United States Patent [19]

Andreux

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[54] **EXPANSION TANKS OF COOLING SYSTEMS**

[75] Inventor: **Bernard Andreux**, Rueil-Malmaison, France

[73] Assignee: **Regie Nationale Des Usines Renault**, Billancourt, France

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[30] **Foreign Application Priority Data**

Oct. 5, 1973 France 73.35686

[52] **U.S. Cl.** **220/203;** 220/360; 220/367; 215/260

[51] **Int. Cl.²** **B65D 51/16**

[58] **Field of Search** 220/202, 203, 205, 208, 220/240, 360, 366, 367; 215/311, 315, 260

[56] **References Cited**

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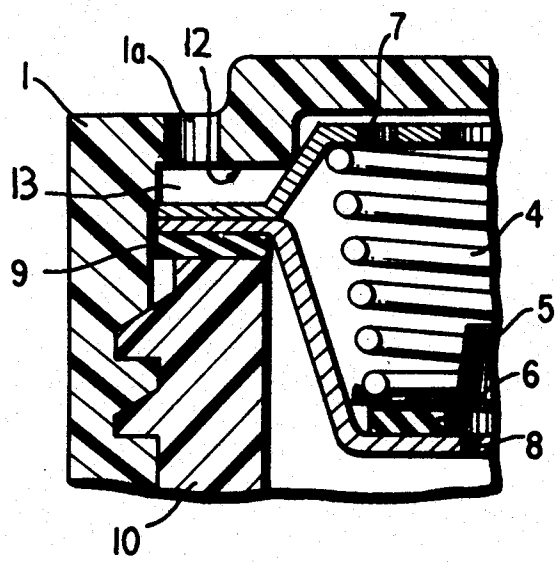
Primary Examiner—William I. Price
Assistant Examiner—Ro E. Hart
Attorney, Agent, or Firm—Oblon, Fisher, Spivak, McClelland & Maier

[57] **ABSTRACT**

An expansion tank for a cooling system of the type having a pressure-vacuum valve capsule wherein the tank and cap are formed of a plastic material and are threadably engagable and the pressure-vacuum valve capsule is arranged for mounting therebetween within a neck portion of the tank so as to provide a seal between the tank and the cap simply by screwing the cap thereon.

