

May 15, 1951

J. LA CROSS
APPARATUS FOR CLEANING AND FLUSHING
RADIATORS AND THE LIKE

2,553,195

Filed Feb. 23, 1946

2 Sheets-Sheet 1

Fig. 1

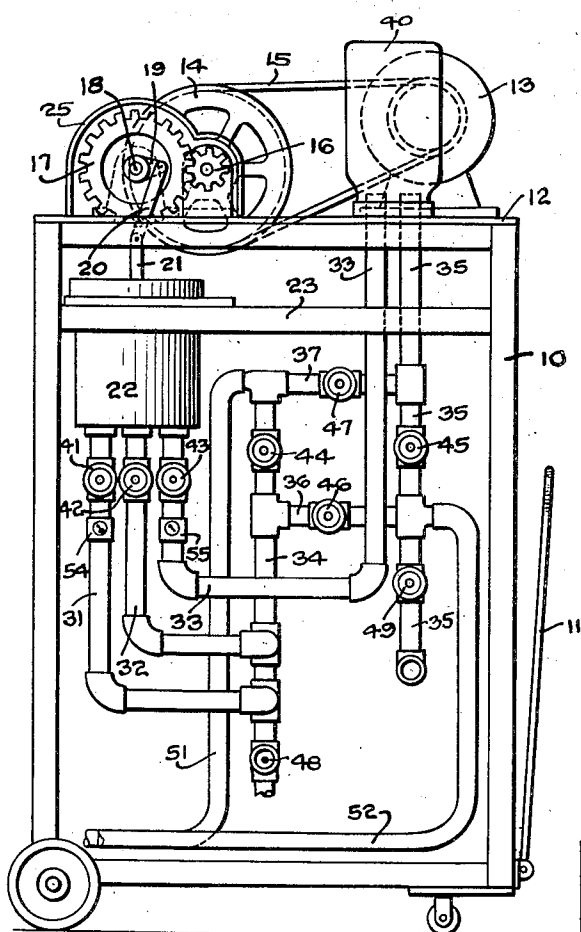
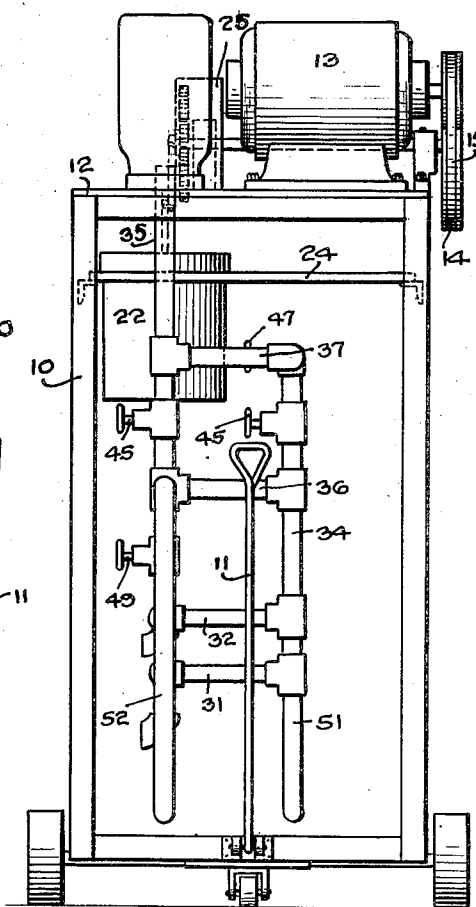


