2013

PATENT ATTORNEYS

EXAMINATION

PAPER E

The New Zealand Law and Practice
relating to Interpretation and Criticism of Patent Specifications

Regulation 158 (1) (e)

Duration: 4 hours (plus 10 minutes for reading)

This examination will be conducted on the basis of the law under the New Zealand Patents Act 1953, as at 1 May 2013, and will not take into account any provisions of the Patents Bill currently before the New Zealand Parliament, as might be enacted by the time of the examination, or any other Bill before Parliament.

Facts

Anne and Bill rush into your office one afternoon. They have just left a food show where they feel a competitor has threatened them with legal action over one of their products. Anne breathlessly tells you about a sauce gun they have been selling to cafés, restaurants and fast-food outlets for some time, and gives you a copy of **D1**, a technical description of the gun provided by their manufacturer, Chad. Anne says, Dean, an importer, has allegedly secured a licence of a New Zealand patent, NZ123456 (**D2**), and walked around the exhibition hall this afternoon waving a copy of the patent and shouting obscenities at anyone selling similar gear. Anne is quite upset. She tells you that they've just taken a big order for the gun and have developed, but not yet sold, a new version of the gun with a nozzle that shuts off the flow of sauce better. This new version of the gun is also shown in **D1**.

You calm the pair down and send them on their way with a promise to call the next day with a view on their position and advice about next steps. Your team runs a search and locates details of **D2**, and copies of prior art documents **D3** and **D4**.

Documents

D1 Description of Anne's sauce gun.

D2 The granted specification for New Zealand patent NZ123456, titled Food Dispensing Gun. The patent application was filed with a complete specification in the first instance on 1 October 2011, and was granted 10 July 2012.

D3 US 4,650,099

D4 US 5,368,195

Questions

Prepare notes outlining key issues to raise with Anne and Bill on your call.

(1) Do the sauce guns infringe D2? **40 marks**

(2) Is D2 valid? **45 marks**

(3) What steps could Anne take and what are the implications of each step?

What do you recommend to Anne? **15 marks**

D1 – Description of Anne's sauce gun

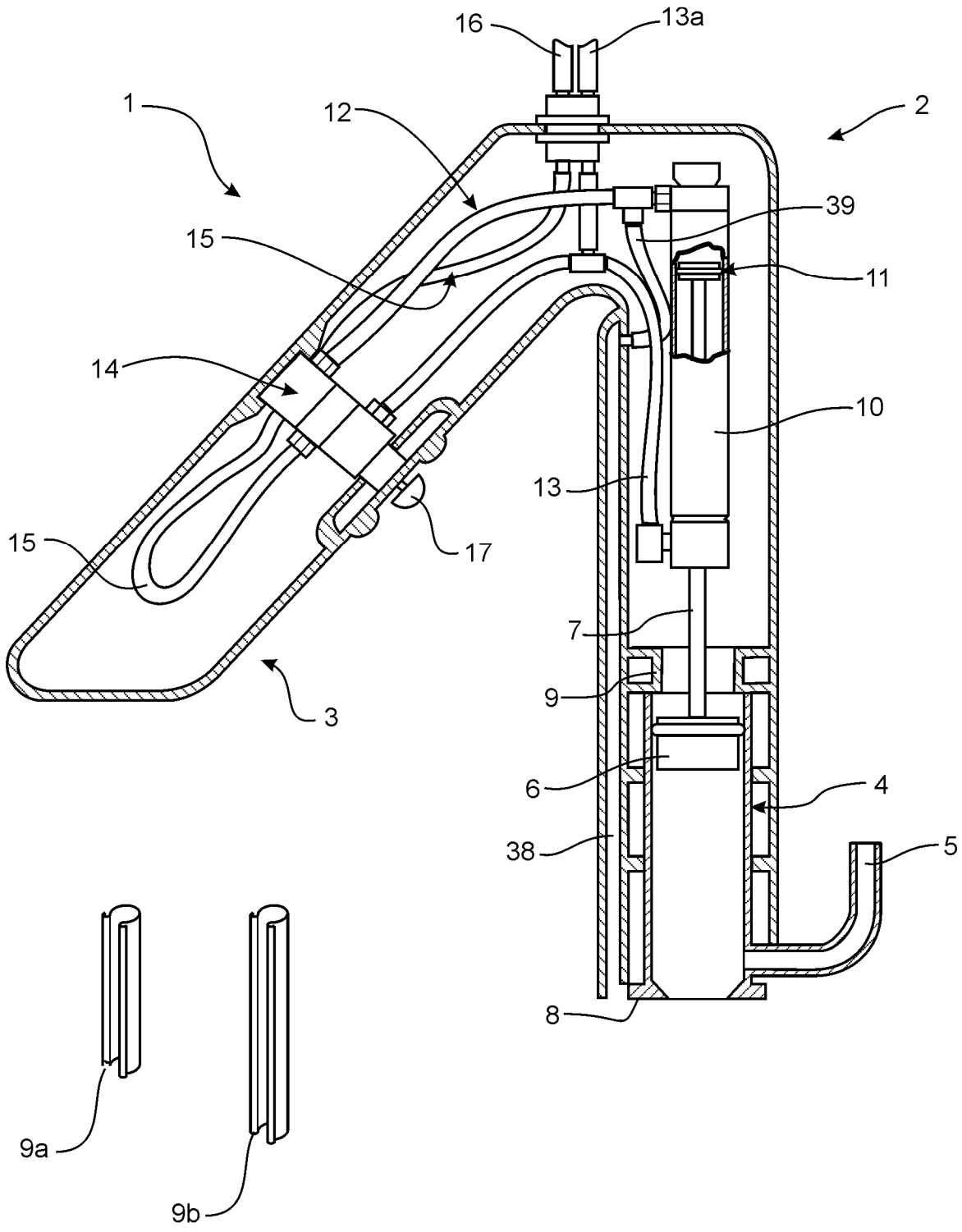


FIGURE 1

D1

Old version, on sale for some time (Figure 1)

As shown in Figure 1, the gun has a plastic housing 1 that has a barrel section 2 and a handle section 3. The housing comes in two halves that reversibly click-fit together – one half is shown in Figure 1 above and the other half is a mirror image. A removable stainless steel (or similar) sauce metering chamber 4 comprising elbow 5 is located in barrel section 2. A condiment, such as tomato sauce, ketchup, mustard, relish or mayonnaise is delivered by a pump (not shown) to the chamber 4 through a conduit (not shown) connected to elbow 5.

A cylindrical piston 6 is secured to the end of piston rod 7 and reciprocates in the chamber 4 between shoulder 8 and rib 9. Piston 6 is fitted with an o-ring that seals against the wall of the chamber 4. The o-ring does not pass the mouth of elbow 5 as the piston 6 moves through chamber 4. Spacer clips 9a and 9b of different lengths may be clipped to rod 7.

Actuator 10 has a piston 11 and is supplied with a suitable pressurised fluid, such as air, at opposite ends through flexible tubular conduits 12 and 13. The conduits 12 and 13 are also connected into opposite outlet ports of valve 14. A supply conduit 15 communicates with valve 14 and with an external conduit 16 leading to a compressor (not shown) that supplies pressurised fluid.

When trigger 17 on valve 14 is depressed, fluid pressure in conduit 12 increases and simultaneously the fluid pressure in conduit 13 reduces in a conventional manner. This causes piston 6 to move toward the discharge end of barrel section 2 to force condiment in the chamber 4 out of the gun 1. When trigger 17 is released, fluid pressure in conduit 13 increases and fluid pressure in conduit 12 reduces. When fluid enters the end of actuator 10 through conduit 13, piston 6 will be moved

upwardly until it encounters spacer clip 9a or 9b. Fluid in conduit 13 also transmits a signal through hose 13a to initiate delivery of a measured amount of condiment from a source (not shown) to chamber 4 through a conduit (not shown) connected to elbow 5.

In operation, when piston 6 is moved away from the discharge end of gun 1, condiment enters through elbow 5 connected to a condiment source (not shown) and fills the chamber disposed in front of piston 6. The size of the condiment charge in chamber 4 depends on how far the piston retracts, and this depends upon the length of spacer clip 9a or 9b. When the piston retracts, the spacer clip that is fitted to the rod 7 contacts the body of the actuator. Spacer clips 9a and 9b are removable and clips of different lengths can be used to allow discharge of different volumes of condiment.

New version, not yet on sale

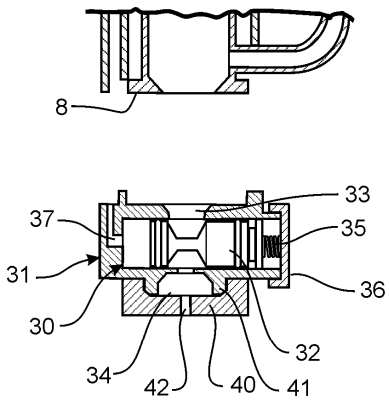


FIGURE 2

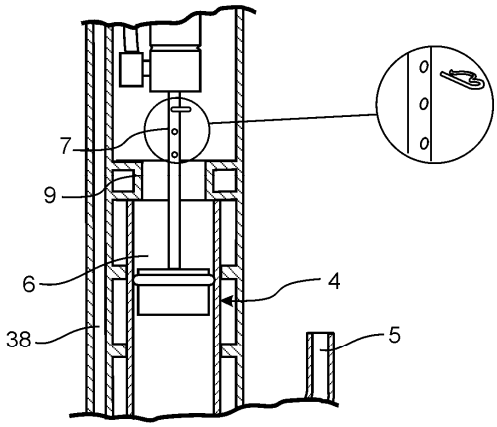


FIGURE 3

D1

Figure 2

The new version of the gun includes a discharge valve 30 shown in Figure 2 comprising a valve housing 31 in which is slidably disposed a valve element 32. The new version is otherwise the same as Figure 1. Valve 30 is attached to the end of gun section 2 by a conventional twist-lock system. Housing 31 has an inlet port 33 and an outlet port 34. Valve 30 is shown in an open, or discharge mode, since the narrow portion of the valve element 32 is in alignment with ports 33 and 34. A spring 35 biases element 32 toward the left. Terminating the right hand end of housing 31 is a retaining cap 36 attached by a conventional twist-lock system. The left end of housing 31 is provided with a passage 37 connectable to a source of pressurised fluid to selectively move element 32 against the bias of spring 35 from a normally closed mode (not shown) to the open mode shown. The outlet of passage 37 in housing 31 is fluidly connected to duct 38 formed on the inner portion of section 2 and in communication at an upper end with a line 39 branched from conduit 12 to pass pressurised fluid to passage 37 whenever valve 14 is passing the fluid to conduit 12.

A discharge nozzle 40 is attached to an annular rim 41 disposed on the lower surface of housing 31. Nozzle 40 is constructed from a suitable resilient material so as to snap over rim 41 and has a through bore 42 aligned with outlet port 34.

Figure 3

As shown in Figure 3, Anne has also developed an alternative to using spacer clips 9a and 9b, but is undecided whether they should use this arrangement in the new gun. The piston rod 7 can be provided with a plurality of holes, one of which can be provided with a spring clip to limit the return of piston 6 when the spring clip contacts the body of the actuator. The position of the spring clip in one of the plurality of holes in piston rod 7 therefore sets the size of the chamber 4.

D2 Complete specification of NZ 123456

FOOD DISPENSING GUN

D2 Complete specification of NZ 123456

FOOD DISPENSING GUN

BACKGROUND OF THE INVENTION

In fast food restaurants it is often necessary to make a large number of burgers and the like quickly enough to accommodate a large number of customers during busy intervals and to prepare for anticipated demand. Not only must this operation be accomplished rapidly with relatively untrained help, but also the burgers must have a reasonably attractive final appearance and, for economic reasons, material such as tomato sauce and other condiments should not be wasted. In many restaurants today the condiments are dispensed from a squeezable container wherein the amount of material discharged depends upon the duration and vigour of the squeeze applied by the operator. Accordingly, with untrained, partially-trained, or careless help a great deal of condiment can be wasted during any operating period while the burgers will still not have an appealing appearance to the customer. Accordingly, there is a need for a condiment dispensing device that will effectively dispense a predetermined amount of condiment and one that is particularly usable in a controlled manner by even inexperienced operators.

SUMMARY OF THE INVENTION

The condiment dispensing device of the invention comprises a housing having a metering chamber therein, a power-actuated mechanism in the housing for ejecting a charge of condiment from the chamber, and means for delivering condiment to the chamber between actuations of the ejecting mechanism. In the preferred embodiment, the device is made of relatively inexpensive-lightweight plastic material, being formed in two half-housings that are easily opened for initial assembly or for servicing of the simple power unit and of the valve mechanism contained therein. Not only is the unit easy to assemble and service but, due to the fact that the only part of the interior of the unit that is contacted by the condiment is a confined chamber near one end, the unit can be quickly and effectively cleaned.

Accordingly an object of the invention is to provide a dispensing unit that is extremely simple in construction and easy to operate to completely discharge the contents of a chamber of the dispensing unit.

Another object of the invention is to provide a method for dispensing condiment in partially liquid form comprising: providing dispensing device of the invention that is fluidly connected to a source of condiment, and actuating said dispensing device to discharge a portion of condiment.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of the dispensing device of the present invention.

FIG. 2 is a section taken on line 2--2 of FIG. 1.

FIG. 3 is a section taken on line 3--3 of FIG. 2.

FIG. 4 is a section taken on line 4--4 of FIG. 2.

FIG. 5 is a section taken on line 5--5 of FIG. 2.

DESCRIPTION OF A PREFERRED EMBODIMENT

In FIGS. 1 and 2 the reference numeral 10 indicates a condiment gun constructed in accordance with the present invention. In the preferred embodiment, the gun is made of polypropylene. It will be understood that it could be made of stainless steel, a plastic other than polypropylene, or any other material that has been approved for food handling uses. The gun is a relatively small, lightweight device, the housing having a width A, (FIG. 1) of about 11/4" and a length L of approximately 9 inches. The housing is made in two pieces 12 and 13 connected by a hinge 14. In the illustrated embodiment the hinge 14 is moulded as an integral part of both of the half-housing members 12 and 13, the thickness of the hinge and its flexibility permitting it to act as a hinge and allow the housing members 12 and 13 to be separated and moved to an open position and then returned to the closed condition.

With a few minor exceptions, the housing members 12 and 13 are identical except that they are mirror images of each other. A description of the half-housing member 12 will serve to disclose the structure of member 13 also. The housing member 12 has a barrel section 12a, a handle section 12b, and a connecting section 12c. At the discharge end of the gun, the half-housing section 12a is generally semi-cylindrical in cross-section as seen in FIG. 3 with a flange 16 extending outwardly from one side. Ribs 17 and 18 (FIG. 2), which are integrally formed with the housing member and

extend transversely thereof, have semi-cylindrical recesses 17a and 18a respectively. Recess 17a receives the piston rod 19 of a power cylinder 20 while recess 18a receives the barrel of the cylinder. Above the rib 18, the half-housing barrel section 12a is elongate in cross-section and includes arcuate wall portions 21a and 21b connected by a straight portion 21c (FIG. 4). Ribs 22 and 23 extend inwardly from the wall of the housing in this area and are provided with semi-cylindrical recesses which receive the barrel of cylinder 20. In the handle section 12b of the gun and in the connecting section 12c, the member 12 has curved wall portions 25a and 25b connected by a straight section 25c (FIG. 5). Intermediate the length of the handle section, the walls 25a and 25b are reinforced by walls portions 25d and 25e respectively, and walls 25a, 25d and 25e are provided with semi-cylindrical recesses 26a and 26e, respectively, to receive cylindrical portions of an air valve assembly 28. Three holes 30, 31 and 32 extend through the flat side walls of housing member 12 at spaced points to receive fastening bolts (not shown) which are inserted through corresponding holes in the housing member 13 to lock the two housing members together. Similarly, two adjacent flanges 16 of the members 12 and 13 are provided with holes 33-35 to receive fastening bolts.

An O-ring cord 38 is disposed in an elongate semi-cylindrical recess 39 in the flange 16 of member 12 and in the rib 17.

At the outer end of the barrel section of the gun, the housing member 12a has a reduced diameter semi-cylindrical portion 42 which provides a shoulder 42a. A cylindrical opening 44 extends entirely through the housing member, and a tubular portion 45a of an elbow connection 45 (FIG. 1) is disposed therein, as by an adhesive.

A semi-cylindrical metering chamber is defined in the member 12a between the shoulder 42a and the transverse rib 17, and a cylindrical piston 47, which is secured on the end of piston rod 19, reciprocates in the chamber between the shoulder 42a and the lower end of a metering component in the form of a cylindrical spacer tube 49 disposed in the chamber between the piston and the rib 17. A rubber O-ring 50 is disposed in a peripheral groove of the piston in yieldable sealing engagement with the inner wall of member 12a.

