



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
17.06.2015 Bulletin 2015/25

(51) Int Cl.:
B05C 5/02 (2006.01) **A24C 5/24** (2006.01)
B05C 11/10 (2006.01) **B31B 1/62** (2006.01)
B31B 3/00 (2006.01)

(21) Application number: **13196603.8**

(22) Date of filing: **11.12.2013**

(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

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(54) **Method and apparatus for delivering a liquid**

(57) The object of the invention is a method of feeding fluid by means of at least one unit (14) for feeding fluid onto a carrier (2) in a machine of the tobacco industry wherein the fluid is fed to a nozzle (4) from a fluid container (10) by means of a feeding device (11), whereas the fluid feeding unit (14) comprises a nozzle unit (24), a body (15), a fluid feeding valve comprising a movable valve member (18) and at least one drive member (12) for moving the movable valve member (18), and the fluid is fed onto the carrier (2) through at least one outlet orifice (19) of the nozzle (4) shut and opened by means of the movable valve member (18). By means of the remotely disposed drive member (12) and a connecting member (13) providing the power transmission from the drive

member (12) to the movable valve member (18) the position of the movable valve member (18) in the fluid feeding valve is varied. The object of the invention is a unit (14) for feeding fluid onto a carrier (2) in a machine of the tobacco industry, comprising a body, at least one movable valve member (18) and at least one drive member (12) for moving the movable valve member (18), and at least one outlet orifice (19) of a nozzle (4) shut and opened by means of the movable valve member (18). The unit also comprises a connecting member (13) providing the power transmission from the drive member (12) to the movable valve member (18), and the drive member (12) of the movable valve member (18) is remotely disposed.

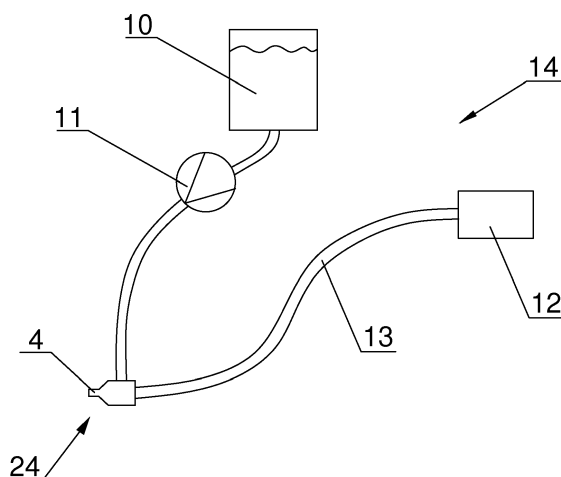


Fig. 2

Description

[0001] The object of the invention is a method and a method and apparatus for delivering a liquid/fluid, in particular for glue feeding in the tobacco industry.

[0002] In the tobacco industry, various rod-like articles such as filters, cigarettes, cigarillos etc. are manufactured. These articles are in general referred to as rods in this description. Tobacco and filter rods are manufactured on machines on which continuously manufactured endless rods, respectively tobacco or filter rods, are cut into single rods. The rods manufactured in such a way are then cut into shorter sections which are used for manufacturing filter cigarettes. Currently, both filters made of one filter material and of many different materials, so-called multi-segment filters, are used. Rods containing one kind of filter material are formed by cutting an endless filter rod which is formed by wrapping a string of filter fibres into a paper wrapper. Multi-segment rods are formed by cutting an endless rod which is formed by wrapping multiple segments of different filter materials. In all cases of rod manufacturing a rotating cutting head with knives situated on its circumference is used for cutting said rods. In case of both filters made of one material and multi-segment filters it is expected that the contents, for example the components of a filter, do not move in relation to the paper wrapper, whereas a commonly used method of segment fixing is to glue them to the paper wrapper by means of glue in the form of a single glue line or multiple glue lines. In case of all both tobacco and filter rods also a seam joining the paper wrapper edges is made, whereas usually one or two glue lines are used. Currently, the cigarette manufacturers use various filter materials as well as various filter wrapping materials. From the point of view of joining filter materials and wrapping materials with glue, a very significant issue is the spread of glue in the space between the surfaces to be glued and the penetration of glue into the structures of both the wrapping material and the filter material. New filter materials as well as new kinds of wrapping material require the application of new kinds of glue which may have a viscosity and a density different from previously used types of glue because they are applied to new joints of the filter material with the wrapping material. The wrapping material hereinafter referred to as the carrier may also be an aluminium foil or a foil made of plastic. Both smooth and porous segments may be applied within a single rod for manufacturing multi-segment filter rods using a porous paper wrapper. The glue percolates to a different degree into glued elements, which is why it is a very difficult problem to maintain proper glue line parameters, in particular the amount of glue being fed, in order to prevent the glue from leaking outside the paper wrapper. Currently used systems for simultaneous feeding of different kinds of glue with different capacities may occupy a lot of space. There is a demand from machine manufacturers to put the glue nozzles in a small space. The nozzles used in the tobacco industry have been dis-