Fig. 2



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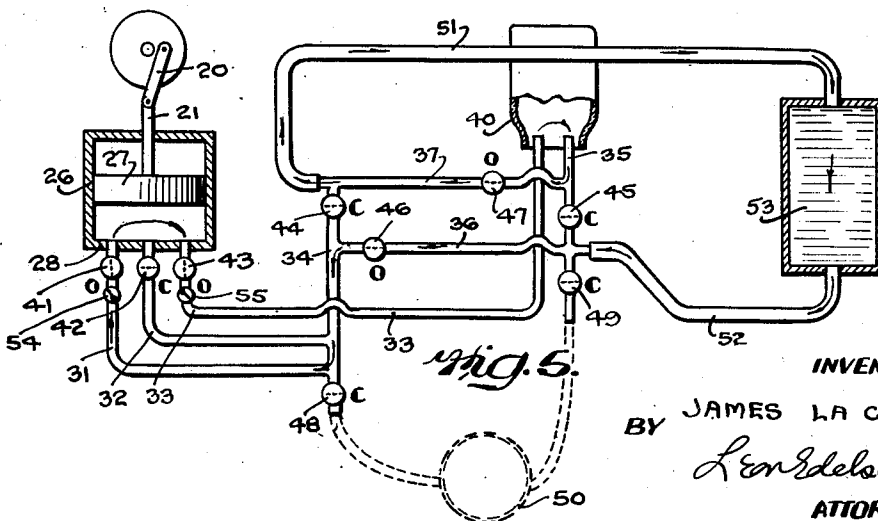
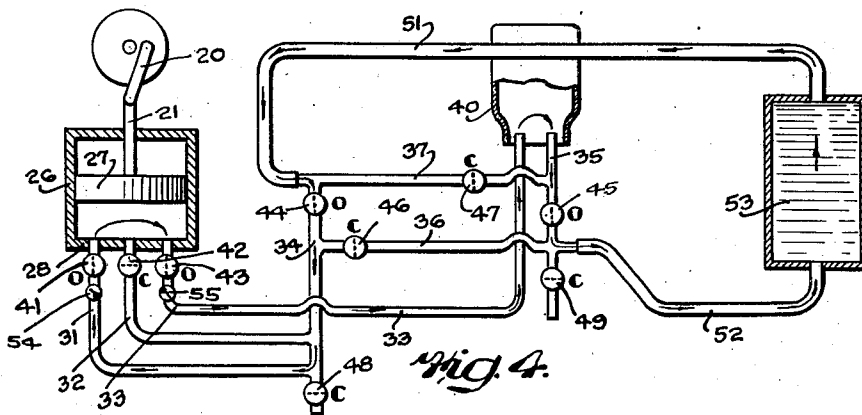
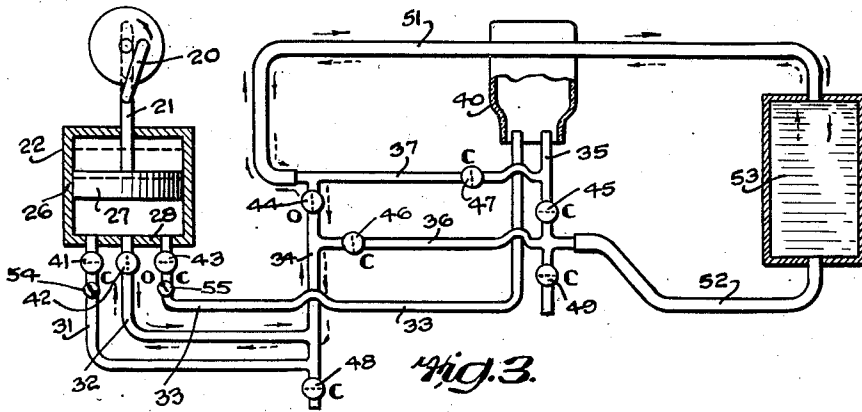
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4 Claims. (Cl. 134-168)

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The present invention relates to a machine for cleaning radiators of internal combustion engines or other such tubular or cellular structures. More particularly, the present invention provides a novel apparatus, which may be employed to clean a radiator by employing the liquid in the radiator as the cleansing agent or by employing a cleaning liquid from an outside source.

Another object of the present invention is to provide a novel apparatus, which may be employed for subjecting the radiator and the liquid contents of the radiator to several types of treatment, successively, each aiming to remove obstructions in the passages and to clean the radiator; the several types of treatment cooperating to remove all obstructions therein and to clean the radiator thoroughly.

The several types of treatment include subjecting the liquid in the radiator to pulsation by quick, successive suction and compression alternations; causing the liquid to oscillate or vibrate, thereby subjecting the solids adhering to the walls in the passages to quick successive shocks, causing them to dislodge.

Another type of treatment of the radiator is to cause its fluid to circulate rapidly through the radiator in one direction for a desired period of time and then to reverse the direction of circulation for a desired period. Still another treatment is to circulate through the radiator a suitable cleaning fluid in one direction or the other.

The essential object of the present invention is to provide a simple, rugged, inexpensive apparatus which may be employed for subjecting the radiator to the above series of treatments with facility, the type of treatment being determined merely by the manipulation of valves.

A preferred embodiment of the present invention is illustrated in the accompanying drawings and described in the following specification; it being understood that variations thereof falling within the scope of the principle of the invention and of the appended claims will be apparent to persons skilled in the art.

In the drawings:

Figure 1 is a front view of the apparatus embodying the invention.

Figure 2 is a side view thereof.

Figure 3 is a diagrammatic illustration of the apparatus when it is employed for subjecting the radiator liquid to pressure pulsations.

Figure 4 illustrates the apparatus when employed for circulating the radiator fluid there-through upward through the radiator.

