

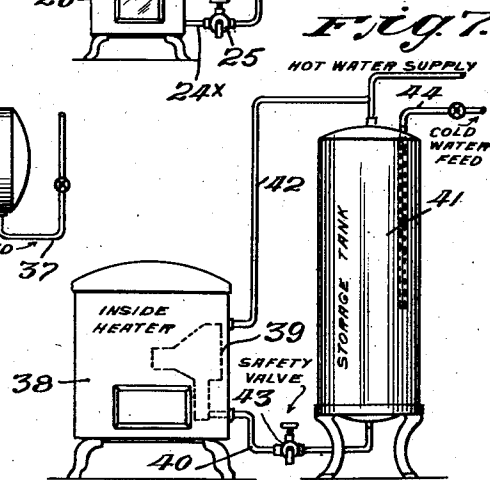
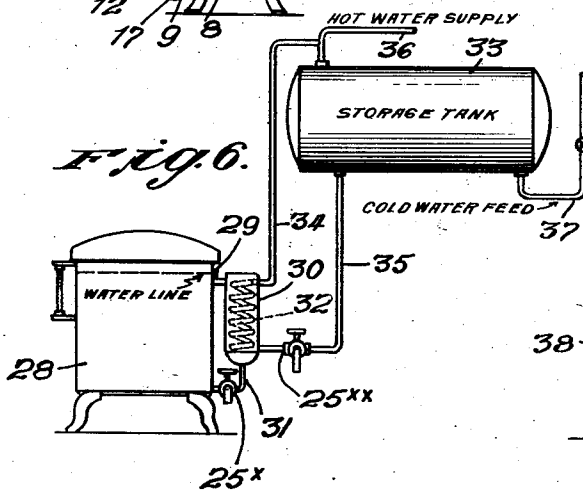
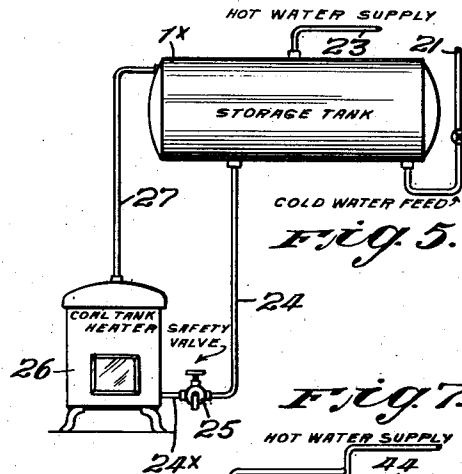
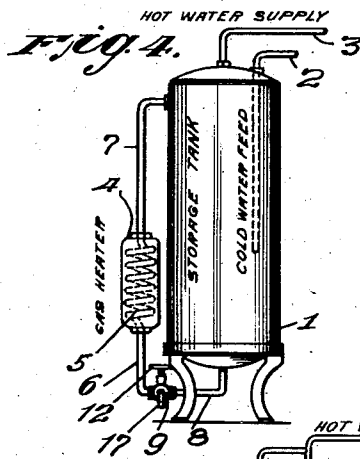
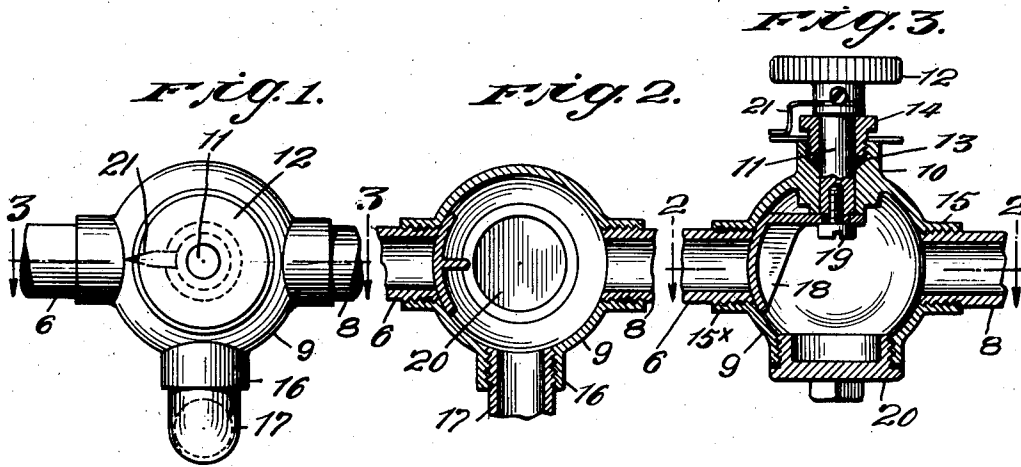
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SAFETY DRAW-OFF APPARATUS FOR HOT WATER SYSTEMS

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SAFETY DRAW-OFF APPARATUS FOR HOT WATER SYSTEMS

Application filed May 21, 1929. Serial No. 364,716.