closed in such documents as: EP1002468A2, US5,263,608A, EP1442665. The US patent 5,129,356 known in the prior art has disclosed a nozzle provided with two orifices, whereas the GB patent 1305023 has disclosed a nozzle provided with three outlet orifices.

[0003] The problem to be solved by the present invention is to develop an improved fluid feeding unit which will allow an effective delivery of glue onto the paper wrapper, generally of fluid onto the carrier in a situation where the access to the paper wrapper is difficult.

[0004] The object of the invention is a method of feeding fluid by means of at least one unit for feeding fluid onto a carrier in a machine of the tobacco industry where the fluid is fed to a nozzle unit from a fluid container by means of a feeding device, whereas the fluid feeding unit comprises a body, a fluid feeding valve comprising a movable valve member and at least one drive member for moving the movable valve member, and the fluid is fed onto the carrier through at least one nozzle outlet orifice which is shut and opened by means of the movable valve member. The method is characterised in that the position of the movable valve member in the fluid feeding valve is varied by means of the remotely disposed drive member and a connecting member providing the power transmission from the drive member to the movable valve member.

[0005] The method is characterised by the use of a connecting member being a flexible member.

[0006] The method is characterised by the use of a connecting member being conducted in a channel.

[0007] The method is characterised in that the fluid is fed through a hose having a constant and/or variable cross-section of a through channel.

[0008] The method is characterised in that the amount of fluid fed through the nozzle outlet orifice varies depending on the capacity of the feeding device.

[0009] The method is characterised in that the amount of fluid fed through the nozzle outlet orifice varies depending on the carrier travel speed.

[0010] The method is characterised by the use of a nozzle unit comprising at least two outlet orifices, whereas each outlet orifice is opened and shut by means of a separate drive member.

[0011] The method is characterised in that through each outlet orifice a fluid with different parameters is fed.

[0012] The substance of the invention is also a unit for feeding fluid onto a carrier in a machine of the tobacco industry comprising a body, at least one movable valve member and at least one drive member for moving the movable valve member and at least one nozzle outlet orifice which is shut and opened by means of the movable valve member. The fluid feeding unit is characterised in that the drive member of the movable valve member is remotely disposed, and in that it comprises a connecting member providing the power transmission from the drive member to the movable valve member.

[0013] The unit is characterised in that the connecting member is a flexible member.

[0014] The unit is characterised in that the connecting member is conducted in a channel.

[0015] The unit is characterised in that the fluid delivery hose is a flexible hose.

[0016] The unit is characterised in that the fluid delivery tube is a tube having a constant or variable cross-section of a through channel.

[0017] Thanks to the application of the method and the unit according to the invention, the glue may be effectively delivered onto the carrier in a situation where the access to is difficult. A change in the product specification does not entail the necessity to use a new nozzle, which reduces the production costs. The efficiency of production machine utilisation is increased.

