Aug. 17, 1926. 1,595,981

O. BALLERT

HYDRAULIC TIPPING DEVICE, ESPECIALLY FOR POWER DRIVEN FREIGHT VEHICLES

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Fig. 1

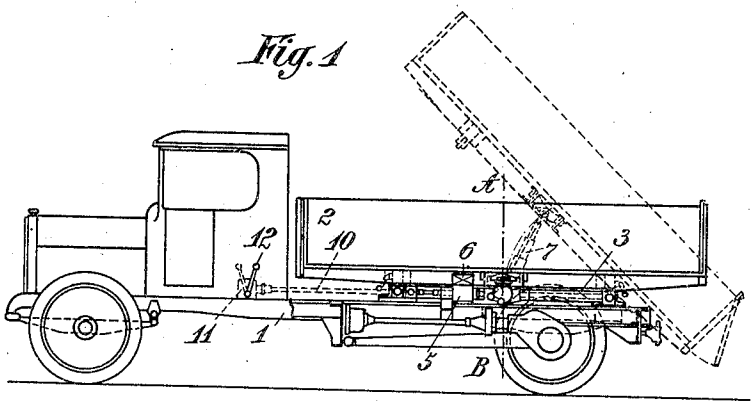


Fig. 2

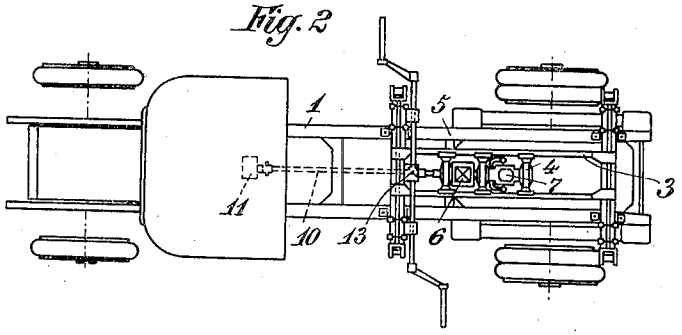
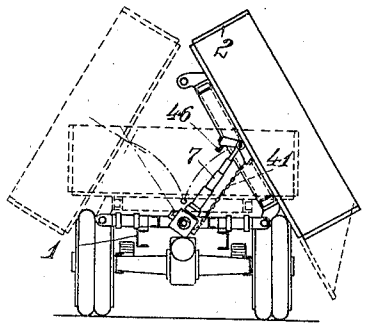


