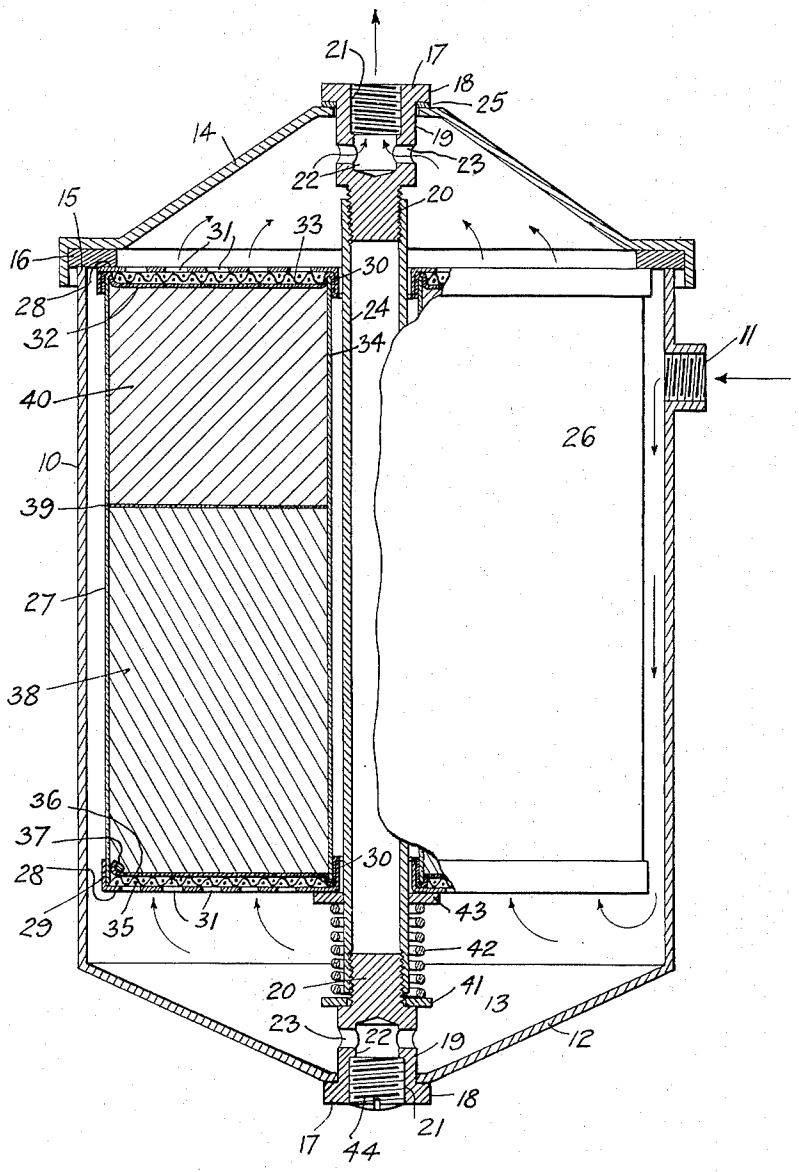
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WATER PURIFYING AND CONDITIONING APPARATUS

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WATER PURIFYING AND CONDITIONING APPARATUS

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4 Claims. (Cl. 210—24)

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This invention relates to water purifying and conditioning apparatus particularly adapted for engines which employ a water circulating system for cooling purposes.

It is an object of the invention to provide such an apparatus in a convenient form so that it can be attached readily to the water line of a cooling system for automotive engines, for instance.

Another object is to provide in the apparatus easily removable and replaceable means in cartridge form which contains filtering means to purify, i. e. filter the water and remove therefrom dirt, scales, and other solid or semi-solid impurities which remain trapped in the apparatus to be removed therefrom periodically, and which also contains conditioning means to soften the water to become after such treatment a rust preventing agent producing a rust free, scale free, dirt and grease free cooling system.

A further object is to provide an apparatus which is so constructed that its cartridge can readily be replaced, and in which the cartridge is designed to efficiently purify and soften the water.

A still further object to provide an apparatus which is most economical to manufacture and which because of its efficiency, results in savings in radiator repairs and servicing expense.

Still further objects will become apparent in the following specification and in the accompanying drawing in which a longitudinal sectional view, partly in elevation, is illustrated of an apparatus embodying a preferred form of the invention.

In this drawing, 10 is a substantially cylindrical shaped housing having an inlet 11 at one side, and a closed bottom 12 forming a sump 13. 14 is a cup shaped top, adapted to contact the top edge 15 of housing 10. 16 is an annular washer, between edge 15 and top 14.

17 are identical bushings inserted in the center of the top 14 and the bottom of housing 10, respectively. Each of these bushings has a preferably polygonal flange 18, a cylindrical portion 19 adjacent the flange, and a threaded terminal 20. Each bushing is threaded interiorly at 21 and bored out at 22 to communicate with cross ducts 23 through the walls of the bushing.

24 is a central tubular element, its ends engaging the terminals 20 of bushings 17. 25 is a washer interposed, between the flange 18 and the top 14. The bottom bushing is, preferably, welded to the bottom 12 of housing 10. It is obvious that by screwing the terminals 20 of each bushing into element 24 by a wrench engaging the polygonal

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flange 18 of each bushing 17, the top 14 and the housing 10 are drawn together and against washer 16, making tight joints between them.

26 is a cartridge which comprises, preferably, a cylindrical metal shell 27 and a cover plate 28 at its top and bottom, respectively. Cover plates 28 are each turned over the shell 27 at 29 and centrally at 30 to clear the tubular element 24. Each plate 28 is provided with perforations 31.

