

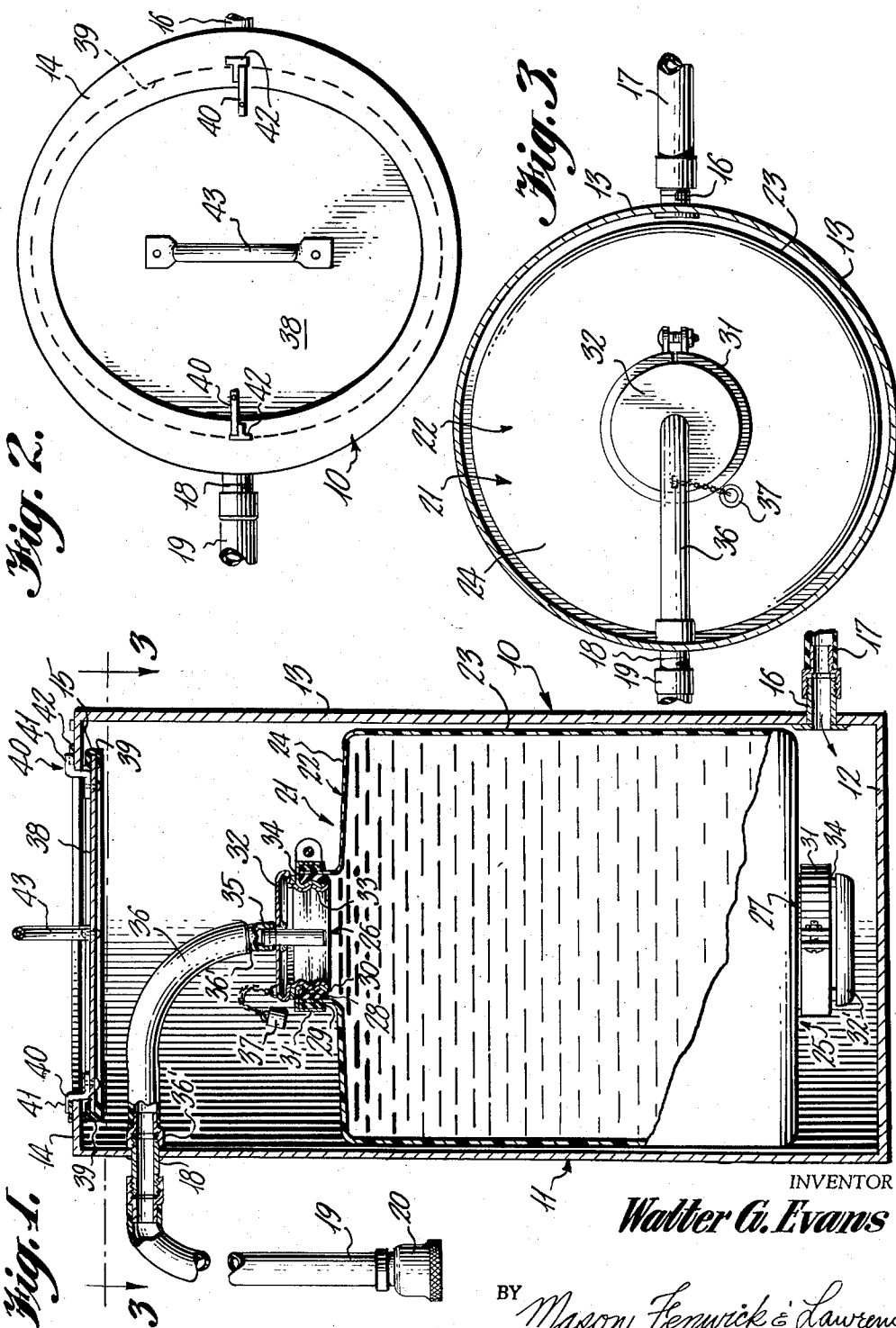
Aug. 12, 1958

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2,847,249

LIQUID SPRAYING DEVICE

Filed Feb. 26, 1957



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LIQUID SPRAYING DEVICE

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Application February 26, 1957, Serial No. 642,514

2 Claims. (Cl. 299—90)

The present invention relates in general to spraying devices, and more particularly to spraying devices of the type having an inner container of resilient material placed in an outer container and arranged so that the inner container will be compressed by introduction of fluid under pressure into the outer container and effect expulsion of the fluid from the inner container.

