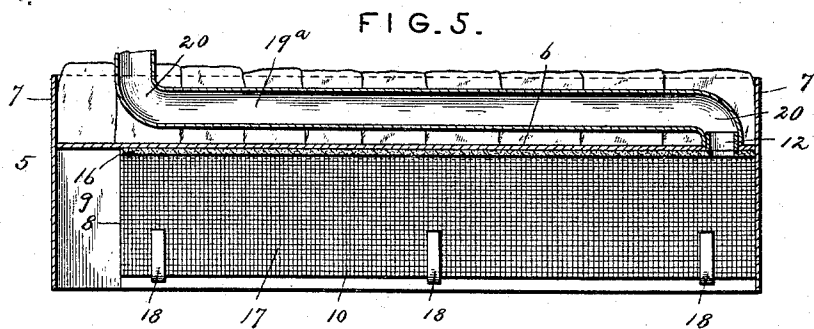
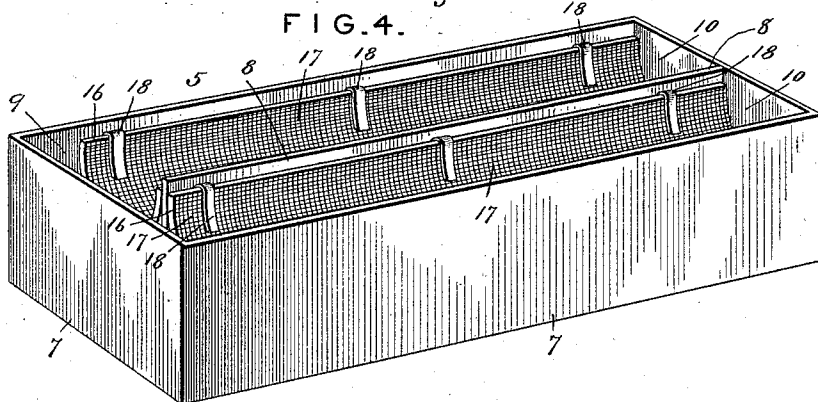
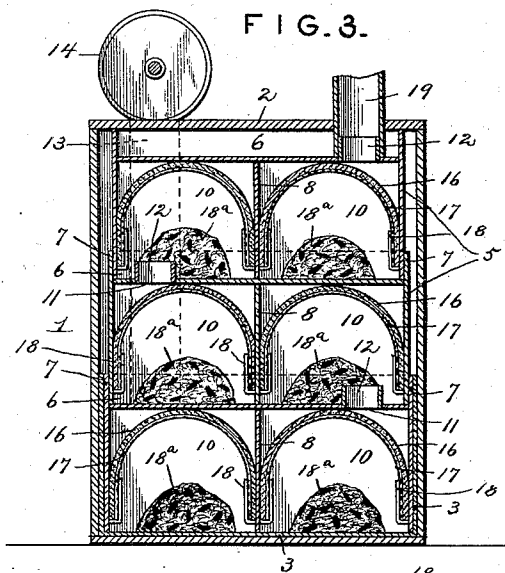


J. R. COOK.
AIR COOLING APPARATUS.

No. 540,237.

Patented June 4, 1895.



Inventor

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Witnesses

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UNITED STATES PATENT OFFICE.

JOHN R. COOK, OF PIOCHE, NEVADA.

AIR-COOLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 540,237, dated June 4, 1895.

Application filed November 20, 1894. Serial No. 529,409. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. COOK, a citizen of the United States, residing at Pioche, in the county of Lincoln and State of Nevada, have invented a new and useful Air-Cooler and Ventilator, of which the following is a specification.

This invention relates to air cooling and ventilating apparatus; and it has for its object to provide a new and useful apparatus of this character making provision for the reduction of the temperature of the outer air and the distribution of the cold air throughout public and private buildings, or in cold storage rooms, for cooling and ventilating purposes.

With this and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a perspective view, partly in section, of an air-cooling and ventilating apparatus constructed in accordance with this invention. Fig. 2 is a central vertical longitudinal sectional view thereof. Fig. 3 is a transverse sectional view on the line *xx* of Fig. 2. Fig. 4 is a bottom perspective view of one of the air-circulating pans. Fig. 5 is a detail longitudinal sectional view of the upper portion of the apparatus, showing a modified arrangement of the air-inlet pipe when the apparatus is adapted particularly for cold-storage purposes.

