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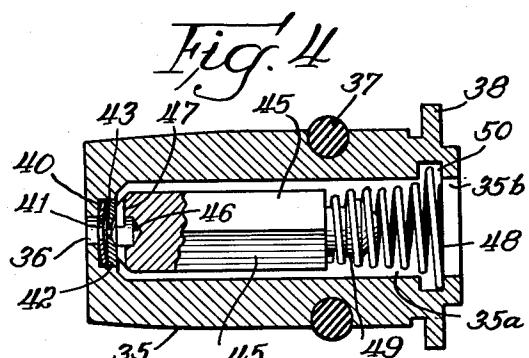
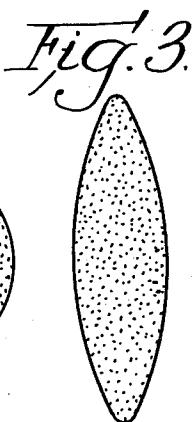
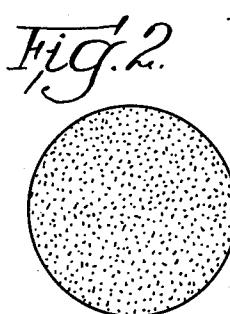
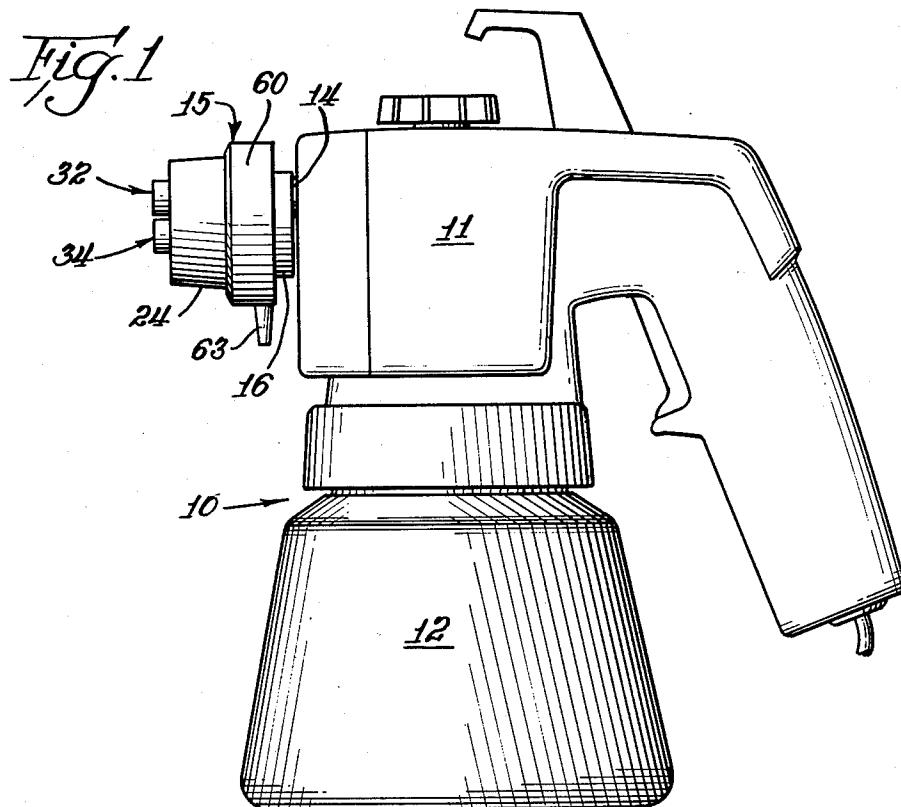
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3,112,885

