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(54) **Spear valve with cooling coil**

(57) Apparatus for dispensing a beverage such as beer from a keg 101 has a head unit 104 provided with a helical cooling coil 108 and a dispense tube 117. The head unit 104 engages a boss 102 in the upper end of the keg 101 and the cooling coil 108 and dispense tube 117 extend to the lower end of the keg 101. The head unit 104 is connectable to a source of coolant for circulating coolant through the cooling coil 108 to cool the beverage in the keg 101 to a desired temperature. The head unit 104 is also connectable to a gas source for pressurising a headspace above the beverage in the keg and forcing beverage through the dispense tube 117 to a dispense line connected to a dispense head in response to initiation of a dispense.

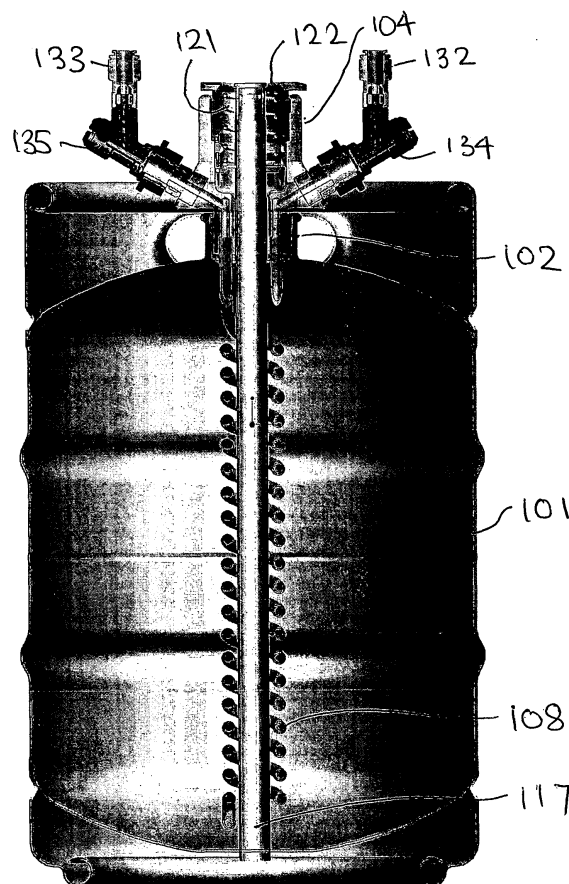


FIGURE 6

Description

[0001] This invention concerns improvements in or relating to beverage dispense and in particular to apparatus for cooling and dispensing beverage from a storage container, especially a keg of beer.

[0002] Beer kegs are usually kept in a cold room, typically a cellar, to maintain the beer at low temperature. When the beer is to be dispensed, the keg is connected to a flow line for delivery of the beer to a dispense head and to a source of pressurised gas, for example carbon dioxide, to propel the beer through the flow line when the dispense head is open. The flow line usually passes through a cooler between the keg and the dispense head to cool the beer to the required temperature for dispense.

[0003] Changes in the ambient temperature in the cold room may affect the temperature of the beer in the keg and the present invention seeks to provide apparatus for cooling and dispensing beverage from a storage container such that the temperature of the beverage in the container is substantially unaffected by variations in the surrounding ambient temperature.

[0004] According to a first aspect of the present invention, there is provided apparatus for cooling and dispensing beverage from a beverage container, the apparatus comprising a head unit having means extending into the beverage container for cooling beverage within the beverage container and means for dispensing beverage from the beverage container.

[0005] By this invention, the functions of cooling and dispensing the beverage are combined through the head unit. Hereinafter, for convenience, the apparatus will be described for cooling and dispensing beer from a keg but it will be understood that the apparatus could be used to cool and dispense other beverages, for example lager, cider from any suitable beverage storage container.

[0006] Preferably, the head unit is releasably connectable to the keg. For example, the head unit may be secured in a filler opening through which the keg can be filled with beer. In a preferred arrangement, the filler opening comprises an internally threaded boss and the head unit screws into the boss to secure the head unit to the keg.

[0007] Preferably, the cooling means comprises a coil of tubing, for example stainless steel tube, that can be inserted into the keg through the boss when the head unit is secured to the keg. In a preferred arrangement, the head unit is mounted at one end of the keg and the cooling coil extends between the ends of the keg so that, in use, beer remaining in the keg can be cooled.

[0008] Preferably, the dispensing means comprises a tube that can be inserted into the keg through the boss when the head unit is secured to the keg. In a preferred arrangement, the dispense tube is arranged inside the cooling coil and extends between the ends of the keg so that, in use, substantially all the beer can be dispensed from the keg through the dispense tube.

[0009] Preferably, the head unit comprises an outer

plug member that is secured in the boss and an inner plug member releasably secured within the outer plug member. In a preferred arrangement, the outer plug member is provided with the cooling coil and has suitable connectors for circulating coolant through the coil, and the inner plug member is provided with the dispense tube and a valve for connecting the keg to a source of gas under pressure to propel the beer through the dispense tube.

[0010] Preferably, the valve is biased to a closed position and is moved to an open position when a coupling member is connected to the head unit to connect the keg to the gas source and to a flow line to deliver beer from the keg to a dispense head. The coupling member may also connect the cooling coil to a source of coolant.

[0011] According to a second aspect of the present invention, there is provided a beverage cooling and dispense system comprising a keg having an inlet for filling the keg with beverage, a detachable head unit for mounting in the inlet, the head unit having a cooling coil that extends into the keg for cooling the beverage, a dispense tube that extends into the keg for dispensing the beverage, and a valve for connecting the keg to a source of gas under pressure for dispensing beverage through the dispense tube.

