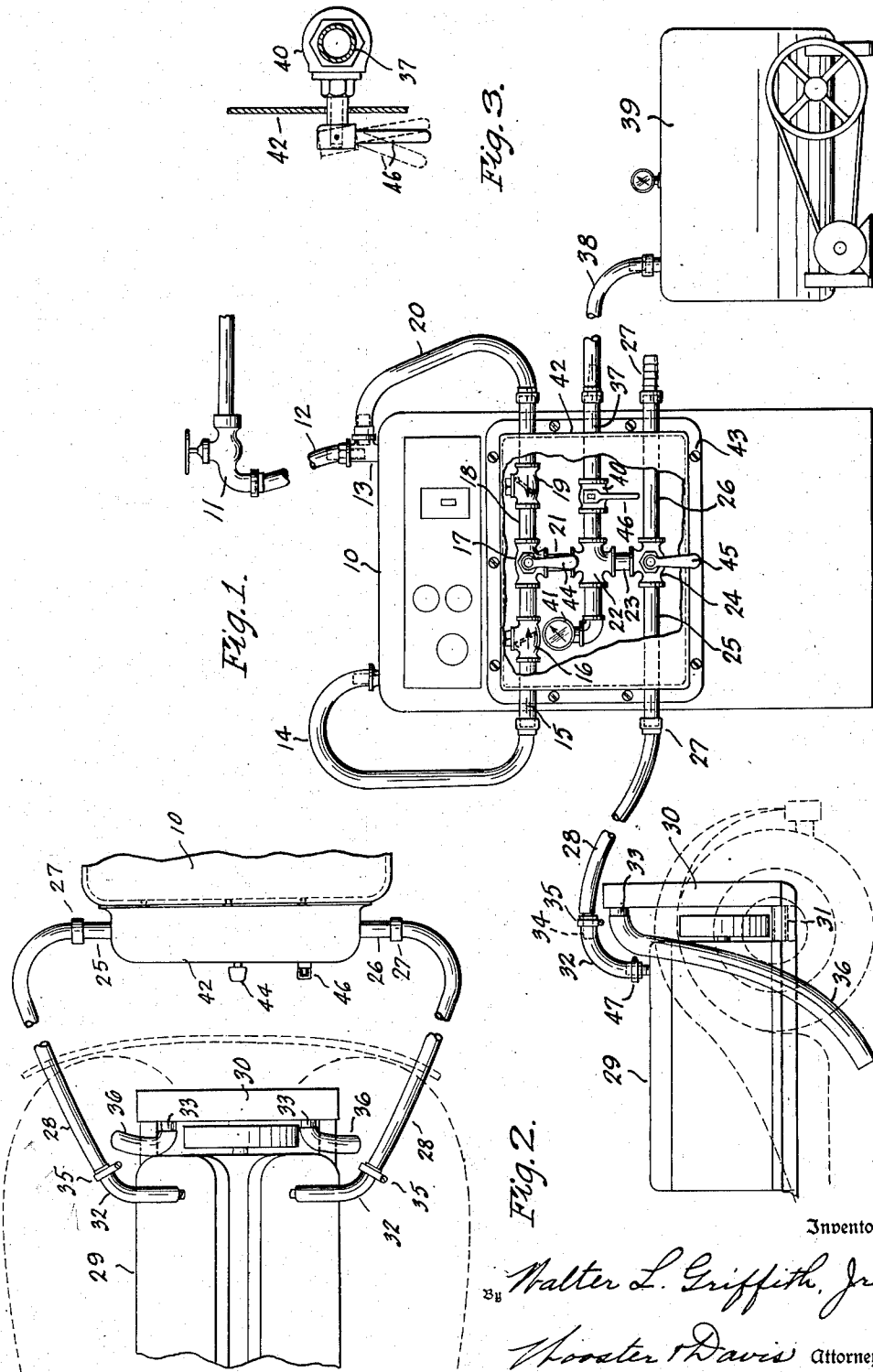


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APPARATUS FOR STEAM CLEANING AND LIQUID CLEANING
INTERNAL-COMBUSTION ENGINE COOLING SYSTEMS
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APPARATUS FOR STEAM CLEANING AND LIQUID CLEANING INTERNAL-COMBUSTION ENGINE COOLING SYSTEMS

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This invention relates to an apparatus for steam-cleaning and liquid-cleaning internal combustion engine cooling systems, and has for an object to provide a simple effective apparatus which will more effectively clean such cooling systems and in a shorter time. It is also an object to provide such an apparatus with simple controlling means.

