Aug. 22, 1944. W. A. LEBUS 2,356,327

SELF VENTING TANK VALVE

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Fig. 1

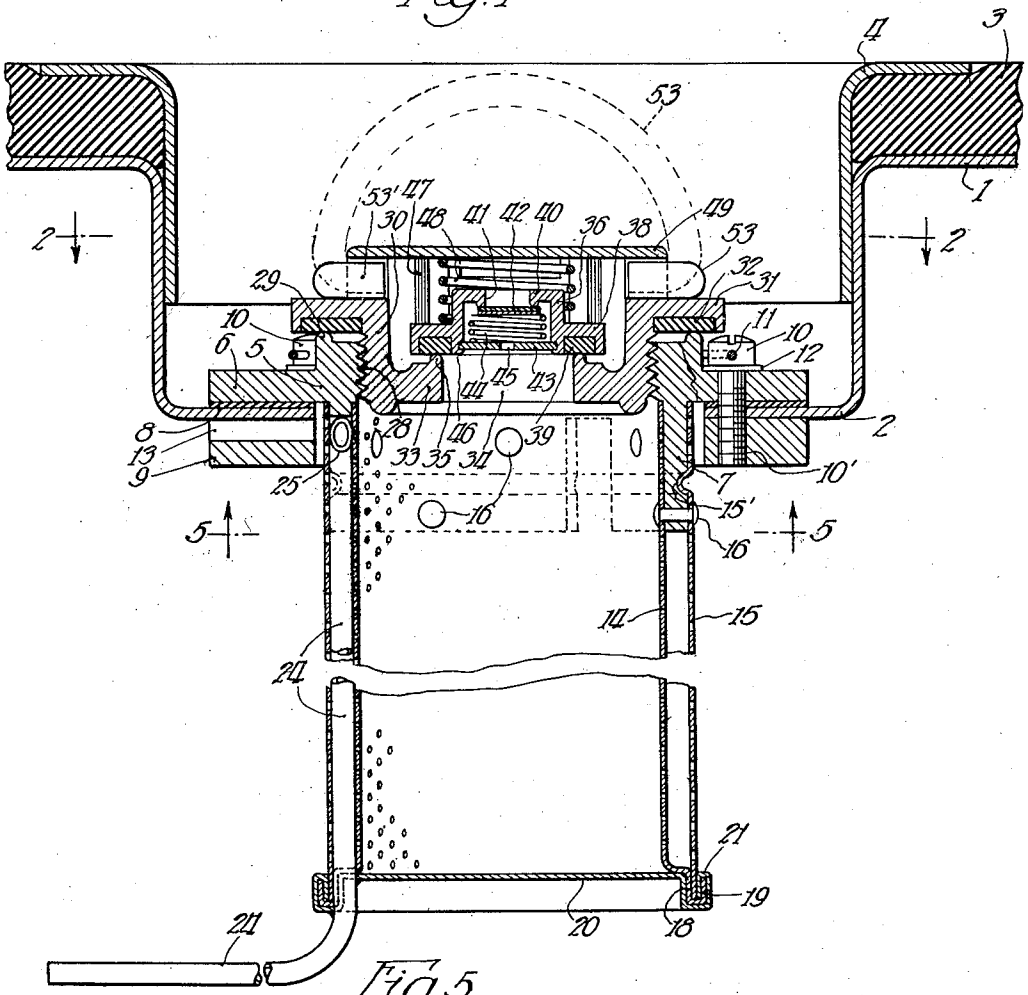


Fig. 5

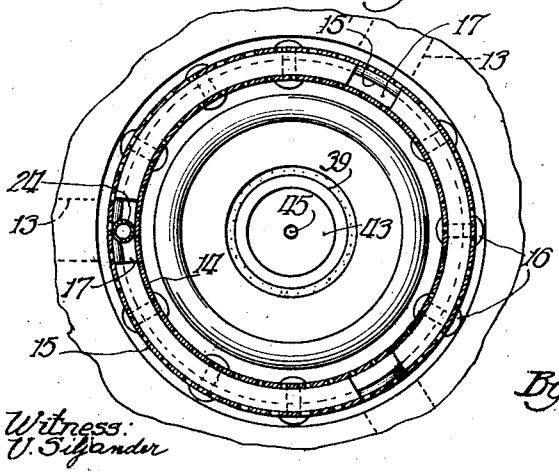
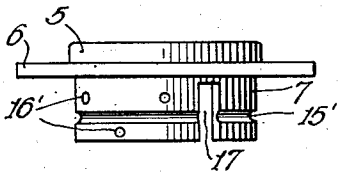


