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(54) Beverage dispenser.

(57) A beverage dispenser particularly adapted for use in the home is disclosed which dispenser includes a source of pressurizing fluid, a diluent tank, dispensing valves and packages of concentrate which are interchangeably insertable in the valves. The diluent tank is provided with quick disconnect couplings to permit ease of removal and refilling, the elements of the dispenser disposed on a base with the diluent tank and source of pressurizing fluid surrounded by removable covers to provide an attractive, compact and low cost dispensing unit.

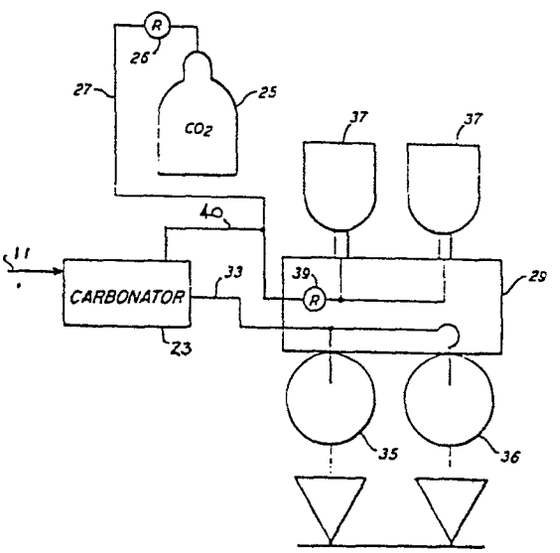

FIG. 1

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Background of the Invention

This invention relates to drink dispensers in general and more particularly to a dispensing device for making carbonated beverages in the home.

Consumers throughout the world consume large quantities of carbonated beverages. Typically, carbonated beverages which are consumed in the home are supplied to the consumer in either cans or bottles. Typically, cans are supplied in 12 ounce sizes and bottles in sizes up to two litres. A carbonated beverage is made up of carbonated water to which there is mixed a juice or syrup. A good tasting beverage requires good water, the proper level of carbonation and the proper proportions between the syrup and carbonated water.

A dispenser of the present invention contains all of the elements necessary in a carbonated drink dispenser and in accordance with the invention the carbonator should be capable of being removed. A number of alternate carbonators are possible for use with the present invention. However, where the dispenser is a stored alone unit, which will normally be the case, and must be periodically batch refilled with water, a simple carbonator can be used.

The container is pressurized, and safety features are provided to prevent danger to the user at the time of refilling the water container.

The present invention is concerned with facilitating removal of the carbonator; prior art dispensers have not been concerned with removable carbonators.

In accordance with the present invention there is provided a dispenser for carbonated beverages comprising a source

of beverage concentrate, a carbonator tank for water to be carbonated, a dispensing head, means connecting the gas under pressure, the source of beverage concentrate, the carbonator tank and the dispensing enabling the dispensing of beverages made up of carbonated water and diluent, and wherein the carbonator tank comprises

a) a tank body for containing a supply of water and having an opening therein;

b) a removable cover for covering and sealing the opening;

c) means for relieving pressure in the tank prior to removal of the cover, and

d) means for conducting diluent from said tank, characterised in that

the carbonator tank is for batch filling and is removable from the dispenser in that it has a quick disconnect coupling which connects by a sliding action with a rigid coupling of the dispenser to couple the carbonator tank with the source of gas under pressure.

Preferably, said means for conducting diluent from said tank comprises a second quick disconnet coupling which couples by a sliding action with a second rigid coupling of the dispenser said first and second quick disconnet couplings being parallel fittings.

Preferably also, mechanical interlock means for preventing removal of said cover until said means for relieving pressure are operated; and means for preventing said cover from being fully removed from said body upon rotation of said cover whereby if said means for relieving pressure fails, gas can escape without having said cover blow off.

Although the dispenser of the present invention is disclosed primarily as a unit for dispensing carbonated beverages and also as an in-home dispensing unit, it is not limited to such functions. Obviously, as will become evident, the

dispenser, with appropriate modification, can also be used in restaurants, soda fountains and the like.

An embodiment of the present invention will now be described, by way of example with reference to the accompanying drawings, wherein:-

Fig. 1 is a block diagram of the dispensing system of the present invention;

Fig. 2a is a front perspective view of a dispenser according to the present invention;

Fig. 2b is a rear perspective view of the dispenser of Fig. 2a;

Fig. 3 is a plan view of the dispenser according to Figs. 2a and 2b;

Fig. 4 is a plan view of the valve of Fig. 6 partially cut away showing the valve integral with a manifold;

Fig. 5is an exploded perspective view of the dispenser showing the carbonator section;

Fig. 6 is a sectional elevation view of the carbonator of Fig. 5;

Fig. 7 is a sectional elevation view of a thermoelectric cooling arrangement for the carbonator;

Fig. 8 is a sectional elevation view of the carbonator lid of Fig. 6.

Figs. 9a-d are views of an alternative embodiment of a carbonator lid.

The present application is divided out of European application No. 80200611.4 (published under number 0 022 589) and reference is made thereto for details of the complete illustration and functioning of the dispensers to be described.

With the above proviso, the present invention will be described in detail in connection with an in-home dispensing unit particularly adapted for carbonated beverages. However, the various aspects of the present invention are also useful in other environments, such as in restaurants, soda fountains, etc.

Thus, Fig. 1 is a generalized block diagram of a dispenser according to the present invention. The system includes a water source 11.

Water source 11 is simply an opening in the carbonator 23 which permits refilling. Carbonator 23 is supplied with carbon dioxide from a tank 25 through a reducing valve 26, a line 27 and, a manifold 29 When the carbonator is in use, carbonated water is supplied over line 33 to the manifold 29. The manifold 29 supplies this water or other diluent to dispensing valves 35 and 36. Also located at the dispensing valves 35 and 36 are containers 37 filled with a concentrate which is to be mixed with the diluent. As is described, in said European Application No. 80200611.4, the metering valve for concentrate is in the container 37 and is coupled to and cooperates with the dispensing valves 35 and 36. That is, the container 37 with the concentrate includes valving means to meter the amount of concentrate in response to a relative movement of two parts of a container brought about by the dispensing valve 35 or 36. The supply of carbon dioxide over line 27 is also used to pressurize the concentrate in the containers 37 after being coupled through a reducing

valve 39. Also shown is a line 40 coupling carbon dioxide to supply the diluent at a constant pressure. In that case, water source 11 is also the carbonator. Furthermore, although carbon dioxide is shown as the pressurizing gas, in embodiments where carbonation is not desired, it may be replaced by any inert gas such as nitrogen.

The embodiment of the dispenser illustrated in perspective view of Figs. 2a and 2b includes a supporting structure 41 which is preferably of molded plastic. Structure 41 includes a base 43 and an upstanding T-shaped portion 45. The T-shaped portion 45 includes a top wall 47 front and rear walls 49 and 51, respectively, and a central divider 53. At the one end of the unit, as best seen in Fig. 2b, mounted to the base 43 is a cooling unit 55. Shown in the cooling unit 55 are ventilation openings 57 which communicate with additional ventilation openings 59 formed in the base 43. Disposed atop the cooling unit 55 is a diluent tank, e.g., a water supply and carbonator tank 61 to be described in more detail below. Surrounding this portion of the unit is a cover 63 which has a depending flange portion 65 which engages corresponding lip 67 on the central portion 45. As will be described in more detail below, the carbonator is adapted to be easily removed and refilled with water when necessary.