D2 Complete specification of NZ 123456

The power cylinder 20 is double-acting, being supplied at one end with air under pressure through a flexible tubular conduit 55 and at the other end by means of a conduit 56. The conduits 55 and 56 are connected into opposite ends of the housing of the valve 28 while a supply conduit 57 is connected into a central section of the valve. The supply conduit extends through the wall of the connecting section 12c of the housing and communicates with a conduit 58 leading to a source of air under pressure.

The valve 28 is of the type which has a valving element (not shown) that is slidable longitudinally in the housing of the valve. The valving element is moved in one direction when a trigger 60, to which the element is connected, is moved inwardly of the housing by the operator against the resistance of a spring in the housing. When the trigger is moved inwardly, the valving element is moved to a position establishing flow communication between the supply conduit 57 and conduit 55, while venting conduit 56 to atmosphere. The piston 50 is then moved toward the discharge end of the gun to force material, in the chamber in front of it, out of the gun. When the trigger is released by the operator, the internal valve spring moves the trigger outwardly of the valve housing and shifts the valving element longitudinally to a position wherein the supply conduit 57 is in flow communication with the conduit 56 and the conduit 55 is vented to atmosphere. When pressurized fluid enters the end of cylinder 20 through conduit 56, the piston 47 is moved rearwardly in the metering chamber until it contacts the metering component, spacer tube 49.

A condiment, such as tomato sauce or mustard, is delivered to the chamber in front of the piston through a flexible plastic conduit 70 (FIG. 1) which is connected into the elbow 45 by means of a quick-disconnect coupling 73. The supply conduit 70 extends through support loops 71 and 72 formed on housing member 12, and is connected at its other end to a pump and reservoir system that maintains a supply of the condiment under a very small positive pressure, as for example, 5 pounds per square inch.

The gun is assembled by inserting the valve 28, the cylinder 20, the conduits 55, 56 and 57 connected between the valve and the cylinder, the spacer tube 49 and the O-ring cord 38 in the housing half 12 with these members resting in their assigned recesses. The air supply conduit 58 is connected to a quick-disconnect fitting 64 in

the wall of the housing member. The housing half 13 is then pivoted about hinge 14 into place opposite the member 12, and bolts or the like are inserted through the aligned holes 30-35 of the housing members and fastened down to secure the housing members together.

It will be noted that, when the two housing halves are secured together, the dispensing chamber, which is the only area of the gun that receives the condiment, is substantially sealed off by the O-ring cord 38, the piston 47 and the side of the housing that is closed by the hinge 14.

A diffuser cap 65, which is made of yieldable plastic and has a snap-on connection at 66 with the lower end of the assembled housing, is positioned on the housing. The cap 65 has a relatively thin, central, slightly-conical wall that comes to an apex at 68 and four cuts (not shown) extend through the wall, intersecting at the apex to provide eight flaps which will yield to permit the condiment to be moved through the cap under the urging of the piston.

As mentioned above, the housing half-sections 12 and 13 are substantially identical. The differences can be easily seen by reference to FIGS. 1 and 2. In general, section 13 is identical to section 12 except that it does not have the structure for supporting the condiment inlet conduit 70 and the aperture 44 for receiving the fitting tube 45a. Similarly section 13 does not have as large an opening as section 12 for receiving the connector 64 of the air inlet hose.

In operation, when the piston 47 is moved away from the discharge end of the gun, condiment enters and fills the chamber in front of the piston. It will be evident that the size of the charge of condiment in the chamber depends upon how far the piston is retracted, and this depends upon the length of the metering component, spacer tube 49. Since the tube is replaceable, the gun can be quickly and easily adapted for discharging different size charges. For example, a range of tubes can be provided so that charges of condiment ranging from 1/3 ounce to 1 ounce can be made.

With this gun, the operator will know exactly how much material is going to be discharged and he can then concentrate his efforts on distributing the material in an appropriate pattern on the food he is processing. At the end of a shift or any other time, as when it is necessary to change the type of condiment being dispensed, the

gun can be cleaned and sanitized without opening it up merely by disconnecting the supply line 70 from the gun at connector 72, connecting to the elbow 45 a conduit leading from a cleaning solution to cause the solution to enter the metering chamber, and then repeatedly actuating the trigger to cause the piston to discharge the cleaning liquid from the cylinder.

From the foregoing description it will be apparent that the present invention provides a condiment dispensing tool that is simple in construction, and easy to assemble. The provision of a replaceable spacer tube makes it particularly easy to adapt the gun for dispensing charges of condiment of different sizes, and the unique use of the O-ring cord provides a simple effective way to seal off the dispensing chamber.

D2 Complete specification of NZ 123456

WHAT WE CLAIM IS

1. A dispensing device for dispensing condiment in partially liquid form comprising:

a housing including a handle section and an elongated dispensing section;

means in said housing defining a chamber having a discharge opening, said chamber being disposed in said dispensing section near one end thereof, and said discharge opening being located at said one end, said chamber defining means including an abutment member at the end of the chamber opposite said discharge opening;

a plunger mounted for reciprocation in said chamber;

annular spacer means disposed in said chamber between said abutment member and said plunger to limit the movement of said plunger toward said abutment member and thereby determine the condiment receiving volume of said chamber;

means for delivering a charge of condiment into that portion of the chamber located between said plunger and the discharge opening; and

means for actuating said plunger to discharge substantially all of the condiment contained within said chamber.

2. A dispensing device according to claim 1 wherein the chamber is a cylinder, said plunger is a piston reciprocable in said cylinder, and said actuating means is a power cylinder mounted in said housing.

3. A dispensing device according to claim 2 wherein said housing is formed into two half-housing members which are mirror images of each other, said device further including means for supporting said power cylinder in fixed position in said housing.

4. The dispensing device of claim 3 wherein said two half-housing members are formed from a plastic material and are connected by a hinge that is an integral part of each member.

D2 Complete specification of NZ 123456

5. The device of claim 3 wherein said housing is formed of a plastic material and each of said half-housing members includes integrally-formed inwardly extending walls adapted to receive and support said power cylinder in said housing, and means for securing said half-housing members together in face-to-face abutment with said cylinder locked between said housing members.

6. A dispensing device according to claim 1 wherein said housing is moulded from plastic into two half-housing members which are mirror-images of each other, said members having opposed internal support walls adapted to support said plunger for reciprocation in said housing.

7. The device of claim 1 wherein said housing includes a passage extending through a side wall thereof and communicating with the chamber at a point between the discharge opening and said abutment member, said device further including means for supplying condiment in partially liquid form to said chamber through the passage at a small positive pressure.

8. A method for dispensing condiment in partially liquid form comprising:

providing a dispensing device for dispensing condiment in partially liquid form, the dispensing device being fluidly connected to a source of condiment and comprising

a housing including a handle section and an elongated dispensing section;

means in said housing defining a chamber having a discharge opening, said chamber being disposed in said dispensing section near one end thereof, and said discharge opening being located at said one end;

a plunger mounted for reciprocation in said chamber;

a metering component disposed in said housing to restrict the movement of said plunger and thereby determine the condiment receiving volume of said chamber;

means for delivering a charge of condiment into that portion of the chamber located between said plunger and the discharge opening; and

means for actuating said plunger to discharge substantially all of the condiment contained within said chamber,

and actuating said dispensing device to discharge a complete portion of condiment.

9. The method according to claim 8 wherein the chamber is a cylinder, said plunger is a piston reciprocable in said cylinder, and said actuating means is a power cylinder mounted in said housing.

10. The method according to claim 9 wherein said housing is formed into two half-housing members which are mirror images of each other, said device further including means for supporting said power cylinder in fixed position in said housing.

11. The method of claim 10 wherein said two half-housing members are formed from a plastic material and are connected by a hinge that is an integral part of each member.

12. The method of claim 10 wherein said housing is formed of a plastic material and each of said half-housing members includes integrally-formed inwardly extending walls adapted to receive and support said power cylinder in said housing, and means for securing said half-housing members together in face-to-face abutment with said cylinder locked between said housing members.

13. The method according to claim 8 wherein said housing is moulded from plastic into two half-housing members which are mirror-images of each other, said members having opposed internal support walls adapted to support said plunger for reciprocation in said housing.

14. The method of claim 8 wherein said housing includes a passage extending through a side wall thereof and communicating with the chamber at a point between the discharge opening and said abutment member, said device further including means for supplying condiment in partially liquid form to said chamber through the passage at a small positive pressure.

D2 Complete specification of NZ 123456

Fig_1

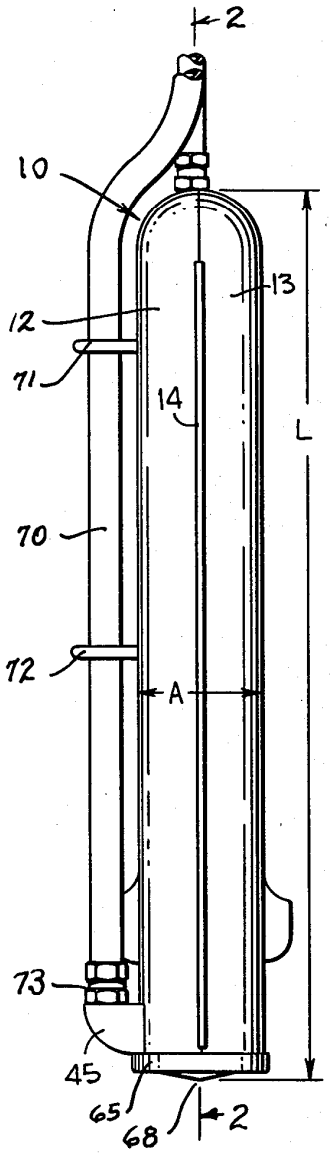
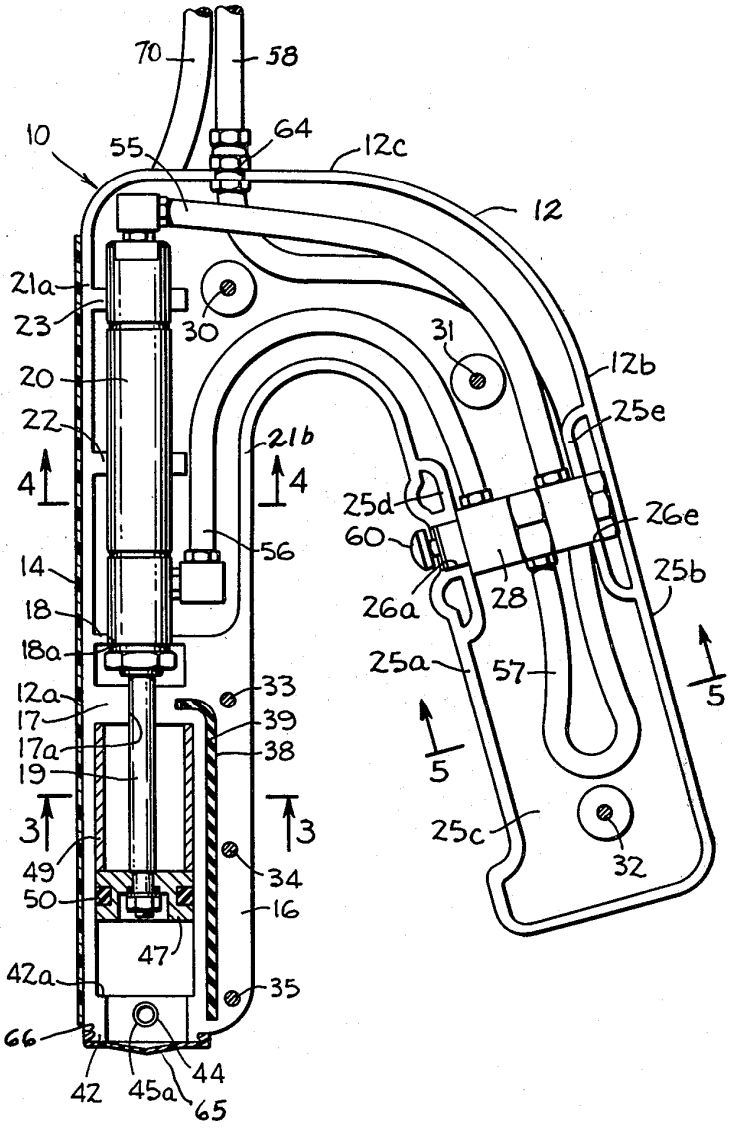


Fig_2



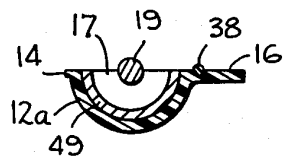


Fig_3

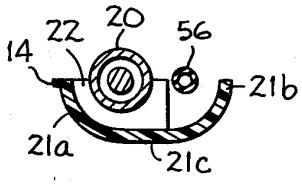


Fig_4

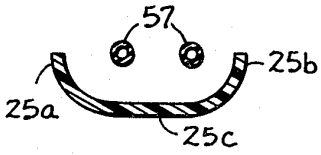


Fig_5

United States Patent [19]

Paulsen et al.

[11] **Patent Number: 4,650,099**

[45] **Date of Patent: Mar. 17, 1987**

[54] **LIQUID DISPENSING GUN**

[75] Inventors: **Gary Paulsen**, Geneva; **Lawrence E. Thomas**, Carol Stream, both of Ill.

[73] Assignee: **Spraying Systems Company**, Wheaton, Ill.

[21] Appl. No.: **596,654**

[22] Filed: **Apr. 4, 1984**

[51] **Int. Cl.**[4] **G01F 11/06**

[52] **U.S. Cl.** **222/263**; 222/335; 222/340; 222/449; 137/627.5

[58] **Field of Search** 222/253, 263, 335, 340, 222/441, 444, 453, 449; 137/627.5

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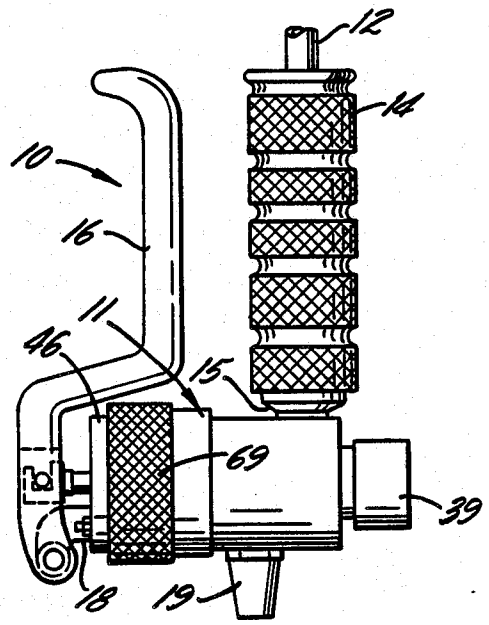
Primary Examiner—Charles A. Marmor
Assistant Examiner—Frederick R. Handren
Attorney, Agent, or Firm—Leydig, Voit & Mayer

[57] **ABSTRACT**

A liquid dispensing gun for repeatedly dispensing precisely metered quantities of liquid from a pressurized source. The gun comprises a hollow body having a valve chamber and a metering chamber connected thereto by a control orifice. An axially slidable valve spool in the valve chamber and a trigger operated actuating plunger serve to govern the reciprocation of a metering piston in the metering chamber and the admission and discharge of metered quantities of liquid to and from the metering chamber.

19 Claims, 4 Drawing Figures



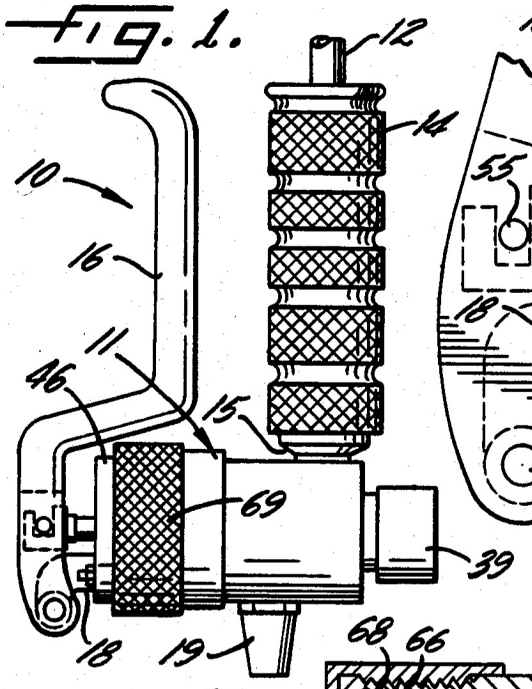


FIG. 1.

