HAND PAINT SPRAY GUN AGITATOR

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The invention described herein may be manufactured and used by or for the United States Government for governmental purposes without payment to us of any royalty thereon.

This invention relates to improvements in paint spray gun agitators and has for an object the provision of a hand paint spray gun in combination with an agitator or stirrer which is actuated by the same pressure means which actuates the paint spraying means for the gun.

A further object of the invention is the provision of a liquid spraying device of the pneumatic type for spraying paint, lubricants, and other liquid materials, particularly those which are immiscible types which are adapted to settle out of solution, in which an agitator or stirrer is provided which is mounted integral with the spray gun and includes pneumatic means for operating the mixer or stirrer which is connected to the pneumatic supply means for operating the spray gun so that the stirrer is operated to stir and mix the materials being sprayed when the pneumatic pressure is applied to the device for the operation of the spray gun.

A still further object is the provision of a portable pneumatic hand spray device in which part of the air supply is used to rotate a turbine for rotating a stirrer insensible into the bottom of a liquid supply container fixed adjacent relation to the liquid supply tube to the spraying device, in which the air pressure employed to turn the turbine is exhausted to atmosphere, and the device is utilized and removable applicable to paint and liquid containers for stirring the liquid therein as it is withdrawn from the container for the spray operation.

A further object is the provision of a spraying device for spray mixtures which contain ingredients which separate rapidly into layers, which provide a desirable and convenient means for continuously keeping the spray mixture in a uniformly mixed condition during spraying and eliminates the need for hand agitation of the spray gun and provides better agitation and more uniform coatings with such materials, and does not require separate power means, such as electric motors, etc., to maintain the mixing or stirring operation.

The objects and advantages of the invention will become apparent from the following description and accompanying drawings in which like reference characters refer to like parts in the several figures.

In the drawings:

FIG. 1 is a side view, in perspective, of a hand paint spray gun, incorporating the invention, part of the paint can or container being broken away and shown in section;
FIG. 2 is a top plan view of the device, as shown in FIG. 1;
FIG. 3 is a horizontal sectional view taken about on the plane indicated by line 3--3 in FIG. 1, and; FIG. 4 is a fragmentary vertical sectional view taken about on line 4--4 of FIG. 3, looking in the direction of the arrows, parts being broken away.

Referring to the drawings, particularly FIG. 1, the reference numeral 1 denotes a conventional "air brush" or pneumatic spray gun having a spray head 2 carried by a handle 3, through which the pneumatic fluid, such as air under pressure is conveyed to the spraying head through suitable conduit means, which is adapted to be connected at 4 to a suitable air pressure source (not shown), suitable pressure control valve means 5 and spray control valve means 6, being shown, which are actuated by a manually operable hand control lever 7 in the usual or conventional manner, the first actuation of the lever 7 opening the air valve 5 to discharge air under pressure through the spray head while further opening movement of the lever 7 opens the liquid control valve 6 to discharge liquid into the air jet.

The liquid material to be sprayed is conveyed to the spray head 2 through a tubing 8, connected to a pump 9, and is fixed to a suitable container cover plate 9, forming the conventional standard or support for the device on the top or mouth of a paint or liquid container 10, the tubular support 8 being bent at 11, extends downwardly in the container 10 to the bottom thereof, adjacent its front side.

A bifurcated clamp member 12 is axially movable on the tubular stem 8 and carries opposite hook or detent ends 12a which are adapted to receive and engage pin projections 13 which are provided at the opposite sides of the top or neck portion of the container 10, a conventional camming lever 14 being suitably mounted on the tubular stem 8, is rotatable to draw the clamp member 12 upwardly relative to the container 10, and thus draw the mouth of the container into sealing contact with the cover 9, a suitable gasket may be provided therebetween in the usual manner.

The agitating or stirring means provides for continuous agitation of the contents of the container 10 while the spray gun is connected to the air pressure source to prevent liquid and pigment paint materials from settling, or where liquids are used which are immiscible and tend to separate out into layers during the spraying operation, to maintain them in proper and thoroughly mixed conditions at all times during the spraying and nonspattering operations of the device while the device is being operated. This agitating and stirring device forms an integral part of the portable paint spray gun and is only dependent on the same pressure source which operate the spraying gun, thus eliminating all need for a separate power source making the device operable, and completely portable, and nondependent upon electrical motors or other connections.

As seen in the drawings the stirring or agitating device is generally indicated at 15, and specifically comprises a casing 16 which has a cylindrical chamber 17 having a bottom closure 18 and a top closure or cover 19, upper and lower bearings 20, 21 being secured in the chamber 17 are disposed in spaced relation, in which is journaled a turbine or stirrer shaft 22 having a bladed turbine wheel 23 fixed thereon for rotating stirrer shaft 22.

The lower closure 18 preferably has a threaded extension 24 which is threaded into a suitable threaded opening in the main or container cover plate 9, this closure plate 18 is formed with a central bore 25 through which the turbine shaft 22 extends downwardly into the container.