The object of the present invention is to provide a draw-off apparatus for hot water systems of such nature that the pipe lines and copper coils or heaters can be cleaned of rust and other solid formations through the flow of water under usual city street pressure and in such manner that the draw-off faucet cannot be closed without automatically re-establishing the circuit between the cold water feed, the heater and the storage tank. Also by turning on the draw-off faucet for cleaning the heater, whether it be a coil heater or of other construction, the cold water inlet to the heater is shut off without affecting circulation through the heater, which circulation will then be in a reverse direction to the normal. Also in turning on the draw-off faucet to remove sediment from the storage tank, for example, the heater inlet is automatically shut off, but in such manner that a vent is provided to prevent any explosion due to interruption of normal circulation of water through the heater.

The invention will be described with reference to the accompanying drawing, in which—

Figure 1 is a plan view of the safety draw-off valve;

Figure 2 is a horizontal section thereof on the line 2—2, Fig. 3, and

Figure 3 is a vertical section on the line 3—3, Fig. 1;

Figure 4 is a diagrammatic view in elevation of the invention applied to a water heating apparatus in which the heat is applied by a gas flame;

Figure 5 is a diagrammatic view in elevation of an embodiment of the invention in which the heating element is a coal tank-heater;

Figure 6 is a view in elevation of the embodiment of the invention in which the heating element comprises a heating boiler by means of which hot water, steam or vapor is circulated around coils through which the water to be heated is passed and

Figure 7 is a view in elevation of an embodiment of the invention in which the heating element comprises a heating boiler with in which a coil is placed through which the

water to be heated circulates from and to the hot water storage tank.

Referring to Fig. 4 of the drawing, 1 indicates a hot water storage tank into which cold water is led, for example under city pressure, through pipe 2. The house supply of hot water emerges through pipe 3. The heating element is a gas heater 4, the burner not being shown. Within the gas heater is a coil 5 of copper or the like connected at its base to a pipe 6 and connected at its upper end with a pipe 7 leading to and within tank 1 at its upper portion. The base of tank 1 has connected therewith a pipe 8 and pipes 6 and 8 are connected with a safety draw-off valve which will now be described.

The safety draw-off valve is illustrated in Figs. 1 to 3 inclusive. It consists of a casing 9 having cast integrally therewith at its top the annular bearing boss 10. Boss 10 is apertured to receive a stem 11 having secured thereto at its top the operating handle 12. Surrounding the stem may be placed a packing 13 at the top of which is a rotatable packing-expander sleeve 14 threaded within boss 10 and surrounding stem 11.

Casing 9 is provided with oppositely disposed internally threaded annular nipples 15, 15x. Nipple 15x receives pipe 6 and nipple 15 pipe 8. Extending at a right angle to nipples 15, 15x is a third internally threaded nipple 16 into which is threaded a draw-off short angularly bent outlet pipe 17. In practice, however, outlet pipe 17 may be cast integrally with the casing.

At its lower end stem 11 is reduced and squared and fitted thereon is a valve head 18 held in position by means of threaded stud 19. Valve head 18 is curved to closely conform with the inlet surfaces of nipples 15, 15x and 16 so as to effectively close each of the same when moved from one to the other in succession.

A gate is formed at the base of the casing 1 and is closed by threaded plug 20. This gate enables convenient assembly of the valve head and associated parts.

Below operating handle 12 may be placed a pointer 21 which will serve to indicate the position of the valve head 18. Thus

when the pointer is opposite pipe 6, that pipe will be closed, and so on with respect to outlet 17 and pipe 8.

In Fig. 5 I have shown the invention in connection with a coal tank-heater and a storage tank for the hot water supply. Cold water is led to the storage tank through pipe 2 and discharges from the same through pipe 23. Water is led to the heater via pipe 24 and short pipe connection 24a, and intermediate the said pipe and pipe connection is placed the safety draw-off valve indicated at 25. The tank is shown at 1x and the heater at 26. Hot water is led from the heater to storage tank 1x via pipe 27. When it is desired to clean out the heater, the operating handle of safety valve 25, Fig. 5, is turned to shut off pipe 24 which will automatically open outlet pipe 17. The water pressure through pipe 22 will cause a reversal of normal movement of the water, causing it to flow from the storage tank through pipe 27, through the heating elements of the heater 26 and out of the valve 25, all under pressure. If it is desired to clean out the storage tank, the operating handle of the valve is turned to shut off pipe 24a and water will flow under pressure through the tank through pipe 24 and out of the valve. This will affect a venting for the heater, in the sense that the water displaced through pipe 24 will be compensated by cold water flowing through pipe 22 which will rapidly take up and condense any steam which may be generated by the heater through interruption of normal circulation therethrough. The action in the case of the gas heater combination, shown in Fig. 4, will be precisely the same as that just described with respect to Fig. 5.

