

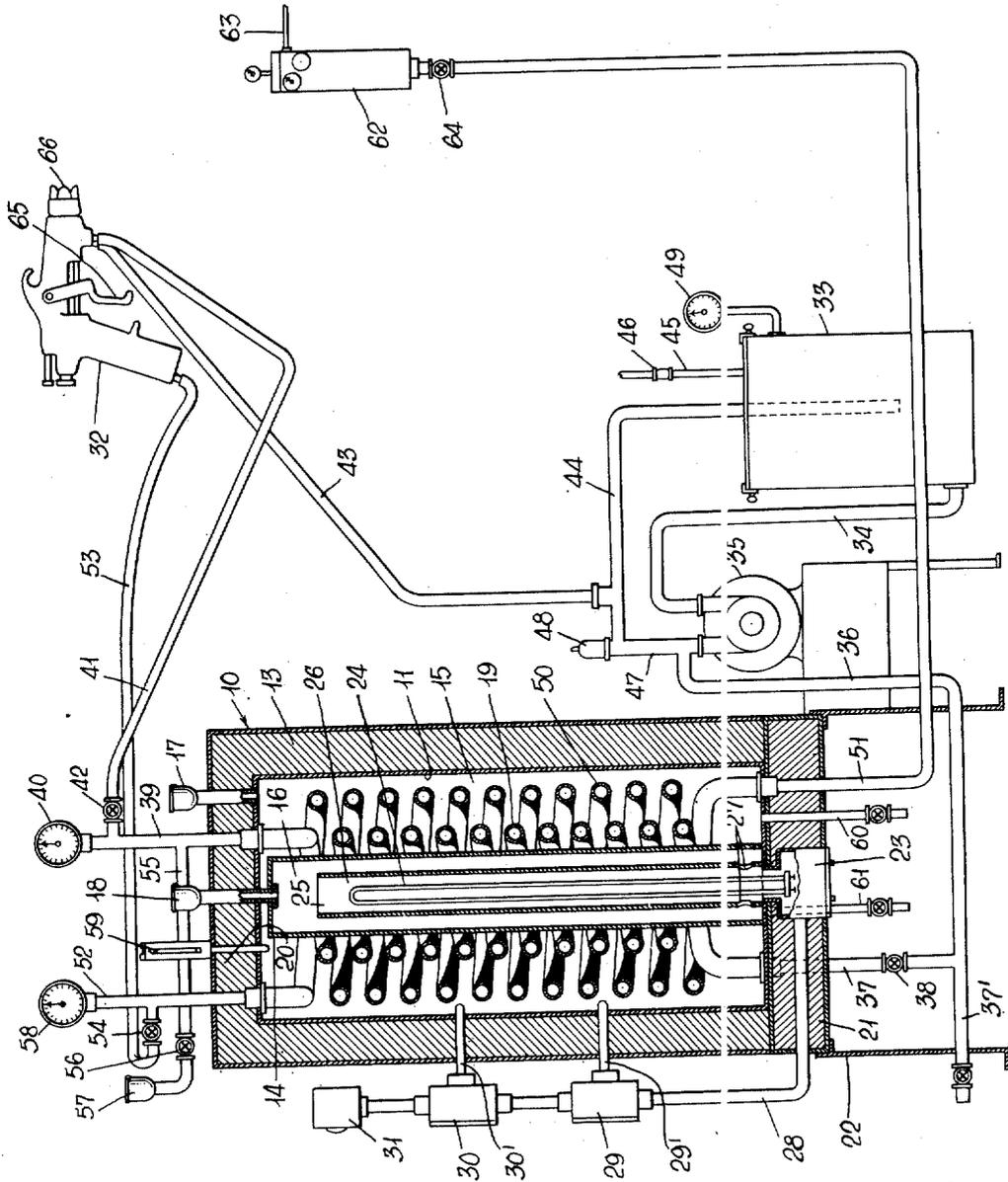
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PAINT PREHEATING AND SPRAYING APPARATUS

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PAINT PREHEATING AND SPRAYING
APPARATUS

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This invention relates to apparatus for use in preheating a fluid or heavy fluid such for example as paints, lacquers, enamels or the like or chemical or other compositions of any type or kind in the spray or other discharge thereof and, particularly, wherein it is desirable to preheat the fluid prior to, and in the act of, discharging the same from the apparatus. Still more particularly, the invention deals with apparatus of the character described, wherein a single preheating unit is employed for heating the fluid to be discharged, as well as to preheat air utilized in the discharge or spraying of the fluid from a gun, so as to maintain the fluid at a warm state at the point of discharge from the gun.

The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and in which the drawing is a sectional view through a preheater and diagrammatically illustrating the associated parts of the apparatus to demonstrate use of the preheater.

