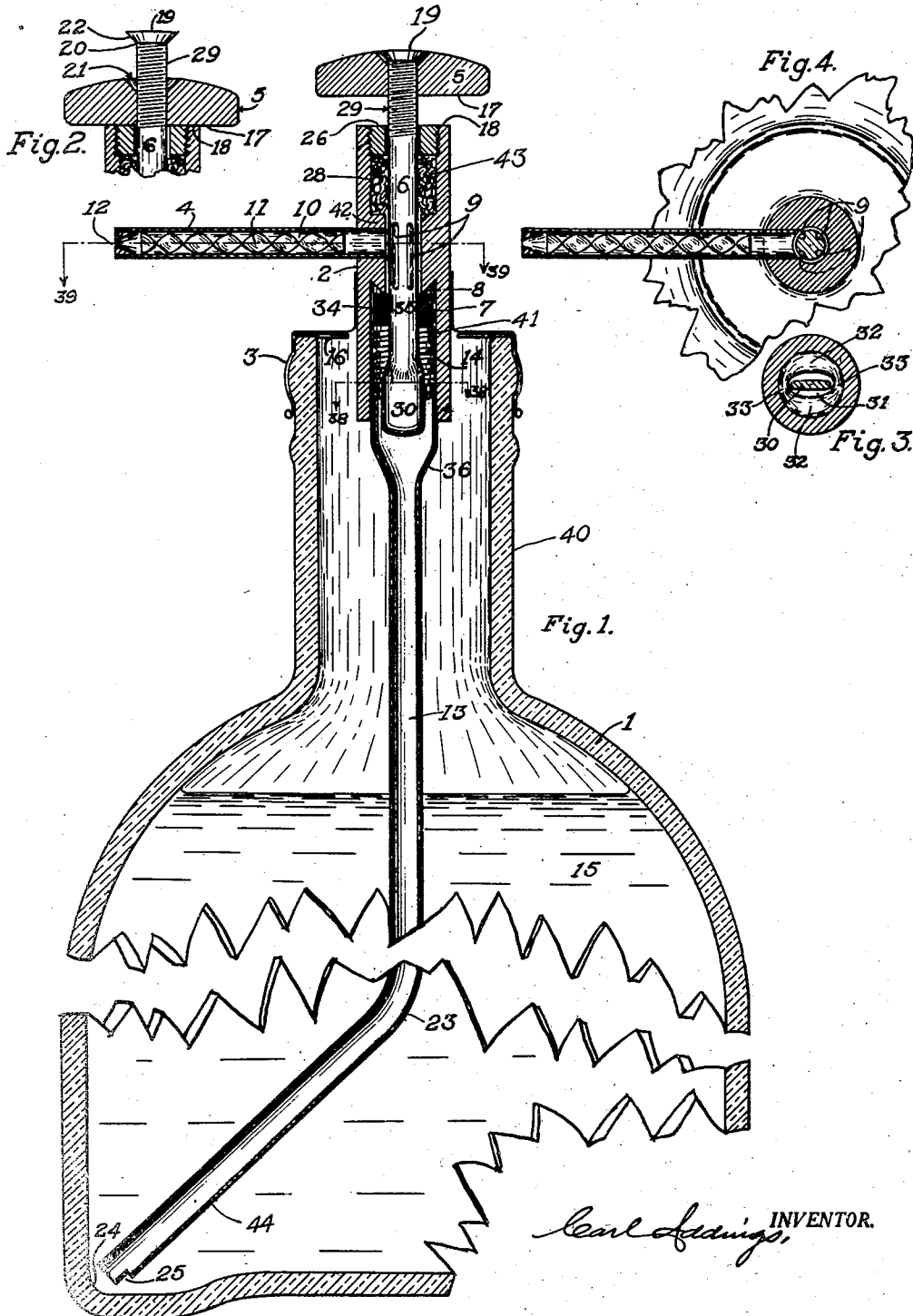


Jan. 2, 1934.

C. IDDINGS
SPRAYING DEVICE

1,941,898

Filed Sept. 23, 1932



Carl Idings, INVENTOR.

UNITED STATES PATENT OFFICE

1,941,898

SPRAYING DEVICE

Carl Iddings, Kew Gardens, N. Y.

Application September 23, 1932

Serial No. 634,597

6 Claims. (Cl. 299—95)

My invention relates broadly to a spraying device, and more particularly to an apparatus for spraying or applying liquids.

The primary object of my invention is to provide an apparatus for spraying or applying self-propelled liquids that are described and claimed in my copending application filed of even date herewith.

