

19



**Octrooi Centrum
Nederland**

11

2014946

12 B1 OCTROOI

21

Aanvraagnummer: **2014946**

22

Aanvraag ingediend: **09/06/2015**

51

Int. Cl.:

B65B 39/12 (2016.01) **B65B 59/00** (2016.01) **B65B 59/04** (2016.01) **B65B 3/00** (2016.01) **B67C 3/22** (2016.01) **B65B 39/00** (2016.01)

43

Aanvraag gepubliceerd:
23/01/2017

47

Octrooi verleend:
31/01/2017

45

Octrooischrift uitgegeven:
22/03/2017

73

Octrooihouder(s):
Sluis Cigar Machinery B.V. te Kampen.

72

Uitvinder(s):
Oscar Slurink te Heino.

74

Gemachtigde:
ir. H.V. Mertens c.s. te Rijswijk.

54

Filling station and method for filling cartridges of electronic cigarettes with a liquid.

57

The present invention relates to a filling station for filling cartridges of electronic cigarettes with a liquid, the filling station defining a plurality of filling positions for a plurality of cartridges, the filling station being configured for simultaneously filling the cartridges which are in the filling positions, the filling station comprising:

- a plurality of nozzles, wherein the nozzles are grouped in:
 - o a first group of first nozzles and
 - o a second group of second nozzles,
- wherein each filling position is associated with a first nozzle from the first group and a second nozzle from the second group,
- an up-down actuator for moving the nozzles downward into upwardly oriented filling openings of the cartridges in the filling positions in order to insert at least a first nozzle and a second nozzle into each cartridge, and
- a distance actuator for changing a horizontal distance between each first nozzle and second nozzle.

Title: Filling station and method for filling cartridges of electronic cigarettes with a liquid

5

Field of the invention

The present invention relates to a filling station and method for filling cartridges of electronic cigarettes with a liquid. Filling stations and filling methods for filling cartridges of electronic cigarettes are known.

10

Background of the invention

Cartridges for electronic cigarettes are generally filled in a filling line. Generally, the cartridges contain a wad (also referred to as a "non-woven"). During the filling, the wad is impregnated with the liquid. The liquid may contain nicotine, aromas and various other substances.

15

The cartridges are generally filled by directing the open top end upward and filling the cartridge with a predetermined volume of the liquid. The filling itself may be difficult and time-consuming. This is partly due to the fact that the liquid substance which is injected into the cartridge has to impregnate the wad, which is a relatively slow process. The time-consuming nature is also due to the viscous nature of the liquid itself. The liquid generally has a high viscosity and density, which slows down its movement.

20

As a result, currently used filling devices of cartridges for electronic cigarettes are relatively slow and rather cumbersome.

25

To speed up the filling process, WO2015040568A1 proposes a filling device having metering chambers. It was found that this in itself is a complex and cumbersome method of filling the cartridges.

30

A further challenge in filling cartridges of electronic cigarettes is that the cartridges may have varying sizes. In particular the diameter of the cartridges may vary. A single filling line is generally used for cartridges of multiple sizes. When a series of cartridges of a different diameter must be filled, the filling line is converted. In order to limit the downtime, the conversion should be quite fast. It has been found quite challenging in practice to convert the filling line fast. In practice, a considerable down time of the filling line generally occurs for a conversion from one diameter to another diameter, which is disadvantageous.

35

Object of the invention

It is a first objective of the invention to provide a filling device which enables relatively fast and reliable filling of cartridges for electronic cigarettes.

5 It is second objective of the invention to provide a filling device which can be adapted to cartridges of varying size, in particular a varying diameter, in a reliable manner and within a short period of time.

10 It is yet a further objective to achieve both the first and second objective in a single apparatus and method.

The invention

In order to achieve at least one objective, a filling station for filling cartridges of electronic cigarettes with a liquid is provided, the filling station defining a plurality of filling
15 positions for a plurality of cartridges, the filling station being configured for simultaneously filling the cartridges which are in the filling positions, the filling station comprising:

- a plurality of nozzles, wherein the nozzles are grouped in:
 - o a first group of first nozzles and
 - o a second group of second nozzles,
- 20 wherein each filling position is associated with a first nozzle from the first group and a second nozzle from the second group,
- an up-down actuator for moving the nozzles downward into upwardly oriented filling openings of the cartridges in the filling positions in order to insert at least a first nozzle and a second nozzle into each cartridge, and
- 25 – a distance actuator for changing a horizontal distance between each first nozzle and second nozzle.

By using multiple nozzles per cartridge, the filling can take place faster and more evenly.

30

It is a risk during the filling of the cartridges that the nozzles collide with the upper rim of the cartridge during their downward movement. This is due to the fact that the size of the openings of the cartridges are relatively small. Any deviation in the position of the cartridge or the position of the nozzle may lead to the nozzle hitting the cartridge on the way down. This
35 may result in a non-filled cartridge and damage to the nozzle. With two nozzles (or more) which are positioned at a distance from one another, the risk of collision is even greater.

The adjustment of the distance between the first and second needles makes it possible to avoid collisions with the cartridges.

5 The possibility to vary the distance also makes it possible to position the nozzles in a preferred location inside the cartridges during the filling.

In an embodiment:

- the up-down actuator (38) is configured to move the first and second group of nozzles into and out of the cartridges, and
- 10 – the distance actuator (39) is configured to increase and decrease the distance between the respective first nozzles and second nozzles while they are inserted into the cartridges.

15 With this embodiment, the risk of collision has been further mitigated by inserting the nozzles relatively close to one another into the cartridge, followed by increasing the distance between the nozzles. Subsequently, the cartridge is filled.

In an embodiment, the up-down actuator is configured to further move the first and second group of nozzles into the cartridges after the distance between the respective first
20 nozzles and second nozzles has been increased by the distance actuator. The up-down actuator and the distance actuator may be configured to insert the respective first and second nozzle into each cartridge between the wall of the cartridge and a wad which is located inside the cartridge. This allows direct injection of the liquid into the wads from both
25 nozzles.

In an embodiment, the first and second nozzle are inserted on opposite sides of the cartridge. This creates an effective filling of the cartridge and the wad inside the cartridge. The plurality of nozzles makes it easier to completely fill the wad in a limited amount of time.

30 The up-down actuator and the distance actuator may be configured to – after the filling of the cartridges, decrease the distance (D) between the respective first nozzles and second nozzles while they are still inserted in the cartridges and to subsequently retract the first and second group of nozzles upwards and out of the cartridges. This creates a simple cycle for the movement of the nozzles and prevent the nozzles from contacting the ridge of
35 the cartridge which surrounds the opening.

The up-down actuator and the distance actuator may be configured to – after the filling of the cartridges, retract the respective first nozzles and second nozzles partially from the cartridges and to subsequently decrease the distance between the respective first nozzles and second nozzles. In this way damage to the wad is substantially limited or prevented.

In an embodiment, the up-down actuator and the distance actuator are configured to fully retract the respective first nozzles and second nozzles from the cartridges after the distance between the respective first nozzles and second nozzles has been decreased.

In an embodiment, the filling station comprises an overhead beam which extends above the filling area, wherein a rail is mounted to said overhead beam, and wherein the common first and second support members are connected to said rail via sliders and are movable from left to right and vice versa. It was found that this embodiment provides great reliability.

In an embodiment, the nozzles of the first group are mounted to a common first support member and the nozzles of the second group are mounted to a common second support member, wherein the first and second common support member are moveable relative to one another over a horizontal distance. It was found that this forms a simple and reliable mechanism.

The second common support member may be located vertically above the first common support member and may slide over the first support member.

The nozzles may have a needle shape, comprising an opening or an inclined surface, wherein the opening or inclined surface of each first nozzle faces the opening or inclined surface of the associated second nozzle for each filling position. This allows direct injection into the wad in the inserted position. In another embodiment, the nozzle may have a needle shape with a closed inclined bottom surface, and with the opening in the side wall instead of being provided in the inclined bottom surface. This allows a more sideways oriented filling of the liquid, into the wad. The inclined surface ensures that the nozzle does not penetrate the wad but remains between the wad and the side wall.

Each nozzle may have a lower tip which is located eccentrically with respect to a main axis of the said nozzle and wherein when the nozzle is in the inserted position the lower

tip of each nozzle is closer to a side wall of the cartridge than the main axis of each nozzle. It was found that in this arrangement the injection of the liquid into the wad is most effective.

5 The filling station may be configured to simultaneously insert all nozzles into the filling openings of the cartridges situated in the filling positions.

When seen in top view the filling locations may be arranged along a part of a circle and the nozzles are arranged along a part of a same or similar circle in order to match with the arrangement of the filling locations. This allows a rotary arrangement for the filling which
10 was found to be very effective and reliable.

The filling station may comprise a rotary conveyor for revolving the cartridges around a central axis, the rotary conveyor being supported by a support frame, the rotary conveyor comprising an entry area where the cartridges enter the rotary conveyor, a filling area where the filling locations are provided and an exit area where the cartridges leave the
15 rotary conveyor. This arrangement was found to be very reliable and effective.

The present invention further relates to a method of filling cartridges for electronic cigarettes, the method comprising:

- providing the filling station according to the invention,
- 20 – positioning a number of cartridges in the respective filling locations,
- inserting the nozzles of the first and second group into the respective cartridges,
- filling each cartridge by ejecting a liquid through the respective first and second nozzles, and
- 25 – retracting the nozzles from the cartridges,

wherein the method comprises changing the distance between the respective nozzles of the first group and the respective nozzles of the second group.

30 The method provides the same advantages as the filling station according to the invention

The method may comprise:

- inserting the nozzles into the cartridges, wherein the respective first and second nozzle for each filling position are positioned at first distance (D1) from
35 one another,
- increasing the distance between the first and second nozzles to a second distance (D2) when the nozzles are in the inserted position, and

- inserting the nozzles further to a deepest position.

The method may further comprise inserting the nozzles further into the cartridges after the distance has been increased. The method may comprise inserting each nozzle into
5 the cartridge between the side wall of the cartridge and the wad.

