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TANK CLOSURE

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Fig. 1.

Fig. 4.

Fig. 2.

Fig. 3.

Fig. 5.

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## TANK CLOSURE.

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This invention relates to improvements in tank closures of the type provided with a vent opening to permit the flow of air to or from the tank as the liquid contents thereof varies, and more particularly to means adapted to prevent leakage of the liquid through the vent when the tank is in an abnormal position such that the vent is at or below the level of the liquid.

Tank closures of the character described above and made in accordance with the present invention as defined by the claims are particularly useful in connection with the fuel tanks of outboard motors. These motors are portable and provided with means for quickly attaching or detaching them to the stern of a boat. It has been found from experience that when these motors are carried about or placed upon the ground, leakage of gasoline occurs through the usual vent opening in the cap or closure for the gasoline tank. When the motor is in a vertical position at the stern of the boat, the cap is above the level of the gasoline in the tank so that no leakage through the vent opening is possible.

One of the objects of the invention is to provide an improved tank closure having a vent opening with means for closing the vent when the motor or tank is tilted from its normal, vertical position.

Another object is to provide an improved tank closure of the character described in which the vent is automatically closed by gravity-controlled means upon tilting of the motor or tank from normal, vertical position.

Another object is to provide a tank closure of the character described which is simple, durable and which may be economically manufactured.

Other objects and advantages will hereinafter appear.

For the purpose of illustrating the invention, an embodiment thereof is shown in the drawings, in which

Figure 1 is a rear end elevation, partly in section, of the upper portion of an outboard motor showing the improved tank closure or cap applied to the gasoline tank, the motor and tank associated therewith being in normal, vertical position;

Fig. 2 is a side elevation, partly in section, of the improved tank closure or cap, showing the position of the various parts when the tank is in normal, vertical position;

Fig. 3 is a view similar to Fig. 2, showing the position of the various parts when the motor is placed upon its side and the cap tilted;

Fig. 4 is a section on line 4—4 of Fig. 2; and

Fig. 5 is a section on line 5—5 of Fig. 2.

The invention comprises, in general, a casing 1 provided with a vent opening 2, means such as a valve 3 for opening and closing the vent, and means such a substantially spherical actuating member 4 arranged for cooperation with valve 3 to automatically move the same to close the vent when the cap is tilted to a position such as shown in Fig. 3. Casing 1 may comprise a body portion 5 which is threaded into the neck 6 of the tank 7, and an upper wall or top 8 having a boss 9 at the center thereof through which the vent opening 2 is made. The lower end of body portion 5 is internally threaded to receive a similarly threaded plug or bottom member 9 having a concave surface 10 arranged opposite vent opening 2 and upon which actuating member 4 is seated for the purpose hereinafter explained. Plug 9 may be provided with the usual openings 11 to receive a spanner wrench for adjusting the member axially with respect to casing 1. The bottom member 9 may be provided with an opening at the center thereof to receive the upper link 12 of the usual anchor chain 13 for preventing the cap from becoming lost when the same is taken off for the purpose of filling the tank, the end 14 of the link being riveted over, as shown, to secure the chain to the bottom member.

The valve 3 may comprise a shank 15 loosely fitted in the vent opening 2 and a head 16 which is engaged by actuating member 4.

A gasket 17 may be placed between neck 6 of the tank and the top 8 of the casing to prevent leakage of gasoline between these parts.

The plug or bottom member 9 is adjusted with respect to casing 1 so that when the cap is in normal, vertical position as shown in Fig. 2, valve 3 is supported by actuating member 4 in position to open the vent and permit the flow of air to or from the tank by way of suitable openings 18 in the body

portion 5 and the space between shank 15 and boss 9 provided by the loose fit of these parts. Any suitable means such as a screw 19 threaded into both bottom member 9 and body portion 5 of the casing may be provided to lock the former in adjusted position.

