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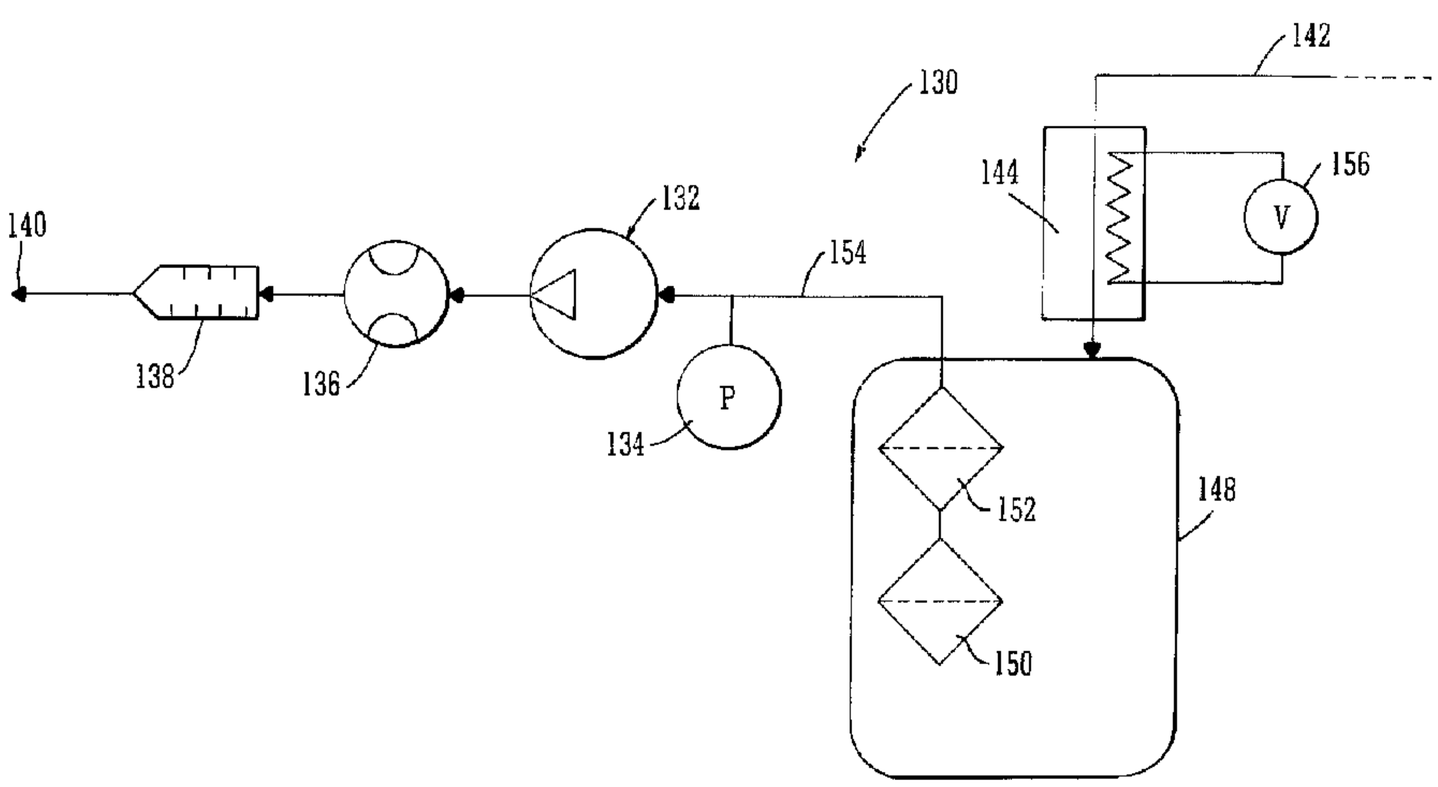

(57) Abrégé/Abstract:
Apparatus (130) for use in wound therapy of mammals is described, the apparatus (130) comprising: a dressing covering the wound, the dressing being substantially sealed to prevent ingress of ambient atmospheric air to the wound; aspiration means (132) operably connected to a space between the dressing and the wound by an aspiration conduit (142) sealed to the point of entry between wound and dressing against ingress of ambient atmosphere, said conduit (142) being for aspiration of said wound and for removal of fluid from said space between said wound and said dressing; a waste container (148) for receiving aspirated fluid to be discarded operably connected to said aspiration conduit; and heating means (144) for heating said fluid in order to increase the vapour pressure thereof and to cause evaporation to reduce the volume of the fluid in the waste container (148). In a preferred embodiment of the present invention the waste fluid is also provided with a sparge gas.

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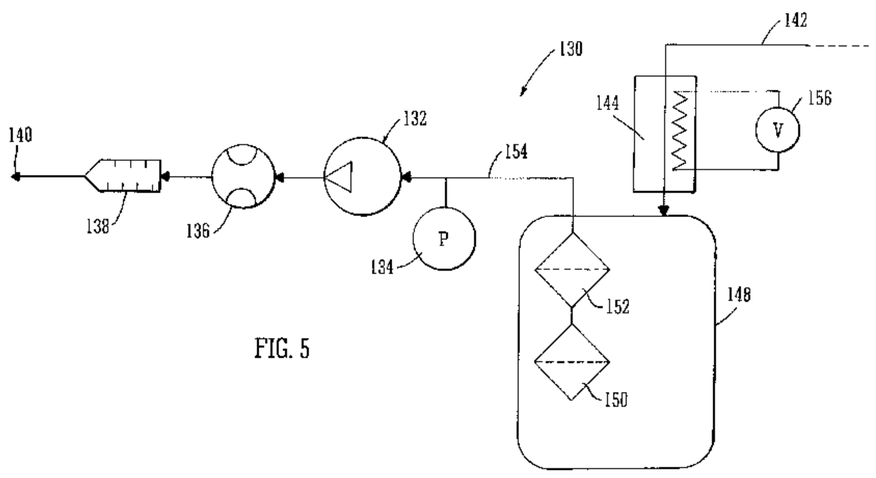

FIG. 5

(57) **Abstract:** Apparatus (130) for use in wound therapy of mammals is described, the apparatus (130) comprising: a dressing covering the wound, the dressing being substantially sealed to prevent ingress of ambient atmospheric air to the wound; aspiration means (132) operably connected to a space between the dressing and the wound by an aspiration conduit (142) sealed to the point of entry between wound and dressing against ingress of ambient atmosphere, said conduit (142) being for aspiration of said wound and for removal of fluid from said space between said wound and said dressing; a waste container (148) for receiving aspirated fluid to be discarded operably connected to said aspiration conduit; and heating means (144) for heating said fluid in order to increase the vapour pressure thereof and to cause evaporation to reduce the volume of the fluid in the waste container (148). In a preferred embodiment of the present invention the waste fluid is also provided with a sparge gas.

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WOUND TREATMENT APPARATUS WITH EXUDATE VOLUME REDUCTION BY HEAT

The present invention relates to apparatus for aspirating, irrigating and/or cleansing wounds, and a method of treating wounds and the exudates from such wounds using such apparatus for aspirating, irrigating and/or cleansing wounds.

The invention relates in particular to such an apparatus and method that can be easily applied to a wide variety of wounds, to cleanse them of materials that are deleterious to wound healing, whilst retaining materials that are beneficial in some therapeutic aspect, in particular to wound healing.

