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SPRAY PAINTING APPARATUS

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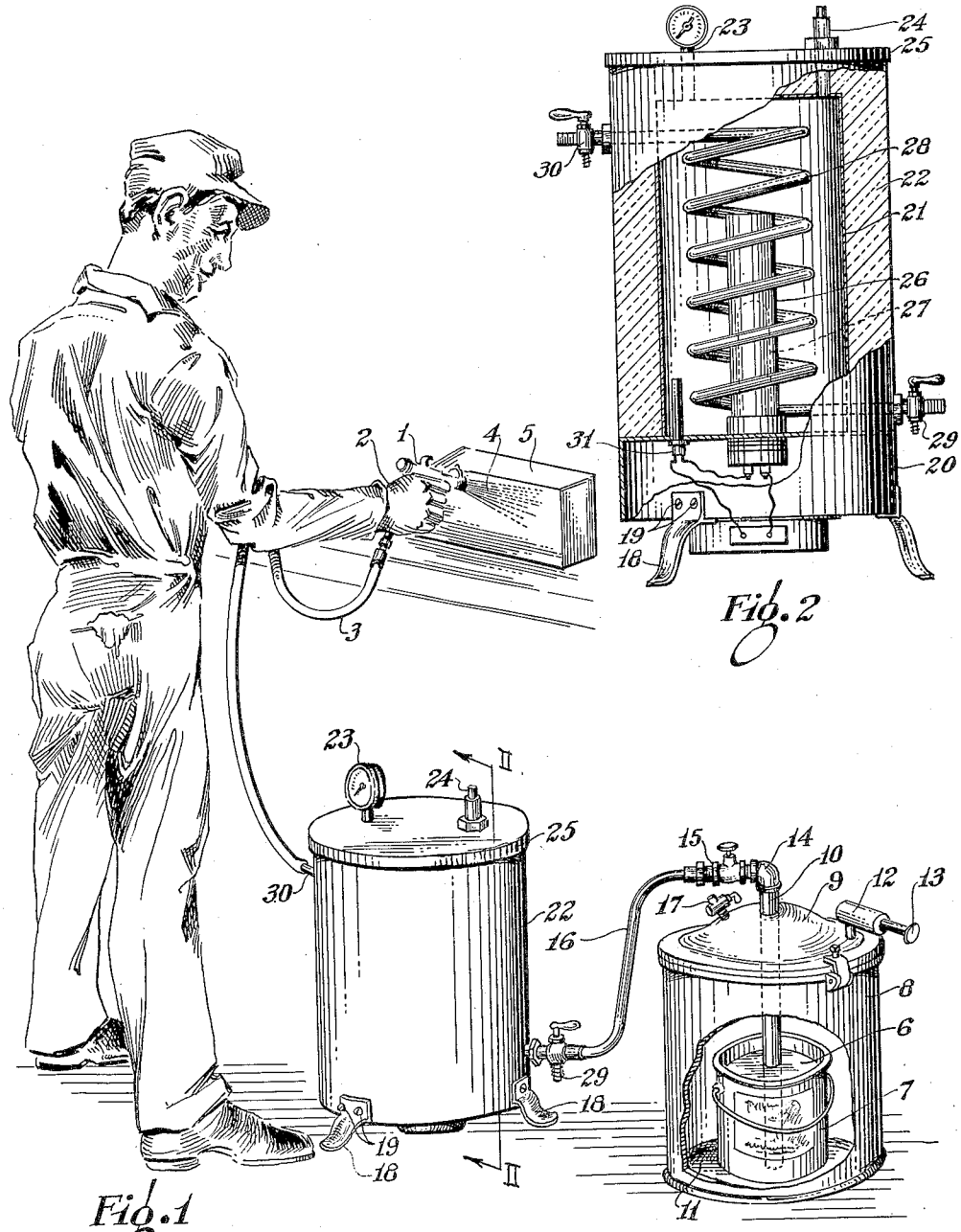


Fig. 2

Fig. 1

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SPRAY PAINTING APPARATUS

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1 Claim. (Cl. 91—44)

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This invention relates to apparatus for supplying materials such as coating materials, paint, varnish, lacquer, enamel, plastics and the like to various articles or surfaces.

