

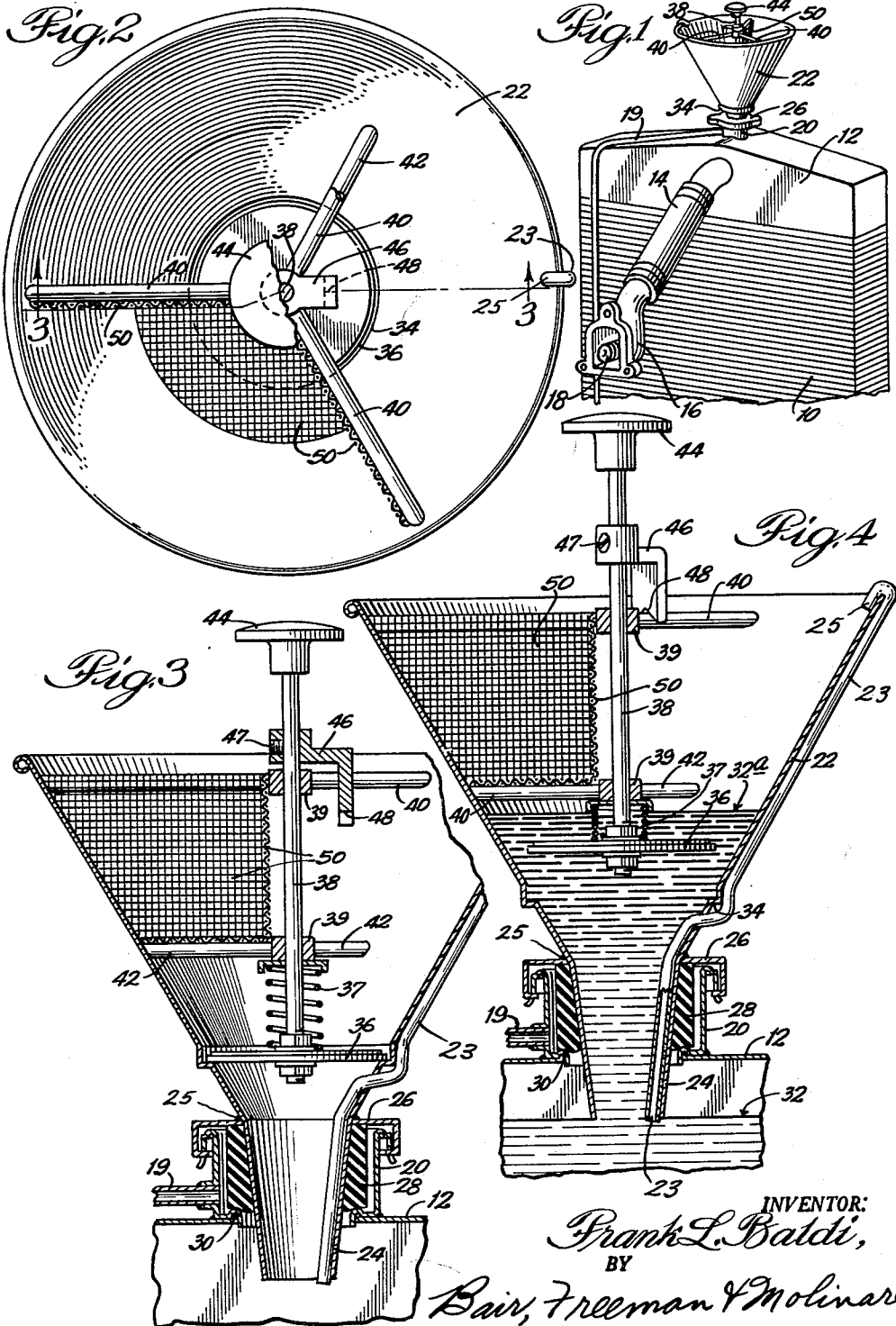
April 13, 1965

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3,177,907

FUNNEL STRUCTURE FOR INTRODUCING ANTI-FREEZE TO RADIATORS

Filed Jan. 24, 1962



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FUNNEL STRUCTURE FOR INTRODUCING ANTI-FREEZE TO RADIATORS

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Filed Jan. 24, 1962, Ser. No. 168,369

2 Claims. (Cl. 141-300)

This invention relates to a funnel particularly designed for the introduction of anti-freeze to the radiators of automobiles, tractors and the like.

One object of the invention is to provide a novel type of funnel structure so designed that it may be sealed relative to the interior of the radiator to prevent wasting anti-freeze solution due to overfilling the radiator, the problem being that heretofore such overfilling resulted in the surplus being normally discharged through the overflow pipe of the radiator or spilling over the upper edge of the radiator neck and resulting in loss.

Another object is to provide a funnel structure including automatic gauging means to insure that the radiator is filled only to the recommended level, i.e., approximately 1" below the drain pipe opening.

