

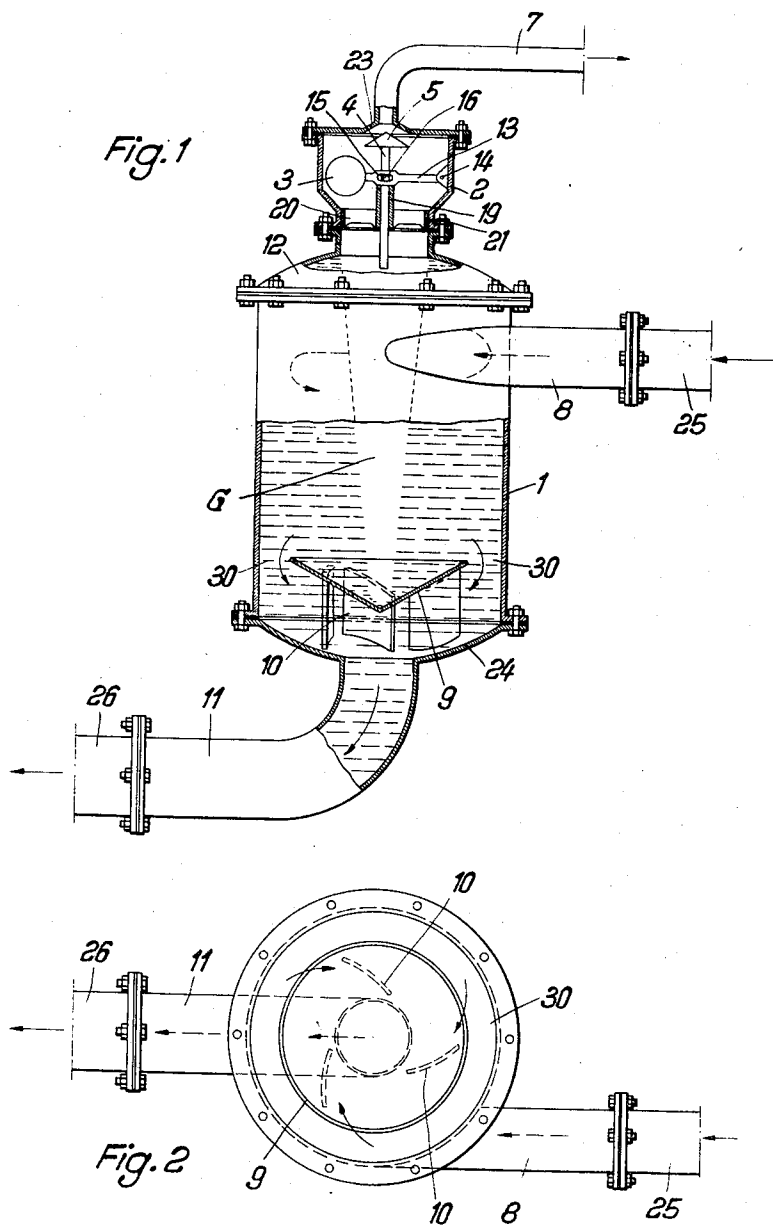
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DEVICE FOR SEPARATING AIR OR GAS FROM MOTOR FUEL

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DEVICE FOR SEPARATING AIR OR GAS FROM MOTOR FUEL

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2 Claims. (Cl. 183—2.5)

The present invention relates to a device for separating air or gas from motor fuel.

When motor fuel such as gasoline, diesel oil, and the like, is transferred by pump action from a tank into the fuel container of a plane, or from a reservoir into the tank truck, or from a truck into a storage tank below ground, or for any similar purpose, care has to be taken that air or any other gas contained in the fuel should not be sucked into the container into which the fuel is pumped, since otherwise the danger of explosion is increased. Devices are therefore built into the suction lines of the pumps, which serve for eliminating the gases contained in the fuel and permitting their escape into the open.

The above mentioned devices make use of centrifugal force, i. e. fuel subjected to centrifugation in an upright cylinder built into the suction line of a pump at some suitable point. One such device is shown in the copending U. S. application Serial No. 378,263, filed September 3, 1952, now Patent No. 2,757,798, dated August 7, 1956, where an air separator is provided in the fuel transfer system.

The centrifugal force drives the fuel in the direction of the cylinder wall, and in the whirling fuel an air or gas funnel is formed at the center, from where the gas collected at this space will rise to the top and escape to the open through an outlet pipe provided in the lid. The outlet pipe can be closed by a valve controlled by a float for shutting the valve, when little or no gas escapes from the fuel, this preventing that fuel will escape through the outlet pipe at times, when no gas funnel is formed in the cylinder.

It will be readily understood that it is a condition for complete separation of air or gas from the fuel to make the cylinder in which separation occurs so high, and to dispose the discharge pipe for the fuel so low, that in no case air could be sucked from the above-mentioned air funnel through the fuel discharge pipe into the suction line of the pump; in other words, it is necessary that the fuel discharge pipe is disposed at a suitable distance below the lower end of the air funnel.

In order to fulfil these conditions, it is necessary to build a cylinder of considerable height; this, in turn, makes it difficult to house the device in a movable pumping system for fuel transfer into containers, a system as shown in the copending application Ser. No. 378,263. In many cases it is quite impossible to accommodate the device at all.

