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(71) Applicant: **Schroeder Industries, Inc.**
San Antonio, TX 78218 (US)

(72) Inventors:
- **Santy, David**
  Converse, TX 78109 (US)
- **Schroeder, A.A. "Jud"**
  San Antonio, TX 78230 (US)

(74) Representative: **Elsworth, Dominic Stephen et al**
Hargreaves Elsworth
6 Charlotte Square
Newcastle-upon-Tyne
NE1 4XF (GB)

(54) Beverage dispensing apparatus

(57) A beverage dispensing apparatus is adapted to mix together a concentrate fluid with a base fluid. The apparatus comprises a cool fluid trunk line carrying the base fluid, a manifold, an in line and an out line extending between the cool fluid trunk and the manifold, a python and a bar gun assembly fluidly connected to the downstream side of the manifold by means of a plurality of conduits contained in the python, wherein the apparatus includes a recirculation channel having an inlet port and an outlet port, wherein the inlet and outlet ports of the recirculation channel are fluidly connected to respective in and out conduits in the python, the said in and out conduits being fluidly connected respectively to the in line and the out line of the cool fluid trunk line via the manifold, the beverage dispensing apparatus further including a plurality of product lines, a mixing means and a dispensing outlet, wherein the insulation material extends beyond the end of the outer sheath via the manifold, at least one of the product lines is fluidly connected to a source of concentrate and at least one of the product lines is fluidly connected to a source of base fluid.

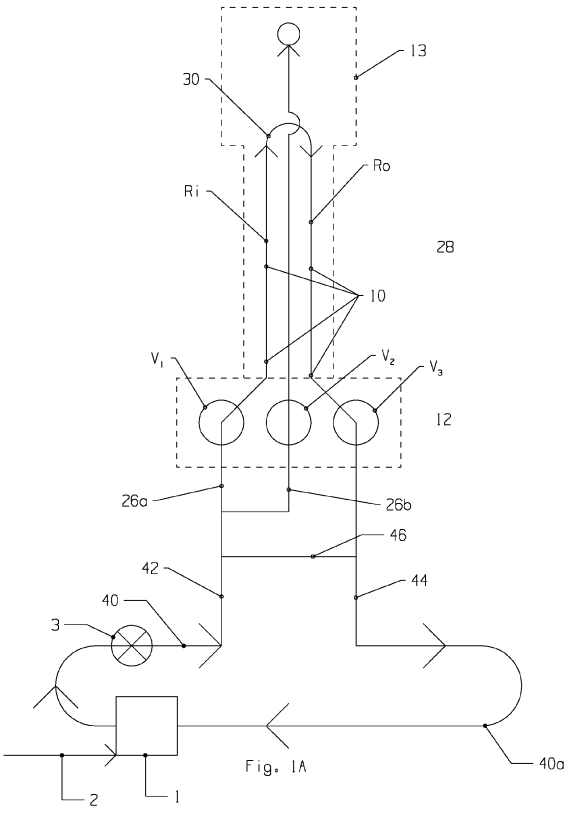

Fig. 1A

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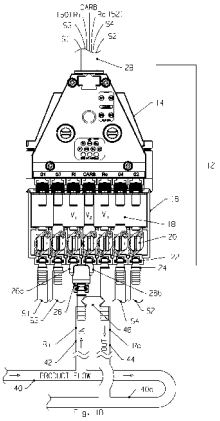


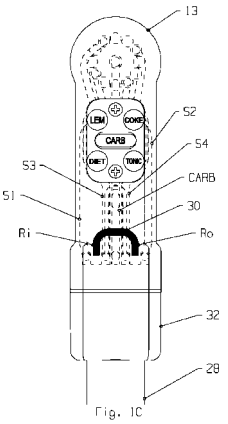

13
LEM
COKE
CARB
CHET
TONIC
S2
S4
CARB
S3
S1
30
Ri
Ro
32
28

Fig. 1C

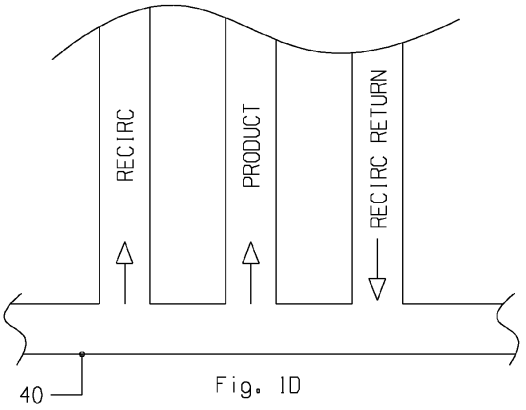
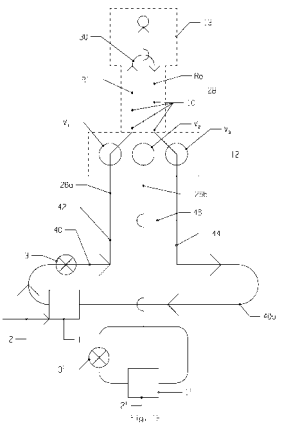

RECIRC
PRODUCT
RECIRC RETURN
40

Fig. 1D



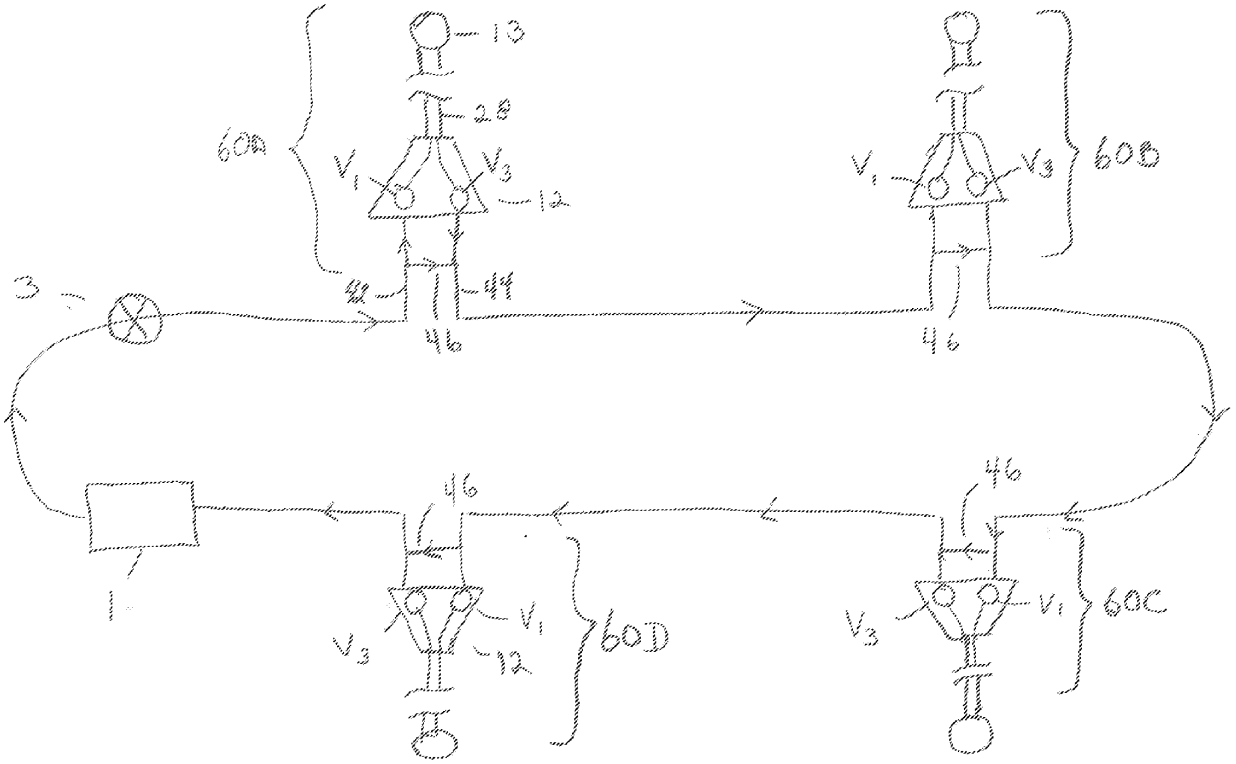


Fig. 1F

Description

FIELD OF THE INVENTION

[0001] Beverage dispensing systems having bar guns, more particularly, a beverage dispensing system for dispensing multiple beverages therefrom, which contains a bar gun, which bar gun has a recirculation loop for substantially continuous recirculation of cool liquids.

BACKGROUND OF THE INVENTION

[0002] This invention incorporates by reference U.S. Application No. 12/286,441 entitled "A Bar Gun Assembly" filed September 30, 2008 and U.S. Application No. 12/465,283 entitled "Flow Control and Manifold Assembly" filed May 13, 2009.

[0003] Dispensing systems, including beverage dispensing systems having bar guns that are well-known in the art. Bar guns are designed to dispense multiple beverages therefrom, typically receiving a number of different types of syrup from a number of separate sources, as well as carbonated water. Typically, pressing a button for the desired beverage on the bar gun will valve both the carbonated water (soda) and the syrup for post-mixing and dispensing into a cup as known in the art.

[0004] Typical beverage dispensing systems of the bar gun post-mix type typically include remote vessels for the soda, which vessel is typically maintained at a cooled temperature. Trunk lines are provided from the main remote carbonated soda (out) and/or beverage syrup vessels (out), which trunk lines provide fluid under pressure to, typically, a multiplicity of remote bar guns. As is known in the art, the trunk lines carrying cooled fluid, typically soda water, carry fluid to the bar guns through a valve and manifold assembly. One of the functions of the manifold and valve assembly is to provide individual on/off valves to each of the multiplicity of lines (soda and syrup) entering the valve and manifold assembly, as well as providing individual valved channels, which valved (flow controlled) channels have valves engaged therewith. The valves may be flow control valves or mechanically set adjustable orifice valves, but in either case, they are designed to control the flow rate of the fluid (syrup or soda) flowing therethrough so as to properly mix the soda/syrup at the bar gun nozzle, so that it will be neither too strong nor too weak. All of the foregoing describes structures and functions well-known in the art.

