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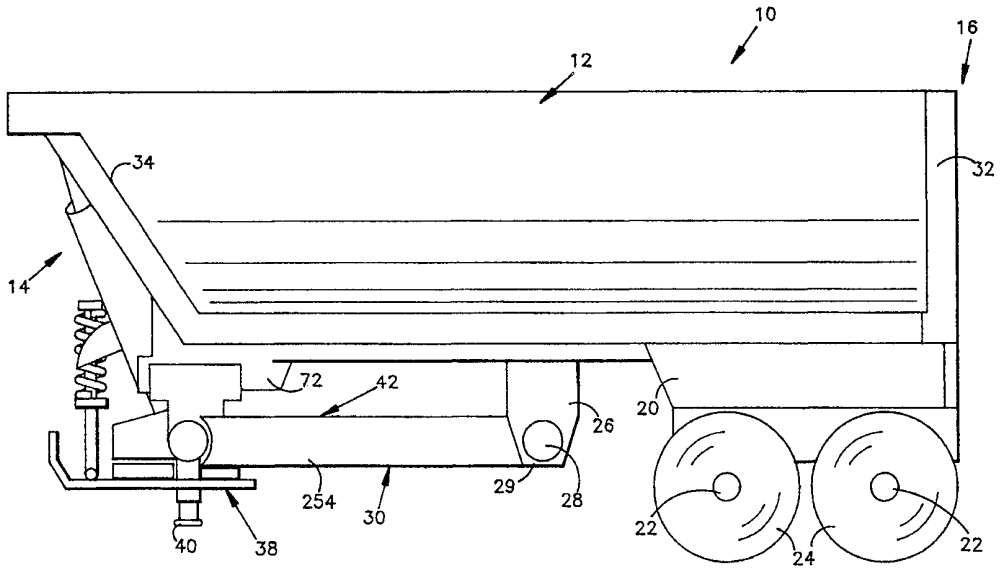

(57) Abstract

A coupler is provided for coupling a frameless trailer (10) to a wheel of a tractor. The coupler includes both a coupling plate (38) having a king pin (40) and a pivot member (128). The pivot member (128) pivotably couples the lower end of a hydraulic cylinder (102) to the coupling plate (38). The hydraulic cylinder (104) lifts the front end of the trailer body between a down or "travel" position, and an up or "dump" position. The coupling plate (38) also includes an upper surface on which forwardly extending (202, 204) and rearwardly extending (208, 210) engagement members are placed. The engagement members (202, 204, 208, 210) extend upwardly from the surface of the coupling member, and each include an upper engagement surface (203, 205, 207, 211).

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A COUPLING MECHANISM FOR A FRAMELESS TRAILER

I. Technical Field of the Invention

The present invention relates to truck trailers of a type normally associated with semi-trailer trucks, and more particularly, to a coupling mechanism for use with frameless trailers.

II. Background of the Invention

Most semi-trailers in use today are so called "frame" trailers. A frame trailer generally has a frame which extends from the front to the back of the trailer. The frame may include means for mounting an axle and wheels to the rear of the trailer; and a king pin at the front of the trailer for coupling the trailer to the fifth wheel of the tractor. A trailer body such as a box body, dump body, or the like is then mounted or constructed on top of the frame.

The king pin of the trailer is typically fixedly positioned with respect to the trailer and is insertable into a receiving aperture of a pivotable fifth wheel of a semi-trailer tractor (a "tractor"). The fifth wheel of the tractor is pivotably mounted to the frame of the tractor. Through this pivotable arrangement, the trailer-tractor connection can better withstand the relative movement of the truck and trailer, which requires the flexibility provided by the vertical axis pivotable (as opposed to fixed) coupling between the trailer and the tractor.

Another type of trailer is a "frameless" trailer. A frameless trailer differs from a framed trailer, since a frameless trailer does not have a full length frame. Rather, the body of a frameless trailer serves as its frame. Typically, a frameless trailer has a body, having a sub-frame disposed at its rear end, on its underside. The sub-frame is configured for receiving one or more axles. The axles are provided for each receiving a pair of wheel sets, for supporting the back end of the trailer above the ground. A coupling plate is pivotably coupled to the front end of the trailer, and includes a king pin that can be received by the fifth wheel of a tractor, for coupling the coupling plate (and hence the front end of the trailer) to the tractor.

On certain type of frameless trailers, such as frameless dump trailers, the coupling plate is preferably pivotably mounted to the front end of the trailer. The pivotable mounting of the coupling

plate to the trailer, when coupled to the pivotal coupling of the fifth wheel to the frame of the truck, induces twice as much potential for pivotable movement, when compared to a framed trailer having a fixed king pin, and whose only pivotable coupling is the horizontal axis pivotal coupling of the fifth wheel to the tractor frame.

Although the pivotable coupling between the coupling plate and the trailer in a frameless trailer is desirable, especially when such a frameless trailer is undergoing a dumping exercise, such pivotable movement is not desirable when the trailer is being towed down a highway. To prevent the coupling plate from pivoting with respect to the trailer, during the towing of the trailer down a highway, the prior, known practice has been to insert a pin into both of the coupling plate and trailer that serves to effectively lock the coupling plate with respect to the trailer, and thereby present the coupling plate from pivoting with respect to the trailer. This pin can then be removed when the trailer is used in its dumping mode.

Although this method of fixedly positioning the trailer and coupling plate with respect to each other performs its intended function in a salutary manner, room for alternate fixation methods exist. It is therefore one object of the present invention to provide such an alternate fixation method.

III. Summary of the Invention

In accordance with the present invention, a coupling means is provided for coupling a frameless trailer to a fifth wheel of a tractor. The coupling means includes a coupling plate having a king pin. The coupling plate also includes a pivot member. The pivot member pivotably couples the lower end of a hydraulic cylinder to the coupling plate. The hydraulic cylinder is provided for lifting the front end of the body between a down or "travel" position, and an up or "dump" position.

The coupling plate also includes an upper surface on which a forwardly extending engagement member and a rearwardly extending engagement member are placed. The engagement members extend upwardly from the surface of the coupling member, and each include an upper engagement surface.

The pivot member also includes an upper surface for receiving a saddle member that is fixedly coupled to a frame support member. A concave lower surface of the opening saddle

member engages the upper surface of a pivot collar. A forwardly extending shoe member extends forwardly from the saddle member, and includes a lower surface for engaging the engagement member. Similarly, a rearwardly extending shoe extends rearwardly from the saddle member, and includes a lower surface for engaging the upper surface of the engaging member. Through this engagement of the lower surface of the front shoe and the upper surface of the engaging member; and the lower surface of the rear shoe with the upper surface of the engaging member, the frame support member and coupling member engage in a manner that prevents the relative pivoting between the two when the frame support member is in its lower, travel position, engaged with the upper surface of the collar of the pivot member.

One feature of the present invention is that it includes a pair of shoes for engaging the coupling plate in a manner that prevents movement of the frame relative to the coupling member. This feature has the advantage of preventing pivotable movement between the dump body and coupling plate, without requiring the engagement or disengagement of pins by the user.

