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L. T. WARD

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CARTRIDGE FOR PRESSURE DISPENSING DEVICES

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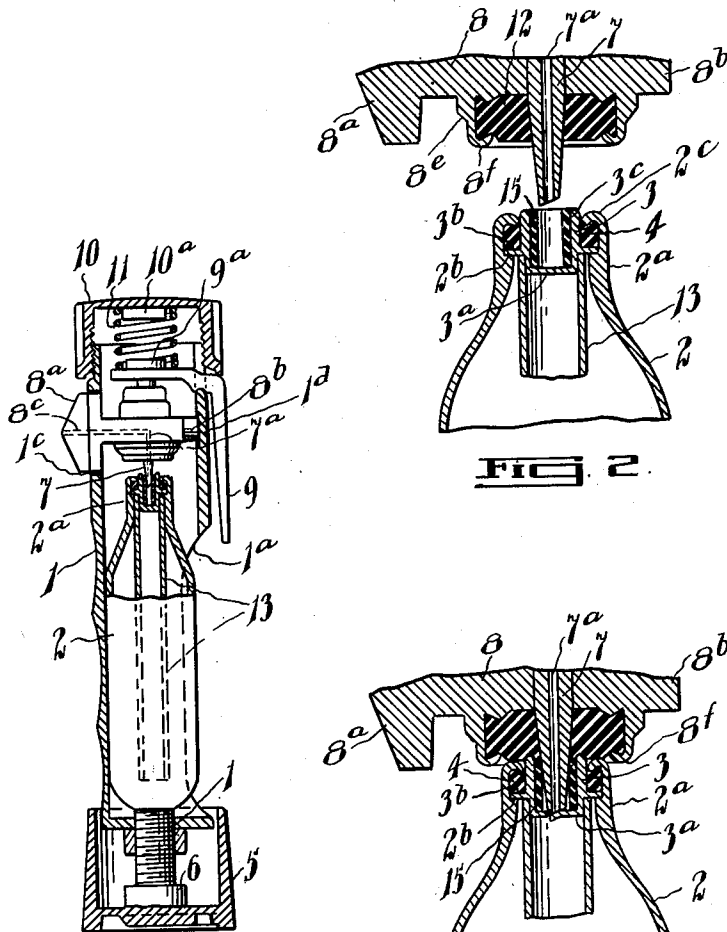


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

INVENTOR

LAWRENCE T. WARD

By *Lawrence T. Ward*

ATTY.

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## CARTRIDGE FOR PRESSURE DISPENSING DEVICES

Lawrence T. Ward, East Orange, N. J., assignor to  
Prel Incorporated, East Orange, N. J., a corporation

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This invention relates to pressure dispensing devices of the type in which a cylinder or cartridge is filled with fluid under pressure and is pierced to permit the ejection of the fluid. The invention is applicable to dispensing devices of this kind in which the material to be dispensed is contained within the cylinder or cartridge or in which the material to be dispensed is contained elsewhere and the fluid in the cylinder or cartridge is utilized merely to provide pressure for dispensing certain materials. The former type of dispenser is described an illustrated in the following specification and drawings.

The purpose of the invention is to provide a pressure dispensing device in which the puncturable area of the cartridge is protected against accidental puncturing and effective sealing means is provided to prevent leakage of the fluid from the cartridge around the punctured end.

These and other objects of the invention will be hereinafter more fully explained and described in the following description of the invention and illustrated by way of example in the drawings annexed thereto, in which:

Fig. 1 is a vertical section through a dispensing device with certain parts in side elevation showing a cartridge mounted thereon, and the piercing pin moved part way to the puncturing position;

Fig. 2 is a fragmentary vertical section showing the relative position of the piercing pin and cartridge before the commencement of the piercing operation;

Fig. 3 is a similar view showing the relative position of the parts at the commencement of the piercing operation; and

Fig. 4 is a similar view showing the position of the parts at the completion of the piercing operation.

In the drawings corresponding numerals refer to corresponding parts in the different figures.

Referring first to Figure 1, the dispensing container consists primarily of a substantially cylindrical supporting member 1 having an aperture 1a in the side thereof for insertion of the cartridge 2. The cartridge 2 is of known construction and is formed preferably of metal, which will be of sufficient strength to resist the pressure of the fluid contained therein.

