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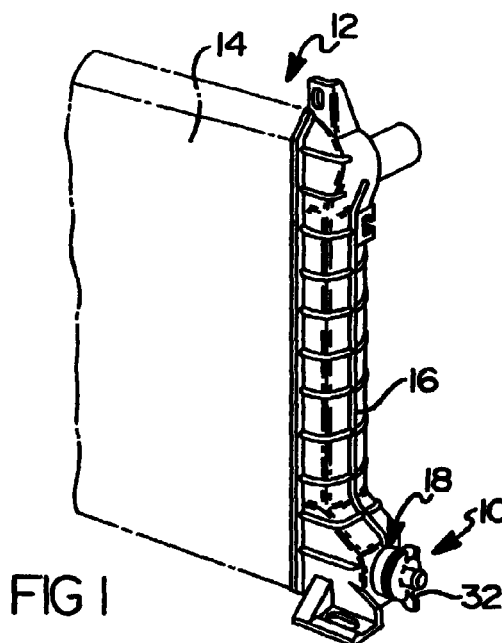
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(54) **Draincock assembly for a container**

(57) A draincock assembly for a container includes a receiving member for fluid communication with the container and having a projection therein. The draincock assembly also includes a rotatable draincock being partially disposed in the receiving member having a fluid passageway and a guide slot cooperating with the projection to allow the draincock to be rotated and moved axially. The guide slot has a closed position relative to the projection to prevent the draincock from moving axially and draining fluid through the fluid passageway. The guide slot also has an open position rotated relative to the projection to allow the draincock to move axially and drain fluid through the fluid passageway.



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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to containers and, more specifically, to a draincock assembly for a radiator in a motor vehicle.

2. Description of the Related Art

[0002] It is known to provide a draincock for a container such as a radiator in a motor vehicle. Typically, the radiator includes a plastic tanks mechanically attached to a radiator core. The plastic tanks include a threaded drain hole and a draincock with a seal threaded into the drain hole at a predetermined torque to effect good sealing. The draincock is unthreaded from the drain hole to open the drain hole to allow fluid to drain from the tanks and radiator core.

[0003] It is also known that the draincock may be of a non-threaded type. An example of such a draincock is disclosed in U.S. Patent No. 4,449,692. In this patent, the tank has an annular pipe with an enlarged end extending outwardly from the tank and a rotatable plug disposed in the annular pipe having passageways therethrough in order to facilitate draining of the tank.

[0004] Although the above draincocks have worked, the threaded draincocks suffer from the disadvantage that they may be lost or misplaced when unthreaded from the drain hole. Another disadvantage of these draincocks is that they require torque monitoring to effect good sealing and prevent leaks. Yet another disadvantage of these draincocks is that they are threaded which is relatively costly and undesired. However, a disadvantage of the above non-threaded draincock is that the fluid cannot be drained axially from the tank. Therefore, there is a need in the art to provide a new non-threaded draincock that overcomes these disadvantages.

SUMMARY OF THE INVENTION

[0005] Accordingly, the present invention is a draincock assembly for a container including a receiving member for fluid communication with the container and having a projection therein. The draincock assembly also includes a rotatable draincock being partially disposed in the receiving member having a fluid passageway and a guide slot cooperating with the projection to allow the draincock to be rotated and moved axially. The guide slot has a closed position relative to the projection to prevent the draincock from moving axially and draining fluid through the fluid passageway. The guide slot also has an open position rotated relative to the projection to allow the draincock to move axially and drain fluid through the fluid passageway.

[0006] One advantage of the present invention is that a draincock assembly is provided for a container such as a radiator in a motor vehicle to allow fluid to be drained axially from a tank of the radiator. Another advantage of the present invention is that the draincock assembly is non-threaded and does not require torque monitoring. Yet another advantage of the present invention is that the draincock assembly is injection molded and relatively low in cost. Still another advantage of the present invention is that the draincock assembly has a fluid passageway to an internal chamber to drain fluid when the draincock is rotated and moved axially.