An object of the invention is to provide an improved method of applying materials which are or may be rendered fluid.

Another object of the invention is to provide an improved apparatus for applying such materials which will more effectively distribute the same.

Another object of the invention is to provide an improved apparatus for applying such materials which will effect more complete atomization of paints and the like during spraying.

Another object of the invention is to provide an improved apparatus which will effect substantial savings in the quantity of material used.

Another object of the invention is to provide an improved apparatus which will produce an improved film of material.

Another object of the invention is to provide an improved apparatus which will be simple in construction.

Another object of the invention is to provide an improved apparatus which will be economical in operation.

Another object of the invention is to provide an improved apparatus which may be kept clean easily.

Another object of the invention is to provide an improved apparatus which will be extremely compact.

Another object of the invention is to provide an improved apparatus to which additional material may easily be supplied.

Another object of the invention is to provide an improved apparatus which will be extremely safe.

Other objects will hereinafter appear.

The invention will be better understood from the description of one practical embodiment thereof, illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of one form of apparatus in operation, and

Figure 2 is a central sectional view, taken on the line II—II of Figure 1, of the heating portion of the apparatus illustrated in the first figure, this being shown to an enlarged scale.

In the apparatus illustrated in the drawing, paint, lacquer, or the like is being supplied to a spray gun by which it is applied to the article. The spray gun itself may be of any desired or well known type, and so is not shown in detail, but is indicated generally at 1, being illustrated as held in the hand 2 of the operator and connected by a hose or similar flexible conduit 3 to the parts of the apparatus which are hereinafter

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described or may be used by automatic spray fixtures.

The operator uses the gun in the conventional manner, directing its spray 4 onto the surface of a piece 5 which he is coating with paint or enamel, as is well understood in the art.

The coating material is hereinafter referred to as "paint," irrespective of its character, and is supplied at 6, in a pail or any other suitable container 7, which is set within a pressure chamber 8, closed by a cover 9, which is tightly clamped and sealed to the container.

A pipe 10 extends downwardly through the cover to adjacent the bottom 11 of the pail container 8 and practically to the bottom of the pail itself.

The cover 9 carries a pressure pump 12 having actuating handle 13.

The upper end of pipe 10 is shown as provided with an elbow 14 and valve 15, to which is connected a flexible conduit or hose 16, extending to the heating portion of the apparatus.

A stop cock 17 is also provided in the cover 9, by which the pressure within container 8 may be relieved as desired.

The heater is shown as supported on legs 18, riveted at 19 to an inverted cup-shaped bottom piece 20, on which is supported a cylindrical tank 21 surrounded by a jacket of heat insulating material 22.

Extending through the top of tank 21 and heat insulating material 22 are pipes communicating wtih a temperature gage or thermometer 23 and with a pressure relief valve 24.

The top of the heating device is protected by a top 25 consisting of a disc with a depending marginal flange.

Extending upwardly, centrally and coaxial with the tank 21, is a sleeve 26 containing an electrical heating element 27, and around this heating element and spaced therefrom is a helical coil of tubing 28, the lower end of which extends through the wall of tank 21 and heat insulating material 22 to a stop cock 29 which serves as the connection to the end of hose 16 remote from container 8.

The upper end of the tubing of coil 28 similarly extends through the wall of tank 21 and the heat insulating material 22 to stop cock 30, which is connected to the end of hose 3 remote from spray gun 1.

A thermostat 31 is positioned in the bottom of tank 21 near its outer wall and controls the supply of current to heater element 27.

The operation of the device is as follows:

While a heat conducting liquid is shown, it will be understood that any material capable of retaining quantities of heat may be used, as, for instance, the tank might be filled with solid metal such as aluminum, or fins or other shaped pieces

of aluminum, copper, or other heat containing and conducting material might be applied to the coil of pipe.

The operator removes cover 9 from pressure chamber 8 by loosening the clamping means by which these parts are held together, and then deposits his can or pail 7 of paint within the chamber. He then replaces the cover and clamps it into place.

