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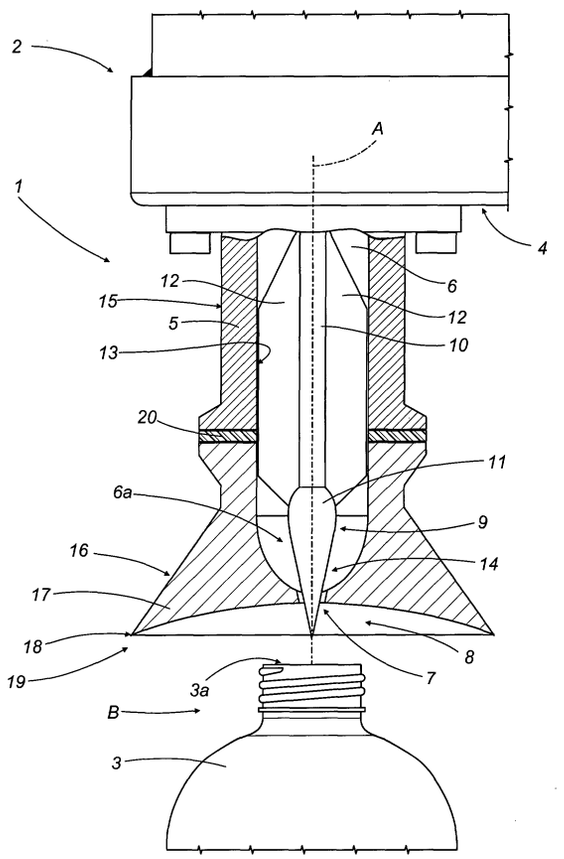
(54) Filling nozzle for a filling machine

(57) Fluid products are dispensed from a device (1) with a tubular nozzle (5) of which the filler outlet (7) incorporates a system (19) designed so that droplets of condensate and/or particles of the fluid product collecting on the nozzle (5) will be carried away and drained off outside the actual filling area (8).

FIG.1



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Description

[0001] The present invention relates to a device for dispensing fluid products in filling machines.

[0002] The filling machines in question can form part of automated systems for filling containers intended to hold a fluid product, for example bottles and flacons, generally considered.

[0003] In particular, the present invention relates to a dispensing device for fluid substances of the type comprising a feed duct, also an outlet from which to release the fluid product, located at the end of the duct and positionable thus over the mouth of a container to be filled while occupying a dispensing and filling area, and a valve element capable of movement relative to the duct in such a way as to open and/or close the outlet and control the flow of the fluid product.

[0004] Dispensing devices of the familiar type outlined above are advanced typically along a circular path by a carousel rotatable about a vertical axis, in such a way that they can be associated cyclically with successive containers for filling as these are placed in succession under the single devices.

[0005] Automatic machines used to fill containers with fluid products, particularly bottling machines, are affected by a trouble spot around the filling area, namely the lack of an aseptic barrier attributable to the fact that, given the appreciable difference in temperature between the fluid product and the external environment, a layer of condensation can form on the outer surface of the dispensing device and drip subsequently into the container.

[0006] Several technical solutions have been proposed in the attempt to overcome this particular drawback. Patents US 5 267 591, US 6 105 634 and JP 10 101 025, for example, describe three different liquid filler devices in which a sleeve is placed around a sector of the nozzle and a flow of air directed into the gap between the sleeve and the nozzle to prevent the formation of condensation on the peripheral outer surface of the nozzle.

[0007] US Patent 5 775 387 discloses a dispensing device for filling containers with liquids, of which the nozzle comprises a moving internal valve poppet having a flared end portion, which is designed to facilitate the expulsion of air from the container while filling with liquids and avoid the liquid product mixing with the air, and incorporates an isolation gap such as will prevent the formation of condensation on the outside of the nozzle.

[0008] Japanese patent 577 891 discloses a device for dispensing liquids into bottles, equipped with a valve poppet and a system designed to prevent any dripping of liquids when the device is closed: to this end, the poppet affords a central duct through which, at the moment of closing the nozzle, any droplets of liquid are held back by suction. In this instance, both the condensate and the residual liquid product are aspirated.

