Dec. 25, 1928. 1,696,451

W. A. RANKIN

PERCOLATOR

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Fig. 1

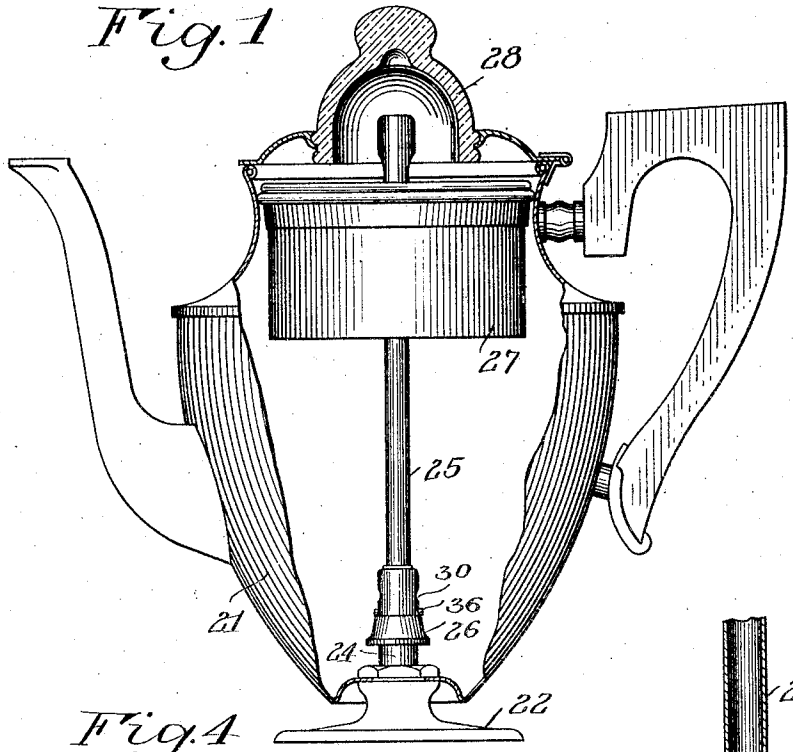


Fig. 2

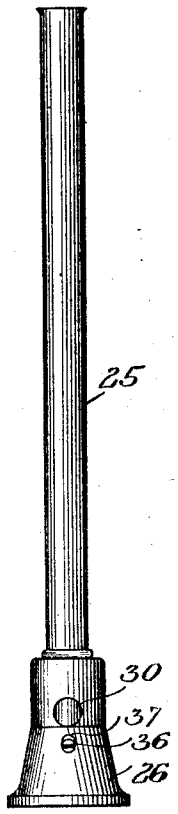
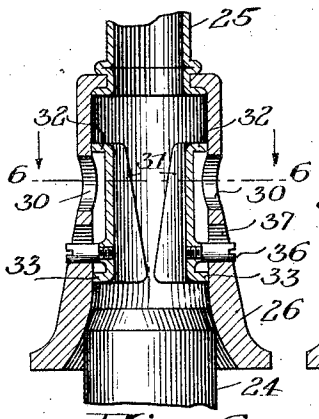


Fig. 4



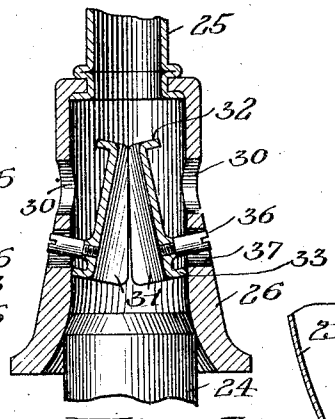


Fig. 6

Fig. 5

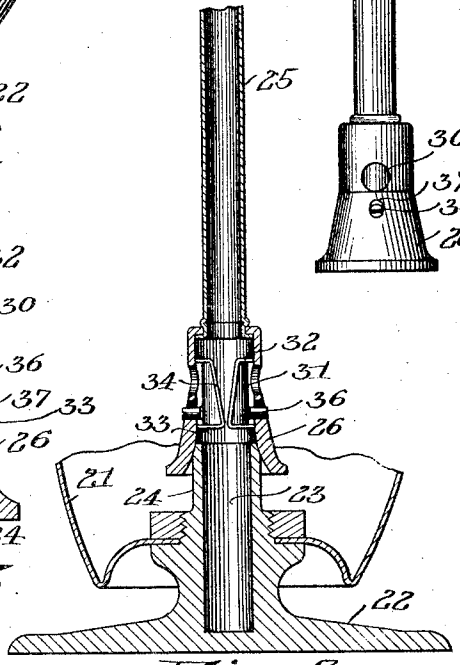
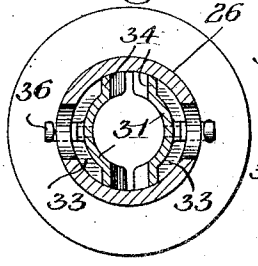


