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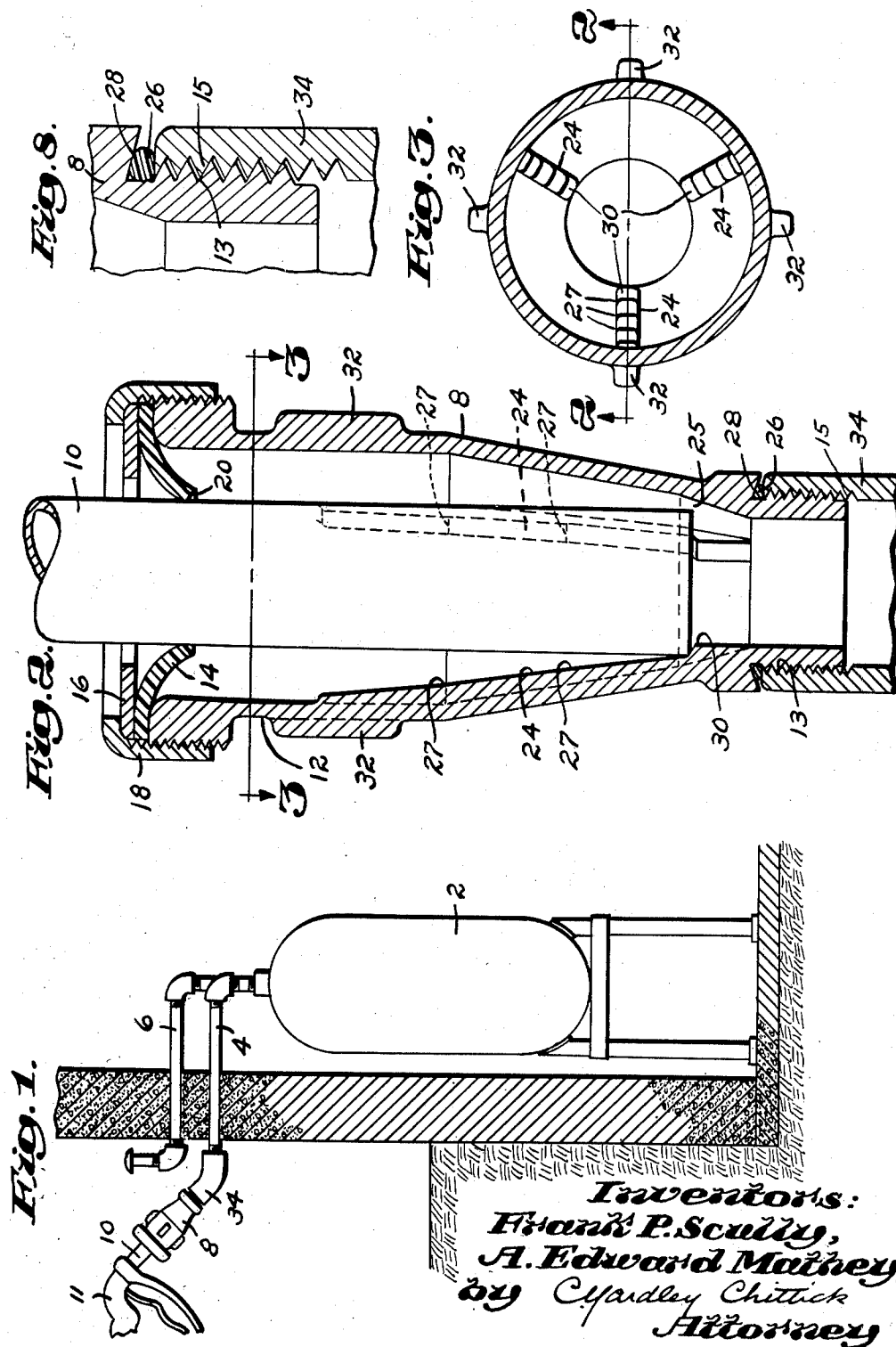
F. P. SCULLY ET AL