[0009] US Patent 4 964 444 relates to a device for use in filling containers that comprises a plurality of filler valves, wherein the nozzle of each valve is furnished with a modular external mechanism such as will clean the nozzle periodically by circulating a cleansing fluid, in order to guarantee the aseptic conditions needed for filling operations.

[0010] Considering the state of the art in the field to which the present invention relates, a fundamental drawback common to all dispensing devices of the type described above is that the solutions adopted in order to prevent condensation from forming and possibly dripping into the container during the filling step are typified by arrangements tending to overcomplicate the structure of the dispensing device, whether by heating the walls of the filler nozzle or by aspirating the droplets of liquid that collect on the nozzle, or by cleaning the nozzle periodically.

[0011] The object of the present invention is to provide a device for dispensing fluids such as will remain free of the drawbacks in question while presenting a simple and economic structure.

[0012] The stated object is realized according to the present invention in a device for dispensing fluid products in filling machines, comprising a nozzle referable to a substantially vertical axis and furnished with a bottom outlet, also a valve poppet capable of movement internally of the nozzle in such a way as to open and close the outlet, from which the fluid product is directed into respective containers each affording a relative mouth placed in a filling area beneath the outlet, characterized in that it comprises diverter means positioned near the outlet, by which condensate and/or particles of the fluid product are carried away and drained off outside the filling area.

[0013] The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

- figure 1 illustrates a first embodiment of the dispensing device in accordance with the present invention, viewed in a side elevation with certain parts in section and certain parts omitted;
- figure 2 illustrates a second embodiment of the dispensing device in figure 1, viewed in a side elevation with certain parts in section and certain parts omitted;
- figure 3 illustrates the dispensing device from beneath, viewed in the direction of the arrow F in figure 2;
- figure 4 illustrates a third embodiment of the dispensing device in figure 1, viewed in a side elevation with certain parts in section and certain parts omitted;
- figure 5 shows a detail of the dispensing device of figure 1, illustrated in a further embodiment.

[0014] Referring to figures 1, 2 and 4 of the drawings, 1 denotes a device for dispensing fluids such as would

be mounted typically along the periphery of a conventional bottling carousel, denoted 2 in its entirety, rotatable substantially in continuous fashion about a vertical axis (not illustrated) so as to advance the device 1 along a predetermined circular path, likewise not illustrated. The path in question will extend normally through an infeed station (not illustrated) at which each one of the devices 1 fitted to the carousel 2 is associated with a respective container 3 about to be filled, and thereafter through an outfeed station, likewise not illustrated, at which the filled container 3 is distanced from the relative device 1.

[0015] The device 1 extends vertically downwards from a bottom wall 4 of the carousel 2 and comprises a substantially cylindrical tubular nozzle 5. The tubular nozzle 5 presents a centre axis A lying parallel to the aforementioned axis of rotation of the carousel 2 and houses a feed duct 6, coaxial with the centre axis A, along which fluids are directed.

[0016] A bottom end 6a of the feed duct 6 affords an aperture establishing an outlet 7 through which the fluid product is dispensed into the containers 3 at a filling position, denoted B in figure 1, located between the infeed station and the outfeed station (not illustrated). The containers 3 are disposed substantially in vertical alignment with the axes A and placed each with a relative mouth 3a facing the outlet 7 of a corresponding dispensing device 1.

[0017] The space occupied by the delivery outlet 7 of the device 1 represents a filling area 8.

[0018] The dispensing device 1 further comprises a valve element 9 mounted slidably in the feed duct 6 and capable thus of reciprocating motion relative to the duct 6, generated by an actuator (conventional, and not illustrated). The valve element 9 comprises a stem 10 with a tapered head 11 at the bottom, and guide means that consist in a plurality of fins 12 extending radially from the stem 10 and offered in contact to an inside surface 13 of the duct 6, so as to contain the axial movement of the stem 10.

[0019] The head 11 constitutes a valve poppet 14 which during the movement of the stem 10 will alternately register against and separate from the outlet 7, by degrees, in such a way as to regulate the flow of fluid into the container 3 and close the outlet 7 after the container has been filled.

[0020] With reference to figure 1, the tubular nozzle 5 includes a substantially cylindrical top portion 15 departing from the wall 4 of the carousel, also a bottom portion 16 that comprises a tubular wall 17 disposed substantially coaxial to the nozzle 5 and presents a diameter increasing gradually toward an outer rim 18, thus creating a flared profile.

