

Oct. 25, 1932.

O. P. YOST

1,884,485

SPRAY GUN

Filed Dec. 31, 1929

Fig-1



Fig-2

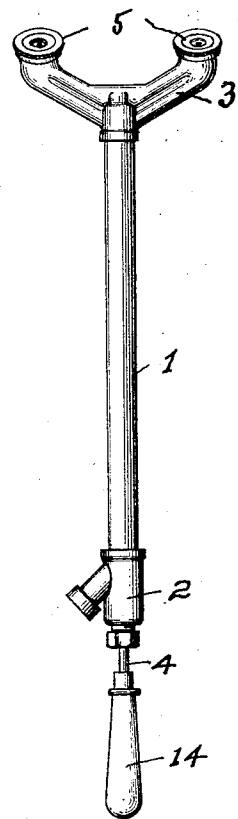


Fig-3

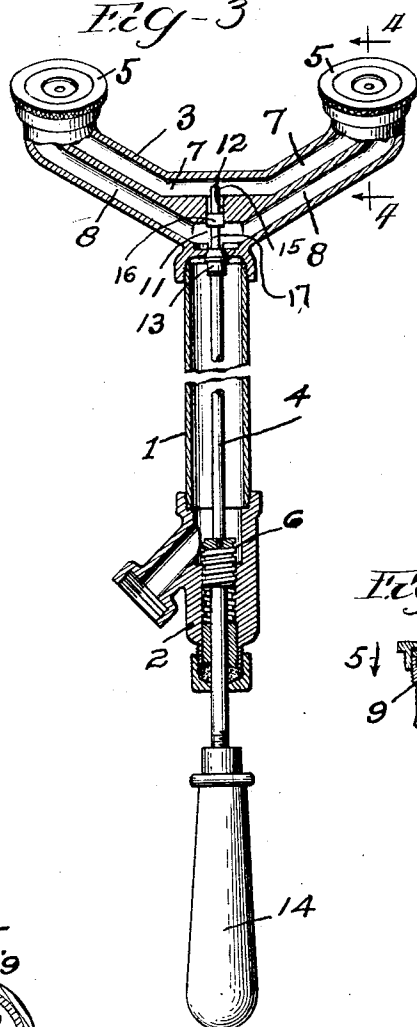


Fig-4

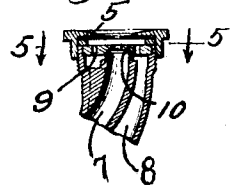
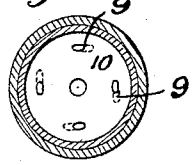


Fig 5



Inventor
Oliver P. Yost
By: *W. H. Maham*
Sittly.

UNITED STATES PATENT OFFICE

OLIVER P. YOST, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO FOOD MACHINERY CORPORATION

SPRAY GUN

Application filed December 31, 1929. Serial No. 417,733.

This invention relates to improvements in spray guns and nozzles therefor and particularly to improvements on the spray devices of the type shown in the Boyce Patent 1,432,958 dated October 24, 1928.

The improvements relate in particular to the angularity of the spray nozzles relative to the gun proper; the making of the spray head in one piece of cast material instead of being built up of piping and fittings as is shown in the Boyce patent; and also to the construction of the valve stem.

It has been found in using the Boyce device that the spray head made up of fittings is rather difficult and expensive to manufacture and have everything line up nicely for final assembling, also that the spray nozzles should be set at an inclination of about 40° to enable the operator to spray on the under sides of leaves and plants and to assist in reaching all parts of a tree. Heretofore the valve stem has been made of one long piece with the spiral soldered thereto and it caused no end of trouble on account of the spiral coming loose and thus putting the gun out of use until repaired. The spray head made of fittings developed leaks while in use which interfered more or less with efficient operation.

It is therefore an object of the invention to provide a spray device having a spray head made of a single casting.

It is a further object of the invention to make a spray device having a plurality of spray nozzles inclined at an angle from the axis of the stem thereof in two different directions.

It is a further object of the invention to provide a valve stem of improved construction and efficiency.

With such objects in view as well as other advantages which may be inherent in the invention, consisting in the parts and combinations hereinafter set forth and claimed, it is understood that the several necessary elements and combinations constituting the same may be varied in their proportions, placement and general arrangement without departing from the nature and scope of the invention. In order to make the invention more clearly understood there are shown in

the accompanying drawing, more or less diagrammatically, the preferred means and mechanism for placing the same in concrete form, without limiting the improvements in their applications to the particular construction chosen to illustrate the invention.

Referring now to the drawing Figure 1 is a side elevation of the complete spray gun showing the 40° inclination to the spray nozzles.

Figure 2 is a plan of Figure 1, showing the manner of inclining the spray nozzles in two different directions relative to the longitudinal axis of the gun.

Figure 3 is a similar view to Figure 2 but on a larger scale and making it a sectional view to clearly show the interior construction of the gun.

Figure 4 is a detail taken on approximately the line 4-4 of Figure 3 showing the construction of the spray nozzle.

Figure 5 is a plan view of the spray nozzle of Figure 4 showing the inclination of the holes to produce a swirling spray when the valve stem is set in a certain position.

1 represents the main tubular body of the spray gun. 2 a connection at the handle end to which a hose may be attached to deliver spray material to the gun, the hose is not shown, but is of the ordinary and well known type used for this purpose. 3 represents the one piece spray head which is here shown in one type of solid construction. 4 represents the valve stem secured to a spiral 6 that forms a part of the handle section, and 5 represents the spray nozzles or heads which are here shown as knurled screw on caps, it is understood of course that these heads may be of hexagon shape as well, or any other shape desired.