Before the present invention, aspirating and/or irrigating apparatus therefor were known, and tended to be used to remove wound exudate during wound therapy. In known forms of such wound therapy, the offtake from the wound, especially when in a highly exuding state, is voided to waste, e.g. to a collection bag or vessel which is removed when full and discarded as clinical waste. Materials deleterious to wound healing are removed in this way.

The volume of such exudates in some cases is very high and the collection bag or vessel can become relatively rapidly filled. If a collection bag or vessel of greater volume is used to extend the period between which the vessel needs to be emptied or changed this can have disadvantageous consequences on the portability of such apparatus and its convenience of use making the device or apparatus cumbersome and heavy. Furthermore, changing the collection bag or vessel is costly, time consuming and results in cessation of therapy.

In our co-pending International patent application, WO 2004/037334, apparatus, a wound dressing and a method for aspirating, irrigating and cleansing wounds are described. In very general terms, this invention describes the treatment of a wound by the application of topical negative pressure (TNP) therapy for aspirating the wound together with the further provision of additional fluid for irrigating and/or cleansing the wound, which fluid, comprising both wound exudates and irrigation fluid, is then drawn off by the aspiration means and circulated through means for separating the beneficial materials therein from deleterious materials. The materials which are beneficial to wound healing are recirculated through the wound dressing and those materials deleterious to wound healing are discarded to a waste collection bag or vessel.

In our co-pending International patent application, WO 2005/04670, apparatus, a wound dressing and a method for cleansing a wound using aspiration, irrigation and cleansing wounds are described. Again, in very general terms, the invention described in this document utilises similar apparatus to that in WO 2004/037334 with regard to the aspiration, irrigation and cleansing of the wound, however, it further includes the important additional step of providing heating means to control the temperature of that beneficial material being returned to the wound site/dressing so that it is at an optimum temperature, for example, to have the most efficacious therapeutic effect on the wound.

Our co-pending International patent application, WO 2005/105180, apparatus and a method for the aspiration, irrigation and/or cleansing of wounds are described. Again, in very general terms, this document describes similar apparatus to the two previously mentioned documents hereinabove but with the additional step of providing means for the supply and application of physiologically active agents to the wound site/dressing to promote wound healing.

There are available various forms of apparatus for topical negative pressure (TNP) therapy of wounds, the apparatus being intended to be portable and for use by a patient outside of hospitalisation, for example, in the home, outdoors or even at work so that the therapy can be continuously applied to a wound which does not necessarily require hospitalisation. In such apparatus, a vessel or canister is provided for receiving wound exudates, the canister being gradually filled by aspiration means such as a pump which applies a negative (below atmospheric) pressure. Eventually the canister becomes full and must be removed and discarded and a fresh, empty canister installed. Clearly, the less frequently this canister change is required the better.

In all of the above examples it is clearly beneficial to be able to reduce the volume of exudate which is collected in an apparatus waste container and consequently reduce the weight thereof and also to decrease the frequency at which the waste container need be changed and discarded. This may perhaps be especially so where there is additional fluid being provided to the wound site/dressing for various reasons and which fluid inevitably adds to the volume of waste which is collected and eventually discarded.

It is an object of the present invention to provide apparatus and a method for reducing the rate of collection of waste which eventually needs to be discarded. Consequently, a

further objective is to reduce the frequency at which waste containers need to be changed in a given apparatus.

According to a first aspect of the present invention there is provided apparatus for use in wound therapy of mammals, the apparatus comprising:

a dressing covering the wound, the dressing being substantially sealed to prevent ingress of ambient atmospheric air to the wound;

aspiration means operably connected to a space between the dressing and the wound by an aspiration conduit sealed to the point of entry between wound and dressing against ingress of ambient atmosphere, said conduit being for aspiration of said wound and for removal of fluid from said space between said wound and said dressing;

a waste container for receiving aspirated fluid to be discarded operably connected to said aspiration conduit; and

heating means for heating said fluid in order to increase the vapour pressure thereof and to cause evaporation to reduce the volume of the fluid in the waste container.

In a further aspect of the invention there is provided an apparatus for use in wound therapy of mammals, the apparatus comprising: a dressing configured to cover a wound; aspiration means operably connectable to a space between the dressing and the wound by an aspiration conduit, said conduit being for aspiration of said wound and for removal of fluid from said space between said wound and said dressing; a waste container for receiving fluid to be discarded operably connected to said aspiration conduit; and heating means positioned downstream of the wound dressing so as to be applied to the fluid removed from the wound, the heating means configured to heat the fluid removed from the wound in order to increase the vapor pressure thereof and to cause evaporation to reduce the volume of the fluid in the waste container.

In a further aspect of the invention there is provided an apparatus for use in wound therapy of mammals, the apparatus comprising: a dressing configured to cover a wound; a pump operably connectable with the dressing configured to provide a source of negative pressure to the wound; a collection canister for receiving fluid waste aspirated from the wound; an aspiration conduit operably connectable with at least the dressing and the collection canister; and a heater positioned downstream of the wound dressing, the heater adapted to apply heat to the fluid aspirated from the wound, the heater being

configured to heat the fluid aspirated from the wound so as to vaporize at least some of the fluid within the collection canister.

In a further aspect of the invention there is provided a negative pressure wound therapy apparatus comprising: a dressing configured to cover a wound; a source of negative pressure configured to be in fluid communication with the dressing, the source of negative pressure further configured to aspirate fluid from the wound; a collection canister configured to be in fluid communication with the dressing and the source of negative pressure, the collection canister further configured to receive fluid aspirated from the wound; and a volume reduction mechanism positioned downstream of the dressing so as to be applied to fluid removal from the wound, the volume reduction mechanism configured to increase vapor pressure of fluid aspirated from the wound and to cause at least some of the fluid to evaporate so that volume of the fluid aspirated from the wound is reduced.

In the present invention the dressing is effectively sealed to the skin surrounding the wound. However, the term "sealed" is not an absolute requirement or practically attainable since many flexible dressing membrane materials forming the wound cover are composed of semi-permeable plastics materials which are well known to those skilled in the art. Furthermore, there is almost inevitably some leakage between the skin to which the sealing dressing material is adhered, usually by well known pressure sensitive adhesives, due to hairs and/or other skin surface irregularities and/or imperfections which are not easily completely sealed in absolute terms. The types of self adhesive, flexible dressing drape materials which are ordinarily used in TNP type therapy for sealing membranes over and around wounds are well know to those skilled in the art and will not be elaborated on further herein unless necessary.

In one embodiment of the apparatus according to the present invention, the aspiration means comprises a pump which applies a negative pressure to the wound site in the space between the wound and the sealed dressing. For the avoidance of doubt, the term "negative pressure" used herein means a pressure lower than ambient atmospheric pressure. Such negative pressure is generally at a lowest pressure of 250 mmHg below atmospheric pressure but more usually within a range of 50-200 mmHg below atmospheric pressure.

There are many types of pump which may be used to apply a negative pressure and include peristaltic, vane, diaphragm and the like, for example.

In a TNP apparatus where only a suction force is applied to the wound, the waste material container may be interposed between the aspiration means and the conduit in operable connection to the wound site thus, the aspiration means or pump is applying its negative pressure through the waste container. However, in alternative embodiments the aspiration means may be interposed between the wound site/dressing and the waste container.

The heating means may be any which is suitable for the apparatus in question and may comprise a heating mat or blanket type of material in direct contact with the waste container, for example, or may be associated with the aspiration conduit to heat the waste fluid before it reaches the waste container. Other forms of heating such as cartridge heaters and infrared may be employed. Infrared has the advantage that it is non-contact and the majority of the energy may be coupled into the fluid as suitable non-absorbing canister materials may be chosen.

