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(54) FILLING DEVICE AND METHOD FOR SELECTIVELY CONTACT OR CONTACTLESS FILLING AN ARTICLE WITH A POURABLE PRODUCT

(57) There is disclosed a filling device (14) for selectively contact or contactless filling an article (2) with a pourable product, comprising:
- a common body (17), which defines a fluidic line (16) which is adapted to be flown by pourable product;
- an end portion (19a, 19b), which defines a filling mouth (18);
characterized in that a specific end portion (19a, 19b) is selectively fittable to common body (17) depending of contact or contactless filling to be carried out;
filling mouth (18) being fluidly connected with fluidic line (16), when specific end portion (19a, 19b) is fitted to common body (17);
filling device (16) further comprising a connecting element (20) which can be selectively arranged, in use,:
- either in a first configuration, in which it blocks specific end portion (19a, 19b) and common body (17) with respect to one another; or
- in a second configuration, in which it leaves free from one another end portion (19a, 19b) from common body (17).

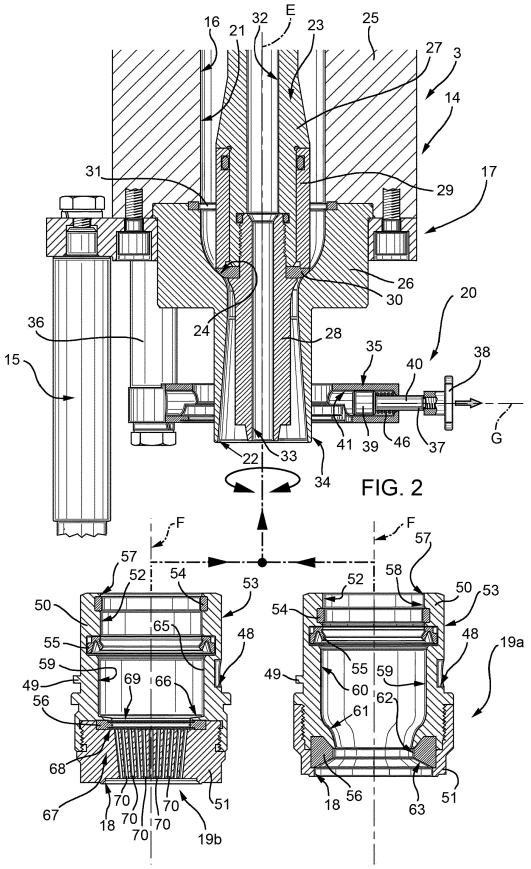

FIG. 2

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Description

[0001] The present invention relates to a filling device for selectively contact or contactless filling an article with a pourable product.

[0002] The present invention also relates to a filling method for selectively contact or contactless filling an article with a pourable product.

[0003] Filling machines are known, comprising a filling station fed with empty articles and adapted to provide articles filled with the pourable food product.

[0004] The filling station substantially comprises a carousel conveyor rotating about a rotation axis, a tank containing the pourable food product, and a plurality of filling devices supported by the carousel conveyor in a position radially external with respect to the rotation axis of the carousel conveyor.

[0005] In greater detail, the carousel is provided with a plurality of support elements for respective articles provided to arrange the mouths of respective articles in a lower position and with respect to the respective filling devices and to displace the articles along a circumferential arc trajectory about the above said rotation axis integrally to the respective filling devices.

[0006] Each filling device essentially comprises a fixed body connected to the carousel and a shutter sliding with respect to the fixed body between an open position and a closed position.

[0007] In greater detail, when the shutter is arranged in the open position, the shutter defines an opening with the fixed body. The pourable product thereby flows from the tank to the mouth of the relative article passing through the opening.

[0008] Differently, when the shutter is arranged in the closed position, it sealingly cooperates with an abutment surface defined by the fixed body, thus preventing the pourable product from flowing from tank towards the mouth of the relative article.

[0009] The fixed body defines a filling mouth through which the pourable product flows, when the shutter is in the open position.

[0010] It is known in the art filling the article both according to a so-called "contact" filling technique and according to a so-called "contactless" filling technique.

[0011] In particular, the articles undergo the contact filling modality, especially when they are intended to be filled with a carbonated product.

[0012] The contact filling modality requires that the filling mouth is sealingly pressed onto a pouring opening of the article.

[0013] The air contained inside the article escapes inside a return duct defined by the fixed body, during the filling of the article, i.e. when the shutter is in the open position.

[0014] Differently, the articles undergo the contactless filling modality especially when they are intended to be filled with a still product.

[0015] The contactless modality requires that the filling mouth is axially spaced from the pouring opening of the article.

[0016] EP-A-2792634 discloses a filling device, which is capable of filling article with a pourable product both according to a contact modality and to a contactless modality.

[0017] A need is felt within the industry to quickly switch the filling device between:

- a first configuration, in which it is configured to carry out a contact filling; and
- a second configuration, in which it is configured to carry out a contactless filling.

[0018] A need is also felt to switch the filling device between the first and the second configuration, without impairing the overall hygiene of the filled pourable product.

[0019] It is an object of the present invention to provide a filling device for selectively contact or contactless filling an article with a pourable product, which solves the above-identified need.

[0020] The aforementioned object is achieved by the present invention as it relates to a filling device for selectively contact or contactless filling an article with a pourable product, as claimed in claim 1.

[0021] The present invention also relates to a method for selectively contact or contactless filling an article with a pourable product, as claimed in claim 12.

[0022] One preferred embodiment is hereinafter disclosed for a better understanding of the present invention, by way of non-limitative example and with reference to the accompanying drawings, in which:

- Figure 1 is a top schematic view of a filling unit comprising a plurality of filling devices according to the present invention;
- Figure 2 is an axial section of one of the filling device of Figure 1 together with a first end portion suitable for carrying out a contact filling and with a second end portion suitable for carrying out a contactless filling;
- Figure 3 is an axial section of the filling device of Figure 2 together with the first end portion and when carrying out a contact filling of a respective article, with parts removed for clarity;
- Figure 4 is an axial section of the filling device of Figure 2 together with the second end portion and when carrying out a contactless filling of a respective article, with parts removed for clarity; and
- Figure 5 is a perspective exploded view of some components of the filling device of Figures 1 to 4.