At the other end of the dispensing apparatus, supported on the base 43, is a tank of a pressurizing gas, e.g., a carbon dioxide tank, 68 shown in phantom. The carbon dioxide tank or bottle 68 is connected to a reducing valve 69 by means of a quick disconnect clamp 71 to permit ease of replacement of the carbon dioxide bottle 68 which may be a conventional commercial unit. Extending through the dividing wall 53 and secured to a bracket 73 thereon by means of screws or bolts 75 is a manifold 77 which will be described in detail below. The manifold 77 distributes the pressurizing gas and diluent, e.g., carbon dioxide and

carbonated water. The front portion of the manifold 77 is visible on Fig. 2a. Integral with the manifold are two dispensing valves 79A and 79B to be described in detail below. Disposed above each of the dispensing valve 79A and 79B is a container 81 containing therein a concentrate to be mixed with the diluent supplied from the diluent tank 61. Below valves 79A and 79B is a removable tray 82, retained magnetically for example, for catching any spillage. Tray 82 may be removed and rinsed periodically. As explained in said European application 80200611.4, the containers 81 are particularly adaptable to packaging and storing all types of concentrate in a sanitary manner.

Covering the carbon dioxide tank 68 is a second cover 83, which similarly has a depending flange 85 engaging a lip on the T-shaped central structure 45.

Fig. 3 is a plan view of the dispenser of Figs. 2a and 2b with the covers 63 and 83 removed and the T-shaped center section 45 also removed for clarity of presentation. In this view, the carbon dioxide bottle 68 is visible along with its quick disconnect clamp 71 and reducing valve 69.

The reducing valve is semi-rigidly mounted and coupled by tubing 87 to the manifold 77. Portions of valves 79A and 79B which are molded integrally with the manifold are also shown. Also shown in cross section is the carbonator tank 61. The carbonator tank contains a coupling 89 which permits a quick disconnect with the manifold 77.

Reducing valve 69 reduces the carbon dioxide pressure to 40 psi. CO_2 at this pressure is fed through a passage 91 in the manifold 77 to the disconnect coupling 89. From that point it flows through tubing 90 to a restrictor 93, and thence to a diffuser 95. Carbonated water is removed from the carbonator tank through a line 97 extending to the bottom of tank 61 and leading to the coupling 89

whence it enters a passage 99 in the manifold. This passage connects with two smaller passages 101 and 103, which lead to outlets 105 and 107, in the portion of the valves which is integral with the manifold. At each of the outlets an O-ring seal 109 is provided. Carbon dioxide is also fed through a further pressure reducing valve 111 which is built into the manifold, where the pressure is reduced to 5 psi. From valve 111 the carbon dioxide flows in a passage 113 to which are connected two passages 115 and 117, which lead to elongated openings 119 and 121 in the portion of the manifold which comprises part of the valve. Again, in each case an O-ring seal 123 of neoprene or the like is inserted. Although the manifold 77 can be made of various materials, a plastic is preferred. With such plastic the manifold can be molded and any necessary machining carried out to form the various passageways.

Fig. 4 shows the manifold 77 and the dispensing valves in more detail. At the inlet for carbon dioxide, a threaded fitting 125 is provided in the manifold. As illustrated, this communicates with a channel 127 which is connected directly to the passage 91. Inserted into appropriate bores 129 and 131 on the left side of the manifold 77, are tubular fittings 133 and 135. These are press fitted into their respective bores 129 and 131. Each contains, threaded therein, a check valve, i.e., a Schrader type valve, 137a and 137b respectively. The fittings 133 and 135 which are rigid insert by sliding into the quick disconnect coupling 89 in the carbonator tank 61 and are sealed by O-rings 136. Within a bore 130 in the coupling 89, mating with the fitting 129, is disposed an anvil 139 followed by a check valve 141 which is blown open by carbon dioxide pressure from the line 91. In a bore 137 of the coupling 89 which mates with the fitting 135 is inserted another Schrader valve 143. The valve 143 abuts against the valve 137b opening both valves when the quick

disconnect coupling 89 is attached to the manifold. Similarly, an anvil similar to anvil 138 opens the valve 137b. In this manner, when the carbonator is disconnected from the manifold, there is a check valve in both passages of the manifold and in both passages into the carbonator to prevent release of pressure. The coupling 89 also contains, at its inside, threaded bores 144 and 146 for connecting lines 90 and 97 of Fig. 3. The stub connections 104, 118 are for connection to a remote dispensing valve.

For a more detailed description of the operation of the manifold shown in Fig. 4, reference is made to said European Application No. 80200611.4.

The coupling of the carbonator to the dispenser is designed with a view toward ease of operation and low cost. The carbonator will now be explainnd in more detail in connection with Fig. 5 which is an exploded perspective view of the dispenser showing the manner of insertion and removal of the carbonator. In the disclosed embodiment of the drink dispenser of the present invention, the unit is self standing. In the unit of Fig. 5, the carbonator 61 comprises a metal tank 300 preferably of stainless steel or aluminium, having a lid 301 which is removable in order to refill the carbonator 61 with water. As previously explained, the carbonator 61 includes a quick disconnect coupling 89 from which one line 90 leads through a restriction or orifice 93 to a dispersion block 95. Carbonated water is forced out of the unit through a line 97. Also shown in Fig. 5 is the end of the manifold 77 with the two rigid connecting fittings 133 and 135 projecting therefrom. As explained in detail in connection with Fig. 4, these slide into appropriate bores in the fitting 89. As also explained in connection with Fig. 4, there are valves both in the fitting 89 and the connecting stubs 133 and 135 of the manifold. What this means is that, when the tank 61 is pulled by sliding away

from the manifold, the pressure within the dispensing unit, i.e., that pressurizing the container 81 and the carbonated water in the various passages, which is under pressure, and the gas under pressure being fed from the CO_2 tank are not released. Without such valving, carbonated water would be released from the connecting fitting 135 and the 40 psi carbon dioxide would flow from the fitting 133.

At the same time, the valves within the coupling 89 prevent the carbonated water under pressure from being discharged from carbonator 61 and also prevent any discharge through the carbon dioxide inlet. In order to aid in the quick disconnect of the carbonator tank 61 and also aid in handling it when disconnected, i.e., to permit refilling, a folding handle 303 is provided. A view of the handle 303 is also provided in the cross section of the carbonator shown on Fig. 6. The handle includes a bracket 305 which is attached vertically to the carbonator tank 300. This is essentially a U-shaped bracket which contains a cutout portion 307 in its central portion, i.e., at this portion only the base of the U is present. The handle itself comprises two arm sections, an upper arm section 309 and a lower arm section 311. The two arm sections are hinged together by means of a pin or rivet 313. The upper arm section 309 is also hinged to the upper part of the bracket 305 by means of a pin or rivet 315. The other end of the lower arm 311 contains a pin or rivet 317 which passes through a slot 320 formed in the U-shaped bracket 305 near its bottom and is retained in place by washers 319. Also hinged to the pin 317 is a downwardly extending retaining pin 321. In the position shown in solid lines on Fig. 6, with the handle folded against the tank 300, the pin 321 extends through an appropriate slot 323 in a support plate 330 in the top of the cooling unit 55. This, along with the insertion of the connection stubs 133 and 135, into the fitting 89,

retains the tank 61 in place. Alternatively, coupling 89 could be on the bottom or vertically disposed on the side of carbonator 61 and the weight of carbonator 61 used to maintain the connection.

When it is desired to remove the tank, after removal of cover 63, the handle 303 is moved to the position shown in dotted lines. The pin 317 slides upward in the slot 320 at the same time carrying with it the retaining pin 321. It is now possible to remove the carbonator to refill it with water.

