(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 246 052**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **87304166.9**

(22) Date of filing: **11.05.87**

(51) Int. Cl.³: **B 67 D 1/00**
B 67 D 1/14

(30) Priority: **10.05.86 GB 8611457**
10.05.86 GB 8611458

(43) Date of publication of application:
19.11.87 Bulletin 87/47

(84) Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

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(54) Improvements relating to beverage dispensers.

(57) The invention is a beverage dispensing system wherein concentrated syrup and diluent are dispensed from a machine into a cup to provide a beverage. The syrup is contained in a package (36) which is removable from the machine and the package has an outlet tube (38) which is deformed by a mechanism (58) of the machine to open and close the tube for the dispensing of the syrup. At the same time the mechanism opens and closes a diluent valve (56) so that the diluent flows and syrup flows, in predetermined proportions, at the same time. The two flows of diluent and syrup emerge from the machine from outlets (28,38) which are spaced so that the two flows do not mix in the machine, but the outlets are sufficiently close so that they can be caught in the same cup to provide the beverage.

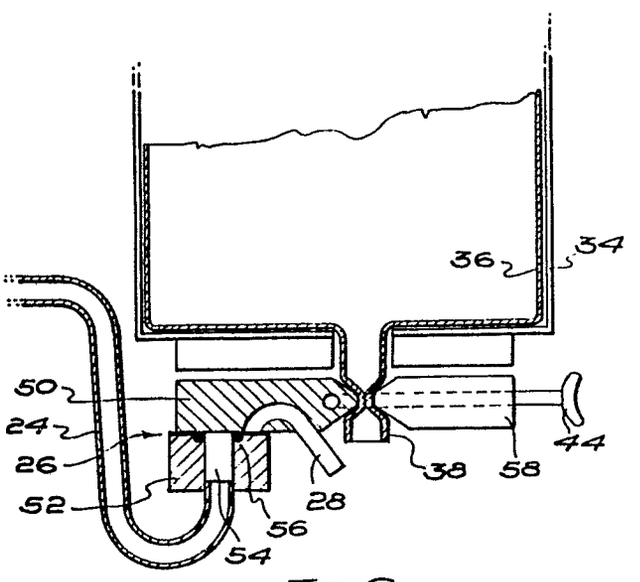

FIG. 2.

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Improvements relating to beverage dispensers

This invention concerns the field of dispensing beverages of the type comprising a concentrate or syrup and a diluent, which are mixed in order to provide the beverage.

Many systems are known for the production and dispensing of beverages of the type indicated above, such systems ranging from large scale factory installations which blend syrup and diluent in controlled quantities and under controlled conditions in order to produce a beverage mixture which is subsequently bottled and canned for retail to the public through traditional retail outlets such as supermarkets and stores. Such factory installations may be arranged to produce carbonated beverages in which case the diluent or sometimes the mixed beverage is carbonated under controlled temperature conditions, it being noted that higher carbonation levels can be achieved and maintained if the carbonation is effected and the carbonated liquid is stored under refrigerated conditions.

Another form of beverage dispensing system which is in common use comprises the installed type used in cafeterias, restaurants and bars in which the supplies of concentrate and diluent are connected via supply pipes and appropriate valving, with refrigeration being provided as appropriate, to a dispensing head whereat there is an operating means such as a handle or a button the manipulation or depressing of which results in flow of diluent and concentrate from the bulk supplies to a mixing head in which the constituents are mixed to provide the beverage mixture which issues from the dispensing head and can be caught in a drinking vessel. This

method is distinguished from the factory production installation referred to above in that mixing takes place only when a drink is to be dispensed, as the mixing takes place in the mixing head of the dispenser.

In a third type of dispensing arrangement, which is identified by the description "in-home" the consumer purchases a small dispensing machine for use for example on a kitchen counter. The diluent for the dispenser is, as it will probably be in all systems, water, which the consumer draws from the main supply, whilst the machine is adapted to receive packages, which are usually disposable, containing the concentrate. The concentrate can be bought in the packages from supermarkets or stores. When the package is fitted in the machine, and the machine is supplied with the diluent, operation of the machine effects dispensing of the syrup from the package and diluent from the machine so that the constituents are mixed to produce a beverage which is caught in a drinking cup. There are a number of forms of these in-home dispensing machines described in the published literature, and reference may be made for example to the following United States patent specifications.

U.S. 2,537,119 Bauerlein
U.S. 3,685,694 Ianelli
U.S. 3,292,822 Crowder

The various systems described in these patent specifications have shortcomings which range from significant to inconvenient, or simply adding to expense.

Thus, in the systems such as disclosed by Bauerlein and Ianelli which involve a mixing valve for the syrup and diluent before it is dispensed from the machine, there is always the need to clean the machine thoroughly, in particular the passages through which the syrup passes, as residual and aged syrup can lead to the formation of bacteria inside the machine passages, creating a health problem.

Of the system such as disclosed by Crowder, wherein the person requiring a drink has to dispense initially one constituent such as the syrup and catch same in the drinking vessel, followed by movement of the drinking vessel with the syrup contained therein to another outlet, it is difficult to achieve effective mixing of the two ingredients, without stirring the ingredients vigorously, and that action is undesirable when, as will normally be the case, the diluent is a carbonated water, as such vigorous stirring will cause carbon dioxide to come out of solution and therefore reduce the carbonation or fizziness of the drink.

The present invention seeks to provide a simple and effective dispensing system, especially suited for in-home applications, but which can be adapted for other dispensing applications, such as cafeteria dispensing applications.

The system according to the present invention has the advantage that operation of the dispensing system will result in issuance of the concentrate and

diluent in a predetermined ratio to provide a pallatable drink, but wherein the concentrate issues directly from a package without making contact with the machine so that hygiene problems are avoided, and in addition the concentrate and diluent can be caught in the same drinking cup whilst they simultaneously issue from the machine.

In accordance with a first aspect of the invention there is provided, a beverage dispensing system comprising a machine with an operating device adapted to be operated for the dispensing of a beverage package, wherein the machine comprises means for receiving the package containing syrup, said package having an outlet which can be opened and closed selectively, the machine furthermore comprising means permitting the supply of diluent from a diluent outlet of the machine when the said operating means are operated, and so that the syrup, when the package is in the machine, will issue directly from said outlet without contact with the machine and can be caught along with the diluent in the same drinking cup, and wherein said package has a collapsible body which collapses as the syrup flows therefrom.

In accordance with the invention in another aspect, the beverage dispensing system comprises a machine with an operating device adapted to be operated for the dispensing of a beverage, wherein the machine comprises means for receiving a package containing the syrup, said package having an outlet which can be pinched or twisted to close and open the package outlet selectively, the machine furthermore comprising means permitting the supply of diluent from a diluent outlet of the machine when said operating means are operated, and so that the syrup, when the package is in the machine, will issue directly from said outlet without contact with the machine and can be caught along with the diluent in the same drinking cup.

The means for operating the machine preferably operates simultaneously on a valve controlling the flow of diluent from the diluent outlet, and the pinching and unpinching or twisting and untwisting of the package outlet.

The machine preferably will include a clip for clipping the package outlet in closed condition, which clip is adapted to be located in a seating or the like in the machine when the package, with the outlet facing downwards is positioned in the machine so that the said clip can be adapted to be operated by the said operating means of the

machine. By this arrangement, when the package with the clip is in the machine, the clip can be opened and closed to effect dispensing of syrup from the package along with flow of diluent from the machine, but when the clip is positioned closing the package outlet, the package with the clip can be removed from the machine and stored in position with the outlet facing upward. Thereby, different packages with different syrup flavourings can be inserted in and removed from the machine at will.

The operating means may comprise a button or lever or any other suitable means.

The machine may be constructed along similar lines to the machine illustrated and described in said U.S. Patent No. 4,523,697 to Jeans except of course for the designing of the machine to accommodate the operation of the package as described herein.

Specifically, the machine may comprise a carbonator as described in said Jeans Patent, which can be quick release connected and disconnected from the remainder of the machine so that it can be filled with water from the tap and repositioned into the machine easily.

The package in said other aspect of the invention preferably comprise a collapsible bag which collapses progressively as the syrup is removed therefrom in the dispensing of drinks, or the bag may be provided with a loading device, such as a simple weight or springs pressing on the outside of the bag in order to maintain pressure on the syrup contained therein for the effective dispensing of the syrup from the outlet. The outlet will of course be dimensioned and

designed so as to give a predetermined flow, related to the flow of diluent from the machine, in order to provide a satisfactory mixture and a palatable drink.

If, as in the said Jeans Patent, the machine is provided with a carbon dioxide cylinder for carbonating the diluent, then the carbon dioxide can be used as required in order to pressurise the chamber containing the flexible bag of the package. In this connection, the package may come with an outer rigid casing and the collapsible bag containing the syrup inside, the outer casing being adapted to be coupled to the supply of CO_2 gas for the pressurisation of the outside of the collapsible bag. In an alternative arrangement, the package may simply be fittable into a chamber which, when the chamber is closed, is connected to the supply of CO_2 gas at an appropriate, regulated pressure so that the exterior thereof will be under the pressure of CO_2 gas which will force the syrup from the package when the machine is operated.

The present invention provides a novel dispensing machine which has a plurality of advantages namely that the syrup in being dispensed from the package does not contact the machine, and therefore hygiene problems resulting from aged syrup deposits in the machine are avoided. The packages can be inserted in and removed from the machine at will in order to change flavour of the drink, and preferably will be disposable so that they are thrown away when empty. The syrup and diluent are dispensed simultaneously and at a predetermined ratio to provide a satisfactory drink which does not require any additional stirring when poured in to the cap.

It is a problem of known beverage dispensing machine proposals wherein the concentrate passes through pipes and valves before issuing from the machine outlet, because such pipes and valves, being part of the machine, have to be cleaned of residual concentrate from time to time.

It has already been proposed in the Jeans United States Patent No. 4,523,697 to provide a beverage dispensing machine and package, the machine being particularly designed for the dispensing of carbonated beverages, the package having a valve and being adapted to fit into the machine so as to cooperate with movable parts of the machine. Movement of these parts of the machine effects relative movement of valve components of the package, enabling the concentrate to flow therefrom. At the same time, the said movable means operate a carbonated water supply line valve, enabling the discharge of carbonated water to form diluent for the concentrate, from another outlet. The two streams of concentrate and carbonated water, although spaced, are sufficiently close to enable both streams to be caught in the same drinking cup so that a palatable beverage is formed therein. The streams of concentrate and carbonated water flow continuously whilst the movable parts are in the dispensing position. When the movable parts return or are returned to the non-dispensing position, the valve of the package is closed, and the valve controlling the flow of carbonated water is closed. The package can be removed from the machine and replaced by another, for example containing concentrate of a different flavour.