In alternative embodiments, the heating means may be formed integrally with the waste container or canister and may also include integral thermocouples or thermistors to allow the temperature to be controlled by feedback loop from the control system.

In accordance with the first aspect of the invention an apparatus which is intended for TNP therapy only may be provided in a waste fluid container therefor with one or more filters elements, for example, a hydrophobic filter, which prevents passage or egress of liquid and bacteria but permits egress of vapour, for example, water vapour, in a gaseous state.

Such filter elements, for example, a 0.2 micron pore size filter and/or a 1 micron pore size, may advantageously be incorporated into an exit duct of the waste canister or container. This had the advantage that it provides certainty that the filter has been changed regularly, i.e. when the container has been discarded when full and furthermore, seals the exit duct/container when removed from the apparatus.

In a preferred embodiment of the apparatus of the present invention there is further provided a supply of gas such as air, for example, to the fluid in the waste container

which gas supply is in effect a sparge gas supply which may be arranged to pass through the fluid waste to influence constituents such as water, for example, having a lower vapour pressure to be removed preferential by the gas supply. However, the sparge gas may merely discharge into the waste container with the aspirated waste fluid without actually flowing through the waste fluid already collected in the waste container depending upon the arrangement and type of heating means employed.

The waste container also preferably has a connection to pump means to remove the fluid vapour so produced. The pump means may be the same as the aspiration means or may be additional thereto so as to provide a separate flow of gas bubbles through the waste fluid in the waste container. Alternatively or in addition thereto, the gas supply may be a gas bleed provided by suitable valve means to admit a bleed of gas into the aspiration conduit leading from the wound site dressing.

In a further preferred modified embodiment of the present invention the apparatus may further comprise a supply of a gas to the wound site/dressing. Such a gas supply to wound site dressing may be provided by a separate conduit leading into the dressing and may be either a separately provided gas supply or may be a gas bleed into the dressing provided as a bleed gas via suitable valve means and drawn through the dressing by the aspiration means.

The gas may be air or any other suitable gas which is compatible with the wound. This gas supply may, in effect, be the gas supply referred to above as a sparge gas but where the flow of gas is first directed through the wound site/dressing by means of a separate, second bleed gas conduit which is sealed into the wound site/dressing in a similar manner as the aspirant conduit, before being drawn off by the aspiration means to the waste container. The aspirant conduit again allowing the bleed gas supply to be drawn through the waste fluid by the aspiration means. The provision of the bleed gas to the wound site/dressing increase the concentration of volatiles by increasing the surface area and number of nucleation sites for evaporation due to the bubbles and also increases the mass transfer of fluid through the system due to the greater mass of gas passing through the system which in turn is more saturated therefore promoting a greater mass leaving the system.

The provision of a bleed gas may have physiological effects or may serve to reduce the bioburden and/or odour throughout the fluid system of the wound and apparatus by

diluting or reacting with or simply flushing through the system more quickly gases such as ozone, nitrous oxide and other gases which may be generated. A gas bleed to the wound site/dressing is particularly beneficial where the wound site/dressing is provided with additional fluid for cleansing and/or irrigation of the wound. The ability to aerate larger quantities of exudates and other fluid prior to reaching the waste container accelerates the evaporation process and removal of liquid which would otherwise accumulate in the waste bottle. It should be understood that the additional fluid supplied to the wound for cleansing and/or irrigation may contain physiologically active agents, may be heated to body temperature, for example, and the exudates from the wound site may be prior treated to remove beneficial agents in the exudates which may be recirculated to the wound, as disclosed in the three co-pending International patent applications of common ownership herewith and mentioned hereinabove, and that only the fluid ultimately destined for the waste container is treated according to the present invention.

In an alternative preferred embodiment the waste fluid may be discharged into the waste container in the form of atomised droplets so as to increase the evaporation rate of the fluid and some of which vapour may be drawn off to a separate receptacle, for example, and discarded.

In a further alternative preferred embodiment the waste fluid may be discharged over the area of a heated plate member in the waste container, for example, the heated plate member being inclined so that the fluid flows relatively slowly to a lower part of the plate member thus having a relatively extended period in which to be heated and being in the form of a relatively thin film. Thus, the rate of evaporation may be increased.

According to a second aspect of the present invention there is provided a method of treating wound exudates with the apparatus according to the first aspect of the present invention.

In order that the present invention may be more fully understood examples, by way of illustration only, will be described with reference to the following drawings, of which:

Figure 1 shows a schematic illustration of an apparatus according to a first preferred embodiment of the present invention;

Figure 2 shows an end view of a heated tube which may be used as the heating means in apparatus according to the present invention;

Figure 3 shows part of a modified apparatus of Figure 1; and

Figure 4 shows a further modification of part of a modified apparatus of Figure 1; and

Figure 5 which shows a schematic arrangement of a portable TNP type apparatus embodying the present invention.

Referring now to the drawings and where Figure 1 shows a schematic layout of an apparatus 10 according to the present invention. The schematic shows a “model wound” at 12 made from clear acetate comprising a wound simulating cavity (not shown) into which an aspirant tube 14, an irrigant tube 16 and an air bleed tube 18 are sealed so as to simulate a wound having a sealing dressing. The rectangles 20, 22, 24 denote connectors connecting the three tubes 14, 16, 18 to the appropriate parts of the rest of the apparatus, respectively. Clamps, denoted collectively at 26 and 28 serve to isolate the wound 12 when disconnected from the apparatus or to change one of of the tubes or to replace the source of supply relevant to the particular tube. The aspirant tube 14 is connected to a vacuum pump unit 30 via a waste bottle 32 and outlet tube 34 for the application of TNP therapy to the wound 12.The vacuum pump unit 30 is provided with various filter modules 38, 40 to catch “solid” material and suppress odours, respectively. A sensor 42 monitors the vacuum applied by the pump 30 and the vacuum in the waste bottle 32. The air bleed tube 18 is ultimately connected to a vacuum regulator 46 through an extension 50 of line 18 via a filter 52. A wound pressure sensor 54 is also connected to the tube 50 so as to monitor the actual depression at the wound 12. A flow meter 58 and restrictor 60 are provided in the bleed path before the vacuum regulator unit 46. The irrigant tube 16 is connected to a peristaltic pump cassette 64 which in turn is connected to a container 66 of irrigant fluid 68 for the supply of the irrigant fluid 68 to the wound 12. The waste bottle 32 is provided with a heater 70 upon which it sits so as to heat the contents thereof. The whole apparatus is controlled by a control unit 72 which operates on principles well known to those skilled in the electronic control art.

The effect of the vacuum pump 30 aspirating the wound 12 by the tube 14 is to create a vacuum therein so as to draw a supply of bleed air into the wound via the tube 16. The amount of or rate of bleed air is controlled by outputs 74 from the control unit 72 to the

vacuum regulator 46 in response to the inputs 76 from the various sensors in the apparatus. Thus, the bleed air is drawn into the wound site by the vacuum applied by the pump 30 and is also withdrawn by the aspiration tube 14 by the vacuum pump together with the wound exudates and the irrigant fluid 68. The waste fluid 80 being withdrawn from the wound site 12 is aerated by the bleed air supply and is delivered to the waste bottle 32 by the tube 14. The waste fluid in the bottle 32 is heated by the heater 70 to a predetermined temperature set in the control system and with the flow of bleed air through the waste fluid 80 vapour is drawn off through the line 34 and discharged via the filter 40.

