

Nov. 23, 1937.

B. F. FITCH

2,099,684

MECHANISM FOR HANDLING FREIGHT CONTAINERS

Filed Jan. 22, 1936

5 Sheets-Sheet 1

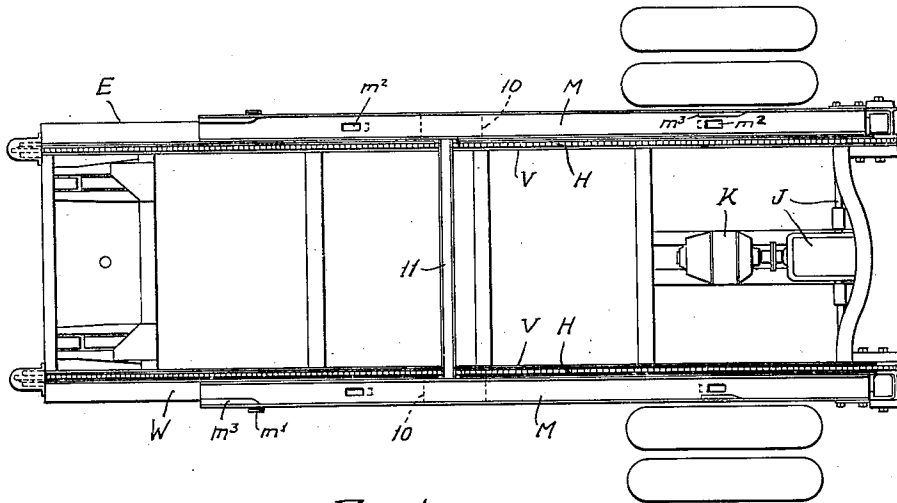


Fig. 1

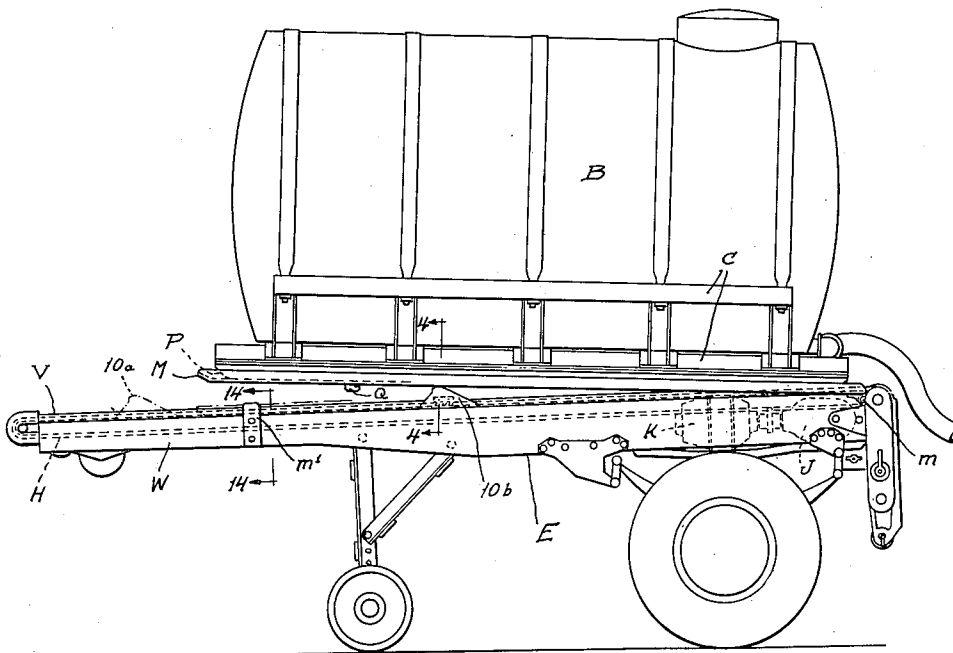


Fig. 2

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5 Sheets-Sheet 2