In the said Jeans United States Patent, a novel form of holder and operating means for the package is described in that the package is inserted in the machine by inverting same and inserting the package cap which

embodies the valve in a specially shaped aperture in the holder, so that the cap and the body of the package drivingly engage the said movable parts wherby movement of the parts effects movement of the cap relative to the remainder of the package, and this action opens the valve in the package causing flow of concentrate direct from the package into free space where the drinking vessel can be located. There is no contact between the concentrate and the machine.

The package has a rigid body, and it also includes means for allowing air to enter the package to replace concentrate which flows therefrom. The present invention in yet a further aspect is concerned with the provision of an alternative form of package which is particularly adaptable to the fitting of a machine of the type set forth in said United States Patent.

In accordance with the further aspect of the invention, a concentrate package comprises a collapsible bag or pouch which is integrally connected to a package valve comprising movable valve members defining a valve controlling flow of concentrate from the package, said package being for use in combination with and received in a holder having movable parts so that the movable parts drivingly engage the movable members of the package, and when the package is in the holder, movement of the said movable parts effects opening and closing of the package valve permitting concentrate to flow therefrom, the said movable parts of the holder being arranged so that when the package is operated by same to cause the concentrate to flow from the package, it flows directly from the package into free space without touching the machine, so that it can be caught in a drinking vessel in said free space, the bag or pouch of the package being adapted to collapse as the concentrate is progressively used up.

For the collapsing of the flexible bag there may be provided a loading means which is loaded onto the flexible bag in order to pressurise the concentrate therein. Such loading means may comprise simply a weight resting on the top of the flexible bag when it is in position in the machine, or a spring acting on the bag in order to create the said pressure. Alternatively, if the machine is provided with a supply of carbon dioxide gas under pressure, such gas may be used to load the exterior of the flexible bag in order to pressurise same. The loading of the flexible bag is to ensure the positive discharge under pressure of the concentrate, as this will provide for dispensing of the concentrate at a substantially constant rate when the package valve is opened. If the concentrate were allowed simply to run out under gravity, then the flow rate could change between a full package and a partially filled package due to the change in concentrate head acting to force the concentrate from the package, but such an arrangement is not to be excluded from the present invention.

The said valve members may comprise relatively rotatable valve members, and the said movable parts of the machine may also comprise relatively rotatable machine members. The valve members may comprise drive dog tabs which extend radially therefrom, which are adapted to engage in drive slots in the machine members to establish said drive connection.

The package may further include an outer casing of cardboard or the like, in order to protect the flexible bag during handling and transportation.

Various other advantages and features of the invention will appear from the following description, given by way of example, embodiments of the invention and several modifications thereof.

In the drawings:-

Figure 1 is a diagrammatic side elevation of the dispensing machine according to one embodiment;

Figure 2 is a sectional elevation showing in more detail certain constructional and operational features of the machine shown in Figure 1, the machine being in the off condition;

Figures 3 is similar to Figure 2 but illustrates the on condition of the machine;

Figure 4 is a side view of the package used in connection with the dispensing system;

Figures 5 and 6 show modified forms of loading arrangements for the package;

Figures 7 and 8 are views similar to Figs. 2 and 3 but show an alternative arrangement for pinching the package tube;

Figures 9 and 10 again are views similar to Figs. 2 and 3, but show an embodiment of the invention wherein the tube of the package is twisted;

Figures 11 and 12 are plan views of details of the arrangement shown in Figs. 9 and 10;

Figure 13 is a sectional elevation of a package according to the invention;

Figure 14 is a sectional elevation of part of the package shown in Figure 13, in the process of being opened;

Figure 15 is a sectional elevation of the container of the package of Figure 13 when in the in-use position in the machine;

Figure 16 is a sectional elevation showing the container of the package of Figure 13, but when in use in a modified machine;

Figure 17 is a sectonal side elevation of the interior of the pinch tube of the container according to one embodiment thereof and when in a closed position;

Figure 18 is a sectional plan of the tube of Figure 17, when in the closed position;

Figure 19 is a sectional elevation of the pinch tube of Figure 17 when in the open position;

Figure 20 is a sectional plan of the tube of Figure 17, when in the Figure 19 position;

Figures 21 to 24 are views similar to Figures 17 to 20 but show another embodiment of pinch tube;

Fig. 25 is an exploded perspective elevation of the significant components of a package and holder combination of a beverage dispensing system according to another embodiment of the invention;

Fig. 26 is a sectional elevation of the arrangement shown in Fig. 25, when the package and holder are coupled, and when the system is in the "no flow" condition;

Fig. 27 is a view similar to Fig. 26, but showing the dispensing system in the "flow" condition;

Figs. 28 and 29 show two alternative methods of loading the internal pouch of the package shown in Figs. 26 and 27;

Fig. 30 is a side view of a package according to another embodiment of the invention;

Fig. 31 is an underneath plan of the package shown in Fig. 30;

Fig. 32 is a sectional elevation of the valve of the package shown in Fig. 30 with the valve in the closed condition; and

Fig. 33 is a sectional elevation similar to Fig. 32, but showing the valve in the open position.

Referring to the drawings, an example of a machine according to the invention as shown, the machine being shown diagrammatically. The casing of the machine is indicated by numeral 10, and it contains a carbon dioxide cylinder 12 supplying pressurised gas on lines 14 and 16 which lead from the said source, the line 14 leading through a regulator valve 18 so that the pressure in output line 20 from regulator

18, which leads to the syrup package, is at a reduced pressure. The line 16 leads to a carbonator tank 22 from which carbonated water may issue through line 24. Line 24 has an on/off valve 26 controlling the flow of carbonated water from an outlet 28 located so that carbonated water issuing from the outlet 28 can be caught directly in a drinking vessel. The inside of the casing has a location for a syrup package 32, and the syrup package in this example comprises an outer casing 34 and an inner flexible, collapsible bag 36 containing the syrup. The bag has a flexible tube 38 which forms the outlet, and which fits in the machine between a pair of pinching members 40 and 42, the operation of which is controlled by a button 44.

Quite simply, to operate the machine when it is in a condition as shown in Figure 1, the operator presses a button 44 which releases the pinch on tube 38, and also opens valve 26 so that water and syrup flow in predetermined portions into the cup 30 to provide the beverage. The propulsion of the syrup out of the outlet 38 is assisted by the carbon dioxide gas under pressure supplied through line 20 to the interior of the casing 32, but to the exterior of the bag 36.

Figure 1 as will be appreciated is diagramatic, and the method of pinching the tube 38 can be any suitable as will be explained hereinafter.

Figures 2 and 3 show in more detail one arrangement for the pinching of the tube 38, and the control of the supply of the carbon dioxide from the outlet 20.

Referring to Figure 2, supply outlet 24 pipe for carbonated water is shown as is the outlet 28, and it will be seen that the valve 26 is in fact made up of a sliding block 50 carrying outlet 28 and a

stationary block 52 into which the line 24 leads. The passage 54 in the fixed block 52 seals against the underside of block 50 by means of an O-ring seal 56 so that in the position shown in Figure 2, the passage 54 is blocked and carboned water can flow from line 24 to outlet 28. The button 44 is however connected to the block 50 so that when the button 44 is pushed, the block 50 will be in a retracted position as shown in Figure 3 in which the outlet 28 is aligned with the passage 54, and carbonated water can shoot from the outlet 28 as shown. At the same time, the pressing of the button releases the pinch on tube 38, and the syrup can flow from the outlet 38 as shown in Figure 3, both outlets although spaced, being in position so that the syrup and water can be caught in the same drinking vessel 30.

The pinching members 40 and 42 in the Figures 2 and 3 embodiment are in fact bevelled faces of the movable block 50 and a co-operating block 58.

It is to be mentioned that other means of loading the flexible container liner 36 may be employed, and two examples are shown in Figures 5 and 6. In Figure 5, the loading of the flexible bag to assist flow therefrom is by means of a weight 60, whilst in the arrangement of Figure 6 a spring 62 acting between a pair of discs 64 and 66 loads the bag 36. The invention however applies when there is no loading on the flexible bag 36, and indeed if the container 36 has a means whereby make up gas can be introduced therein as the syrup is being dispensed the container may be a rigid container.

The package may be supplied simply as a flexible bag adapted to be fitted into the machine or the flexible

bag may come with the more rigid casing 34, the casing and bag being throwaway items when the syrup in the bag has been used up. In this connection the package should be capable of easy insertion into and removal from the machine. This is possible with the Figure 2 and Figure 3 arrangement, but some difficulty may be experienced in blocking off the flow of syrup through the outlet 38 when the package is being removed from the machine when it is not empty, for example when it is desired to change the flavour.

One way of overcoming this difficulty, is to use a pipe clip such as is shown at 68 in Figure 4 to pinch close the outlet tube 38 so that the package can be removed and positioned upright until it is once more required to be used.

In fact, the machine may be arranged to operate on the pads 70 and 72 of the clip when the package is positioned in the operative position therein, so that the clip remains with the package at all times.

As an alternative to using the clip 68 as shown in Fig. 3, the flexible tube of the container may be designed to act as a valve which is open and closed between pinched and unpinched conditions or vice versa, and two embodiments for acheiving this are shown respectively in Figs. 17 to 20 and Figs. 21 to 24.

Referring first to Figs. 17 to 20, the flexible tube of the container may be provided with an internal shoulder 80 on which rests a ball 82 which seats on the shoulder 80 in the normal unpinched condition of the tube and the ball and seat 82 and

80 form a closed valve.

When the tube is pinched as shown in Fig. 19 in the vicinity of the shoulder 80, the bore 84 as shown clearly in Fig. 20 takes up an elongated form so that whilst the ball 82 still rests on the shoulder 80, portions of the bore 84 project beyond the ball and therefore the valve is opened. Concentrate can now flow past the ball 82 into the bore 84 and out of the tube.

When the pinching effect is removed, the tube returns by its natural resilience to the Fig. 17 position blocking further flow through the tube.

In the arrangement of Figs. 21 to 24, the tube is formed with a pair of internal shoulders 86 and 88 which make line contact across the diameter of the tube as shown in Fig. 22 thereby preventing passage of concentrate through the tube. When the tube is pinched in the region of the shoulders 86 and 88 however as shown in Figs. 23 and 24, the edges of the shoulders 86 and 88 which previously were straight and in contact, take up curved form creating an aperture 90 therebetween, the concentrate can flow through the tube. Again, when the pinching force is removed, the tube returns to the Fig. 21 position blocking further flow of concentrate therethrough.

