April 3, 1956 D. M. JACKSON 2,740,563

LIQUID RECEIVING FITTING

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Fig. 1

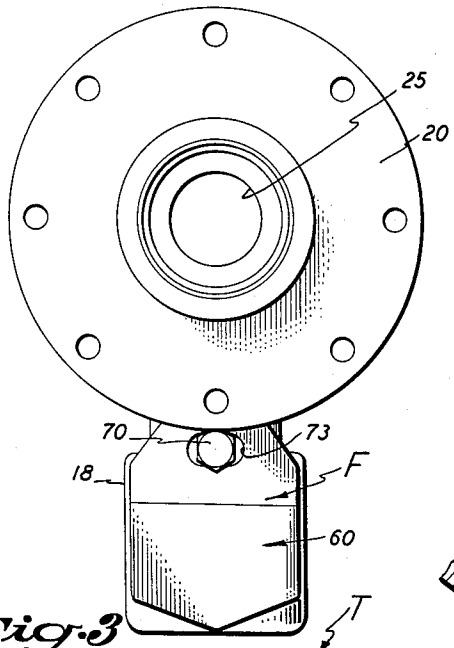


Fig. 2

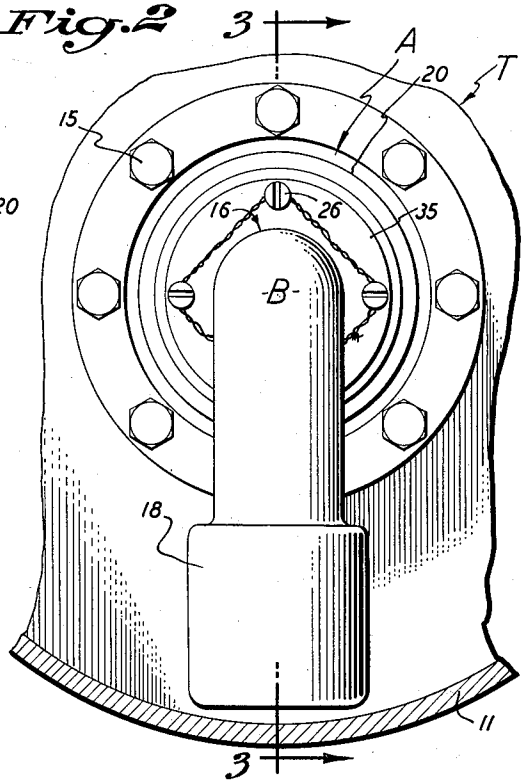


Fig. 3

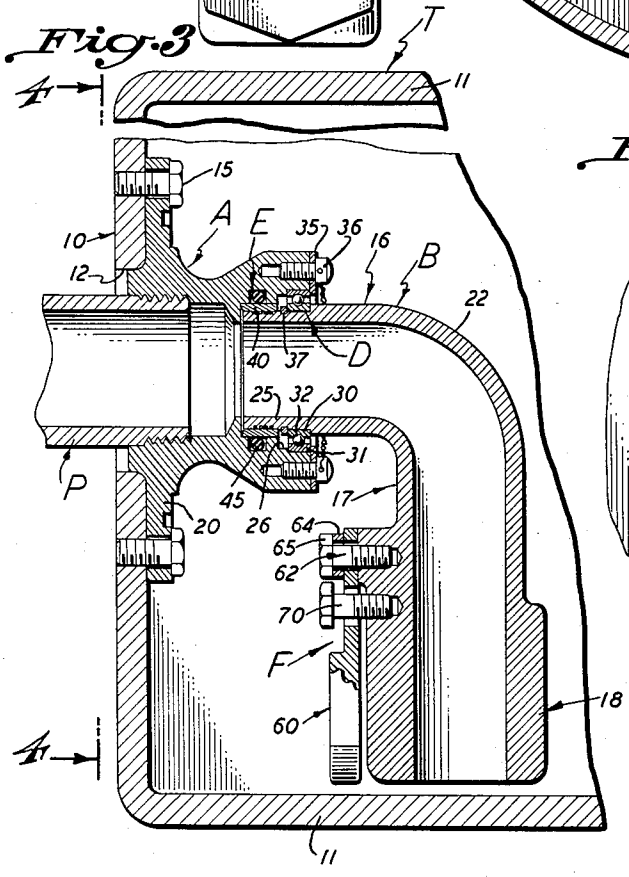
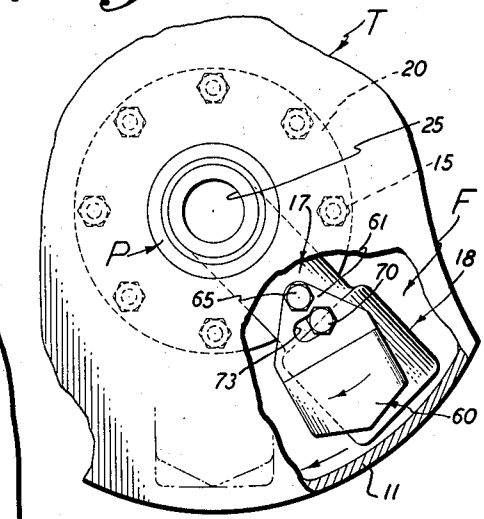