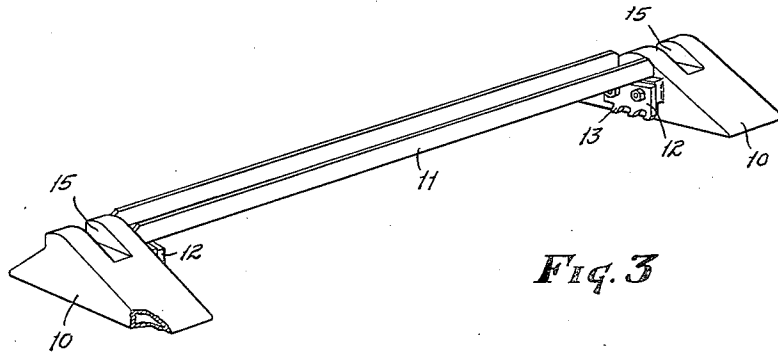


Fig. 3

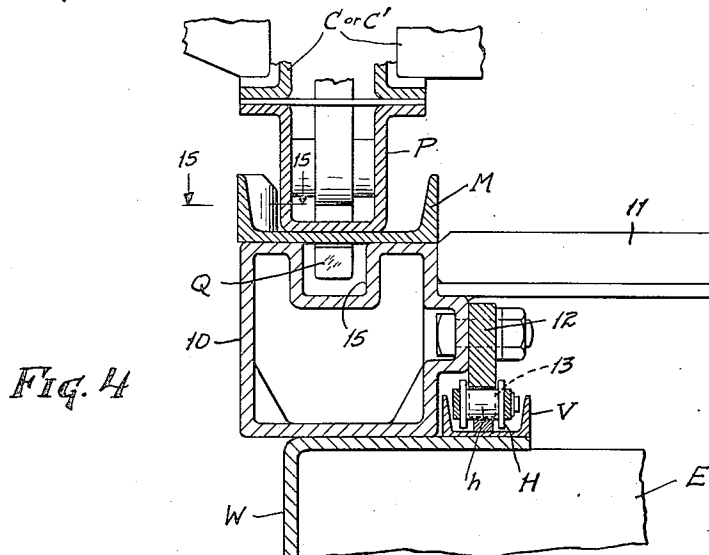


Fig. 4

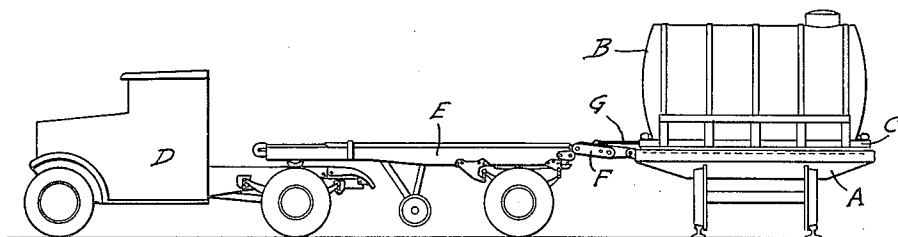


Fig. 5

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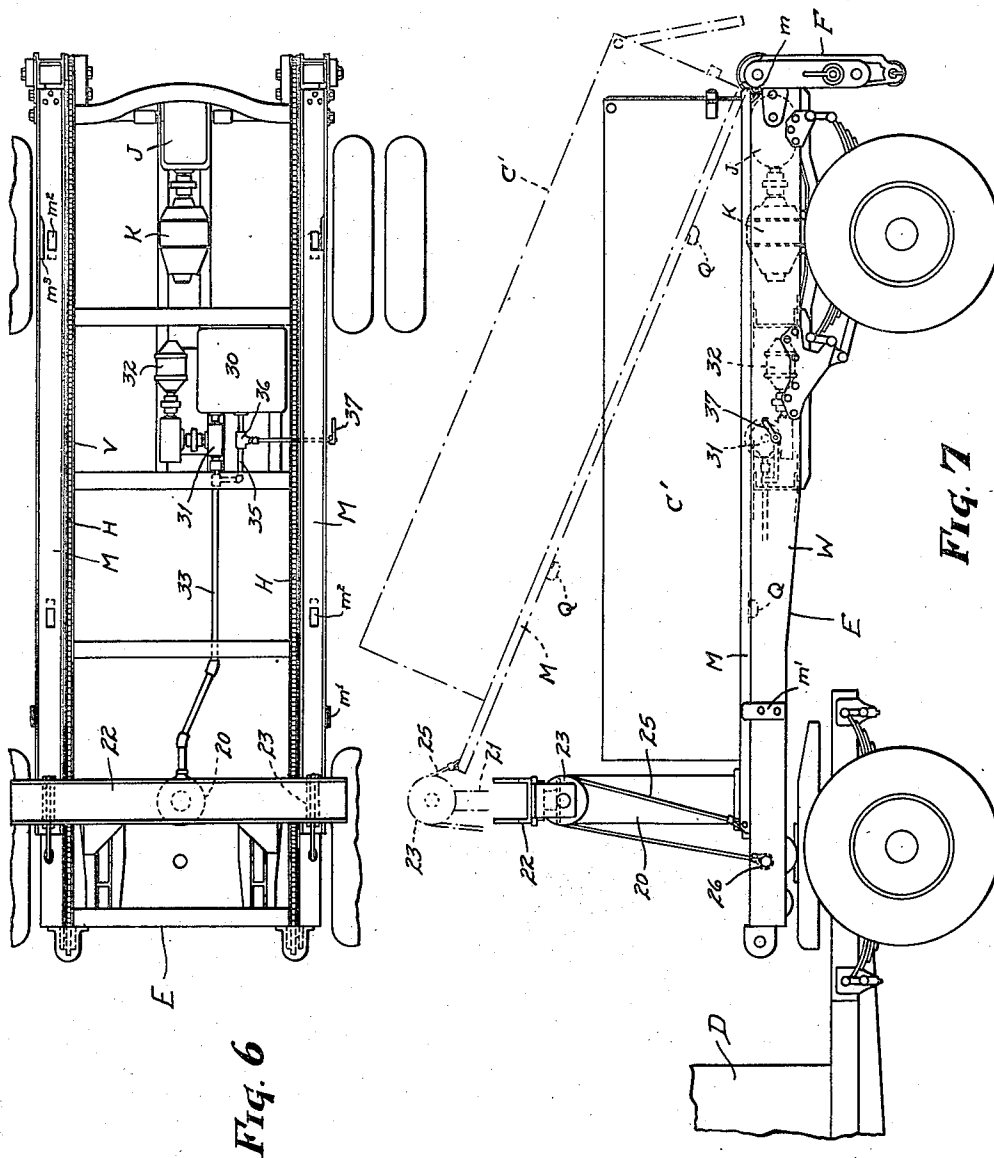
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2,099,684