Fig. 6



Witness:
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Fig. 2

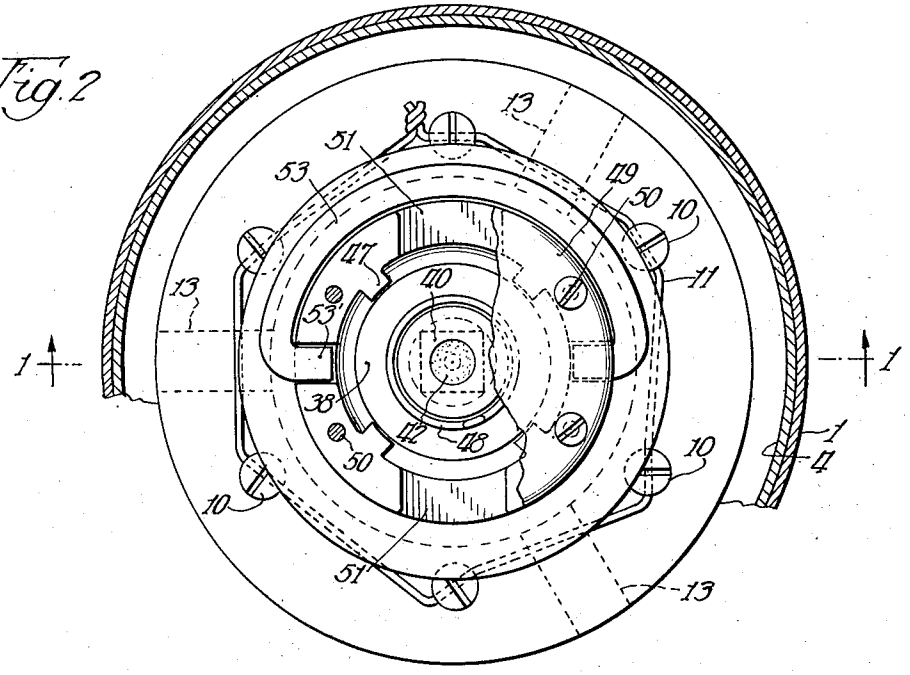


Fig. 3.

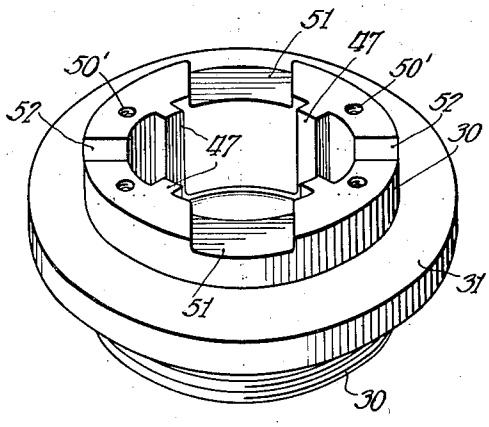
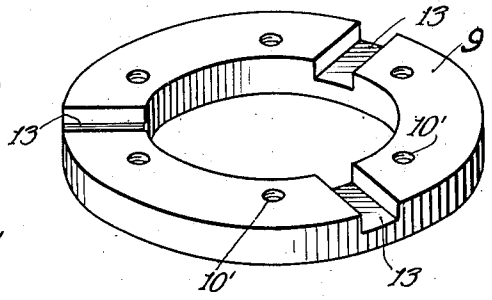


Fig. 4.



