

July 30, 1963

A. M. LYNN  
SPRAYING DEVICES

3,099,394

Filed April 27, 1961

2 Sheets-Sheet 1

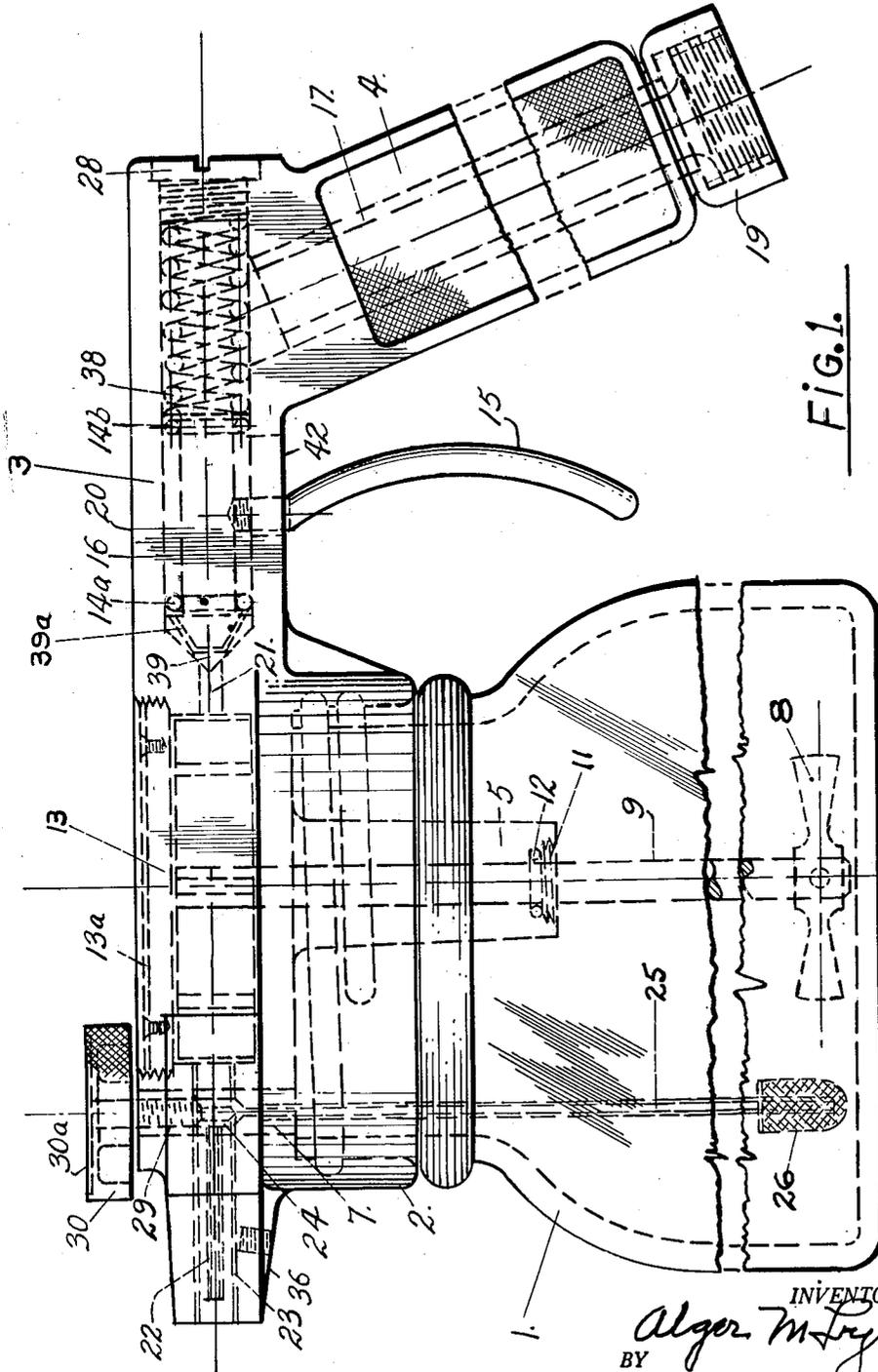


FIG. 1.