MECHANISM FOR HANDLING FREIGHT CONTAINERS

Filed Jan. 22, 1936

5 Sheets-Sheet 3.



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2,099,684

MECHANISM FOR HANDLING FREIGHT CONTAINERS

Filed Jan. 22, 1936

5 Sheets-Sheet 4

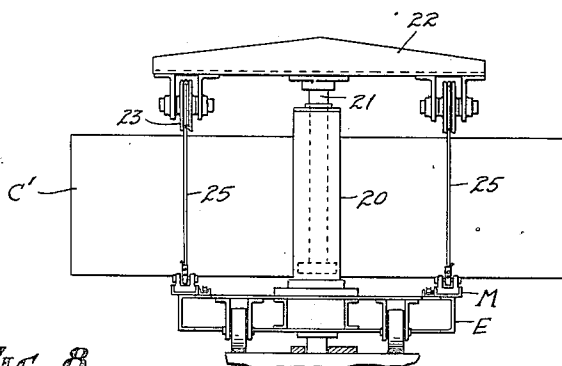


Fig. 8

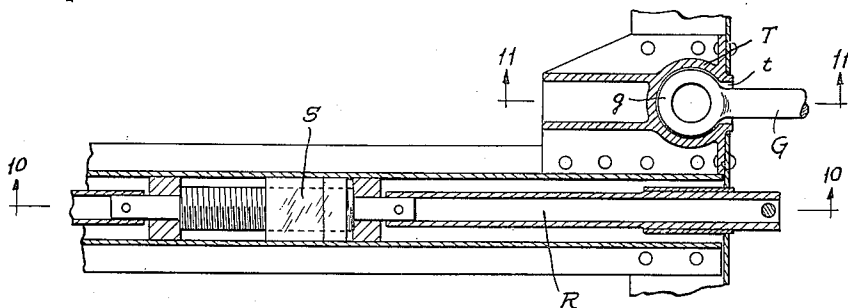


Fig. 9

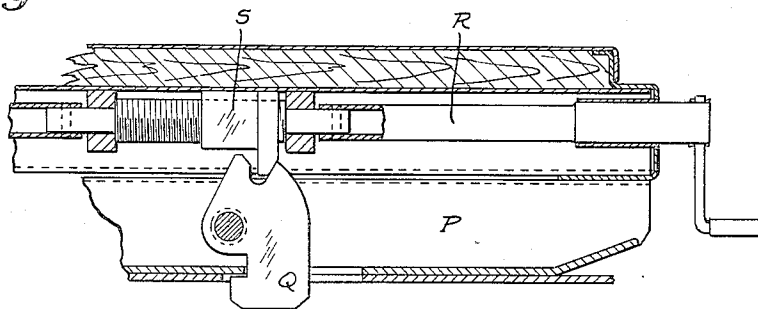


Fig. 10

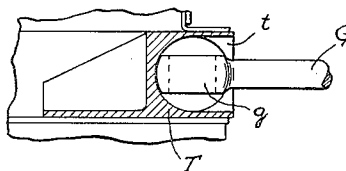


Fig. 11

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2,099,684

MECHANISM FOR HANDLING FREIGHT CONTAINERS

Filed Jan. 22, 1936

5 Sheets-Sheet 5

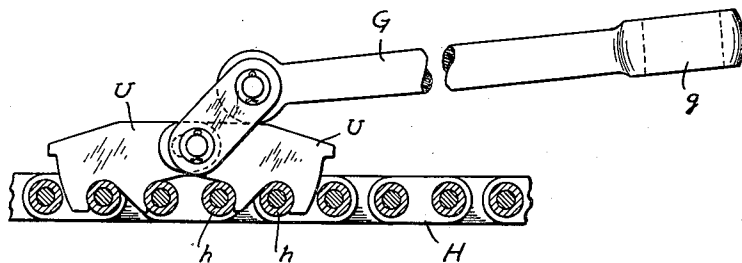


Fig. 12

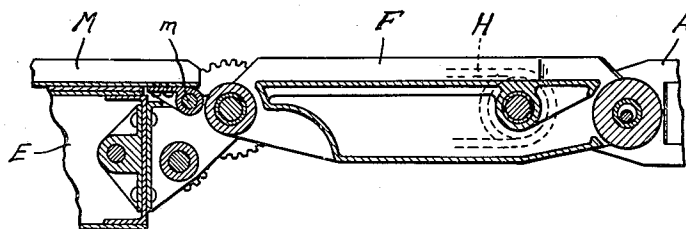


Fig. 13

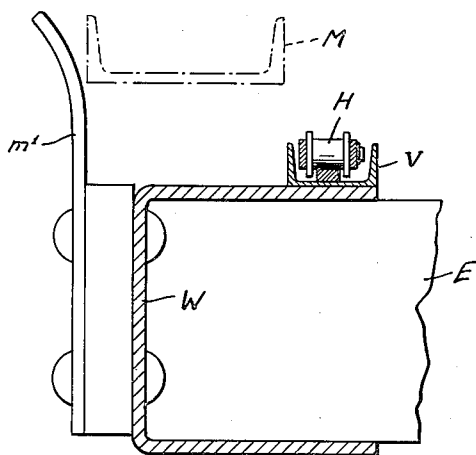


Fig. 14

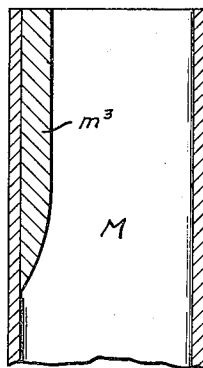


Fig. 15

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UNITED STATES PATENT OFFICE

2,099,684

MECHANISM FOR HANDLING FREIGHT
CONTAINERS

Benjamin F. Fitch, Greenwich, Conn.

Application January 22, 1936, Serial No. 60,248

17 Claims. (Cl. 214-65)

My copending applications Nos. 1,926, filed January 15th, 1935; 32,130, filed July 18th, 1935; 39,725, filed September 9th, 1935; 39,726, filed September 9th, 1935, and 45,616, filed October 18th, 1935, disclose a transportation system comprising a tractor and trailer, the latter carrying bridges at its rear end by which it may be coupled to a railway car, a body for containing goods adapted to be mounted on the trailer, or car, and longitudinally extending endless chains on the trailer and bridges operated by power supplied by the tractor and connected to the body for propelling the body to transfer it from the trailer to the railway car or vice versa. Reference should be made to such applications for claims on various features of such system.

As shown in each of the applications referred to, the body when on the trailer rests on suitable supports forming a fixed part of the trailer. Now I have found that for certain uses it is desirable to be able to tip the body on the trailer, one of such uses being to dump the material from the body through an open tail-gate, and another use being to slightly tip a tank for liquid so that sagging of the forward end of the trailer will not trap liquid in the front portion of the tank, and thereby prevent complete discharge at the rear end. The present invention relates to provisions on the trailer for enabling the tipping of the body mounted thereon, such tipping being effected by power mechanism on the trailer.