[0005] However, prior art post-mix bar gun dispensing systems have a drawback wherein, if a long enough period of time exists between dispensing operations, fluid in the valve and manifold assembly and downstream thereof, may begin to warm up. That is to say, if a bar gun is in almost continuous use, fluid from the cooled trunk lines and remote sources is not stagnate or stationary for any period of time sufficient to warm up to or near room temperature. However, if a sufficient period of time elapses between dispensing, product (soda or syrup) in the valve and manifold assembly and downstream thereof tends to warm up. This is especially deleterious with carbonated water (soda) wherein the CO_2 gas entrained in the soda under pressure will release greater amounts if the dispensing temperature is warmer than if it were cooler. Greater amounts of released gas generates greater amounts of unwanted foam.

OBJECT OF THE INVENTION

[0006] It is an object of the present invention to provide for multiple means of maintaining or helping maintain a cooler temperature for liquids in the valve and manifold assembly and/or elements downstream thereof.

SUMMARY OF THE INVENTION

[0007] According to a first aspect of the invention there is provided a beverage dispensing apparatus adapted to mix together a concentrate fluid with a base fluid, the apparatus comprising a cool fluid trunk line carrying a coolant fluid, a manifold and valve assembly, an in line and an out line extending between the cool fluid trunk and the manifold, a python and a bar gun assembly fluidly connected to the downstream side of the manifold by means of a plurality of conduits contained in the python, wherein the apparatus includes a recirculation channel for re-directing fluid from the in line to the out line, wherein the recirculation channel is fluidly connected to respective in and out conduits, said conduits contained in the python and being fluidly connected respectively to the in line and the out line of the cool fluid trunk line via the manifold, the beverage dispensing apparatus further including a plurality of product lines, a mixing means and a dispensing outlet, wherein via the manifold, at least one of the product lines is fluidly connected to a source of concentrate and at least one of the product lines is fluidly connected to a source of base fluid.

[0008] Preferably, the recirculation channel includes an inlet port and an outlet port, and wherein the inlet and outlet ports of the recirculation channel are fluidly connected to respective in and out conduits.

[0009] Advantageously, the coolant fluid trunk line carries the base fluid and wherein at least one of the product lines is fluidly connected to the cool fluid trunk line.

[0010] The product line that may be fluidly connected to the cool fluid trunk line is connected thereto directly. Preferably, the product line that is fluidly connected to the cool fluid trunk line is connected thereto by means of a conduit one end of which is connected to the manifold and the other end of which is connected to the in line extending between the cool fluid trunk and the manifold.

[0011] The product line may be connected to a port in the manifold, which port includes a valve configured to control the flow of fluid therethrough when a dispense actuator of the bar gun is actuated.

[0012] The recirculation channel may be situated in the bar gun assembly, and may be situated in the bar

gun assembly proximate the python.

[0013] The recirculation channel may be situated in the python.

[0014] Advantageously, the recirculation channel is situated at the end of the python proximate the bar gun assembly.

[0015] Preferably, the bar gun assembly includes a body and a heel, the heel for engaging the bar gun body and the python, and the recirculation channel may be situated in the heel.

[0016] At least the python and/or the manifold may be insulated. Preferably, the insulation material is situated internally or externally of the manifold or a sheath of the python. More preferably, the python includes an outer sheath and the insulation is situated inside the outer sheath. Still more preferably, the insulation material extends beyond the end of the outer sheath. Yet more preferably, the insulation is so shaped and dimension as to squeeze together the conduits contained in the python. Advantageously, the beverage dispensing apparatus further comprises a collar configured to surround that part of the insulation material that extends beyond the outer sheath of the python, and the collar may be formed of tape.

[0017] The said recirculation channel is preferably at least partially surrounded by insulation material.

[0018] A collar adapted to engage the outside of an end of a fluid line on to the recirculation channel may be provided, and such a collar may be flexible.

[0019] The recirculation channel preferably includes ends having elements so shaped and dimensioned as to engage with fluid lines, and the said elements may be barbs.

[0020] The recirculation channel may comprise first and second hollow legs and a conduit fluidly connecting the said legs together, and wherein the said elements are situated on each of the first and second legs.

[0021] Advantageously, the collar engages the fluid line against the said fluid line engaging element.

[0022] Preferably, a product line and/or the inlet to the recirculation channel are provided with a flow control.

[0023] A product line and/or the inlet to the recirculation channel may be provided with a shut-off valve.

[0024] Preferably, the apparatus further comprises a bypass line extending between and in fluid communication with the in line and the out line, said by pass line situated upstream of the manifold and valve assembly.

[0025] According to a second aspect of the invention there is provided a beverage dispensing apparatus adapted to mix together a concentrate fluid with a base fluid, the apparatus comprising a cool fluid trunk line adapted to carry a coolant fluid, a manifold and valve assembly, an in line and an out line extending between the cool fluid trunk and the manifold, a python and a bar gun assembly fluidly connected to the downstream side of the manifold by means of a plurality of conduits contained in the python, wherein the apparatus, the said in and out conduits being fluidly connected respectively to the in line and the out line of the cool fluid trunk line via the manifold, the beverage dispensing apparatus further including a plurality of product lines, a mixing means and a dispensing outlet, wherein via the manifold, at least one of the product lines is fluidly connected to a source of concentrate and at least one of the product lines is fluidly connected to a source of base fluid, wherein at least the python and/or the manifold are insulated.

[0026] The insulation material may be situated internally or externally of the manifold or a sheath of the python. The python may include an outer sheath and the insulation is situated inside the outer sheath. The insulation material extends beyond the end of the outer sheath. The insulation may be so shaped and dimension as to squeeze together the conduits contained in the python.

[0027] The apparatus may further comprising a collar configured to surround that part of the insulation material that extends beyond the outer sheath of the python, and the collar may be formed of tape.

[0028] According to a third aspect of the invention there is provided a plurality of beverage dispensing system according to the first and/or second aspects of the invention, each beverage dispensing apparatus being connected to a common cool fluid trunk line and/or source of base fluid and/or source of concentrate.

[0029] According to a fourth aspect of the invention there is provided a method of cooling a plurality of beverage dispensing apparatus in a beverage dispensing system according to a fourth aspect of the invention and including a bypass line extending between and in fluid communication with the in line and the out line, said by pass line situated upstream of the manifold and valve assembly, by controlling the relative proportions of coolant fluid flowing through the recirculation channel and the bypass line in respective beverage dispensing apparatus fluidly connected to the common cool fluid trunk line.

[0030] Preferred features of the invention are specified in the claims dependent on Claim 1, and/or in the description.

[0031] The device of the present invention provides a number of features, which, alone or in combination, will help prevent heat loss of liquids in or downstream of the valve and manifold assembly of a bar gun system.

[0032] The first such feature is a recirculation loop, which recirculates coolant (typically carbonated water or water), from the cool trunk line carrying the coolant through the valve and manifold assembly, then through the python and into the bar gun, returning (undispensed) back through the python and through the valve and manifold assembly into the trunk line. This recirculation loop is operational even when the bar gun is not in use. That is to say, the recirculation loop will recirculate coolant from the trunk line through the python and valve assembly into the coolant trunk line. This recirculation loop is valved for flow even when the bar gun is not in use (that is to say, when none of the buttons on the bar gun are actively dispensing fluid therefrom). The recirculation loop may

be situated in the bar gun handle, in the heel or in the python, where it would typically be situated proximate the bar gun handle.

[0033] Regarding the recirculation feature, it is noted that the structure providing recirculation, generally a U-shaped member, will direct fluid from a direction towards the dispensing nozzle to a direction away from a dispensing nozzle and back towards the valve and manifold assembly. In regards to the location of this structure that will redirect the cooling fluid, it may be located in the bar gun handle itself, in one embodiment, and in a second embodiment, may be located in the heel of the apparatus, or it may be located in the python. In all of these cases, the structure of the recirculation loop is downstream of the valve and manifold assembly. This is unlike the prior art in which it is known to deliver cooling fluid up to, but not into, the valve and manifold assembly.

[0034] A second feature of the recirculation loop is that it may be open or closed. In an open recirculation loop the cool fluid may be drawn off and mixed with syrup and dispensed as product into a cup for a consumer. Clearly, in an open system, the cooling fluid is compatible with the beverage and may be drunk by the consumer. Typically, an open system would use cooled soda water. In a closed system, there is no structure or function providing for the drawing off of cooling fluid to dispense into a container. In the case of a closed system, there are more options for the cooled fluid, and fluids such as glycol or the like may be used. There is no need to worry, in a closed system, about the compatibility of the cooled fluid for human consumption.

[0035] A third feature, which may be used alone or in combination with the recirculation loop, is the providing of insulation in various parts of the valve and manifold assembly and/or the python or the bar gun of the bar gun assembly. This insulation will help prevent heat loss by radiation, conduction and/or convection from the fluid in the valve and manifold assembly and/or the sheath and may assist in the transfer of heat between the coolant fluid and the uncooled fluids carried by respective conduits in the python. Insulation, in one example a pocket of air adjacent the recirculation loop, may help avoid the excessive cooling of the exterior of the bar gun body. Excessive cooling of a bar gun resting unused over a period of time, while good for the first dispensing of a cool drink, may cause the bar gun surface to form condensation thereon, as "sweat."

[0036] The position of the recirculation loop in the apparatus, for example as in the heel or python, will help prevent "sweating" of the bar gun body. The use of insulation will also help prevent "sweating" of the bar gun body.

[0037] Preferably, the recirculation loop is used in conjunction with the insulation to provide for effective prevention of heat loss from the liquids of the bar gun assembly and/or sweating of the bar gun body.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038]

Fig. 1A is a schematic illustration of the elements of a recirculation loop of the bar gun system.

Fig. 1B is a top elevational view of the elements of the recirculation loop as they apply to the trunk line, valve and manifold assembly, and python.

Fig. 1C is a top elevational view of the bar gun illustrating the recirculation channel therein.

Fig. 1D is an alternate configuration of lines carrying fluid to the valve and manifold assembly.

Fig. 1E illustrates a closed system.

Fig. 1F is a schematic illustration of a beverage dispensing system comprising multiple beverage dispensing apparatus operating off a common coolant line.

Fig. 2A is a perspective view of the manner in which the python joins the bar gun illustrating details of the insulation used as well as the arrangement of the lines incorporating the recirculation loop.