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UNITED STATES PATENT OFFICE

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SELF-VENTING TANK VALVE

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Application December 13, 1941, Serial No. 422,801

4 Claims. (Cl. 220—44)

My invention relates to tank fittings or the like and particularly to devices of the kind described adapted to be mounted in metallic drums, barrels, tanks or the equivalent at the filling opening and adapted to relieve the pressure within the tank or drum when the same exceeds a predetermined pressure, as well as to admit air into the drum when the same is being emptied or the contents of the barrel unduly contract.

The invention has among its objects the production of a device of the kind described that is compact, convenient, durable, efficient, leakproof, non-explosive, safe and satisfactory for use wherever found applicable.

The invention has among its further objects the production of an improved closure of the kind described which provides a fire or flame barrier in connection with the closure, which closure may be readily removed or applied without the use of tools such as wrenches or the like.

The invention has as another object the production of an improved venting device of the kind described adapted to be mounted upon barrels, tanks or drums, which may be subjected to rough handling and hard usage, and which cannot be injured by rough handling, and at the same time provide a leak-proof closure adapted to relieve excessive pressure within the drum or to vent the drum to break a vacuum within the drum.

The closure device herein shown and described is particularly adapted for use on drums adapted for use as auxiliary or supply containers, which may be carried on a suitable vehicle to provide an emergency or refueling supply of fuel, and dumped, pitched or dropped off at desired points to be picked up and racked or carried in a vehicle to be refueled, such as a truck, a combat tank, an aeroplane or the like, and discharge the same into the fuel tank of the vehicle, at the same time providing a pressure relief and venting device for the vehicle's fuel tank.

The invention contemplates the use of the device on a drum or the like provided with a wall having a filling opening inset or the wall recessed about the opening, the closure being applied to the drum and disposed in the recess without parts projecting therefrom.

The invention also contemplates the use of a device on a drum provided with a separate discharge outlet (not shown) from which fuel may be conducted from the drum to a vehicle fuel tank, my device being provided with a venting pipe which may extend through said discharge outlet during the discharge of the drum and provide a vent connected to the vehicle tank.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described and more particularly pointed out in the claims.

In the drawings wherein like reference characters indicate like or corresponding parts

Fig. 1 is a longitudinal sectional view through one embodiment of the fitting substantially as viewed along the line 1—1 in Fig. 2;

Fig. 2 is a cross-sectional view taken substantially on line 2—2 of Fig. 1 showing the fitting in elevation with portions cut away to illustrate the interior;

Fig. 3 is a perspective view of the cap with portions removed;

Fig. 4 is a perspective view of the flange member 9;

Fig. 5 is a cross-sectional view taken substantially on line 5—5 of Fig. 1; and

Fig. 6 is a side elevation of the body member 5 on a reduced scale.

Referring to the drawings, 1 represents a metal drum, tank or barrel, only a portion of the drum being shown, which is provided with a depressed portion, through the wall 2 of which is provided a filler opening. Drums of this type are generally provided with a separate discharge opening through which the contents of the tank may be discharged. Such opening is not shown in the drawings, nor have I shown the closure therefor, nor the discharge conduit extending therefrom. These drums are intended for rough handling, even when filled so that they may be dropped, dumped, pitched or thrown from a truck, plane or other vehicle, even during travel of the vehicle, and be used as a source of supply to provide fuel or other material, or for such other use as may be found desirable. Generally the drum is provided with a covering 3 of rubber or other resilient, shock absorbing material which may be protected at the filler opening of the drum or tank by a binding 4 suitably secured in place. My improved device provides a closure at the filling opening and also a fire or flame baffle carried by the fitting and projecting into the tank or the drum.

As shown, 5 represents an annular body member which is provided with a flange 6 extending about the exterior of the same and with a depending annular flange 7 which is of a size to project through the filling opening to the tank.

