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HYDRAULIC LIFT

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FIG. 1

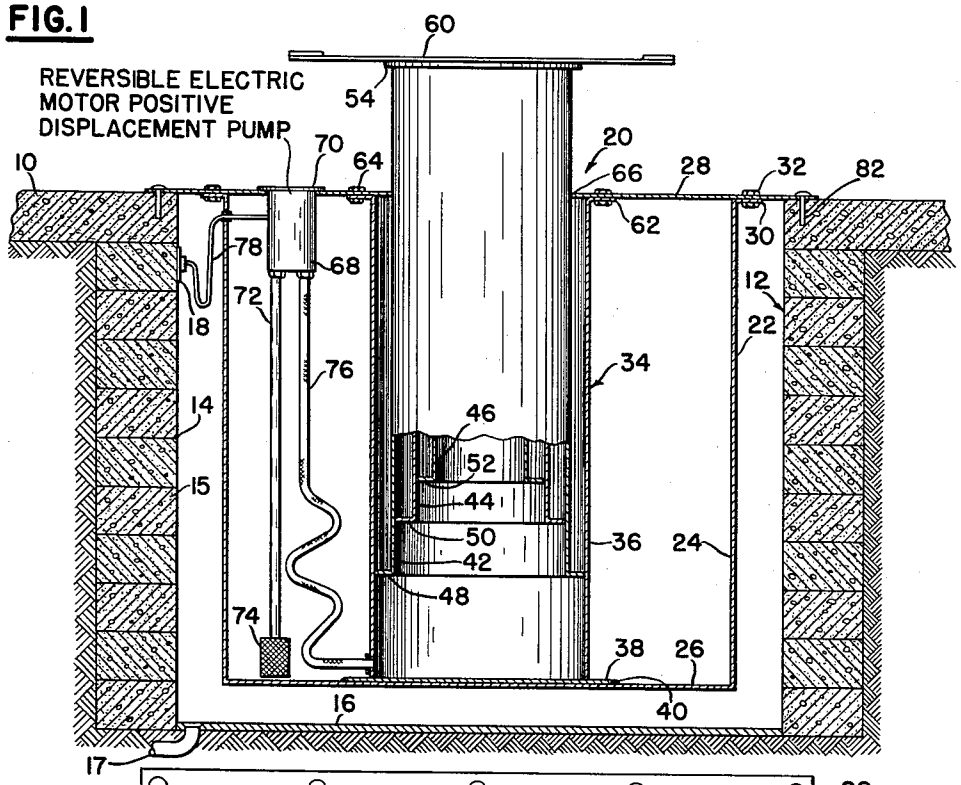
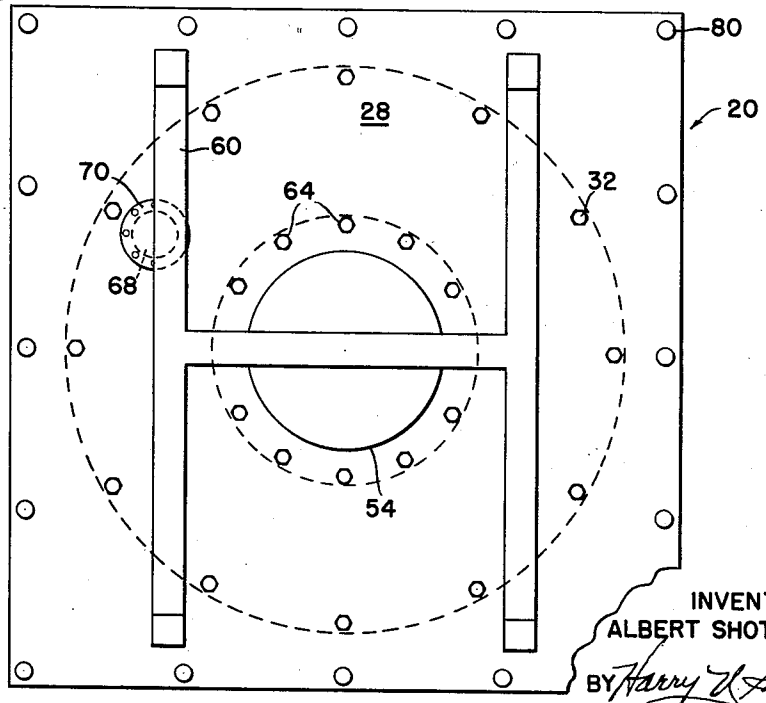


FIG. 2



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HYDRAULIC LIFT

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This invention relates to hydraulic lifts, and more specifically to novel service station hydraulic lift installations.

Heretofore it has been customary to construct service station hydraulic lifts as permanent constructions which could not readily be moved from place to place. The moving of such a lift from one place to another is a major operation, requiring the excavation of the lift, which is usually embedded in the ground, the excavation of a hole at the new site and the reinstallation of the lift at the new site. This calls for considerable labor, including preparing forms for concrete and pouring of concrete.

