



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.04.2019 Bulletin 2019/17

(51) Int Cl.:
B67C 3/26 (2006.01) B67C 3/28 (2006.01)

(21) Application number: **17306419.7**

(22) Date of filing: **19.10.2017**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

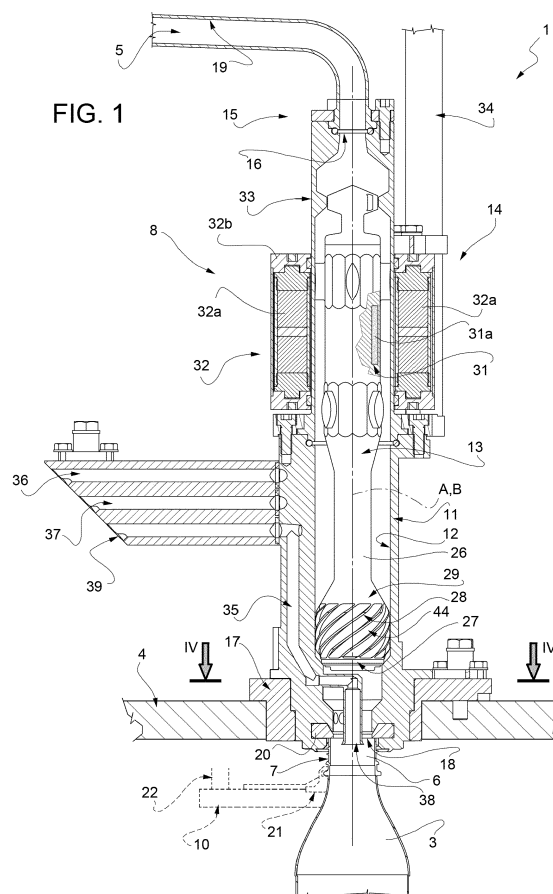
(72) Inventor: **BANDINI, Filippo**
43126 Parma (IT)

(74) Representative: **Siloret, Patrick**
Sidel Participations
Avenue de la Patrouille de France
CS60627 Octeville-sur-mer
76059 Le Havre Cedex (FR)

(71) Applicant: **Sidel Participations**
76930 Octeville-sur-Mer (FR)

(54) **IMPROVED FILLING DEVICE FOR A FILLING MACHINE**

(57) There is described a filling device (1) for a filling machine configured to fill receptacles (3) with a pourable product; the filling device (1) comprises: a tubular body (11) having a longitudinal axis (B), defining a central flowing channel (12) configured to deliver the pourable product to a respective receptacle (3) to be filled; a shutter (13) movable within the channel (12) between a lower position, in which the shutter (13) sealingly closes the channel (12), and an upper position, in which it (13) delimits with the channel (12) an annular passage for the pourable product; and at least one gas return conduit (35), adapted to exhaust the gas present in the respective receptacle (3) during filling thereof and including at least one transversal gas conveying portion (41), extending transversally with respect to the axis (B) and crossing the channel (12); the filling device (1) further comprises a swirl device (44) carried by the shutter (13), located upstream of the gas conveying portion (41), with reference to the motion of the pourable product towards the respective receptacle (3), and configured to impart a swirling movement to the pourable product itself; the gas conveying portion (41) is at least partially surrounded by an outer surface (47) having, in the area contacted in use by the pourable product, a beveled configuration for guiding the swirling movement of the pourable product itself.



Description

TECHNICAL FIELD

[0001] The present invention relates to an improved filling device for a filling machine configured to fill receptacles with a pourable product, in particular a still or carbonated pourable product, such as water, soft drinks, beverages, or the like, and operating in aseptic or ultra-clean conditions.

BACKGROUND ART

[0002] A typical filling machine of the above-mentioned type, suitable for operating in aseptic conditions, substantially comprises a carousel conveyor configured to rotate about a vertical axis, a product tank carried centrally by the carousel and containing the pourable product, and a plurality of filling devices peripherally carried by the carousel, in positions radially external with respect to the product tank. In particular, the filling devices are conveyed by the carousel along a circular transfer path.

[0003] More specifically, the carousel conveyor receives a succession of empty receptacles from an input star wheel and releases the filled receptacles to an output star wheel.

[0004] The filling devices are connected to the product tank through respective fluidic circuits or lines.

[0005] Each filling device basically comprises a support device adapted to receive and retain a respective receptacle in a vertical position, and a filling valve configured to feed a given volume of pourable product into the receptacles, as the filling device travels along the circular transfer path by following the rotary movement imparted thereto by the carousel.

[0006] A typical filling valve basically comprises:

- a vertical tubular body fixed to the peripheral portion of the carousel and defining a central flowing channel for feeding the pourable product to a respective empty receptacle to be filled, through at least one axial narrow outlet opening;
- a shutter engaging in a sliding manner the tubular body and movable within the flowing channel to allow or prevent the flow of the pourable product towards the respective receptacle; and
- actuator means configured to move the shutter within the flowing channel defined by the tubular body.

[0007] In particular, the tubular body presents a longitudinal axis parallel to the carousel axis and terminates at a lower end with the above-mentioned outlet opening; the tubular body is adapted to sealingly contact, in use, a top end mouth of the receptacle to be filled.

[0008] The flowing channel usually comprises a tapered-section portion located at a given axial distance from, and above, the outlet opening, and extending up to a minimum-diameter section.

[0009] The shutter is movable in a sliding manner within the channel of the tubular body between:

- a lower closed position, in which the shutter sealingly closes the outlet opening, preventing the flow of the pourable product towards the outlet opening; and
- an upper open position, in which a gap is established between the shutter and the tapered-section portion, so as to allow a free flow of the pourable product towards the respective receptacle, through the outlet opening.

[0010] In order to ensure an aseptic filling and to avoid any risk of external contamination, the actuator means controlling the movements of the shutter within the flowing channel are of electro-magnetic type. In particular, the shutter is magnetically coupled to a driving actuator arranged completely external to the tubular body and is provided with one or more permanent magnets. More specifically, the driving actuator is mounted onto the outer surface of the tubular body in a sliding manner.