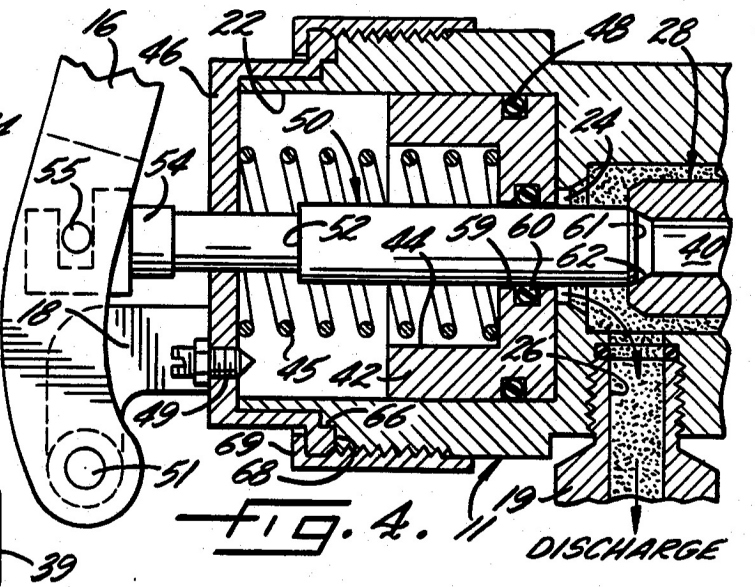


FIG. 4.

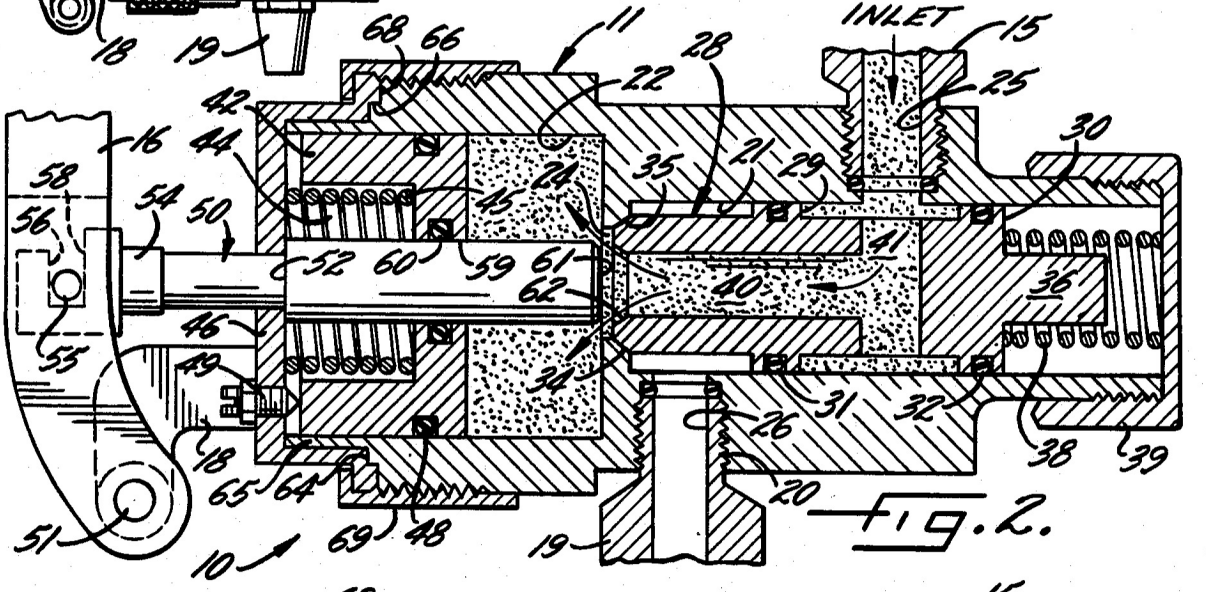


FIG. 2.

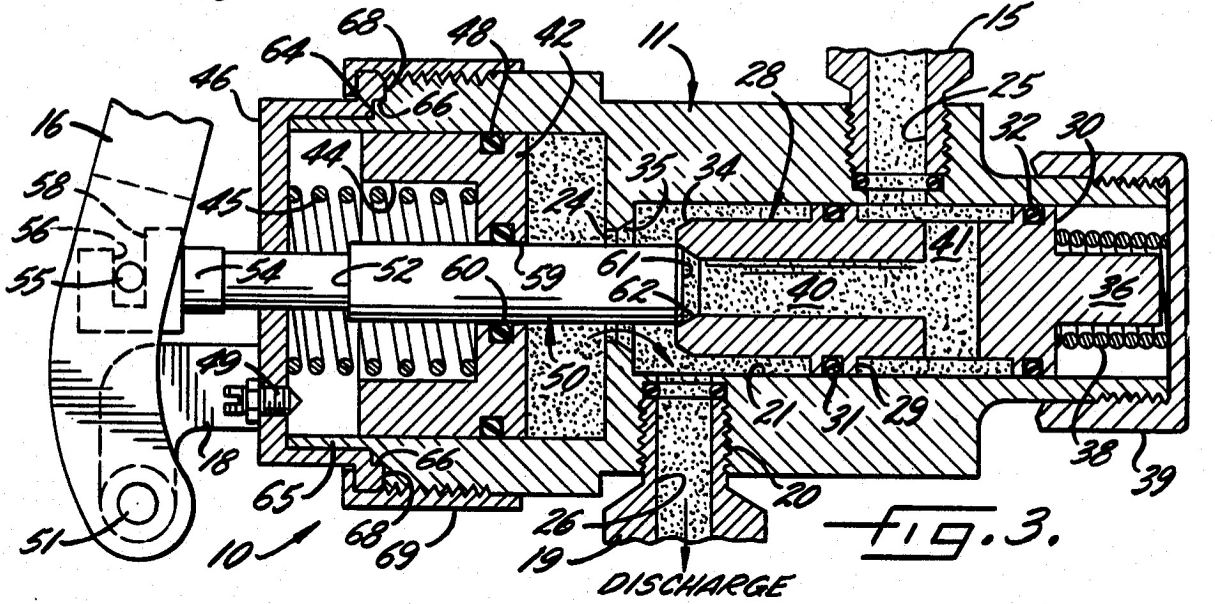


FIG. 3.

LIQUID DISPENSING GUN

BACKGROUND OF THE INVENTION

The present invention relates to the field of devices for dispensing a predetermined quantity of liquid from a pressurized source in response to each actuation of the device. It finds particular, but not exclusive, utility for dispensing viscous liquids such as ketchup. The device lends itself to advantageous use in fast food operations where careful quantity control of the dispensed liquid is important to the quality of the product and the economics of the operation.

A wide variety of devices for dispensing measured quanities of liquid have been devised heretofore. Such prior devices have numerous shortcomings, including complexity, expense, difficulty in dismantling for cleaning purposes, imprecise measuring of liquid dispensed, or difficulty in handling liquid from a pressurized source.

SUMMARY OF THE INVENTION

One object of the present invention is to provide a gun for repeatedly and reliably dispensing precisely metered quantities of liquid from a pressurized source in a high production operation.

Another object of the invention is to provide a dispensing gun of the type set-forth above adapted to be manually actuated with precision by application of fingertip forces. A related object is to provide a dispensing gun of the foregoing nature which is adapted to be operated under power as well as manual means.

A further object is to provide a dispensing gun of the above type which is of simple, compact construction and capable of quick disassembly for cleaning and quick reassembly after cleaning.

Another object of the invention is to provide a dispensing gun of the above character capable of handling pressurized liquid without leakage.

The foregoing objectives are accomplished by the present invention through a remarkably simple and efficient dispensing gun adapted to operate from a pressurized source of viscous liquid. The gun comprises a hollow body having a valve chamber with an inlet and an outlet port and a metering chamber connected to the valve chamber by a control orifice; and axially slidable valve spool in the valve chamber resiliently biased into engagement with the control orifice; a metering piston in the metering cylinder resiliently biased toward the control orifice; and a trigger operated actuating plunger adapted to shift the valve spool between a first position for loading the metering chamber with pressurized liquid and overcoming the metering piston biasing means while the outlet port is blocked, and a second position for discharging a metered quantity of liquid from the metering chamber through the control orifice while the outlet port is open and the inlet port is blocked.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of an illustrative liquid dispensing gun exemplifying the present invention.

FIG. 2 is an enlarged fragmentary sectional view taken axially through the body of the dispensing gun shown in FIG. 1 with the parts in the intake position.

FIG. 3 is an enlarged fragmentary sectional view similar to FIG. 2 but with the dispensing gun in process of discharging liquid from the metering cylinder.

FIG. 4 is an enlarged fragmentary sectional view similar to FIG. 2 but with the metering cylinder in the fully discharged condition.

While the invention is susceptible of various modifications and alternative constructions, a certain illustrative embodiment has been shown in the drawings and will be described below in considerable detail. It should be understood, however, that there is no intention to limit the invention to the specific form disclosed, but, on the contrary, the intention is to cover all modifications, alternative constructions, and equivalents falling within the scope of the appended claims.

DETAILED DESCRIPTION OF THE INVENTION

Referring more specifically to FIGS. 1–4, the present invention is there exemplified in a dispensing gun **10** adapted when actuated by manual or power means to dispense precisely metered quantitites of liquid. The gun **10** comprises a hollow body **11** connected to a pressurized supply line **12** which in this instance contains ketchup. The supply line **12** passes through a handle **14** attached to the body and terminates in a supply line fitting **15** threadedly connected to the body. An acutating trigger **16** is pivotally attached to a support bracket **18** fixed to one end of the body. Fluid is discharged from an outlet nozzle **19** threadedly attached to the body by nozzle fitting **20**. Each time the trigger **16** is squeezed toward the handle **14**, a precisely metered quantity of ketchup is discharged from the gun **10**. Upon release of the trigger, the gun promptly reloads for the next discharge.

In order to provide for the intake and discharge of liquid to and from the dispensing gun **10**, the body **11** is formed with a valve chamber **21** and a metering chamber **22**. The chambers **21** and **22** are axially aligned and connected by a control orifice **24**. Adjacent the end of the body remote from the control orifice, the valve chamber is formed with an inlet port **25** which communicates with the supply line fitting **15** and the pressurized liquid supply. Between the inlet port **25** and the control orifice **24**, the valve chamber is formed with an outlet port **26** communicating with nozzle **19** and its fitting **20**.

In accordance with the invention, a resiliently biased valve spool **28** is mounted for axial sliding movement within the valve chamber to regulate the flow of liquid from the inlet port into the metering chamber, and from the metering chamber to the outlet port. The valve spool **28** has a first operative position establishing communication between the inlet port **25** and the metering chamber **22** while blocking the outlet port **26**. The valve spool has a second operative position establishing communication between the metering chamber **22** and the outlet port **26** while blocking the inlet port **25**.

Referring in greater detail to the valve spool **28**, it will be noted that the latter is formed intermediate its ends with a pair of axially spaced lands **29**, **30** each of somewhat larger diameter than the remainder of the spool. Each land in this case has an annular groove which houses a respective one of O-rings **31**, **32** formed of resilient sealing material. The land **29** and its O-ring **31** serve as a movable seal isolating the inlet port **25** from the outlet port **26**. The land **30** and its O-ring **32** serve as a movable seal preventing leakage of pressur-

ized liquid from the inlet port **25** to the end of the valve chamber remote from the control orifice **24**. The end of the valve spool **28** facing the metering chamber **22** is formed with a taper **34** adapted to sealingly engage a mating seat **35** on the control orifice **24**. At its opposite end, the valve spool has an axial stem **36** of reduced diameter which is surrounded by a resilient biasing means in the form of a spiral spring **38**. The spring **38** bears against a cap **39** threaded on one end of the body **11** and an annular shoulder on the valve spool surrounding the stem **36**. By reason of this construction, the valve spool **28** is biased into engagement with the control orifice **24**.

Provision is made for injecting liquid from the pressurized source into the metering chamber **22** via the valve spool **28**. The spool **28** is thus formed with an axial passage **40** open at the downstream end which faces the metering chamber and connected at its upstream end with a radial passage **41** which communicates directly with the inlet port **25**. When the trigger **16** is in its non-actuated position, the downstream end of the axial passage **40** is open and pressurized liquid flows from the supply line **12** through fitting **15**, inlet port **25**, passages **41, 40** and into the metering chamber **22** (FIG. 2).

For the purpose of metering the liquid injected into the metering chamber **22** by the valve spool **28**, a metering piston **42** is slidably housed within the chamber **22**. The piston **42** is of cup-shaped form, defining an annular recess **44** in the face remote from the control orifice **24**. The recess **44** houses a resilient biasing means in the form of a spiral spring **45**. The latter is interposed between the bottom end of the recess **44** and a cap **46** fixed to the end of the body **11** adjacent to the trigger **16**. The outer periphery of the piston **42** has a groove accommodating an O-ring **48** which defines a sliding seal with the wall of the metering chamber **22**. The characteristic of the spring **45** of the metering piston is such that it is adapted to yield against the force of an incoming charge of liquid from the valve spool passage **40**. When the incoming liquid charge is cut off and the metering chamber is connected to the outlet, the spring **45** is adapted to drive the metering piston **42** toward the control orifice and against the opposed end wall of the metering chamber to expel the charge of liquid via the outlet port **26**.

The volume of liquid delivered by the gun **10** may be selectively varied by means of an adjustment stop **49** adapted to alter the stroke of the metering piston within close tolerances. In the present instance, the stop **49** comprises a screw mounted in a tapped hole in the end wall of the cap **46** and an associated lock nut. The stop **49** is positioned so as to engage the annular end face of the piston surrounding the biasing spring **45** and thereby regulate the piston stroke.

As indicated earlier herein, the gun **10** is actuated by means of trigger **16** to discharge a precisely measured quantity of liquid from the nozzle **19**. The gun thus includes an actuating plunger **50** constrained for axial sliding movement within the body **11** and operatively connected to an intermediate portion of the trigger **16** spaced radially from its pivot **51** on bracket **18**. The main body portion of the plunger **50** has a length equal to or slightly shorter than the length of the metering chamber. A portion of reduced diameter, defining a shoulder **52** with the main body portion, is slidably mounted relative to an aperture in the end wall of cap **46**. The reduced diameter portion connects the actuating plunger **50** to the trigger **16** by means of an appropriate coupling **54** engageable by a pin **55** on the trigger.

In order to accommodate the straight line or axial motion of the plunger **50** to the arcuate motion of the trigger **16** about its pivot **51**, the coupling **54** is fashioned in a general U-shape, defining two spaced apart slide surfaces **56, 58**. Accordingly, when the trigger is actuated the radial thrust of the trigger pin **55** will be accompanied by relative linear movement of the pin along one or the other of slide surfaces **56, 58** depending upon the direction in which the trigger is moved about its own pivot **51**.

To receive the main portion of the actuating plunger **50**, the metering piston **42** has a central bore **59** with a sliding seal in the form of an O-ring **60**. The projecting inner end of the actuating plunger **50** has a chamfer **61** adapted to enter into sealing engagement with a seat **62** at the mouth of the axial bore **40** of the valve spool.

To maintain the orientation of the trigger **16** parallel to the handle **14**, appropriate registration means are provided between the spring cap **46** and the body **11** (FIGS. 2–4). In this instance, the body is formed with a shoulder **64** between the skirt **65** defining the outer end portion of the metering chamber and the outer end of the threads surrounding the metering chamber. At least one pair of diametrically opposed flats **66** is formed in the shoulder **64**. The spring cover or cap **46** is fashioned with a corresponding pair of diametrically opposed, axially extending, segmental lugs **68**. When the cap **46** is telescoped over the metering chamber skirt **65**, the lugs **68** on the cap register with the flats **66** in the shoulder **64**, thereby orienting the cap **46** and thus the trigger **16** with respect to the body and the handle **14**. Tightening of the clamp ring **69** thereby retains the trigger **16** in properly oriented position.