[0018] The fluid feeding method and unit according to the invention have been presented in detail in preferred embodiments in a drawing in which:

Fig. 1 shows a fragment of a production machine for manufacturing multi-segment rods;

Fig. 2 shows a general diagram of a unit for feeding fluid onto a carrier;

Fig. 3 shows a unit for feeding fluid onto a carrier in a first embodiment;

Fig. 4 shows a unit for feeding fluid onto a carrier in a second embodiment;

Fig. 5 shows a cross-section through a fluid feeding unit along a drive member, a connecting member and a nozzle unit;

Fig. 6 shows a cross-section through a nozzle unit with a visible valve member

[0019] Fig. 1 shows a fragment of a machine for manufacturing multi-segment rods. Rod-like segments 1 are fed onto a paper wrapper 2 from any not shown segment feeding device. For example, the member directly placing the segments onto the paper wrapper may be a delivery wheel 3. A machine for manufacturing multi-segment rods is provided with a conveyor 5 on which the paper wrapper 2 moves together with the tape 6. The segments 1 are fixed in relation to the paper wrapper 2 by means of glue. A fluid feeding unit 14 is used to feed the glue onto the paper wrapper before placing segments onto it. After wrapping the segments into the paper wrapper and sealing the paper wrapper, an endless multi-segment rod is formed and the said rod is cut into single multi-segment rods 7 by means of a cutting head 8 provided with knives 9. The fluid feeding unit may be used to feed glue or a fluid being a solvent or one of the glue components. Also water may be fed by means of the fluid feeding unit 14 if a glue layer has already been applied onto the paper wrapper. A general expression "fluid" generally relating to any of the abovementioned substances will be here-

inafter used. The fluid is fed from a fluid container 10 by means of a pump 11 or any feeding device. Nozzle 4 opening and shutting is forced by a drive member 12 by means of a connecting member 13. The fluid may be fed onto a paper or foil wrapper or generally onto a carrier used in the tobacco industry machines.

[0020] Fig. 2 shows a general diagram of a fluid feeding unit 14. The fluid is fed to a nozzle unit 24 from a container 10 by means of a feeding device 11. The nozzle unit 24 is connected with a drive unit 12 by means of a connecting member 13. The connecting member 13 preferably is a flexible member.

[0021] Fig. 3 shows a unit 14' feeding the fluid onto a carrier 2 in a first embodiment. The fluid is fed from a container 10 to nozzle units 24 by means of a feeding device 11 which may be connected to a control unit 17. Opening and shutting of nozzles 4 situated in the nozzle units 24 takes place by moving movable valve members (not shown) connected with remotely disposed drive members 12 by means of connecting members 13. Each nozzle 4 is opened and shut independently of one another. In this embodiment, the nozzle units 24 are supplied with one kind of fluid delivered from the container 10 by means of the feeding device 11 connected to the control unit (17).

[0022] Fig. 4 shows a unit 14" feeding the fluid onto a carrier 2 in a second embodiment. The fluid is fed from a container 10 to a nozzle unit 24 by means of feeding devices 11. Opening and shutting of nozzles 4 takes place by moving movable valve members (not shown) connected with a single, remotely disposed drive member 12 by means of (flexible) connecting members 13. Each nozzle 4 is opened and shut at the same time. In this embodiment, the nozzle units 24 are each supplied with a different fluid fed from a separate container 10, 10', 10" by means of the feeding devices 11 connected to a control unit (17).

[0023] Fig. 5 shows a cross-section through a fluid feeding unit 14. A nozzle unit 24 is connected to a drive member 12 by means of a connecting member 13. A movable valve member 18 opens an orifice 19 of a nozzle 4 making a movement to the right along its axis 20, forced by the connecting member 13 which may be conducted in a channel 21. The other end of the connecting member 13 is fastened to the drive member 12 which may have different, such as pneumatic, hydraulic, electrical, mechanical etc., drive medium sources 22. As a result of opening of the outlet orifice 19 of the nozzle 4 the fluid flows out through that orifice 19. The fluid is delivered from a container (not shown) using a hose 23 with a constant and/or variable cross-section to the nozzle unit 24 by means of a feeding device.

