Oct. 22, 1940. F. J. GIFFORD 2,218,790

SPRAYER

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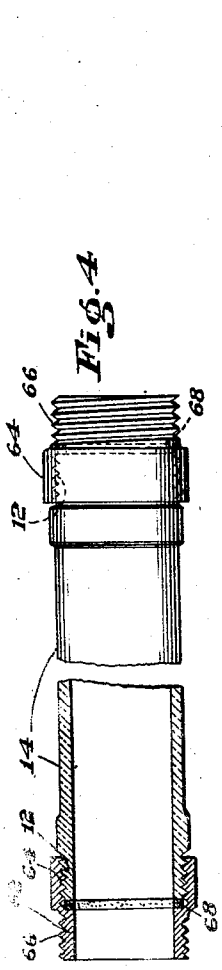


Fig. 4

Fig. 1

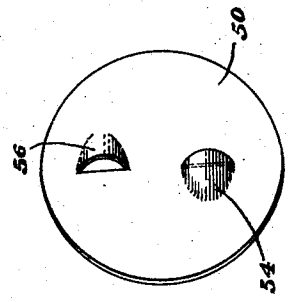


Fig. 3

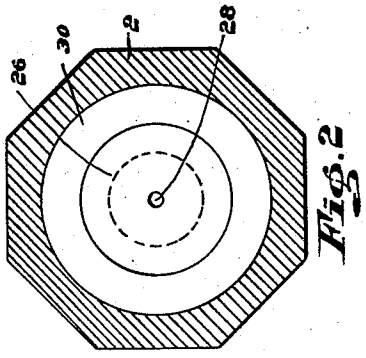


Fig. 2

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SPRAYER

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1 Claim. (Cl. 299—83)

This invention relates to sprayers adapted for connection with an ordinary garden hose or the like.

More particularly it concerns sprayers of the type having a chemical cartridge therein to be dissolved by the passing water so that the resulting spray will be of a strength equivalent to chemical solutions ordinarily used as insecticides in the cultivation of gardens and plants.

One of the objects of my invention is to provide a sprayer of such construction that the rate of dissolution of the chemical cartridge used in connection therewith will be such that the concentration of the resulting spray issuing therefrom will be within ordinary commercial limits until the cartridge has been substantially consumed.

Another object of my invention is to provide a sprayer which may be under easy control, which may be easily taken apart and cleaned, but which at the same time is rugged enough to withstand hard usage.

A further object of my invention is to provide a sprayer having a transparent cartridge chamber so that the condition of the cartridges used therewith may be known at all times.

In addition to the foregoing, other features and objects of my invention will become apparent as the description proceeds with the aid of the accompanying drawing in which:

Fig. 1 is a cross-sectional elevation of my sprayer.

Fig. 2 is an enlarged section on line 2—2 of Fig. 1.

Fig. 3 is a perspective view of the disk used in the nozzle of the sprayer to produce rotary action in the resulting spray.

Fig. 4 shows a modification of the cartridge barrel construction, part being shown in section and part in elevation.

In Fig. 1 is shown a tubular shut-off body 2, internally threaded at either end, as at 4 and 6. The threads 4 are adapted to receive the threaded coupling 8 attached to the end of hose 10. Threads 6 are adapted to receive the threaded end 12 of the transparent cartridge barrel 14.

Passage 16 extending through the shut-off body 2 has a valve seat at 18 adapted to receive the valve 20 which may be opened and closed by rotation of the wing handle 22 attached to the threaded valve shaft 23. Leakage is prevented by the packing 24 held in position by a cap 25.

At the exit end of the shut-off body 2 is positioned a disk 26 having at its center a small hole 28. This disk is held in position by the gasket 30 interposed between the disk and the end of the cartridge chamber.

At the outlet end of cartridge chamber 14 is a perforated baffle 34 having a plurality of aperture 36. This baffle 34 is to prevent the chemical cartridge designated as 38 from being forced out of tne cartridge chamber by the passing water and jammed in the end of the spray gun. The apertures are so arranged that the solution is free at all times to escape from the chamber.

A spray gun 32 screws on the end of the chamber, as at 40, and a washer 42 provides a water-tight connection. The spray gun terminates at the end of the extension 44 in a spray nozzle 46 which has screwed thereto a spray cap 48. Between the spray cap and nipple is a disk 50 which will be referred to as a whirl washer, and the connection is made watertight by the washer 52.

As can be seen in Fig. 3, the whirl washer 50 has portions 54 and 56 died out in such a fashion as to be raised above the surface of the washer as shown, so that the solution passing therethrough will be caused to swirl about, as indicated by the arrows in Fig. 1. By means of an opening 58 in the spray cap 48 the solution escapes to the atmosphere and takes the form of a fine mist when in normal operation.

The chemical cartridge 38 that I use in connection with my spray gun may be composed in proper proportions of any of the chemicals that are found useful as insecticides and the like in garden work mixed with soluble inert binder material. Through my improved construction the rate of dissolution of the cartridge will be such that the solution leaving the gun will be of ordinary commercial concentration for the particular chemicals used in the cartridge, and this concentration will hold until the cartridge is substantially dissolved.