Fig. 4



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LIQUID RECEIVING FITTING

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4 Claims. (Cl. 222—464)

This invention has to do with a liquid receiving fitting and it is a general object of the invention to provide a simple, practical, dependable fitting applicable to a container such as a tank, or the like, and adapted to receive liquid from the bottom of such container.

There are numerous situations where liquid is carried in a container such as a tank, or the like, and where that liquid is to be drained or drawn from the tank as through a suitable pipe or duct. It is not uncommon for such a tank to be employed in a situation where it is moved to various positions and it is common to provide such a tank with a fitting designed to remove liquid from the bottom or lower-most part of the tank. In cases where it is important that the liquid be drained from the lower-most part of the tank, and where the tank is subject to being shifted, the fitting provided is usually a pivoted structure and when suction is employed to induce the desired flow from the tank it is necessary to provide the fitting with a packed joint. In such a case the friction occurring in the joint incidental to the maintenance of a satisfactory sealed joint, is likely to result in the movable part of the fitting becoming stuck or hung up so that it does not necessarily depend into the bottom or lower-most part of the tank.

It is a general object of this invention to provide a fitting applicable to, or adapted to be used in connection with, a tank and which is such as to provide a dependable yet simple and practical means whereby liquid is drawn from the lower-most part of the tank without danger of the fitting becoming stuck or otherwise failing to act as desired.

An object of the present invention is to provide a fitting of the general character referred to wherein there is a tubular receiver pivotally supported and effectively sealed at the point of support and wherein there is a gravity actuated means in connection with the receiver, adapted to so act upon the receiver as to effectively operate or cause movement of the receiver as shifting or movement of the tank occurs.

It is another object of this invention to provide a structure of the general character referred to wherein the actuator for the pivoted receiver is of simple, dependable construction and involves but one part movable relative to the arm of the receiver to which it is applied.

It is another object of the present invention to provide a structure of the general character referred to wherein the receiver that handles the fluid in the tank in such as to have an inlet arm weighted so that it is operable by gravity, while an actuator for the receiver is a gravity actuated element carried by the weighted arm of the receiver.

In accordance with the present invention, the fitting, which can be applied to containers such as tanks generally, is characterized by a mounting bracket applicable to a part of the tank such, for instance, as the side thereof. The bracket makes connection with a fluid handling duct such as a pipe and it is provided with a socket. The liquid receiver is preferably a simple, L-shaped, tubular element

with a horizontally disposed arm with a pin portion adapted to be received in the socket of the bracket. A bearing means supports the pin portion in the socket and a sealing means seals between these parts. The receiver has an outer arm adapted to be maintained in a vertical position and this arm is preferably provided with a weight at its terminal or lower end. In a typical installation, the bracket may be so mounted and the bottom of the tank to which the structure is related may be formed so that as the tank operates through the desired range of movement the receiving end of the vertical arm of the fitting is adjacent, though somewhat spaced from, the bottom of the tank and is adapted to receive liquid so that there will be a flow or supply of liquid so long as there is any liquid present in the tank.