In the drawing, we have shown a sectional view through a preheated unit, this unit comprising a main casing 11 in the form of a cylinder or tank having an outer jacket 10, within which is arranged insulating material 13. Within the casing or cylinder 11 is disposed a supplemental cylinder or shell 14 which divides the casing into an outer chamber 15 and an inner chamber 16. The chamber 15 forms what may be termed a heat transfer chamber and may contain a heat transfer medium of any type or kind, preferably in liquid form, the liquid being introduced into the chamber through the filling cap 17. The chamber 16, in like manner, may be filled through the cap 18. It will be understood that the shell 14 prevents the fluid of the chamber 15 from contaminating the fluid in the chamber 16 in the event that a leakage occurs in the paint or chemical heating coil 19, which is disposed in the chamber 15. The casing, including its jacket, is closed at one end, as seen at 20, whereas the other end is closed by way of a closure plate 21 and the unit is preferably supported over a surface by a base or supporting frame 22 of any suitable, and preferably openwork, construction.

A suitable electric heating unit is diagrammatically illustrated at 23 as supported in the plate 21, the unit having a heating element 24 extending upwardly in the shell 14 and disposed within a supplemental inner shell 25 which forms a more or less instantaneous fluid heating chamber 26 within the chamber 16.

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The shell 25 opens into the chamber 16 near the upper end thereof and the lower end of the shell has apertures 27 which provide a circulation of the fluid in the chamber 16 upwardly through the chamber 26 and downwardly through the chamber 16, as will be apparent.

Extending from the unit 23 is a tube 28 for directing electric wires to thermo-switches 29 and 30 and to a pilot light 31, the switches 29 and 30 having element 29' and 30' exposed to the chamber 15 at suitable different levels in order to provide controls for temperature of the discharged paint or other fluid being directed to a spray gun or the like, as diagrammatically seen at 32 of the drawing.

Diagrammatically illustrated on the drawing is a paint or fluid tank or container 33 through the discharge pipe 34 of which paint is adapted to pass to and through a pump 35 and then through a pipe 36 into the coil 19 through a connecting pipe 37. The pipe 37 has a control valve 38.

The coil 19 is disposed in close proximity to the wall of the shell 14 and has, at its upper end, a discharge pipe 39 in which is a thermometer 40. Coupled with the pipe 39 is a flexible tube or hose 41 which leads to the spray gun 32. A suitable valve 42 is employed to control this discharge. Extending from the spray gun is a return flexible tube or hose 43 which couples with a bi-pass circulating pipe 44 for return to the tank or container 33 of excess or un-pumped fluid and also for the return fluid from the pipe 43.

The tank or container 33 has a suitable vent 45 with a vent check 46 therein.

In the pipe 47, which joins the pipe 36 with the pipe 44, is a relief valve 48 to relieve excessive pressures which may prevail at any time in this circulatory system. These pressures may be noted by the gauge 49 on the tank 33. On the other hand, the valve 48 may be set to automatically relieve the excess pressure.

Also arranged in the chamber 15 is another coil 50 with an intake pipe 51 leading to the bottom of the coil through the closure plate 21 and an exhaust 52 through the top 20 of the preheater, the latter having a discharge through a flexible tube or hose 53 to the gun 32. This discharge is controlled by a valve 54.

Coupled with the discharge pipe 39 inwardly of the valve 42 is a pipe 55 having a control valve 56 therein and a filler cap 57 at its end, so that a solvent or suitable cleaner can be placed in the coil 19 to clean-out the coil from time to time in the event that any of the fluids, that is to say, paints, enamels, lacquers and the like should solidify or cake therein.

It will also be noted that a thermometer 58 is employed in the pipe 52. Extending into the chamber 15 at the upper end thereof is another thermometer 59, so that, at all times, a reading can be taken of the temperature of the heat transmitting medium in the upper portion of said chamber.

Suitable valve controlled drains are provided for the chambers 15 and 16. The drain for the chamber 15 is shown at 60 and for the chamber 16 at 61.

In the drawing, we have shown in the pipe line 51 suitable means, as at 62 for supply of air to said pipe from a suitable source of pressure air supply, the inlet pipe being shown at 63 and, at 64, is shown a control valve to control supply of air to the coil 50. At 37' is shown a valve controlled paint drain for the pipes 36—37.

The present invention does not deal specifically with the structure of the spray gun 32. However, suitable means, as for example, a trigger 65 is provided on the gun for controlling spray discharge of paint or other fluid from the nozzle end 56 of the gun. In the use of the apparatus, the heat transferring medium disposed in the chamber 16 is brought to the proper temperature by the heating element 24 and transmitted to the heat transfer medium or fluid in the chamber 15 to heat both the fluid in the coil 26 and the air in the coil 50.

In the use of the apparatus, the paint is discharged in conjunction with the hot air from the spray gun by operation thereof, the circuit operating continuously and, if excess pressure should prevail in the paint line, this will operate to return the paint to the tank.

