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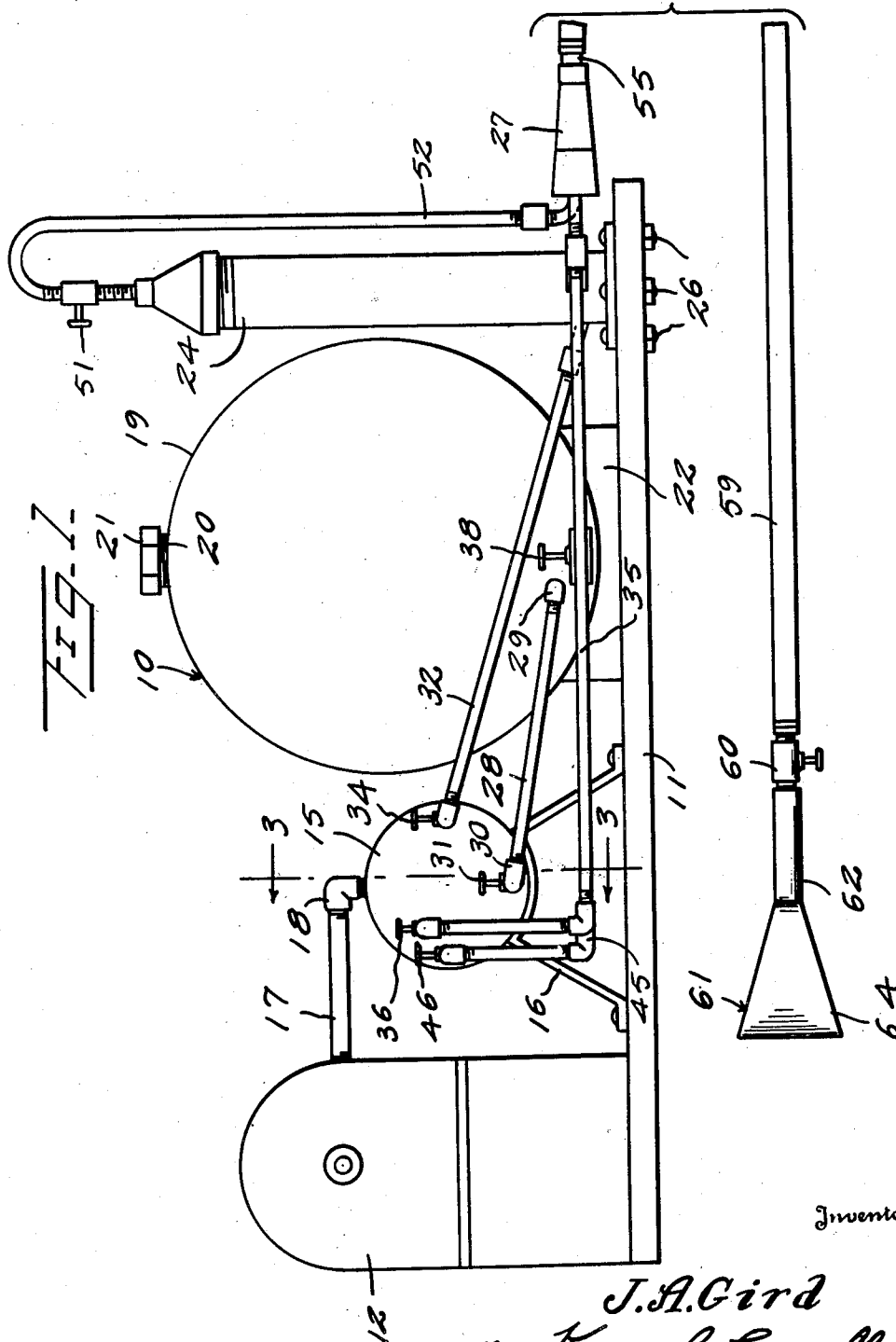
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2,500,816

