Jan. 30, 1968 J. SAMPSON ET AL 3,366,280

STORAGE TANK AND DISPENSING UNIT

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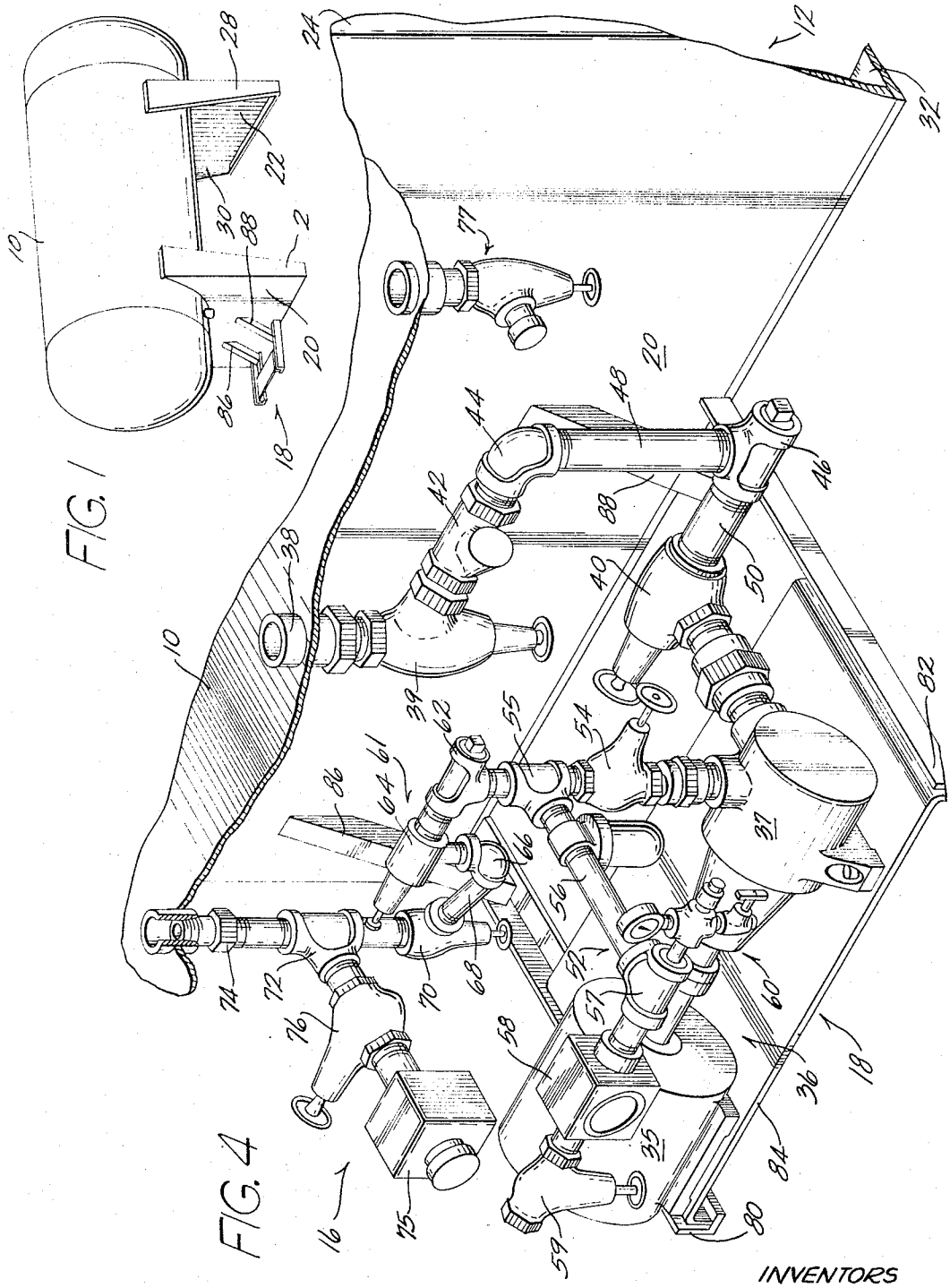