Arranged between the flange 6 and the bottom 2 of the recess is a gasket 8, and at the interior of the drum is arranged an annular clamping ring 9. The body member is secured in place on the drum by screws 10 which extend through the flange 6 and engage with the ring 9. The several screws 10 may be locked by means of a wire 11, as shown in Figs. 1 and 2. A gasket 12, preferably of soft copper or the like, is arranged between the head of the screw and the flange 6 so as to make the same leak-proof. The annular clamping ring 9, shown in detail in Fig. 4, in which 10' represents the screw holes for the screws 10, is provided with the desired number of grooves 13 for venting purposes as will be more fully described hereinafter.

As most clearly shown in Fig. 1, the flange 7 carries inner and outer perforated sheets or baffles 14 and 15 which are closed at the bottom and providing a flame baffle. As shown, the baffles 14 and 15 are secured to the flange 7 by means of rivets 16. I also prefer to form a groove 15' about the flange and crimp the outer baffle 15 into the same as shown in Fig. 1.

In Fig. 6 a side elevation of the preferred body member is shown on a reduced scale with rivet holes for the rivets 16 indicated at 16'. The flange 7 is provided with one or more notches or openings 17 which are arranged to cooperate with the grooves 13 in the annular clamping ring 9.

The concentric perforated metal fire baffles 14 and 15 are preferably closed at their lower ends in any suitable manner, preferably in such a manner that they will be closed tight. As shown, there is provided a bottom plate 20, and the lower end 18 of the inner baffle is lockseamed with the bottom as indicated at 19—21. In the particular embodiment of the invention shown there is provided a tube 24 arranged with the upper end 25 brought in proximity to the body member and extending therefrom between the baffles and out through the bottom for the desired distance. This constitutes an auxiliary venting tube, the purpose of which will be explained hereinafter.

The body member 5 is provided with an annular thread 28 with a seat 29 about the top. An annular cap member 30 is externally threaded to engage the threads 28 and is provided with a flange 31 extending externally about the same and recessed to receive a gasket 32. Cap member 30 is also provided with an internal flange 33 of a size to provide the opening 34 through the cap. It is also provided with a valve seat 35 arranged to cooperate with the pressure valve 36.

The pressure valve 36 is provided at its exterior with a flange 38 recessed to receive a gasket or packing 39, and is also provided at the top with an internally extending flange 40 provided with a valve seat 41 at the inner side.

Arranged to cooperate with the valve seat 41 is a valve 42 of suitable material, as shown it consists of an annular plate with a ply of material that will not be affected by the gasoline or drum contents, and which in the construction shown is square in configuration so that its corners serve as guides. Valve 42 constitutes what may be termed a vacuum valve, the same being normally maintained on its seat by a spring 44 which is carried by the disc or plate 43 having an opening 45 through the same. The disc or plate 43 is secured in place by swedging over the bottom of the valve 36 as indicated at 46.

As most clearly shown in Figs. 1 and 3, as well as Fig. 2, the body member is provided with ribs 47 which serve as guides for the valve 36. The valve 36 is normally maintained on its seat 35 by a spring 48 engaging with the flange 38 at one end and with the cover plate 49 extending over the top of the cap member. Plate 49 is secured in place by the desired number of screws 50 which engage in screw holes 50', as shown in Fig. 3. The cap member at its top edge is provided with grooves or notches 51 and 52 which form vent openings from the interior of the cap to the exterior on the valve side of the cap. There is also provided a handle 53 having its ends 52' turned back and projected into the grooves or notches 52, the handle serving the same as a wrench to turn the cap into secured position or turn it back to permit its removal. It will be noted by referring to Fig. 1 that the handle and recess are so designed that the handle does not project beyond the exterior face of the drum when in raised position.