When tank 7 and the cap secured thereto are tilted so that the latter is in a position such as shown in Fig. 3, actuating member 4 will drop by the action of gravity and roll upon the concave surface 10 and force valve 3 in position automatically to close the vent opening, as shown, the outlet end 20 of the vent opening being restricted to provide a suitable seat against which the tapered end of valve 3 fits. From the foregoing it will be seen that when the cap is tilted or moved from its normal, vertical position the actuating member 4 will move by the action of gravity along the concave surface 10 and automatically force valve 3 in position to close vent opening 2. Leakage of gasoline from the tank is thereby prevented.

Various changes in the size, shape and arrangement of the parts may be made without departing from the spirit of the invention or the scope of the claims.

The invention claimed is:

1. A cap of the character described comprising a casing provided with a vent opening leading directly to the atmosphere, a substantially spherical member arranged in said casing for movement therein laterally of the vent opening upon tilting of said cap, a valve interposed between said vent opening and said member and adapted for coaction with the latter upon such movement of the same to close said vent opening.

2. A cap of the character described comprising a casing provided with a vent opening, a valve therefor, and a substantially spherical actuating member arranged between and directly engaging said valve and a portion of said casing and adapted to positively force said valve to a position wherein it closes said vent opening automatically when said cap is tilted.

3. A cap of the character described comprising a casing having an upper wall provided with a vent opening and a bottom having a concave surface arranged opposite said vent opening, a valve adapted to close and open said vent opening, and a substantially spherical actuating member seated upon said concave surface and engaging said valve, said member being adapted to cooperate with said surface and said valve to open said vent opening when said cap is in normal position and to close said vent opening when said cap is tilted.

A cap of the character described comprising a casing having an upper wall provided with a vent opening and a bottom member adjustable axially with respect to said casing and having a concave surface arranged opposite said vent opening, a valve adapted to close and open said vent opening, and a substantially spherical actuating member seated upon said concave surface and engaging said valve, said member being adapted to cooperate with said surface and said valve to open said vent opening when said cap is in normal position and to close said vent opening when said cap is tilted, and means adapted to lock said bottom portion in adjusted position.

5. A cap of the character described comprising a casing having an upper wall provided with a vent opening having the outlet end thereof restricted, a bottom member adjustable axially with respect to said casing and having a concave surface arranged opposite said vent opening, a valve comprising a shank loosely fitted in said opening and adapted to seat upon said outlet end thereof to close the same and a substantially flat head, and a substantially spherical actuating member seated upon said concave surface and engaging said head, said member being adapted to support said valve in positions respectively to open said vent opening when said cap is in normal position and to close said vent opening when said cap is tilted.

6. A cap of the character described comprising a casing provided with a vent opening leading directly to the atmosphere, means arranged in said casing for lateral movement with respect thereto upon tilting of the same, and valve means interposed between said vent opening and said means and being operable to seat over said vent opening, said valve means being urged normally to open position and engaging said first-named means, said first-named means engaging said valve means to limit opening movement thereof when said cap is in a predetermined position and engaging said valve means upon tilting of said cap from said position to impart closing movement to said valve means.

7. A cap of the character described comprising a casing provided with a vent opening, a valve arranged in said casing for closing said opening, a gravity-actuated member arranged in said casing for movement with respect thereto in a plurality of directions substantially transverse to the longitudinal axis of said cap upon tilting of the latter in such wise that its said axis will be at an angle to the vertical, said member being interposed between said valve and one side of said casing and coacting with both of the latter to impart closing movement to said valve upon said tilting of said cap and assuming a position in said casing when said axis is substantially coincident with the vertical to permit said valve to open said vent opening.

8. In a device of the character described, a casing having a vent opening leading to the atmosphere, a normally open valve cooperable with the vent opening to close the same, and a free rolling member in the casing engageable with the valve, said casing having means with which the free rolling member is engageable when the casing is tipped to advance the free rolling member against the valve whereby to force the valve shut.

In witness whereof I hereto affix my signature.

OLE EVINRUDE.