Still another object is to provide a funnel structure which is sealed relative to the interior of the radiator so that overfilling may be prevented by reason of the anti-freeze solution rising in the funnel of the structure during the filling operation to thereby indicate to the service station attendant that the desired level of anti-freeze solution in the radiator has been attained.

A further object is to provide a selectively operable valve means associated with the funnel structure that can be closed when too much solution has been introduced into the funnel, whereupon removal of the funnel structure from the radiator will assure no higher than the proper level of fluid within the radiator, and the solution trapped in the funnel can be saved.

Still a further object is to provide a screen in the mouth of the funnel structure to screen foreign material from liquid introduced through the screen to the funnel and thereby to the radiator.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my funnel structure whereby the objects above contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in detail on the accompanying drawing, wherein:

FIG. 1 is a perspective view of an automotive radiator with my funnel structure in operative position in relation thereto;

FIG. 2 is an enlarged plan view of my funnel structure;

FIG. 3 is a vertical sectional view thereof on the line 3-3 of FIG. 2 showing the funnel structure operatively associated with the radiator; and

FIG. 4 is a similar sectional view showing the radiator filled, the funnel partially filled, and showing a valve of the structure in a different position than illustrated in FIG. 3.

On the accompanying drawing, I have used the reference numeral 10 to indicate a radiator of an automobile, tractor or the like and 12 the upper tank thereof. In FIG. 1 the usual fitting 16 is shown that attaches to the head of the engine and a hose 14 leads therefrom to the tank 12. The fitting 16 is usually provided with a thermostatic valve 18 which is closed until the engine warms up to proper operating temperature, and then opens for permitting circulation of the cooling fluid through the engine and the radiator. The neck of the radiator is shown at 20 and this neck is provided with an annular gasket seat 30 with which the usual radiator cap (not shown) coacts. The usual overflow pipe 19 is also shown connected to the radiator neck 20.

My funnel structure comprises a funnel proper 22 and a depending spout 24. The funnel structure is rigidly

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mounted on the radiator 12 and sealed relative to the interior of the radiator by means of a radiator cap 26 perforated to receive the spout 24 and which is soldered or welded to the funnel as indicated at 25. The cap 26 coacts with the radiator neck 20 the same as the usual type of closure cap for the radiator. A gasket sleeve 28 of rubber, neoprene or the like surrounds the spout 24 and engages cap 26, and is adapted to enter the radiator neck 20 to coact with and be compressed against the gasket seat 30 as shown in FIGS. 3 and 4, so as to seal off the interior of radiator 10 except for communication with funnel 22. When mounted in the position of FIGS. 3 and 4, the lower end of the spout 24 terminates at a fluid level indicated as 32 in FIG. 4. A vent tube 23 extends upwardly from the level 32 and terminates at 25 as shown for a purpose which will hereinafter appear.

The funnel 22 is formed with a valve seat 34 with which a valve disc 36 is adapted to coact as shown in FIG. 3 under the action of a spring 37. A stem 38 extends upwardly from the valve disc 36 and terminates in a control knob 44. The stem 38 is slidable in a pair of hubs 39 which are parts of spiders 40 and 42 supported by the funnel 22. A bracket 46 is secured to the stem 38 as by a set screw 47 and has a notch 48 adapted to coact with one arm of the spider 40 as shown in FIG. 4 for holding the valve disc 36 spaced from the valve seat 34, or may assume a position of non-coaction therewith as shown in FIG. 3 to permit the spring 37 to close the valve disc 36 against the seat 34. A screen 50 having two upright sides and a bottom is located in the conical segment between two of the three arms of spiders 40 and 42, and is located in the vertical space between the planes of said spiders.

Practical operation

In the operation of my funnel structure, it is mounted on the radiator neck 20 as shown in FIGS. 1 and 3 by screwing the radiator cap 26 in position on the neck. Mounting the funnel thus, the gasket 28 is compressed against the seat 30 whereby the funnel 22 is in communication with the interior of the radiator 10 through the spout 24, and is sealed relative thereto. The valve disc 36 is now opened as in FIG. 4.

In the usual operation of introducing anti-freeze to a radiator, the water is completely drained from the radiator whereupon the drain cocks are closed and an anti-freeze solution is then poured through my funnel structure into the radiator. Such solution is usually a mixture of water and anti-freeze liquid.