Additionally, a spring loaded rod member is provided that can extend between the pneumatic (or hydraulic) cylinder and the coupling plate. The rod member reduces the amount of pivotable movement between the coupling plate and the body when: (1) the body is in its raised or dumping position; and (2) the frame support member is disengaged from the pivot member. Through this, the front and rear shoes are disengageable from the engaging surfaces of the coupling member.

These and other features of the advantage will be apparent to those skilled in the art upon a review of the detailed description and drawings presented below, that represent the best mode of practicing the invention perceived presently by the applicant.

IV. Detailed Description of Drawings

Fig. 1 is a side elevational view of a frameless trailer; that includes the coupling member of the present invention;

Fig. 2 is a front elevation view of a frameless trailer of the present invention;

Fig. 3 is a sectional view taken along lines 3-3 of Fig 2;

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

Fig. 5 is a sectional view taken along lines 5-5 of Fig. 3;

Fig. 6 is a side elevational, somewhat schematic view of a prior art coupling plate showing the coupling plate coupled to a pivotable fifth wheel of a semi-tractor;

Fig. 7 is a side elevational, semi-schematic view, similar to Fig. 6, but showing the relative movement of the coupling plate and fifth wheel, when the fifth wheel pivots with respect to the semi-tractor frame; and

Fig. 8 is a sectional view taken along lines 8-8 of Fig. 5.

V. Detailed Description of Preferred Embodiment

As best shown in Figs. 1 and 2, frameless trailer 10 includes a generally semi-cylindrically shaped, "round bodied" dump-type body 12, having a front 14 and a rear 16. Sub-frame 20 is coupled to the lower portion of the rear 16 of the body 12. The sub-frame 20 has axles 22 attached thereto for supporting the axles 22, which themselves support the wheels and tires 24 that are mounted to the axles 22.

It is envisioned that the majority of the trailers 10 of the present invention will be tandem axle trailers, that typically carry eight tires (four tires per axle). However, single axle and three or more-axle trailers are also possible with the present invention.

A yoke member 26 extends downwardly from the underside surface of the body 12 of the frameless trailer 10, and is fixedly coupled to the underside surface of the body 12. The yoke member 26 includes a pivot member 28 that pivotably couples the rear end 29 of draft arms 30 to the yolk 26, so that the draft arms 30 can move pivotably with respect to the yolk 26. The draft arms 30 extend forwardly, from their coupling with the yolk 26, and include a forward end 36 that, as will be described in more detail below, is pivotably coupled to a coupler plate 38.

The body 12 also includes a generally angled front panel 34 disposed at the front of the body 12, and a tailgate 32 disposed at the rear of the body 12. Any one of several different types of known tailgate members 32 can be employed.

A coupler plate 38 includes a downwardly extending king pin 40 that is insertable through a correspondingly sized and shaped aperture (not shown) in the pivotable fifth wheel of a tractor (not

shown). The king pin 40 is fixedly coupled to the selectively pivotable coupling plate 38. Through the insertion of the king pin 40 into the aperture of the tractor's fifth wheel, the pivotable fifth wheel (not shown) becomes coupled to coupling plate 38 in a manner that permits the pivotable fifth wheel (not shown) and coupling plate 38 to pivot with respect to each other about a vertical axis defined by the king pin 40.

Turning now to Figs. 6 and 7, a prior art coupling mechanism is shown. As best shwon schematically in Fig. 6, draft arms 430 are pivotably coupled by pivot member 442 to a prior art coupler plate 438. Coupler plate 38 includes a king pin 440 that is insertable through an aperture 443 in a fifth wheel 448 of a semi-tractor. Fifth wheel 448 of the semi-tractor is pivotably coupled by pivot member 450 to a frame member 452 of the tractor.

Fig. 6 best shows this pivotable coupling when the trailer (not shown) is in its down or rest position, and is not moving. At such point, each of the fifth wheel 448, coupling plate 438, truck frame 452, and draft arms 430 are disposed in generally parallel, predominately horizontally disposed planes, which planes are generally parallel to the ground.

However, because the coupling between the trailer and the truck frame includes a pair of pivotable couplings, 442, 450 the relative positions of the various components can move substantially in response to various stimuli, such as changes in the relative position of the truck and the trailer, bumps in the highway, and the like. For example, as shown in Fig. 7, the draft arms 430 are relatively parallel to the ground, but have pivoted about pivot member 442. Through this pivoting, the draft arms 430 are disposed at an angle (and no longer parallel) to each of the coupling member 438 and fifth wheel 448. When this pivoting occurs, the coupling member 438 draft arms 430 and the tractor frame 452 are no longer disposed in the horizontally disposed planes shown in Fig. 6. Because of their configuration, wherein the underside surface of the coupling member 438 engages, the upper side surface of the fifth wheel over a relatively broad area, and the king pin 440 extends through an aperture in the fifth wheel 448 of the tractor, and the coupling member 438 and fifth wheel 448 remain disposed in generally parallel planes. However, the fifth wheel 448 and coupling member 438 are disposed at an angle to the truck frame 452.

An upstanding, laterally extending upstanding plate 456 can be formed on the upper surface of the coupling member 438. The upper surface 457 of the upstanding plate 456 is positioned for engaging the underside surface 459 of the draft arms 430 to provide a stop point to limit counter-

clockwise pivoting of the coupling plate 456 relative to the draft arms 430.

Additionally, a generally longitudinally extending, upstanding, rear facing rib 454 can be formed on the upperside surface of the coupling member to enhance the structural rigidity of the coupling member 438.

Those familiar with handling characteristics of truck trailers understand that this pivotable coupling between a trailer and a tractor about pivot members 442, 450, as shown in Figs. 6 and 7, is usually not preferred under most circumstances. In particular, this type of pivotal movement between a trailer and a fifth wheel is not preferred when the tractor is pulling a trailer down the road, although it can occur in response to certain stimuli, such as the truck and trailer running over a bump, or any significant change in the velocity of the tractor-trailer, such as when stopping or accelerating. This movement between the trailer and tractor about pivot members 442, 450 decreases the stability of the rig, and thus may make the rig more difficult to control.

To overcome this pivotal movement, a pin (not shown) can be inserted to extend through each of the coupling member 438, fifth wheel 448, and frame member 452, to fixedly couple the coupling member 438, fifth wheel 448, and frame member 452 together, thereby preventing pivotable movement. However, one drawback with the use of such a pin is that the pivotable movement between the draft arms 430, coupling member 438, fifth wheel 448, and truck frame 452 is desired when the trailer is raised into its "dump" position. Thus, the use of such a coupling pin (not shown) requires the driver to get out of his cab prior to dumping the trailer, and removing the pin before the truck body is raised to dump its load, to thereby permit pivotable movement between the draft arms 430, coupling plate 438, fifth wheel 448, and truck frame 452 to occur during the dumping of a load from the trailer. Further, after the load has been dumped from the trailer, the driver must then reinsert the locking pin (not shown) to prevent such pivotable movement during the transport of the trailer by the tractor, to its next destination.