When the drum is to be filled, the cap being removed, the gasoline or other liquid is poured into the drum through the body member, the discharge outlet, not shown but previously mentioned, being of course closed. After filling the drum the cap 30 may be positioned and turned down tight on the gasket 32 by means of the handle 53. The drum may then be pitched about or dumped without any danger of leakage from the same. Should there be any pressure developed within the drum, when the same reaches sufficient pressure to compress the spring 48 the valve 36 will lift and the gasoline vapor can flow out between the seat 35 and the gasket 39 and out through the vents 51 and 52, the valve closing as soon as the pressure is relieved sufficiently. If there is any contraction of the fluid within the drum it is vented and the vacuum relieved by the admission of air through the ports 51 and 52, past the valve 42, through the opening 45 and into the drum. By providing the notches or slots 17 in the flange 7 and the grooves 13 in the clamp member or ring 9, it is possible to fill the drum up to the level of the wall 2 of the recess, since air outside of the baffles and flange 7 can flow into the body member and out of the tank, preventing air-locking. Due to the fire baffles, there is no danger of explosion of the drum under excessive pressure. Where the drum is dumped or dropped at a supply point and thence picked up and racked in an automobile, a combat tank or an aeroplane, the tube or conduit may extend from said discharge port (not shown) direct into the fuel tank of the other vehicle, that tank being vented by means of the tube 24 extending out of the drum 1 into the said conduit and preferably down into the other fuel tank. It will be noted that the venting through drum 1 is out between the baffles so that the gas is discharged into drum 1 through the baffles and past the valves, so that the baffles in this case also protect the other fuel tank. Owing to the fitting being recessed in the drum wall as shown, there is no danger of the same being damaged when the drum is given hard usage. After the drum has been emptied, it may be thrown out and picked up for refilling.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence I do not wish to be understood as limiting myself to the exact form, construction, arrangement and combina-

tion of parts herein shown and described, or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. A fitting of the kind described comprising an annular body member secured to a tank, an annular chambered cap member removably secured to said body member, and provided with a valve seat at the lower end thereof defining an opening, an annular chambered pressure valve disposed on said seat, guide means carried by said cap member and engageable with the peripheral edges of said annular pressure valve to guide the latter toward and away from said seat, a vacuum relief valve carried in the chamber of said annular valve and normally closing the opening therethrough, and means for normally maintaining said valves on their respective seats.

2. A fitting of the kind described for drums comprising a body member secured to a drum, an annular chambered cap member removably secured to said body member, and provided with a valve seat at the lower end thereof defining an opening, a vertically movable annular chambered pressure valve cooperable with said seat, spaced guide means extending vertically on the outer side of said annular cap member and in contact with said pressure valve to guide the same, an inwardly movable vacuum relief valve carried in the chamber of said annular valve and operative to control the passage of air through the annular pressure valve to the interior of the drum, and means for normally yieldingly maintaining said valves on their respective seats.

3. A fitting of the kind described for drums for containing fuel comprising a tubular body member, means for securing the body member to a drum, an annular chambered cap removably secured to said body member, said cap provided with a valve seat in the lower end thereof defining an opening, an outwardly movable annular chambered pressure valve having its edges guided by guide means formed on said cap and cooperable with said seat, an inwardly movable vacuum relief valve mounted in the chamber of said annular pressure valve, and independent means for normally yieldingly maintaining said valves on their respective seats and sealing the tubular passage through the body member.

4. A fitting of the kind described comprising an internally threaded annular body formed with an external flange adapted to be secured to a tank, an outwardly opening chambered externally threaded cap threadedly secured to said body and having an external flange seated upon said body, said cap being formed with an internal annular flange defining an opening through the cap and having a valve seat surrounding said opening, a chambered pressure valve adapted to seat upon said valve seat and having an aperture in one wall, a vacuum relief valve for closing the opening in said wall, guide ribs on said cap engaging the edges of said pressure valve to guide the same to and from its seat and springs individual to said pressure valve and vacuum relief valve to yieldably hold them on their seat.

WILLIAM A. LEBUS.