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(72) Inventor: **AMENABAR, Jesus**
Glenview, IL 60025 (US)

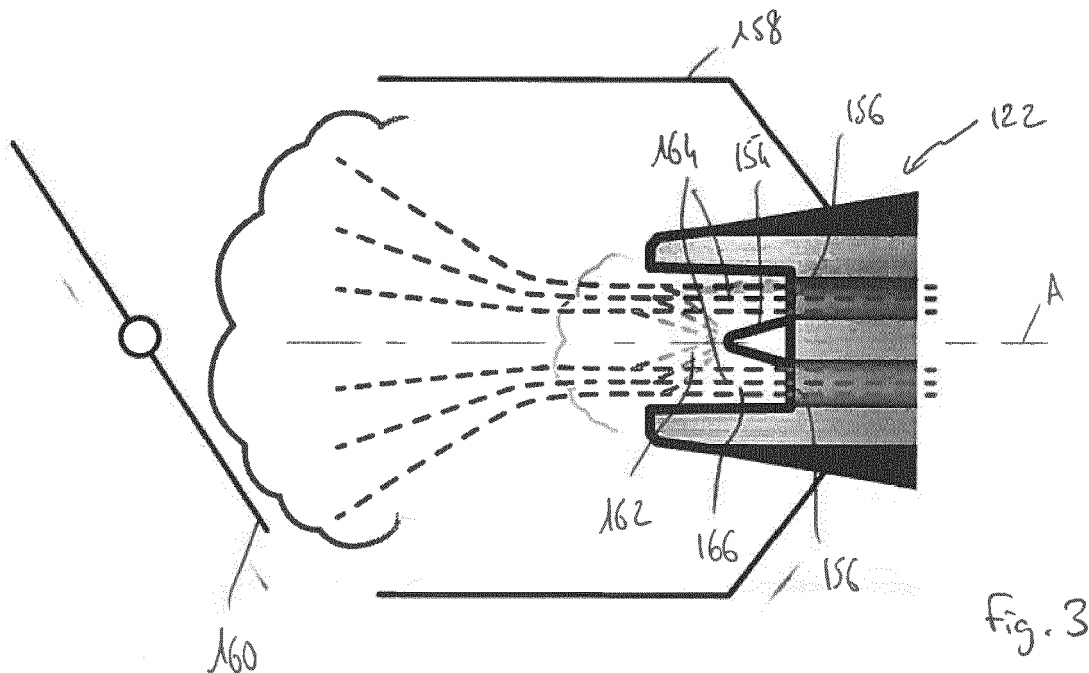
(74) Representative: **HGF Limited**
3rd Floor Central Square South
Orchard Street
Newcastle
Newcastle upon Tyne NE1 3AZ (GB)

(71) Applicant: **Illinois Tool Works, Inc.**
Glenview, Illinois 60025 (US)

(54) **IMPROVED DEVICE FOR INJECTING A CLEANING LIQUID INTO AN AIR INTAKE CIRCUIT OF A MOTOR VEHICLE**

(57) A device (122) for injecting a liquid for cleaning an air intake circuit (158) of a motor vehicle, comprising a first end which is configured to be engaged in an air intake conduit and which comprises at least one liquid spraying port (154) and at least one air spraying port (156), and an opposite second end which is configured to remain outside said air intake conduit and which com-

prises at least one liquid supply port (168) and at least one air supply port (170), characterized in that said first end comprises a cavity (166) into which said at least one liquid spraying port and said at least one air spraying port are located, said cavity being configured to perform a pre-mixture of the sprayed liquid and of the sprayed air before being injected into said air intake conduit.



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Description

TECHNICAL DOMAIN

[0001] The invention concerns a device for injecting a cleaning liquid into an air intake circuit of a motor vehicle.

STATE OF THE ART

[0002] Methods are known for cleaning the air intake circuit of a motor vehicle by injection of a liquid into this circuit, with the vehicle's motor operating such that the outside air sucked in by the circuit ensures the circulation of the cleaning liquid within the circuit. For this to occur, a hose line between the outlet of an exchanger and an air intake conduit is usually removed and the cleaning liquid is injected directly into the air intake conduit.

[0003] At present, there are two techniques for injecting cleaning liquid into an air intake circuit.

[0004] The first technique consists of using a canister containing a pressurized cleaning liquid (like an aerosol spray can). The canister is equipped with a pulverization nozzle that is activated manually and which is connected to a flexible straw that is designed to be fitted into the intake conduit.

[0005] Another technique consists of using a tank that is designed to hold the cleaning liquid and to be connected to a compressor or a pump. The tank is connected to one end of a flexible tube whose other end is equipped with a device for injecting cleaning liquid.

[0006] The injection devices that are currently available have some drawbacks. For example, a Venturi injection device is known, and which must be equipped with a flask in the shape of a flat disk, whose outer diameter must be greater than the internal diameter of the intake conduit. The flask is designed to be supported by the peripheral edge of the conduit (after the abovementioned radiator hose has been removed), by extending into a plane that is perpendicular to the axis of this conduit, and is held in this position thanks to the suction generated by the air intake into the conduit.

[0007] One problem that could be solved by the present invention is to simplify this technology by limiting the number of parts and the risk of improper installation of the device.

[0008] Another problem that the invention proposes to solve is the precise positioning of the device, and keeping the device in position, inside the conduit.

[0009] Another problem is to ensure that the liquid is properly injected into the conduit and is not at risk of leaking, since the liquid used is relatively corrosive and likely to corrode parts of the vehicle's motor.

