

June 28, 1960

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SPRAY PAINTING APPARATUS

2,942,787

Filed June 11, 1959

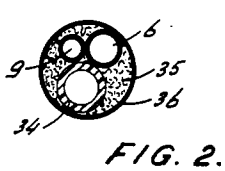
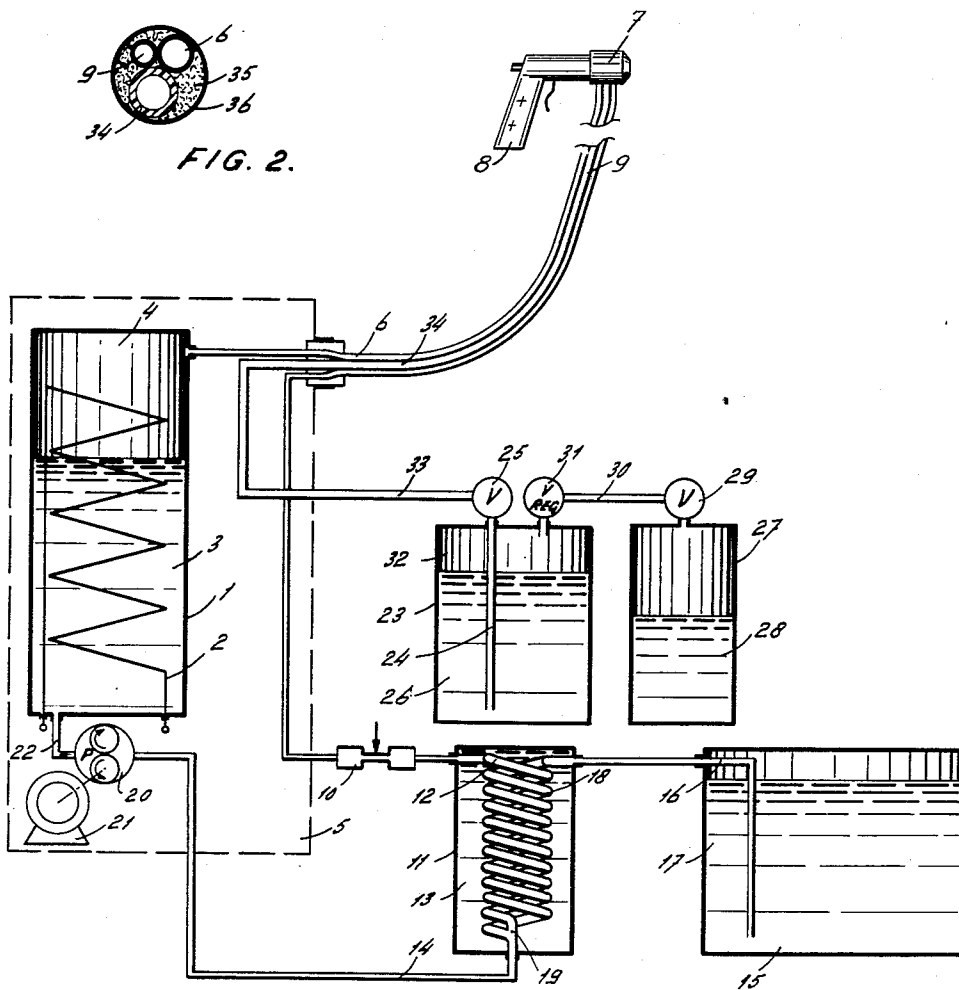


FIG. 1.

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SPRAY PAINTING APPARATUS

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Filed June 11, 1959, Ser. No. 819,643

10 Claims. (Cl. 239—124)

The present invention relates to a spray painting apparatus of the type which evaporates a volatile thinner for the paint and utilizes the vapor so obtained as a spraying medium, particularly such an apparatus wherein the paint to be sprayed is preheated by its delivery adjacent the hot vapor spraying medium.

The instant invention is related to application Serial No. 798,509, filed by the inventors herein on March 10, 1959, for a Paint Spraying Apparatus. In this prior application, the paint to be sprayed was preheated by its momentary passage through a heat exchanger which was adapted principally for evaporation of the spraying medium.

The instant invention distinguishes from the aforesaid application and the art in that heat exchange between the spraying medium and the paint to be sprayed is not limited to juxtaposed contact within an evaporation device. Rather, heat exchange between the vapor spraying medium and the paint to be sprayed is effected intermediate the evaporation device and the spray painting gun by an abutting of the vapor spraying circuit and the paint supply circuit. This heat exchange is enhanced by the employment of a vapor return wherein small amounts of vapor are returned continuously from said spray gun to a condensing coil and thence to the evaporation device.

