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Wilkerson

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[54] **ENGINE VENTILATION OF BOAT BILGES**

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[52] **U.S. Cl.** ..... **114/211,** 114/183 R

[51] **Int. Cl.** **B63b 13/00**

[58] **Field of Search**..... 114/211, 212, 16 D, 183 R; 115/.5 R; 123/198 D

[56] **References Cited**

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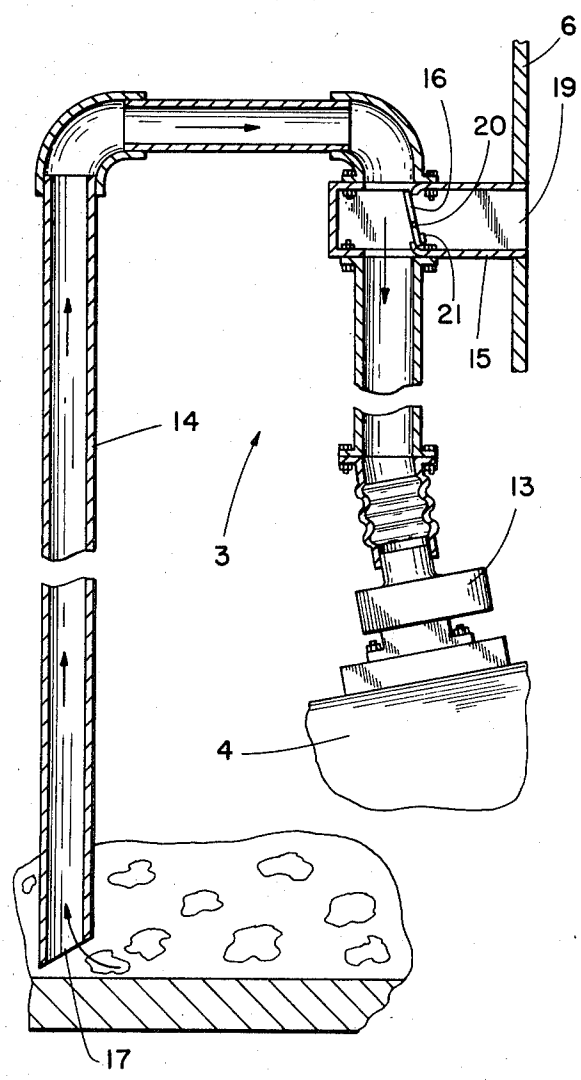
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[57] **ABSTRACT**

A system for ventilating the bilge of a closed boat which is powered by a confined inboard gasoline engine having a down draft carburetor. Engine air is supplied by a dual air source formed by a first fluid passage conduit extending from approximate floor level in the bilge to the air inlet of the carburetor and a second fluid passage conduit extending from the second fluid passage through an engine compartment wall isolating the engine from open atmosphere. A valve is located in the second fluid passage to close normally that passage when fluid flow occurs in the first passage. The valve opens to draw air from open atmosphere through the second passage in response to an obstruction in the first fluid passage. Accordingly, the bilge supplies engine aspirating air until the bilge is flooded by water, for example, and then engine air is supplied by open atmosphere.

