April 5, 1932. G. IACOBITTI 1,852,013

SPRAY NOZZLE

Filed Sept. 16, 1930

Fig. 1.

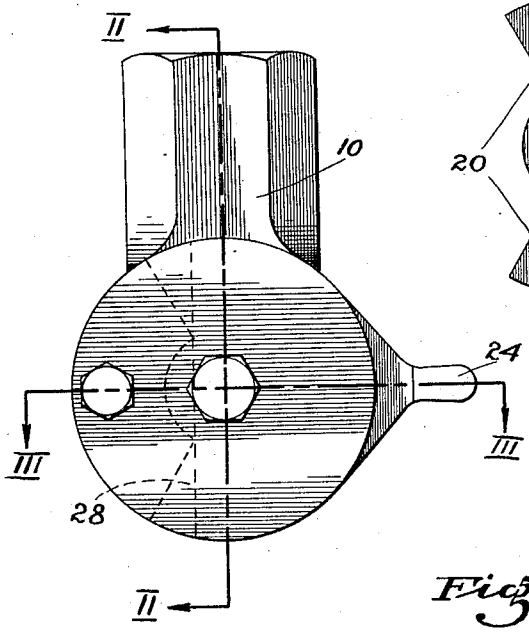


Fig. 4.

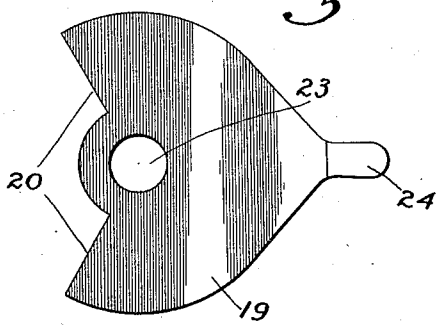


Fig. 2.

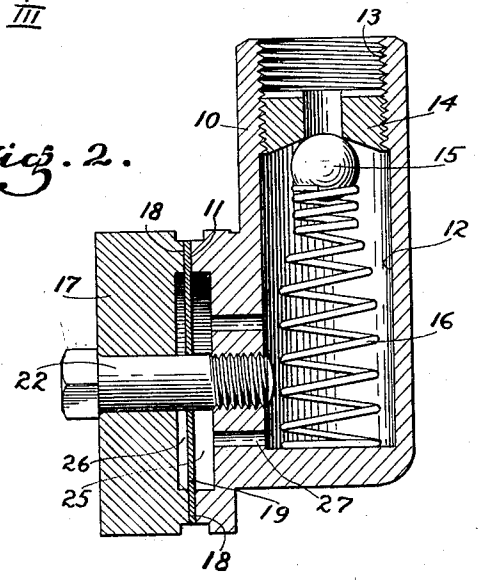
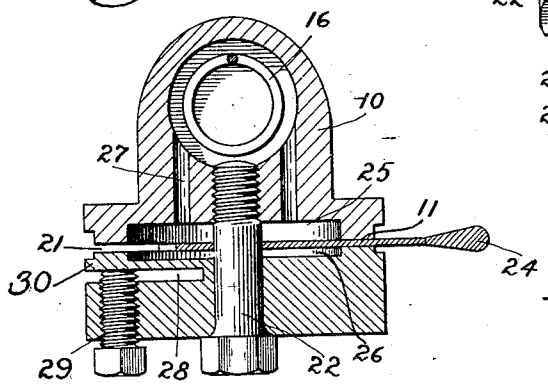


Fig. 3.



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UNITED STATES PATENT OFFICE

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SPRAY NOZZLE

Application filed September 16, 1930. Serial No. 482,216.

My present invention relates to a spray nozzle and more particularly to an improved nozzle for controlling the spray of water in sugar washing centrifugals.

The principal object of my invention is to provide a new and novel type of spray nozzle for sugar washing centrifugals having features and advantages not possessed by nozzles heretofore provided for this purpose.

A further object of my invention is to provide in a nozzle of the so called fan spray type a means whereby the direction of the spray can be changed in the plane of the spray without disturbing the position of the nozzle proper.

