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(54) **Anti-drip device.**

(57) An anti-(after)drip device at the outflow pipe of a dosing device, in particular a beverage machine, wherein, in a first outflow path (1) of the outflow pipe, a branch (3, 16) is provided for a second outflow path (13) having a direction which is different from that of the first outflow path and slants downwards, which branch can be bridged by the liquid at a relatively high flow velocity, whereas at decreasing flow velocity the residual liquid follows the second outflow path (13) through the branch (3, 16).

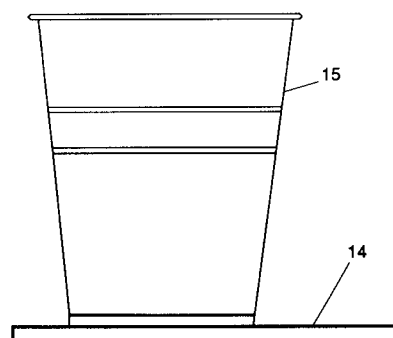
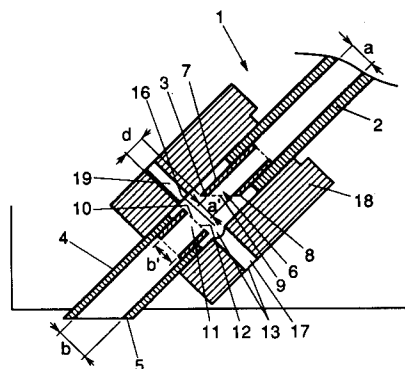


FIG. 1

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This invention relates to an anti-(after)drip device at the outflow pipe of a dosing device, in particular a beverage machine.

In such appliances and also in filling devices for bottles and the like, some form of prolonged after-drip arises at the end of each dosing operation, which entails a number of disadvantages. In a beverage machine with cups to be arranged under the outlet opening of the outflow pipe, a cup will oftentimes be removed before the dosing operation has been entirely completed. Dripping beverage may then fall onto the outside of the cup or onto the locating position or supporting surface for the cup. Both phenomena have an undesirably contaminatory effect.

From laid-open Dutch patent application no. 8203763 it is known to avoid after-drip in a dosing device of the above-mentioned type by sucking out drops egressing through the outlet opening of the outflow pipe upon completion of the dosing operation. This requires the provision of a suction channel having its inlet by or near the outlet opening, as well as a vacuum pump.

German 'Offenlegungsschrift' no. 2064456 discloses a dosing device where the outflow pipe can be closed by a valve which can be controlled by a outflow gutter tiltable about a horizontal axis and having a closed and an open outflow end. In one tilted end position of the outflow gutter, where the gutter slants downwards in the direction of the closed end, the valve is kept in closed position in the outflow pipe through spring bias. Dripping liquid, if any, of a previous dosing operation falls into the outflow gutter and is collected in the closed end thereof. By tilting the open outflow end of the gutter downwards, the valve is moved against the spring bias into the open position and a particular amount of liquid flows out through the outflow gutter into a cup or similar receptacle being held in readiness. Upon completion of the dosing operation, the valve is closed again and dripping residual liquid is collected in the closed end of the outflow gutter again.

A swivelling outflow gutter with which drops can be diverted laterally of a cup supporting position is also described in German patent specification 3742930.

In particular if the construction of beverage machines is compact, additional pumps, shut-off valves, swivelling gutters and the like constitute a problem.

The object of the present invention is to provide a device for preventing after-drip at the outflow pipe of a dosing device, in particular after-drip onto the cup supporting position in a beverage machine, without the disadvantages of known proposals.

For that purpose, according to the invention, in a first outflow path of the outflow pipe a branch is provided for a second outflow path having a direction which is different from that of the first outflow path and slants downwards, which branch can be bridged by the liquid at a relatively high flow velocity, so that the liquid flow follows the first outflow path, whereas at decreasing flow velocity the residual liquid follows the second outflow path through the branch.

In a practical constructively simple exemplary embodiment, the outflow path of the outflow pipe is interrupted in an interruption, a supply part of the first outflow path being located upstream of the interruption and an outflow part of the first outflow path being located downstream of the interruption.

During the delivery of a portion of liquid, the greater part will flow out at a relatively high velocity, so that the interruption in the first outflow path of the outflow pipe will be bridged by the flowing liquid. By the end of the delivery of the dosed amount, the velocity decreases, so that residual liquid can no longer reach the part of the first outflow path downstream of the interruption and can be diverted within the device by way of the second outflow path to a drip-tray or like collecting reservoir.