In the form of the invention shown in the drawings and hereinafter described, it is intended that the cartridge will contain a disinfecting or deodorizing fluid and an inert compressible gas under pressure which will eject the fluid when the cartridge is punctured.

The cartridge is preferably in capsule form having a restricted neck 2a open at its ends. This open end is sealed by the means hereafter described. The construction of the sealing mem-

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ber can best be observed in Figures 2, 3 and 4 which are on an enlarged scale.

The sealing is effected by a cup-shaped member generally designated as 3. The bottom 3a of the cup-shaped member is either reduced in thickness or is formed of weaker material, so that it is sufficiently strong to resist the pressure within the cartridge, but can be readily punctured by suitable puncturing means.

The cup-shaped member is provided with an external flange 3b between the rim 3c thereof and the puncturable bottom area 3a. This flange is adapted to rest upon shoulder 2b. This supports the cup-shaped member 3 in the opening in the end of the cartridge 2 substantially coaxially therewith.

A washer 4 of suitable compressible material such as rubber or synthetic rubber surrounds the cup-shaped member 3 within the neck 2a of the cartridge and is compressed and firmly held therein by means of a turned-in flange 2c at the top of the cartridge 2. The washer 4 is thus compressed between flange 2c and the flange 3b forming a tight seal to prevent escape of the fluid under pressure in the cartridge 2.

It will be observed that the distance between the flange 3b of the cup-shaped member 3 and the rim 3c of said cup-shaped member is greater than the distance between the shoulder 2b and turned-in flange 2c of the cartridge 2, so that the rim 3c of the cup-shaped member projects above the turned-in flange or top of the cartridge 2. It will also be observed that the puncturable area 3a is located well below the top of the cartridge 2 so that accidental piercing thereof is very unlikely to occur.

Referring again to the dispensing container as shown in Figure 1, a base member 5 is provided and secured to bolt 6 which is adapted to screw through threaded aperture 1b in the base of the cylindrical member 1. The lower end of cartridge 2 when inserted in the container rests on the end of the bolts 6. By screwing the bolt in the cartridge may be forced against the piercing pin causing it to puncture the puncturable area of the cartridge as hereafter described.

Piercing pin 7, which is provided with a small bore 7a is secured to nozzle member 8 which has a head 8a projecting through aperture 1c in the side of the cylindrical member 1. A trunnion 8b is fitted into elongated recess 1d in the wall of said cylindrical member 1 as shown in Figure 1, in dotted lines, and dispensing passage 8c extends through the nozzle member 8 and communicates with dispensing passage or bore 7a in the piercing pin 7.

Details of nozzle 8 are not described since it does not form part of the invention.

Screw cap 10 is adapted to be screwed onto threaded upper end of cylindrical member 1 and is provided with a central stud 10a. Coil spring

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11 mounted on said stud 10a engages lever arm 9 on which is provided a stud 9a for positioning said spring. Spring 11 presses the inner end of the lever arm against a boss on the upper face of nozzle member when the cap is screwed down. This pressure is relieved by pressing the outer end of the lever 9. It will be observed that the piercing pin 7 is mounted with its central axis substantially in alignment with the central axis of the cup-shaped member, so that when base member 5 is rotated screw 6 will be screwed in forcing the cartridge 2 upwardly, the piercing pin 7 will enter the cup-shaped member substantially along the central axis thereof until it engages and pierces the puncturable area 3a.

In Figure 1 the device is shown with the cap 5 partially screwed in bringing the piercing pin 7 just within the upper end of the cup-shaped member 3.

In Figure 2, the relative position of the parts is shown before the pin has entered the cup-shaped member 3. In Figure 3, the cartridge is shown moved up to the point where the pin commences to pierce the puncturable area 3a and in Figure 4 the puncturing operation is shown as completed.

