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SEALED COOLING SYSTEM FOR INTERNAL-COMBUSTION ENGINES

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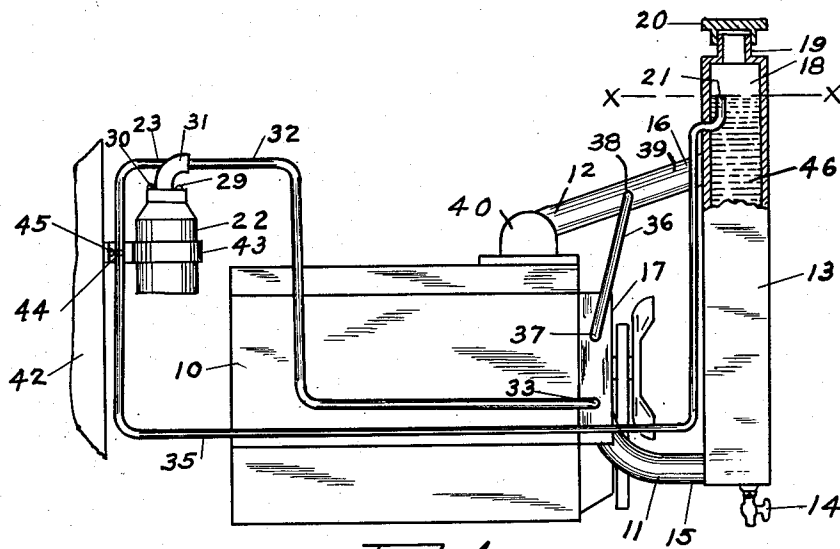


FIG. 1

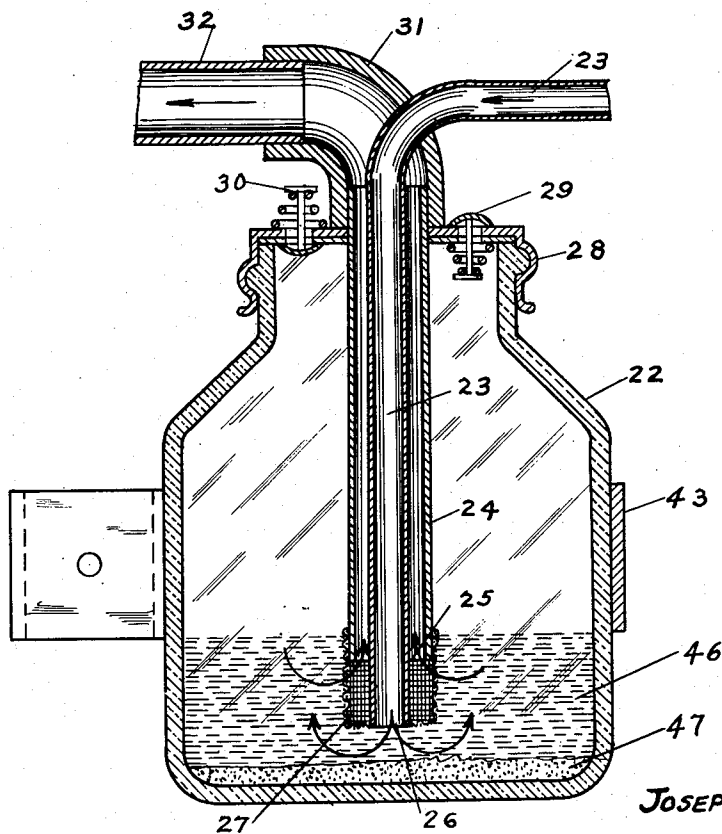


FIG. 2

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SEALED COOLING SYSTEM FOR INTERNAL-COMBUSTION ENGINES

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6 Claims. (Cl. 123—41.08)

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This invention relates to improvements in internal combustion engines, and more particularly it pertains to a new and novel improvement in connection with the cooling system thereof.

While many arrangements have been suggested, designed and placed in service for cooling modern internal combustion engines, the actual results obtained have not been wholly satisfactory. This is primarily due to the fact that the present cooling system was designed to operate with the old low compression engines that generated less heat than the new high compression engines, used today. The characteristics of the old and the new engines are different.

It is an object of this invention to provide a new and improved sealed unit cooling system for use with internal combustion engines designed to relieve air, eliminate pressure, trap rust, grease and condense steam, and keep the cooling system full of fluid at all times.