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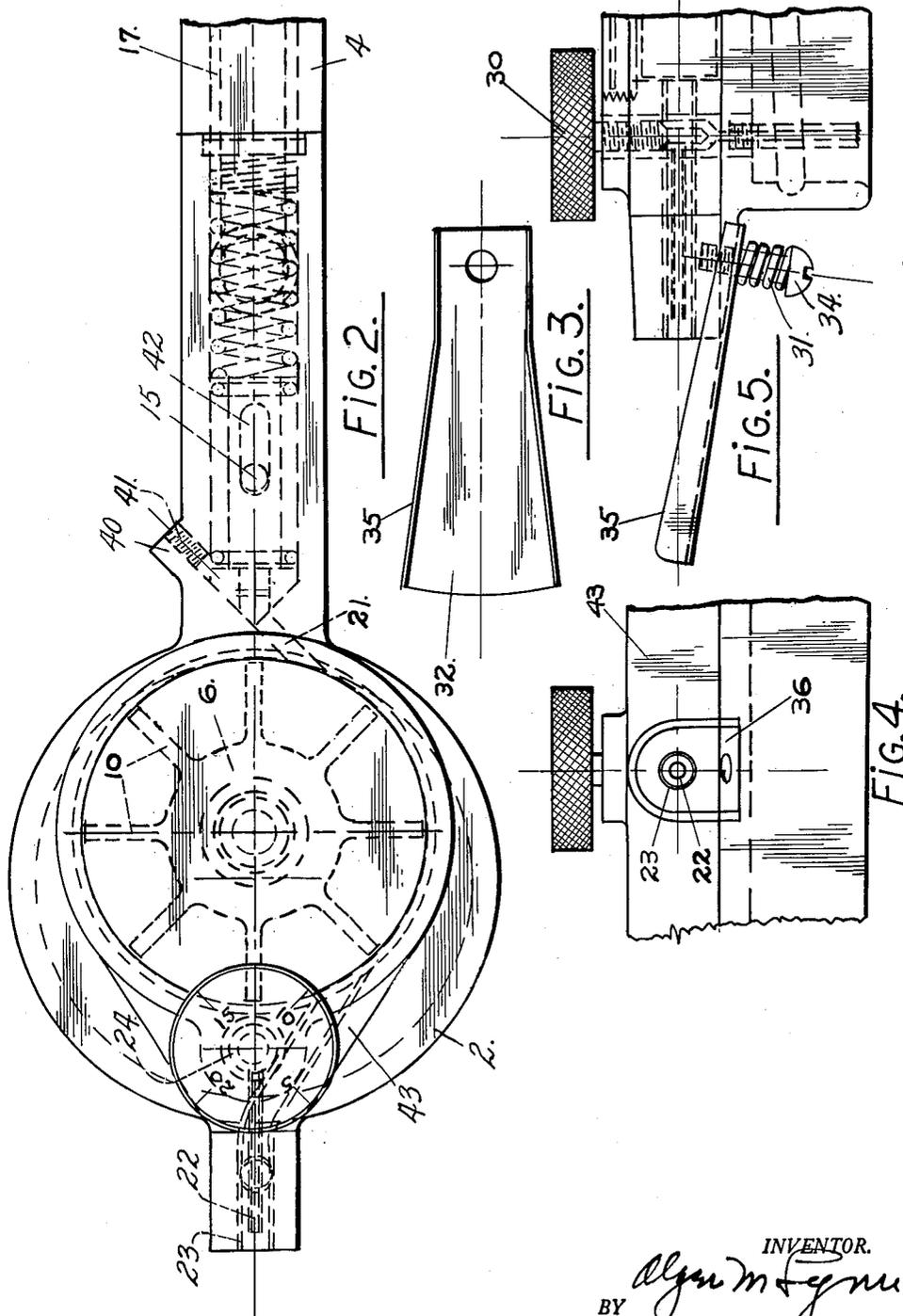
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**SPRAYING DEVICES**

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5 Claims. (Cl. 239-142)

My invention relates to spraying devices and particularly to a portable turbojet spraying device actuated by high pressure water for applying insecticides, nutritional and other spray materials to growing plants. An object of the invention is to provide novel agitating means for maintaining insoluble materials in suspension in a fluid and jet spraying it from a portable container by water pressure. Another object is to provide a metering means on the sprayer for controlling the concentration of the material being sprayed. Another object is to provide the sprayer with a jet diffuser which may be rendered inoperative when so desired. Other objects and advantages will appear more fully from the following description when taken in conjunction with the accompanying drawings in which—

FIG. 1 is a side elevation disclosing a preferred embodiment of my invention.

FIG. 2 is a plan view of my device shown in FIG. 1 though all of the underlying structure of FIG. 1 is not shown in FIG. 2 as to do so would unnecessarily complicate the plan view.

