Nov. 6, 1956 H. T. COLBY 2,769,450

ENGINE COOLING SYSTEM CLEANER

Filed Sept. 10, 1951

Fig. 2.

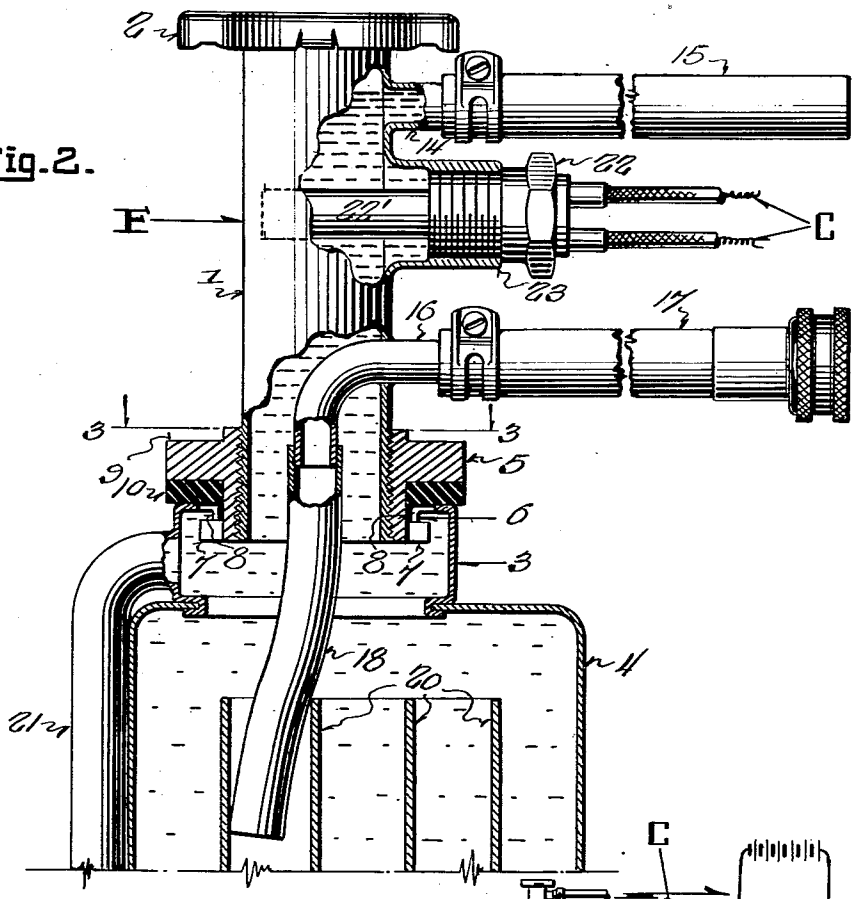


Fig. 3.

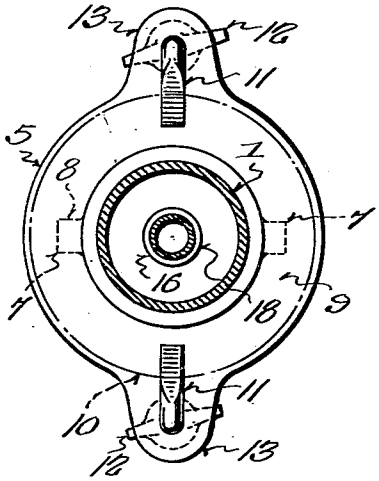
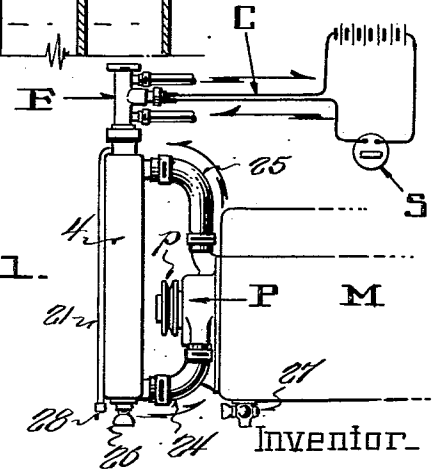


Fig. 1.