Instead of the tube being in normally closed position as shown in Figs. 17 and 21, it may be in normally open position, so that when it is pinched it moves to a closed position in a manner illustrated in Figs. 2 and 4.

Figs. 7 and 8 show an alternative mechanism for the pinching of the tube and for the coupling of the diluent to a diluent outlet. Referring to these Figures, the flexible container body 36 is shown as is the outlet tube 38. The tube in the closed Fig. 7 position is pinched between a stop plate 92 and a lever arm 94. Lever arm 94 is pivotally mounted on an operating arm 96 at pivot point 98, and a lever 96 is mounted for pivotal movement about a fixed pivot point 100. The other end of the operating arm 96 is provided with a drive pin 102 which engages in a slot 104 of a valve block 106. Valve block 106 has an elbow passage 108 therein of which one end 110 forms an outlet, and the other end 112 forms an inlet. Abutting the face of the block 106 in which inlet 112 is located is a supply tube 114 for diluent, specifically carbonated water, the tube having a bore 116 through which the carbonated water passes. In the Fig. 7 position, the block 106 blocks flow of diluent through the bore 116 (and to this end an O-ring seal 118 is provided), but when the lever 96 is moved upwardly in the direction of arrow 120 until a position shown in Fig. 8 is reached, the block 106 is moved downwardly as indicated by arrow 122 until inlet 112 registers with the bore 116, and the diluent can flow through the block 106 and out of outlet 110 as shown in Fig. 8. At the same time, with the raising of the lever 96, the lever 94 is pivoted to the position shown in Fig. 8 releasing the pinching effect on the tube 38 and the concentrate flows out of the end of the tube 38. The flowing concentrate and diluent are caught in a cup to provide a beverage as described herein in relation to and as illustrated in Fig. 3.

Instead of the operating mechanism being designed

to pinch the tube closed by means of a linear action as provided for in the case of the embodiments of Figs. 2 and 7, the tube may be twisted and untwisted to be opened and closed or vice versa, as shown in Figs. 9 to 12. Referring to these figures, the flexible body 36 is again shown as is the outlet tube 38. The outlet tube 38 passes through a bore 124 in a mounting plate 126. The mounting plate 126 supports by means of a flange 128 a rotary valve member 130. The valve member 130 has a bore 132 registering with bore 124, and is rotatable about the central axis of the bore 132 by means of a lever 134 forming an integral part of the valve member 130, and projecting through a slot 136 in the mounting member 126.

Diluent is supplied through an inlet pipe 138 to an elbow passage 140 in the mounting member 26 an outlet 142 of same being surrounded by an O-ring seal 144 in order to form a liquid type seal between the face of the valve member 130 and the mounting member 126 when it is required that flow of diluent be blocked.

As shown in Fig. 11, the bore 132 may have a surface defined by serrations or grooves 146, and the outer surface of the tube 138 may be similarly shaped so as to fit neatly and drivingly in the groove 132.

As shown in Fig. 12, which is a plan view of the rotary valve member 130, in addition to the bore 132 there is a further bore 148 which is offset relative to the centre of the valve member.

The arrangement is that when the valve member 130 is in the position shown in Fig. 11, the tube 38 is

twisted as shown in Figs. 9 and 11 thereby blocking flow of concentrate therethrough. This twist may be a permanent set twist. Additionally, the passage 140 is blocked by the member 130 blocking flow of diluent from outlet 142. When the valve member 130 is turned however by manipulating the arm 134 as indicated by arrow 150 in Fig. 12, the tube 38 is untwisted as shown in Fig. 10 allowing flow of concentrate therethrough and into a drinking vessel 30, and at the same time, the bore 148 is registered with the outlet 142 so that the diluent can flow through the member 130 and can be caught in the same drinking vessel. The serrations 146 and the corresponding formations on the tube 38 ensure in fact that the tube 38 will be untwisted and twisted as the member 130 is rotated.

Figs. 13 to 15 show the package according to the invention in more detail. In Fig. 13, the package is shown as having a sealed outer case 34 and the inner flexible bag 36. The integral tube 38 is shown as being tucked into position inside the sealed case 34, and has a closed end 152. The outer case 34 has at one end a tear strip 154 which is torn away as shown in Fig. 14 to allow the tube 38 to be pulled to the in-use position shown in Fig. 14. Additionally, there is a tear strip 156 surounding the outer case and the tearing away of same as indicated in Fig. 14 allows the upper portion 34A of the case to be removed from the position covering the flexible bag 36, as indicated by arrow 158. The thus exposed inner flexxble bag 36 can now be positioned in a rigid casing 158 as shown in Fig. 15 which is made up of a base plate 160 and a covering bell portion 162 which are sealingly interfitted in the region 164. The bell portion 162 has a coupling 166 for the connection thereto of the CO_2 pressure gas supply whereby the interior

of the bell 158 may be pressurised to pressurise the exterior of the bag 36 for the dispensing as herein described. Fig. 15 also shows that in the alternative a weight 168 may be placed on top of the bag 36 for the loading of same in which case the supply of gas under pressure through connection 166 would not be required.

Fig. 16 shows simply that instead of using a weight 168 or a supply of gas under pressure, a spring 170 reacting between the top end of the bag 36 and the undersurface of a cap 172 of the casing, may be utilised for the loading of the bag 36.

Although the invention in the aspects described in relation to Figs. 1 to 24 is particularly applicable with closed flexible and collapsible bag type packages, it could be used with rigid disposable packages, but such packages would require a means for allowing air to enter the interior of the package to replace syrup as the syrup flows therefrom.

The package according to the invention aspects to be described in relation to Figs. 25 to 33 is essentially for use in a beverage dispensing machine of the type set forth in U.S. Patent No. 4,523,697 which is incorporated herein by reference, and in which there is a full description of the construction and operation of the machine and the advantages thereof. The accompanying drawings are therefore only diagrammatic but will be well understood when considered in conjunction with the disclosure of said U.S. Patent.

Referring to Fig. 25, the package 110 shown is of a disposable character and comprises a body 112 and a valve arrangement 114 in the form of a cap which comprises two relatively rotatable discs 116 and 118, provided with drive tabs 120 and 122 whose function will become clear hereinafter. The disc 116 is provided with an outlet aperture 124 from which syrup or concentrate contained in the body 112 can flow when the package is in the open condition as shown in Fig. 27. The size of aperture 124 will be set depending upon the viscosity of the concentrate in the package.

Interiorally, as shown in Fig. 26, the body comprises a flexible bag or pouch 126, which may be formed by synthetic plastics film material, which is integrally connected to the disc 118, and forms a closed container housing the syrup or concentrate 128. The body 112 also comprises a rigidifying outer case 130 which may be of cardboard or the like. When supplied the case may be closed to protect the pouch and may require to be broken open to make the package operational.

It will be seen from Fig. 26 that disc 116 is shown as a solid disc except for the through passage 124, and is provided with a circular flange 132 which engages a circular groove 134 in the disc 118 so that the disc

116 is rotatable relative to the disc 118, but cannot be disconnected therefrom. Disc 118 has an outlet aperture 136 which in the open position of the package as shown in Fig. 27 aligns with the passage 124 permitting the concentrate 128 to flow from the package as indicated, by stream 138 in Fig. 27. Other forms of disc and valve arrangement can be used.

In the arrangement shown in Fig. 26, the top of the outer case 130 is shown as being open, and placed in the case is a weight 140 which acts on the flexible pouch or bag 128 as indicated by the arrows 142 in order to maintain a pressure on the concentrate 128 so that it will flow at a substantially constant rate stream 138 when the valve of the package is opened.

Returning to Fig. 25, a holder of the machine with which the package is to be used is shown, and such holder typically will be the holder of the machine illustrated and described in the said U.S. Patent. The holder shown in the drawings is diagrammatic of the holder illustrated in said U.S. Patent and comprises basically two annular plates 144 and 146. The plate 146 being provided with a manipulating handle 148 so that the plate 146 can be pivoted by the handle 148 between the closed and open positions of the dispensing system. The open position of the handle 148 is shown in dotted lines in Fig. 25.

The central bore 150 defined by the two plates 144 and 146 is for receiving the two discs 116 and 118 of the package which is inserted as indicated by arrow 152, and from the bore 150 is defined an axial slot 154 for receiving the tabs 120 and 122 so that when the discs 116 and 118 are inserted in bore 150 as shown in Figs. 26 and 27, the tabs 122 and 120 will be respectively drivingly engaged by the plates 144 and 146, as

described more particularly in the said U.S. Patent.

Carbonated water feedline 156 coupled to a bulk supply of carbonated water as described in said U.S. Patent enters the side of plate 144 and connects with a short passage 158 therein. The plate 146 has a water coupling passage 160 located as shown in Fig. 25 for aligning with the passage 158 when the dispensing system is in the operative dispensing condition shown in Fig. 27.

Operation of the system it is believed will be understood from the above and from reference to said U.S.Patent, but it should be mentioned that the holder shown in Fig. 25 is part of a machine, for example an in-home dispensing machine for use on a kitchen counter or sink, and there will be a space under the holder shown in Fig. 25 for the location of a cup 162 as shown in Fig. 27. To fit a package 110 into the machine, it is simply a matter of ensuring that the plates 144 and 146 are in the position shown in Fig. 25, then the package is lowered into position as indicated by arrow 152 until the discs 116 and 118 enter the bore 150. This is the position shown in Fig. 26. To dispense a drink into a cup 162, it is simply a matter of turning the plate 146 by means of the handle 148 which turns the plate 116 relative to the plate 118. This action brings the outlet 136 in disc 118 into register with passage 124 in disc 116, so that syrup can flow from the package directly into the cup without touching the machine or the holder, and at the same time the connecting passage 160 is aligned with the passage 158, and carbonated water can flow from the connecting passage 160 in a stream as indicated by reference 164 in Fig. 27 so as to be caught in the same cup 162 as the syrup thereby to provide a mixture to constitute a beverage. The streams 164 and 138 may be arranged in any particular geometric relationshsip in order to

ensure best mixing of the two components of the drink, but it is preferred that they should issue from locations which are spaced so that the constituents do not in fact mix until they are in free space and/or are contained in a cup.

Instead of the totally manual system illustrated for operating the plates 144, 146, a mechanical/pneumatic system may be used in which a lever is operated by hand directly or by positioning the cup, to cause pneumatic operation of the plates; the pneumatic operation may be effected by using CO_2 gas under pressure as a supply of such gas will normally form part of the machine as described in said U.S. Patent for carbonating the water.