An object of the present invention is the provision of a novel spraying device of the above-described type which is simple in construction, comparatively inexpensive to manufacture, and operates in a highly satisfactory manner.

Another object of the present invention is the provision of a novel spraying device of the above-described type wherein the inner resilient container may be readily removed from and introduced into the outer container.

Another object of the present invention is the provision of a novel liquid sprayer of the above-described type wherein the outer container is provided with a lid which is associated with an access opening in a novel manner facilitating sealing of the outer container in a manner excluding air therefrom when the outer container is filled with water and which lid is readily removable to facilitate removal or insertion of the inner resilient container.

Other objects, advantages and capabilities of the present invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawing illustrating one preferred embodiment of the invention.

In the drawing:

Figure 1 is a vertical section of the spraying apparatus embodying the present invention;

Figure 2 is a top plan view of the spraying apparatus; and,

Figure 3 is a horizontal section taken along the line 3—3 of Figure 1.

Referring to the drawing wherein like reference characters designate corresponding parts throughout the several figures, the spraying apparatus of the present invention, generally designated by the reference character 10, comprises an outer container in the form of a cylindrical metal tank 11 having uninterrupted bottom and side walls 12 and 13 and a top wall 14 of circular outline having an elliptical opening 15 therein. In one preferred embodiment of the invention, the metal tank 11 is fourteen inches in height and has an inside diameter of 7½ inches, and the major and minor axes of the elliptical opening 15 are 6½ inches and 5¾ inches, respectively.

Along a lower portion of the side 13 of the metal tank 11 there is provided an externally threaded nipple 16 which is preferably soldered to the side wall 13 and is adapted to have fitted thereon a flexible conduit 17 formed of rubber pressure tubing or the like which is coupled at its other end to a supply of water or other fluid under pressure. This remote end of the flexible conduit 17 may, for example, have a standard female garden hose connection thereon or the like for coupling

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the conduit 17 to the end of the length of the garden hose or to an exterior water tap.

Another externally threaded, double-ended nipple 18 is also provided in the side wall 13 of the metal tank 11, the double-ended nipple 18 being preferably located near the upper end of the side 13 and disposed diametrically opposite the nipple 16. One end of the nipple 18 projects externally of the side wall 13 and has fitted thereon a length of flexible conduit 19 whose other end is secured to a conventional spray head 20 or the like.

The metal container 11 is adapted to receive a collapsible inner receptacle, indicated generally by the reference character 21, which in the preferred embodiment, is in the form of a plastic bag 22 of approximately two-gallon capacity. This plastic bag 22 is of circular cross section, and in one practical embodiment has a cylindrical central region 23 which is 10 inches long and 7½ inches in diameter. The opposite end regions 24 and 25 of the plastic bag 22 are pleated to form constricted diameter openings 26 and 27, the lips or terminal portions of which are received between the adjacent surfaces of a pair of annular rubber rings 28, 29. The innermost annular ring 28 surrounds a flanged and press threaded metal ring 30 whose inner surface forms a threaded boundary for the openings 26 and 27, and the outer rubber ring 29 is surrounded by a flanged metal hose clamp 31 or the like which frictionally clamps the pair of rubber rings 28, 29 and the terminal portions of the plastic bag 22 sandwiched therebetween against the threaded metal ring 30.

The openings 26 and 27 thus formed are adapted to have threaded therein metal caps 32 and 32' having threaded flanges 33 arranged to interfit with the threaded rings 30 and rubber gaskets 34 adapted to sealingly engage the flanges of the threaded rings 30. The metal cap 32 is provided with an externally threaded nipple 35 having a bore extending entirely through the cap to communicate with the interior of the plastic bag 22. Fitted on the threaded nipple 35 of the cap 32 and the interior end of the double-ended nipple 18 is an interconnecting tube 36 for completing the communication conduit from the interior of the plastic bag 22 to the spray head 20 having freely turning threaded fittings 36' on each end thereof. An internally threaded captive metal cap 37 is removably associated with the upper metal cap 32 for sealing the threaded nipple 35 to retain the opening 26 in closed condition when the tube 36 is not assembled with the nipple 35.