In the device according to the invention, therefore, it is ensured that a cup supporting surface can remain clean without the necessity of deploying for that purpose valves, discharge gutters and the like, which take up space and increase the cost price.

In addition, the device according to the invention is eminently suitable for use with a beverage machine of compact design, where it is advantageous if the discharge pipe for conveying liquid from a preparation unit or a supply container to the point where a cup or other receptacle is to be arranged, can extend at least substantially horizontally, ending in a 90° angled outflow extending down towards the cup supporting surface. Precisely in the case of such a design, the drop of the outflow pipe is slight and thus the liquid velocity is low at the end of a dosing operation. As a result, protracted after-drip can arise and there is a substantial chance of contamination of the cup and/or the cup supporting surface when a cup is being removed prematurely. The device according to the invention, however, will limit such prolonged after-drip to a minimum.

In further elaboration of the invention, at the location of the interruption in the first outflow path, a coupling sleeve can be arranged which encloses a collecting chamber with a discharge channel for residual liquid.

The invention will now be further explained with reference to the accompanying drawing, in which:

Fig. 1 represents a first embodiment of the anti-(after)drip device according to the invention;

Fig. 2 represents a second embodiment of an anti-(after)drip device according to the invention.

Fig. 1 diagrammatically shows a longitudinal elevation of the device, reference character 1 indicating the slanting terminal outflow path of a discharge pipe of a beverage machine or like dosing device (not shown).

The first outflow path 1 comprises a supply part 2 located upstream of an interruption 3 and an outflow part 4 with an outflow opening 5, located downstream of the interruption 3.

In the embodiment shown, the upstream supply part 2 has an inner diameter a and the downstream outflow part 4 has an inner diameter b , with b being preferably greater than a .

The supply part 2 ends at the interruption 3 in a spray nozzle 6 which, in the present exemplary embodiment, has an inner diameter a' . An upper side 7 of the spray nozzle 6 is preferably extended in downstream direction relative to the lower side 8 of the spray nozzle 6. Accordingly, in this embodiment the spray nozzle 6 comprises a bevelled outlet end 9 which slants downwards in upstream direction.

The upstream inlet end 10 of the discharge part 4 forms part of an inlet nozzle 11 which has an inner diameter b' which is greater than a' . Preferably, the inlet nozzle 11 has a non-bevelled inlet end 10, i.e. an edge 12 of the input nozzle 11 is located in a plane at least substantially perpendicular to the longitudinal direction of the supply part 2.

The device further comprises at least one second outflow path 13 originating in the interruption 3. In the present embodiment, the second outflow path 13 is directed obliquely downwards, but it may also be designed so as to extend perpendicularly downwards. The second outflow path 13 will preferably originate in a part of the interruption 3 located below the spray nozzle 6.

As long as the flow velocity of the metered liquid is still sufficiently high, the interruption 3 will be bridged. However, as soon as the flow velocity of the liquid falls below a particular value, typically at the end of a dosing cycle, residual liquid will no longer reach the inlet nozzle 11 of the outflow part 4. Accordingly, this residual liquid does not leave the discharge pipe via the outflow opening 5, which is typically arranged above a supporting surface or locating position 14 for a cup 15 or the like, so that the locating position 14 remains clean.

In accordance with the invention, the residual liquid can be discharged via the second outflow path 13. For that purpose the device in this case comprises a collecting chamber 16 and a discharge channel 17. The residual liquid is received, typically in the form of drops, in the collecting

chamber 16 which is located in a coupling sleeve 18 which embraces the outflow path 1 at the location of the interruption 3. Then residual liquid will be discharged to a suitable location by way of discharge channel 17.

In accordance with a particular embodiment, the device further comprises at least one aeration channel 19 originating at an upper side of the interruption 3. In Fig. 1 the aeration channel 19 is located downstream of the upper side 7 of the spray nozzle 6, more particularly in the prolongation of the discharge channel 17. It is also possible, however, to design the aeration channel 19 so as to originate in the interruption 3 at a point further upstream or downstream. The advantage of the aeration channel 19 is that the residual liquid referred to can be discharged particularly easily via the second outflow path 13 without a part of this residual liquid yet being discharged through the outflow opening 5 in the form of drops. The time lapse in which the after-drip from the outflow opening 5 ends completely upon closure of the liquid supply to the supply part 2 will be further shortened by virtue of the aeration channel 19. The reaction time in which the delivery of liquid from the outflow opening 5 can be completed entirely is therefore improved.