It is a particular object to provide an apparatus in which short blasts of compressed air may be fed to the cleaning mixture of steam and cleaning compound as it flows through the cooling system to give an impulse or blow effect to more effectively loosen and remove the rust and scale.

It is also an object to provide such an apparatus which may be effectively used in automobile repair garages.

With the foregoing and other objects in view, I have devised the construction illustrated in the accompanying drawing forming a part of this specification. It is, however, to be understood the invention is not limited to the specific details of construction and arrangement shown, but may embody various changes and modifications within the scope of the invention.

In this drawing:

Fig. 1 is a side elevation showing the apparatus and its use with parts broken away to more clearly show the construction, the drawing being somewhat diagrammatical;

Fig. 2 is a top plan view of a portion of the device showing its application to the cleaning of a cooling system, with a V-type engine, and

Fig. 3 is a detail view of a control for the air supply valve.

The apparatus comprises what is known on the market as a steam cleaner, which is indicated at 10, merely the outline being shown as such apparatus is of itself old and can be bought on the market. It comprises a cabinet or housing enclosing means for supplying a mixture of cleaning compound and water in certain proportions to a boiler or suitable heating means for heating this mixture to generate steam, and then a discharge means for discharging this mixture of steam and cleaning compound into the system of the internal combustion motor to be cleaned. While this method of cleaning internal combustion engine cooling systems has been largely used, I have found that it is much more effective if there is fed to the mixture of steam and cleaning compound as it is conducted to the cooling system, short blasts of compressed air which will give an impulse or hammer effect to this cleaning mixture as it flows through the system. These short blasts or jabs of air may be used continuously during the cleaning operation if desired, but it has been found to be sufficient if they are supplied intermittently and in short intervals during the cleaning operation. This im-

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pulse or hammer effect of these short jabs or blasts of air make the cleaning mixture much more effective in loosening or detaching the rust and scale and removing it from the system. For carrying out this new method I have applied to the steam cleaner, any suitable type of which is indicated by the numeral 10, a new and effective means not only for controlling the operation of this cleaner in supplying the mixture of steam and cleaning compound to the cooling system, but also a simple and effective means of supplying to this mixture the short blasts of compressed air and for controlling them.

Water is supplied to the steam cleaner 10 from any suitable source, such as a faucet 11, through a conduit 12 which is usually a flexible hose, so that the device is portable and may be used at different locations about the garage. This is connected to the device through the fixture 13 which leads by pipes or conduits (not shown) to the means for mixing the cleaning compound with the water, conducting it to the boiler or heating means from which the mixture of steam and cleaning compound, or mixture of steam, water and cleaning compound, is discharged through the conduit 14. On one side wall of the cabinet of the steam cleaner 10 is mounted a control device including the pipe 15 to which the conduit 14 for the mixture of steam and cleaning compound is connected, through a non-return or check valve 16 to a three-way valve 17. A similar pipe 18 is connected through the check valve 19 by means of the pipe connection 20 to the fixture 13 and therefore the water supply conduit 12. The outlet 21 from the control valve 17 is connected to a T fixture 22 and this is connected by an outlet 23 to a control valve 24, which in the preferred set up is a three-way valve with two branch or outlet pipes 25 and 26, each having a fixture 27 to which may be connected a flexible hose 28 forming a conduit for conducting and supplying the cleaning mixture of steam and cleaning compound to the cooling system of the internal combustion engine to be cleaned. Such an engine is indicated diagrammatically at 29 with the cooling radiator indicated at 30 connected to the water jackets of the engine at the lower part 31. The usual hose connection from the top of the water jacket to the top of the radiator is indicated at 32, but in use during the cleaning operation it is disconnected from the nipple 33 at the top of the radiator and is connected to the hose 28 by a connector 34 inserted into the hose 32 and held by the clamp 35. A discharge hose 36 is connected to the nipple 33 of the radiator and led to a position under the car or to a sewer drain to prevent cleaning mixture splashing onto the engine during the cleaning operation.

Connected to one side of the fitting 22 by a

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cleaned while connections are being made from the other side to the other engine. Then after the first engine is cleaned the valve may be swung to cut off cleaning action from this engine and direct it to the other engine. When valve 24 is in the intermediate position shown, both pipes 25 and 26 are shut off. When swung to the left, discharge 23 is open to pipe 25 and 26 is still shut off. When the valve is swung to the right, 23 is in communication with pipe 26 while 25 is shut off.

With this method and apparatus the cooling system of any car, including the engine, the radiator and water jackets, as well as the heater if there is one, can be thoroughly steam-cleaned in an hour or less.

