tube upper part and said lower ends being secured to lateral outer parts of the plate means, and said bars being additionally secured respectively to the side members.

6. The invention defined in claim 4, including: duct means leading from one container to the other and extending exteriorly of the central tube.

7. Pedestal structure of the class described, comprising: a transverse horizontal plate means having opposite lateral ends; a central tube rigidly secured to and rising from a central portion of the plate means; opposite side bars rigidly secured respectively to the lateral ends of the plate means and converging upwardly and rigidly secured to the upper part of the tube; side mounting members respectively on the lateral ends of the plate means; a front mounting member spaced ahead of the tube; fore-and-aft rigid means connecting the front mounting member to the plate means and tube; a front brace secured to the front mounting member and extending rearwardly and upwardly and rigidly secured to the upper part of the tube; and a plurality of complementary shell like members of vertical and lateral dimensions similar respectively to those of the tube and plate means and secured to the tube, to the side bars and to the plate means and interbracing same to afford a rigid integrated generally hollow structure.

8. Pedestal structure of the class described, comprising: a central upright tube; a lower plate means having an aperture therethrough in which the lower end of said tube is received in fluid-tight relation and further having transverse front and rear edges respectively ahead of and behind the tube; a cross member of inverted L-shaped section having an upright rear flange paralleling and secured in fluid-tight relation to the rear edge of the plate means and a transverse upper flange spaced above and overhanging the rear of the plate means and extending forwardly to and rigidly joined to the tube in fluid-tight relation to afford a cross passage defined by the top surface of the plate means, the rear exterior of the tube, the bottom surface of the upper flange and the front surface of the rear flange; and chamber-forming members secured in fluid-tight relation to and rising from the plate means and upper flange and secured in fluid-tight relation to diametrically opposed interior sides of the tube to constitute a pair of fluid containers separated by the tube but in communication via the aforesaid passage.

9. Pedestal structure of the class described, comprising: a transverse horizontal plate means having a central aperture on a vertical axis; a central tube rising from said plate means and coaxial with said aperture; means rigidly securing the tube at its lower end to said plate means about said aperture; a pair of side members of U-shaped section as seen from above, each member having an outer bight portion and a pair of legs and each leg having an inner upright edge substantially equal in length to the height of the tube, said edges being rigidly secured to the central tube so that the members are disposed above the plate means at diametrically opposite sides of the central tube, said members having bottom portions proximate to said plate means; and means rigidly securing said bottom portions to the plate means whereby to afford a rigid integrated box-like structure.

10. Pedestal structure of the class described, comprising: a transverse horizontal plate means having opposite lateral ends; a central tube rigidly secured to and rising from a central portion of the plate means; opposite side bars rigidly secured respectively to the lateral ends of the plate means and converging upwardly and rigidly secured to the upper part of the tube; side mounting members respectively on the lateral ends of the plate means; a front mounting member spaced ahead of the tube; a front brace secured to the front mounting member and extending rearwardly and upwardly and rigidly secured to the upper part of the tube; and a plurality of complementary shell-like members of vertical and lateral dimensions respectively similar to those of the tube and plate means and secured to the tube, the side bars and the plate means and interbracing same to afford a rigid integrated generally hollow structure.

11. Pedestal structure of the class described, comprising: a transverse lower horizontal plate-like member; lower means on said member and generally centrally thereof and affording a lower bearing on a vertical axis; upper means spaced above said member and providing an upper bearing coaxial with the lower bearing; a plurality of related walls rigidly joined together and extending between and rigidly joined to the plate-like member and upper means to afford a rigid box-like element; mounting means spaced from and generally at the level of the plate-like member; and brace means extending between and rigidly joined to the mounting means and to said element.

12. Pedestal structure of the class described, comprising: a transverse lower horizontal plate-like member; upper means spaced above said member and providing an upper bearing on a vertical axis; a plurality of related walls rigidly joined together and extending between and rigidly joined to the plate-like member and upper means to afford a rigid box-like element; mounting means spaced from and generally at the level of the plate-like member; and brace means extending between and rigidly joined to the mounting means and to said element.

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