An object of my invention is to provide a container with an air and gas-tight seal having a valve spray nozzle for use with a self-propellant liquid.

Another object of my invention is to provide a liquid spraying apparatus that improves the economy in the use of sprays by eliminating all unnecessary spillage, evaporation and wastage, so that all but a very insignificant portion of the liquid, which necessarily remains in the container, can be effectively used.

A further object of my invention is to provide a spray device that requires no pumping or manipulative action and one that can be easily and efficiently handled.

Still another object of my invention resides in constructing in a spraying device a container having a valve that is not involved in its operation, easy to manufacture and assemble; simplicity with positive effectiveness governing the manufacture and use of the device.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of parts as will be described more fully hereinafter.

Reference is to be had to the accompanying drawing forming part of this specification, in which like reference characters indicate corresponding parts throughout the several views, and in which:

Fig. 1 is a central sectional view in plan of my improved container and valve;

Fig. 2 is a detail view of my improved valve;

Fig. 3 is a view on line 38—38 of Fig. 1;

Fig. 4 is a view on line 39—39 of Fig. 1.

Referring more particularly to the drawing, 1 indicates a container having neck 40 into which is placed a valve housing 2 that is secured to the neck by means of cap 3 and gas-tight gasket 16. The valve housing 2 has a packing gland 28 in its upper portion, a chamber 41 in its lower end and a valve stem guide 42 separating the gland and chamber. Fitted into the center portion of housing 2 is an outlet or spray tube 4 that has passage 10 and nozzle end 12. A twisted vane 11 is placed in passage 10 to impart a swirling motion to the

mist and vapors which leave nozzle 12, thus assisting in the creation of a fine uniform spray.

Inserted for reciprocation in guide 42 is a valve stem 6 having a threaded upper end portion 29 onto which is screwed button or valve head 5. A portion of the guide 42 is beveled to form a knife edge 8 that projects into the chamber 41, and secured to valve stem 6 is a valve disk 7 adapted to be brought up tight against the knife edge 8 to form an air and gas-tight seal. The disk 7 is preferably made of a soft material, such as a resilient rubber which is spaced from the walls of the chamber and is held by metal band or cup 34.

Fitted into the lower end of chamber 41 is flared end 36 of a tube 13 that is bent as at 23 to permit its lower end 44 to almost touch as at 24 the side and bottom of the container 2. The end 44 of the tube 13 has a small cut as at 25 to allow ready access of the liquid to the inside of the tube 13 when the apparatus is in use, even though the tube should accidentally press against the container.

A spring 14 having one end abutting against the under surface of disk 7 and the other end bearing against rolled edge 32 of tube 13 is placed around stem 6 in chamber 41 to hold disk 7 against the knife edge 8 of guide 42. A portion of the stem 6 adjacent the upper surface of disk 11 has grooves or channels 9 that insure a passage to the outlet tube 4 and in order to provide against leakage from the upper part of the housing 2, packing 43 is placed in gland 28 and firmly held against the stem by threading plug 26 into the end of the housing 2.

To prevent removal and possible loss of valve head 5, a top piece 19 with projections 22 greater in diameter than the stem 6 is securely fastened to the stem at 20. The projection 22 fits into a cavity 21 of the valve head 5 so that when the valve head is in its upper position, the upper surface of the top of piece 19 of valve stem 6 and the upper surface of the valve head 5 form a practically continuous smooth surface. The threads 29 in the upper part of stem 6 upon which head 5 travels, terminate just below face 18 so that when valve stem 6 is depressed they, the threads, will not come in contact with packing 43.

To prevent rotation of valve stem 6, thereby permitting the locking of the valve by turning button 5 on threads 29 until faces 17 and 18 come in contact with each other, the lower end 30 of stem 6 is flattened so as to fit into an oblong opening 31 having sides 32 and 33 formed

by rolling or folding the end of tube 13. The opening 31 is large enough to allow ready flow of fluids around stem 6, but not large enough to permit end 30 to rotate freely.