Fig. 2B is a cross-section elevational view of some of the elements illustrated in Fig. 2A.

Fig. 2C is a cross-section elevational view of the elements illustrated in Figure 2A where a recirculation channel is situated in the python proximate the heel of the bar gun assembly.

Fig. 3 is an exploded perspective view of the manifold portion of the valve and manifold assembly illustrating the manner in which insulation is used therewith and the manner in which it joins the python.

Figs. 4A, 4B, and 4C are illustrations of an alternate preferred embodiment of Applicant's recirculation loop. Figs. 4A and 4B show the U-shape fitting exploded away from lines 50 and 52, while Fig. 4C shows the fitting as it is used, attached to the removed ends of lines 50 and 52.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0039] Figs. 1A, 1B, and 1C illustrate various elements, structurally and functionally, of beverage dispensing apparatus that may comprise Applicants' recirculation loop 10. As stated above, the recirculation loop 10 is designed to help prevent heat loss in the valve and manifold assembly and the elements downstream thereof, including

the python and bar gun assembly 13.

[0040] This function is achieved through the use of an in line 42 carrying incoming cool fluid Ri coming off trunk line 40 entering and passing through valve/manifold assembly 12 and into the bar gun assembly 13 in conjunction with a recirculation channel 30, which in the illustrated example is in the bar gun assembly 13, and which joins recirculation in line Ri to recirculation out line Ro in the bar gun handle as illustrated in Fig. 1C. Ro then exits bar gun assembly 13, passes through a line situated in python 28, through valve/manifold assembly 12, to out line 44, and into a trunk line return 40a (for coolant recirculation). The embodiment illustrated in Figures 1A and 1B is an open system where the recirculating cool fluid is a fluid that may be dispensed through the bar gun. Suitable fluids include, but are not limited to: soda water, carbonated water, water, consumable liquefied gases, or consumable gaseous fluids such as carbon dioxide, which when mixed with the other liquids in the bar gun carbonates the dispensed beverage. When referring to consumable liquefied gases and consumable gaseous fluids the Applicant is referring to such gases and fluids which are known to be consumable in certain proportions by human beings without harm.

[0041] Additional elements may be seen with reference to Figs. 1A-1C. More particularly, in line 42 may take recirculation fluid Ri into a splitter 26 having branch 26a and branch 26b. Recirculation fluid Ri will pass through V1 and as dispensed coolant, typically carbonated water through V2, which are two of a multiplicity of valves 18. Valves 18 may be of the flow control type or adjustable/fixed orifice type, but in any case are valves known in the art to control the flow of fluids therethrough. In conjunction with a multiplicity of valves 18 (engaged with channels therethrough) may be shutoff or ball valves 20 as known in the art.

[0042] It is not necessary that all the coolant passing through in line 42 should pass through the recirculation channel 30. A bypass line 46 may extend between the in line 42 and the out line 44. Hence, whilst some of the coolant passes through the recirculation channel 30, some of the coolant passes directly into the out line, without passing through the recirculation channel 30. The relative proportion of coolant passing through the recirculation channel 30 and the bypass line 46 maybe influenced by the setting of valves V1 and V3, the relative sizes of the in line 42, out line 44 and bypass line 46 for example.

[0043] At splitter 26, recirculation fluid (coolant) passing through branch 26a will be destined to return through V3 and out line 44 as Ro (recirculation of the fluid out). When the bar gun is not being used, that is, none of the beverages are being dispensed, then it may be seen that substantially no flow will occur through branch 26b, valve V2, and the line marked "carb" (for carbonated water or soda water). That is to say, the recirculation loop operates primarily in a mode in which none of the buttons (actuating valves as known in the art) of the bar gun are being depressed and no beverage is being dispensed. In such a condition, recirculating fluid Ri will circulate in the channels and lines as illustrated up to recirculation channel 30 where it will perform a substantial "U-turn" and return as recirculation out or Ro through line 44 and into the trunk return line 40a. The trunk line typically carries chilled carbonated fluid and thus has an out line 40 which services a number of bar gun assemblies 13 (see Fig. 1F) and a return line 40a engaging a source 1 of carbonated water or soda cooled by a chiller 1 as known in the art and including a recirculation pump 3 as known in the art. Valves V1 and/or V3 may be adjusted to control the flow rate of recirculation fluid therethrough. Indeed, valves V1 and V3 may be used, but it is not necessary that they are adjusted - the recirculation fluid mayflow through valves V1 and V3 with the valves open. Indeed, valves V1 and V3 may be no more than openings of a specified size to give a desired flow rate with no facility to adjust for adjustment to control the flow rate. Valve V2, where such a valve is adjustable to control the flow of fluid flowing therethrough, may be adjusted to control said flow of the fluid. A splitter is not necessary to the recirculation loop, line 42 may go directly into the fitting that, in illustration Fig. 1A, engages branch 26a and the fitting engaging branch 26b will receive the product from the trunk line as known in the art. Such an arrangement also provides for a closed system where the coolant fluid is not used in the mixing of beverages. Such coolant fluid could be ethylene glycol or another known refrigerant.

[0044] Fig. 1F illustrates multiple (four) flow control/python/bar gun assembly systems 60A/60B/60C/60D. Each is comprised of at least elements 12/13/28/42/44/46/V1/V3. That is to say, coming off the trunk line or coolant main line, the system 60A/60B/60C/60D comprising a flow control/python/bar gun assembly is typically provided at multiple places.

[0045] It is seen that adjusting either V1 or V3 at 60A will affect the crossover or bypass coolant fluid going through 46 and back into the main coolant line. Specifically, either V1 or V3 may be adjusted to choke down or reduce the flow of coolant therethrough and therefore to the recirculation loop of the python and/or bar gun assemblies. Then, more of that fluid will go through line 46 and be available as fluid typically a little bit cooler than the fluid that went through the python 28 of 60A. Increasing the flow of fluid through python 28 of 60A will provide a cooler temperature at the elements downstream of 46 on 60A, but will provide a slightly higher temperature to downstream elements 60B/60C/60D.

[0046] Thus, it is seen that by adjusting either or both of valves V1 or V3 at each of the stations, the amount of cool fluid going into the recirculation loops at each station can be controlled and the flow to the recirculation loop can be increased for more coolant or decreased. However, it is also recognized that increased flow at any recirculation loop will slightly decrease the ability for downstream stations (for example, station 60B/60C/60D which are downstream from 60A) to cool themselves.

[0047] A number of the other elements illustrated in Figs. 1A - 1C are known in the art. Locking slides 22 and fittings 24 removably engage a number of typically flexible fluid lines to the valve and manifold assembly 12. Pythons 28 are known in the art and include outer sheath 34 and carry a number of fluid bearing lines therethrough, here four syrup lines and a carb line. However, the python of the present invention is also carrying a line for recirculation fluid Ri designated 50 and a line for Ro designated 52 as illustrated. Lines 50 and 52 originate at the manifold assembly, run through the python, and in one embodiment engage recirculation channel 30, and in a second embodiment (Figs. 4A-4C) engage a "U" shaped fitting 54 outside of bar gun body 13A. Both a "U" shaped fitting 54 and the recirculation channel 30 will signify a structural member or element adapted to reverse the flow of coolant from towards the dispensing nozzle to away from the dispensing nozzle.

[0048] Additional features of Applicants' present device are also provided in an effort to achieve a reduction of heat loss to the environment from the fluids in the lines and valves and other elements of the valve and manifold assembly, python and/or bar gun assembly.

[0049] An additional feature includes the use of insulation including, typically, tubular insulation at least partially within python 28 as illustrated in Figs. 2A and 2B. That is to say, python 28 may, in addition to having outer sheath 34, carry insulation 36, which may be tubular and which may be located within or on the outside of outer sheath 34 (illustrated is an inner python sheath insulation 36). In the manner illustrated, insulation preferablywraps or at least partially wraps the multiplicity of lines within the python, including Ri and Ro, those lines carrying the recirculated fluid (coolant). The sheath 34 may be combined with sheath insulation 36 as a single unit combining flexibility, insulation and an annulus or channel therethrough. As can be seen in Fig. 2A, python insulation sheath 30 may extend slightly beyond outer sheath 34 (upstream end) and may be wrapped with an insulated tape 38 to help protect and further insulate the lines within the python and extending past the python into body 13A of the bar gun. Tape 38 may be an insulation type tape (preferably adhesive bearing) and may help prevent chafing of the lines. The insulation 36 may in addition to preventing heat loss may also increase heat transfer between conduits carrying cooled fluid and those carrying uncooled fluid by bringing them into closer proximity. The fluid carrying lines and the insulation 36, 38 may be so shaped and dimensioned as to squeeze together (but not crush) fluid carrying conduits so that heat exchange between adjacent conduits is at least partially by conduction.

[0050] Referring to Fig. 2C the parts illustrated are essentially the same as shown in Figure 2b, except that the recirculation channel 30 is situated in the python proximate the heel 32 of the bar gun assembly.

[0051] Turning to Fig. 3, it may be seen that manifold insulation 48 may be used in conjunction with any of the other elements of Applicants' design. More particularly, Fig. 3. illustrates the use of manifold insulation at least partially within manifold covers 14a/14b, which covers comprise a manifold housing. Manifold insulation 48 may be internal, that is to say, within the housing and may at least partially rest adjacent the multiplicity of lines passing through the manifold from the valve assembly 16 to manifold 14 into python 28.

[0052] Figs 1D illustrates alternative embodiments for bringing cool recirculation fluid and product (or multiple products) to the valve and manifold assembly from a source. The recirculation fluid used will be chilled, before entering the recirculation loop, product dispensed may or may not be. Types of insulation that may be used include, but are not limited to, foam, armaflex, fiberglass, flat, tubular tape, etc. Where the product dispensed for example syrup is not cooled, this product may be delivered via a fluid line other than trunk line 40 in ways known in the art.

[0053] Fig 1E illustrates an alternative embodiment where a separate supply of product 2' is delivered to the bar gun assembly 13 by a pump 3' from a chiller 1'. Such an arrangement provides for a closed system as described above.

