Dec. 22, 1953 S. R. BRICKER 2,663,100

STEAM IRON

Filed Aug. 21, 1951 3 Sheets-Sheet 1

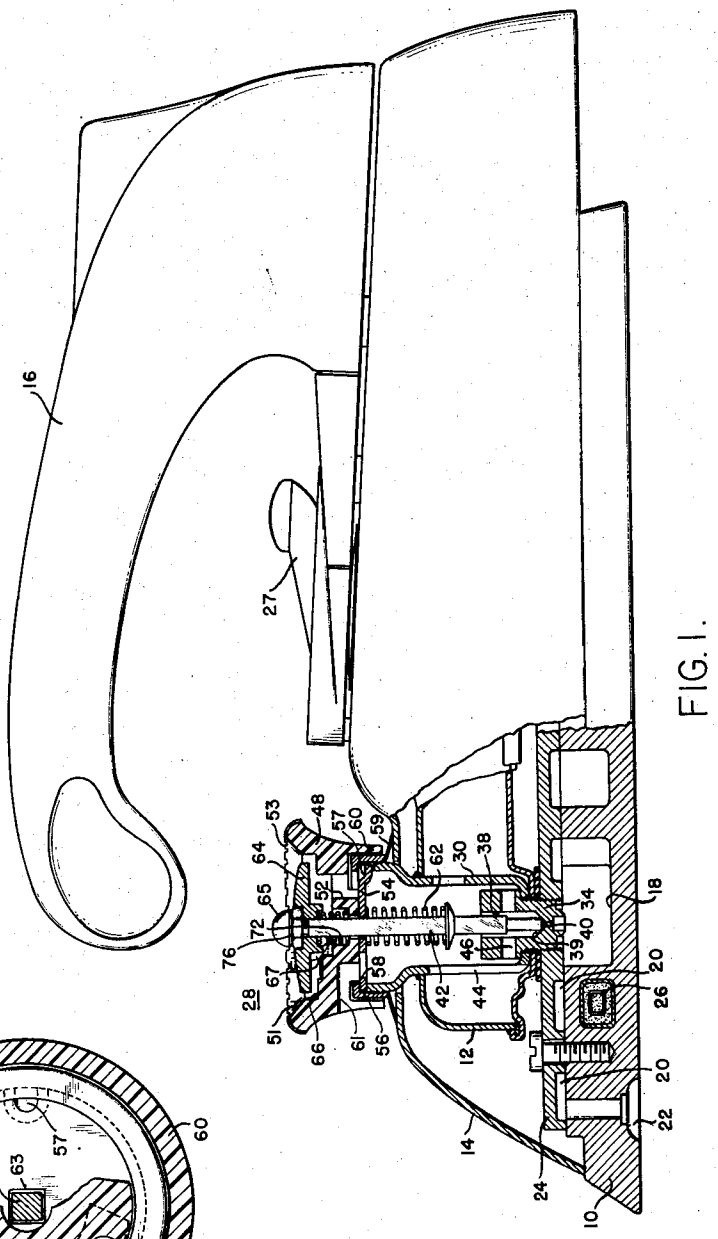


FIG. 1.

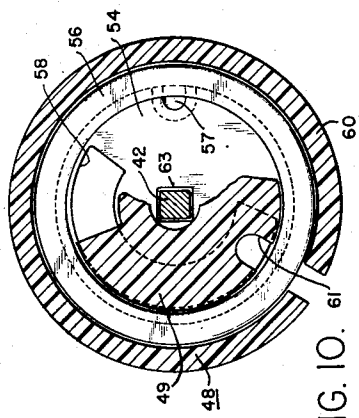


FIG. 10.

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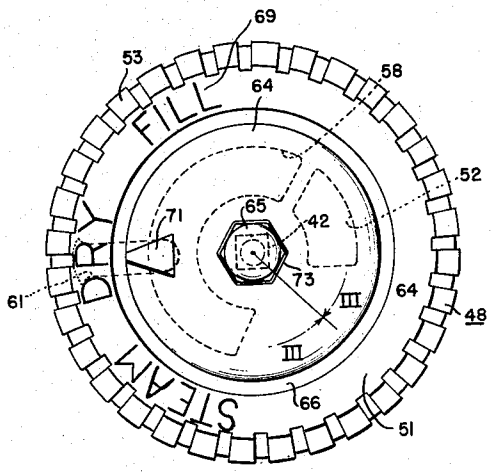


FIG. 2.