The instant invention also embodies paint supply pressurizing means, utilizing CO₂ or like volatile matter, whereby the paint is urged towards the spray painting gun.

As indicated above, the instant invention embodies also a vapor condensing coil, located in a return portion of the vapor circuit and juxtaposed and interconnected with volatile liquid supply conduit. This vapor condenser coil is immersed in liquid cooling means, which, together with the juxtaposed volatile liquid supply conduit, enhance condensation. This enhanced condition for condensation assures that only liquid matter is returned to the evaporation device.

Manifestly, the instant invention assures the efficacious spraying of hot paint together with a hot vaporous thinner with a resultant capability of achieving lower viscosity paint at the point of its contact with the object to be sprayed. The advantages of this invention over conventional devices wherein hot paint is sprayed by cold air means or the like are obvious. Since lower viscosities are provided at the point of spray contact, a higher viscosity paint may be employed effectively in this apparatus.

Accordingly, it is an object of invention to provide in a spray painting apparatus, means for pre-heating the paint to be sprayed.

Another object of invention is to provide in a spray painting apparatus means for preheating the paint to be sprayed continuously during spray, as well as non-spray, operation.

Another object of invention is to provide pressurizing means for conveying paint to a spray painting gun.

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Another object of invention is to provide in a spray painting apparatus means for returning the spray painting medium.

Another object of invention is to provide in a spray painting apparatus means for returning, condensing and reusing portions of the spray painting medium.

Yet other objects of invention will become apparent from the ensuing specification and attached drawings, wherein:

Fig. 1 is a schematic view of the instant spray painting apparatus embodying a spray paint gun, a pressure tank having a heating element mounted therein, a source of paint supply, and a pressurizing medium adjacent thereto; a source of volatile liquid to be employed as the spraying medium and a vapor condensing coil juxtaposed and interconnecting with a spraying medium supply line leading from said source of spraying medium to said pressure tank.

Fig. 2 is a cross section of the vapor circuit and paint circuit abuttingly disposed within an insulated cover for heat exchange.

In Fig. 1 a pressure vessel is shown as having an electric heating element 2 fixed therein, and containing a volatile hydrocarbon liquid 3. Vapor compartment 4 in the top interior of the evaporation device is defined by a volatile liquid 3 level. The pressure vessel may be mounted within a suitable casing, indicated by dotted lines 5. A vapor circuit leading from vapor compartment 4 comprises vapor supply conduit 6 which leads to spray painting gun 8 having head 7, and vapor return circuit 9. As indicated in applicants' aforesaid application, a portion of generated vapor may be returned continuously through the spray gun to the pressure vessel for purposes of heating the spray gun so as to avoid condensation of spraying medium therein.

A flow regulator 10 may be mounted in vapor return conduit 9 which leads to condensing device 11, comprising a condensing coil 12 mounted in a liquid 13 such as water, and juxtaposed and interconnected at 19 with cooling volatile liquid supply coil 18. The latter coil 18 is connected to volatile liquid supply conduit 16 which leads from volatile liquid supply tank 15 containing a volatile hydrocarbon or like liquid 17. As will be apparent, water 13, as well as volatile liquid 17 within coil 18 cause condensation within coil 12, thus assuring that matter returned through suction conduit 14 is in condensed form. Gear pump 20 powered by motor 21 may be employed to effect a suction return through conduit 14, thence into inlet 22 of the evaporation device 2.

A paint container 23 is shown as having outlet tube 24, outlet valve 25, to which is connected paint conduit 33. Paint conduit 33 is attached to flexible paint supply hose 34, which as shown in Fig. 2 abuts both vapor supply circuit 6 and vapor return circuit 9. Thus, paint 26 carried in hose 34 is preheated prior to its entry within spray gun head 7.

As illustrated in Fig. 1, a paint pressurizing container 27, containing CO₂ or other highly volatile liquid may be employed. Container 27 is connected to paint container 23 via valve 29, inlet conduit 30 and pressure regulator 31 affording regulated pressure of gas upon paint 26. Thus, there is a constant pressure in top compartment 32 of container 23 which pressure urges paint 26 outwardly through outlet tube 24 and into conduits 33 and 34 for spraying purposes.

As shown in Fig. 2 abutting vapor circuits 6 and 9 and paint circuit 36 may be contained within a cover 36, having insulating material 35 therein for enhancing heat exchange. As will be apparent the preheating of paint, according to the instant invention, enhances the capability of the instant apparatus for spraying small particles of paint. This type of spraying ensures a more

even and more complete coat of paint upon the spray surface. Manifestly, it eliminates the necessity for repetitive spraying of a single surface. Thus, improved paint spraying is achieved with consequent savings in the amount of paint employed.

