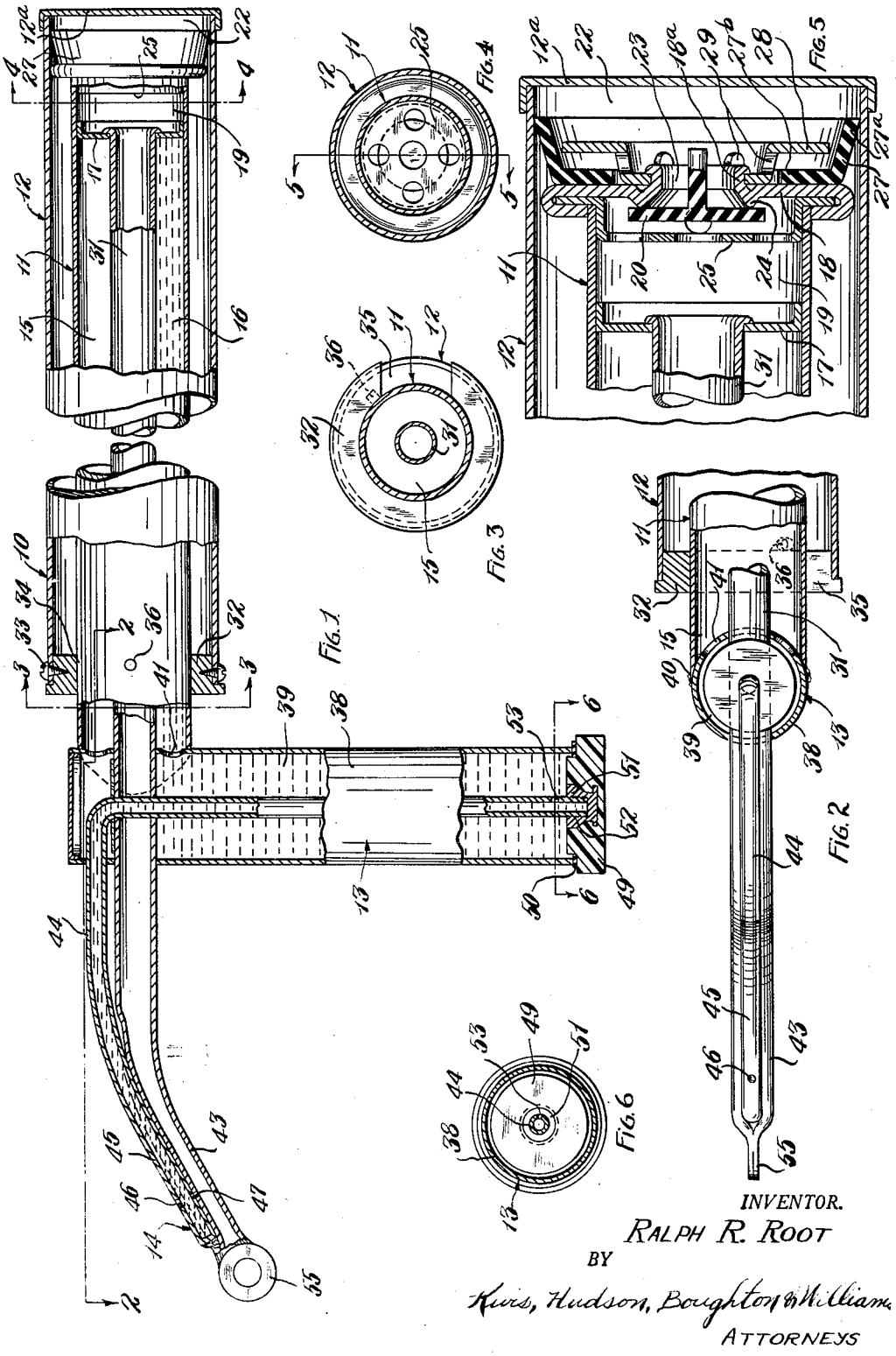
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SPRAYER

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SPRAYER

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This invention relates to sprayers for insecticide and/or fungicide liquids, or the like, and aims to provide an improved spraying device of this kind comprising a relatively small number of parts enabling it to be economically manufactured and assembled and which can be manually carried and operated with relative ease for efficiently delivering a spray of atomized liquid in a desired direction.