8 Claims, 3 Drawing Figures



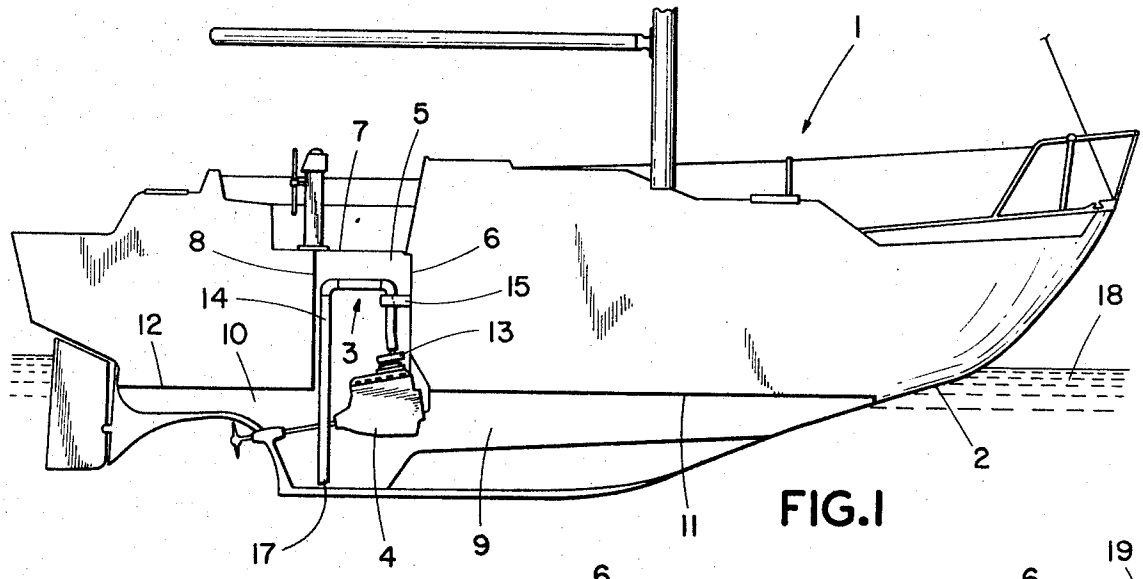


FIG.1

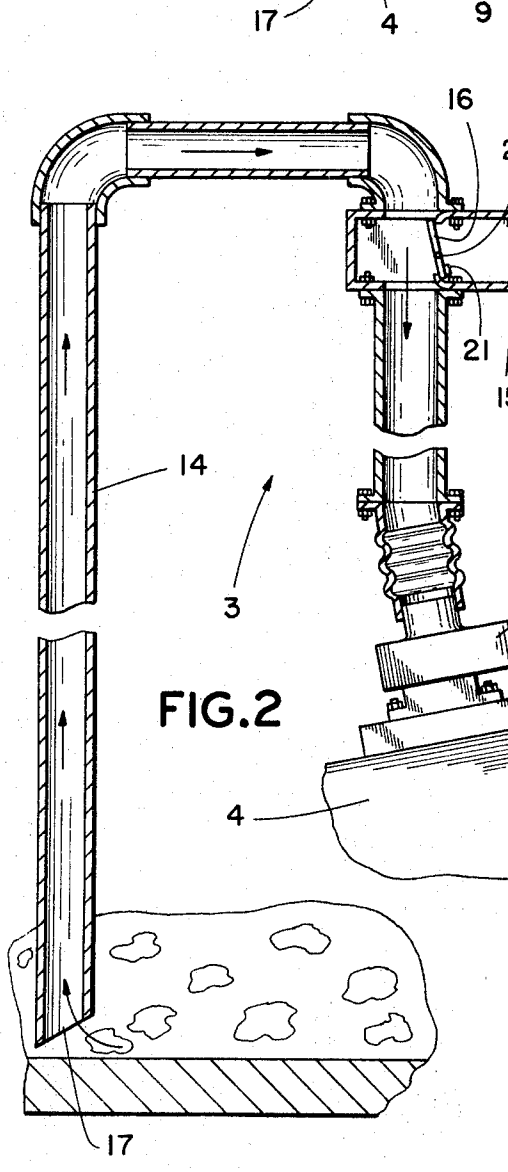


FIG.2

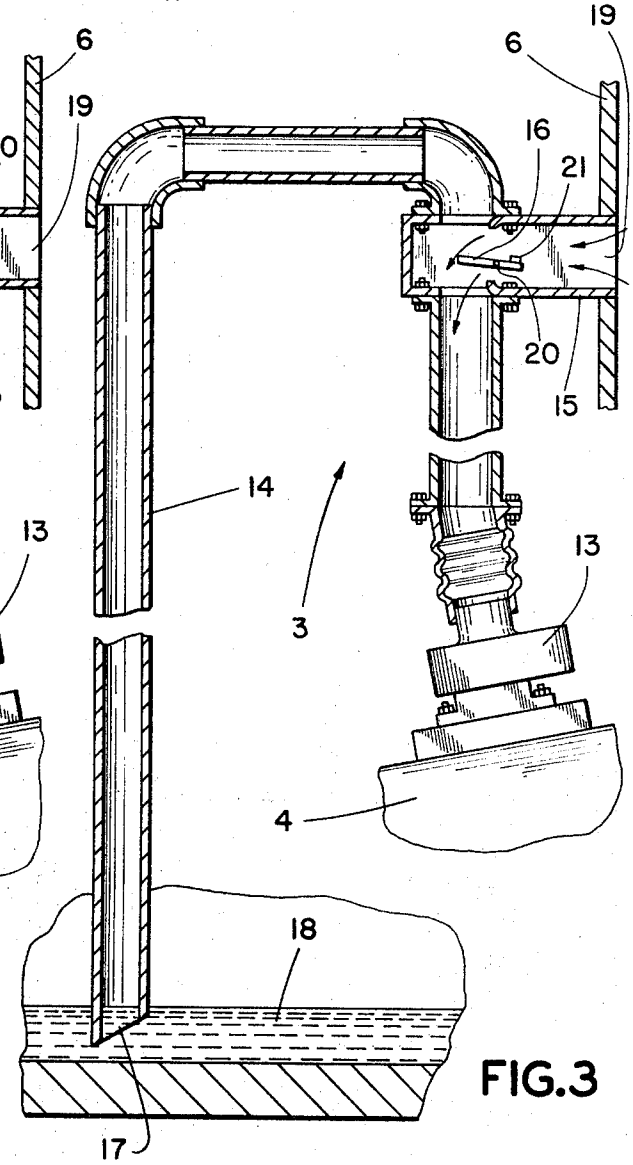


FIG.3

ENGINE VENTILATION OF BOAT BILGES

BACKGROUND OF THE INVENTION

The use of gasoline in boats will always present a safety hazard because the vapors are heavier than air and may find their way into the bilge from which there is no escape except through ventilation systems. In an open boat these vapors may be dissipated by the scouring effect of exposure to the open atmosphere. Closed boats, however, require adequate structure to effect positive ventilation of gasoline vapors.

This invention relates to boat safety, and in particular to the ventilation of the bilges of a closed boat to eliminate thereby the fire and explosion hazard present when gasoline fumes accumulate in the bilge. This hazardous accumulation is due to fuel and fumes entering the bilge from flooding carburetors, faulty fuel pumps, fuel spillage and leaky gasoline lines.

Gasoline fumes, being heavier than air, drift to the lowest section of the boat interior; that is, the bilge, and when the level of these fumes builds up to a height sufficient to reach the electrical parts of the engine, such as the starter, generator, distributor or spark plugs, the fumes ignite and serious property damage and loss of life can result.

The present devices used in effecting bilge ventilation are: (1) exhaust and intake cowls and ducts utilizing the natural movements of air, and (2) electrically operated blowers to create air movement. These devices have not resulted in foolproof ventilation systems.

SUMMARY OF THE INVENTION

This invention contemplates means whereby the aspiration of the engine will automatically ventilate the lower section (or level) of the bilges and prevent the fumes from building to a level where they would be ignited by the electrical components of the engine. The particular structure employed is described in the Abstract of the Disclosure.