Since the carbonator after being removed for refilling will still be under a pressure of 40 psi it is essential that the pressure be released before the cover is removed.

Otherwise, the cover could possibly blow off causing serious injury to the user. Furthermore, it is important that a good seal be maintained between the cover 301 and the container 300. The present invention provides a novel design of the mating of the cover with the container which both insures that the cover cannot be removed until the pressure is released, and at the same time insures that the cover will always be adequately sealed, after the carbonator is refilled. The manner in which the cover fits into the container 300 is best illustrated by Figs. 5, 6 and 8.

The container 300 at its top 351 (the container is of solid welded construction) has a stepped profile. It has an upper recess 353 of first diameter in which a top flanged section 355 of the cover 301 rests. Following this is a portion 357 of somewhat smaller diameter containing internal threads 358. The cover 301 contains matching external threads 359 which screw into the threads 358. This section is followed by a section 360 of still

smaller diameter which contains on its vertical surface 361 an O-ring seal 363. O-ring seal 363 seals against cylindrical circumferential portion 365 of the cover. Because of the location of the seal 363, a radial rather than the convention axial type seal takes place. What this means is that the carbonator will be sealed even if the cover is not screwed on completely tightly, in contrast, with an axial seal, where good sealing depends on the cover being screwed on tightly. This essentially eases operation for the user, typically a housewife, and does not require critical alignment or the application of a certain amount of pressure in order to get good sealing.

In order to ensure that pressure is released before the cover is removed, a rotatable handle 371, shown on Figs. 5 and 8 is provided. This handle rotates to operate a relief valve 372, the lower portion of which is visible in Fig. 6.

Handle 371 is hinged to a plunger 377 by means of a pin 379. Plunger 377 has, in a recess 381 at its end, a rubber sealing disc 383. This seals against a plastic valve seat member 385 containing a central bore 380 which is screwed into a threaded bore 387 in the lid 301 and sealed against the bottom of lid 301 with an O-ring seal 387A. A spring 375 biases the plunger 377 against seat member 385. Rotation of handle 371 upward lifts plunger 377 off seat member 385, by means of a larger radius 388 at the handle end, to release the pressure in the carbonator 61. This valve also acts as a safety valve in that if the pressure exceeds an amount determined by biasing spring 375, the plunger 377 will lift off seat member 385.

Thus, rotation of the handle 371 upwards when it is desired to refill the container, opens the valve to

release the pressure. Unscrewing of the cover 301 without operating the handle 371 is not possible. Such is prevented by having the handle 371 extend beyond the circumference of the uppermost portion 353 of the cover. A cutout 378 is formed in the top 351 of the container 300 as best seen in Figs. 5 and 6. When cover 301 is screwed into place, the handle 371 snaps into this cutout 378. When one attemps to unscrew the cover without lifting the handle 371 it will come into contact with the edge 380 of cutout 378 preventing further turning until the handle is lifted and the pressure released. Furthermore, because of the pressure, turning will be very difficult, by hand, without first releasing the pressure. This too is a reminder to operate handle 371. Finally, should someone use a wrench or the like to generate enough torque, leakage past the threads will bleed the pressure off before the cover 301 is free of tank 300.

Figs. 9a-d illustrate an alternate embodiment of a closure for the carbonator lid. Shown is a carbonator lid 301a with a cylindrical opening 501 therein. Inserted within the opening 501 is an insert 503 having a first cylindrical section 505 press fitted into the opening 501 followed by an outwardly flared section 507 and a terminating cylindrical section 509.

The closure, or stopper mechanism, which is utilized to close the opening in the cover 301a is of a nature similar to devices used as stoppers for vacuum bottles and also as boat plugs. However, as with the previously described cover for the carbonator, it is necessary that such a closure incorporate means to insure that pressure is relieved before the cover or stopper is removed, and it is also desirable that the closure be capable of performing as a pressure relief valve. The arrangement illustrated in Figs. 9a-d accomplishes all of these functions. The member which actually closes the opening comprises a

compressible stopper 511 of rubber, for example. The stopper, which is of cylindrical shape with a central bore 512, in the uncompressed state (See Fig. 31d), is fitted over a tube 513. At its inner end tube 513 is threaded. At the inner end of the stopper is a washer 515 which is held in place by a nut 517 screwed on to the threaded end of tube 513. The stopper 511 is compressed between washer 515 and a washer 519 at the outer end of the stopper, also slid over the tube 513. The tube 513 contains a bore 521 in its outer end which terminates in a conical valve seat 523. A smaller bore 525 extends from the valve seat through to the inner end of the tube 513. At the end of the tube projecting through the washer 519, the tube is slotted to provide two diametrically opposed members or ears 527 and 529. Each of the ears 527 and 529 contains a hole 531 through the end thereof. A bolt 533 on the end of which is a nut 535 passes through these holes and through corresponding holes 537 in camming means 539. Camming means 539 comprise a member of essentially U-shaped cross-section with two identical cam surfces 541 on the legs thereof on the end of which is a U-shaped lever arm 543. The cam surfaces 541 act against the washer 519. In the position shown in Fig. 9a, the distances between the bolt 533 and the circumference of the cam surface 541 is a maximum. This in turn causes the bolt and with it the tube 513 to move outward compressing the compressible stopper 511. In the position shown in Fig. 9c, the radius of the cam surface remains essentially the same, still maintaining compression. Finally, in Fig. 9d, the distance between the bolt 533 and the flattened portion 541a of the cam surface is now reduced to permit the compressible stopper to take the cylindrical form shown in Fig. 9d and allow its removal.

What has this far been described is a conventional compressible stopper arrangement typically used in vacuum bottles and as a boat plug. The primary difference is

that the conventional device does not have a hollow rod such as the tube 513 but a solid rod.

In accordance with the present invention, seated against the valve seat 523 is a valve member 545, on the end of a rod 547. The rod extends, with a spacing, through a threaded plug 549, which is screwed into internal threads in the end of the tube 513 and provides a guide for rod 547. Biasing spring 551 is disposed between the guide 549 and the valve member 545 biasing the valve member against the seat 523. The end of the rod 547 is attached to an oval ring 553. Between the two ears 527 and 529, a cam 555 is mounted to bolt 533. Bolt 533, at least in the central part thereof, has a square cross-section so that the cam 555 turns with the bolt and the camming means 539. Ears 527 and 529 are, of course, mounted so that the bolt 533 turns within the ears, e.g., the bolt is round where it passes through ears 527 and 529.

In the position shown in Fig. 9a, there is a slight spacing between the oval ring 553 and the cam 555. This allows the biasing spring 551 to bias the valve member 545 against the seat 523 to prevent the passage of fluid. The spring force is selected to provide a biasing pressure which will counteract the design pressure within the vessel with which the closure is used. For example, when used in the carbonator of the present invention the spring would be set for a pressure slightly greater than 40 psi. If excessive pressure builds up within the carbonator tank the valve acts as a pressure relief valve. The biasing force of spring 551 is overcome and the pressure within the tank will lift the valve member 545 off the seat allowing excess pressure to be relieved. The fluid, e.g., carbon dioxide, under pressure would flow through the bore 525 past the valve member 545 through the bore 521 escaping between the rod 547 and the opening in the guide member 549. In order to permit pressure relief, the rod

is disposed within the guide member 549 with a small spacing. The nature of cam 555 is such that in the position shown in Fig. 9a, the distance between the axis of the bolt 533 and the cam surface is a minimum. As noted above, in this position there is a slight spacing between the cam surface and the ring 553. At the position shown in Fig. 9c, in which the handle 543 has been rotated through 90o, a second, larger distance, results.