5 In the practical operation of my improved device, I first place in the container 1 liquid 15 which is made in accordance with the method set out in my copending application. The liquid has in solution a sufficient amount of a volatile com-
10 ponent to create within the container a total absolute pressure in excess of one atmosphere and, therefore, the valve housing 2 is secured and sealed by cap 3 and made gas tight by gasket 16. To provide a spray as desired, a valve head 5 is depressed downward, causing the valve stem 6 to move down and carrying with it the disk 7, compressing spring 14 and separating the rubber of disk 7 from knife edge 8, thereby creating an open passage for the liquid 15 which, due to
20 pressure, is forced through tube 13, around spring 14, between the walls of chamber 41 and cup 34, through channels 9 to and through outlet tube 4 and nozzle 12. To stop the spraying, the pressure upon valve head 5 is released, permitting spring 14 to move the disk 7 and stem 6 upwardly until the soft material or rubber of disk 7 comes into contact with knife edge 8 forming a seal, thereby shutting off the flow of liquid to the nozzle 12. To lock the valve thereby preventing slow leakage of the contents of the container during long periods of storage, the valve head 5 is turned on its axis so that it travels downwardly on threads 29 of stem 6 until face 17 is brought into contact with face 18. A further slight movement of head 5 causes slight pressure between faces 17 and 18 which is transmitted to the seal formed between disk 7 and knife edge 8, thus providing a definite pressure at this point. When it is desired to use the apparatus again for the purpose of spraying the contents of the bottle, it is only necessary first to unscrew head 5 to the top of pin 6, at which point the apparatus is again ready for use.

If desired, the outer end of the valve outlet 4 can be fitted with threads (not shown) suitable for attaching a flexible or inflexible extension for conveying the vapors to a greater distance from the container before releasing them through a nozzle to the atmosphere, or before directing them against the object to be sprayed. When using an extension, the nozzle 12 or the entire tube 4 could be moved to the outer end of the extension which can be attached to the outer end of tube 4 or directly to the valve housing 2.

55 It will be understood that the above description and accompanying drawing comprehend only the general and preferred embodiment of my invention, and that various changes in construction, proportion and arrangement of parts may be made within the scope of this invention and the appended claims, without sacrificing any of the advantages of the invention.

What I claim is:

65 1. In combination, a container, a valve secured to said container, said valve comprising a housing with an outlet port and a packing gland in its upper portion, a chamber in its lower portion and a valve stem guide between the gland and chamber, a valve disk in said chamber and adapted to seat against said guide, a stem having a non-circular portion for moving said disk, said stem extending through the packing gland and the valve stem guide and a fluid conveying

tube secured to the housing and extending into said container, the non-circular portion of said stem extending into a non-circular aperture of said tube thereby limiting the stem to a reciprocating movement.

2. In combination, a container, a valve housing secured to the container, said housing having an outlet port, a packing gland in its upper portion, a chamber in its lower portion and a valve stem guide between the chamber and gland, a fluid conveying tube inserted in and extending from the chamber into the container, a stem loosely positioned in said stem guide and having a non-circular bottom portion protruding into a slotted orifice in the tube, said stem passing through the packing gland and a valve carried by said stem controlling the flow of fluid from the chamber to the port.

3. In combination, a container, a valve housing secured to the container, said housing having an outlet port, a chamber and a valve stem guide, a fluid conveying tube inserted in and extending from the chamber into the container, a stem loosely positioned in the stem guide and having a flattened bottom portion protruding into a slotted orifice in the tube, and a valve carried by said stem controlling flow from the chamber to the port, said tube substantially limiting the stem to a reciprocating movement for opening and closing the valve, and means for locking said stem.

4. In combination, a valve comprising a housing having a chamber, an outlet nozzle and a valve stem guide forming a passage from the chamber to the nozzle, a valve stem loosely fitted into the guide, and having a non-circular portion extending into the chamber, a valve disk carried by said stem controlling the flow from the chamber to the nozzle, and a fluid conveying tube inserted into the chamber, said tube having a non-circular orifice into which the non-circular portion of the stem extends, thereby limiting the stem to a reciprocating movement.

5. In combination, a container, a valve secured to the container, said valve comprising a housing having a chamber, an outlet nozzle and a valve stem guide with a valve seat in said chamber, said guide forming a passage from the chamber to the nozzle, a valve stem having a flat end loosely fitted into said guide and extending through the chamber, a valve disk carried by said stem in the chamber, a fluid conveying tube having a rolled end with a slot therein inserted into the bottom of said chamber with the flat end of the valve stem protruding through the slot whereby said stem is limited to reciprocating movement, and a spring having one end bearing against the tube rolled top and the other end against the underside of said disk for holding the disk on the valve seat, and a nut threaded on said stem adapted to lock the valve in closed position.

6. In combination, a container, a valve housing secured to the container, a valve in said housing, said valve having a regulating stem with a non-circular end, and a fluid conveying tube extending into the container, said tube having a rolled end with a non-circular orifice inserted into the bottom of said housing so that the non-circular end of the stem protrudes through the orifice thereby limiting the stem to a reciprocating movement for opening and closing the valve.

CARL IDDINGS.