Another object of the present invention is to provide an improved sprayer of this character, having reciprocably telescoping cylinder and reservoir members forming an air pump and wherein air and liquid delivery conduits project outwardly from the reservoir member in coextending relation and carry an atomizing means.

A further object of the invention is to provide an improved sprayer of this type, in which a handle connected with the outer end of the reservoir member is adapted to be grasped by one hand of the operator while his other hand grasps the telescoping cylinder member.

Still another object of this invention is to provide an improved sprayer of this kind, in which the handle is hollow and extends in depending relation to the reservoir member and forms an extension of the main reservoir chamber.

Yet another object is to provide an improved sprayer of this character having means by which it can, when not in use, be suspended in a manner such that leakage of liquid from the device will not occur.

The invention can be further briefly summarized as consisting in certain novel combinations and arrangements of parts hereinafter described and particularly set out in the appended claims.

In the accompanying sheet of drawings

Fig. 1 is an elevational view, with portions thereof in section, showing a liquid spraying device embodying the present invention,

Fig. 2 is a partial longitudinal sectional view of the device taken substantially as indicated by line 2—2 of Fig. 1,

Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 1,

Fig. 4 is a transverse sectional view taken on line 4—4 of Fig. 1,

Fig. 5 is a partial longitudinal sectional view on a relatively enlarged scale and taken on line 5—5 of Fig. 4, and

Fig. 6 is a transverse sectional view taken through the handle of the device as indicated by line 6—6 of Fig. 1.

In the embodiment of the invention illustrated

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in the drawing, the improved sprayer 10 includes a plunger member or reservoir member 11 and a cylinder member 12 disposed in surrounding relation to the reservoir member and cooperating therewith to form an air pump. The device also includes a handle 13 connected with the outer end of the reservoir member 11 and extending in angular depending relation thereto. The device further includes an atomizing means 14 located at its outer or forward end and by which a stream of atomized liquid can be discharged in a desired direction during the operation of the device.

The reservoir member 11 comprises an elongated tubular member having therein a main reservoir chamber 15 which is adapted to contain a quantity of liquid spray material 16. The inner end of this reservoir member is provided with axially spaced transverse walls 17 and 18 defining a valve chamber 19 in which a check valve 20 is operable. The inner end of the reservoir member 11 forms a plunger which cooperates with the adjacent end of the cylinder member 12 in forming a pump chamber 22.

The valve chamber 19 of the reservoir member 11 is connected with the pump chamber 22 through the passage 23 of the axially extending tubular portion 18^a of the wall 18. A valve seat 24 carried by the wall 18 and surrounding the passage 23 is sealingly engaged by the valve 20 when the latter is in its closed position, as shown in Fig. 5. The valve is retained in cooperating relation to the seat 24 by means of the cage 25.

The inner end of the reservoir member 11 is also provided with a packing means which, in this case, is in the form of a cup-shaped flexible member 27 having an annular skirt 27^a in sealing engagement with the wall of the cylinder member 12. The packing 27 is retained on the reservoir member by having a body portion 27^b disposed between the wall 18 and a retainer 28 which is carried by the central axially extending tubular portion 18^a. The retainer 28 is provided with openings 29 which permit air to pass from one side of the packing 27 to the other during the inoperative or return stroke of the pump. The reservoir member 11 is also provided with an air delivery conduit 31 which extends axially therein and has its inner end connected with the pump chamber 22 through the valve chamber 19.