Fig. 3



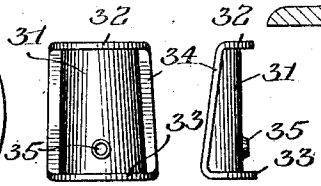


Fig. 7 Fig. 8

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Fig. 9

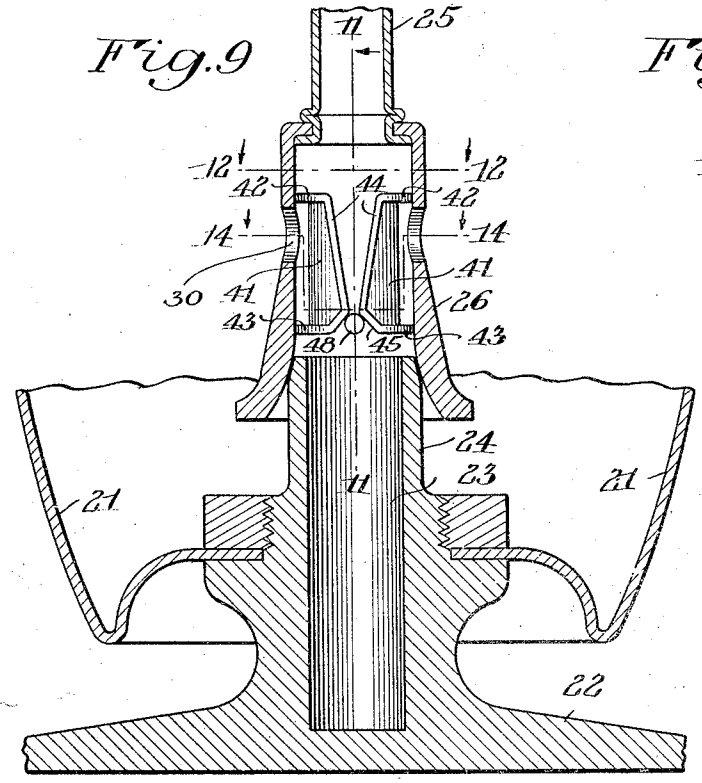


Fig. 10

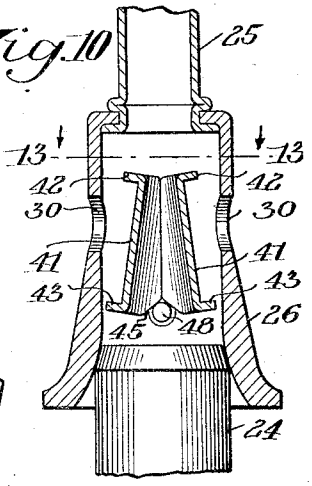


Fig. 11

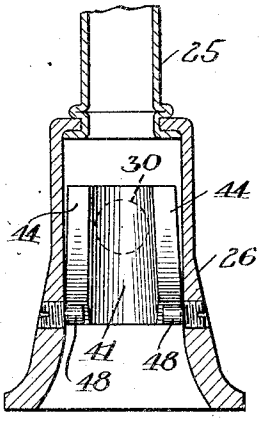


Fig. 12

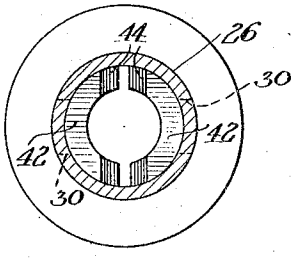


Fig. 13

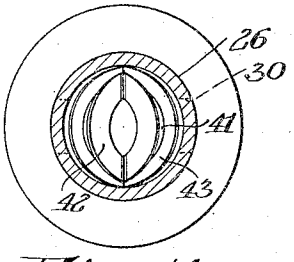


Fig. 14

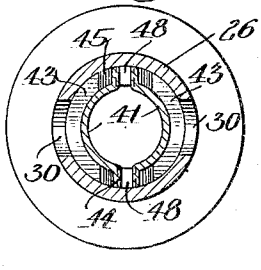


Fig. 15

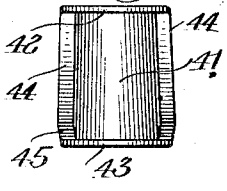
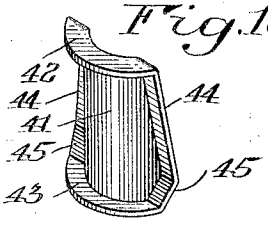