An elliptical lid 38 having an annular rubber gasket 39 of U-shaped section extending entirely around the perimeter thereof is provided for sealing the elliptical opening 15 of the metal tank 11. In the preferred embodiment herein described, the dimensions of the major and minor axes of this gasketed lid 38 are 7¼ inches and 6¼ inches, respectively. Riveted onto the lid 38 at diametrically opposite points adjacent the periphery thereof in alignment with the minor axis of the lid are a pair of Z-shaped offset members 40 whose terminal portions 41 are in axial alignment with each other and terminate substantially in alignment with the periphery of the lid 38. A pair of T-shaped stop members 42 are preferably welded or otherwise affixed to the top wall 14 of the metal tank 11 in such position that the legs of the T-shaped stop members 42 will engage the terminal portions 41 of the offset members 40 when the lid 38 is oriented with its major and minor axes in alignment with the major and minor axes, respectively, of the elliptical opening 15. The ends of the terminal portions 41 will lie immediately inwardly of the heads of the T members 42 when the lid 38 is properly centered relative to the elliptical opening 15. An upwardly pro-

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jecting handle 43 formed of tubular stock or like material is also riveted to the lid 38 and projects upwardly therefrom to form a convenient carrying handle for the tank 11.

In preparing the device for use, the plastic bag 22 is filled with spraying fluid to a preselected level, which is about two gallons in the preferred embodiment, and the top metal cap 32 is threaded into the opening 26. During filling, the bottom of the bag is rested on a flat surface and the upper opening 26 when the cap is threaded tightly therein is depressed until the spraying fluid is about to emerge from the opening of the nipple 35. The nipple cap 37 is then screwed into place, thereby excluding substantially all air from above the liquid surface. The plastic bag 22 is then introduced into the metal tank 11 through the elliptical opening 15, the plastic bag being deformed sufficiently to permit it to be accommodated through the opening 15.

After the plastic bag 22 has been inserted into the metal tank 11, the cap 37 is removed from the nipple 35 on the metal cap 32 and fitting 36 at the inner end of the flexible tube 36 is threaded over the external threads of the nipple 35, thereby communicating the interior of the plastic bag 22 with the spraying head 20. The fitting 36' at the other end of the tube 36 is already threaded onto the nipple 18. The elliptical lid 38 is then inserted through the elliptical opening 15 with the minor axis of the lid 38 aligned with the major axis of the opening 15 until the lid 38 lies wholly below the plane of the top wall 14 of the metal tank 11. The lid 38 is then rotated through an arc of approximately 90 degrees with the terminal portions 41 of the offset members 40 overlying the lip of the metal tank bounding the opening 15 until the terminal portions 41 about the legs of the T-shaped stop members 42, thereby orienting the lid 38 into proper alignment with the elliptical opening 15. Water or other fluid under pressure is then admitted to the metal tank 11 through the flexible conduit 17 and nipple 16 until the water begins to emerge between the gasket 39 of the lid 38 and the rim of the tank 11 bounding the opening 15. The tank is then lifted by the lid handle 43, the relative downward movement of the lip of the opening 15 with reference to the lid 38 thereby effecting a tight seal at the gasket 39 with substantially all air excluded from the interior of the tank 11. Further application of water under pressure to the interior of the metal tank 11 maintains the foregoing tight seal at the gasket 39 when the metal tank 11 is not supported by the lid handle 43 and effects compression of the flexible bag 22 and discharge under pressure of the spraying fluid contents thereof through the flexible conduits 36 and 19, the nipples 35 and 18 and the spraying head 20.

By virtue of the particular structure herein disclosed, a spraying unit of the dual container type has been provided wherein the lid 38 of the outer container 11 is readily removable to facilitate introduction or replacement of the inner container 21, and facilitates procedures for effecting exclusion of air from the outer container 11. Because of the facility with which the flexible bag 22 may be removed from and introduced into the tank 11, separate bags may be effectively used for each different type of spraying fluid needed. The inner container 21 so effectively isolates the contents thereof from the metal tank 11 that the metal surfaces of the tank 11 are not subjected to corrosive spraying fluids which are frequently used in the inner container.

While a preferred and practical embodiment of the invention has been disclosed in the above description, it will be understood by those skilled in the art that the disclosure represents an exemplary embodiment, and that other arrangements of parts cooperable to carry out the inventive concept are to be regarded as within the purview of the invention.