The liquid is introduced until it rises in the funnel 22 such as shown in FIG. 4, and as soon as it starts to rise in the funnel the attendant knows that the proper amount of solution is contained within the radiator because of the sealed space within the tank 12 above the level of liquid 32 shown in FIG. 4. The vent tube 23 permits escape of air as the liquid is poured through the funnel and into the radiator. Without the vent tube, if liquid is poured in too fast, proper escape of air through the funnel itself would be interfered with and result in air bubbling through the liquid being poured, thus causing it to slop out over the edge of the funnel and be wasted. If any drops of liquid find their way into the vent tube during this operation, they are returned to the funnel by reason of the terminal end 25 of the vent tube being directed back into the funnel as shown in FIG. 4. The gasket sleeve 28 seals off any possibility of overflow through the pipe 19 and the distance the spout 24 projects into the tank 12 prevents any filling above the level 32. In this connection, the usual procedure of merely pouring the anti-freeze solution into the radiator often results in overfilling the radiator because of filling the tank 12 completely full, whereupon the liquid starts running out through the overflow pipe 19. If the attendant is not particularly watchful

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some of the solution may also spill out of the neck 20.

Contrasted to this, my funnel structure determines the level 32 to which the tank 12 can be filled and conserves any liquid thereafter poured into the funnel by retaining it within the funnel as to the level indicated at 32^a in FIG. 4. The valve disc 36 may now be released by moving the bracket 46 from the position shown in FIG. 4 to the position shown in FIG. 3 thereby permitting the spring 37 to expand and close the valve as in FIG. 3, whereupon the cap 26 may be unscrewed from the radiator and the liquid between the valve seat 34 and the lower end of the spout 24 will drain into the radiator and raise the level 32 but very little, and of course the length of the spout 24 is designed so that when the radiator receives this additional liquid the level of anti-freeze solution in the radiator will be proper as recommended (approximately 1" below the overflow pipe 19 to provide an expansion air space). The liquid in the funnel 22 above the valve disc 36 may be poured back into the anti-freeze solution container and thus saved.

In some instances, a different procedure may be followed such as part of the water drained from the radiator (slightly more than the amount of anti-freeze liquid to be introduced), the liquid then introduced and the radiator then filled with water, again to the level 32 and into the funnel 22 as shown in FIG. 4. In still other instances, particularly when the anti-freeze solution in the radiator is weak and requires strengthening by the introduction of additional anti-freeze liquid, part of the old solution is drained from the radiator, the fresh anti-freeze liquid introduced and then part of the old solution poured back in. In the latter case it is desirable to strain out any foreign matter, and for this purpose a screen 50 is provided in the funnel through which the old solution may be introduced into the radiator. During any of the operations described, and when there is any chance of foreign material in the solution, the screen 50 is used in this manner.

At times the thermostatic valve 18 presents a problem. When the engine is cold the valve is closed, and after the radiator is drained and filled with anti-freeze solution as illustrated in FIG. 4 there may be an unfilled pocket of air above the thermostat so that the level 32 will recede after the engine is warmed up and the thermostatic valve opened thereby. In that event the funnel is left in position until the thermostat does open and lower the level 32^a illustrated in FIG. 4 which level may recede far enough that the level 32 also is lowered. Thereupon additional anti-freeze solution may be introduced to bring the level up again to where it can be seen within the funnel 22.

From the foregoing specification it will be obvious that I have provided a funnel construction particularly adapted to facilitate the introduction of anti-freeze solution to a radiator without wastage thereof.

Some changes may be made in the construction and arrangement of the parts of my funnel structure without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified

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forms of structure or use of mechanical equivalents which may reasonably be included within their scope.

I claim as my invention:

1. A funnel for introducing anti-freeze solution through the neck of a radiator that includes an overflow pipe and a gasket seat spaced below the upper edge of the radiator neck; said funnel comprising, in combination, a radiator cap adapted for screw-type securement to the neck of said radiator, a funnel structure secured to and projecting through said radiator cap and defining a discharge spout for extending into said radiator, an axially elongated gasket sleeve surrounding and engaging said spout and engaging said radiator cap, said sleeve being adapted to coact with and be compressed axially between the radiator cap and said gasket seat for sealing the interior of said radiator from both said neck and said overflow pipe, a valve seat defined in said funnel structure and above the point of securement of the funnel structure to the radiator cap, a valve disc positioned within the said funnel and above said valve seat and adapted to cooperate with said valve seat, a stem extending vertically upward from said valve disc, means for guiding said stem for pivotable movement therein and for vertical sliding movement relative to said funnel and axially of said valve seat, spring means normally biasing said valve disc vertically downward toward sealing engagement with said valve seat, whereby when the valve disc is seated with liquid in the funnel, the forces of both the spring and the pressure of liquid above the valve disc all cooperate toward biasing the valve disc for sealing and seating onto the valve seat, a latch for selectively maintaining said valve disc in the open position and being selectively operable with pivoting of the stem about its axis, and vent means carried by the funnel and defining an opening therefor adjacent the lower terminus of the discharge spout.

2. The device of claim 1 including a screen in the mouth of said funnel for screening foreign material from liquid introduced through said screen, and said vent means being an elongated vent tube which extends upwardly within said spout and then passes to the exterior of said funnel at a point above said radiator cap and below said valve seat, said vent tube then extending upwardly along the exterior of the spout and having an upper terminal end directed to discharge back into said funnel.

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