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Figure 5 illustrates the apparatus circulating the radiator fluid downward through the radiator.

In the drawings, the wheeled frame 10 with its handle 11 renders the entire apparatus portable. Table top 12 supports the electric motor 13 which transmits its power to the drive wheel 14 by the belt 15. By reduction gearing 16 and 17 the power of the motor is transmitted to the shaft 18 which rotates at a much reduced rate. The pitman 19 and connecting rod 20 transmit the rotary power of the shaft 18 to the piston rod 21 of the reciprocating pump 22 supported in the frame 10 on the braces 23 and 24. The guard plate 25 encloses the reduction gearing.

All the operations and the several types of treatments, to which the radiator is subjected by the present apparatus are all effected by reciprocating pump 22 which is shown diagrammatically in Figures 3, 4 and 5 as comprising the cylinder 26 and piston 27. The limits of reciprocation of the piston 27 are roughly indicated by the dotted lines in Figure 3.

The closed bottom 28 of the cylinder 26 is provided with three openings and pipes or conduits 31, 32 and 33 are connected to these openings and are provided with valves 41, 42 and 43, respectively. The pipes 31 and 32 connect with pipe 34, which has valve 44. Pipe 33 leads to glass chamber 40, and, through the chamber, pipe 33 connects with pipe 35 which has valve 45. Pipes 34 and 35 are preferably parallel. Pipe 36 with its valve 46 cross connects parallel pipes 34 and 35 below the valves 44 and 45, while pipe 37 with its valve 47 forms another cross connection between pipes 34 and 35 above valves 44 and 45. The lower ends of pipes 34 and 35 have valves 48 and 49, respectively, and these ends may be connected to a tank of cleaning fluid 50 as shown in Figure 5. A hose 51 connects one end of pipe 37 to the top of the radiator and hose 52 connects pipe 36 to the lower end of the radiator, schematically illustrated at 53.

Pipe 31 is provided with a check valve 54 arranged to open on the upstroke and close on the downstroke; and pipe 33 has check valve 55 arranged to open on the downstroke and close on the upstroke.

Thus the present apparatus comprises essentially a reciprocating pump with three conduits connected to the cylinder all on the same side of the piston; together with valves and connections with the radiator so that by closing some and opening other valves the radiator may be subjected to any desired treatment or it may be

subjected to all the desired treatments in succession.

Figure 3 illustrates the condition of the valves when it is desired to subject the radiator to pulsation by the rapid alternation of compressions and suction. In this figure and in the remaining schematic figures the open valves are designated O, and are further indicated by the dotted line in the direction of its pipe and the closed valves are designated C and are further indicated closed by the dotted line across the direction of the pipe.

In Figure 3 valves 42 and 44 are open and all remaining valves are closed. Communication, therefore, exists between the top of the radiator 53 and the pump, while the bottom of the radiator is sealed off by the closed valves 45, 46 and 49. When the pump 22 is set into operation the liquid in the radiator is set into more or less violent oscillation and vibration by the pulsation of pressure created by the pump. The hose 51 is preferably free of liquid and if desired the radiator has an air space at the top. The downstroke of the pump will subject the liquid in the radiator to pressure as shown by the solid arrows along the pipes 32 and 34 and hose 51. The upstroke of the piston 27 subjects the radiator to suction as shown by the dotted arrows. This treatment may be conducted as long as desired. The rapid pressure pulsations will serve to loosen any solid matter or any obstructions adhering to the walls of the radiator.

With the valves set respectively as shown in Figure 3, the pressure pulsation or to and fro surge of the cleansing liquid is directed to the top side of the radiator. By closing the valve 44 and opening the valve 46, such pressure pulsation or surge is directed to the bottom of the radiator by way of the conduits 36 and 52. Thus, the radiator may be subjected to surging action of the liquid successively directed to opposite sides thereof.

Figure 4 shows the arrangement of valves for circulating the liquid in the radiator upwardly. For this operation valves 41, 43, 44 and 45 are open and the remaining valves are closed. With the aid of the check valves 54, 55, the pump 22 draws liquid from the top of the radiator through hose 51 and pipes 34 and 31, on the upstroke; on the downstroke the liquid is returned to the bottom of the radiator through the pipes 33, glass chamber 40, pipe 35 and hose 52.

When the valves are arranged as shown in Figure 5, the liquid in the radiator is circulated downwardly through the radiator. In this arrangement valves 41, 43, 46 and 47 are open and the remaining valves are closed. On the upstroke liquid is drawn from the bottom of the radiator through hose 52 and pipes 36, 34 and 31. On the downstroke the liquid is pumped into the top of the radiator through pipe 33, chamber 40, pipes 35 and 37 and hose 51.