[0010] Another problem is associated with the type of injection control used (continuous or impulse) and of the injection flow rate of the liquid, which is not always possible or precise with current techniques.

[0011] Another significant problem encountered when cleaning the air intake is associated with the risk that the

cleaning liquid will penetrate into the combustion chamber, which could cause serious damage or even an engine breakdown, due to the fact that the liquid cannot be compressed inside the combustion chamber. For this reason, the cleaning operation requires the presence of a qualified technician to continuously monitor the cleaning process. This could be due to a poor (quality of) injection of the liquid, or to injection of too great a quantity of liquid into the air intake circuit.

[0012] Finally, another problem with modern direct injection engines (both gasoline and diesel), is associated with the fact that carbon deposits on intake valves were identified as being one of the primary causes of engine malfunction, since they reduce performance and increase emission of polluting gases. This may be due to the fact that the injected cleaning liquids have trouble reaching the intake valves located at the far end of the intake manifolds.

[0013] The applicant proposed a solution to these problems, that is disclosed in FR-A1-3 055 863. This document discloses a device for injecting a liquid for cleaning an air intake circuit of a motor vehicle, comprising a first end which is configured to be engaged into an air intake conduit and to spray air and cleaning liquid, and an opposite second end which is configured to remain outside said air intake conduit and to be connected to air and cleaning liquid supply means.

[0014] Figure 2 shows an injecting device 22 as disclosed in FR-A1-3 055 863. This device 22 has a frusto-conical shape and comprises at its first end a flat transverse surface 52 which includes or carries air and liquid spraying ports 54, 56. This first end of the device 22 is intended to be engaged into the air intake circuit 58 just in front of a butterfly valve 60.

[0015] The liquid spraying port 54 is located at the center of the surface 52 and is configured to pulverize an ejection cone 62 of a specific angle. The air spraying ports 56 are located about the port 54 and configured to pulverize an ejection annulus 64 around the ejection cone 62.

[0016] The aim of the air is to be mixed with the liquid and to facilitate spraying and spreading of the liquid deep into the air intake circuit 158. However, in some motor vehicle, the distance D between the butterfly valve 60 and the first end of the device 22 may be short or even null which does not allow having a good mixture of the air with the cleaning liquid.

[0017] The present invention proposes an enhancement to this device and a solution to this problem, which is simple, efficient and economical.

SUMMARY OF THE INVENTION

[0018] The invention proposes a device for injecting a liquid for cleaning an air intake circuit of a motor vehicle, comprising a first end which is configured to be engaged in an air intake conduit and which comprises at least one liquid spraying port and at least one air spraying port,

and an opposite second end which is configured to remain outside said air intake conduit and which comprises at least one liquid supply port and at least one air supply port, characterized in that said first end comprises a cavity into which said at least one liquid spraying port and said at least one air spraying port are located, said cavity being configured to perform a pre-mixture of the sprayed liquid and of the sprayed air before being injected into said air intake conduit.

[0019] The liquid supply port is preferably fully housed in the cavity and is therefore in a retracted position when compared to the prior art device. That means the liquid supply port may be remote and rearward from the front end of the device. This avoids direct contact of the liquid supply port with the butterfly valve of the air intake circuit. This further enhances Venturi effect and swirl with the air spraying, improves liquid nebulization, and reduces knocking phenomenon.

[0020] The device according to the invention may consist of one or more of the following characteristics, taken separately or in combination with each other:

- said cavity is delimited by an annular flange,
- said first end comprises a flat surface onto which said at least one liquid spraying port and said at least one air spraying port are located, and from which said annular flange protrudes,
- said at least one liquid spraying port comprises a liquid spraying nozzle which is located at a centre of said surface,
- said at least one air spraying port comprises air spraying holes located about said at least one liquid spraying port,
- the device comprises three air spraying holes, two of which being close to each other and diametrically opposed to the third one,
- said three air spraying holes are partially formed into said annular flange which includes notches each extending one of said holes,
- said cavity has a cylindrical or frustoconical shape and comprises a length which is between 0.3Dmin and 0.6Dmin, Dmin being the diameter or average diameter of said cavity,
- the device comprises a substantially cylindrical metal body surrounded by a plastic frustoconical sleeve,
- said at least one liquid spraying port and said at least one air spraying port are formed in said body or carried by said body, the body comprising internal ducts for connecting said at least one liquid spraying port to said at least one liquid supply port and for connecting said at least one air spraying port to said at least one air supply port,
- said at least one air supply port comprises air intake holes opening out on a flat surface located at the second end,
- the device further comprises a rotating plate arranged at said second end and including at least one aperture, said rotating plate being moveable be-

tween a first position where it closes said air intake holes and a second position where said at least one aperture is located in front of said air intake holes, said rotating plate being able to be positioned in any position between said first and second positions to adjust the closing rate of said air intake holes,

- said rotating plate comprises a plurality of regularly-spaced outer lobes and is suitable to be manually gripped and rotated by an operator.

[0021] The present invention further concerns a method for injecting a cleaning liquid into an air intake circuit of a motor vehicle, by means of a device as disclosed above, wherein said at least one liquid supply port is fed with an adjustable flow rate of cleaning liquid.

[0022] Liquid flow rate parameters may be adjusted. Said parameters may comprise the number and time of injection pulses, and the period of time between two successive injection pulses.

[0023] Said at least one air supply port may be fed with a predetermined and continuous flow rate of air.