Fig. 3



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Fig. 4

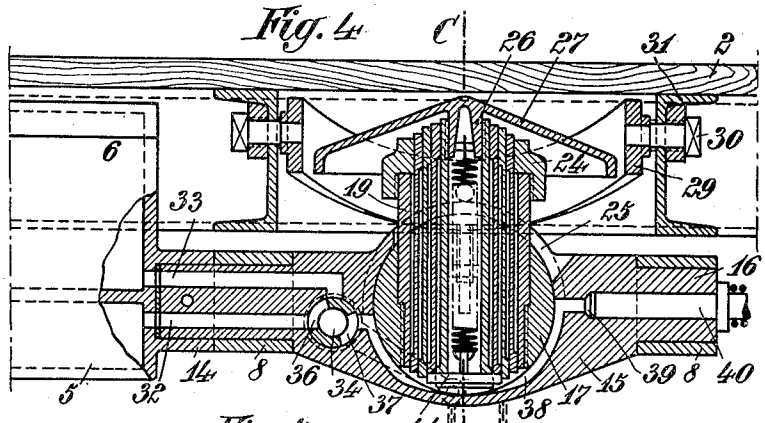


Fig. 5

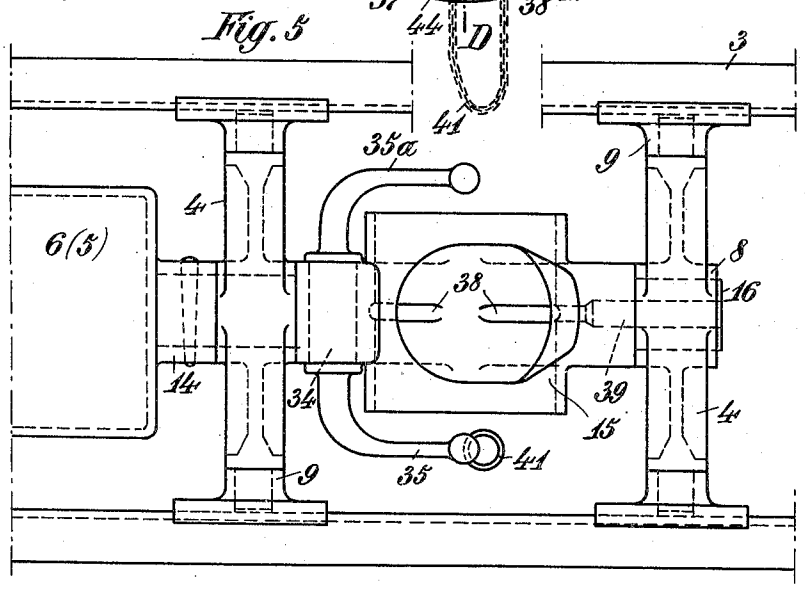
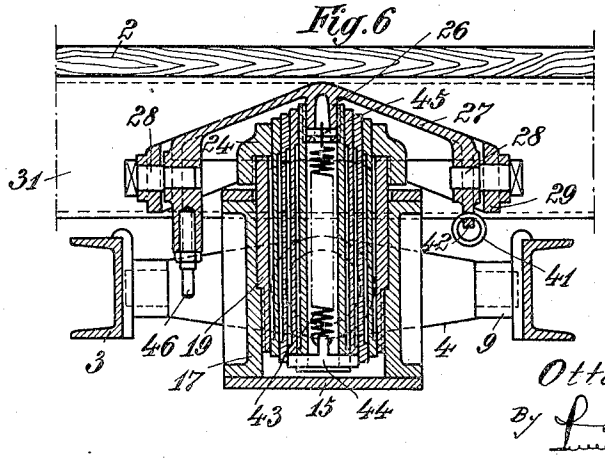


Fig. 6



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HYDRAULIC TIPPING DEVICE, ESPECIALLY FOR POWER DRIVEN FREIGHT VEHICLES

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Fig. 8

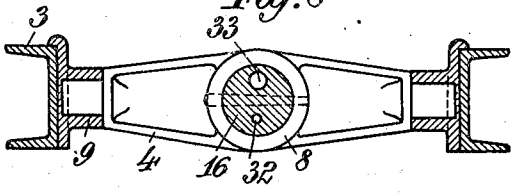


Fig. 7

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UNITED STATES PATENT OFFICE.

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HYDRAULIC TIPPING DEVICE, ESPECIALLY FOR POWER-DRIVEN FREIGHT VEHICLES.

Application filed June 9, 1926, Serial No. 114,777, and in Germany March 13, 1925.

My invention relates to a hydraulically driven device for tipping the body of a power-driven vehicle to any of its two sides, as well as rearwardly. This object is accomplished, first, by a press piston composed of telescopically arranged tubular portions; second, by specially designed piston supporting means rotatably located in the frame of the vehicle, and being provided with channels and parts for the press liquid; and third, by certain means for operating automatically a cock controlling the supply and the discharge of said liquid.

The invention is illustrated diagrammatically and by way of example on the accompanying drawings on which Figure 1 is a side-view of a motor vehicle provided with a tipping device according to this invention, the body of the vehicle being shown in vertical longitudinal section and in two positions, one (full lines) being the normal one, and the other (dotted lines) showing the body tipped rearwardly; figure 2 is a plan of Figure 1, but without the vehicle body; Figure 3 a vertical cross-section in the plane A—B of Fig. 1, the vehicle body being, however, shown in three positions, viz, the horizontal normal one (dotted lines), tipped to the left (also dotted lines), and tipped to the right (full lines); Figure 4 is a vertical longitudinal section through the press piston in collapsed state, together with its supporting means and some adjacent parts of the vehicle frame; Figure 5 a plan of the parts shown in Fig. 4, but without the bottom and the press piston; Figure 6 a vertical cross-section in the plane C—D of Fig. 4; Figure 7 is a section like Fig. 4, but showing the press piston extended and the vehicle bottom inclined, and Figure 8 is a sectional view.

1 (Figs. 1–3) denotes a power vehicle frame of any usual design, and 2 the body carried by said frame. The parts constituting the tipping device are arranged on, and attached to, an oblong frame 3 which can be easily attached to, and detached from, the main frame 1 so that also the entire tipping device can be easily attached to, and detached from, the vehicle. The tipping device proper is carried by the frame 3 by the intermediary of cross members 4 (Figs. 5, 6 and 8), and is constructed as follows:

5 (Fig. 4) denotes the cylinder of a hydraulic pump, 6 a receptacle for the liquid to be forced by said pump under the extensible piston, and 7 (Figs. 1–3) the piston which is located in a plug-like cylinder 17 (Figs. 4, 6 and 7) enclosed in a casing-forming member 15 supported by pivot-forming extensions 16 engaging the bearing-forming mid-portions 8 of the cross members 4, the entire arrangement being, therefore, such that the piston can be turned rearwardly, as well as to either side. The cross members are supported at the frame 3 in separate bearings 9 whereby jamming of the tipping device in the case of the main frame becoming somewhat distorted is prevented.