The method may further comprise decreasing the distance between the respective first and second nozzles after the filling of the cartridges and prior to retracting of the nozzles fully from the cartridges.

10

The nozzles may be moved upwardly during the filling in order to fill the wads substantially evenly.

The method may comprise:

- 15 – providing the filling station according to the invention which are directed at the filling station,
- filling a number of cartridges of a first size, wherein the respective first and second nozzles are positioned at a first distance from one another during the filling,
- 20 – adjusting the filling station by changing the distance between the nozzles during the filling from the first distance to a second distance, and
- filling a number of cartridges of a second size, wherein the respective first and second nozzles are positioned at the second distance from one another during the filling.

25 This effectively allows filling cartridges of different size with the same filling station without a long downtime.

In an embodiment of the method, the first distance is smaller than a first diameter of the cartridges of the first size, and the second distance is smaller than a second diameter of
30 the cartridges of the first size.

In an embodiment of the method, the first and second group of nozzles are simultaneously inserted into the openings of the respective cartridges. This is fast and simple

35 These and other aspects of the invention will be more readily appreciated as the same becomes better understood by reference to the following detailed description and considered

in connection with the accompanying drawings in which like reference symbols designate like parts.

Brief description of the figures

5 Figure 1 shows an isometric view of a filling station according to the present invention.

Figure 2A shows an isometric view of the filling station according to the present invention from a different angle.

Figure 2B shows a top view of the filling station according to the present invention.

10 Figure 3 shows a partial isometric view of the filling station according to the present invention from a different angle.

Figure 4 shows a partial front view of the filling station according to the present invention.

Figure 5 shows a partial back view of the filling station according to the present invention.

15 Figure 6 shows a partial isometric view of an arrangement of nozzles according to the present invention.

Figure 7 shows a detail of figure 6 including a cartridge and in a first stage.

Figure 8 shows a detail of figure 6 including a cartridge and in a second stage.

20 Figures 9A, 9B, 9C and 9D show a sequence of the movement of the nozzles relative to the cartridges in a sectional view.

Figure 10 shows nozzles in combination with cartridges of different diameters.

Detailed description of the figures

25 Turning to figures 1, 2A and 2B, a filling station 10 for filling cartridges of electronic cigarettes with a liquid is shown. A cartridge 40 is shown in figure 8 and will be discussed further below. Returning to figure 1, the filling station is intended to form part of a filling line.

30 The filling station comprises two parts, a permanent part 12 and an exchangeable part 14 . Both parts comprise a frame 13A resp. 13B.

35 The permanent part 12 comprises a rotary conveyor 16, an infeed device 18 and an outfeed device 20. The rotary conveyor moves the cartridges around a central axis 21. The rotary conveyor comprising an entry area 60 where the cartridges enter the rotary conveyor, a filling area 61 where the filling locations are provided and an exit area 62 where the cartridges leave the rotary conveyor. The cartridges are conveyed in groups.

In use, a group of cartridges 40 are positioned in the respective filling locations 30 of the filling area 61 by the rotary conveyor.

5 The exchangeable part 14 comprises a filling unit 22 which is positioned overhead the rotary conveyor 16. The rotary conveyor receives a group of cartridges from the infeed device 18. The rotary conveyor subsequently moves the group in the direction 24 to a filling area 61 underneath the filling unit 22. The filling area comprises twenty filling positions. A different number is also possible. The filling positions are discussed in more detail further below. Subsequently the cartridges are filled. Next, the group of cartridges is moved to the outfeed
10 device 20, where the cartridges are removed from the rotary conveyor.

The exchangeable part 14 is provided with wheels 25 in order to be exchanged for a similar exchangeable part. However, this is not essential to this invention. The exchangeable part could also be non-exchangeable and integrated with the permanent part.

15

Turning to figure 2B, the rotary conveyor 16 comprises three "pizza-slice" segments 17A, 17B, 17C which each hold a group of cartridges and rotate about the main axis 21.

Turning to figures 3, 4 and 5, the filling unit 22 is shown in more detail. The filling unit
20 comprises two posts 26A, 26B and a horizontal beam 27. The posts 26A, 26B are positioned just outside the rotary conveyor 16. The beam 27 is supported by the posts 26A, 26B and is positioned above the rotary conveyor 16. The beam supports a plurality of nozzles 35.

The filling station further comprises an up-down actuator 38 for moving the nozzles 35
25 downward, into upwardly oriented filling openings of the cartridges in the filling positions 30. The up-down actuator is positioned on the post 26B. The up-down actuator 38 is an electric linear actuator but other types may also be used. The up-down actuator moves all nozzles downward simultaneously in order to insert a first nozzle and a second nozzle into each cartridge. All nozzles are inserted simultaneously.

30

Turning to figures 6, 7 and 8, a part of the filling unit is shown. The filling unit 22 has twenty pairs 32 of nozzles 35. In top view, the pairs 32 are arranged as a part of a circle which matches the size and shape of the rotary conveyor 16. The filling station 10 defines twenty filling positions 30 for a plurality of cartridges. The cartridges are filled simultaneously.
35 Three filling positions 30 are shown in figure 6. Obviously, the filling station 10 could also have a different number of filling positions than twenty.

Each nozzle pair 32 has a left nozzle 35A and a right nozzle 35B, also indicated as a first nozzle 35A and a second nozzle 35B. The nozzles are also collectively indicated by numeral 35. The nozzles are grouped in a first group 36A of first nozzles 35A and a second group 36B of second nozzles 35B. The first group 36A and second group 36B are indicated schematically in figure 6.

Each filling position 30 is associated with a first nozzle 35A from the first group and a second nozzle 35B from the second group.

The nozzles have a shape which is somewhat similar to the shape of hypodermic needle, wherein the opening 50A of each first nozzle faces the opening 50B of the associated second nozzle 35B for each filling position.

As indicate in figure 8, each nozzle has a lower tip 48 which is located eccentrically with respect to a main axis 49 of the said nozzle and wherein when the nozzle is in the inserted position the lower tip 48 of each nozzle is closer to a side wall of the cartridge than the main axis 49 of each nozzle.

The filling station further comprises a distance actuator 39 for changing a horizontal distance (D) between each first nozzle 35A and second nozzle 35B. The distance actuator is an electric linear actuator, but other actuators may be used.

The up-down actuator 38 and the distance actuator 39 are configured to move the first group 36A and second group 36B of nozzles into the cartridges, and to increase the distance between the respective first nozzles and second nozzles when they are inserted into the cartridges.

The up-down actuator 38 is configured to further move the first and second group of nozzles into the cartridges after the distance between the respective first nozzles and second nozzles has been increased.

The first group 36A of first nozzles are mounted on a common first support member 42A. The second group of nozzles 36B are mounted on a common second support member 42B. The first and second support members 42A, 42B are movable relative to one another over a horizontal distance. The first and second support members 42A, 42B are connected to a rail 41 via sliders 43 which slide along the rail 41 in the direction indicated by arrow 103. The rail 41 is mounted to the overhead beam 27. The second common support member 42B

is located vertically above the first common support member 42A. The distance actuator 39 is coupled with the common support members 42A, 42B via two beams 101A, 101B and the sliders 43.

5 Turning to figures 9A, 9B, 9C and 9D, the cartridge 40 is shown in more detail in a sectional view. The cartridge comprises a wad 44 or non-woven for holding the liquid. The wad has a tubular shape. The cartridge has an upper opening 46.

10 Turning in particular to figure 9A, the up-down actuator and the distance actuator are configured to insert the respective first and second nozzle into each cartridge when the first and second nozzle are at a first distance D1 from one another.

15 The first distance D1 is small enough to ensure that the nozzles remain at a distance X1 from the side wall 45 of the cartridge. In this way, any collisions between the nozzles and the upper ridge 47 of the opening 46 are prevented.

20 Turning to figure 9B, the situation is shown after the tips 48 of the nozzles 35A, 35B have been inserted into the cartridge 40 over a distance L1. The nozzles are in an intermediate position and not yet fully inserted. The distance between the nozzles is still D1, i.e. relatively small.

25 Subsequently, the distance is increase by the distance actuator 39 to the distance D2. This situation is shown in figure 9C. The nozzles 35A, 35B engage the wall 45 or have a very small distance to the wall 45. The first and second nozzle 35A, 35B are located on opposite sides of the cartridge.

30 Turning to figure 9D, subsequently the nozzles 35A, 35B are further inserted into the cartridge to a deepest position, to a distance L2 which is greater than the distance L1. The difference between L1 and L2 is indicated as L3. The nozzles 35A, 35B are inserted between the wad 44 and the wall 45. In this position, the liquid is ejected from the nozzles. The liquid is ejected directly into the wad 44. All cartridges are filled simultaneously.

35 In an embodiment the needles are moving upward during the liquid flow to create an even liquid distribution in the wad.

 After the filling of the cartridges, the nozzles 35A, 35B are retracted from the cartridge over a distance L2 from the deepest position.

After the retraction of the needle width is decreased to D1.

Turning to figure 10, the filling station 10 is also configured to fill cartridges of different diameters P1, P2. A cartridge 40 having a relatively small diameter P1 is shown and a
5 cartridge having a relatively large diameter P2 is shown. The distance actuator 39 can be adjusted to vary the distances D1, D2 in case the diameter of the cartridge varies. This is a relatively simple and straightforward process.

Likewise, the up-down actuator 38 can also be adjusted to vary the distances L1 and
10 L2 in case a height of the cartridge varies. This is a relatively simple and straightforward process. In this way, the filling station can be converted from one type of filling cartridge to another type of filling cartridge quite easily.

It will be understood that for each diameter and each length of the cartridge, a same
15 kind of trajectory may be followed by the nozzles, i.e. inserting the nozzles to an intermediate position, increasing the distance between the nozzles and subsequently inserting the nozzles to the deepest position. The distances D1, D2, L1 and L2 may be adjusted for each type of nozzle. These distances may be pre-set in a control unit so that the conversion can be carried out fast and with little downtime.

20

It will be recognized that an embodiment may not achieve all of the stated products.

