C. H. KING.

VALVE.

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1,340,719. Patented May 18, 1920.

Fig. 1.

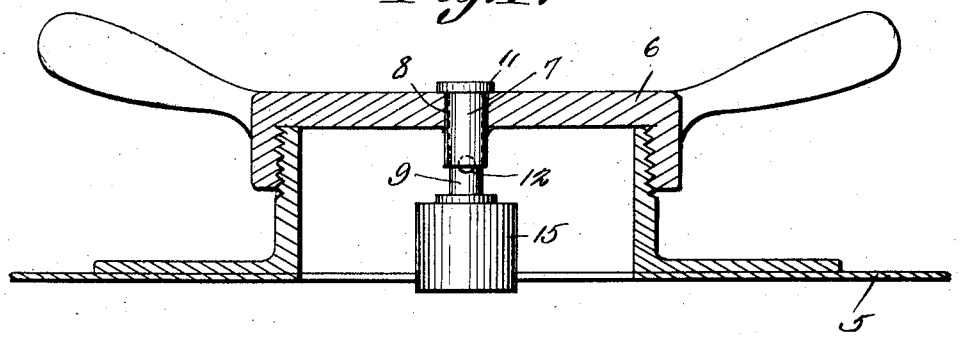


Fig. 2.

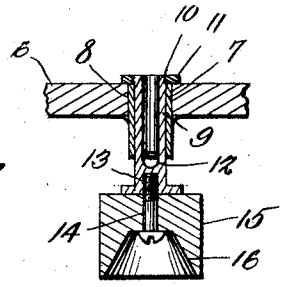
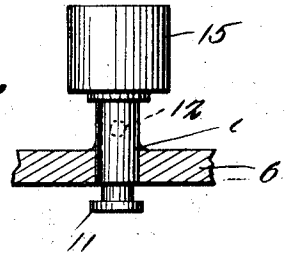


Fig. 3.



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UNITED STATES PATENT OFFICE.

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VALVE.

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To all whom it may concern:

Be it known that I, CHARLES H. KING, a citizen of the United States of America, and resident of Ithaca, in the county of Tompkins and State of New York, have invented certain new and useful Improvements in Valves, of which the following is a specification.

This invention relates to a combined float, gravity valve and vent adapted to use in connection with fuel tanks of internal combustion motors and more particularly for use in connection with such tanks employed on aeroplanes or otherwise used where the position of the tank with relation to the horizontal may be varied.

An object of this invention is to insure proper venting in a fuel tank employed on aeroplanes and the like, the said device operating to close the vent when the tank is inverted or inclined sharply as when the aeroplane is banking speedily, the said venting member assuming its normal position upon the righting of the aeroplane.

A further object of this invention is to produce a device which will be controlled by the pressure within the tank in order that it will close when pressure has become great enough to cause the fluid to flow out of the top and the said valve has the peculiar characteristics that it is a floating or a non-floating valve, according to conditions of operation.

With the foregoing and other objects in view, the invention consists in the details of construction, and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this specification wherein like characters denote corresponding parts in the several views, and in which—

Figure 1 illustrates a sectional view of a fragment of a tank with a cap applied thereto and the invention applied to the cap, said invention being shown in elevation;

Fig. 2 illustrates a sectional view of a fragment of the cap with the controlling device applied thereto; and

Fig. 3 illustrates a view in elevation of the device showing the relation of parts when the tank is inverted.

In these drawings 5 denotes a fragment of a tank, 6 a cap therefor, all of which may be of any ordinary construction.

The device as shown in this embodiment of the invention comprises a stationary sleeve 7 stationed in an aperture 8 of the cap 6 and secured therein in any appropriate way.

An air tube 9 is slidable in the sleeve and it has external screw threads 10 at its outer end engaged by a nut 11, which limits the sliding movement of the air tube in the sleeve. The air tube is of such length as to have movement longitudinally of the sleeve and the said tube has transversely disposed ports 12 communicating with the bore of the sleeve and adapted to open to the interior of the tank for venting purposes, as will presently appear, and the said tube is free to slide within the sleeve to such an extent as to close the port when the air tube is at the limit of its outward movement.