The use of engine suction or vacuum to effect bilge ventilation offers several advantages. The vacuum of the engine handles several times the cubic feet per minute capacity of the average blower, and therefore bilge ventilation is accomplished quickly. Additionally, the engine vacuum is automatically generated and it does not depend upon supervision by the boat operator.

DESCRIPTION OF THE DRAWINGS

In order that all of the structural features for attaining the objects of this invention may be readily understood, reference is herein made to the accompanying drawings, wherein:

FIG. **1** is a side elevation view of an inboard power driven boat with the hull removed to show the application of the ventilation structure of this invention to the engine;

FIG. **2** is a view showing the dual air source conduits connected to the air intake of the gasoline engine carburetor with the external air valve being closed; and

FIG. **3** is a view showing the structure of FIG. **2** with the external air valve being opened in response to the flooding of the bilge.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** is a simplified side elevation view of an inboard power driven boat **1** with a portion of the hull **2** being removed to show the installation of the ventilation structure **3** of the invention to inboard engine **4.** Engine **4** is located within a generally closed engine room **5** formed by front wall **6,** cockpit deck **7,** and back wall **8.** Bilge areas **9** and **10** are defined by the lowermost portion of hull **2** and cabin sole sections **11** and **12.** Engine room **5** is in atmospheric common with bilge areas **9** and **10** in the sense that air and gasoline fumes may pass freely therebetween. In general, the bilge is that space between hull **2** of the boat and the underneath of the lowest floors **11** and **12** in the boat. Gasoline fumes, being lighter than air, collect at the lowest levels in the boat within the bilge. When these fumes build up, usually as the result of fuel leaks, to sufficient height to reach the electrical components on the engine, the gasoline vapors are ignited and an explosion results.