[0024] The present invention also concerns a moveable trolley for cleaning an air intake circuit of a motor vehicle, comprising at least one device as specified above.

BRIEF DESCRIPTION OF FIGURES

[0025] The invention will be better understood, and other details, characteristics and advantages of the present invention will appear more clearly in the following description, which is given as a non-limiting example and which refers to the attached drawings, in which:

- figure 1a is a schematic perspective view of a moveable trolley according to the invention,
- figure 1b is a schematic view of the trolley in figure 1a as well as its accessories,
- figure 2 is a schematic view of an injection device for an air intake circuit, according to the state of the art,
- figure 3 is a schematic view of an injection device for an air intake circuit, according to the invention,
- figure 4 is a schematic perspective view of an injection device according to an embodiment of the invention,
- figure 5 is a schematic view of a rear end of a body of the injection device of figure 4,
- figure 6 is an axial sectional view of the body of the injection device of figure 4,
- figure 7 is a schematic view of a front end of the body of the injection device of figure 4,
- figure 8 is an axial sectional view of the sleeve of the injection device of figure 4, and
- figure 9 is a schematic view of the rear end of the injection device of figure 4.

DETAILED DESCRIPTION

[0026] Figure 1 shows a moveable trolley or cart, in particular for an air intake circuit for an automotive vehicle. As will be seen below, this trolley also makes it possible to clean the fuel circuit, the turbo and the particulate filter (FAP) of the vehicle.

[0027] The trolley 10 is equipped with casters 12, four in number in the example shown, so that an operator may move it easily to the vicinity of the vehicle to be cleaned, for example in a maintenance workshop.

[0028] The trolley 10 consists essentially of the following:

- a primary means of cleaning of an air intake circuit,
- a second means of cleaning a particulate filter, and
- a third means of cleaning of a fuel injection circuit and a turbo.

[0029] The first means of cleaning includes:

- a first tank 14 designed to hold cleaning liquid (for example *Air Intake Cleaner* product marketed by the Wynn's® Company), for example of a capacity of one or two liters or more, and equipped with a stopper 16 for closing its filling orifice, and
- a first pump 18 of which a liquid inlet 18a is connected to the first tank 14 and of which a liquid outlet 18b is connected to one end of a flexible tube 20 of which the other end is connected to an injection device 22 such as the one shown in figure 2.

[0030] In the example shown, inlet 18a of pump 18 is connected by a solenoid valve E1 to an outlet 14a of tank 14. Outlet 18b of pump 18 is connected by a pressure sensor P and a solenoid valve E2 to the aforementioned end of tube 20.

[0031] Pump 18 is preferably a high-pressure pump, able to increase the pressure of the liquid coming out of the pump to a pressure greater than 5 bars, preferably greater than 10 bars, and for example 12 bars.

[0032] The second means of cleaning consist of:

- a second tank 24 designed to contain cleaning liquid (for example the *Diesel Particulate Filter Cleaner* product or the *Diesel Particulate Filter Regenerator* product, which are marketed by the Wynn's® Company), for example with a capacity of one or two liters or more, and equipped with a stopper 26 for closing its filling orifice, and
- a second pump 28 of which a liquid inlet 28a is connected to an outlet 24a of tank 24 and of which a liquid outlet 28b is connected to one end of a flexible tube 30.

[0033] The third means of cleaning consist of:

- a third tank 34 designed to be filled with cleaning

liquid (for example the *Injection System Purge* product or the *Diesel System Purge* product, which are marketed by the Wynn's® Company, or a turbo cleaning product), for example with a capacity of one or two liters or more, and equipped with a closing stopper 36 in its filling orifice, and

- the first pump 18.

[0034] In the example shown, inlet 18a of pump 18 is connected by a solenoid valve E3 to an outlet 34a of tank 34. Outlet 18b of pump 18 is connected by the pressure sensor P and a solenoid valve E4 to the end of a flexible tube 40.

[0035] Tank 34 also comprises an inlet 34b that is connected to one end of another flexible tube 50.

[0036] Flexible tubes 20, 30, 40, 50 preferably include, at each of their ends, a means M for quick connection, for example, an elastic interlocking and/or snapfit type. The end of tube 50, which is opposite tank 34, may also be equipped with a filter F which is preferably integrated into the connecting means M. The purpose of this filter F is to limit or even avoid polluting tank 34 with particles coming from the vehicle's injection circuit. Filter F is, for example, designed to capture particles of size greater than or equal to 25µm. The filter can, for example, be of the sintered type.

[0037] Tanks 14, 24, 34 must each be associated with a level sensor N to detect the level of liquid in the tank.

[0038] Sensors N and P, solenoid valves E1, E2, E3 and E4 and pumps 18, 28 are connected to means of control C, which comprises, in particular, an electronic board. In the example shown, the means of control C are designed to receive their electrical power supply from the vehicle's battery, through the use of electrical cables R equipped at their ends with clamps (such as an alligator clip) or similar and which are opposite to means of control C. As a variation, the trolley could include a rechargeable battery for supplying electric power from its power supply means C.

[0039] The means of control C includes adjustment or winding buttons B (for example for choosing options), switches I, etc. The trolley also includes a means of display T such as a screen configured to enable data to be displayed. Means C and T may be located on a front and/or upper surface of the trolley, which is called the control panel.

[0040] Figure 2 illustrate an injecting device 22 according to the state of the art as explained above.