[0012] Preferably, the valve is biased to a closed position and is moved to an open position by a coupling member provided with a gas line connected to the gas source. Preferably, the coupling member is also provided with a beverage line connected to a dispense head and the beverage line receives beverage from the dispense tube.

[0013] According to a third aspect of the present invention, there is provided a method of cooling and dispensing a beverage comprising providing a keg with an inlet opening, filling the keg with beverage through the inlet opening, providing a head unit with a cooling coil and a dispense tube, mounting the head unit in the inlet opening with the cooling coil and dispense tube extending into the keg, circulating coolant through the cooling coil to cool the beverage, and connecting the keg to a source of gas under pressure to dispense beverage through the tube.

[0014] The method may include the step of controlling circulation and/or temperature of the coolant to maintain a desired beverage temperature. For example, the method may include the step of controlling circulation and/or temperature of the coolant in response to the temperature of the beverage and/or coolant.

[0015] Other features, benefits and advantages of the invention will be apparent from the description hereinafter of exemplary embodiments with reference to the accompanying drawings wherein:

Figure 1 is a perspective view of apparatus according to a first embodiment of the invention;

Figure 2 is an exploded perspective view of the head

unit of the apparatus shown in Figure 1;

Figure 3 is a perspective view showing installation of the apparatus in a keg;

Figure 4 is a perspective view showing the apparatus mounted in a keg with parts of the keg and head unit broken away for clarity;

Figure 5 is perspective view of apparatus according to a second embodiment of the invention installed in a keg, the keg being shown in outline for clarity;

Figure 6 is a section through the apparatus shown in Figure 5 with parts of the keg broken away for clarity; and

Figure 7 is an exploded perspective view of the head unit of the apparatus shown in Figures 5 and 6 with the keg shown in phantom for clarity.

[0016] Referring first to Figures 1 to 4 of the accompanying drawings, there is shown apparatus for cooling and dispensing beer from a keg 1 according to a first embodiment of the invention. The keg 1 is made of metal, for example food grade stainless steel, and has a tubular boss 2 at one end for filling the keg 1 with beer. The boss 2 has an internal screw thread 3 for mounting a head unit 4 of the apparatus. In use, the keg 1 is arranged with the boss 2 at the upper end for connection to the head unit 4.

[0017] The head unit 4 has an outer plug member 5 and an inner plug member 6. The outer plug member 5 has an external screw thread 7 complementary to the internal screw thread 3 of the boss 2 for securing the outer plug member 5 in the boss 2. The engagement of the screw threads 3,7 may provide a fluid tight connection or additional sealing means may be provided.

[0018] The outer plug member 5 supports a helical cooling coil 8 and has inlet and outlet connectors 9,10 for connection to supply and return lines (not shown) for circulating a coolant through the cooling coil 8. The cooling coil 8 is inserted into the keg 1 through the boss 2 when the outer plug member 5 is screwed into the boss 3 and extends to the other (lower) end of the keg 1. The cooling coil 8 is made of metal tube, for example food grade stainless steel tube, and the coolant may be chilled water, a water/glycol mixture or any other suitable coolant. The supply and return lines may be connected to a cooler, for example an ice bank cooler, for circulating coolant through the cooling coil 8.

[0019] The outer plug member 5 has a through bore 11 with an internal screw thread 12. The inner plug member 6 has a tubular sleeve 13 provided with an external screw thread 14 matching the internal screw thread 12 of the outer plug member 5 for securing the inner plug member 6 in the outer plug member 5. As shown, the sleeve 13 has a pair of O-rings 15,16 that provide a fluid tight seal within the bore 11 and the lower end of the

sleeve 13 projects from the bore 11.

[0020] The inner plug member 6 has a tube 17, commonly referred to as a spear, that extends through the sleeve 13 and cooling coil 8 to the other (lower) end of the keg 1. The tube 17 has a collar 19 spaced from the upper end that is seated at the lower end of the sleeve 13 below a series of circumferentially spaced holes 20 in the sleeve 13.

[0021] The collar 19 provides an abutment for the lower end of a compression spring 21 surrounding the upper end of the tube 17. The spring 21 biases a valve member 22 to a position closing an annular gas port 23 in the inner plug member 6 and a beer port (not shown) in the tube 17. The valve member 22 is depressed against the biasing of the spring 21 by a keg coupler (not shown) releasably connected to the inner plug member 6 to open the gas port 23 and beer port.

[0022] The keg coupler is connected via a gas line (not shown) to a source of gas (not shown), for example carbon dioxide, under pressure. The keg coupler is also connected via a flow line (not shown) to a remote dispense head (not shown). When the keg coupler is connected, gas is introduced into the head unit 4 through the gas port 23 and exits the head unit via holes 20 in the sleeve 13 to pressurise the head space above the beer within the keg 1. When the dispense head is opened, the pressure of the gas forces the beer up through the tube 17 out of the beer port and into the flow line for delivery to the dispense head.

[0023] The beer in the keg 1 is cooled to a desired temperature and maintained at the desired temperature (or within a desired range) by circulating coolant through the cooling coil 8. We may circulate the coolant continuously or intermittently. We may monitor the temperature of the coolant and/or the beer in the keg and control circulation and/or temperature of the coolant to provide the desired cooling.

[0024] As will be appreciated, by arranging the cooling coil 8 within the keg 1, the beer is cooled and maintained at the desired temperature in an efficient manner. Furthermore, by arranging the cooling coil 8 to extend between the ends of the keg 1, the cooling efficiency is maintained as beer is withdrawn from the keg 1.