In Fig. 6 I have shown the invention applied to a boiler type heater in which the boiler is indicated at 28. Hot water from the boiler passes through pipe 29 into a heat transfer chamber 30 and thence circulates back into the boiler through pipe 31 and a safety draw-off valve 25a connected to the boiler, the valve being of a construction shown in Figs. 1 and 3. Within the heat transfer chamber is a coil 32 which discharges into the storage tank 33 via pipe 34. At the inlet end of coil 30 is placed a second safety draw-off valve 25xx of the construction shown in Figs. 1 and 3 which receives cold water from the storage tank 33 via pipe 35. Hot water is led from the storage tank via pipe 36. Cold water passes to the storage tank through pipe 37.

When it is desired to clean out the boiler and heat-transfer chamber, the operating handle of valve 25 is turned to simultaneously open the discharge pipe and shut off, in the first instance, the lower boiler connection with the valve. The water within the heat transfer chamber will then pass downward and carry with it the solid particles. By moving

the operating handle to shut off the heat transfer chamber from the valve, the boiler will be opened so that it may be drained.

When it is desired to clean the coil 32, operating handle of valve 25xx is turned to shut off pipe 25 and automatically open the outlet of the valve whereupon water under pressure will be forced from the storage tank through coil 32 in a direction reverse to normal. By turning the operating handle to shut off the coil from the valve, the latter will be automatically opened to enable passage of water from pipe 35 to the valve.

In Fig. 7 I have shown the invention applied to a fire pot generator, the heater being indicated at 38, having an interior chamber 39 within the fire box of a furnace or heating boiler and which receives cold water via pipe 40 and discharges hot water into storage tank 41 by means of a pipe 42. Connected with pipe 40 is a valve 43 constructed in accordance with Figs. 1 to 3 inclusive.

By turning operating handle of valve 43 to shut off the storage tank from the coil 39, the valve will be automatically opened and water under pressure induced by the cold water feed 44 will pass through the coil in a direction reverse to the normal direction of liquid movement, and thence out of the valve, to clean the coil.

It has heretofore been proposed to provide means for cleaning pressure water lines heated to high temperatures by providing in the lines shut-off valves and outlet valves. Many explosions have been caused through the use of such means, because through careless operations the shut-off valves have been kept closed after closing the draw-off valves. This cannot happen with the present system because at all times there is either positive circulation or venting and when the draw-off valve is closed re-establishment of positive circulation is automatic. Due to the danger of shut-off valves with draw-off valves, many systems omit them and require disconnection of pipes for cleaning, which means that generally the heating is continued and re-established only when the pipes are back in position. The labor costs involved are avoided by my invention. Furthermore the system may always continue to operate without danger.

Now referring to Fig. 4, if the conduit intermediate the heater and the tank had connected therewith a faucet or other ordinary draw-off valve and the same were opened for cleaning purposes, the water would follow the path of least resistance and would flow from the base of the tank and clean out the latter without forming any useful cleaning function in the heater coil, and the same principle would apply in the case of each of the three remaining combinations shown in Figs. 5 to 7 inclusive. With my combination, however, the full pressure may be placed on

either the heater or the tank simultaneously with opening the draw-off valve.

My invention may be used on the various types of heater combinations illustrated in the drawing and other types. In fact, on high pressure lines on all kinds carrying oils and other liquids where it is dangerous to install shut-off valves.

Having described my invention what I claim and desire to secure by Letters Patent is as follows:—

Safety draw-off apparatus for hot water systems comprising in combination with a heater having a water chamber, a storage pressure tank with a cold water inlet and a conduit connecting the heater and tank, of a draw-off valve in the conduit having three passages, two conduit passages and one discharge passage independent of the conduit passages and adapted to discharge water from either the heater or the tank, and means whereby either conduit passage may be closed and closing said conduit passage is dependent upon opening the discharge passage.

In testimony whereof, I have signed my name to this specification.

EDWARD H. RUPPERT.

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