I claim:

1. A spraying device comprising an outer cylindrical metal tank including a circular top wall having an ellipti-

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cal opening therein and an integral lip portion bounding said opening, a resilient plastic bag for containing a spraying fluid, said inner bag being deformable to be shifted through said opening and dispose the same within said outer tank and having at least one access opening and removable closure means therefor, a spraying head located externally of said outer tank, a discharge conduit communicating with said spraying head located externally of said tank at one end thereof, said discharge conduit extending through and being supported by a side of said outer tank and having coupling means at the other end thereof internally of said tank for removably coupling the conduit with said closure means in communication with said inner bag, conduit means communicating with said outer tank for conducting fluid under pressure to the interior of said outer tank to apply contracting pressure to said inner bag and discharge the contents thereof through said discharge conduit and said spraying head, an elliptical lid adapted to be inserted into said outer tank through said elliptical opening to occupy a position paralleling said top wall and immediately underlying and lapping said lip portion for closing said elliptical opening and supporting said outer tank in suspended relation therefrom upon elevation of said lid, the ellipse defined by said lid being similar to and larger than said elliptical opening and the minor axis of said lid being shorter than the major axis of said elliptical opening to permit insertion of said lid through said elliptical opening and rotation of the same within said tank about its center through substantially 90 degrees to dispose the periphery thereof in uniformly underlapping relation to said lip portion of said top wall, whereby the peripheral region of said lid underlapping said lip portion engages and supports said top wall and said tank upon elevation of said lid, and handle means projecting upwardly from said lid to an exposed position, said lid being freely displaceable through a selected range of relative movement normal to the plane of said top wall upon application of lifting force to said handle means and having annular gasket means supported on the perimeter of said lid and be compressed between to engage said lip portion upon relative elevation of the lid for sealing the lapping portions of said lid and said lip portion by the weight of the outer tank and its contents to seal said lapping portions against passage of fluid therebetween.

2. A spraying device comprising an outer cylindrical metal tank including a circular top wall having an elliptical opening therein and an integral lip portion bounding said opening, a resilient plastic bag for containing a spraying fluid, said inner bag being deformable to be shifted through said opening and dispose the same within said outer tank and having at least one access opening and removable closure means therefor, a spraying head located externally of said outer tank, a discharge conduit communicating with said spraying head at an end thereof located externally of said tank and having an inner end disposed within said tank, said discharge conduit extending through and being supported by a side of said tank and having coupling means at the inner end thereof for removably coupling the conduit with said closure means in communication with said inner bag, conduit means communicating with said outer tank for conducting fluid under pressure to the interior of said outer tank to apply contracting pressure to said inner bag and discharge the contents thereof through said discharge conduit and said spraying head, an elliptical lid adapted to be inserted into said outer tank through said elliptical opening to occupy a position paralleling said top wall and immediately underlying and lapping said lip portion for closing said elliptical opening and forming a supporting platform from which said outer tank is suspended for transportation upon elevation of said lid, the ellipse defined by said lid being similar to and larger than said elliptical opening and the minor axis of said lid being shorter than the major axis of said elliptical opening to permit insertion of said lid through said el-

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liptical opening and rotation of the same within said tank about its center through substantially 90 degrees to dispose the periphery thereof in uniformly underlapping relation to said lip portion of said top wall, whereby the peripheral region of said lid underlapping said lip portion engages and supports said top wall and said tank upon elevation of said lid, handle means projecting upwardly from said lid to an exposed position, said lid being freely displaceable through a selected range of relative movement normal to the plane of said top wall upon application of lifting force to said handle means and having annular gasket means supported on the perimeter of said lid positioned to engage said lip portion upon relative elevation of the lid and be compressed between the lapping portions of said lid and said lip portion by the weight of the outer tank and its contents to seal said lapping portions against passage of fluid therebetween when said outer tank is suspended from said lid and responsive thereafter to the pressure of said fluid under pressure to maintain the sealing condition, a pair of upwardly projecting offset members located at diametrically opposed points on said lid adjacent the periphery thereof having terminal portions extending oppositely along the minor axis of said lid and lying in a plane paralleling and

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spaced from said lid to at least partially overlie said lip portion when said lid is located within said tank and engage said top wall to suspend said lid in slightly spaced relation below said top wall, and a pair of T-shaped stop members fixed on said top wall with the legs thereof extending toward each other along the minor axis of said elliptical opening and terminating in slightly outwardly spaced relation with the boundary of said opening and the head portions thereof being spaced complementary to the spacing of the opposite ends of said terminal portions of said offset members, the legs of said T-shaped stop members being positioned to abut the terminal portions of said offset members when the major and minor axes of said elliptical lid are aligned respectively with the major and minor axes of said elliptical opening and the heads of said stop members being spaced to precisely center said lid relative to said elliptical opening.

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