3 Claims, 4 Drawing Figures



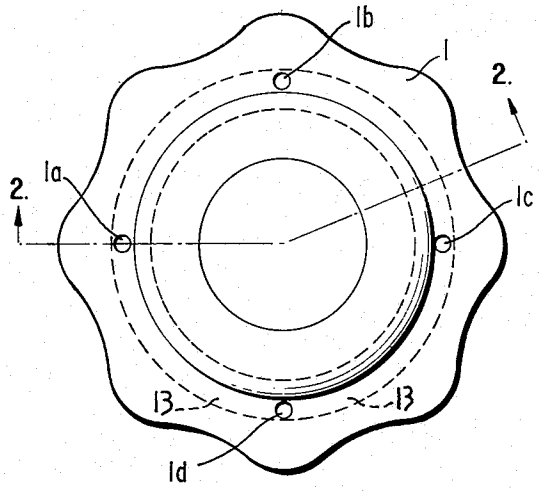


FIG. 1

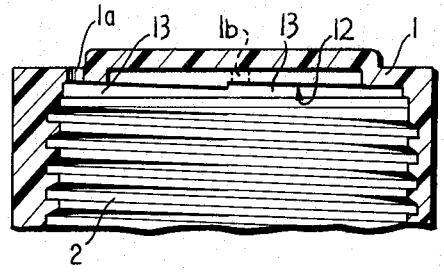


FIG. 2

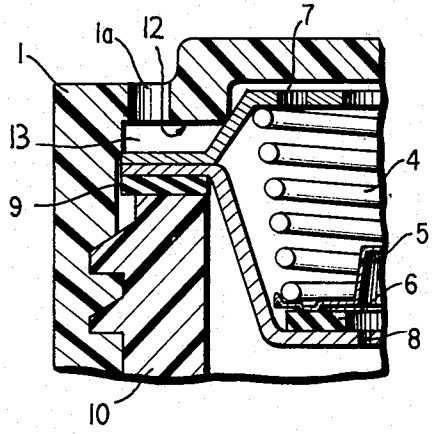


FIG. 3

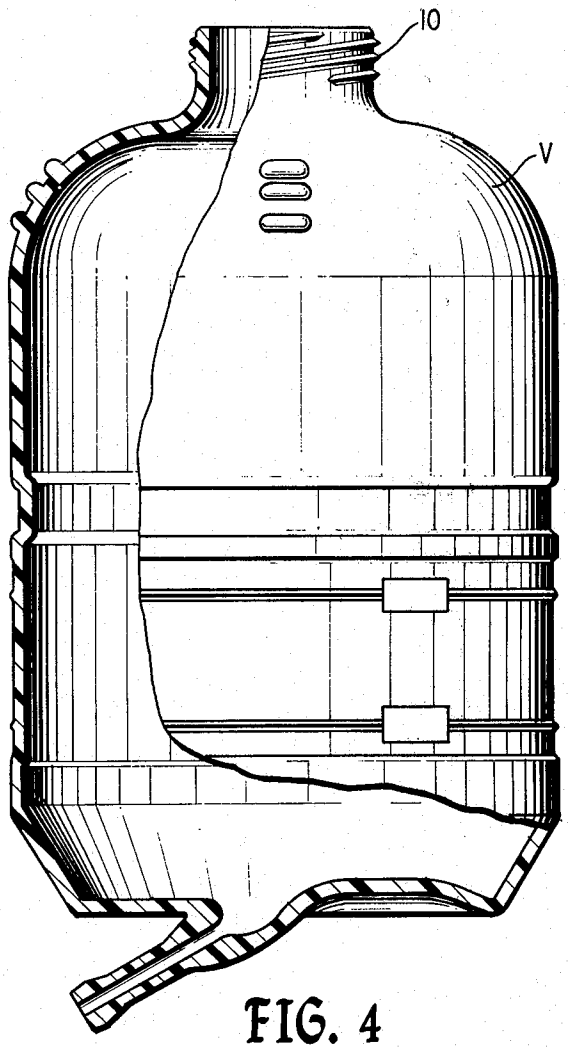


FIG. 4

EXPANSION TANKS OF COOLING SYSTEMS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to expansion tanks for cooling systems of the type having a pressure-vacuum valve, and more particularly to an improved expansion tank for a cooling system of the type having a plastic tank and cap and a pressure-vacuum valve capsule of known design, characterized by the fact that the pressure vacuum valve capsule is mounted as a seal between the tank and the cap simply by screwing the cap thereon.

2. Description of the Prior Art

Heretofore, the methods of manufacturing expansion tanks for cooling systems, such as described in the French Pat. Nos. 1,169,341 and 2,102,469, have produced models which exhibit, among others, the particular disadvantage of having to combine parts which are made of glass or molded plastic, such as, for example, the tank and cap, with mechanical parts, such as crimped metal stampings and springs, which give rise to relatively high assembly costs.

SUMMARY OF THE INVENTION

Among the objects of the present invention, therefore, is that of providing a method for producing expansion tanks for cooling systems of the character described herein which avoids the aforementioned disadvantage and such other disadvantages associated therewith through the arrangement of dissociating the parts of molded plastic from the mechanical parts, such parts being produced by different industries.

Yet another object of this invention is to provide an improved method of producing and an improved expansion tank arising therefrom which virtually eliminates all costs of assembly of the tanks, as heretofore were encountered.

Still another object of the present invention is to provide an improved expansion tank of the character described which is light, strong and compact, and which may be produced at a lower price than previously known expansion tank structures.

Accordingly, these objects and others are achieved by the expansion tank of the present invention, which is of the type having the tank and its cap made of plastic and a pressure-vacuum valve capsule, being characterized by the fact that the pressure-vacuum valve capsule is mounted as a seal between the tank and the cap simply by screwing the cap thereon.

