

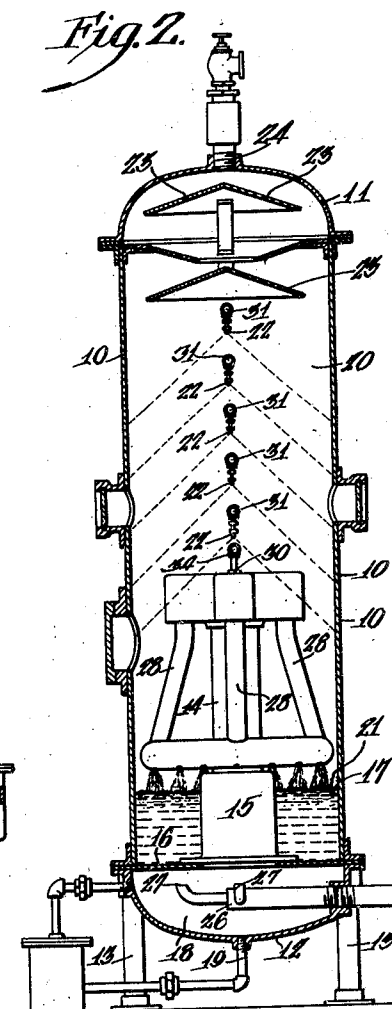
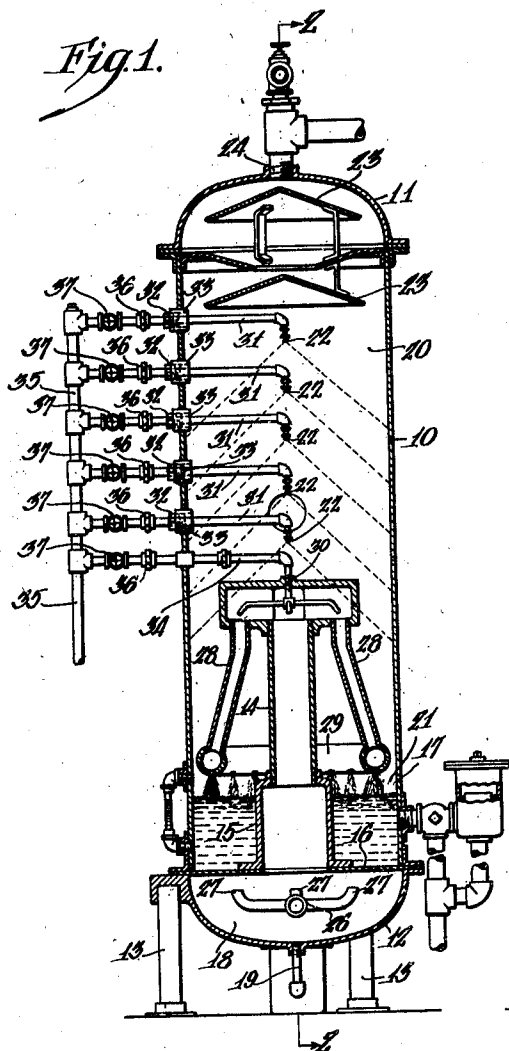
Oct. 13, 1931.

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1,827,092

SPRAY DEHYDRATOR

Filed June 15, 1926



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SPRAY DEHYDRATOR

Application filed June 15, 1928. Serial No. 116,096.

My invention relates to systems for the dehydration of air for whatever purpose and to connections and mechanisms by which the dehydrated air may be used in raw-water ice manufacture and more particularly to a development and improvement of a dehydration system and apparatus disclosed in my U. S. Patent No. 1,558,741, dated October 27, 1925.

10 A purpose of my invention is to provide for easy regulation of the temperature of the air leaving the dehydrator.

A further purpose is to arrange a succession of nozzles vertically one above another in the dehydrator each adapted to easy independent removal and independent control.

Further purposes will appear in the specification and in the claims.

Of the different forms of my invention 20 I show one only selecting a form that is efficient and practical in operation and which illustrates particularly well the principles involved.

Figure 1 is a sectional side elevation illustrating a dehydrator embodying my invention.

Figure 2 is a section of Figure 1 taken upon the line 2—2 thereof, the preliminary cooler not being sectioned.

30 This invention is a development of the subject matter of my former invention upon which I have been granted U. S. Patent 1,558,741, above mentioned.

In the drawings like numerals refer to like 35 parts in all figures.

Describing in illustration and not in limitation and referring to the drawings:—

By my former invention I avoid undue dilution of brine during its use for dehydrating 40 air by cooling the air out of contact with the brine to near the point of frosting, subsequently bringing the air that has been thus partially dehydrated into direct intimate contact with the brine for additional cooling.