As required, detailed embodiments of the present invention are disclosed herein; however, it is to be understood that the disclosed embodiments are merely exemplary of the
25 invention, which can be embodied in various forms. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present invention in virtually any appropriately detailed structure. Further, the terms and phrases used herein are not intended to be limiting, but rather, to provide an
30 understandable description of the invention.

The terms "a" or "an", as used herein, are defined as one or more than one. The term plurality, as used herein, is defined as two or more than two. The term another, as used
herein, is defined as at least a second or more. The terms including and/or having, as used
35 herein, are defined as comprising (i.e., open language, not excluding other elements or steps). Any reference signs in the claims should not be construed as limiting the scope of the claims or the invention.

The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.

CONCLUSIES

1. Vulstation (10) voor het vullen van cartridges (40) van elektronische sigaretten met een vloeistof, waarbij het vulstation meerdere vulposities (30) definieert voor meerdere cartridges, waarbij het vulstation is geconfigureerd voor het simultaan vullen van de cartridges die zich in de vulposities bevinden, het vulstation omvattende:

- 5 - meerdere spuitmonden (35), waarin de spuitmonden zijn gegroepeerd in:
 - een eerste groep (36A) van eerste spuitmonden (35A), en
 - een tweede groep (36B) van tweede spuitmonden (35B),waarbij iedere vulpositie is geassocieerd met een eerste spuitmond (35) van de eerste groep en een tweede spuitmond (35B) van de tweede groep,
- 10 - een op-en-neer-actuator (38) voor het naar beneden bewegen van de spuitmonden (35) in naar boven toe gerichte vulopeningen (46) van de cartridges in de vulposities ten einde ten minste een eerste spuitmond en tweede spuitmond in iedere cartridge te brengen, en
- een afstand-actuator (39) voor het veranderen van een horizontale afstand
- 15 (D) tussen iedere eerste spuitmond en tweede spuitmond.

2. Vulstation volgens conclusie 1, waarbij:

- de op-en-neer-actuator (38) is ingericht om de eerste en tweede groep van spuitmonden in en uit de cartridges te bewegen, en
- 20 - de afstand-actuator (39) is ingericht om de afstand tussen respectieve eerste spuitmonden en tweede spuitmonden te vergroten en te verkleinen terwijl zij zich in de ingebrachte positie bevinden.

3. Vulstation volgens conclusie 2, waarbij de op-en-neer-actuator is geconfigureerd om
25 de eerste en tweede groep van spuitmonden verder in de cartridges te bewegen nadat de afstand tussen de respectieve eerste spuitmonden en tweede spuitmonden is vergroot door de afstand-actuator.

4. Vulstation volgens een van de voorgaande conclusies, waarbij de op-en-neer-actuator en de afstand-actuator zijn ingericht om de respectieve eerste en tweede
30 spuitmond in iedere cartridge in te brengen tussen de wand (45) van de cartridge en een watje (44) dat zich in de cartridge bevindt.

5. Vulstation volgens een van de voorgaande conclusies, waarbij de eerste en tweede
35 spuitmond aan tegenovergelegen zijden van de cartridge worden ingebracht.

6. Vulstation volgens een van de voorgaande conclusies, waarbij de op-en-neer-actuator en de afstand-actuator zijn ingericht om – na het vullen van de cartridges – de respectieve eerste spuitmonden en tweede spuitmonden over een afstand gedeeltelijk uit de cartridges te trekken en om vervolgens de afstand tussen de respectieve eerste
5 spuitmonden en tweede spuitmonden te verkleinen.

7. Vulstation volgens conclusie 6, waarbij de op-en-neer-actuator en de afstand-actuator zijn ingericht om de respectieve eerste spuitmonden en tweede spuitmonden volledig uit de cartridges te trekken nadat de afstand tussen de respectieve eerste
10 spuitmonden en tweede spuitmonden is verkleind.

8. Vulstation volgens een van de voorgaande conclusies, waarbij de spuitmonden van de eerste groep zijn gemonteerd op een gemeenschappelijk eerste steunorgaan (42A) en de spuitmonden van de tweede groep zijn gemonteerd op een gemeenschappelijk tweede
15 steunorgaan (42B), waarbij de eerste en tweede gemeenschappelijke steunorganen over een horizontale afstand ten opzichte van elkaar beweegbaar zijn.

9. Vulstation volgens conclusie 8, omvattende een bovenligger (27) die zich boven het vulgebied uitstrekt, waarbij een rail (41) is gemonteerd op genoemde bovenligger, en waarbij
20 de gemeenschappelijke eerste en tweede steunorganen (42A, 42B) via glijders (43) met genoemde rail zijn verbonden en van links naar rechts en vice versa beweegbaar zijn.

10. Vulstation volgens een van de voorgaande conclusies, waarbij de spuitmonden een naaldvorm hebben en een opening of een hellend oppervlak omvatten, waarbij de opening
25 of het hellend oppervlak van iedere eerste spuitmond naar de opening of het hellend oppervlak van de geassocieerde tweede spuitmond van iedere vulpositie zijn gericht.

11. Vulstation volgens een van de voorgaande conclusies, waarbij iedere spuitmond een onderste uiteinde (48) heeft dat excentrisch ten opzichte van een hoofdas (49) van de
30 genoemde spuitmond is geplaatst en waarbij, wanneer de spuitmond zich in de ingebrachte positie bevindt, het onderste uiteinde van iedere spuitmond zich dichterbij een zijwand van de cartridge bevindt dan de hoofdas van dezelfde spuitmond.

12. Vulstation volgens een van de voorgaande conclusies, ingericht om alle spuitmonden
35 simultaan in de vulopeningen van de cartridges die zich in de vulpositie bevinden in te brengen.

13. Vulstation volgens een van de voorgaande conclusies, waarbij - gezien in bovenaanzicht - de vullocaties zijn opgesteld langs een deel van een cirkel en de paren van spuitmonden zijn opgesteld langs een deel van een zelfde of vergelijkbare cirkel ten einde te passen bij de opstelling van de vullocaties.

5

14. Vulstation volgens een van de voorgaande conclusies, omvattende een roteerbare transporteur (16) voor het roteren van de cartridges om een centrale as (21) waarbij de roteerbare transporteur wordt ondersteund door een ondersteuningsframe (13A), waarbij de roteerbare transporteur een toegangsgebied (60) omvat waar de cartridges de roteerbare transporteur binnenkomen, een vulgebied (61) waar de vullocaties zijn gelegen en een uitgangsggebied (62) waar de cartridges de roteerbare transporteur verlaten.

10

15. Werkwijze voor het vullen van cartridges van elektronische sigaretten, de werkwijze omvattende:

15

- het verschaffen van het vulstation (10) volgens een van de voorgaande conclusies,
- het positioneren van een aantal cartridges (40) in de respectieve vullocaties (30),
- het inbrengen van de spuitmonden van de eerste en tweede groep in de respectieve cartridges,
- het vullen van iedere cartridge door het spuiten van een vloeistof door de respectieve eerste en tweede spuitmonden, en
- het terugtrekken van de spuitmonden uit de cartridges

20

waarbij de werkwijze omvat het veranderen van de afstand (D) tussen de respectieve spuitmonden van de eerste groep en de respectieve spuitmonden van de tweede groep.

25

16. Werkwijze volgende de voorgaande werkwijzeconclusie, omvattende:

- het inbrengen van de spuitmonden in de cartridges, waarbij de respectieve eerste en tweede spuitmond van iedere vulpositie op een eerste afstand (D1) van elkaar zijn gepositioneerd,
- het vergroten van de afstand tussen de eerste en tweede spuitmond naar een tweede afstand (D2) wanneer de spuitmonden zich in de ingebrachte positie bevinden, en
- het verder inbrengen van de spuitmonden naar een diepste positie.

30

35

17. Werkwijze volgens een van de voorgaande werkwijzeconclusies, omvattende het verder inbrengen van de spuitmonden in de cartridges nadat de afstand is vergroot.

18. Werkwijze volgens een van de voorgaande werkwijzeconclusies, omvattende het inbrengen van iedere spuitmond in de cartridge tussen de zijwand van de cartridge en het watje.
- 5 19. Werkwijze volgens een van de voorgaande werkwijzeconclusies, waarbij de spuitmonden gedurende het vullen opwaarts worden bewogen ten einde de watjes in hoofdzaak gelijkmatig te vullen.
20. Werkwijze voor het vullen van elektronische sigaretten, de werkwijze omvattende:
- 10 - het verschaffen van het vulstation volgens een van de conclusies 1-14,
- het vullen van een aantal cartridges van een eerste grootte, waarbij de respectieve eerste en tweede spuitmonden gedurende het vullen op een eerste afstand van elkaar zijn gepositioneerd,
- het aanpassen van het vulstation door het veranderen van de afstand tussen
15 de spuitmonden van de eerste afstand naar een tweede afstand, en
- het vullen van cartridges van een tweede grootte, waarbij de respectieve eerste en tweede spuitmonden gedurende het vullen op de tweede afstand van elkaar zijn gepositioneerd.
- 20 21. Werkwijze volgens de voorgaande werkwijzeconclusie, waarbij de eerste afstand kleiner is dan een eerste diameter (P1) van de cartridges van de eerste grootte, en waarbij de tweede afstand kleiner is dan een tweede diameter (P2) van de cartridges van de tweede grootte.
- 25 22. Werkwijze volgens de voorgaande werkwijzeconclusies, waarbij de eerste en tweede groep spuitmonden simultaan in de openingen van de respectieve cartridges worden ingebracht.
23. Werkwijze volgens de voorgaande werkwijzeconclusies, waarbij de spuitmonden
30 opwaarts worden bewogen gedurende het vullen ten einde de watjes in hoofdzaak gelijkmatig te vullen.