The operation of the gun **10** will become more apparent in light of the foregoing description. Starting with the trigger **16** in the rest position shown in FIGS. **1** and **2**, the tapered end **34** of the valve spool **28** is seated in the control orifice **24** and the actuating plunger **50** is in its retracted position. Under this condition, shown in FIG. **2**, pressurized liquid from the supply line **12** enters the inlet port and passages **41, 40** of the valve spool, filling the void space in the metering chamber between the face of the metering pistion **42** and the end wall of the metering chamber surrounding the control orifice. At this time, the outlet port **26** is completely blocked by the valve spool **28**. Upon squeezing the trigger **16** against the handle **14**, the actuating plunger **50** moves axially from the position shown in FIG. **2** to that shown in FIG. **3**. As an incident to such movement, the projecting end of the actuating plunger engages the seat **62** at the end of the valve spool passage **40**, precluding entry of additional liquid through the inlet port. At the same time, such action also forces the valve spool **28** to the right, compressing its biasing spring **38** and establishing communication with the outlet port **26** via the control orifice **24**. This relieves the back pressure on the liquid within the metering chamber and the metering piston **42** thus moves toward the control orifice under the force of its biasing spring **45**. Such motion continues, passing from the condition illustrated in FIG. **3** to that shown in FIG. **4** where the metering piston **42** has emptied the metering chamber of its precise quanity of liquid and has brought its face into abutment with the inner end wall of the metering chamber.

Upon release of the trigger **16** following discharge of the metered quantity of liquid, the valve spool **28** and

the actuating plunger **50** will be driven in unison to the left by the biasing spring **38** until the tapered end **34** of the valve spool engages the mating seat of the control orifice **24**, as shown in FIG. **2**. Since this cuts off communication with the outlet port, liquid pressure from the supply line bears against the projecting end of the actuating plunger, forcing it to the left until the shoulder **52** at the end of the enlarged portion engages the inner face of the cap **46**, also as shown in FIG. **2**. This establishes communication of pressurized liquid between the valve spool passage **40** and the metering chamber via the control orifice, forcing the metering piston to the left against the biasing spring and refilling the metering chamber. At that point, the gun is ready for another cycle.

Since the embodiment of the present invention described above is utilized in the food industry, sanitation is an important consideration. The construction of the gun **10** lends itself well to quick disassembly for cleaning. The end caps **39**, and **46**, being threadedly attached to the body **11**, may readily be removed. This permits easy removal of the valve spool **28** and its biasing spring. Upon removal of the end cap **46** and disconnection of the pivotal fitting on the actuating plunger from the trigger, the metering piston **42**, its biasing spring **45**, and the actuating plunger may readily be removed from the metering chamber. The O-ring type liquid seals on the valve spool and metering piston lend themselves to easy removal for cleaning. Following the cleaning operation, the parts of the gun may be quickly and easily reassembled to restore the gun to service.

I claim as my invention:

1. A gun for repeatedly dispensing precisely metered quantities of liquid from a pressurized source, said gun comprising, in combination:

(a) a hollow body having a valve chamber, a metering chamber, and a control orifice;

(b) a metering piston in said metering chamber resiliently biased toward said control orifice;

(c) said valve chamber having an inlet port connected to a pressurized liquid source and an outlet port connected to a discharge nozzle;

(d) an axially slidable valve spool in said valve chamber, said valve spool being formed with a liquid passageway;

(e) said valve spool having a first operative position within said valve chamber in which it engages said control orifice and blocks communication between said metering chamber and said outlet port while permitting the flow of pressurized liquid from said inlet port through said spool passageway into said metering chamber against the resilient biasing means of said metering piston; and

(f) actuating means for shifting said valve spool and simultaneously blocking said spool passageway, said actuating means comprising an actuating plunger adapted for engaging and shifting said valve spool from said first operative position to a second operative position in which said valve spool is disengaged from said control orifice to permit communication between said metering chamber and said outlet port to discharge a metered quantity of liquid through said outlet port while communication between said inlet port and metering chamber through said spool passageway simultaneously is blocked.

2. The combination set forth in claim **1**, wherein said valve spool liquid passageway communicates between said inlet port and an end of said valve spool facing said control orifice.

3. The combination set forth in claim **2**, wherein said valve spool is formed with a seal blocking communication between said inlet port and said outlet port.

4. The combination recited in claim **2** in which said valve spool has a pair of axially spaced lands disposed in sealing engagement with said valve chamber and bracketing said inlet port.

5. The combination recited in claim **2**, wherein said end of said valve spool facing said control orifice is contoured for entering into complemental engagement therewith.

6. The combination set forth in claim **2**, wherein said actuating plunger has an end facing said control orifice that is contoured for complemental engagement with said valve spool to block said spool passage.

7. The combination set forth in claim **6**, wherein said actuating plunger is substantially smaller in diameter than said control orifice, thereby allowing communication between said metering chamber and said outlet port of said valve chamber.

8. The combination recited in claim **1**, which further comprises a trigger pivotally attached to said body at a point offset from the axis of said actuating plunger; and a pivotal connection between said trigger and said actuating plunger for driving the latter into engagement with said valve spool when said trigger is pivoted toward said body.

9. The combination set forth in claim **8**, wherein said actuating plunger is constrained to move axially, and said pivotal connection between said trigger and said actuating plunger includes sliding movement as well as pivotal movement.

10. The combination set forth in claim **1**, which further comprises means in said metering chamber for adjusting the stroke of said metering piston and thereby to adjust the volume delivered by the latter.

11. A gun for dispensing metered quantities of liquid from a pressurized source and comprising, in combination:

(a) a hollow body having a metering chamber and a valve chamber, said metering chamber and valve chamber being disposed on opposite sides of a control orifice connecting said chambers;

(b) said valve chamber having an inlet port connected to a pressurized liquid source and an outlet port;

(c) a metering piston slidably disposed in said metering chamber;

(d) a first resilient means biasing said metering piston toward said control orifice;

(e) valve means moveably disposed in said valve chamber, said valve means being formed with a liquid passageway and having a first operative position in said valve chamber in which said valve means engages said control orifice and establishes communication between said inlet port and said metering chamber through said valve means passageway while blocking communication between said metering chamber and said outlet port;

(f) a second resilient means biasing said valve means toward said first operative position; and

(g) actuating means adapted for (1) engaging and shifting said valve means against the thrust of said second resilient biasing means to a second operative position in which said valve means is disengaged from said control orifice for establishing communication between said metering chamber

and said outlet port and (2) simultaneously blocking communication between said inlet port and metering chamber through said valve means passageway.

12. The combination recited in claim 11, which further comprises a trigger having a first pivotal connection to said body and a second pivotal connection to said actuating means radially offset for said first pivotal connection.

13. A gun for dispensing metered quantities of liquid ketchup from a pressurized source and comprising in combination:

(a) a hollow body having a valve chamber and a metering chamber connected by a control orifice;

(b) said body having an inlet port and an outlet port communicating with said valve chamber;

(c) a valve spool slidably disposed in said valve chamber and having an axial passage communicating between one end thereof and the outer periphery of a medial portion thereof;

(d) sealing means on said valve spool interposed between said inlet and said outlet;

(e) resilient means biasing said valve spool into engagement with said control orifice;

(f) a metering piston slidably disposed in said metering chamber;

(g) resilient means biasing said metering piston toward said valve chamber;

(h) an axially slidable actuating plunger disposed in opposition to said valve spool and adapted to open and close the axial passage thereof; and

(i) a trigger pivotally mounted on said body and adapted when squeezed toward the latter to drive said actuating plunger into engagement with said valve spool and to move said valve spool away from said control orifice for effecting closure of the axial passage of said valve spool and opening of said control orifice to permit communication between said metering chamber and said valve chamber outlet port.

14. A gun for dispensing metered quantities of liquid from a pressurized source and comprising, in combination:

(a) a hollow body having a metering chamber and a valve chamber, said metering chamber and valve chamber being disposed on opposite sides of a control orifice communicating between said chambers;

(c) a metering piston slidably disposed in said metering chamber;

(d) a first resilient means biasing said metering piston toward said valve chamber;

(e) a closure cap attached to said body enclosing said metering chamber and said first resilient biasing means;

(f) means in said valve chamber being movable to a first operative position in which it engages said control orifice and establishes communication between said inlet port and said metering chamber while blocking communication between said metering chamber and said outlet port;

(g) said valve means being movable to a second operative position in which it is disengaged from said control orifice and establishes communication between said metering chamber and said outlet port while blocking said inlet port;

(h) means for blocking communication between said inlet port and said metering chamber during movement of said valve means from said first position to said second position;

(i) a second resilient means biasing said valve means toward said first operative position; and

(j) an axially slidable actuating plunger extending through said closure cap and adapted to shift said valve means from said first operative position to said second operative position against the thrust of said second resilient biasing means;

(k) a trigger pivotably mounted on said closure cap at a point offset from the axis of said actuating plunger;

(l) a pivotal connection between said trigger and said actuating plunger for driving the latter into engagement with said valve means when said trigger is pivoted toward said body; and

(m) registration means interposed between said closure cap and said body to maintain the orientation of said trigger relative to said body.

15. The combination set forth in claim 14, wherein said registration means comprises a pair of diametrically opposed, axially extending lugs on said closure cap and a mating pair of diametrically opposed flats on said body

16. A gun for repeatedly dispensing precisely metered quantities of liquid from a pressurized source, said gun comprising, in combination:

(a) a hollow body having a valve chamber and a metering chamber connected by a control orifice;

(b) a metering piston in said metering chamber resiliently biased toward said control orifice;

(c) said valve chamber having an inlet port connected to a pressurized liquid source and an outlet port connected to a discharge nozzle;

(d) an axially slidable and resiliently biased valve spool in said chamber, said valve spool having a passage communicating between said inlet port and an end of said valve spool facing said control orifice;

(e) said valve spool having a first operative position in which it engages said control orifice and blocks said outlet port while permitting the flow of pressurized liquid from said inlet port through said valve spool passage and into said metering chamber against the resilient biasing means of said metering piston; and

(f) actuating means for shifting said valve spool and simultaneously blocking said spool passageway, said actuating means comprising an actuating plunger adapted for engaging and shifting said valve spool from said first operative position to a second operative position in which it is disengaged from said control orifice so as to permit communication between said metering chamber and said outlet port and the discharge of a metered quantity of liquid through the outlet port while blocking communication between said inlet port and metering chamber through said valve spool passage.

17. The combination set forth in claim 16 in which said actuating plunger is operable for blocking communciation between said inlet port and said metering chamber as an incident to shifting said valve spool from said first position to said second position.

18. The combination set forth in claim 16 in which said plunger is shifted into engagement with said valve spool passage as an incident to shifting said valve spool from said first position to said second position.

19. A gun for dispensing metered quantities of liquid from a pressurized source and comprising, in combination:

(a) a hollow body having a metering chamber and a valve chamber communicating therewith;

(b) said valve chamber having an inlet port connected to the pressurized liquid source and an outlet port;

(c) a metering piston slidably disposed in said metering chamber;

(d) a first resilient means biasing said metering piston toward said valve chamber;

(e) valve means in the form of a generally spool shaped body slidably disposed in said valve chamber, means defining an axial passage in said valve body that is open at one end thereof, a pair of axially spaced lands on said valve body intermediate the ends thereof, and means defining a radial passage in said valve body between said lands and communicating with said axial passage therein;

(f) said valve means having a first operative position in said valve chamber establishing communication through said radial and axial passages between said inlet port and said metering chamber while blocking communication between said metering chamber and said outlet port;

(g) a second resilient means biasing said valve means toward said first operative position; and

(h) actuating means adapted to (1) shift said valve means against the thrust of said second resilient biasing means from said first operative position to a second operative position for establishing communication between said metering chamber and said outlet port and (2) simultaneously block communication between said inlet port and metering chamber through said valve body axial passage.

* * * * *

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United States Patent [19]

Pleet et al.

[11] Patent Number: 5,368,195

[45] Date of Patent: Nov. 29, 1994

[54] **PRESSURIZED BAG-IN-BOTTLE LIQUID DISPENSING SYSTEM**

[76] Inventors: **Lawrence Pleet**, 9 Flintlock La., Bell Canyon, Calif. 91307; **Richard J. Heminuk**, 3277 Cherie Dr., Simi Valley, Calif. 93063

[21] Appl. No.: **61,194**

[22] Filed: **May 13, 1993**

[51] **Int. Cl.**[5] **B65D 35/28**; G01F 11/00

[52] **U.S. Cl.** **222/52**; 222/95; 222/105; 222/144.5; 222/146.6; 222/219; 222/263; 222/494

[58] **Field of Search** 222/52, 54, 95, 105, 222/183, 217–219, 146.5, 146.1, 146.6, 144.5, 389, 386.5, 256, 257, 258, 262, 263, 148, 571, 494

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Attorney, Agent, or Firm—Kelly Bauersfeld & Lowry

[57] **ABSTRACT**

A fluid dispenser system is provided for accurate delivery of a viscous or semi-viscous fluid. The dispenser system includes a pressure station for receiving a bottle filled with the selected fluid substance, and for pressurizing the bottle for fluid flow therefrom. In the preferred form, the fluid passes through a metering unit to a dispenser gun having a manually operated trigger. The metering unit responds to trigger operation to deliver a metered volume of the fluid to the dispenser gun for dispensing via a spout. The system is designed for quickly and easily dispensing a rapid succession of accurately metered volumes. The dispenser system is particularly suited for use in dispensing condiments in a fast food restaurant environment, or for dispensing metered volumes of paints and/or pigments used in mixing paints, or for handling other flowable materials such as adhesives and the like.

42 Claims, 6 Drawing Sheets

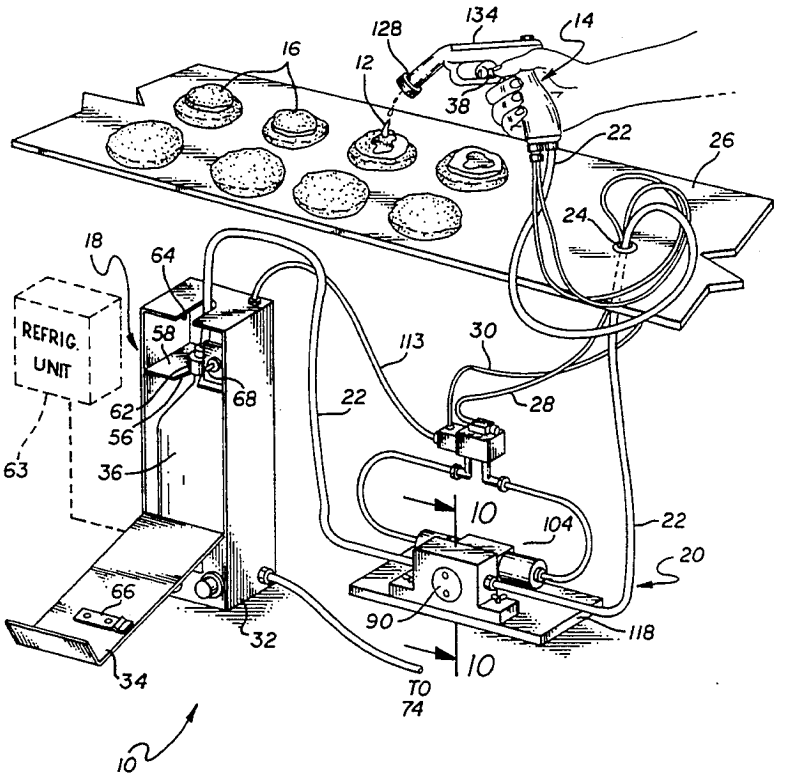
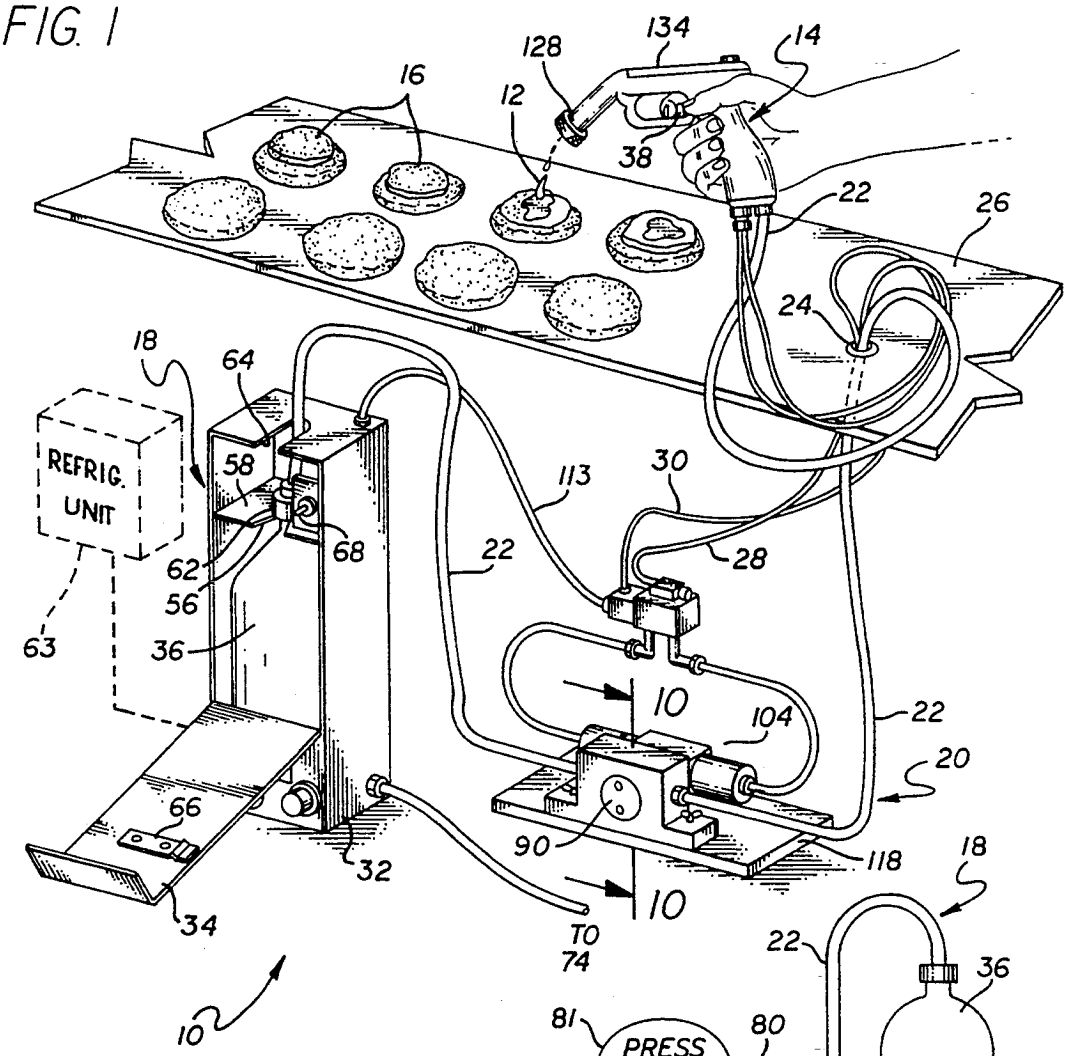