45 In my earlier invention the air after preliminary cooling is directed downwardly upon the turbulent surface of a pool of cold brine then to flow upwardly through spray of cold brine to ultimate delivery from the top of the 50 dehydrator.

My invention relates more particularly to the means for maintaining and adjustably controlling spray after the preliminary cooling.

I have discovered that a series of sprays independently controllable and independently removable, ranged above the preliminary cooler, one above another is an arrangement particularly advantageous, in that it affords very easy control of the ultimate temperature of the air leaving the dehydrator and makes it very easy to clean out individual spray pipes without disturbing any structure other than a clogged pipe; also that it offers a minimum tendency for sprayed particles to be carried mechanically along with the air out of the dehydrator.

The preferred form of the dehydrator illustrated in the figures is enclosed in a shell 10, and upper and lower heads 11 and 12 respectively and is shown supported upon suitable legs 13.

Within the lower part of the casing is located an air stand-pipe 14 enlarged at the bottom at 15 and an annular floor 16 closing the space between the stand-pipe and the casing to form a brine chamber 17 above it and an air chamber 18 below it. The latter drains through the drain pipe 19. Above the brine chamber is an air and spray space 20.

The stand-pipe 14 and air chamber 18 comprise a preliminary air cooler in which the air is preliminarily cooled out of contact with brine. After being preliminarily cooled out of contact with brine it is cooled in contact with brine for further dehydrating the air being first brought into intimate contact with the turbulent surface of the brine pool 21 and then passed upwardly through a succession of brine sprays 22 and past baffles 23 for the removal of any mechanically entrained brine to the exit 24 at the top of the dehydrator.

The air from the compressor finds inlet through a pipe into a manifold 26 within the air inlet chamber 18 beneath the brine pool, and the air is discharged at high velocity through upwardly directed nozzles 27 against the cold bottom 16 of the brine pool.

From the inlet chamber 18 the air passes upwardly through the central stand-pipe 14 and from the top of the stand-pipe diagonally downwardly through a series of pipes 28 into a ring or header 29.

This header is slightly above the level of the surface of the turbulent pool 21 and the air from the header discharges at high velocity downwardly to the turbulent surface of the pool.

Usually the air by the time it reaches the top of the stand-pipe 14 will be near the freezing point and the walls of the diagonally downwardly extending pipes 28 being continuously sprayed upon the outside by cold brine, will be beneath the freezing temperature, with the result that frost to greater or lesser extent tends to deposit inside these pipes.

To avoid any accumulation of frost inside the downwardly extending pipes 28 or inside of the ring header 29 I introduce at 30 through the top of the stand-pipe sufficient brine (usually a mere trickle) into each diagonal pipe 28. This small amount of brine spreads over the interior surface of the pipes and effectually prevents any accumulation of frost by melting it as it deposits.

The spray nozzles 22 are ranged one above another and directed downwardly, the downward velocity of the particles of brine lessening to a minimum the tendency for small particles of the brine to be entraining with the up-flowing air.

Each nozzle is fed by a horizontal pipe 31 which is desirably mounted in a sleeve 32 screwed into a bushing 33 that is sufficiently large to pass the nozzle.

All of the nozzles 22 as well as the pipe 34 into the top of the stand-pipe, connect to a header 35 supplied by cold brine and union 36 and a valve 37 are inserted between the header and each nozzle.

The temperature best for the air to leave the dehydrator usually depends somewhat on the pressure of the air, and as a result it is desirable to control this temperature. Such control is very easy by controlling the quantity of spray fed through the respective valves 37, and the individual unions 36 with the individually removable sleeves 32 makes it very easy to take out for inspection or cleaning any nozzle desired without opening up the main shell of the dehydrator or interfering with the other nozzles.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need and to obtain part or all of the benefit of my invention without copying the structure of the drawing will doubtless become evident to others skilled in the art and I therefore claim all such in so far as they fall within the reasonable spirit and scope of my invention.

Having thus described my invention what

I claim as new and desire to secure by Letters Patent is:—

1. In a dehydrator for air, the combination of a casing having an outlet near the top thereof, a surface condenser in the lower part of the casing, a succession of vertically spaced downwardly directed spray pipes in the casing intermediate the outlet and the condenser, means for delivering air against the surface of the surface condenser and connections for passing the air from the surface condenser into an intermediate portion of the casing for upward passage through the sprays to the outlet.

2. In a dehydrator for air, a surface condenser, a compartment having an outlet near the top thereof and adapted to hold a pool of cooled brine, a plurality of vertically spaced downwardly directed spray pipes in the compartment between the pool and outlet, connections for delivering air to be dehydrated against the surface of the condenser and subsequently discharging it downwardly against the turbulent surface of the pool for passage upward through the sprays and connections providing individual control of the spray pipe deliveries.

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