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MEANS FOR DISPENSING LIQUIDS UNDER PRESSURE

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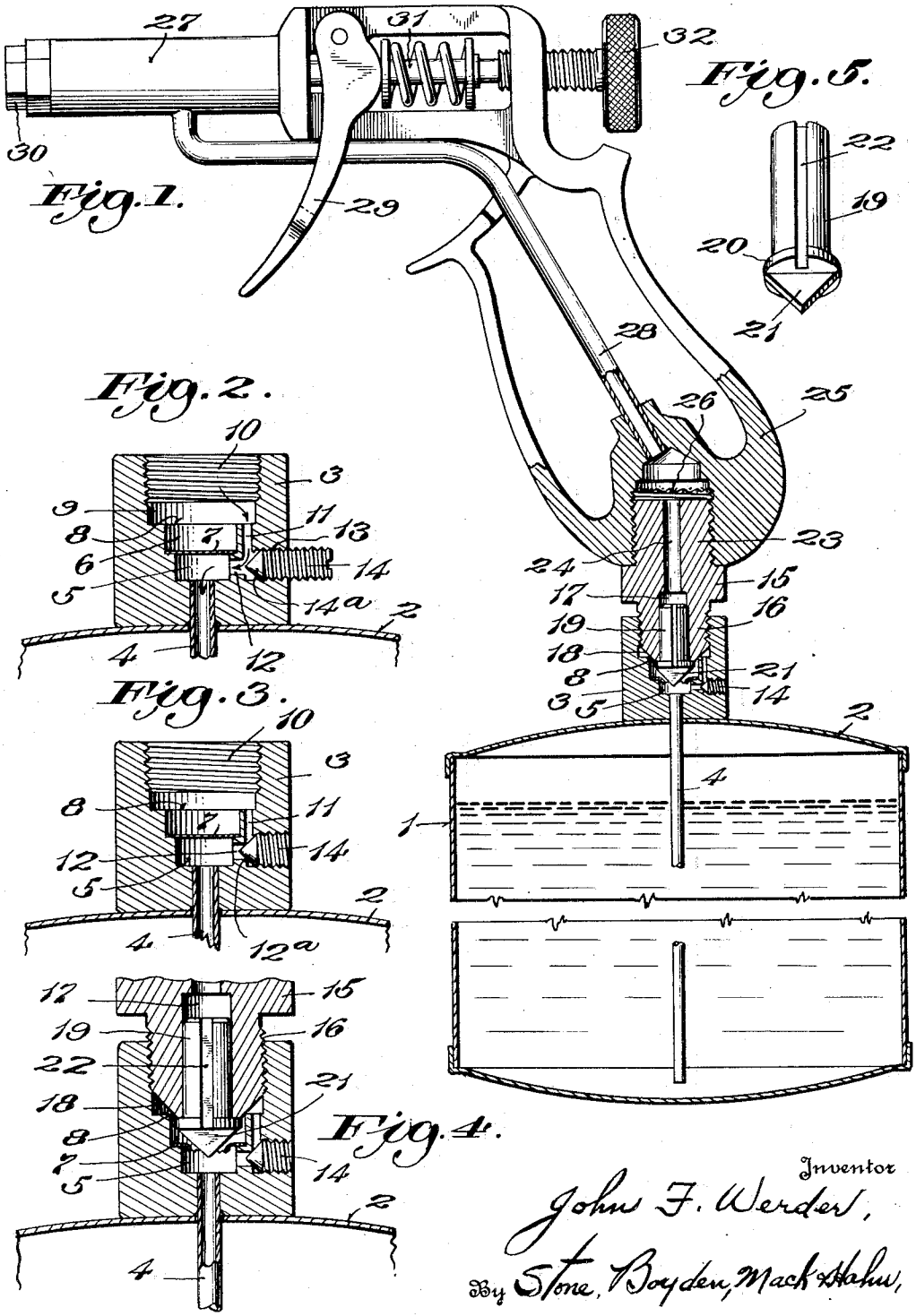


Fig. 1.

Fig. 5.

Fig. 2.

Fig. 3.

Fig. 4.

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MEANS FOR DISPENSING LIQUIDS UNDER PRESSURE

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This invention relates to means for dispensing liquids under pressure, and more particularly to means for spraying from the original package such liquids as lubricating oils, insecticides, etc.

Heretofore, in the spraying of such liquids, it has been customary to employ a special spraying device operated by compressed air, such air being supplied either manually by means of a pump, as in the usual hand sprayers, or by means of a motor driven compressor such as is commonly employed at garages and automobile service stations.

The general object of the present invention is to obviate the necessity for the use of compressed air, and to provide a self contained package in which the liquid is stored under a pressure sufficient to forcibly discharge the liquid through a suitable nozzle. To this end, I propose to charge the liquid with a neutral gas such as carbon dioxide and to package the same in sealed receptacles or containers. I also propose to provide a spray gun capable of being attached to such a sealed package, and having means for puncturing the seal as the gun is attached. In practice, a user of such liquids will purchase a spray gun as permanent equipment and this gun may then be applied to successive packages of liquid under pressure, as required, each package being used until exhausted, and then discarded.