A system was set up as in the above schematic and the pressure was set up 100 mmHg below atmospheric at the wound site 12. The air bleed was adjusted to 0.2l/min and the heater 70 set to 65ºC and allowed to stabilise. Saline was used as the irrigant fluid 68 and delivered to the wound 12 at a fixed rate to represent fluid coming from the wound 12. The mass of fluid delivered was recorded together with the mass of fluid collected in the waste bottle 32. For the waste bottle a glass bottle was used with Hawco (trade mark) 20 watt silicon heater mat glued to the base of the bottle. The conditions were by no means optimised but, however, the results indicated that over a 24 hour period a mass of 45g of fluid was evaporated. Thus, with suitable optimisation of the system it is expected that far higher levels of evaporation may be easily achieved.

Figure 2 shows a heated plastics material tube 100 having seven separate lumens comprising one central lumen 102 for the passage of fluid and six surrounding smaller lumens 104 which were provided with a continuous element of nickel-chrome resistance heating wire 106 which was run up and down the lumens 104 in a continuous manner. The ends of the wire 106 have a voltage applied thereto.

This heating tube may be used in the apparatus of Fig. 1 as, for example, part of the tube 14 immediately prior to entry into the waste bottle 32. With this heating means the surface area to volume ratio of the fluid in contact with the central lumen 102 is relatively high and the fluid may be heated rapidly prior to entry into the waste bottle 32. It will be appreciated by those skilled in the art that this heated tube may be used additionally to the heater 70 shown in Figure 1 to further enhance the rate of evaporation of fluid.

Figure 3 shows the waste bottle of Fig. 1 modified by the substitution of an atomising spray head 120 in place of the tube 14 which has an end immersed in the waste fluid in

bottle 32 in Figure 1. The spray head 120 terminates above the waste fluid level in the bottle 32 and sprays directly into the free space 122 in the bottle 32. In addition to the spray head 120 this embodiment is further modified by the addition of the heated tube 100 of Figure 2 so as to preheat the waste fluid prior to entry into the waste bottle 32.

Figure 4 shows a schematic diagram of part of a further modification of the apparatus of Figure 1. The waste container is indicated by the reference numeral 32 as before as is the inlet aspirant conduit 14. However, in this case the wound exudates and other fluids are discharged by a nozzle 110 over a weir arrangement 112 in the waste container in order to increase the efficiency of heating of the fluid and also to increase the surface area thereof to increase the rate of evaporation. The weir 112 is heated by means of a suitable heating element 114 by a potential difference V controlled by the control unit 72 to maintain a predetermined temperature in response to temperature signals from a sensor (not shown). The waste container 32 is provided with filters 116, 118 which allow the passage of gaseous vapour but not liquid.

Figure 5 shows a schematic representation of part of a portable TNP therapy apparatus 130. The apparatus comprises a device including a pump 132, a pressure monitor 134 to monitor pressure applied by the pump at a wound site (not shown), a flow meter 136 and a silencer 138 to quieten gas/vapour being exhausted by the pump through an exhaust orifice 140. The pump aspirates a wound site via an aspiration tube or conduit 142 and draws the aspirated fluid through a heated conduit 144, which may be the same or similar to heated conduit described with reference to Figure 2, immediately into a waste canister 148 which is equipped with filters 150, 152 which ensure that only gaseous vapour and/or gas is drawn from the canister 148 via an exit conduit 154. The conduit 144 has a voltage 156 applied across a resistance heater the voltage being controlled by a control system (not shown) located in a device housing (not shown) together with the pump, pressure sensor, flow meter etc. A desired temperature may be preset in the control system to be maintained thereby in response to signals from a temperature sensor (not shown) incorporated into the heated conduit in known manner.

CLAIMS:

1. An apparatus for use in wound therapy of mammals, the apparatus comprising:

a dressing configured to cover a wound;

aspiration means operably connectable to a space between the dressing and the wound by an aspiration conduit, said conduit being for aspiration of said wound and for removal of fluid from said space between said wound and said dressing;

a waste container for receiving fluid to be discarded operably connected to said aspiration conduit; and

heating means positioned downstream of the wound dressing so as to be applied to the fluid removed from the wound, the heating means configured to heat the fluid removed from the wound in order to increase the vapor pressure thereof and to cause evaporation to reduce the volume of the fluid in the waste container.

2. An apparatus according to claim 1 wherein the waste container is interposed between the aspiration means and the conduit in operable connection to the wound.

3. An apparatus according to claim 1 wherein the heating means comprises a resistance heated article.

4. An apparatus according to claim 3 wherein the article is a mat or blanket in contact with the waste container.

5. An apparatus according to claim 3 wherein the article is a conduit through which the aspirated fluid passes.

6. An apparatus according to claim 3 wherein the article is a heated weir over which said waste fluid flows.

7. An apparatus according to claim 1 wherein a portion of the waste container is configured so as to permit the passage of gaseous vapor but not liquid out of the waste container.

8. An apparatus according to claim 1 further comprising a gas supply

9. An apparatus according to claim 8 wherein the gas supply is arranged to pass through the fluid waste in the waste container.

10. An apparatus according to claim 8 wherein the gas supply is a bleed gas provided by a valve means.

11. An apparatus according to claim 8 wherein the gas supply is arranged to first flow through said dressing covering said wound before being aspirated by said aspiration pump.

12. An apparatus according to claim 11 wherein said gas supply through said dressing is provided via a separate conduit into said dressing covering said wound.

13. An apparatus according to claim 1 wherein the aspirated fluid waste is discharged into the waste container via an atomising nozzle.

14. An apparatus according to claim 1 wherein an aspiration pump is interposed between the waste container and the conduit.

15. An apparatus according to claim 8 wherein the gas supply is in communication with at least one of the waste container, the dressing, and the aspiration conduit.

16. An apparatus according to claim 8 wherein said gas supply is a sparge gas supply.

17. An apparatus according to claim 8 comprising one or more pumps.

18. An apparatus according to claim 8 wherein said waste container comprises a pump to remove vapor within the waste container.

19. An apparatus according to claim 1 wherein said heating means comprises at least one of a cartridge heater and an infrared heater.

20. An apparatus according to claim 1 further comprising one or more thermocouples or thermistors.

21. An apparatus for use in wound therapy of mammals, the apparatus comprising:

a dressing configured to cover a wound;

a pump operably connectable with the dressing configured to provide a source of negative pressure to the wound;

a collection canister for receiving fluid waste aspirated from the wound;

an aspiration conduit operably connectable with at least the dressing and the collection canister; and

a heater positioned downstream of the wound dressing, the heater adapted to apply heat to the fluid aspirated from the wound, the heater being configured to heat the fluid aspirated from the wound so as to vaporize at least some of the fluid within the collection canister.

22. An apparatus according to claim 21 further comprising a gas supply.

23. An apparatus according to claim 22 wherein the gas supply is arranged to pass through the fluid waste in the collection canister.

24. An apparatus according to claim 21 wherein the heater is coupled with at least one of the aspiration conduit and the collection canister.

25. An apparatus according to claim 21 wherein a portion of the collection canister is configured so as to permit the passage of gaseous vapor but not liquid out of the collection canister.