FIG. 1

FIG. 4

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FIG. 2

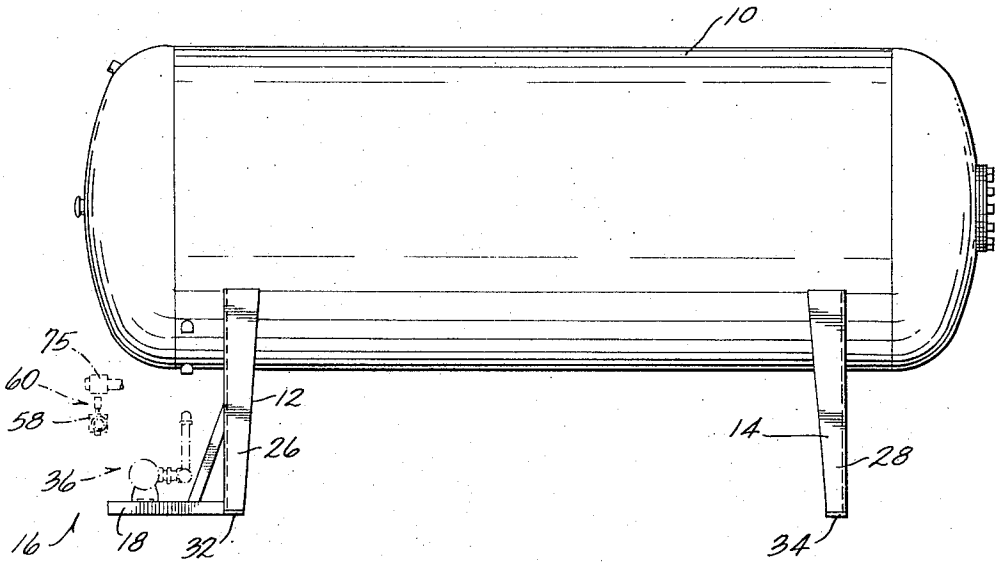
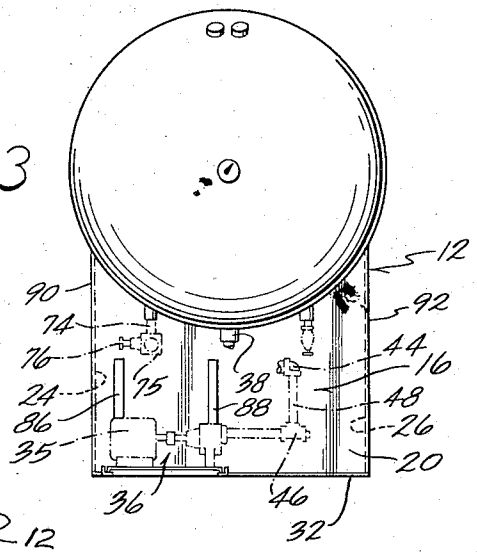


FIG. 3



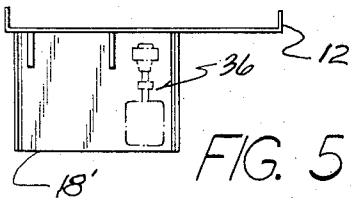


FIG. 5

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STORAGE TANK AND DISPENSING UNIT

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ABSTRACT OF THE DISCLOSURE

This disclosure relates to the provision of a storage and dispensing unit wherein a storage tank and the fluid pumping system therefor form an integral assembly. The pumping assembly is suspended beneath the tank adjacent one of the tank legs and a horizontal support extends from that leg beneath the pumping assembly to provide support for the assembly. Preferably, the pumping assembly is generally arranged in an area defined by the tank leg and the outer axial extremity of the adjacent tank end and is confined within the horizontal limits of the leg.

This invention relates to storage tanks and, more particularly, to combination storage tank and dispensing systems.

Systems or tank assemblies of the type to which this invention relates are intended to provide an integrated unit for both storing and dispensing a particular medium, such as a gaseous medium stored under pressure or a liquid medium. To be capable of dispensing a particular medium as well as storing it, suitable withdrawal and dispensing equipment is associated with the storage tank. This equipment usually includes a pump and various plumbing fixtures (connections, piping and valving) connected to the tank and the pump, and in the aggregate the equipment can make up a relatively heavy and bulky assembly.

This invention is concerned with the problem of properly supporting this withdrawal and dispensing equipment in the storage tank and dispensing unit and has as a general object the provision of a secure support for the withdrawal and dispensing equipment which also maintains the simplicity and compactness of the overall storage tank and dispensing unit.

Another general object of this invention is to provide a support having the aforementioned attributes and which further renders the equipment readily accessible for initial installation and subsequent repair and replacement.

A further object of this invention is to provide a withdrawal and dispensing equipment support arrangement which reduces, or virtually eliminates, stresses which could otherwise occur in the equipment and the tank wall from attachment of the equipment in the storage tank and dispensing unit and to the tank wall.

Another specific object of this invention is to support the equipment in a manner to protect it against accidental damage or damage due to rough handling.

For the achievement of these and other objects, this invention proposes to provide a support platform on which the withdrawal and dispensing equipment can be mounted. The equipment is connected to the tank wall through suitable plumbing fixtures so that the equipment is suspended from the tank wall as well as being supported from below by the platform. This combination of suspension from the tank wall and lower support provides a stable assembly of the equipment without unduly stressing either the equipment or the tank wall. The storage tank is provided with at least a pair of vertical support legs and a support platform is attached to one of the legs, preferably cantilevered from one of the legs and extending outwardly of the leg toward a horizontal end of the tank so that the equipment is readily accessible from that end. With this arrangement the support platform and the equipment attached thereto become an integral part of the storage tank and dispensing unit.