[0054] Recirculation fluid passing through branch 26a and V1 as Ri will be destined to return through V3 and out line 44 as Ro (recirculation of the fluid out). When the bar gun is not being used, that is, none of the beverages are being dispensed, then it may be seen that substantially no flow will occur through branch 26b, valve V2. In this embodiment, the recirculation loop operates in the same manner whether buttons to dispense beverage are actuated or not, i.e. whether product flows through branch 26b or not. Recirculating fluid Ri will circulate in the channels and lines as illustrated up to recirculation channel 30 where it will perform a substantial "U-turn" and return as recirculation out or Ro through line 44 and into the trunk return line 40a. In this example, the trunk line typically carries glycol or the like and has an out line 40 which services a number of bar gun assemblies 13 and a return line 40a engaging a source of glycol 2 cooled by a chiller 1 as known in the art and including a recirculation pump 3 as known in the art. Valves V1 and/or V3 may be adjusted to control the flow rate of recirculation fluid therethrough. Indeed, valves V1 and V3 may be used, but are not necessary - the recirculation fluid may flow unvalved. Valve V2 may be adjusted to control flow of the product flowing therethrough.

[0055] Figs. 4A, 4B, and 4C illustrate an alternate preferred embodiment from that described above and as set forth in the previous Figures. In the alternate preferred embodiment, the rerouting or reversal of the incoming fluid Ri to the outgoing fluid Ro occurs not in bar gun body 13A, like described above.

[0056] As can be seen from Figs. 4A-4C, U-shape fitting 54 typically engages the removed ends of lines 50 and 52 between the heel 32 of the bar gun assembly and the removed end of the sheath. That is to say, U-shape

fitting 54 engages the removed ends 50a/52a in a fluid sealing fashion and when heel 32 is attached, through fasteners to the rear of body 13A of the bar gun assembly, U-shape fitting 54 is typically located substantially in the space just beyond the end of python 28 and the mounting plate 58. Fig. 4C shows the fitting attached, as in use (but for clarity deletes heel, insulation, and python). With the U-shape fitting 54 mounted as illustrated in Figures 4A - 4C, when assembled the U-shape fitting is covered by heel 32.

[0057] U-shape fitting 54 is substantially hollow and incoming fluid from line 50 enters the leg attached to line 50 and passes through body 54c, and into line 52. In other words, U-shape fitting 54 recirculates incoming fluid from line 50 to line 52 as outgoing fluid Ro. Moreover, this recirculation occurs without the recirculation fluid (typically cool fluid recirculating at times when the bar gun is not in use) entering body 13A of the bar gun assembly. Moreover, the insulation (tape, foam or other suitable insulation) that is illustrated as used with the sheath can be used to at least partially cover U-shape fitting 54. In this fashion, with the coolant fluid avoiding contact with the bar gun body itself, the problem of bar gun "sweating" is avoided. With the embodiment of the previous illustration, wherein the recirculation fluid actually enters body 13A of the bar gun assembly, there has been some experience where the bar gun assembly is left overnight, for instance, "sweats" at the portion of the bar gun that is adjacent the recirculation channel. The use of the U-shape fitting upstream of the bar gun body as illustrated is one method of avoiding the "sweating" issue.

[0058] Thus, it is seen that the construction of U-shape fitting 54 having hollow legs 54a with barbs 54b at the removed end thereof and having hollow body 54c would provide for snug fit of ends 50a and 52a over barbs 54b. Moreover, it can be seen that slidable, flexible collars 56 may, after the ends of lines 50 and 52 are engaged to legs 54a, be moved up and to partially engage the outside of ends 50a and 52a and, optionally, part of legs 54a to provide a snug, slip-resistant fitting of lines 50 and 52 to U-shape fitting 54.

[0059] In another embodiment of the invention, instead of the U-shape fitting 54 being situated just outside the end of the outer sheath 34 of the python 28, the u-shape fitting may be situated within the sheath 34, preferably proximate the end thereof which attaches to the bar gun assembly.

[0060] Although the invention has been described in connection with the preferred embodiment, it is not intended to limit the invention's particular form set forth, but on the contrary, it is intended to cover such alterations, modifications, and equivalences that may be included in the spirit and scope of the invention as defined by the appended claims.

Claims

1. A beverage dispensing apparatus adapted to mix together a concentrate fluid with a base fluid, the apparatus comprising a cool fluid trunk line carrying a coolant fluid, a manifold and valve assembly, an in line and an out line extending between the cool fluid trunk and the manifold, a python and a bar gun assembly fluidly connected to the downstream side of the manifold by means of a plurality of conduits contained in the python, wherein the apparatus includes a recirculation channel for re-directing fluid from the in line to the out line, wherein the recirculation channel is fluidly connected to respective in and out conduits, said conduits contained in the python and being fluidly connected respectively to the in line and the out line of the cool fluid trunk line via the manifold, the beverage dispensing apparatus further including a plurality of product lines, a mixing means and a dispensing outlet, wherein via the manifold, at least one of the product lines is fluidly connected to a source of concentrate and at least one of the product lines is fluidly connected to a source of base fluid wherein the recirculation channel is situated in the bar gun assembly proximate the python or wherein the recirculation channel is situated in the python.

2. A beverage dispensing apparatus according to Claim 1:

   wherein the recirculation channel includes an inlet port and an outlet port, and
   wherein the inlet and outlet ports of the recirculation channel are fluidly connected to respective in and out conduits;
   and/or
   wherein the coolant fluid trunk line carries the base fluid and wherein at least one of the product lines is fluidly connected to the cool fluid trunk line;
   and/or
   wherein the product line that is fluidly connected to the cool fluid trunk line is connected thereto directly.

3. A beverage dispensing apparatus according to Claim 2, wherein the product line that is fluidly connected to the cool fluid trunk line is connected thereto by means of a conduit one end of which is connected to the manifold and the other end of which is connected to the in line extending between the cool fluid trunk and the manifold.

4. A beverage dispensing apparatus according to any preceding claim, wherein the product line is connected to a port in the manifold, which port includes a valve configured to control the flow of fluid there-

through when a dispense actuator of the bar gun is actuated.

5. A beverage dispensing apparatus according to any preceding claim, wherein the recirculation channel is situated at the end of the python proximate the bar gun assembly.

6. A beverage dispensing apparatus according to any preceding claim:

wherein the bar gun assembly includes a body and a heel, the heel for engaging the bar gun body and the python;
or
wherein the bar gun assembly includes a body and a heel, the heel for engaging the bar gun body and the python and wherein the recirculation channel is situated in the heel.

7. A beverage dispensing apparatus according to any preceding claim:

wherein at least the python and/or the manifold are insulated;
or
wherein at least the python and/or the manifold are insulated and wherein the insulation material is situated internally or externally of the manifold or a sheath of the python.

8. A beverage dispensing apparatus according to Claim 7, wherein the python includes an outer sheath and the insulation is situated inside the outer sheath;
or
wherein the python includes an outer sheath and the insulation is situated inside the outer sheath and wherein the insulation material extends beyond the end of the outer sheath;
or
wherein the python includes an outer sheath and the insulation is situated inside the outer sheath, wherein the insulation is so shaped and dimension as to squeeze together the conduits contained in the python;
or
wherein the python includes an outer sheath and the insulation is situated inside the outer sheath and wherein the insulation material extends beyond the end of the outer sheath, wherein the insulation is so shaped and dimension as to squeeze together the conduits contained in the python.

9. A beverage dispensing apparatus according to Claim 8, further comprising a collar configured to surround that part of the insulation material that extends beyond the outer sheath of the python; or
further comprising a collar configured to surround that part of the insulation material that extends beyond the outer sheath of the python and wherein the collar is formed of tape.

10. A beverage dispensing apparatus according to any of Claims 7 to 9, wherein the said recirculation channel is at least partially surrounded by insulation material.

11. A beverage dispensing apparatus according to any preceding claim, further comprising a collar adapted to engage the outside of an end of a fluid line on to the recirculation channel; or
further comprising a collar adapted to engage the outside of an end of a fluid line on to the recirculation channel, wherein the collar is flexible.

12. A beverage dispensing apparatus according to any preceding claim, wherein the recirculation channel includes ends having elements so shaped and dimensioned as to engage with fluid lines; or
wherein the recirculation channel includes ends having elements so shaped and dimensioned as to engage with fluid lines, wherein the said elements are barbs; or
wherein the recirculation channel includes ends having elements so shaped and dimensioned as to engage with fluid lines, wherein the recirculation channel comprises first and second hollow legs and a conduit fluidly connecting the said legs together, and wherein the said elements are situated on each of the first and second legs;
or
wherein the recirculation channel includes ends having elements so shaped and dimensioned as to engage with fluid lines, wherein the said elements are barbs, wherein the recirculation channel comprises first and second hollow legs and a conduit fluidly connecting the said legs together, and wherein the said elements are situated on each of the first and second legs.

13. A beverage dispensing apparatus according to Claim 12 when dependent on Claim 9, wherein the collar engages the fluid line against the said fluid line engaging element.

14. A beverage dispensing apparatus according to any preceding claim, wherein a product line and/or the inlet to the recirculation channel are provided with a flow control and/or a product line and/or the inlet to the recirculation channel are provided with a shut-off valve and/or further comprise a bypass line extending between and in fluid communication with the in line and the out line, said by pass line situated upstream of the manifold and valve assembly.

15. A beverage dispensing system comprising a plurality

of beverage dispensing apparatus according to any preceding claim, each beverage dispensing apparatus having a bypass line associated therewith, and the beverage dispensing apparatus being fluidly connected to a common trunk line.