The foregoing description and attached drawings are submitted as illustrative only of a proposed construction according to the instant invention. As will be apparent, various modifications might be employed without departing from the spirit and scope of invention as defined in the subjoined claims.

We claim:

1. A spray painting apparatus comprising a pressure tank adapted to contain volatile liquid; an electric resistor mounted in said tank; means defining an inlet for said liquid in said tank; means defining a vapor outlet in said tank; a main vapor circuit, including a conduit connected with said vapor outlet in said tank; a spray gun connected with said conduit; and a paint supply tank having a paint outlet and a paint circuit interconnecting said paint outlet and said spray gun, said paint circuit abutting said main vapor circuit.

2. A spray painting apparatus as in claim 1, said main vapor circuit including a return portion interconnecting said spray gun and said pressure tank.

3. In a spray painting apparatus of the type using a hot spraying medium which is a paint thinner vaporized in a pressure tank and discharged with paint through a spray paint gun, the combination of a paint supply conduit and an abutting spraying medium conduit attached to said gun, said spraying medium conduit preheating a paint carried in said paint supply conduit.

4. A spray painting apparatus comprising a pressure tank having a resistance heating element for evaporating a volatile paint thinner mounted in said tank; a vapor circuit attached to said tank and including at an intermediate portion a spray gun; a paint supply tank; and a paint circuit leading from said tank to said spray gun and abutting said vapor circuit for preheating of the paint to be sprayed.

5. A spray painting apparatus comprising a pressure tank adapted to contain a volatile liquid; an electric resistor mounted in said tank; means defining an inlet for said liquid in said tank; means defining a vapor outlet in said tank; a main vapor circuit, including a conduit connected with said vapor outlet in said tank; a spray gun connected with said conduit; a paint supply tank having a paint outlet, a paint circuit connected to said paint outlet and said spray gun, said paint circuit substantially abutting said main vapor circuit; and pressurizing means adjacent said paint supply tank and urging said paint into said paint outlet.

6. A spray painting apparatus comprising a pressure tank adapted to contain a volatile liquid; an electric resistor mounted in said tank; means defining an inlet for said liquid in said tank; means defining a vapor outlet in said tank; a main vapor circuit including a conduit connected with said vapor outlet in said tank; a spray gun connected with said conduit; a paint supply tank having a paint outlet; a paint circuit connected to said paint outlet and said spray gun, said paint circuit substantially abutting said main vapor circuit; and a vapor condensing coil mounted in said main vapor circuit inter-

mediate said pressure tank and the abutment of said vapor circuit and said paint circuit.

7. A spray painting apparatus comprising a source of supply of volatile liquid; a pressure tank adapted for evaporation of said liquid; a heating element mounted in said pressure tank; a volatile liquid supply conduit leading from said source of supply to said pressure tank; a main vapor circuit leading from said pressure tank to a spray paint gun and from thence to a vapor condensing coil mounted in said volatile liquid supply conduit; said vapor condensing coil being juxtaposed with a volatile liquid supply coil.

8. A spray painting apparatus comprising a source of supply of volatile liquid; a pressure tank adapted for evaporation of said liquid; a heating element mounted in said pressure tank; a volatile liquid supply conduit leading from said source of supply to said pressure tank; a main vapor circuit leading from said pressure tank to a spray paint gun and from thence to a vapor condensing coil mounted in said volatile liquid supply conduit, said vapor condensing coil being juxtaposed with a volatile liquid supply conduit coil, and being immersed in liquid cooling means.

9. A spray painting apparatus comprising a source of volatile liquid; a source of paint; a pressure tank having a heating element mounted therein for evaporating said volatile liquid; a volatile liquid supply conduit interconnecting said source of volatile liquid and said pressure tank; a vapor circuit leading from said pressure tank to a paint spray gun and from thence to a condensing coil immersed in cooling liquid, said condensing coil being juxtaposed and connected to said volatile liquid supply conduit; and a paint supply conduit leading from said source of paint to said spray gun and said paint supply conduit abutting said vapor circuit for preheating of paint carried therein.

10. A spray painting apparatus comprising a source of volatile liquid; a source of paint; a pressure tank having a heating element mounted therein for evaporating said volatile liquid; a volatile liquid supply conduit interconnecting said source of volatile liquid and said pressure tank; a vapor circuit leading from said pressure tank to a paint spray gun and from thence to a condensing coil immersed in cooling liquid, said condensing coil being juxtaposed and connected to said volatile liquid supply conduit; and a paint supply conduit leading from said source of paint to said spray gun via said pressure vessel for preheating paint carried therein.

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