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Filed June 24, 1946

4 Sheets-Sheet 2

Inventor

Harry H. Wenigar

By *Randolph & Beavers*
Attorneys

Attorneys

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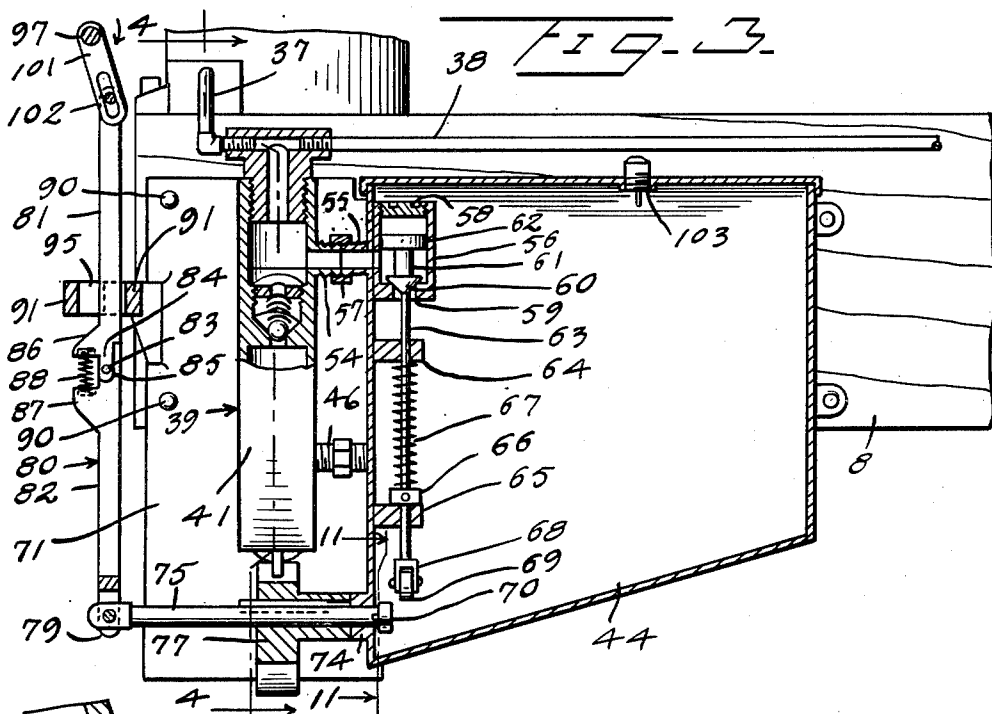