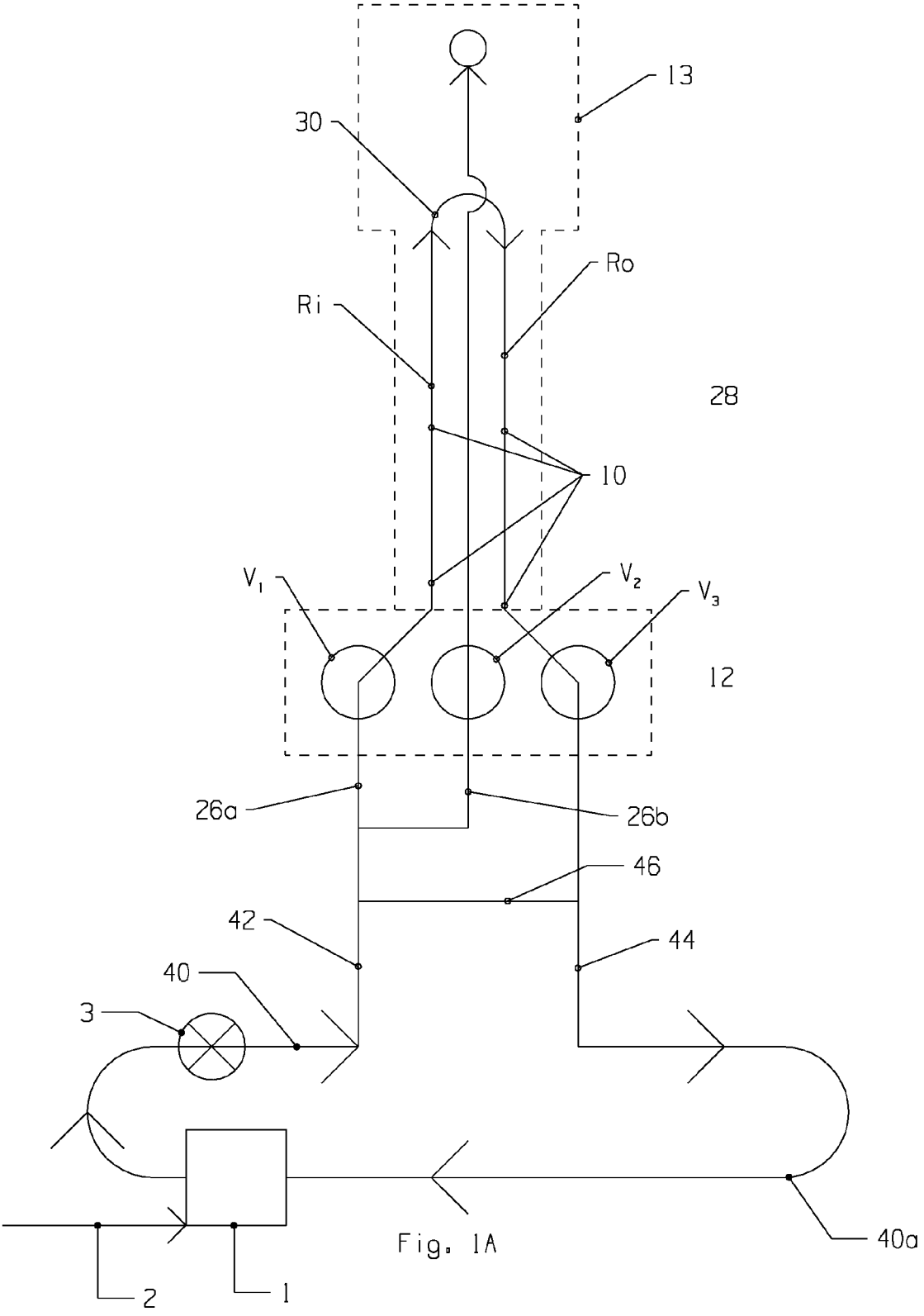


Fig. 1A

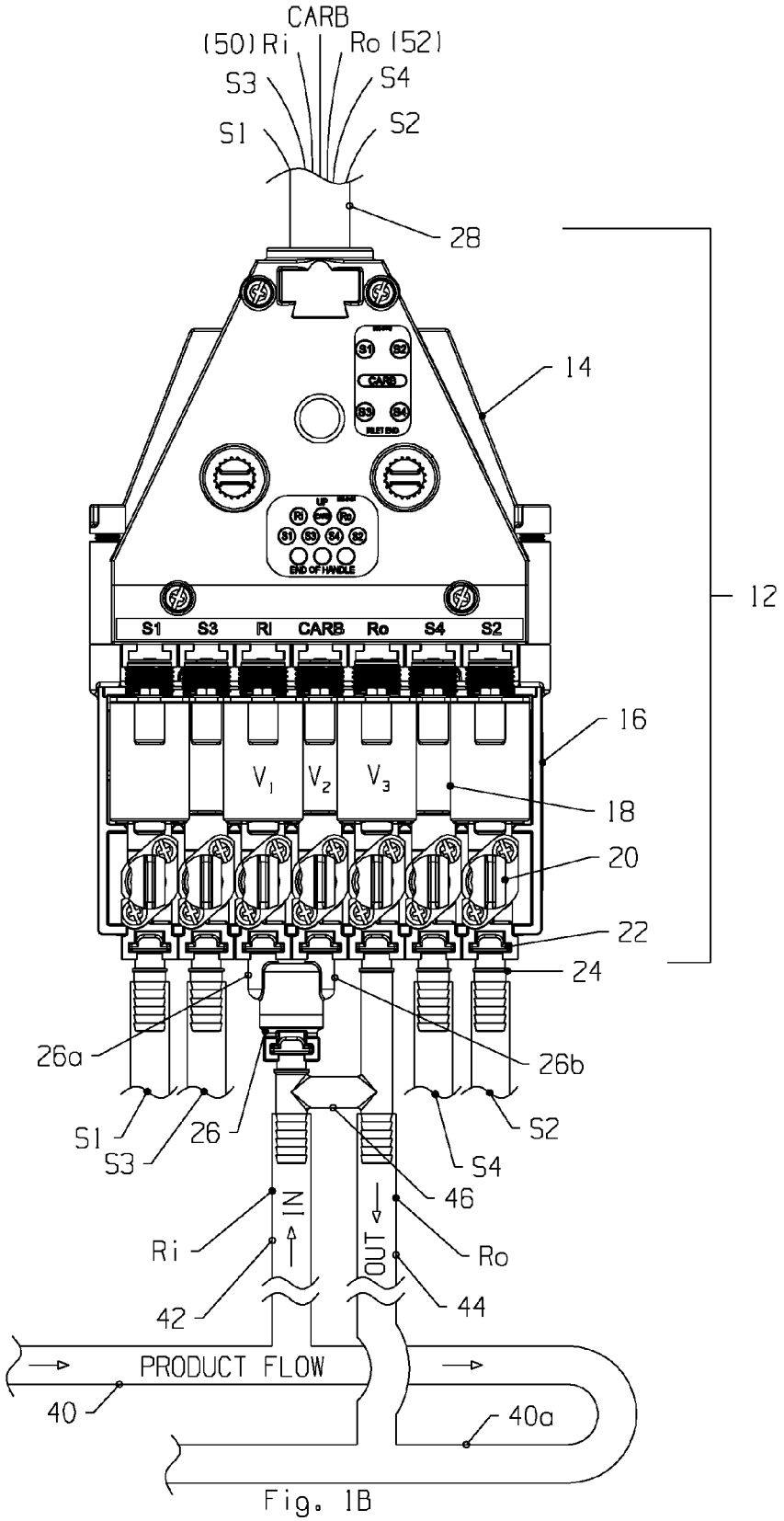

CARB
(50) Ri
Ro (52)
S3
S4
S1
S2
28
14
12
S1 S3 RI CARB Ro S4 S2
16
V1 V2 V3
18
20
22
24
26a
26b
S1
S3
26
S2
S4
46
IN
OUT
Ri
Ro
42
44
PRODUCT FLOW
40
40a

