March 1, 1938. W. P. BRASHER 2,109,460

HYDRAULIC SCALE

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Fig. 1.

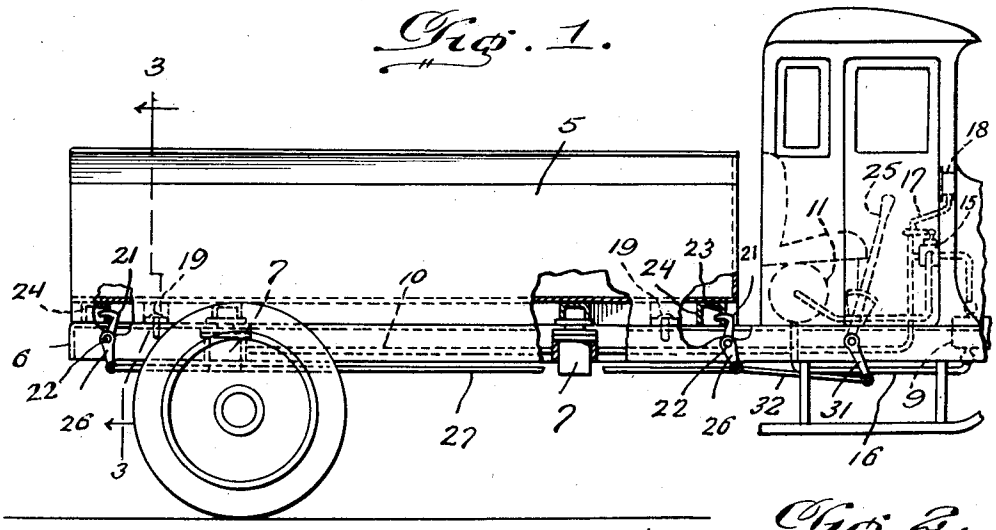


Fig. 2.

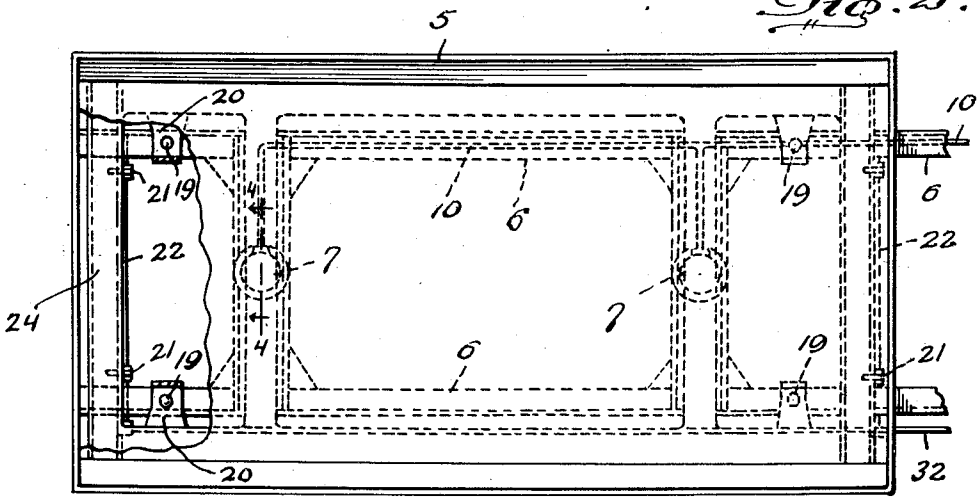
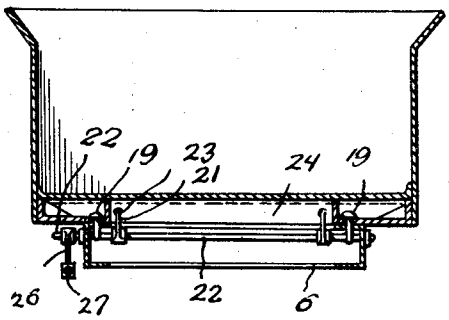


Fig. 3.



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Fig. 4.

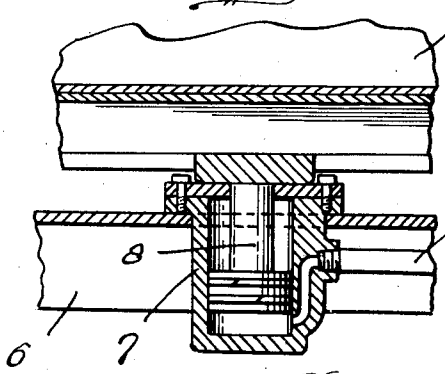


Fig. 5.