The inner end of the air tube has a recess 13, the wall of which is threaded to engage a screw 14, which screw is utilized for holding a float 15 in place, the said float having the characteristic of operating by gravity under certain conditions to open the port or to operate by buoyancy under other conditions to close the port, and the said valve has other characteristics as will presently appear, it being seen from an inspection of the drawing that the inner end of the valve has a recess or cavity 16, in which air bubbles may collect under certain conditions of use.

From an inspection of the drawing and reference to the elements of the device by numbers from the foregoing description, it will be understood that it is the purpose of the inventor to have this valve and vent device operate under any conditions by placing it in the top of a gasolene tank filler cap, or any convenient place at the highest point of the tank, to give it the best advantages as a vent and at the same time to be used as a valve that would close itself when the tank is turned upside down, sidewise or fore and aft, as in looping or heavy banking, diving and climbing by an aeroplane. It is the purpose of this valve to safeguard against the

loss of gasolene from the tank or tanks at such times, and also to prevent liability of fire or in case the pilot should be aft of the tank to prevent a gasolene stream from interfering with his vision during flight.

The operation of the valve will be understood by reference to the drawing where the number 6 represents the top of the tank filler cap, whereas 7 is the stationary valve sleeve preferably sweated in the top of the filler cap to form a sleeve for the valve stem. In Fig. 2 the device is shown in position with the vent or port holes open and the valve at its lowermost point, and is shown with the filler cap and valve in its normal position until the tank is filled to a point level with the top side of the float. If the tank is filled above this point, the float starts to rise by reason of the air bubble that is formed in the air pocket 16 in the bottom of the float and it will continue to rise until the flange on the top of the float sets tight against the bottom of the valve stem sleeve, thereby closing the ports 12 in the side of the valve stem.

The device operates in the same way when the tank is turned upside down as in looping except by the time the tank has reached this position, the air bubble which stays in the float when the tank is upright, has been released and the valve is closed as shown in Fig. 3.

Fig. 3 shows the operation of the valve closed as when the tank is upside down or in any position 15° past the horizontal line laterally or longitudinally. At any of these points past 15°, the valve will close itself by gravity due to its weight or by gasolene starting through the port holes 12. The air bubble operates the valve in closing from the time the tank is full until the gasolene is two-thirds consumed, when at this point, and with gasolene tank turned sidewise or fore and aft past 15°, with gasolene from one-half to two-thirds consumed, there will be no air bubble formed in the pocket 15, but during the time that the tank is moving from the horizontal to 15° past horizontal position, the valve will close from gasolene starting to flow through the port holes, or in case the gasolene is too low in the tank to touch the float or flow through ports 12 in valve stem, the valve will close itself by gravity and will stay closed until gasolene tank rights itself again, going past the horizontal line when the valve will start to drop and open again, and as the tank again reaches 15° or more, the valve automatically opens by gravity.

In order that a valve may accomplish this result, the float must be both floating and non-floating, the function of which is attained by having the float of proper weight and of proper configuration to operate under all conditions, both as a float and vent, and at the same time to accomplish the purpose for which it is intended.

I claim:

1. In a controlling valve for tanks, a tank having an opening in its top, an air pipe slidable in the opening, the said pipe having an open outer end and ports near the inner end communicating with the interior of the tank and the interior of the pipe, the member of the tank having the opening being operative to seal the said ports when the pipe slides outwardly, and a combination float and weight on the inner end of the air pipe, having a recess in its inner end forming an air chamber.

2. In a controlling valve for tanks, a tank having a member with an aperture therein at what is normally the top of the tank, an air pipe slidably held in the said opening, the said air pipe having a port near its inner end communicating with the interior of the tank and with the interior of the air pipe, the said port being sealed by the member in which the pipe is slidable when the pipe moves outwardly, and a float secured to the inner end of the said pipe, said float having a recess in its inner end forming an air chamber.

3. In a controlling valve for tanks, a sleeve communicating with the atmosphere and the interior of the tank at the top thereof, an air pipe slidable in the sleeve, the said pipe being of greater length than the sleeve, the said air pipe having ports adapted to communicate with the interior of the tank and the interior of the pipe, the said ports being sealed when the pipe moves outwardly in the sleeve, a combined float and weight on the inner end of the air pipe, said combined float and weight having a recess in its outer end, the wall of said recess being outwardly flared, and means for limiting the motion of the air pipe in the sleeve.

CHARLES H. KING.