[0024] Fig. 6 shows a cross-section of a nozzle unit 24 with a visible nozzle 4 and a movable valve member 18 connected to a connecting member 13 situated in a channel 21. The fluid is delivered to the nozzle unit 24 using a hose 23 coming out from a feeding device 11 which is connected to a container 10.

Claims

1. A method of feeding fluid by means of at least one unit (14) for feeding the fluid onto a carrier (2) in a machine of the tobacco industry where the fluid is fed to a nozzle unit (24) from a fluid container (10) by means of a feeding device (11), whereas the unit (14) comprises a body (15), a nozzle (4), a fluid feeding valve comprising a movable valve member (18) and at least one drive member (12) for moving the movable valve member (18), and the fluid is fed onto the carrier (2) through at least one outlet orifice (19) of the nozzle (4) shut and opened by means of the movable valve member (18),
characterised in that
the position of the movable valve member (18) in the fluid feeding valve is varied by means of the remotely disposed drive member (12) and a connecting member (13) providing the power transmission from the drive member (12) to the movable valve member (18).
 10. A unit as in claim 9 wherein the connecting member (13) is a flexible member.
 11. A unit as in claim 9 or 10 wherein the connecting member (13) is conducted in a channel (21).
 12. A unit as in any of the claims from 9 to 11 wherein the fluid delivery hose (23) is a flexible hose.
 13. A unit as in any of the claims from 9 to 12 wherein the fluid delivery hose (23) is a hose having a constant and/or variable cross-section of a through channel.
2. A method as in claim 1 wherein a connecting member (13) is a flexible member.
3. A method as in claim 1 or 2 wherein a connecting member (13) is conducted in a channel (21).
4. A method as in claim 2 wherein that the fluid is fed through a flexible hose (23) having a constant and/or variable cross-section of a through channel.
5. A method as in any of the claims from 1 to 4 wherein that the amount of fluid fed through an outlet orifice (19) of a nozzle (4) varies depending on the capacity of a feeding device (11).
6. A method as in any of the claims from 1 to 4 wherein that the amount of fluid fed through an outlet orifice (19) of a nozzle (4) varies depending on the carrier's (2) travel speed.
7. A method as in any of the claims from 1 to 6 wherein a nozzle unit (24) comprising at least two outlet orifices (19), whereas each outlet orifice is opened and shut by means of a separate drive member (12).
8. A method as in claim 7 wherein that through each outlet orifice (19) fluid of different parameters is fed.
9. A unit (14) for feeding fluid onto a carrier (2) in a machine of the tobacco industry comprising a nozzle unit (24), a body (15), at least one movable valve member (18) and at least one drive member (12) for moving the movable valve member (18), and at least one outlet orifice (19) of a nozzle (4) shut and opened by means of the movable valve member (18),
characterised in that
the drive member (12) of the movable valve member (18) is remotely disposed, and **in that** it comprises a connecting member (13) providing the power transmission from the drive member (12) to the movable valve member (18).
 10. A unit as in claim 9 wherein the connecting member (13) is a flexible member.
 11. A unit as in claim 9 or 10 wherein the connecting member (13) is conducted in a channel (21).
 12. A unit as in any of the claims from 9 to 11 wherein the fluid delivery hose (23) is a flexible hose.
 13. A unit as in any of the claims from 9 to 12 wherein the fluid delivery hose (23) is a hose having a constant and/or variable cross-section of a through channel.