It is the object of the present invention to overcome this drawback. Broadly speaking, the device according to the invention provides a means by which the air funnel formed in the cylinder by the rotating fuel is intercepted at a desired height in the lower part of the cylinder, said intercepting means being so designed that only those portions of fuel, which due to the centrifugal force have been concentrated near the cylinder wall, will be capable of passing an annular channel formed by the wall of the

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cylinder and the said intercepting means, the fuel being then discharged below through an outlet pipe arranged at the bottom of the cylinder.

According to the invention, means are further provided for holding the central intercepting member attached to a wall, e. g. the bottom wall of the cylinder, which holding means are shaped as guiding blades with a curvature so chosen that they will direct the rotating fuel passing through the annular channel toward the center of the cylinder bottom where the discharge pipe is provided.

By the combination of the features above mentioned the height of the device serving for the separation of air or other gases from fuel can be so far reduced as compared to other known devices in this field, that, with other operational conditions being equal, the separating device according to the invention can be built into mobile pump systems for the transfer of motor fuel of largest capacity.

It should be understood that the invention is not limited to mobile pumping systems, but it can be very well used for stationary pumping devices for the transfer of motor fuel.

An embodiment of the gas separator according to the invention will now be more fully described with reference to the accompanying drawing, but it should be understood that this is given by way of illustration and not of limitation and that many changes can be made in the details without departing from the spirit of the invention.

In the drawing:

Fig. 1 is a vertical section through the separating device; and

Fig. 2, a plan view with the lid removed.

In Fig. 1, a cylinder 1 is shown having a lid 12 screwed thereto so as to be hermetically sealed. A housing 2 for a float 3 is secured to the lid 12 so as to communicate freely with the interior of cylinder 1. The float 3 is mounted on a lever 13 pivotally arranged inside the casing 2 on a pin 14. Lever 13 has a slot 15 for accommodating a pin 16 of a valve rod 4. Rod 4 supports a valve cone 5 and is axially guided in a hub-shaped member 19 supported by spokes 20 of a ring member 21 mounted on the wall of the casing 2. Lever 13 rests on member 19 when the float 3 is in its lowermost position. When the float is in its top position, it will force lever 13 and pin 16 upwards, thus causing valve rod 4, to move cone 5 onto a valve seat 23 and thereby to close a pipeline 7 leading into the open. In this way it is prevented that fuel from the interior of the cylinder can escape into the open by pipe 7 when it rises into the housing 2.

Cylinder 1 has an inlet tube 8 at the upper end closely adjacent to lid 12, and an outlet tube 11 at the bottom 24. A suction line 25, 26 of a pump (not shown) is connected to tubes 8 and 11, said pump being part of a fuel transfer system.

Pipe 8 is connected to the wall of the cylinder 1 tangentially, as may be seen from Fig. 2, so that the fuel entering into cylinder 1 at high speed has a rotating motion imparted thereto. This motion drives the fuel by centrifugal force in the direction of the cylinder wall, where it becomes condensed, so that air or gas bubbles will escape toward the center of the cylinder and to the top. In the center of the rotating fuel, an air or gas funnel G is created, from which air or gas will escape in an uninterrupted stream toward the top and through the open pipe 7 into the air.

According to the invention, the gas funnel G is intercepted at a desired height by a, for instance, disk-shaped member 9, of such diameter that an annular gap 30 will be left free between the cylinder wall, through which only the densest layers of fuel, which are near the cylinder wall, can escape to the bottom and below member 9, whereas gas or air can never enter.

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Even though the gas funnel G may tear off once in a while, the air bubbles thus separated will rise toward the top, and in the direction of pipe 7.

For mounting member 9 on the wall of cylinder 1, or as shown in the drawing, on the bottom 24, guiding blades 10 are used which are so shaped that they will direct the circulating fuel reaching the space below member 9 by way of gap 30, toward the exit pipe 11 at the bottom of 24.

What I claim is:

1. A device for separating air or gas from motor fuel which comprises an upright cylinder for the passage of said fuel, an inlet pipe at the top and an outlet pipe at the bottom of the cylinder for connection to a suction line of a pump, said inlet pipe being tangentially attached to the wall of said cylinder so as to have a rotating motion imparted to the fuel on arrival whereby a funnel-like gas space is formed; a lid for closing said cylinder at the top, a housing arranged on said lid in open communication with said cylinder, said housing having an outlet pipe connecting to the open air for escape of air or gas, valve means in said housing for temporarily shutting off said outlet pipe, when fuel rises too high, and baffle means in

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the lower portion of said cylinder in the shape of an inverted cone, said baffle means acting as an intercepting means for gas or air and forming with the wall of the cylinder an annular gap serving as a conduit for said rotating fuel and separating the same from the gas collecting above said baffle means shaped as an inverted cone, said funnel-like gas space permitting said gases to rise therein and to escape by way of the outlet pipe attached to said housing on the lid, while the concentrated fuel is withdrawn from the bottom of said cylinder.

2. A device according to claim 1 wherein mounting means are provided for attaching said baffle means on the cylinder wall, which mounting means are in the shape of curved guide plates for directing the fuel entering through the annular gap toward the center of the cylinder bottom and into said outlet pipe.

References Cited in the file of this patent

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