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ENGINE COOLING SYSTEM CLEANER

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1 Claim. (Cl. 134—57)

This invention pertains generally to an apparatus for cleaning cooling systems of fluid cooled internal combustion engines, and more particularly to a unit for direct attachment to the radiator of the system for cleaning and flushing the radiator, connections and cooling compartments of a combustion engine of stationary, automotive or marine type.

Aside from the primitive methods of cleaning engine cooling systems by the use of solvents and subsequent flushing with fresh water introduced through the radiator and subsequently discharged through the radiator drain, several machines have been devised for circulating solvent and rinsing fluid through the radiator and engine block. However, such machines are costly to manufacture and operate, and a tedious operation usually is required in removing several of the radiator and engine connections in order to attach the cleaning machine. Also, present machines usually incorporate an auxiliary pump, which frequently has a capacity of greater or lesser pressure than that for which the cooling system is designed, which results in either insufficient circulation of the cleaning fluid, or causes forced leaks in the connections and radiator core.

The primary object of the present invention is to overcome the foregoing objections by the provision of a comparatively simple and inexpensive attachment for direct connection to the filling neck of a cooling radiator to effectively clean and flush the entire cooling system of a fluid cooled internal combustion engine, without disconnection or removal of parts of the system, other than the radiator filling cap.

Incidental to the foregoing, a more specific object of the present invention resides in the provision of a fitting for attachment to conventional radiator filling spouts, and provided with inlet and outlet communications in addition to a thermostat switch for either controlling the motor ignition circuit to kill the engine, or a circuit connected with either a visible or audible signal, in the event of over-heating of the motor.

A still further object of the present invention is to provide an apparatus of the foregoing type, dependent solely for its operation upon the conventional fluid circulating pump with which the engine is equipped, and capable of maintaining sufficient pressure within the cooling system to cause enough agitation or swirl of the cleaning and flushing fluid to hold heavy particles or scales in suspension for effective discharge through the drain outlets of the motor block and radiator.

With the above and other objects in view, the invention resides in the novel features of construction fully described in the specification, and more particularly defined by the appended claim, it being understood that modifications in structure and design are contemplated within the scope of the invention.

In the drawings:

Figure 1 is a simple schematic view of a fluid cooled internal combustion engine, connected to a radiator to which the present invention is attached;

Figure 2 is an enlarged partial sectional view of a fitting incorporating features of the present invention; and

Figure 3 is a plan sectional view taken on the line 3—3 of Figure 1.

Referring now more particularly to the accompanying drawing, F designates generally a fitting constituting the salient feature of the present invention. The fitting F consists of a T-shaped tubular casing 1, the upper open end of which is closed by a removable filling cap 2, of any conventional construction. To attach the fitting 1 to the filling neck 3 of a conventional radiator 4, an adaptor 5 is threaded upon the lower end of the fitting.

Inasmuch as conventional filling necks vary, the adaptor is designed to accommodate two general types of necks, namely, those provided with an internal depending flange 6, such as shown in Figure 2, or necks having an external flange (not shown). To accommodate the radiator neck illustrated, the adaptor 5 is provided with a pair of diametrically opposed lugs 7, which pass through corresponding openings 8 formed in the top flange of the spout, and upon slight rotation of the adaptor, they engage the lower edge of the depending flange 6 to lock the fitting 1 on the neck. The opposite end of the adaptor 5 is provided with an annular flange 9 which abuts a stretchable gasket or washer 10 engaging the top of the filling spout 3 to effectively seal the same during operation of the invention.

In types of radiator necks having external flanges, the adaptor is reversed and the gasket is placed on the opposite side of the flange 9 to engage and seal the top of the spout. A pair of hooks 11 provided with thumb nuts 12, carried by lugs 13 formed on the flange 9 of the adaptor, are engaged under the external flange to lock the adaptor thereon.

The tubular casing 1, adjacent its upper end, is provided with an outlet duct 14 to which a rubber hose 15 is attached to deliver fluid to a convenient drain or receptacle. Secured in the lower end of the tube is an elbow inlet duct 16 upon which a hose 17 is clamped for attachment to a service outlet or other source of water supply under pressure. The inner end of the duct 16 is directed downwardly and provided with a relatively short piece of flexible or rubber tubing 18, extending below the top of any baffle plates 20 or other obstructions, positioned within the radiator casing 4. Flexibility of the tube 18 permits the same to bend to avoid such obstructions as may be encountered and deliver fluid at a point below the level of the radiator over-flow pipe 21, which, in the present instance, is shown communicating with the filling spout 3.