10 (Figs. 1 and 2) denotes a driving shaft for the piston of the pump 5, and 11 a gearing by which said shaft can be coupled with the motor of the vehicle with the aid of a hand-lever 12. I desire it, however, to be understood that the pump may be also operated manually, or provision may be made that both kinds of drive can be used, one or the other, at will. The pump may be of any suitable type. The pivot-forming extensions 16 of the casing-forming member 15 which is located near the pump extends preferably through the respective cross member 4, i. e. through the bearing-forming mid-portion thereof, and extends farther into a branch 14 of the combined parts 5 and 6 (pump cylinder and liquid receptacle) where it is firmly connected with said branch so that said combined parts are being turned to one or the other side together with the member 15 etc. Owing to that connection, stuffing boxes or other packings can be completely dispensed with.

The piston space of the plug-like cylinder 17 of the tipping device extends at right angles to the member 15, and on about the lower half of its inner wall is provided an internal screw-thread 18 into which is screwed a cylinder 19 constituting the cylinder proper for the telescopic piston of the tipping device. This piston consists, in the example shown, of four parts, 20, 21, 22, and 23, which guide themselves mutually in known manner. The part 20 of the piston (and with it also the other piston parts) is coupled with the cylinder proper 19 by a screw-cap 24 (Figs. 4, 6 and 7); and it can be unscrewed from the cylinder 19, whereby it is rendered possible to separate the telescopic piston, from this cylinder.

The casing-forming member 15 has in its

upper part an oblong recess or aperture 25 (Figs. 4, 5 and 7), the parallel sides of which form guide ways for the adjacent parts of the cylinder 19, and the location of said recess relatively to the cylinder 19 is such that this latter, together with the piston, can be tilted from its normal position (Fig. 4) into that shown in Fig. 7.

The piston part 23 is closed at its top by a kind of plug 26 formed by a downwardly extending central projection of a circular member 27 resembling a shallow bell or the head of certain kinds of fungus. This member has lateral pivots 28 located diametrically opposite to each other and engaging holes in a frame 29 also provided with lateral pivots 30 located diametrically opposite to each other and engaging U-shaped iron members 31 secured to the bottom of the vehicle body, the pivots 28 and 30 being arranged at right angles with respect to each other whereby a universal joint or Cardan joint is formed.

That of the pivot-forming extensions 16 which is located near the combined parts 5 and 6 (pump and liquid receptacle) is provided with a channel 32 serving for conducting the press liquid from said pump to the cylindrical body 17 and the cylinder proper 19, and there is in the same extension (16) also a channel 33, the diameter of which is a little larger than that of the channel 32, and through which the liquid can be re-conducted into the receptacle 6. A cock 34 is arranged in the member 15 between said two passages and the cylindrical body 17, and provided with two openings 36 and 37. 34 denotes, more precisely, the cock plug, whereas the cock casing is formed by the portion of the member 15 surrounding it, and at the two frontal faces of the cock plug 34 are two curved arms 35 and 35[a] (Fig. 5) by which it can be actuated.

Below the cylindrical body 17 the member 15 has a semi-circular groove 38, the breadth of which corresponds to the lower diameter of the cylinder proper 19. This groove communicates at one end with the opening 37 of the plug 34 and at its other end with a passage 39 provided in the other pivot-forming extension 16 of the member 15, and enclosing a plunger-like piston 40 by which the supporting springs of the vehicle body may be moved into operative position, or the bolts locking the flaps of said body may be unlocked, or other movable members may be operated in known manner.

The arm 35 is connected with one end of a chain 41, the other end of which is affixed to a projection provided for it at the head member 27 of the extensible piston, and diametrically opposite this projection is a downwardly projecting pin 46 (Fig. 6) which contacts with the end of the arm 35[a] and depresses it when the head member 27 reassumes its normal position, or position of rest respectively. The pin 46 is adjustable.

Inside the piston parts 22 and 23 is a helical spring 43, the lower end of which is attached to a cross bar 44 (Fig. 7) and the upper end to a cross pin 45 provided in the hollow plug 26.