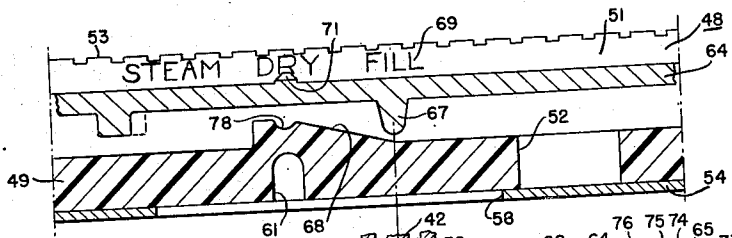


FIG. 3.

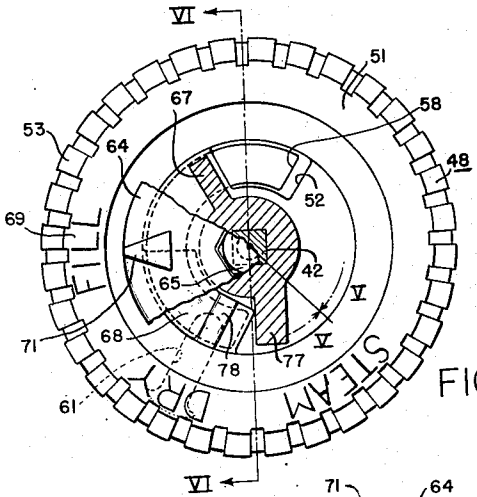


FIG. 4.

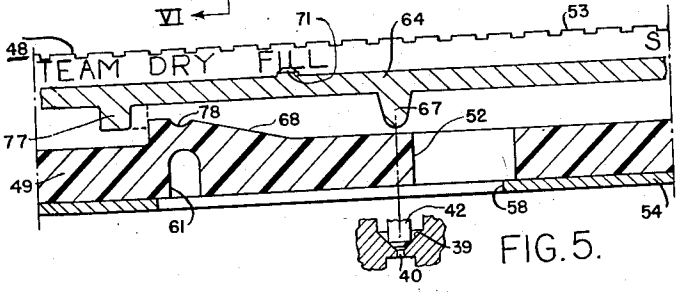


FIG. 5.

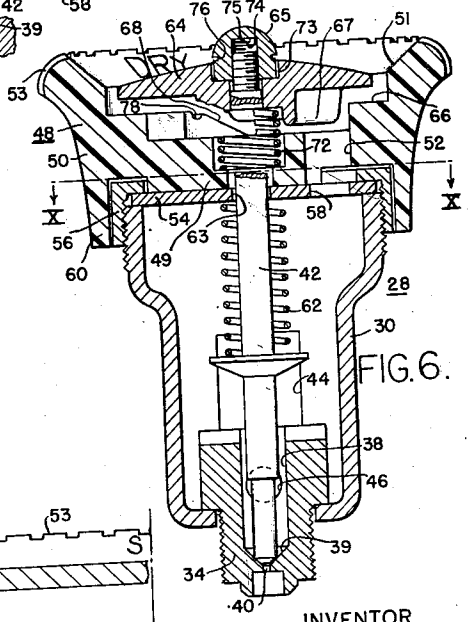


FIG. 6.

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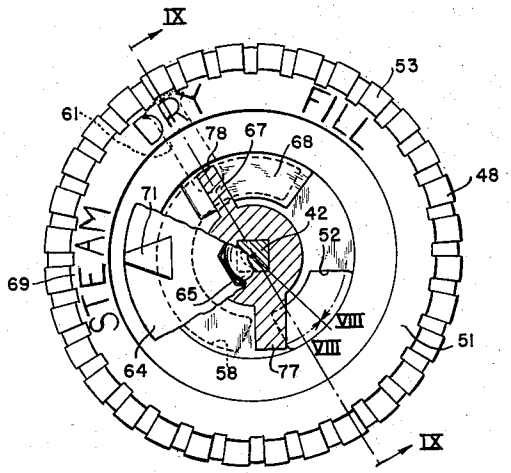


FIG. 7.