[0025] Referring now to Figures 5 to 7 of the accompanying drawings, there is shown apparatus according to a second embodiment of the invention that is generally similar to the first embodiment. Where appropriate, like reference numerals in the series 100 are used to indicate parts of the second embodiment corresponding to the first embodiment and these will not be described in detail where the construction and operation will be understood from the description of the first embodiment.

[0026] In this embodiment, the coolant supply and return lines are connected to respective ports 130,131 in the outer plug member 105 for circulating coolant through a helical cooling coil 108 that is inserted into the keg 101 through the boss 102 when the outer plug member 105 is screwed into the boss 102 and extends to the opposite

(lower) end of the keg 101.

[0027] The coolant lines are provided with end fittings 132,133 connected to quick-fit couplings members 134,135 that are releasably engageable with connector members 136,137 connected to the ports 130,131 via adaptors 138,139 respectively screwed into the ports 130,131. In a modification (not shown), the adaptors 138,139 are omitted and the ports 130,131 are provided with threaded bosses for connecting the connector members 136,137.

[0028] The quick-fit coupling members 134,135 include self-closing poppet valves (not shown) that are opened when the coupling members 134,135 are connected to the connector members 136,137 and that close automatically when the coupling members 134,135 are disconnected from the connector members 136,137 to seal the coolant supply and return lines and prevent escape of coolant from the supply and return lines. Each coupling member 134,135 has a removable end plug 140,141 respectively for obtaining access to the associated poppet valve for maintenance.

[0029] In a modification (not shown) the connector members 136,137 may also be provided with self-closing poppet valves that are opened when the coupling members 134,135 are connected and that close when the coupling members 134,135 are disconnected. Alternatively, we may provide self-closing poppet valves in the coupling member 134 connected to the supply line from the coolant supply and in the connector member 137 connected to the coupling member 135 connected to the return line to the coolant supply. In this way, escape of coolant is prevented when either coupling member 134,135 is connected/disconnected.

[0030] It will be understood that connectors 9,10 of the first embodiment may be provided with the above-described arrangements of quick-fit coupling members 134,135 for releasably connecting the coolant supply and return lines.

[0031] The head unit 104 further includes an inner plug member 106 that screws into the outer plug member 105 and is provided with a hollow tube (spear) 117 and spring loaded valve member 122 as described in the first embodiment. A keg coupler (not shown) is releasably attached to the inner plug member 106 and is provided with a port for connection to a gas supply line (not shown) and a port for connection to a beer line. The valve member 122 is depressed against the biasing of the spring 121 when the keg coupler is connected to allow gas to enter the headspace above the beer within the keg 101 and force the beer up the tube 117 into the beer supply line when a dispense tap connected to the beer supply line is opened.

[0032] The operation of the apparatus to cool and dispense beer from the keg 101 will be understood from the description of the first embodiment.

[0033] In a modification (not shown) to the above-described embodiments, we may provide a single coupling member for connection to the head unit to connect the

cooling coil to the supply and return lines for coolant and to connect the supply of pressurised gas and beer flow line to the keg.

[0034] It will be appreciated that the invention provides apparatus that combines the cooling and dispensing functions in a simple manner that can be connected to a keg via the inlet for filling the keg. In this way, the apparatus can be used with both new and existing (retro-fit) kegs.

[0035] While the invention has been described in the exemplary embodiments with reference to dispensing beer from a keg, it will be understood that the invention could be employed to dispense other alcoholic beverages such as lager, cider as well as non-alcoholic beverages from a keg or other suitable storage container.

Claims

1. Apparatus for cooling and dispensing beverage from a beverage container, the apparatus comprising a head unit having means extending into the beverage container for cooling beverage within the beverage container and means for dispensing beverage from the beverage container.
2. Apparatus according to claim 1 wherein, the head unit is releasably secured in a filler opening through which the beverage container can be filled with beverage, for example the filler opening comprises an internally threaded boss and the head unit screws into the boss to secure releasably the head unit to the beverage container.
3. Apparatus according to claim 2 wherein, the dispensing means comprises a tube and the cooling means comprises a coil that extends around the dispense tube such that the dispense tube and cooling coil can be inserted into the beverage container through the boss when the head unit is secured to the beverage container.
4. Apparatus according to claim 3 wherein, the boss is provided at an upper end of the beverage container and the dispense tube and cooling coil extend from the upper end to a lower end.
5. Apparatus according to claim 3 or claim 4 wherein, the cooling coil is connected to an outer plug member of the head unit that is secured in the boss, and the dispense tube is connected to an inner plug member of the head unit that is releasably secured within the outer plug member.
6. Apparatus according to claim 5 wherein, the outer plug member is connectable to a source of coolant for circulating coolant through the cooling coil, for example by self-sealing connectors arranged to pre-

vent escape of coolant when disconnecting the coolant source from the outer plug member, and the inner plug member is arranged for connecting the beverage container to a source of gas under pressure to propel beverage through the dispense tube, for example by a valve biased to a closed position and moved to an open position when a coupling member is connected to the head unit to connect the beverage container to the gas source and to a flow line to deliver beverage from the beverage container to a dispense head.