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PORTABLE FILLING CONNECTION

Filed July 30, 1952

2 Sheets-Sheet 1



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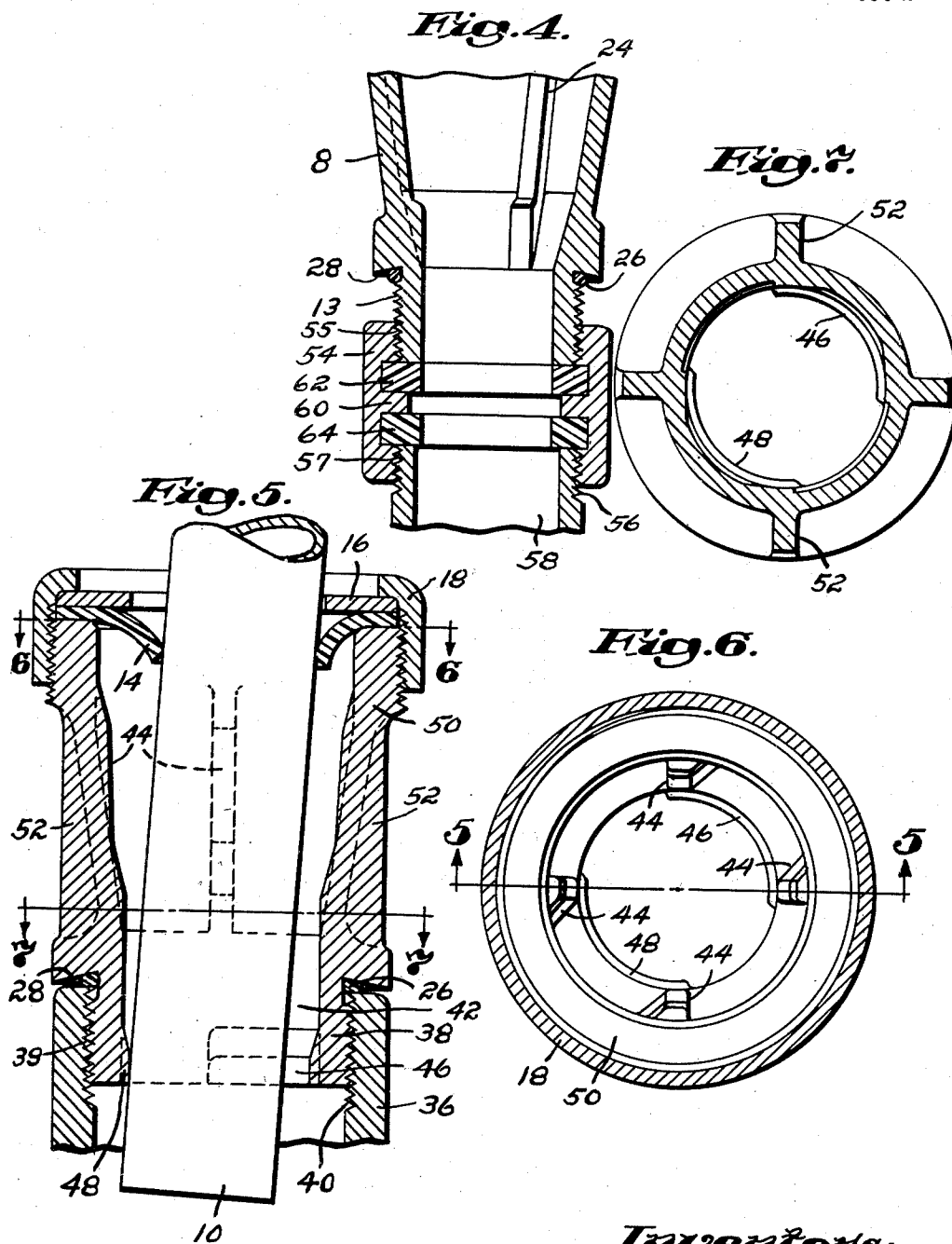
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PORTABLE FILLING CONNECTION

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5 Claims. (Cl. 285—175)

This invention relates to the filling of tanks or other containers with liquid. It is particularly concerned with a means of providing a tight connection between a filling hose or pipe and the fill pipe of the container that is to receive the liquid.