Fig. 1

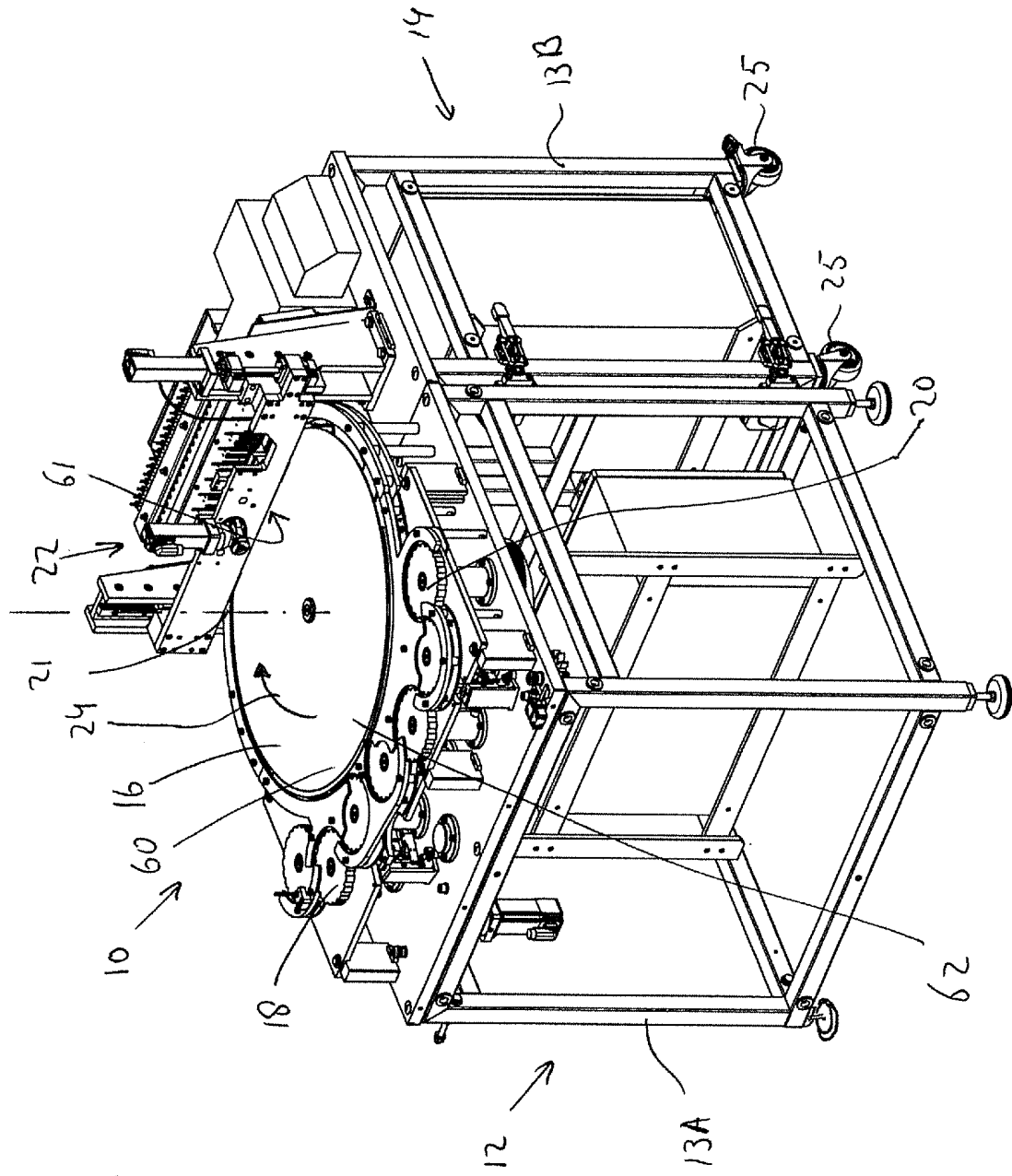
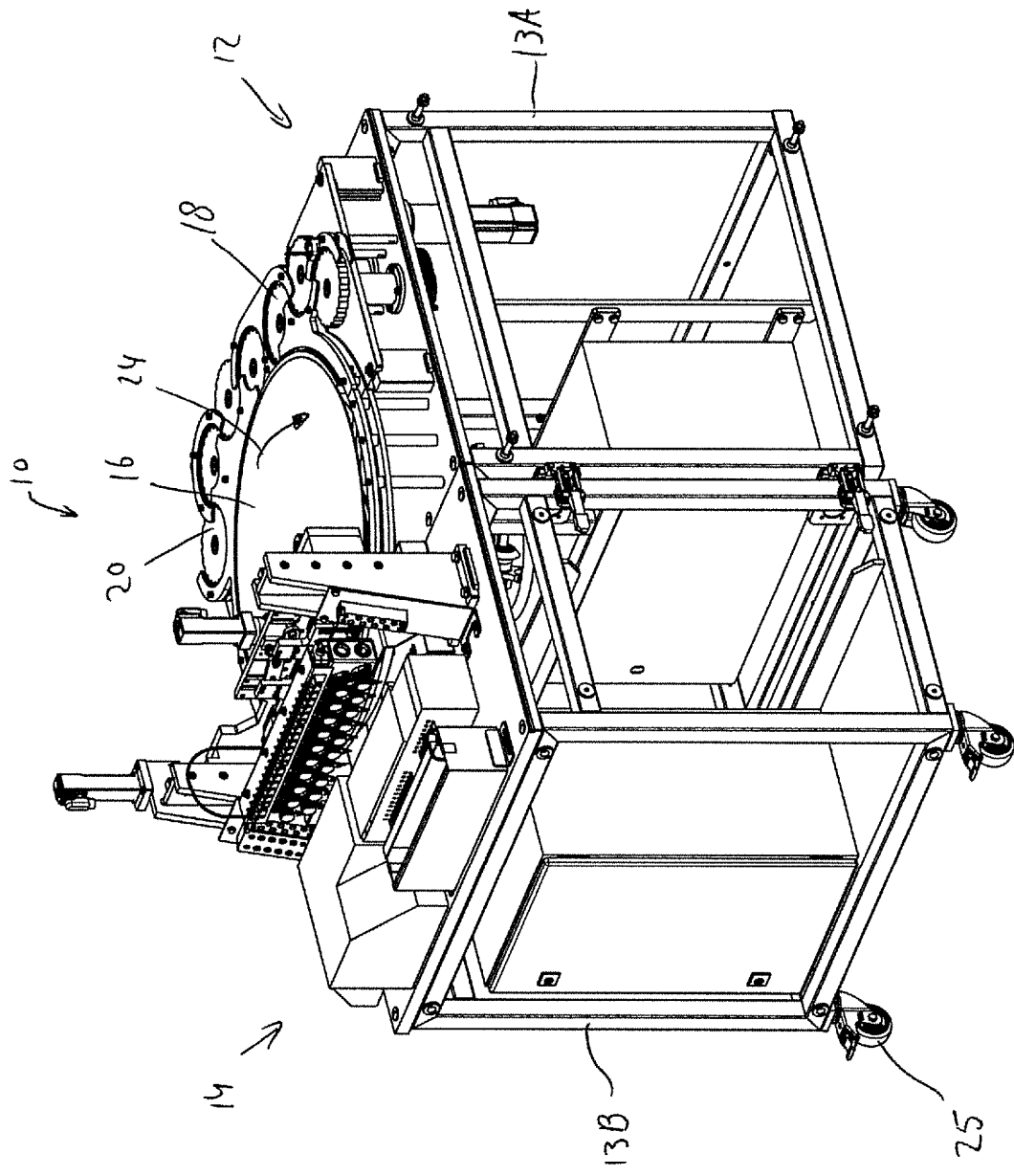