[0023] With reference to Figure 1, numeral 1 indicates as a whole a unit for manufacturing, filling and labelling articles 2.

[0024] Unit 1 is shown only partially and comprises, in particular,:

- a filling unit 3, which is adapted to fill articles 2 with the pourable product;
- a star-wheel 4, which is adapted to convey articles 2 to be filled to filling unit 3; and
- a star-wheel 5, which is adapted to receive filled articles 2 from filling unit 3.

[0025] In particular, filling unit 3 and star-wheels 4, 5 are rotatable about respective axes A, B, C, which are parallel to each other and vertical in the embodiment shown.

[0026] Star-wheels 4, 5 define at respective outer periphery respective plurality of seats 11 open on the opposite side of respective axes B, C and configured to receive, convey and release respective articles 2.

[0027] Articles 2 travel along a common trajectory, which is tangent to axes B, A, C.

[0028] In particular, articles 2 extend about relative axes D and can be made of glass or of a plastic material and comprise, each,:

- a body 6, which defines an inner lateral surface 9 of article 2;
- a neck 7 arranged on one side of body 6 and defining a mouth 8; and
- a not-shown bottom portion, which bounds body 6 on the opposite side of neck 7.

[0029] In greater detail, filling unit 3 comprises:

- a carousel 13 is driven rotation about axis A; and
- a plurality of filling devices 14, which are arranged on an outer periphery 12 of carousel 13; and
- a plurality of gripping devices 15, which are arranged on the periphery 12, are arranged below respective filling devices 14 and are movable between respective closed positions in which the grip relative articles 1 and respective open positions in which they receive or release respective articles 2.

[0030] In the following of the present description, only one filling device 14 will be described, being all the filling devices 14 identical to one another.

[0031] As it will be evident from the following description, each filling device 14 can selectively be configured:

- either for filling articles 2 according to a contact filling modality (Figure 3); and
- or for filling articles 2 according to a contactless filling modality (Figure 4).

[0032] In particular, filling device 14 is sealingly pressed against mouth 8 of article 2, when the contact filling modality is carried out.

[0033] Differently, filling device 14 is axially detached from mouth 8 of article 2, when the contactless filling modality is carried out.

[0034] With reference to Figure 2, each filling device 2 comprises:

- a common body 17, which defines a fluidic line 16 through which the pourable product flows; and
- an end portion 19a, 19b which defines a filling mouth 18 fluidly connected to fluidic line 16, when end portion 19a, 19b is fitted to body 17.

[0035] Advantageously, a specific end portion 19a, 19b is selectively fitted to common body 17 in dependence of contact or contactless filling to be carried out; filling device 14 further comprises a connecting element 20 (see Figure 5) which can be selectively arranged:

- either in a blocking configuration, in which it blocks a desired end portion 19a, 19b on body 17; or
- in a release configuration, in which it leaves the desired end portion 19a, 19b free to be removed from body 17.

[0036] In other words, while body 17 is used both for contact filling and contactless filling, end portion 19a (Figure 3) is specific for contact filling modality and end portion 19b (Figure 4) is specific for contactless filling modality.

[0037] A specific end portion 19a, 19b is fitted to body 17 on the basis of the contact or contactless filling modality.

[0038] Furthermore, fluidic line 16 defines cavity 21, which is connected with a tank filled with the pourable product at one side thereof and defines an opening 22 at the opposite side thereof.

[0039] Filling device 14 further comprises a shutter 23 movable along an axis E inside cavity 21 defined by body 17.

[0040] Shutter 23 is movable between:

- a first position, in which it sealingly abuts against a section 24 of body 17, thus preventing the pourable product from flowing along fluidic line 16 towards opening 22; and
- a second position, in which it is detached from section 24, thus allowing the pourable product to flow along line 16 and to reach opening 22.

[0041] Axis E is parallel to axis A in the embodiment shown.

[0042] In the embodiment shown, body 17 comprises a pair of elements 25, 26 which define cavity 21.

[0043] Elements 25, 26 are sealingly connected to one another.

[0044] Element 26 defines opening 22.

[0045] Opening 22 is shaped, in the embodiment shown, as a circular crown having centre on axis E.

[0046] In the embodiment shown, opening 22 is axially interposed along axis E between opening 18 and section 24 of body 17.

[0047] Shutter 23 comprises, in turn a pair of elements

27, 28 screwed to one another, and a distributor 29 fitted to element 27 and connected, on the opposite end of element 27, to an abutting element 30 adapted to tight-fluidly abut against section 24.

[0048] Distributor 29 comprises a plurality of paddles 31 radially protruding inside cavity 21 to impart a swirl motion, i.e. a helix motion, to the pourable product flowing inside fluidic line 16.

[0049] Distributor 29 is axially interposed between a shoulder defined by element 26 and abutting element 30.

[0050] Shutter 23 also defines a duct 32 which is connected, on one side, to the not-shown tank and defines, at the opposite side, an opening 33.

[0051] Opening 33 is surrounded by opening 22.

[0052] Connecting element 20 is configured to block end portion 19a, 19b on an outer surface 34 of element 26.

[0053] Furthermore, connecting element 20 is movable parallel to axis E together with end portion 19a, 19b, so as to approach or move away end portion 19a, 19b to mouth 8 of article 2.

[0054] In detail, connecting element 20 comprises (Figure 5) :

- a disk 35 adapted to be centred on end portion 19a, 19b and extending about axis E;
- a pair of columns 36 having respective ends 37 fixed to disk 35 and movable parallel to axis E with respect to body 17 between a raised and a lowered position and by means of a not-shown actuating element; and
- a pin 37, which slides inside a groove 41 defined by disk 35 along a direction G radial to axis E and horizontal in the embodiment shown.

[0055] Disk 35 comprises an inner surface 42 and an outer surface 43 opposite to one another.