[0011] In a similar manner, the shutter is internally provided with one or more permanent magnets facing the respective permanent magnets of the driving actuator and magnetically attracted by the latter through the lateral wall of the tubular body.

[0012] Due to the above-mentioned magnetic coupling, any axial displacement of the driving actuator produces a corresponding axial movement of the shutter.

[0013] Such type of configuration is disclosed in WO2013/057695, in the name of the same applicant.

[0014] A filling valve of the above-mentioned type usually also comprises a gas return conduit configured to discharge the gas present in the receptacle during the filling thereof with the pourable product.

[0015] It is generally known that providing an axial outflow of such gas present in the receptacle is the most convenient solution for not disturbing the flow of the pourable product towards the receptacle to be filled.

[0016] However, this configuration is rarely used in aseptic filling devices, as it requires dynamic sealings for separating the product environment from the shutter actuator environment.

[0017] To this end, return conduits of filling devices operating in aseptic conditions typically comprise an axial portion communicating with the receptacle to be filled and a radial portion extending radially with respect to the axis of the tubular body, arranged partly inside the flowing channel and communicating with a further portion external with respect to the flowing channel itself.

[0018] It is well-known that, in typical filling devices of the above-described type, the particular configuration of the flowing channel and of the outlet opening tends to establish a turbulence regime within the fluid product delivered to the receptacle. This condition leads to the formation of vortices, with possible creation of undesired foam within the receptacle.

[0019] A solution to overcome this problem is disclosed

in WO2014102075, in the name of the same applicant, which describes a filling machine operating in non-aseptic conditions.

[0020] In this solution, the shutter carries, at its lower portion, a swirler axially engaging the shutter itself on the outer lateral surface of the latter. In particular, the swirler has a substantially cylindrical configuration and is provided with a plurality of blades configured to impart a swirling movement to the pourable product flowing therebetween.

[0021] In practice, the blades of the swirler define a fluidic connection between the flowing channel and the top end mouth of the respective receptacle to be filled through the outlet opening.

[0022] In this way, the establishment of a turbulence regime within the fluid product delivered to the receptacle is avoided, and the formation of undesired foam is prevented.

[0023] However, the above-described configuration cannot be applied effectively in filling machines operating in aseptic conditions, as the radial portion of the return conduit extending inside the flowing channel tends to hamper the swirling flow imparted by the swirler to the product, limiting the benefits resulting from the implementation of the swirler itself, i.e. the formation of undesired foam.

[0024] Furthermore, the need is felt within the industry to reduce the number of components, and to limit the technical complications involved in the design of such filling machines.

DISCLOSURE OF INVENTION

[0025] It is therefore an object of the present invention to provide a filling device which is designed to fulfill at least one of the above-mentioned drawbacks in a straightforward and low-cost manner.

[0026] This object is achieved by a filling device as claimed in claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a partially sectioned front view of a filling device according to the present invention, in a condition prior to starting a filling operation of a receptacle, and with parts removed for clarity;

Figure 2 shows a larger-scale sectioned front view of the filling device of Figure 1;

Figure 3 shows a larger-scale sectioned front view of the filling device of Figure 1, in a condition during the filling operation of the receptacle;

Figure 4 is a larger-scale section along the line IV-IV of Figure 1;

Figure 5 is a larger-scale perspective view, with parts

removed for clarity, of a particular of the filling device of Figure 1; and

Figure 6 is a perspective view, from a different angle, of the particular of Figure 5.

BEST MODE FOR CARRYING OUT THE INVENTION

[0028] With reference to Figure 1, number 1 indicates as a whole a filling device 1 adapted to be incorporated in a filling machine (known per se and not shown) for filling receptacles 3 with a pourable product under pressure, up to a desired level. Preferably, receptacles 3 may be formed in plastic material, and the pourable product may be a still or carbonated beverage.

[0029] In particular, filling device 1 is adapted to carry out a so-called "contact filling operation", in which the receptacle 3 is kept in fluid-tight contact against the filling device 1 itself during the filling operation.

[0030] The filling machine is fed with sterilized empty receptacles 3 and is configured to fill the latter with the pourable product in aseptic or ultra-clean conditions.

[0031] The filling machine comprises a conveyor, preferably a carousel 4 (only partially shown in Figure 1) configured to rotate about a vertical axis (not shown), and a product tank (also not shown) containing the pourable product and carried centrally by the carousel 4 itself.

[0032] Carousel 4 protrudingly bears at its peripheral portion a plurality of filling devices 1 (only one shown in the enclosed Figures) configured to fill respective receptacles 3 during the rotation of the carousel 4 itself around its axis.

[0033] Each filling device 1 is therefore conveyed by carousel 4 along a circular transfer path in respective positions radially external with respect to the carousel axis and is fluidly connected to the product tank through a circuit 5.

[0034] Preferably, carousel 4 receives a succession of empty receptacles 3 from an input star wheel (not shown) and releases the filled receptacles 3 to an output star wheel (also not shown).

[0035] In particular, each receptacle 3 is defined by a bottle presenting a longitudinal axis A and which is advanced in a vertical position by the carousel 4. When each receptacle 3 is advanced, its axis A stays parallel to the carousel axis.

[0036] In greater detail, each receptacle 3 has a top neck 6 coaxial with axis A and defining a threaded surface 7 designed to allow the closing thereof by a screw cap (known per se and not shown).

[0037] Each filling device 1 comprises a filling valve 8 configured to control the flow of the pourable product towards the respective receptacle 3 to be filled and support means 10 adapted to support such receptacle 3 in a vertical position below the valve 8. In such configuration, the receptacle 3 has its neck 6 in contact with the valve 8 itself, so as to receive from the latter the pourable product in a fluid-tight condition.