When it is desired to circulate cleaning fluid through the radiator from the tank 50, valves 42, 44, 45 and 46 are closed and valves 41, 43, 47, 48, 49 are opened. In this arrangement the intake or upstroke of the pump draws liquid from the bottom of the radiator through hose 52, pipe 35 through tank 50 which contains cleansing fluid, and through pipe 31 into the pump. During the downstroke or the discharge stroke the cleaning fluid is discharged through pipe 33, chamber 40, pipes 35, 37 and hose 51 into the top of the radiator.

The conduits 36 and 37 and portions of the conduits 34 and 35 will be seen as forming a

four arm circuit, each arm having a valve. Opposing corners or diametrically opposite points in the circuit are connected directly to the radiator, one to the top, the other to the bottom of the radiator. The other pair of opposite corners of the circuit are connected through valves 41 and 43 to the pump 22. To control the direction of circulation of the liquid in the radiator it is only necessary to close one pair of opposed valves, 46, 47 and open the other pair of opposed valves 44, 45 in the circuit; and to reverse the direction of flow, open the one pair, 46, 47 and close the other pair of opposed valves, 44, 45.

The oppositely acting check valves 54, 55 associated with manual valves 41, 43, prevent reversal of flow in the pump when the water is being circulated.

What is claimed as new and useful is:

1. In an apparatus for flushing and cleaning radiators and the like, a reciprocating pump having a cylinder adapted to alternately force from and draw into the cylinder a radiator cleansing liquid, said cylinder being provided in the head thereof with a pair of ports for unidirectional flow of the liquid into and out of said cylinder and with a single auxiliary port from which the liquid may be alternately forced from and drawn into the cylinder, a liquid-receiving vessel having entrance and exit ports, a first conduit extending between one of said unidirectional flow ports of the cylinder and the entrance port of said vessel, a second conduit extending from the other of said unidirectional flow ports of the cylinder, a third conduit extending from said single auxiliary port of the cylinder for communication with said second conduit at a connecting point removed from said auxiliary port, an extension conduit leading from said connecting point to the exit port of said vessel, a branch conduit connected in parallel relation to said extension conduit, a pair of spaced valves in said branch conduit, a second pair of spaced valves in said extension conduit, an outlet for said branch conduit located between the spaced valves thereof, and an outlet for said extension conduit located between the spaced valves thereof, said outlets being adapted respectively for connection to opposite ends of the radiator to be flushed.

2. In an apparatus for flushing and cleaning radiators and the like, a reciprocating pump having a cylinder adapted to alternately force from and draw into the cylinder a radiator cleansing liquid, said cylinder being provided in the head thereof with a pair of ports for unidirectional flow of the liquid into and out of said cylinder and with a single auxiliary port from which the liquid may be alternately forced from and drawn into the cylinder, a liquid-receiving vessel having entrance and exit ports, a first conduit extending between one of said unidirectional flow ports of the cylinder and the entrance port of said vessel, a second conduit extending from the other of said unidirectional flow ports of the cylinder, a third conduit extending from said single auxiliary port of the cylinder for communication with said second conduit at a connecting point removed from said auxiliary port, an extension conduit leading from said connecting point to the exit port of said vessel, a branch conduit connected in parallel relation to said extension conduit, a pair of spaced valves in said branch conduit, a second pair of spaced valves in said extension conduit, an outlet for said branch conduit located between the spaced valves thereof, and an outlet for said extension conduit located

between the spaced valves thereof, said outlets being adapted respectively for connection to opposite ends of the radiator to be flushed, said apparatus being operative upon selective opening and closing of said valves to alternatively effect to and fro surging of liquid from the pump to either of said opposite ends of the radiator, or unidirectional flow of liquid through the radiator in either of two opposite directions.

3. In an apparatus of the character defined in claim 1 wherein said first and second conduits are each provided with check valves for insuring unidirectional circulation of liquid through the pump and radiator.

4. In an apparatus of the character defined in claim 1 wherein said first, second and third conduits are respectively provided with valves selectively operable to render the apparatus effective either for surging of the liquid to and from the radiator, or for unidirectional flow of the liquid through the radiator.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,721,444	Habel	July 16, 1929
1,755,318	Dinesen	Apr. 22, 1930
2,187,413	Boezi et al.	Jan. 16, 1940
2,204,900	Lowry	June 18, 1940
2,222,516	Powell et al.	Nov. 19, 1940
2,410,162	Horan	Oct. 29, 1946

FOREIGN PATENTS

Number	Country	Date
19,188	Austria	Feb. 10, 1905
162,314	Germany	Oct. 3, 1905