Referring now to the embodiment of the invention shown in Figs. 28 to 33, in these Figures similar reference numerals to those used in Figures 25 to 27 are used, where corresponding parts are designated. The flexible container body 112 is clearly shown, as are the relatively rotatable discs or components 116 and 118, with drive tabs 120 and 122, but in addition, the parts 116 and 118 have interlocking projections and recesses 116A and 118A which form a lock preventing the parts 116 and 118 from untwisting in transit, but this lock can be overcome by applying positive torque to the respective parts 116 and 118 through the tabs 120 and 122 during the use of the package in the machine.

The components 116 and 118 are hollow as shown in Fig. 32, and component 118 comprises an outer wall 200, an inner cylindrical wall 202, these walls being connected by a lower disc portion 204. The outer wall 200 has the drive tab 122 provided integrally therewith. A flange 206 at the top end of wall 200 as shown in Fig. 32 is sealed to the flexible body 112 and inside the bore

defined by inner wall 202 is a flexible tubular valve member 208 having an enlarged top end flange 210 which is sealed between the top end of inner wall 202 and the flexible body 112, the flexible body 112 having an outlet 212 leading into the top end of the flexible tube member 208.

The rotary member 116 similar to member 118 has an outer cylindrical wall 214 and a shorter inner wall 216, these being connected by a disc portion 218. The lower end of the tubular valve member 208 passes into the bore defined by the inner wall 216, and a flange 220 at the top end of wall 216 is sealed to a lower enlarged flange 222 at the lower end of the flexible tubular member 208.

In the position shown in Fig. 32, the tubular member 208 is twisted in that the lower end is turned through 180^{o} relative to the top end, and therefore the tube 208 prevents flow of syrup from the body 112. When the valve member 116 is however turned as described in relation to Figs. 25 to 27, the tube 208 as shown clearly in Fig. 33 moves to the untwisted condition, and syrup can pass therethrough out of the valve. It can be seen that by this embodiment a simple valve means is provided in the form of a flexible tube which is moved between twisted and untwisted positions for controlling the flow of syrup from the body 112.

It is appreciated that Figs. 25 to 33 show basic outlines of systems, and that many modifications are possible. For example, instead of using a weight to pressurise the exterior of the package 126, the machine could be adapted so that a spring 170 acts between the bag 128 and a fixed part of the machine as shown in Fig. 25 or so that the supply of carbon dioxide gas under pressure at the machine, is used to pressurise a

sealed chamber 180 containing the bag 128 as shown in Fig. 29 so that the pressure of the CO_2 gas acts in the bag 128 as shown by arrows 182. It is also possible to let the concentrate flow from bag 128 under gravity if required if consistency of quality of drink dispensed is not a high priority.

The considerable advantage of the package according to the invention is its simplicity in that the package valve components can be much simplified. Insertion and removal of the package can take place even although the contents of the package are not exhausted no air enters the package and therefore the syrup therein will have a long shelf life, and it is a simple matter to replace a package containing concentrate of one flavour with another containing concentrate of a different flavour.

The passages 136 and 124, the weight 140, the passages 158 and 160 will be chosen so as to give the correct proportions of water and syrup flows to ensure a palatable drink is dispensed.

CLAIMS

1. A beverage dispensing system comprising a machine with an operating device adapted to be operated for the dispensing of a beverage package, wherein the machine comprises means for receiving the package containing syrup, said package having an outlet which can be opened and closed selectively, the machine furthermore comprising means permitting the supply of diluent from a diluent outlet of the machine when the said operating means are operated, and so that the syrup, when the package is in the machine, will issue directly from said outlet without contact with the machine and can be caught along with the diluent in the same drinking cup, and wherein said package has a collapsible body which collapses as the syrup flows therefrom.

2. A beverage dispensing system comprising:-

a) a machine comprising

i) a dispensing head for receiving a package containing syrup;

ii) a supply of diluent;

iii) means connecting the supply of diluent to the dispensing head;

iv) a diluent supply valve in said head controlling flow of diluent;

v) a diluent outlet in said head

vi) an operating device for controlling the diluent supply valve;

vii) first and second package receiving means in said head for receiving the syrup package, said first and second means relatively movable;

viii) means coupling the operating device to said first and second package receiving means for the relative movement of said first and second means; and

b) a syrup package comprising

i) a body; and

ii) a flexible outlet tube from which syrup can drain;

said package being received in the first and second package receiving means with the outlet tube hanging downwards so that the syrup can flow therefrom when the dispensing machine is dispensing, directly from the outlet through free space into a drinking vessel,

the first and second package receiving means when operated moving the tube between a closed position and an open position and the tube undergoes flexible distortion in moving between said

positions;

and wherein the diluent outlet is located spaced from but sufficiently close to the syrup outlet that both flows can be caught in the same drinking vessel to form a beverage.

3. A dispensing system according to Claim 2, wherein said first and second package receiving means comprises first and second relatively slidable members providing a means for pinching the syrup outlet tube, a diluent passage in one of said members of which one end of the passage forms the diluent outlet and the other end is connectible with the means ccnnecting the diluent supply.

4. A dispensing system according to Claim 2, wherein said first and second receiving means comprises:

a) a stop plate;

b) a pinching lever movable towards and away from the stop plate to pinch and unpinch the outlet tube of the package;

and wherein the operating device comprises

i) an operating lever pivotally ccnnected to the pinching lever and pivotally mounted on a fixed pivot of the macine;

ii) a further lever arm on said operating lever;

iii) a slide block having a diluent passage therein of which one end forms the diluent outlet;

iv) a pin on said further lever arm;

v) a slot in the slide block engaged by said pin;

whereby moving of the operating lever moves the slide block between positions allowing and preventing flow of diluent from the diluent outlet as well as pinching and unpinching the package outlet tube.

5. A dispensing system according to Claim 2, wherein said first and second receiving means comprises:-

a) a rotary member;

b) a support member supporting the rotary member for rotation thereon;

c) a bore in said rotary member through which the package outlet tube extends so that syrup issuing therefrom issues into free space and can be caught in a drinking vessel;

d) a second bore in the rotary member of which one end forms the diluent outlet;

e) means drivingly connecting the first bore with the package outlet tube whereby turning of the rotary member twists and untwists the outlet tube ccntrolling flow therefrom and selectively positions the second bore in registry and out of registry with the means connecting the supply of diluent to the dispensing head.

6. A dispensing system according to Claim 5, including a diluent passage in the holder member coupling with said means connecting the supply of diluent, an O-ring seal at an outlet of said passage sealing said outlet against the rotary member.

7. A dispensing system according to Claim 5, including serrations on the face of said first bore, and corresponding formation on the outer surface of said outlet tube stabilising a drive connection between the outlet tube and the rotary member.

8. A dispensing system according to Claim 2, wherein the package comprises a flexible bag and the outlet tube is integral with said bag.

9. A dispensing system according to Claim 3, wherein the package includes an outer casing containing the bag.

10. A dispensing system according to Claim 9, including a tear panel on the casing for giving access to the outlet tube.

11. A dispensing system according to Claim 9, wherein the casing includes a tear strip ccnnecting upper and lower casing portions and removal of the tear strip permits removal of at least the upper casing portion.

12. A dispensing system according to Claim 9, including a source of gas under pressure, a coupling for gas under pressure in said casing and means coupling the source of gas under pressure to said coupling to pressurise the interior of the casing and the exterior of the bag.

13. A dispensing system according to Claim 9, including a weight resting on the bag to pressurise same.

14. A dispensing system according to Claim 9, inclduing a spring means acting between the bag and the casing to pressurise the bag.

15. A dispensing system according to Claim 2, wherein the outlet tube includes an internal shoulder and a sealing ball which sits on the shoulder blocking flow of syrup therethrough until the tube is deformed by pinching.

16. A dispensing system according to Claim 2, wherein the outlet tube includes internal shoulders

which abut and block flow of syrup through the tube until the tube is deformed by pinching to cause the contacting surfaces of the shoulders to move apart.

17. A container for dispensing a concentrate through air to a receptacle comprising:

(a) a flexible closed container bag for containing a volume of the concentrate;

(b) a first valve part in communication with said volume;

(c) a second container part having a second mating valve part therein and having means forming an outlet opening, said second container part movable to selectively move said first and second valve parts with respect to each other to allow, while said first and second valve parts are moved apart, a continuous flow of said concentrate from said first part, through said valve parts and out said outlet opening;

(d) means establishing a constricted area through which concentrate must flow when being dispensed, the cross section of said constricted area being predetermined as a function of the viscosity of said concentrate;

(e) means to maintain an essentially constant head pressure in the interior of said first container part over a range of concentrate levels in said first container part, whereby said means establishing and said means to maintain, together will result in a controlled constant flow rate from said outlet opening.

18. A container according to claim 17 and further including means for effecting movement of said first and second valve parts with respect to each other comprising

(a) means on said bottle and cap respectively for engagement by first and second parts of a dispensing mechanism which are movable with respect to each other.

19. A container according to claim 17 wherein the size of said outlet is selected to establish a desired flow rate after rotation, based on the nature of the

concentrate to be contained.

20. A container according to claim 17 wherein the size of said outlet opening is sized to establish a desired flow rate after movement of said valve parts apart, based on the nature of the concentrate to be contained.

21. A container according to claim 18 in combination with a dispensing mechanism having at least first and second parts movable with respect to each other and adaptable to engage said bottle and cap respectively.

22. The combination according to claim 21 wherein opposing surfaces of said dispensing mechanism parts and bottle and cap contain cooperating slots and tabs for engageent with each other.

23. The combination according to claim 21, including a weight member acting on the flexible container bag to force the concentrate therefrom when the valve is open.

24. The combination according to claim 21, including a spring acting on the flexible container bag to force the concentrate therefrom when the valve is open.

25. The combination according to claim 21, including a source of gas under pressure, means enclosing the flexible bag, means coupling the source of gas under pressure to apply same to the interior of the means enclosing but exterior to the flexible bag to act on the flexible bag to force concentrate therefrom when the valve is open.

26. Apparatus for dispensing a concentrate at a predetermined flow rate comprising:

(a) a container including;

(1) a closed flexible container bag with a

neck for containing a volume of the concentrate;

(2) a first valve part at said neck in communication with said volume;

(3) a cap having a second mating valve part therein and having means forming an outlet opening, said cap movable with respect to said bottle to selectively move said first and second valve parts with respect to each other by a preselected amount to allow the flow of said concentrate from said first part, through said valve parts and out said outlet opening;

(4) means on said bottle and cap, respectively, for engagement by first and second parts of a dispensing mechanism which are movable with respect to each other;

(5) means loading the flexible bag to force concentrate therefrom when said valve is open; and

(b) a dispensing mechanism comprising first and second parts movable with respect to each other engaging said means on said bottle and cap to move said first and second valve parts to permit concentrate flow.