[0007] Other features and advantages of the present invention will be readily appreciated, as the same becomes better understood after reading the subsequent description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

FIG. 1 is a perspective view of a draincock assembly, according to the present invention, illustrated in operational relationship with a radiator for a motor vehicle.

FIG. 2 is a fragmentary elevational view of the draincock assembly of FIG. 1.

FIG. 3 is a perspective view of the draincock assembly of FIG. 1 illustrating a draincock in a first position.

FIG. 4 is a view similar to FIG. 3 illustrating the draincock in a second position.

FIG. 4A is a perspective view of the draincock assembly of FIG. 1 with the draincock removed.

FIG. 5 is a side elevational view of the draincock for the draincock assembly of FIG. 1.

FIG. 6 is a front elevational view of the draincock for the draincock assembly of FIG. 1.

FIG. 7 is a front elevational view of another embodiment, according to the present invention, of the draincock for the draincock assembly of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0009] Referring to the drawings and in particular FIG. 1, one embodiment of a draincock assembly 10, according to the present invention, is illustrated in operational relationship with a container such as a radiator, generally indicated at 12, for a motor vehicle (not shown). The radiator 12 includes a core 14 of a plurality of tubes (not shown) and fins (not shown) disposed between each the tubes to form a stack. The radiator 12 includes at least one header or tank 16 at the end of the core 14. The tank 16 contains the fluid handled by the radiator core 14 and the radiator core 14 is used generally to dissipate heat from the fluid as it passes there-

through. It should be appreciated that, except for the draincock assembly 10, the radiator 12 is conventional and known in the art. It should also be appreciated that the draincock assembly 10 could be used for containers and vessels in other applications besides motor vehicles.

[0010] Referring to FIGS. 1 through 4A, the draincock assembly 10 includes a tank receiving member, generally indicated at 18, extending outwardly from the tank 16. The tank receiving member 18 has an interior portion 20 extending into an interior chamber 22 of the tank 16 to communicate with the fluid therein. The tank receiving member 18 also has an exterior portion 24 extending outwardly from the tank 16. The interior portion 20 and exterior portion 24 are generally cylindrical in shape. The exterior portion 24 has a cavity 26 extending axially inward and being generally circular in shape. The interior portion 20 has an aperture 28 extending axially therethrough and communicating with the cavity 26. The aperture 28 is generally circular in shape. The tank receiving member 18 also has at least one projection or stop 30 extending radially into the aperture 28 from the interior portion 20 for a function to be described. The tank receiving member 18 and tank 16 are made of a plastic material such as polypropylene or nylon 6/6 and formed as a monolithic structure being integral, unitary and one-piece. It should be appreciated that the stops 30 could be connected to form a solid shaft extending diametrically across the aperture 28.

[0011] The draincock assembly 10 also includes a draincock, generally indicated at 32, to cooperate with the tank receiving member 18. The draincock 32 is generally cylindrical in shape. The draincock 32 includes an annular base portion 34 extending axially and a plurality, preferably a pair of anti-removal hooks 36 extending axially from the base portion. The anti-removal hooks 36 have a generally 'J' shape. The anti-removal hooks 36 have an arm 38 extending axially and a flange 40 extending radially and axially. The arms 38 flex inwardly when inserted into the aperture 28 of the tank receiving member 18 until the flanges 40 are past the end of the interior portion 20. The arms 38 flex outwardly to their original position and the flanges 40 may engage the end of the interior portion 20 to prevent the draincock 32 from exiting the tank receiving member 18. It should be appreciated that the anti-removal hooks 36 allow the draincock 32 to snap-fit into the tank receiving member 18 and prevent removal therefrom.