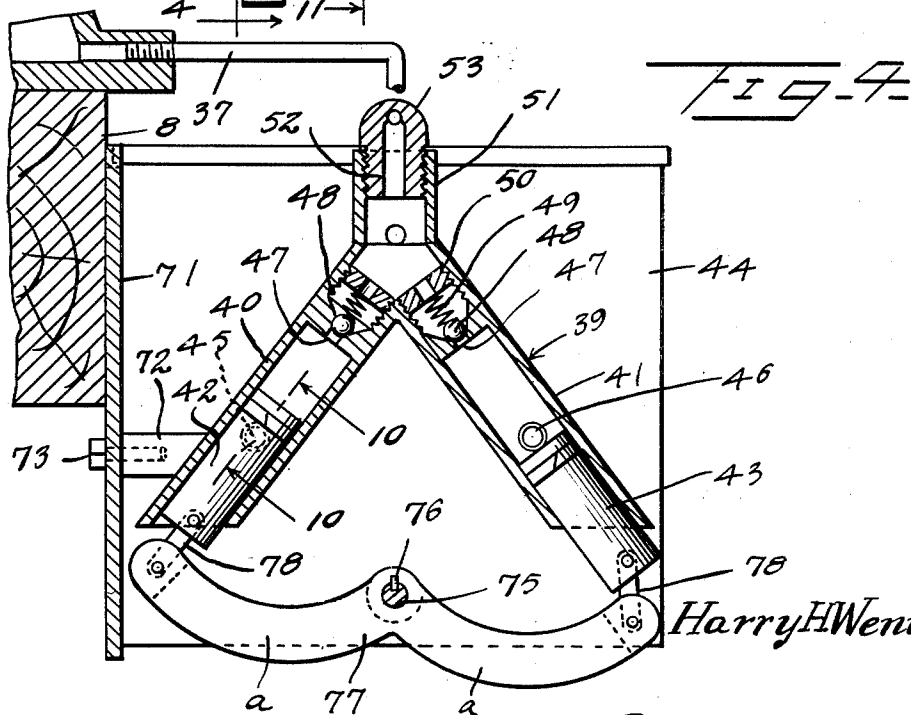
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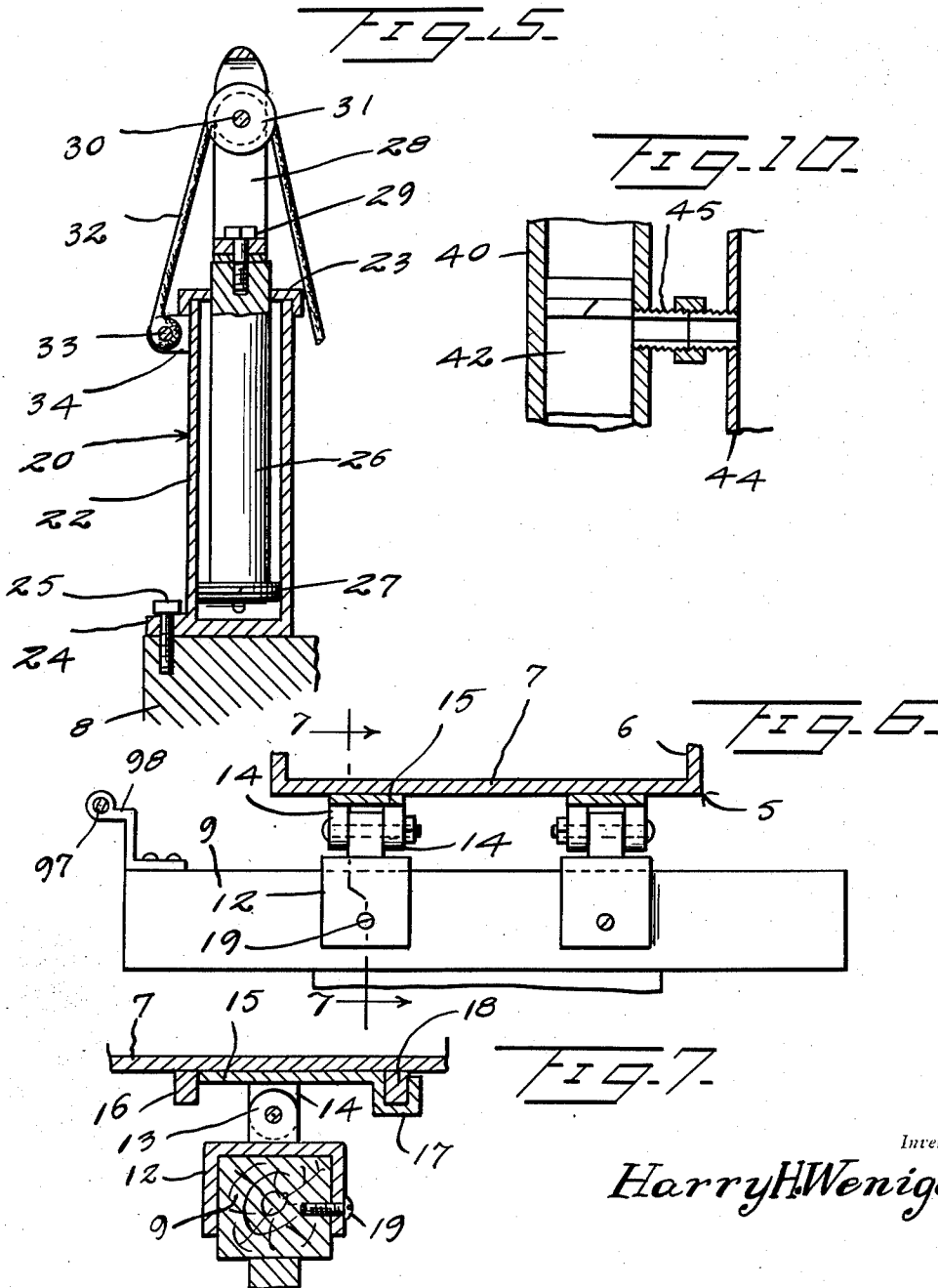
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UNITED STATES PATENT OFFICE