Because of this, the cam surface comes into contact with ring 553 raising the ring and with it, the rod 547. This lifts the valve member 545 from the seat 523 and allows a pressure reduction through the valve which will take place at a controlled rate based on the valve orifice and the cross-sectional area between the rod 547 and the hole in the guide member 549. As noted above, in this position, the cam surface of cam 541 is still maintaining the compressible stopper in the compressed state. Finally, as shown in Fig. 9d, further rotation of the handle 543 releases the stopper while at the same time maintaining the valve member 545 raised from the seat 523. This results because the cam surface of cam 555 is such that between the position shown in Fig. 9c and 9d it maintains the ring at the same distance from the axis of the bolt 533 holding the valve open.

As illustrated in Fig. 5, since the carbonator is cooled, the cover 63 will contain, on its inside, a layer of insulation 325. Cooling is accomplished one of two ways. In the embodiment shown on Figs. 5 and 6, cooling is done utilizing a pan 327 of essentially cylindrical shape and having a lip 329 at its top. The pan is filled with what is commonly known as "Blue Ice", a type of material typically used for cooling in picnic coolers. The pan containing the Blue Ice sealed therein is placed in a home freezer and frozen prior to use. It is then inserted into

dispenser. For this purpose, the support plate 330 having a circular opening 331 therein to recieve the pan 327 is provided. The plate 330 is supported in conventional fashion on a rectangular frame which forms part of the cooling unit. In addition, the inside of the rectangular frame 331, this frame resting on the base 43 of the dispensing unit, contains insulation (Fig. 5) 333.

Shown on Fig. 5 are ventilation holes 57 in the rectangular frame, and ventilation holes 59 in the base 43. These are not required with this type of cooling unit but are used with the cooling unit to be described in connection with Fig. 7 below. The plate 330 in which the pan 327 is inserted is preferably of a material with poor heat conductivity, such as polypropylene.

In the alternate embodiment shown in Fig. 7, the dispenser is provided with an electrical cooling unit. Once again, this unit is inserted in, or provided in conjunction with, a plate 330, of poor heat conductivity. Again, the plate contains an opening 323 for the insertion of the pin 321 on the handle 303 of the carbonator 61. The unit includes, below a plate 335 of good heat conductivity, a plurality of thermoelectric cooling units 337. The nature of these units is that they are cool on one side and hot on the other side when electricity is passed through them. The thermoelectric units, which are essentially of a plate-like material, have their cold side abutting against the plate 335. Attached to their warm side are heat sinks 339. Below the heat sinks, a fan 341 is mounted for conducting heat away from the heat sinks. Power is supplied to the fan and to the thermoelectric cooling units 337 by means of the power line 343. Via a suitable circuit as described in European Application No. 80200611.4 when operating with such a unit, the warm air is expelled through openings 345 below the fan and is

exhausted through the openings 57 and 59 shown in Figs. 5 and 2b

CLAIMS

1. A dispenser for carbonated beverages comprising a source of beverage concentrate, a carbonator tank for water to be carbonated, a dispensing head, means connecting the gas under pressure, the source of beverage concentrate, the carbonator tank and the dispensing enabling the dispensing of beverages made up of carbonated water and diluent, and wherein the carbonator tank comprises

a) a tank body for containing a supply of water and having an opening therein;

b) a removable cover for covering and sealing the opening;

c) means for relieving pressure in the tank prior to removal of the cover, and

d) means for conducting diluent from said tank, characterised in that

the carbonator tank is for batch filling and is removable from the dispenser in that it has a quick disconnect coupling which connects by a sliding action with a rigid coupling of the dispenser to couple the carbonator tank with the source of gas under pressure.

2. A dispenser according to Claim 1, characterised in that said means for conducting diluent from said tank comprises a second quick disconnect coupling which couples by a sliding action with a second rigid coupling of the dispenser, said first and second quick disconnect couplings being parallel fittings.

3. A dispenser according to Claim 2, characterised in that said first and second rigid quick disconnect couplings are in a block containing two parallel bores adapted to mate with the rigid couplings comprising fittings in the form of two parallel tubular stubs which may be inserted into said bores.

4. A dispenser according to Claim 3, further characterised by means in said diluent tank for carbonating water therein, said means being coupled to said first quick release coupling.

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5. A dispenser according to Claim 4, characterised in that said means for carbonating comprise: a diffuser block disposed near the bottom of said tank; a conduit extending between said diffuser block and said first quick release coupling to supply carbon dioxide thereto; and a restrictor to control the flow of carbon dioxide therethrough.

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6. A dispenser according to Claim 3, characterised in that said block is mounted on one side of said tank, said fittings thereby extending essentially in a radial direction and further including means on the other side of said tank for preventing movement of said tank after said quick release couplings connection are made.

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7. A dispenser according to Claim 6, characterised in that said tank is adapted to be supported on a horizontal supporting surface and wherein said means for preventing comprise a pin mounted to the opposite side of said tank from said coupling, and means for selectively inserting said pin into and removing said pin from a hole formed in the supporting surface.

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8. A dispenser according to Claim 7, characterised in that said means for inserting and removing comprise a collapsible handle mounted to said tank, said handle comprising:

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a U-shaped bracket vertically disposed on said tank on the side opposite said coupling having elongated slots in its sides near the bottom thereof; a first handle portion hinged to the top of said bracket; a second handle portion having one end hinged to said first handle portion and

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another end slidably coupled to said elongated slots at the bottom of said U-shaped bracket, said pin hinged to said other end of said second handle part, whereby movement of said handle to a collapsed position will result in a downward movement of said pin into a hole in said supporting means and extension of said handle will result in upward movement of the other end of said second handle part in said slot to remove said pin and provide a handle which can be grasped by a user to remove said tank from said fittings.

9. A dispenser according to Claim 3, and further including check valves in the fittings of said couplings.

10. A dispenser according to Claim 9, wherein the check valve in the first fitting comprises a valve core including a cylindrical stem portion of a first, smaller diameter; a conical section at the base of said stem section; and a partially cylindrical section, said cylindrical section having formed therein on each side thereof a pair of cuts of cylindrical cross-section, one of said pairs of cuts being directed inwardly and toward the bottom of said partially cylindrical portion, and the other pair being directed toward the top thereof and intersecting the base of said conical section to provide smooth flow passages; an O-ring for sealing against said conical section; a spring for biasing the conical section of said valve core against the O-ring; and means for retaining said O-ring, core and spring together with said spring biasing said core against said O-ring.

11. A dispenser according to Claim 3, characterised in that said block is removable from said tank body.

12. A dispenser according to Claim 11, wherein said block comprises a cylindrical flanged plastic block having a screw thread on its outer surface, said tank containing a

flat portion having an opening through which said block can be inserted with its flange abutting against said flat portion on the outside of said tank, an O-ring inserted between the said flange and said tank body and a retaining ring screwed onto said threaded portion on the inside of said tank.

13. A dispenser according to Claim 1, characterised in that said tank body contains in a recess in the opening in the top thereof, means for bringing and maintaining said cover in contact with said recess, said handle extending radially beyond the circumference of said cover, and further including a cutout in the top of said tank body for accepting the portion of said handle which extends beyond said circumference when said cover is in place.

14. A dispenser according to Claim 1, characterised by a sealing gasket disposed between matching circumferential surfaces of said cover and said tank top thereby a seal will be effective irrespective of said cover being screwed down into said top to its full extent.