[0038] Filling valve 8 basically comprises:

- a vertical tubular body 11 coupled with the peripheral portion of carousel 4 and defining a central flowing channel 12 configured to feed the pourable product to the respective receptacle 3;
- a shutter 13 engaging in a sliding manner tubular body 11 and movable within channel 12, so as to allow or prevent the flow of the pourable product towards the respective receptacle 3; and
- actuator means 14 arranged completely external to tubular body 11 and configured to control the movement of shutter 13 within channel 12.

[0039] In particular, tubular body 11 presents a longitudinal axis B, parallel to the rotation axis of carousel 4, and terminates at its upper end 15 with an axial inlet opening 16 configured to receive the pourable product from the product tank through circuit 5. Furthermore, tubular body 11 terminates at its lower end 17 with an axial outlet opening 18 configured to feed the pourable product to the respective receptacle 3.

[0040] More specifically, inlet opening 16 is directly connected to a product conduit 19 of circuit 5 extending from tubular body 11 to the product tank.

[0041] Lower end 17 of tubular body 11 is adapted to contact in use the top neck 6 of the receptacle 3 to be filled, so as to put the inlet/outlet mouth of the receptacle 3 itself in fluidic connection with outlet opening 18. To this aim, lower end 17 comprises an annular gasket 20 defining in use an abutment for neck 6 of the respective receptacle 3 and configured to sealingly close the latter during the filling process. In this way, the interior of such receptacle 3 is maintained in a sealed condition during the filling thereof with the pourable product. A filling valve 8 of the above-described type is known as a "contact filling valve", suitable for performing a contact filling operation.

[0042] As clearly visible in Figures from 1 to 3, support means 10 are configured to receive and retain one relative receptacle 3 in a suspended position with its axis A coaxial to axis B of the tubular body 11. In particular, support means 10 comprise a gripping member 21, arranged below filling valve 8 and configured to retain a relative receptacle 3 by its neck 6, and actuator means 22 for moving gripping member 21, and therefore receptacle 3, towards and away from annular gasket 20 of lower end 17 of tubular body 11.

[0043] With particular reference to Figure 2 and 3, channel 12 comprises, in correspondence with lower end 17 of tubular body 11, a tapered-section portion 23 located at a given axial distance from, and above, outlet opening 18 and tapering towards the latter. More specifically, tapered-section portion 23 is defined by a frustum-conical inner surface of channel 12, which tapers from an upper, substantially cylindrical, inner surface 24 of the channel 12 itself.

[0044] As clearly visible in Figures from 1 to 3, shutter 13 is housed coaxially within channel 12 of tubular body 11 and comprises a substantially cylindrical main portion

26 and an axial end portion 28 connected to main portion 26 by a frustum-conical portion 29. In detail, end portion 28 has a larger diameter than the diameter of such main portion 26.

[0045] Furthermore, shutter 13 comprises a closing head 27, axially protruding from end portion 28 and configured to cooperate in a fluid-tight manner with tapered-section portion 23 of channel 12.

[0046] To this aim, closing head 27 is provided with a sealing member, preferably an o-ring 30, configured to directly contact tapered-section portion 23, so as to sealingly close the fluidic connection of channel 12 with outlet opening 18 and, therefore, with the respective receptacle 3.

[0047] Shutter 13 is movable within channel 12 of tubular body 11 between:

- a lower closed position (Figures 1 and 2), in which shutter 13 sealingly closes tapered-section portion 23, preventing the pourable product to flow towards the respective receptacle 3; and
- an upper open position (Figure 3), in which a gap is established between shutter 13 and tapered-section portion 23, so as to allow a free flow of the pourable product towards the respective receptacle 3 to be filled.

[0048] More specifically, when shutter 13 is in the closed position, closing head 27 cooperates in a fluid-tight manner with tapered-section portion 23, i.e. o-ring 30 directly contacts in sealing manner the tapered-section portion 23 itself.

[0049] With particular reference to Figure 1, actuator means 14 comprise a permanent-magnet unit 32, which is magnetically coupled with a corresponding permanent-magnet unit 31 housed in main portion 26 of shutter 13.

[0050] Preferably, unit 31 comprises at least two permanent magnets 31a (only one shown in Figure 1) conveniently incorporated within main portion 26 of shutter 13 so as to face unit 32.

[0051] In a similar way, unit 32 comprises at least two permanent magnets 32a arranged adjacent to one another with identical magnetic poles facing axially, and oriented, with respect to permanent magnets 31a of unit 31, with different magnetic poles respectively facing radially. Furthermore, unit 32 also comprises a cylindrical casing 32b housing permanent magnets 32a.

[0052] In greater detail, unit 32 is coaxially coupled in a sliding manner onto an outer surface 33 of tubular body 11 and is controlled by a driving linear actuator 34 (only partially shown) configured to command an axial displacement of unit 32 along axis B.

[0053] In practice, any axial displacement of unit 32 controlled by the driving linear actuator 34 produces a corresponding axial movement of unit 31, and consequently of shutter 13, due to the magnetic coupling of permanent magnets 32a with permanent magnets 31a.

[0054] This configuration allows an automatized con-

trol of the movement of shutter 13 and permits to avoid any risk of contamination of the pourable product with any lubrication fluid or external particles.

[0055] According to this preferred embodiment shown, filling device 1 further comprises:

- a pressurization conduit 36, which is connected to an external chamber (also not shown) and filled with a pressurization fluid, such as carbon dioxide;
- a gas return conduit 35, which is connected, to a chamber (known per se and not shown), preferably arranged within carousel 4, for discharging the gas exiting the respective receptacle 3 during filling thereof; and
- a decompression conduit 37, which is connected to a decompression chamber (known per se and not shown).

[0056] In particular, pressurization conduit 36 is configured to pressurize the respective receptacle 3 at a pressure higher than the atmospheric pressure prior to starting the filling of the receptacle 3 itself.

[0057] Return conduit 35 is configured to exhaust the gas present within the respective receptacle 3 as the latter is filled in the above-mentioned sealed conditions.