It is an object of this invention to provide a novel hydraulic lift which can readily and easily be installed within a pit and which can be readily and easily removed therefrom for repair, servicing, or for removal to a different location, by unskilled labor.

It is a further object to provide a novel self-contained hydraulic lift unit, including novel construction features, capable of being completely assembled at a manufacturing plant, and shipped to the point of use where it can be readily placed in operative position in a minimum of time and without interfering with other service station operations.

It is a still further object to provide a novel self-contained hydraulic lift in which all of the component elements are housed within a tank which can be suspended within a relatively shallow pit in the floor of a service station, and which can readily be moved and suspended in another similar pit when desired.

The attainment of the above objects and other objects and advantages will become evident from a consideration of the following specification and the accompanying drawings, in which:

FIG. 1 is a sectional view of a preferred form of the invention; and

FIG. 2 is a plan view of the hydraulic lift shown in FIG. 1.

Referring to the accompanying drawings, in which corresponding elements in the several figures are designated by the same reference character, the numeral **10** designates the floor of a service station which may have one or more pits **12** located at convenient points. The pits may be circular or rectangular in cross section, having side walls **14** lined with cinder or concrete blocks **15**, and a bottom wall **16**. The pit **12** is relatively shallow, for example, about 4 feet deep, and the bottom wall may be earth or lined with concrete and provided wtih a suitable drain **17** if desired. One side wall **14** carries a conventional electric outlet **18** which is in a circuit including a conventional two-way switch, not shown.

A hydraulic lift, designated in its entirety by the numeral **20**, is adapted to be suspended within the pit **12** with the side wall and bottom wall of the lift in spaced relation with the side walls and the bottom wall, respectively, of the pit. The hydraulic lift **20** comprises a cylindrical tank **22** having a side wall **24** and a bottom wall **26**, being made of heavy gauge steel to support the hydraulic jack therein. The upper end of the tank **22** is open, and is adapted to be covered by a rectangular cover plate **28** to which the tank is attached by a series of bolts and nuts **32** passing through registering openings in a flange **30** on the upper end of the tank and in the cover plate **28**. The cover plate **28** is made of heavy gauge steel, and may be reinforced by ribs and the like, not shown, to support

the weight of the tank, the jack and a load thereon. While the tank **22** is shown in the drawings as being circular in cross section and the cover plate is shown as being rectangular in outline, it is evident that the tank may assume other forms in cross section, such as rectangular or elliptical, and likewise the cover plate may be made in other shapes.

A hydraulic jack **34** is mounted within the tank **22**, being supported by the bottom wall **26**. The jack **34** comprises a cylinder **36**, the lower end of which is closed by a bottom plate **38** which may be secured to the bottom wall **26** of the tank by any suitable means, such as by welding **40**. Telescopically disposed within the cylinder **36** are a plurality of hollow sectional pistons **42**, **44** and **46**, each piston having a lower external flange **48**, **50** and **52**, respectively, retaining the piston in concentric relation with the cylinder **36** and with the interior of another piston, the flanges **48**, **50** and **52** forming pressure surfaces for the piston **42**, **44** and **46**, respectively, the hollow interior wall of the pistons **42** and **44** serving as cylinders for the pistons **44** and **46**, respectively. The upper end of the piston **46** carries a plate **54** projecting beyond the exterior wall of the piston to be engaged by the upper ends of the pistons **42** and **44**. The upper end of the hydraulic jack **34** includes conventional means, not shown, to guide the pistons within their respective cylinders and to limit the upward movement of the pistons. A conventional H-frame **60** is mounted on the plate **54**. The upper end of the cylinder **36** is provided with a flange **62** which is attached to the cover plate **28** by a series of bolts and nuts **64**. A central opening **66** in the cover plate **28** provides a guide for the piston **42**.

A reversible pump and motor unit **68** is mounted within the tank **22** by a flange **70** bolted to the cover plate **28**, the unit **68** being suspended in the tank through an opening in the cover plate. An inlet conduit **72** is connected at one end with the unit **68**, the other end having a strainer **74** disposed adjacent the bottom wall **26** of the tank **22**. A second conduit **76** is connected at one end with the unit **68** and at its other end to the interior of the cylinder **36** below the pistons **42**, **44** and **46**. An electrical conductor **78** extends from the motor of the unit **68** through an opening in the wall **24** of the tank **22**, having a plug on the end thereof which is received within the electrical outlet **18** to supply electrical current to the motor.

As seen in FIG. 1, the dimensions of the cover plate **28** are greater than the transverse dimensions of the pit **12** whereby the peripheral edges of the cover plate overlap the floor **10** surrounding the pit. A series of spaced apertures **80** around the periphery are adapted to receive screws **82** engaging threaded bores in the floor to secure the cover plate **28** and thereby the hydraulic lift in position. Since the transverse dimensions and depth of the tank **22** are less than the transverse dimensions and depth of the pit, respectively, the cover plate **28** suspends the tank **22** and its contents in spaced relation with reference to the side walls and bottom wall of the pit.