Referring more particularly to the use of a transferable tank body, as shown in my application No. 39,726, above mentioned, such body is very useful for the transportation of milk, and in such use it is frequently desirable to uncouple the tractor from the trailer enabling the use of the tractor for other purposes while the trailer, which is then supported at its forward end by struts, remains to support the tank of liquid. With such strut support there is a tendency of the trailer to sag at the forward end, tipping down the tank, so that the discharge conduits at the opposite end cannot entirely free the tank of liquid.

Thus, when my trailer is designed particularly to obviate this difficulty, I provide tipping means readily attached to and operable by the propelling chains of the trailer to raise slightly the forward end of the tank before the tractor is uncoupled, such raising compensating for the subsequent sag when the tractor is removed. I find a very simple mechanism for utilizing the movement of the trailer chains to tip the tank comprises wedges attached to the chains and operated by the motor

thereof to travel in between the trailer chassis and means supporting the tank.

To effect the operation described without throwing undue strain on the tank cradle, I provide longitudinal beams on the trailer which are hinged thereto adjacent the rear end of the trailer and normally lie horizontal on the trailer. The wedges described are adapted to slide in between such supporting beams and the chassis frame to thus tip the beam while the tank cradle is locked to it.

Where it is desired to dump the contents of a body, I utilize similar supporting beams hinged at the rear end to the trailer and having provision for the locking of the body to them, but I furnish means for raising the forward ends of such beams much higher than they can be raised by the inserted wedges. This means may, for instance, comprise an upstanding hydraulic hoist carried at the forward end of the trailer having cables attached to the two beams of the trailer and operated by a cross-head carried by the piston rod of the hydraulic cylinder, there being suitable power mechanism on the trailer for operating such hoist.