It is an additional object of this invention to provide a new and improved closed cooling system comprising an internal combustion engine having a water cooled head and block with an inlet and outlet, a radiator having a drain, an overflow, a discharge and intake, connected to the engine, the radiator overflow is connected to the combination sealed container and indicator, and then to the suction side of the pump, then from the pressure side of pump to the radiator inlet to provide a thermostat by-pass back to the radiator.

An additional object of this invention is to provide a new and improved closed water cooling and filtering system having a sealed visual indicator to trap all foreign materials and separate them from the cooling medium and to automatically release air, steam etc. from the system without losing the anti-freeze solution from the cooling medium.

A further object of this invention is to provide a new and improved cooling system for internal combustion engines comprising an indicating container of transparent material to separate and retain grease, dirt and other foreign matter from the cooling medium and release steam and air automatically from the container, and to act as an alarm indicator when the cooling system is out of order.

Other objects will become apparent as the invention is more fully set forth.

For a clearer understanding of the invention and the objects thereof, reference is made to the accompanying drawings, wherein a particular form of the invention is indicated. These drawings when used in conjunction with the following description serve to illustrate the invention, its principles and the operation thereof, while the claims indicate the scope thereof.

In the drawings:

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Figure 1 is a diagrammatic view showing the device and its connections used in the sealed cooling system for internal combustion engines, embodying this invention, and

Figure 2 is an enlarged view of the sealed unit with parts broken away to show its internal construction.

Similar reference characters refer to the same parts throughout the drawings.

In the construction shown in the drawings 10 indicates an internal combustion engine having a water cooled head and block with an inlet 11 and an outlet 12. A radiator 13 has the conventional drain 14, the discharge 15 and intake 16. The pump 17 may be included between the radiator and engine openings 15 and 11 respectively, or may be positioned as shown in the drawings. The radiator and engine openings 16 and 12 are also connected together. The radiator may be of any conventional type, i.e. vertical flow or the cross flow as indicated herein or that for vapor (steam) cooling. With the cross flow type there is a head of liquid above the opening 13 through which the vapors must pass before entering the space 18 in the top of the radiator and which is provided with the usual filling neck 19 closed by a sealed cap 20 and an overflow outlet 21 at a predetermined level x—x. The above is a standard commercial construction.

The invention in its simplest form comprises a transparent sealed container 22 of suitable capacity (a half gallon jar is shown) having an inlet 23 near the bottom and an outlet tube 24 preferably surrounding the inlet tube 23, and with its lower end 25 positioned approximately one-half inch above the lower end 26 of the inlet 23. The lower end 26 of the inlet tube 23 is unobstructed and projects through the end of a filter screen 27 which is preferably of cylindrical form, with its upper edge fixed to the lower end 25 of the outlet tube 24 to prevent foreign material from passing out of the sealed container 22, and back into the cooling system. A container cap 28 for closing the top of the container is provided with a pressure release valve 29, to release air or other gases entrapped in the container 22, and a vacuum valve 30 to prevent blocking the operation of the container. An L fitting 31 is attached to the cap 28 and receives the tube 24 at its lower end, while the upper end supports a pipe 32 connected with the suction side 33 of a pump 17. The inlet 23 projects through the fitting 31 and is connected to the overflow outlet 21 by a pipe 35. A by-pass loop 36 is connected at one end to the discharge end 37 of the pump 17, and the other end of the by-pass is connected at 38 to the hose 39. This by-passes the thermostatic valve 40. The transparent container 22 is usually secured to the cowl 42 of an automobile by a band