While in the accompanying drawing and foregoing specification, we have dealt with a gun for the discharge of the fluid, it will be understood that the apparatus can be utilized for any purpose whatever, where a heated fluid, chemical or the like is transferred to a predetermined point and wherein it is desirable to maintain heat of the fluid at the point of discharge.

By mounting the unit 23 in the manner described, the same can be removed whenever desired for cleaning, repair or replacement.

It will be apparent that the illustrations in the accompanying drawings are entirely diagrammatic for the purpose of simplifying the illustration. The particular type of fittings and couplings will be employed as and where desired and this is also true of the various controls which are employed. All of these devices or mechanisms are well-known in the arts and, for this reason, need no detail showing.

The present invention deals primarily with the heater unit and it will be understood that such devices or apparatus as the thermo-switches, pilot light and the like are suitably hooked-up with the heating means to provide any desired or predetermined temperature in the fluid which is circulated to the point of discharge.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A fluid preheater comprising a main insulated casing, a cylinder within said casing and spaced from the inner walls thereof to form a heat transfer chamber around said cylinder, a fluid circulating coil in said chamber, means comprising a heating element arranged in said cylinder for heating a transfer medium in the cylinder for, in turn, heating said chamber and the fluid in said coil, means within said cylinder

for circulating the heat transfer medium there-through and for quick heating of said medium, and an air coil in said chamber and heated by the same heating medium employed for heating the fluid coil.

2. A fluid preheater comprising a main insulated casing, a cylinder within said casing and spaced from the inner walls thereof to form a heat transfer chamber around said cylinder, a fluid circulating coil in said chamber, means comprising a heating element arranged in said cylinder for heating a transfer medium in the cylinder for, in turn, heating said chamber and the fluid in said coil, means within said cylinder for circulating the heat transfer medium there-through and for quick heating of said medium, an air coil in said chamber and heated by the same heating medium employed for heating the fluid coil, and means for directing heated fluid and air to a common station in spaced relation to the preheater.

3. A fluid preheater comprising a main insulated casing, a cylinder within said casing and spaced from the inner walls thereof to form a heat transfer chamber around said cylinder, a fluid circulating coil in said chamber, means comprising a heating element arranged in said cylinder for heating a transfer medium in the cylinder for, in turn, heating said chamber and the fluid in said coil, means within said cylinder for circulating the heat transfer medium there-through and for quick heating of said medium, an air coil in said chamber and heated by the same heating medium employed for heating the fluid coil, means for directing heated fluid and air to a common station in spaced relation to the preheater, and means providing a force-feed of fluid through said fluid coil.

4. A fluid preheater comprising a main insulated casing, a cylinder within said casing and spaced from the inner walls thereof to form a heat transfer chamber around said cylinder, a fluid circulating coil in said chamber, means comprising a heating element arranged in said cylinder for heating a transfer medium in the cylinder for, in turn, heating said chamber and the fluid in said coil, means within said cylinder for circulating the heat transfer medium there-through and for quick heating of said medium, an air coil in said chamber and heated by the same heating medium employed for heating the fluid coil, means for directing heated fluid and air to a common station in spaced relation to the preheater, means providing a force-feed of fluid through said fluid coil, and means for supplying air under pressure to said air coil.

5. A fluid preheater comprising a main insulated casing, a cylinder within said casing and spaced from the inner walls thereof to form a heat transfer chamber around said cylinder, a fluid circulating coil in said chamber, means comprising a heating element arranged in said cylinder for heating a transfer medium in the cylinder for, in turn, heating said chamber and the fluid in said coil, means within said cylinder for circulating the heat transfer medium there-through and for quick heating of said medium, an air coil in said chamber and heated by the same heating medium employed for heating the fluid coil, and independent means for draining said chamber in the space within said cylinder.

6. A fluid preheater comprising a main insulated casing, a cylinder within said casing and spaced from the inner walls thereof to form a heat transfer chamber around said cylinder, a

fluid circulating coil in said chamber, means comprising a heating element arranged in said cylinder for heating a transfer medium in the cylinder for, in turn, heating said chamber and the fluid in said coil, means within said cylinder for circulating the heat transfer medium therethrough and for quick heating of said medium, an air coil in said chamber and heated by the same heating medium employed for heating the fluid coil, independent means for draining said chamber in the space within said cylinder, and means for introducing a solvent in the fluid coil and means for draining said fluid coil.

7. In apparatus for preheating fluids and for directing heated air to a fluid at a point of discharge, said apparatus comprising an insulated casing, in which a fluid coil and an air coil are arranged, a cylinder in the casing inwardly of said coils forming a heater unit, an elongated small diameter tube within said cylinder and short of one end thereof, said tube being ported at the other end to provide circulation of a fluid heating medium within said cylinder, an elongated electric heating element in said tube providing quick heating of the fluid medium in said cylinder, and means providing forced circulation of fluid through said fluid coil.