32 is a closely woven disc of cloth or the like, placed between the top of shell 27 and the top cover plate 28. 33 is a disc of wire screen having a central hole disposed between the plate 28 and the cloth disc 32. In pressing the plate 28 upon the top of the shell 27, the outer edges of the cloth disc 32 are confined between the plate and the shell as clearly shown in the drawing.

34 is a center tube made of metal or other suitable material which surrounds the tubular element 24 and forms the inner wall of the cartridge 26.

At the bottom, the cartridge has a disc 35 of wire screen similar to disc 33. Above the disc 35 is another closely woven disc 36 of cloth or the like, also similar to disc 32 at the top, but held in place by a snap ring 37 at its outer edge. The inner edges of both cloth discs 32 and 36 are clamped between turned over portions 30 of plates 28 and center tube 34 while the cartridge is assembled.

Within the cartridge, in its lower portion, is a quantity of absorption and filtering material such as sawdust, coke, cellulose pulp, charcoal or other porous material, designated as 38 in the drawing. On top of this material is placed an annular disc 39 of closely woven cloth or the like. Over this disc 39 is placed a quantity of "ion" exchange material for softening water, such as zeolite, porous stone, sand, or other porous minerals, sufficient to fill the cartridge. This material is designated in the drawing as 40.

41 is a washer placed over a shoulder adjacent the terminal 20 of bottom bushing 17. 42 is a helical spring between washer 41 and another washer 43 at the bottom of bottom plate 28. This spring serves to keep the top of the cartridge tightly against the washer 16.

44 is a drain plug screwed into the bottom of bushing 17 at the bottom of the housing.

In applying the device to an engine of the automotive type, it is connected directly into the water pipe of the circulating water system for full flow filtration, or in a by-pass position, as desired. The water enters at the inlet 11, is forced to the bottom, and then upwardly through

the perforations in bottom plate 28, wire screen 35, cloth disc 33, first through the absorption material 38, thence by way of disc 39 through the water softening material 40, cloth disc 32, wire screen 33, and the perforations 31 of the top plate 28 into the space above the cartridge 26, thence by way of ducts 23 into the outlet of the device to be passed into the system.

Any solid or semi-solid impurities will be filtered out of the water at the lower portion of the cartridge and accumulate in its sump. Removing the drain plug 44 periodically permits these impurities to be flushed out without removing the cartridge. Filtered water only passes the material 40 so that it can be fully effective for conditioning purposes.

The device can be readily taken apart and the cartridge removed by merely unscrewing one of of the bushings 17. The bushings 17, being identical in shape enable the device most economically to be manufactured and serviced.

The combination water filtering and conditioning means results in a simple and effective device which removes rust, scales, dirt, grease, etc. from the inner passages of the cooling system including the radiator, cylinder head and block, hot water heater, etc.

It is obvious that many changes of form, proportions and minor details of construction may be resorted to without departing from the principles or sacrificing any of the advantages of the invention as defined in the appended claims.

What I claim as new, is:

1. In an apparatus for purifying and conditioning water in cooling systems for engines of the automotive type comprising a housing having a water inlet and a water outlet, a removable cartridge interposed between the inlet and outlet and containing a filtering agent for purifying the water and a conditioning agent for the water, the housing having an upper part and a lower part containing a sump, the water inlet being adjacent the top of the lower part above the sump, a bushing in the upper part and a bushing in the lower part, a connecting element between the bushings, means in the bushings engaging the element to draw the upper part and the lower part together, the cartridge being of annular shape having imperforate side walls and having screened inlet openings at its bottom and screened outlet openings at its top, its outer diameter in spaced relation to the wall of the lower part of the housing, and its inner diameter surrounding the element, the cartridge being disposed within the lower part of the housing and the space between its outer side wall and the wall of the housing forming an annular passage for the water from the inlet to the sump, and means in the sump to force the cartridge toward a shoulder in the upper part of the housing, the bushings being identical, the one in the upper part containing the water outlet, and the one in the lower part containing a plug for periodical removal for cleaning the sump.

2. In an apparatus for purifying and conditioning water in cooling systems for engines of the automotive type comprising a housing having an upper part and a lower part containing a sump, the water inlet being in the lower part above the sump, a bushing in the upper part of the housing having a water outlet, and a bushing in the lower part of the housing, a drain plug in the last named bushing, a connecting element between the bushings, means in the bushings engaging the element to draw the parts of the housing together, a removable cartridge having an annular casing with imperforate side walls, flanged over perforated ends, a closely woven fabric sheet clamped between each of the flanged over ends and the outer and inner walls of the casing, a wire screen between each of the perforated ends and the fabric sheet, a filtering agent for purifying the water in the lower part of the casing, and a conditioning agent for the water in the upper part of the casing, a sheet of closely woven fabric separating the agents, the outer side wall of the casing being in spaced relation to the wall of the housing, and the inner side wall of the casing surrounding the connecting element, and means in the sump to force the cartridge toward the upper part of the housing.

3. In an apparatus as defined in claim 2, the bushings in the upper and lower parts of the housing being identical, each comprising an interiorly threaded portion, cross ducts in communication with the threaded portions, and threaded terminals adapted to engage the connecting element.

4. In an apparatus as defined in claim 2, the means to force the cartridge toward the upper part of the housing comprising a helical spring, and washers at both ends of the spring contacting, respectively, the bottom of the cartridge and the bushing in the lower part of the housing, so that water will be admitted into the cartridge at its bottom only and travel lengthwise through the cartridge to be discharged at its top.

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