After seeing that valve 15 and stop cock 17 are both tightly closed, he operates the handle of pump 12 to apply air pressure to the surface of the fluid 6, checks the connection of hose 16 to valve 15 and stop cock 29, and that of hose 3 to stop cock 30 and spray gun 1, and turns on the current to supply electricity to heater 27.

When the heater has been operated for a sufficient time to bring the liquid in tank 21 to the proper temperature, which can be determined by the time when thermostat 31 clicks to open the circuit supplying current to the heater, he opens stop cocks 29 and 30 and valve 15, upon which the air pressure on the surface of fluid 6 forces this fluid up pipe 10 and through hose 16 into coil 28.

It will be noted that the coating fluid enters the bottom of the coil and circulates in a helical, upward path to the top of this coil, the coil being of relatively large cross section in relation to the jet which will eminate from the spray gun, so that the material passing through the coil moves slowly and reaches substantially the temperature of its heat conducting bath before leaving the heater, the temperature which I find particularly suitable for many of the commercial coatings being about 180° Fahrenheit.

The actual emission of the coating material is, of course, controlled in the usual manner by the spray gun 1, the temperature at the nozzle of this gun is generally some 20 to 40° below that existing in the heating coil, due to cooling on passing through hose 3.

It will be noted that the coating material rises constantly on its passage through the heater, and that when the operator is through using the apparatus and releases the pressure within container 8 by opening stop cock 17, any fluid material within the coil 28 is siphoned back into the pail 7. Consequently, if a very little gasoline or other solvent be run through the heating coil 28, it will completely clean the heating apparatus, making it ready for use with another color or type of material.

The cleaning of the pipe 10 and hose 16 is also easily accomplished by flushing with a solvent.

The paint or coating material is at all times, after it leaves pail 7, kept under pressure and away from the atmosphere until it is discharged from the spray gun, and so has no opportunity to oxidize or dry while being heated.

The heating, of course, renders the material much more fluid than it would be at atmospheric temperatures, and so causes it to spread and adhere in a much more effective manner, which in turn reduces the amount of this material which must be used to apply a proper coating to the articles which are being coated, and produces an improved and uniform finish.

There is no danger of overheating the material and thus chemically breaking it down, because of the thermostatc control and the heating bath, while excessive pressure upon this bath is avoided by the relief valve at 24. It is also apparent from the drawing that because of the great length of coil 28 relative to its cross-section diameter, the temperature of said coil is substantially the same as that to which it is desired to raise the coating material. In this way, no portion of the stream of material is subjected to excessive breakdown temperatures as would be the case where a heating element extends only for a short length relative to the cross-section diameter of the conduit through which said material flows.

While I have described the illustrated embodiment of my invention in some particularity, obviously many other embodiments, variations, and modifications will readily occur to those skilled in this art, and I do not, therefore, limit myself to the precise details shown and described herein, but I claim as my invention all embodiments, modifications and variations coming within the scope of the appended claim.

I claim:

A coating apparatus comprising a pressure chamber provided with a removable cover, means to lock said cover in sealing relationship with said chamber, an open can disposed within and at the bottom of said chamber, said can containing liquid coating material, a portable tank containing fluid heat conducting material, heating means comprising an electric immersion heater centrally located within said tank, a vertically disposed helical tube surrounding said heating means, said tube having its top and bottom ends projecting exteriorly of said tank, a temperature responsive control element for said heating means immersed in such conducting material whereby such material is heated to a predetermined temperature, said element being located closer to said tube than to said heating means whereby to be primarily responsive to the temperature of the conducting material adjacent said tube rather than to the temperature of the conducting material adjacent said heating means, a spray gun connected to the top end of said tube, a conduit through the cover of said chamber having its upper end connected by tubular means to the bottom end of said tube and the lower end disposed within and closely adjacent the bottom of said can, and pressure applying means attached to said chamber for forcing coating material from said can through said conduit and tubular means and then upwardly through said tube and out of said spray gun, whereby unheated paint flows upwardly to and through the heating coil and upon release of pressure in said chamber paint siphons back through said coil to facilitate cleaning thereof.

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