Fig. 2A



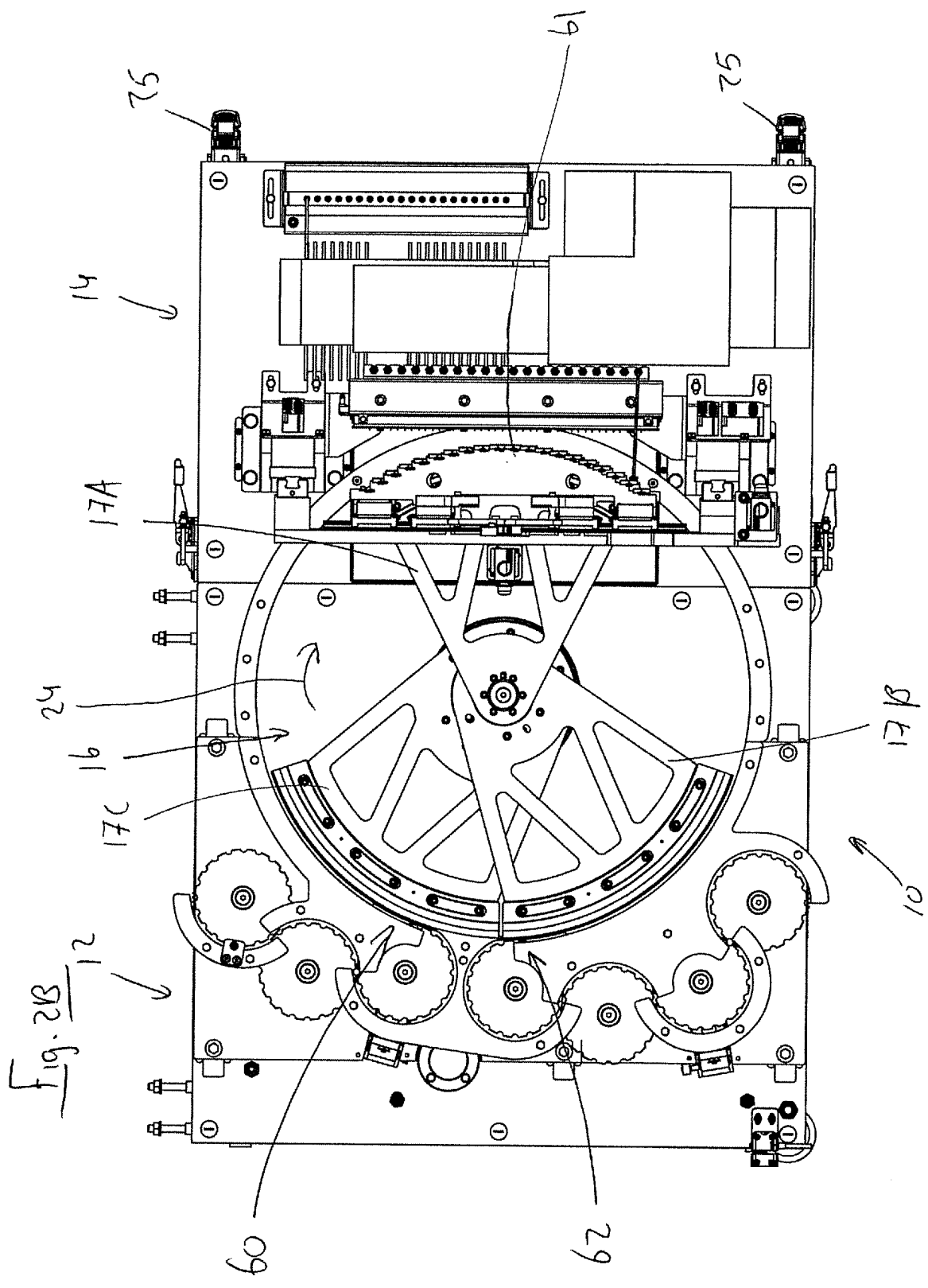


Fig. 3

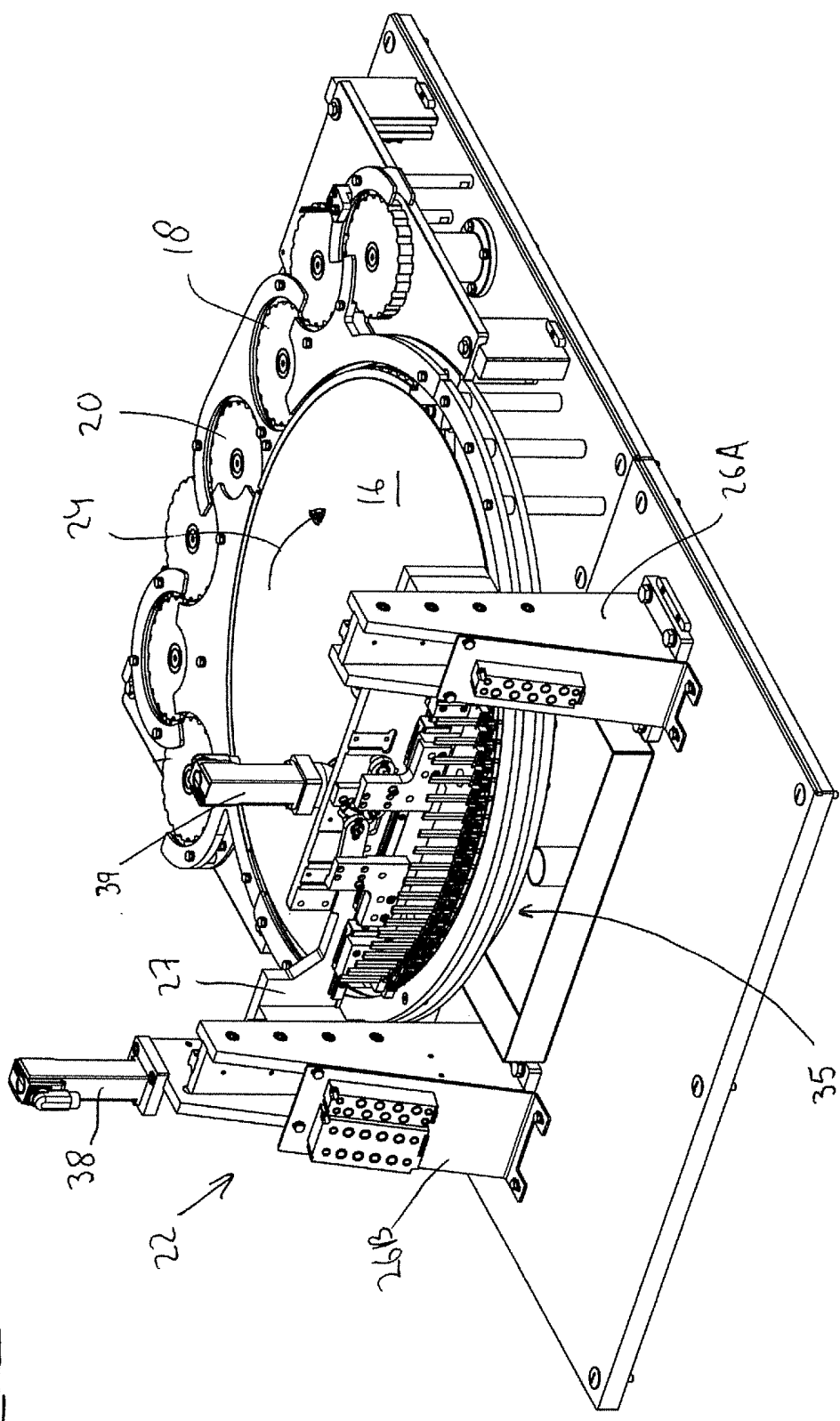


Fig. 4

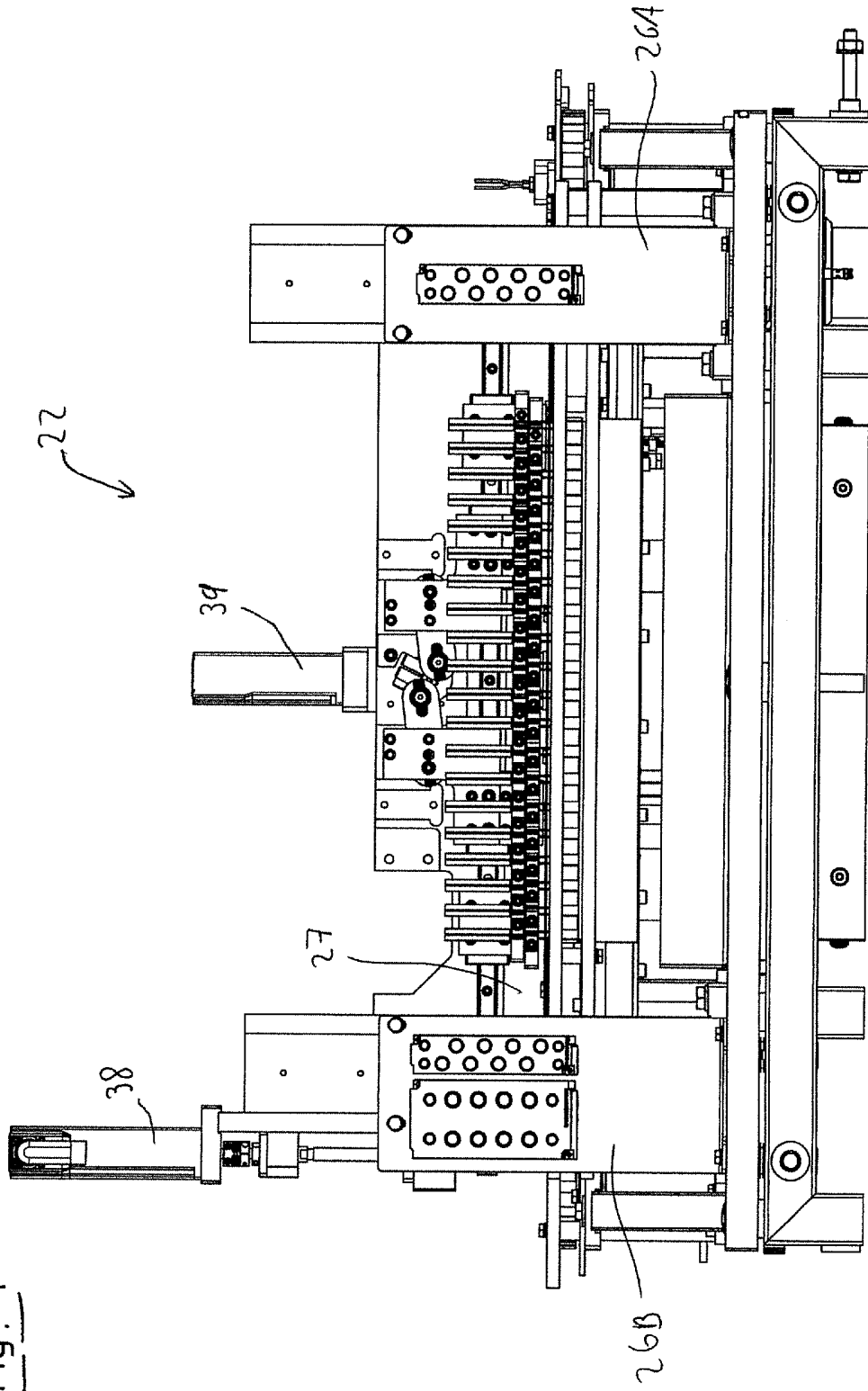


Fig. 5

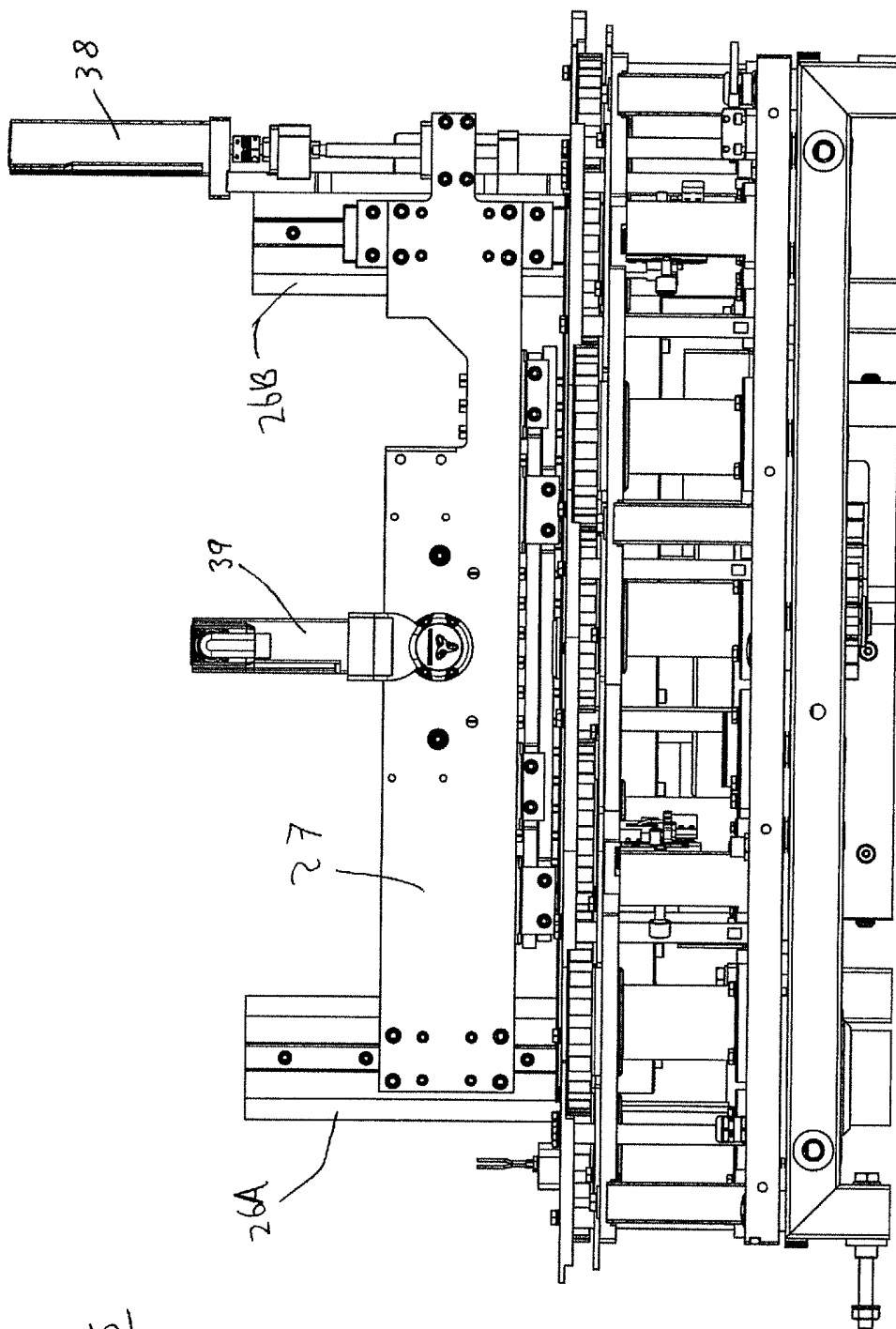


Fig. 6

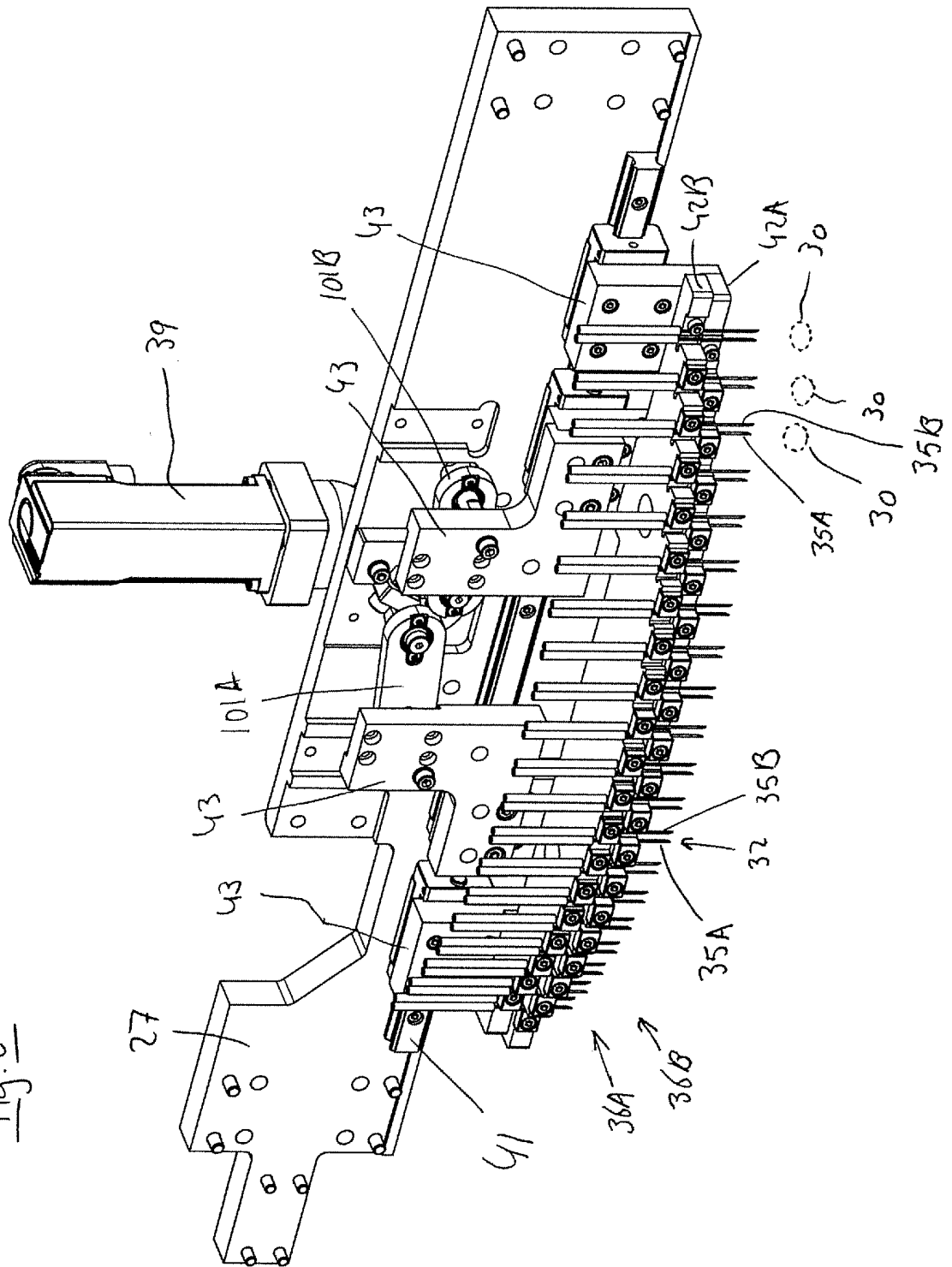


Fig. 7

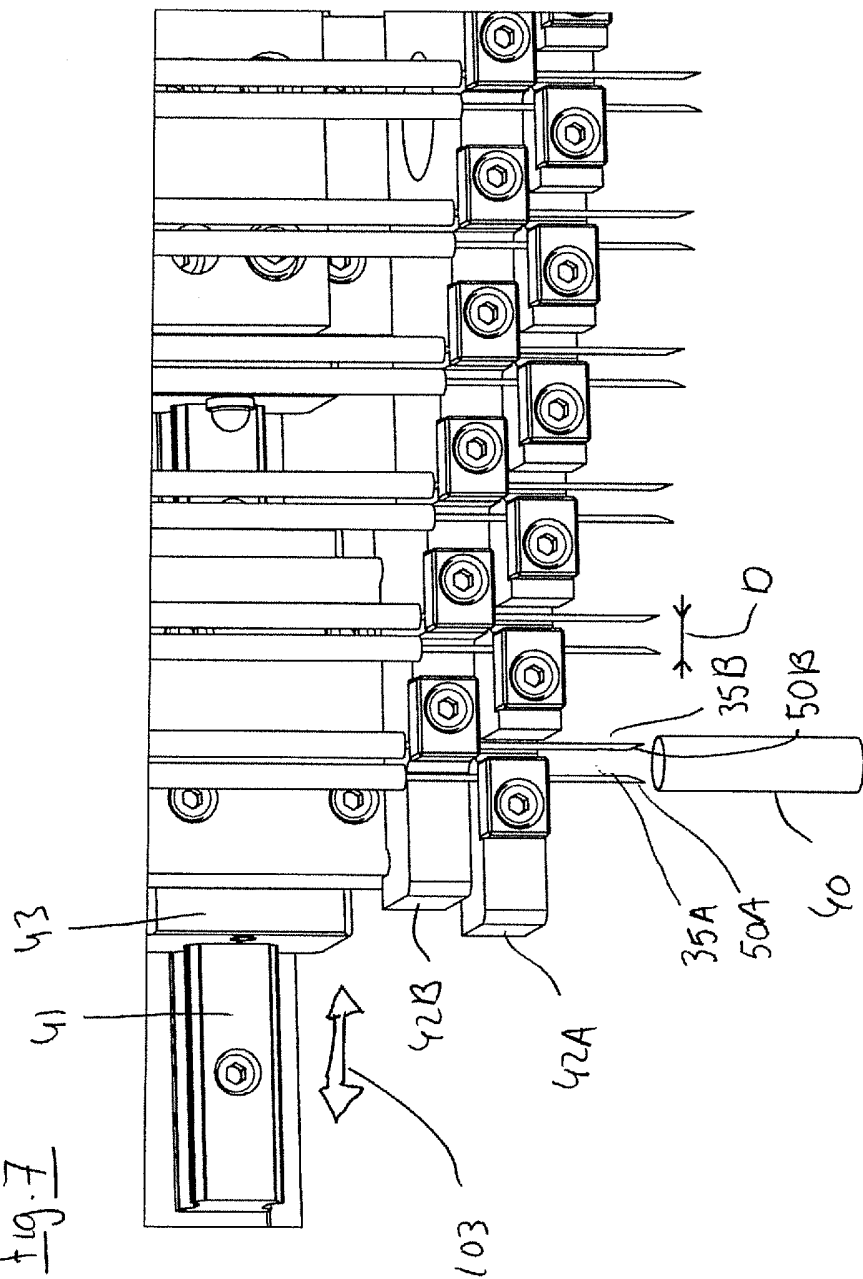


Fig. 8

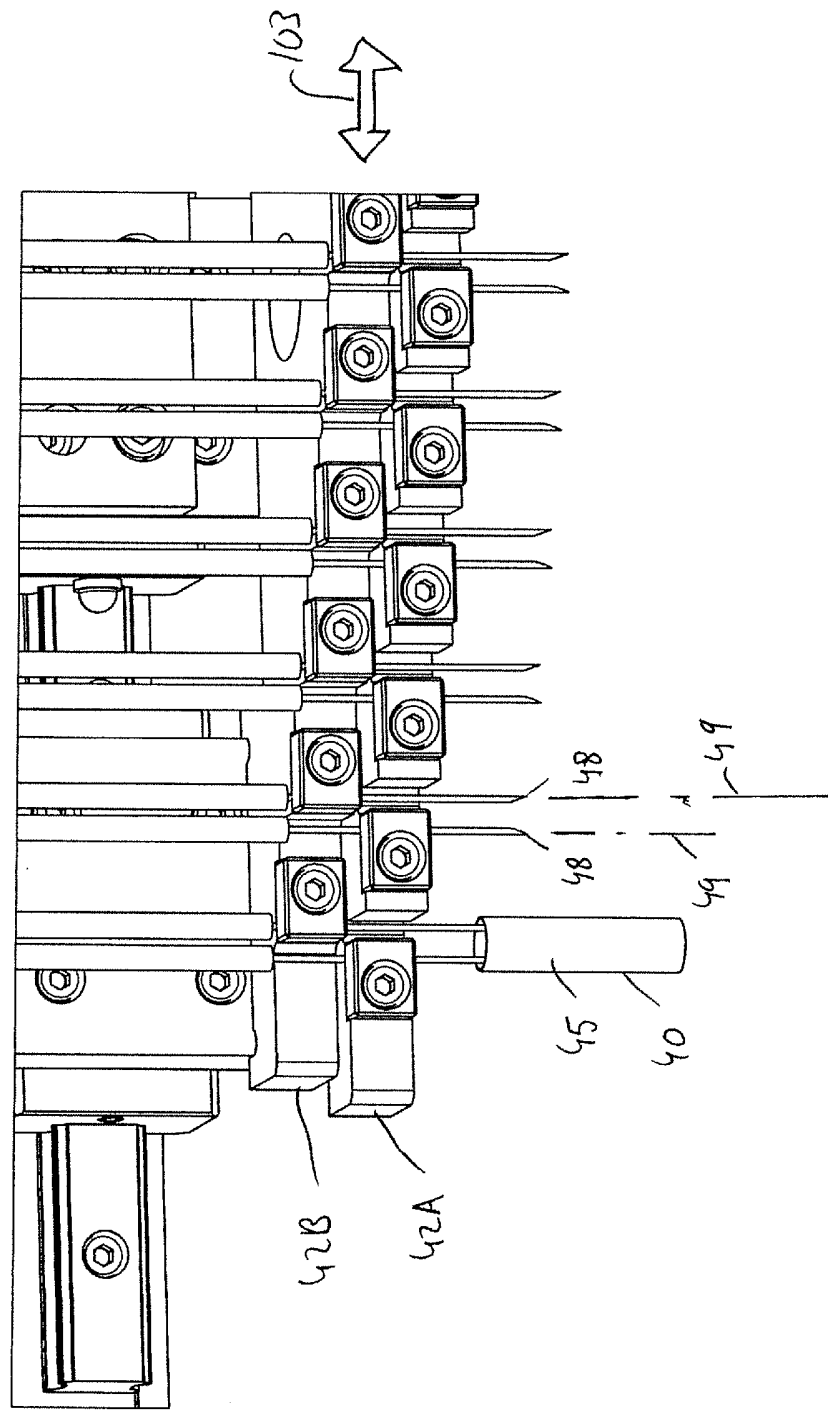


Fig. 9A

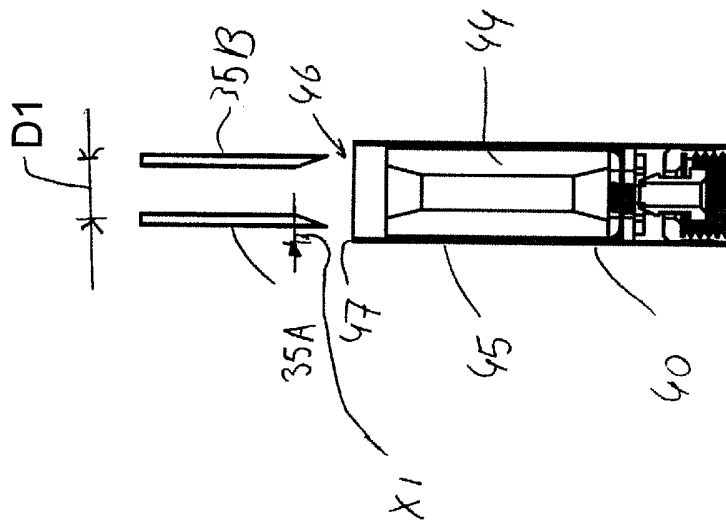


Fig. 9B

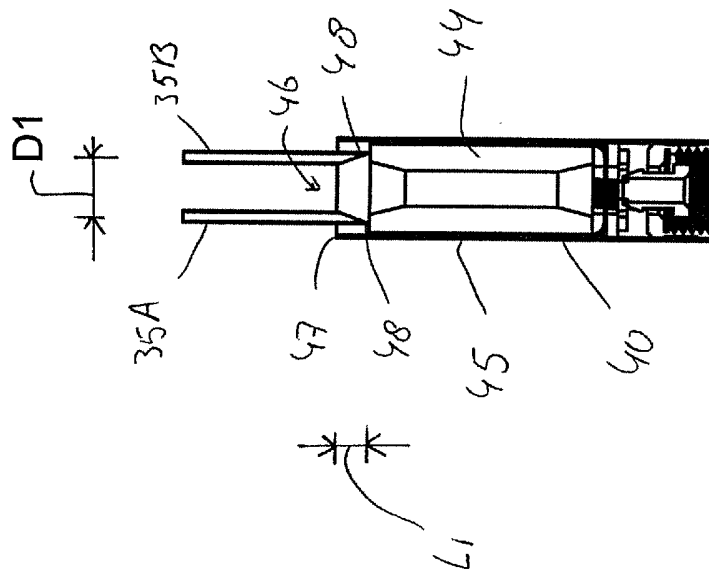


Fig. 9C

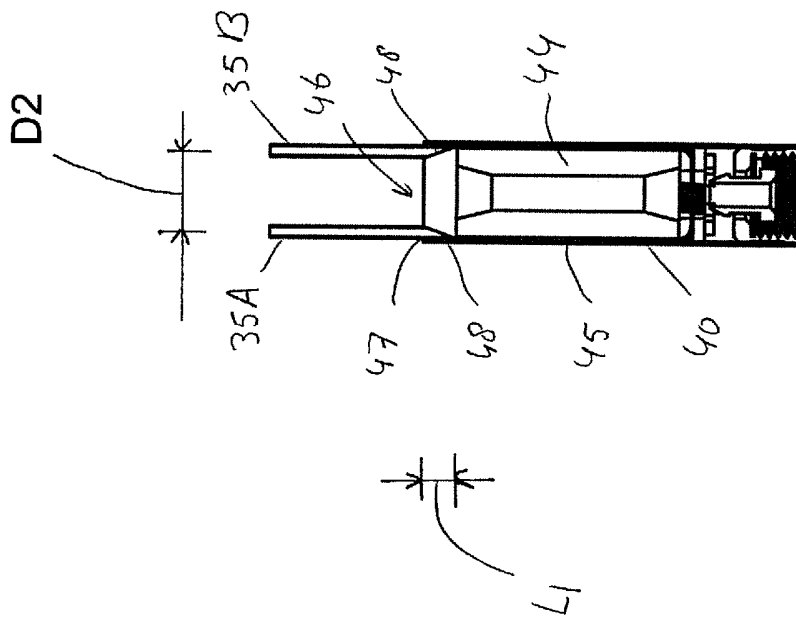


Fig. 9D

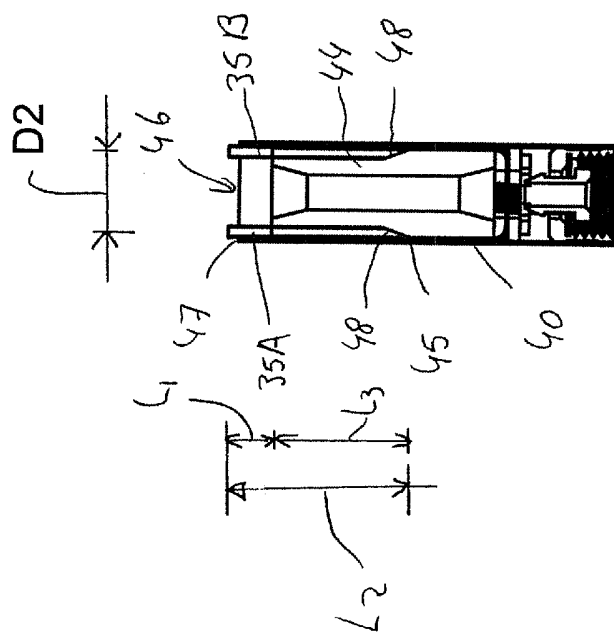
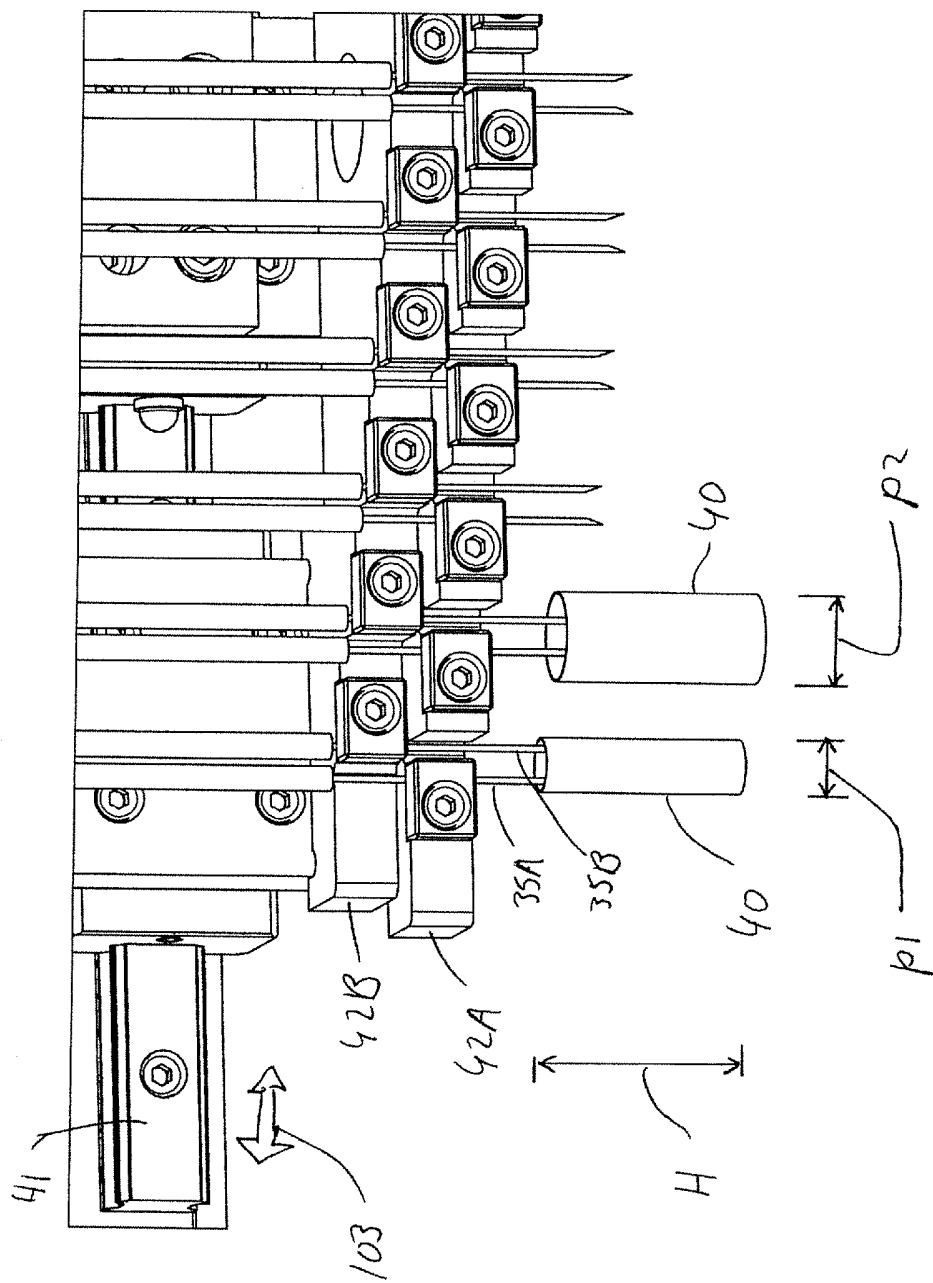


Fig. 10



ABSTRACT

The present invention relates to a filling station for filling cartridges of electronic cigarettes with a liquid, the filling station defining a plurality of filling positions for a plurality of
5 cartridges, the filling station being configured for simultaneously filling the cartridges which are in the filling positions, the filling station comprising:

- a plurality of nozzles, wherein the nozzles are grouped in:
 - a first group of first nozzles and
 - a second group of second nozzles,
- 10 – wherein each filling position is associated with a first nozzle from the first group and a second nozzle from the second group,
- an up-down actuator for moving the nozzles downward into upwardly oriented filling openings of the cartridges in the filling positions in order to insert at least a first nozzle and a second nozzle into each cartridge, and
- 15 – a distance actuator for changing a horizontal distance between each first nozzle and second nozzle.

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE Nederlands aanvraag nr. 2014946	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE P32387NL00/WHA						
Indieningsdatum 09-06-2015	Ingevoeren voordragsdatum 						
Aanvrager (Naam) Sluis Cigar Machinery B.V.							
Datum van het verzoek voor een onderzoek van internationaal type 15-08-2015	Door de instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. SN64705						