COMBINED CLEANING AND INSECTICIDE APPARATUS

Filed Sept. 10, 1947

4 Sheets-Sheet 1



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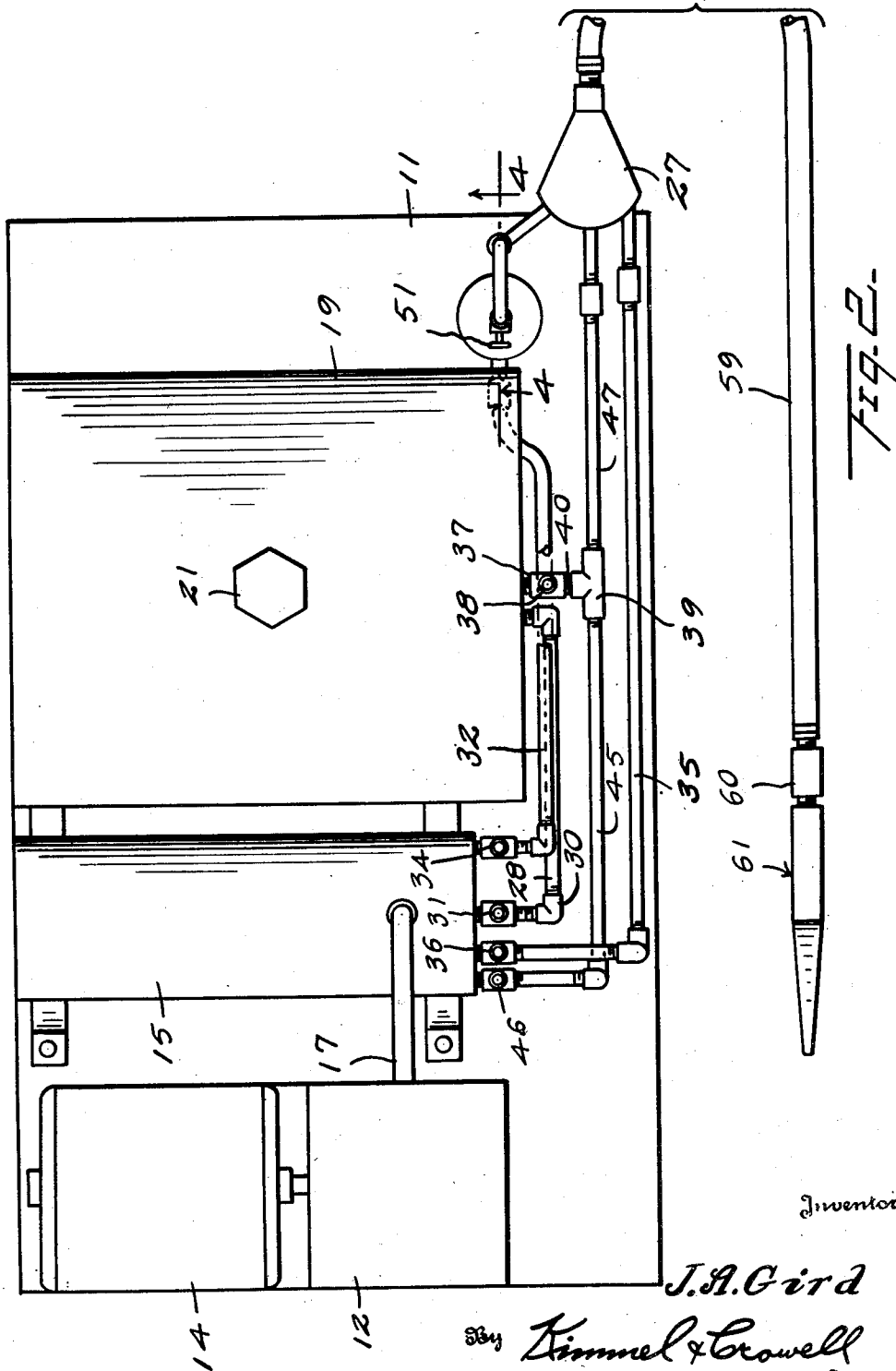
