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(54) Anti-drip nozzle in a filling machine for oily liquid products

(57) The invention falls within the sector relating to the filling of containers with oily liquids and in particular relates to an anti-drip nozzle which comprises a plurality of concentric tubular elements (8) which are inserted inside one another so as to create a plurality of slits or interstices (9) inside which, when there is no supply flow, the oily liquid product is retained as a result of capillarity and, where applicable, owing to the Venturi effect.

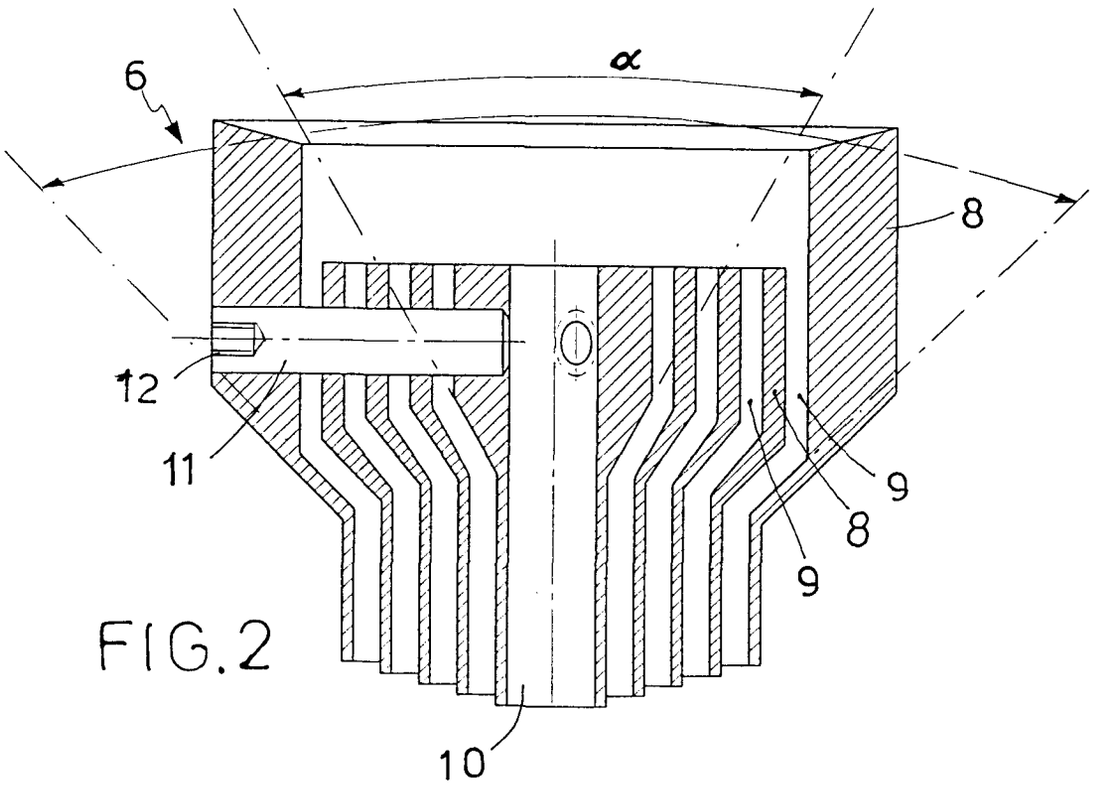

FIG.2

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Description

[0001] The present invention relates to an anti-drip nozzle in a filling machine for oily liquid products.

[0002] In the sector relating to the filling of containers with oily liquids, in particular oils for alimentary use, there exists the need to avoid dripping of the filling nozzles. A first embodiment envisages the use of a nozzle with a substantially cylindrical shape, having, positioned inside it, superimposed wire gauzes or filters which have the purpose of retaining the liquid between the meshes of the filters when the supply flow of the liquid itself is interrupted.

[0003] A drawback of this embodiment is due to possible blockage of the nozzle following the use of liquids or ducts which are not very clean or in any case are subject to the formation of particle deposits. This causes cleavages in the flow of liquid emerging from the nozzle and excessive pressures in the ducts upstream of the nozzle.

[0004] A second embodiment envisages the use of a nozzle consisting of a plurality of small cylindrical ducts which are inclined so as to be slightly converging towards the outlet. The cylindrical ducts are formed by perforating a block of material, are easily affected by blockages and the operations for cleaning the individual ducts are somewhat complex. Moreover the dimensions of the nozzle overall are considerable and this limits the application of this nozzle to the various filling situations.