Fig. 16



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Patented Dec. 25, 1928. 1,696,451

UNITED STATES PATENT OFFICE.

WILLIAM A. RANKIN, OF ROCHESTER, NEW YORK, ASSIGNOR TO ROBESON-ROCHESTER CORPORATION, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

PERCOLATOR.

Application filed January 20, 1928. Serial No. 248,078.

This invention relates to percolators, and has for its principal object the provision of improved valve mechanism for opening and closing the inlet openings of the fountain tube of a percolator.

Another object of the invention is to provide a valve of such form that it will not become clogged by coffee grounds and will not stick although a sticky substance may become deposited on the valve seat.

A further object of the invention is to provide a valve which will not interfere to an appreciable extent with the flow of liquid from the heating chamber to the fountain tube.

An additional object of the invention is the provision of a valve which will offer a minimum of resistance to opening and closing. It is still another object of the invention to provide a valve which is cheap to manufacture and simple to install or repair, and which is not liable to get out of order.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a side elevation with parts broken away, of a percolator showing one embodiment of the invention;

Fig. 2 is an enlarged elevation of the fountain tube of the percolator as viewed from the right in Fig. 1;

Fig. 3 is a vertical section through the lower part of the percolator and fountain tube showing the valve in elevation;

Fig. 4 is an enlarged vertical section through the lower end of the fountain tube showing the valve in section and in its closed position;

Fig. 5 is a view similar to Fig. 4 showing the valve open;

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

Fig. 7 is an elevation of one of the valve members;

Fig. 8 is a side elevation of the valve as viewed from the left in Fig. 7;

Fig. 9 is a vertical elevation through the lower end of a percolator and fountain tube showing another embodiment of the invention;

Fig. 10 is a fragmentary vertical elevation through the lower end of the fountain tube, showing the modified form of a valve in its open position;

Fig. 11 is a vertical section taken approximately on the line 11—11 of Fig. 9;

Fig. 12 is a horizontal section taken on the line 12—12 of Fig. 9;

Fig. 13 is a horizontal section on the line 13—13 of Fig. 10;

Fig. 14 is a horizontal section on the line 14—14 of Fig. 9;

Fig. 15 is an elevation of the modified form of valve member, and

Fig. 16 is a perspective view thereof.

Similar reference numerals throughout the several views indicate the same parts.

The invention may be applied to percolators of well known constructions which may include, for example, a casing 21 forming a liquid reservoir resting upon a base 22 in which is formed a liquid heating chamber 23, the upper portion of which is formed by a cylindrical wall 24. A fountain tube 25 has an enlarged portion 26 at the bottom thereof, which portion is flared outwardly as shown in Figures 2 to 5 inclusive, and is adapted to embrace and rest upon the top of the cylindrical wall 24 of the liquid heating chamber.

At the top of the fountain tube 25 there may be placed the usual basket 27 adapted to hold ground coffee or tea leaves, the construction of this basket and of the dome 28 above it being of any well known form. For example, the basket may be of the kind shown in the patent to Swan 1,309,374, dated July 8, 1919.

In the side walls of the enlarged portion 26 at the bottom of the fountain tube there may be formed inlet openings 30, through which liquid may flow from the liquid reservoir 21 into the fountain tube 25, 26 and the heating chamber 23. These inlet openings have valves associated with them, and it is to such valves that the present invention relates.

The valve shown in Figs. 1 to 8 inclusive includes two body portions 31 each of which comprises a curved wall. Flanges 32 and 33 extend outwardly from the top and bottom edges respectively of each body portion 31. The sides of the body portions terminate in an oblique plane at an acute angle to the longitudinal axis of the body portion 31, and flanges 34 extend outwardly from the side edges of the body portion in the direction of this oblique plane, as shown clearly in Figs. 6, 7 and 8.