The manner of operation of the device is as follows:

Supposing, the vehicle body be in its normal horizontal position and is to be tilted either rearwardly or to one or the other side. First of all the known locking bolts at the body supports must be unlocked. If the vehicle body is to be tilted rearwardly, as indicated by dotted lines in Fig. 1, it will be necessary, therefore, to unlock the two front locking bolts, whereafter the hand lever 12 is so turned that the pump 5 is actuated by the motor, and liquid is forced through the passage 32, the openings 36 and 37 of the plug 34, and the recess 38 of the cylindrical body 17, into the cylinder 19, the position of the plug 34 at this time being such that the passage 33 is closed. The press liquid acts at first upon the piston 40 which is shifted as much as necessary to effect the certain unlockings which need not be dealt with at this place as the respective members do not form part of this invention. Instantly thereafter the telescopic piston is lifted, as is also the vehicle body, until this latter arrives in its oblique end position (Figs. 1 and 7). Now the chain 41 turns the plug 34 by the intermediary of the plug arm 35, whereby the passages 32 and 33 and the groove 38 are connected with each other. The pump continues to work, but the liquid pumped flows at once back into the receptacle 6, and at the same time the liquid filling the hollow piston members is pressed back into said receptacle under the weight of the vehicle body which descends slowly until it assumes finally its former normal position. Just prior thereto, the pin 46 has again turned the plug 34 by the intermediary of the plug arm 35[a], the plug being now again in that position in which the press water lifts the vehicle body if not, prior thereto, the hand lever 12 has been re-moved into its position of rest.

If the vehicle body is to be kept in any certain oblique position, it is, for this purpose, only necessary to stop the pump, the plug 34 being at this time still in the position shown in Fig. 5.

It may in certain cases be necessary to tip the vehicle body so much that it is, in its extreme position, not able to sink down into its normal position under its own weight. It is for such cases that the spring 43 is provided. This spring is being expanded near the end of the stroke of the piston and retards it, and as soon as the press liquid has

ceased to work the spring 43 pulls the piston member 23 into the piston member 22 whereby the inclination of the vehicle body is so much decreased that its weight can effect the further downward movement.

The longitudinal axis of the pump 5 lies parallel to, or coincides with, the longitudinal axis of the vehicle, as does also the axis of the pivots 16, whereby the arrangement of the driving members for the pump is simplified. These details do not, however, form part of the present invention, wherefore I abstain from dwelling upon them.

I claim:—

1. A hydraulic tipping device for vehicle bodies comprising a frame adapted to carry said body; an oblong frame mounted in said frame; a casing-forming member mounted in said oblong frame; a telescopic piston mounted in said casing-forming member and being adapted to actuate the body; a joint connecting the upper end of the piston with the vehicle body; a cylindrical body mounted in said casing-forming member and adapted to receive the piston; a pump; a liquid receptacle for the liquid; a valve in the casing-forming member adapted to control the flow of liquid between the pump, piston and the receptacle; and a spring in said piston one end being secured in the piston at a point approximately intermediate its ends and the other end being secured at the upper end thereof for exerting a retracting force tending to return the body from tilted to normal position.

2. A hydraulic three-side tipping device for vehicle bodies, especially those of power-driven vehicles, comprising, in combination, a telescopic piston adapted to be tilted to either side of the vehicle, as well as rearwardly; a tension spring located inside said piston and connecting two of its members with each other and being adapted to be put under tension when the piston is extended; a joint connecting the upper end of said piston with the vehicle body; a cylindrical body receiving the said piston in its collapsed state and being adapted to be turned on a horizontal axis lying crosswise to the vehicle; another body forming in its mid-portion a casing adapted to receive said cylindrical body and being adapted to be turned on an axis lying longitudinally with respect to the vehicle and having an upper recess through which the said piston projects and the length and width of which is such that the extent of tilting of the piston is limited and this latter is guided; said second body having press-liquid passages in one of its supporting ends; and means for supplying press-liquid to the said telescopic piston, substantially as set forth.

3. A hydraulic three-side tipping device for vehicle bodies, especially those of power-driven vehicles, comprising, in combination, a telescopic piston adapted to be tilted to either side of the vehicle, as well as rearwardly; a joint connecting the upper end of said piston with the vehicle body; a cylindrical body receiving the said piston in its collapsed state and being adapted to be turned on a horizontal axis lying crosswise to the vehicle; another body forming in its mid-portion a casing adapted to receive said cylindrical body and being adapted to be turned on an axis lying longitudinally with respect to the vehicle and having an upper recess through which the said piston projects and the length and width of which is such that the extent of tilting of the piston is limited and this latter is guided; said second body having press-liquid passages in one of its supporting ends; a press pump and a liquid receptacle connected firmly with each other and with said other body and being adapted to be turned together with it, on an axis lying in the vertical longitudinal mid-plane of the vehicle, substantially as set forth.

In testimony whereof I have affixed my signature.

OTTO BALLERT.