A CENTRAL HEATING SYSTEM FLUSHING APPARATUS

Abstract: A flushing apparatus (10) for internal cleaning of central heating systems and which comprises a reservoir (11) for a flushing liquid, a pump (15) for pumping flushing liquid around the system, service ports (32, 33) by which pumped liquid leaves from and returns to the reservoir (11), and a diverter valve (35) which changes the direction of flow between service ports (32, 33). The pump (15) is fully located within the reservoir for immersion in the liquid being pumped so that the pump motor is cooled by the pumped liquid.
A Central Heating System Flushing Apparatus

Field
5 This invention relates to a flushing apparatus for internal cleaning of pipes or other liquid filled bodies, in particular domestic or commercial central heating systems.

Background of the Invention
10 Cleaning or flushing apparatus for central heating central heating systems are known. In their simplest form they comprises a tank to hold the cleaning solution, flow and return pipes, and a pump to circulate the cleaning solution through the system. Some known systems include valves that permit the direction of flow of the cleaning solution in the system to be reversed without disconnection and reconnection of the pipes.

In known systems, the pump and pump connections are generally mounted externally of the tank with the pump head inside the tank and the pump motor outside of the tank. The pump connections and associated pipework and valves are also mounted externally of the tank. These known systems tend to be top heavy and may leak around the pump apertures and the pumps being generally located above the liquid in the tank are inefficient and achieve low flow rates for the size of pumps used.
Object of the present Invention

The present invention provides a flushing apparatus which is more efficient and delivers relatively higher flow rates than the prior art.

Statement of Invention

According to the present invention there is provided a flushing apparatus, particularly for use in internal cleaning of central heating systems, and which comprises a reservoir for a liquid to be flushed through a system, a pump for pumping liquid from the reservoir through said system, at least two service ports by which pumped liquid leaves from and returns to the reservoir, and a diverter valve for changing the direction of flow between the two service ports, the pump being fully located within the reservoir for immersion in the liquid being pumped, so that the pump motor is cooled by the pumped liquid.

Preferably the reservoir is a one piece rotational casting formed from a suitable plastics material such as a polyolefin, typically high or medium density polyethylene, or mixture thereof. Since the reservoir is a single moulding it is substantially leakproof.

Preferably the pump is held in position in the reservoir by inwardly projecting lugs integrally moulded into the wall of the reservoir, more preferably the base.
The diverter valve forms part of a manifold system with the manifold and diverter valve being located internally of the reservoir with the diverter valve being controlled by a handle located externally of the reservoir.

The reservoir is in the form of an upright cylinder having a base with a sump formed therein, the sump being located below the pump for the collection of any sludge or solids flushed out of the system. The reservoir may be mounted on wheels and the base is shaped to accommodate a pair of wheels mounted one at each end of an axle arranged across the base on a chord thereto.

Preferably, the diverter valve has four valve ports, an inlet port connected through the manifold to the pump, a drain port for returning fluid to the reservoir, and two other ports each respectively connected via the manifold to a respective one of said two service ports, the diverter valve being operable to direct fluid from the inlet port to either one of said two service ports. The service ports, and drain port may each have a respective flow control valve located externally of the reservoir.

Also according to the invention there is provided a flushing system for flushing central heating systems and which includes apparatus according to the invention and further includes flow and return hoses each connectable at one end thereof to a service port, and having at their
other ends fittings for connection heating system pump unions.

Description of Drawings
The invention will be described by way of example and with reference to the accompanying drawings in which:

Fig. 1 is a front elevation of apparatus according to the present invention,
Fig. 2 is part sectional side elevation of the apparatus of Fig.1,
Fig. 3 is an isometric view of the upper part of the apparatus of Fig.1,
Fig. 4 is a schematic drawing of the diverter valve and manifold showing the two operational settings for the two directions of flow 4A & 4B, and
Fig. 5 is a schematic drawing showing the operation of the apparatus for flushing a central heating system.

Detailed Description of the Invention

With reference Figs. 1-3 there is shown an apparatus 10 for flushing out central heating systems. The apparatus comprises a tank or reservoir 11 which is substantially in the form of an upright cylinder and is a one piece rotational casting made from medium density polyethylene with moulded liquid level indicators 12. The base 13 of the
reservoir has integral internally projecting lugs 14, preferably at least three, which serve to locate an immersion pump 15 in an upright condition inside the reservoir. The base 13 of the reservoir 11 includes a moulded-in sump 16 which located at the front of the apparatus and lies at a lower level than the pump 15. At the rear of the apparatus the base is formed with grooved rib 17 which serves as a location for an axle having wheels 18 at the ends thereof. The sump 16 serves as a foot when the apparatus is stood upright.

The upper portion of the reservoir comprises a lower front chordate sector 22 and a raised rear chordate sector 23 with a step 24 between the two sectors. A handle 25 is fixed to the raised sector 23 and a circular access lid 26 is located in an aperture in the lower sector 22. The lid 26 may be used for adding chemicals to water held in the reservoir.

Referring now also to Figs. 4 A & B, the pump 15 is connected to three ports 31, 32, 33 located on the front of the step 24 through a manifold 30. A fourth port 34 is used for filling the reservoir with mains water and has a coupling 48 for attachment of a hose. The manifold 30 is made of a rigid plastics material e.g. UPVC and includes a diverter valve 35 having four ports, an inlet valve port 36 connected to the output from the pump 15, a return port 37 for returning used liquid to the reservoir, and two
other valve ports 38, 39 which are each respectively connected via the manifold conduits 41, 42 to two of said three ports which are service ports 32 and 33. The conduit 41 is also connected to the third of said ports 31 which serves as a main drain port. The lugs 14 and manifold 30 hold the pump 15 firmly in position allowing the apparatus to be inverted for cleaning.