Returning now to Figs. 1-5 and 8, which show the present invention, the mechanism for lifting the body 12 of the dump trailer is disposed adjacent to the front end 12 of the trailer 10, and is coupled, at least partially to the angled front panel 34 thereof.

First and second longitudinally extending front underside body support members 70, 72 are fixedly coupled, such as by welding, to the underside surface of the body 14. The rearward ends of the first and second longitudinal members 70, 72 are disposed underneath the underside surface of

the body 14, and the forward ends extend outwardly past the point at which the front panel 34 meets the underside surface. The first and second underside support members 70, 72 are fixedly coupled, such as by welding, on their upperside surfaces, to the lower surfaces of first and second front panel reinforcing frame members 76, 78, respectively. As shown in Fig. 2, the first front panel reinforcing frame member 76, extends upwardly along the forward facing surface of the angled front panel member 34, and the second forward surface reinforcing frame member 78 extends upwardly along the forward facing surface of the angled front panel member 34.

The first forward surface reinforcing frame member 76 includes an upper end 80 and a lower end 82. The underside surface of the lower end 82 is fixedly coupled, such as by welding, to the upper surface of the first longitudinal frame member 70, along that portion of the first front longitudinal frame member 70 that extends forwardly and longitudinally past the intersection of the front panel member 34 and the underside surface. The second forward surface reinforcing frame member 78 also includes an upper end 81 and a lower end 83. The underside surface of the lower end 83 of the second forward surface reinforcing frame member 78 is fixedly coupled, such as by welding, to the upper side surface of the second longitudinally extending front underside body support frame member 72.

As the forward panel 34 is angled (rather than perpendicular), relative to the ground, and as the first and second forward surface reinforcing frame members extend along the forward facing surface of the front panel 34, the first and second front panel reinforcing frame member 76, 78 are also angled relative to the ground. Each of the first and second front panel reinforcing frame members 76, 78 have a generally rectangular cross section, and are preferably constructed as rectangular, hollow, U-shaped channel members that are welded to the angled front panel 34. Preferably, right triangular-shaped members are affixed to the lower ends of each of the first and second front panel reinforcing frame member 76, 78, to provide a widened base for the first and second front panel reinforcing frame member 76, 78, thus providing them with a greater area in which to engage the longitudinally extending front underside body support frame members 70, 72. Additionally, the first and second front panel reinforcing frame member 76, 78 have a bottom surface which is disposed generally parallel to the upper surface of the first and second longitudinally extending front underside body support member 70, 72 to permit the lower ends of the first and second front panel reinforcing frame member 76, 78 to be received interiorly within the U-shaped

channel members that comprise the first and second longitudinally extending front underside body support members 70, 72.

The upper ends 80, 81 of the first and second front panel reinforcing frame members 76, 78 are generally angled, and fixedly coupled to the first and second angle members 84, 86. The angle members 84, 86 each include an angled leg portion 88, 90 respectively, which is fixedly coupled, such as by welding to the angled upperside surface of the upper ends 80, 81 of the first and second front panel reinforcing frame members 76, 78 respectively. The first and second angle members 84, 86 also include upright, generally vertically extending legs 92, 94, respectively, which are disposed to extend generally parallel to each other, and relatively upwardly from the lower, angled leg portions 88, 90. A horizontally disposed connector rod 95, extends between the first and second upright, generally vertically extending legs 92, 94, and is provided for receiving a piston collar 96 that slideably receives the connector rod 95.

The piston collar 96 is provided for coupling the upper end 98 of the piston 100 to the connector rod 95, and, through the connection between the connector rod 95 and the angle members 84, 86, to the first and second front panel reinforcing frame member 76, 78, and to the first and second longitudinally extending front underside body support members 70, 72. The piston 100 is the piston portion of a large sized, heavy-duty, hydraulic or pneumatic cylinder 102 that is capable of exerting enough force to lift the dump body 10, which, when loaded can contain 58 cubic yards of material such as dirt or stones. Pneumatic and hydraulic cylinders 102 of this type are commercially available from a variety of sources.

Cylinder 102 contains a lower, body portion 104, into which the piston 100, can be slideably received, when the piston 100 is in its retracted portion. The cylinder 102 also includes a plurality of valves therein (not shown), for enabling the hydraulic or pneumatic fluid to exert pressure against the head (not shown) of the piston for moving the piston between its fully extended position (not shown) and its fully retracted position, as shown in Fig. 3.

A U-shaped channel bracket member 110 is preferably welded onto the forward facing surface of the body portion 104 of the hydraulic or pneumatic cylinder 102. The bracket 110 includes a pair of generally vertically extending side legs, and a generally horizontally disposed bottom leg portion 111. Bottom leg portion 111 contains an aperture (not shown) therein through which a spring loaded rod 114 can pass. Spring loaded rod 114 includes a first spring 116 that

extends between the upper surface of the horizontally disposed bottom leg portion 111, and an upper spring seat 118 disposed at the top end of the spring loaded rod 114. The spring loaded rod 114 also includes a second spring 120 that extends between the lower surface of the horizontally disposed bottom leg portion 111 and the second, or lower spring seat 124.

The lower end of the rod 126 is pivotably coupled to a pivot pin 128 that extends through an aperture 180 formed in a central reinforcing rib 176 of the coupler plate 38. The first and second springs 116, 120 are generally, fairly heavy-duty springs, and are biased to place the rod in a generally neutral position, wherein the aperture (not shown) of the bracket 110 is disposed midway between the upper seat 118 and the lower seat 124.

The purpose of the spring loaded rod 114 is to reduce the pivotal movement of the coupling plate 38 vis-a-vis the cylinder 102 when the dump body 10 is in its upper, or dump position, and when the dump body 10 is moving between its travel position (Fig. 3) and its dump position (not shown). This reduction of movement that is facilitated by the rod 114 helps to increase the overall stability of the trailer 10, and the coupling between the coupling plate 38 and the body 12 of the trailer 10.

The coupling plate 38 includes a generally planar base portion 140 having a generally ovaloid shape with truncated forward and rear ends. An angled, front skid plate 144 is welded to, or formed as a part of the base portion 140, at the front of the base portion 140. The skid plate portion 154 is angled forwardly to better enable the coupling plate 34 to slideably engage the upperside surface (not shown) of a tractor's fifth wheel, when the tractor (not shown) is being coupled to a trailer 10. This coupling between a tractor and a trailer 10 usually occurs by the tractor being placed in front of the trailer so that the aperture of the fifth wheel is aligned with the king pin of the trailer 10. The tractor is then being backed into engagement with the trailer 10, such that the fifth wheel of the tractor engages the underside surface of the coupling plate 38 in an aligned manner so that the king pin 40 can extend through the aperture (not shown) of the fifth wheel (not shown) of the tractor. A vertically and laterally extending plate-like lip 146 is joined to, or formed as a part of the front portion of the angled front skid plate portion, and is disposed in a generally vertical plane. The coupling plate 38 also includes an angled, rear skid portion 150, that extends laterally across the rear edge of the generally planar base portion 140.