[0056] Surface 42 defines a plurality, three in the embodiment shown, of arch-shaped protrusions 44 which are angularly spaced about axis F.

[0057] Surface 42 defines a circular opening 45 extending about axis G and circumferentially interposed between two consecutive protrusions 44 and defining an end of groove 41.

[0058] Furthermore, pin 37 comprises, in turn,:

- a handgrip 38, which is arranged outside disk 35 and can thrust by an operator parallel to direction G and defines an end of pin 37;
- an enlarged end 39, which is opposite to handgrip 38 and arranged inside groove 41; and
- a stem 40 interposed between end 39 and a shoulder of groove 41.

[0059] When connecting element 20 is set in the blocking positions,:

- pin 37 engages one of circular holes 48 (Figure 5) of desired end portion 19a, 19b, thus preventing any rotational movement between end portion 19a, 19b and element 28 of body 17;
- protrusions 44 are arranged axially below corresponding protrusions 49 projecting from end portion 19a, 19b on the opposite side of axis E, thus preventing any axial movement between end portion 19a, 19b and element 26 of body 17.

[0060] Connecting element 20 is elastically loaded in the blocking configuration and can be manually displaced by means of handgrip 38 in the release configuration.

[0061] In greater detail, connecting element 20 comprises a spring 46 interposed between pin 37 and disk 35.

[0062] Spring 46 is pre-loaded in such a way to keep pin 37 engaged inside hole 48.

[0063] End portions 19a, 19b extend each about a relative axis F, which coincides with axis E when end portion 19a, 19b is connected to common body 17.

[0064] End portion 19a comprises (Figures 2 and 3):

- a tubular body 50 which defines a inner lateral surface 52 and a lateral outer surface 53 opposite to one another; and
- a tubular body 51 connected to body 50 and defining mouth 18.

[0065] In particular, surface 52 is fitted to surface 34 of element 26, when end portion 19a is connected to body 17.

[0066] Surface 53 defines holes 48 and protrusions 49.

[0067] In particular, holes 48 and protrusion 49 are circumferentially alternated to one another about axis F.

[0068] End portion 19a further comprises:

- a pair of annular seals 54, 55 fitted to surface 52 and onto which end portion 19a slides with respect to element 26 of body 17; and
- an annular seal 56 axially interposed between bodies 50, 51.

[0069] Bodies 51, 52 are hollow and define a cavity 59 extending about axis F.

[0070] Cavity 59 comprises, proceeding from an end 57 of body 50 axially opposite to body 51 towards mouth 18,:

- a cylindrical portion 58, which is engaged by a terminal part of element 26, when end portion 19a is fitted to body 16 and to which seals 54, 55 are fitted;
- a cylindrical portion 60;
- a convergent portion 61;
- a cylindrical portion 62 bound by seal 55; and
- a divergent portion 63 defining mouth 18.

[0071] In order to carry out a contact filling of article 2, end portion 19a is fitted to common body 16.

[0072] With shutter 23 in the closed position, end portion 19a is lowered by connecting element 20 up to reach

a position, in which mouth 18 is pressed against mouth 8 of article 2.

[0073] When end portion 19a is fitted to common body 16 and shutter 23 is set in the open position, the pourable product flows through opening 22 and then through portions 60, 61, 62, 63 and mouth 18, thus contact filling article 2.

[0074] Portions 60, 61, 62 and 63 are so shaped to not disturb the swirl motion of the pourable product, which therefore fills article 2 substantially starting from surface 9 of article 2.

[0075] In other words, the pourable product flows along surface 9 while the central area of mouth 8 is not passed through by the pourable product.

[0076] As shown in Figures 2, 4 and 5, end portion 19b is similar to end portion 19a and will be described hereinafter only as far as it differs therefrom; corresponding or equivalent parts of end portions 19a, 19b will be indicated where possible by the same reference numbers.

[0077] End portion 19b differs from end portion 19a in that cavity 59 comprises only a cylindrical portion 65 and a conical end 66 defined by body 50.

[0078] Furthermore, end portion 19b differs from end portion 19a in that body 51 comprises a nozzle 67, which is configured to cancel the swirl movement of the flow of the pourable product and to redirect that flow towards axis F.

[0079] In particular, nozzle 67 comprises, proceeding parallel to axis F from seal 54 towards mouth 18:

- a pair of annular nets 68, 69 which are fitted to seal 54;
- a plurality of ducts 70 which extend about relative axes converging towards axis F.

[0080] Nets 68, 69 comprise, in the embodiments shown, respective pluralities of holes having respective axes parallel to axis F.

[0081] In particular, net 68, 69 is effective in reducing the swirl motion component of the pourable product and in preventing, thanks to capillarity effective, the leakage of the pourable product from mouth 18, when shutter 23 is set in the closed position.

[0082] The remaining swirl motion is cancelled in ducts 70, which are also effective in rendering the flow of the pourable product as laminar as possible.

[0083] With shutter 23 in the closed position, end portion 19b is lowered by connecting element 20 up to reach a position, in which mouth 18 is spaced from mouth 8 of article 2.

[0084] When end portion 19b is fitted to common body 17 and shutter 23 is set in the open position, the pourable product flows through opening 22 and then through nozzle 67 and mouth 18, thus contactless filling article 2.

[0085] In use, articles 2 to be filled are conveyed by star-wheel 4 to filling unit 3. Filling unit 3 fills articles 2 and conveys them to star-wheel 4.

[0086] In the following, the operation of only filling device 14, of corresponding connecting element 20 and of corresponding article 2 is described, being the operation of all filling devices 16 and relative connecting elements 20 identical.

[0087] Filling device 14 can be used both for contact and for contactless filling of article 2.

[0088] Filling device 14 can, in particular, contact fill article 2 both with a carbonated and with a still pourable product and contactless fill article 2 with a still pourable product.

[0089] In particular, the same common body 17 is used both for contact and for contactless filling of article 2.

[0090] End portion 19a is used for contactless filling of article 2 while end portion 19b is used for contact filling of article 2.

[0091] Connecting element 20 is used for selectively connecting end portion 19a or 19b on common body 17 or for removing end portion 19a, 19b from body 17.