[0012] The draincock 32 has a guide slot 42 extending circumferentially and partially about the base portion 34. The guide slot 42 has an open end 44 at a free axial end of the base portion 34 and extends axially and circumferentially in a generally arcuate path to a closed end 46. The guide slot 42 receives the stop 30 on the tank receiving member 18. It should be appreciated that the guide slot 42 moves relative to the stop 30 as the draincock 32 is rotated.

[0013] The draincock 32 also includes a recess 48

forming a recessed portion 50 axially adjacent the base portion 34. The recessed portion 50 is generally annular in shape and has a diameter less than a diameter of the base portion 34. The draincock 32 includes a flange 52 extending radially adjacent the recessed portion 50. The flange 52 is annular in shape and has a diameter approximately equal that of the base portion 34. The draincock 32 also has a seal 54 disposed in the recess 48 and about the recessed portion between the flange 52 and the base portion 34. The seal 54 is an O-ring made of an elastomeric material. It should be appreciated that the seal 54 engages the interior portion 20 when the draincock 32 is disposed in the aperture 28 to prevent fluid from passing therebetween.

[0014] The draincock 32 includes a chamber portion 56 axially adjacent the flange 52. The chamber portion 56 has a diameter less than a diameter of the base portion 34 to form an inner chamber 58 between the draincock 32 and the tank receiving member 18. The chamber portion 56 has at least one, preferably a pair of apertures 60 extending radially therein and communicating with the inner chamber 58. The apertures 60 are generally circular in shape. The apertures 60 also communicate with a passage extending axially to be described. It should be appreciated that the chamber portion 56 is designed to control fluid flow out rearward axially to drain.

[0015] The draincock 32 includes a top portion 62 axially adjacent the chamber portion 56. The top portion 62 is generally annular and a diameter greater than a diameter of the base portion 34 to be disposed in the cavity 26 of the exterior portion 24. The top portion 62 includes a flash 64 extending radially outward axially adjacent the chamber portion 56 to provide retention of fluid in the inner chamber 58. The flash 64 has a relatively thin thickness to minimize leakage during drainage. It should be appreciated that the flash 64 is optional depending on the application.

[0016] The top portion 62 also includes a flange 66 extending radially outward at the other end opposite the flash 64 and is adapted to abut the end of the exterior portion 24 of the tank receiving member 18. The flange 66 is generally annular and has a diameter greater than the top portion 62. The top portion 62 also includes a plurality, preferably a pair of hand removal tabs 68 extending radially and axially outwardly from the flange 66. The removal tabs 68 allow the operator to rotate the draincock 32 with their fingers in a relatively easy manner. The top portion 62 includes a projection or barb 70 extending axially from the flange 66. The barb 70 is generally tubular to allow a hose (not shown) to be attached thereto. The top portion 62 includes a fluid passageway 72 extending therethrough from the barb 70 to the chamber portion 56 to fluidly communicate with the apertures 60 thereof. The fluid passageway 72 acts as a rearward axial drain to allow fluid to flow from the inner chamber 58 through the apertures 60 and fluid passageway 72 and exit the barb 70. The draincock 32 is

made of a plastic material such as polypropylene and formed as a monolithic structure being integral, unitary and one-piece by conventional injection molding processes.

[0017] In operation of the draincock assembly 10, the draincock 32 is disposed in the tank receiving member 18 in a closed position as illustrated in FIGS. 2 and 4. In the closed position, the stop 30 is at the closed end 46 of the guide slot 42 and prevents the draincock 32 from moving axially. The flange 66 of the top portion 62 abuts the end of the exterior portion 24 of the tank receiving member 18. Fluid is prevented from draining through the draincock 32 because the seal 54 prevents fluid from reaching the inner chamber 55. To drain fluid, an operator grasps the removal tabs 68 and rotates the draincock 32 to move the guide slot 42 to the open end 44 thereof and the draincock is moved axially by the operator to an open position illustrated in FIG. 3. Fluid is allowed to flow, as indicated by the arrow A in FIG. 3, past the seal 54 and enter the inner chamber 58 to flow through the apertures 60 and fluid passageway 72 axially out of the draincock 32. When the fluid is drained, the operator rotates the draincock 32 in the opposite direction such that the guide slot 42 moves to the closed end 46 and the seal 54 engages the interior portion 20. It should be appreciated that the anti-removal hooks 36 prevent the draincock 32 from exiting the tank receiving member 18.