FIG. 1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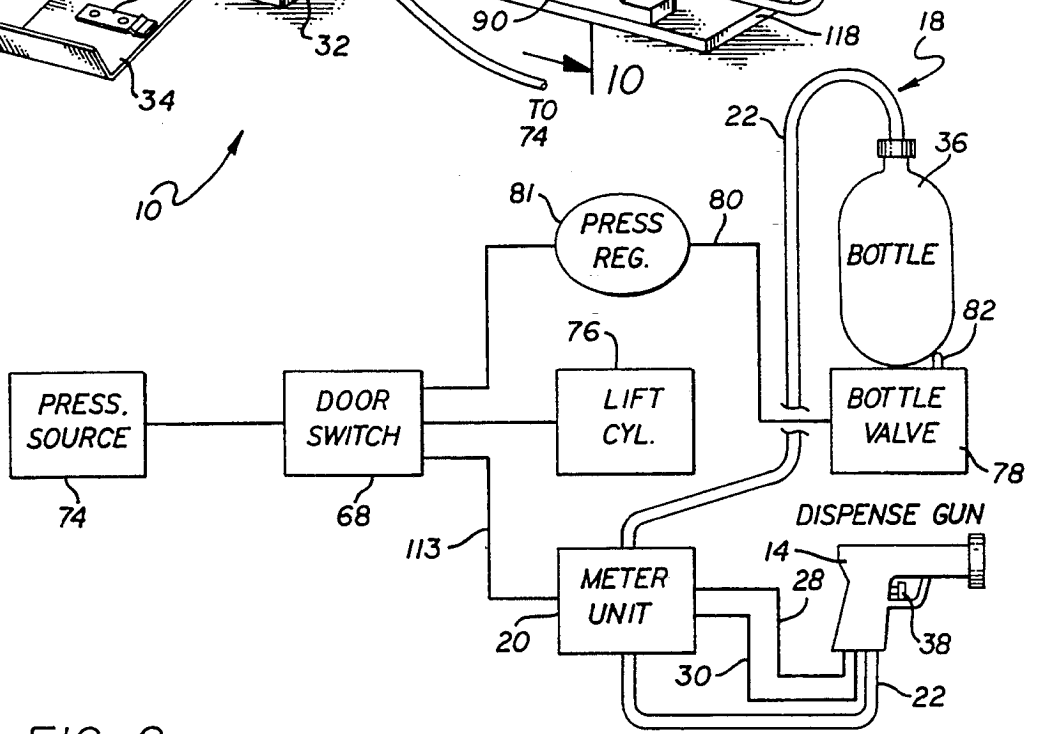
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BOTTLE
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DOOR SWITCH
LIFT CYL.
BOTTLE VALVE
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74
68
DISPENSE GUN
113
14
METER UNIT
28
38
20
30
22

FIG. 2

FIG. 3

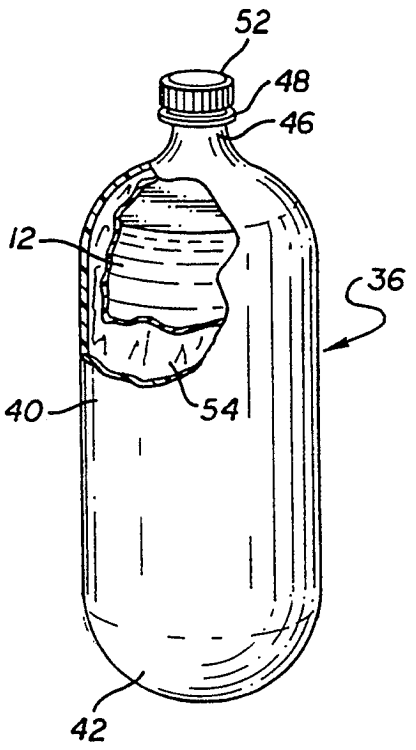


FIG. 4

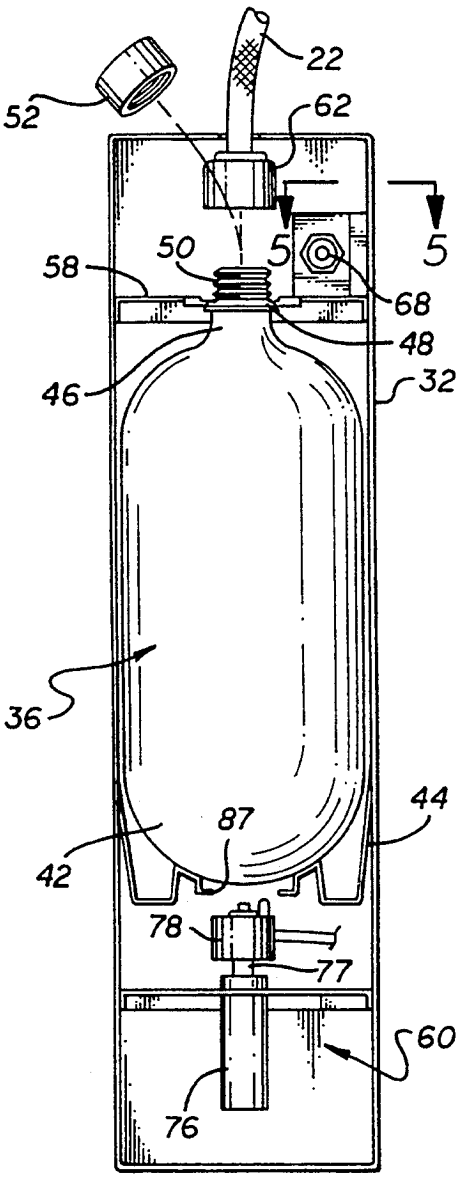


FIG. 5

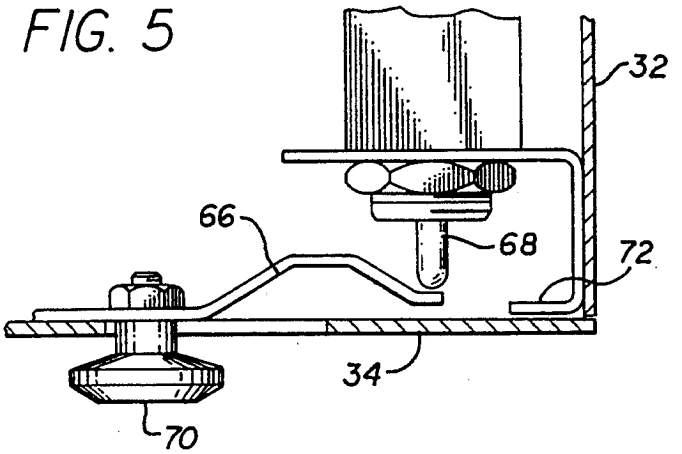


FIG. 6

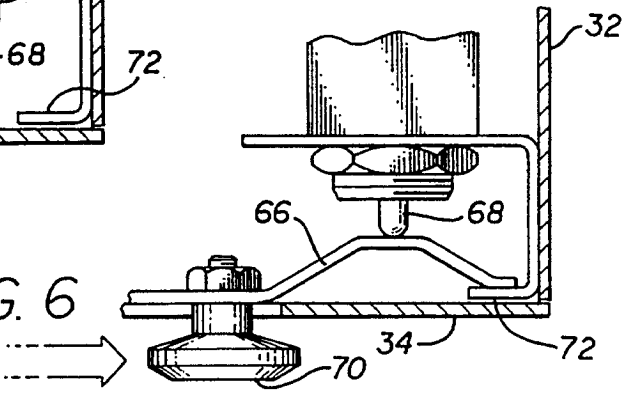


FIG. 7

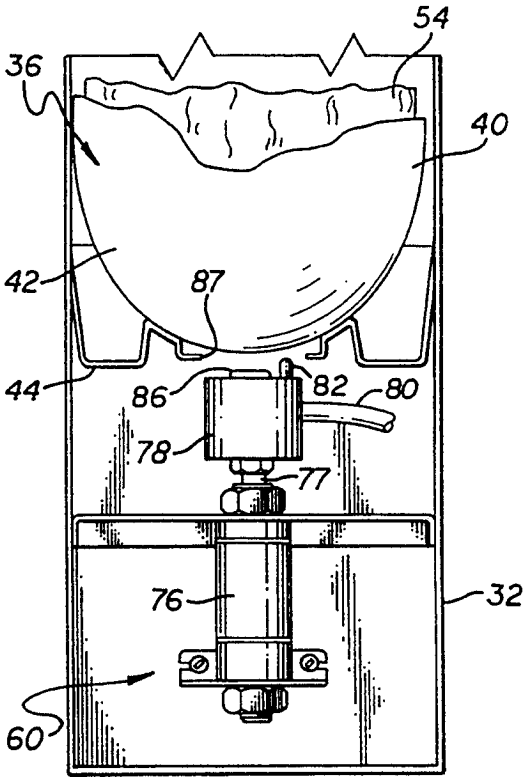
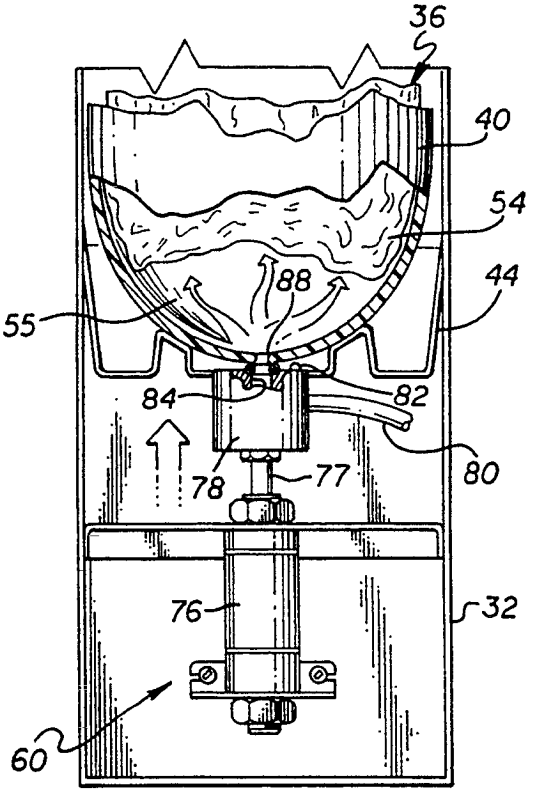