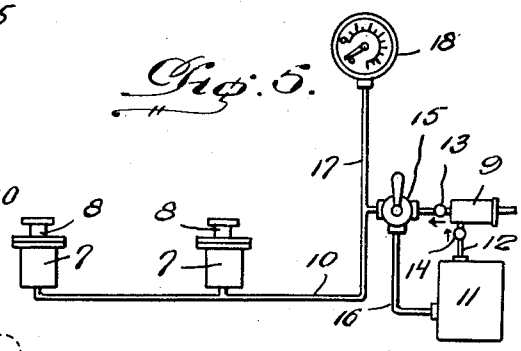


Fig. 6.

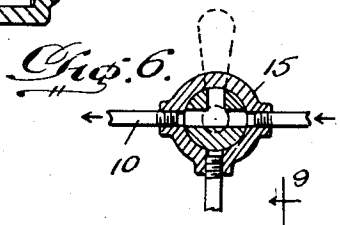


Fig. 7.

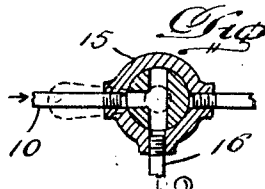
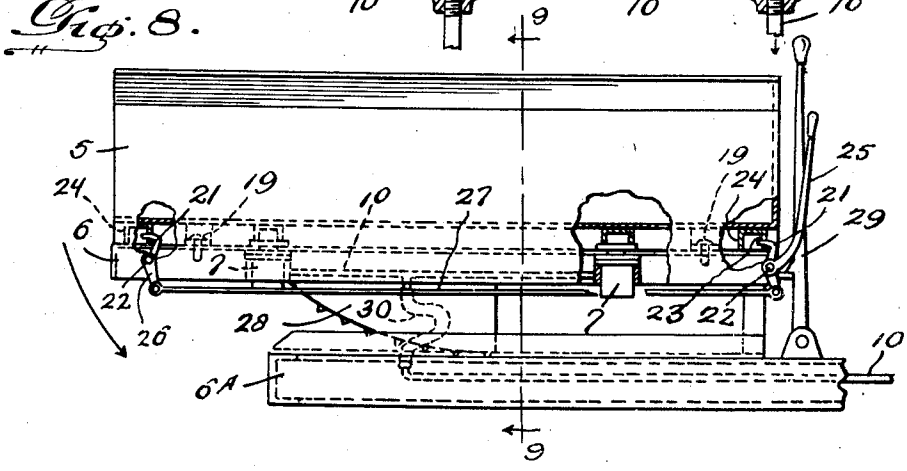


Fig. 8.



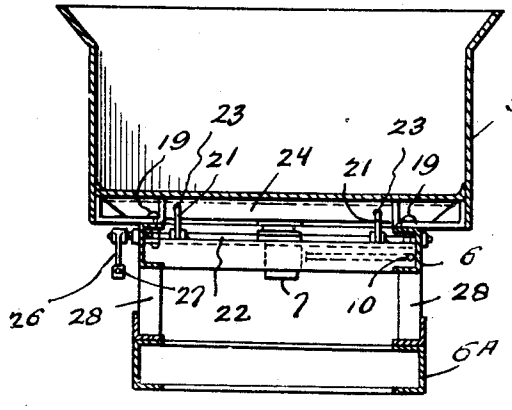


Fig. 9.

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Patented Mar. 1, 1938 2,109,460

UNITED STATES PATENT OFFICE

2,109,460

HYDRAULIC SCALE

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Application March 23, 1936, Serial No. 70,511

3 Claims. (Cl. 265—40)

This invention relates to hydraulic scales by which the weight of a load on a vehicle or truck may be indicated during the loading of the truck or at any other desired time.

The primary object of the present invention is to generally improve scales or devices of the above kind whereby the same may meet with the requirements for a successful commercial use.

More particularly, the present invention provides a construction wherein the body of the vehicle normally rests directly upon its supporting frame and is bodily movable upwardly therefrom in a rectilinear path so as to be wholly or entirely supported in the raised position by hydraulic means provided for raising said body upwardly from said supporting frame, whereby the weight of a load on such body may be directly or accurately indicated.

Another object of the present invention is to provide a construction characterized as above stated, wherein means is provided for forcing and securely fastening the body down upon its supporting frame when the load is being transported and the scales are not in use.

Still another object of the present invention is to provide means for effectively guiding the body in its vertical movement when being raised or lowered.