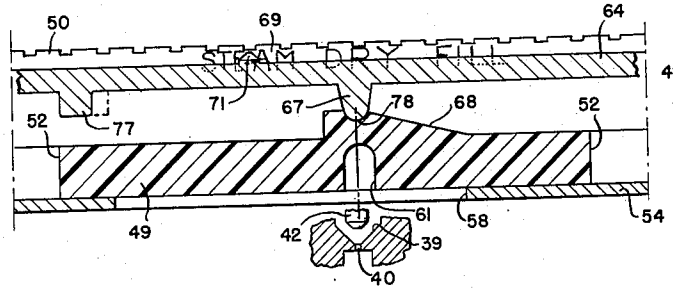


FIG. 8.

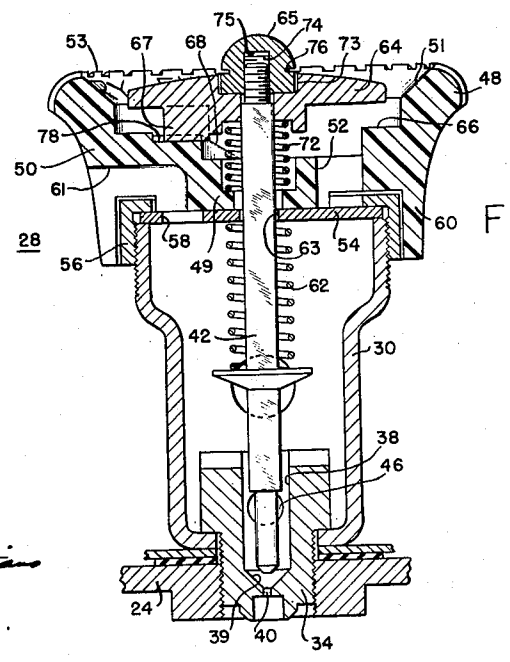


FIG. 9.

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UNITED STATES PATENT OFFICE

2,663,100

STEAM IRON

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Application August 21, 1951, Serial No. 242,883

5 Claims. (Cl. 38—77)

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This invention relates to a steam iron of the flash type, particularly to an arrangement for filling the water reservoir and for operating the valve which controls the flow of water from the reservoir to the steam generating chamber.

In the steam iron structure described and claimed in application Serial No. 236,625, of B. F. Parr, filed July 13, 1951, and entitled Steam Iron, there is an inter-connection between the water valve for admitting water to the steam generating chamber and the fill cap for admitting water to the water tank of the iron. As further described in that application, the inter-connection is so arranged that when the fill cap is adjusted to a first or "fill" position, the valve is in the "off" position, thereby preventing water from flowing into the steam generating chamber and flooding the same while water is being admitted to the tank. The fill cap is also adjustable to a second or "steam" position in which the valve is in the open position for admitting water into the steam generating chamber while the fill opening to the tank is closed.

It is an object of this invention to provide a steam iron of the flash type, in which the fill and valve arrangement is provided with an additional setting by which the steam iron may be conditioned for dry ironing, and in which the valve is in the "off" position and the filling means to the tank is closed.

It is a further object to provide a fill and valve arrangement having a vent which communicates with the tank at all times regardless of the setting of the fill cap.

Another object of the invention is to so arrange the vent that any steam or vapor which may be vented from the tank will be expelled in a direction away from the hand of the user.

A still further object is to provide an improved fill and valve arrangement which may be manufactured simply, expeditiously, and at low cost, by modern manufacturing methods.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a side elevation of a flash type steam iron incorporating my invention, the combination fill and valve arrangement and other associated portions being shown in section;

Fig. 2 is a plan showing the combination fill and valve arrangement in the "dry" position;

Fig. 3 is a developed view of a circular section taken on line III—III of Fig. 2, the starting point being indicated by the arrow heads;

Fig. 4 is a plan, with portions cut away for clarity, showing the combination fill and valve arrangement in the "fill" position;

Fig. 5 is a developed view of a circular section taken on line V—V on Fig. 4, the starting point being indicated by the arrow heads;

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Fig. 6 is a section taken on line VI—VI of Fig. 4;

Fig. 7 is a plan, with portions cut away for clarity, showing the combination fill and valve arrangement in the "steam" position;

Fig. 8 is a developed view of a circular section taken on line VIII—VIII of Fig. 7, the starting point being indicated by the arrow heads;

Fig. 9 is a section taken on line IX—IX of Fig. 7; and

Fig. 10 is a section taken on line X—X of Fig. 6.

