This invention relates to hydraulic lifting devices of the type employing at least one hydraulic ram unit for tipping a vehicle or trailer body and operating a pivoted crane beam or jib.

Various types of hydraulic ram unit lifting devices are known for use in relation to road or land vehicles and such devices have included rigid, hinged and telescopic jibs or beams.

According to the present invention there is provided a hydraulic lifting device including at least one ram and cylinder unit having an axially movable mounting carrying a unit hinged with attachment means for connection to a vehicle body for tipping purposes, said movable mounting also having a carrier bracket providing a pivot means for one end of a crane beam, the unit ram being pivotally connected, or capable of connection, to the beam intermediate the beam ends and extendable from the mounting to give angular pivotal movement to the beam, and locking means to be used for locking the beam against said angular operation relative to its pivotal axis when the unit is required for body tippping purposes. The axially movable mounting may be an external tubular pillar.

The invention includes a hydraulic lifting device for use on a vehicle, including at least one ram and cylinder unit having a ram axially movable by selection either in relation to or with an external mounting in the form of a pillar, a head stock at the top of the pillar providing a horizontal pivot for a crane beam to be movable angularly in a vertical plane under the control of the said ram pivotally connected to or engaged with the beam in advance of said pivot, means for locking the beam at will against said pivotal angular movement and/or connecting the ram to the pillar, and attachment means on the pillar normally connected to the vehicle body for tipping said body when the beam is locked against angular movement and the hydraulic unit is operated.

The invention will now be more particularly described with reference to the accompanying drawing in which:

FIG. 1 is a side elevation of a vehicle with the improved hydraulic lifting device fitted thereto;
FIG. 2 is a rear view of FIGURE 1;
FIG. 3 is an enlarged detail view of the upper end of the hydraulic device;
FIG. 4 is a detail view of a modified form of mounting for the beam;
FIG. 5 is a part sectional detail view of another form of beam mounting;
FIG. 6 is a part sectional detail view showing a rotatable headstock;
FIG. 7 is a part sectional detail view of a beam with stroke limiting means;
FIG. 8 shows a beam with movable trolley for a lifting means; and
FIG. 9 is a part sectional detail elevation of a headstock provided with alternative pivot points.

In a particular embodiment a known type of telescopic ram 1 and cylinder unit 2, which is usually pivotally mounted at 3 with its hydraulic control gear 4 on the chassis 5 of a vehicle, is used for this invention and is furnished with an external tubular pillar 6, or some other form of mounting, which is capable of axial movement on the outer cylinder of the unit 2. This tubular pillar is also capable of rotation about the unit axis and any known form of means may be furnished for causing such axial rotation. The pillar serves as a mounting as hereinafter described.

Near its upper end the pillar 6 has a fixed flange 7 on which rests a collar 8 (preferably with an interposed thrust bearing) in which the tubular pillar is capable of rotation. This collar is adapted to be attached to a vehicle body 9 and conveniently may have one or more lugs, a flange or plate 10, with holes therein for the tie rods or other means to be attached to the collar. For example, two tie rods 11 are attached preferably to the lower part of the tipping body front wall or body framework with a central tie bracket 12 (or other means) secured to the body head board or other part. This central tie means is secured by a withdrawable pin 17 passed through it and the lug 8a on the collar 8. It will hold the ram and cylinder unit 2 firmly upright when the beam end is down. Above this collar 8 is a bracket 13, forming a head stock, which is fixed to the tubular pillar 6, or to a cap which may be fixed or detachably mounted on the top of the pillar. This bracket 13 has upstanding side parts which embrace, with clearance, the crane beam 14 whose rear end is pivotally connected at 24 to a link 15 the rod end of which passes through bracket 13 and has a stop nut 20 for adjustment. The stop means may take some other form.

In a modified arrangement, if the beam 14 is removed, the locking pin 17 may be inserted through the tubular pillar 6 (or its bracket 13) to connect the ram 1 to the pillar 6 for body tipping purposes through the rods 11. In another arrangement the aforesaid bracket 13 may have one more upstanding members, say a stirrup, in advance of the axis of the ram 1 and cylinder unit 2 and carry locking means to pass through or over or otherwise engage the crane beam 14.

The hydraulic unit 2 may have additional load supporting means in the form of adjustable legs 21 (they are shown detachably or otherwise connected to the aforesaid collar 8) extensible to the ground when the crane is to be used. The legs 21 may be fitted with wheels, feet or ground gripping means.