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43 tightened around the container 22 by an adjusting bolt 44 and held to the cowl by screws 45. The operation is as follows: The container is filled with enough water 46 to cover the ends of tubes, usually about 2 inches from bottom of the container. The radiator and cooling system is filled with the cooling medium such as water or water including an anti-freeze compound up to a suitable level such as the overflow outlet. If below that level initial overboiling fills the radiator up to the inlet. If the system is filled above the outlet, or the overboil rises above the same, the surplus passes through pipe 35 into the container 22, where rust 47 settles to the bottom, and grease congeals and stays trapped and other foreign matter is trapped, and steam is condensed and air is released. The pump pulls liquid from the bottom of the radiator and container at same time and causes more liquid to be delivered to the top of the radiator than the core will take. This excess amount of liquid rises to the top of the radiator and forces the air, steam, grease, dirt, etc., and excess fluid back to the container where the air is released through the release valve, steam is condensed in center condensing and inlet tube 23 and the grease is congealed, and floats at the top of the container liquid, and dirt enters the container out of direct circulation, and the filter screen 27 prevents the foreign materials from returning to the system. When the engine stops and cools it contracts and causes a vacuum which pulls liquid from container back to the system, because the inlet and outlet tubes being located below the water line in the container seals the system, allowing air and steam to escape, and the cleansed liquid to be returned to the system. The container can be used for testing a cooling system in the following manner. If the container fills to top, radiator is clogged, or thermostat fails to open. If container empties, it indicates there are leaks somewhere in the system. If air bubbles are observed rising to the top of the container, it indicates air is being sucked into the system through the head gasket, cracked head or engine block, worn pump shaft or packing. It is safe to operate the engine as long as two inches of liquid is in the container. If one inch of rust or other solids are visible, the container should be cleaned and refilled to water line.

While but one general form of the invention is shown in the drawings and described in the specification, it is not desired to limit this application for patent to this particular form as it is appreciated that other forms of construction could be made that would use the same principles and come within the scope of the appended claims.

Having thus described the invention, what is claimed is:

1. The combination with an internal combustion engine and a sealed unit liquid cooling system therefore including a pump, a radiator having a filling neck, a sealed closure therefor, an overflow outlet near the upper end thereof, a container having an inlet attached to said overflow outlet, an outlet projecting from said container connected to the pump, a hose from said engine to radiator, a thermostat positioned between the engine and hose, and a bypass loop positioned between the pump and hose.

2. The combination with an internal combustion engine and a sealed unit liquid cooling system therefore including a pump, a radiator having a filling neck, a sealed closure therefor, an

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overflow outlet near the upper end thereof, a container having an inlet attached to said overflow outlet, an outlet projecting from said container connected to the pump, a hose from said engine to radiator, a thermostat positioned between the engine and hose, a by-pass loop positioned between the pump and hose, said inlet positioned in said outlet.

3. The combination with an internal combustion engine and a sealed unit liquid cooling system therefore including a pump, a radiator having a filling neck, a sealed closure therefor, an overflow outlet near the upper end thereof, a container having an inlet attached to said overflow outlet, an outlet projecting from said container connected to the pump, a hose from said engine to radiator, a thermostat positioned between the engine and hose, a by-pass loop positioned between the pump and hose, said inlet positioned in said outlet, and a screen enclosing the end of said outlet.

4. The combination with an internal combustion engine and a sealed unit liquid cooling system therefore including a pump, a radiator having a filling neck, a sealed closure therefor, an overflow outlet near the upper end thereof, a container having an inlet attached to said overflow outlet, an outlet projecting from said container connected to the pump, a hose from said engine to radiator, a thermostat positioned between the engine and hose, a by-pass loop positioned between the pump and hose, said inlet positioned in said outlet, a screen enclosing the end of said outlet, and a removable closure for said container.

5. The combination with an internal combustion engine and a sealed unit liquid cooling system therefore including a pump a radiator having a filling neck, a sealed closure therefor, an overflow outlet near the upper end thereof, a container having an inlet attached to said overflow outlet, an outlet projecting from said container connected to the pump, a hose from said engine to radiator, a thermostat positioned between the engine and hose, a by-pass loop positioned between the pump and hose, said inlet positioned in said outlet, a screen enclosing the end of said outlet, a removable closure for said container, and a relief valve positioned in said container.

6. The combination with an internal combustion engine and a sealed unit liquid cooling system therefore including a pump a radiator having a filling neck, a sealed closure therefor, an overflow outlet near the upper end thereof, a container having an inlet attached to said overflow outlet, an outlet projecting from said container connected to the pump, a hose from said engine to radiator, a thermostat positioned between the engine and hose, a by-pass loop positioned between the pump and hose, said inlet positioned in said outlet, a screen enclosing the end of said outlet, a removable closure for said container, a relief valve positioned in said container, and a vacuum relief valve operable in said container.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,315,423	Sapper	Sept. 9, 1919
1,378,070	Welge	May 17, 1921