My invention, both in the form adapted for tipping a tank to level it and for tipping another form of body to discharge the contents, is illustrated in the drawings hereof and hereinafter more fully described, the essential novel features being summarized in the claims.

In the drawings, Fig. 1 is a plan of my trailer having longitudinal supporting beams hinged to the rear end of the trailer and normally lying horizontally on the chassis frame, such frame carrying propelling chains adjacent the beams, movable wedges being indicated for tipping the beams. Fig. 2 is a side elevation of the trailer with a tank and cradle therefor mounted on the beams of the trailer, these beams with the cradle and tank being shown in slightly tipped position by the insertion of movable wedges. Fig. 3 is a perspective of the wedges adapted to be anchored to the propelling chains for tipping the tank body. Fig. 4 is a vertical section through portions of the trailer and tank cradle and one of the interposed wedges, as indicated by the line 4-4 on Fig. 2; Fig. 5 is an elevation of a transportation system employing the tank and cradle, shown as mounted on a flat car, the trailer being coupled to such car in position for the propulsion of the tank from a car to the trailer. Fig. 6 is a plan of the trailer of Fig. 1, equipped with mechanism for tipping the forward ends of the normally horizontal beams sufficiently high to dump the

load. Fig. 7 is a side elevation of the trailer shown in Fig. 6, with the forward end of the body raised for dumping the contents, the hoist being intermediately broken away. Fig. 8 is a sectional front elevation of the trailer of Fig. 6. Fig. 9 is a horizontal section through the lower portion of the body shown in Figs. 7 and 8 or the tank cradle of Figs. 2 and 5, to show the attachment of the push and pull bar to the body or cradle and the operating mechanism for the lock. Fig. 10 is a vertical section through the lock of the tank cradle or body, as indicated by the line 10—10 on Fig. 9. Fig. 11 is a detail of the attachment of push and pull bar to the body or cradle, being a vertical section indicated by the line 11—11 on Fig. 9. Fig. 12 is an elevation of one of the push and pull bars and the means connecting it to one of the propelling chains on the trailer. Fig. 13 is a vertical section through the rear end of the trailer and one of the bridges hinged thereto, showing also the pivotal connection of the longitudinal tippable beam of the trailer. Fig. 14 is a detail of a guide for the longitudinal beam, being a vertical section indicated by the line 14—14 on Fig. 2. Fig. 15 is a fragmentary detail of one of the longitudinal tippable beams of the tractor, being a horizontal section indicated by the line 15—15 on Fig. 4.

Referring first briefly to the general transportation system as indicated in Fig. 5, A indicates a railway car and B a body adapted to be carried thereby. As shown in this view, the body is a tank and rests on and is rigidly attached to a cradle designated C, which in turn rests on the railway car. D indicates a tractor and E a trailer supported thereby at the forward end, and connected at the rear end with the car by suitable bridges F hinged to the rear end of the trailer and adapted to be temporarily attached to the car. G indicates push and pull bars which are attached at one end to the body or the cradle for the tank and at the other end to longitudinal propelling chains on the trailer. These chains do not appear in Fig. 5, but are shown at H in Fig. 1. They are connected by suitable reduction gearing shafts etc. indicated at J to a motor K. This motor is adapted to be energized from a generator mounted on the tractor and driven by the engine of the tractor.

Such transportation system as just described is shown in my prior applications referred to, but in those applications the trailer support on which the body slidably rests is fixed to the trailer. In the present invention this support comprises beams hinged at their rear end to the trailer frame and adapted to be elevated at the forward end. Such beams are shown at M in Figs. 1, 2, 6 and 7. They are hinged at their rear ends to the chassis frame, as indicated by the pivot pin *m* in Fig. 13, and are guided near their forward ends by a bar *m1* upstanding from the chassis frame, as indicated in Figs. 2, 7 and 14.

Before describing the two mechanisms shown for raising the forward end of the trailer beams M, I will describe the means indicated for locking the body to such beams, as it is important to have the body so locked before the tipping begins. I will also describe the means of attaching the push and pull bar to the body and the chain, these mechanisms being identical in the two types of bodies and tipping mechanisms shown.

The locking mechanism is illustrated herein in Figs. 9, 10 and 4, and will be only briefly de-

scribed, reference being made to my copending application No. 32,130, for a fuller description of the same and for claims thereon.

The tank cradle C or the body indicated at C1 in Figs. 6 and 8, has on its underside a pair of hollow parallel shoes P, which are adapted to form skid rails slidable along the channels M of the trailer. Pivotaly mounted within each shoe is a pair of locking hooks Q, facing each other and adapted to extend downwardly beyond the shoe and pass through openings *m2* in the beam M of the trailer to thus lock the body firmly to such beams.