[0021] The diameter of the tubular wall 17 measured at the rim 18 is greater than that presented by the mouth 3a of the container 3, and preferably greater than the transverse dimensions of the container 3 overall. In addition, the rim 18 is located below the outlet 7, relative to the vertical axis A.

[0022] The tubular wall 17 and the corresponding outer edge 18 combine to create diverter means 19 for the dispensing device 1.

[0023] The top portion 15 of the tubular nozzle 5 and the diverter means 19 are connected together in conventional manner, by threaded couplings, bolts, clamps or a bayonet fitting, so that the diverter means 19 afford a detachable component such as can be removed to allow inspection and cleaning of the internal parts presented by the feed duct 6 and the valve element 9.

[0024] Observing figure 1, the dispensing device 1 will be seen to comprise a seal 20 interposed axially between the top and bottom portions 15 and 16 of the nozzle 5.

[0025] To advantage, the tubular wall 17 of the diverter means 19 can exhibit a variety of flared profiles, allowing selection of the profile most appropriate to the different fluid products and the different containers 3 utilized.

[0026] In particular, as illustrated by the longitudinal section of figure 2 and the view from beneath along the direction denoted F in figure 2, the profile presented by the tubular wall 17 of the diverter means 19 can assume an umbrella-like configuration of symmetrical or asymmetrical geometry, affording one or more preferential routes 21 along which the droplets run away toward the edge 18.

[0027] The outer edge 18 functions as a drip rail for the diverter means 19.

[0028] The tubular wall 17 presents an outer surface 22 uppermost and an inner surface 23 underneath, both angled downwards and converging toward the rim 18.

[0029] In operation, the drops of fluid and the droplets of condensate that collect on the downward-facing inner surface 23 will trickle by gravity toward the rim 18 providing the drip rail.

[0030] Advantageously, in this way, it becomes possible to avoid wetting and contaminating the container 3, whilst the condensation that might have formed on the various parts of the dispensing device 1 can be collected by a respective drainage and disposal system of conventional embodiment not illustrated in the drawings.

[0031] As discernible in figures 2 and 3, the droplets of condensate and/or fluid product will pass along the preferential routes 21.

[0032] In other embodiments of the dispensing device 1 shown in figures 4 and 5, the diverter means 19 are fashioned to advantage as an additional portion in the form of a shroud 24 and detachable thus from the tubular nozzle 5; this allows swift replacement of the diverter means 19 in use at any given time, since the outlet 7 is associated permanently with the top portion 15 of the nozzle 5.

[0033] In the example of figure 4, the diverter means 19 are attached to the tubular nozzle 5 by association with an outer face 25 of the selfsame nozzle 5 and uti-

lizing a connection of conventional type (not illustrated), for example a threaded or a bayonet type coupling.

[0034] In the example of figure 5, and similarly to that of figure 4, the diverter means 19 are attached to the tubular nozzle 5 at the outlet 7 utilizing a connection of conventional type (not illustrated), for example a threaded or a bayonet type coupling.

[0035] To advantage, the detachable shroud 24 can take on a variety of configurations and dimensions, both according to the type of fluid directed through the nozzle 5 and according to the shape and size of the container 3 being filled.

[0036] The interchangeability of the shrouds 24 is thus instrumental in allowing the dispensing device 1 to be adapted swiftly to the particular needs of the moment, making the device 1 extremely versatile.

[0037] In short, and broadly considered with reference to the accompanying drawings and to the foregoing specification, the tubular wall 17 is embodied as a solid of revolution coaxial with the nozzle 5 and presents two surfaces 22 and 23, upper and lower respectively, both of which angled downwards and converging toward the outer rim 18.

Claims

1. A device for dispensing fluid products in filling machines, comprising a nozzle (5) referable to a substantially vertical axis (A) and furnished with a bottom outlet (7), also a valve poppet (14) capable of movement internally of the nozzle (5) in such a way as to open and close the outlet (7), from which the fluid product is directed into respective containers (3) each affording a relative mouth (3a) placed in a filling area (8) beneath the outlet, **characterized in that** it comprises diverter means (19) positioned near the outlet (7), by which condensate and/or particles of the fluid product are carried away and drained off outside the filling area (8).