The cylinder member 12 is an elongated tubular member which telescopically surrounds the reservoir member 11 and is reciprocable relative thereto. The inner or rear end of the cylinder member is closed by a transverse end wall or cap 12^a. At its outer or forward end the cylinder

member is provided with a ring-shaped bushing 32 which is retained therein as by means of screws 33 and has a guide opening 34 in which the reservoir member 11 is relatively slidable. The bushing 32 can be made of any suitable material but is preferably constructed by being molded from suitable nonmetallic or plastic material. This bushing is here shown as being less than a complete ring and having a gap or opening 35 therein providing an air inlet opening for admitting air to the pump chamber 22 from atmosphere. This bushing preferably is of a springy character so that it can be assembled onto the reservoir member 11 by being sprung in a direction to expand the opening 35 a sufficient distance to permit the reservoir member 11 to pass therethrough.

When the bushing 32 is constructed with the opening 35 therein it also constitutes one element of a pair of cooperating bayonet locking elements for preventing axial separation of the cylinder and reservoir members 12 and 11. The other of these locking elements is a pin or projection 36 carried by the reservoir member and located adjacent the outer end thereof. When the cylinder and reservoir members are to be locked against relative separation the cylinder member is moved to its collapsed position causing the pin 36 to travel through the opening 35, whereupon the cylinder member is rotated a sufficient angular distance relative to the reservoir member to bring the pin into holding engagement with the inner end face of the bushing as shown in Fig. 3.

The handle 13 is connected with the outer end of the reservoir member 11 and, as mentioned above, extends in downward angular relation thereto. This handle may be constructed with a tubular body 38 having therein a chamber 39 forming an auxiliary reservoir. The handle 13 can be connected with the reservoir member 11 by the soldering indicated at 40, or by any other suitable connecting means. At this point of the device, the wall of the handle member 38 is provided with openings 41 which connect the auxiliary reservoir 39 with the main reservoir 15 so that the auxiliary reservoir forms a depending or angular extension of the main reservoir, as shown in Fig. 1.

The air delivery conduit 31 extends outwardly or forwardly from the reservoir member 11 and, in this instance, extends transversely through and beyond the hollow handle 13. This conduit is provided at its outer end with a portion 43 of relatively reduced size and which is curved or deflected downwardly relative to the longitudinal axis of the reservoir member. A liquid feeding tube or conduit 44 also extends outwardly or forwardly from the reservoir member 11 for feeding therefrom the liquid spray material 16. This liquid delivery conduit is disposed above and in coextending relation to the outwardly projecting portion of the air delivery conduit 31 and also has a downwardly curved or deflected outer end portion 45.

The downwardly deflected end portions 43 and 45 of the air and liquid delivery conduits 31 and 44 constitute the atomizing means 14. For this purpose the end portion 45 of the liquid delivery conduit is provided with an orifice 46 extending through the wall thereof and located on the upper side of the spraying device. An air delivery orifice 47 is located opposite the orifice 46 and extends through the adjacent walls of the end portions 43 and 45 of the air and liquid delivery conduits. The orifice 47 is usually of a smaller size than the orifice 46 and serves to direct a jet of air across the liquid conduit and outwardly through the orifice 46. This jet of air effectively atomizes liquid being supplied from the reservoir 15 by the delivery conduit 44.

The hollow handle 13 has an opening thereinto at its lower end which forms a filling opening for the main and auxiliary reservoirs. This filling opening is closed by a cap 49 having a sealing gasket 50 thereon. As shown in Fig. 1, the liquid delivery conduit 44 extends axially within the hollow handle 13 and has its inner end located adjacent the filling opening. The cap 49 can be retained in its closed position by being provided with a nut 51 which cooperates with a thread 52 formed on the inner end of the liquid delivery conduit. An opening 53 formed in the conduit at a point above the thread 52 connects the passage of the conduit with the auxiliary reservoir 39 adjacent the bottom of the latter.