FIG. 8



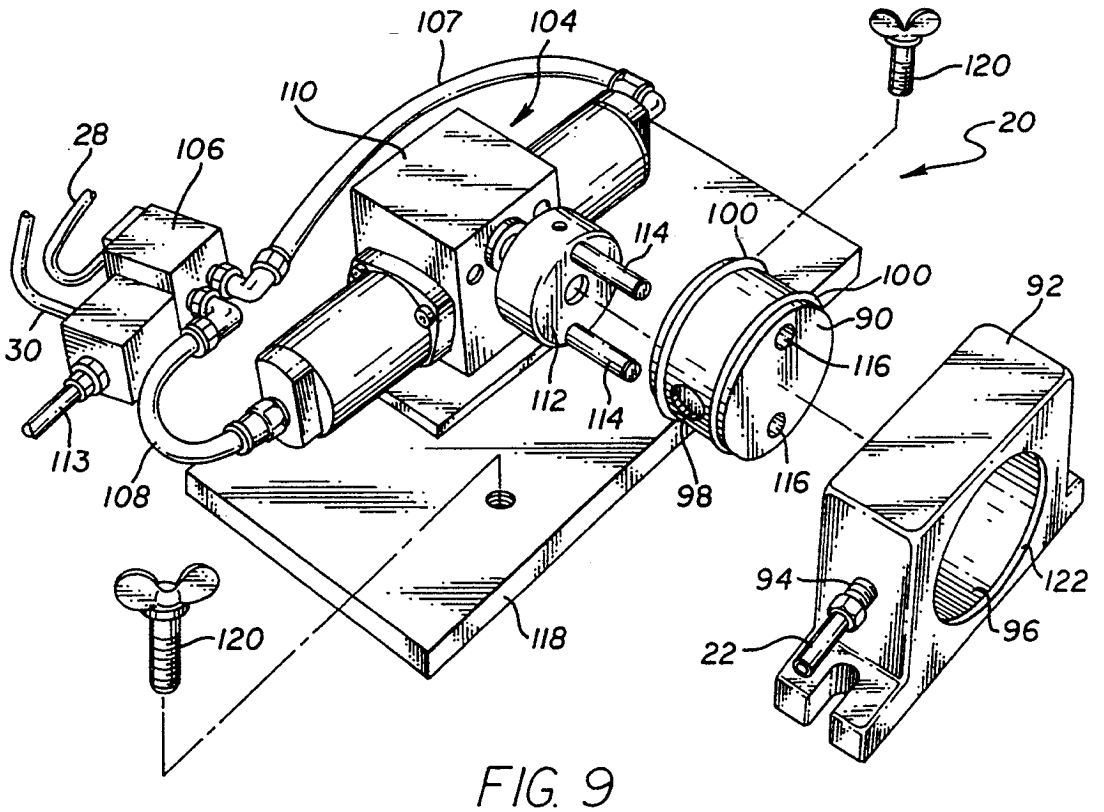


FIG. 9

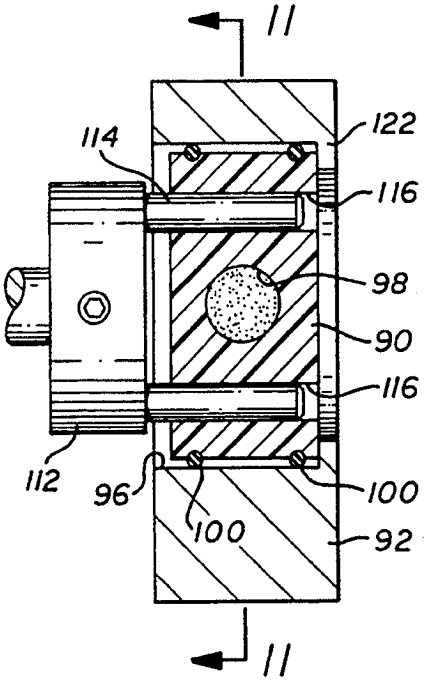


FIG. 10

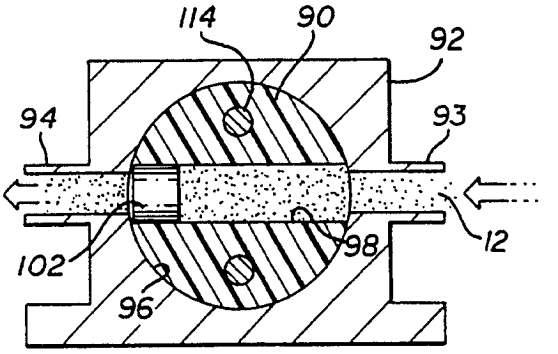


FIG. 11

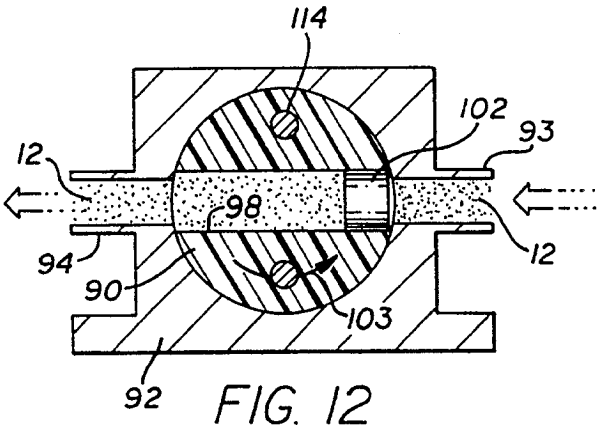


FIG. 12

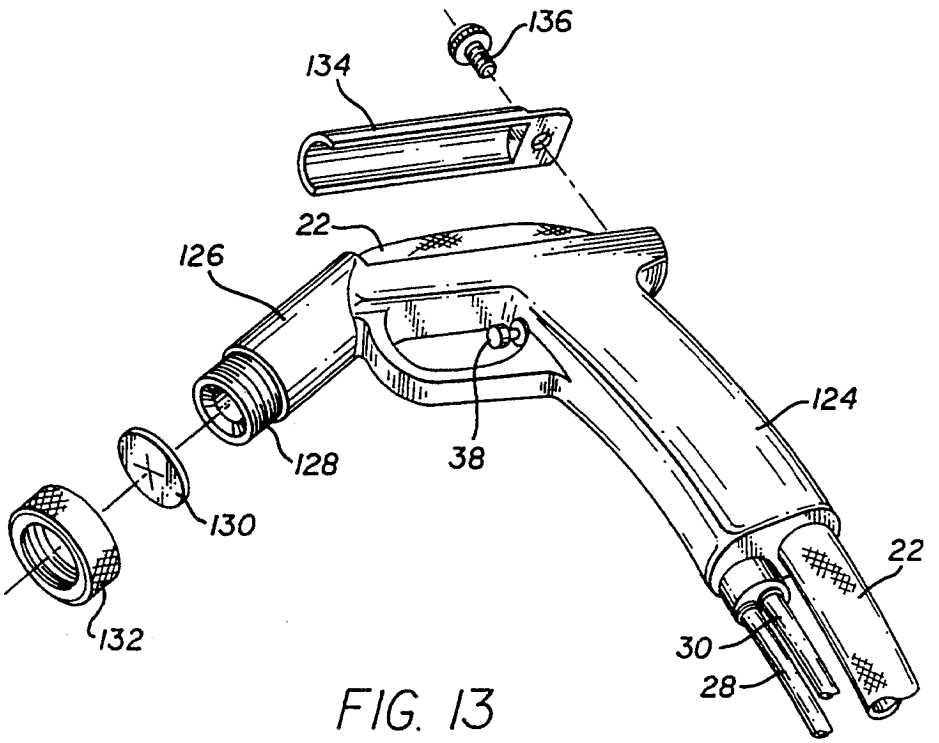


FIG. 13

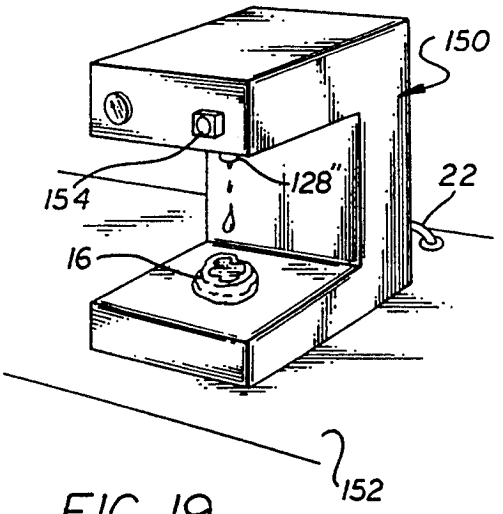


FIG. 19

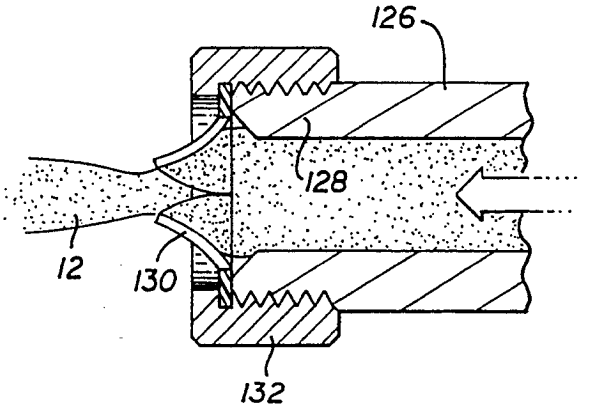


FIG. 14

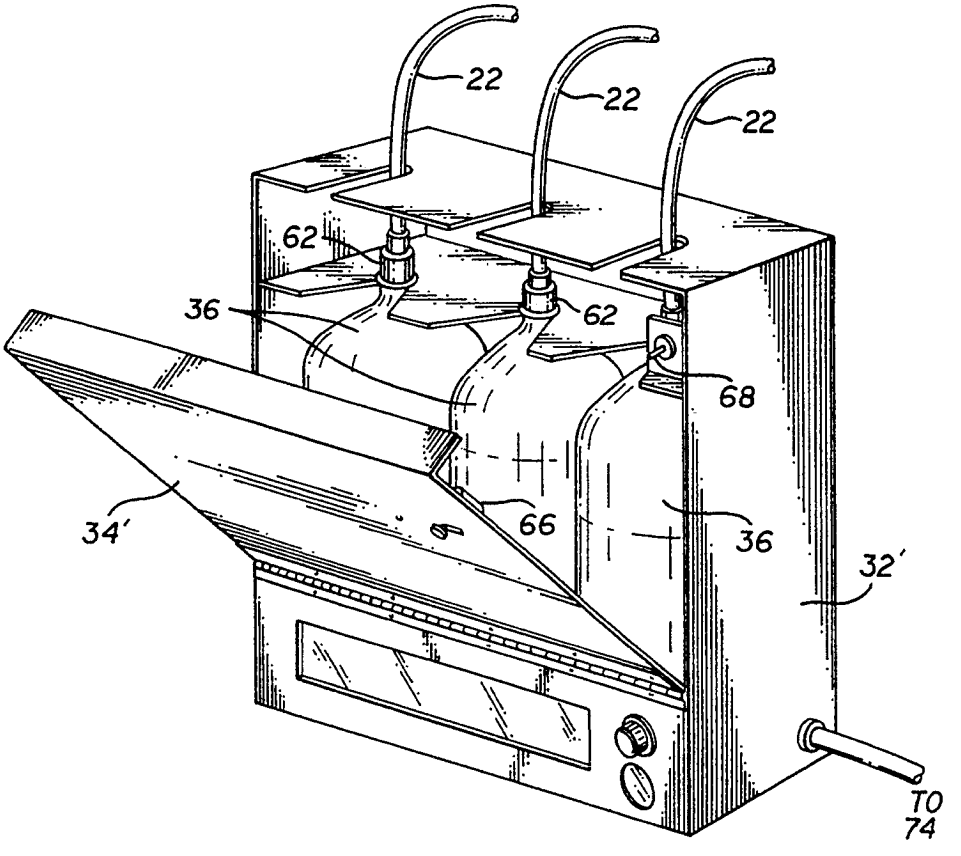
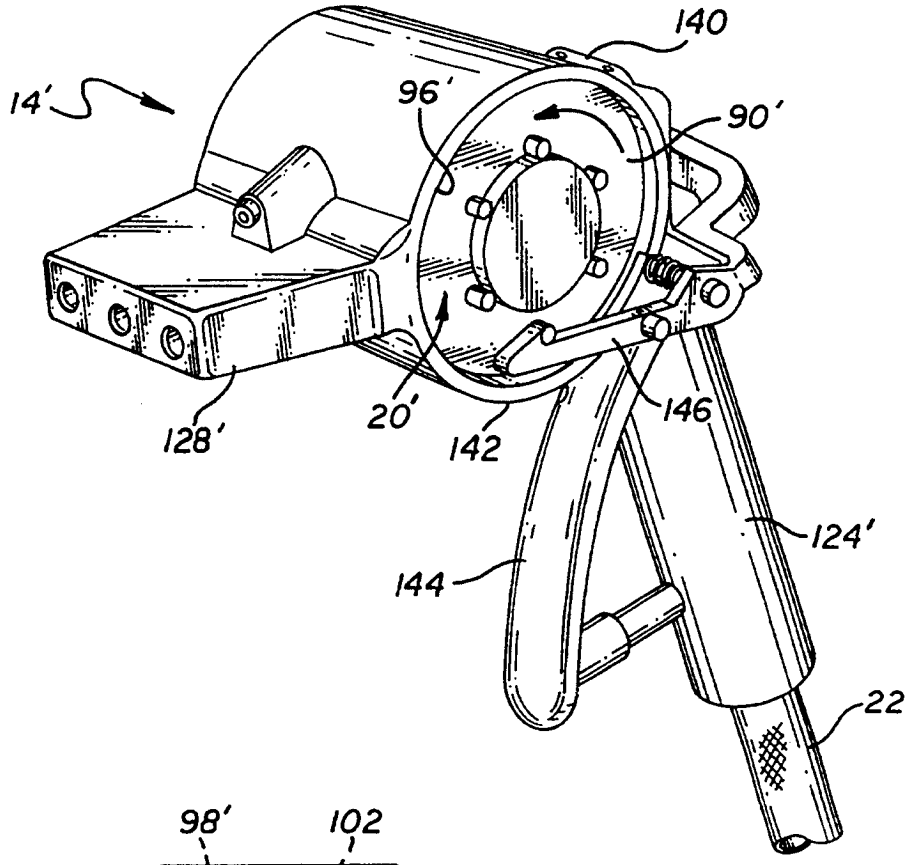


FIG. 15

FIG. 16



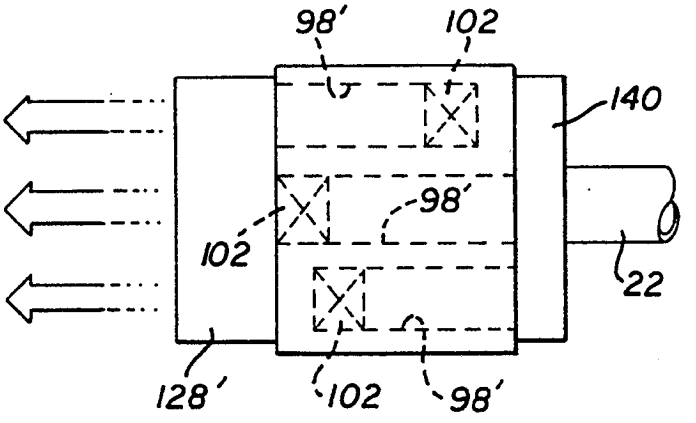


FIG. 17

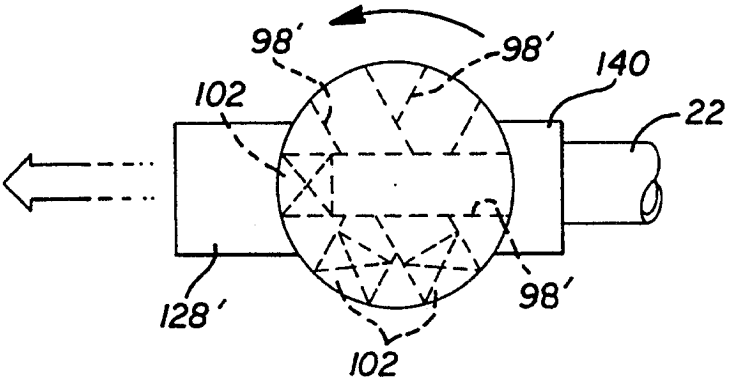


FIG. 18

PRESSURIZED BAG-IN-BOTTLE LIQUID DISPENSING SYSTEM

BACKGROUND OF THE INVENTION

This invention relates generally to dispenser systems for precision delivery or dispensing of viscous or semi-viscous fluid. More specifically, this invention relates to an improved dispenser system designed for facilitated pressure-caused fluid dispensing, preferably in rapid succession of metered fluid volumes, and in a manner which substantially minimizes or eliminates significant operator fatigue. The dispenser system is adapted for use in a range of different applications, including but not limited to dispensing of condiments in a fast food restaurant environment.

Fluid dispenser systems are generally known in the art for use in handling and dispensing measured quantities of relatively viscous or semi-viscous fluids. As one example, in a fast food restaurant, condiments such as catsup, mustard, tartar sauce, etc., are commonly dispensed in the course of production and preparation of fast food items such as sandwiches and the like. In this environment, the selected condiment must be applied quickly and in accurately metered doses to a succession of sandwiches or other food items, in a manner maintaining consistent product quality and taste characteristics.

In the past, various dispenser devices have been proposed for use in handling and dispensing condiments in a restaurant environment. For example, cartridge-type dispenser guns have been proposed wherein a ratchet-operated power piston is advanced through a disposable condiment-filled cartridge to force the cartridge contents through an open nozzle tip. Such devices, however, generally have not provided measured doses having adequate volumetric repeatability. Moreover, the volumetric capacity of the disposable cartridge is relatively limited in order to minimize the total weight of the dispenser gun and operator fatigue associated with manipulation of the filled cartridge, with the undesirable result that frequent cartridge replacement is required in the course of a normal work shift.

Alternative condiment dispenser devices have utilized manually reciprocal pump elements to dispense flow able condiments in roughly uniform doses. Such dispenser systems, however, are generally incompatible with kitchen usage fast foot restaurant or the like, since each food item must be transported to the pump dispenser. Accordingly, such pump dispenser devices are normally employed at a customer self-service counter whereat customers can select and dispense condiments on their own. In this latter location, restaurant personnel are required to monitor and refill each customer operated pump dispenser on an as-needed basis. Moreover, customer access to the pump dispenser creates a potential for condiment wastage and/or contamination.

Similar ratchet-type and/or pump devices have been used to dispense viscous or semi-viscous fluids in other applications. By way of example, paints and/or pigments used therein are often dispensed in metered quantities to provide a custom-mixed paint of selected color. Adhesives are also dispensed in metered volumes in many industrial applications, frequently by dispensing and mixing proportioned volumes of base and accelerator materials used in form polymerizable epoxy resins. In all of these fluid dispense environments, rapid and accurately repeatable dispensing of metered volumes has remained a persistent problem.

The present invention provides an improved dispenser system designed particularly for use in highly repeatable dispensing of viscous or semi-viscous fluids, wherein the improved dispenser system is adapted to dispense the fluid quickly and easily and with minimal operator fatigue.

SUMMARY OF THE INVENTION

In accordance with the invention, a fluid dispensing system is provided for handling and accurate dispensing of a viscous or semi-viscous flowable substance. The dispenser system comprises a pressurized supply station for receiving a relatively large supply of the selected fluid and for subjecting the fluid to pressure for regulated outflow through a delivery conduit. In the preferred form, a metering unit is mounted along the delivery conduit between the supply station and a dispenser gun having a manually operated trigger. The metering unit responds to trigger operation to deliver an accurate and repeatably measured dose of the fluid to a spout through which the metered volume is dispensed. The system will be shown and described with respect to metered condiment dispensing in a fast food restaurant environment or the like, although it will be understood that the invention is applicable to a variety of different fluid dispensing applications.

In accordance with the preferred form of the invention, the supply of the fluid such as a selected condiment is contained within a storage bottle having a relatively rigid or semirigid outer shell and a comparatively non-rigid or flexible inner liner. The flexible inner liner has the condiment carried therein for pressure-forced flow from the bottle in response to pressure applied to the space between the outer shell and the inner liner. In this regard, a supply station housing is provided for removable reception of the storage bottle with the bottle mouth connected to the delivery conduit via an adaptor cap. When the storage bottle is installed into the housing, and a safety door thereof moved to a closed and locked position, a pressure valve engages the bottle for flow communication of a pressurized gas source with a pressure port formed in the outer shell.

In the preferred form, the delivery conduit flow-couples the condiment to the metering unit which has a rotatable core defining an internal cylinder of fixed volume. A metering piston is mounted within the core cylinder for displacement from one end to the other. The pressurized flow of condiment from the storage bottle displaces the metering piston from the upstream end to the downstream end of the cylinder, resulting dispensing of a correspondingly metered volume through the delivery conduit and dispenser gun. The rotatable core is then indexed through a half revolution stroke to return the metering piston to the upstream end of the cylinder, and the process is repeated.