2. A device as in claim 1, wherein the diverter means (19) are rigidly associated with the nozzle (5).

3. A device as in claim 2, wherein diverter means (19) comprise at least one tubular wall (17) substantially coaxial with the nozzle (5) and presenting a flared profile extending from the edge of the outlet (7) to a rim (18) located outside the filling area (8).

4. A device as in claim 3, wherein the rim (18) of the tubular wall (17) functions as a drip rail from which to drain off the condensate and/or fluid particles.

5. A device as in claim 3, wherein the tubular wall (17) comprises a shroud (24).

6. A device as in claim 3, wherein the tubular wall (17) includes a solid of revolution coaxial with the nozzle (5), presenting an upper surface (22) and a lower surface (23) both angled downwards and converging toward the rim (18).

7. A device as in claims 3 to 6, wherein the tubular wall (17) is mounted detachably to the nozzle (5).

8. A device as in claim 6, wherein the lower surface (23) is angled to a degree determined by the type of fluid being dispensed.

9. A device as in claim 6, wherein the solid of revolution constitutes a replaceable bottom portion of the nozzle (5), selected according to the type of fluid being dispensed.

FIG.1

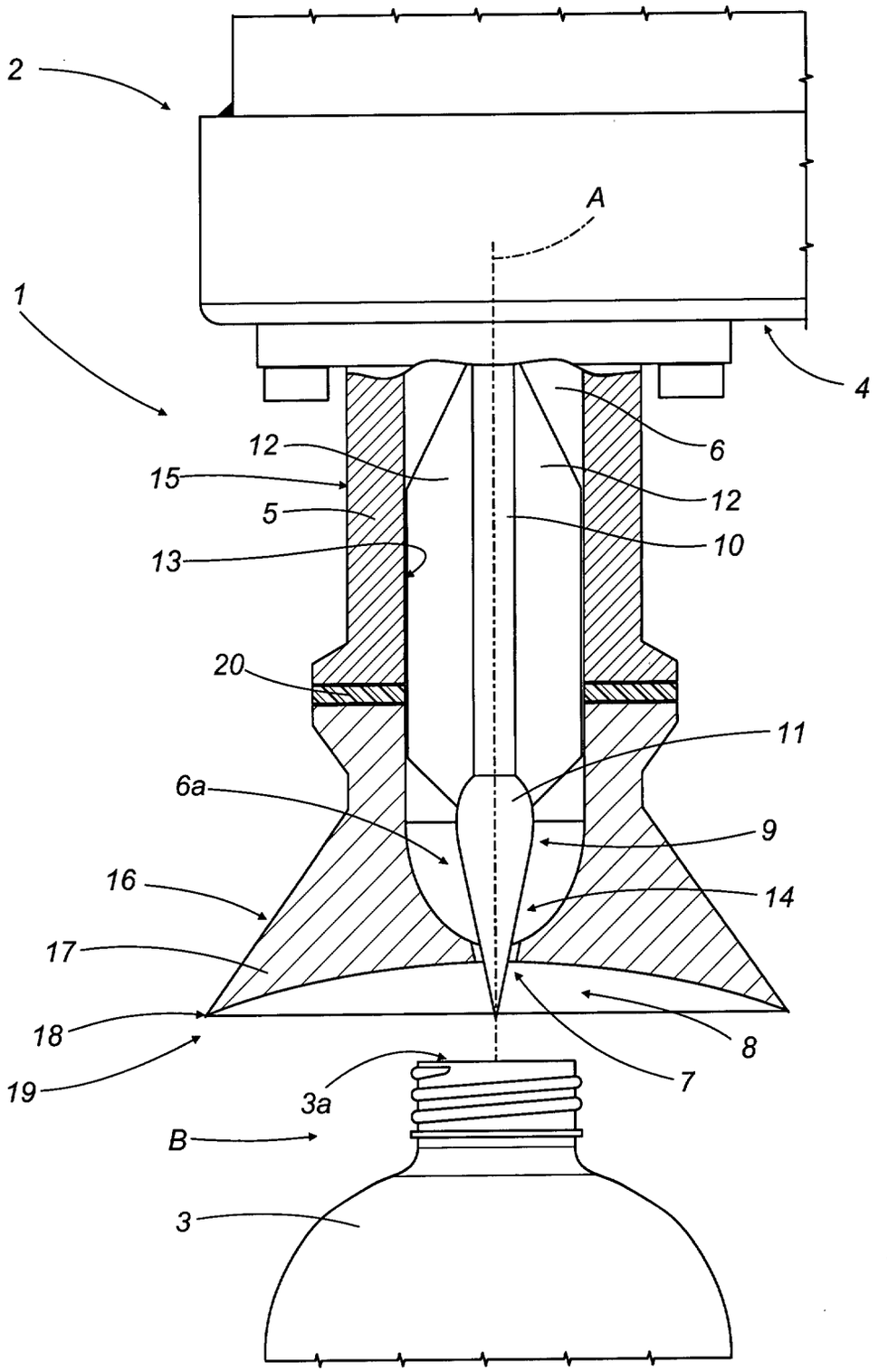

FIG.2

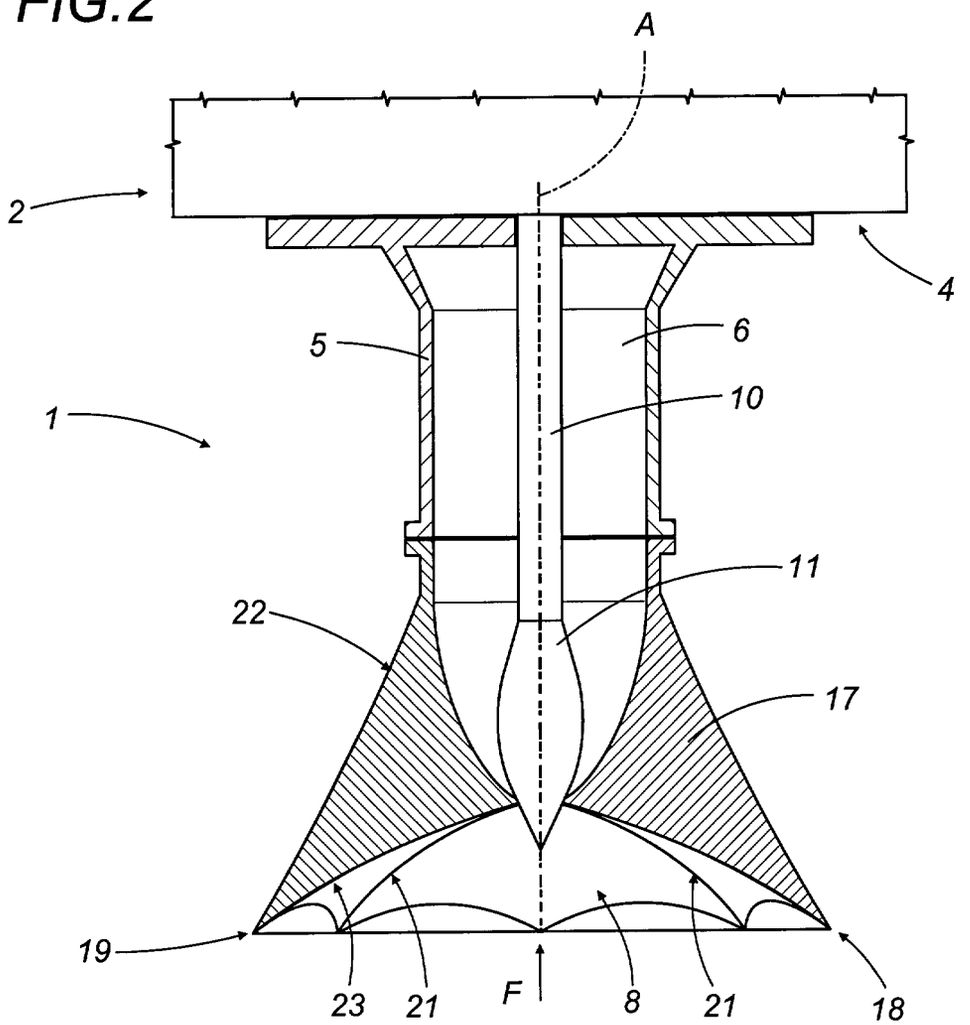

FIG.3

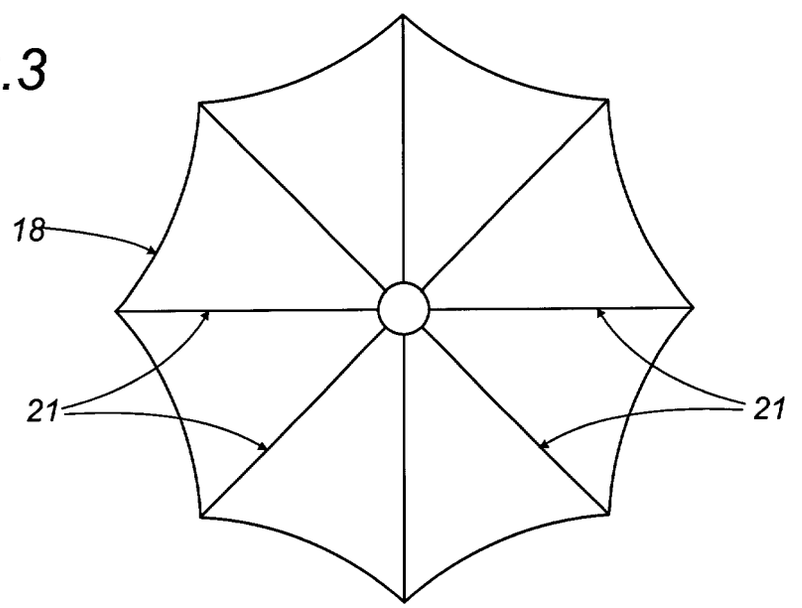

FIG.4

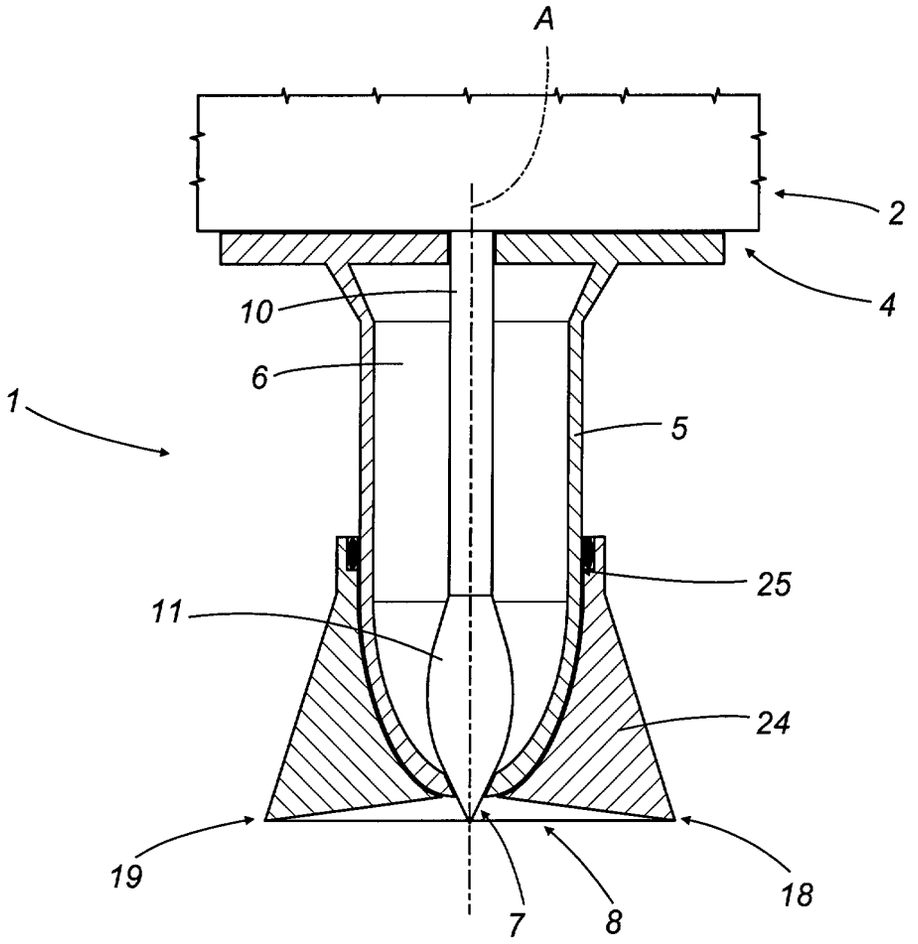

FIG.5