Other objects and features of the present invention will become apparent from the following description, when considered in connection with the accompanying drawings, in which:

Figure 1 is a fragmentary view, partly in side elevation and partly broken away and in section, of a motor truck equipped with hydraulic scales in accordance with the present invention.

Figure 2 is a fragmentary view of the construction shown in Figure 1, partly in top plan and partly broken away.

Figure 3 is a vertical transverse section on line 3—3 of Figure 1.

Figure 4 is an enlarged fragmentary transverse section on line 4—4 of Figure 2.

Figure 5 is a diagrammatic view showing the hydraulic system embodied in the present invention.

Figure 6 is an enlarged detail view showing the control valve of the hydraulic system in one position.

Figure 7 is a view similar to Figure 6 with the control valve in another position.

Figure 8 is a view similar to Figure 1 illustrating the present invention applied to a dumping truck; and

Figure 9 is a transverse vertical section on line 9—9 of Figure 8.

Referring in detail to the drawings, 5 indicates the body of a motor truck or other vehicle, and 6 the horizontal supporting frame therefor. The body 5 normally rests directly upon the supporting frame 6, but is capable of being raised bodily therefrom in a rectilinear path. Hydraulic means is provided for so raising the body 5, including any suitable number and arrangement of hydraulic jacks 7 mounted on the frame 6 and having plungers 8 engaging the under side of the body 5. This hydraulic means further includes a pressure producing device or pump 9 having its discharge port or outlet connected with the cylinders of the jacks 7 by means of a pipe 10, and a reservoir 11 for oil or any other incompressible liquid having an outlet connected with the intake of the pressure producing device or pump 9 by means of a pipe 12. As indicated at 13, the device or pump 9 has a check valve for holding the produced pressure in the jacks 7, while a check valve 14 is provided to permit the liquid to be drawn from reservoir 11 into the device or pump 9 while preventing it from passing from said device or pump 9 through the pipe 12 into said reservoir 11. A control valve 15 is provided to selectively cut off communication between the device or pump 9 and the jacks 7 and simultaneously place said jacks in communication with the reservoir 11 for bleeding the oil or other pressure medium from said jacks to the reservoir 11 so as to permit the body 5 to lower onto its supporting frame 6, or to place said device or pump 9 in communication with the jacks 7 and simultaneously cut off communication between said jacks 7 and reservoir 11 so that the oil or other pressure medium may be forced under pressure to said jacks for raising the body 5 off the frame 6. The valve 15 may be of any suitable kind but is shown by way of example as of the turn plug type having a rotatable valve member positionable as shown in Figure 6 to provide communication between the pump 9 and the jacks 7, and positionable as shown in Figure 7 to cut off communication between the pump 9 and the jacks 7 and provide communication between said jacks 7 and the reservoir 11. For this purpose, the valve 15 is interposed in the pipe 10 as shown in Figure 1, and has a third port connected with the inlet of tank or reservoir 11 by a pipe 16. Intermediate the jacks 7 and valve 15, the pipe 10 has a branch 17 connected with a suitable pressure gage 18 calibrated so that its pointer will indicate "zero" when the body 5 is

empty and raised to impose its weight alone upon the jacks 7 and the pressure medium behind the plungers 8 of said jacks and in the pipes 10 and 17.

As the body 5 is free of permanent connection with the frame 6 other than possibly through jacks 7, and is solely supported in raised position by said jacks, means is provided for guiding the body 5 in its vertical rectilinear movement when being raised or lowered so as to maintain said body in proper relation to the supporting frame 6. For this purpose, the body 5 may be provided at the bottom with suitably arranged downwardly projecting guide pins 19 slidably projecting through guide openings provided in the sides of the frame 6.

In order to prevent the body 5 from bouncing and otherwise vibrating relative to the frame 6 when lowered onto the latter, means is provided for forcing and securely fastening said body 5 down onto the frame 6. This means, while essentially releasable, may be greatly varied as to kind and specific structure. As shown, it may consist of cam hooks 21 secured on the opposite end portions of transverse rock shafts 22 journaled in the frame 6 near the front and rear ends of body 5 and arranged to engage in keeper openings provided at 23 in transverse bars 24 rigidly secured on the bottom of body 5, a hand lever 25 being provided for actuating the forward one of the rock shafts 22, and said rock shafts 22 being operatively interconnected through the medium of arms 26 rigid with and depending from said rock shafts 22 and connected by a rod or link 27. Preferably, the reservoir 11 is located in a suitable out-of-the-way place, such as under the driver's seat as indicated by dotted lines in Figure 1, the gage 18 and valve 15 being disposed in front of the driver's seat for convenient access.