Other objects and advantages will be pointed out in, or be apparent from, the specification and claims, as will obvious modifications of the embodiment shown in the drawings, in which:

FIG. 1 is a perspective view of a storage tank and dispensing unit embodying this invention;

FIG. 2 is a side elevation thereof;

FIG. 3 is an end view thereof;

FIG. 4 is an enlarged perspective of withdrawal and dispensing equipment which can be used with this invention; and

FIG. 5 is a plan view of a portion of a modified arrangement of withdrawal and dispensing equipment.

With particular reference to the drawings, an elongated tank **10** is supported on relatively spaced legs **12** and **14** located one adjacent each end of the tank. A fluid withdrawal and dispensing assembly **16** is disposed below the tank adjacent leg **12** and, in a manner to be described more completely hereinafter, is supported on horizontal platform **18** connected to and extending from leg **12**.

Structurally, each leg includes a vertical planar member **20** and **22** attached to the underside of the tank. Preferably ribs **24**, **26**, **28** and **30** are attached to the opposite vertical edges of legs **12** and **14**, respectively, and to the tank wall to reinforce and provide stability for planar members **20** and **22**. Horizontal plates **32** and **34** can be connected to the bottom edges of each leg and its reinforcing ribs to provide a relatively broad base through which the weight of the tank is distributed.

Withdrawal and dispensing assembly **16** includes a pump-motor arrangement **36** connected to platform **18** and including motor **35** and pump **37**. The pump-motor when energized, draws the stored fluid medium from tank outlet **38** through valves **39** and **40**, connections **42**, **44** and **46** and pipe segments **48** and **50**. The fluid medium can be delivered for a particular process use by directing it through dispensing branch **52** of the withdrawal and dispensing assembly. More specifically, the fluid medium can be directed from pump **37** through valve **54**, T-connection **55**, pipe **56**, second T-connection **57**, sight flow indicator **58** and outlet valve **59** to which a suitable receiving line (not shown) can be attached. A pressure gauge and relief valve assembly **60** is also attached to T-connection **57**.

In the particular assembly illustrated, the withdrawal and dispensing assembly is also adapted to merely circulate the fluid medium out of and back into the tank without discharging it through dispensing branch **52**. More particularly, if outlet valve **59** is closed the flowing medium can be directed back into the tank through a recirculation branch **61**. Specifically the medium would be directed from T-connection **55** through T-connection **62**, a now-open bypass valve **64**, elbow **66**, pipe connection **68**, valve **70** and T-connection **72** to inlet coupling **74** for re-entry into the tank. This provides the particularly desirable advantage that, even though actual delivery of the fluid medium through outlet valve **59** is temporarily inter-

rupted, the pump-motor can be allowed to run during a particular withdrawal operation by merely directing the flowing medium back into the tank. Thus, the pump-motor need not be stopped and re-started each time delivery is interrupted and, moreover, in some instances it may even be advantageous to periodically circulate the stored fluid medium through the system without dispensing any fluid medium.

In the particular assembly illustrated, branch **61** also provides the arrangement through which the particular fluid medium is charged into the tank. More specifically, an inlet coupling **75** is connected in branch **61** through control valve **76** connected to T-connection **72**.

Accordingly, through selective manipulation of the various control valves in the withdrawal and dispensing assembly (e.g. **59**, **64** and **76**) fluid medium can be charged into the tank through coupling **75**, dispensed through outlet valve **59** or circulated back into the tank through inlet coupling **74**.

It will be appreciated that other forms of withdrawal and dispensing equipment can be used and other operational assemblies can be attached to the tank as desired. For example, an outlet assembly **77** can be provided to function as a vapor equalizer or can be used as an outlet through which the fluid medium can selectively be drawn off without going through the pump-motor, the motive force in this instance being provided externally.

At this point another desirable feature of the illustrated arrangement of withdrawal and dispensing equipment should be mentioned. In some instances it may be necessary to hold tanks at the manufacturer for a period of time before shipment and it may also be desirable to ship the tank and withdrawal and dispensing equipment separately. In either case it is desirable to introduce an inert gas holding charge into the tank. With the illustrated arrangement, this can be accomplished and the tank sealed without the need for connecting all of the withdrawal and dispensing equipment. Only valves **39**, **70**, **76** and **77** need be connected as they will seal the inert gas within the tank. Subsequently, the remainder of the equipment can be assembled by making the necessary connections to valves **39**, **70** and **76** without breaking the seal.