In the manufacture, sale and use of the Boyce gun referred to more or less trouble has been experienced by the users in having leaks develop in the pieced up spray head; the joints are hard to make tight and maintain tight in operation, and the conduits are more or less restricted at times on account of spelter getting in during the brazing operation, or if screwed together cracks are left at the joints to gather residue and gradually

restrict the openings. By making the spray heads in one piece the difficulties are overcome at one stroke and a very efficient reliable and durable spray gun produced.

The Y part of the spray head is on the same plane as the longitudinal axis of the gun while the heads are set at approximately an angle of 40° thereto to enable the operator to project the spray material on the under sides of low lying plants without stooping or turning the entire gun sideways in order to try to get the spray where wanted. By setting the spray heads at the 40° angle it is seen that the head as a whole has two different angles relative to the axis of the gun or the tube 1, which has the advantage of placing the nozzles far enough apart to cover a considerable area with whirling spray and of also getting under the leaves or in otherwise inaccessible places in the trees.

In the drawing I have shown a comparatively short gun but it may be lengthened considerably without becoming unwieldy if thought desirable.

The valve stem in the Boyce gun as has been stated has always been made of two pieces joining them at the screw section 6 by either soldering or brazing but it has been very difficult to make a joint that would stand the constant strain of manipulating the valve while in operation without coming loose.

It will be observed that there are two separate conduits in the spray head 5, the conduit 7 leads to the center opening of the spray nozzle which throws a long thin stream when it is desired to reach high places while the conduit 8 leads to the angularly disposed holes 9 in the disk 10 inside of the nozzle. The end 11 of the valve stem 4 prevents spray material from entering the conduit 7 when in the position shown in Figure 3 and will continue so to do as long as it is entered in the port 12. This permits moving the valve 13 from its seat to admit spray material to the head without letting it get into the conduit 7, so that only when the part 11 is completely withdrawn from the port 12 will the spray enter the conduit 7 and issue as a thin stream in addition to the whirling spray from the other holes 9 in the spray nozzles.

The adjustment of the sprays is controlled by the handle 14 always within easy reach of the operator and when once set for a certain condition of operation it may be released and the adjustment will remain until actually changed by a turning of the handle.

Referring further to the construction of the valve stem it will be seen by reference to Figure 3 that in the present construction the spiral which was formerly soldered to the stem is now made integral with the handle section of the stem and the inner section of the stem carrying the valves proper is screwed into this spiral section. In oper-

ation considerable strain is applied to the spiral in closing the valves and with the soldered construction referred to the spiral was continually coming loose and causing delay for repairs. With this improved construction, however, with the spiral an integral part of the handle section as much pressure may be applied as desired without loosening anything. The spiral 6 as will be seen is larger in diameter than formerly so that it is better able to stand added pressure and will wear much longer. The diameter of the spiral is sufficient to permit of removing the entire valve stem from the handle end of the gun for such repairs as may be needed, in other words the diameter of the spiral 6 is greater than the valve head 13 so that the valve head 13 will pass through the opening in the handle end of the gun through the part 2. This is a very desirable feature to enable quick removal for cleaning or refacing the valve and seat.

The extreme end of the valve stem has also a very important improvement in the particular shape disclosed. It will be noted that the extreme end of the stem has a reduced extension that extends into the port 12 as shown at 15, while the portion 16 acts as a closure for the port 12 unless the spiral is turned down sufficiently to draw the portion 16 out of port 12 when solution will enter and pass through the conduits 7 and produce the long thin stream. It will also be noted that there is a reduced portion on the stem 4 between the portion 16 and the main valve 13 as at 17. The reduced portions 15 and 17 are for the purpose of distributing the solution substantially equally in the conduits 7 and 8 so that each nozzle will receive about the same quantity and thereby more nearly throw the same spray. If the conduits 7 and 8 of applicant's structure are restricted in any manner by the breaking down of a core or through a displacement of the sand constituting the mold in which the parts are cast, he can most readily compensate such condition by changing the diameters of the pilot members 15 and 17 in the testing of the guns during manufacture, which members may be filed or ground off until the proper flow of liquid to the nozzles is obtained. The manner in which the flow of liquid is equalized by the extension 15 and the reduced portion 17 of the valve stem is through a properly proportioned retardation of the flow into the channels 7 and 8. It has been found that where only one restriction is present as in prior devices the liquid under the pressures used tends to flow too freely into the channel 7 but by providing the pilot extension 15 there is just enough retardation to the flow to equalize the flow into the two channels 7 and 8. This arrangement adds materially to the efficient operation of the device.

The spray disk 10 is also made in an im-

proved form. It will be seen in Figure 4 that the disk 10 has a central bevel counter-bore that seats on a beveled nozzle at the end of port 7.

Having described my invention, I claim as follows:

1. A spray device for spraying insecticides or fungicides on plants and trees comprising a spray head of one piece construction and having a plurality of limbs each provided with a plurality of conduits, and spray nozzles disposed on the ends of said limbs, a valve stem for controlling the admission of spray material into said plurality of conduits consisting of a seat member for cutting off admission of spray material to all of said conduits, another portion on said stem for cutting off admission of spray material to one of said conduits and reduced portions as a part of said stem for restricting the inlets to said conduits and thereby effect a more even distribution of spray material thereto, when both admission inlets are open for the flow of spray material.

2. A spray device for spraying insecticides or fungicides on plants and trees comprising a spray head of one piece construction and having a plurality of limbs each provided with a plurality of conduits, with spray nozzles disposed on the ends of the limbs, separate ports for admitting spray material to each of said conduits, a single valve stem for controlling the flow of material to each of said ports, portions on said valve stem for remaining in said ports at all conditions of operation to offer a proportioned retardation to the flow of material through said ports to thereby effect a more equalized flow to the several conduits.

In testimony whereof I affix my signature.

OLIVER P. YOST.