

PATENT SPECIFICATION

DRAWINGS ATTACHED

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(19)



(54) SPRAYING APPARATUS

(71) We, F. E. ZUELLIG (MALAYA) SENDIRIAN BERHAD, a Malaysian Body Corporate, of 1st Floor, Chartered Bank Building, New Town Centre, Petaling Jaya, Selangor, Malaysia, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to spraying apparatus and is particularly concerned with spraying apparatus in the form of a "knapsack sprayer" which is suitable for spraying not only liquids but also liquids containing emulsions or finely divided solids in suspension which must be maintained in a mixed state during spraying.

According to the invention there is provided spraying apparatus in the form of a "knapsack sprayer" and comprising a liquid container, nozzle means for liquid to be sprayed and connected by first conduit means to a hand-operated pump which is operable to withdraw liquid from the container and to discharge liquid so withdrawn through the nozzle means, and second conduit means connected to the pump and opening inside the container so that when the pump is operated to discharge liquid from the nozzle means a portion of the liquid withdrawn by the pump from the container is simultaneously discharged from the second conduit means to agitate liquid inside the container. Agitation of the liquid inside the container resulting from discharge of liquid from the second conduit means will cause any liquid in the container to be mixed before it is sprayed.

The invention will be more readily understood from the following description, given by way of example only, of an embodiment thereof, reference being made to the accompanying drawings in which:—

Figure 1 is an elevational view of spraying apparatus according to the invention;

[Price 25p]

Figure 2 is a sectional view of part of the apparatus of Figure 1; and

Figure 3 is an elevational view of parts of the apparatus of Figure 1.

Turning to the drawings, the spraying apparatus comprises a liquid container 9 having a vent 10. A tubular member 11 located inside the container 9 and opening adjacent the container floor 12 communicates with the exterior of the container 9 by way of connection means 13 and pipe 14. The pipe 14 is screwed into a union 15 at the base of a single-acting pump 16. A bracket 17 encircling an upper portion of the pump 16 and secured to the container 9 assists in securing the pump to the container. The pump piston rod 18 is reciprocated by means of a handle 20 which is pivotally connected to the container 9, there being a rod 21 interconnecting the piston rod and the handle so that pivotal movement of the handle will result in reciprocating movement of the piston rod. Pipe means 22 leads from the union 15 and has three outlets indicated at 23, 24 and 25 in Figure 3. A pipe 26 communicates with the outlet 23 and is screwed into a union 27 which communicates by way of a flexible tube 28 with a pair of spray nozzles 30 which discharge liquid towards the object to be sprayed. There may be only a single nozzle 30. Outlet 24 communicates with an air chamber 31 the purpose of which will be described hereinafter. Outlet 25 communicates by way of a flexible tube 32 with a pipe 33 fast with the container 9 and extending inside the container. A union 34 carrying a pipe 35 which itself carries a nozzle 36 is for screwing onto pipe 33. A filter 37 will be housed inside the union 34.

The flexible tube 28 communicates with a fitting 38 for housing a filter 40. The end 41 of the fitting 38 screws into the housing 42 of a valve 43 which is manually operated by a pivotally mounted lever 44; in the out-of-use position of the lever 44, the valve

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SPECIFICATION AMENDED - SEE ATTACHED SLIP

43 is closed. The spray nozzles 30 are coupled to the valve 43 by way of a lance 45.

The container 9 can be charged through mouth 46 with liquid to be sprayed, the mouth being shut by a closure when the container has been filled.

In use of the spraying apparatus, the operator moves the lever 44 to open the valve 43 and operates the pump 16 by means of the handle 20. During the forward, or discharge, strokes of the pump, liquid will be discharged simultaneously through the outlets 23, 24 and 25 and respectively through the nozzles 30, into the air chamber 31, and through the nozzle 36. During the return, or suction, strokes of the pump, liquid will be discharged under pressure from the air chamber 31 through the nozzles 30 and nozzle 36. Thus, during both the discharge and suction strokes of the pump, liquid is discharged from the nozzles 30 and also from the nozzle 36.

The nozzle 36 is so positioned within the container 9 that the liquid, which is discharged under pressure from the nozzle 36, agitates the liquid in the container and through mixing of that liquid is effected. With the container 9 full of liquid, the nozzle 36 will be well below the liquid surface and accordingly agitation will occur within the body of the liquid. There will come a time when the nozzle 36 is spaced above the liquid surface and then the agitation will result from the spray from the nozzle 36 impinging upon and mixing with the liquid therebeneath.

So that the additional nozzle 36 will not materially prejudice the effectiveness of the sprays from nozzles 30, the outlet 25, pipe 35 and nozzle 36 are smaller than the outlet 23, lance 45 and nozzles 30.

The container 9 can be provided with shoulder straps to make the apparatus usable as a "knapsack sprayer".

Although a nozzle is preferred to discharge liquid from the pipe 35, different means may be used. Thus the pipe wall at the discharge end may be circumferentially apertured so that the liquid will be discharged as a member of circumferentially spaced radially extending streams. Alternatively, a number of branch conduits may be connected to the pipe 35 so that the liquid will be discharged as a number of streams. However, in each case, the liquid discharged from the pipe 35 will act to agitate, and therefore effect mixing of, any liquid present in the container 9.

WHAT WE CLAIM IS:—

1. Spraying apparatus in the form of a "knapsack sprayer" and comprising a liquid container, nozzle means for liquid to be sprayed and connected by first conduit means to a hand-operated pump which is operable to withdraw liquid from the container and to discharge liquid so withdrawn through the nozzle means, and second conduit means connected to the pump and opening inside the container so that when the pump is operated to discharge liquid from the nozzle means a portion of the liquid withdrawn by the pump from the container is simultaneously discharged from the second conduit means to agitate liquid inside the container.

2. Spraying apparatus according to claim 1, wherein liquid is discharged from the second conduit means into the container through nozzle means.

3. Spraying apparatus substantially as herein described with reference to the accompanying drawings.

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