The coupling plate 38 includes a lower surface 162 that is provided for engaging the upper

surface (not shown) of the fifth wheel of a tractor, and an upper surface 164. A first, plate-like, longitudinally extending, upstanding reinforcing rib 168 is attached to the upper surface 164 (Fig. 5) of the coupler plate 38. Similarly, a second, longitudinally upstanding, longitudinally extending reinforcing rib 170 extends between the front surface of the coupler base member 174 and the rearwardly facing surface 177 of the vertically extending lip 146 and front skid plate portion 144. Further, a third, centrally disposed, longitudinally extending, upstanding reinforcing rib member 176 extends between the forwardly facing surface 179 of the coupler base member 174, and the rearwardly facing surface of the front portion 144 and upstanding lip 146 of the coupler plate.

As discussed above, the third longitudinally extending, upstanding reinforcing rib 176 contains a generally horizontally disposed aperture 180 therein through which coupling pin 128 extends for coupling the lower portion 126 of the spring loaded rod 114 to the coupler plate 38. The forwardly disposed, longitudinally extending, first, second and third reinforcing ribs 170, 168, 176, provide enhanced structural rigidity in the coupler plate 38, to better help the coupler plate 38, withstand the load imposed thereon, without any significant twisting or bending movements.

Similarly, rearwardly disposed, first 184, second 186, and third 188, longitudinally extending, upstanding reinforcing rib members are formed or otherwise fixedly attached to the upper surface 165 of the base portion, rearwardly of the coupler base member 174. The first 184, second 186, and third 188 longitudinally extending, upstanding reinforcing rib members are disposed generally co-linearly with their respective forward-facing counterparts 168, 170, 176, and extend generally between the rearwardly facing surface 190 of the coupler base member 174, and the forwardly facing, upperside surface 192 of the rear skid plate 150. The first 184, second 186, and third 188 reinforcing rib members also help contribute to the structural rigidity of the coupler plate 38, to help reduce any bending or twisting movement thereof caused by the loads imposed on the coupler plate 38.

The upper surface 164 of the coupler plate 38 also includes a generally, cuboid-rectangular shaped first, forwardly extending shoe engaging member 202, having any upper, shoe engaging surface 203; and a second forwardly extending shoe engaging member 204, having an upper, shoe engaging surface 205. The first forwardly extending shoe engaging member 203 is disposed generally between the first 168 and central 18, forwardly and longitudinally extending ribs. Similarly, the second forwardly extending shoe engaging member 204 extends generally parallel

with, and in between the second 170 and central 180 longitudinally extending forward ribs.

The upper rear surface 165 of the coupler plate 38 includes first 208 and second 210 rearwardly extending shoe engaging members formed thereon. The first and second rearwardly extending shoe engaging members 208, 210 respectively, also have a generally square or rectangular cross section in a lateral direction, and a generally rectangular cross section in a longitudinal direction. The first and second rearwardly extending shoe engaging members 208, 210, respectively, include upper, shoe engaging surfaces 207, 211 respectively. The upper engaging surfaces 203, 205, 207 and 211 are each generally disposed in a horizontal plane, and face upwardly when installed on a trailer.

Turning now to Figs. 5 and 8, the coupler base 174 is generally formed of a solid piece of steel or aluminum, to better enable the coupler base 174 to withstand the loads imposed by the trailer 10, the front end 14 of which rests thereon. The coupler base 174 includes a first outboard collar stand 218 that is welded or otherwise attached to the outboard, upper surface 220 of the coupler base 174; and a second outboard collar stand 223, that is also attached to the upper surface of the coupler base 174, at its other outboard end. The first and second outboard collar stands 218, 223 are welded, or otherwise fixedly attached to the coupler base 174.

A primary coupling mechanism 219 includes a first 220 and second 224 outboard collar members, first 230 and second 232 inboard collars, and a master pivot pin 238. A first outboard collar 220 is welded, or otherwise fixedly attached to the upper end of the first outboard collar stand 218, and a second outboard collar 224 is welded, or otherwise fixedly attached to the upper surface of the second outboard collar stand 223. The first and second outboard collars 222, 224 include a laterally extending, cylindrical aperture therein, for pivotably receiving a master pivot pin 238, that comprises a cylindrical bar of steel, capable of withstanding the loads imposed thereon by the trailer 10.

A first inboard collar 230 is welded, or otherwise fixedly attached to the upper surface 220 of the coupler base 174, and is disposed at a spaced, laterally inward position from the first outboard collar 222. A second inboard collar 232 is also welded to the upper surface of the coupler base 174, laterally inwardly of the second outboard collar 224.

The first and second inboard collars 230, 232 include generally laterally extending cylindrical apertures that are positioned co-linearly with the cylindrical apertures of the first and

second outboard collars 222, 224, for pivotably receiving the master pivot pin 238 therein. The inner diameters of each of the first and second outboard collars 222, 224 and the first and second inboard collars 230, 232 are designed to be sufficiently greater than the outer diameter of the master pivot pin 238, so that the pivot pin 238 may rotate within the apertures of the four collars, 222, 224, 230, 232. After the master pivot pin 238 is installed within the laterally extending apertures of the outboard collars 222, 224, inboard collars 230, 232, draft arm sleeves, 248, 252, and central, cylinder mounting sleeve 256, end caps 242, 244 can be affixed to maintain the master pivot pin 238 in place. These end caps include a first end cap 242 that is welded, or otherwise fixedly attached to the first outboard end collar 222, and a second end cap 244, that is attached to the second outboard collar 224.

A first draft arm sleeve 248 is pivotably coupled to the master pivot pin 238, and is disposed between the first outboard collar 222 and the first inboard collar 230. The first draft arm sleeve 248 is rigidly coupled to the first draft arm 250. Similarly, a second draft arm 252 includes a generally, laterally extending aperture therein, for permitting the second draft arm sleeve 252 to be pivotably coupled to the master pivot pin 238. The second draft arm sleeve 252 is fixedly coupled to the second draft arm 254 (Fig. 1).

The centrally disposed cylinder mounting sleeve 258 is disposed between the first 230 and second 232 inboard collars, and is pivotably mounted (as are the draft arm collars 248, 252) to the master pivot pin 238. The centrally disposed cylinder mounting sleeve 258 is welded, or otherwise fixedly attached to the base portion 258 of the lower end of the cylinder 104. Through its attachment to the centrally disposed cylinder mounting sleeve 258, the cylinder 104 becomes pivotably mounted to the master pivot pin 238, and hence, to the coupling plate 238, to permit the cylinder 104 to pivot with respect to the coupling plate 238.

A first saddle member 266, includes a generally concave, cylindrical underside surface that is sized and positioned for engaging the upper surface of the inboard collar 230. A second saddle member 268 also includes a concave, cylindrical underside surface, and that is positioned for engaging the upperside surface of the inboard collar 232. (See Fig. 3).

A first yoke member 270, comprised of a pair of upstanding, generally longitudinally extending plates is fixedly attached to the first saddle member 266, and a similar, second yoke 272 is fixedly attached, or formed as a part of the second saddle member 268. The first yoke member

270 is sized and positioned for receiving the first, longitudinally extending front underside body support member 70, and the second yoke 272 is sized and positioned for receiving the second longitudinally extending front underside support member 72. Pins or bolts 274 can be provided for extending through, and fixedly coupling the first and second yokes 270, 272 to the first and second front underside body support member 70, 72, respectively.