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HYDRAULIC HOIST FOR TRAILERS AND FARM WAGONS

Harry H. Wenigar, Danvers, Minn.

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5 Claims. (Cl. 298—22)

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This invention relates to hydraulic hoists for vehicle bodies and more particularly for trailers and farm wagons.

An important object of the invention is to provide a hoisting means, involving hydraulic lifting apparatus, whereby wagon boxes and other vehicle structures can be tilted for the more convenient unloading of their contents.

Another important object of the invention is to provide a hydraulic hoist for vehicle bodies, which can be conveniently operated manually in an easy and convenient manner.

Still another object of the invention is to provide a hydraulic lift for tilting and unloading vehicle bodies wherein nominal effort is all that is required in actuating the hydraulic pump means incident to the lifting operation.

A further object of the invention is to provide hydraulic hoist means for trailers, farm wagons and other vehicles which employs a pair of concurrently operated hydraulic lifts, the use of which permits a balanced lifting of the desired end of the vehicle body so as to preclude torque and other wear causing distortions that normally occur in the use of a single, under the body, hoist unit.

Still a further object of the invention is to provide an apparatus of the character stated which can be easily operated for lifting one end of a loaded wagon box or other structure, and which can be set for relief of the hydraulic jacks, in the lowering of the wagon box without continual attention.

These and various other objects and advantages of the invention will become apparent to the reader of the following description.

In the drawings:

Figure 1 is a side elevational view of a farm wagon, with parts in section, showing the manner in which the wagon body is associated with the bolsters and hoist means.

Figure 2 is a transverse vertical sectional view showing the lift unit and the body in partly elevated position.

Figure 3 is an enlarged fragmentary detailed sectional view of the pump and reservoir structure.

Figure 4 is a fragmentary vertical sectional view taken substantially on line 4—4 of Figure 3.

Figure 5 is a vertical sectional view through one of the jacks.

Figure 6 is a sectional view taken substantially on line 6—6 of Figure 1.

Figure 7 is a fragmentary vertical sectional view taken on line 7—7 of Figure 6.

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Figure 8 is a fragmentary vertical sectional view of the transmitter arm guide and holder.

Figure 9 is a fragmentary side elevational view, partly in section, showing the joint in the transmitter arm.

Figure 10 is a fragmentary longitudinal sectional view taken substantially on line 10—10 of Figure 4.

Figure 11 is a fragmentary vertical sectional view taken substantially on line 11—11 of Figure 3.

Referring to the drawings, numeral 5 generally refers to a conventional farm wagon having a box 6, including a bottom 7. Numerals 8, 9 represent front and rear bolsters, supported by front and rear wheels 10, 11.

There are a pair of hinged connections between the wagon box body bottom 7 and the rear bolster 9, substantially shown in Figures 1, 6 and 7. Each of these hinged connections consists of an inverted U-shaped cap 12 having an upstanding apertured lug 13 overlapped by a pair of apertured lugs 14, 14 depending from a plate 15, contacting the bottom of the wagon box 7, the forward edge of which abuts a cleat 16 on the bottom of the wagon box, while the rear end of the plate 15 has a channeled formation 17 for receiving a second transverse cleat 18 on the wagon bottom. Thus the wagon box is removably, but hingedly supported by the rear bolster 9, the U-shaped caps 12 being secured to the bolster 9 by screws or the like 19.