The invention provides an actuator for the receiver of the fitting and the actuator is preferably a gravity actuated device carried by the vertical arm of the receiver. In a preferred embodiment the actuator includes a body in the form of a weight and a flange projecting from the body. The flange is mounted on the vertical arm at the terminal end portion thereof, preferably by means of a pivot member and a stop is carried by the vertical arm and operates in or is engaged through an arcuate slot in the flange. As a result of this construction the actuator is movable or adapted to pivot relative to the vertical arm and it is a gravity actuated member which, as movements of the tank occur, serves to, in effect, jar or actuate the arm or receiver of the fitting to the end that the vertical arm of the receiver is normally maintained in a true vertical position.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of the invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is an end view of the fitting provided by the present invention showing it apart from the structure with which it is normally combined. Fig. 2 is an end view of the fitting as provided by the present invention showing it applied to, or in combination with, the parts of a typical tank or container. Fig. 3 is a sectional view of the structure shown in Fig. 2, being a view taken as indicated by line 3—3 on Fig. 2 and 4 is a view taken substantially as indicated by line 4—4 on Fig. 3, with certain parts broken away to show in section and indicating the tank moved from a position such as is shown in Fig. 3 and the receiving arm of the receiver being actuated toward a true vertical position so that it receives fluid from the lower-most part of the tank.

The fitting provided by the present invention is adapted to be applied to containers generally and it can be used to advantage in various situations where a liquid receiver is required and where it is important that the intake arms of the receiver be maintained in a substantially vertical position. In a typical situation the fitting of the present invention can be applied to a tank T and in the drawings a tank is illustrated having a side wall 10, a top wall 11 and a bottom wall 12. The particular tank illustrated is intended for use in a situation where it is subject to being bodily shifted or moved and because of this, the bottom 11 is shown curved or formed so that it is in the nature of a basin.

The side wall 10 of the tank T is shown provided with an opening 12 through which fluid is adapted to be passed. In the particular case illustrated, the curved, or basin-like bottom 11 is related to the opening 12 in the side wall 10 to be substantially concentric therewith.

The fitting as provided by the present invention includes a mounting bracket A adapted to be secured to a part of the tank T, for instance, to the side wall 10 of the tank and in the drawings the bracket is shown secured

to side wall 10 by suitable fasteners 15. The bracket A is adapted to be connected with a suitable fluid handling element say, for instance, a duct or pipe P and in the particular arrangement illustrated, the bracket is mounted on the inner side of wall 10 while the pipe P enters through the opening 12 and is threaded to the bracket.

The invention provides a liquid handling receiver B. A bearing means D is provided between a horizontal arm 16 of the receiver and the bracket A. A sealing means E is provided between the engaged parts of arm 16 and bracket A. The receiver B has a receiving arm 17 which is adapted to depend so that it is normally vertically disposed and a weight 18 is provided at the lower or receiving end of arm 17. The actuator F provided by the present invention is combined with, or applied to, the arm 17 of receiver B.

The mounting bracket A may in practice vary widely in form and construction. In the particular case illustrated it is shown as a simple, tubular part with a flange 20 adapted to engage a side of a part such as the wall 10 of tank T. In the drawings the flange 20 is shown engaging, or abutting the inner side of wall 10 and the fasteners or fastening means 15 are shown as simple screw fasteners. The mounting is such that the tubular portion of the bracket A is mounted concentric with the opening 12 in wall 10 and projects inwardly from wall 10 to be within the tank.

The receiver B is, in effect, a simple L-shaped, tubular element with the horizontal arm 16 joined to the receiving or vertical arm 17 by a suitably curved neck portion 22.