Four shoes, 280, 286, 292, and 298 extend generally longitudinally of the saddle members 266, 268. The first forwardly extending shoe 280 includes a lower surface 282 for engaging the upper engaging surface 203 of the first forward shoe engaging member. The first forwardly extending shoe 280 is fixedly attached, such by welding to, and extends generally, longitudinally forwardly of the first saddle member 230 (Fig. 4). The second forwardly extending shoe 286 is also fixedly attached to the forwardly facing surface of the saddle member 232, and includes a lower engaging surface 282 that is sized and positioned for engaging the upper engaging surface 205 of the second forwarding shoe engaging member 204. Shoes 292, 298 are rearwardly extending shoes, and include a first rearwardly extending shoe 292 having a lower engaging surface 294, and a second rearwardly extending shoe 298 having a lower engaging surface 300. The shoes 292, 298 are fixedly attached to the rear facing surfaces. The lower engaging surface 294 of the first rearwardly extending shoe 292 is provided for engaging the upperside surface 207 of the first rearwardly extending shoe engaging member 206. Similarly, the lower engaging surface 300 of the second rearwardly extending shoe 298 is provided for engaging the upperside surface 211 of the second rearwardly extending shoe 208, (Fig. 4).

Turning now to Fig. 3, it will be noted that the second shoe engaging member 204 engages the second forwardly engaging shoe 286, and that the second rearwardly shoe engaging member 208 engages the second rearwardly extending shoe 298, when the trailer is in its rest, or lowered position. When in this position, the engagement between the respective shoes 286, 298 and shoe engaging members 204, 208 prevents the coupling plate 38 from pivoting about master pivot pin 238. As such, this prevents the coupling plate 238 from pivoting with respect to the trailer 10. As will be appreciated, this lower, rest position is the position that the trailer body 10 assumes when the trailer 10 is being pulled down a road or highway by a tractor (not shown), the engagement between the shoes 286, 298 and the shoe engaging members 204, 208 helps to stabilize the trailer when moving, by reducing, if not eliminating, the trailer 10's ability to pivot about the pivot plate 38.

As such, this engagement relatively fixedly positions the trailer 10 and coupler plate 38 with respect to each other, from a standpoint of their ability to pivot with respect to each other. As discussed above, this relative fixed positioning is very desirable, especially, as in the present invention, when it is accomplished without the need of the use of a removable locking pin, such as in the prior art, (see Figs. 6 and 7).

Although the best mode of producing the invention, as perceived presently by the Applicant, is disclosed above, it will be appreciated that variations exist within the scope and spirit of the claims that are appended hereto.

What is claimed is:

1. A coupling mechanism for coupling a fifth wheel of a tractor to a frameless trailer (10) having dump body (12) movable between a raised, dump position and a lowered, travel position, the coupling mechanism comprising

A. a fluid powered cylinder member (104) having a first end coupled to the dump body, and a second end;

B. a coupling plate (38) including

1. a plate member (38)

2. a king pin (40) for engaging the fifth wheel

3. a cylinder coupling pivot member (128) for pivotably coupling the second end of the cylinder to the coupling plate (38);

4. an engagement member (202, 204, 208, 210) fixedly coupled to the plate member (38); and

C. a primary coupler mechanism (219) for coupling the coupler plate to the dump body (12), the primary coupler mechanism (219) comprising

1. a collar (220, 224, 230, 232) having an upper surface;

2. a master pivot member (238) pivotably receivable by the collar (220, 224, 230, 232)

3. a saddle member (266, 268) fixedly coupled to the dump body (12) and having an underside surface for engaging the collar (230, 232)

4. a shoe member (280, 286, 292, 298) fixedly coupled to the dump body (12) for engaging the engagement member (202, 204, 208, 210)

wherein, the engagement between the shoe member and the engagement member prevent pivoting movement of the coupling plate relative to the dump body, when the dump body is in the travel position.