To operate the hooks, I provide in the base frame of the body or in the tank cradle C a rotatable right-and-left screw shaft R, which carries a pair of slidable but non-rotatable nuts S, each nut engaging a notch in the upper portion of one of the hooks Q. This enables a crank applied to the shaft R to swing the two hooks toward or from each other to cause them to lock the body to the beams or free it therefrom.

As the shoes P have preferably considerable side clearance in the channels M, I provide guides *m3* on the inner face of one of the vertical flanges of the channel adjacent the locking openings *m2*, which will so guide the body or cradle that the locking hook Q will laterally register with the opening *m2* when the action of the propelling chains has brought these hooks into longitudinal registration.

At one side of the locking shaft R, I provide in the base frame of the body or cradle a hollow spherical socket T (Figs. 9 and 11) which has a rectangular entrance opening *t*, the opening being shown as having its large dimension in the vertical direction. The push and pull bar G heretofore referred to, has a flattened spherical head *g* adapted to be passed through the opening *t* into the socket T. Thereafter, by a quarter turn, the head G assumes a position within the spherical socket transversely of the elongated mouth, and thus is locked to the body. At its other end the bar G is connected by links as shown in Fig. 12 to a pair of mutually pivotally connected jaws U, which are adapted to engage effectively the cross members *h* of the chain H, as described more in detail in my application Serial No. 45,616.

I will now take up the description of the mechanism for slightly tipping the tank to effect a levelling of the same when the tank sags, this mechanism being shown in Figs. 2, 3 and 4. Included in this mechanism are a pair of wedges 10, which are preferably hollow castings connected together by a cross bar 11. Each wedge has on its inner face a block 12, suitably bolted or otherwise secured to it, which has downwardly projecting teeth 13, adapted to engage between the cross members of the chain H, these cross members being preferably rollers *h* on cross pins connecting the chain links, as shown more particularly in Fig. 12.

The chain H rides in a suitable upwardly facing channel member V, which is rigidly mounted on the longitudinal chassis sill W of the trailer. This channel, as shown in Fig. 4, is located adjacent the inner edge of the top flange of the chassis sill and the face of such flange beyond the channel V normally engages and supports the hinged channel beam M which rests on the chassis alongside of the chain channel V. Now the wedge 10 has a flat lower face adapted to rest on the chassis sill flange in place of the beam M, and has a top surface of substantially the same

width, adapted to engage the under surface of the beam M, as shown in Fig. 4.

Each of the wedges 10 is recessed at its ridge as indicated at 15, to provide clearance for the downwardly extending hooks Q. The cross bar 11 is of such length that it holds the wedges spaced corresponding to the spacing of the beams M and with the jaw blocks 12 spaced according to the two chains H.

10 It follows from the construction described that when it is desired to tip the tank cradle it is only necessary to mount the wedges on the chassis frame W beyond the front ends of the beams M as indicated by the dotted lines 10a in Fig. 2.

15 Then with the cradle locked to the beams M, as shown in Fig. 2, and unattached to the chain, an operation of the motor K in the proper direction will carry the wedges toward the rear beneath the slightly inclined ends of the beams M and thus gradually tip up that end of the beams, cradle and tank. Fig. 2 indicates at 10b a suitable final position for the wedge where the tank has been tipped sufficiently to compensate for sagging of the forward end of the trailer when detached from the tractor.

25 It will be seen that the provision of two connected wedges with their jaws provides a simple attachment for effecting the result desired. This attachment may be normally carried by the trailer in front of the supporting beams and out of position for engagement with the chain, but whenever desired may be readily lifted manually into attaching position and operated to effect the tipping of the tank by the mere operation of the chain motor K before the tractor is detached.

30 The other mechanism I have provided for tipping the body supporting beams of the trailer at their forward ends, utilizable primarily when it is desired to dump the contents of the body, is illustrated in Figs. 6, 7 and 8. As there shown, I provide on the trailer, between the forward portions of the beams M, an upright cylinder 20. In this cylinder is a piston having a vertical piston rod 21 on the upper end of which is mounted a cross-head 22. On this cross-head are a pair of depending brackets having sheaves 23. These sheaves are the same distance from center to center as the two beams M. A pair of cables 25, attached to the ends of the beams, pass over the sheaves and have their free ends anchored as at 26 to the chassis frame beyond the end of the beams.

35 It follows from the described construction that when fluid under pressure is admitted to the bottom of the cylinder 20 beneath the piston therein, the cross-head 22 is shoved upwardly, thus pulling up on the forward ends of the beams M and tipping the body as illustrated in Fig. 7. Obviously, an increased length of cylinder and piston rod might be employed to enable tipping of the body to a greater angle than that shown. It will be noted that the forward body-hooks Q face rearwardly, so that the body, locked to the beams M, cannot slip down those beams, no matter how steep the incline. When the body has been tipped, the open tail gate allows the contents of the body to readily pass out at the rear end.