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven) Volgens de internationale classificatie (IPC) B65B39/12;B65B59/00;B65B59/04;B65B3/00;B67C3/22;B65B39/00							
II. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK Onderzochte minimumdocumentatie <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Classificatiesysteem</td> <td>Classificatiesymbolen</td> </tr> <tr> <td style="text-align: center;">IPC</td> <td>B65B;B67C</td> </tr> </table>		Classificatiesysteem	Classificatiesymbolen	IPC	B65B;B67C		
Classificatiesysteem	Classificatiesymbolen						
IPC	B65B;B67C						
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen: 							
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: center;">III.</td> <td style="width: 60%;">GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES</td> <td style="width: 35%; text-align: right;">(opmerkingen op aanvullingsblad)</td> </tr> <tr> <td style="text-align: center;">IV.</td> <td>GEBREK AAN EENHEID VAN UITVINDING</td> <td style="text-align: right;">(opmerkingen op aanvullingsblad)</td> </tr> </table>		III.	GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES	(opmerkingen op aanvullingsblad)	IV.	GEBREK AAN EENHEID VAN UITVINDING	(opmerkingen op aanvullingsblad)
III.	GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES	(opmerkingen op aanvullingsblad)					
IV.	GEBREK AAN EENHEID VAN UITVINDING	(opmerkingen op aanvullingsblad)					

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2014946

A. CLASSIFICATIE VAN HET ONDERWERP

INV. B65B39/12 B65B59/00 B65B59/04 B65B3/00 B67C3/22
B65B39/00

ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimum documentatie (plaatscode gevolgd door classificatiesymbolen)

B65B B67C

Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)

EPO-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geslechte documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
A	EP 2 639 163 A1 (ANTONIO MENGIBAR S A [ES]) 18 september 2013 (2013-09-18) * alinea [0050] - alinea [0052]; figuren 5A, 6A *	1-23