[0041] Figure 3 illustrates an injecting device 122 according to the invention and figures 4 to 9 illustrate an embodiment of this device 122.

[0042] The device 122 differs from the device 22 in that its first or front end intended to be engaged into the air intake circuit 158 comprises a cavity 166 into which at least one liquid spraying port 154 and at least one air spraying port 156 are located and preferably fully housed therein.

[0043] The cavity 166 is configured to perform a pre-

mixture of the sprayed liquid 162 and of the sprayed air 164 before being injected into said air intake circuit 158. The cavity 166 is therefore a pre-mixture cavity and the air intake circuit 158 may be considered as a mixture cavity where further mixture of the air and of the cleaning liquid may occur.

[0044] Even if the device 122 is close to the butterfly valve 160 when it is engaged into the air intake circuit 158, the pre-mixture cavity 166 is sufficient to mix the air and liquid and ensure a spraying and spreading of the air-liquid mixture deep into the air intake circuit 158. The device 122 is then suitable to pulverize a fog consisting of a multitude of micrometric cleaning droplets.

[0045] The device 122 is generally tapered in shape, and whose first end is of smaller diameter and is configured so that it fits into the air intake circuit 158, and of which the opposite second end is of larger diameter and is configured so that it remains outside the circuit 158. This second end of the device 122 includes air and liquid supply ports 168, 170 (figures 5, 6 and 9).

[0046] Device 122 comprises a metal body 172 that is largely cylindrical (about axis A) and surrounded by a tapered sleeve 174 made of plastic. The ports are fitted onto the body 172, which comprises internal ducts 176 and 178 connecting the ports and extending between both first and second ends of the device 122.

[0047] In the embodiment shown in figures 4 to 9, the liquid spraying port 154 is formed by a liquid pulverization nozzle 154a that is fitted into a hole 154b of the body 172. The air spraying ports 156 are formed by holes of the body 172.

[0048] The liquid duct 176 extends into the body 172, along axis A, and opens out on a flat transverse surface 152 at the front end of the body 172 to form said hole 154b. The duct 176 further opens out on a rear flat surface 180 at the second end of the device 122, so as to form the liquid supply port 168.

[0049] In the example shown, the device 122 includes three air spraying holes or ports 156 and are connected to three air ducts 178 extending into the body, along axis A. The ducts 178 open out on the flat transverse surface 152 to form said holes or ports 156. The ducts 178 further opens out on the surface 180 to form the air supply ports 170.

[0050] As shown in the example, the flat surfaces 152, 180 are disc-shaped and centered on axis A. The air duct 176 is aligned on axis A and the liquid spraying port 154 is centered on the surface 152. The nozzle 154a is fitted into the hole 154b and protrudes from the surface 152.

[0051] The air ducts 178 are distributed about the axis A and the ports 156 are located on a single circumference C1 centered on axis A (figure 7).

[0052] In the example shown, the cavity 166 is delimited by an annular flange 166a protruding from surface 152 at the periphery of the body 172. The flange 166a extends about the ports 154, 156. The cavity 166 is opened at its front end and is closed at its rear end by the surface 152.

[0053] The annular flange 166a has an outer diameter Dmax which is equal to the diameter of the body 172, and an inner diameter Dmin. The diameter of the air ports 156 are chosen so that they extend between an inner circumference C2 and an outer circumference C3. The outer circumference C3 has a diameter greater than Dmin (figure 7). The air ports 156 are therefore located close to the periphery of the body 172 and the annular flange 166a comprises axial notches 166b extending from the ducts 178 and the ports 156.

[0054] The flange 166a has a length L comprised between $0.3D_{min}$ and $0.6D_{min}$.

[0055] The sleeve 174 shown in figure 8 comprises an internal axial bore of a diameter that is largely equal to or slightly greater than the diameter of body 172, so that it can be mounted onto this latter merely by fitting it in, and an external tapered surface. The tapered surface extends over the entire axial dimension of sleeve 174 in the example shown.

[0056] Sleeve 174 is preferably made of elastomer. Body 172 may be made of aluminum.

[0057] Figure 9 shows the rear side of the device 122 and in particular a rotating plate 182 which is also visible at figure 4.

[0058] Rotating plate 182 is arranged at said rear end to be able to rotate about axis A. The plate 182 is circular in shape and includes a plurality of regularly-spaced outer lobes 184. The rotating plate has an outer diameter which is greater than the maximum diameter of the sleeve at the second or rear end of the device (figure 4). The plate 182 is suitable to be manually gripped and rotated by an operator who can put his/her fingers between said lobes 184.

[0059] The plate 182 includes apertures 186. The plate 182 is moveable between a first position shown in continuous lines in figure 9, where said apertures 186 are located in front of said air supply ports 170, and a second position shown in dashed lines in figure 9, where the plate 182 closes said ports 170. The rotating plate 182 may be positioned in any position between said extreme positions to adjust the closing rate of the air supply ports 170.

[0060] In the example shown, the rotating plate 182 comprises two diametrically-opposed apertures 186 which have each an elongated shape about the axis A. Among the air supply ports 170, two are close to each other and diametrically opposed to the third one. One of the apertures is dimensioned and shaped to let free the adjacent ports 170 when the rotating plate 182 is in its first position. In this position, the other aperture 186 lets free the last port 170.

[0061] Abutment fingers 188 are located onto the surface 180 and configured to be engaged into the apertures 186 and to cooperate with the edges of these apertures to limit the rotation of the plate 182 about the axis A and define therefore said both extreme positions. These abutment fingers 188 may be screwed into threaded holes 190 formed in the surface 180 of the body (figures 5 and

6).