40 To supply the pressure to the cylinder 20, I provide hydraulic pumping mechanism operated by a suitable electric motor. As indicated in Fig. 6, 30 indicates a tank adapted to contain oil or other liquid, 31 a pump connected therewith, 32 a motor with reduction gearing for operating the pump, 33 a conduit leading from the pump to

the lower portion of the cylinder 20. By this construction the operation of the motor 32, by current supplied from the tractor generator, may force liquid into the bottom of the cylinder and thus dump the body and hold it in any raised position.

The reduction gearing between the motor and hydraulic pump may readily be self-locking to hold the load in any given position, and a suitable circuit breaker may be furnished to shut off the motor when the load has reached its maximum height.

To lower the body, I provide a by-pass 35 from the conduit 33 to the tank 30 around the pump 31, the by-pass being under control of a valve 36 which may be operated by a handle 37 at the side of the chassis. This valve is closed during the raising of the body, but whenever it is desired to lower it, the valve is opened by its handle 37, and the liquid in the conduit 33 may thus pass freely back into the tank 30, allowing the piston and cross-head and the raised body to descend by gravity.

45 It will be seen that the hoist construction described is comparatively simple and requires no extra room on the trailer. The cylinder stands between the forward portions of the beams M directly in front of the horizontal body, and the hydraulic system leading to the cylinder may be carried in idle space between the chassis side sills. The mere operation of the electric switch will result in the motor operating the hydraulic system to tip the body, as desired, after which the operation of the by-pass handle may cause its return to normal position.

50 The inner flange of the channel beam edge is limited in position by the fixed chain carrying channels V. To insure the beams M being in proper position as lowered, I provide the strips m', heretofore mentioned, which rise from the chassis sills on opposite sides of the truck adjacent the forward ends of the pivoted beams. Accordingly, as these channel beams are being lowered, if they are displaced laterally in either direction, one or the other of the beams will engage the outwardly bent upper portion of one of the bars m', which will act to cam that beam, and automatically the other beam, (by reason of the connection between them provided by the body or cradle) so that when lowered the beams return exactly into normal position resting on the chassis sills.

55 It has heretofore been proposed to provide truck chassis with tilting platforms on which demountable bodies may be mounted and thus dumped. However, as far as I am aware, such tilting platforms have never been combined with endless chain propelling mechanism mounted on the chassis to move the body onto and off of the platform. Instead of a platform, I use the two individual supporting beams which only become cross-connected by the body itself resting thereon. By thus avoiding any cross-connections directly from one beam to the other, such as is employed in the case of a platform, I am enabled to mount the propelling chains between the supporting beams and have them accessible throughout the entire length of the supporting beams.

60 If the beams were cross-connected below the chains, the tipping of the body would be prevented or unduly limited. Or, if the beams were cross-connected above the chains the full stroke of the push and pull bar attached to the chains would be prevented. On the other hand, to 75

mount the chains on the outer sides of the body supporting members to enable the latter to be cross-connected unduly widens the truck or narrows the support for the body, and also introduces difficulties in the way of driving the chains.

It will be seen that by providing the fixed chain carrying channels as guides for the inner edges of the raisable channel beams and the upright positioning or camming bars limiting the outward movement thereof, I maintain the channel beams in proper position when no body is resting thereon. When a body is on the channel beams and locked to them, they become thereby effectively braced laterally.

It will also be seen that my improved trailer, with its channel-shaped supporting beams M hinged at the rear end of the trailer and normally lying horizontally on the chassis frame, provides for all the service of my former trailers, having fixed channel beams for supporting the body, while this improved construction has the additional advantage of enabling tipping of the body as desired.

I claim:

1. The combination of a highway trailer, having a pair of parallel propelling chains mounted on its chassis, motor mechanism and gearing for operating said chains, a pair of individual load supporting members carried by the trailer chassis on the outer sides of the chains respectively, and power actuated means for tilting said members to tilt a body resting thereon.

2. The combination of a vehicle provided with a pair of longitudinal propelling chains, a pair of longitudinal supporting beams carried by the vehicle on the outer sides of the chains respectively and hinged to the vehicle adjacent the rear end of the vehicle and free for vertical movement about their hinge axes, and means for simultaneously lifting the forward ends of both beams.

3. The combination of a vehicle provided with a pair of propelling chains, a pair of supporting beams carried by the vehicle on the outer sides of the chains respectively and hinged to the vehicle adjacent one end of the beams and free for vertical movement about their hinge axes, a demountable body adapted to rest on said beams, means for locking the body to the beams, and means for simultaneously lifting the free ends of both beams.