More specifically, one feature of the invention consists in providing a spray gun having a handle in the form of a pistol grip and in attaching the package or container to the lower end of such handle, whereby the weight is conveniently supported. Another feature consists in the provision of means for forming a liquid tight joint or connection between the gun or container by means of metal parts only.

In order that the invention may be readily understood, reference is had to the accompanying drawing, forming part of this specification, and in which:—

Figure 1 is an assembly view partly in side elevation and partly in longitudinal section, showing my complete gun and liquid container, as they appear when ready for use;

Figures 2, 3 and 4 are enlarged fragmentary detailed vertical sections through the upper part of the container, showing the socket by which it is connected to the gun, and illustrating the steps of filling, sealing and puncturing the container; and

Figure 5 is a perspective view on an enlarged scale showing the puncturing device itself.

Referring to the drawing in detail, 1 designates a suitable receptacle or container which preferably consists of a sheet metal can. This has a top 2 permanently secured thereto and preferably dome-shaped, as shown, and to this top is secured, as by brazing or soldering, a socket member 3.

A siphon tube 4 has its upper end set into the socket member 3 and extends downwardly into the receptacle to a point near the bottom thereof, as clearly shown in Figure 1.

Immediately above the upper end of the tube 4, is a chamber 5, and above this is a larger chamber 6. Resting on the shoulder between these two chambers and permanently secured thereto as by soldering, is a sealing disc 7, preferably formed of thin sheet metal. This constitutes a wall which serves to confine the liquid and which controls communication with the interior of the receptacle.

Above the chamber 6 is a still larger bore 9, the upper portion of which is screw threaded, as shown at 10. Between the bores 6 and 9, is an annular shoulder having a square, sharp edge 8, the walls of which are at right angles to each other. This sharp edge constitutes an important feature of the invention, and is designed to cooperate with an element of the gun in order to form a tight joint, as hereinafter described.

In order to fill the receptacle or container with the liquid under pressure, I provide a by-pass around the seal 7, such by-pass being illustrated in the present instance as consisting of a port 11 extending downwardly from the bore 9 and meeting a cross port 12 extending from the side of the socket member 3 into the chamber 5. The inner portion of this port 12 is of reduced diameter and such portion has, at its outer end, a sharp edged shoulder 12^a. The outer portion of the port 12 is some-

what enlarged and internally screw threaded, as indicated at 13, and working in this threaded portion is a correspondingly threaded plug 14 having at its inner end a conical surface 14*a*.

In practice, the receptacle or container is filled with a liquid charged with a neutral gas such as carbon dioxide, under pressure. The charging and filling may be carried out in the manner described in my prior Patent No. 1,762,903, dated June 10, 1930, except that, in the present case, the filling nozzle is applied to the bore 10 of the socket member 3, and the screw plug 14 being in the position shown in Figure 2, the liquid enters the receptacle through the ports 11 and 12, as indicated by the arrows. After the receptacle has been filled to the desired extent, the plug 14 is screwed up until the conical end 14ª snugly engages the sharp edge 12ª of the port 12, thus forming a gas and liquid tight seal. The outer end of the plug 14 is then cut off flush with the surface of the socket member 3, as shown in Figure 3, thereby making it impossible to remove this plug. The filled and sealed can is then ready for use.

While I have shown and described one method of filling my improved receptacle, it will be understood that the invention is by no means limited to this method, since other methods will no doubt suggest themselves, and may be employed, if desired.

Arranged to cooperate with the screw threaded socket 10 on the receptacle is a member 15 carried by the gun and provided with a correspondingly threaded plug 16. The lower end of this plug is formed with a tapered or conical surface, as best shown at 18 in Figure 4, and this surface, when the plug is screwed down, is forced into contact with the sharp edge 8 between the bores 6 and 9 of the socket member, thus forming a liquid tight joint, these parts being preferably constructed of brass or the like.

Inside the plug 16 is an axially extending chamber 17 in which is mounted a seal puncturing device 19. As shown in Figure 5, this is preferably cylindrical in form and is provided at its lower end with a shoulder 20 adapted to seat again the end of the plug 16, and with one or more longitudinal channels 22. At its extreme lower end, the puncturing device carries a pointed member 21, preferably relatively thin, so as to give a knife blade effect. It is obvious that when the socket and plug are screwed together, this pointed knife blade or cutter will be forced against and through the sealing disc 7, thus rupturing the same and permitting the liquid to be forced, under its own pressure, up through the tube 4 and thence through the channels 22 into the chamber 17.

The member 15 is secured to the gun as by means of a screw threaded portion 23 which fits within a similarly threaded socket in the gun handle, and extending through the portion 23 is a port or passage 24, communicating with the chamber 17. Across the socket beyond the member 23 is preferably mounted a woven wire strainer 26 to insure against the passage of any foreign matter to the spray nozzle.