27. Apparatus according to claim 26, wherein said loading means comprise means to permit application of gas under pressure in a controlled manner which will maintain said essentially constant head pressure on said bag.

28. Apparatus according to claim 27, and further including a seal between said first and second valve parts to stop flow to the outlet opening in said cap when said valve is closed.

29. Apparatus according to claim 27 or 28, wherein the size of said outlet is selected to establish a desired flow rate after rotation, based on the nature of the concentrate to be contained.

30. A container for dispensing a concentrate through air to a receptacle comprising:

(a) a flexible, closed container bag for containing a volume of concentrate;

(b) a flexible tube forming an outlet from said bag and through which concentrate can flow;

(c) a first valve membe connected to said tube;

(d) a second valve member connected to said tube and rotatable relative to said first valve member; whereby the tube may by rotation of said second valve member relative to said first valve member, twist and untwist the tube to control the flow of concentrate therethrough.

31. A container according to claim 30, wherein said first valve member is connected to said flexible bag.

32. A container according to claim 31, wherein said first valve member comprises inner and outer cylindrical walls, said inner wall connected to said flexible tube and said outer wall connected to said bag.

33. A container according to claim 32, wherein said flexible tube comprises enlarged flanges at each end, the enlarged flange at one end connected to the bag and the enlarged flange at the other end connected to said second valve member.

34. A container according to claim 33, including first drive tab means on the first valve member and second drive tab means on the second valve member.

35. A container according to claim 30, in combination with a dispensing mechanism having at least first and second parts movable with respect to each other and adaptable to drivingly engage said valve members respectively.

36. The combination according to claim 35, wherein opposing surfaces of said dispensing mechanism parts and first and second valve members contain cooperating slots and tabs for engagement with each other.

37. The combination according to claim 36, including a weight member acting on the flexible container bag to force the concentrate therefrom when the valve is open.

38. The combination according to claim 36, including a spring acting on the flexible container bag to force the concentrate therefrom when the valve is open.

39. The combination according to claim 36, including a source of gas under pressure, means enclosing the flexible bag, means enabling the source of gas under pressure to apply same to the interior of the means enclosing but exterior to the flexible bag to act on the flexible bag to force concentrate therefrom when the valve is open.

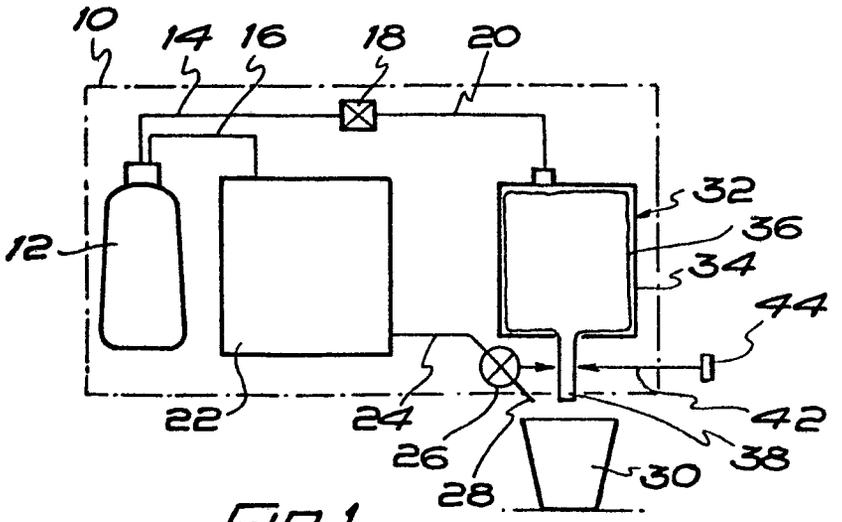
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FIG. 1

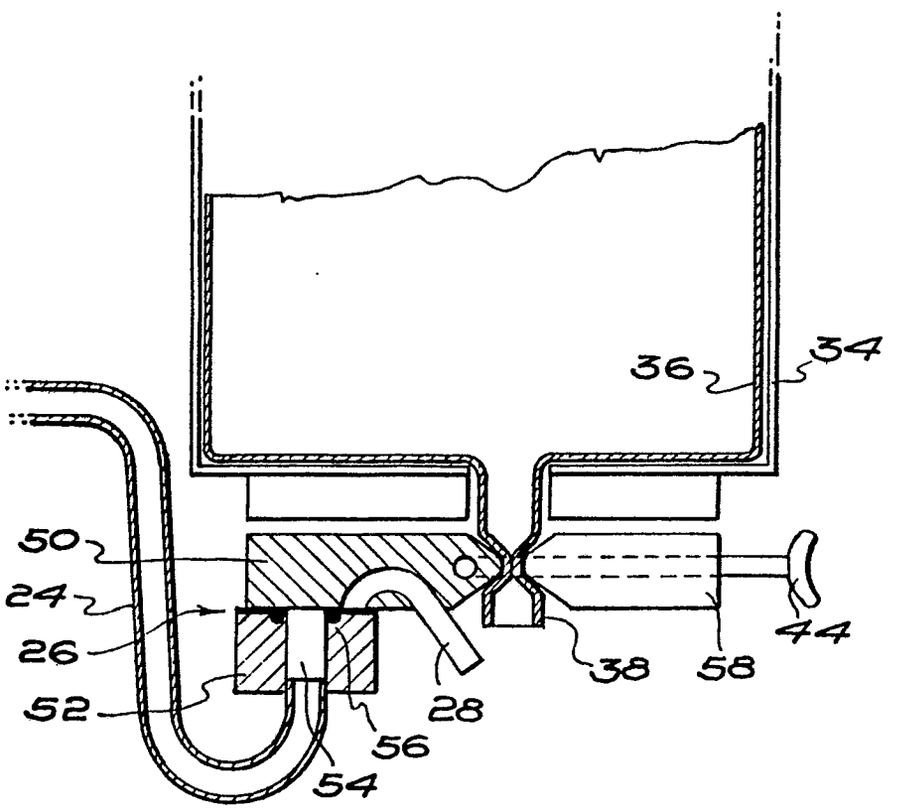
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FIG. 2

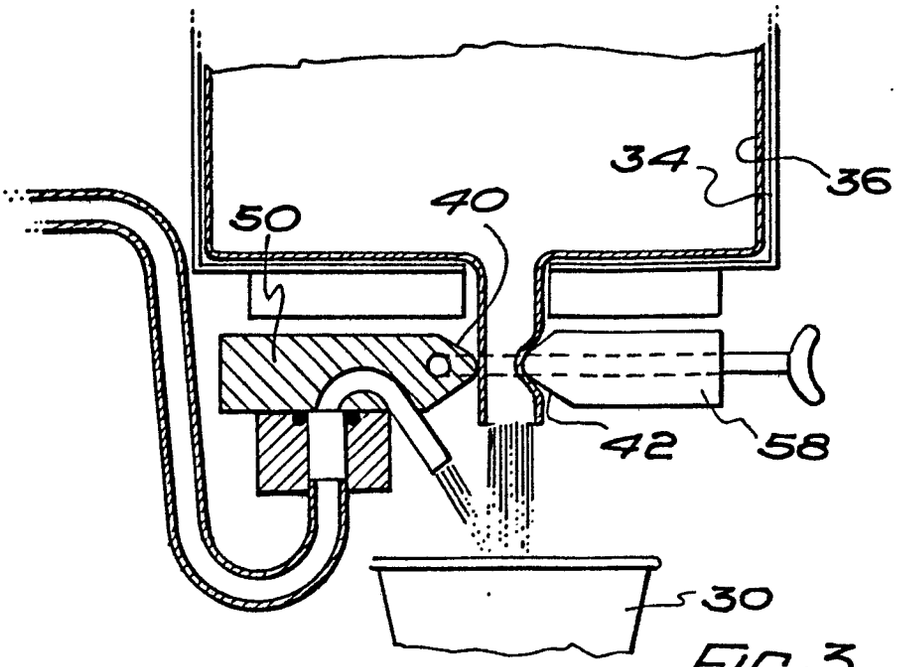

FIG. 3

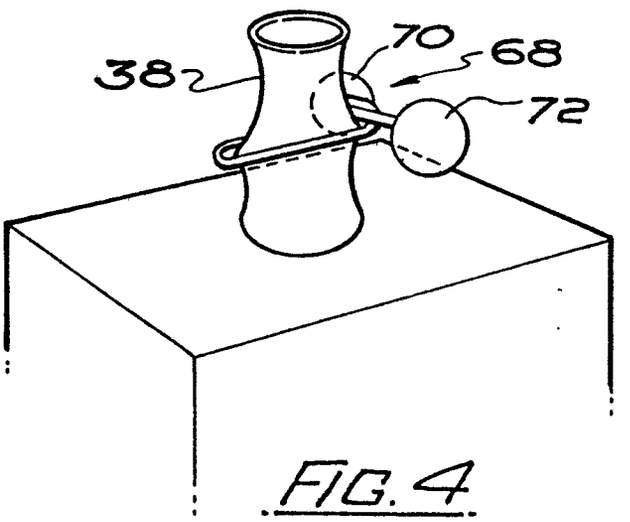

FIG. 4

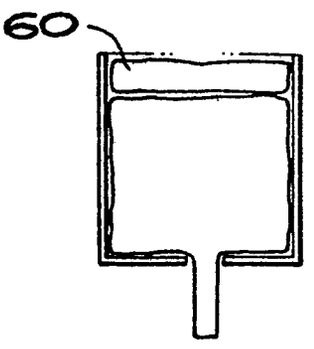

FIG. 5

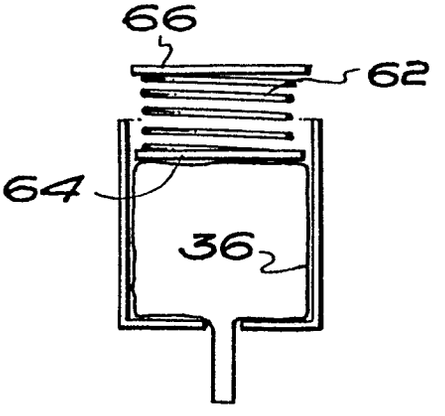

FIG. 6

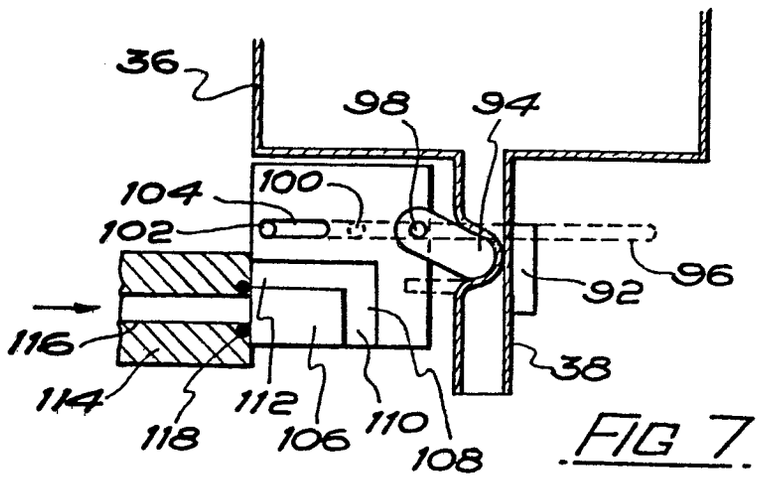

FIG 7.