[0005] A further embodiment envisages the use of a cylindrical nozzle which is closed by a conical obturator kept in the closed position by the recall force of a spring or a direct control system. When the pressure of the filling product exceeds the recall force of the spring, the obturator moves downwards, freeing a perimetral slit through which the liquid is sprayed, said liquid tending to emulsify and to create vortices, thus requiring a perfect and precise connection between the mouth of the container and the nozzle in order to prevent the spillage of liquid.

[0006] In this case also the dimensions are fairly large and limit the use of the nozzle to a small number of applications.

[0007] This nozzle is subject, moreover, to dripping and to contamination with the free surface of the product inside the container.

[0008] The object of the present invention is that of eliminating the abovementioned drawbacks and providing a nozzle which avoids dripping of the product and which is manufactured in an extremely simple and low-cost manner.

[0009] A further object is that of allowing easy and efficient cleaning of the nozzle itself as well as ensuring adaptability of the nozzle so that it can be applied to different types of filling valves (for example, of the disk type, ball type, back-pressure type, etc.) without the need for an extremely precise connection with the container to be filled.

[0010] Said objects are fully achieved by the nozzle according to the present invention which is characterized by the contents of the claims indicated below and in particular by the fact that it comprises a plurality of concentric tubular elements which are inserted inside one other so as to create a plurality of slits or interstices inside which, when there is no supply flow, the oily liquid product is retained as a result of capillarity.

[0011] The concentric tubular elements are formed so that the slits or interstices have a flow cross-section for the fluid which is greater at the nozzle outlet than at the nozzle inlet so that the fluid, owing to the Venturi effect, tends to keep its own flow compact without cleavages, towards the outside, of the stream of fluid.

[0012] The concentric elements are cylindrical elements which are arranged so as to create a plurality of cylindrical slits which are concentric with one another or are frustoconical and arranged so as to create a plurality of frustoconical slits which are concentric with one another or are cylindrical elements with a frustoconical middle zone which are arranged so as to create a plurality of cylindrical shaped concentric slits with a frustoconical middle zone.

[0013] Preferably the conicity increases from the internal element towards the external element, passing from about 60° to 90°.

[0014] These and other characteristic features will emerge more clearly from the following description of a preferred embodiment illustrated, purely by way of a non-limiting example, in the accompanying illustrative plate in which:

- Figure 1 shows a partial vertical cross-section through the nozzle applied to a filling valve;
- Figure 2 shows a central vertical cross-section through the nozzle.

[0015] With reference to the Figures, 1 denotes in its entirety a filling valve of the known type comprising a body 2 inside which an obturator 3 operates, said obturator in the case in question being of the piston type, so as to open and close an opening 4 through which an oily fluid supplied from a supply duct 5 is introduced into containers, not shown, which must be filled.

[0016] The above belongs to the prior art and operates in accordance with a known method. 6 denotes an original nozzle which is applied to the valve 1 by means of a threaded ring 7 which is screwed onto the valve.

[0017] The ring 7 is formed so as to contain the nozzle 6 in such a way that the latter projects at the bottom of the ring and is contact at the top with the valve body.

[0018] The ring 7 has the function of allowing easy disassembly and assembly of the nozzle in the case of operations involving maintenance and cleaning of the valve and the nozzle itself.

[0019] The nozzle 6 comprises a plurality of concentric tubular elements 8 which are inserted inside one other so as to create a plurality of slits or interstices 9 inside

which, when there is no fluid supply, the oily liquid product is retained as a result of capillarity so as to avoid dripping of the product itself.

[0020] The tubular elements 8 have a form which is obtained by joining together two cylindrical tube sections of different diameter united by a frustoconical element, as illustrated in Figure 2.

[0021] However, according to a variation of embodiment not shown, the tubular elements 8 may be concentric cylindrical elements or concentric frustoconical elements or concentric frustoconical elements with a single cylindrical part.

[0022] In the case illustrated, the conicity increases gradually from the innermost tubular element 8 towards the outermost element, passing from an angle α of about 60° to an angle of about 90°.

[0023] The outermost tubular element 8 projects at the top with respect to the other elements so as to facilitate application to the valve.

