

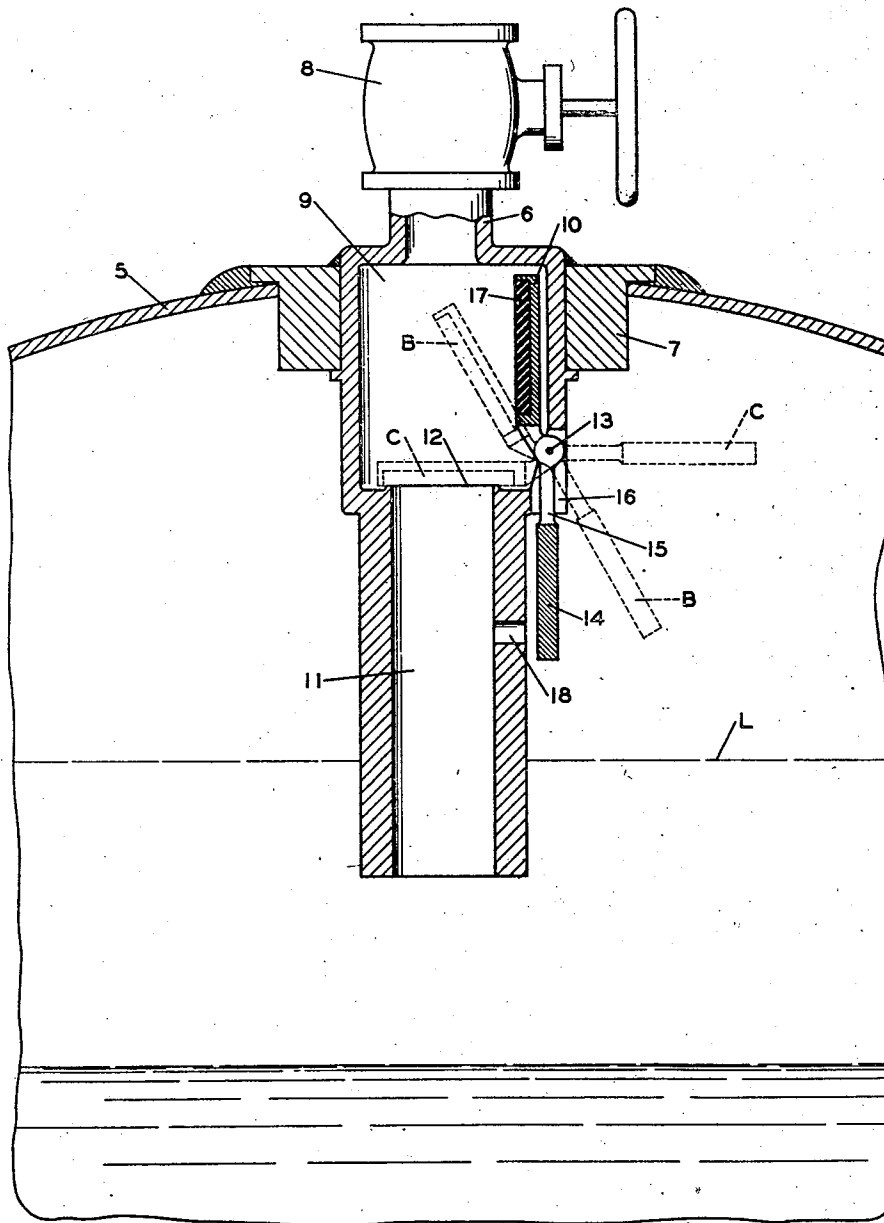
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FILLING DEVICE

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FILLING DEVICE

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3 Claims. (Cl. 220—86)

This invention relates to a filling device for use with containers to prevent overfilling the container.

In the handling of liquefied gases and volatile liquids, the containers in which the liquefied gas is transported or stored must not be filled above limits prescribed by law. Because of the high volatility and inflammability of liquefied petroleum gases, such as propane, butane, and mixtures containing one or both of them, many of the liquid level gauges applicable to use with less volatile or less inflammable liquids are not advantageously used with liquefied petroleum gases. On some of the larger storage containers and transport tanks, a dip tube gauge is used. These devices are well known and consist of a small tube extending into the container with a valve on the portion of the tube outside the container. The end of the tube inside the container is set at a predetermined point relative to the top of the container or, in some gauges, may be varied at will during the gauging operation. The operator may determine whether the open end of the dip tube inside the tank is above or below the surface of the liquid by opening the valve and noting whether vapor or liquid is expelled. Portable containers often are not equipped with a liquid level device. These containers are filled to the proper extent by weighing or metering the liquefied gas into the container.

The present invention provides an improved filling device for use with the containers by which the containers may be filled to the desired extent without the necessity of gauging the liquid. The device is attached to the container inlet and automatically retards flow of liquid into the container when a predetermined liquid level is reached.