The dispenser gun includes the trigger operable to rotate the core through a half revolution stroke for dispensing the metered dose, as described above. The trigger may comprise a pneumatic trigger switch for operating a bidirectional actuator connected to the rotatable core of the metering unit. In another alternative form, the rotatable core may be carried within the body of the dispenser gun, wherein the trigger may comprise a manually retractable lever for operating the rotatable core through part-rotation strokes by means of a ratchet mechanism. In addition, the rotatable core mounted

within the body of the dispenser gun may include multiple internal cylinders each having a metering piston mounted therein.

In a preferred configuration of the invention, the dispenser gun comprises a hand-held implement which may be employed by restaurant personnel or the like for quickly and easily dispensing metered volumes of the selected condiment in the course of production food item preparation, for example, in a fast food restaurant. In one alternative, the dispenser gun may be installed within a dispenser station housing located, for example, at a customer self-service counter, with a trigger switch exposed for customer access. Depression of the trigger switch in this configuration operates the metering unit to dispense a measured volume of the selected condiment.

Other feature and advantages of the present invention will become more apparent from the following detailed description, taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate the invention. In such drawings:

FIG. **1** is a fragmented and somewhat schematic perspective view illustrating an improved fluid dispenser system embodying the novel features of the invention;

FIG. **2** is a schematic representation illustrating the fluid dispenser system of FIG. **2**;

FIG. **3** is a perspective view illustrating a preferred supply bottle containing a viscous or semi-viscous fluid to be dispensed, with portions broken away to illustrate construction details of the supply bottle;

FIG. **4** is an enlarged vertical sectional view illustrating the supply bottle mounted within a pressure station housing;

FIG. **5** is an enlarged fragmented horizontal sectional view taken generally on the line **5—5** of FIG. **4**, and illustrating a safety door for the pressure station housing in a closed but unlocked position;

FIG. **6** is a fragmented horizontal sectional view similar to FIG. **5**, and illustrating the safety door in a closed and locked position;

FIG. **7** is an enlarged fragmented vertical sectional view corresponding with a portion of FIG. **4**, and illustrating a bottle pressure valve retracted from the supply bottle;

FIG. **8** is an enlarged fragmented vertical sectional view similar to FIG. **7** and showing the bottle pressure valve in engagement with the supply bottle;

FIG. **9** is an enlarged and exploded perspective view illustrating a metering unit for use in the invention;

FIG. **10** is an enlarged fragmented vertical sectional view taken generally on the line **10—10** of FIG. **1**;

FIG. **11** is a vertical sectional view taken generally on the line **11—11** of FIG. **10**, and showing movement of a metering piston to a downstream position within a metering cylinder;

FIG. **12** is an enlarged fragmented sectional view similar to FIG. **11**, and illustrating movement of a rotatable core to result in displacement of the metering piston to an upstream end of the metering cylinder;

FIG. **13** is an enlarged fragmented and exploded perspective view depicting a preferred dispenser gun for use in the invention;

FIG. **14** is an enlarged fragmented sectional view illustrating a drip-free spout for use in the dispenser gun;

FIG. **15** is a fragmented perspective view illustrating a modified pressure station housing having multiple supply bottles mounted therein;

FIG. **16** is an enlarged fragmented perspective view depicting an alternative form of a dispenser gun for use in the invention;

FIG. **17** is a top plan view, shown somewhat in schematic form, illustrating the dispenser gun of FIG. **16**;

FIG. **18** is a side elevation view, shown somewhat in schematic form, of the dispenser gun of FIG. **16**; and

FIG. **19** is a fragmented perspective view depicting a further modified form of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in the exemplary drawings, a dispenser system referred to generally in FIG. **1** by the reference numeral **10** is provided for facilitated dispensing of a selected viscous or semi-viscous fluid **12**. FIG. **1** shows the dispenser system **10** to include a hand-held and manually operated dispenser gun **14** for delivering the flowable substance such as a selected condiment **12** to a succession of hamburgers **16** under preparation in a fast food restaurant or the like. The dispenser gun **14** is shown connected to a supply station **18** for receiving and pressurizing a supply of the condiment **12**, and a metering unit **20** for regulating flow of the condiment **12** to the dispenser gun **14** in accurately metered volumes.

The dispenser system of the present invention is shown and described particularly for use in a fast food or similar restaurant environment wherein repeated and substantially uniform metered volumes of the flowable substance **12** must be delivered with relative precision to produce an attractive food product with consistent quality and flavor characteristics. In this regard, the dispenser system **10** is shown in FIG. **1** in a preferred configuration, wherein the supply station **18** and metering unit **20** are located in an under-counter position to avoid interfering with food production processes. A delivery conduit **22** extends through an appropriate port **24** in the counter **26**, in association with appropriate pneumatic control lines **28** and **30**. The system is shown for use in applying metered doses of a condiment **12** such as catsup, mustard, tartar sauce, etc., to a production sequence of hamburgers **16** or other food items, although it will be understood that other types of viscous or semi-viscous flowable substances may be handled and dispensed in other operating environments which may or may not require metered doses. For example, the dispenser system **10** may be used to deliver accurately metered volumes of paint or paint pigments used to mix paint of selected color, or to deliver other substances such as adhesives and/or components thereof.

In general terms, with reference to FIGS. **1** and **2**, the supply station **18** includes a relatively compact housing **32** having a hinged safety door **34** to permit removable placement into the housing interior of a supply bottle **36** filled with the selected condiment **12**. The supply bottle **36** is connected to the delivery conduit **22** which extends to the metering unit **20**, and further to the dispenser gun **14**. When the safety door **34** is closed and locked, the contents of the supply bottle **36** is pressurized for regulated pressure-caused flow of the condiment **12** to the dispenser gun, in response to manual operation of a trigger switch **38**. In the preferred form, as will be described detail, the illustrative system is

designed for rapidly dispensing the selected condiment 12 in metered doses up to about one ounce at a rate of one dose per second.

FIGS. 3 and 4 illustrate the supply bottle 36 in one preferred form. More specifically, the supply bottle 36 comprises a plastic blow-molded outer shell 40 of relatively rigid or semi-rigid construction, such as blow-molded PET plastic. The outer shell 40 normally has a generally hemispherical bottom wall 42 which is mounted by an adhesive connection or the like into a base cup 44 adapted to support the bottle in a upright position on a flat surface. The upper end of the bottle shell 40 defines an upwardly projecting neck 46, typically including a rigid neck transfer ring 48 in combination with external threads 50 to permit thread-on mounting of a conventional closure cap 52.

A flexible inner liner 54 is positioned within the outer shell 40 of the supply bottle 36 and defines a deformable bladder adapted to be filled with the condiment 12 or other flowable substance. The upper end of the liner 54 is joined to the neck 46 of the bottle shell 40, such that the liner 54 can be filled or the contents otherwise dispensed therefrom through the bottle neck 46. In the preferred form, the flexible inner liner 54 is comolded with the outer shell 40 in a blow molding process which avoids connection of the blown portion of the liner 54 to the blown portion of the shell 40, or otherwise permits delamination of these structures upon introduction of a pressurized fluid or gas into the space therebetween, as will be described.

When the safety door 34 of the supply station housing 32 is opened, as shown best in FIG. 1, the supply bottle 36 may be installed quickly and easily into the housing interior. In this regard, the bottle 36 is placed into the housing 32 in an upright position, with the neck 46 and neck ring 48 press-fitted into an open-sided slot 56 formed in a bottle support platform 58. In this position, the lower end of the bottle 36 is suspended in a self-centered position above a bottle pressurization unit 60 (FIGS. 4, 7 and 8) disposed within a lower region of the station housing 32. In addition, the neck 46 projects a short distance above the support platform 58 in a position for thread-on mounting of a ported adaptor cap 62 at an upstream end of the delivery conduit 22. The closure cap 52 on the bottle is, of course, removed prior to bottle placement into the station housing, and the adaptor cap 62 may be threaded onto the bottle neck immediately prior to bottle placement into the housing. In this regard, an open-sided conduit slot 64 is conveniently formed in a top wall of the housing 32, to accommodate bottle installation with the adapter cap 62 and associated delivery conduit 22 connected thereto. The adapter cap 62 functions to connect the upstream end of the delivery conduit 22 to the condiment 12 within the inner liner 54 of the supply bottle 36. A refrigeration unit 63 (FIG. 1) including conventional mechanical refrigeration components or otherwise including thermoelectric heat transfer devices may be provided to chill the bottle 36 and its contents 12 when mounted within the housing 32.

The safety door 34 includes a slide latch 66 for locking the door in a closed position, with the supply bottle 36 contained therein. In accordance with one feature of the invention, the slide latch 66 engages a door switch 68 to initiate pressurization of the bottle contents when the safety door is closed and locked. More particularly, with reference to FIGS. 5 and 6, the slide latch 66 is operable from the front of the door 34 by means of a knob 70 to displace the latch between an unlocked position and a locked position relative to a keeper 72 on the station housing 32. When the slide latch 66 is closed and locked, as viewed in FIG. 6, a segment of the latch 66 engages and depresses the door switch 68 to initiate bottle pressurization. Conversely, when the slide latch 66 is moved to the open position, as viewed in FIG. 5, the door switch 68 is disengaged to correspondingly disconnect a pressure source 74 (FIG. 2) such as compressed air or a CO_2 cartridge, from the system components. Such depressurization of the system components beneficially precludes access to the supply bottle 36 in a pressurized state.

FIGS. 7 and 8 illustrate operation of the bottle pressurization unit 60 to engage and pressurize the supply bottle 36, when the safety door 34 is closed and locked. As shown, the pressurization unit 60 comprises a lift cylinder 76 having a lower end mounted to the station housing 32. A movable ram 77 projects upwardly from the lift cylinder 76 and carries a bottle pressure valve 78 for engagement with the bottom of the bottle 36. In particular, when the safety door 34 is closed and locked, the pressure source 74 is coupled to the lift cylinder for displacing the ram 77 in an upward direction, for purposes of moving the pressure valve 78 into engagement with the bottom of the bottle, as shown in FIG. 8. Conversely, when the safety door 34 is unlocked, the door switch 68 disconnects the lift cylinder 76 from the pressure source 74, resulting in downward displacement of the ram 77 and the pressure valve 78 carried thereon, to the position spaced from the bottle as shown in FIG. 7. Although the lift cylinder 76 may take various forms, one preferred commercial device is marketed by Clippard Instrument Laboratory, Inc. of Cincinnati, Ohio under Model Designation USR-17. Alternatively, the bottle pressure valve 78 may be mounted on the ram 77 or the like for simple spring-biased movement toward the bottom of the bottle 36.

The pressure valve 78 is also connected to the pressure source 74 via a pneumatic line 80, when the safety door 34 is closed and locked. The pneumatic line 80 supplies the pressurized gas through a pressure regulator 81 (FIG. 2) to a bottle switch 82 and further through a flow port 84 having an open downstream end lined by an O-ring gasket 86 positioned to engage the bottom of the supply bottle 36. More particularly, upward translation of the pressure valve 78 moves the pressure valve 78 in an upward direction as viewed in FIG. 8. The pressure valve 78 fits through a central opening 87 in the bottle base cup 44, such that the gasket 86 moves into sealed engagement with the lower end of the bottle shell 40, with the flow port 84 in communication with a pressure inflow port 88 (FIG. 8) at the bottom of the bottle. This sealed engagement of the pressure valve 78 with the bottle bottom is accompanied by depression of the bottle switch 82 upon contact with the bottle bottom, to open the flow path for the pressurization gas into the bottle interior. Once again, while the specific construction details of the pressurization valve 78 may vary, a preferred device is marketed by Clippard Instruments Laboratory, Inc. of Cincinnati, Ohio under Model Designation MAV-2C.

As shown in FIG. 8, the pressurized gas flow to the supply bottle 36 passes through the inflow port 88 to the space between the outer shell 40 and the inner flexible liner 54 of the bottle. The pressurized gas thus fills a pressure chamber 55 defined by the space between the shell and liner to subject the liner 54 to a regulated

pressure, for purposes of forcing the liner to collapse while correspondingly forcing the condiment **12** to flow from the bottle through the adaptor cap **62** and delivery conduit **22**. Importantly, however, closure of the safety door **84** without prior installation of a supply bottle **36** will not result in flow of the pressurized gas into the interior of the housing, since the bottle switch **82** on the elevated pressure valve **78** will not be depressed and thus will not detect the presence of a bottle within the housing **32**.

The flowable condiment **12** exits the supply bottle **36** for passage through the delivery conduit **22** to the metering unit **20**. In general operation, the metering unit **20** responds to manual actuation of the trigger switch **38** on the dispenser gun **14** to regulate condiment dispensing in the desired discrete doses of precision metered volume.

The metering unit **20** is shown in more detail in FIGS. **9–12**, and generally comprises a cylindrical rotary core **90** carried within a housing block **92** mounted in-line with the delivery conduit **22**. More particularly, the housing block **92** has an inlet fitting **93** and an outlet fitting **94** for in-line connection with the delivery conduit **22**, at diametrically opposed positions with respect to a relatively large and generally circular cross bore **96**. The rotary core **90** has a generally cylindrical shape adapted for slide-fit installation into the cross bore **96** of the housing block **92**. A metering cylinder **98** is formed to extend diametrically through the core **90**, for in-line positioning between the inlet and outlet fittings **93** and **94**, upon appropriate rotational orientation of the core **90** within the housing block **92**. O-ring seals **100** are provided on the core **90** at axially opposite sides of the metering cylinder **98** for sealed engagement with the housing block **92** within the cross bore **96**.

FIGS. **11** and **12** show the metering cylinder **98** with the rotary core **90** to have a cross sectional size which is somewhat greater than the flow path defined by the inlet and outlet fittings **93** and **94**. A metering piston **102** is slid ably fitted into the metering cylinder **98** for translation back-and-forth therein, as will be described in more detail. The metering piston **102** thus also has a cross sectional size which is greater than the flow paths defined by the fittings **93** and **94**, such that the piston **102** cannot travel beyond the periphery of the rotary core **90**.

In normal operation, the pressurized condiment within the supply bottle **36** flows through the delivery conduit **22** to the inlet fitting **93** of the metering unit **20**. This condiment flow, under pressure as previously described, forces the metering piston **102** to displace along the metering cylinder **98** to a downstream end thereof as shown in FIG. **11**, provided that the metering cylinder **98** is aligned with the fittings **93** and **94**. Such displacement of the piston **102** to the downstream end of the metering cylinder **98** effectively fills the metering cylinder **98** with a measured volume of the condiment to be dispensed.

When dispensing is desired, the rotary core **90** is moved through a part-circle stroke of one-half revolution within the housing block **92**, in the direction of arrow **103** in FIG. **12**. This half-revolution movement of the core **90** reverses the position of the metering piston **102** to the upstream end of the metering cylinder **98**. As the cylinder **98** returns to a rest position disposed in-line with the fittings **93** and **94**, the pressurized condiment within the supply bottle **36** again forces the piston to translate through the cylinder **98** toward the downstream end thereof. During this return motion to the downstream end of the cylinder **98**, the piston **102** effectively dispenses the measured volume of the condiments **12** through the outlet fitting **94**, while permitting a subsequent measured volume to flow into and re-fill the metering cylinder **98**. Sequential rotation of the core **90** through half-revolution strokes is thus effective to dispense metered increments of the condiment **12** through the outlet fitting **94**.

The metering unit **20** includes a rotary actuator **104** for displacing the core **90** through the desired half-circle strokes. As shown best in FIGS. **1** and **9**, the rotary actuator comprises a bi-directional pneumatic cylinder device having a control valve **106** for supplying pneumatic pressure through a pair of pressure lines **107** and **108** to opposite ends of an actuator unit **110**. The control valve **106** is operated each time the trigger switch **38** is depressed, by means of connecting the dispenser gun **14** to the control valve **106** via the pneumatic control lines **28, 30**, to rotate a driven hub **112** through half-circle increments. The control valve **106** is supplied with control fluid under pressure from the source **74** via a pneumatic lure **113**, when the safety door is closed and locked. The hub **112** includes a pair of axial drive pins **114** which slide-fit into matingly positioned drive ports **116** in the rotary core **90**. Although the construction details of this rotary actuator may take various forms, one preferred actuator device is marketed by Bimba Manufacturing Company of Monee, Ill. under the name Bimba Pneu-Turn Rotary Actuator.