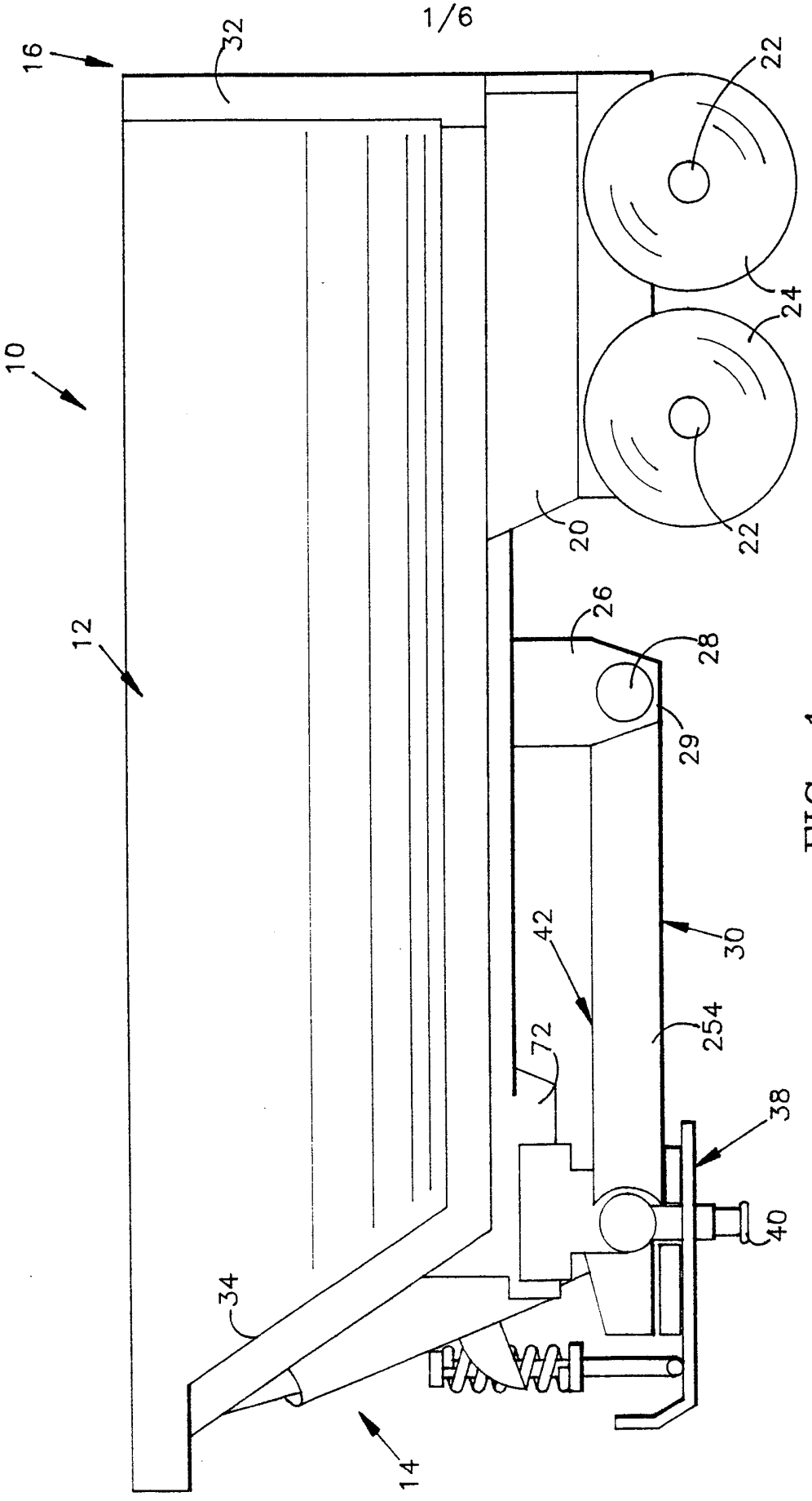

FIG. 1

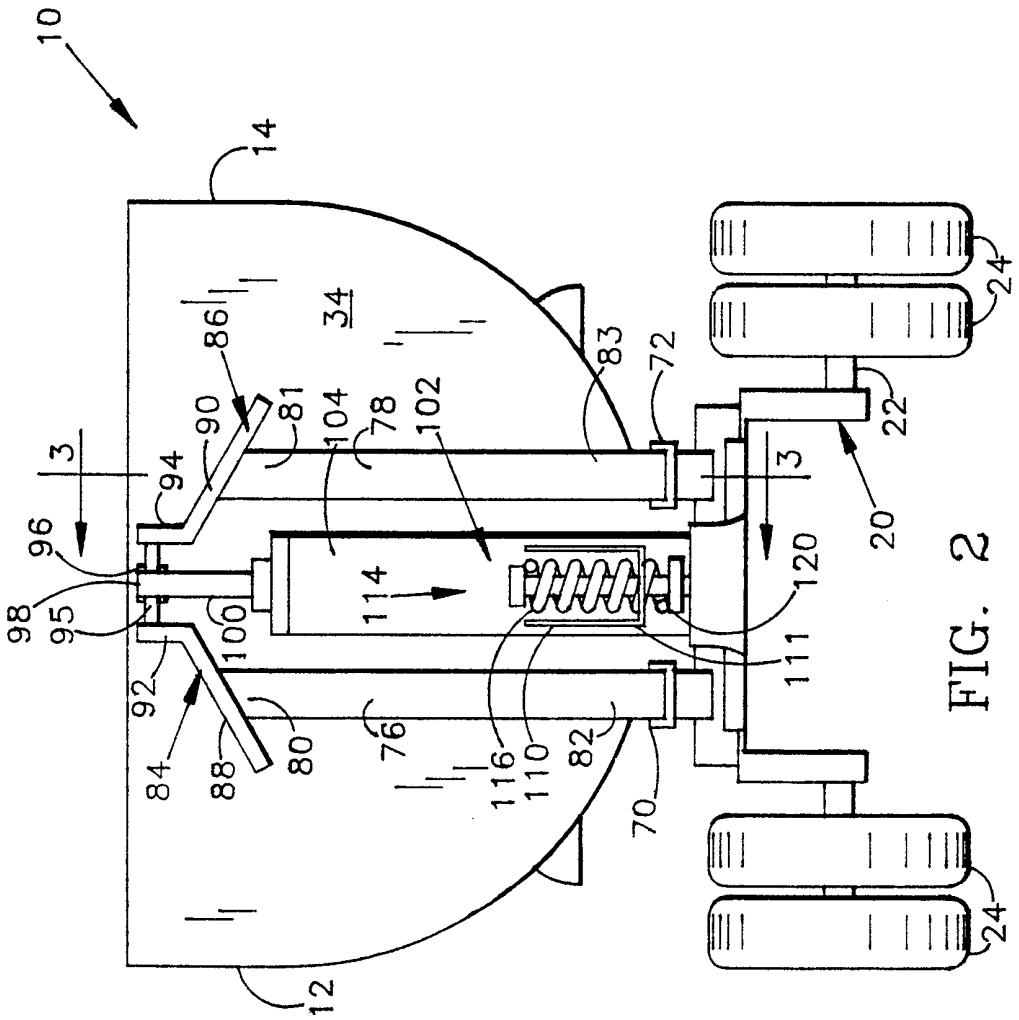
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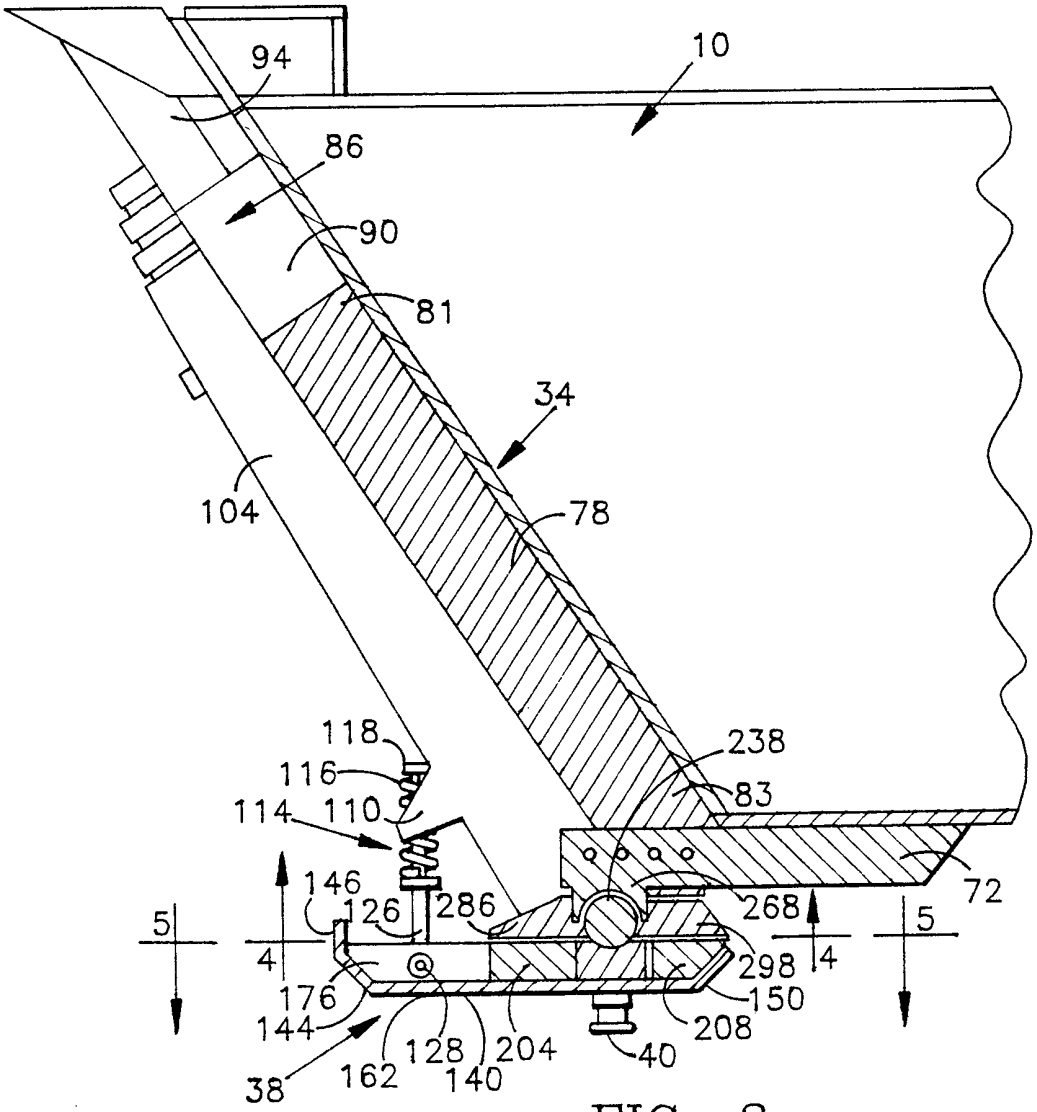
FIG. 2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72
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4
298
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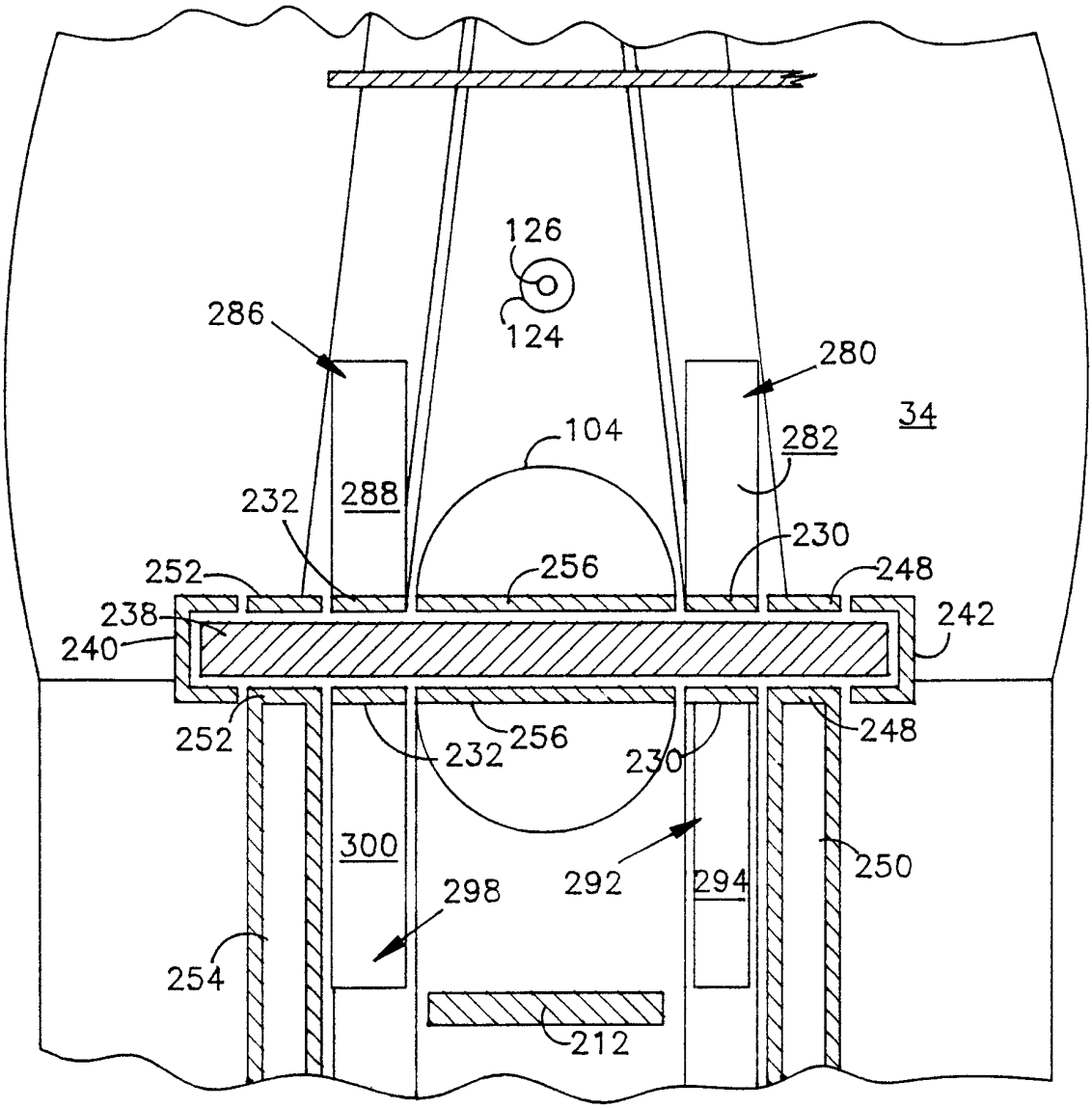
208
128
204
40
38
162
140