It will be observed that the lower end of the pin is tapered to a blunt point. Surrounding this tapered portion of the pin 7 is a washer 12 of material similar to the washer 4. The nozzle member 8, which is also the pin supporting member, has an annular flange 8c depending therefrom and an intumed rim or flange 8f holds the washer 12 in close contact with the tapered sides of the pin 7. It will be observed that the distance between the point of the pin 7 and the washer 12 is substantially the same as, or slightly less than, the distance between the rim 3c of the cup-shaped member and the puncturable area 3a whereby the washer will engage the rim of the cup-shaped member before the point of the pin pierces the puncturable area of the cup-shaped member. In fact, the engagement of the rim 3c and washer 2 takes place almost simultaneously with the engagement of the point of the pin 7 with the said puncturable area 3a, but the sealing takes place before the puncturing takes place. This is very important in order to avoid leakage of the fluid in the cartridge.

It will also be observed by reference to Fig. 4 that the washer 12, when the piercing act is completed is forced between the rim 3c of the cup-shaped member 3 and the tapering or sloping sides of the piercing pin 7, thus effecting a perfect seal and preventing any leakage around the sides of the pin 7. As a further precaution against leakage an annular washer 15 of rubber or other suitable resilient material is inserted within the cup member 3, through which the piercing pin 7 passes.

When the piercing operation is completed, the contents of the cartridge 2 will pass up through the bore or passage 7a and the piercing pin 7 to passage 8c in the nozzle member 8.

In the construction described, a tube 13 mounted on the lower portion of the cup-shaped member 3 depends into the cartridge 2 to a point near the bottom thereof. If the cartridge is used as a dispensing means for liquid disinfectant or a similar product, the lower portion of the cartridge will be filled with the material to be dispensed and the gas or other compressible fluid will be in the upper part of the cartridge 2 and will force the fluid up through tube 13.

It will be observed from the above description

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that a construction is provided in which the puncturable area of the cartridge seal is protected from inadvertent puncturing, and a leak-proof seal is provided to prevent leakage of the contents of the cartridge.

It is thought that the construction and use of the invention will be apparent from the above description of the various parts and their purposes. It is to be understood that the form of my invention herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of my invention, or the scope of the subjoined claims.

What I claim as my invention is:

1. In a pressure dispensing device, a frame member, a cartridge for fluid under pressure mounted in said frame member and having an opening at one end thereof, a seal for said opening comprising a cup-shaped member having a rim around the top thereof and a puncturable area in the bottom thereof, means for mounting the cup-shaped member in the opening in the cartridge with its rim projecting above the end of the cartridge and its puncturable area within the opening in the cartridge and below the end thereof, a sealing washer between the cup-shaped member and the cartridge, a piercing pin tapering substantially to a point, a member mounted on the frame member and supporting the piercing pin above the cup-shaped member with its central axis substantially in alignment with the central axis of the cup-shaped member, said cartridge being axially movable relative to the pin-supporting member, a washer of resilient material surrounding the pin, said washer being secured to the pin supporting member in close contact with the tapered sides of the piercing pin, and means on the frame member for imparting relative movement to the cartridge and the pin-supporting member to cause the last mentioned washer to be compressed between the rim and the tapered side of the piercing pin and to cause the pin to pierce the puncturable area, the distance between the point of the pin and the washer being relatively less than the distance between the rim of the cup-shaped member and the puncturable area whereby the washer will engage the rim of the cup-shaped member before the piercing pin punctures the puncturable area.

2. In a pressure dispensing device, a frame member, a cartridge for fluid under pressure mounted in said frame member and having an opening at one end thereof, a seal for said opening comprising a cup-shaped member having a rim around the top thereof and a puncturable area in the bottom thereof and an external flange between the bottom and top thereof, said cartridge having an internal shoulder in the opening thereof below the top thereof on which the flange of the cup-shaped member rests, and a turned-in flange at the top thereof, a sealing washer surrounding the cup-shaped member and compressed between the turned-in flange of the cartridge and the flange of the cup-shaped member, the distance between the flange on the cup-shaped member and the rim thereof being such that the rim projects above the top of the turned-in flange of the cartridge, a piercing pin tapering substantially to a point, a member mounted on the frame member and supporting the piercing pin above the cup-shaped member with its central axis substantially in alignment

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with the central axis of the cup-shaped member, a washer of resilient material surrounding the pin, said washer being secured to the pin supporting member in close contact with the tapered sides of the piercing pin, and means on the frame member for imparting relative movement to the pin and the cartridge to cause the last-mentioned washer to be compressed between the rim and the tapered side of the piercing pin and to cause the pin to pierce the puncturable area, the distance between the point of the pin and the washer being relatively less than the distance between the rim of the cup-shaped member and the puncturable area whereby the washer will engage the rim of the cup-shaped member before the piercing pin punctures the puncturable area.