[0092] In the following, the operation of filling device 14 with end portion 19a is described (as shown in Figure 2) and starting from a condition in which shutter 23 is in the first position and end portion 19a is in a raised rest position.

[0093] End portion 19a is fitted to the end of element 26 opposite to element 25.

[0094] Connecting element 20 is kept by spring 46 in the blocking position, in which:

- pin 37 engages one of hole 48 of end portion 19a, so as to prevent any relative rotation between end portion 19a and body 17; and
- protrusions 44 are arranged below protrusions 49 of end portion 19a, thus preventing any relative axial movement between end portion 19a and body 16.

[0095] When it is necessary filling article 2 with the pourable product, columns 36 are lowered parallel to axis E towards mouth 8, up to a position in which seal 56 abuts against opening 22.

[0096] Then, shutter 23 is moved in the second position. In this way, the pourable product flows along fluidic line 16 and flows opening 22 inside portions 60, 61, 62 and 63.

[0097] The pourable product is swirled, i.e. is directed along a helical path, by paddles 31 of distributor 29.

[0098] Then, the pourable product reaches mouth 18 and fills article 2.

[0099] Due to the fact that portions 60, 61, 62 and 63 substantially do not affect the flow of the pourable product, the latter moves along a helix path when it passes through mouth 18.

[0100] Accordingly, the pourable product preferably flows along edge 9 of body 6 and is preferably staggered from centre of opening 21, when passing through mouth 18.

[0101] During the filling of article 2, the air and the other gases contained therein flow along duct 32 towards the tank or another exhaust.

[0102] After the completion of the filling, shutter 23 is moved back in the second position, in which it prevents the flow of the pourable product along fluidic line 16.

[0103] At this stage, filled article 2 is removed from filling unit 3 and conveyed to star-wheels 5.

[0104] In case it is necessary to switch the operation of filling device 14 from the contact to the contactless filling, connecting element 20 is moved in the release configuration, end portion 19a is removed from common body 17 and an end portion 19b suitable for contactless filling is fitted to common body 17.

[0105] In greater detail, handgrip 38 of connecting element 20 is pulled by an operator against the action of spring 46.

[0106] In this way, pin 37 is removed from relative hole 48 of body 50.

[0107] Thereafter, end portion 19a is rotated up to a position in which protrusions 44, 49 are circumferentially staggered from one another and end portion 19a is removed from common body 17.

[0108] At this stage, end portion 19b is mounted on common body 17 up to reach a position in which:

- pin 37 faces one of circular holes 48 of desired end portion 19b; and
- protrusions 44 are arranged axially below corresponding protrusions 49 projecting from end portion 19a, 19b on the opposite side of axis E, thus preventing any axial movement between end portion 19b and element 28 of body 17.

[0109] At this stage, handgrip 38 is released and spring 46 elastically moves back pin 37 inside one hole 48 of end portion 19b. In this way, it is prevented any rotational movement between end portion 19b and element 26 of body 17.

[0110] At this stage, columns 36 are lowered up to displace end portion 19b in the correct filling position, in which mouth 18 is axially spaced from mouth 8 of article 2.

[0111] Shutter 23 is moved in the second position, thus allowing the pourable product to flow along fluidic line 16.

[0112] In greater detail, the pourable product is swirled by paddles 31, passes through opening 22, nozzle 67 and reaches mouth 18.

[0113] In particular, nets 68, 69 are effective in reducing the swirl motion component of the pourable product and in preventing, thanks to capillarity effective, the leakage of the pourable product from mouth 18, when shutter 23 is set in the closed position.

[0114] The remaining swirl motion is cancelled in ducts 67, which are also effective in rendering the flow of the pourable product as laminar as possible.

[0115] As a result, the pourable product flows substantially along a cylindrical volume centred on axis E, when filling article 2.

[0116] When the filling is completed, shutter 23 is moved back in the first position, end portion 19b is raised and article 2 is conveyed to star-wheel 5.

[0117] The advantages of filling device 14 and of the filling method according to the present invention will be clear from the above description.

[0118] In particular, connecting element 20 allows to easily mount either end portion 19a in case of contact filling or end portion 19b in case of contactless filling on the same common mouth 18.

[0119] Accordingly, it is possible to use the same common body 17 to carry out both the contact filling and non-contact filling of articles 2, by simply operating connecting element 20.

[0120] Furthermore, the relative positioning between end portion 19a, 19b and article 2 is achieved thanks to the movement of connecting element 20 - and, therefore, of end portion 19a, 19b - along axis E with respect to article 2.

[0121] Finally, end portion 19b comprises nets 68, 69 and ducts 70, which are effective in cancelling the swirl component of the flow motion of the pourable product, before the latter fills article 2 substantially flowing along a cylinder centred on the centre of mouth 18 in case of contact filling.

[0122] Accordingly, it is possible to use a single common mouth 18 with a distributor 29 capable of imparting a swirl component to the flow of the pourable product, no matter if end portion 19a or end portion 19b is fitted to common body 17.

[0123] As a matter of fact, in case of contact filling, end portion 19a does not affect that swirl component so that the pourable product flows preferentially on edge 9 when filling articles 2.

[0124] A further advantage of the filling device according to the invention, is the fact that when carrying out contactless filling (as shown in figure 4) with the gripping device 15 engaging the neck of the bottle below a neck ring, contact pressure is exerted on the bottle only at the neck ring and at the neck of the bottle. This enables filling of extremely lightweight bottles with very thin walls, without any risk of deforming the bottles.

[0125] Another advantage of the filling device according to the invention, is the fact that when carrying out contact filling (as shown in figure 3) with the gripping device 15 engaging the neck of the bottle below a neck ring, the contact pressure is borne by the gripping device instead of being transferred to the body 6 of the bottle. This also enables filling of lightweight bottles with thin walls, without any risk of deforming the bottles.

[0126] Finally, it is apparent that modifications and variants not departing from the scope of protection of the claims may be made to filling device 14 and to the filling method.