4. The combination of a truck chassis, a pair of parallel propelling chains mounted thereon, motor mechanism for operating said chains, a pair of supporting beams hinged to the chassis adjacent one end of the beams, a demountable body, means for attaching it to the chains, whereby the body may be moved onto or off of the beams, and means for simultaneously raising the free ends of both beams.

5. The combination of a vehicle, a pair of propelling chains mounted thereon, motor mechanism for operating said chains, a demountable body, means for attaching it to the chains, whereby the body may be moved onto or off of the vehicle, and means including a pair of wedges adapted to be attached to the chains and moved thereby to tilt the body.

6. The combination of a truck chassis, a pair of longitudinal propelling chains mounted thereon, motor mechanism for operating said chains, a pair of upwardly facing channel beams extending longitudinally of the chassis hinged to it adjacent the rear ends of the beams, a demountable body, means for attaching it to the chains,

whereby the body may be moved onto or off of the beams, and means adapted to be attached to the chains and moved thereby to raise the beams and thus tilt whatever body stands thereon, said body being provided with downwardly extending locking hooks adapted to extend through openings in the webs of the channel beams to lock the body thereto.

7. The combination of a highway truck, a demountable body adapted to be carried thereby, a wedge adapted to be moved between the truck and body to tip the body with reference to the truck, and power mechanism for bodily moving the wedge.

8. The combination of a vehicle, body supporting members thereon hinged to the vehicle, wedges adapted to be moved under said members, and power mechanism for bodily moving the wedges.

9. The combination of a vehicle, a pair of beams hinged to the vehicle, said beams being adapted to support a demountable body, propelling chains carried by the vehicle extending parallel with said beams, and wedges adapted to be attached to the chains to pass between the beams and the vehicle.

10. The combination of a highway truck, a pair of upwardly facing channel beams hinged at their rear ends adjacent the rear end of the truck extending longitudinally along the truck, said beams being adapted to receive shoes on the base of a demountable body, propelling chains carried by the truck extending parallel with said beams, and wedges adapted to be attached to the chains to pass between the beams and the chassis.

11. The combination of a vehicle, a pair of upwardly facing channels fixed thereto, propelling chains in the respective channels, mechanism on the vehicle for moving the chains within the channels, a pair of body supporting beams hinged adjacent their ends to the vehicle and adapted to rest thereon alongside of the fixed channels, means for raising the free ends of said beams, said beams being immediately on the outer sides of the fixed channels and limited thereby against inward movement.

12. The combination of a highway truck, a pair of upwardly facing channels fixed thereto, propelling chains in the respective channels, mechanism on the truck for moving the chains, a pair of body supporting beams hinged adjacent their ends to the vehicle and adapted to rest thereon alongside of the fixed channels, means for raising the free ends of said beams, and means for guiding said beams into position adjacent the fixed channels when lowered.

13. The combination of a vehicle, a pair of upwardly facing channel beams arranged parallel with each other longitudinally of the vehicle and hinged to the vehicle adjacent the rear end of the beams, a demountable body having shoes adapted to occupy the channels of the beams, means for locking the body to the beams, camming guides within the channel of said beams to position the body laterally, and means for raising the free ends of the beams to tip the body.

14. The combination of a vehicle, a demountable body adapted to be carried thereby, propelling chains on the vehicle, means for attaching them to the body to move the body onto or off the vehicle, a pair of wedges adapted to pass between the vehicle frame and the body to tip the body, means for attaching said wedges to the chains, and a cross-bar connecting said wedges

and spacing them corresponding to the spacing of the beams.

15. The combination of a vehicle having a frame, a pair of beams hinged to the frame adjacent one end of the beams, a demountable body having supporting members adapted to rest on the beams, downwardly projecting locking hooks carried by the body and adapted to extend through openings in the beams, wedges adapted to rest on the vehicle frame and pass between it and the beams to tip the body which is locked to the beams, said wedges being recessed at their upper edges to enable them to pass the hooks on the body, and mechanism for moving the wedges.
16. The combination of a vehicle having a frame, a pair of longitudinal beams hinged to the frame adjacent the rear ends of the beams, propelling chains on the vehicle extending parallel with the beams, a demountable body having supporting members adapted to rest on the beams, means for attaching the body to the chains to

move it to and from the vehicle, downwardly projecting locking hooks carried by the body and adapted to extend through openings in the beams, wedges adapted to rest on the vehicle frame and pass between it and the beams to tip the body which is locked to the beams, said wedges being recessed at their upper edges to enable them to pass the hooks on the body, and means for attaching the wedges to the chains whereby they may be forced between the vehicle frame and beams.

17. The combination of a trailer having a pair of individually movable beams hingedly attached at their rear ends to said trailer and formed to receive skid rails of a body, means for locking such body to the beams characterized by the fact that any warpage of the body is compensated for by the individual movement of the beams, and means for elevating the forward ends of said beams.

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