15. A dispenser according to Claim 1, characterised in that said opening is recessed and there is a bore at the bottom of said recessed opening, the cover contains a cylindrical portion for covering and sealing said opening, said bore and cover including means for bringing them into and retaining them in sealing engagement, and characterised by a means disposed in said cover for relieving pressure in said tank prior to removal of said cover, a vertically rotatable handle to operate said means for relieving pressure, and a cutout in the top of said tank body, said handle extending beyond the circumference of said cover and adapted to fit in said cutout whereby said cover cannot be unscrewed until said handle is lifted to relieve the pressure in said tank.

16. A dispenser according to Claim 15, and characterised by a shut-off valve for said source of pressurization; and means coupling said shut-off valve to said handle such that said handle cannot be rotated to relieve pressure unless said shut-off valve is closed.

17. A dispenser according to Claim 16, characterised in that said shut-off valve comprises a valve body with a plunger therein, an actuating rod extendng therefrom and said means coupling includes said handle on said cover rotating between a position where it operates to move said plunger against said biasing spring to open said valve and a position where it is moved away from said plunger allowing said valve to close, said handle extending below a bracket in the top of the tank body when rotated to operate said plunger to open said valve whereby said handle is prevented from being lifted when in a position to open said valve.

18. A dispenser according to Claim 1, characterised in that the cover is removable by rotation and characterised by mechanical interlock means for preventing removal of said cover until said means for relieving pressure are operated; and means for preventing said cover from being fully removed from said body upon rotation of said cover whereby if said means for relieving pressure fails, gas can escape without having said cover blow off.

19. A dispenser according to Claim 18, characterised in that said means for relieving pressure is adapted to also act as an overpressure relief valve.

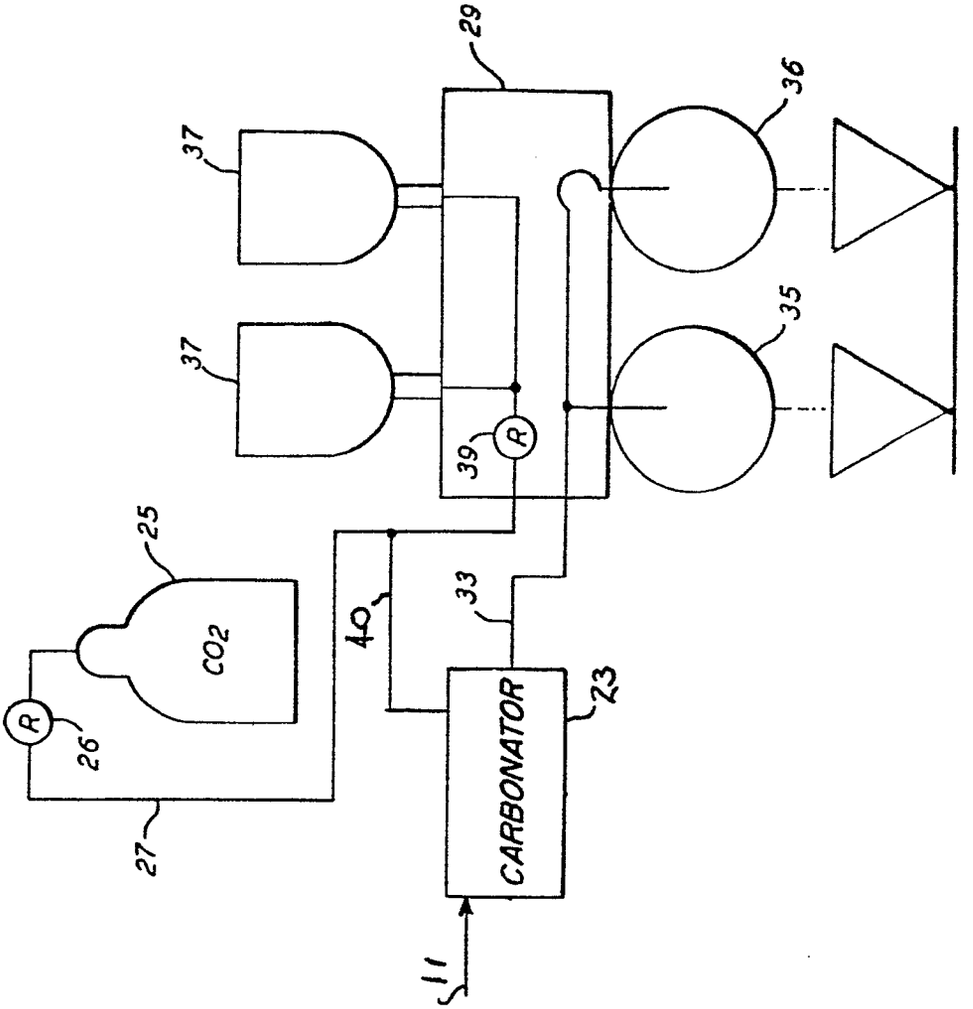

FIG. 1

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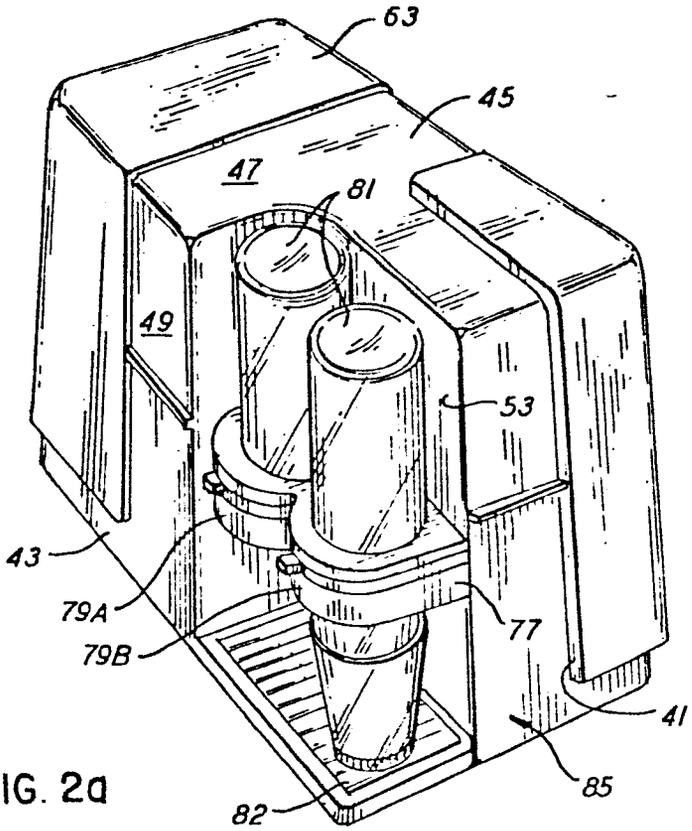