The ordinary application of the invention is in the oil industry, but is obviously may be used in other situations where a connection of this type is desirable.

For the sake of example, reference will be made to the use of the invention in connection with the filling of oil tanks with fuel oil of the type used with household oil burners. In such situations the oil tank is customarily positioned in the cellar, and a fill pipe extends upwardly therefrom through the wall to the outside where it is accessible for connection with a hose leading from a tank truck. In addition, there is a vent pipe leading from the tank through the wall to the outside.

It has been found in practice that if the spout of the oil hose is placed loosely in the end of the fill pipe, the oil will flow properly into the tank up to a certain maximum rate, but when an attempt is made to fill the tank more rapidly, the back pressure built up within the tank and fill pipe is sufficiently great to cause some of the oil to back up the fill pipe and overflow. This situation, of course, is undesirable, and the practical result is that the rate of fill to any given tank is limited by the particular characteristics of the equipment, such as the diameter of the fill pipe, diameter of the vent pipe, the number of bends in the fill pipe, etc.

Under such conditions, if it is desired to increase the rate at which a tank may be filled, it is essential that a tight connection be established between the spout of the hose nozzle and the fill pipe.

One of the objects of the invention is, therefore, to provide a simple light-weight connection which the operator may carry with him as he makes his rounds from house to house, which may be quickly and easily attached to a fill pipe, and which, when so attached, will receive the spout of the hose nozzle in such a way that a tight connection will be formed so that the rate of fill may be increased to the extent desired. With a tight connection the full capacity of the pump on the tank truck may be utilized.

A further object of the invention is to provide a portable filling connection of the character described, which, by means of connectors or reducing bushings, may be attached to pipes of varying sizes.

It is contemplated that the invention may be used with other sizes and types of tanks and may be constructed to receive nozzle spouts of varying dimensions. Means have also been provided within the connection for locating and supporting the spout of the inserted nozzle so that it will be properly held at two longitudinally spaced positions. Suitable spacing between the end of the spout and casing is also provided so that there will be access to the upper area of the unit.

Another object of the invention is to provide in the filling connection, spout supporting means both above

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and below the point of liquid-tight engagement with the nozzle so that in the use of extra large and heavy nozzles, the load of the spout on the apertured sealing disk may be limited.

Still another object of the invention is the provision of means integral with the filling connection and with the connectors or reducing bushings that may be used therewith which will permit the operator to screw the various elements in position very easily by hand without the necessity of using any tools at any time. Screw threads of a particular character are used for this purpose and the connection is made liquid-tight by the use of sealing rings or gaskets that engage the opposed ends of the elements rather than the threads which hold the elements together. One type of sealing ring that has been found particularly effective is known as an O-ring. Where reference is made hereinafter to O-rings, it will be understood that other types of sealing rings could be used if desired.

These and other objects of the invention will appear as the description proceeds with the aid of the accompanying drawings in which

Fig. 1 is an end elevation of a tank in a cellar, showing the fill and vent pipes extending through the building wall with the nozzle in place in the filling connection of the present invention.

Fig. 2 is a vertical cross section of the filling connection showing the spout of the filling nozzle in place therein. This view is in part on the line 2—2 of Fig. 3 in which latter figure the spout is not shown.

Fig. 3 is a horizontal sectional view on the line 3—3 of Fig. 2 with the spout omitted.

Fig. 4 is a vertical section of the lower portion of the filling connection showing the use of a coupling for connecting the unit to a pipe having an exterior thread.

Fig. 5 is a vertical section similar to Fig. 2, showing a slightly modified form of the invention designed for use with a fill pipe of larger dimensions.

Fig. 6 is a horizontal section on the line 6—6 of Fig. 6 with the spout omitted.

Fig. 7 is a horizontal section taken on the line 7—7 of Fig. 5 with the spout omitted.