SPRAYER WITH TURRET NOZZLE ASSEMBLY

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2 Sheets-Sheet 1



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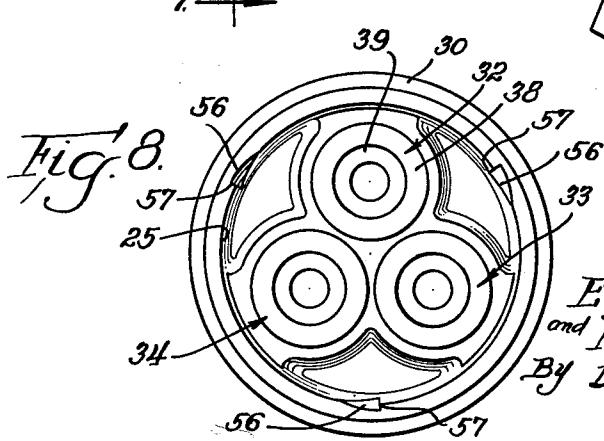
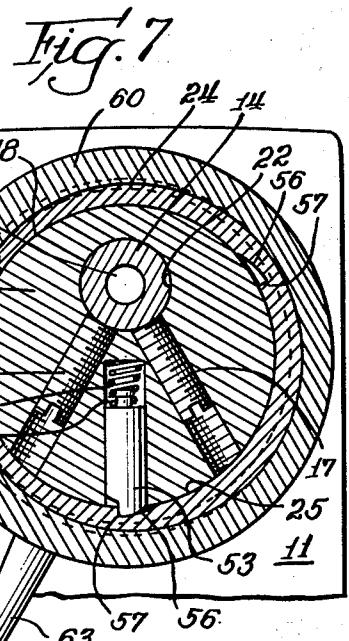
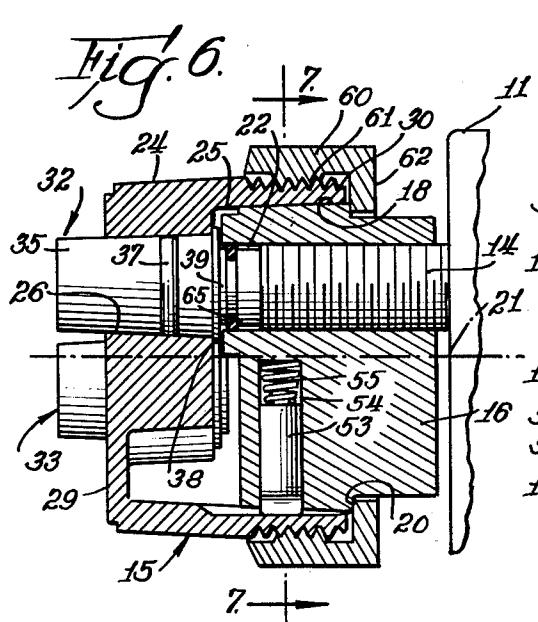
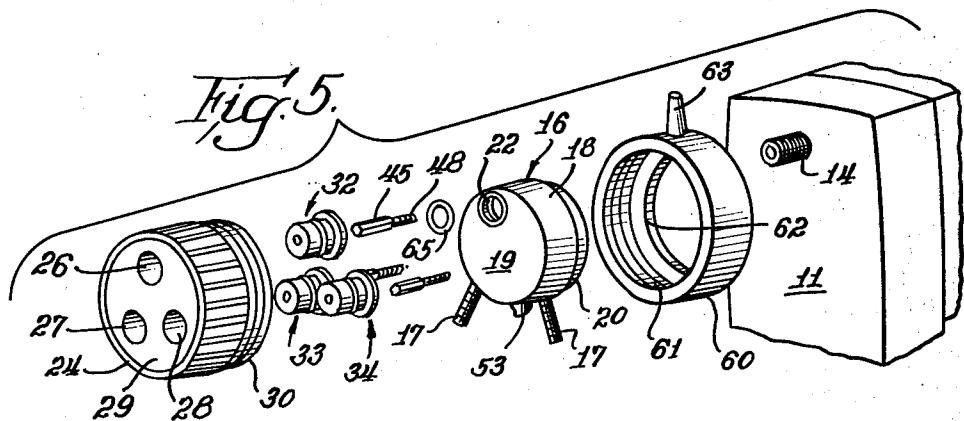
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SPRAYER WITH TURRET NOZZLE ASSEMBLY

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2 Sheets-Sheet 2



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3,112,885

SPRAYER WITH TURRET NOZZLE ASSEMBLY
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4 Claims. (Cl. 239—394)

The present invention relates to a sprayer for atomizing liquids having turret mounted interchangeable nozzles.

For a particular spraying job a specific spray pattern and a certain degree of atomization usually is to be preferred. Almost universally spray guns, e.g. paint sprayers, are provided with an assortment of nozzles and provision is made for interchanging the nozzles to change the spray dispersion pattern. In some instances additional atomizing adjustments must be made in addition to physically replacing one nozzle with another. The various manipulations required to change the spray dispersion pattern with conventional equipment can be time consuming and burdensome, particularly in those instances in which frequent changes are required. Furthermore, since the parts must be removed and replaced with the alternate parts being set to one side there is always the opportunity for parts to be lost or misplaced.