Fig. 2 shows an alternative embodiment of a device according to the invention. Corresponding parts in Figs. 1 and 2 are indicated by the same reference characters.

In Fig. 2 the first outflow path 1 is of at least substantially horizontal design. More particularly, the supply part 2 and the upstream part 20 of the outflow part 4 extend horizontally, the downstream part 21 of the outflow part 4 bending downwards through an angle of approximately 90° . The second outflow path 13, in particular the discharge channel 17, extends at least substantially vertically. The device of Fig. 2 has as an advantage that it can be made of particularly compact design.

The inner diameter a' of the spray nozzle 6 is preferably between 3.5 mm (millimeters) and 5 mm for both embodiments. The inner diameter b' of the inlet nozzle 11 is preferably between 6 mm and 15 mm. The distance d between the upper side 7 of the spray nozzle 6 and the inlet end 9 of the inlet nozzle 11 will preferably be between 0.5 mm and 2 mm.

The inner diameter of the aeration channel 19 is not critical and may for instance be chosen to be 2 mm. However, other diameters are also possible. Similarly, the inner diameter of the discharge channel 17 is not critical and may for instance be chosen to be of the order of magnitude of the inner diameter a' or b' .

If 125 cc of liquid is supplied to the device according to the invention for filling, for instance,

the cup 15, only a maximum of 2.5 cc of residual liquid will be discharged via the second outflow path. Moreover, the reaction time is considerably improved over that of conventional systems.

Both in Fig. 1 and in Fig. 2, the discharge channel 17 and the aeration channel 19 are arranged in the coupling sleeve 18. It will be clear, however, that supply part 2, outflow part 4, spray nozzle 6, inlet nozzle 11, discharge channel 17 and aeration channel 19 may also be made in one piece.

Claims

1. An anti-(after)drip device at the outflow pipe of a dosing device, in particular a beverage machine, characterized in that, in a first outflow path (1) of the outflow pipe, a branch (3, 16) is provided for a second outflow path (13) having a direction which is different from that of the first outflow path and slants downwards, which branch can be bridged by the liquid at a relatively high flow velocity, so that the liquid flow follows the first outflow path (1), whereas at decreasing flow velocity the residual liquid follows the second outflow path (13) through the branch (3, 16). 15 20 25
2. A device according to claim 1, characterized in that the outflow path (1) of the discharge pipe is interrupted in a first interruption (3), a supply part (2) of the first outflow path (1) being located upstream of the interruption (3) and an outflow part (4) of the first outflow path (1) being located downstream of the interruption (3). 30 35
3. A device according to claim 2, characterized in that the supply part (2) ends downstream in a spray nozzle (6) and the outflow part (4) begins upstream in an inlet end (10), which has a greater inner diameter than the spray nozzle (6). 40
4. A device according to claim 2 or 3, characterized in that a coupling sleeve (18) is arranged at the location of the interruption (3) in the first outflow path (1), said coupling sleeve (18) enclosing a collecting chamber (16) with a discharge channel (17) for the residual liquid. 45 50
5. A device according to claim 3, characterized in that the inlet end (10) of the outflow part (4) forms part of an inlet nozzle (11). 55
6. A device according to any one of the preceding claims, characterized in that the device further comprises an aeration channel (19) originating in the interruption (3).
7. A device according to claims 3 and 6, characterized in that the aeration channel (19) originates in a part of the interruption (3) located above the spray nozzle (6). 5
8. A device according to claim 3, characterized in that the spray nozzle (6) comprises a bevelled outlet end (9) slanting downwards in upstream direction. 10
9. A device according to claim 3, characterized in that said inner diameter of the spray nozzle (6) is between 3.5 mm and 5 mm and said inner diameter of the inlet end (10) is between 6 mm and 15 mm.
10. A device according to claim 9, characterized in that the distance between an upper side (7) of the spray nozzle (6) and the inlet end (9) of the outflow part (4) is between 0.5 mm and 2 mm.
11. A device according to claim 3, characterized in that the second outflow path originates in a part of the interruption (3) located below the spray nozzle (6).