Claims

1. A filling device (14) for selectively contact or contactless filling an article (2) with a pourable product, comprising:

- a common body (17), which defines a fluidic line (16) which is adapted to be flown by said pourable product;
- an end portion (19a, 19b), which defines a filling mouth (18);

characterized in that a specific said end portion (19a, 19b) is selectively fittable to said common body (17) depending of contact or contactless filling to be carried out;
said filling mouth (18) being fluidly connected with said fluidic line (16), when said specific end portion (19a, 19b) is fitted to said common body (17);
said filling device (16) further comprising a connecting element (20) which can be selectively arranged, in use,:

- either in a first configuration, in which it blocks said specific end portion (19a, 19b) and said common body (17) with respect to one another; or
- in a second configuration, in which it leaves free from one another said end portion (19a, 19b) from said common body (17).

2. The filling device of claim 1, **characterized in that** said connecting element (20) is movable along a direction (E, F), so as to move said end portion (19a, 19b) towards and away from said article (2) when said connecting element (20) is set, in use, in said first configuration.

3. The filling device of any one of the foregoing claims, **characterized in that** said connecting element (20) comprises a pin (37) which is slidable along a second direction (G) transversal to said first direction (E, F) and said end element (19a, 19b);
said filling device (14) being **characterized in that** said connecting element (20) can be operated from the outside of said filling device (14), and **in that** said end portion (19a, 19b) comprises an opening (48) which is engaged by said pin (37), when said connecting element (20) is set, in use, in said first configuration.

4. The filling device of any one of the foregoing claims, **characterized in that** said connecting element (20) comprises at least two first appendices (44) angularly spaced with respect to one another, and **in that** said end portion (19a, 19b) comprises at least two second appendices (49) angularly spaced with respect to one another and adapt to axially abut against said first appendices (44), when said connecting element (20) is in said first configuration.

5. The filling device of claim 5, when depending on claim 3 or 4, **characterized in that** said first appendices (44) are angularly spaced from said pin (37), and **in that** said second appendices (59) are angularly spaced from said opening (48).

6. The filling device of any one of the foregoing claims, **characterized in that** said connecting element (20) is elastically loaded towards said first configuration.

7. The filling device of claim 6, **characterized in that** said connecting element comprises (25):

- a frame (35) movable along said first direction (E, F); and
- an elastic element (46), which is interposed between said frame (35) and said pin (37).

8. The filling device of any one of the foregoing claims, **characterized in that** said common element (17) comprises a shutter (23) movable between an open configuration in which it prevents said pourable product from flowing along said fluidic line (16) and a closed configuration in which it allows said pourable product to flow along said fluidic line (16);
said shutter (23) comprising a plurality of radially protruding blades (31) which extend inside said fluidic line (16) and are configured to impart a swirl motion to said pourable product upstream of said mouth (18), proceeding according the advancing direction of said pourable product towards said mouth (18).

9. The filling device of any one of the foregoing claims, **characterized in that** specific said end portion (19b) is configured to carry out a contactless filling of said article (2);
said end portion (19b) comprising a nozzle (67) arranged upstream of said mouth (18) proceeding according the advancing direction of said pourable product towards said mouth (18), and configured to direct the flow of said pourable product towards the centreline of said mouth (18).

10. The filling device of any one of claims 1 to 8, **characterized in that** said end portion (19a) is configured to carry out a contact filling of said article (2);
said end portion (19a) comprising a seal (56) adapted to abut against said article (2) and being shaped in such a way to direct the flow towards a peripheral edge (9) of said article (2)

11. The filling device of any one of the foregoing claims, **characterized in that** said end portion (19a, 19b) is radially interposed between said common body (17) and said connecting element (20), when said connecting element (20) is set in said first configuration.

12. A method of contact or contactless filling an article with a pourable product, comprising the steps of:

i) conveying said pourable product along a fluidic

line (16) defined by a common body (17); and
ii) conveying said pourable product through a filling mouth (18) of an end portion (19a, 19b) and fluidly connected to said fluidic line (16);
characterized by the comprising the steps of:

ii) selectively connecting a specific said end portion (19a, 19b) to said common body (17) in dependence of the fact that said contact or contactless filling is to be carried out; and
iii) selectively arranging a connecting element (20) :

- either in a first configuration in which it blocks said end portion (19a, 19b) and said common body (17) with respect to another; or
- in a second configuration in which it leaves free from one another said end portion (19a, 19b) from said body (17).

13. The method of claim 12, **characterized by** comprising the step iv) of creating a swirl motion of said pourable product inside said common body (17), both in case of contact filling and contactless filling.

14. The method of claim 13, **characterized by** comprising:

either the step v) of conveying a flow of said pourable product towards the periphery of said filling mouth (18) in case of contactless filling; or or the step vi) of conveying said flow of said pourable product towards a central zone of said filling mouth (18) in case of contact filling.

15. The method of any one of claims 11 to 14, **characterized by** comprising a step vii) of moving said end portion with respect to said article (2), before the filling thereof with said pourable product.