In the embodiment shown in Figs. 1 to 8 inclusive, a threaded hole 35 is formed in each valve and a pin 36 is screwed into this hole. Openings 37 are formed in the sides 26 of the fountain tube, directly beneath the inlet openings 30, these openings 37 being of such size that the pins 36 have free play therein, as shown in Figs. 4 and 5. These pins 36 act as supporting members for holding the valves 31 within the fountain tube, so that the valves will remain opposite the inlet openings 30 and will not drop down below these openings. Normally the two valve members will be tilted inwardly toward each other so that their upper ends will be in contact, as shown in Fig. 5, their lower ends being supported by the pins 36. When the parts are in this position, it will be seen that the inlet openings 30 are open and liquid will be allowed to flow from the liquid reservoir 21 into the fountain tube and liquid heating chamber.

When the liquid within the heating chamber 23 has been heated to a sufficient extent, it will be ejected upwardly in a well known manner, because of its high temperature and the vapor pressure formed by the heat. Such upward movement of the liquid and vapor through the tapered, restricted passageway formed by the two valve members when in the position shown in Figure 5, separates these valve members and forces them against the sides of the fountain tube 26, so that they will be in substantially the position shown in Figure 4. In such a position, it will be seen that the inlet openings 30 are closed so that liquid cannot flow through these openings into the fountain tube or heating chamber. The heated liquid from the chamber 23, therefore, flows upwardly through the fountain tube without being impeded by an inrush of colder liquid from the liquid reservoir. When the upward rush of liquid has ceased, the valves then fall back by gravity from the position shown in Fig. 4 to that shown in Figure 5, and cooler liquid from the reservoir 21 is then allowed to enter the fountain tube and to fill it and the liquid heating chamber 23. The liquid within the heating chamber then becomes sufficiently hot so that it in turn is ejected upwardly, the valves closing during such ejection, and the cycle above described is repeated. Thus the pulsating upward ejection of liquid closes the valves at each pulsation, and after each pulsation is completed the valves are again opened by gravity assisted by the pressure of liquid outside the fountain tube.

A valve of a slightly different form, which has some advantages over that above described, is shown in Figs. 9 to 16 inclusive. In this embodiment of the invention the liquid reservoir 21, the liquid heating chamber 23, and the fountain tube 25 with its enlarged lower portion 26 are all constructed as heretofore. Each valve is also of the same general shape above described, and has a curved body portion 41, top and bottom flanges 42 and 43 respectively, and flanges 44 extending outwardly in a plane at an acute angle to the axis of the imaginary cylinder of which the body portion 41 is a part. The lower corner of the valve where the side flanges 44 would join the bottom portion 43 is beveled or cut off obliquely, however, as shown at 45 in Figs. 9 and 16.

In this construction the inlet opening 30 through the enlarged portion 26 of the fountain tube is retained, but the opening 37 is omitted. Supporting members such as the pins 48 are screwed into threaded openings in the walls 26 of the fountain tube, and these pins 48 support the valves, holding them in a position opposite the inlet openings 30. The oblique corners 45 on the valves are adapted to rest upon the pins 48 as shown in Figs. 9 and 10, and these oblique portions 45 act as cams which tend to force the valves against the side walls of the fountain tube.

Valves of this form are normally held closed by gravity, in the position shown in Fig. 9. This has some advantages over the valves of the first form above described, since normally there is no restriction in the fountain tube and the liquid from the heating chamber 23 has less resistance to overcome in passing upwardly through the fountain tube. Thus a percolator constructed with valves of this form will start its pulsating percolations somewhat sooner than would be the case if constructed with valves of the form shown in Figs. 4 and 5, since the first weak pulsations may pass upward easily through the valves in the normal position shown in Fig. 9, while pulsations of the same strength would be stopped or greatly weakened in overcoming the resistance of the valves of the first form when in their normal position shown in Fig. 5.