In using the spraying device 10, the operator ordinarily grasps the handle 13 with one hand and with the other hand grasps the cylinder member 12 and reciprocates the latter on the reservoir member 11. This relative reciprocation causes air to be compressed in the pump chamber 22 on each working stroke and to be delivered past the check valve 20 and through the conduit 31 to the orifice 47 for producing the atomization of the liquid as described above. By grasping the handle 13 the operator can hold the device in a firm and steady manner and can readily direct the atomizing means 14 either upwardly or downwardly or in any other desired direction in which he may wish to discharge the stream of atomized liquid. The check valve 20 serves to prevent liquid from being sucked back into the pump chamber 22 from the atomizing means 14 during the return stroke of the pump.

When the device 10 is not being used, it is desirable to suspend the same in a convenient location and in a position such that liquid from the auxiliary reservoir 39 will tend to drain back into the main reservoir 15. By having the liquid drain out of the auxiliary reservoir into the main reservoir no portion of the liquid supply will be in a position adjacent the opening 53 to leak from or be forced out of the liquid conduit 44. To enable the device to be supported in this inoperative position, the end portion 43 of the air delivery conduit is provided with an attaching means which is here shown in the form of an eye or a ring 55 adapted to be engaged with a hook, nail or other suitable support for suspending the device therefrom.

The eye 55 is located in downwardly offset relation to the longitudinal axis of the reservoir member 11, such that when the device is thus suspended it will hang in a relatively inclined position to bring about the above mentioned drainage of spray material from the auxiliary reservoir 39 into the main reservoir 15 through the openings 41. The small amount of liquid which may be trapped in the liquid delivery conduit 44 at the time that the device is suspended on the support can either be left in this conduit or can be discharged therefrom by imparting a few pumping strokes to the cylinder member 12. Thereafter, the liquid delivery conduit 44 will remain empty until the device is removed from the support, whereupon liquid will flow back into the auxiliary reservoir from the main reservoir.

While the device 10 is suspended by the eye 55 as just explained above, the locking pin 36 will

prevent the cylinder member 12 from dropping to its extended position.

From the foregoing description and the accompanying drawing it will now be readily understood that this invention provides an improved sprayer which is of a relatively simple construction and which will be easy to carry and operate. It will also be seen that this device will operate in a positive manner and will efficiently deliver a stream of atomized liquid regardless of the direction or position in which the device is being held by the operator. Moreover, it will be seen that when the device is not in use it is adapted to be conveniently suspended so that there will be substantially no leakage of liquid from any part of the device.

Although my improved sprayer has been illustrated and described herein in more or less detail, it will be understood of course that the invention is not to be regarded as correspondingly limited but includes all changes and modifications coming within the scope of the appended claims.

Having thus described my invention, I claim:

1. A spraying device comprising, telescoping relatively reciprocable cylinder and plunger members forming an air pump, said plunger member having a reservoir therein adapted to contain a supply of liquid spray material, a handle connected with said plunger member and extending downwardly therefrom and adapted to be grasped for holding the device during the relative reciprocation of said members, a liquid delivery conduit extending forwardly of said handle, and an air delivery conduit extending forwardly of said handle and disposed beneath said liquid delivery conduit in adjacent coextending relation thereto, said conduits having their outer

end portions extending forwardly and downwardly and said end portions having cooperating atomizing orifices on the tops thereof.

2. A spraying device comprising, telescoping relatively reciprocable cylinder and plunger members forming an air pump, said plunger member having a main reservoir therein adapted to contain a supply of liquid spray material, a handle connected with said plunger member and extending downwardly therefrom and adapted to be grasped for holding the device during the relative reciprocation of said members, said handle having a chamber therein forming an auxiliary reservoir which is connected with said main reservoir, air and liquid delivery conduits extending forwardly of said handle, forwardly downwardly extending atomizing means carried by said conduits, and means connected with said atomizing means and engageable with a support for suspending the device in a position in which the liquid in said liquid delivery conduit tends to drain back into one of said reservoirs.

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