26. A use of the apparatus defined in any one of claims 1 to 25 for treating a wound.

27. A negative pressure wound therapy apparatus comprising:

a dressing configured to cover a wound;

a source of negative pressure configured to be in fluid communication with the dressing, the source of negative pressure further configured to aspirate fluid from the wound;

a collection canister configured to be in fluid communication with the dressing and

the source of negative pressure, the collection canister further configured to receive fluid aspirated from the wound; and

a volume reduction mechanism positioned downstream of the dressing so as to be applied to fluid removal from the wound, the volume reduction mechanism configured to increase vapor pressure of fluid aspirated from the wound and to cause at least some of the fluid to evaporate so that volume of the fluid aspirated from the wound is reduced.

28. The apparatus according to claim 27 further comprising an aspiration conduit for aspiration of the wound and for removal of fluid from the wound.

29. The apparatus according to claim 28 wherein the collection canister is interposed between the source of negative pressure and the aspiration conduit in operable connection to the wound.

30. The apparatus according to claim 27 wherein the volume reduction mechanism comprises a resistance heated article.

31. The apparatus according to claim 30 wherein the article is a mat or blanket in contact with the collection canister.

32. The apparatus according to claim 30 wherein the article is a conduit through which the fluid aspirated from the wound passes.

33. The apparatus according to claim 30 wherein the article is a heated weir over which the fluid aspirated from the wound flows.

34. The apparatus according to claim 27 wherein a portion of the collection canister is configured so as to permit passage of gaseous vapor but not liquid out of the collection canister.

35. The apparatus according to claim 27 further comprising a gas supply

36. The apparatus according to claim 35 wherein the volume reduction mechanism comprised the gas supply arranged to pass through the fluid aspirated from the wound in the collection canister.

37. The apparatus according to claim 35 wherein the gas supply is a bleed gas provided by valve means.

38. The apparatus according to claim 35 wherein the gas supply is arranged to first flow through the dressing covering the wound before being aspirated from the wound.

39. The apparatus according to claim 38 wherein the gas supply through the dressing is provided via a separate conduit into the dressing covering the wound.

40. The apparatus according to claim 27 wherein the aspirated fluid is discharge into the collection canister via an atomising nozzle.

41. The apparatus according to claim 27 wherein an aspiration pump is interposed between the collection canister and the aspiration conduit.

42. The apparatus according to claim 35 wherein the gas supply is in communication with at least one of the collection canister, the dressing, and an aspiration conduit.

43. The apparatus according to claim 35 wherein the gas supply is a sparge gas supply.

44. The apparatus according to claim 35 comprising one or more pumps.

45. The apparatus according to claim 35 wherein the collection canister comprises a pump to remove vapor within the collection canister.

46. The apparatus according to claim 27 wherein the volume reduction mechanism comprises at least one of a cartridge heater and an infrared heater.