[0062] The device 122 is intended to be fed with a pre-determined and continuous flow rate of air. Since the air supply ports 170 may be fully opened, fully closed, or partially closed/opened by means of the rotating plate 182, it is possible to adjust the velocity of the air sprayed by the device 122 by means of this rotating plate. The lower the number of ports 170 supplied with air, the higher the air velocity sprayed through the ports 156. Since the air sprayed is configured to drive and accelerate the sprayed liquid by Venturi effect, the position of the rotating plate 182 is used to adjust the velocity of the pre-mixture into the air intake circuit 158. In case where the entrance and the butterfly valve 160 of the air intake circuit 158 have to be cleaned, all the ports 170 are fed with air. In case where the circuit 158 should be injected deeply into the air intake circuit 158, one or no port 170 is fed with air.

[0063] The device 122 may be fed with a predetermined and continuous flow rate of cleaning liquid. In a preferred variant, the device is fed with an adjustable flow rate of cleaning liquid. Liquid flow rate parameters may be adjusted and may for instance comprise the number and time of injection pulses, and the period of time between two successive injection pulses. For instance, duration of each pulse may be 1 or 2 seconds. The period of time between two successive pulses may be adjusted between 15 seconds (minimum) and 30 seconds (maximum).

[0064] As an example, the first end of the device 122 has a diameter of between 20 and 60 mm, and preferably between 30 and 50mm, and its second end has a diameter of between 40 and 120mm, and preferably between 60 and 100mm. the cavity 166 may have a diameter D_{min} comprised between 20 and 50mm, and preferably between 30 and 40mm, and a length L comprised between 10 and 30mm, and preferably between 15 and 20mm.

[0065] The transverse dimensions of device 122 make it possible to fit it into circuit 158 of different internal diameters, for example between 40 and 90mm.

[0066] From this, it can be understood that all that needs to be done is to fit the device, at its smaller-diameter end, inside the conduit, so that the device is positioned correctly. Because of its tapered shape, the device can be adapted to conduits of varying diameters, which is advantageous. In the operation position, the pulverization nozzle is located inside the conduit and not just at its inlet, which is advantageous for optimizing the injection of liquid into the conduit and avoid loss of liquid during the injection process.

[0067] The vehicle's engine may be of any type, and in particular diesel or gasoline-powered.

Claims

1. A device (122) for injecting a liquid for cleaning an air intake circuit (158) of a motor vehicle, comprising

a first end which is configured to be engaged in an air intake conduit and which comprises at least one liquid spraying port (154) and at least one air spraying port (156), and an opposite second end which is configured to remain outside said air intake conduit and which comprises at least one liquid supply port (168) and at least one air supply port (170), **characterized in that** said first end comprises a cavity (166) into which said at least one liquid spraying port and said at least one air spraying port are located, said cavity being configured to perform a pre-mixture of the sprayed liquid and of the sprayed air before being injected into said air intake conduit.

2. The device (122) according to the preceding claim, wherein said cavity (166) is delimited by an annular flange (166a).

3. The device (122) according to the preceding claim, wherein said first end comprises a flat surface (152) onto which said at least one liquid spraying port (154) and said at least one air spraying port (156) are located, and from which said annular flange (166a) protrudes.

4. The device (122) according to the preceding claim, wherein said at least one liquid spraying port (154) comprises a liquid spraying nozzle (154a) which is located at a centre of said surface (152).

5. The device (122) according to the preceding claim, wherein said at least one air spraying port (156) comprises air spraying holes located about said at least one liquid spraying port (154).

6. The device (122) according to the preceding claim, which comprises three air spraying holes, two of which being close to each other and diametrically opposed to the third one.

7. The device (122) according to the claim 5 or 6, wherein said three air spraying holes are partially formed into said annular flange (166) which includes notches (166b) each extending one of said holes.

8. The device (122) according to any one of the preceding claims, wherein said cavity (166) has a cylindrical or frustoconical shape and comprises a length (L) which is between $0.3D_{min}$ and $0.6D_{min}$, D_{min} being the diameter or average diameter of said cavity.

9. The device (122) according to any one of the preceding claims, which comprises a substantially cylindrical metal body (172) surrounded by a plastic frustoconical sleeve (174).

10. The device (122) according to the preceding claim,

in which said at least one liquid spraying port (154) and said at least one air spraying port (156) are formed in said body or carried by said body (172), the body comprising internal ducts (176, 178) for connecting said at least one liquid spraying port to said at least one liquid supply port (168) and for connecting said at least one air spraying port (156) to said at least one air supply port (170).

11. The device (122) according to any one of the preceding claims, wherein said at least one air supply port (170) comprises air intake holes opening out on a flat surface (180) located at the second end.
12. The device (122) according to the preceding claim, which further comprises a rotating plate (182) arranged at said second end and including at least one aperture (186), said rotating plate being moveable between a first position where it closes said air intake holes (170) and a second position where said at least one aperture is located in front of said air intake holes, said rotating plate being able to be positioned in any position between said first and second positions to adjust the closing rate of said air intake holes.
13. The device (122) according to the preceding claim, wherein said rotating plate (182) comprises a plurality of regularly-spaced outer lobes (184) and is suitable to be manually gripped and rotated by an operator.
14. A method for injecting a cleaning liquid into an air intake circuit (158) of a motor vehicle, by means of a device (122) according to one of claims 1 to 13, wherein said at least one liquid supply port (168) is fed with an adjustable flow rate of cleaning liquid.
15. The method according to claim 14, wherein liquid flow rate parameters are adjusted, said parameters comprising the number and time of injection pulses, and the period of time between two successive injection pulses.
16. The method according to claim 13 or 14, wherein said at least one air supply port (170) is fed with a predetermined and continuous flow rate of air.
17. A moveable trolley (10) for cleaning an air intake circuit (158) of a motor vehicle, comprising at least one device (122) according to one of claims 1 to 13.