The manifold 30 is located inside the reservoir behind the step 24 and connected through the step to said ports 31-33 located outside of the reservoir. The diverter valve 35 is controlled by a handle 43 located outside the reservoir and fitted onto valve spindle which passes through the top of the reservoir. The service ports 32, 33 each have a control valve and coupling 44,45 fixed to the respective port for controlling the flow of liquid through the valve. The main drain port 31 is also provided with a control valve and coupling 47 for attachment to a hose.

The pump is connectable to an electrical supply and its motor is operated through an enclosed water proof dipole switch 46 mounted on top of the reservoir. The pump is cooled by the solution that it pumps and may be fitted with a thermal cut out if the temperature of the pump exceeds a predetermined value.

The diverter valve 35 operates so that when the handle 43 is set to the position shown in Fig.4A and Fig.3 the pumped
cleaning liquid passes out through valve port 39 to service port 33 and returns through service port 32 and returns to the reservoir via outlet port 37. With the diverter valve handle 43 set to the position shown in Fig. 4B, the flow direction is reversed, the pumped liquid passes out through valve port 38 to service port 32, and returns through service port 33 and returns to reservoir via valve port 37.

With reference now to Fig. 5, the apparatus 10 supplied with hoses 51-54 for use on site. The hoses 51 and 52 are connected to the main drain port 31 and the fill port 34 respectively. The hoses 53 and 54 are connected the service ports 32 and 33 via couplings on one end of each hose and on their other end have connections suitable for coupling to a pump union in a central heating system.

Before flushing a heating system it will be necessary to isolate the header tank 61 and overflow 62 with valves 55,56 respectively and turn off the main water supply to the header tank. The valves on all radiators 57 are opened. The recirculation pump 58 is taken out of the heating circuit and the service port 32 is connected to the suction side union of the heating system and the service port 33 is connected to the delivery union of the heating system.

The reservoir 11 is filled with water through the hose 52. Any chemicals or cleaning fluid can be added through the lid 26. The diverter valve is set to the position shown in
Figs. 3 & 4A so that liquid will flow through the system from port 33 to port 32. With the control valves 44, 45 open, the pump 15 is switched on and water flows in the set direction for a required period of time, between 5-30 minutes depending on the operation. The diverter handle is set to the position shown in Fig. 4B reversing the direction of flow and the pump run for another period of time.

The change in direction of flow may be repeated many times depending upon the state of the system being flushed and the operation being performed e.g. initial flush, chemical clean, final flush etc.

Contaminated liquid can be removed from the system by opening the drain valve 47 and removing say 50% of the volume of dirty liquid, and then refilling with fresh water. This can be repeated several times until the circulated water is relatively clean. Any sludge collected in the sump 16 should be cleaned out of the apparatus after use.
Claims

1. A flushing apparatus for use in internal cleaning of central heating systems and which comprises a reservoir for a liquid to be flushed through a system, a pump for pumping liquid from the reservoir through said system, at least two service ports by which pumped liquid leaves from and returns to the reservoir, and a diverter valve for changing the direction of flow between the two service ports, the pump being fully located within the reservoir for immersion in the liquid being pumped so that the pump motor is cooled by the pumped liquid.

2. Apparatus as claimed in Claim 1 wherein the reservoir is a one piece rotational casting formed from a suitable plastics material, preferably a polyolefin.

3. Apparatus as claimed in claim 2 wherein the pump is held in position by inwardly projecting lugs formed integrally with a wall of the reservoir.

4. Apparatus as claimed in any one of Claims 1 to 3, wherein the reservoir has a sump located below the pump for the collection of sludge flushed from the system.

5. Apparatus as claimed in any one of claims 1 to 4 wherein the reservoir is mounted on wheels to facilitate movement.
6. Apparatus as claimed in Claim 5 wherein the base of the reservoir is shaped to accommodate a pair of wheels mounted on an axle secured to the base of the reservoir.

7. Apparatus as claimed in any one of Claims 1 to 6 wherein the diverter valve forms part of a manifold system with the manifold and diverter valve being located internally of the reservoir, the diverter valve being controlled by a handle located externally of the reservoir.

8. Apparatus as claimed in any one of Claims 1 to 7 wherein the diverter valve has four valve ports, an inlet port connected through the manifold to the pump, a return port for returning fluid to the reservoir, and two other ports each respectively connected via the manifold to a respective one of said two service ports, the diverter valve being operable to direct fluid from the inlet port to either one of said two service ports.

9. Apparatus as claimed in Claim in any one of Claims 1 to 8 and further including control valves mounted externally of the reservoir and associated with each service port for controlling the flow of fluid through the service ports.

10. Apparatus as claimed in any one of Claims 7 to 9 wherein one of said service ports is connected via the manifold to a drain port for removal of liquid from the
11. A system for flushing central heating systems and which includes apparatus as claimed in any one of claims 1 to 12, and further includes flow and return hoses each connectable at one end thereof to a service port, and having at their other ends fittings for connection heating system pump connections.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F24D19/00

According to International Patent Classification (IPC) or to both national classification and IPC.

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
IPC 7 F24D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched.

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>NL 7 507 125 A (GERARD PIETER MARIA JANSSEN) 20 December 1976 (1976-12-20) figures</td>
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Patent family members are listed in annex.

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