A	GB 2 323 081 A (UNILEVER PLC [GB]) 16 september 1998 (1998-09-16) * samenvatting; figuren 2, 3e *	1
A	DE 101 52 234 A1 (BOSCH GMBH ROBERT [DE]) 24 juli 2003 (2003-07-24) * samenvatting; figuur 1 *	1

☐ Verdere documenten worden vermeld in het vervolg van vak C.

☒ Leden van dezelfde octroofamilie zijn vermeld in een bijlage

*** Speciale categorieën van aangehaalde documenten**

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"C" in de octrooiaanvraag vermeld

"E" eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermeldde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorzetsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorzetsdatum gepubliceerde literatuur die niet bezwaarlijk is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geslechte literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"Z" lid van dezelfde octroofamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid

25 januari 2016

Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type

Naam en adres van de instantie

European Patent Office, P.O. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040
Fax: (+31-70) 340-3016

De bevoegde ambtenaar

Schelle, Josef

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**
informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar
de stand van de techniek
NL 2014946

In het rapport genoemd octrooigezinslid	Datum van publicatie	Overeenkomstig(e) geschrift(en)	Datum van publicatie
EP 2639163	A1	18-09-2013	CA 2808954 A1 15-09-2013
		OK 2639163 T3	08-12-2014
		EP 2639163 A1	18-09-2013
		ES 2525406 T3	22-12-2014
		US 2013255828 A1	03-10-2013
GB 2323081	A	16-09-1998	GEEN
DE 10152234	A1	24-07-2003	GEEN

WRITTEN OPINION

File No. SN64705	Filing date (day/month/year) 09.06.2015	Priority date (day/month/year)	Application No. NL2014946
International Patent Classification (IPC) INV. B65B39/12 B65B59/00 B65B59/04 B65B33/00 B67C3/22 B65B39/00			
Applicant Sluis Cigar Machinery B.V.			

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the application
- ☐ Box No. VIII Certain observations on the application

