March 4, 1952 J. J. PELOUCH 2,588,285

AIR BLEEDER FOR VEHICLE LIFTS

Filed May 27, 1950 2 SHEETS—SHEET 1

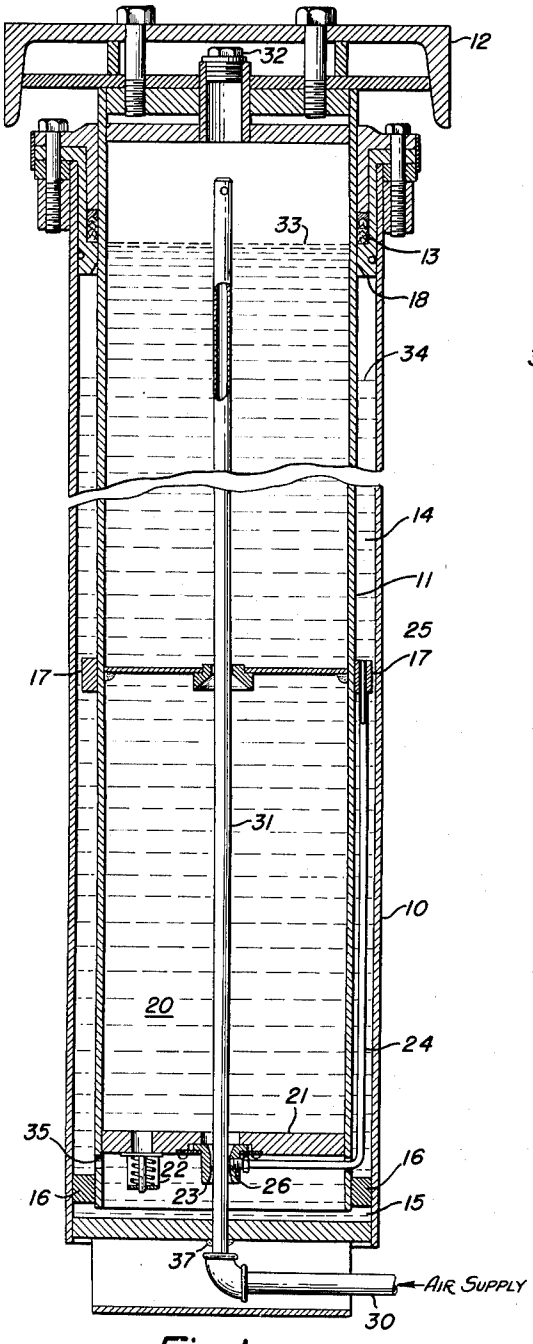


Fig. 1

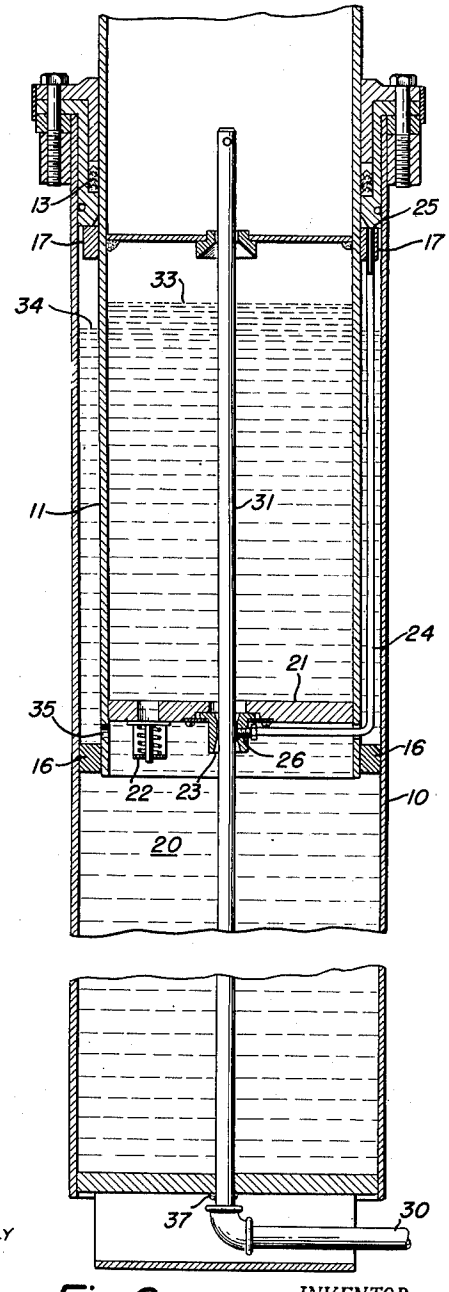


Fig. 2

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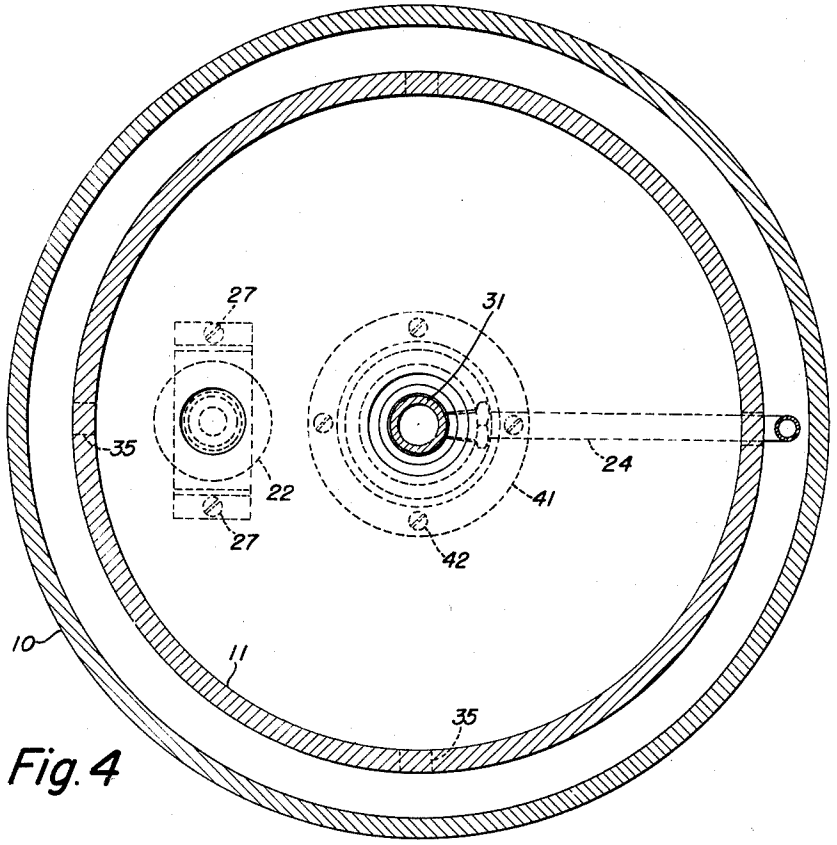


Fig. 4

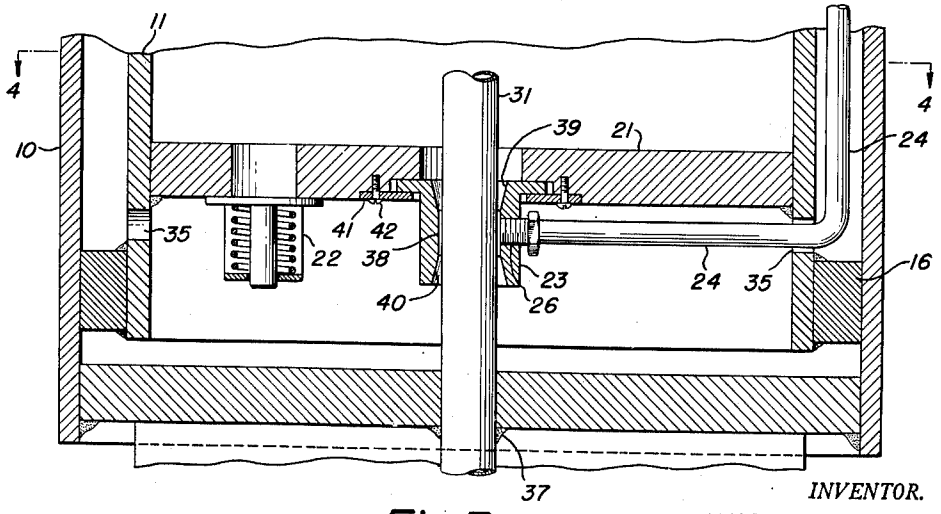


Fig. 3

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UNITED STATES PATENT OFFICE

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AIR BLEEDER FOR VEHICLE LIFTS

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4 Claims. (Cl. 121—46)

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This invention relates to an air bleeder for vehicle lifts particularly employed for servicing automotive and road vehicles.