The essential distinction between the form of the invention shown in Figure 1 and that shown in Figure 8 is that in the former instance, the truck is of the non-dumping type, while in the latter instance, it is of the dumping type. In the former case, the supporting frame 6 is constituted by the chassis frame of the vehicle, while in the latter case or in Figure 8, said frame 6 consists of a supplemental frame tiltably mounted upon the chassis frame 6A by means of rockers 28, in accordance with the well known type of dumping truck. However, in the embodiment of Figure 8, the rockers 28 are attached to the supplemental frame 6 instead of to the body 5 so that the latter is permitted to be raised from the frame 6 in the use of the scales. The usual lever for controlling the operation of the dumping body 5 is indicated at 29, and it will be apparent that this lever is engageable with the frame 6 and must be released when the body 5 is to be tilted for dumping the contents of said body. In this embodiment, the pipe 10 is provided with a flexible conduit section 30 of a sufficient length to permit the tilting movements of body 5 and supporting frame 6 relative to the chassis frame 6A. Also, in this embodiment, the lever 25 is secured directly on one end of the forward one of the rock shafts 22, while in the embodiment of Figure 1, said lever 25 may be mounted beside the driver's seat and operatively connected to the forward one of the rock shafts 22 by means of the arm 26 of the latter, an arm 31 on the lever 25, and a link 32 connecting said arms 26 and 31. Otherwise, the construction and operation of both forms of the invention are similar, and similar parts are indicated by corresponding reference characters in both forms of the invention.

In operation, the body 5 is released so that it may be raised upwardly from the frame 6, whereupon the latter is accomplished by operation of the device or pump 9 with the valve 15 positioned as shown in Figure 6. As the body 5 is loaded, it is depressed for forcing the pressure medium toward the gage 18 and thereby causing the weight of the load to be registered on said gage. When the body 5 has been fully loaded and the weight of the load registered, the body 5 is lowered onto the frame 6 by releasing the pressure medium from behind the plungers 8 of the jacks 7 and bleeding such pressure medium back into the tank or reservoir 11 by positioning the valve 15 as shown in Figure 7. The body is then forced and securely fastened down upon the frame 6, whereupon the load may be safely transported without danger of the body 5 bouncing and vibrating relative to the frame 6. As the body 5 and its load is entirely supported solely upon the jacks 7 when raised and during the weighing operation, an accurate indication of the weight of the load is insured. Of course, the body 5 may be loaded and then elevated by the hydraulic jacking means to determine the weight of the load.

What I claim as new is:

1. In a load indicator, the combination of a supporting frame, a vehicle body normally resting directly on but being capable of being bodily raised upwardly from said supporting frame in a rectilinear path, pressure influenced means disposed in operative relation between said frame and body for so raising the latter, a reservoir for a pressure medium, a pressure producing device for forcing the pressure medium from said reservoir to said pressure influenced means and maintaining the produced pressure in the latter, a controlling device for selectively placing said pressure producing device in communication with said pressure influenced means for raising the body or for placing said reservoir in communication with said pressure influenced means for releasing the pressure in the latter, a pressure gage in communication with said pressure influenced means, said body being free of connection with said frame except through said pressure influenced means so as to be solely and entirely supported by the latter when raised, and cam means to force and releasably secure the body down upon said frame when lowered upon the latter by release of the pressure in said pressure influenced means.

2. In a load indicator, the combination with a chassis and vehicle body, of a supplemental frame tiltably mounted on said chassis, said body normally resting upon said supplemental frame but being bodily movable upwardly therefrom, pressure influenced means disposed in operative relation between said supplemental frame and said body for so raising the latter, a driver's cab, cam means operable from the driver's cab for forcing and releasably securing the body down on the supplemental frame when lowered, means for producing and maintaining a pressure in said pressure influenced means, means for releasing the pressure from said pressure influenced means, and a pressure gage in communication with said pressure influenced means, said body being free of connection with said supplemental frame except through said pressure influenced means so as to be entirely and solely supported by the latter when raised.

3. The combination of a wheeled truck having a supporting frame, a body normally resting upon said supporting frame and having members on the bottom thereof provided with keeper openings, operatively interconnected transverse rock shafts journaled in the supporting frame, cam hooks carried by said rock shafts and engageable in said keeper openings to force and releasably secure the body down upon said supporting frame, plungers carried by said supporting frame and engaging the body, means for raising the plungers to lift the body off of the supporting frame, and means for indicating the downward pressure on the raised plungers.

WILLIAM P. BRASHER.