Another object of my invention is to provide in a spray nozzle of the type described a means for preventing a drip from the nozzle when the pressure of the liquid being sprayed is insufficient to form a proper spray.

Another object of my invention is to provide in a spray nozzle of the fan or sheet spray type a means whereby the distribution of the liquid in the sheet of spray may be varied in a simple manner.

Other objects and advantages of my invention will be in part pointed out and in part evident from the following description taken in connection with the accompanying drawings wherein I have shown, by way of illustration and not of limitation, a preferred form of my invention.

In the drawings wherein like numerals refer to like parts throughout the several views:

Figure 1 is a front elevation of my improved nozzle showing the spray outlet on the left side,

Figure 2 is a vertical sectional view taken along line II—II of Figure 1,

Figure 3 is a horizontal sectional view taken along line III—III of Figure 1, and

Figure 4 shows a preferred type of spray aperture forming spacer and director.

In the washing of sugar crystals at the refinery the crystallized sugar as taken from the evaporating pans contains a certain amount of uncrystallized juice which must be separated from the crystals. This operation is carried out by placing the sugar in a basket type of perforated receptacle that is rotated at a high speed about a vertical axis and in which the sugar, as it is disposed around the wall of the basket by centrifugal force, is subjected to a high velocity jet or spray of washing water.

For a proper washing of the sugar crystals in this manner it is necessary that the washing operation be timed so that the crystals will not be subjected to more water than is required for the elimination of the impurities. It is also necessary that the spray or jet from the nozzle be so directed that the layer of crystals disposed upon the walls of the basket will be subjected to a uniform amount of wash water over the entire surface during the washing operation.

In order to provide this uniform distribution of the wash water it is customary to project the wash water in the form of a sheet or fan like spray which distributes the water uniformly between the top and bottom of the washing basket. The spray nozzle is generally disposed near the center of the basket and is located so as to direct the sheet of wash water radially outward in a vertical plane. In nozzles of the type now used the spray outlet is fixed and as a result any vertical adjustment of the spray in the basket must be accomplished by raising or lowering the nozzle as a whole together with the wash water supply pipe. It is important that the spray outlet be properly located with respect to the walls of the centrifugal basket and it is therefore a further object of my invention to provide a means for adjusting the direction of the spray in a simple manner without changing the location of the nozzle or disturbing the supply connections.

For a better understanding of my invention reference should be had to the accompanying drawings wherein 10 designates the main or body portion of my improved nozzle. The body portion 10 is provided with a vertically disposed annular surface 11 and is cored out to provide a conduit 12 for the washing liquid or fluid. The upper end of the body portion 10 is internally threaded as at 13 to receive a fluid supply pipe (not

shown) and a valve seat 14 is screwed into this end to form a seat for a ball check valve 15. The ball valve 15 in this embodiment is shown as held in engagement with the seat 14 by a helical spring 16. The spring 16 is preferably of such size and strength that it will hold the ball 15 in its valve closing position at all times when the fluid pressure is not sufficient to produce a proper spray. If it is desired to provide for an adjustment of the pressure exerted by the spring 16 this can be done by providing an adjustable seat at the lower end of the spring.

Cooperating with the annular surface 11 upon the body member 10, I show a member 17 as having an annular surface 18 which is complementary to the annular surface 11 and disposed between these two surfaces 11 and 18, I provide a spacing or spray outlet defining element 19. This spacing element 19 is in the form of a disk-like member and has a cut away portion designated by the numeral 20 which defines the length of a spray outlet 21. The member 17 is held upon the nozzle body 10 by a bolt 22 and the spacing disk 19 is held in clamped engagement between the annular surfaces 11 and 18. A central opening 23 is provided in the spacing disk 19 through which the bolt 22 may pass.

With the above construction it will be seen that when the bolt 22 is loosened slightly the disk 19 may be turned about the bolt to change the position of the spray outlet 21 between the surfaces 11 and 18. The disk 19 is shown as provided with a projecting portion or handle 24 to facilitate a movement thereof when changing the direction of the spray.