Heretofore it has been difficult, if not impossible, to cause the cartridge to dissolve sufficiently rapidly to give a solution of continuing proper strength. This has been due to the fact that the water passing by the cartridge necessarily must move by at a slow rate due to the large volume of the chamber as compared with the small area of opening 58. This slow movement of water by the cartridge resulted in a solution of insufficient concentration to be satisfactory, and if the nature of the cartridge were changed so that it would be more soluble, the cartridge would be so soft and unstable that it

would be commercially impractical, to say nothing of the fact that it would probably jam in the outlet end of the chamber.

By my construction, however, I am enabled to use a cartridge of such composition that it is firm enough to be easily handled and at the same time, through the use of the disk 26 with the single small hole 28 through which all water to the chamber must enter, I secure adequate dissolution to give the proper concentration of the resulting solution.

If the hole 28 is of the same cross sectional area as that of opening 58 in the spray cap, the velocity of the stream entering chamber 14 will be the same as that of the velocity of the solution leaving the spray gun. If hole 28 is made slightly larger, the velocity of water entering the chamber will be reduced and if hole 28 is made smaller than opening 58, the velocity will be increased.

Therefore, by having a single centrally located opening 28 I am enabled to cause an entering stream of high velocity to impinge on the end of cartridge 38. The high velocity of a small quantity of water causes sufficiently rapid erosion of the cartridge to give me the desired concentration. By testing the resulting solution for concentration and by varying the size of hole 28, it is possible to provide ready means for giving a resulting solution of commercial standards, and if necessary, there may be a plurality of disks 26, each having a hole of different diameter for use with different types of cartridges of different degrees of solubility. In this way a person in taking care of a garden may quickly change from one type of chemical to another and still be assured that the solution will be of proper concentration to act as an effective insecticide or the like. In practice, however, by properly compounding the cartridges, a single disk will suffice for use with all of the ordinarily used chemicals.

With certain types of cartrides I have found it desirable to mold them in such a way that there is a longitudinal bore 60 extending throughout the length. When so constructed, the high velocity entering stream will not only impinge on the end of the cartridge, but will also flow into the bore and cause a somewhat more rapid erosion than would otherwise be the case to give a greater resulting concentration of solution.

Due to the eddies that are set up in the chamber, I have found that the cartridge tends to float back and forth in the chamber and it does not drift to the far end to rest against baffle 34. This is a particularly desirable result, as it permits the high velocity entering stream to be effective against the cartridge for a longer period than would be the case should the cartridge remain at the far end.

In operation after the shut-off body has been attached to the end of the hose, the water may be turned on at the main valve while valve 20 is still closed. The operator may then, by turning the wing handle, permit the water to flow through the chamber to give the resulting desired solution as needed.

When not in use, the unit may be readily disassembled for cleaning if necessary, and by virtue of the transparent chamber 14 the condition of the cartridge is at all times known to the operator so that replacement may be made when necessary. In the ordinary case the solution will not drop below commercial concentration until considerably more than half of the cartridge is consumed; and this is due of course to the erosive effect of the high velocity entering stream provided by the hole 28 in the disk 26, which rapidly puts some of the cartridge in solution. The solution is then strengthened by additional amounts going into solution as the water passes slowly along the cartridge toward the exit end. As the cartridge is gradually dissipated, the erosive effect on the end diminishes somewhat as the end area decreases and average distance from the disk aperture increases, but the rate of dissolution of the cylindrical surface of the cartridge increases as a greater volume of water per unit area is available, coupled with the softened condition of the cartridge. In this way the resulting solution is held to proper commercial concentration until the cartridge has very substantially diminished.

In case it is desired to increase the durability of the threads at the ends of the cartridge barrel 14, I have provided a modified form as shown in Fig. 4. The left half of this figure is in section, while the right half is shown in elevation.

In this construction a metal adapter 62 is provided threaded internally at 64 and externally at 66. The threads 66 are of the same dimensions as the threads 12 of the barrel so that the adapter may be screwed into the threads 6 of the shut-off body 2 and, at the other end, into the threaded connecter 40 of the spray gun.

In order that the connection between the adapter and barrel may be watertight, a washer 68 or other sealing material is provided. In addition, to prevent the separation of the adapter and barrel when the latter is being unscrewed for refilling, the two may be cemented, pinned or otherwise mechanically secured.

Having thus described my invention, I wish it to be distinctly understood, however, that the particular form I have disclosed is illustrative only and I do not intend to be limited thereby but only by the appended claim.

I claim:

In a sprayer of the character described, a readily detachable and refillable cartridge chamber comprising a tubular body member of a transparent material, the wall of said body member having portions of substantial thickness at each end of the body member to provide reinforced end portions of substantial strength, the portion of the wall of said body member intermediate said end portions being of reduced thickness to facilitate viewing the interior of said chamber through the wall of the body member, said body member being threaded adjacent said reinforced end portions to provide for attaching said cartridge member to spray apparatus, and an apertured baffle in one end of said body member integrally attached to the body wall adjacent one of said reinforced end portions, the other end of said body member being substantially open and unobstructed.

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