Fig. 8 is an enlarged fragmentary view of the lower end of Fig. 2, illustrating the loose fit of the threads.

Referring now to Fig. 1, 2 represents a tank or other container to be filled, 4 is a fill pipe connected thereto, and 6 is a vent pipe.

To the outer end of fill pipe 4 is screwed the filling connection 8, in which is shown inserted the spout 10 of nozzle 11 of the hose leading to the source of supply.

In Figs. 2 to 7 are shown the details of the construction of filling connection 8. This unit consists of a tubular body 12 which is threaded at its lower end, as at 13. On the upper end is placed a disk of rubber or other flexible resilient material 14, which preferably should be of a character not readily attacked by the liquids with which the tank is to be filled. However, the durability of the disk 14 is relatively immaterial, as it may be readily replaced at small expense. To secure the flexible disk 14 in position is a washer 16 positioned thereover and held in place by the flanged screw cap 18.

The internal diameter of disk 14 is always somewhat less than the diameter of spout 10 with which it is to be used, so that when the spout is in filling position, the inner edge of disk 14 will be bent downwardly to position 20, as shown in Fig. 2. When the spout is withdrawn, which can be accomplished only by the application of considerable force, the inner edge of disk 14 will snap upwardly to a position the reverse of position 20, permitting somewhat easier removal.

To prevent the spout 10 from getting jammed in the throat, or otherwise unduly obstructing the passage, and

also for the purpose of bringing the spout into substantial axial alignment with the connection, there is provided a series of webs 24 which may be in any suitable number, size and shape, it being contemplated that there will always be ample clearance 25 between the spout end and casing to permit the liquid to back up into the body of the connection below disk 14.

Fill pipes are ordinarily threaded interiorly at the outer end, and it is contemplated that the fill connection will be screwed thereon. Preferably the threads 13 of the connection are of such dimensions that they will provide a very loose running fit, so that an operator, in applying the connection, can spin it down by hand, thus saving delay by eliminating the use of a wrench. The connection is made tight by the use of an O-ring 26 which fits closely against the undercut shoulder 28 and is compressed by the upper end of the pipe or fitting 34 to which it is screwed.

In order to provide the loose running fit referred to above, the following procedure is practiced. The fill pipes that are permanently installed in connection with the tanks in the various buildings at which oil will be delivered will customarily be threaded according to standard pipe thread dimensions. That is to say, the threads 15 on the interior of fill pipe 34 will be of such dimensions. In order to provide that the threads 13 will run freely and loosely within the standard threads 15 but, at the same time, will be adequate to secure the connection to the fill pipe, the threads 13 are intentionally made undersized, so much so that the operator will have no trouble whatsoever in screwing the connection to the pipe end. In other words, the connection always contemplates that the thread on the fixed installation at the building will be of standard thread dimensions while the thread of the connection will be materially undersized. The pitch, of course, will be the same.

The webs 24, shown in Figs. 2 and 3, are three in number but could be increased if it were considered desirable. The webs as shown have their interior edges broken slightly at 27 but they may run in a straight line if desired. At the lower end of the webs there are shoulders 30 which act as stops for terminating downward movement of the spout 10. When the spout is in maximum down position, there will still be the clearance 25 so that any back pressure may be exerted upwardly against the under side of disk 14.

The undercut shoulder 28, previously referred to and against which O-ring 26 rests, is designed so that upon engagement of the O-ring with the upper end of the cooperating fill pipe, the O-ring will be not only compressed longitudinally but will be squeezed inwardly toward the engaging threads, thus providing a more effective seal than would be the case were the shoulder 28 not undercut. The exact configuration of the undercut surface may be varied so long as the tendency to squeeze the O-ring inwardly is present.

The four projections 32, about the upper portion of the casing, provide a good handhold for use in screwing the connection to the fill pipe. In Fig. 2 the connection is screwed to the end of a pipe 34 which is representative of the end of the fill pipe or the end of an elbow as shown in Fig. 1.