[0058] Decompression conduit 37 is configured to depressurize the respective receptacle 3 at the end of filling.

[0059] Return conduit 35, pressurization conduit 36 and decompression conduit 37 are at least partly formed within tubular body 11 and are all distinct from one another.

[0060] Each one of these conduits 35, 36, 37 is partly arranged on one side of channel 12 and on an outer circumference C than channel 12 with respect to axis B (Figure 4).

[0061] In greater detail, return conduit 35 comprises an inlet mouth 38, which opens in use into the inner volume of the respective receptacle, when the latter is in the above-mentioned sealed condition, with neck 6 axially abutted onto gasket 20. Furthermore, return conduit 35 comprises an outlet mouth 39 communicating with the relative chamber.

[0062] As clearly visible in Figures 2 and 3, return conduit 35 comprises, proceeding from inlet mouth 38 towards outlet mouth 39:

- a gas receiving portion 40, extending coaxially within channel 12 and communicating at one end with the respective receptacle 3 to be filled;
- a gas conveying portion 41, extending transversally from gas receiving portion 40 and crossing channel 12; and
- a longitudinal portion 42, extending parallel to axis B on one side of channel 12 and in radial correspondence with the outer circumference C; and
- an inclined portion 43 connecting gas conveying portion 41 and longitudinal portion 42.

[0063] With particular reference to Figures 1, 2 and 3, shutter 13 is further provided with a swirler 44.

[0064] In particular, swirler 44 is located in correspondence with end portion 28 of shutter 13, between tapered section 29 and closing head 27. In practice, swirler 44 is located upstream of gas conveying portion 41 with reference to the motion of the pourable product towards the respective receptacle 3 to be filled.

[0065] In greater detail, swirler 44 has a substantially cylindrical configuration and is provided with a plurality of slanted (with respect to axis B) blades 45 configured to impart a swirling movement to the pourable product flowing therebetween.

[0066] Blades 45 define, between each other, respective guiding channels 46 through which the pourable product is guided, acquiring the swirling movement, prior to flow towards the respective receptacle 3 through outlet opening 18.

[0067] Advantageously, swirler 44 is formed integral with shutter 13.

[0068] According to an important aspect of the present invention, gas conveying portion 41 of return conduit 35 is surrounded by an outer surface 47 having, in the area contacted in use by the pourable product, a beveled configuration for guiding the swirling movement of the pourable product itself.

[0069] In particular, outer surface 47 comprises, in the area contacted in use by the pourable product, an upper beveled edge 48 and a lower beveled edge 49, for guiding the flow of the swirling pourable product.

[0070] In the preferred embodiment shown in Figures 4, 5 and 6, gas conveying portion 41 of return conduit 35 is supported by a shaped body 50, defining the outer surface 47 and, therefore, comprising upper beveled edge 48 and lower beveled edge 49.

[0071] According to a possible alternative not shown, outer surface 47, may be directly defined by gas conveying portion 41.

[0072] According to another alternative not shown, gas conveying portion 41 may be supported by a shaped body, defining only partially outer surface 47; the remaining part of outer surface 47 may be directly defined by gas conveying portion 41.

[0073] The operation of filling device 1 is described hereinafter with reference to a single receptacle 3 and starting from a condition in which such receptacle 3 is fed to carousel 4 of filling machine 2 in order to be filled with a pourable product.

[0074] In particular, receptacle 3 is retained at its neck 6 by gripping member 21, in vertical position with its axis A coaxial to axis B of the filling valve 8, and may be also supported at its bottom wall by a respective lower support plate (not shown) of carousel 4.

[0075] Receptacle 3 is coupled with tubular body 11 in a fluid-tight manner by activating actuator means 22 so as to raise gripping member 21 towards filling valve 8 up to bring neck 6 into contact with annular gasket 20 of lower end 17. In this condition, shutter 13 of filling valve

8 is set to the lower closed position within channel 12 of tubular body 11.

[0076] At this point, receptacle 3 is subjected to a pressurization step, by means of pressurization conduit 36, up to the moment in which the pressure in receptacle 3 reaches a desired level. This desired pressure level corresponds to the pressure level of the carbonated pourable product in the product tank and defines the requested condition for starting the filling operation.

[0077] Then, shutter 13 is moved to its upper open position (Figure 3); in this way, a gap between tapered-section portion 23 of channel 12 and closing head 27 of shutter 13 is established, allowing the pourable product to flow towards receptacle 3, through outlet opening 18. The movement of shutter 13 is achieved by activating driving linear actuator 34 which controls unit 32; by effect of the magnetic coupling between permanent magnets 31a of unit 31 and permanent magnets 32a of unit 32, the translating motion of this latter unit determines a corresponding axial motion of the shutter 13 itself within channel 12 of tubular body 11.

[0078] At the same time, the gas contained in receptacle 3 prior to filling it with the pourable product is exhausted through return conduit 35. This step ends when the pourable product reaches the desired level in receptacle 3.

[0079] At the end of the filling operation, shutter 13 is moved to its initial lower closed position.

[0080] The next step is the decompression phase of receptacle 3, achieved connecting the receptacle 3 itself with decompression conduit 37 and with the decompression chamber.

[0081] The advantages of filling device 1 according to the present invention will be clear from the foregoing description.

[0082] In particular, the beveled configuration of outer surface 47 ensures a non-hampered, swirling flow of the pourable product over gas conveying portion 41, in all the cases in which such gas conveying portion 41 crosses transversally channel 12; in this way, it is possible to limit the formation of undesired foam into the respective receptacle 3 during filling.

[0083] Furthermore, as swirler 44 is formed integral with shutter 13, the total number of components present in the filling device 1 itself is reduced and the overall reliability is increased.