Referring to the drawings in detail, especially Fig. 1, there is shown an electric steam iron of the flash type, having a soleplate 10, a water tank 12 disposed above the soleplate, a shell 14 and a manipulating handle 16 anchored to the shell 14.

The soleplate 10 is provided with a steam-generating chamber 18 which is connected by passages 20 to a plurality of steam exhaust apertures 22 (only one shown) directed downwardly through the soleplate. A cover plate 24 is clamped to the upper surface of the soleplate and serves as the upper wall of the steam-generating chamber 18 and the passages 20. An electrical heating element 26, preferably of the sheathed type, is embedded in the soleplate 10 and serves to heat the soleplate for steam or dry pressing textiles, as is well understood in the art. The temperature of the soleplate may be adjusted by a rotatable knob 27 disposed below the manipulating handle and connected to a thermostat (not shown).

The water tank 12 extends, horizontally, substantially from the front to the rear of the iron and is provided at the front end with my improved combination fill and water valve arrangement generally designated 28.

The tank is provided with a fill member 30 of inverted thimble shape soldered thereto and extending upwardly through the shell 14. The tank 12 is clamped to the cover plate 24 by a threaded ferrule 34 passing through the lower end of the fill member 30 and received in a threaded hole in the cover plate.

The threaded ferrule 34 forms part of a valve structure and has an axially disposed bore 38 which is beveled at its lower end to provide a valve seat 39. Below the valve seat there is provided a valve orifice 40. An axially movable valve stem 42 for controlling the valve orifice is received within the bore 38 and cooperates with the valve seat 39 and the orifice 40 to form the water valve. A front slot 44 is provided in the fill member 30 and a transverse bore 46 is provided in the ferrule 34. Thus, when the valve stem 42 is raised, water will flow from the tank 12 through the slot 44 into the fill member 30, and through the bore 46 and the valve orifice 40 to the steam-generating chamber 18.

The fill and valve arrangement 28 (referring to Figs. 2, 3 and 6, for example) further includes a rotatable fill cap 48 supported on the fill mem-

ber 30. The fill cap 48 includes a bottom wall 49 which is encompassed by an upwardly extending annular wall 50 having an upwardly flared inner surface 51, thereby forming a top opening recess 66, at least the upper portion of which may be referred to as being of funnel shape, for receiving water that is poured into it from above. The bottom wall is provided with an arcuate port 52. The outer surface of the fill cap is ribbed to provide a finger gripping portion 53. Between the fill cap 48 and the fill member 30 there is interposed a disc 54 which is clamped against the fill member by a threaded ring 56 and is held against turning by an indentation 57 received in a notch in the fill member 30. The ring 56 further serves to hold the shell 14 against the soleplate 10 and to this end an annular spring washer 59 is interposed between the shell and the ring. The disc 54 has an arcuate port 58 of substantially larger angular extent than the port 52. The fill cap 48 is provided with a depending skirt portion 60 defining a bore within which the ring 56 is received. Thus, the ring 56 serves as a bearing during rotation of the fill cap 48. A venting aperture 61 is provided in the fill cap and extends horizontally through the wall 50 and downwardly through the bottom wall 49 into registry with the stationary port 58. The port 58 extends through an angle which is larger than the angle of rotation of the fill cap, thereby permitting the aperture 61 to register with the port 58, regardless of the position of the fill cap.

As thus far described, it may be seen that by rotating the fill cap 48, the port 58 may be moved into or out of registry with the stationary port 58, and the tank is vented to the atmosphere at all times through the aperture 61.

The valve stem 42 is biased downwardly toward closed position by a helical spring 62. As shown in Fig. 10, the upper portion of the valve stem is of square cross section and passes through a square opening 63 provided in the disc 54, which opening prevents rotation of the valve stem. A circular cover member 64 is keyed to the upper end of the valve stem 42 and is held thereon by an acorn nut 65. The cover member 64 is centrally disposed in the recess 66 in the fill cap 48 and is provided on its under side with a radial finger 67. The fill cap is provided with a cam portion 68 adapted to be rotated into engagement and out of engagement with the finger 67 to thereby raise the valve stem 42 against the bias of the spring 62.