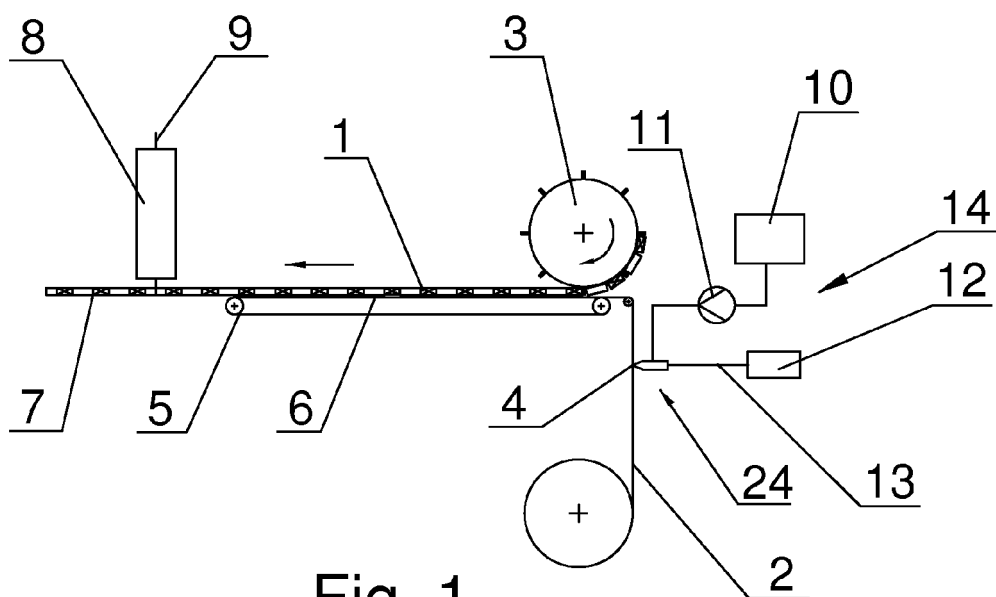


Fig. 1

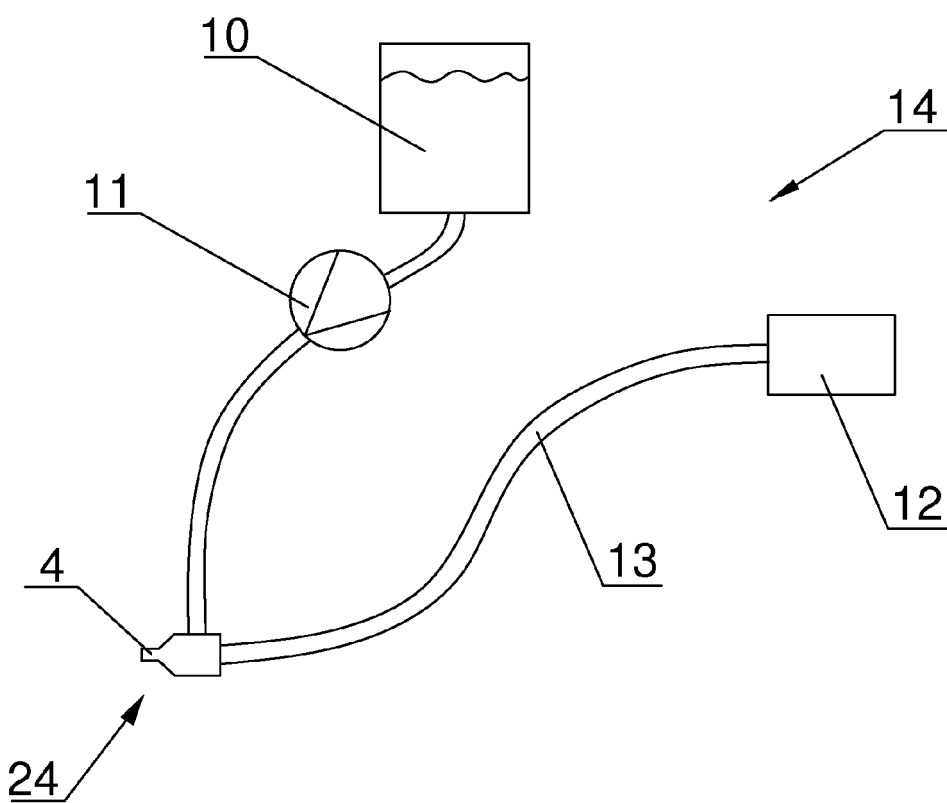


Fig. 2

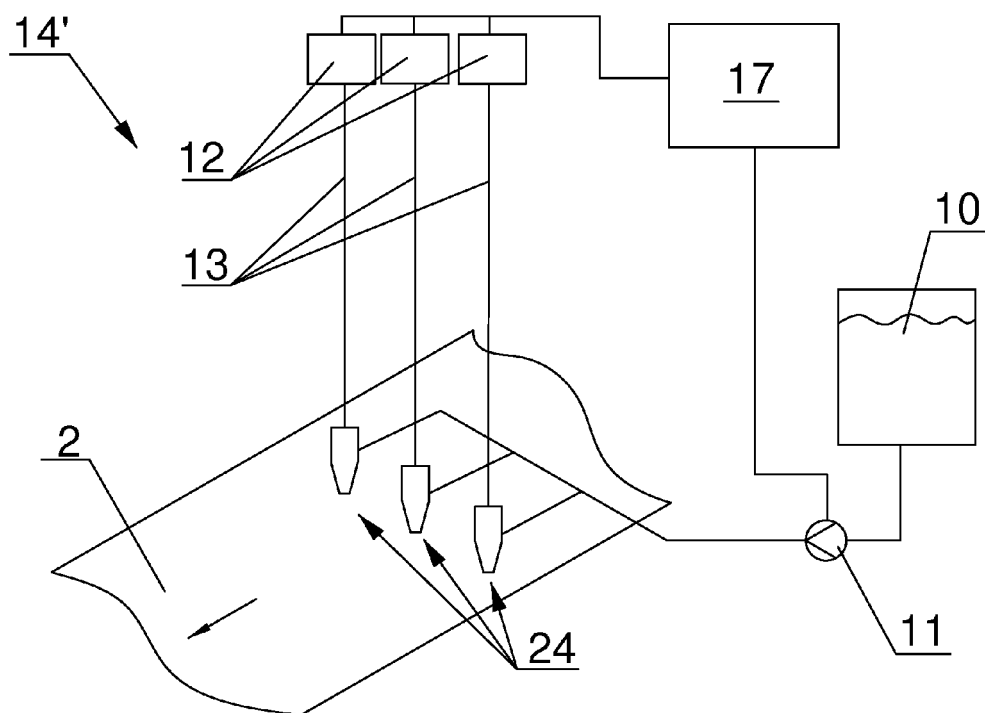