7. Apparatus according to claim 6 wherein the coupling member also connects the cooling coil to the source of coolant.
8. A beverage cooling and dispense system comprising a beverage container having an inlet for filling the beverage container with beverage, a detachable head unit for mounting in the inlet, the head unit having a cooling coil that extends into the beverage container for cooling the beverage, a dispense tube that extends into the beverage container for dispensing the beverage, and a valve for connecting the beverage container to a source of gas under pressure for dispensing beverage through the dispense tube.
9. A system according to claim 8 wherein, the valve is biased to a closed position and is moved to an open position by a coupling member provided with a gas line connected to the gas source for introducing gas to a headspace above the beverage in the beverage container, and with a beverage line connected to a dispense head for receiving beverage from the dispense tube.
10. A method of cooling and dispensing a beverage comprising providing a beverage container with an inlet opening, filling the beverage container with beverage through the inlet opening, providing a head unit with a cooling coil and a dispense tube, mounting the head unit in the inlet opening with the cooling coil and dispense tube extending into the beverage container, circulating coolant through the cooling coil to cool the beverage, and connecting the beverage container to a source of gas under pressure to dispense beverage through the tube.
11. A method according to claim 10 including the step of controlling circulation and/or temperature of the coolant to maintain a desired beverage temperature, for example by controlling circulation and/or temperature of the coolant in response to the temperature of the beverage and/or coolant.