A thermostat switch 22 for controlling an electric circuit C is threaded into the branch 23 of the tubular T fitting 1, with the thermostatic element 22' extending well into the tube 1 for quick responsive action to fluid temperature.

Figure 1 schematically illustrates a typical fluid cooled combustion engine assembly, in which the motor block M carries a circulating pump P, operated by a pulley *p* connected with a fan belt or other form of drive. In turn, the pump P is connected with the lower portion of the radiator 4 through a hose connection 24, and delivers fluid from the radiator to the motor block. Also, the motor block is connected to the upper portion of the radiator 4 through a hose connection 25. A plug 26 is provided for draining the radiator 4, while a pet cock 27, secured in the motor block, allows draining of the same.

In the preferred method of operation, the cooling system, including the radiator, connections and motor block, is initially drained by opening the plug 26 and pet cock 27, following which the system can be flushed with fresh water supplied to the fitting F through the service line 17. This is for the purpose of not only draining the old fluid,

but also for removing loose sediment, scale and accumulation from the system.

Upon completion of the initial purging operation, the drain plug 26 and pet cock 27 are closed, and the lower end of the radiator over-flow pipe 21 is closed with a cork or suitable plug 28. A necessary amount of chemical solvent, in either powdered or liquid form, is then introduced into the system through the opening in the top of the T fitting F, after which the cover 2 is locked on the fitting to close the same. Fresh water or fluid is then supplied through the service line 17 to completely fill the system to the level of the outlet duct 14 after which the fresh water supply is cut off and the motor is started.

By means of the pump P, the solvent solution is then circulated through the entire cooling system, including the radiator, connections and motor block, and after a period of time sufficient to dissolve and loosen all accumulation and scale formed in the system, the system may be flushed by again supplying fresh fluid through the line 17. Upon completion of the flushing operation, the fresh water supply is cut off and the drain plug 26 and engine pet cock are open to allow complete drainage of the system before filling the same with fresh cooling fluid, after which the drain openings are closed and the plug 28 of the over-flow pipe are removed. The fitting F is then replaced with the usual radiator filling cap and the system is in condition for normal operation.

During the cleaning and flushing operation, in the event that the fluid becomes over-heated at any time, the thermostat switch 22 is effective to control the electric circuit C, which, as diagrammatically shown in Figure 1, may be connected with the switch in the ignition system, a visible signal, or an audible signal, designated as S. In the first instance, operation of the thermostat switch 22 opens the ignition system to stop the engine, while in other instances a visible signal is given to the operator so that the motor may be cut off before over-heating.

Particular attention is directed to the fact that the capacity of the outlet duct 14 is so proportioned in relation to the inlet duct 16 and the pressure fluid introduced through the duct, as to maintain a slight pressure within the system during the cleaning and flushing operation.

The result of this pressure is to cause sufficient swirl and agitation of the cleaning fluid to hold heavy particles of dirt and scale in suspension so that they will be completely discharged through the line 15, or through the drain plug 26 and the pet cock 27.

From the foregoing explanation, considered in connection with the accompanying drawing, it will be apparent that an exceedingly simple and comparatively inexpensive device has been devised for effectively cleaning combustion engine cooling systems, at minimum cost. Tedious operations required in removing connections between the motor block and radiator, as required in conventional machines now on the market, are entirely eliminated.

Also, due to the fact that the cleansing and purging operations are performed under pressure created by a conventional pump designed for the particular system, no loss of cleansing fluid is encountered, and excessive pressures do not occur to force leaks in the radiator core and motor connections.

I claim:

A cleaning device for attachment to the filling neck of a radiator in the cooling system of an internal combustion engine provided with a fluid circulating pump, said device comprising a tubular fitting, a removable cap for the upper end of said fitting, means for attaching the lower end of said tubular fitting on the filling neck of said radiator, ducts at the upper and lower ends of said fitting for introduction and discharge of a flushing liquid into the radiator, one of said ducts adapted to extend down into the body of the radiator, a thermostatic switch extending into said tubular fitting, and means operatively connected to the thermostatic switch and operative in response to the operation thereof to interrupt the ignition system of the engine to prevent overheating of said cleaning fluid.

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