The fill cap 48 is inscribed with appropriate indicia 69 such as "fill," "dry" and "steam," while the cover member may be provided with a dart 71 to indicate the position of the fill and valve arrangement 28.

As shown in Figs. 1, 2 and 3, the fill and valve arrangement 28 is set in the "dry" position. In this position the steam iron may be used in the manner of a conventional sadiron. The developed view shown in Fig. 3 somewhat schematically portrays the position of the various parts previously described. With the fill cap adjusted to the "dry" position, the finger 67 is out of engagement with the cam portion 68 and the valve stem is in its lower position, closing the orifice 40 and shutting off flow of water to the steam generating chamber 18. The port 52 is out of registry with the stationary port 58, thereby closing the fill opening and preventing hot vapors, which may be generated in the tank, from escaping upwardly through the recess 66 in the fill cap. A spring member 72, of weaker compressive strength than the spring 62, is interposed between the fill cap 48 and the cover member 64 to bias the fill cap against the disc 54 and thereby prevent vapor leakage between the fill cap and the disc. However, generated vapor may escape through the venting aperture 61 provided in the side of the fill cap.

Although as mentioned above, the valve stem 42 is keyed to the cover member 64, the valve stem is axially slidable within the cover member. As shown in Figs. 2 and 6, for example, the cover member 64 is provided with a recess 73 of hexagonal outline within which is received the hexagonal portion of the acorn nut 65. The acorn nut is provided with the usual female threaded portion 74, however, the threaded portion is of such a depth that the male threaded portion of the valve stem 42 does not bottom therein and will leave a space 75 at the upper end of the threaded portion 74. With this arrangement the effective axial length of the valve stem 42 is adjustable to ensure that the valve seat 39 will be closed when the finger 67 is out of engagement with the cam portion 68 and the valve stem is in its lower position. This adjustment may be effected during the manufacture of the iron and once set, need not be adjusted thereafter.

To facilitate adjustment of the valve stem 42, the acorn nut is provided with a peripheral groove 76 which provides a grip for lifting of the acorn nut and the valve stem to a height sufficiently above the cover member 64 to permit rotation of the acorn nut. The acorn nut may be then released and lowered into the recess 73 which recess locks the nut against rotation. In operation, the bias of the spring 62 is sufficient to maintain the acorn nut within the recess. With this arrangement, dimensional variations in manufacture of the various parts of the fill and valve arrangement are compensated for and proper seating of the valve stem 42 on the valve seat 39 is assured. Clockwise rotation of the acorn nut, as seen in Fig. 2, will shorten the effective length of the valve stem, while counterclockwise rotation will lengthen the effective length of the valve stem.

As shown in Figs. 4, 5 and 6, the fill cap is adjusted to the "fill" position. In this position the water tank 12 may be filled at any time that it is desired, whether the device is hot or cold. To set the fill and valve arrangement 28 to the "fill" position, the fill cap 48 is rotated counterclockwise to the position shown in Fig. 4, in which the "fill" indicium is in registry with the dart 71. Further counterclockwise movement of the fill cap is prevented by a rib 77 provided on the under side of the cover member 64 in the path of the cam 68 and abutted thereby. The port 52 is in registry with the stationary port 58, permitting water to flow around the cover member 64, down the recess 66 through the ports 52 and 58 into the fill member 30 and through the slot 44 into the tank 12. The water will fill the tank and the fill member to the same level, since communication between the tank and fill member is unrestricted by the slot 44. The venting aperture 61 is in registry with the stationary port 58, thereby permitting the displaced air from the water tank to escape unimpeded. The finger 67 is still out of contact with the cam 68, and the valve stem 42 is in its lower position, closing the valve orifice 40. Since the valve orifice 40 is closed, water is prevented from flowing into the steam generating chamber 18 when the fill cap is in the "fill" position.

