Oct. 16, 1934. F. C. NELSON 1,976,799

SPRAY NOZZLE

Filed March 19, 1932 3 Sheets-Sheet 1

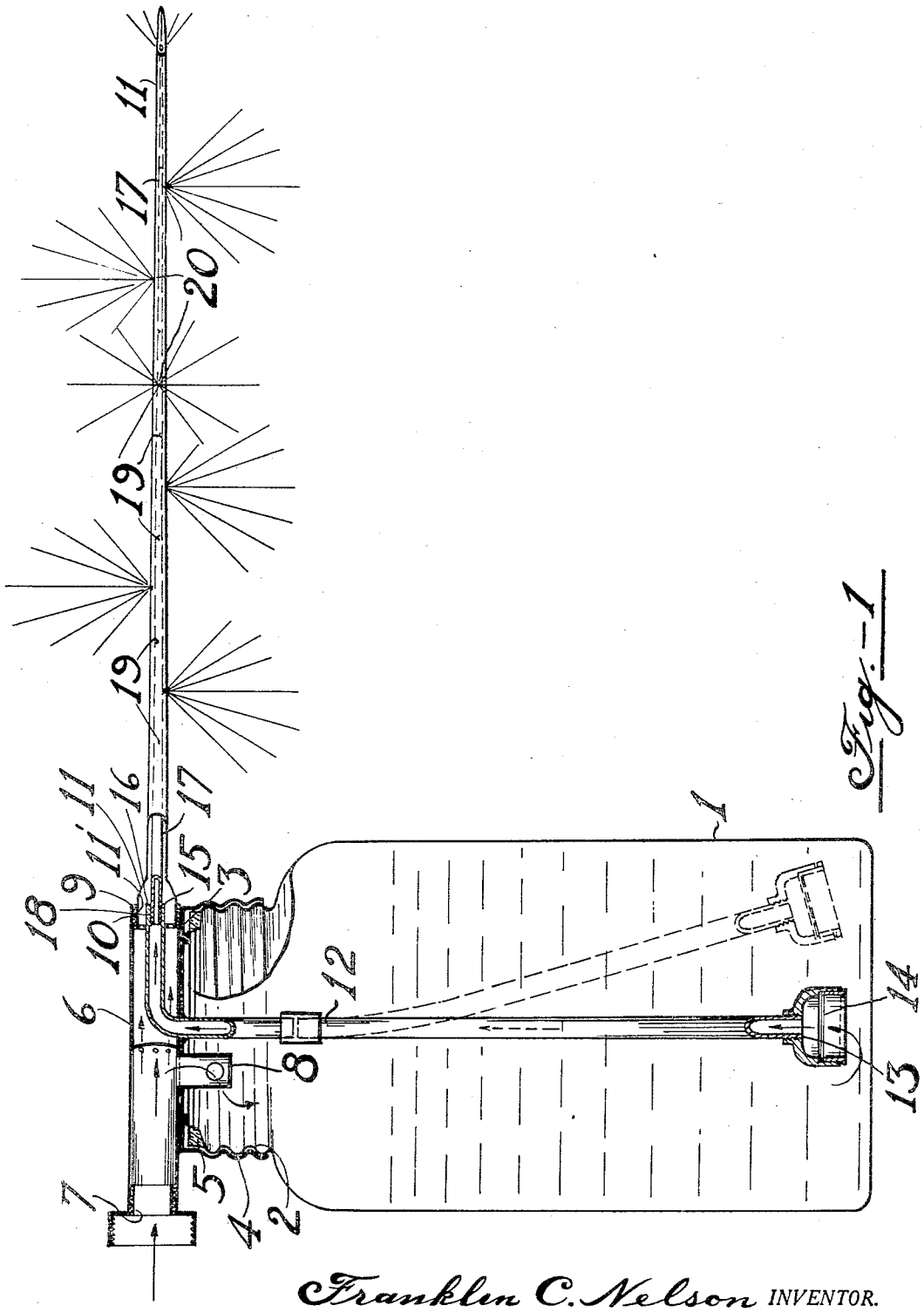


Fig. 1

Franklin C. Nelson INVENTOR.