The principal object of the present invention is to provide a paint sprayer with a turret assembly incorporating interchangeable nozzles which alternatively may be moved easily, quickly and accurately into effective position. Each nozzle has a predetermined spray pattern different from the others. One of the important features of our invention is the ease and speed with which a change may be accomplished from one nozzle to another to obtain the desired change in the dispersion spray pattern. Since no parts must be removed or replaced there is no opportunity for the user to lose or misplace the alternate nozzle parts that are not in use.

One of the requisites of an apparatus of the type of the present invention is that a fluid tight seal must be maintained between the liquid supply means, e.g. pump, and the particular nozzle that is being used to achieve the desired spray pattern. This fluid tight seal must exist so long as the selected nozzle is in use, yet at the same time the means for achieving the fluid tight seal must not interfere with the ability of the user to change from one nozzle to another. We have devised a remarkably simple and effective apparatus which achieves the required fluid tight seal between the supply means and the nozzle being used. At the same time, as has already been mentioned, the user may easily and simply change from one nozzle to another. The seal prevents the liquid from leaking from the apparatus as well as its emission from any of the nozzles other than the one selected for the desired spray pattern. Provision is made to insure accuracy of alignment between the selected nozzle and the conduit through which the liquid to be sprayed is delivered to that nozzle.

Particularly with those spray devices with which paints, etc., are to be used, the ability to clean the paint from the device following its use is an important factor to the user. If the cleanup time is long and tedious with a particular device, that device is not likely to be favorably received by the user. The apparatus of our invention is such that for all practical purposes no additional cleanup time is required over that necessary with conventional devices utilizing removable interchangeable nozzles. In the usual instance the apparatus of our invention may be cleaned merely by spraying a cleaning fluid therethrough. If paint should be allowed to solidify by reason of improper or incomplete cleaning. The device

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may be readily disassembled to enable a more complete cleaning of the parts thereof. The apparatus is sufficiently simple so that the disassembly is easy and its reassembly will be understood by even a relative novice.

5 The services of a skilled mechanic are not required either to perform the disassembly or the reassembly.

A further feature of our invention is that the apparatus is sufficiently simple so that it is relatively inexpensive to manufacture. Taking into consideration the desirability of readily interchangeable nozzles, embodiments

10 of our invention may be sold competitively with conventional sprayers having nozzles that must be completely removed and replaced to change.

Other objects and advantages of the present invention will be apparent from the following description taken in conjunction with the drawings in which:

FIGURE 1 is an elevational view of a sprayer embodying the turret nozzle assembly of the present invention;

FIGURES 2 and 3 are illustrative of different spray dispersion patterns that may be achieved by using different nozzles;

FIGURE 4 is a section through one of the nozzles;

FIGURE 5 is an exploded view of the turret assembly and its mounting on the fluid supply apparatus;

25 FIGURE 6 is a vertical section through the mounted turret assembly.

FIGURE 7 is a section as viewed at line 7—7 of FIGURE 6; and

FIGURE 8 is a view of the backside of the nozzle holder with the nozzles positioned therein.

FIGURE 1 illustrates a sprayer, generally 10, having a sprayer body 11 to which is removably secured a fluid container 12. Except for our invention, hereinafter described in detail, the structure and operation of sprayer 10 is conventional. Suffice it to say that it is a sprayer of the type that incorporates an electric pump (not shown) which withdraws the fluid from container 10 and delivers it under pressure to an atomizing and spraying nozzle. It will be apparent to those skilled in the art however, that our invention can be used with other types of sprayers different from that illustrated in FIGURE 1.

The fluid from the sprayer pump is delivered to a fluid discharge conduit 14. The turret nozzle device, generally 15, of our invention is mounted on conduit 14. To this end a turret body 16 is threaded onto conduit 14. Body 16 is held against rotation with respect to conduit 14 by a pair of set screws 17.

Body 16 is generally cylindrical with an outside surface 18 which is approximately cylindrical but actually is a frustum of a cone having its smaller diameter at outer face 19 of the body and its larger diameter at shoulder 20 on the rearward side of the body. Body 16 is formed about a cylindrical (or conical as the case may be) axis 21. As is best seen in FIGURE 6 the opening 22 in body 16 into which conduit 14 is threaded is offset from axis 21 and parallel thereto.

A turret or nozzle holder 24 is received on turret body 16. Turret 24 is generally cylindrical in configuration about axis 21, but has an inner face 25 which has a slight taper to conform to the configuration of the outside surface 18 of body 16. Turret 24 has three openings, 26, 27 and 28 in outer face 29 thereof. Openings 26-28 are offset from axis 21 a distance such that they can be (depending on their rotational position) aligned with opening 22 in body 16. The rearward skirt of turret 24 has outer threads 30 thereon.