Fig. 3

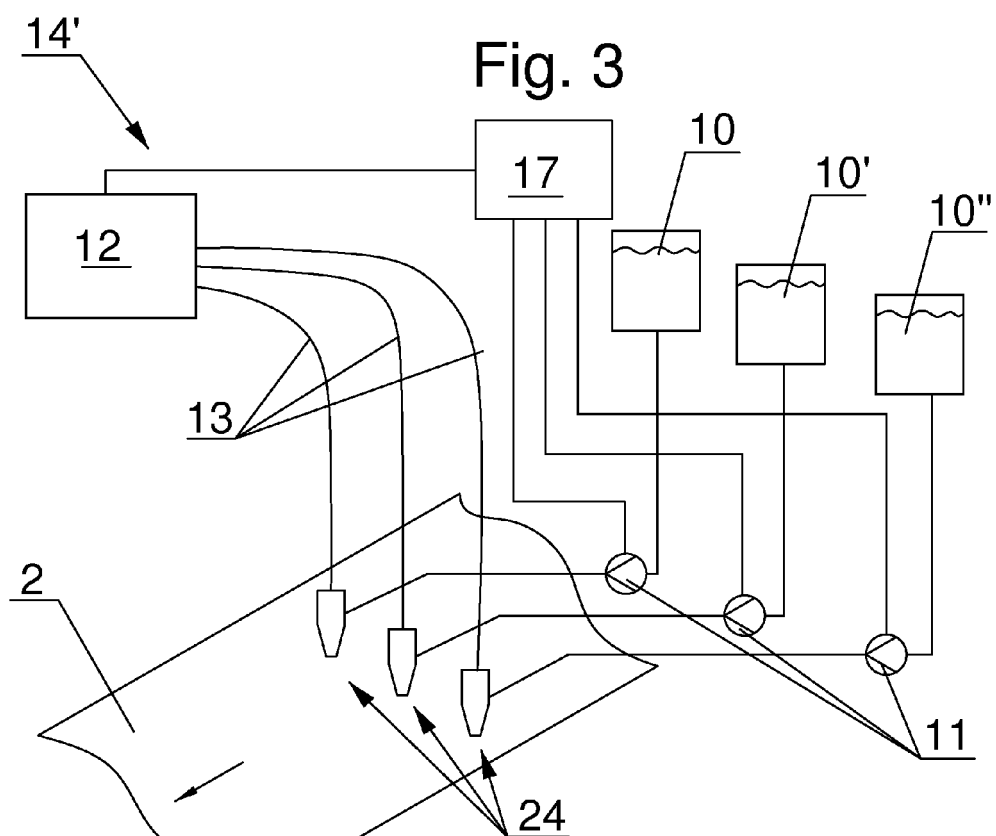
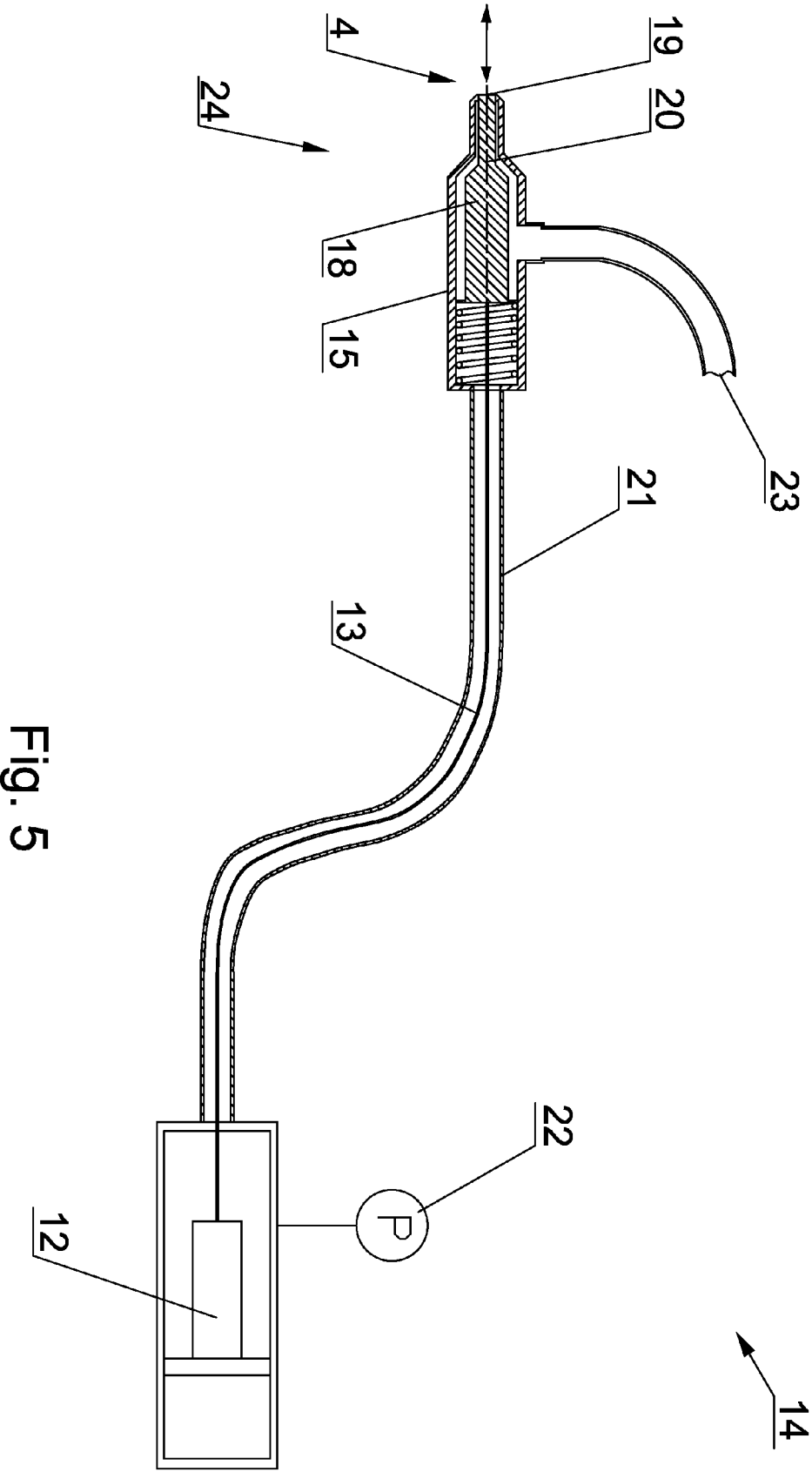