In such lifts an air pocket tends to form in the space between the plunger and the cylinder between the upper level of the oil and the packing seal at the top of the cylinder.

An object of the invention is to provide an air bleeder which will prevent and eliminate the air pockets in the lift.

Another object of the invention is the provision of a venturi which will establish a region of low pressure to aid in removing air pockets from the lift.

Another object of the invention is the provision of a bleeder pipe communicating between the air pocket and a venturi, whereby the venturi operates to hasten the exhaustion of the air from the air pocket.

Another object of the invention is the provision of an air bleeder which requires only a few operations of the lift to exhaust substantially all of the air out of the air pocket.

Other objects and a fuller understanding of the invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawing, in which:

Figure 1 is a longitudinal cross-sectional view of a lift embodying the features of the invention, the lift being shown in its lowermost position;

Figure 2 is a view similar to Figure 1 but shows the lift in its uppermost elevated position;

Figure 3 is an enlarged fragmentary view of the lower region of the lift shown in Figure 1; and

Figure 4 is a cross-sectional view taken along the line 4—4 of Figure 3.

The vehicle lift comprises a cylinder 10 in which is reciprocally mounted a ram 11 for elevating a vehicle which is mounted upon a lifting structure 12 mounted on the upper end of the ram. As illustrated, a packing seal 13 is provided between the ram and the cylinder to make a fluid-tight connection. The lower end of the ram is provided with guide members 16 which guide the ram within the cylinder. An annular clearance space 14 is provided between the ram 11 and the cylinder 10. Mounted on the outside of the ram 11 and extending into the annular clearance space 14 is a stop member 17 which when it abuts against the lower edge of a packing gland member 18 operates to limit the travel of the ram 11 upwardly in the cylinder 10.

The ram 11 is hollow and provides a fluid ram

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chamber 20 for containing fluid. The ram 11 is provided with a bottom wall section 21 which separates the fluid ram chamber 20 from the fluid cylindrical chamber 15. Provided in the bottom wall section 21 is a check valve 22 which permits the flow of the fluid from the fluid ram chamber 20 into the fluid cylindrical chamber 15 as the ram is elevated. The check valve 22 may be secured to the bottom wall section 21 by means of screws 27. Also mounted in the bottom wall section 21 is a venturi 23 through which fluid may pass as the ram is reciprocally moved within the cylinder 10. The venturi 23 may be secured to the bottom wall section 21 of the ram by means of a plate 41 and screws 42. As shown best in Figure 3, the venturi comprises an intermediate annular surface 38 which surrounds an air duct 31 extending upwardly therethrough. Extending upwardly from the intermediate annular space 38 is a diverging annular space 39, and extending downwardly from the intermediate annular surface 38 is a diverging annular surface 40. The venturi 23, in combination with the air duct 31, provides a restricted communication between the fluid-tight ram chamber 20 and the fluid cylindrical chamber 15.

An air bleeder tube 24 having a suitable cross-sectional area interconnects the annular clearance space 14 to the venturi 23. As illustrated, the lower end 26 of the tube 24 is connected to the intermediate annular surface 38 of the venturi, and the upper end 25 of the tube is secured to the stop member 17.

Preparatory to operation, the fluid ram chamber 20 and the fluid cylindrical chamber 15 are filled with fluid up to a level substantially indicated by the reference character 33. As observed in Figure 1, the fluid level in the annular clearance space 14 is indicated by the reference character 34 and this is below the fluid level 33 within the fluid ram chamber 20. The annular space above the fluid level 34 and below the packing seal 13 is filled with air and constitutes an air pocket. After the fluid is charged within the ram and cylinder, a fluid fill plug 32 is employed to enclose the ram. Free fluid communication is provided between the annular clearance space 14 and the cylindrical chamber 15 through annular openings 35 provided in the lower wall of the ram which is beneath the bottom wall section 21. The air bleeder tube 24 extends through one of these openings 35. The air duct 31 may be welded as indicated by the reference character 37 to the bottom wall of the cylinder 10 to provide a fluid seal for the cylindrical chamber 15. Air under