Fig. 1B

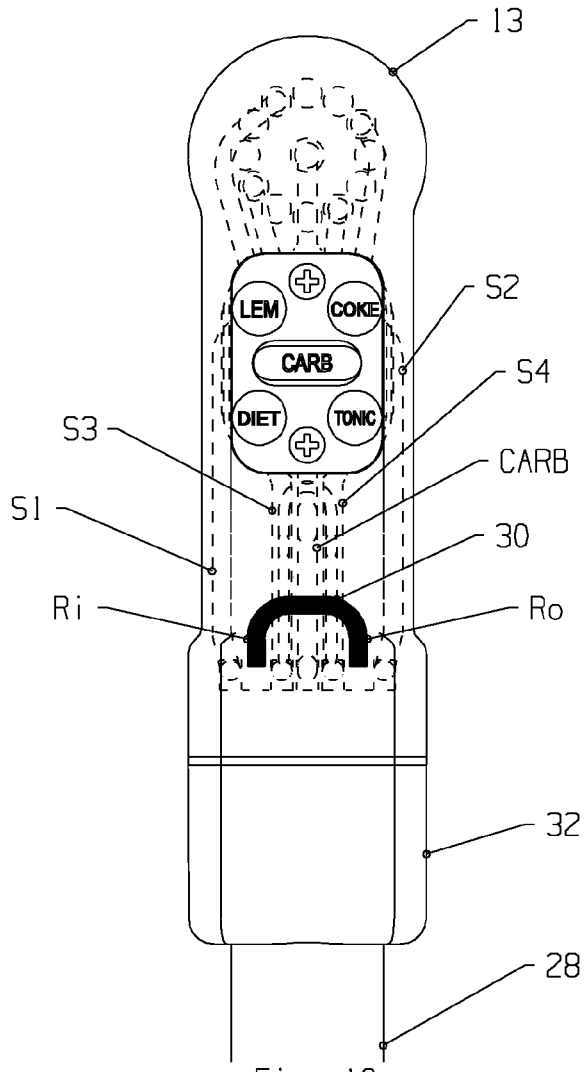

13
LEM
COKE
CARB
DIET
TONIC
S2
S4
S3
CARB
S1
30
Ri
Ro
32
28

Fig. 1C

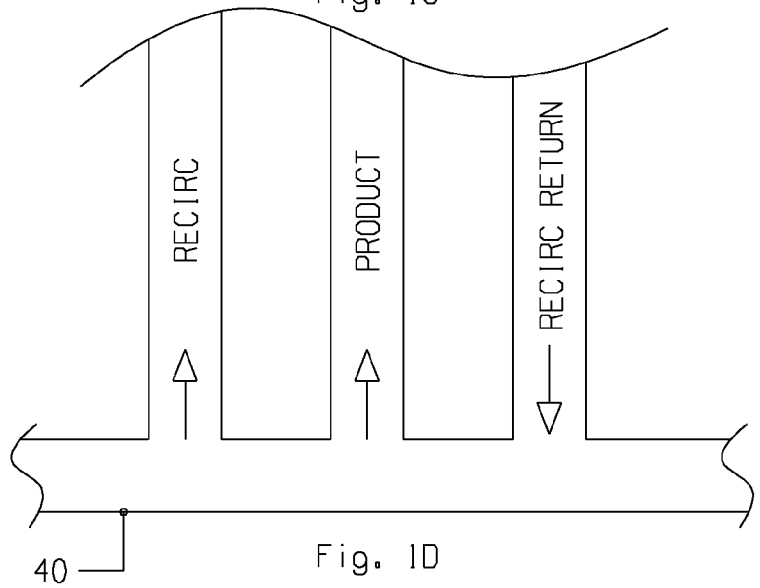

RECIRC
PRODUCT
RECIRC RETURN
40

Fig. 1D

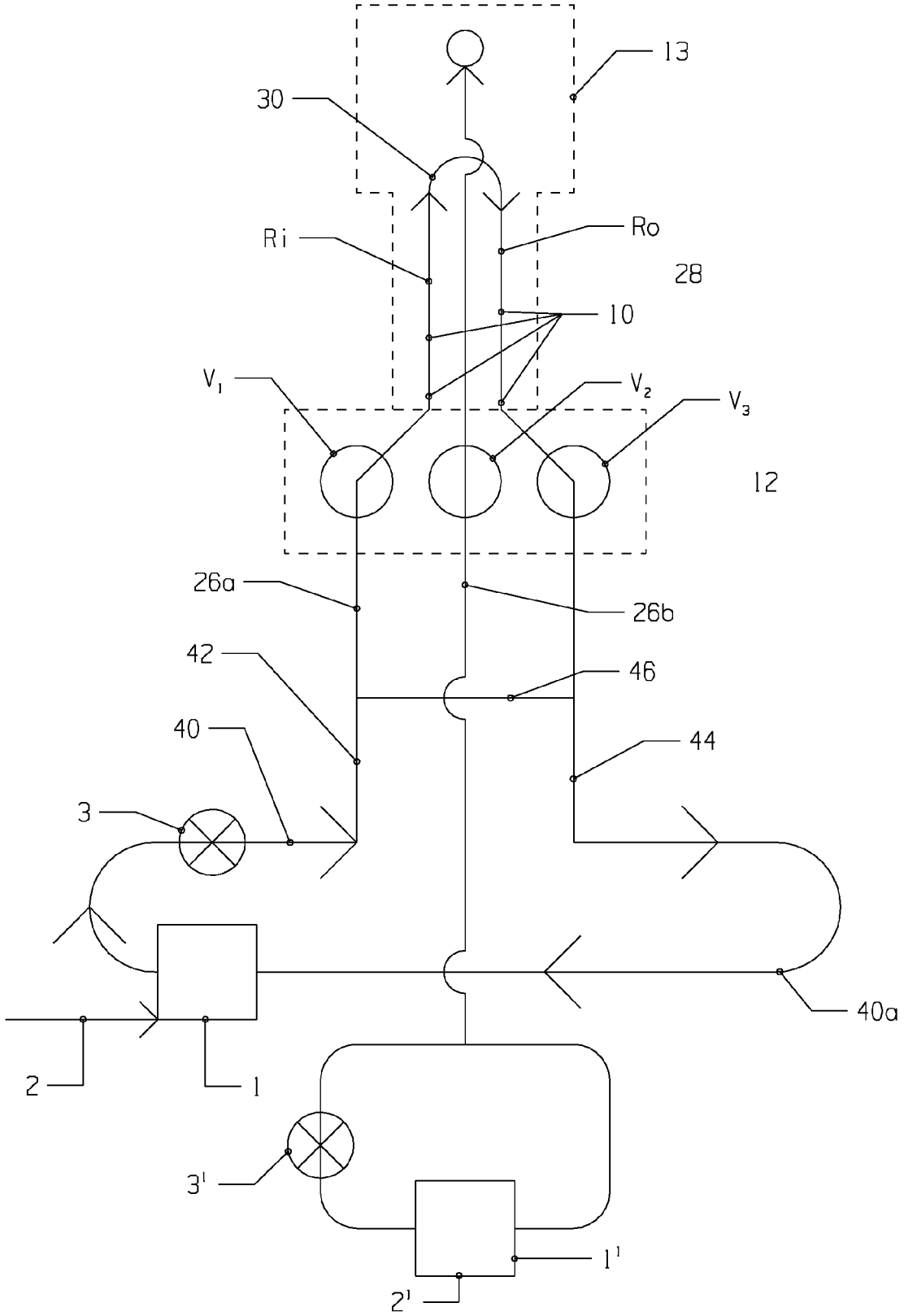


Fig. 1E