As shown in the drawings the lower end of the turbine shaft 22 is socketed at 26 and receives the upper end of a stirrer shaft 27 of smaller diameter which extends downwardly into the container 10 to a point adjacent the bottom thereof, also near one side of the container 10.
and has fixed thereon a stirrer or a mixer 28 having four (or more) radially inclined blades 28' preferably pitched to circulate the liquid in the container upwardly and thus thoroughly mix and stir the liquid to prevent the same from settling out any solids or separations of liquids in the container which might be immiscible.

To secure the stirrer shaft 27 in the lower end of the turbine wheel shaft 22 any suitable means may be employed, such as a cotter pin 29 extending through aligned holes in the shafts 22 and 27.

The turbine wheel is driven by the same pressure medium which operates the spraying head and comprises an air inlet nozzle 30 leading into the turbine wheel chamber 17 having a air discharge opening at one side thereof in a horizontal plane, as seen in FIG. 3 and an exhaust nozzle 32 extending from the chamber 17 in the same plane for exhausting the air pressure from the chamber after it turns the turbine wheel 23. These nozzles 30 and 31 are disposed in 45° angular relation to each other in the same horizontal plane and are both disposed in tangent relation to the turbine wheel 23 on a circle about midway between the axis and the periphery of the turbine wheel.

The air pressure inlet nozzle 30 is connected by a pressure conducting pipe 33 to the main air pressure supply conduit through the handle to the spray head 2, at the point 34 and is supplied with conventional unions for dismantling the device.

The discharge nozzle 31, as seen in FIG. 1, is supplied with a retainer member 35 in the form of an outlet cap which is filled with glass wool or similar filter material 36 which acts as a muffler to reduce the outlet pressure and discharge source of the air and increase the drive speed of the turbine and the stirrer head.

In the drawings the preferred form of the invention is disclosed and set forth in the preceding specification; however, it is not desired to limit the invention to the specific form disclosed and described, but to include such modifications and changes contemplated by those skilled in the art, which come within the scope and spirit of the appended claims. The operation of the device should be self evident.

After the spraying ingredients, such as paints, lubricants, or immiscible liquid materials are placed in the container 10, the cover 9 is placed on the container closing the same, this disposed the lower end of the liquid supply or inlet tube 8—11 adjacent the bottom and one side of the container. Since the tube 8 is bent forwardly this side of the container is referred to as the forward side. The disposition of the cover 9 on the mouth of the container automatically disposed the rotary stirrer or mixer 28 adjacent the bottom of the container slightly off center and adjacent the inlet end of the tube 8. The hook ends 12a of the bifurcated clamp member 12 are engaged with the pins 13, as seen in FIG. 1, and the clamping lever 14 is rotated to secure the device firmly on the container 10. When the nipple, at 4, is connected to a flexible conduit from a suitable air pump or pressure supply means, air therefrom is conducted through the conduit 33 to the turbine inlet nozzle and strikes the turbine wheel, rotating the stirrer, the air from the turbine being discharged into atmosphere through the exhaust nozzle and the packing therein, thus maintaining the solution and ingredients in the container in proper and thoroughly mixed condition. Thereafter, depression of the control lever 7 first actuates the air valve 5 which supplies air under pressure through the sprayer head 2 onto the work (also for dusting) and further depression of the control lever 7 then opens the conduit to the container and delivers the liquid to the spray head where it is picked up by the air jet and sprayed onto the work. When the control lever 7 is released the valves 5 and 6 close, but the stirring action within the container continues and is ready for delivery in properly mixed condition any time the control lever 7 is actuated.

We claim:

1. In a hand paint spray gun and agitator for immiscible liquids, a cylindrical liquid container having an open upper end, a horizontal cover for closing the upper end of the container, a liquid spraying head fixed on said cover having a liquid supply tube therefrom leading substantially to the bottom of the container at one side of the center thereof and a rigid air supply conduit connected to said spraying head, forming a manipulating handle for the spray gun, a closed turbine chamber fixed on the upper side of said cover at one side of said liquid supply tube, an air turbine wheel rotatable in said turbine chamber on an axis perpendicular to the upper face of said cover, a stirrer shaft removably fixed to said turbine wheel for rotation thereby, extending downwardly into said container substantially to the bottom thereof, a bladed stirrer fixed to the lower end of said shaft having inclined blades thereon for agitating a liquid in the container in an upward direction during rotation of said shaft, said turbine chamber having an air inlet in one side thereof for directing air against the side of the turbine wheel for rotation thereof, an air outlet disposed in angular relation to the said inlet in the direction of rotation of the turbine wheel for exhausting the air from the chamber following the rotation of the turbine wheel by air from said inlet, and a by-pass air supply conduit connecting the first mentioned air supply conduit to said air inlet for continuously supplying air to said inlet for rotation of said bladed stirrer when air is supplied to the first mentioned air supply conduit.

2. Apparatus as set forth in claim 1 in which said air outlet is formed with an enlarged filter chamber exterior of said turbine chamber and filter means fixed in said enlarged filter chamber for filtering the air discharged from said outlet and silencing the noise of the exhaust from said turbine chamber through said air outlet and filtering the air discharged from said turbine chamber.

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