An object of this invention is to provide an improved filling device for use with containers.

A further object of this invention is to provide a device which will automatically retard flow of fluid into a container when a predetermined level has been reached.

The drawing is an elevational view in vertical cross-section of a container showing the device of the present invention in position.

With reference to the drawing, the numeral 5 designates the container with which the filling device 6 is to be used. The filling device extends through the top of the container and is attached thereto by any suitable means, as by welding to the plug 7 in the top of the container. Attached to the filling device, outside the container, is the valve 8 which is normally closed except when the

container is being filled. The body of the filling device comprises an enlarged portion 9 containing a valve disk 10. Liquid entering the filling device through the valve 8 flows through the enlarged portion 9 and through the discharge conduit 11 into the container. Formed around the conduit 11 at its juncture with the enlarged portion 9 is the valve seat 12. The valve disk 10 is pivotally mounted on the pin 13 in the filling device and is normally maintained in a vertical position, as illustrated in the drawing, by the counterweight 14. The counterweight is joined to the valve disk by the lever arm 15 which passes through a slot 16 in the filling device. The slot is of sufficient size to allow freedom of movement of the valve disk from the vertical position to the horizontal position C indicated by dotted lines in the drawing. When the valve disk 10 is in the horizontal position C the resilient valve face 17 cooperates with the valve seat 12 to prevent flow through the conduit 11 into the container. Directly opposite the counterweight 14 is a port 18 through which liquid from the conduit 11 may flow into the container.

The operation of the device is as follows. Liquid from an external source is admitted to the container through the valve 8 and flows through the filling device into the container 5. In flowing through the conduit 11 of the filling device liquid may also be diverted through the port 18 into the container. The flow rate through the valve 8 is so adjusted that very little, if any, liquid is diverted through the port 18 during the filling operation. When the liquid in the tank reaches the predetermined level L in the container the flow of liquid through conduit 11 is opposed by the liquid in the tank. Liquid passing through the conduit 11 is discharged against the liquid head equal to the depth of submergence of the lower end of the conduit 11 below the liquid level L. This added resistance to flow of liquid through the conduit 11 causes an increased volume of liquid flow through the port 18. Liquid discharged through the port 18 impinges on the lever arm and counterweight 14 swinging it away from the conduit 11 to some intermediate position B. Motion of the lever arm 15 moves the valve disk 10 a corresponding amount into its intermediate position B. When the valve disk 10 reaches the intermediate position, liquid flowing through the filling device exerts a force on the upper side of the disk moving it into closed position C. Interruption of flow of liquid through the conduit 11 may be detected by the operator filling the container by any suitable means. The operator

may then close the valve 8 and proceed with filling of other containers.

It is to be noted that the device of the present invention eliminates the necessity for a liquid level gauge. The present filling device interrupts the flow of liquid to the container when the desired liquid level has been reached. The operator filling the containers is thereby relieved of the responsibility of constant vigilance to prevent over-filling. A small amount of liquid may escape through the slot 16 when the valve 10 is in closed position. This serves to relieve excessive pressure developed upon sudden closure of the valve.

I claim:

1. In combination with a container for liquids, a filling device comprising a body member, a conduit extending from the body member into the container, the lower end of the conduit being submerged in the liquid in the container when the container has been filled to the proper height, a valve in the body member to close the conduit connected to the body member, a port through the wall of the conduit through which the fluid entering the conduit flows into the container when the lower end of the conduit becomes submerged, and means connected to the valve and actuated by the flow of fluid through the port to close the valve and prevent further liquid entering into the container.

2. In combination with a container for liquids, a filling device comprising a body member, a conduit extending from the body member into the container, the lower end of the conduit being submerged in the liquid in the container when the container has been filled to the proper height,

a valve disk pivoted in said body member and normally positioned out of the path of fluid flow entering the container but adapted to close the conduit connected to the body member, a port communicating with the conduit a substantial distance above said lower end, through which port the fluid entering the conduit flows when the lower end of the conduit becomes submerged, and means connected to the valve disk and actuated by the flow of fluid through the port to pivot the valve disk to a closed position on the conduit and prevent further liquid entering into the container.

3. In combination with a container for liquids, a filling device comprising a body member, a conduit extending from the body member into the container, the lower end of the conduit being submerged in the liquid in the container when the container has been filled to the proper height, a valve disk pivoted in said body member and normally positioned out of the path of fluid flow entering the container but adapted to close the conduit connected to the body member, a weighted lever arm attached to said valve disk which maintains the valve disk normally out of the path of fluid flow through the body member, a port through the wall of the conduit intermediate its ends through which the fluid entering the chamber flows into the container when the lower end of the conduit becomes submerged, and the fluid flow through the port actuating the weighted lever arm to pivot the valve disk to a closed position on the conduit and prevent further liquid entering into the container.

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