In a modification, FIG. 4, the top 22 of the ram 1 is detachably connected to the crane beam 14, i.e. withdrawably engaged with a roller or pin 23 on the beam. The beam also has a quick release connection at its rear pivot 24 carried by bracket 13 in that the pin is withdrawable. The beam end may be hooked to engage a fixed pin.

In another arrangement FIG. 5, the beam 14 is mounted on a rearwards disposed pivot 26 and a link 27 connects the ram 1 to the beam 14 to allow for the angular movement of the beam. The locking pin 17 in this case may be above the beam although it could pass through it.

As shown in FIG. 6 the bracket 13 may be rotatably mounted on the top of the pillar 6 so that the beam and its carrier bracket can rotate about the axis of the piston.
and cylinder unit 2. The flange 6a at the top of the pillar may be fixed or detachable and a thrust bearing may be inserted between the bracket 13 and collar 8. FIG. 7 shows more clearly the idea of limiting means for the angular movement of the beam 14 with the beam mounted on a fixed pivot 26.

The crane beam in this instance may be a rigid one of any desired section including tubular, it may be twin side-by-side members, or of lattice beam construction, hinged intermediate its ends to be foldable, or telescopic. In the latter two instances hydraulic control means may be furnished for controlling extension and retraction of the beam in its length. The end of the beam may be adapted to receive an extension or other ladder which may be pivoted thereto or on a universal joint.

Preferably, the means for lifting a load comprises a pulley block unit which is detachably or otherwise connected to the outer end of the beam so that a load can be lifted or lowered in relation to the beam independently of any movement of such beam. Some other lifting rope arrangement may be used. As shown in FIG. 8 the lifting means may be suspended from a movable trolley 29 which is guided along the beam 14.

A further modified arrangement is shown in FIG. 9, wherein the headstock comprises a bracket 13a which is off-set, in its length, from the head of the pillar 6 and is furnished with two pairs of pivot holes 30, 31. By providing two sets of holes in this manner a beam 14 can be mounted on a pivot pin 24 in either of the top holes, or mounted on a link (or links) 15 which will have its pivot pin 16 mounted in either of the lower holes. By allowing for alternative mountings the headstock is more adaptable and if the holes 30 are selected the leverage will be shorter, say for quick lifting of lighter loads, and if either of the holes 31 are selected it allows for greater leverage for heavier loads.

What I claim is:

1. A hydraulic lifting device on a vehicle having a tipping body, including at least one hydraulic ram and cylinder unit, a tubular pillar surrounding and pivoting about the axis of said unit, a headstock on the pillar, said headstock providing a pivotal mounting, a crane beam on said mounting, connection means between said beam and the unit ram for the ram to give the beam angular movement about its pivotal mounting, selection means for locking the beam temporarily at will to the headstock to prevent any angular movement of the beam so that it will only rise and fall with the ram, and attachment means for connecting the pillar to the tipping body of the vehicle for the ram to tilt said body.

2. A hydraulic lifting device according to claim 1, wherein the rear end of the crane beam has a pivotal mounting comprising a link pivotally connected to the pillar headstock.

3. A hydraulic lifting device according to claim 1, including a withdrawable locking pin for securing the beam to the headstock to prevent angular movement of the beam.

4. A hydraulic lifting device according to claim 1, including a bracket mounted on the pillar to move therewith but in a manner that allows the pillar to have axial rotation, said bracket having tie members attached there-to and to the vehicle body so that a rising movement of the pillar through the medium of the crane beam the head stock and the ram will tilt the vehicle body.

5. A hydraulic lifting device according to claim 1, wherein the ram and cylinder unit is pivoted at its lower end to the vehicle and detachably anchored near the cylinder upper end to the vehicle body by means attached to a bracket on the pillar.

6. A hydraulic lifting device according to claim 1, wherein the ram is detachably engageable with means on the beam.

7. A hydraulic lifting device according to claim 1, wherein the beam carrying head stock is rotatably mounted on the pillar.

8. A hydraulic lifting device according to claim 1, wherein the beam carrying head stock has a plurality of beam pivot mounting holes in two sets on opposite ends of the head stock to provide a beam pivot selection and different degrees of leverage.

9. A hydraulic lifting device according to claim 1, wherein the beam carrying head stock has supporting legs attached to the pillar bracket for use when the device is lifting heavy loads.

References Cited

FOREIGN PATENTS


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