Having thus set forth the nature of my invention, I claim:

1. Apparatus for cleaning the cooling system of internal combustion engines having a free liquid discharge outlet, comprising a steam cleaner including means for heating a mixture of water and chemically acting cleaning compound to generate a mixture of steam and this cleaner, a conduit for conducting the mixture of steam and compound to the cooling system to be cleaned to circulate through this system to said outlet, a conduit from the water supply to said latter conduit, valve means for controlling said conduits, and means for supplying compressed air in short blasts to the conduit for steam and compound to produce an impulse effect in said mixture as it flows through the system.

2. Apparatus for cleaning the cooling system of internal combustion engines having a free liquid discharge outlet, comprising means for supplying a mixture of steam and liquid chemically acting cleaning compound, a conduit connection from said means, means for connecting the conduit to the cooling system to be cleaned for discharging said mixture therein to circulate through the system to said outlet, means for cutting off the mixture of steam and cleaning compound and supplying in its place a stream of clear water to flush out the cooling system, and means for supplying compressed air in short blasts to both the stream of cleaning mixture and the water stream to produce an impulse effect of the cleaning mixture and the water as they each flow through the cooling system.

3. Apparatus for cleaning the cooling system of internal combustion engines having a free liquid discharge outlet, comprising a steam cleaner including a cabinet and means in the cabinet for heating a mixture of water and chemically acting cleaning compound to generate a mixture of steam, water and this compound, means for supplying water to said heating means, valve control means mounted on the cabinet, a conduit from the heating means to said valve means, a conduit from the water supply to said valve means, a discharge conduit leading from the valve control means for conducting said mixture to the system to be cleaned for circulation through the system to said outlet and water for flushing out the system after treating with said mixture, said valve control means including means to open the mixture supply while the water is shut off and then open the water supply while shutting off the mixture supply, and means for supplying compressed air to the discharge conduit in short separate blasts to produce an impulse effect in both the cleaning mix-

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ture and in the flushing water as they each flow through the cooling system.

4. Apparatus for cleaning the cooling system of internal combustion engines having a free liquid discharge outlet, comprising a steam cleaner including means for heating a mixture of water and chemically acting cleaning compound to generate a mixture of steam, water and this compound, a water supply conduit leading to said cleaner, a control means comprising a valve, a pipe connection from said heating means to the valve, a pipe connection from the water supply to said valve, a discharge conduit leading from the valve for conducting said mixture to the system to be cleaned for circulation through this system to said outlet and water for flushing out the system after treatment with said mixture and including branches for connection to different engine cooling systems, said valve including means for controlling both the mixture supply and the water supply, a control valve in the discharge conduit for controlling said branches, and means for supplying compressed air in a series of short blasts to the discharge conduit to produce an impulse effect of both the cleaning mixture and flushing water as they each flow through said systems.

5. Apparatus for cleaning the cooling system of internal combustion engines having a free liquid discharge outlet, comprising a steam cleaner including a cabinet and means in the cabinet for heating a mixture of water and chemically acting cleaning compound to generate a mixture of steam, water and this compound, a water supply conduit leading to said cleaner, a control means mounted on the cabinet comprising a valve, a pair of pipe connections to said valve one being connected to said heating means for receiving the mixture of steam and cleaning compound and the other being connected to the water supply, a non-return check valve in each pipe connection, a discharge pipe leading from the valve, said valve including means for alternately connecting said first pipe connections to the discharge pipe, branch connections from the discharge pipe, conduits for connecting the said branch connections to different cooling systems to be cleaned for circulation of the heated mixture and then water through the systems to said outlet, valve means for controlling said branch connections, and means for supplying compressed air in a series of short blasts to the discharge pipe to produce an impulse effect of both the cleaning mixture and flushing water as they each flow through said systems.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
60	Re. 18,242	Moore et al. ----- Nov. 3, 1931
	1,142,083	Dodge ----- June 8, 1915
	1,447,305	Hauk ----- Mar. 6, 1923
	1,625,300	Davis ----- Apr. 19, 1927
65	1,695,412	Cotterill ----- Dec. 18, 1928
	1,827,301	Smith et al. ----- Oct. 13, 1931
	1,865,289	Trowbridge ----- June 28, 1932
	1,887,985	Auker ----- Nov. 15, 1932
	1,908,955	Carmin ----- May 16, 1933
70	1,934,826	Shepherd ----- Nov. 14, 1933
	1,939,836	Tolfree ----- Dec. 19, 1933
	2,187,413	Boezi et al. ----- Jan. 16, 1940
	2,221,803	Krobusek ----- Nov. 19, 1940
	2,222,516	Powell et al. ----- Nov. 19, 1940
75	2,245,195	Hopkins ----- June 10, 1941