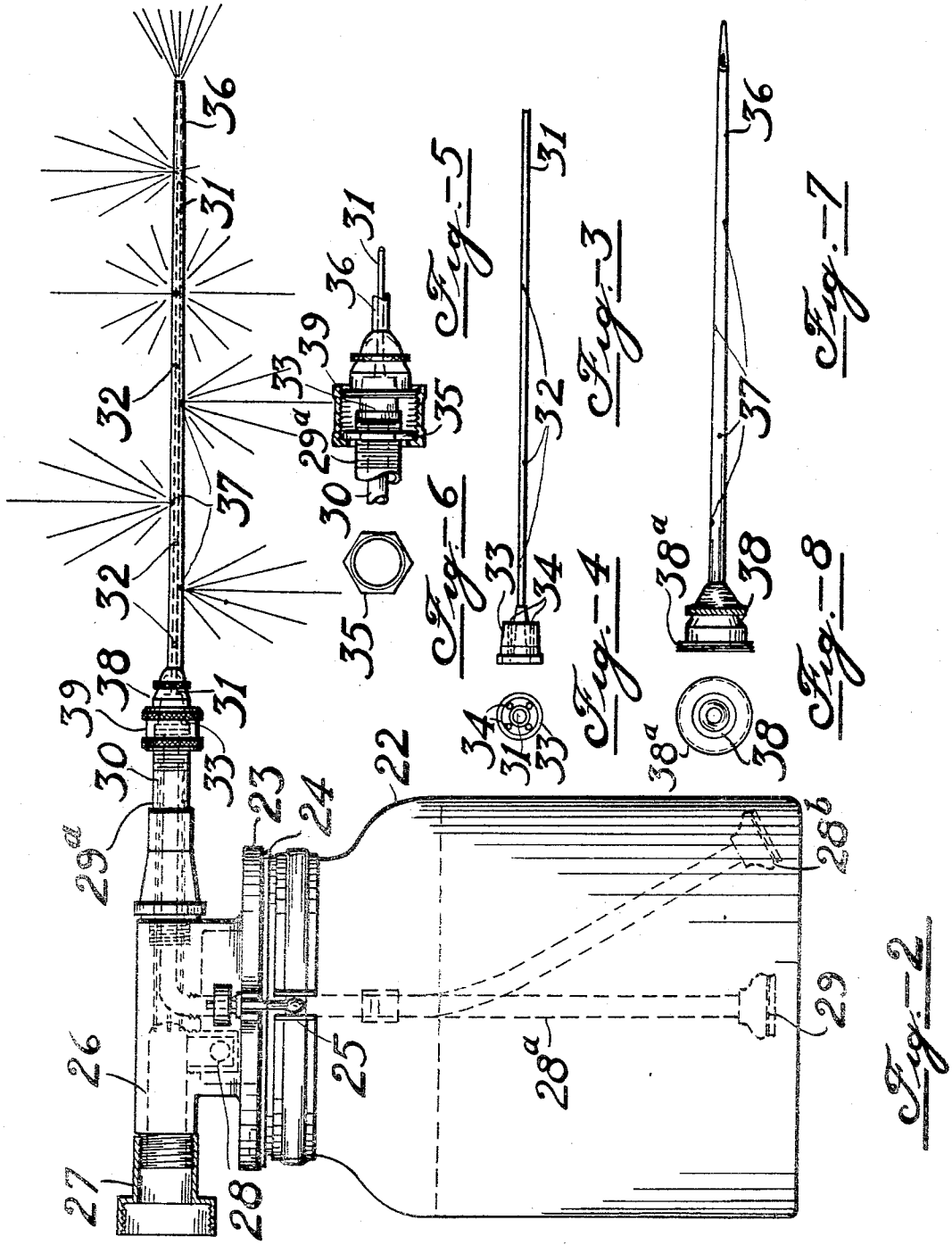
BY

W. E. Currie ATTORNEYS.

Oct. 16, 1934. F. C. NELSON 1,976,799

SPRAY NOZZLE

Filed March 19, 1932 3 Sheets-Sheet 2



Franklin C. Nelson INVENTOR.