[0024] The bottom ends of the individual innermost tubular elements 8 project slightly with respect to those of the outermost elements so to make the flow or stream of fluid emerging from the nozzle more compact and uniform.

[0025] The tubular elements 8 are moreover formed so that the slits or interstices have a flow cross-section of the fluid which is greater at the nozzle outlet than at the nozzle inlet, so that the fluid, as a result of the Venturi effect, tends to keep its own flow compact without cleavages, towards the outside, of the stream of fluid.

[0026] The vertical upper portion of the slits 9 has in fact a cross-section which is smaller than that of the vertical lower portion of the same slits.

[0027] The innermost tubular element 8, or central element, is provided with a central channel 10 of cylindrical shape.

[0028] 11 denotes a transverse pin which passes through a hole formed in each tubular element so as to keep the tubular elements correctly positioned and allow rapid assembly and disassembly thereof during the nozzle cleaning operations.

[0029] In the case in question three radial pins are arranged at 120°, each of said pins being provided with a threading 12, into which, during disassembly of the nozzle, a screw is inserted so as to allow removal of the pin.

[0030] With the nozzle according to the present invention an effective anti-drip action is obtained, together with a constructional simplicity of the nozzle itself and ease of disassembly and assembly which facilitates the cleaning operations.

[0031] A further advantage consists in the fact that the present nozzle does not emulsify the product, providing it with a laminar type movement and therefore does not require an extremely precise connection. The nozzle may in fact also operate at a distance from the mouth of the container, increasing the degree of cleanliness of the filling cycle.

Claims

1. Anti-drip nozzle in a filling machine for oily liquid products, characterized in that it comprises a plurality of concentric tubular elements (8) which are inserted inside one another so as to create a plurality of slits or interstices (9) inside which, when no there is no supply flow, the oily liquid product is retained as a result of capillarity.

2. Nozzle according to Claim 1, in which the concentric tubular elements (8) are formed so that the slits or interstices (9) have a fluid flow cross-section which is greater at the nozzle outlet than at the nozzle inlet, so that the fluid, owing to the Venturi effect, tends to keep its own flow compact.

3. Nozzle according to Claim 1, in which the concentric tubular elements (8) are cylindrical elements arranged so as to create a plurality of cylindrical slits (9) which are concentric with one another.

4. Nozzle according to Claim 1, in which the concentric tubular elements (8) are frustoconical elements arranged so as to create a plurality of frustoconical slits (9) which are concentric with one another.

5. Nozzle according to Claim 1, in which the tubular elements (8) are frustoconical elements with a cylindrical part arranged so as to create a plurality of frustoconical slits (9) with a cylindrical part which are concentric with one another.

6. Nozzle according to Claim 1, in which the concentric tubular elements (8) are cylindrical elements with a frustoconical middle part which are arranged so as to create a plurality of concentric slits (9) of cylindrical shape with a frustoconical middle part.

7. Nozzle according to Claim 5 or 6, in which the frustoconical part is such that the conicity increases from the internal element towards the outermost element, passing from about 60° to about 90°.

8. Nozzle according to Claim 1, in which transverse pins (11) are provided, said pins passing through a hole formed in each tubular element (8) so as to keep said tubular elements (8) correctly positioned and allow rapid disassembly and assembly thereof.

9. Nozzle according to Claim 1, in which the tubular elements (8) are formed so that the bottom end of the innermost tubular elements (8) projects with respect to the bottom end of the outermost elements.