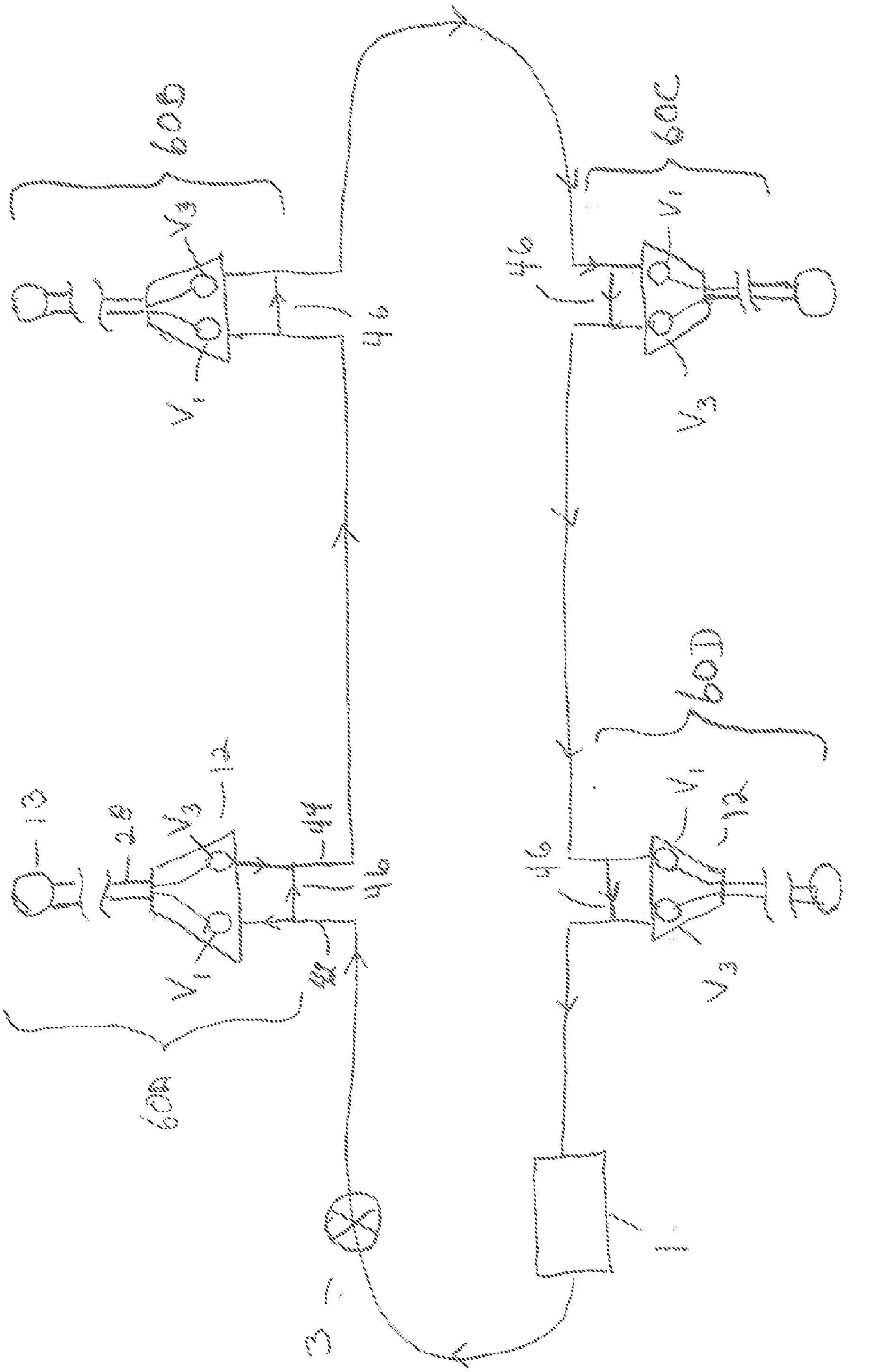


Fig. 1F

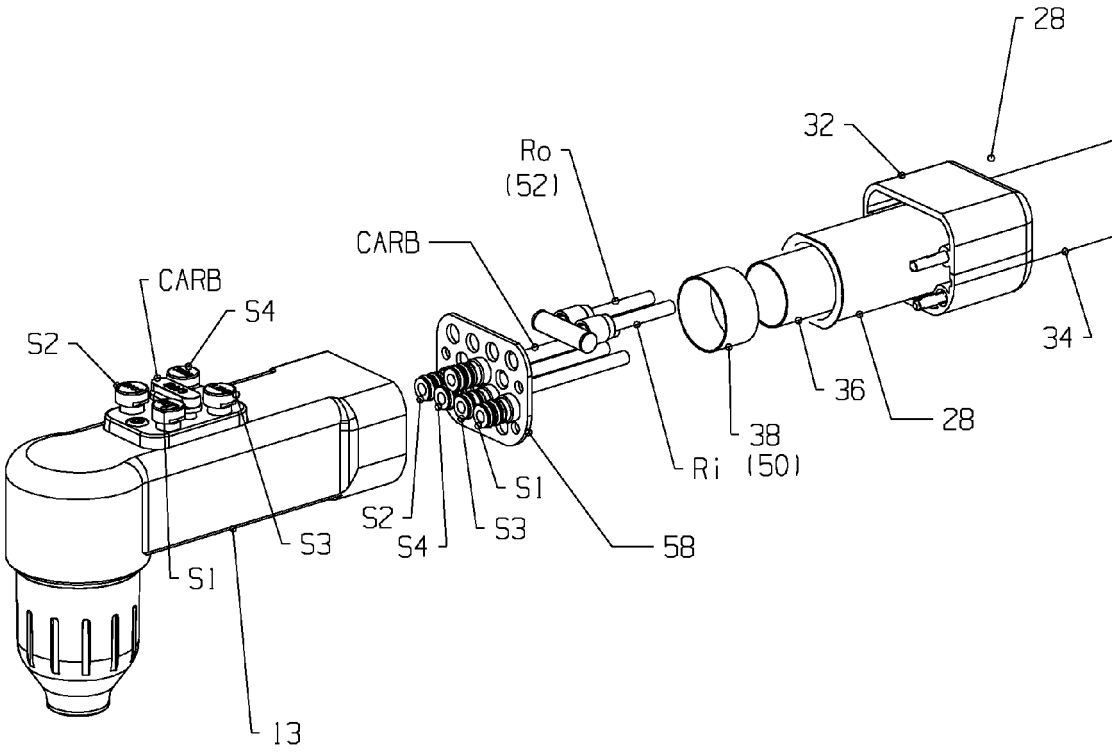


Fig. 2A

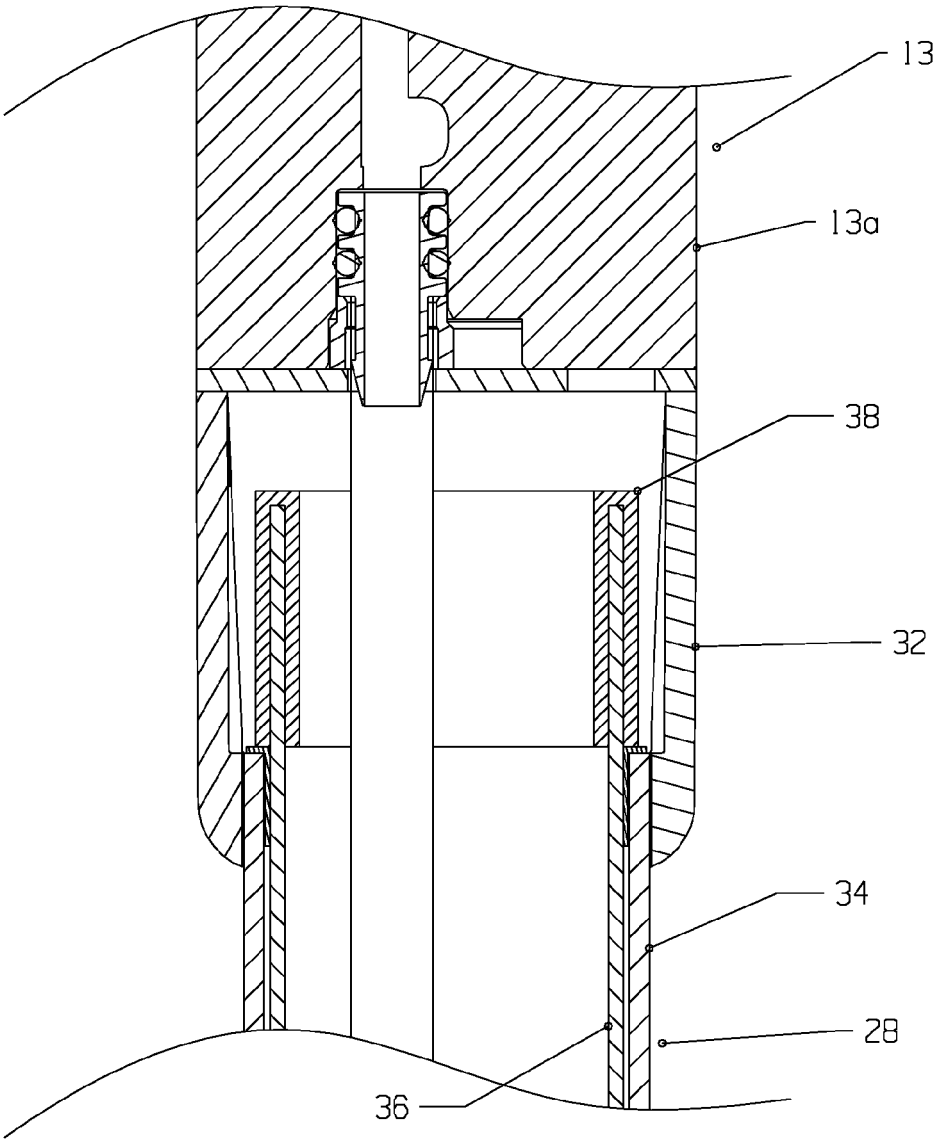


Fig. 2B

SECTION A-A

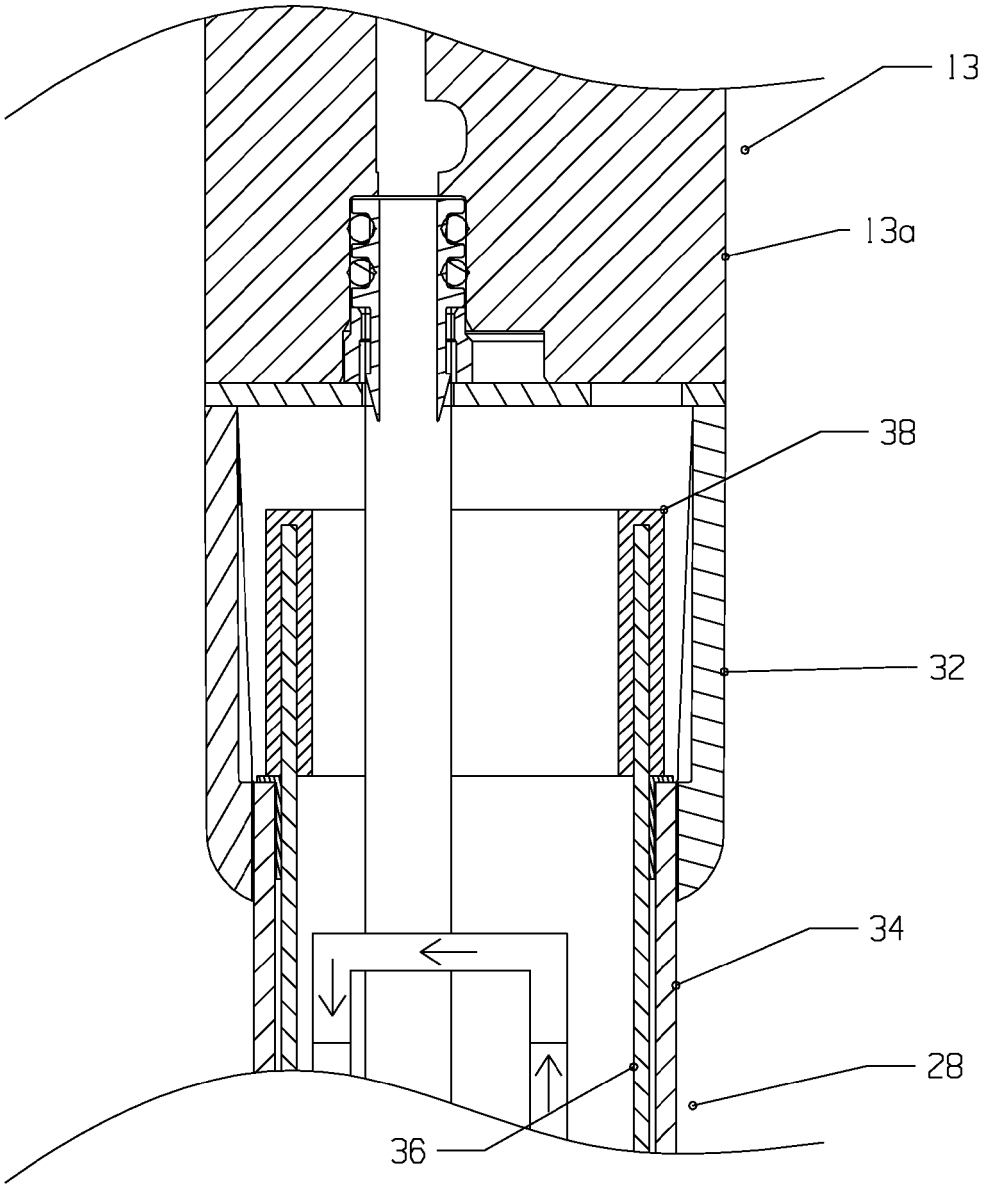


Fig. 2C

SECTION A - A

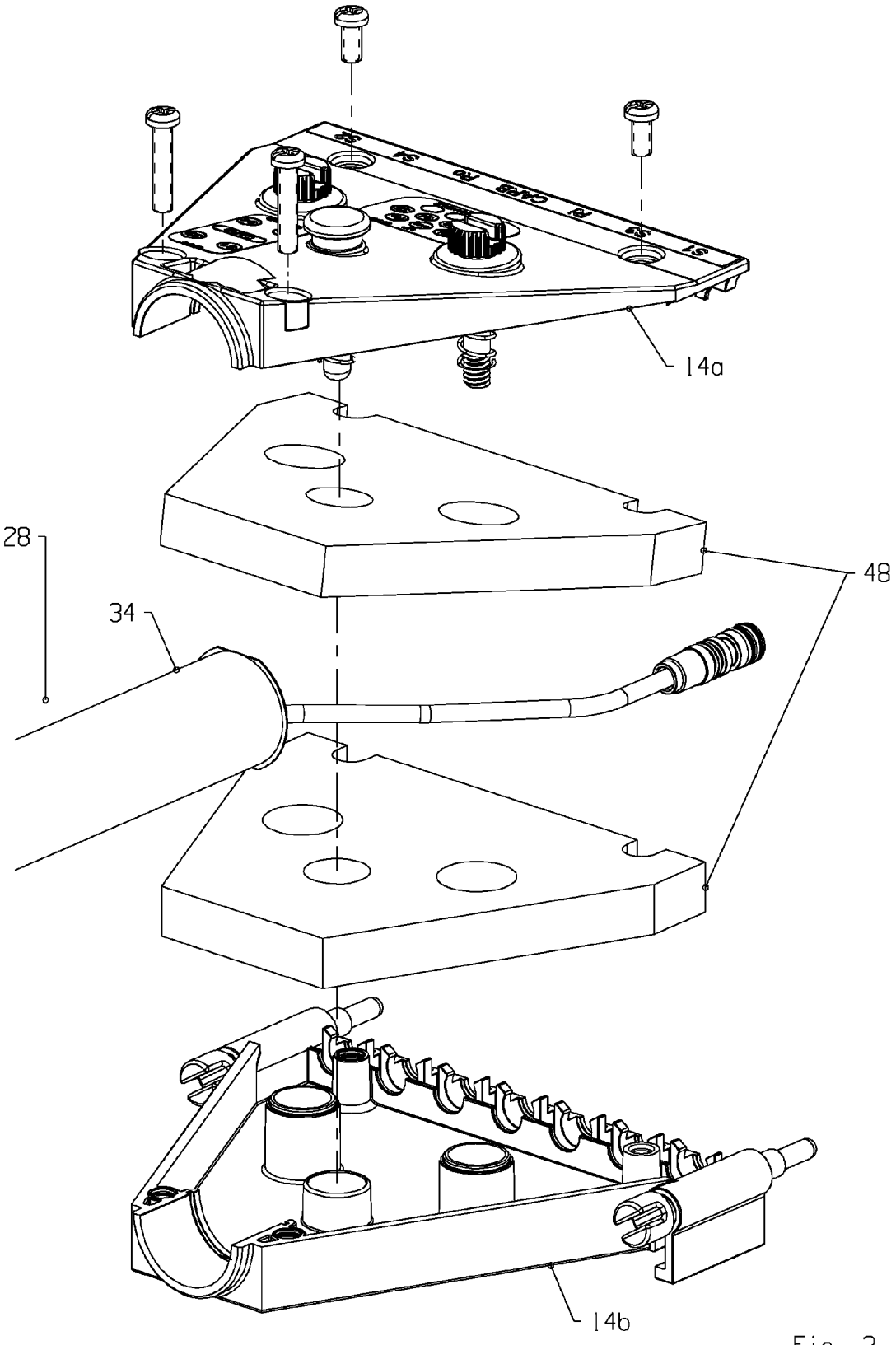