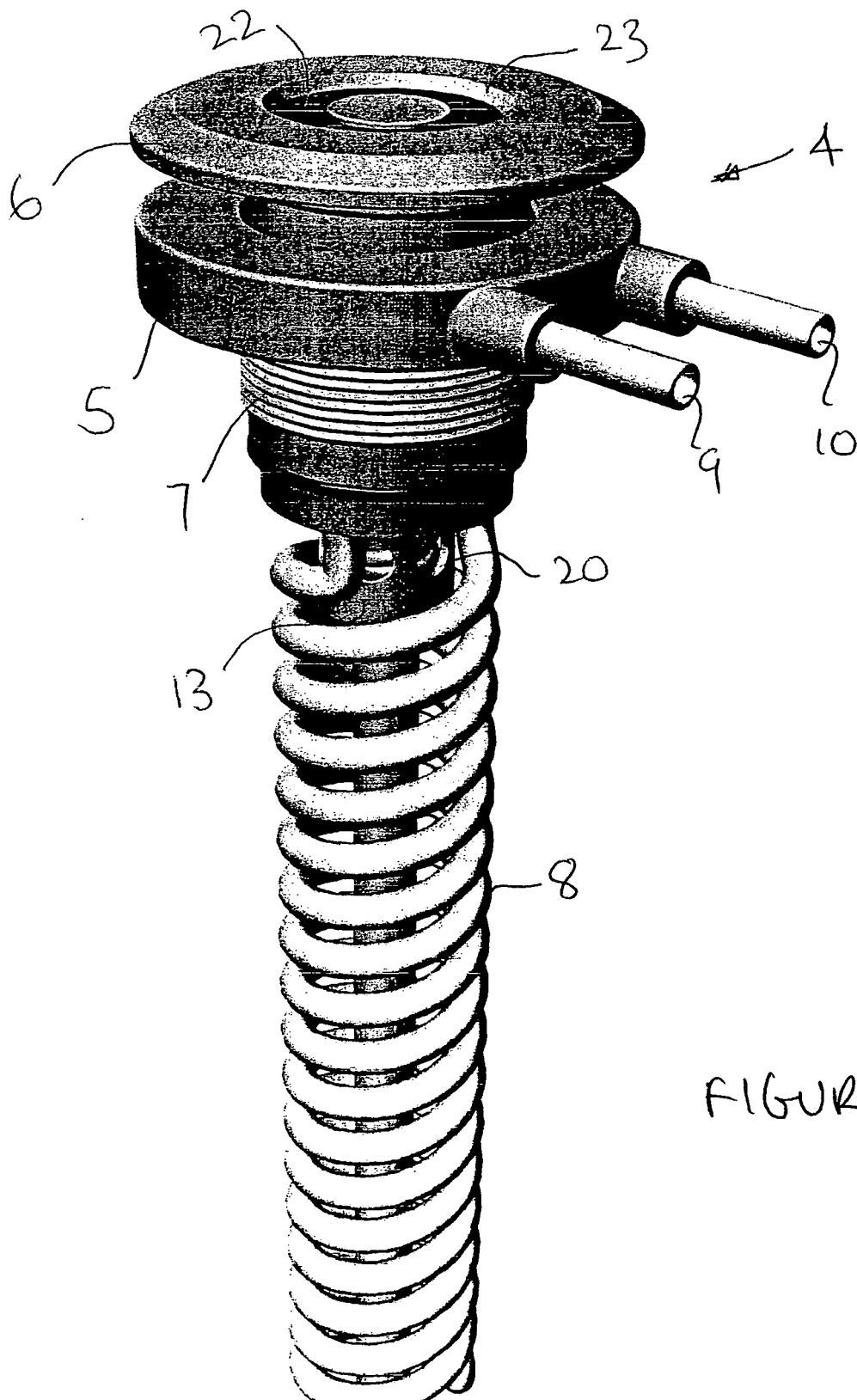


FIGURE 1

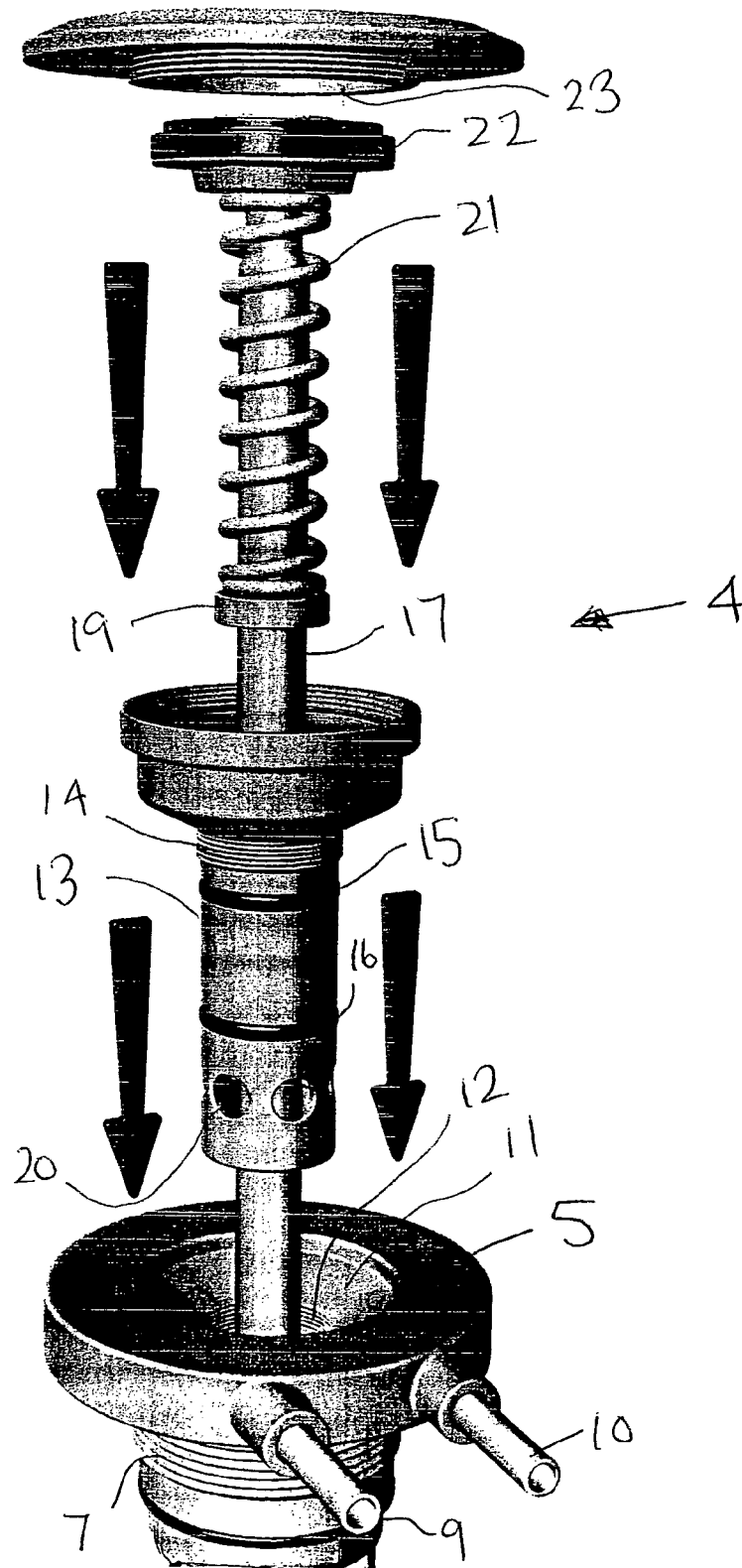


FIGURE 2

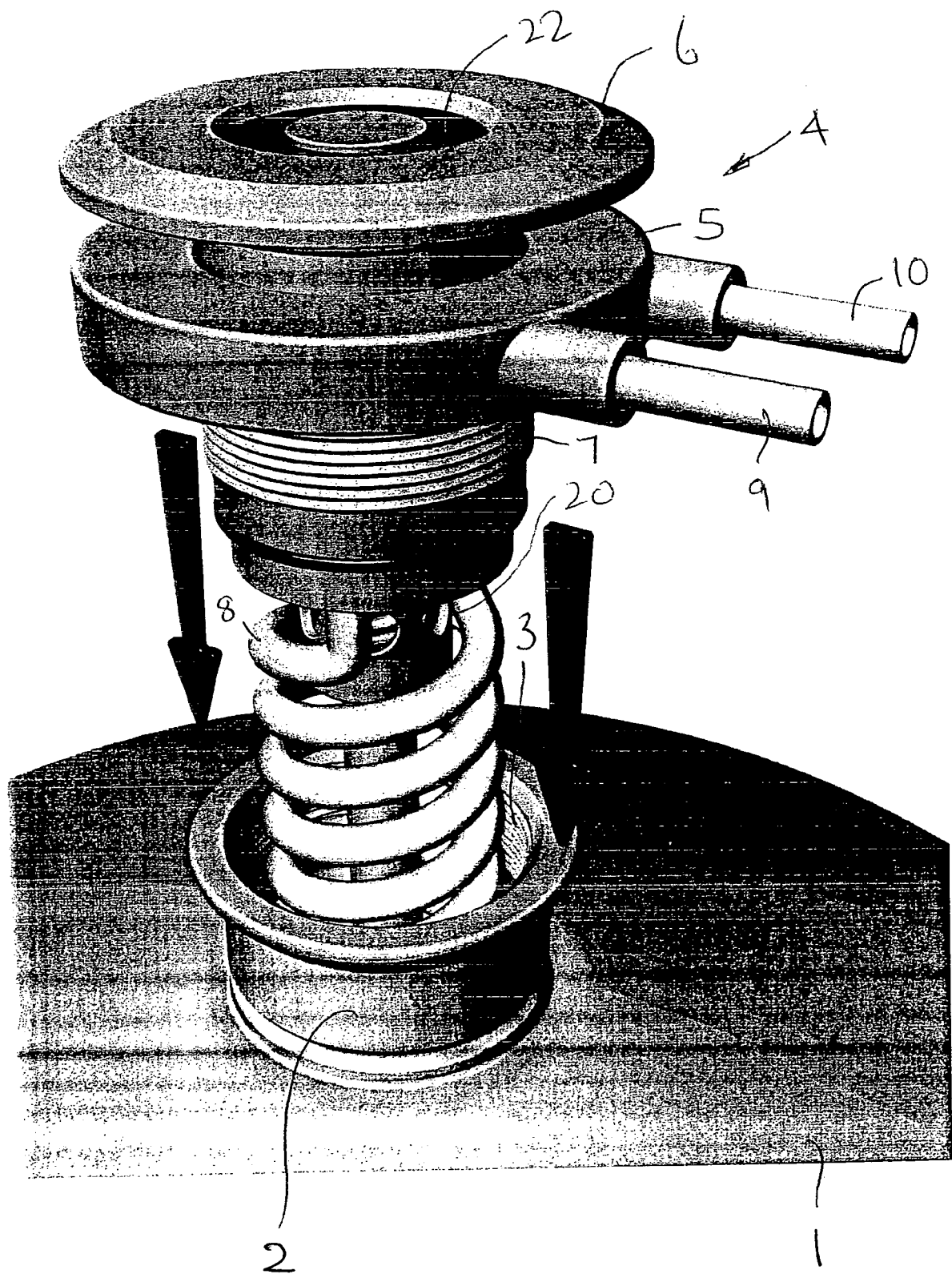


FIGURE 3

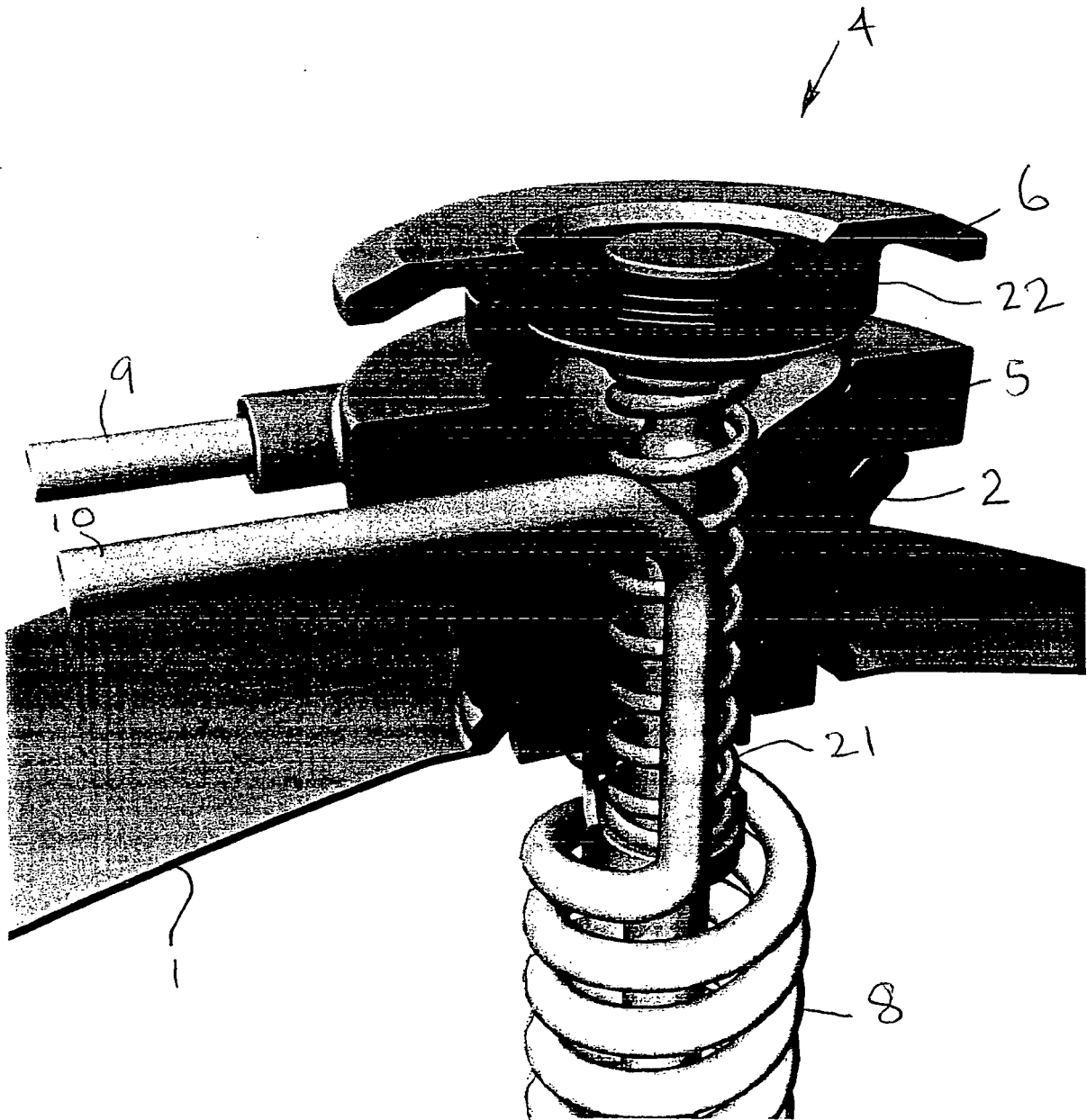


FIGURE 4

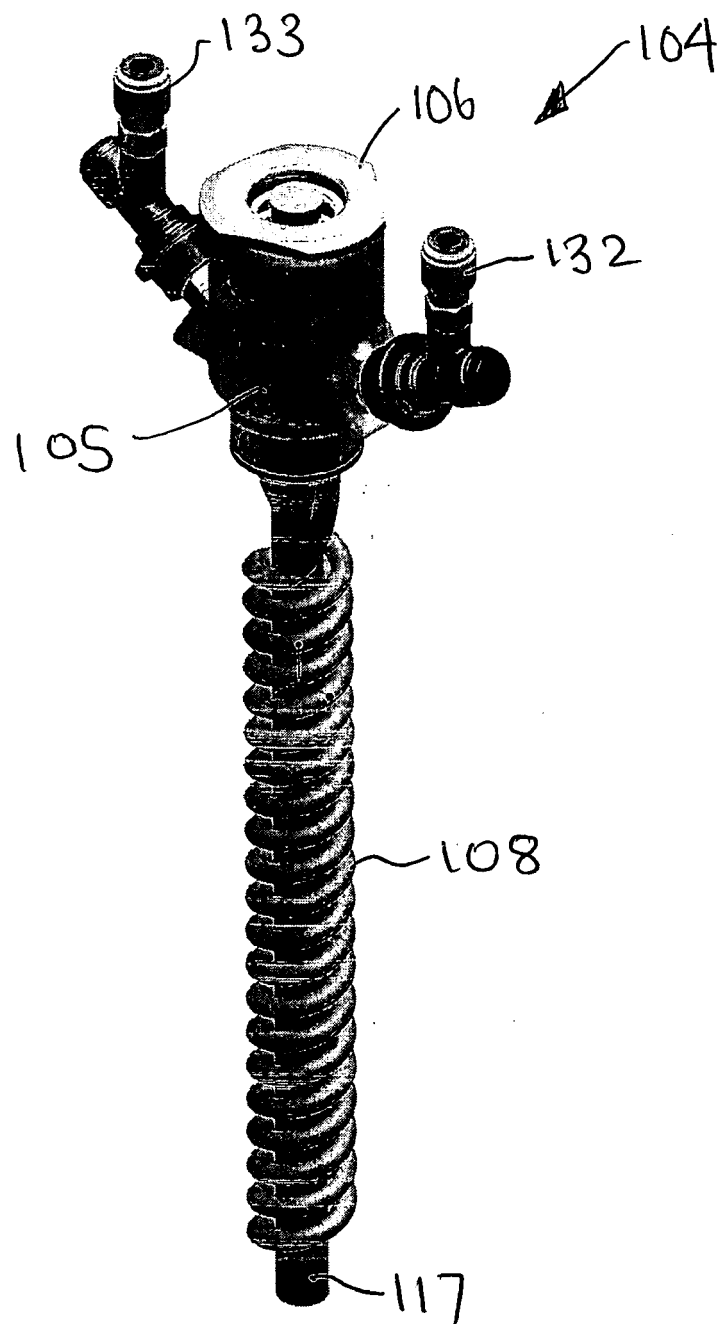


FIGURE 5

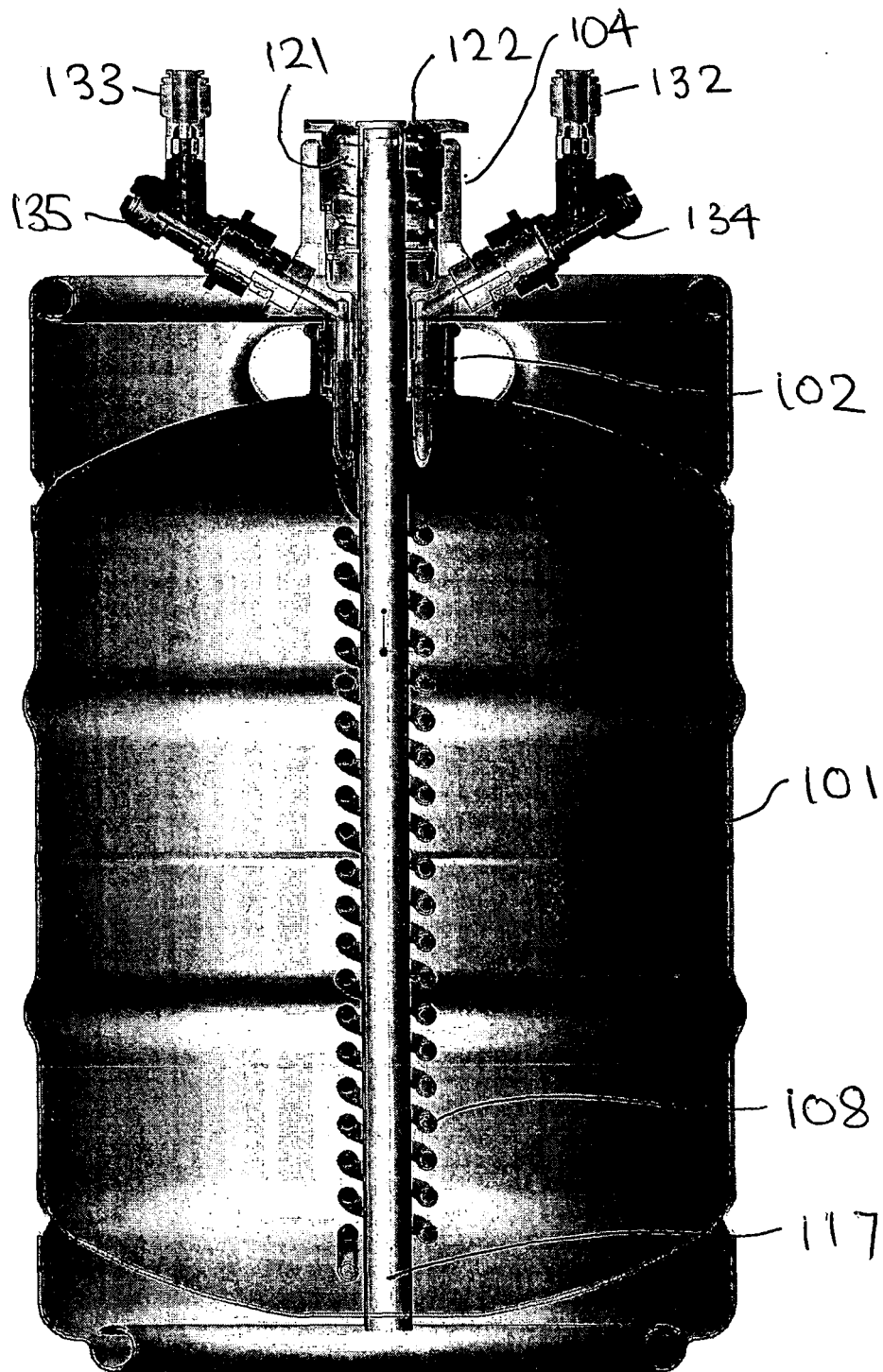


FIGURE 6