The horizontal arm 16 of receiver B has an end or pin portion 25 which enters a socket 26 provided in the bracket A.

The bearing means D is preferably an anti-friction bearing and in the drawings it is shown as including an inner race 30 carried on the pin portion 25, an outer race 31 carried in the socket 26 and an annular series of balls 32 between the races. A retainer 35 in the form of a plate is secured to the end of bracket A as by fasteners 36 and serves to retain the outer race 31 in the socket. A suitable retainer or split ring 37 is provided on the pin portion 25 and retains the inner race on the pin portion.

In the particular construction illustrated, a bearing member 40 is provided on the pin portion 25 inward of the bearing means D and fits into the socket opening 26. A recess is provided in the wall of the socket opening 26 facing the member 40 and the sealing means E includes a sealing ring 45 carried in the recess and having sealing engagement with a wall, or with walls, of the recess and with the exterior of the bearing member 40 as clearly shown in Fig. 3 of the drawings.

Through the construction just described, the fluid receiver B is pivotally connected with the mounting bracket A and is sealed therewith. The anti-friction bearing means D is such as to provide for free pivotal movement of the receiver B relative to the mounting bracket A; however, in practice, when an effective, fluid tight seal, such as a means E is provided, there is likely to be enough friction in the structure so that under some circumstances the receiver B will stick or hang up and not necessarily turn freely or in the desired manner relative to the bracket A.

In the case of an ordinary structure if the structure is turned through about 180° to an inverted position, as may occur in an airplane, and stays in that position for a time, the arm intended to depend may reach an upwardly projecting position and remain there.

The receiving arm 17 of receiver B is adapted to depend as illustrated in Figs. 1, 2 and 3 of the drawings. To assure movement of the receiver B relative to the bracket A so that arm 17 depends in the desired manner a weight, or mass, 18 is provided at the lower or terminal end portion of arm 17. By providing a suitable weight 18 gravity acts on arm 17 and normally

maintains it in the desired depending position. In practice the weight may be varied widely in form and size; however, there are situations wherein it is preferred that the weight 18 be of minimum size, for example, where the structure is to be employed in aircraft where weight is a critical factor it is preferred that the weight 18 be minimum. Further, there are, or may be, situations wherein the space available requires that the weight 18 be of minimum size.

The actuator F provided by the present invention is mounted on, or carried by, the arm 17 preferably at the lower end portion thereof. In the form illustrated, the means 17 is a gravity actuated means and the particular construction illustrated in the drawings includes a body 60 in the form of a weight. A mounting flange 61 projects from the body 60 and a pivot member 62 pivotally supports the combined body and flange on the arm 17.

In the case illustrated, the combined body 60 and flange 61 are located at one side of arm 17 and the pivot member 62 is threaded to the arm 17 and projects therefrom to support a flanged bushing or washer 64 to freely support the flange 61. From the drawings it will be apparent how the pivot member 61 provided with a head 65 retains the washer 64 in position and how the member 62 pivotally carries the flange 61.

The parts are fitted and the pivot member 62 is disposed so that the pivotal axis is horizontal and the body 60 is acted upon by gravity so that it normally tends to depend straight down relative to the pivotal axis established by the member 62.

In the structure provided by the present invention a stop member or pin 70 is carried by the arm 17 and cooperates with, or projects through, an arcuate slot 73 provided in the flange 61. The slot 73 is concentric with the axis of the pivot member 62 and is of such length as to allow for appreciable movement of the actuating means relative to the arm 17.