FIG. **9** shows the metering unit **20** in a convenient form adapted for rapid assembly and disassembly for cleaning and maintenance purposes as required for example, in a food service environment. For example, the rotary actuator unit **110** is mounted in a fixed position onto a base plate **118** which can be securely fastened, for example, in an under-counter position in a food service establishment. The housing block **92** is adapted for removable connection by wing nuts **120** or other suitable quick release fasteners onto the base plate **118**, in a position with the drive pins **114** engaging the core **90** within the housing block. The housing block **92** and core **90** are disassembled quickly and easily by removing the wing nuts **120**, followed by slide-off displacement of the core **90** from the drive pins **114**. With this arrangement, the fluid-contacting components of the metering unit may be disassembled quickly and easily for cleaning at the end of a business day, and correspondingly simple reassembly for resumed operation. Moreover, a short radially inwardly extending flange **122** may be provided at the axial outboard side of the cross bore **96**, for accurately locating the core **90** in a operational position restrained between the flange **122** and the drive hub **112**.

The dispenser gun **14** is shown in FIGS. **13** and **14**, and comprises a relatively compact and lightweight pistol-shaped implement. The dispenser gun **14** includes a handgrip **124** having a base end suitably connected to the metering unit via the pneumatic control lines **28, 30**, which are coupled in turn to the trigger switch **38**. The delivery conduit **22** extends through the hand grip **124** and curves through a barrel **126** to a downstream end secured as by threading within a spout **128**. An anti-drool valve disk **130** is conveniently mounted over the spout **128** by a threaded clamp ring **132** or the like. FIG. **13** shows a removable cap member **134** of a domed semicircular cross section forming a portion of the barrel **126**, wherein the cap member may be removed by

means of a screw **136** to facilitate installation of the delivery conduit **22** and/or removal thereof for cleaning purposes.

In use, the food service operator can manipulate the dispenser gun **14** quickly and easily over a production array of food items, such as the hamburgers **16** shown in FIG. **1**, with appropriate depression of the trigger switch **38** to dispense metered volumes of the condiment **12**. Such dispensing may occur rapidly, as fast as one cycle per second, with the metered dispensed volume corresponding with the cross sectional volume of the metering cylinder **98** less the volume occupied by the piston **102**. In this regard, different specific metered volumes may be selected quickly and easily by appropriate interchange of a rotary core having the appropriate metering cylinder of the selected volume, or by use of a piston **102** of different volumetric size. The metering unit regulates condiment flow so that the selected measured volume is supplied incrementally to the dispenser gun **14** for dispensing through the spout **128**. The anti-drool valve disk **130** prevents undesired dripping of the condiment between dispense cycles.

FIG. **15** shows one alternative form of the invention, wherein a modified supply station housing **32'** is adapted for receiving and supporting a plurality of the supply bottles **36**, constructed as previously described. In this variation, each of the supply bottles **36** is separately supported within the housing **32'**, and connected via a corresponding adapter cap **62** to a dedicated delivery conduit **22**. A hinged safety door **34'** has a latch **66** for engaging a door switch **68** in the closed and locked position, resulting in supply of pressurization fluid to a plurality of bottle pressurization units **60** (not shown in FIG. **15**) mounted respectively beneath each of the supply bottles **36**. Importantly, the bottle switch **82** on each pressurization unit **60** prevents flow of the pressurizing fluid, unless a supply bottle **36** is mounted in association therewith. Accordingly, the multi-bottle housing **32'** is operational, even though one or more of the bottle mounting positions is vacant. The multiple delivery conduits **22** will normally each be connected to an associated metering unit **20** and dispenser gun **14** to provide the capability of dispensing the same or several different flowable substances at the same time.

FIGS. **16–18** show an alternative dispenser gun **14'** having the metering unit **20'** mounted therein. In this version of the invention, a handgrip **124'** is connected to the delivery conduit **22** for fluid flow passage to a manifold **140** at an upstream side of a cylindrical gun housing **142**. A rotating metering core **90'** is carried within a cross bore **96'** of the housing **142** and is shown with an axially spaced plurality of diametrically formed metering cylinders **98'** disposed at 60° intervals with respect to each other. Each cylinder **98'** has a metering piston **102** therein for metering fluid flow in the same manner as previously described. A retractable trigger lever **144** on the gun **14'** operates a spring-loaded pawl **146** to rotate the core 90° through part-circle strokes of approximately 60° increments. Such rotation of the core 90° aligns the three metering cylinders **98'** one at a time for condiment flow passages from the manifold **140** to a dispenser spout **128'** which may be multiported, as shown.

In another variation of the invention, the multibarreled dispenser gun **14'** of FIGS. **16–18** may be manifolded such that each cylinder **98'** therein is separately connected to a dedicated conduit **22** associated with a different condiment. Thus, the gun can be coupled with several different supply bottles such as the three bottles shown in FIG. **15**, with a different condiment being dispensed upon successive operation of the lever **144**. The multiple dispense ports can be arranged side-by-side as shown in FIG. **16**, or otherwise oriented in concentric circles or the like.

A further alternative form of the invention is shown in FIG. **19** wherein a condiment self-serve station **150** is shown. In this embodiment, a supply station and metering unit may be installed at a convenient sealed location, such as under a counter **152**, with the delivery conduit **22** extending through the counter to a rear side of the self-service station **150**. Within the station **150**, the delivery conduit passes through a dispenser gun structure (not shown), wherein the trigger switch **154** is mounted on a face panel of the unit **150** for direct customer access. A food product such as a hamburger **16** can be placed by the customer at a position beneath a spout **128''**, in a position to receive a measured or metered volume of the condiment **12** each time the trigger switch **154** is depressed by the customer. In this embodiment, the condiment supply is not accessible to store customers, and the condiment is dispensed in regulated volumes to reduce the likelihood of condiment waste.

The station configuration of FIG. **9** may be modified for use with a multiple bottle supply station **32'** of the type shown in FIG. **15**, with corresponding multiple trigger switches **154** for push-button or similar operation to dispense accurately metered volumes of different fluid. Such arrangement is suited for dispensing different condiments in a restaurant application, or for use in other dispensing environments such as custom color paint mixing or the like.

The dispenser system **10** of the present invention, in its various embodiments, thus provides an effective and accurate system and method for dispensing repeatable metered volumes of one or more flowable substances. The fluids can be dispensed quickly and easily by use of relatively lightweight and easily manipulated dispenser devices, thereby reducing personnel fatigue. The dispenser gun may be configured in a form which is easy to handle and provides high visibility of the precise application point to which the fluid substance is dispensed.

A variety of further modifications and improvements to the dispenser system of the present invention will be apparent to those skilled in the art. Accordingly, no limitation on the invention is intended by way of the forgoing description and accompanying drawings, except as set forth in the appended claims.

What is claimed is:

1. A fluid dispenser system, comprising:

a supply bottle including an outer shell having an open mouth and pressure port formed therein at spaced locations, and a deformable inner liner within said outer shell and connected to said outer shell generally at said mouth to permit fluid flow into and from said inner liner through said mouth, said outer shell and inner liner cooperatively defining a pressure chamber therebetween in flow communication with said pressure port;

a supply station for receiving and supporting said supply bottle, and including means for connecting a pressure source via said pressure port to said pressure chamber thereby pressurizing said inner liner and fluid contained therein, said supply station including means for supporting said supply bottle generally at the mouth thereof, and pressure

valve means for connecting the pressure source to said pressure chamber;

a delivery conduit connected to said bottle mouth for pressure-caused flow of the fluid from said inner liner; and

dispenser control means for regulating fluid flow through said delivery conduit.

2. The dispenser system of claim 1 wherein said supply bottle has said open mouth and said pressure port formed therein at opposite ends thereof.

3. The dispenser system of claim 1 wherein said supply bottle comprises a blow-molded plastic bottle.

4. The dispenser system of claim 1 wherein said outer shell of said supply bottle is relatively rigid in comparison to said inner liner.

5. The dispenser system of claim 1 wherein said pressure source comprises a pressurized gas.

6. The dispenser system of claim 1 wherein said pressure valve means sealingly engages said outer shell in surrounding relation to said pressure port, said pressure valve means further including means for connecting the pressure source to said pressure chamber upon sealing engagement with said outer shell.

7. The dispenser station of claim 6 wherein said supply station includes a housing for receiving and supporting said supply bottle therein, said housing including a door movable between an open position to permit said supply bottle to be removably placed into said housing and a closed position to prevent access to said supply bottle within said housing, and safety switch means for preventing connection of the pressure source to said pressure chamber unless said door is in the closed position.

8. The dispenser system of claim 7 wherein said pressure valve means includes means for detecting the presence of a supply bottle within said housing, and for permitting flow of fluid from the pressure source through said pressure valve means only when said supply bottle is mounted within said housing.

9. The dispenser system of claim 7 wherein said pressure valve means includes means responsive to closure of said door to displace said means for sealingly engaging said outer shell from an inoperative position spaced from said outer shell to an operative position for engaging said outer shell, and means responsive to opening of said door for movement of said sealingly engaging means from said operative position to said inoperative position.

10. The dispenser system of claim 7 wherein said pressure valve means includes means for maintaining said sealingly engaging means in engagement with said outer shell while said supply bottle is within said housing and said door is in the closed position.

11. The dispenser system of claim 7 wherein said supply station further includes temperature control means for regulating the temperature within said housing.

12. The dispenser system of claim 1 wherein said delivery conduit includes an upstream end having an adaptor cap thereon for connection to said supply bottle to permit flow of fluid contained within said inner liner through said mouth and adapter cap to said delivery conduit.

13. The dispenser system of claim 1 wherein said dispenser control means comprises a dispenser gun mounted in-line with said delivery conduit, and trigger means on said dispenser gun for regulating fluid flow through said delivery conduit.

14. The dispenser system of claim 13 wherein said trigger means comprises a pneumatic trigger.

15. The dispenser system of claim 13 wherein said trigger means comprises a manual trigger.

16. The dispenser system of claim 13 further including a metering unit mounted in-line along said delivery conduit and operable to permit pressure-caused flow of the fluid through said delivery conduit in predetermined metered volumes, said trigger means being for operating said metering unit.

17. The dispenser system of claim 16 wherein said dispenser gun is mounted along said delivery conduit at a location downstream from said metering unit.

18. The dispenser system of claim 16 wherein said dispenser gun has said metering unit mounted therein.

19. The dispenser system of claim 13 wherein said dispenser gun includes a dispense spout disposed at a downstream end of said delivery conduit, and further including antidrool means for preventing fluid drool from said spout.

20. The dispenser system of claim 1 further including a metering unit mounted in-line along said delivery conduit and operable for permitting pressure-caused flow of the fluid therethrough in predetermined metered volumes, said dispenser control means being for operating said metering unit.

21. A fluid dispenser system, comprising:

a supply bottle including an outer shell having an open mouth and pressure port formed therein at spaced locations, and a deformable inner liner within said outer shell and connected to said outer shell generally at said mouth to permit fluid flow into and from said inner liner through said mouth, said outer shell and inner liner cooperatively defining a pressure chamber therebetween in flow communication with said pressure port;

a supply station for receiving and supporting said supply bottle, and including means for connecting a pressure source via said pressure port to said pressure chamber thereby pressurizing said inner liner and fluid contained therein;

a delivery conduit connected to said bottle mouth for pressure-caused flow of the fluid from said inner liner;

dispenser control means for regulating fluid flow through said delivery conduit; and

a metering unit mounted in-line along said delivery conduit and operable for permitting pressure-caused flow of the fluid therethrough in predetermined metered volumes, said dispenser control means being for operating said metering unit; said metering unit comprising a rotatable core having a generally diametrically extending metering cylinder extending therethrough with a metering piston received slidably within said cylinder, and said control means comprising means for moving said core to a position disposed generally in-line with said delivery conduit whereby fluid within said inner liner is permitted to flow under pressure to said cylinder to displace said piston to a downstream end of said cylinder while filling the residual volume of said cylinder with a metered volume of the fluid, said core moving means including means for rotating said core to reverse the orientation of said cylinder relative to said delivery conduit and thereby move said piston to an upstream end of said cylinder, whereby said metered volume of the fluid within said cylinder is discharged to

said delivery conduit for dispensing and a subsequent metered fluid volume is permitted to flow under pressure from said inner liner to said cylinder to again displace said piston to the downstream end of said cylinder.

22. The dispenser system of claim 21 wherein said core moving means displaces said core through one-half revolutions.

23. The dispenser system of claim 21 wherein said core has a plurality of said metering cylinders formed therein each having a metering piston mounted therein.

24. The dispenser system of claim 23 further including manifold means at an upstream and of said core for connecting said delivery conduit to said cylinders.

25. The dispenser system of claim 21 wherein said metering piston has a cross sectional size and shape to prevent movement thereof beyond a downstream end of said cylinder.

26. The dispenser system of claim 21 wherein said metering cylinder has a cross sectional size greater than a cross sectional size of said delivery conduit.

27. The dispenser system of claim 21 wherein said core moving means comprises a pneumatic actuator.

28. The dispenser system of claim 21 wherein said core moving means comprises means for manually rotating said core through predetermined rotational increments.

29. The dispenser system of claim 21 wherein said metering unit further includes a core block having inlet and outlet fittings connected in-line with said delivery conduit, said core being mounted within a cross-bore formed in said core block and adapted for slide-out removal for facilitated cleaning.

30. The dispenser system of claim 29 wherein said core moving means comprises a pneumatic actuator having a rotatable drive hub, said core being mounted axially between said drive hub and a retainer flange on said core block.

31. A fluid dispenser system for use with a supply bottle including an outer shell having an upper end defining a neck with an open mouth formed therein and a lower end having a pressure port formed therein, said supply bottle further including a deformable inner liner within said outer shell and connected to said neck to permit fluid flow into and from said inner liner through said mouth, said outer shell and inner liner cooperatively defining a pressure chamber therebetween in flow communication with said pressure port, said dispenser system comprising:

a supply station including a housing having means for receiving and supporting said supply bottle, said housing including a door movable between an open position to permit removable placement of said supply bottle into said housing, and a closed position to prevent access to said supply bottle, pressure valve means for engaging said outer shell at said pressure port and for connecting a pressure source through said pressure port to said pressure chamber when said door is closed, thereby pressurizing said inner liner and fluid contained therein for pressure-caused flow of the fluid from said inner liner through said mouth; and

a delivery conduit connected to said bottle neck for flow of the fluid from said inner liner through said delivery conduit.

32. The dispenser system of claim 31 further including dispenser control means for regulating fluid flow through said delivery conduit.

33. The dispenser system of claim 32 including a metering unit mounted in-line along said delivery conduit and operable for permitting pressure-caused flow of the fluid therethrough in predetermined metered volumes, said dispenser control means being for operating said metering unit.

34. The dispenser system of claim 31 wherein said supply station further includes means for engaging said bottle neck to support said supply bottle in a generally upright position.

35. The dispenser system of claim 31 wherein said pressure valve means includes means for detecting the presence of said supply bottle within said housing and for permitting flow of fluid from the pressure source only when said supply bottle is detected.

36. The dispenser system of claim 31 wherein said supply bottle comprises a blow-molded plastic bottle.

37. The dispenser system of claim 31 wherein said supply station further includes safety switch means for preventing connection of the fluid pressure source to said pressure chamber unless said door is in the closed position.

38. The dispenser station of claim 33 further including a dispenser gun mounted in-line with said delivery conduit, said dispenser control means comprising trigger means on said dispenser gun for operating said metering unit.

39. The dispenser station of claim 38 wherein said dispenser gun includes a dispense spout disposed at a downstream end of said delivery conduit, and further including antidrool means for preventing fluid drool from said spout.

40. The dispenser system of claim 33 wherein said metering unit comprises a rotatable core having a generally diametrically extending metering cylinder extending therethrough with a metering piston received slidably within said cylinder, and said control means comprising means for moving said core to a position disposed generally in-line with said delivery conduit whereby fluid within said inner liner is permitted to flow under pressure to said cylinder to displace said piston to a downstream end of said cylinder while filling the residual volume of said cylinder with a metered volume of the fluid, said core moving means including means for rotating said core to reverse the orientation of said cylinder relative to said delivery conduit and thereby move said piston to an upstream end of said cylinder, whereby said metered volume of the fluid within said cylinder is discharged to said delivery conduit for dispensing and a subsequent metered fluid volume is permitted to flow under pressure from said inner liner to said cylinder to again displace said piston to the downstream end of said cylinder.

41. The dispenser system of claim 40 wherein said metering piston has a cross sectional size and shape to prevent movement thereof beyond a downstream end of said cylinder.

42. The dispenser station of claim 31 for use with a plurality of said supply bottles, said supply station housing including means for receiving and supporting said plurality of said supply bottles and a corresponding plurality of said pressure valve means associated respectively with said supply bottles.

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