8. In apparatus for preheating fluids and for directing heated air to a fluid at a point of discharge, said apparatus comprising an insulated casing, in which a fluid coil and an air coil are arranged, a cylinder in the casing inwardly of said coils forming a heater unit, an elongated small diameter tube within said cylinder and short of one end thereof, said tube being ported at the other end to provide circulation of a fluid heating medium within said cylinder, an elongated electric heating element in said tube providing quick heating of the fluid medium in said cylinder, means providing forced circulation of fluid through said fluid coil, and means draining said casing and said cylinder.

9. In apparatus for preheating fluids and for directing heated air to a fluid at a point of discharge, said apparatus comprising an insulated casing, in which a fluid coil and an air coil are arranged, a cylinder in the casing inwardly of said coils forming a heater unit, an elongated small diameter tube within said cylinder and short of one end thereof, said tube being ported at the other end to provide circulation of a fluid heating medium within said cylinder, an elongated electric heating element in said tube providing quick heating of the fluid medium in said cylinder, means providing forced circulation of fluid through said fluid coil, means draining said casing and said cylinder, and means for draining the fluid coil.

10. In apparatus for preheating fluids and for directing heated air to a fluid at a point of discharge, said apparatus comprising an insulated casing, in which a fluid coil and an air coil are arranged, a cylinder in the casing inwardly of said coils forming a heater unit, an elongated small diameter tube within said cylinder and short of one end thereof, said tube being ported at the other end to provide circulation of a fluid heating medium within said cylinder, an elongated electric heating element in said tube providing quick heating of the fluid medium of said cylinder, means providing forced circulation of fluid through said fluid coil, means draining said casing and said cylinder, means for draining the fluid coil, and means for introducing a solvent into the fluid coil.

11. A preheater apparatus of the character described comprising a casing having insulated top and side walls, the bottom of the casing being opened, an insulated closure for the bottom of the casing, a cylinder within the casing between the top wall thereof and said bottom closure dividing the casing into an outer heat transfer chamber and an inner heater chamber, means mounted within said bottom closure and extending into the inner chamber for heating a fluid therein, a coil in the heat transfer chamber, means extending through the bottom closure for supplying a fluid to said coil, means extending through the top of the casing for discharging fluid from said coil to a predetermined station, and means providing pressure circulation of a fluid through said coil.

12. A preheater apparatus of the character described comprising a casing having insulated top and side walls, the bottom of the casing being opened, an insulated closure for the bottom of the casing, a cylinder within the casing between the top wall thereof and said bottom closure dividing the casing into an outer heat transfer chamber and an inner heater chamber, means mounted within said bottom closure and extending into the inner chamber for heating a fluid therein, a coil in the heat transfer chamber, means extending through the bottom closure for supplying a fluid to said coil, means extending through the top of the casing for discharging fluid from said coil to a predetermined station, means providing pressure circulation of a fluid through said coil, a secondary coil in said transfer chamber outwardly of the first named coil, and means for circulating air under pressure through said secondary coil for discharge to said point of discharge of said fluid.

13. A preheater apparatus of the character described comprising a casing having insulated top and side walls, the bottom of the casing being opened, an insulated closure for the bottom of the casing, a cylinder within the casing between the top wall thereof and said bottom closure dividing the casing into an outer heat transfer chamber and an inner heater chamber, means mounted within said bottom closure and extending into the inner chamber for heating a fluid therein, a coil in the heat transfer chamber, means extending through the bottom closure for supplying a fluid to said coil, means extending through the top of the casing for discharging fluid from said coil to a predetermined station, means providing pressure circulation of a fluid through said coil, a secondary coil in said transfer chamber outwardly of the first named coil, means for circulating air under pressure through said secondary coil for discharge to said point of discharge of said fluid, and said fluid coil, transfer chamber and heater chamber having independent drains.

14. A preheater apparatus of the character described comprising a casing having insulated top and side walls, the bottom of the casing being opened, an insulated closure for the bottom of the casing, a cylinder within the casing between the top wall thereof and said bottom closure dividing the casing into an outer heat transfer chamber and an inner heater chamber, means mounted within said bottom closure and extending into the inner chamber for heating a fluid therein, a coil in the heat transfer chamber, means extending through the bottom closure for supplying a fluid to said coil, means extending through the top of the casing for discharging

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fluid from said coil to a predetermined station, means providing pressure circulation of a fluid through said coil, a secondary coil in said transfer chamber outwardly of the first named coil, means for circulating air under pressure through said secondary coil for discharge to said point of discharge of said fluid, said fluid coil, transfer chamber and heater chamber having independent drains, and means providing return of fluid from said point of discharge to the source of supply of fluid.

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