pressure is supplied to an air supply line **30** for elevating the ram **11** within the cylinder **10**. The air under pressure is released within the ram **11** above the level of the liquid **33** which is contained therein. The air under pressure exerts an upward force on the ram **11** and a downward force on the liquid to elevate the ram and force the liquid from the fluid ram chamber **20** through both the check valve **22** and the venturi **23** into the fluid cylindrical chamber **15**. Upon the descending movement of the ram within the cylinder, the fluid flows only through the venturi **23**, since it cannot flow through the check valve **22**. The flow of the fluid through the venturi **23** establishes a region of low pressure in the air bleeder tube **24** and operates to exhaust the air above the level of the liquid **34** in the annular clearance space **14**. In Figure 2 it is observed that the upper end **25** of the tube **24** is next adjacent the packing gland member **18** and thus air is immediately exhausted from the air pocket the instant that the ram **11** starts to move downwardly. The entrapped air in the air pocket continues to be exhausted until the upper end **25** of the tube becomes immersed in the oil and then the tube **24** tends to draw oil from the annular clearance space **14** into the venturi. In practice it has been found that substantially three or four operations of the ram within the cylinder will completely exhaust substantially all of the air out of the air pocket. During continued operation of the lift, should air tend to be entrapped within the air pocket, then the air bleeder tube is also present to exhaust the air therefrom to keep the lift free from air at all times of operation.

Although the invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. In a lift, the combination of a relatively movable cylinder and a plunger having an annular clearance space therebetween, said cylinder having a closed end, sealing means between the cylinder and plunger, said cylinder and plunger together with said sealing means defining a first fluid chamber including said annular clearance space said plunger being hollow and providing a second fluid chamber, said plunger having a wall section separating said fluid chambers, a venturi in said wall section providing a restricted fluid communication between said fluid chambers, stop means to limit the travel of said plunger in said cylinder, said stop means including a stop member secured to said plunger and extending into said annular clearance space, and a tube having a first end connected in communication with said venturi and having a second end connected in communication with said annular clearance space in the region of said member.

2. In a lift, the combination of a relatively movable cylinder and a plunger having an annular clearance space therebetween, said cylinder having a closed end, sealing means between the cylinder and plunger, said cylinder and plunger together with said sealing means defining a first fluid chamber including said annular clearance space, said plunger being hollow and providing

a second fluid chamber, said plunger having a wall section separating said fluid chambers, a venturi in said wall section providing a restricted fluid communication between said fluid chambers, stop means to limit the travel of said plunger in said cylinder, said stop means including a stop member secured to said plunger and extending into said annular clearance space, and a tube having a first end connected in communication with said venturi and having a second end connected in communication with said annular clearance space in the region of said member, said venturi having a minimum annular surface defining a restricted opening in communication with said first fluid chamber and having a diverging annular surface extending from said minimum annular surface and facing toward said second fluid chamber.

3. In a lift, the combination of a relatively movable cylinder and a plunger having an annular clearance space therebetween, said cylinder having a closed end, sealing means between the cylinder and plunger, said cylinder and plunger together with said sealing means defining a first fluid chamber including said annular clearance space, said plunger being hollow and providing a second fluid chamber, said plunger having a wall section separating said fluid chambers, a venturi in said wall section providing a restricted fluid communication between said fluid chambers, stop means to limit the travel of said plunger in said cylinder, said stop means including a stop member secured to said plunger and extending into said annular clearance space, a tube having a first end connected in communication with said venturi and having a second end connected in communication with said annular clearance space in the region of said member, and an air supply duct extending through said wall section, said venturi having a minimum annular surface surrounding said air supply duct and providing a restricted communication with said first fluid chamber and having a diverging annular surface extending from said minimum annular surface and facing toward said second fluid chamber.

4. In a lift, the combination of a relatively movable cylinder and a plunger having an annular clearance space therebetween, said cylinder having a closed end, sealing means between the cylinder and plunger, said cylinder and plunger together with said sealing means defining a first fluid chamber including said annular clearance space, said plunger being hollow and providing a second fluid chamber, said plunger having a wall section separating said fluid chambers, a venturi in said wall section providing a restricted fluid communication between said fluid chambers, stop means to limit the travel of said plunger in said cylinder, and a tube having a first end connected in communication with said venturi and having a second end connected in communication with said annular clearance space.

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