The gun itself, as clearly shown in Figure 1, is in the shape of a conventional pistol, having a handle 25 in the form of a pistol grip, and a barrel 27. A tube extends from the barrel 27 down into the handle and communicates with the passage 24, so that liquid may freely flow from the receptacle up to the barrel 27. At the end of the barrel is a suitable spray nozzle 30, and passage of the liquid to such nozzle is controlled by valve mechanism within the barrel, such valve mechanism being operated by means of a trigger 29. This trigger actuates a spring pressed plunger 31, the movement of which is regulated by an adjusting crew 32. The details of construction of this gun and its valve mechanism form no part of the present invention.

It will be particularly observed that the attaching member 15 having the screw threaded plug 16 is located at the lower end of the pistol grip handle 25, so that when this handle is grasped by the operator, the weight of the receptacle 1 and its contents will hang directly below the operator's hand. This tends to maintain the barrel 27 in a more or less horizontal position and relieves the operator from any strain such as would result from attaching the receptacle to the gun at any other point, as for example, to the barrel itself. In other words, with the arrangement shown, the weight of the receptacle exerts no leverage, but the center of gravity thereof is located directly below the point of support.

It will be further noted that by virtue of my improved construction, involving the sharp edge 8 and the conical surface 18, I am enabled to produce a liquid tight joint or connection without the use of any soft or fibrous packing or washers whatsoever. This is a distinct advantage, especially where the device is employed for dispensing hydrocarbon oils which, as is well known, have a destructive action on rubber and the like. It will be obvious that when the plug 16 and socket 10 are screwed together, the cutter 21 will first engage and puncture the seal 7, and then, by a further movement, the parts 8 and 18 will be brought into close contact, thus effecting a liquid tight joint, independent of the screw threads themselves. Thus, while the screw threaded connection prevents any serious escape of liquid at the moment that the seal is punctured, the screw threads are not relied upon to form a permanently tight joint, but such joint is provided by the elements 8 and 18, as described, which thereupon prevent leakage or seepage of the liquid.

In conclusion, it will be understood that the spray gun itself is, of course, retained by the purchaser as permanent equipment while any number of receptacles containing the desired liquid may be bought and successively attached to the gun as the contents become exhausted. The successive receptacles may of course contain the same or different liquids, as desired.

What I claim is:—

1. The combination with a container in which liquid is held under pressure, said container having a discharge opening closed by a frangible seal, of a spray gun having means for attaching the same to said container adjacent said opening and means for puncturing said seal, said gun and container having cooperating wholly metallic elements which, when brought into engagement as the gun is attached serve to effect a liquid tight joint between said gun and container.

2. The combination with a container in which liquid is held under pressure, of a dispensing gun adapted to be attached thereto, said container having an internally screw threaded socket within which is an annular seat and at the bottom of which is located a sealing disc serving as a closure for the container, and said gun being provided with a correspondingly threaded plug fitting said socket and having at its end means for puncturing said sealing disc and admitting liquid to said gun when the parts are screwed together and also having means engaging said seat to form a liquid tight joint.

3. The combination with a container in which liquid is held under pressure, of a dispensing gun adapted to be attached thereto, said container having a screw threaded socket at the bottom of which is located a relatively thin wall controlling communication with the interior of the container, and above said wall an internal annular shoulder, and said gun being provided with a correspondingly threaded plug having at its end means for puncturing said thin wall, and with a conical portion adapted to engage said shoulder, whereby, when said plug and socket are screwed together, said thin wall is punctured, and said conical portion and shoulder are brought into close contact to form a liquid tight joint.

4. The combination with a container in which liquid is held under pressure, of a dispensing gun adapted to be attached thereto, said container having an internally screw threaded socket, at the bottom of which is located a thin wall controlling communication with the interior of the container, and said gun being provided with a correspondingly threaded plug fitting said socket, and means whereby, as said plug and socket are screwed together, the said thin wall is first punctured, and then a liquid tight joint, independent of said screw threads, established between the end surface of said plug and said socket at a point inwardly of the screw threads.

5. As an article of manufacture, a closed receptacle provided with an open, screw threaded socket having therein a puncturable sealing disc permanently secured thereto, said receptacle having a filling port by-passing said disc, and opening into said socket outside of said disk.

6. The combination with a container in which fluid is held under pressure, of a dispensing gun adapted to be attached thereto, said container having a screw-threaded socket at the bottom of which is located a sealing disc normally closing the container, and said gun having at one end a plug adapted to be screwed into said socket, and at the other end a discharge nozzle, a manually operated valve carried by said gun for governing the discharge of fluid from said nozzle, and means at the end of said plug serving, when the same is screwed into said socket, both to puncture said sealing disc and to form with the interior of said socket a fluid tight joint, whereby the flow of fluid from said container is thereafter controlled by said valve.

In testimony whereof I affix my signature.

JOHN F. WERDER.