The hydraulic pump and jack unit are located adjacent the forward end of the box 6 and are all mounted on the forward bolster 8.

The jacks are generally referred to by numerals 20, 21 and each consists (see Figure 5) of a vertical cylinder 22 having a head 23 and a base 24, the base 24 being secured by screws or the like 25 to the adjacent end of the bolster 8.

A plunger 26 is slidable in the cylinder 22 and through the head 23, said plunger having a piston head 27, with suitable packing means thereon, at the lower end thereof, while the upper and outer end of the plunger 26 has a vertically disposed narrow frame 28 secured thereon by a screw or the like 29. Mounted on a cross pin 30 within the upper portion of the frame 28 is a pulley 31 over which one end of a cable 32 is trained. The adjacent end of the cable 32 is trained over and suitably secured to a cross pin 33, disposed between a pair of outstanding ears 34, on the upper end of the cylinder 22.

The cable 32 extends downwardly at the inner side of the jack and passes through an elongated roller tube 35, supporting the forward end of the

wagon box 6, to the jack 21 at the opposite end of the bolster 8, which is constructed and arranged in the same manner as the jack 20. The opposite ends of the roller tube 35 are preferably flared as at 36, to prevent lateral displacement of the tube with respect to the bottom of the wagon box.

Fluid conduits or pipes 37, 38 extend from the jacks 20, 21 to a pump unit generally referred to by numeral 39.

The pump unit 39 consists of an inverted Y-shaped structure, the depending diverged portions of which form cylinders 40, 41 in which pistons 42, 43 respectively, operate. The intermediate portion of each of these cylinders 40, 41 is in communication with a reservoir 44, of suitable shape and capacity, by way of short conduit connections 45, 46.

The upper ends of the cylinders are closed with the exception of small ports 47 against which check valves 48 normally seat and are there held by springs 49 interposed between said check valves and apertured plugs or bushings 50 threaded into the extreme upper ends of the cylinders.

The upper neck portion 51 of the pump assembly may be welded or otherwise secured onto the diverged cylinders, after the bushings 50 have been properly set with respect to the check valves.

A hollow plug 52 is threaded into the neck 51 and has a T-head 53 with which the fluid conduit pipes 37, 38 connect:

At the lower portion of the neck 51 a nipple 54 extends laterally to meet a nipple 55 projecting from the adjacent wall of the reservoir 44 and in communication with a valve chamber 56, located within the reservoir 44. A coupling 57 connects these nipples 54, 55 together.

The chamber 56 has a removable plug 58 at its top while a port 59 is formed in its bottom and merges with a seat, against which a valve element 60 normally seats, this valve having a stem 61 on which is a guide or piston 62.

Projecting upwardly through the port 59 and abutting the valve 60, is a push rod 63, which extends downwardly through guides 64, 65 projecting inwardly from a wall of the reservoir 44. The rod 63 has a fixed collar 66 thereon between which and the upper guide 64, a coiled compression spring 67 is interposed.

The lower end of the rod 64 has a yoke 68, carrying a pulley 69, and the rod 63 may be splined in one of the guides 64, 65, to prevent rotation thereof and so that the roller 69 will always be in position for contact by a cam 70, when the latter is properly positioned with respect thereto.

The reservoir 44 has a wall 71 projecting outwardly therefrom and a boss or protuberance 72 on the pump 39 projects from the pump to abut this wall. A screw 73 or other securing means penetrates through the wall and into the protuberance 72, to adequately support the pump.