[0084] Clearly, changes may be made to filling device 1 as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

Claims

1. A filling device (1) for a filling machine configured to fill receptacles (3) with a pourable product; said filling device (1) comprising:

- a tubular body (11) having a longitudinal axis (B), defining a central flowing channel (12) configured to deliver said pourable product to a respective receptacle (3) to be filled;
- a shutter (13) movable within said channel (12) between a lower position, in which said shutter (13) sealingly closes said channel (12), and an upper position, in which said shutter (13) delimits with said channel (12) an annular passage for said pourable product; and
- at least one gas return conduit (35), adapted to exhaust the gas present in the respective receptacle (3) during filling thereof and including at least one transversal gas conveying portion (41), extending transversally with respect to said axis (B) and crossing said channel (12);

characterized in that said filling device (1) further comprises a swirl device (44) carried by said shutter (13), located upstream of said gas conveying portion (41) of said return conduit (35), with reference to the motion of the pourable product towards the respective receptacle (3), and configured to impart a swirling movement to the pourable product itself; and **in that** said gas conveying portion (41) of said return conduit (35) is at least partially surrounded by an outer surface (47) having, in the area contacted in use by the pourable product, a beveled configuration for guiding said swirling movement of the pourable product itself.

2. The filling device as claimed in claim 1, wherein said outer surface (47) comprises an upper beveled edge (48) and a lower beveled edge (49), diametrically opposite to one another.
3. The filling device as claimed in claims 1 or 2, wherein said gas conveying portion (41) is supported by a shaped body defining at least partially said outer surface (47).
4. The filling device as claimed in any one of the claims from 1 to 3, wherein said swirl device (44) is formed integral with said shutter (13).
5. The filling device as claimed in any one of the foregoing claims, wherein said swirl device (44) is arranged at an axial end portion (28) of said shutter (13).
6. The filling device as claimed in any one of the foregoing claims, wherein said swirl device (44) is provided with a plurality of blades (45) slanted with respect to said axis (B).
7. The filling device as claimed in any one of the foregoing claims, wherein said return conduit (35) further comprises a gas receiving portion (40) extending co-

axially within said channel (12) and communicating at one end with the respective receptacle (3) to be filled and at another section with said gas conveying portion (41).

5

8. The filling device as claimed in any one of the foregoing claims, further comprising first magnetic means (31), carried by said shutter (13), and second magnetic means (32) arranged completely external of said tubular body (11), magnetically coupled to said first magnetic means (31), and selectively activated to control the movement of said shutter (13) along said axis (B), between said lower position and said upper position.

10

15

9. The filling device as claimed in any one of the foregoing claims, wherein said tubular body (11) comprises an end annular gasket (20) contacting in use the respective receptacle (3) to perform a contact filling operation.