FIG. 3 is a plan view of the jet diffuser plate.

FIG. 4 is a partial end view showing the jet orifice with the aspirator tube, described later, axially mounted therein.

FIGURE 5 shows the jet diffuser mounted in operative position on the jet structure of the sprayer.

Referring now to the drawings in which like reference numerals designate the same parts throughout the several views, FIG. 1, 1 designates a container of glass, plastic or other suitable material for holding a concentrated spray solution or mixture of any desired composition. This container has an upper neck portion which is threaded into a frame or cover 2 having an integral extending arm 3 and a sloping handle 4 integral with arm 3 as shown. This handle provides a convenient means for holding and manipulating the sprayer when in use.

Threaded cover 2 has a horizontal circular casing integral with it mounted on its upper surface. This casing encloses downward through bearing 5 into the lower part of container 1. When the sprayer is in operation shaft 9 and agitator 8, mounted thereon, are rapidly rotated by the rotor and the liquid contents of container 1 are thus agitated so that insoluble materials therein are maintained in suspension thus providing a mixture of uniform composition for spraying. The driving rotor consists of a thick disc 6 and a plurality of radial blades 10 integrally mounted around the periphery as shown in FIG. 2. When the sprayer is operating a jet of high pressure water from channel 21 impinges on the blades 10 thus rotatively driving the rotor and shaft 9 and agitator 8. To prevent leakage of high pressure water through bearing 5 from the rotor casing I provide an O ring or other suitable water tight seal 12 which is held in place by retainer ring 11, FIG. 1. When the sprayer is operating the rotor case is filled with high pressure water which escapes through tube 23 as a jet stream containing spray material from container 1 which may be applied to growing trees or shrubs as such or may be diffused into a finer spray by use of the jet diffuser, FIGURES 3 and 5, as will be explained later. Jet tube 23 is bent in a smooth curve to avoid index screw housing 7 and to reduce turbulence in the stream flowing through it. Tube 23 has axially located in it a smaller diameter aspirator tube 22 which

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extends through the outer convex wall of tube 23 as shown and into the annular space 24 in the index valve body 7. The high pressure water escaping through tube 23 induces a vacuum in aspirator tube 22 and in space 24 into which concentrated spray solution is drawn from container 1 through screen 26 and tube 25. This spray material is drawn out through tube 22 into the water jet in tube 23 which dilutes it to the proper concentration for application to the plants being sprayed.

The ratio of concentrated spray material entering the water jet may be adjusted by turning the calibrated index wheel 30 which is integrally mounted on screw 29 which has a downwardly extending reduced diameter portion with tapered end, as shown in FIG. 1, which enables the opening from tube 25 into the annular space 24 in valve body 7 to be varied.

High pressure water is supplied to the sprayer by attaching a hose to the threaded ferrule 19 from which tube 17 conducts the water to the longitudinal channel in arm 3 in which a trigger operated control valve is located. This control valve consists of a hollow cylinder 16 slidably mounted in the channel in arm 3. Mounted at the rotor or inner end of cylinder 16 is a triangular bridge piece 39a on the apex of which is mounted a conical shaped resilient valve sealing part 39 which, when the sprayer is inoperative, is pressed into the mouth of jet channel 21 by the pressure of the water and spring 38. This valve is opened by pulling trigger 15 which is integrally attached to cylinder 16, toward handle 4. Slot 42 in the bottom of the wall of arm 3 permits movement of trigger 15. To prevent leakage of high pressure water along the outer surface of cylinder 16 and into slot 42 I mount an O ring or other suitable seal at each end of cylinder 16 as shown. These are shown as parts 14a and 14b. The outer end of the water channel in arm 3 is sealed by screw plug 28. Jet channel 21 which provides the water jet to drive the rotor may be made in arm 3 either by drilling after the sprayer body is plastic molded or it may be produced during the molding operation. The outer end of channel 21 is sealed by screw plug 41 mounted in lug 40 as shown in FIG. 2. The underside of the main jet housing is a flat sloping surface 36 as shown in FIGURES 1, 4 and 5. FIG. 3 is a plan view of the diffuser plate 32, the edges 35 of which extend upward as shown to confine the edges of the sheet of spray liquid to the flat surface of the plate. This diffuser plate is mounted on and held in contact with surface 36 by screw 34 and spring 31 as shown in FIG. 5. When the diffuser plate is located in front of the jet orifice as shown in FIG. 5 it is in operative position and spreads the jet of spray liquid issuing from the jet nozzle into a flat sheet of liquid which breaks into spray as it is driven off the forward edge of the plate. The jet diffuser may be rendered inoperative when desired by pressing it downward against spring 31 until the side flanges 35 are below the surface 36 when the diffuser plate may be turned through an angle of 90 degrees out of the path of the jet stream.