As a result of the construction just described, the weight, or mass unit formed by the body 60 and flange 61, hangs or pivots freely and has a swinging or pendulum-like movement relative to arm 17. It will be immediately apparent that as the tank T shifts or rocks one way or another, gravity acts upon the arm 17 of the receiver B and upon a body 60 of the actuating means. This action of gravity on the parts named results in a tendency for the arm 17, as well as the body 61, to move down or to maintain a depending position. There is a tendency for these parts to move relative to each other and if the relative movement is sufficient there will actually be a knocking or hammering of the actuator due to cooperation of the stop 70, and the ends of slot 73, to the end that the arm 17 is jarred. This action or operation occurs when there is a tendency for the receiver B to hang up or fail to swing to the depending position and in practice, the sticking action that may result from packing means E or from other like conditions or factors is effectively counteracted by the actuator F. In the case of an installation occurring in a vehicle or, for instance, in an aircraft, there is enough movement, swinging or rocking of the structure so that any tendency for the depending arm 17 to stick or get hung up in other than a depending position is taken care of by the action of the actuator F and as a result of this the arm 17 remains vertically disposed at all times. In Fig. 4 an exaggerated condition is indicated, that is, the arm 17 is shown up at a substantial angle and the actuator B is shown swinging down relative to the arm so that it may have a hammering action tending to jar the arm 17 so that it moves down to the true vertical position. Actually, in practice, such an extreme condition is not likely to occur. Ordinarily some rather free swinging movement or oscillation of the body 60 of the actuator F occurs relative to arm 17, causing a gentle tapping or agitation of the arm 17 so that it is kept free and is, in effect, maintained at all times in a substantially true vertical position.

Should the arm 17 reach a position where it projects upwardly in a true vertical position and tends to stick in that position, the actuator being freely pivoted will fall to one side or the other, and jar the arm 17, causing it to swing by gravity to the desired depending position.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. A liquid handling fitting for a tank subject to movement including, a bracket adapted to be fixed to the tank, a tubular liquid receiver having a horizontal arm and a vertical depending arm, bearing means rotatably supporting the horizontal arm from the bracket whereby the vertical arm normally depends, sealing means maintaining a fluid tight seal between the horizontal arm and the bracket, and a gravity operated actuator adapted to operate the receiver to maintain the vertical arm in a depending position, the actuator including a weight pivotally carried at the lower end of the depending arm of the receiver and adapted to swing relative thereto.

2. A liquid handling fitting for a tank subject to movement including, a bracket adapted to be fixed to the tank, a tubular liquid receiver having a horizontal arm and a vertical depending arm, bearing means rotatably supporting the horizontal arm from the bracket whereby the vertical arm normally depends, sealing means maintaining a fluid tight seal between the horizontal arm and the bracket, and a gravity operated actuator adapted to operate the receiver to maintain the vertical arm in a depending position, the actuator including a weight pivotally carried at the lower end of the depending arm of the receiver and adapted to swing relative thereto and a stop member carried by said arm and engaging the actuator to limit swinging movement of the weight relative to the receiver.

3. A liquid handling fitting for a tank subject to movement including a bracket adapted to be fixed to the tank, a tubular liquid receiver having a horizontal arm and a vertical depending arm, bearing means rotatably supporting the horizontal arm from the bracket whereby the vertical arm normally depends, sealing means maintaining a fluid tight seal between the horizontal arm and the bracket, and a gravity operated actuator adapted to operate the receiver to maintain the vertical arm in a depending position, the actuator including a body, a flange on the body, a pivotal member connecting the flange to the lower end of the vertical arm, and a stop member carried by said arm and engaging the actuator to limit pivotal movement of the body and flange relative to this vertical arm.

4. A liquid handling fitting for a tank subject to movement including, a bracket adapted to be fixed to the tank, a tubular liquid receiver having a horizontal arm and a vertical depending arm, bearing means rotatably supporting the horizontal arm from the bracket whereby the vertical arm normally depends, sealing means maintaining a fluid seal between the horizontal arm and the bracket, and a gravity operated actuator adapted to operate the receiver to maintain the vertical arm in a depending position, the actuator including a body, a flange on the body, a pivotal member connecting the flange to the lower end of the vertical arm, and a stop member carried by said arm and operating in an arcuate slot in the flange and engaging the ends of the slot to limit pivotal movement of the body and flange relative to the vertical arm.

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