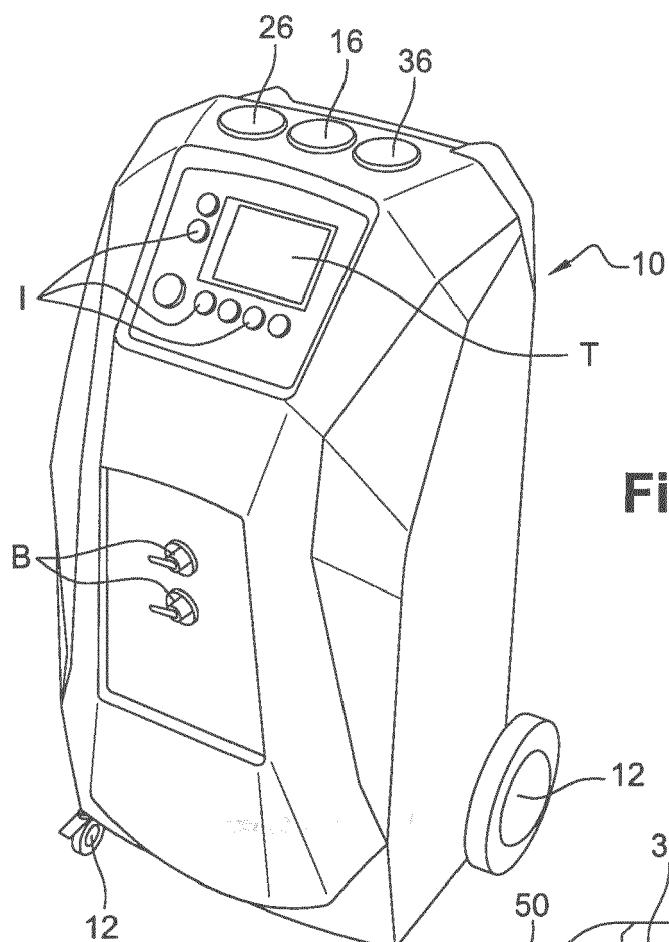


Fig. 1a

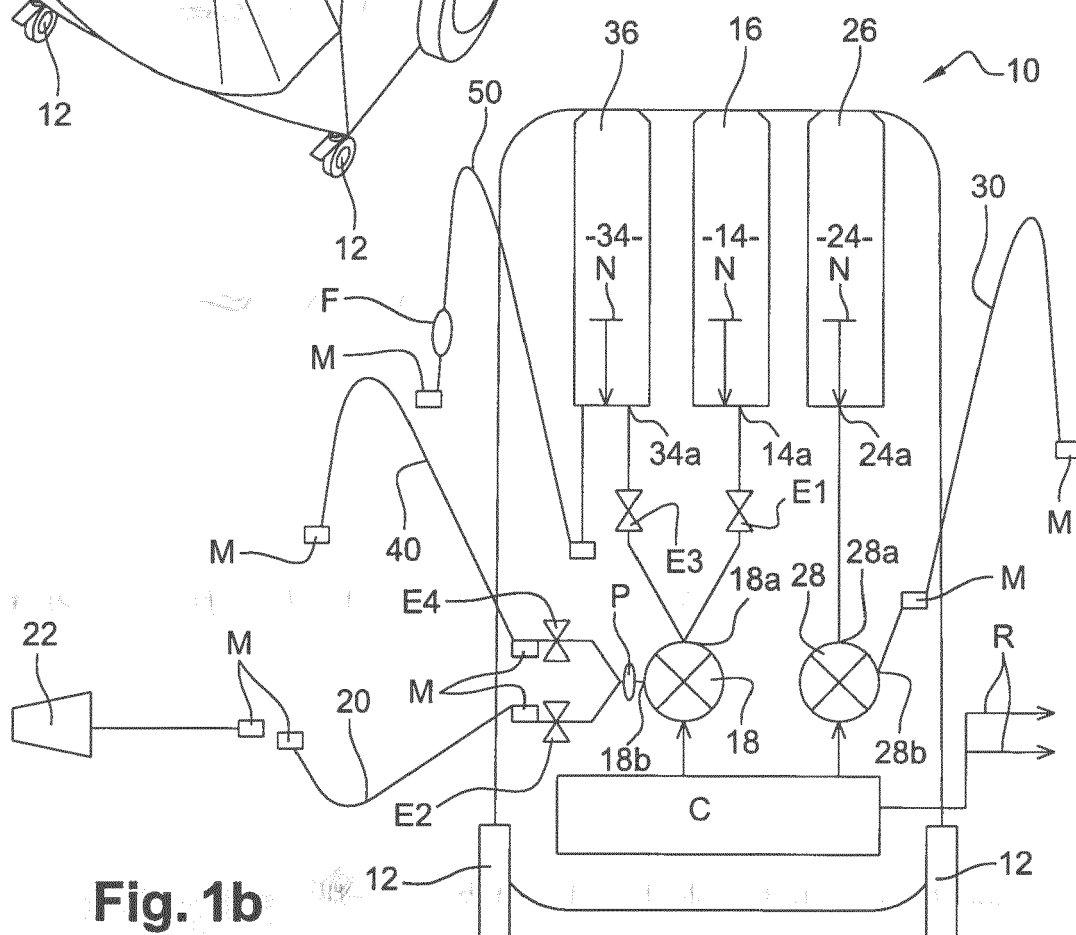
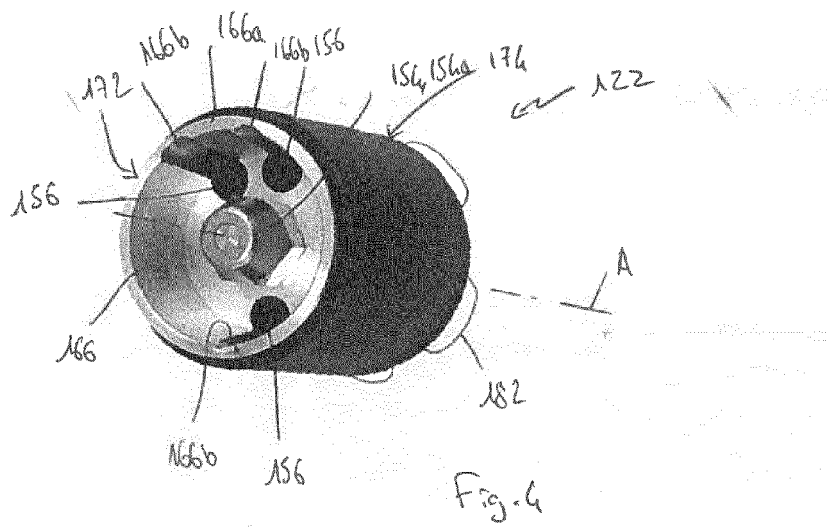
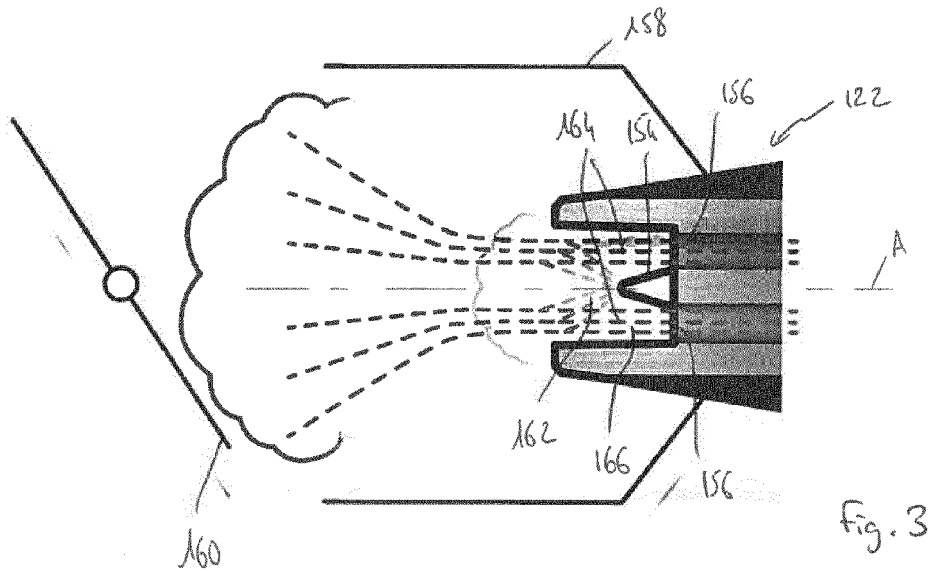