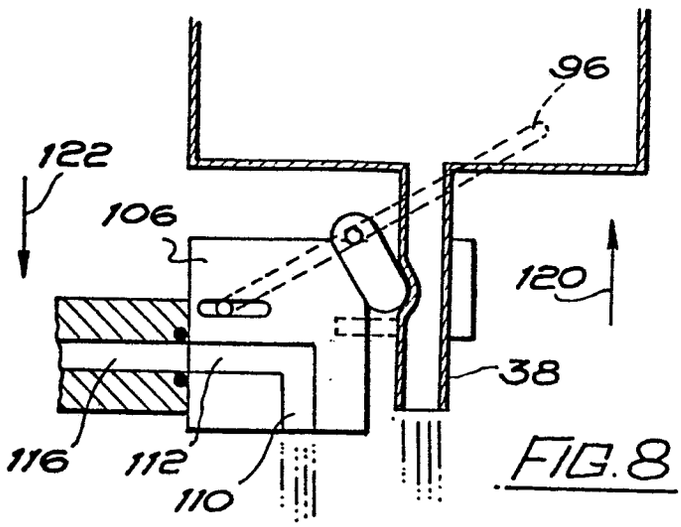

FIG. 8

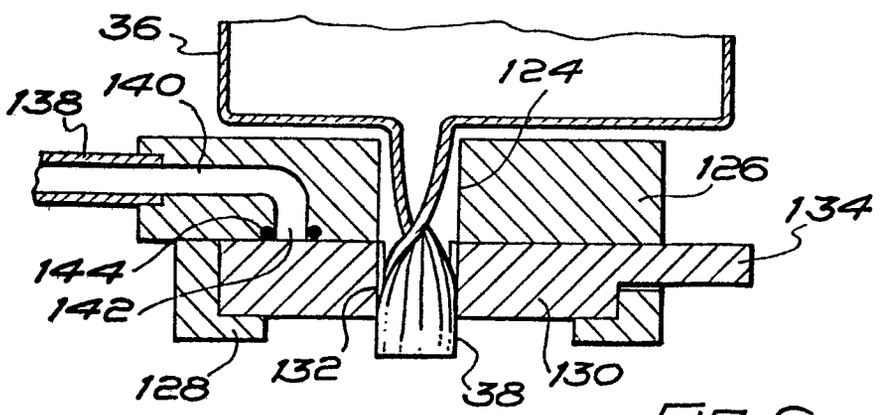

FIG. 9

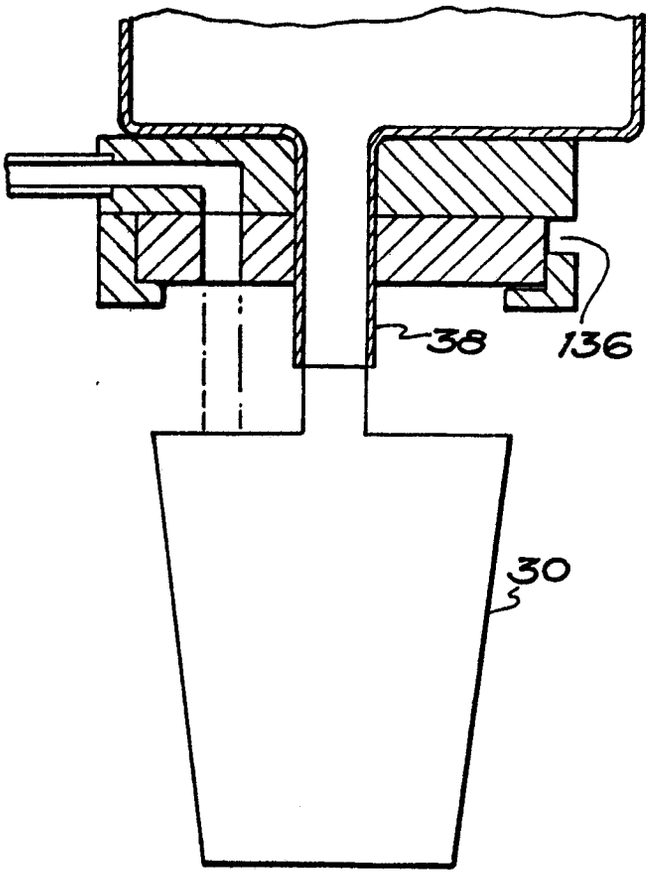

FIG. 10

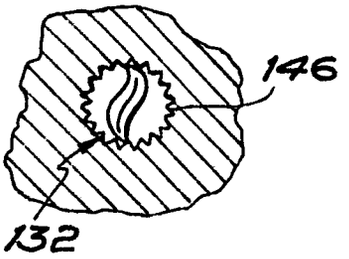

FIG. 11

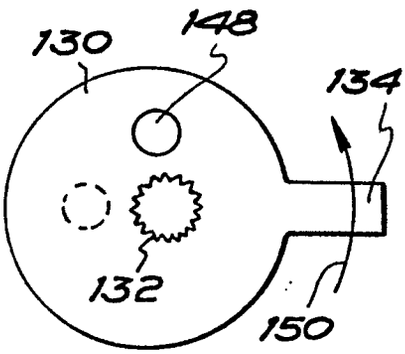

FIG. 12

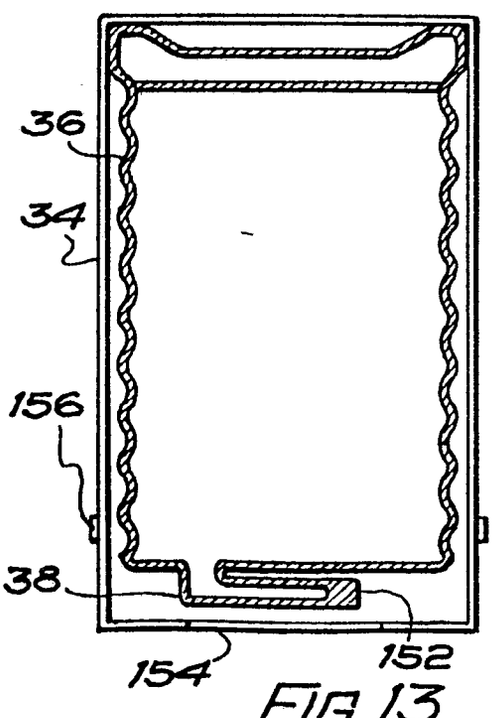

FIG. 13

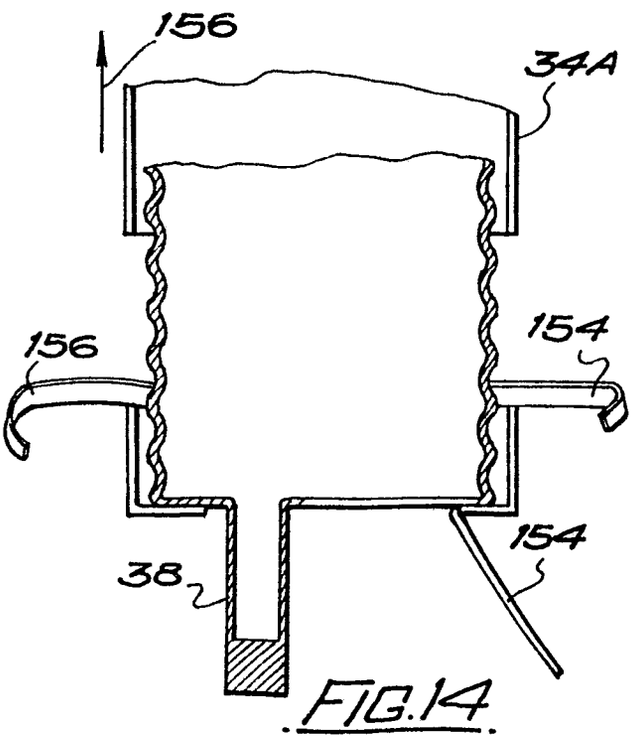

FIG. 14

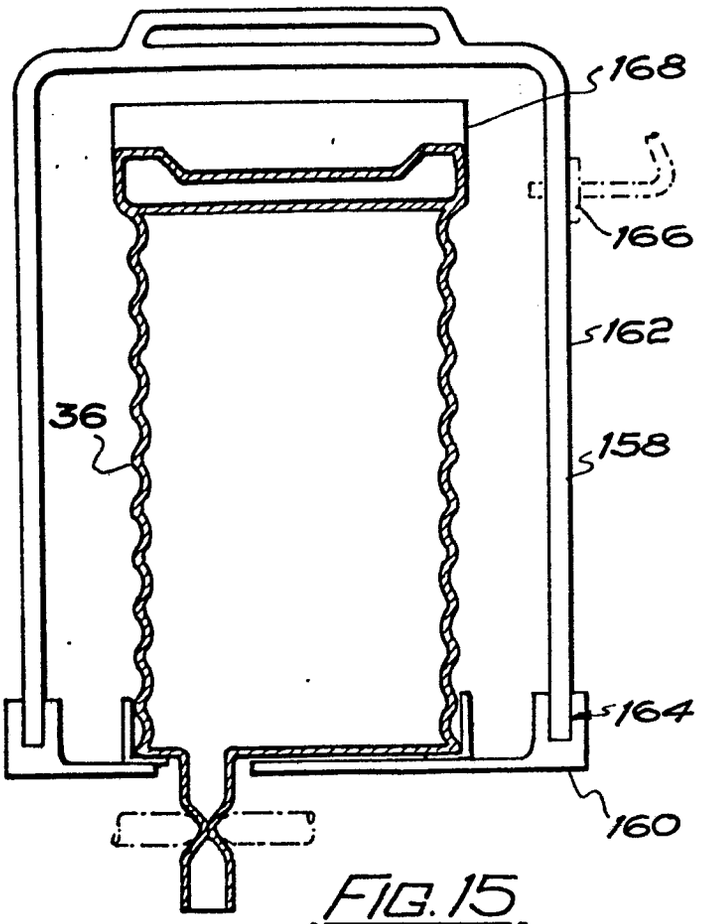

FIG. 15

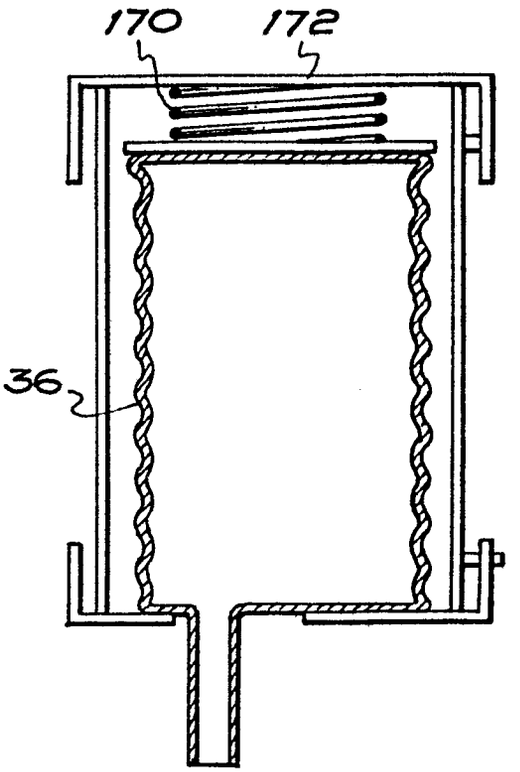

FIG. 16

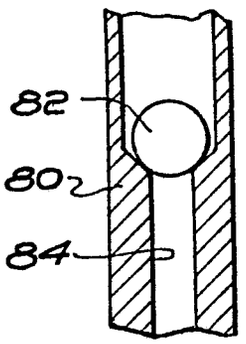

FIG. 17

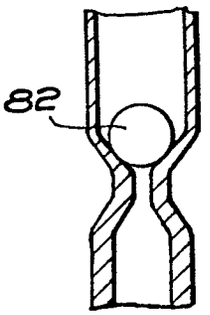

FIG 19

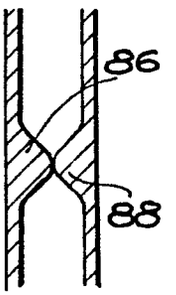