20

25

30

35

40

45

50

55

FIG. 1

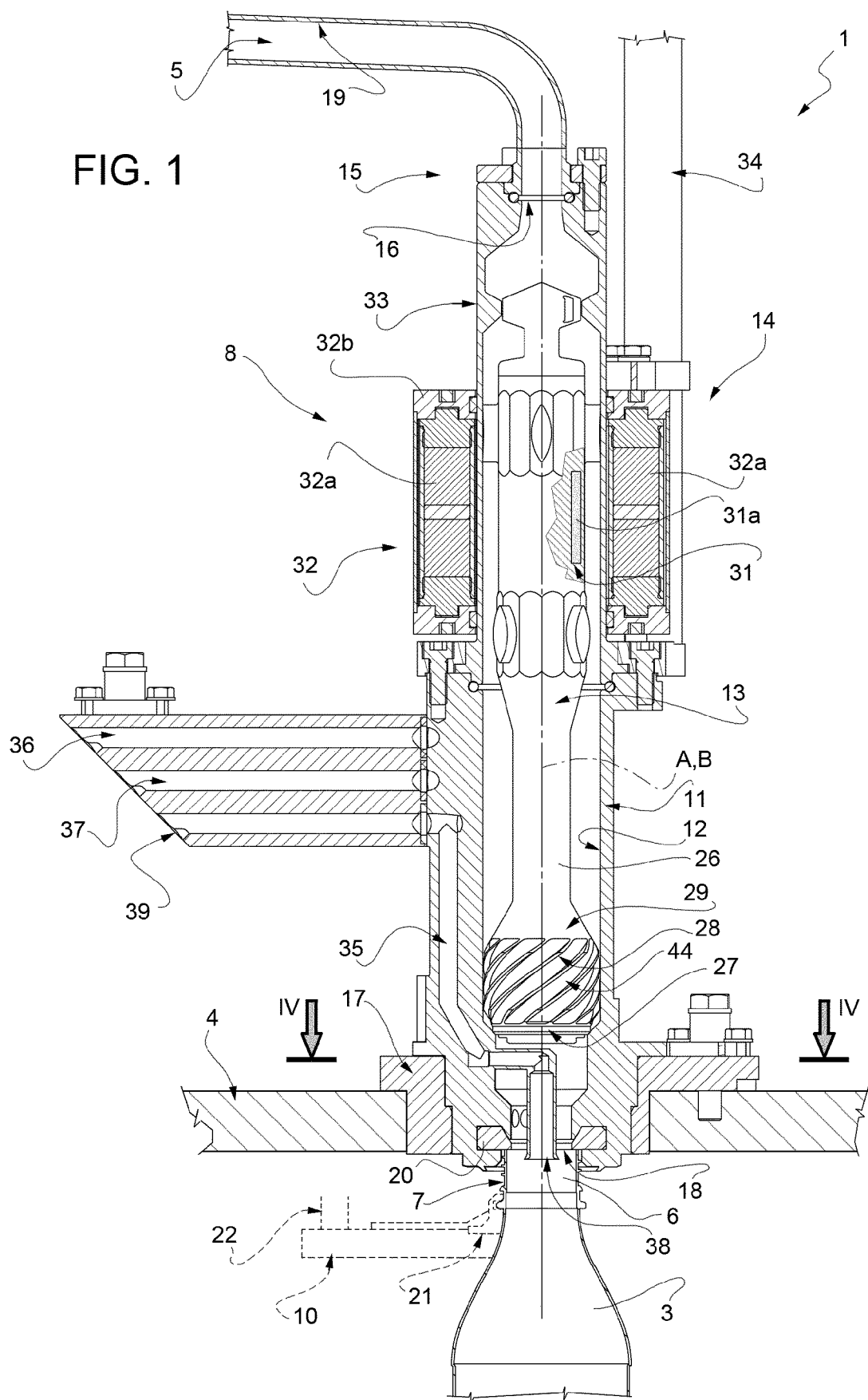


FIG. 2