A bearing 74 on the outside of the reservoir 44 has a rotatable and slidable shaft 75 disposed therethrough, this shaft 75 carrying the aforementioned cam 70. The shaft 75 is splined as at 76 to a rocker 77, the rocker having a pair of arcuate arm formations *a, a*, each connected by a link 78 to the adjacent end of the corresponding piston 42 or 43.

The outer end of the shaft 75 projects into the bifurcated lower end 79 of a vertically disposed transmitter arm generally referred to by numeral 80 and which is composed of a pair of bar

sections 81, 82, pivotally secured together as at 83, with interlapping portions 84, 85 at their side portions facing the pump 39. This hinged joint is clearly shown in Figure 9 and the purpose is to prevent hinging inwardly of the sections 81, 82. Bosses 86, 87 are provided on the sections 81, 82 respectively, at the outer portions thereof and at opposite sides of the pivot 83. These bosses have their opposed faces recessed to receive the ends of a compression spring 88 for normally tending to hold the sections 81, 82 in aligned position.

An arm 89 projects rearwardly from the wall 71, this wall 71 being adequately secured by elements 90, to the bolster 8, and supports a guide and lock frame 91, for the transmitter arm 80. One corner of this frame 91 is filled by a formation 92, serving as an abutment, limiting the extent of movement of the transmitter arm 80, in one direction, while an end rail 93, limits movement of the arm 80, in the opposite direction. A slightly diverged outer rail 94 extends from the end rail 93 and connects to an end rail 95 at the opposite end of the frame 91 and in complement with the formation 92 defines an alcove 96 into which the transmitter arm 80 can be disposed and held, after the same has been hinged outwardly and moved to that position, in which position the apparatus will be set for relief of the hydraulic jacks, permitting the lowering of the box 6.

For actuating the transmitter arm 80, an elongated rod 97, extending from the rear of the vehicle, is employed. This rod extends through a guide 98, supported on the bolster 9, the rear end of the rod 97 being provided with a suitable handle 99. The forward end of the rod 97 extends into a guide 100, which may be supported by the top of the wall 71, or upon the bolster 8.

Above the transmitter arm 80, the rod 97 is provided with a depending and slotted arm 101 which receives a pin 102 on the upper end of the transmitter arm section 81.

A filler plug 103 is provided for the reservoir 44 whereby hydraulic fluid can be placed in the system.

In the operation of the apparatus, assuming that the shaft 75 (see Figure 3) is at its outward position, with the cam 70 removed from the roller 69, the operator grasps the handle 99 of the elongated actuating rod 97 and reciprocates the rod longitudinally of the vehicle. The arm 101, as shown in Figure 3, will transmit this movement to the arm 80, which in turn will transmit oscillatory movement to the shaft 75, with the result that the rocker 77 is rocked, alternately forcing first one piston 42 and then the other 43, upwardly in the corresponding cylinders 40, 41.

For example, as the piston 42 moves upwardly in its cylinder 40 and passes the hydraulic fluid admission port 45, the fluid will be forced upwardly, pass the check valve 48 and into the neck 51 and pipes 37, 38 and if these pipes have been previously charged, by a preceding operation of the pump, pressure will be built up in these lines and in the check cylinders 22, under the pistons 27. As these pistons 42, 43 alternately operate, more fluid is pumped into the jack lines or pipes 37, 38 and more volume under pressure is admitted to the cylinders 22 of the jacks 20, 21, with the result that the plungers 26 are gradually lifted. As this lifting operation takes place pursuant to the operation of the pump 39 by the manually actuated rod 97, the pulleys 31 of the jacks will be gradually elevated, shortening the length of the cable portion between the pulleys and this shortening results in the carrying up-

wardly of the roller tube 35 and gradual elevation of this end of the wagon box 6, as it hinges on the hinge structures shown in Figures 6 and 7, at its rear end.

The operator is stationed at the rear or dumping end of the body, where he can control the outlet or release of the load.