[0018] Referring to FIG. 7, another embodiment 132, according to the present invention, of the draincock 32 for the draincock assembly 10 is shown. Like parts of the draincock 32 have like reference numerals increased by one hundred (100). In this embodiment, the draincock 132 eliminates the flash on the top portion 162 and includes a pair of flanges 180 axially spaced and extending radially outwardly adjacent the chamber portion 156. The draincock 132 includes an annular recess 182 disposed axially between the flanges 180 to form a recessed portion 184. The draincock 132 includes a seal 186 disposed in the recess 182 about the recessed portion 184 between the flanges 180. The seal 186 is an O-ring made of an elastomeric material. The seal 186 prevents fluid from passing between the top portion 162 and the tank receiving member 18. The operation of the draincock 132 is similar to that described above for the draincock 32.

[0019] The present invention has been described in an illustrative manner. It is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than of limitation.

[0020] Many modifications and variations of the present invention are possible in light of the above teachings. Therefore, within the scope of the appended claims, the present invention may be practiced other than as specifically described.

Claims

1. A draincock assembly for a container comprising:
 - a receiving member for fluid communication with the container and having a projection therein; and
 - a rotatable draincock being partially disposed in said receiving member having a fluid passageway and a guide slot cooperating with said projection to allow said draincock to be rotated and moved axially, said guide slot having a closed position relative to said projection to prevent said draincock from moving axially and draining fluid through said fluid passageway and an open position rotated relative to said projection to allow said draincock to move axially and drain fluid through said fluid passageway.
2. A draincock assembly as set forth in claim 1 wherein said draincock extends axially and has a base portion at an axial end thereof, said guide slot extending axially and circumferentially at least partially about said base portion.
3. A draincock assembly as set forth in claim 2 wherein said guide slot has an open end at an axial end of said base portion and a closed end spaced from the axial end of the base portion, said closed position being at said closed end and said open position being at said open end.
4. A draincock assembly as set forth in claim 2 wherein said draincock includes a plurality of anti-removal hooks extending axially from said base portion to engage said receiving member and prevent removal therefrom.
5. A draincock assembly as set forth in claim 2 wherein said draincock includes an annular recess disposed adjacent said base portion and a seal disposed in said recess.
6. A draincock assembly as set forth in claim 5 wherein said draincock includes a flange disposed adjacent said recess and extending radially.
7. A draincock assembly as set forth in claim 2 wherein said draincock includes a top portion at an axial end opposite said base portion and having a diameter greater than a diameter of said base portion.
8. A draincock assembly as set forth in claim 7 wherein said draincock includes a chamber portion disposed between said top portion and said base portion and forming a chamber between said drain-

cock and said receiving member.

9. A draincock assembly as set forth in claim 7 wherein said fluid passageway extends through said top portion and said chamber portion and fluidly communicates with said chamber. 5
10. A draincock assembly as set forth in claim 6 wherein said draincock includes a flash adjacent said chamber portion extending radially. 10
11. A draincock assembly as set forth in claim 6 wherein said draincock includes a recess disposed between said top portion and said chamber portion and a seal disposed in said recess. 15
12. A draincock assembly as set forth in claim 6 wherein said draincock includes at least one tab extending from said top portion to allow an operator to grasp and rotate said draincock. 20
13. A draincock assembly as set forth in claim 6 wherein said draincock includes a barb extending from said top portion and fluidly communicating with said fluid passageway for allowing connection to a conduit. 25
14. A draincock assembly as set forth in claim 1 wherein said receiving member has a cavity, said projection extending radially into said cavity 30

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