The construction shown in Fig. 5 differs slightly from that shown in Fig. 2, the main difference being in the size of the connection and the fill pipe. As pointed out in connection with the explanation above relating to the size of the threads 13 and 15, shown in Fig. 2, the thread 40, being connected to the tank is of standard pipe thread dimensions while the thread 39 of the connector is undersized, thereby permitting the two parts to be screwed together easily by hand. Reliance for the fluid-tight character of the connection is placed on the O-ring 26 which is compressed between the end of pipe 36 and the undercut shoulder 28. Because of the larger dimension, the bottom opening at 42 will in many cases be larger than the spout

10 so that the spout can be pushed through the connection to extend downwardly a distance into the fill pipe.

In order to prevent the spout from sealing the interior of the connection a plurality of webs 44 are provided about the upper interior, and, in addition, there are two thickened areas 46 and 48, each of which extends approximately 90° around the lower interior of the casing. This arrangement will insure that there will be clearance at all times between the interior of the connection and the exterior of the spout.

The body portion 50 of the connection shown in Fig. 5 has a plurality of vertical flanges 52, spaced around its circumference, which act as means for the user to secure a good grip thereon, thus making it possible to screw the unit by hand tightly into place.

The flexible disk 14 is similar to that described in Fig. 2 and is maintained in position by the same means, namely, a washer 16 and a screw cap 18. Likewise the O-ring 26 is positioned against the undercut shoulder 28 where it will engage the upper end of pipe 36 to make a tight seal when screwed down to hand tightness.

In other cases, it may be found necessary to attach the filling connection to the end of a pipe having an external thread. For those cases, there is provided, as shown in Fig. 4, a coupling 54 which has an internal thread 55 at its upper end adapted to engage with thread 13 on the connection, and internal threads 57 at its lower end adapted to engage with external threads 56 on the end of the fill pipe 58. The coupling has a center circumferential flange 60 with gaskets 62 and 64 above and below, against which the ends of the two threaded members abut to provide a tight sealed connection.

In order that the various parts may be screwed together as easily by hand as in the previously referred to constructions, the coupling is made in the following manner. Thread 57 is oversized so that it may be screwed easily to thread 56 which is of standard pipe thread dimensions. Thread 55 is of standard pipe thread dimensions so that it may easily receive thread 13 which is undersized. In other words, the coupling 54 has two internal threads, one of which is of standard pipe thread dimensions and the other is oversized. This permits the coupling to be screwed easily onto the end of pipe 58 so that the pipe will press against gasket 64 to make a liquid-tight seal. With the coupling in position, the filling connection may then with equal ease be screwed into thread 55, causing the lower end of the connection to press against gasket 62 making a second liquid-tight seal. Couplings of varying thread dimensions, of course, can be provided so that the filling connection can be easily applied to fill pipes of different sizes. It will be noted, however, that in every case of threaded engagement, the thread on the tank side of the connection is of standard pipe thread dimensions while the cooperating thread on the filling connector side is undersized or oversized, depending on the circumstances.

The operation of the constructions described is as follows. The operator, wishing to fill a tank, goes to the fill pipe, carrying with him the tight filling connection and reducing couplings, all of which weigh but a few pounds. On removing the cap from the fill pipe, it is a matter of only a moment to determine which connections are necessary to attach properly the filling connection 8 to the end of the pipe. The necessary parts are rapidly and easily screwed into position by hand. This is possible by virtue of the standard pipe threads being in engagement with undersized or oversized threads. The joints are made liquid-tight by the O-rings or gaskets interposed between the pipe ends, connector ends and shoulders, as the case may be. No reliance is placed on the threads for liquid-tight characteristics. The spout of the hose nozzle is then introduced into the connection 8 through the gasket and the unit is ready for operation. The liquid supply, whether coming by gravity or under forced feed, is turned on and filling takes place as rapidly

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as the liquid head and tank venting capacity permit, staying, of course, within the safe limits of the receiving tank. When the filling has been completed, the spout is withdrawn from the basket. Somewhat more force is required to withdraw the spout than to insert it but such effort is easily within the strength of the operator. The various parts may then be unscrewed by hand, due to the free running fit of the threads, and the parts removed, to be taken to the next tank to be filled.