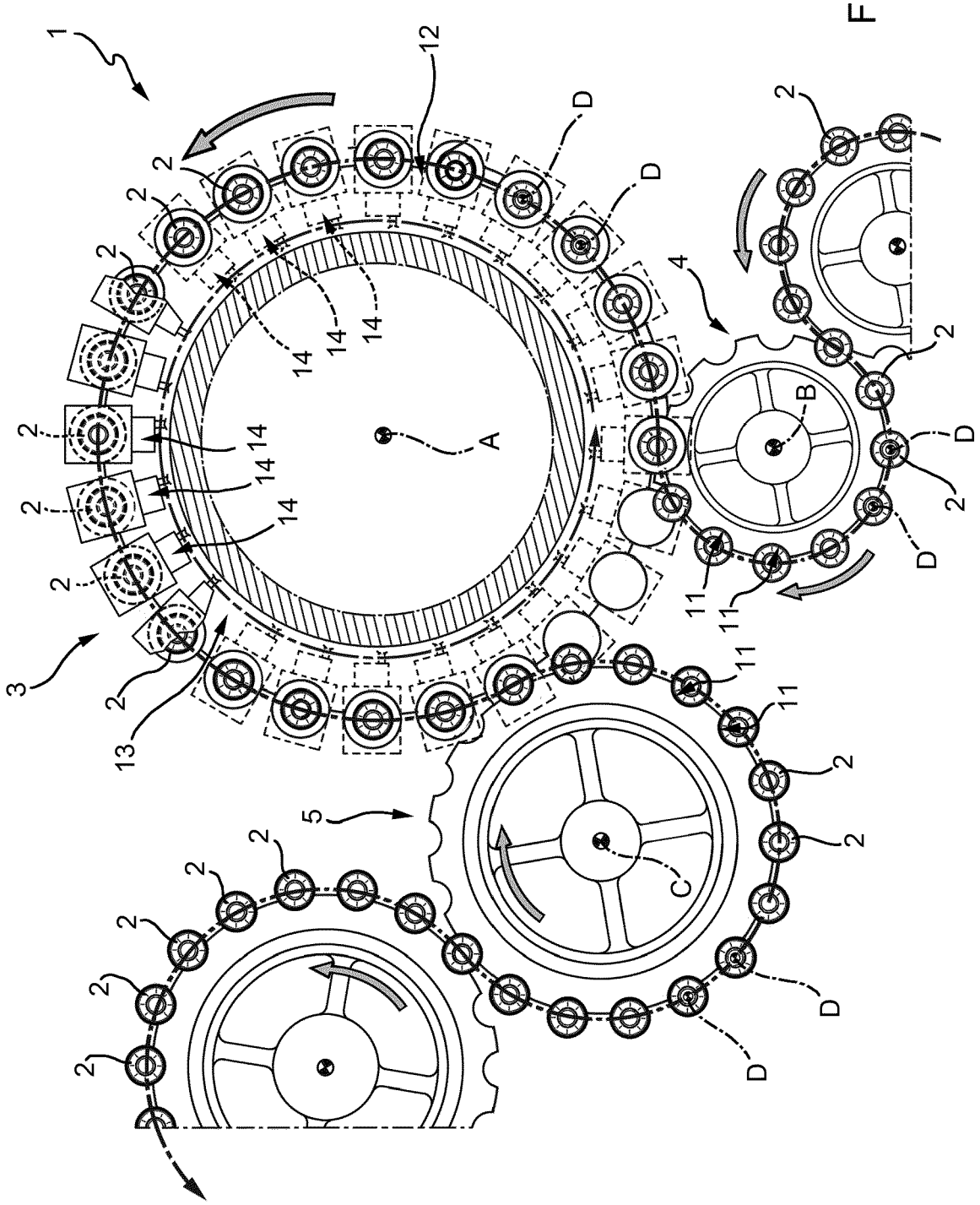

FIG. 1

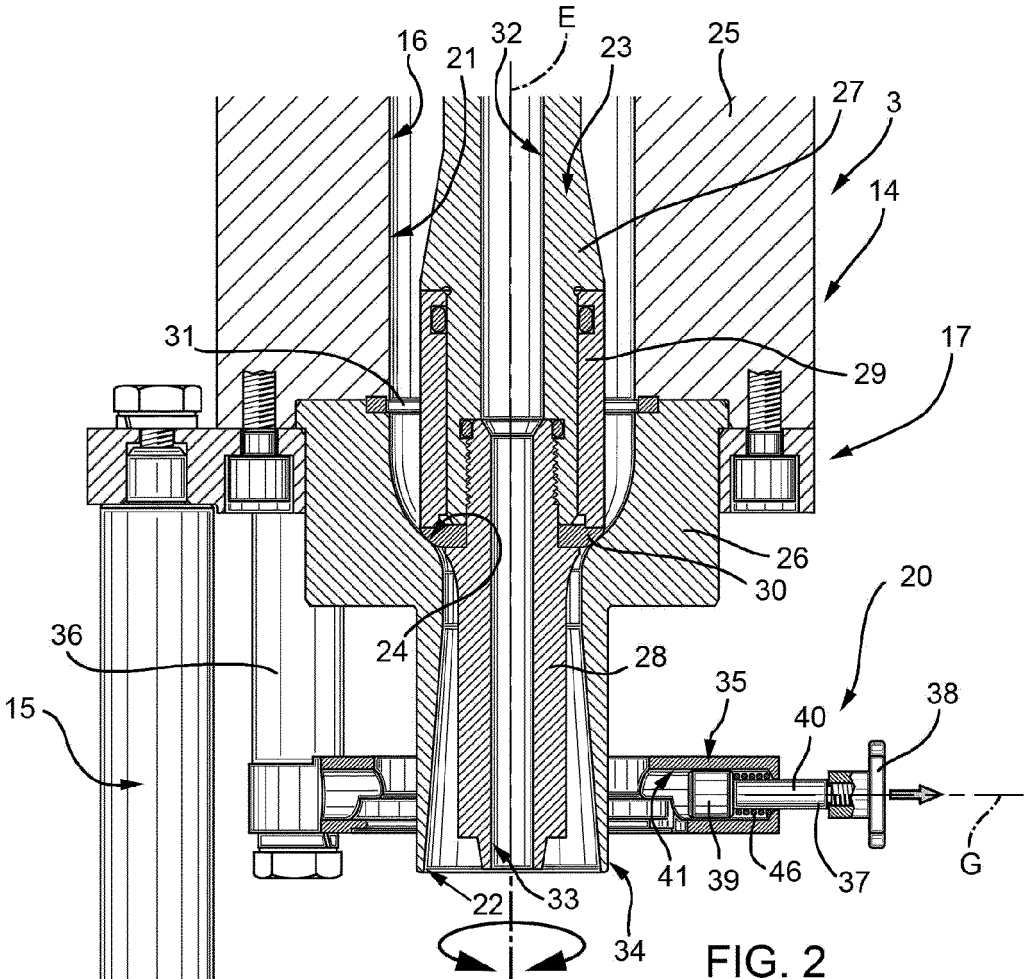
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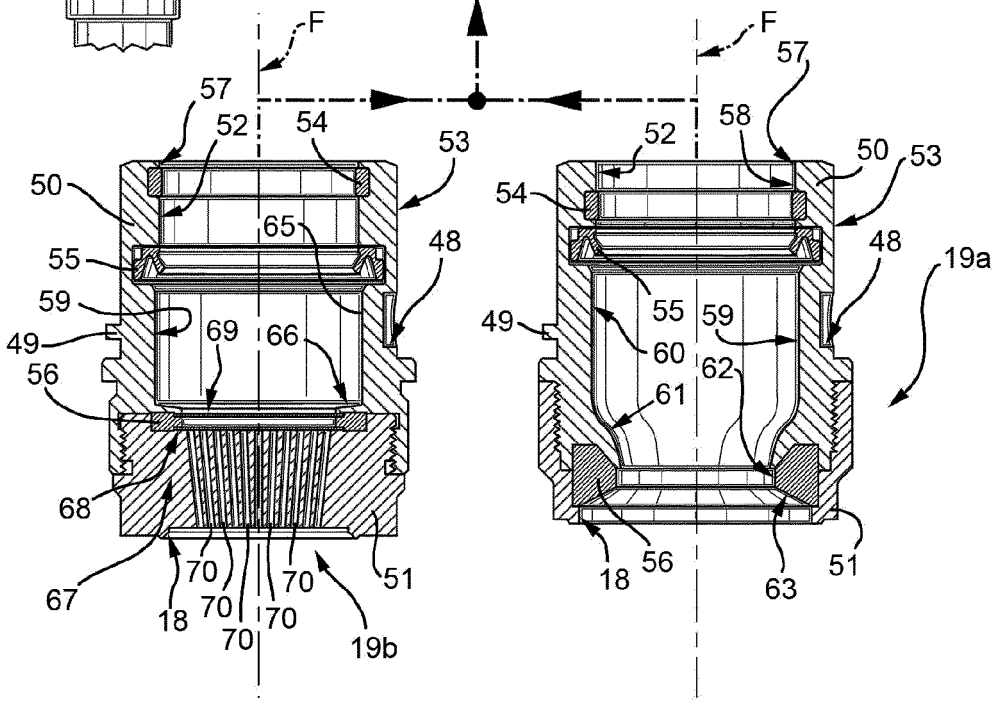