	Examiner Schelle, Josef
--	----------------------------

WRITTEN OPINION

Application number
NL2014946

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the application as filed.
 - ☐ filed together with the application in electronic form.
 - ☐ furnished subsequently for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	1-23
	No: Claims	
Inventive step	Yes: Claims	1-23
	No: Claims	
Industrial applicability	Yes: Claims	1-23
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents:

- D1 EP 2 639 163 A1 (ANTONIO MENGIBAR S A [ES]) 18 september 2013 (2013-09-18)
- D2 GB 2 323 081 A (UNILEVER PLC [GB]) 16 september 1998 (1998-09-16)
- D3 DE 101 52 234 A1 (BOSCH GMBH ROBERT [DE]) 24 juli 2003 (2003-07-24)

2 The filling station according to claim 1 meets the criteria of patentability.

2.1 Novelty:

The filling station known from document D1 (see in particular: paragraphs [0050] - [0052]; figures 5A, 5B), which is undoubtedly suitable for filling cartridges of electronic cigarettes with a liquid, can be regarded as closest prior art.

The filling station of claim 1 differs from this known filling station in that a distance actuator for changing the horizontal distance between each first nozzle and second nozzle is provided.

2.2 Inventive step:

The available prior art (see documents D2 and D3) fails to give the slightest hint towards the claimed solution.

The differentiating feature over the filling station known from D1, viz. the distance actuator for changing the horizontal distance between each first nozzle and second nozzle, enables the filling station station to fill cartridges of varying sizes.

2.3 The filling station according to claim 1 is undoubtedly industrially applicable.

3 Both the methods according to claim 15 and the method according to claim 20 include the use of the filling station according to claim 1.

Therefore these methods also meet the criteria of patentability.

- 4 The claims 2 to 14, 16 to 19 and 21 to 23 are dependent and as such also meet the criteria of patentability.