The ventilation structure **3** of the invention ventilates the bilge areas **8** and **9** forcibly by the suction generated by engine vacuum. There are two periods when the bilge should be ventilated. First, when the boat has been inactive and prior to starting engine **4,** a battery driven blower (not shown) open to the outside of the hull is started to purge the bilge. This blower usually employs a flexible hose extending to the lowest section of the bilge. After approximately five minutes, this blower is off and engine **4** is started. This procedure is not always successful. Second, while under way with the boat engine operating, (usually the battery operated blower is not operated at this time), as this is usually the time a fuel leak occurs. It is during this second period that the ventilation system **3** offers safe gasoline fume control.

Ventilation structure **3** provides a dual air source for down draft carburetor **13** which is situated above engine **4.** In particular, a first air passage conduit **14** extends from a low level of the combined bilge areas **9,** 10 to the air horn inlet of carburetor **13,** and a second air passage duct **15** extends from open atmosphere outside of wall **6** to form an air junction with conduit **14.** A normally closed butterfly flap valve **16** (FIG. **2**) is located within duct **15** so that carburetor air is normally supplied by intake opening **17** located in the first air passage **14.** Valve **16** is opened by engine vacuum whenever intake opening **17** is closed. Intake opening **17** can be obstructed, for example, by flooding of the bilge by water **18,** or other liquid, as is shown in FIG. **3.** Flap valve **16** opens in response to the obstruction of intake opening **17** (FIG. **3**) and carburetor air is supplied from open atmosphere inlet opening **19.** Valve **16** is pivoted at **20,** and in view of the fact that the valve carries a weight **21** at its bottom edge, the valve is normally closed by the force exerted by gravity. Alternatively, resilient means, such as a spring braced to effect normal closing, can be employed. This force is overcome by engine vacuum buildup on the inside surface of valve **16** whenever intake opening **17** is closed. The low suction force exerted on the inside of valve **16** is effective to open the valve because pivot **20** is located below the horizontal center of valve **16;** accordingly, a counterclockwise rotating force is applied to valve **16.**

FIG. **2** shows the carburetor air flow through the first passage **14,** with duct **15** being closed, when boat **1** is underway with bilge conditions being normal. If gasoline fumes are present within bilge areas **9** and **10,** the fumes are purged before they can build up to explosive levels. In the event the bilge is flooded by water to a

level at which opening **17** is closed, carburetor air is supplied from open atmosphere through duct **15** (FIG. **3**). Thus, boat safety is enhanced by the inclusion of a dual carburetor air source of the type provided by ventilation structure **3.**

It should be understood that the above described structure is merely illustrative of the principles of this invention, and that modifications can be made without departing from the scope of the invention.

What is claimed is:

1. In a system for ventilating the bilge of a closed boat which is powered by a confined inboard gasoline engine having a down draft carburetor supplied by an air source, the improvement in the carburetor aspirating air source comprising an air passage conduit extending from a low level of the bilge to an air inlet of the carburetor to provide a first carburetor aspirating air source, and a normally closed valve actuatable to an open position in response to a predetermined air pressure differential, said valve being located in a second fluid passage conduit to close normally said second passage when air flow occurs in the first passage with the valve opening to draw air from open atmosphere through the second passage in response to an obstruction in the first air passage which produces the predetermined air pressure differential, whereby the bilge supplies carburetor aspirating air until an obstruction occurs at which time air is then supplied by open atmosphere.

2. The combination of claim **1** in which the engine is confined within an engine compartment, and the first air passage is formed generally by a conduit having an inlet opening at approximate lowest level in the bilge.

3. The combination of claim **2** in which the first air passage conduit is of generally an inverted U-shaped construction.

4. The combination of claim **2** in which the second air passage conduit is a duct extending between the first air passage conduit and an engine compartment wall isolating the engine from open atmosphere.

5. The combination of claim **2** in which the valve is a weighted bufferfly flap pivoted to a closed position by the force of gravity.

6. The combination of claim **3** in which the second air passage conduit is a duct extending between the first air passage conduit and an engine compartment wall isolating the engine from open atmosphere.

7. The combination of claim **3** in which the valve is a weighted butterfly flap pivotally biased to a closed position.

8. The combination of claim **4** in which the valve is a weighted butterfly flap pivotally biased to a closed position.

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