The actual connection of the withdrawal and dispensing assembly to the support platform is preferably made through the pump-motor arrangement which is suitably bolted to the platform. The pump-motor arrangement being the largest element of assembly, it provides a stable and secure base point of attachment for the assembly and upon which the remainder of the assembly is assembled and supported.

The platform itself can be of any suitable construction and as illustrated comprises a pair of parallel angle irons **80** and **82**, connected to and extending from leg **12**, and an inverted U-shaped plate **84**, which rests on the horizontal flange of the angle irons, it attached to and extends between the angle irons. The angle irons are cantilevered from leg **12** and the plate upon which the assembly is attached is disposed at the outermost end of the angle irons. The pump-motor arrangement is attached to plate **84**.

The platform provides lower support for the withdrawal and dispensing assembly and the assembly is also suspended from the tank by inlet and outlet couplings **74** and **38**. This combination of upper and lower support for the equipment provides a secure mounting for the assembly in the unit and markedly reduces, if not completely eliminates, the stresses that might be set up in the tank wall and in elements of the withdrawal and dispensing assembly itself. Angles braces **86** and **88** extend between and are connected to leg **12** and the horizontal flanges of angle irons **80** and **82** of the support platform to provide additional support for the platform and in turn the withdrawal and dispensing assembly. It will be noted that angle irons **80** and **82** are arranged flush with the bottom of leg **12**. This arrangement is preferred so that when the unit is in place the platform rests on the support base for the unit, the ground or concrete pads if used, which further cooperates in minimizing the aforementioned stresses.

The overall arrangement minimizes, if not virtually eliminates, stresses which might otherwise be set up in the equipment and in the tank wall both when the unit is installed at a particular site and also during transportation of the unit to and from a particular site.

It will be noted that in the preferred arrangement the dispensing and withdrawal equipment is located at and faces outwardly of one of the opposite ends of the tank. This locates the equipment adjacent one of the tank support legs so that the leg can be used as the point of attachment and thereby provide an effective and simple attachment of the support platform to the tank. Moreover, it also renders the equipment readily accessible both for initial assembly and also for any repair and/or maintenance which may be required in the field. In this connection, it has also been recognized that accessibility to the pump-motor arrangement can be increased by positioning the pump-motor so that it extends parallel to the longitudinal axis of the tank, preferably coincident with the longitudinal axis (see FIG. 5). With this orientation the pump-motor is readily accessible from the tank end even if the tank is placed against a wall and also permits more than one pump to be used which, similarly orientated, are all equally accessible from the tank end.

Another desirable feature of the illustrated embodiment is the specific relationship of the withdrawal and dispensing equipment with respect to leg **12**. More specifically, the equipment is confined to within an area defined by the outer extremities of the leg. This feature is best illustrated in FIGS. 2 and 3 where for convenience only the outermost elements of the assembly have been illustrated. It will be noted that in a direction transverse to the longitudinal axis of the tank the assembly elements are limited to within the outer vertical edges **90** and **92** of leg **12** (see FIG. 2). This affords protection of the equipment from accidental damage during transit and at the site. If desired, the assembly elements can also be limited to within the area between the axial end of the tank adjacent leg **12** and the leg to provide a further measure of protection.

Although but one embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

We claim:

1. A fluid medium storage and dispensing unit comprising, in combination,

an elongated storage tank havinga longitudinal axis and opposite, longitudinally spaced ends,

first and second vertical legs attached to said tank at longitudinally spaced points and providing vertical support for said tank,

said first leg located adjacent to but spaced axially inwardly of one of said tank ends,

horizontal support means connected to said first leg and extending from said first leg toward said one tank end and beneath the portion of said tank extending beyond said first leg,

and a fluid pumping assembly attached to and depending from the underside of the portion of said tank extending beyond said first leg,

said fluid pumping assembly being between the underside of the tank portion extending beyond said first leg and said horizontal support means with said fluid pumping assembly connected to said horizontal support means so that said horizontal support means provides a lower support for said pumping assembly.

2. The storage and dispensing unit of claim **1** wherein said first leg includes horizontally spaced outer vertical edges,

and wherein said pumping assembly is confined generally within an area defined by said vertical edges.

3. The storage and dispensing unit of claim 1 wherein said fluid pumping assembly includes a pump and motor arrangement and said pump and motor are connected to said horizontal support means providing the point of connection between said support means and said pumping assembly.

4. The storage and dispensing unit of claim 3 wherein said pump and motor are arranged end to end and parallel to the longitudinal axis of said tank.

References Cited

UNITED STATES PATENTS

1,546,049	7/1925	Harper	222—333
3,115,943	12/1963	Miller	222—333
3,206,077	9/1965	Fetterman	222—173
3,217,941	11/1965	Fishburne	222—333

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