Fig. 3

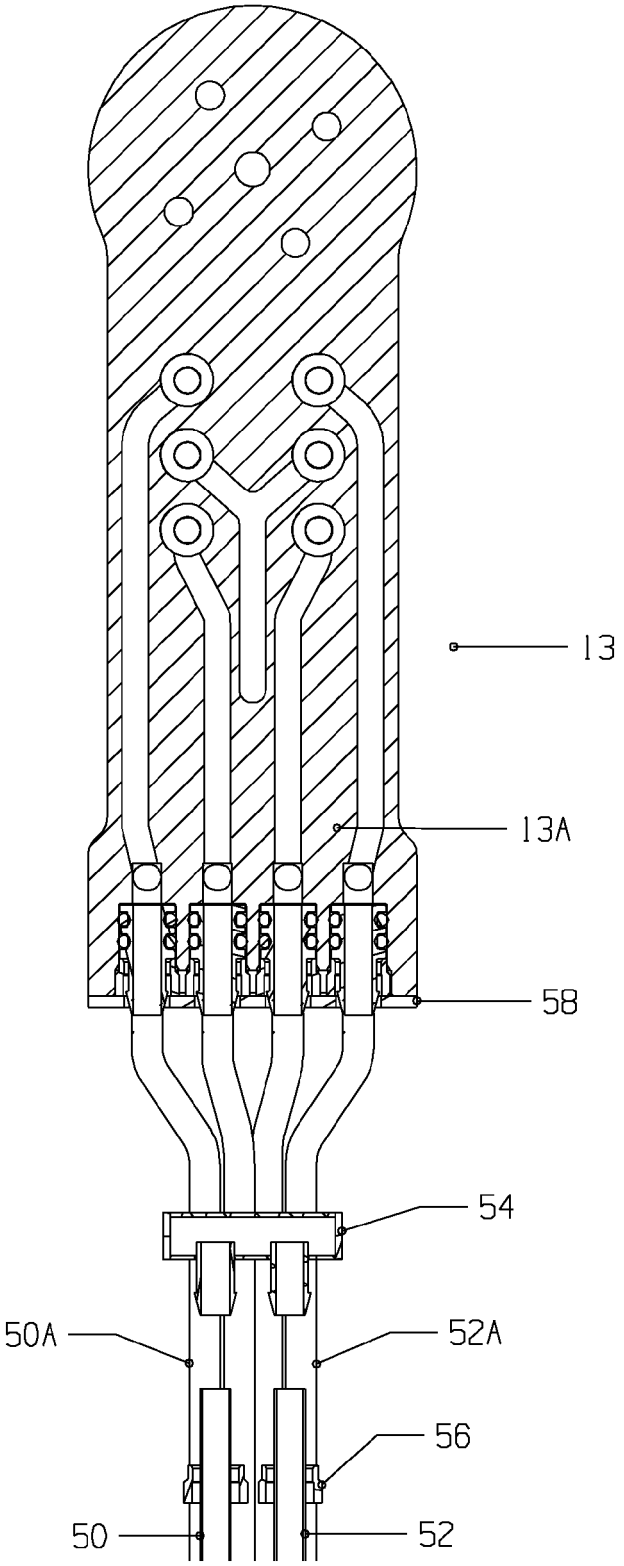


Fig 4A

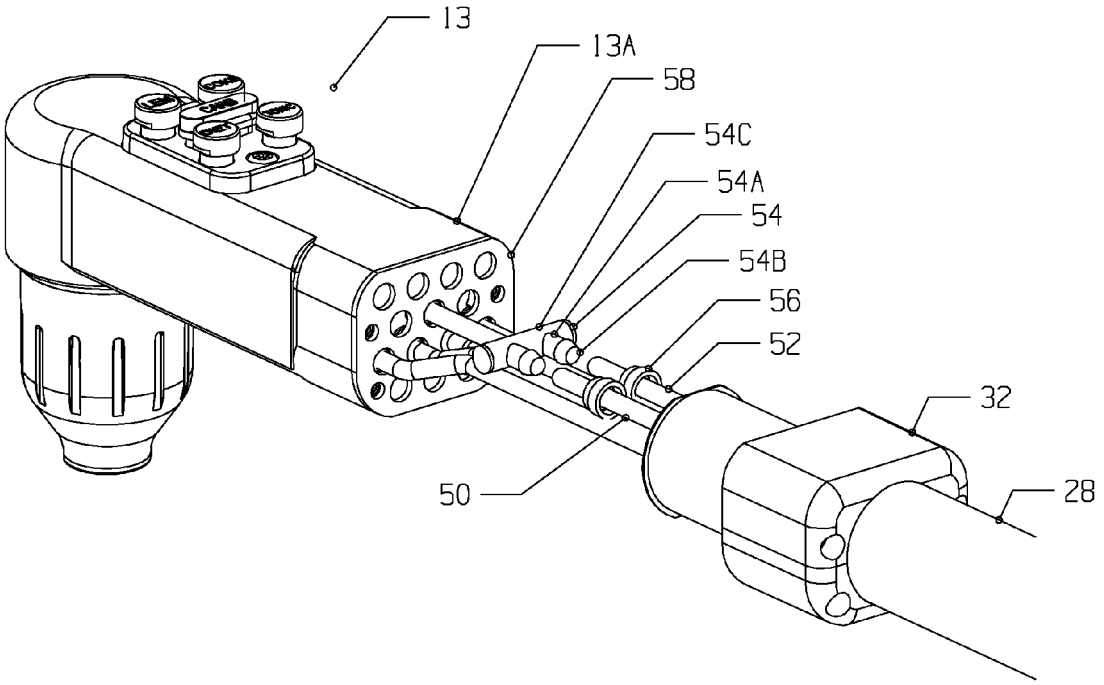


Fig 4B

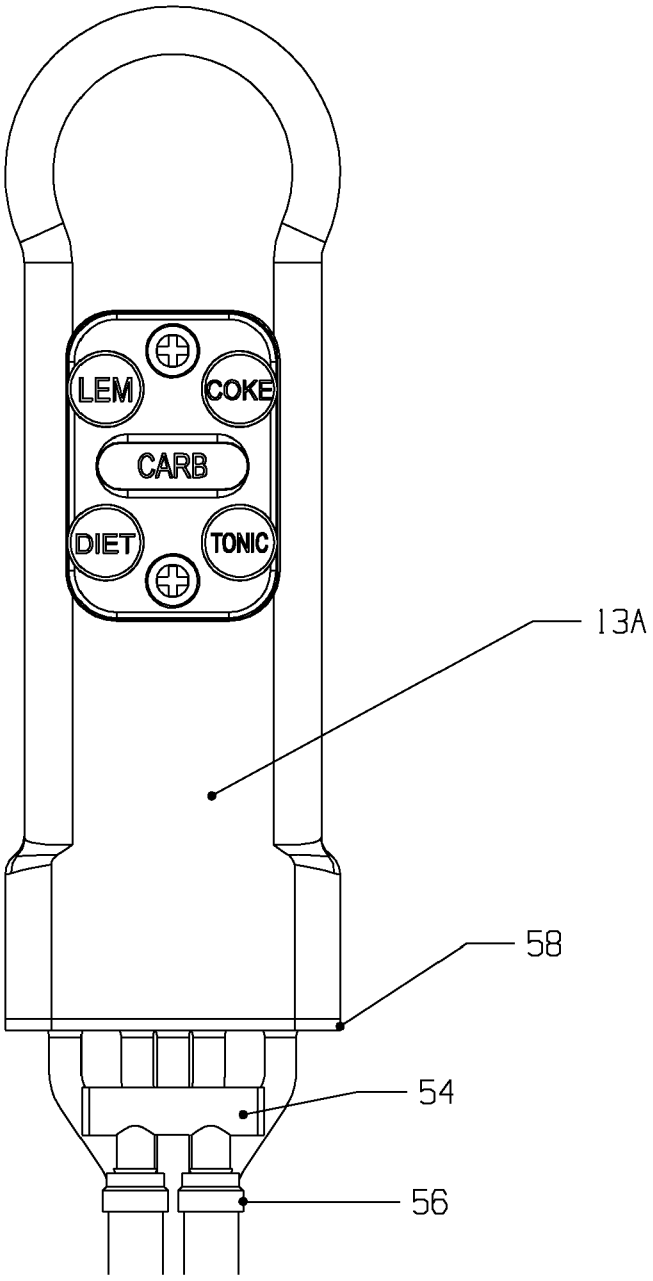


Fig. 4C

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 28644108 A **[0002]**
- US 46528309 A **[0002]**