FIG. 21

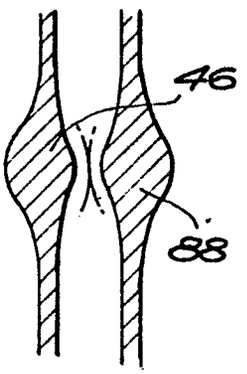

FIG. 23

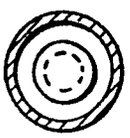

FIG. 18

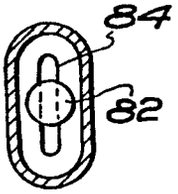

FIG. 20

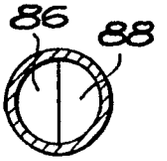

FIG. 22

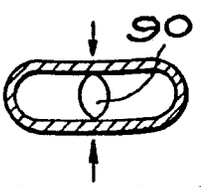

FIG. 24

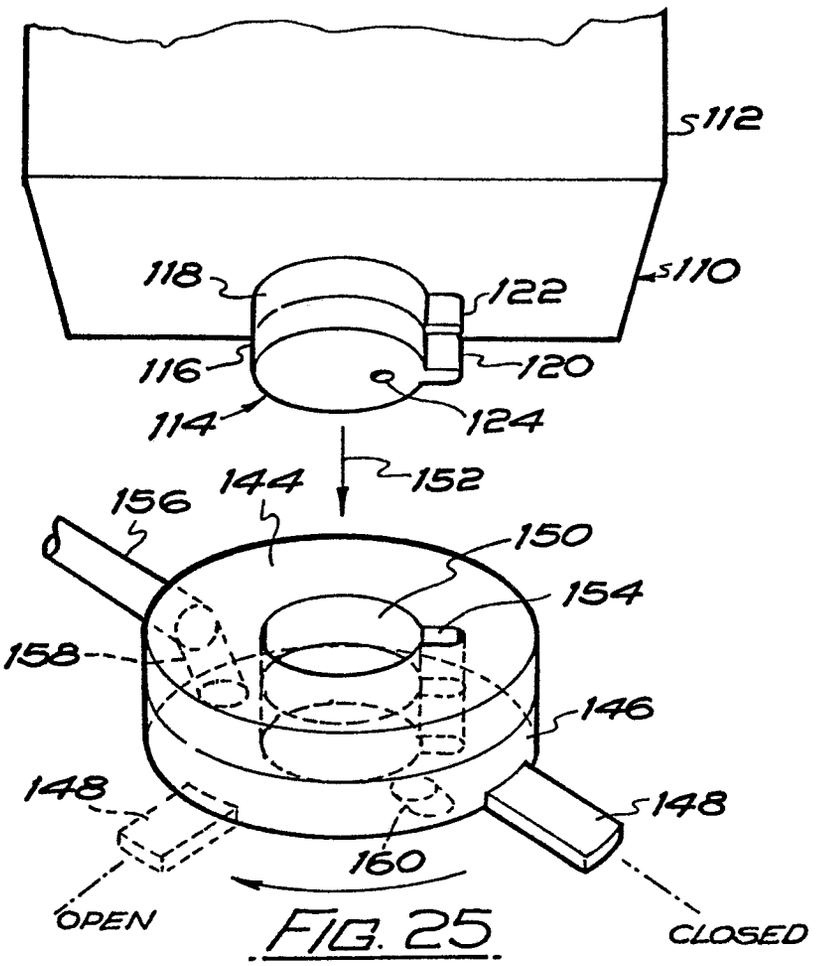
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FIG. 25

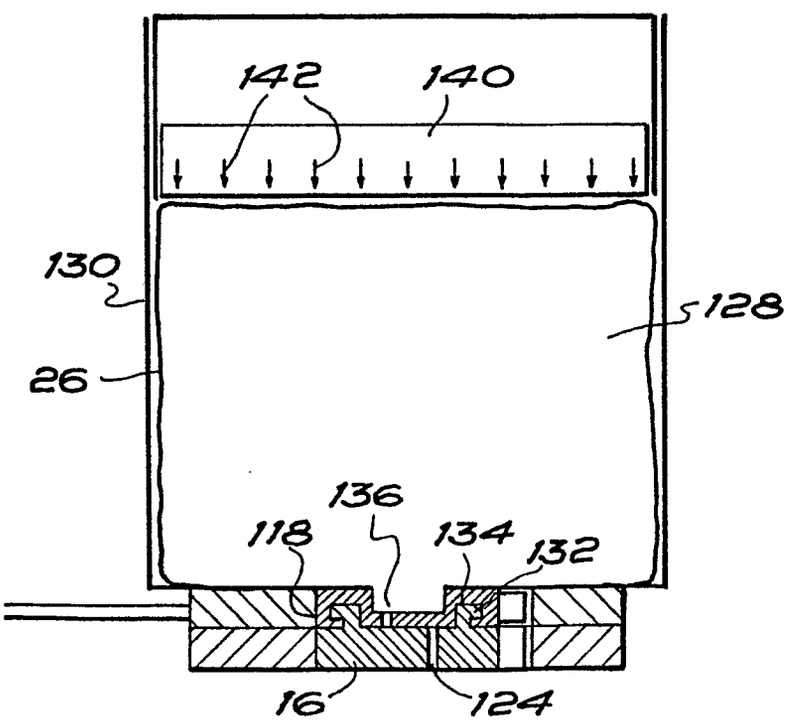
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FIG 26

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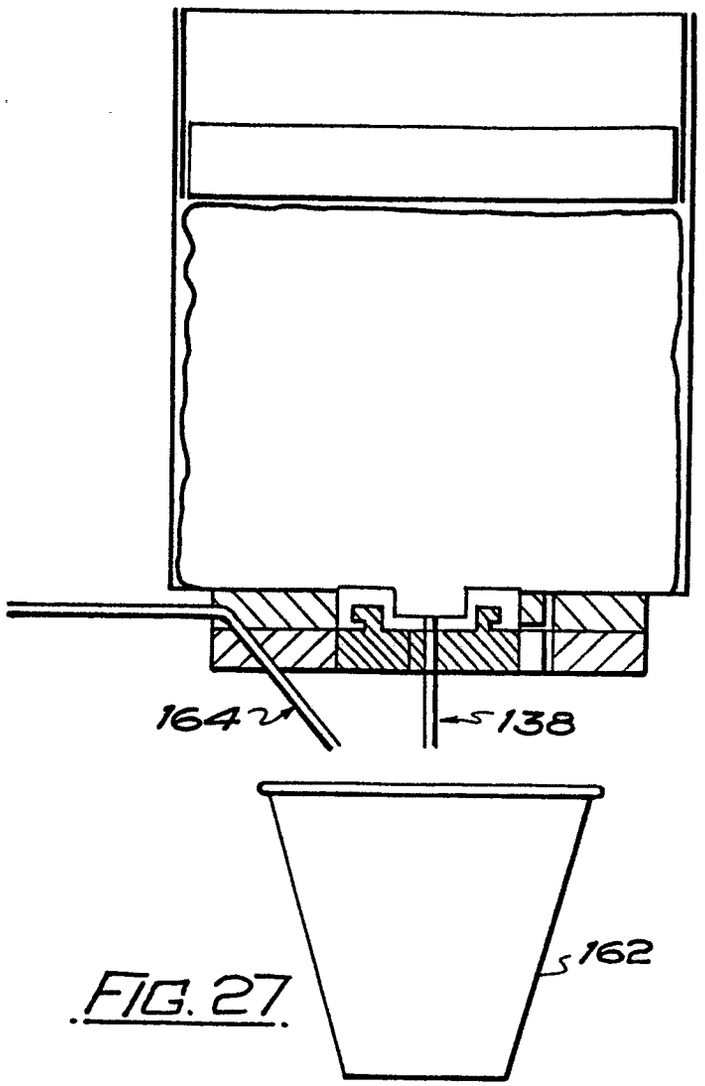