By referring to Figures 2 and 3 of the drawings it will be seen that in forming the annular surfaces 11 and 18 upon the members 10 and 17 there are also formed in these members, cavities 25 and 26 respectively. The cavity 25 is connected with the conduit 12 by a plurality of passageways 27 and the cut away portion 20 in the disk 19 is cut sufficiently deep to permit an accumulation of the washing fluid in the cavity 26. By forming these cavities 25 and 26 with substantially the same depth as shown, I equalize the pressure on each side of the spray opening 21. This arrangement produces a uniform and properly formed spray.

In a fan type of spray it is known that the spray usually thins out at its outer edges. This is due to the diverging end walls of the spray outlet which results in a loss of pressure at these points. In order to overcome this defect, I propose to deflect one of the annular surfaces 11 or 18 at the center of the spray outlet so as to substantially equalize the pressure throughout the area of the spray.

By referring to Figure 3 it will be seen that I accomplish the above by milling out a tangentially extending slot 28 in the member 17 immediately in back of the annular surface 18 and threading a screw 29 in the remaining portion of the member 17. With this construction there will be formed a projecting lip 30 which can be easily deflected and as a result the annular surface 18 at this point may be also deflected inwardly at the spray outlet. In this connection it should be noted that the member 17 is also rotatable about the bolt 22 and as a result the point of deflection in the annular surface 18 can be moved with the spray outlet or with respect to the ends thereof.

While I have, for the sake of clearness and in order to disclose my invention so that the same can be readily understood, described and illustrated specific devices and arrangements, I desire to have it understood that this invention is not limited to the specific means disclosed but may be embodied in other ways that will suggest themselves, in view of this broad disclosure, to persons skilled in the art. It is believed that this invention is broadly new and it is desired to claim it as such so that all such changes as come within the scope of the appended claims are to be considered as part of this invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A spray nozzle of the character described having a body portion through which the liquid to be sprayed may pass, said body portion having a flat surface at its outlet end, means secured in clamping engagement with said surface, a spacing element disposed between said surface and said last means having a part cut away for defining the length and width of a spray outlet and means for deflecting said first means adjacent the cut away portion of said spacing element to diminish the width of the spray outlet intermediate its ends.

2. A spray nozzle of the character described having a body portion through which the liquid to be sprayed may pass, said body portion having an annular surface at its outlet end, means having a partially flexible annular surface secured in clamping engagement with said first annular surface, and a spacing element disposed between said surfaces having a cut away part adapted to be disposed adjacent the flexible portion of said means for defining the length and width of a spray outlet and means for flexing said first means adjacent the spray outlet to provide an opening having a greater width at its ends than in the center.

3. In a spray nozzle of the character described, the combination of a body member adapted to connect with a source of fluid under pressure and having a conduit extending there through, a closure device at one end of said conduit, a disk disposed between said closure device and said body member having a part cut away to define a spray outlet, and

means carried by said disk whereby it may be moved to change the direction of the spray.

4. In a spray nozzle for sugar washing centrifugals and the like, the combination of a pair of oppositely disposed and spaced surfaces between which liquid may pass to normally form a sheet like spray of rectangular cross section, and means for deflecting one of said surfaces at a central point to control the distribution of the liquid and produce a sheet like spray having greater thickness at its edges where it leaves the nozzle than in the center.

5. In a spray nozzle for sugar washing centrifugals and the like, the combination of a fluid supply conduit a pair of oppositely disposed surfaces forming an outlet for said conduit, a relatively thin spacing means disposed and held in clamped engagement between said surfaces and having a part cut away for forming a normally rectangular spray outlet, and means for deflecting one of said surfaces adjacent the spray outlet along a line extending parallel with the long axis of the outlet to control the distribution of the liquid in the spray substantially as described.

6. A spray nozzle for sugar washing centrifugals and the like comprising, a body portion adapted to connect with a source of fluid, an end closure member for said body portion secured in clamped engagement therewith by a single axially extending screw, a spacing member disposed between said end closure member and said body portion and rotatably mounted upon said axially extending screw, and means carried by said member whereby it may be moved to change the direction of the spray.

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