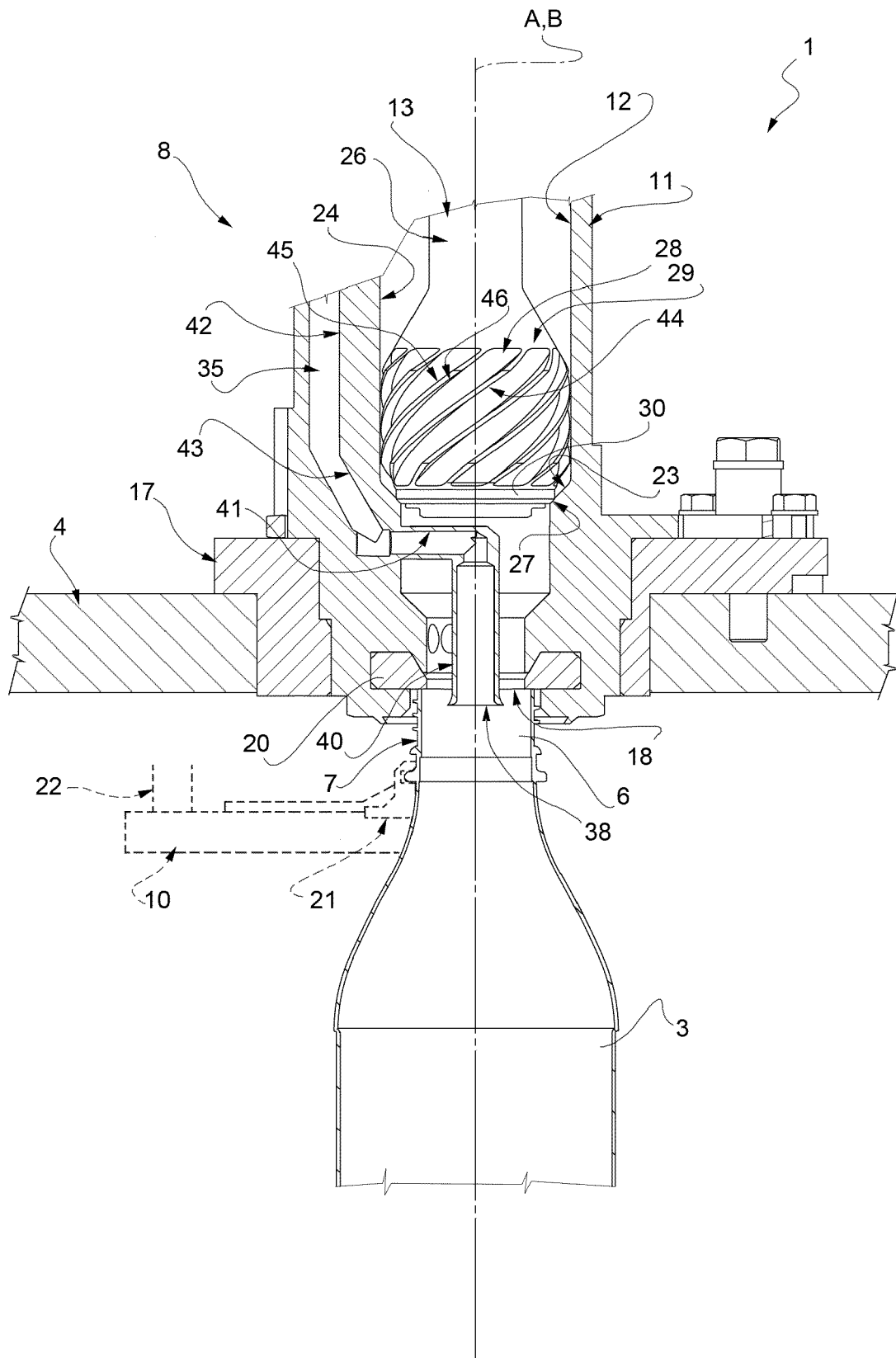
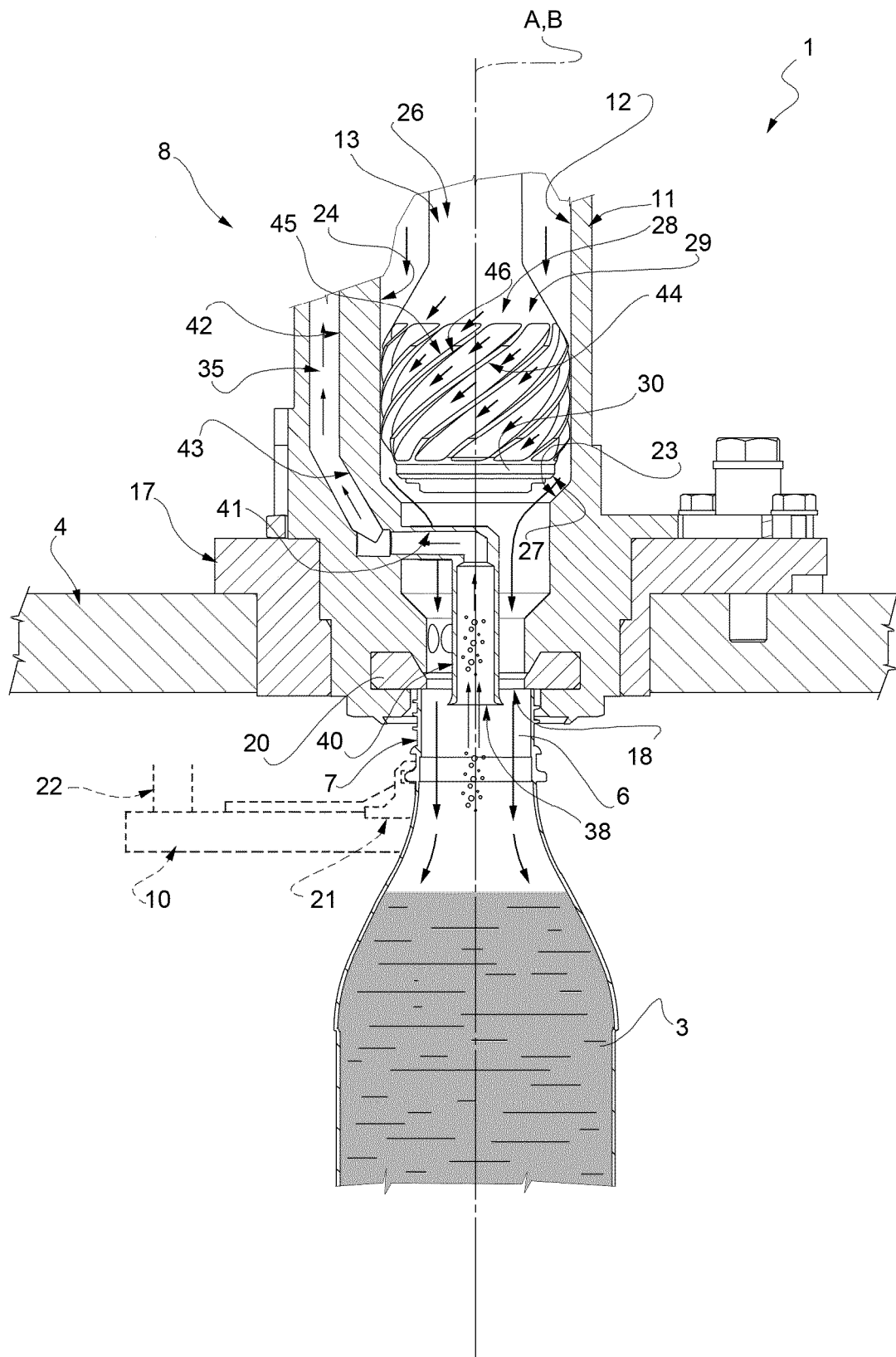