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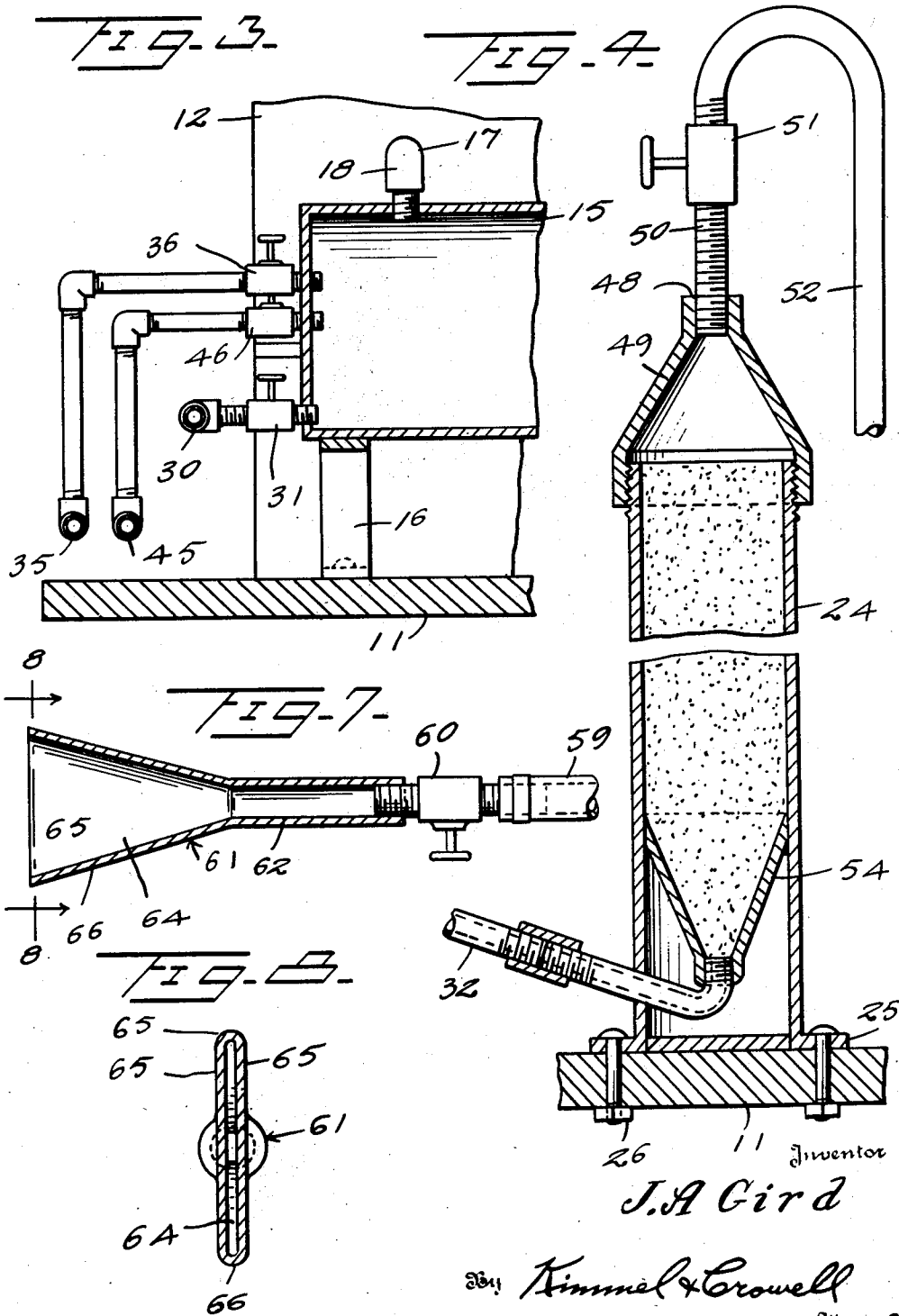
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COMBINED CLEANING AND INSECTICIDE APPARATUS

