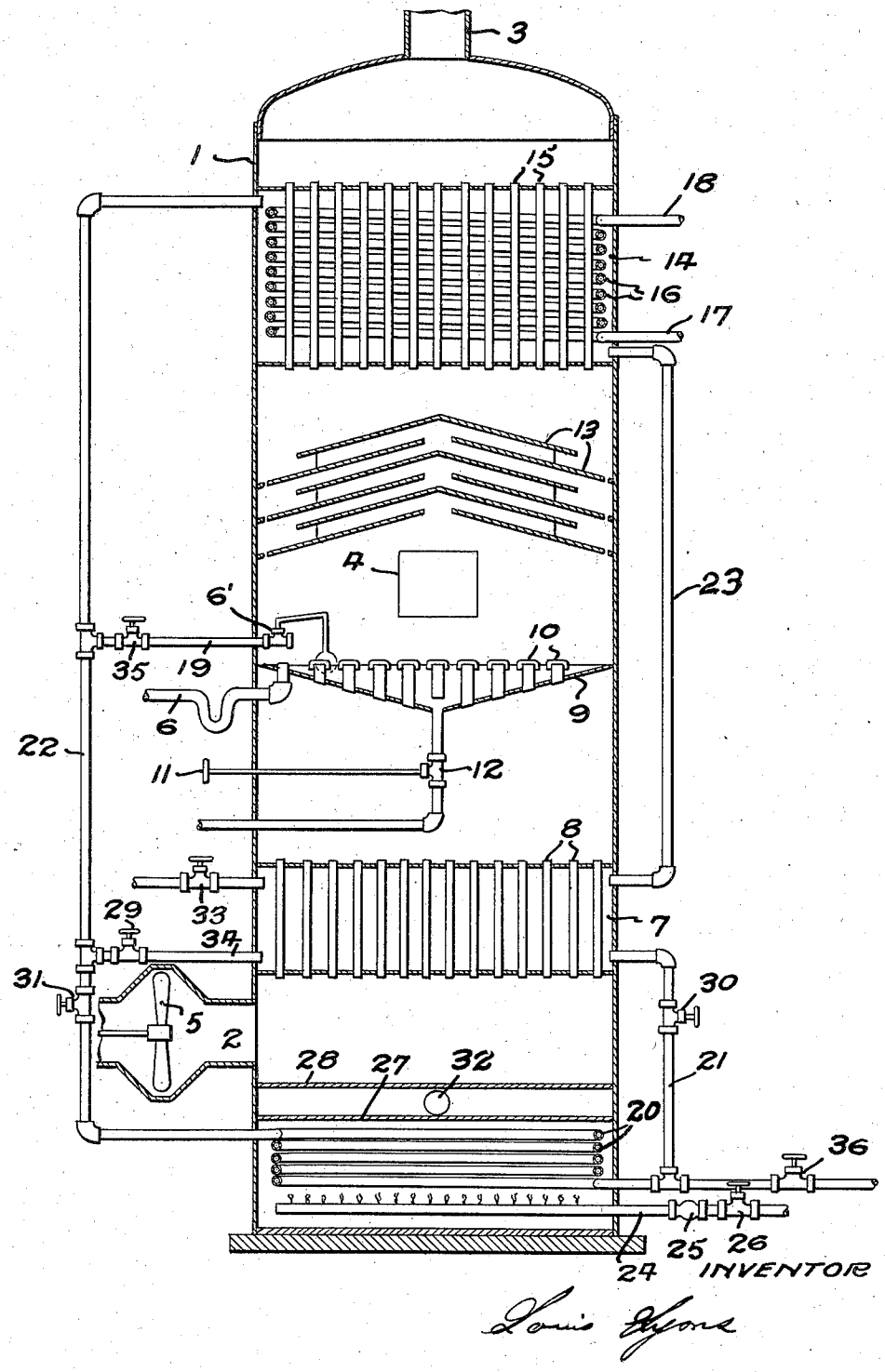
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AIR CONDITIONER

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AIR CONDITIONER

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3 Claims. (Cl. 257—9)

My invention relates to air conditioners and contemplates a mechanism with means to force air thru a casing having means of controlling the physical and chemical properties of said air during its course of travel thru said casing.