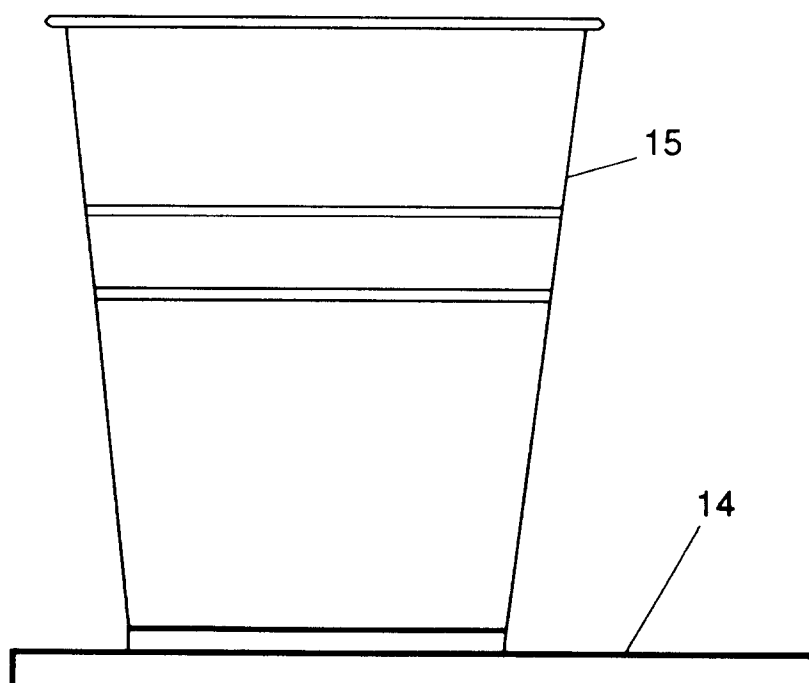
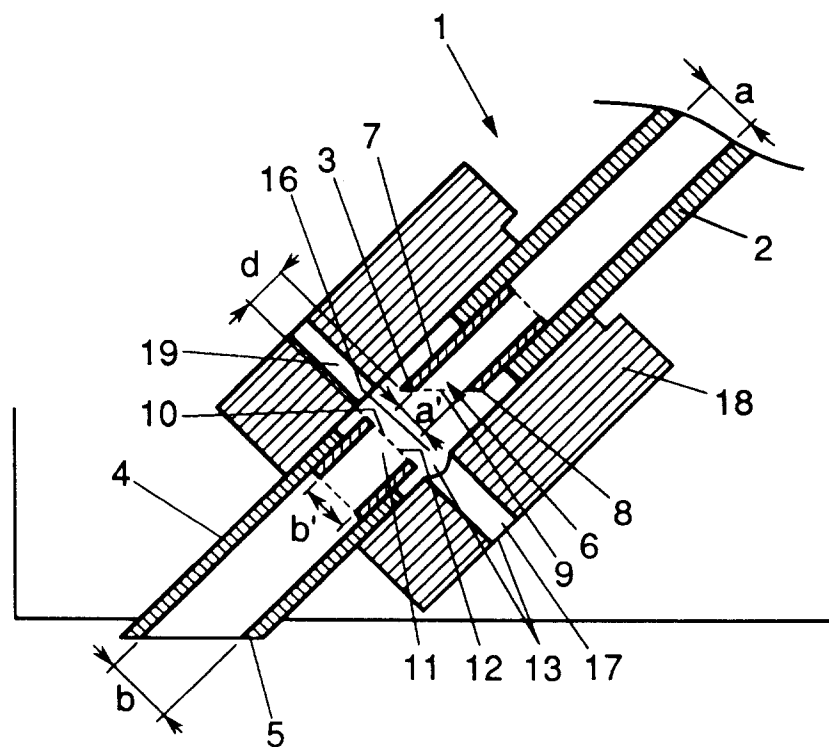