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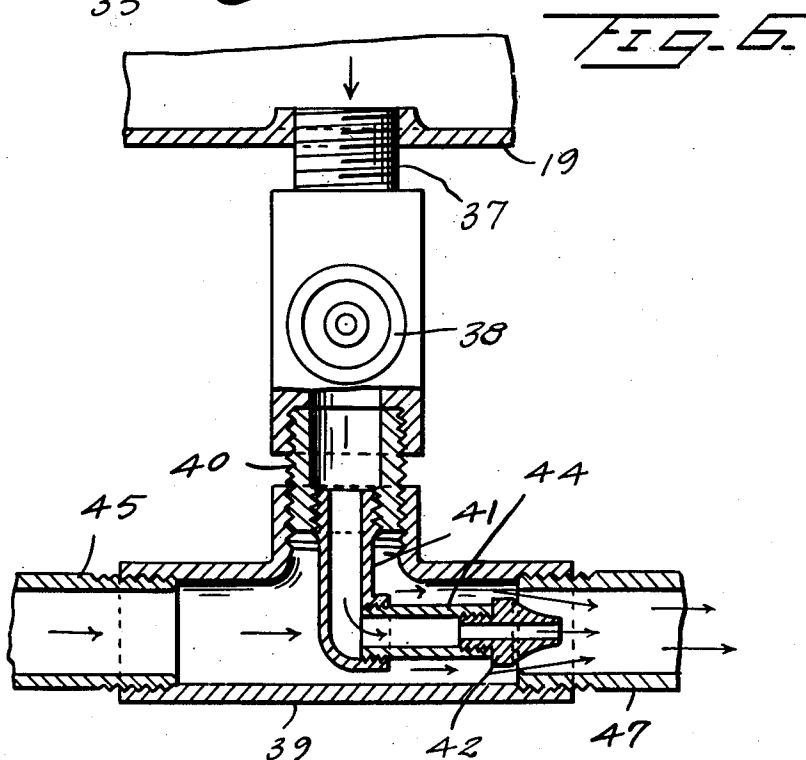
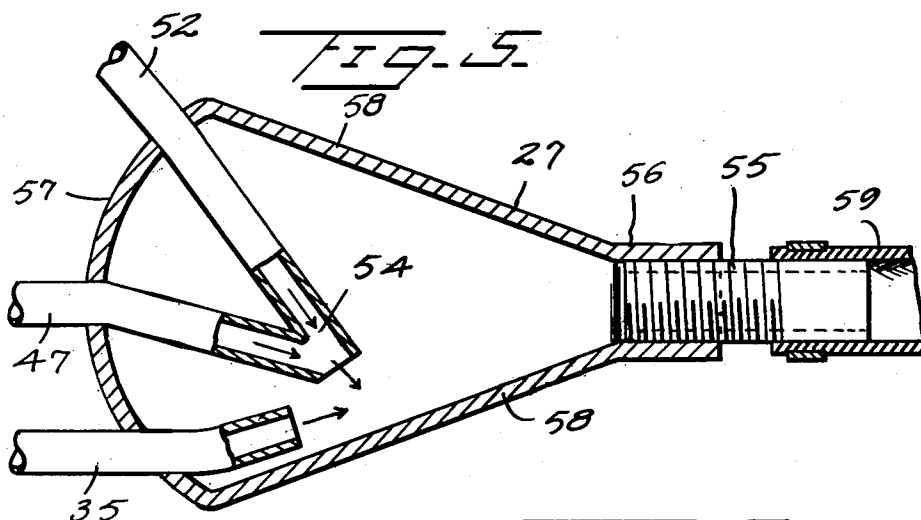
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COMBINED CLEANING AND INSECTICIDE APPARATUS