It is our intention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure which do not constitute departures from the spirit and scope of the invention.

We claim:

1. A tight filling connection for use with a tank having a fill pipe with an internal standard pipe thread at its outer end, comprising a tubular casing, means at one end for liquid-tight connection with said fill pipe, means at the other end for making a substantially liquid-tight connection with a filling nozzle, said first means comprising an external thread of the same pitch as the standard pipe thread of said fill pipe and of less than standard diameter at the lower end of said casing and a circumferentially extending undercut shoulder above said external threads with a sealing ring positioned thereagainst and adapted to engage the end of said internally threaded pipe to which said connection may be screwed, the second of said means comprising a relatively large flexible disk having a centrally located aperture smaller than the diameter of the spout to be received therein and webs extending inwardly from the interior of said casing along a substantial portion of the interior length of said casing to position and direct said spout regardless of its diameter and terminal location with respect to said casing to a position to provide clearance at all times between the interior of said casing and the exterior of said spout.

2. A tight filling connection for use with a tank having a fill pipe with an internal standard pipe thread on its outer end, comprising a tubular casing threaded externally at its upper end, an apertured disk for receiving a spout of larger diameter than said aperture resting on the upper end of said casing, a washer resting on said disk having an aperture therethrough larger than the aperture through said disk but smaller than the internal diameter of the upper end of said casing, a screw cap having an intumed flange screwed on the upper end of said casing with said flange holding said washer and disk firmly against the upper end of said casing, said casing threaded externally at its lower end, said last thread being of the same pitch as said standard pipe thread of said fill pipe and of less than standard diameter, an undercut shoulder above said threads, a sealing ring positioned against said undercut shoulder adapted to engage the end of a pipe to which said connection may be screwed and a plurality of webs spaced about the interior of said casing adapted to prevent the spout regardless of its diameter when positioned within said casing from causing sealing engagement with the interior wall of said casing.

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3. In combination a closed tank having a fill pipe and a vent pipe and a tight filling connection secured to the end of said fill pipe, said filling connection and fill pipe secured together by cooperating screw threads in which the threads on said fill pipe are of standard pipe thread dimension and the threads on said filling connection are of the same pitch as said fill pipe thread and of non-standard diameter to provide a very free running fit between said threads, means for making sealing engagement between said filling connection and said fill pipe, said filling connection including means having an expansible aperture for receiving and holding frictionally a nozzle spout placed therein in liquid-tight engagement and means extending interiorly of said casing for preventing said spout regardless of its diameter from making sealing engagement with the interior of said casing.

4. In combination, a closed tank having an inlet and a vent pipe, said inlet comprising a fill pipe with a tight filling connection mounted on the end thereof, said tight filling connection comprising a tubular casing removably secured to the end of said fill pipe by loose threaded engagement whereby said filling connection may be screwed to and unscrewed from said fill pipe by hand, a circumferentially extending shoulder on said filling connection above the threaded portion, a sealing ring between said shoulder and the end of said fill pipe whereby a liquid-tight joint may be formed by hand tightening of the threaded portions of said filling connection and said fill pipe, said filling connection having at its upper end a flexible apertured disc adapted to receive and to hold frictionally in liquid-tight engagement therewith a spout larger than said aperture, and a plurality of internally extending webs within said casing for preventing said spout from making sealing engagement with the interior wall of said casing.

5. A tight filling connection for use with a tank that has a fill pipe extending therefrom, said connection comprising a tubular casing threaded at one end to make threaded engagement with said fill pipe, the cooperating threads of said casing and fill pipe comprising one thread that is a standard pipe thread and the other thread being of the same pitch but of non-standard diameter to provide a very free running fit between said threads, means at the other end of said connection for making a substantially liquid-tight connection with the spout of a filling nozzle, said means comprising an apertured disc smaller than said spout, said tubular casing having interiorly disposed webs for preventing the end of said spout, regardless of its diameter, when inserted therein from coming into sealing engagement with the interior wall of said casing.

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