A preferable embodiment of my invention would be to mold the collar 2, arm 3, the rotor housing and handle 4 from a plastic molding material making all the above parts integral as a single molding. The rotor and rotor housing cover 13 might also be a plastic molding. Mounted on the upper surface of rotor housing cover 13 is a circular nameplate 13a. Index valve housing 7 with tube 23 and aspirator tube 22 could be made as a metal assembly into a unit which could be positioned in the molding die and embedded in position by molding plastic material around them.

It is obvious that many changes and modifications of my design may be made without departing from the principles of my invention. Thus various designs of wa-

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ter motor may be used and the index valve shown might be omitted and the sprayer built with a fix-ratio of spray material from container 1 to the quantity of water issuing from the main jet, such ratio being a function of the relative diameters of the tubes 22 and 23. Other variations and modifications of the design shown may be made without departing from the essential elements of my invention, which is to be limited only by the scope of the appended claims.

I claim:

1. In a sprayer, a container for receiving a suspension of matter, a cover on said container having a passageway therethrough terminating at one end in a nozzle for projecting water flowed through the other end, said cover having a chamber intersecting said passageway, a rotor mounted in said chamber for rotation by the flow of water, an agitator positioned within said container and connected to said rotor for imparting a turbulence to the entire suspension in said container, aspirator means within said cover and positioned within said passageway between said chamber and said nozzle, and a tube extending from said aspirator means into said suspension in said container.

2. In a sprayer as defined in claim 1 having an arm projecting from the cover and having an elongated trigger slot, a handle depending from the end of the arm, said arm having a passageway communicating with the trigger slot and with the passageway leading to said chamber, said arm passageway being larger in diameter than the chamber passageway, a hollow cylinder slideably mounted in said arm passageway, a bridge member mounted on the end of the cylinder, a resilient cone member mounted on said bridge, means for urging the cylinder toward the cover to position the cone in the chamber passageway, a trigger connected to said cylinder for moving the cylinder to advance the cone member from said chamber passageway, and a seal positioned about the cylinder to preclude the passage of water to the trigger slot.

3. In a sprayer as defined in claim 1 wherein said aspirator means includes a cavity formed in said cover, a tube running from said cavity and extending axially into the passageway between said chamber and nozzle, a tapered member mounted in the cover for movement into said cavity, and means for moving said member into and out of the cavity to vary the affect of the aspirator means.

4. In a sprayer, a container for a suspension to be mixed with water, a cover for said container having a chamber formed therein, a rotor mounted in said chamber for movement by an impinging stream of water, an

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agitator mounted on said rotor and projecting through said cover into said container for imparting a turbulence to the entire suspension, said cover having a first passageway leading into said chamber for receiving a flow of water and impinging said flow onto said rotor, said cover having a second passageway leading from said chamber to an exit orifice, an aspirator means in said second passageway and rendered ineffective upon a flow of water in said second passageway, and a tube running from said aspirator means into the suspension in said container for conveying a stream of said suspension into said second passageway.

5. In a sprayer, an open top container for receiving a liquid suspension of matter, a cover on said open top of said container having a circular chamber, a rotor positioned in said chamber and having radiating blades terminating adjacent the inner circumferential wall of said chamber, a shaft attached to and extending down from said rotor through said cover and into said container, a plurality of agitator blades projecting from the lower section of said shaft for imparting a turbulence to the entire suspension in said container, a nozzle projecting from said cover having a passageway communicating with said chamber at an angle with respect to the circumference of said chamber, said cover having an aspirator cavity between said nozzle and said chamber, a first tube axially positioned within said nozzle and having a section terminating in said cavity, a second tube positioned within said container and extending through said cover into said cavity, said cover having a second passageway in line with said nozzle and having a section communicating with said chamber at an angle with respect to the circumference of said chamber for projecting a flow of water into said rotor blades.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,099,394

July 30, 1963

Alger M. Lynn

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 8, for "ineffective" read -- effective --.

Signed and sealed this 4th day of February 1964.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWIN L. REYNOLDS

Acting Commissioner of Patents