The primary object of my invention is to provide an efficient and economical means of controlling the physical and chemical properties of air used to ventilate buildings, and in pursuance of this object the invention includes a casing having means therein to raise or lower the temperature of the air passing thru by thermostatically operated valves controlling the heating and cooling mediums.

Another object of my invention is the provision of an opening in the casing above the bubble tray and below the baffle plates, thru which ice and chemicals may be inserted to assist in lowering the temperature and purification of the air, in event of poisonous gases in times of war, from explosives or from fires.

With these and other objects in view, my invention resides in certain novel features of construction and combination of parts to be hereinafter described and claimed. The descriptive matter is supplemented by the accompanying drawing, wherein:

Fig. 1 is a vertical sectional view of my invention showing the various units and the desired positions.

Referring now to the drawing, I have shown a vertical casing 1 having an opening 2 at the bottom to admit air, an opening 3 at the top to allow air to pass out, a door 4 in the wall of said casing to admit chemicals or ice, a fan 5 fixed in opening 2 to force air thru the heating, cooling and purifying units in casing 1.

Within casing 1, I have a secondary heating and cooling unit 7 comprising a tank having a plurality of vertical tubes 8 extending thru and substantially fixed in both bottom and top of said tank to allow a liquid to be held around the tubes and to act as a medium of heat transfer from the air passing thru said tubes 8.

Above unit 7, I have a bubble tray 9 having bubble caps 10 contacting a liquid held on the bubble tray 9. Overflow pipe 6 allows excess liquid to be withdrawn and float and lever controlled valve 6' replenishes the liquid on tray 9 when needed; thus, a constant level is obtainable on the tray 9.

For cleaning purposes I have installed a draining system on the bubble tray 9 remotely controlled by shaft 11 and valve 12.

Above the bubble tray 9, I have a series of plates 13 to collect moisture from the air. Above said plates 13, I have my primary heating and cooling unit consisting of a tank 14 having a plurality of vertical tubes 15 extending thru and substantially fixed in both top and bottom of said tank to allow a liquid to be held around the tubes, 15 acting as a medium of heat transfer to or from the air passing thru said tubes 15. Inside of tank 14 and between and around tubes 15, I have a tubular coil 16 having an inlet 17 and an outlet 18 adaptable to be connected to a refrigerating unit.

In the lower portion of casing 1 under the opening 2, I have a partition 28 to transmit heat to the fresh air entering at 2 and to prevent combustion gases from mixing with said air. Below partition 28, I have provided a hole 32 in the wall of casing 1 to allow combustion gases to escape. Below hole 32, I have a perforated partition 27 as a means of heat radiation and distribution.

Under the partition 27, I have a tubular coil 20 discharging thru pipe 22 into tank 14.

Near the bottom of tank 14, I have connected pipe 23 extending downward into tank 7 entering near the top of tank 7. Near the bottom of tank 7, I connected a pipe 21 and the opposite end attached to the inlet of the coil 20.

Under coil 20, I have installed a burner 24 controlled by thermostatically operated valve 25 and hand valve 26.

Into tank 7, I have provided a connection 33 to provide a constant supply of water or other liquid.

I have also connected pipe 22 into tank 7 by means of pipe 34 and valve 29 to make it possible to bypass the heating coil when the unit is being used for cooling purposes.

In the heating operation the primary heating unit is the coil 20 containing a liquid from tanks 7 and 14. Under coil 20, I have a burner 24 as a source of heat.

When the liquid in coil 20 is heated, it rises thru pipe 22 into the top of tank 14 displacing the cold liquid therein thru pipe 23 into tank 7, thence into pipe 21 and into coil 20, thus a circulation is effected.

The air entering at 2 contacts plate 28 which has become heated from flue gases from burner 24, and a heat exchange takes place, warming the air several degrees. The air now passes thru vertical tubes 8, in tank 7 which contains a heated liquid derived from coil 20 and another heat exchange takes place. After passing thru tubes 8 the air passes thru a liquid on a bubble tray 9, where dust and impurities are removed. After

passing thru the bubble tray 9 the air contains moisture, which settles out on plates 13. From plates 13, the air passes thru tubes 15 of heating unit 14 where the desired temperature and humidity of said air is regulated by a thermostatically controlled valve 25 regulating the gas burner 24.

