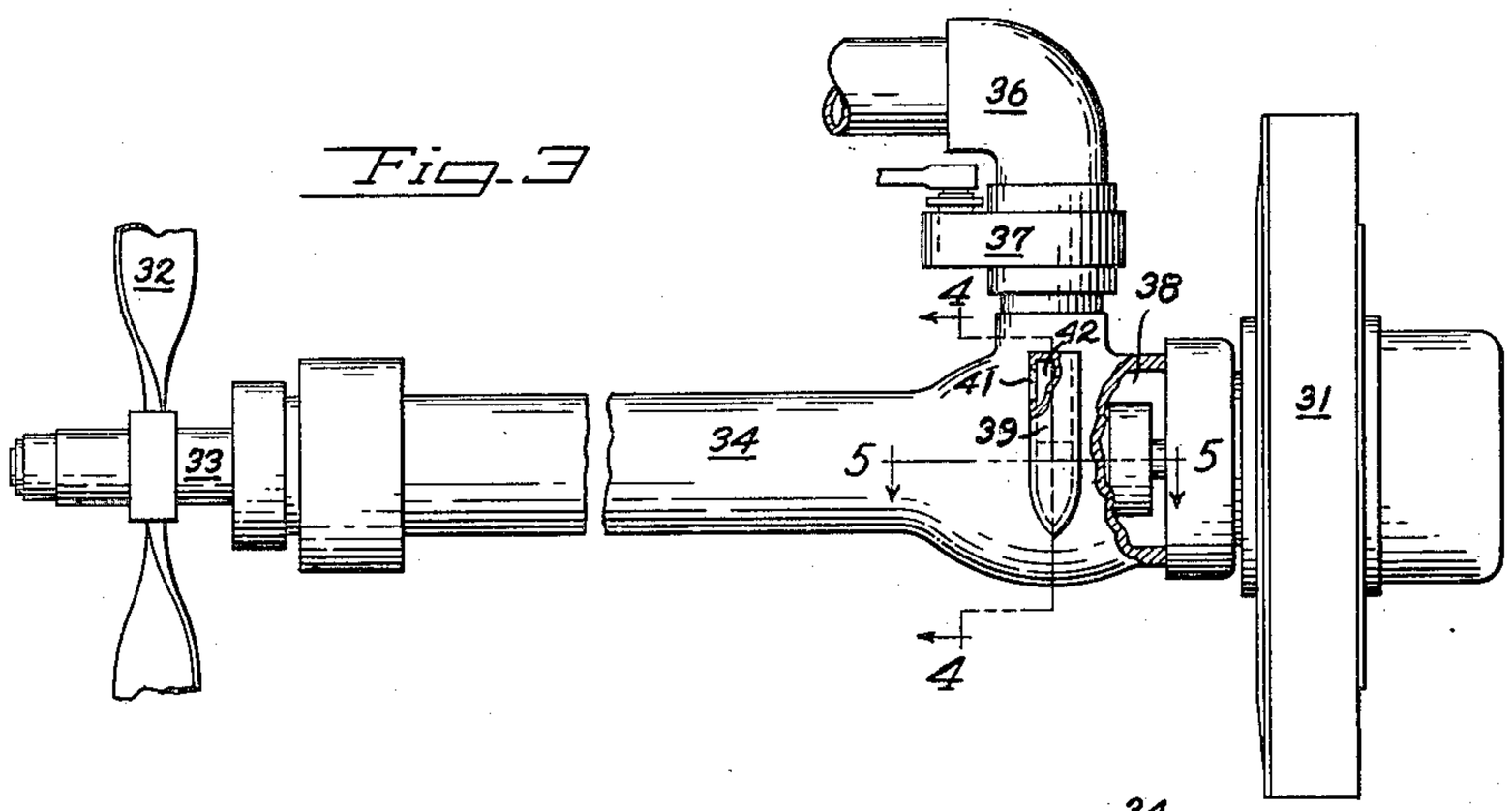
Jan. 6, 1953 M. S. ROBERTSON 2,624,615

SPRAY APPARATUS

Filed June 30, 1950

Fig. 3



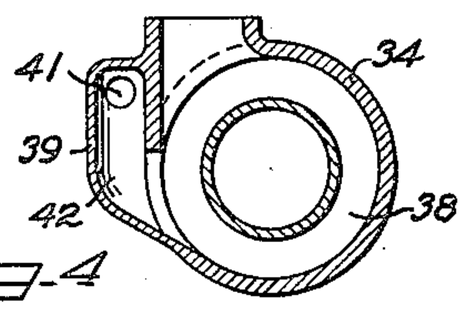


Fig. 4

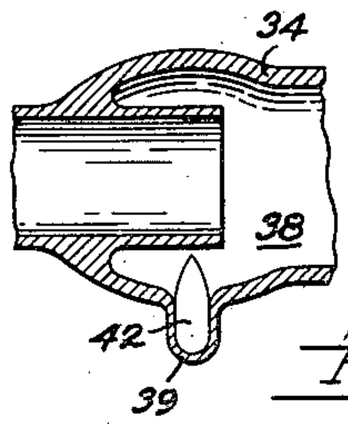


Fig. 5

Fig. 2

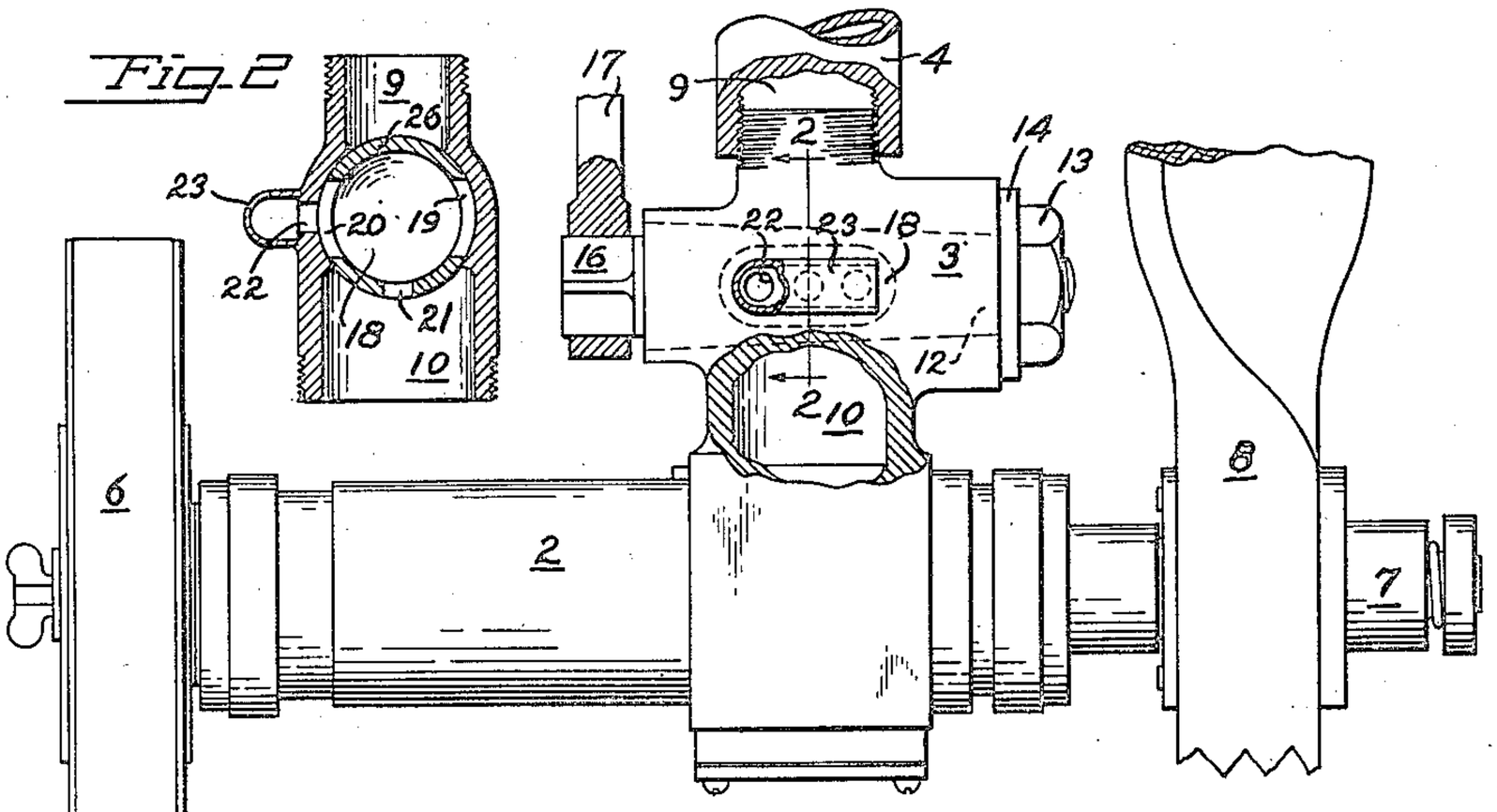


Fig. 1

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SPRAY APPARATUS

Milton S. Robertson, Campbell, Calif.

Application June 30, 1950, Serial No. 171,385

1 Claim. (Cl. 299—30)

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My invention relates to apparatus for spraying liquid from airplanes and the principal object of my invention is to provide means by which air may be introduced into the body of spray liquid shortly before its passage into the spray forming head.

My invention has other objects and features of value, some of which with the foregoing will be set forth at length in the following description of my invention. It is to be understood that the invention is not limited to the forms shown in the drawings since the invention may be embodied in different forms as recited in the claim.

Referring to the drawings: Figure 1 is a side elevation of my spray apparatus, partly in section and with parts broken away to reduce the size of the figure. Fig. 2 is a vertical sectional view taken in the plane 2—2 of Fig. 1. Fig. 3 is a view similar to Fig. 1, but showing another embodiment of my invention. Fig. 4 and Fig. 5 are respectively vertical and horizontal sectional views taken in the planes 4—4 and 5—5 of Fig. 3, only the body shell being shown.