The pump of the reversible pump and motor unit **68** is of the positive displacement type, such as a gear pump or rotary piston pump and the like, whereby rotation of the pump in one direction causes a flow of liquid under pressure in one direction through the conduits **72** and **76**, and rotation of the pump in the other direction causes a flow of liquid in the other direction through the conduits. The electric motor of the unit **68** is reversible and is drivingly connected with the pump. A remotely positioned switch, not shown, is operative to stop and to change the direction of rotation of the electric motor.

A quantity of liquid, such as oil, is placed within the

tank 22. With the jack 34 in its retracted position, the reversing switch, not shown, is operated to cause rotation of the motor and pump in the unit 68 in one direction, producing an inflow of liquid through the strainer 74, inlet conduit 72, pump, and conduit 76 to the interior of the cylinder 36 to elevate the jack and the H-frame 60. Reversal of the direction of rotation of the electric motor and pump causes a reversal of the direction of flow of the liquid and a retraction of the jack and H-frame.

The entire hydraulic lift 20 may be completely assembled at the manufacturing plant, and the liquid within the tank may either be placed in the tank at the time of manufacture or just before the lift is placed in the pit. One or a number of pits 12 can be constructed at a service station, at desirable locations, and a hydraulic lift can be installed in each pit, or, if desired, a hydraulic lift can be moved from one pit to another, as needed, and the pit, when not occupied by a lift, can be covered. The entire hydraulic lift assembly can be easily installed and removed when desired, and can be readily disassembled for maintenance and repair. Because of the sectional piston construction, a relatively shallow pit can be provided, thus reducing construction costs.

The conduit 76 can be made of flexible material, such as braided hose and the like, and of sufficient length to permit the removal of the motor and pump unit 68 from the cover plate 28 without disconnecting the conduit from the lower end of the cylinder 36.

Having fully described my invention, it is to be understood that I do not wish to be limited to the details set forth herein, but that various changes may be made in the details and proportions without departing from the principles of the invention or from the scope of the annexed claims.

I claim:

1. In a service station installation having a floor, means providing a pit in said floor having a bottom wall and side walls, and a hydraulic lift within said pit, said hydraulic lift comprising a tank having at least one side wall and a bottom wall, the depth and transverse dimensions of said tank being less than the corresponding dimensions of said pit, a hydraulic jack supported on the bottom wall of said tank, a pump, conduit means connecting said pump with the bottom of said tank and with said jack, and means supporting said tank within said pit in spaced relation with the walls of said pit.

2. In a service station installation as defined in claim 1, wherein said jack comprises a plurality of telescopically related pistons.

3. In a service station installation as defined in claim 1, wherein said pump is of the positive displacement type and reversible power means drivingly connected with said pump.

4. In a service station installation as defined in claim 1, wherein said pump is of the positive displacement type and is mounted within said tank, and reversible power means drivingly connected with said pump.

5. In a service station installation as defined in claim 1,

wherein said means supporting said tank comprises a tank cover plate, means to attach the tank to said cover plate, said cover plate having dimension greater than the transverse dimensions of said pit, whereby the peripheral edge of said cover plate is supported by the floor surrounding the pit and said tank is suspended within said pit, said cover plate including an opening through which said jack is adapted to extend.

6. In a service station installation as defined in claim 1, wherein said means supporting said tank comprises a tank cover plate, means to attach the tank to said cover plate, said cover plate having dimensions greater than the transverse dimensions of said pit, whereby the peripheral edge of the cover plate is supported by the floor surrounding the pit and said tank is suspended within said pit, said cover plate including an opening through which said jack is adapted to extend, and wherein said pump is of the positive displacement type, reversible power means drivingly connected with said pump, and means attaching said pump and power means to said cover plate.

7. A hydraulic lift for installation within a service station pit, comprising: a tank having at least one side wall and a bottom wall; a cover plate having greater dimension than the transverse dimension of said tank; means attaching said tank to said cover plate whereby peripheral portions of said cover plate project beyond the side wall of said tank to engage the floor about a pit to suspend said tank within said pit; a hydraulic jack within said tank and supported by said bottom wall, said cover plate including an opening through which said jack is adapted to extend; and pump means having fluid connections with the space within said tank and with said hydraulic jack.

8. A hydraulic lift as defined in claim 7, in which said jack comprises a plurality of telescopically related pistons.

9. A hydraulic lift as defined in claim 7, in which said pump is of the positive displacement type, and reversible power means drivingly connected with said pump.

10. A hydraulic lift as defined in claim 7, in which said pump is of the positive displacement type, reversible power means drivingly connected with said pump, and means attaching said pump and power means to said cover plate.

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