47. The apparatus according to claim 27 further comprising one or more thermocouples or thermistors.

48. Use of the apparatus defined in any one of claims 27 to 47 for treating a wound.

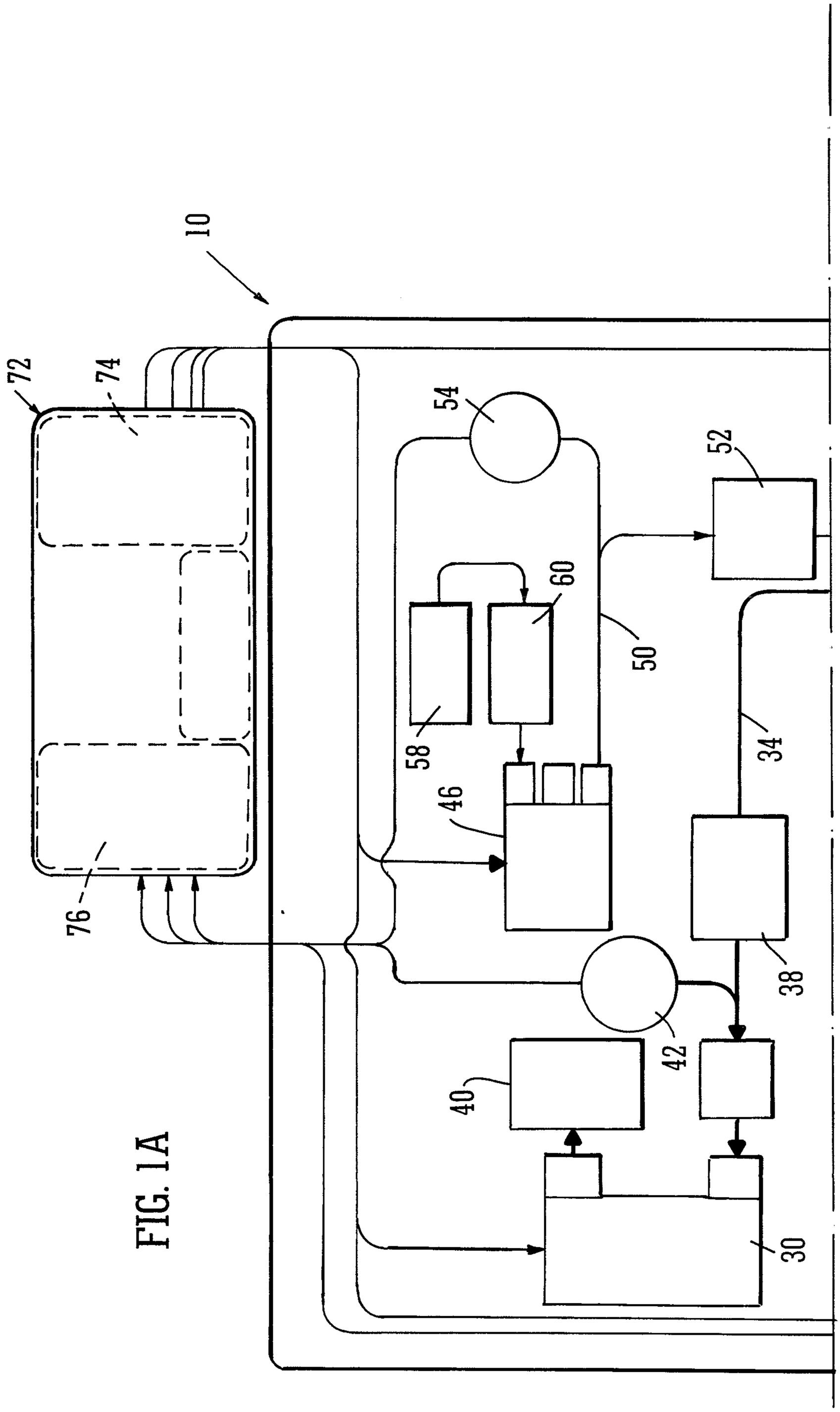


FIG. 1A

FIG. 1B

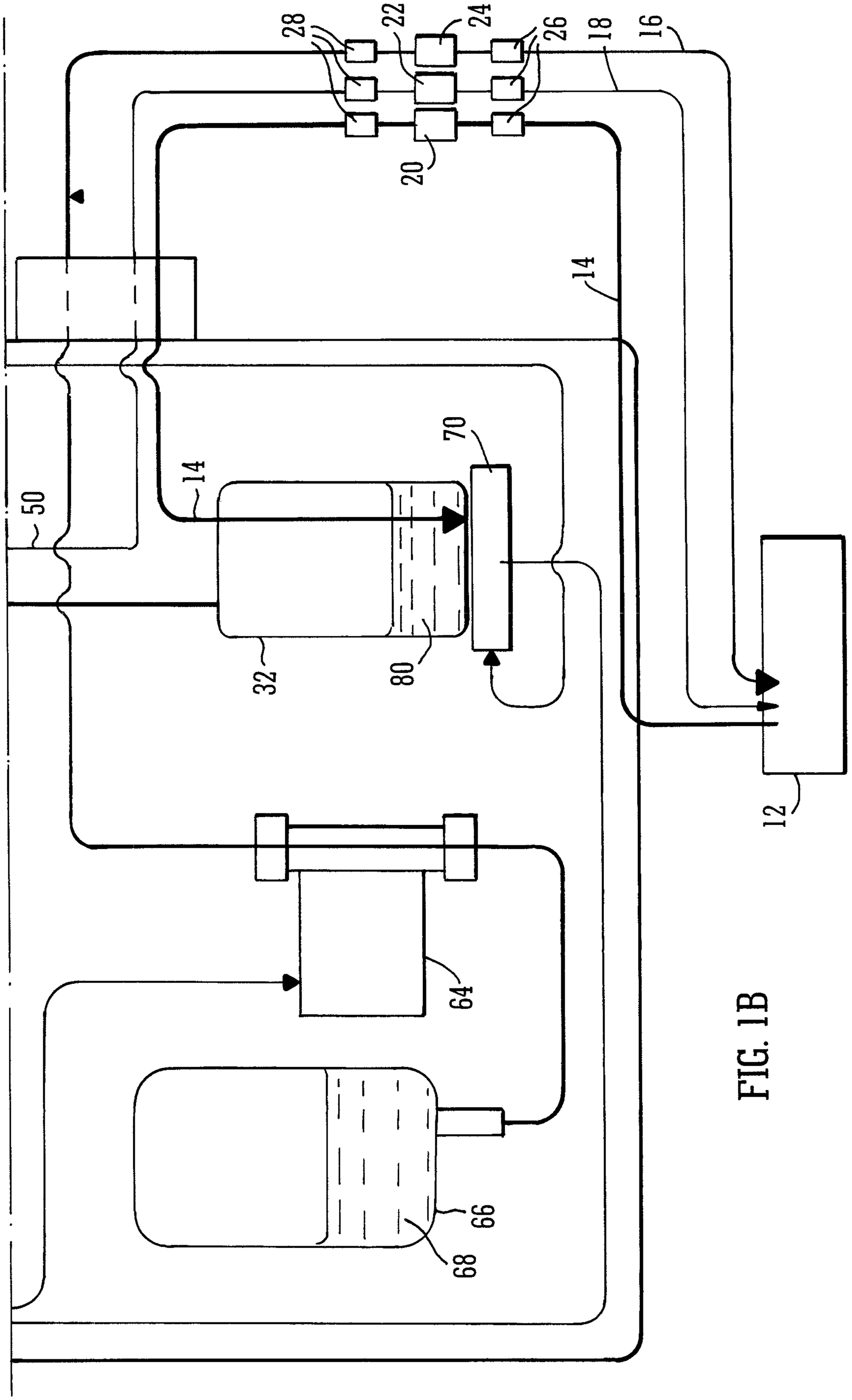


FIG. 1A

FIG. 1B

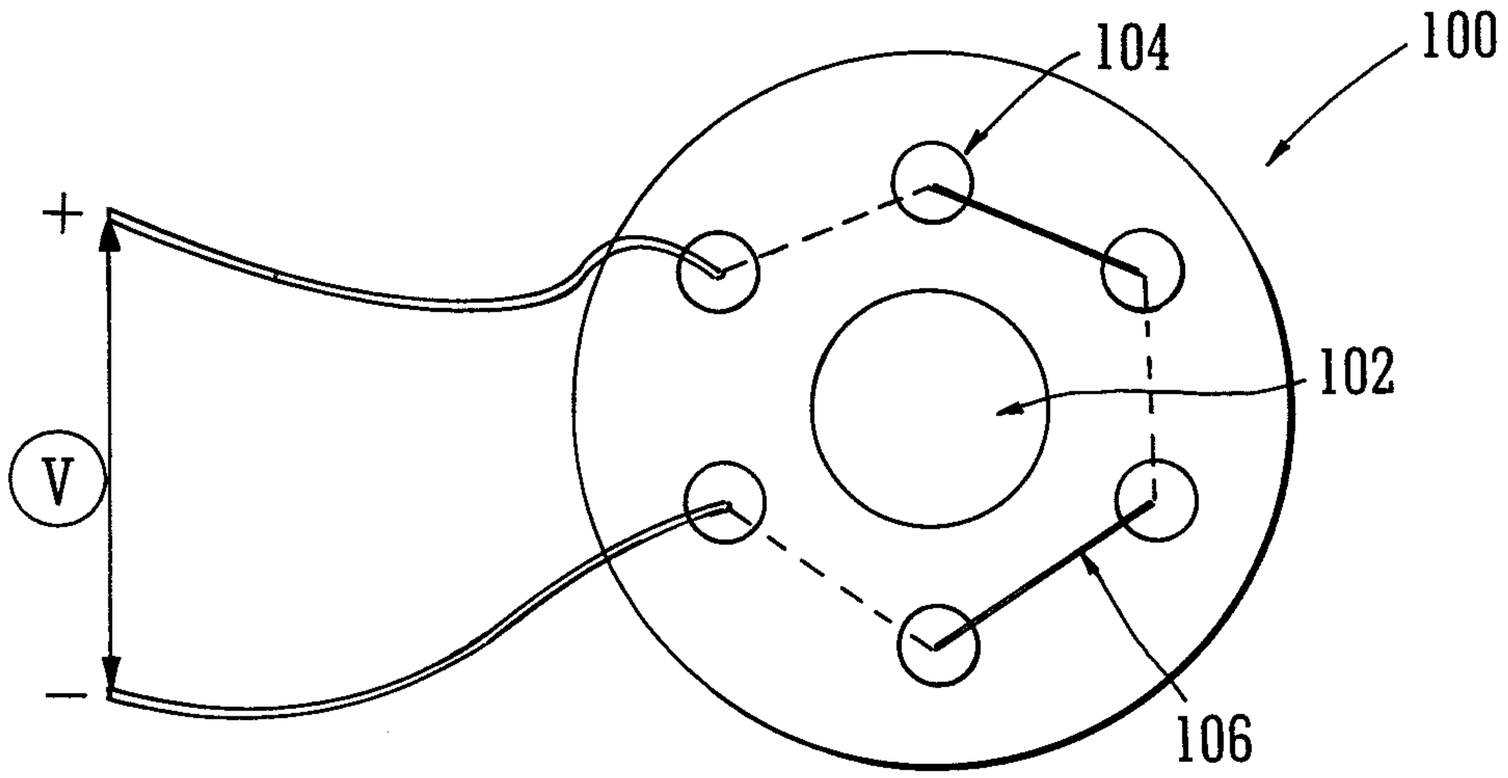


FIG. 2

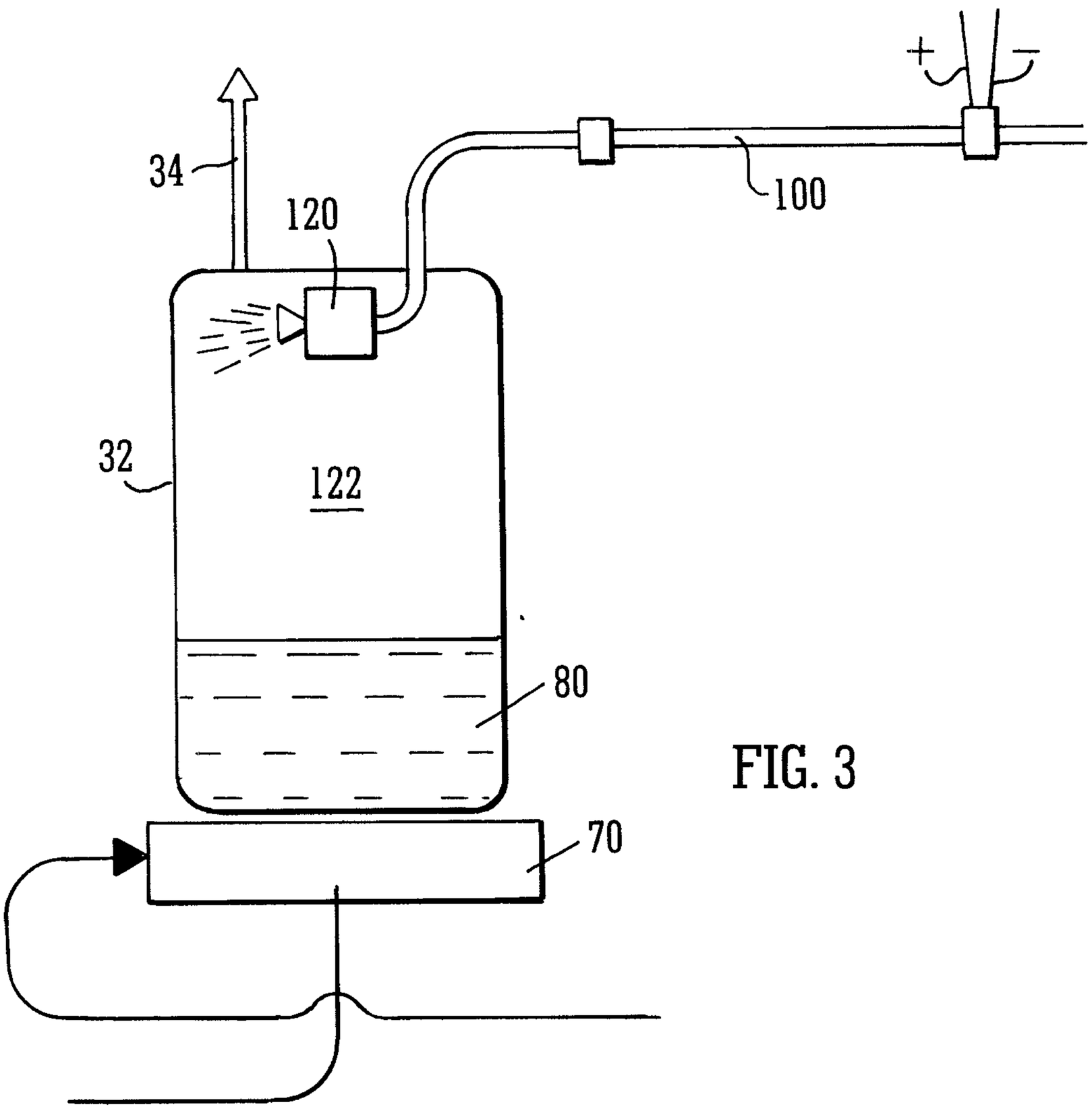