FIG. 1

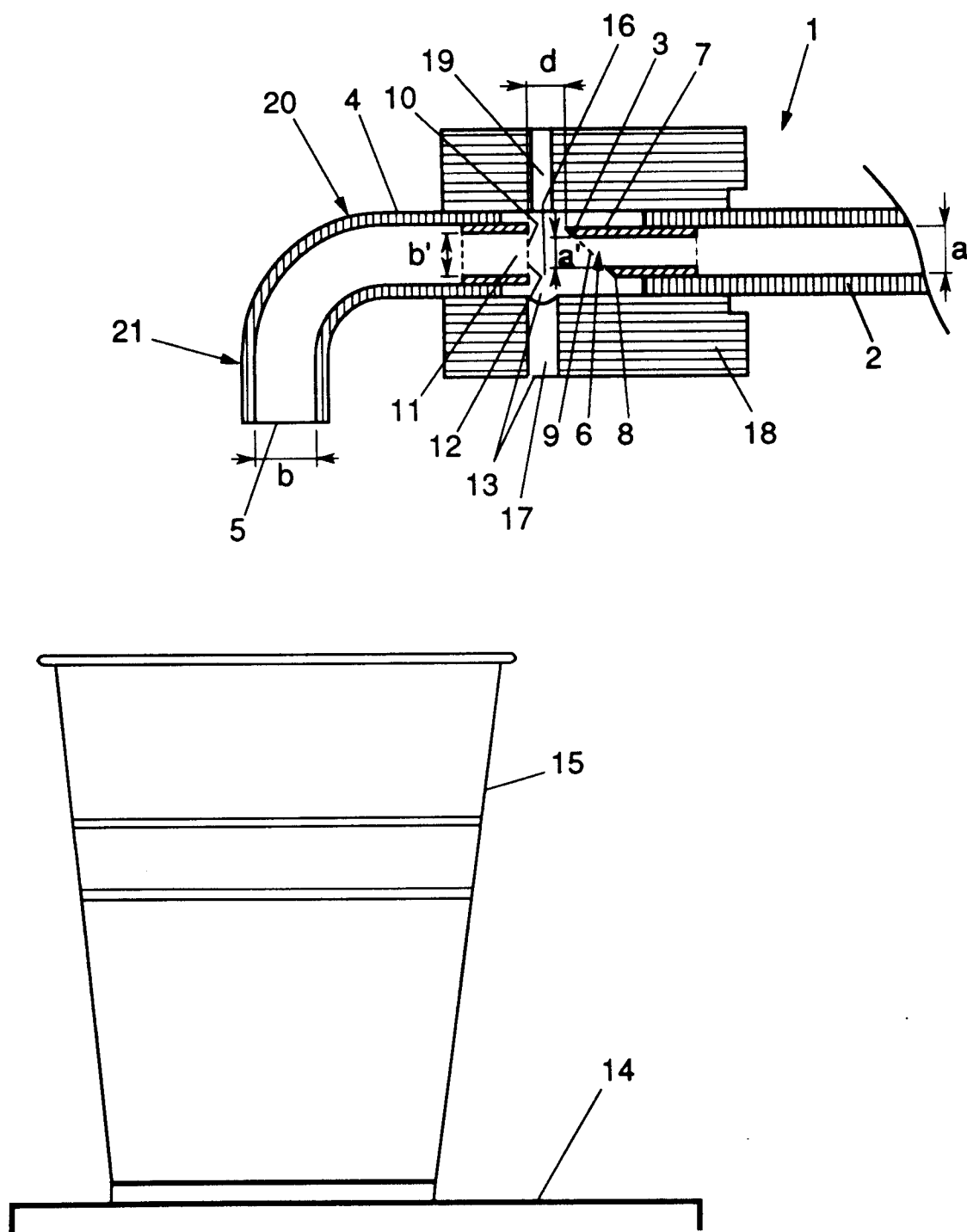


FIG. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 94 20 2100

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	NL,A,8 203 763 (STORK BEPAK BV) 16 April 1984 cited in the application see page 3, line 24 - page 6, line 20; figures 1-3 ---	1	B67D1/08 B67D1/16
A	DE,A,20 64 456 (SIEMENS-ELECTROGERÄTE) 20 July 1972 cited in the application see page 2, line 31 - page 3, line 36; figure 1 ---	1	
A	DE,C,37 42 930 (CAFINA AG) 6 October 1988 cited in the application see abstract; figure 3 ---	1	
A	DE,A,36 02 665 (WÜRTTEMBERGISCHE METALLWARENFABRIK AG) 6 August 1987 see column 4, line 28 - column 7, line 49 see figures 1-5 ---	1	
A	DE,C,589 168 (M. FEIG) see the whole document -----	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6) B67D B67C B65D A47J
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 3 October 1994	Examiner Smolders, R
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