FIG. 3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300
292
294
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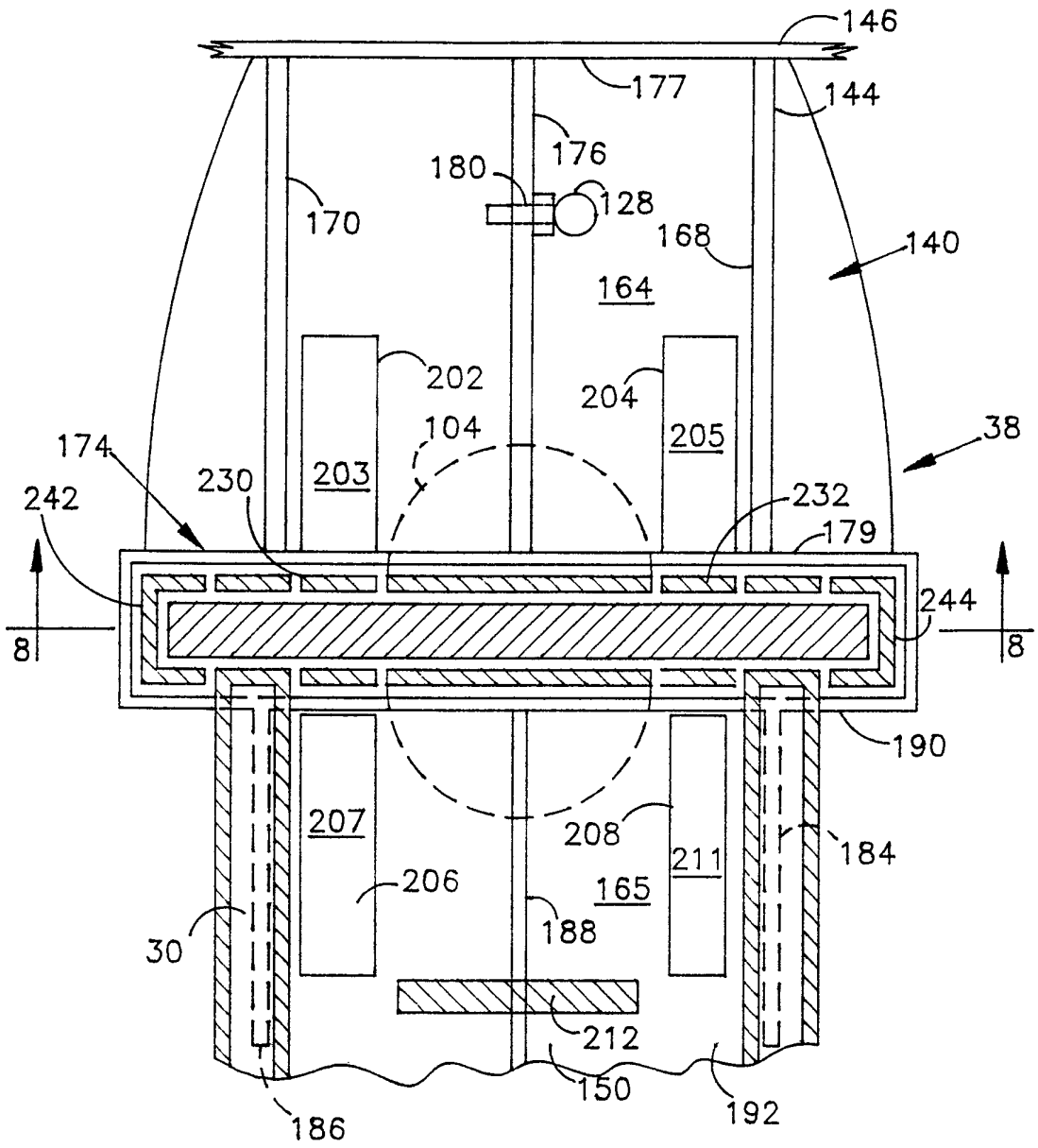
298
254
212