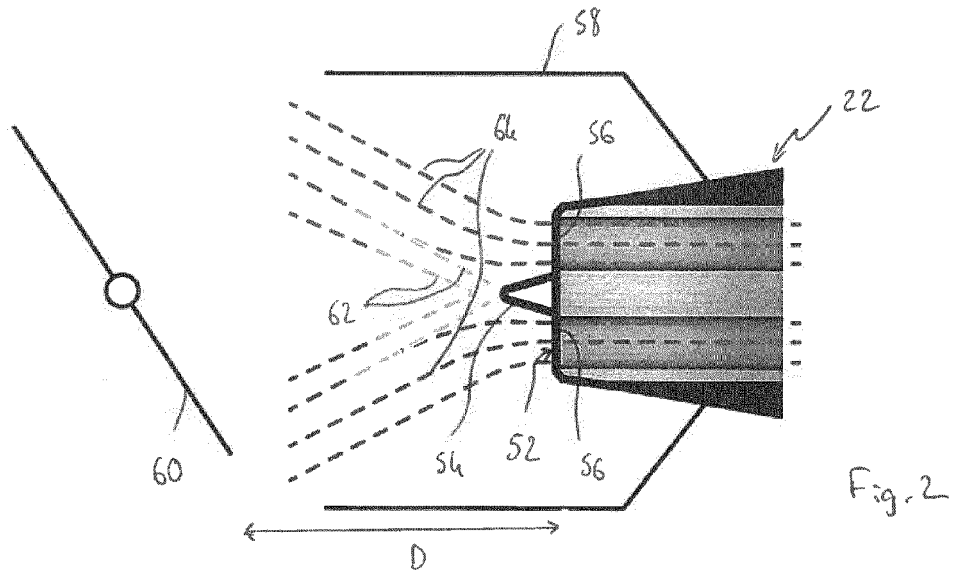
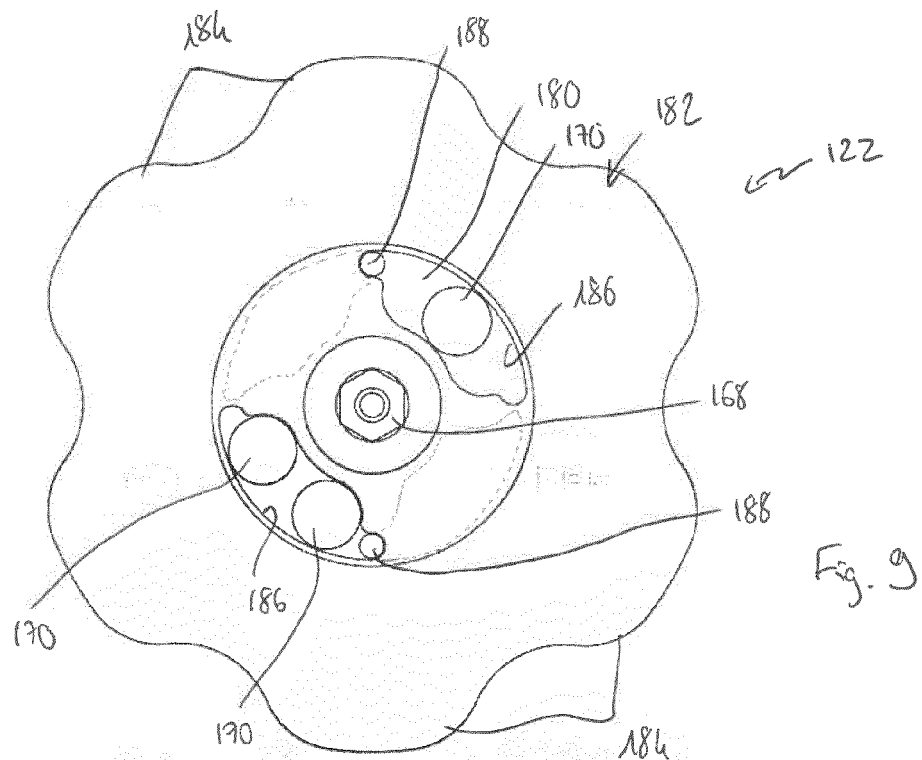
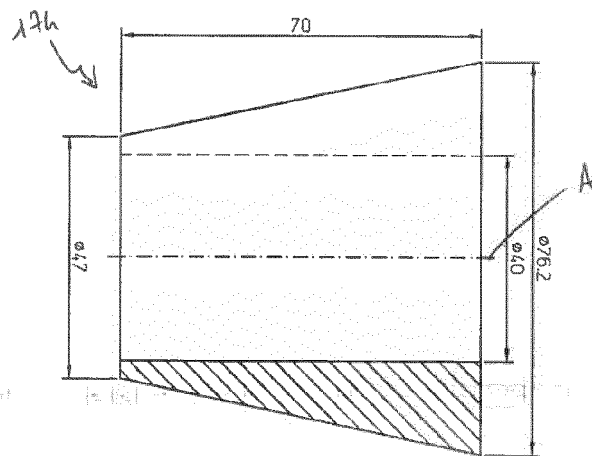
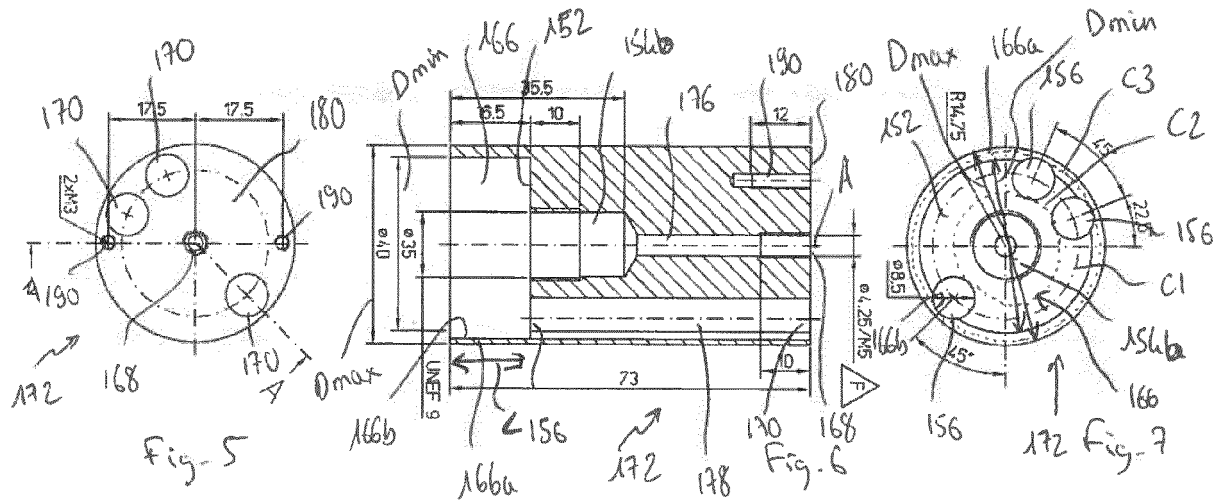


Fig. 1b







EUROPEAN SEARCH REPORT

Application Number
EP 18 19 5849

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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