FIG. 27

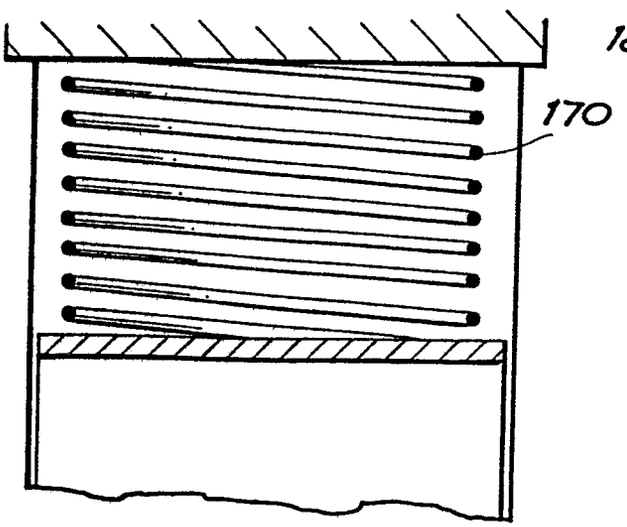

FIG. 28

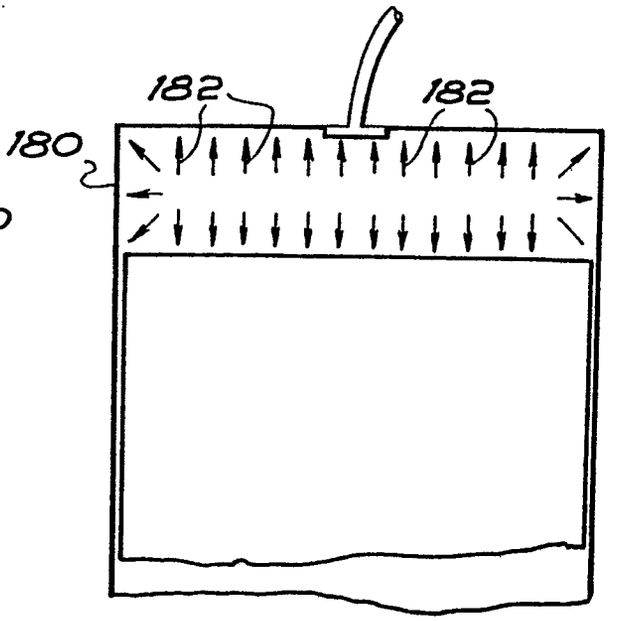

FIG. 29

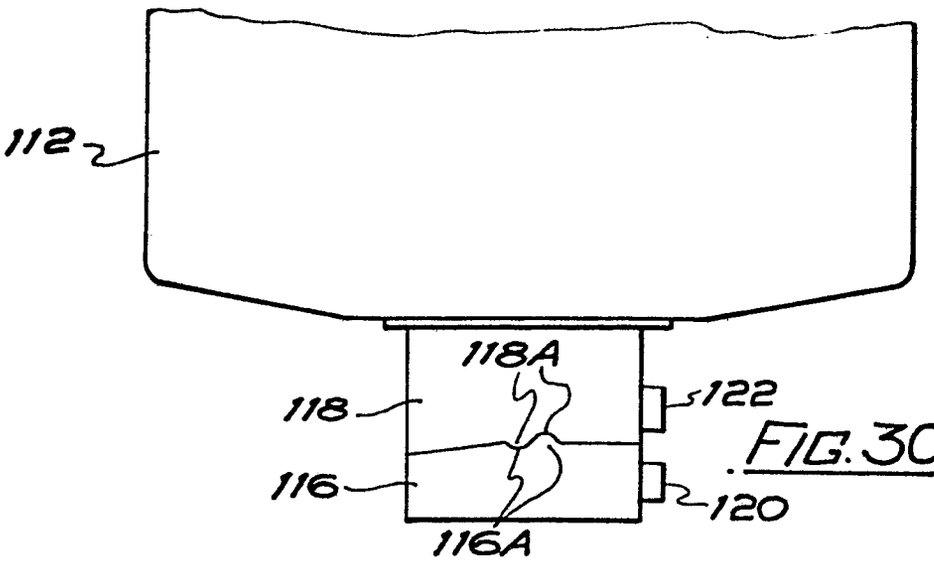

FIG. 30

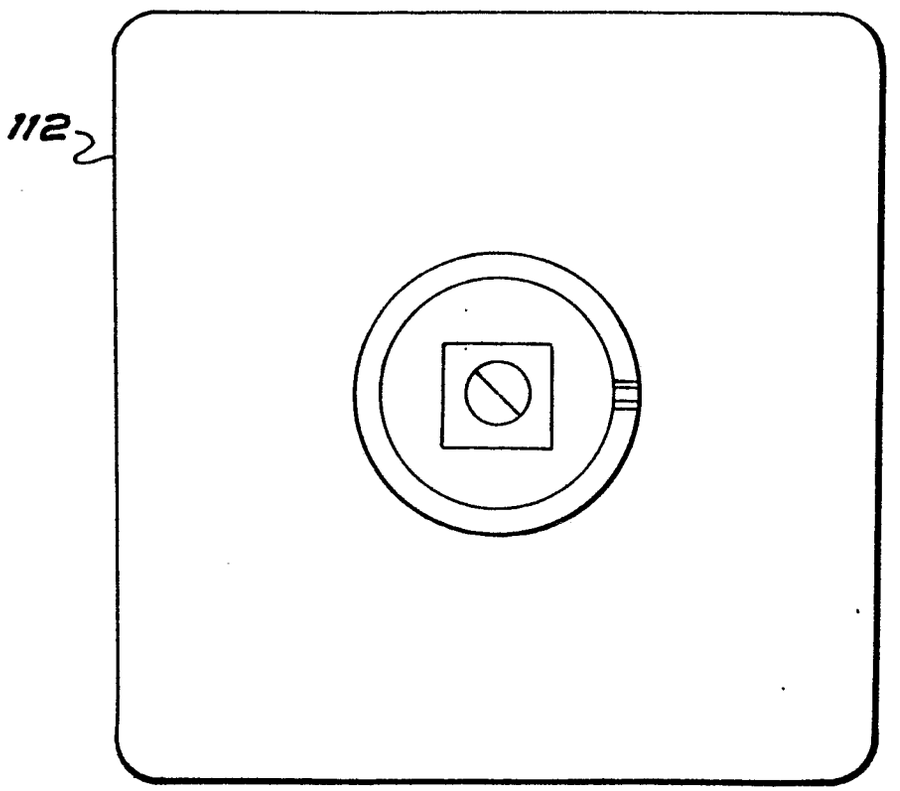

FIG. 31

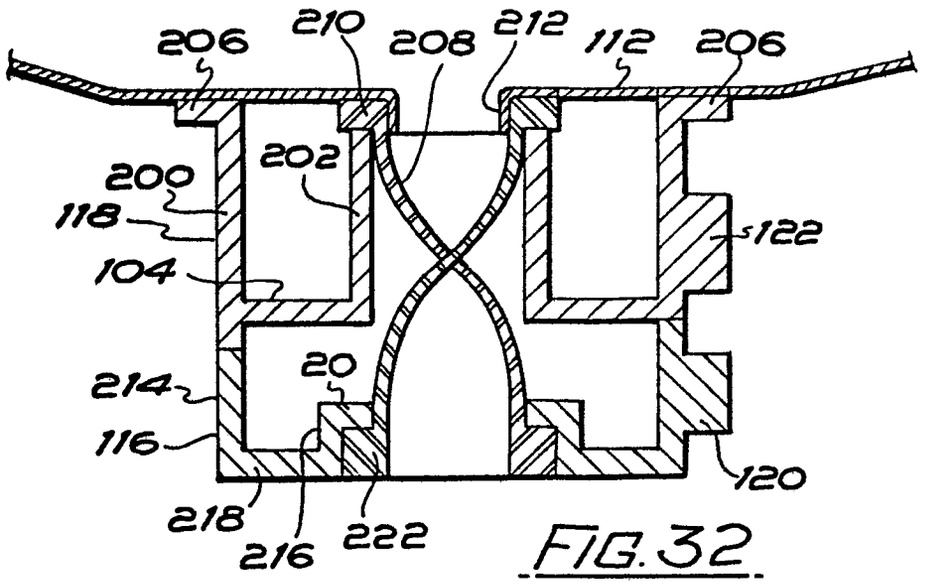
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FIG. 32

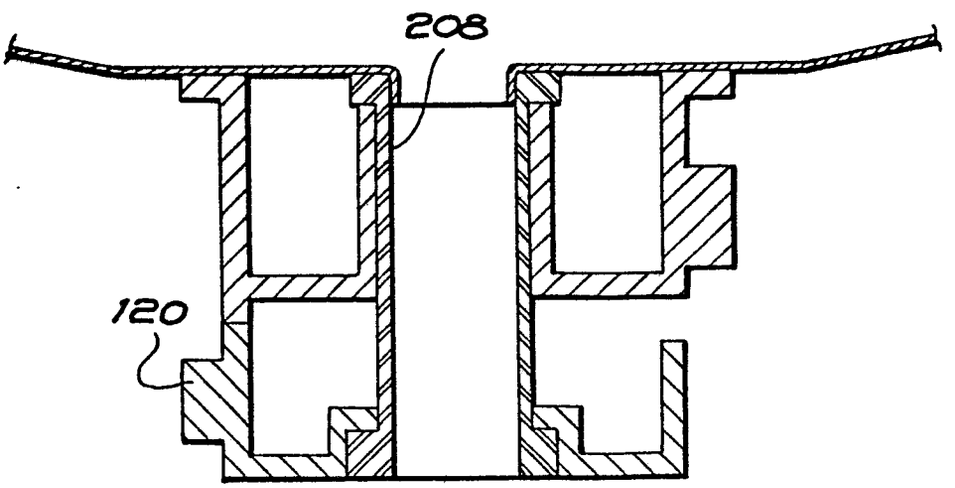
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FIG. 33

0246052

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Application number

EP 87 30 4166

EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl 4)
D,X	EP-A-0 022 589 (CADBURY SCHWEPPES) * Figures 6,10; claims 1,26-32 *	1	B 67 D 1/00 B 67 D 1/14
Y		2,3,5, 8,9	
A		17,26, 30	

X	GB-A-2 142 315 (DEUTSCHE GRANINI) * Figures 1,2; page 2, lines 33-72 *	1	
Y		2,3,5, 8,9	TECHNICAL FIELDS SEARCHED (Int. Cl 4)
	---		B 67 D B 65 D
Y	US-A-3 402 854 (MARCHETTI) * Figures 2,3; column 2, line 58 - column 3, line 10 *	3,9	

Y	US-A-2 493 660 (ELKINS) * Figure 2; claim 1 *	5	

A	WO-A-8 600 609 (BATTELE MEMORIAL)		
	--- -/-		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27-07-1987	DEUTSCH J.P.M.

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Application number

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	US-A-2 377 261 (NORRIS)		
A	GB-A- 899 732 (STILL & SONS)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27-07-1987	DEUTSCH J.P.M.

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