FIG. 3



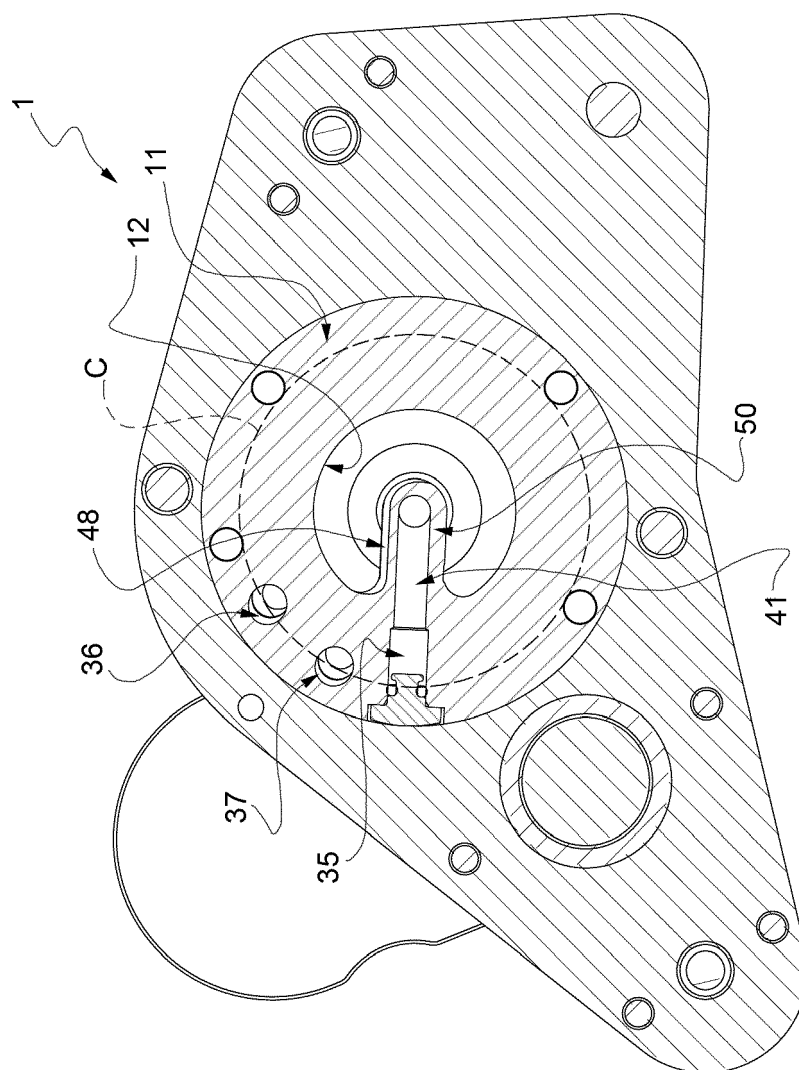


FIG. 4

FIG. 5

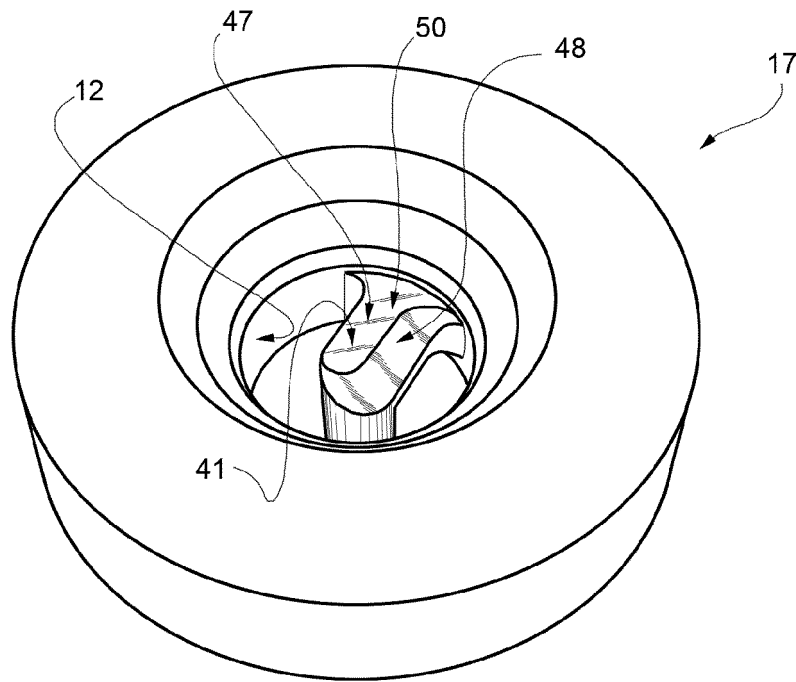
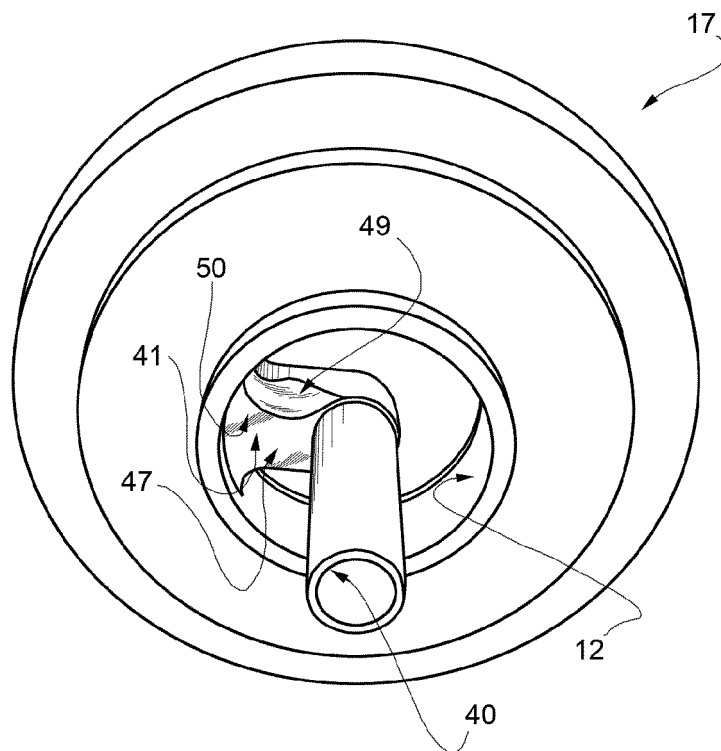


FIG. 6





EUROPEAN SEARCH REPORT

 Application Number
 EP 17 30 6419

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 12 81 878 B (SEITZ WERKE GMBH) 31 October 1968 (1968-10-31) * figure 2 * * column 2, line 31 - column 4, line 12 * -----	1,3-9	INV. B67C3/26 B67C3/28
X	FR 2 514 340 A1 (SEITZ ENZINGER NOLL MASCH [DE]) 15 April 1983 (1983-04-15) * figures 1-3 * * page 4, line 26 - page 10, line 9 * -----	1,3-9	
X	DE 10 29 250 B (HOLSTEIN & KAPPERT MASCHF) 30 April 1958 (1958-04-30) * figure 1 * * column 1, line 25 - column 2, line 40 * -----	1,3-9	
X	CN 104 696 530 A (JIANGSU HY FILLING PACKAGING MACHINERY CO LTD) 10 June 2015 (2015-06-10) * figures 1-3 * * paragraphs [0019] - [0024] * -----	1,3-9	
A	US 3 604 480 A (REICHERT HANS ET AL) 14 September 1971 (1971-09-14) * figures 1-4 * * column 1, line 39 - column 2, line 75 * -----	1-9	TECHNICAL FIELDS SEARCHED (IPC) B67C
A	US 3 500 879 A (MEYER GEORGE L N) 17 March 1970 (1970-03-17) * figures 1-3 * -----	4-6,8	
A,D	WO 2013/057695 A1 (SIDEL SPA CON SOCIO UNICO [IT]) 25 April 2013 (2013-04-25) * figure 1 * -----	1,8	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 23 April 2018	Examiner Pardo Torre, Ignacio
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 30 6419

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-04-2018

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 1281878 B	31-10-1968	BE 679067 A	16-09-1966
		CH 431307 A	28-02-1967
		DE 1281878 B	31-10-1968
		NL 6601534 A	10-10-1966
FR 2514340 A1	15-04-1983	BE 894683 A	31-01-1983
		DE 3140513 A1	28-04-1983
		FR 2514340 A1	15-04-1983
		IT 1148623 B	03-12-1986
		JP H0353195 B2	14-08-1991
		JP S5873588 A	02-05-1983
		NL 8203918 A	02-05-1983
DE 1029250 B	30-04-1958	NONE	
CN 104696530 A	10-06-2015	NONE	
US 3604480 A	14-09-1971	BE 718359 A	31-12-1968
		DE 1607996 A1	02-03-1972
		ES 354224 A1	16-10-1969
		FR 1574448 A	11-07-1969
		GB 1234257 A	03-06-1971
		NL 6807862 A	24-01-1969
		SE 349547 B	02-10-1972
		US 3604480 A	14-09-1971
US 3500879 A	17-03-1970	NONE	
WO 2013057695 A1	25-04-2013	EP 2768763 A1	27-08-2014
		WO 2013057695 A1	25-04-2013

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2013057695 A [0013]
- WO 2014102075 A [0019]