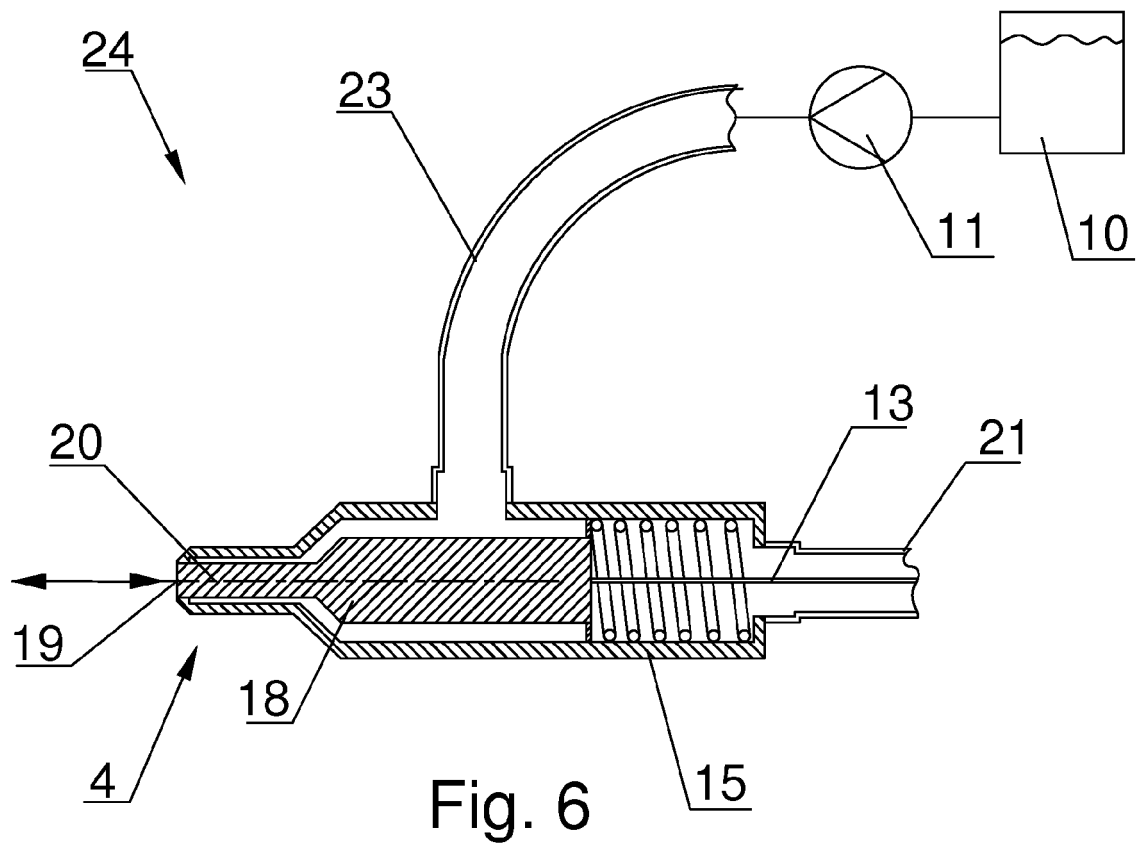


Fig. 4







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The Hague		31 March 2014	Barré, Vincent
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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