In event the rising air passing thru the bubble tray 9 diminishes the liquid on tray 9, I have provided a pipe line 19 and a float controlled valve 6' which replenishes the liquid on said tray, and for cleaning purposes, I have provided a drainage system under the bubble tray 9 where dirt may be washed out thru valve 12, remotely controlled by shaft and wheel 11.

If it is desired that the air be cooled instead of being heated, valves 30 and 31 are closed, bypassing coil 20 and valve 29 is opened. Valves 33 and 35 are closed and drain valve 36 is opened thus draining tanks 14 and tanks 7. The tanks 14 and 7 are now filled with a liquid having a low freezing point and coil 16 is connected to a refrigerating unit at points 17 and 18. The refrigeration unit cooling the liquid in tank 14 which goes downward into tank 7. When the warm air entering at 2 passing thru tubes 3 transfers its heat the liquid becomes warm and rises back to tank 14 thus a circulation is effected. The temperature of the air after it passes thru tubes 3 is lowered, then it is washed in bubble tray 9 and becomes more or less saturated. In contacting plates 13 the moisture is knocked back and falls on the bubble tray 9. On bubble tray 9, I have provided an overflow pipe 6 extending down and right-angled thru wall of casing 1. On the outside of casing 1, the overflow pipe 6 forms a U-bend making a liquid seal to prevent the rising air from passing out and allowing all excess liquid to drain from the bubble tray 9. The air now contacts the primary cooling unit 16 passing thru the tubes 15 where the desired temperature and humidity are obtained by a thermostatically controlled refrigerating machine.

While the drawing discloses only one bubble tray as a means of purifying and humidifying the air, it may be necessary in some instances to use more than one tray which is within the scope of my invention.

I am aware of the fact that air conditioners and heating and cooling units have been patented and are in use, but the art of purifying air in combination with a bubble tray and a dual heat exchange unit has novel features that are embodied in this specification and appended claims.

What I claim is:

1. The combination in an air conditoner having a casing with an inlet opening in wall near the bottom of said casing, a tube and tank heat exchange unit fixed to the wall of said casing, having vertical tubes passing thru said unit adaptable for air to pass on the inside of said tubes and a liquid surrounding said tubes, a bubble tray positioned above said unit having vertical nipples covered with bubble tray caps adaptable to be emersed in a liquid on said tray, a series of plates above said bubble tray to collect moisture, a primary heat exchange unit above said plates having a plurality of vertical tubes extending thru said unit adaptable for air to pass thru said tubes and a liquid surrounding said tubes, a tubular coil adjacent and around said tubes all as and for the purpose set forth.

2. In an air conditioner, the combination of a casing having a partition near the bottom of said casing, forming an upper and lower compartment, a heating element in the lower compartment, an opening in the wall of said casing, under said partition as an exit for combustion gases; an air inlet opening in the wall of said casing above said partition, a tube and tank heat exchange unit fixed to the wall of said casing, having vertical tubes passing through said unit adaptable for air to pass on the inside of said tubes, a liquid surrounding said tubes, a bubble tray positioned above said unit, having vertical nipples covered with bubble tray caps adaptable to be immersed in a liquid on said tray; a series of plates above said bubble tray to collect moisture, a primary heat exchange above said plates having a plurality of vertical tubes extending through said unit adaptable for air to pass through said tubes and a liquid surrounding said tubes, a tubular coil adjacent and around said tubes effecting a means of lowering the temperature of the liquid in said heat exchange unit.

3. In an apparatus for conditioning air, the combination of a casing having a burner positioned in and near the base of said casing, a coil positioned above said burner, a partition above said coil, an air inlet opening in the wall of the casing above said partition, a secondary heat exchange unit fixed to the walls of said casing having vertical tubes adapted for air to pass therethrough, a bubble tray positioned above said heat exchange unit having vertical nipples adapted to receive bubble caps immersable in a fluid therein, means to admit chemicals on said bubble tray, a series of baffle plates fixed above said bubble tray, a primary heat exchange unit fixed above said baffle plates, having vertical tubes passing through said unit, a tubular coil positioned in said unit and adjacent and around said vertical tubes, pipes connecting the primary and secondary heat exchange units, pipes connecting the primary heat exchange unit with said heating coil and said secondary heat exchange units; means to regulate the heat applied to the coil, means to control the level of the fluid on the bubble tray and means to force the air through the liquid on bubble tray within said casing.

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