Three nozzles, generally 32, 33 and 34 are received in openings 26-28 respectively. Nozzle 32 is illustrated in FIGURE 4. It has a hollow nozzle body 35 with an internal opening 35a and an opening 36 in the outer end thereof. Received in a groove about the outside of body

35 is an O-ring gasket 37 which contacts the walls of turret 24 defining opening 26 to frictionally hold the nozzle in the body. At the rear end of body 35 is an outwardly extending flange 38 which contacts the inside of body 24 to limit the extent to which the nozzle 32 may be pushed through opening 26. At the rearward end of body 35 is an abutment 39 (FIGURE 6) slightly smaller in diameter than that of opening 22 and defining there-within an intake opening 35b for the nozzle.

Within the internal opening 35a in body 35, immediately adjacent opening 36 is a fan disc 40. Fan disc 40 has an axial opening 41 of a shape to define the desired spray pattern, e.g. an elongated slot to define the fan shape pattern illustrated in FIGURE 3. Immediately adjacent fan disc 40 is a jewel 42, e.g. sapphire, having an axial opening 43. Opening 43 is extremely small, in the neighborhood of 0.016 inch in diameter. When a round spray pattern as illustrated in FIGURE 2 is desired, jewel 42 is used alone without fan disc 40. Body 35 is staked about jewel 42 to hold the jewel in place.

Immediately to the rear of jewel 42 is a spinner 45 which is generally hexagonal in transverse cross-section so that it will be centered within opening 35a and at the same time allow the fluid to flow thereabout. The forward end of spinner 45 has an axial opening 46 and a pair of offset end slots 47. Slots 47 cause a swirling movement of the fluid as it enters opening 43 in jewel 42. A spring 48 has one end engaged about stud 49 of spinner 45 and the other end engaged in slot 50 of body 35. Spring 48 urges spinner 45 against jewel 42.

Nozzles 33 and 34 generally conform in construction to the specific structure just described with respect to nozzle 32. The differences in the nozzles are only that required to provide different spray patterns and the appropriate atomization for each spray pattern.

Means are provided to align each of nozzles 32-34 with conduit 14. This means is provided by a detent 53 which is received in an opening 54 in body 16. A spring 55 between the base of opening 54 and detent 53 urges the detent outwardly away from axis 21 of the body 16. The inner face 25 of turret 24 has three notches 56 which define a shoulder 57 at one end, with the notch being tapered at the other. When shoulder 57 is in abutment with detent 53 as illustrated in FIGURE 7 one of the nozzles 32-34 will be in proper alignment with conduit 14. Turret 24 may be rotated in one direction (illustrated by arrow 67) on body 16 since the tapered end of the slots 56 provide a camming surface to move detent 53 inwardly against the resistance of spring 55. As soon as the next nozzle is aligned with conduit 14 detent 53 will drop into the next notch 56.

A nut 60 has internal threads 61 to engage threads 30 on turret 24. Nut 60 has an inward shoulder 62 which abuts shoulder 29 of body 16. A handle 63 projects from nut 60.

In use, body 16 is secured to conduit 14 by set screws 17. A gasket 65 is frictionally mounted in opening 22 at the end of conduit 14. When nozzle 32 is positioned in alignment with conduit 14 and nut 60 tightened on turret 24, the turret 24 is drawn onto body 16. At the same time the drawing of the turret towards body 16 causes gasket 65 to be compressed between the end of conduit 14 and abutment 39 on nozzle 32. Thus a fluid tight seal is achieved about the passageway provided by the internal opening 14a in conduit 14 and the internal opening 35a in nozzle 32. Through this passageway the fluid from the electric pump of the sprayer 10 travels to and is sprayed from nozzle 32. Nozzle 32 produces a fan shaped spray pattern as generally illustrated in FIGURE 3. A spray pattern of this shape is particularly suitable for painting large flat surfaces such as walls, screens, floors, fences and the like.

If a different spray pattern is desired lock nut 63 is loosened, i.e. threads 61 and 30 are disengaged. The loosening of the nut allows a separation of the nut and

the turret 24 so that the turret can be moved axially with respect to body 16 and rotated thereabout. Turret 24 then is rotated in the direction indicated by arrow 67 (FIGURE 7) with respect to body 16. When the nozzle having the desired spray pattern is aligned with conduit 14 an accurate alignment is assured by detent 53 being in contact with abutment 57 of the appropriate notch 56. Nut 63 again is tightened on turret 24 to draw the turret onto body 16 and cause the abutment (e.g. abutment 39) of the selected nozzle to enter opening 22 and contact gasket 65.