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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COMBINED CLEANING AND INSECTICIDE APPARATUS

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2 Claims. (Cl. 43-147)

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This invention relates to a combined cleaning and insecticide apparatus.

An object of this invention is to provide a device which in one machine will be capable of performing the cleaning, spraying and dusting of walls and/or equipment about a dairy barn, stable or the like.

Another object of this invention is to provide apparatus of this kind which is so constructed and arranged that the component parts thereof may either be used separately or together.

A further object of this invention is to provide in a liquid spray system, an improved vaporizing means, so that the liquid insecticide or cleaner may be discharged in a regulated vapor or spray.

A further object of this invention is to provide apparatus of this kind which will permit the mixture of a powdered insecticide with a liquid which may also contain an insecticide so that the liquid spray may serve as a vehicle or carrier for the immiscible powder in order that the latter will effectively adhere upon drying of the liquid spray to the surface of the desired parts.

A further object of this invention is to provide apparatus of this kind which is mounted on a common base and may be secured to a mobile chassis or the like so as to make the device easily portable.

With the above and other objects in view, my invention consists in the arrangement, combination and details of construction disclosed in the drawings and specification, and then more particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a side elevation partly broken away of a combined cleaning and insecticide apparatus constructed according to an embodiment of my invention,

Figure 2 is a top plan view thereof,

Figure 3 is a vertical section partly broken away taken on the line 3-3 of Figure 1,

Figure 4 is a vertical section taken substantially on the line 4-4 of Figure 2,

Figure 5 is a longitudinal section through the mixing chamber of the apparatus,

Figure 6 is a fragmentary horizontal section taken through the discharge port and nozzle of the liquid containing tank,

Figure 7 is a longitudinal section taken through the discharge nozzle of the device, and

Figure 8 is a vertical section taken on the line 8-8 of Figure 7.

Referring to the drawings, the numeral 10 designates generally a device for spraying a liquid cleaning solution and a powder insecticide spray

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from a single source of air pressure supply so that either the liquid or the powder may be sprayed alone or the liquid and powder may be combined in a single spray.

In modern farms sanitary regulations of the State require that certain sanitary standards be maintained. In order to maintain the barn up to the standards required, it is necessary at frequent intervals to clean the walls and other structure in the barn and spray the structure with a suitable insecticide. The work at the present time entails the necessity of hiring certain persons for cleaning the structure and others to come at a later date for spraying the insecticide.

It is an object of this invention to provide one unit which is capable of doing both of these jobs and can do these jobs in an approved manner by uniting the cleaning solution and the insecticide powder in a single spray when desired.

The combined cleaning and insecticide apparatus 10 is formed of an elongated substantially rectangular base 11 on which the cleaning and insecticide spraying apparatus is to be mounted. An air compressor 12 is mounted on one end of the frame 11 and is adapted to be connected to an electric motor 14 or other suitable driving means for operating the compressor.

A compressed air tank 15 is suitably mounted on the base 11 closely adjacent to the compressor 12 and may be supported above the base 11 by suitable supporting structure 16. A pipe 17 is connected between the compressor 12 and the air tank 15 for forcing air under pressure into the tank.

The pipe or tube 17 is connected at the upper end of the tank 15 by a suitable coupling or elbow as 18. The tank 15 is constructed to contain air under the required or necessary pressure. A liquid tank 19 is mounted on the frame 11 adjacent the air tank 15 and is of a suitable size for supporting a large amount of liquid therein.

The tank 19 is formed with an upwardly extending tube 20 thereon which is adapted to be closed by a nut or cover 21. The liquid may be admitted into the tank through the opening or tubular connection 20 at the upper end thereof.

The tank 19 is fixed to or mounted on the base 11 by a suitable supporting block structure or the like 22. An insecticide container 24 is mounted on the base 11 adjacent the liquid tank 19 in the opposite end of the base 11 from the compressor 12.

The tank or receptacle 24 is provided for hold-

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ing insecticide powder. The receptacle 24 is formed with a flange 25 at the lower end thereof which is adapted to be secured to the base or frame 11 by bolts 26 or other suitable fastening devices. Suitable air conducting means are connected between the air compressor tank 15 and the liquid tank 19 and powder tank 14 for selectively discharging the matter from the tanks either one at a time or in any desired combination.