FIG. 2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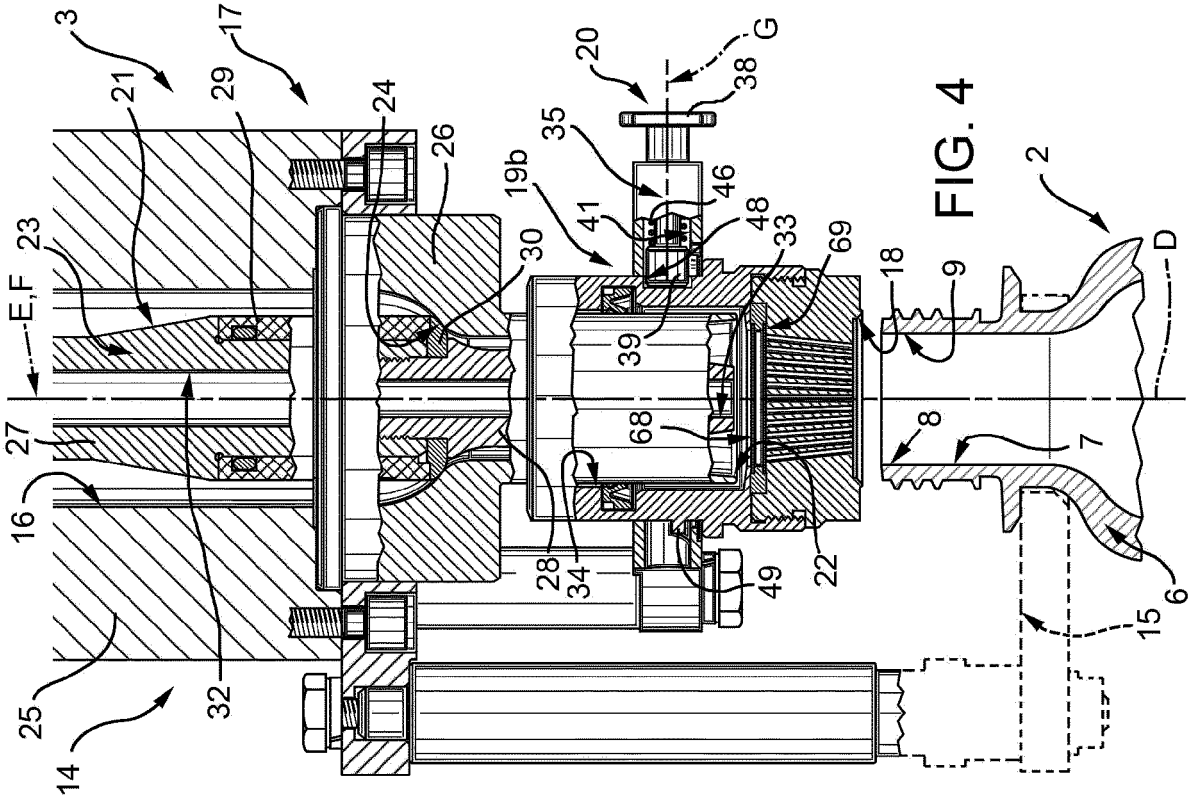
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FIG. 4