BY

W. E. Currie ATTORNEYS.

Oct. 16, 1934. F. C. NELSON 1,976,799

SPRAY NOZZLE

Filed March 19, 1932 3 Sheets-Sheet 3

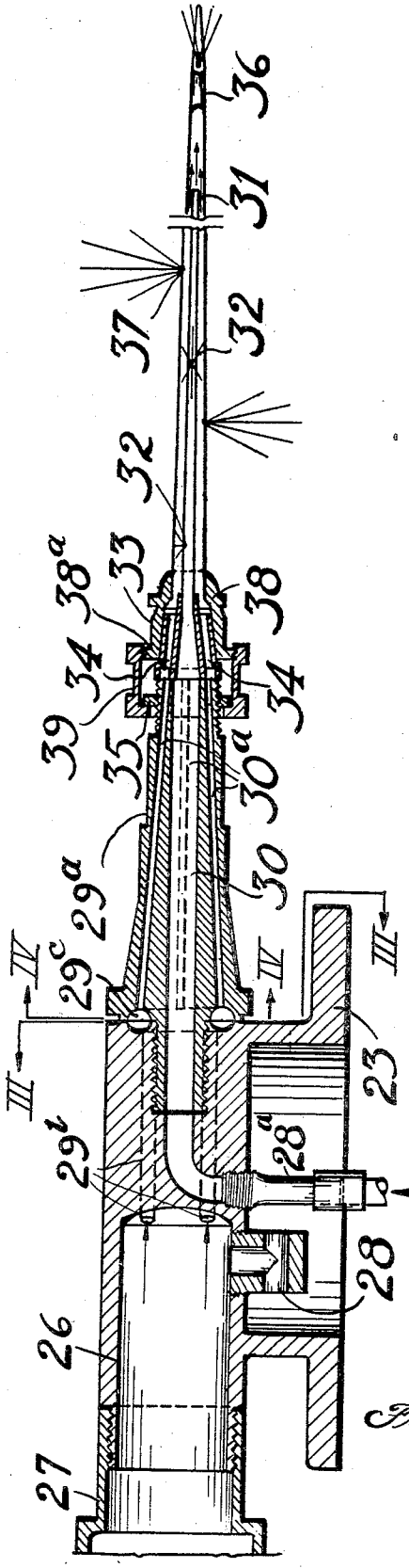


Fig.-9

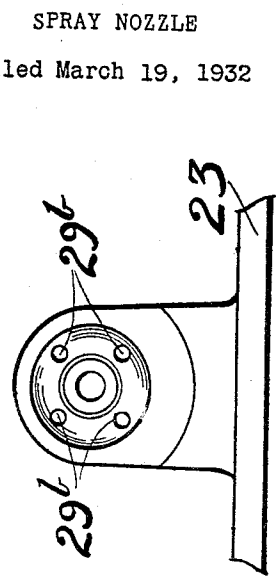


Fig.-12

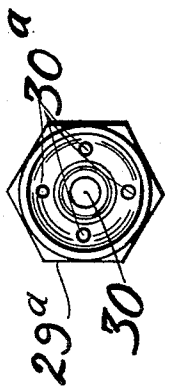


Fig.-13

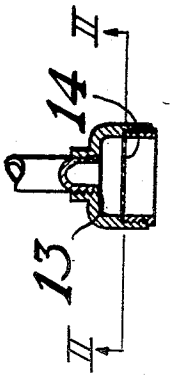


Fig.-11



Fig.-10

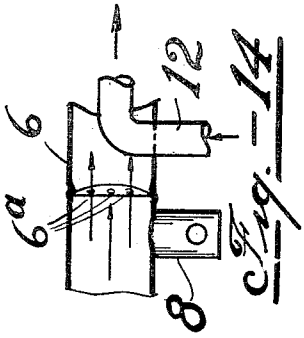


Fig.-14

Franklin C. Nelson Inventor

W. E. Currie Attorney

Patented Oct. 16, 1934

1,976,799

UNITED STATES PATENT OFFICE

1,976,799

SPRAY NOZZLE

Franklin C. Nelson, Roselle, N. J., assignor to Stanco Incorporated, a corporation of Delaware

Application March 19, 1932, Serial No. 599,862

3 Claims. (Cl. 299—89)

This invention relates to a spraying device or atomizer and has for its object the utilization of a single structure for the delivery of sprayed or atomized liquid at a plurality of points.

A particular object of this invention is to provide a long pointed needle-like delivery tube thereby making it possible to insert it into a material such as over-stuffed furniture, mattresses, bags of wool, automobile seats, Pullman seats, grain in bags and in storage bins where grain or other stored products are stored loosely, hair padding used for furniture manufacture or other similar types of places where a more complete penetration is necessary than is accomplished by surface spraying.

Another object of this invention is to deliver the atomized liquid at a plurality of points inside the material so that the porous spaces will be filled with the vapor, thereby treating a greater area than would be treated with a surface spray or solid stream treatment. This method of treatment is particularly adapted for controlling clothes moths, carpet beetles, bed bugs, cigarette beetles, etc.