A mixing chamber 27 is connected by suitable discharge and conducting means to each of the tanks 15, 19, and 24. A pipe or tube 28 is fixed between the lower end of the air accumulator tank 15 and the bottom end of the liquid tank 19. Suitable couplings as 29 and 30 are provided on the pipe 28 for their connection to the tanks. A valve 31 is fixed along the length of the pipe 28 preferably adjacent its junction with the tank 15 for opening or closing the air passage between the two tanks.

As the material to be contained in the tank 19 is preferably formed of a liquid, cleaning liquids in such use frequently require much agitation to prevent the settling of suspended material therein. It is for this reason that the air pressure line from the tank 15 is connected to the bottom of the liquid supporting tank 19. As air under pressure is admitted to the bottom of the tank 19, the air will bubble upwardly through the liquids thus causing the necessary agitation.

A pipe or other suitable tubular connection 32 is fixed between the air pressure tank or accumulator 15 and the lower end of the powder receptacle or tank 24. A valve 34 is interposed along the length of the pipe 32 preferably adjacent the tank 15 for controlling the flow of air pressure from the tank 15 to the receptacle 24. A pipe 35 is connected between the mixing chamber 27 and the air pressure tank 15. A valve 36 is connected along the length of the pipe or tubular connection 35 preferably adjacent the tank 15 for controlling the air pressure from the tank 15 to the mixing chamber 27.

A discharge port or passage 37 is provided on the lower end of the tank 19 from which the liquid may be discharged. A valve 38 is connected to the outer end of the discharge port 37. A T-fitting as 39 is threadably secured to a coupling 40 on the valve 38 through which the liquid is adapted to be passed. As it is discharged from the tank 19 a reduced diameter coupling member 41 is threadably engaged in the coupling member 40 between the T 39 and the valve 38. A discharge nozzle member 42 is threadably engaged on a union 44 between the coupling member 41 and the discharge nozzle 42. A discharge nozzle 42 is of such a diameter that it is spaced from the inner walls of the horizontal or cross arms of the T member 39.

The discharge nozzle 42 is removably attached to the discharge port of the tank 19 so that various nozzles 42 of the desired spray capacity may be used.

A pipe or tubular connecting member 45 is connected to one end of the T member 39 and to the air pressure tank 15. A valve 46 is interposed along the length of the pipe 45 between the T fitting 39 and the tank 15, preferably adjacent the tank 15. Another pipe or tubular connecting member 47 is connected between the other end of the T fitting 39 and the mixing chamber 27. The discharge nozzle 42 is disposed along the air line formed by the pipes 45 and 47 substantially as a venturi. The air through the pipe 45 and

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47 is adapted to pass around the side edges of the discharge nozzle 42 and will aid in drawing the liquid spray therefrom.

A discharge opening 48 is formed on the upper end of a frustoconical cap 49 on the upper end of the receptacle 24. The opening 48 is formed at the apex of the convergent end of the cap 49. A coupling member 50 is threadably engaged in the discharge opening 48 and a valve 51 is secured on the upper end of the coupling member 50.

A suitable pipe or conducting member 52 is connected between the valve 51 and the mixing chamber 27. The air pressure line 32 connected to the powder tank 24 is connected to the lower end thereof and preferably the lower end of the tank 24 is formed with downwardly convergent inner walls 54 so that the air under pressure is admitted at the extreme bottom of the tank. In the mixing chamber 27, the discharge pipes or tubular connections from the various tanks are merged together. The discharge pipe or tubular connection 52 from the powder tank 24 engages through the one end wall of the mixing chamber 27 and is connected to the inner end of the pipe 47 through which the liquid discharge is admitted to the mixing chamber. The terminal ends of the tubular connecting members 52 and 47 are joined and communicated together for final discharge and mixture thereof at this point as indicated by the numeral 54 in Figure 5.

The air pressure line 35 which connects directly between the air pressure tank 15 and the mixing chamber 27 is engaged through the wall of the mixing chamber and is terminated closely adjacent the terminal end of the pipes 52 and 47 within the chamber 27.