When the operator has released the load, or as much of it as he desires, and wishes to return the wagon box to its normal horizontal position, he rotates the handle 99 in a clockwise direction, resulting in the rotation of the arm 101 (see Figure 3), in the direction of the arrow which causes the upper section 81 of the transmitter arm 80 to move against the outer rail 94 of the frame 91, resulting in a fulcruming action of the transmitter arm 80, to an extent sufficient to deliver rectilinear movement to the shaft 75, which will result in the disposition of the cam 70 directly under the roller 69, as to the extent substantially shown in Figure 11.

The upper section 81 of the transmitter arm 80, is now bearing against the outside rail 94 of the frame 91, as is shown in Figure 8 by dotted lines, and with the arm in this position, the operator pushes inwardly on the rod 97, and in so doing, rotates the shaft 75 and disposes the upper section 81 of the transmitter arm 80 into the alcove 96 of the frame 91, at which point, the operator can leave the handle 99. In this operation, the cam 70 has been rotated and has exerted force against the roller 69, lifting the rod 63, to unseat the valve 60. This relieves the jack system, so that the fluid can return from the jacks 20, 21, by way of the nipples 54, 55 and chamber 56, to the reservoir 44. This action will be gradual and as the hydraulic pressure is relieved from the plungers 26 of the packs 20, 21, the weight of the wagon box will force the plungers downwardly, thus allowing for gradual return of the box to its normal horizontal position.

When it is again desired to elevate the forward end of the box 6, it is only necessary to grasp the handle 99 and pull rearwardly, so as to dislodge the upper section 81 of the transmitter arm 80, from the alcove 96 of the frame 91, so that the arm will assume its normal pumping position as shown in full lines in Figure 8.

While the foregoing description sets forth the invention in specific terms, it is to be understood that numerous changes in the shape, size and materials may be resorted to without departing from the spirit and scope of the invention as claimed hereinafter.

Having described the invention what is claimed as new is:

1. A hydraulic hoist for vehicle bodies comprising a pair of hydraulic jacks for engaging opposite sides of a body to be lifted, each of said jacks being provided with an upwardly movable plunger, a flexible element having its ends anchored to the jacks and being trained over the upper portions of the plungers and under the body to be lifted.

2. A hydraulic hoist for vehicle bodies comprising a pair of hydraulic jacks for engaging opposite sides of a body to be lifted, each of said jacks being provided with an upwardly movable plunger, a flexible element having its ends anchored to the jacks and being trained over the upper portions of the plungers and under the body to be lifted, a tube through which the intermediate portion of the flexible element is trained, said tube bearing against the under side of the body.

3. A hydraulic hoist for vehicle bodies comprising a pair of hydraulic jacks for engaging opposite sides of a body to be lifted, each of said jacks being provided with an upwardly movable plunger, a flexible element having its ends anchored to the jacks and being trained over the upper portions of the plungers and under the body to be lifted, a tube underlying the body to be lifted and having its ends flared beyond the opposite sides of said body.

4. A hydraulic hoist for vehicle bodies comprising a pair of hydraulic jacks for engaging opposite sides of a body to be lifted, each of said jacks being provided with an upwardly movable plunger, a flexible element having its ends anchored to the jacks and being trained over the upper portions of the plungers and under the body to be lifted, a tube underlying the body to be lifted and having its ends flared beyond the opposite sides of said body, and manually operated hydraulic pump means for said jacks.

5. A hydraulic hoist for vehicle bodies comprising a pair of hydraulic jacks for engaging opposite sides of a body to be lifted, each of said jacks being provided with an upwardly movable plunger, a flexible element having its ends anchored to the jacks and being trained over the upper portions of the plungers and under the body to be lifted, a tube underlying the body to be lifted and having its ends flared beyond the opposite sides of said body, and manually operated hydraulic pump means for said jacks, said means including an elongated reciprocatory rod for effecting the pumping operation, valve means for relieving the system of fluid under pressure and means between the rod and the valve means whereby rotation of the rod will effect opening of the valve means.

HARRY H. WENIGAR.

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