FIG. 2a

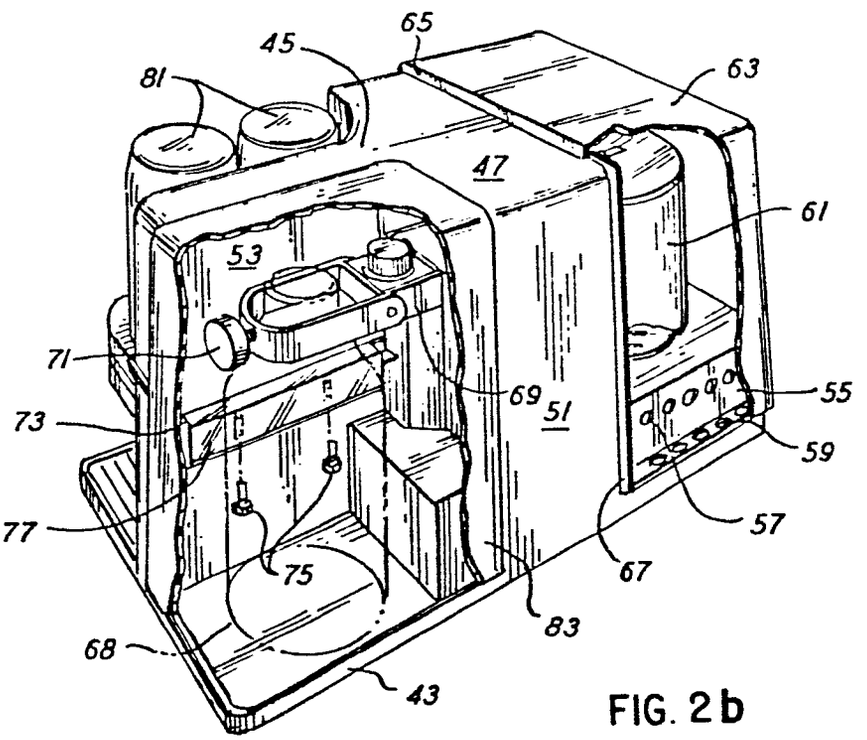

FIG. 2b

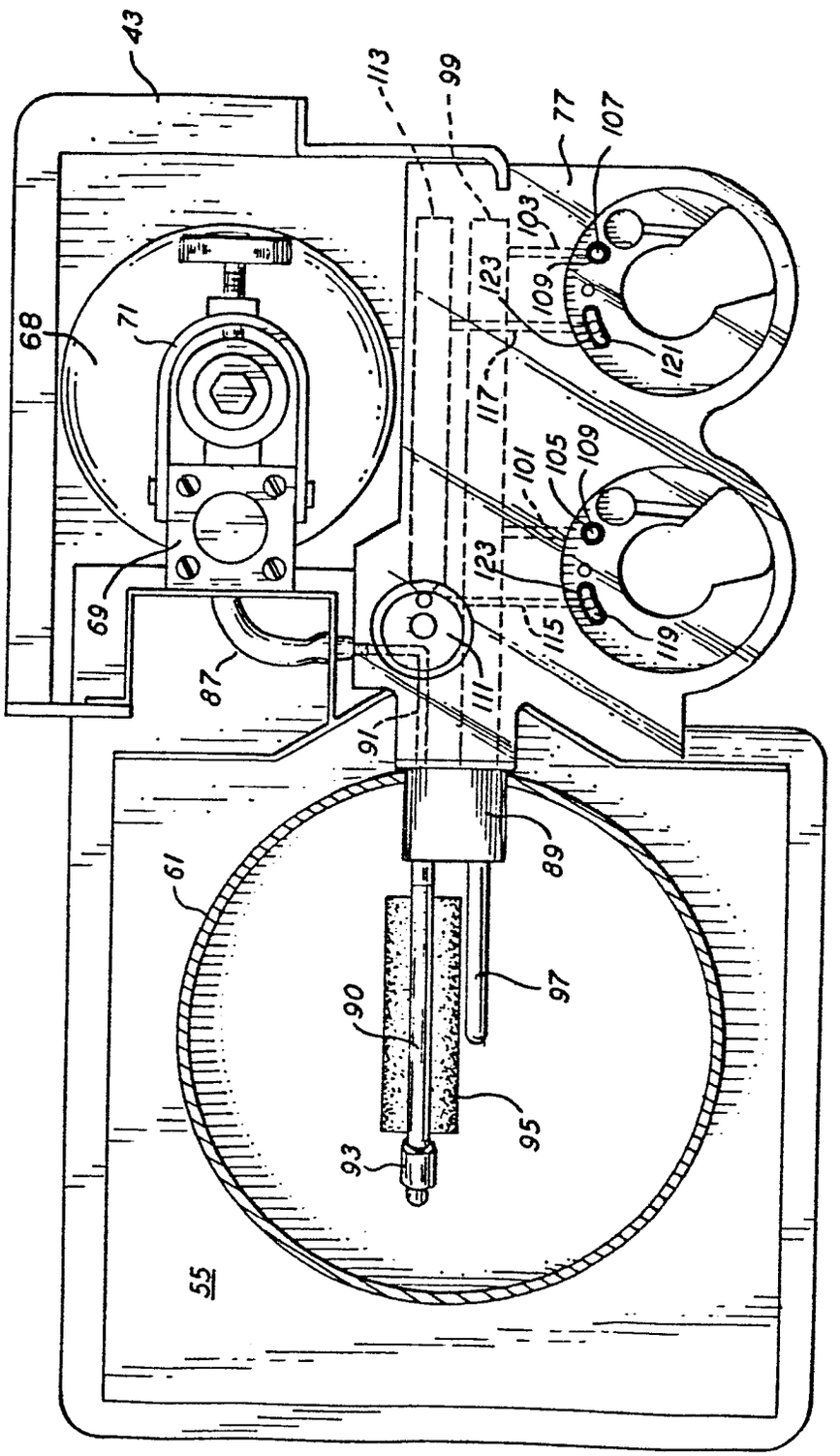
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FIG. 3

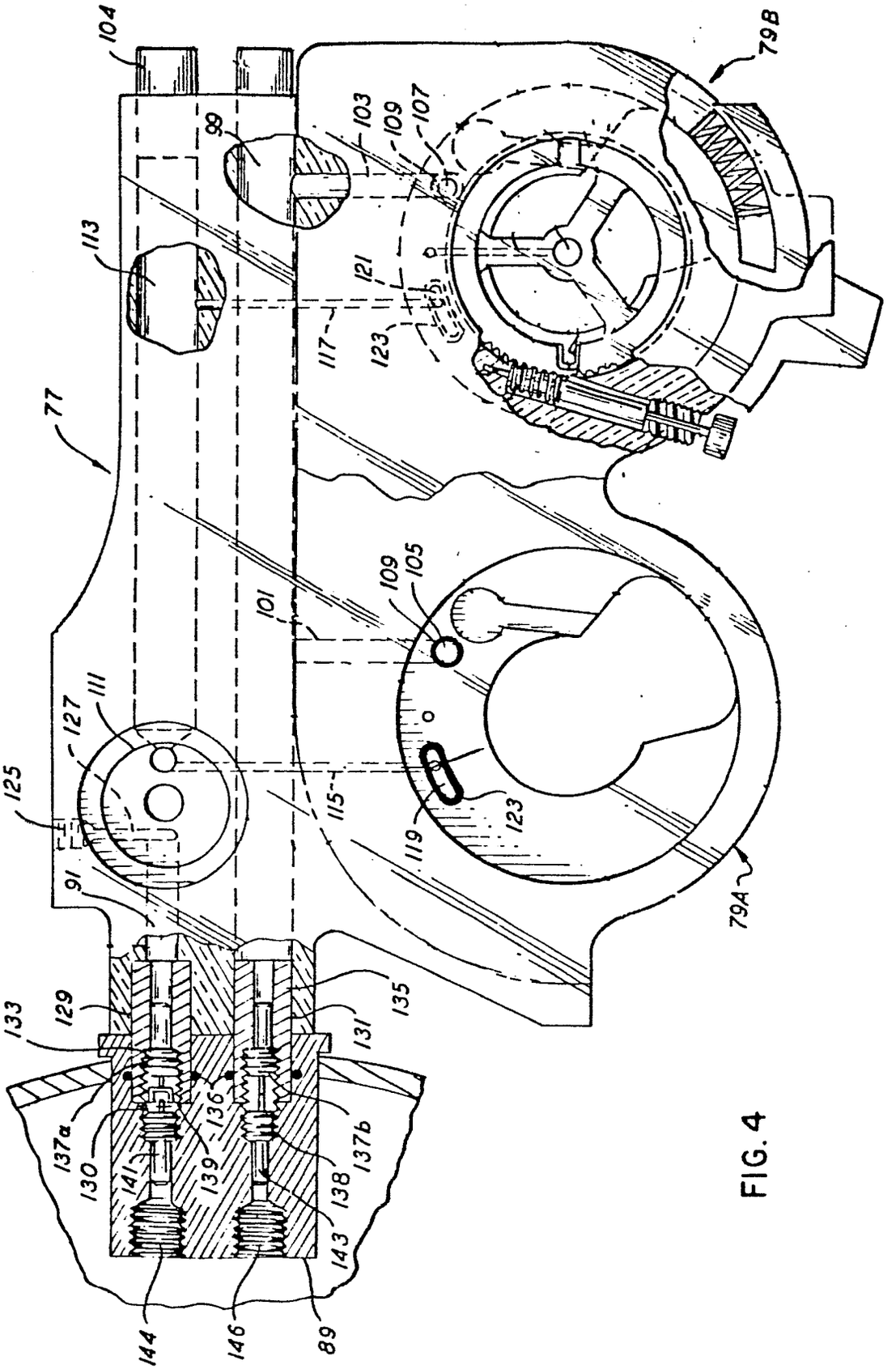
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FIG. 4