The opening 54 at the juncture of the connecting means 47 and 52 is disposed substantially at right angles to the axis of the end of the air pipe 35 and is spaced forwardly therefrom. The disposition of the inner end of the tubes 35, 47 and 52 within the mixing chamber 27 is such that the air under pressure admitted through the pipe 37 will induce the flow of the material in the other pipes and its passage over the end thereof.

A coupling member 55 is threadably engaged in the small end 56 of the mixing chamber 27. The mixing chamber 27 is formed of an arcuate end wall 57 through which the pipes described above are adapted to engage. Forwardly divergent inclined side walls 58 of the chamber 27 are terminated in the reduced end 56 thereof.

The substantially triangular space between the convergent walls 58 forms a converging funnel through which the material admitted to the chamber 27 must pass as it is discharged from this mixing chamber.

Such a reduction and converging of the material will substantially increase the mixing of the materials as they are discharged.

Preferably an elongated flexible tube or hose 59 is secured to the coupling member 55 at the discharge end of the mixing chamber 27. The mixed materials are adapted to be carried through this pipe 59 in their mixed condition prior to being discharged onto the wall or other structural material on which the cleaning or insecticide material is to be disposed.

A valve 60 is secured on one end of the flexible tube 59 and a final discharge nozzle 61 is connected to the other side of the valve 60. The discharge nozzle 61 is provided for discharging the entire mixed materials or selected material from the apparatus 10.

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The discharge nozzle 61 is formed with a tubular end 62 which is adapted to be connected to the valve 60 and a flattened discharge end 62. The end 64 is formed of a pair of flat walls 65 spaced apart along the length thereof and connected together by outwardly divergent side walls 66.

In the use and operation of this combined cleaning and insecticide apparatus, when it is desired to use the device for spraying cleaning material only, the valves 31, 38 and 46 are opened while the remaining valves are left in the closed position. The air under pressure will flow through the pipe 28 into the tank 19 for agitating the liquid therein and placing the liquid under pressure. The pressurized liquid is then discharged from the tank 19 through the valve 38 and the discharge nozzle 42 into the air line 47. Thence the liquid now a spray is admitted to the mixing chamber 27 and may be forced outwardly through the flexible tube 59, the valve 60 when opened, and the discharge nozzle 61.

The powder may be dispensed alone from this apparatus by opening the valves 34, 51 and 60. The air will travel through the pipe 32 up through the tank 24 and force the powder into the mixing chamber 27 through the pipe 52, thence through the flexible tube 59 and discharge nozzle 61.

The air under pressure may be admitted into the mixing chamber 27 through the pipe 35 and valve 36 when the liquid or powder is being dispensed alone or when the liquid and powder are being mixed together.

I do not mean to confine myself to the exact details of construction herein disclosed but claim all variations falling within the purview of the appended claims.

Having thus described my invention, what I claim is:

1. A combined cleaning and insecticide spraying device comprising air pressure means, a cleaning liquid tank connected to said pressure means, a powder tank connected to said pressure means, a mixing chamber connected to said pressure means, means connecting said liquid and powder tanks to said mixing chamber, said latter named means projecting into said chamber in a manner such as to unite the liquid and powder prior to

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discharge of the liquid and powder into said chamber, the connection between said pressure means and said chamber projecting into said chamber in a manner such that the air stream from said latter means will intersect the combined liquid and powder streams on an oblique angle, and a spray means connected to said chamber.

2. A combined cleaning and insecticide spraying device comprising air pressure means, a cleaning liquid tank connected to said pressure means, a powder tank connected to said pressure means, a mixing chamber connected to said pressure means, means connecting said liquid and powder tanks to said mixing chamber, a tubular connection between said pressure means and the connection between said liquid tank and said chamber, a spray nozzle at the point of connection between said tubular connection and said latter named connection for breaking up the liquid stream prior to entering said chamber, said latter named means projecting into said chamber in a manner such as to unite the liquid and powder prior to discharge of the liquid and powder into said chamber, the connection between said pressure means and said chamber projecting into said chamber in a manner such that the air stream from said latter means will intersect the combined liquid and powder streams on an oblique angle, and a spray means connected to said chamber.

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