FIG. 3

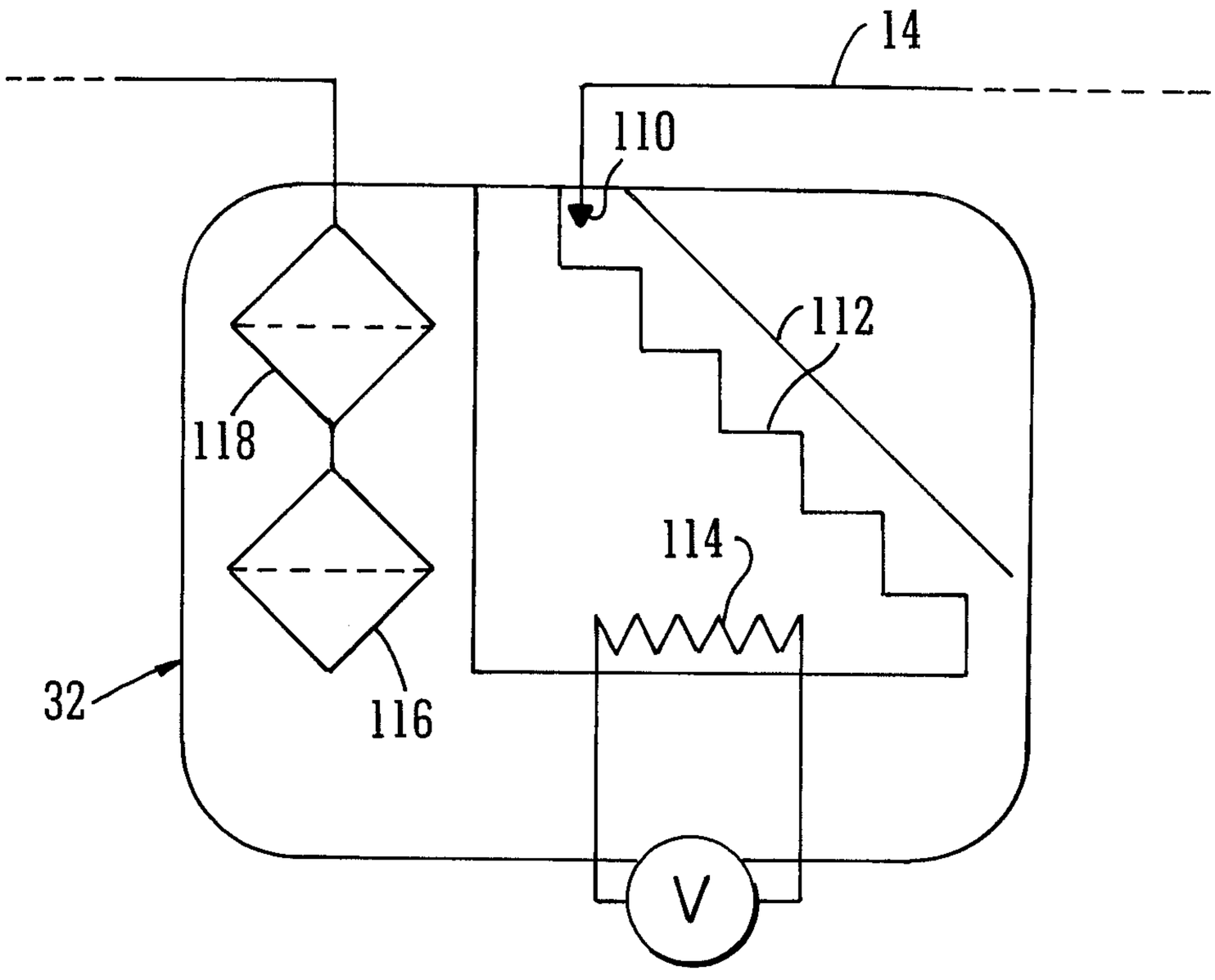


FIG. 4

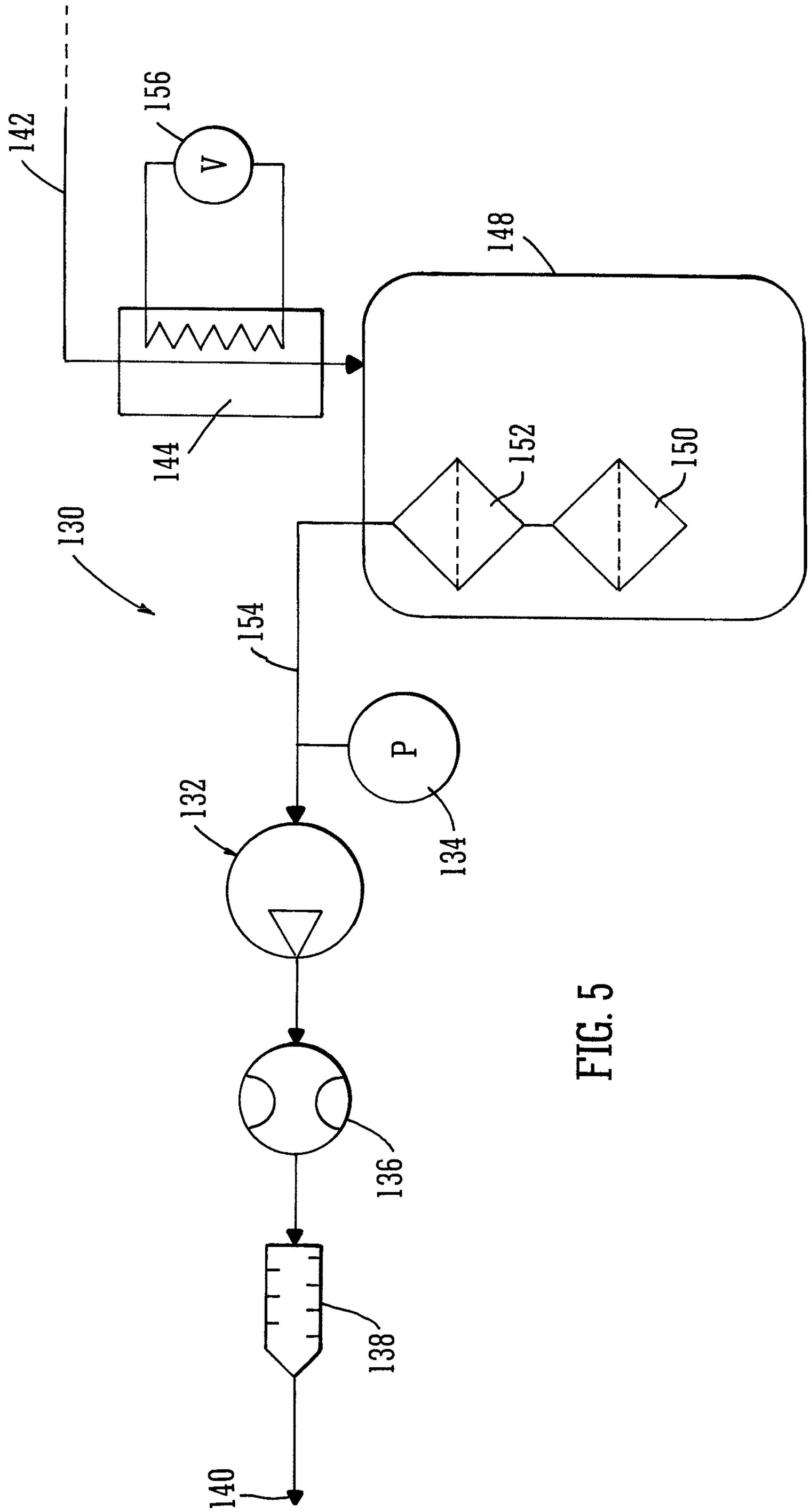
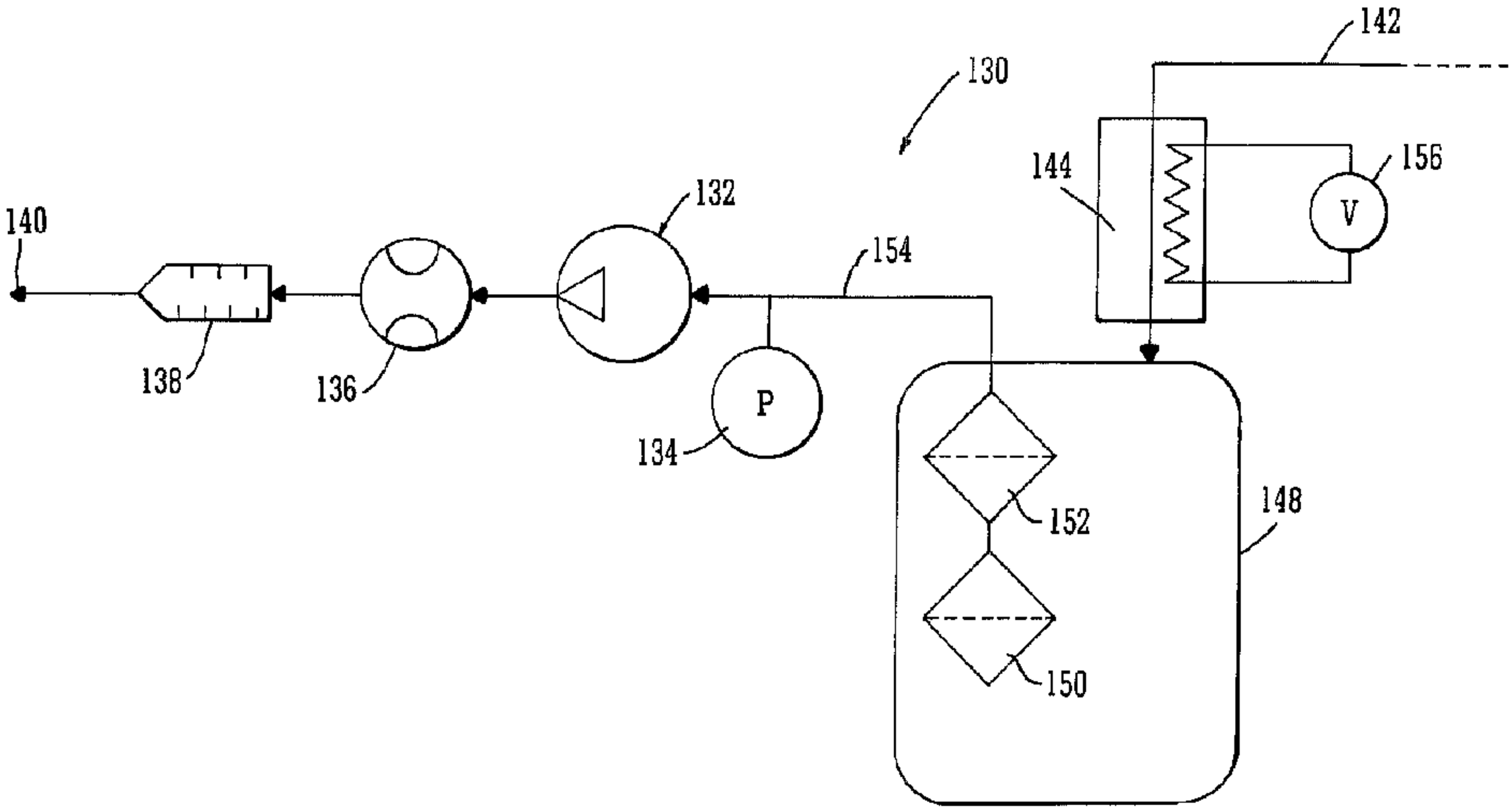


FIG. 5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