Referring to the accompanying drawings, 1 designates a water tight cooling box or tank that is preferably made in a rectangular shape and is of any desired depth according to the capacity of the apparatus, and said water tight cooling box 1, is inclosed at the top by a top lid or cover 2, and is preferably provided at the bottom with a bottom water pan 3, made of sheet metal in order to positively prevent leakage at the bottom of the box or tank, and suitably connected with one end of said tank is an ordinary water gage 4, that serves to indicate when the proper depth of water is in the bottom of the box or tank. The said water tight cooling box or tank 1, is adapted to removably and snugly receive therein a series of horizontal superposed air

circulating pans 5. The circulating pans 5, are arranged one above the other within the box 1, from the top to the bottom of said box to completely fill up the interior space thereof, and there may be any desired number of said pans according to the requirements of the apparatus, and the capacity thereof, and said pans are preferably made of galvanized iron or other suitable non-rusting sheet metal. The pans 5, are open at the bottom and are provided at the top with the flanged water trays 6, surrounded by the upwardly projecting tray flanges 7, and the top water trays 6, of the said pans not only serve to hold water, but snugly receive therein the open lower sides of the circulating pan immediately thereabove and form the bottoms therefor, and by reason of the pans fitting within the trays of the pan immediately therebelow it will be obvious that the water in the said water trays will serve to seal the joints between the superposed pans to provide for the total exclusion of air and the confining thereof in the circulating passages within the said pans.

The open-bottom air circulating pans 5, are provided therein with central longitudinal partition walls 8, that extend from one end of the pans to a point short of the opposite ends thereof to leave end air passages 9, at one end of the pans, to provide communication at one end between the opposite parallel air circulating passages 10, formed at opposite sides of the central partition walls 8, within said pans, and the pans are provided in the tops thereof at the end opposite the passages 9, with the top air inlet openings 11, that communicate with one of the passages 10, of the pans and thereby compel the air that enters the said pans to circulate longitudinally through both air circulating passages therein, before it can find escape out of the pans.

The top air inlet openings 11, of the pans are surrounded by the upwardly projecting overflow flanges 12, that serve to hold a certain depth of water in the water trays 6, of the pans, and at the same time form an overflow for the water that runs into each succeeding lower water tray, and the said flanged air inlet openings 11, of the air circulating pans are arranged alternately near opposite sides of said pans, so that the entire series of said air inlet openings will be out of align-

ment with each other and the air inlet opening of one pan will form the air outlet opening for the pan immediately thereabove, and will communicate with that air circulating passage of such upper pan not having the air inlet opening communicating directly therewith.

The said rectangular air circulating pans 5, are all of substantially the same size excepting the lowermost pan in the bottom of the box or tank 1, and said lowermost pan is slightly longer than the other pans, and is provided in the top and at one end beyond the end of the pan immediately thereabove with an air outlet opening 12^a, into which is fitted the lower end of an air suction pipe 13, that extends through the top of the box or tank 1, and is connected with a suitable ventilating or exhaust fan 14, that is arranged on top of the box or tank 1, and is operated by means of an adjacent electric motor or other suitable motor device 15 directly geared therewith and also arranged on top of the box or tank.

The separate parallel air circulating passages 10, of all of the superposed air circulating pans 5, are lined at the sides and top with inverted U-shaped absorbent linings 16, that may be made of blotting paper or other similar substance having strong capillary attraction, and said absorbent linings 16 are held within the passages 10, by means of inverted U-shaped screening 17, of a suitable mesh, that will not interfere with the free contact of air with the exposed surface of the absorbent lining 16. The screening 17, is preferably secured in position within the passages 10, of the pans 5, by means of a series of upwardly disposed clamp hooks or clips 18, arranged along opposite inner sides of the pans and both sides of the partition walls 8, therein, to engage the opposite side edges of the screenings 17.

In addition to the absorbent linings 16, for the air circulating passages of the air circulating pans, a number of separate sponges or other absorbent bodies 18^a are arranged within the air passages 10, of the pans directly on the bottoms of said passages formed by the bottoms of the trays in which the lower open sides of the pans fit, and said sponges or other absorbent bodies 18^a, absorb themselves full of water from the water trays, and thereby give an increased evaporating surface with which the air comes in contact as it is drawn through the circulating passages of the pans.

The air inlet opening of the uppermost air circulating pan has connected thereto an air inlet pipe 19, that leads to the outer air to provide for supplying the cooler with pure fresh air from the outside of the building or room that is to be cooled and ventilated, but before the apparatus is set in operation, water is introduced through the air inlet opening of the top or uppermost circulating pan, and a sufficient quantity of water is supplied to the pans so that the water trays of all the

pans will overflow into the next lower tray, and so on, to the bottom of the box or tank 1, and the water gage 4, at one bottom end of the said box or tank will indicate when the proper amount of water is in the bottom of the cooler box, and when this indication is made the water trays of all the pans will be filled or supplied with the required amount of water to provide for the cooling of the air drawn through the pans.

When the water trays of the circulating pans have been primed with water in the manner described, it will be obvious that the sponges or other absorbent bodies 18^a, will become wet, and the side edges of the absorbent linings 16, by dipping in the water, will cause the entire linings to become wet by reason of the capillary attraction thereof, and by this construction it will also be apparent that the air circulating passages are perfectly air tight throughout, while at the same time being continuously and evenly moist or wet throughout their entire length to provide a large evaporating surface. By now connecting the air suction pipe 13, with the ventilating or exhaust fan 14, a strong current of air will be drawn in through the air inlet pipe, and tortuously through the air circulating passages of all of the pans before it finds escape into the building or room to be cooled and ventilated. As the air traverses the circulating passages of the pans a rapid evaporation of water is produced with a consequent cooling of the air to a considerable degree, and as the water evaporates, an additional quantity may be added from time to time.