A further object of this invention is to provide a greater spread of the atomized liquid when sprayed in a room to kill flies, mosquitoes, etc.

Other objects and advantages will be fully understood from the following description taken in connection with the accompanying drawings in which latter:

Fig. 1 is a sectional side elevation view of one form of apparatus suitable for carrying out the invention;

Fig. 2 is a side elevation view of a modified form of the apparatus;

Fig. 3 is a detail view of the inner conduit as shown in Fig. 2;

Fig. 4 is a detail end view of one end of the inner conduit as shown in Fig. 2;

Fig. 5 is a detail view in cross section of a coupling to hold the inner conduit in place as shown in Fig. 2;

Fig. 6 is a detail of the lock nut on outer tube;

Fig. 7 is a detail view of the outer conduit as shown in Fig. 2;

Fig. 8 is a detail end view of one end of the outer conduit as shown in Fig. 2.

Fig. 9 is a vertical section, partly broken, of the stopper as shown in Fig. 2; Fig. 10 is an end view of the screen as shown in Fig. 1; Fig. 11 is a sectional view of conduit as shown in Fig. 1; Fig. 12 is an end view of stopper taken along the lines III—III of Fig. 9; Fig. 13 is an end view of stopper taken along the lines IV—IV of Fig. 9; and Fig. 14 is a sectional view of part of the tube as shown in Fig. 1.

Referring particularly to Fig. 1 of the drawings, there is shown a container the shell of which is designated by reference numeral 1. The shell may be of any suitable material such as glass or metal. The upper part of container 1 may have a retracted neck provided with external threads 2. A stopper 3 is provided made with a hollow internally threaded cap 4 carrying a packing washer or gasket 5 and is adapted to be screwed upon the neck of container 1 to form a stopper or closure therefor.

The stopper 3 on its upper portion is provided with a conduit 6 which hereafter is known as the outer conduit. This outer conduit 6 is a cylindrical tube and extends crossways over the top of the stopper and may be either constructed as part of the stopper 3 or fastened on it by means of solder or other means. One end 7 of the outer conduit extends away from the stopper 3 and is fitted with threads for making a connection with an air line connected with a source of compressed air or other means of supplying a continuous supply of air under pressure. A pipe 8 is provided communicating between the outer conduit 6 and container and passing through the wall of the outer conduit and the top of the stopper 3. Pipe 8 serves to pass compressed air into the container from the outer conduit. A perforated disc 6a is provided in conduit 6 between the outlet 12 and inlet 8 of the container 1. Disc 6a is retained across the conduit by being set in an internal furrowed portion of the pipe 6.

The opposite end 9 of the outer conduit is fitted with threads 10 on the inside. A needle-like extension 11 of this outer conduit is provided, fitted with recessed external threads 11', adapted to be screwed into the threads 10 and making a continuous outer conduit of both members 6 and 11. Other means may be used such as soldering to join these two members of the outer conduit. The end carrying the external threads 11' is provided with an attached perforated disc having a central opening to allow the connection of pipes 12 and 17. A plurality of openings is provided in the circular disc to allow the passage of air from pipe 6 to pipe 11.

A conduit 12 which will hereafter be called the inner conduit leads from the lower part of the container, thru the top of stopper 3 and thru the wall of the outer conduit 6 to the center of conduit 6. The lower end 13 of the inner conduit is movable and may be adjusted to the side if desired and is fitted with a strainer 14 and the upper end

15 inside of the outer conduit 6 is fitted with threads 16. A tapering extension 17 of this inner conduit is provided which is fitted on one end 18 with recessed threads adapted to be screwed into the threads 16 thereby making a continuous inner conduit of both members. Other means of joining these two members of the inner conduit may be used such as soldering.

Outlets 19 are provided in the walls of the extended inner conduit 17 for passing the liquid from the container to the space between the inner and outer conduits. Outlets 20 are provided in the walls of the outer conduit 11 to pass out in the form of a fine mist a mixture of liquid and air or inert gas from the space between the two conduits. The fineness of this mist is controlled by the size of the outlets 19 and 20 and the pressure of the air or other gas.