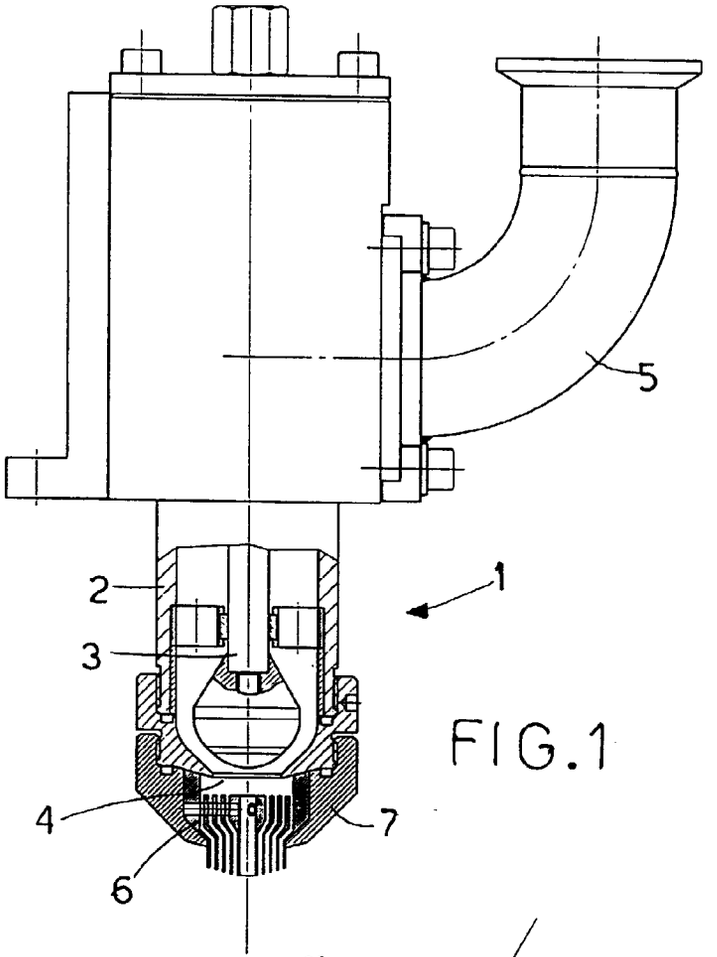

FIG.1

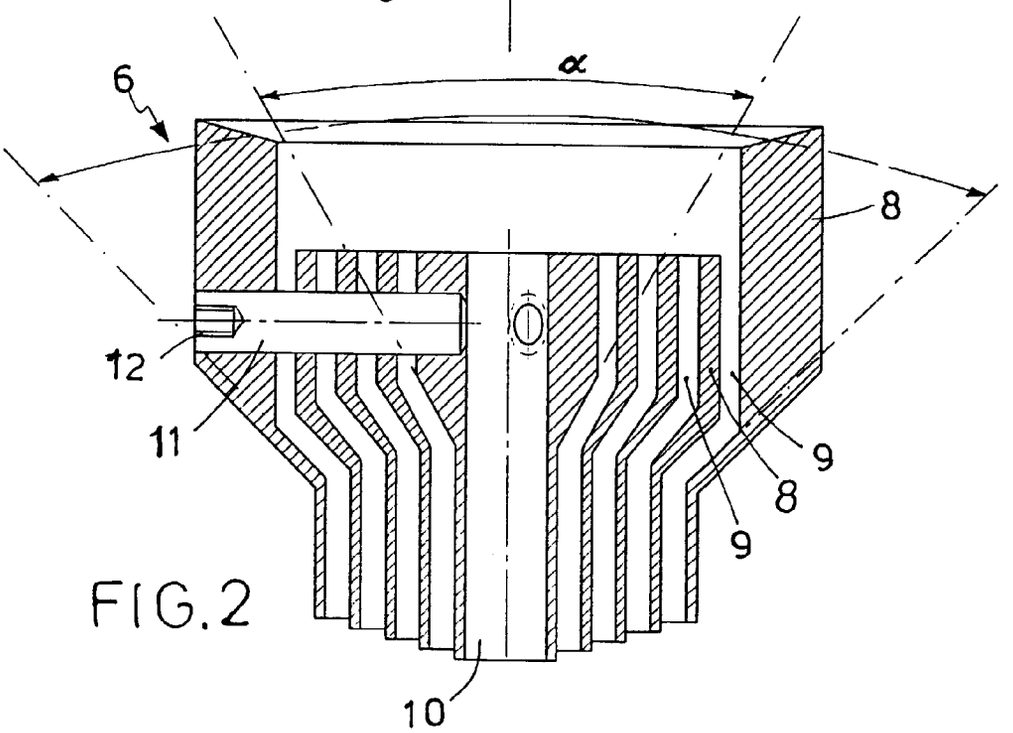

FIG.2

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EUROPEAN SEARCH REPORT

Application Number
EP 98 83 0617

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP 0 131 480 A (SERAC) 16 January 1985 * page 3, line 17-35 * * page 5, column 11-15; figure 1 *	1,3,4,9	B65B39/00 B67C3/26
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TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65B
B67C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 February 1999	Grentzius, W

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18-02-1999

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