FIG. 4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203
232
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165
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212
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192
186

FIG. 5

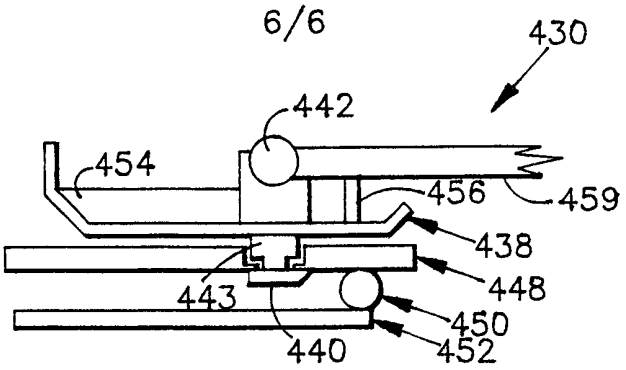

FIG. 6
PRIOR ART

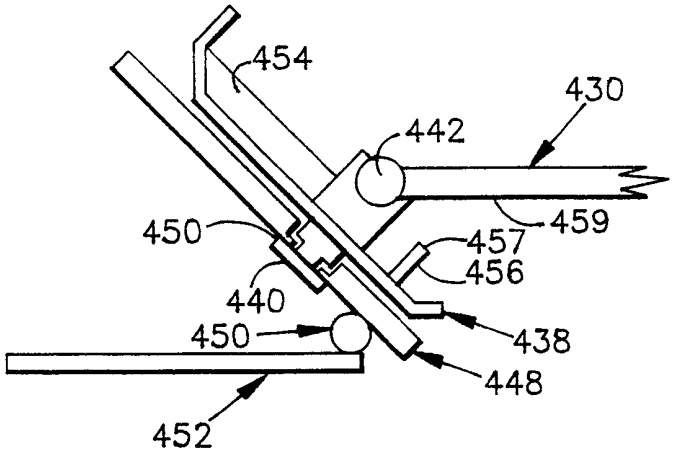

FIG. 7
PRIOR ART

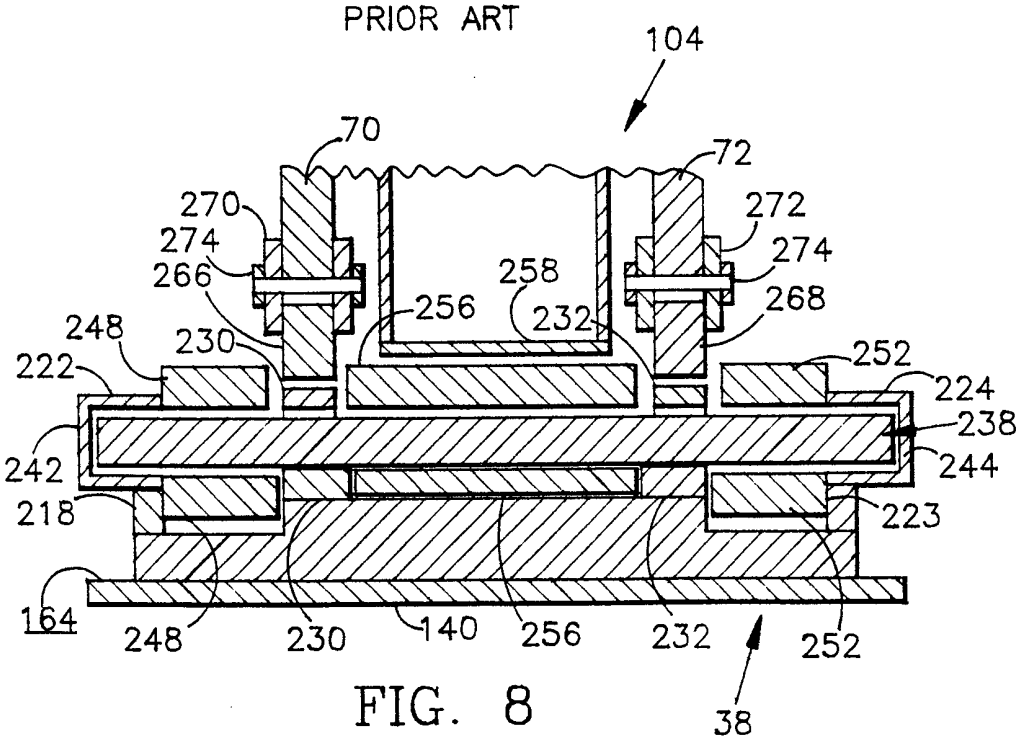

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/25049

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :B60P 1/18
US CL :Please See Extra Sheet.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 298/22AE, 22R, 19R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

none

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,509,724 A (PERRY ET AL.) 23 APRIL 1996, FIGS 1-4.	ALL
A	US 5,758,927 A (KOESTER) 02 JUNE 1998, FIG 3.	ALL
A	US 5,482,356 A (GOODSON JR) 09 JANUARY 1996, ABSTRACT.	ALL

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 20 DECEMBER 1999	Date of mailing of the international search report 24 FEB 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer STEPHEN GORDON Diane Smith for Telephone No. (703) 308-1113

Form PCT/ISA/210 (second sheet)(July 1992)★

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/25049

A. CLASSIFICATION OF SUBJECT MATTER:
US CL :

298/22AE