Referring to Fig. 2, a modified atomizer is shown. Figs. 3 to 8 show the details of some of the parts used in this modified atomizer. Numeral 22 indicates a metal container. A cover 23 is fitted to cover the openings of the container 22 and is provided with a gasket 24 and metal clamps 25 to form an air-tight closure. A tube 26 is provided to pass air thru the upper part of cover 23 and is connected on one end 27 to a source of compressed air (not shown). This tube will hereafter be known as the outer tube. An inlet 28 from the outer tube to the inside of the container 22 is provided to supply compressed air to the container and maintain the liquid inside of the container under pressure. A tube 28*a* with the lower end fitted with a screen 29 forms a continuous passage from the bottom of container 22 to the inside of outer tube 26. The lower part of tube 28 is movable and may be inclined towards one side in order to pass out all the liquid when the container is tilted to one side as at 28*b*. Tube 28*a* is provided in two parts joined together by means of a flexible coupling, such as a rubber tube, to allow the above movement of the lower part of the tube. Tubes 26 and 28*a* are provided with extensions 29*a* and 30 which are joined to the corresponding inner and outer tubes by means of threaded connections.

Part of the air passing through tube 26 is diverted through opening 28 into the container 22. The major part of the air is passed through a plurality of narrow passageways 29*b*' into an annular opening 29*c* from where it passes through a plurality of openings 30*a* into the annular space inside of pipe 29*a* and outside of pipe 30. The annular space 29*c* is provided by grooving the ends of the two connecting pieces at the openings of pipes 29*b* and 30*a* so that the air may pass freely through the outer pipes even though the openings 30*a* and 29*b* are not directly in line. A similar arrangement is provided at the connection of pipes 31 and 36 to pipes 29*a* and 30 so that it is not necessary to have the communicating openings allowing the passage of air from one pipe to its extension in direct line. The pipes 28*a*, 30, and 31 carrying the liquid are tightly joined at the connections so that the liquid does not leak into the air passageways until it reaches the pipe 31.

To the inner tube 29*a* is connected a long tube 31 provided with openings 32. One end of this tube is provided a shoulder piece 33 with a central opening in which the tube 31 is held and openings 34 for the passage of air on the outside of tube 31. A collar or coupling 39 with internal threads and a lock nut 35 on outer tube 29*a* is provided to hold the shoulder piece 33 and tube 31 in place when the lock nut is fastened to the threads on the end of outer tube 29*a*. To the outer tube 29*a* is joined a long tapering needle-like extension 36 with a plurality of outlets 37. A shoulder piece 38 is provided on the enlarged end of the tube in the central portion of which tube 36 is fastened. Shoulder piece 38 is furnished with threads 38*a* on the outside and collar or coupling 39 fitted with internal threads is used to hold tube 36 in position as a continuous extension of the outer tube. The combination of the two long tapering members 31 and 36 forms one needle-like extension and may be manufactured in various lengths and with different numbers of outlets 32 and 37.

In operating the device the container is fitted with a liquid and compressed air is passed into the outer tube and the liquid is forced thru the inner tube. The liquid passes out thru the outlets of inner tube into the outer tube where it mixes with air and is expelled thru the outlets in the outer tube.

The foregoing description is only illustrative and various changes and alternative arrangements may be made within the scope of the appended claims in which it is my intention to claim all novelty as broadly as the prior art permits.

I claim:

1. In a spray device, a stopper, an outer tubular member disposed exteriorly of the stopper and having an inlet opening for compressed fluid at one end, the opposite end of the tubular member projecting from the stopper in an extension containing longitudinally spaced perforations, an intermediate portion of the tubular member having an opening through the stopper, and an inner tube of lesser diameter than and extending substantially the length of the extension forming an annular passage communicating with the inlet, the inner tube containing longitudinally spaced perforations and protruding through the outer tube and stopper.

2. In a spray device, a stopper, an outer tubular member disposed exteriorly of the stopper and having an inlet opening for compressed fluid at one end, the opposite end of the tubular member projecting from the stopper in a long tapering extension containing longitudinally spaced perforations, an intermediate portion of the tubular member having an opening through the stopper, and an inner tube of lesser diameter than and extending substantially the length of the extension forming an annular passage communicating with the inlet, the inner tube containing longitudinally spaced perforations and protruding through the outer tube and stopper.

3. In a spray device a stopper, an outer tubular member disposed exteriorly of the stopper and having an inlet opening for compressed fluid at one end, the opposite end of the tubular member projecting from the stopper in an extension containing longitudinally spaced perforations, an intermediate portion of the tubular member having an opening through the stopper, and an inner tube of lesser diameter than and extending substantially the length of the extension forming an annular passage communicating with the inlet, the inner tube containing longitudinally spaced perforations in offset relation to the perforations of the outer tube and protruding through the outer tube and stopper.

FRANKLIN C. NELSON.