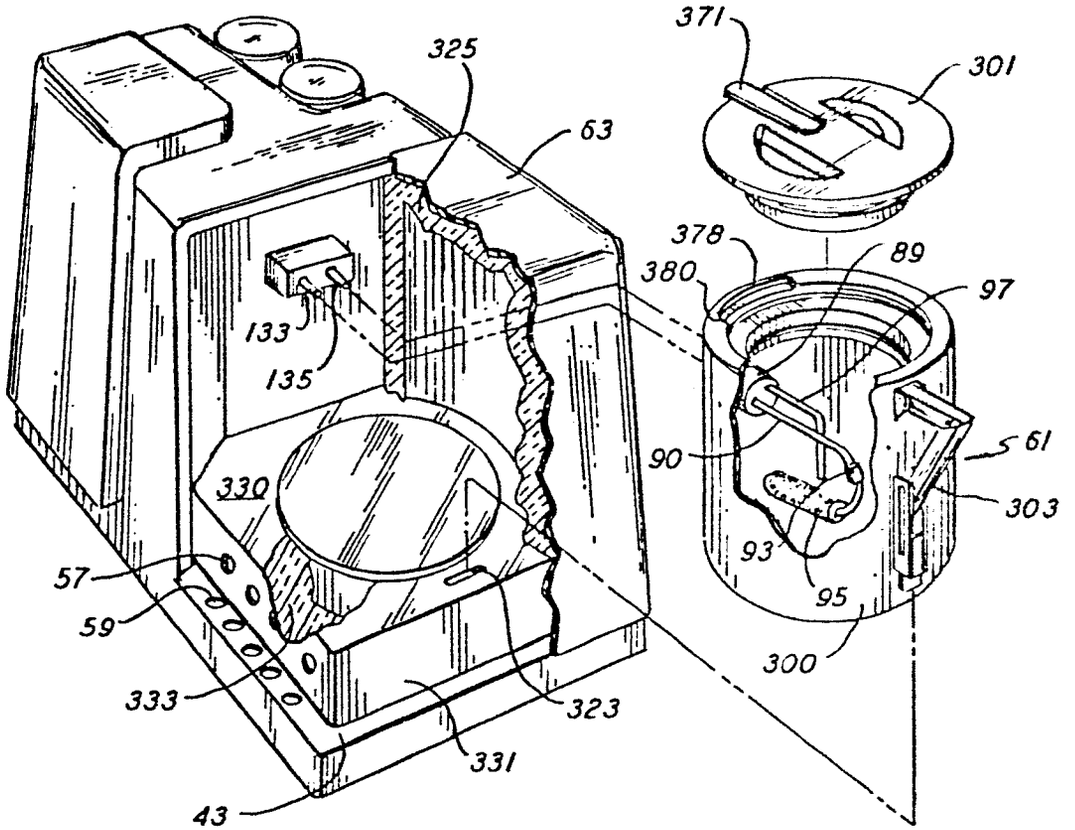
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FIG. 5

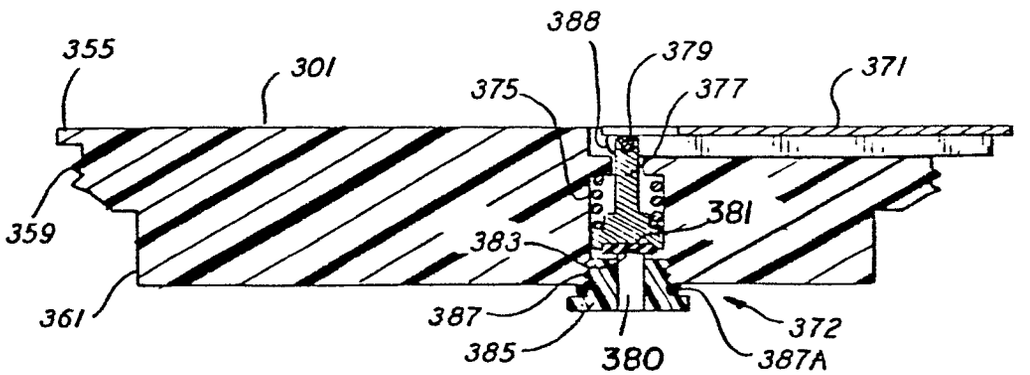
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FIG. 6

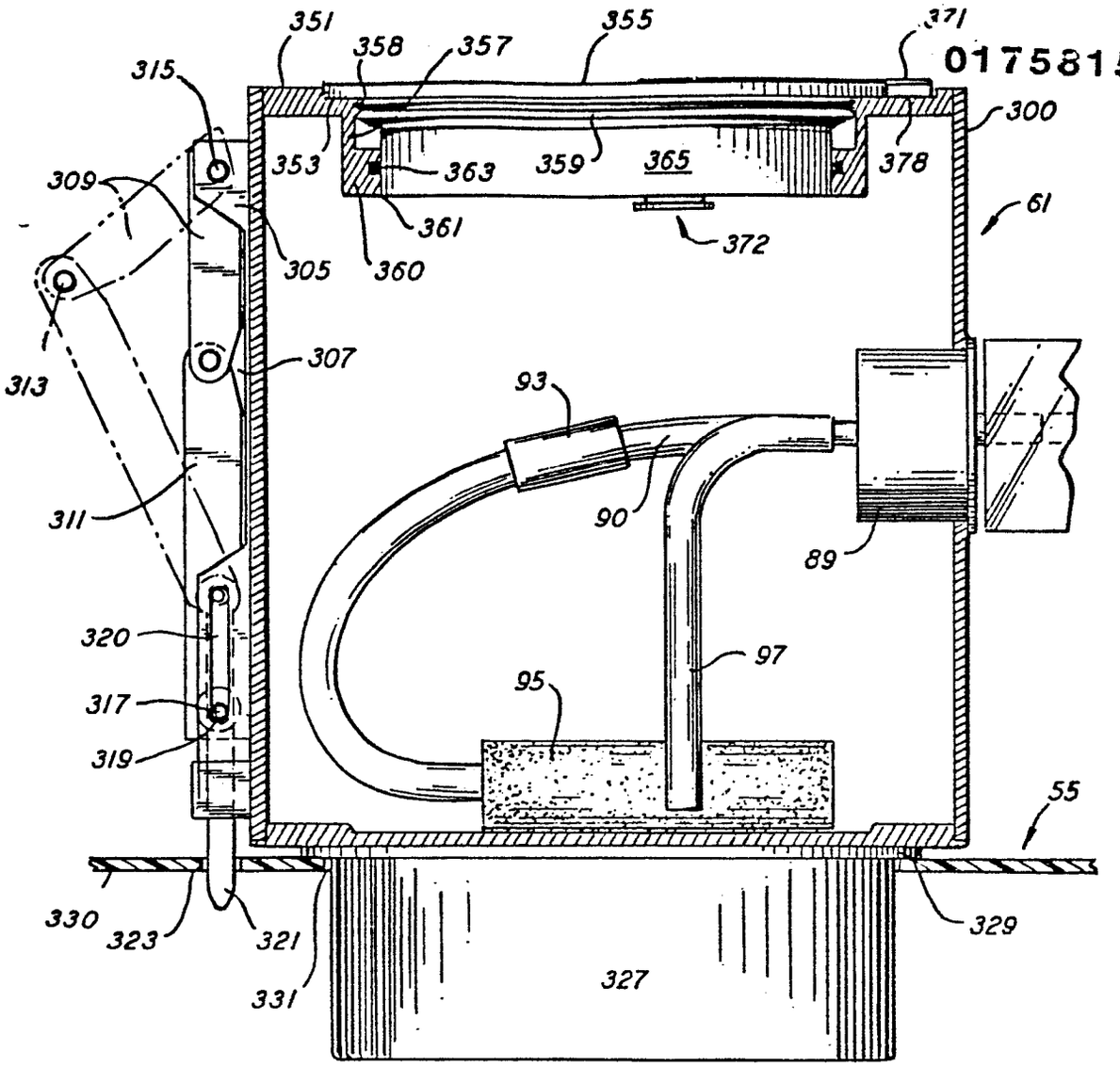
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FIG. 7