In recent years the spraying of orchards and field crops from airplanes has achieved major importance in the never ending fight against insect and other pest infestations. Close control of the liquid spray material has always been highly desirable, but with the advent of extremely powerful and poisonous insecticides accurate control has become essential.

The flow of spray liquid to the spray head can of course be stopped by suitable valve means in the supply passage, but means are needed for close control of the liquid which remains in the passage end after the closing of the valve, because with modern sprays, it is highly desirable, if not absolutely necessary, to limit the sprayed area with great accuracy. I have found that by introducing air into the passage after the flow of liquid has been cut off, the passage and spray head may be cleared almost instantly, whereas in the unvented passage, clearance may require up to five seconds.

Another effect of introducing air into the liquid passage during a spraying operation is an increased fineness of spray which is very desirable under some conditions, although coarser or heavier spray is also desired under other conditions. My apparatus therefore gives a choice of fine or coarse spray as well as means for terminating the operation in a burst of fine spray practically instantaneously.

In Fig. 1, I have shown a standard spray unit in which a body 2 including a valve housing 3 is

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mounted by means of a heavy feed pipe 4 on the wing of an airplane. A spray or atomizing head 6 fixed on one end of the shaft 7 is driven by the propeller 8 fixed on the other end. The shaft is journalled in the main portion of the body; and spray liquid flows into the body from the feed pipe, entering the passage 9 above the valve housing, thence into the passage 10 which extends through the body to the spray head 6 which atomizes and throws it into the air.

Arranged in the valve housing portion 3 of the body is a slightly tapered valve 12 of the plug valve type. The plug is secured snugly in the housing in the usual way, with a nut 13 and washer 14 on the small end, the larger end 16 being squared for the control lever 17, suitably connected for selective movement by the operator.

The center portion of the plug is formed with a chamber 18, oppositely disposed ports 19 and 20 piercing the walls and permitting free flow through the passage 9 when the plug is turned to a position 90° from that shown in Fig. 2. Also piercing the wall of the valve chamber on one side are three small aligned ports 21, positioned midway between the ports 19 and 20, and adapted to be placed in register with the housing ports 22, inside the scoop 23, which opens forwardly toward the propeller and in the direction taken by the plane in flight.

As shown in Fig. 2, flow of spray liquid through the valve and passage 10 has been cut off; and air from the scoop is flowing through the aligned ports 22 and 20, thence through the ports 21 into the passage 10. In this position of the valve, spray liquid in the passage 10 when the valve was turned to shut off the flow from the feed pipe, is rapidly forced to the spray head, the entire passage being cleared in the fraction of a second after closing of the valve.

When it is desired to admit air into the flowing spray liquid, the handle 17 is turned to register the port 20 in the larger passage 9, and the port 19 in the larger passage 10; and the ports 21 with the equal size ports 22, in more or less degree to give the effect desired, which can be observed by the operator. A full opening produces the finest atomization and the largest increase in volume of spray liquid distributed per unit of time.

When conditions require a less finely atomized spray, the valve is turned to close the ports 22 with the unported wall 26 of the valve chamber, and align the ports 19 and 20 in the passages 9—10 respectively.

Thus the valve may be turned to permit full flow of spray liquid without introduction of any air; or to cut off the flow of liquid while admitting air to scavenge the passage and spray head; or to admit air in controlled amounts into the flowing stream of the liquid.

In Figs. 3, 4 and 5, I have shown a modification of the structure just explained, using the spray apparatus of my Patent No. 2,090,950. The spray head **31** is driven by the propeller **32**, both being mounted on a shaft **33**, journaled in the hollow body **34**, which receives spray liquid through the feed pipe **36**, controlled by the valve **37**. In this case the valve is wholly independent of the air intake and merely controls the flow of spray liquid into the passage **38** leading to the spray head.

On the side of the body **34** at the point where the spray liquid enters, an air scoop is arranged to feed air tangentially into the passage. Preferably the scoop is formed by a vertically arranged elongated blister **39**, cast integrally with the body, and having an aperture **41** in the leading side near the top, and the enclosed chamber **42** opening at an angle into the bottom of the liquid passage as best shown in Figure 4.

The aperture **41** remains open at all times, contributing air to the stream of spray liquid flowing to the spray head, and scavenging the

passage of all liquid when the flow is cut off by the valve **37**.

I claim:

A spray apparatus comprising a rotary spray head, a body on which the spray head is journaled and having a passage through the body through which spray liquid flows to the spray head, a valve housing in said body and enclosing a feed passage opening into said body passage, an aperture in the valve housing and opening into the feed passage, an air scoop on the valve housing around the aperture, and a valve in the valve housing to control simultaneously the flow of spray liquid through the feed passage and the flow of air from the scoop through said aperture to the feed passage.

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The following references are of record in the file of this patent:

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