A number of the herein described coolers or ventilators may be used conjointly to cool or ventilate large rooms or buildings, and the several apparatus may be supplied by one main pipe leading outside of the room or building, and at this point attention is directed to the modified arrangement of the apparatus as illustrated in Fig. 5, of the drawings, which arrangement of the apparatus is employed for the production of a very low temperature for cold storage purposes. In this modification a horizontal air inlet pipe 19^a, is adapted to be arranged flat within the water tray of the uppermost air circulating pan, and the said inlet pipe is provided at its ends with elbows 20, to provide connections with the air inlet opening of the top pan, and also with the ventilating or exhaust fan. When the horizontal pipe 19^a, is employed, the water tray of the top air circulating pan is made sufficiently deep to accommodate a quantity of ice that is packed therein on and around the pipe 19^a. When the air is drawn through the pipe 19^a, the same is cooled somewhat and the moisture in the air is condensed. The air thus cooled and dried passes through the wet air passages of all the pans and out through the suction pipe, and while passing through said air passages evaporation takes place, as already described. The water from the melting ice may be allowed to drain

through a water opening 12, formed in the bottom of the tray holding the ice, so that such water may be used to supply the trays of the several pans with the requisite quantity of water, and a suitable drain pipe 22, shown in dotted lines in Fig. 2 of the drawings, may be employed in connection with the modified arrangement to drain off surplus water.

Changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In an air cooling and ventilating apparatus, the combination of a series of superposed intercommunicating air circulating pans having air passages therein and water trays, and means for circulating air through said pans, substantially as set forth.

2. In an air cooling and ventilating apparatus, a series of superposed intercommunicating air circulating pans provided therein with wet air passages, and means for circulating air through the air passages of the entire series of pans, substantially as set forth.

3. In an air cooling and ventilating apparatus, a water tight cooling box, a series of horizontal superposed air circulating pans fitted within said box and provided with top water trays and air circulating passages closed at the bottom by the water tray of the pan immediately therebelow, and means for circulating air through the air passages of the entire series of pans, substantially as set forth.

4. In an air cooling and ventilating apparatus, the combination of a water tight cooling box, a series of horizontal superposed air circulating pans arranged within said box and provided with top water trays and air circulating passages closed at the bottom by the water tray of the pan immediately therebelow, absorbent material arranged within the air passages of the pans, and means for circulating air through the passages of the entire series of pans, substantially as set forth.

5. In an air cooling and ventilating apparatus, a water tight cooling box, a series of horizontal rectangular superposed air circulating pans arranged one upon the other within said box, said pans being open at the bottom and provided with flanged top water trays, and central longitudinal partition walls therein extending from one end thereof to a point short of the opposite ends to leave end air passages and opposite parallel circulating passages closed at the bottom by the water tray of

the pan immediately therebelow, and means for circulating air through the passages of said pans, substantially as set forth.

6. In an air cooling and ventilating apparatus, a water tight cooling box having a bottom water pan, a series of horizontal superposed open-bottom air circulating pans arranged one above the other within said box and provided with flanged top water trays, separate communicating air circulating passages therein closed at the bottom by the water tray immediately therebelow, and flanged top air inlet openings communicating with one of the air passages, the flanged top air inlet openings of the several pans being arranged out of alignment and each forming the air outlet opening for the pan immediately thereabove, the lowermost of said circulating pans being longer than the pans thereabove and provided at one end with an air outlet opening, a ventilating or exhaust fan having a pipe connection with the air outlet opening of the lowermost pan, and an air inlet pipe connected with the air inlet opening of the uppermost or top pan, substantially as set forth.

7. In an air cooling and ventilating apparatus, a water tight box, a series of superposed intercommunicating air circulating pans arranged in said box and provided with top water trays and separate parallel air circulating passages closed at the bottom by the water tray immediately therebelow, inverted U-shaped absorbent linings fitted within the circulating passages of the pan, similarly shaped screenings fitted within said passages against the linings, securing means for said screenings, separate absorbent bodies arranged loosely in said passages, and means for maintaining an air circulation through the passages of said pans, substantially as set forth.

8. In an air cooling and ventilating apparatus, a water tight box, a series of superposed circulating pans arranged within said box and provided with flanged trays at the top and air inlet openings communicating with the interior thereof, an air suction pipe connected with the lowermost of said pans, and a horizontal air inlet pipe connected with the uppermost or top pan and arranged within the flanged tray thereof, said tray of the uppermost or top pan being adapted to contain ice, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN R. COOK.

Witnesses:

GEORGE H. WILLIAMS,
T. J. OSBORNE.