The expansion tank of the present invention is characterized in addition by the fact that it can be drained from the bottom, this being made possible by the plastic molding, and thus there is avoided the plunger tube which passes through the cap in the conventional forms of expansion tanks. Further, according to this invention, the cap is provided with holes from the exterior opening into air passage gaps at the level of the seal, which gaps have a slope of inclined separation in the same sense and helix angle as the cap threads, and the cap can thus be separated from the mold directly by unscrewing after injection. Yet further, the metallic pressure-vacuum valve capsule, according to this invention, has its projecting part enclosed in the neck of the expansion tank, with its peripheral circular flange pressing at the neck rim against a gasket, previously stuck to the flange, and the cap pressing on the opposite side of the flange.

BRIEF DESCRIPTION OF THE DRAWINGS

Various other objects, features and attendant advantages of the present invention will be more fully appreciated as the same becomes better understood from the following detailed description of one embodiment thereof, when considered in connection with the accompanying drawings, wherein like reference characters designate like or corresponding parts, and in which:

FIG. **1** is a top view of the cap of an expansion tank formed according to the present invention;

FIG. **2** is a sectional view taken along the broken line AOA of FIG. **1**;

FIG. **3** is a partial view in detail of FIG. **2**, with the cap being screwed onto the neck of the expansion tank and the pressure vacuum capsule being in place; and

FIG. **4** is a partially cut-away side view of the expansion tank of the invention with the cap being removed from the capsule.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to the drawings, a plastic cap **1** of conventional configuration is provided with a plurality of vent holes shown being four in number, designated **1***a*, 1*b*, 1*c* and **1***d*, and opening at the deepest end of four air passage gaps **13** with sloped bottoms **12**, in the end wall thereof and is threaded as indicated at **2** on the inner periphery of the side wall thereof to facilitate securement to the neck **10** of the expansion tank V by screwing, the neck **10** being threaded externally, to receive the cap **1** in threaded engagement.

On the upper rim of the neck **10**, a circular gasket **9** is positioned, as shown in FIG. **3**, on which a pressure-vacuum valve capsule **3** is pressed by screwing the cap **1** onto the neck **10**. The sloped bottoms **12** of the air passage gaps **13** prevent any air tightness between the pressure vacuum valve **3** and the plug **1**. This disposition, which makes an indirect communication between holes **1***a*, 1*b*, 1*c*, 1*d* and air escape holes **7** in the pressure vacuum valve top prevent also the introduction of any outside dirt inside valve **3** and its seals.

This pressure-vacuum valve capsule **3** is of the type having an overpressure valve **5** pressing against a circular seal **6** disposed about an opening **8** in the lower element thereof under the action of a spring **4**, the air escape holes **7** in the upper element thereof, and a vacuum valve, not shown in the drawing.

The substantially tubular body V of the expansion tank is a conventional plastic type and is provided with a lower tube **11** which may be connected to the hydraulic cooling system by which gas can be evacuated.

The plastic used to make the expansion tank V and its cap **1** is, for example, a polyamide type reinforced with fiberglass.

Various modifications and changes are possible in light of these teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. An expansion tank for a cooling system comprising:

a plastic tank body having an externally threaded neck portion;

a plastic cap having an internally threaded portion and being adapted to be threadably engaged upon said neck portion of said tank body;

a metallic pressure vacuum valve capsule having means thereon for seating upon the edge of said neck portion for supporting said capsule in said tank body;

means on the inner portion of said cap for engaging said capsule upon threadably tightening said cap on said tank body for causing said capsule to serve as a seal between the tank and the cap simply by screwing said cap thereon; and

said cap having holes from the exterior opening into air passage gaps at the level of said seal, said gaps having a slope of inclined separation in the same sense as the cap threads.

2. An expansion tank as set forth in claim **1**, further comprising means for effecting evacuation of the tank body from the bottom thereof.

3. An expansion tank as set forth in claim **1**, wherein said sealing means of said metallic pressure-vacuum valve capsule is a projecting circular flange enclosed in said neck of said expansion tank for being pressed against said neck edge, and further comprising an intervening gasket disposed between one side of said flange and said neck edge, whereby said cap presses on the opposite side of said flange for effecting said seal.

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