A second of the nozzles usually is formed to define a circular spray pattern as illustrated in FIGURE 2. A spray pattern of this shape is suitable for painting odd shaped objects, e.g. chairs, desks, outdoor furniture, cabinets and the like. The third of the nozzles is so designed as to be a "fogging" nozzle, that is a nozzle to produce a maximum dispersion without a definite spray pattern. A nozzle of this latter type is particularly suitable for spraying insecticides, mothproofers, garden sprays and the like.

The foregoing description of a specific embodiment is for the purpose of complying with 35 U.S.C. 112 and should not be construed as imposing unnecessary limitations upon the appended claims inasmuch as modifications and variations will be apparent to those skilled in the art or devised by them. For example, turret body 16 could be an integral part of sprayer body 11.

We claim:

1. In a liquid sprayer the improvement comprising: a body having a fluid discharge conduit therein with a fluid discharge opening in a first plane at the end of said conduit and a passageway from said plane to a face of said body; an annular resilient gasket mounted in said passageway at the end of said conduit and surrounding said opening; a turret mounted on said body for rotation about an axis spaced from said opening and normal to said plane; said turret being movable with respect to said body parallel to said axis; a plurality of nozzles mounted on said turret at spaced intervals about said axis, each of said nozzles having an intake opening in a second plane parallel to the first plane and spaced from said axis a distance equal to the spacing between the conduit opening and the axis, whereby rotation of said turret about said axis alternatively will position the intake opening of a selected one of the nozzles in alignment with the conduit opening, each of said nozzles having an annular abutment about the intake opening, said abutment corresponding approximately in diameter to the diameter of the gasket with the abutment of the one nozzle projecting into the passageway to align the one nozzle and abut said gasket; and means interconnecting the body and the turret to move the turret along said axis towards the body to bring said one nozzle into fluid tight sealing engagement with the gasket.

2. In a liquid sprayer the improvement comprising: a body having a liquid discharge conduit therein with a fluid discharge opening in a plane at the end of said conduit and a passageway from said plane to a face of said body; an annular resilient gasket mounted in said passageway at the end of said conduit and surrounding said opening; a turret mounted on said body for rotation about an axis spaced from said opening and normal to said plane, said turret being movable with respect to said body parallel to said axis, said turret having a plurality of tubular openings extending therethrough parallel to said axis and spaced thereabout, said openings being spaced from the axis a distance equal to the spacing between the conduit opening and the axis; a plurality of tubular nozzles positioned in said turret openings respectively, each nozzle having a flange adjacent an end thereof and abutting the side of said turret and adjacent said body, said end being annular and smaller in external dimensions than said flange, said end corresponding approximately in diameter to the diameter of the gasket and defining an intake opening for the nozzle, one of said nozzles being an effective nozzle and being positioned with said end thereof in said passageway

and in contact with said gasket; and means interconnecting the body and the turret to move the turret along said axis toward the body to bring said effective nozzle into fluid tight sealing engagement with the gasket.

3. In a sprayer having a fluid conduit projecting therefrom and a turret nozzle assembly, the improvement comprising: a turret body detachably mounted upon said sprayer, said body having a tubular opening in which is received said conduit with the outer end of the conduit being spaced inwardly from the outer end of the opening; an annular resilient gasket in said opening and abutting said conduit; a nozzle holder encompassing said body and rotatable about an axis parallel to and spaced from the opening, said holder having notches in the inner surface thereof; a plurality of spray pattern nozzles mounted in said holder at spaced intervals about said axis and parallel thereto, said nozzles being spaced from said axis the same distance the axis is spaced from the opening, said nozzles having an end smaller in cross section than said opening and adapted to enter the opening and to abut the gasket; a detent in said body normally biased outwardly thereof to cooperate with said notches to align each of said spray pattern nozzles with said conduit to permit a flow of fluid therethrough; and means for holding said body and said

holder in assembly with one of the nozzles in the opening and abutting the gasket.

4. The improvement in a sprayer and nozzle assembly as set forth in claim 3 in which said body is undercut at a rear portion thereof to provide a shoulder thereon; said holder is threaded rearwardly thereof; and said means is a lock nut having a radially inwardly projecting shoulder for abutment with said shoulder of said body and said nut is threaded forwardly thereof to receive said holder in threaded engagement.

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