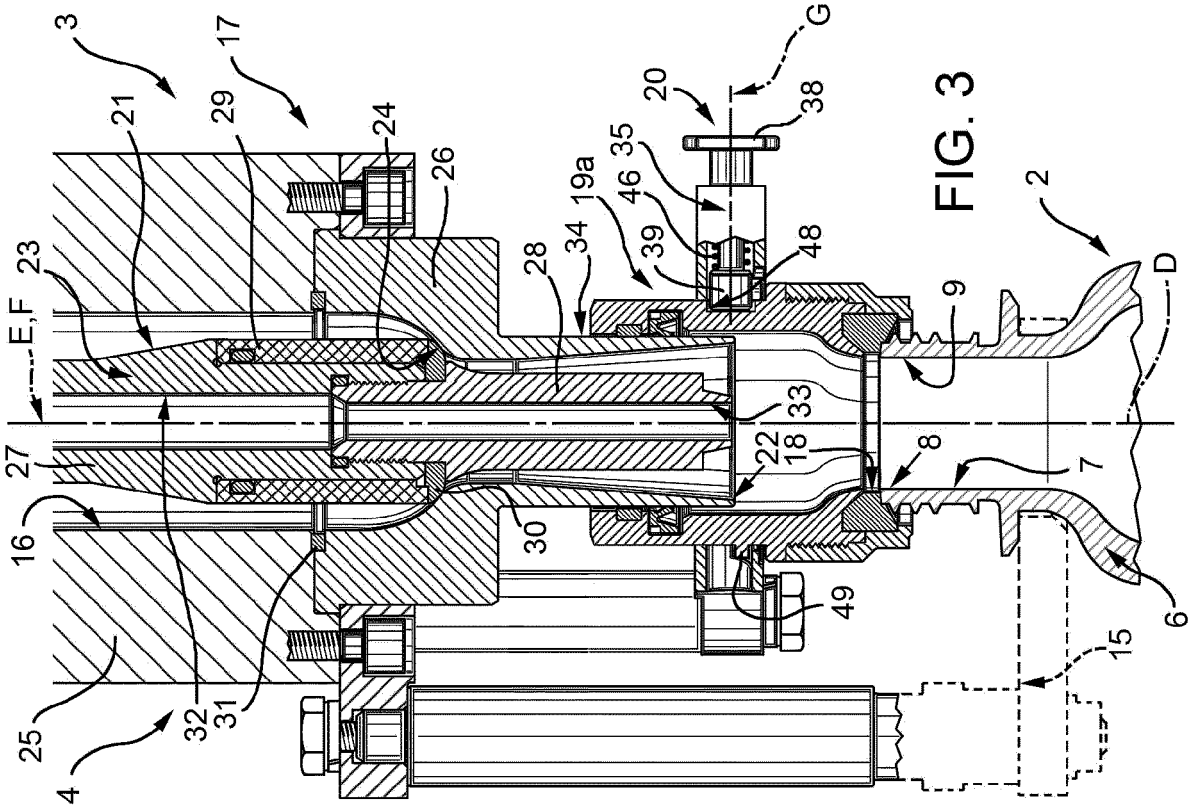
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FIG. 3

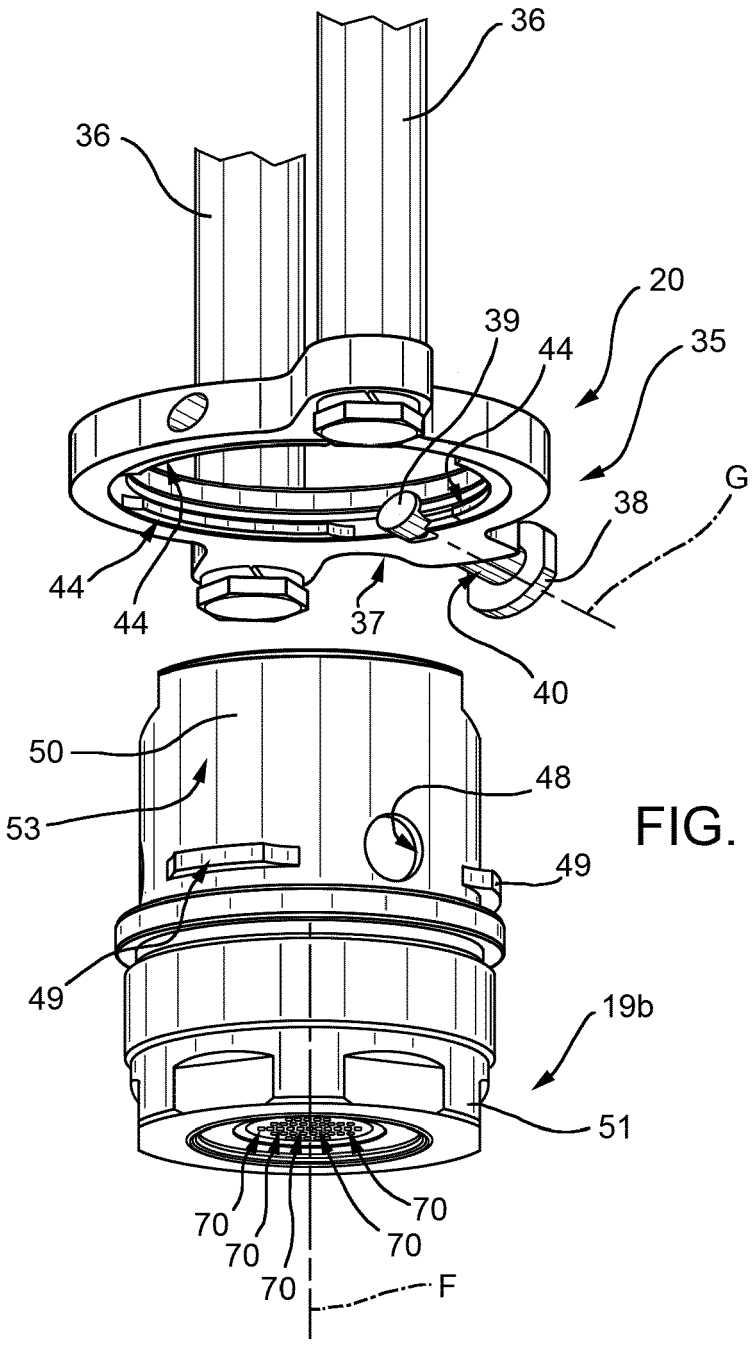

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 15 30 7091

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	31 May 2016	Luepke, Erik

CATEGORY OF CITED DOCUMENTS

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