After a pulsation has occurred, a large part of the liquid has been ejected from the heating chamber 23 upwardly through the fountain tube, and the level of liquid within the fountain tube is then lower than that in the liquid reservoir 21, so that the fluid pressure within the tube is less than that outside the tube. Thus the pressure on the liquid outside pressing against the body portion 41 of the valves opens these valves by moving them toward the center until they are in contact with each other as shown in Fig. 10. When in this position, the inlet ports 30 are open and liquid from the reservoir 21 is free to flow inwardly past the valves and to fill the heating chamber 23. When the liquid pressure within the fountain tube is equalized with that outside, the valves will drop back by gravity into their normal or closed position shown in Fig. 9, and the liquid and vapor in the chamber 23 when sufficiently heated will then pass upwardly through the foun-

tain tube in another pulsation, this cycle being repeated as long as the water lasts and as the necessary heat is applied. If the heating chamber 23 is very hot, the liquid rushing in through the inlet opening 30 and filling the heating chamber may be sufficiently heated before the valves have had a chance to close again by gravity. In such cases the upward pulsation of liquid and vapor will occur when the valves are still open in the position shown in Fig. 10, and the upward rush of liquid passing through the tapered restriction formed by the valves will tend to force them apart and close them exactly as was the case in the form of valve shown in Figs. 4 and 5. Thus it will be seen that in the first form of invention disclosed, the valve is normally open and is closed by the upward flow of liquid and vapor, while in the second form of invention disclosed the valve is normally closed but its closing may be assisted by the upward flow of liquid if such flow should occur before the valve is fully closed. Thus, in the second embodiment of the invention, the parts are so arranged that gravity assists the upward pulsations in the fountain tube in closing the valve openings and shutting off the downward flow of the cooler fluid.

It will be noted that in both forms of the invention, the only parts of the valve in contact with the walls of the fountain tube are the comparatively thin edges of the flanges, the body portions of the valves being spaced from the walls of the fountain tubes in both cases. This construction is found to be very advantageous in that it obviates clogging of the valves due to coffee grounds and also prevents their sticking in closed position on account of the walls of the fountain tube being coated with sticky substances. If a large area of the valve had to seat itself against the wall of the fountain tube in order for the valve to close, it would be obvious that the valve would adhere much more firmly to the wall of the tube in case a sticky substance was on the wall, and that much greater force would be required to open the valve than would be the case if only a comparatively small area of the valve was in contact with the wall as in the present invention. Similarly, if coffee grounds accumulate on the inside of the fountain tube adjacent the inlet opening 30, this will not interfere with complete closing of the valve, since the grounds may occupy the space between the fountain tube and the body portion of the valve. In both forms of the invention, the valve bodies are readily removable by unscrewing the screws 36 and 48 respectively.

The invention thus provides a percolator comprising valve means for the fountain tube of a reliable and efficient character and at the same time of a simple form of construction which is inexpensive to manufacture and assemble.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive idea may be carried out in a number of ways. This application is therefore not to be limited to the precise details shown, but is intended to cover all variations and modifications thereof falling within the spirit of the invention or the scope of the appended claims.

I claim as my invention:

1. In a percolator having a liquid reservoir, a liquid heating chamber, and a fountain tube communicating with said chamber, the combination with an inlet opening in the side wall of said fountain tube, of a supporting member extending inwardly from said side wall, and a valve mounted within said fountain tube opposite said inlet opening, said valve having an oblique cam surface in contact with said supporting member, said cam surface being so shaped that said valve is normally held by gravity in position to close said inlet opening and is capable of being moved by fluid pressure to a position in which said inlet opening is open.

2. In a percolator having a liquid reservoir, a liquid heating chamber, and a fountain tube communicating with said chamber, the combination with an inlet opening in the side of said fountain tube, of a valve mounted within said fountain tube, said valve having a body portion adapted to be placed substantially parallel to the side of said fountain tube and spaced therefrom, and having relatively thin, marginal flanges extending from said body portion to the side of the fountain tube around said inlet opening so that said body portion and flanges seal the inlet opening.

3. In a percolator having a liquid reservoir, a liquid heating chamber, and a fountain tube communicating with said chamber, the combination with an inlet opening in the side of said fountain tube, of a valve mounted within said fountain tube, said valve having a comparatively thin edge for contact with the side of said fountain tube when said valve is closed, the rest of said valve being spaced from said fountain tube to eliminate a clogging thereof by coffee grounds and the like.

4. A valve for use in a coffee percolator, said valve comprising a curved body portion and a flange connected to the body portion at the margin thereof and extending at an angle thereto, said flange presenting a comparatively thin edge adapted to seat itself against a wall so as to lessen the likelihood of said valve becoming clogged or stuck by solid or sticky matter.

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