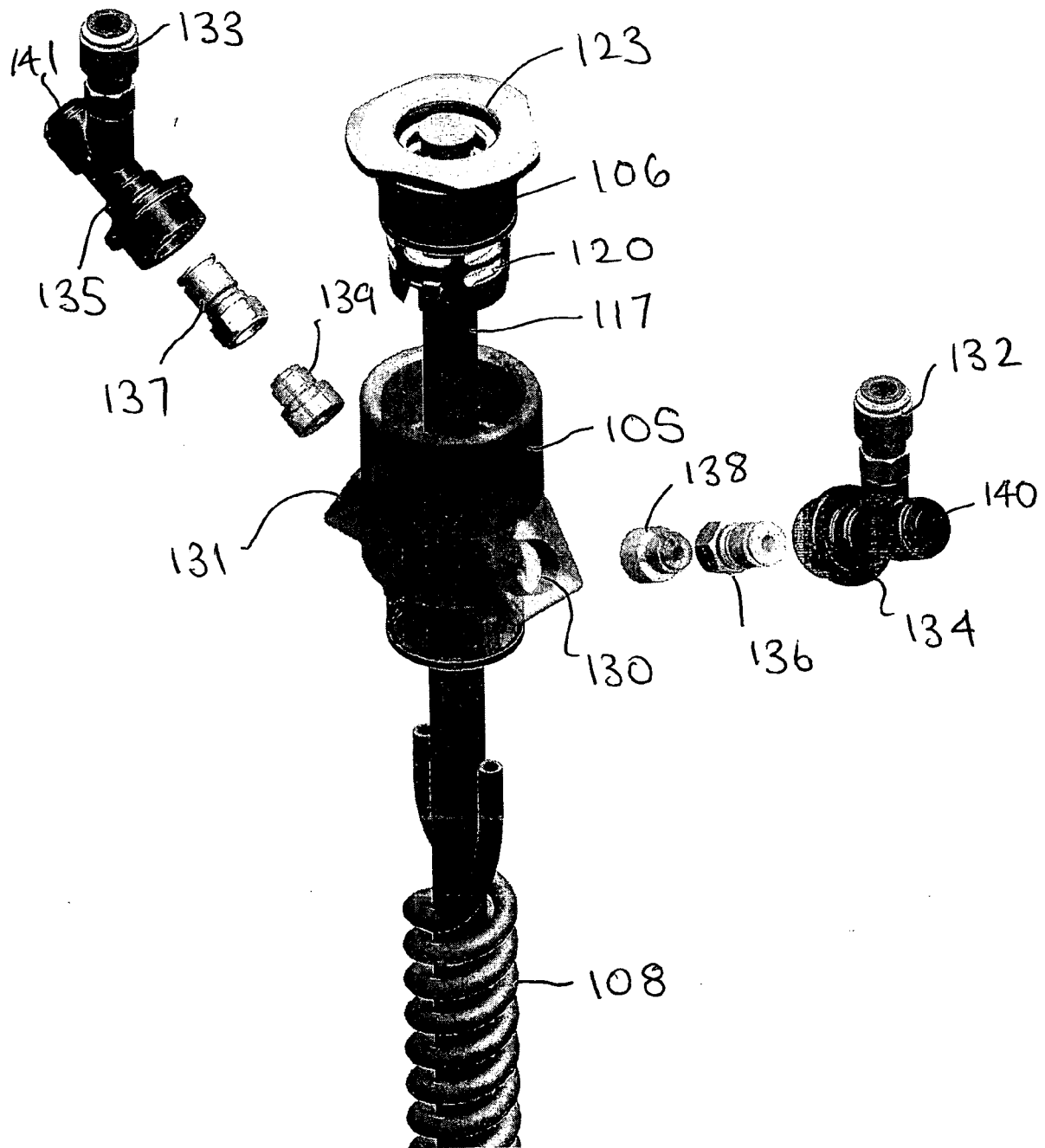


FIGURE 7



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 05 25 6592

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2 187 389 A (WINKLER WYNNE G) 16 January 1940 (1940-01-16)	1,2,8-11	B67D1/08 F25D31/00
Y	* figures 1,2 *	3,4	

X	US 2 638 758 A (DAUN CARL L) 19 May 1953 (1953-05-19)	1,2,10	
Y	* column 6, line 32 - line 62; figures 1-3 *	3,4	

A	US 2 177 207 A (NERO MARTIAL DEL) 24 October 1939 (1939-10-24) * the whole document *		

The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 January 2006	Examiner Desittere, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)

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

EP 05 25 6592

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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27-01-2006

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US 2638758	A	19-05-1953	NONE	

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