Figs. 7, 8 and 9 show the fill and valve arrangement **28** adjusted to the "steam" position. This position is attained by rotating the fill cap **48** clockwise to the position shown in Fig. 7 in which position the "steam" indicium is in registry with the dart **71**. In this position, the finger **67** is engaged and lifted by the cam **68**, raising the valve stem **42** to open the valve orifice **40**. The water will flow through the ferrule **34** via the transverse bore **46**, the axial bore **38** and the valve orifice **40**, into the steam generating chamber **18** where it is quickly converted into steam by the heat from the adjacent heating element **26**. The steam thus generated will flow through the steam passages **20** to the steam exhaust apertures **22** and be emitted at the bottom of the soleplate **10** for steaming textile articles being pressed.

The fill cap is indexed in the "steam" position by a radial groove **78** provided at the upper portion of the cam **68** and adapted to receive the finger **67**. The port **52** is out of registry with the stationary port **58**, thereby preventing egress of hot vapors through the fill cap to the front portion of the manipulating handle **16** and avoiding the danger of scalding the user's hand. The venting aperture **61** is in registry with the stationary port **58**, thereby permitting the venting of such vapors in a harmless manner through the side of the fill cap.

From the foregoing, it will be seen that I have provided an improved fill and valve arrangement for a steam iron which may be expeditiously manufactured at reasonable cost by modern manufacturing methods.

It will also be noted that with this arrangement the tank is vented to the atmosphere at all times regardless of the setting of the knob and that such venting means is arranged in a manner to be inconspicuous. Also, vapor vented will be directed away from the hand of the user, thereby eliminating the danger of scalding.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What I claim is:

1. A flash type steam iron having a soleplate, a steam generating chamber, means for heating said soleplate and said steam generating chamber, a water tank disposed above said soleplate, a valve for controlling flow of water from said water tank to said steam generating chamber for steaming purposes, and filling means for said tank, said filling means including a rotatable fill cap having a port and a stationary member having a port in communication with said tank, said valve being movable axially from a closed position to an open position, means including a cam and a follower operable by rotation of said fill cap to move said valve to the open position, said fill cap being rotatable to a first or fill position, a second or dry position and a third or steam position, said ports in said fill cap and said stationary member being of such angular extent and being so angularly related to each other and said cam being of such shape and being so angularly related to said follower that, when said fill cap is in said first or fill position said ports are in registry with each other and said valve is in the closed position, when said fill cap is in said second or dry position said ports are out of registry with each other and said valve is in the closed position, and when said fill cap is in said third or steam position said ports are out of registry with each other and said valve is in the open position.

2. The structure recited in claim 1 in which said fill cap is funnel-shaped and has an opening arranged in communication with the port in said stationary member and serving to vent the tank to the surrounding atmosphere in all of said positions of the fill cap.

3. The structure recited in claim 1 in which said fill cap has a vertically extending outer wall, said wall having a horizontally extending opening disposed above said stationary member and arranged in registry with said stationary port in all of said positions of the fill cap.

4. A flash type steam iron having a soleplate, a steam generating chamber, means for heating said soleplate and said steam generating chamber, a water tank disposed above said soleplate, a valve movable to a closed position and an open position for controlling flow of water from said water tank to said steam generating chamber for steaming purposes, and means for filling said tank while the iron is resting on said soleplate, said means including a rotatable fill cap disposed above said tank and having a port, a stationary member interposed between said fill cap and said tank and and having a port in communication with the interior of said tank, means including a cam and follower operable by rotation of said fill cap to move said valve to the open position, said fill cap being rotatable to a first (fill) position, a second (dry) position and a third (steam) position, said ports in said fill cap and said stationary member being of such angular extent and being so angularly related to each other and said cam being of such shape and being so angularly related to said follower that, when said fill cap is in said first or fill position said ports are in registry with each other and said valve is in the closed position, when said fill cap is in said second or dry position said ports are out of registry with each other and said valve is in the closed position, and when said fill cap is in said third or steam position said ports are out of registry with each other and said valve is in the open position, and means for venting said tank to the atmosphere, said means including an opening in the side of said fill cap arranged to communicate with the stationary port, said stationary port being arcuate in shape and extending through an angle which is at least as great as the angular movement of said fill cap, said opening thereby being in registry with said stationary port in all of said positions of said fill cap.

5. The structure recited in claim 4 in which said valve has a valve stem extending upwardly through the rotational center of said fill cap, said valve stem being provided with a cover member, said fill cap being funnel-shaped and said cover member being disposed below the upper edge of the same, said cam being carried by said fill cap and said follower being carried by said cover member.

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