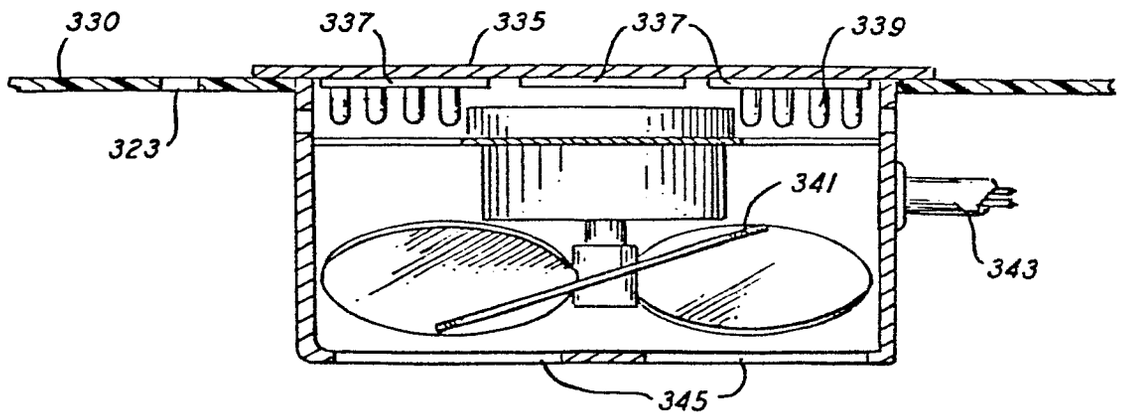
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FIG. 8

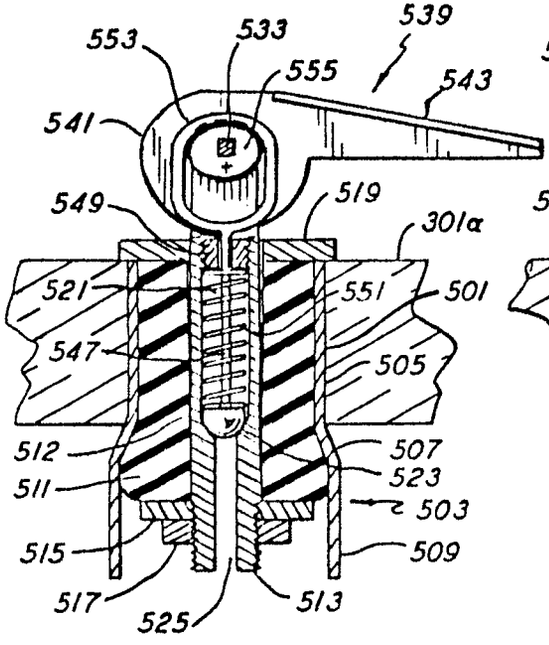

FIG. 9a

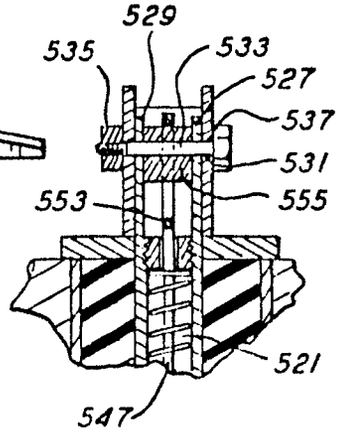

FIG. 9 b

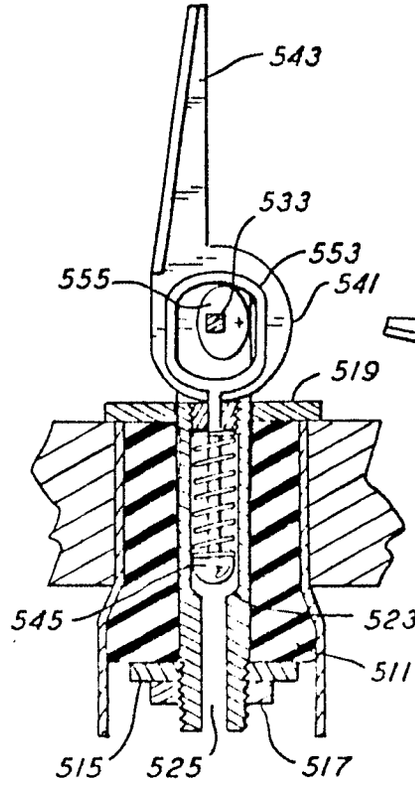

FIG. 9c

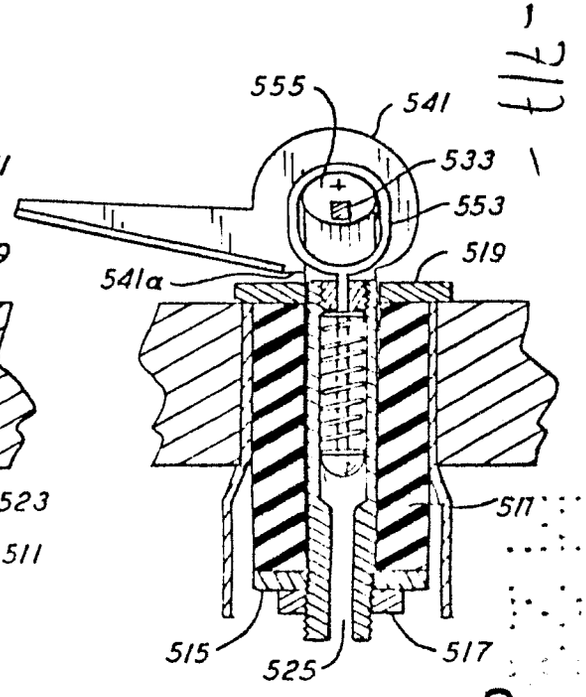

FIG. 9d

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