3. In a pressure dispensing device, a cartridge for fluid under pressure having an opening at one end thereof, a seal for said opening comprising a cup-shaped member having a rim around the top thereof and a puncturable area in the bottom thereof, means for mounting the cup-shaped member in the opening in the cartridge with its rim projecting above the end of the cartridge and its puncturable area within the opening in the cartridge and below the end thereof, a sealing washer between the cup-shaped member and the cartridge, a dispensing container supporting the cartridge, a piercing pin tapering substantially to a point, means for supporting the piercing pin in the dispensing container with said piercing pin in substantial alignment with the central axis of the cup-shaped member, said cartridge being axially movable relative to the pin-supporting member, a washer of resilient material surrounding the pin, said washer being secured to the supporting means in close contact with the tapered sides of the piercing pin, and means on the dispensing container to move the cartridge relative to the pin-supporting member substantially along the central axis of the cup-shaped member to engage the last-mentioned washer with the rim and compress it between the rim and the tapered side of the piercing pin and pierce the puncturable area of the cup-shaped member with the point of the piercing pin, the distance between the point of the pin and the washer relative to the distance between the rim of the cup-shaped member and the puncturable area being such that the washer will engage the rim of the cup-shaped member before the point of the piercing pin pierces the puncturable area of the cup-shaped member.

4. In a pressure dispensing device, a frame member, a cartridge for fluid under pressure mounted in said frame member and having an opening at one end thereof, a seal for said opening comprising a cup-shaped member having a rim around the top thereof and a puncturable area in the bottom thereof and an external flange between the bottom and top thereof, said cartridge having an internal shoulder in the opening thereof below the top thereof on which the flange of the cup-shaped member rests, and a turned-in flange at the top thereof, a sealing washer surrounding the cup-shaped member and compressed between the turned-in flange of the cartridge and the flange of the cup-shaped member, the distance between the flange on the cup-shaped member and the rim thereof being such that the rim projects above the top of the turned-in flange on the cartridge, a tube connected to the cup-shaped member beneath the rim and

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depending into the cartridge, a piercing pin tapering substantially to a point, a member mounted on the frame member and supporting the piercing pin above the cup-shaped member with its central axis substantially in alignment with the central axis of the cup-shaped member, a washer of resilient material surrounding the pin, said washer being secured to the pin supporting member in close contact with the tapered sides of the piercing pin, and means on the frame member for imparting relative movement to the pin and the cartridge to cause the last-mentioned washer to be compressed between the rim and the tapered side of piercing pin and to cause the pin to pierce the puncturable area.

5. In a pressure dispensing device, a frame member, a cartridge for fluid under pressure mounted in said frame member and having an opening at one end thereof, a seal for said opening comprising a cup-shaped member having a rim around the top thereof and a puncturable area in the bottom thereof, means for mounting the cup-shaped member in the opening in the cartridge with its rim projecting above the end of the cartridge and its puncturable area within the opening in the cartridge and below the end thereof, a sealing washer between the cup-shaped member and the cartridge, a piercing pin tapering substantially to a point, a member mounted on the frame member and supporting the piercing pin above the cup-shaped member with its central axis substantially in alignment with the central axis of the cup-shaped member, a washer of resilient material surrounding the pin, said washer being secured to the pin supporting member in close contact with the tapered sides of the piercing pin, said pin-supporting member having an annular flange depending therefrom, with an intumed edge, for receiving and holding the said washer around and in contact with the pin, and means on the frame member for imparting relative movement to the pin and the cartridge to cause the washer to be compressed between the rim and the tapered side of the piercing pin and to cause the pin to pierce the puncturable area, the distance between the point of the pin and the washer being relatively less than the distance between the rim of the cup-shaped member and the puncturable area whereby the washer will engage the rim of the cup-shaped member before the piercing pin punctures the puncturable area.

LAWRENCE T. WARD.

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