

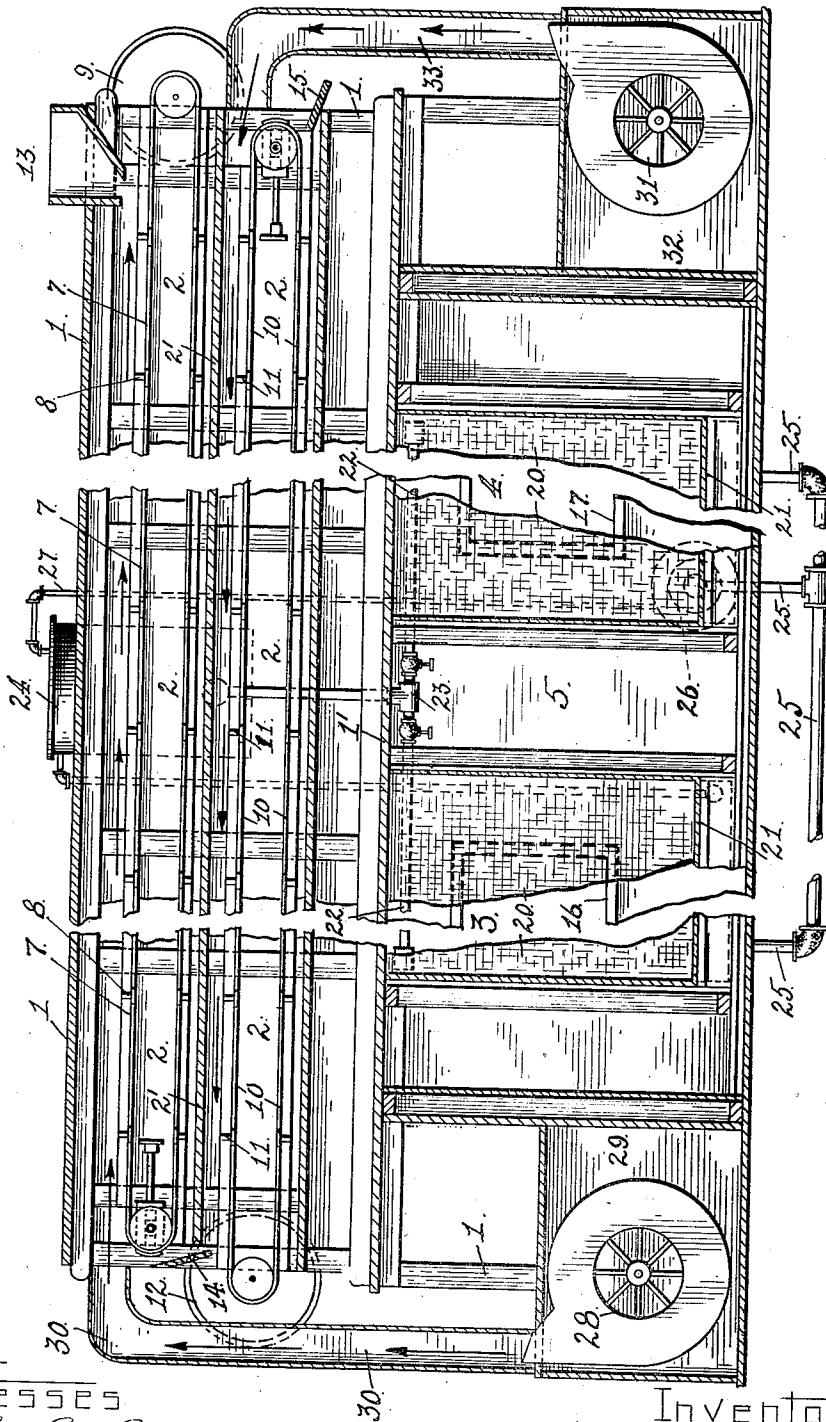
W. C. ANDERSON.
AIR COOLING APPARATUS FOR FRUIT.
APPLICATION FILED OCT. 24, 1910.

1,024,763.

Patented Apr. 30, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses
Arthur L. Slee.
S. Constance.

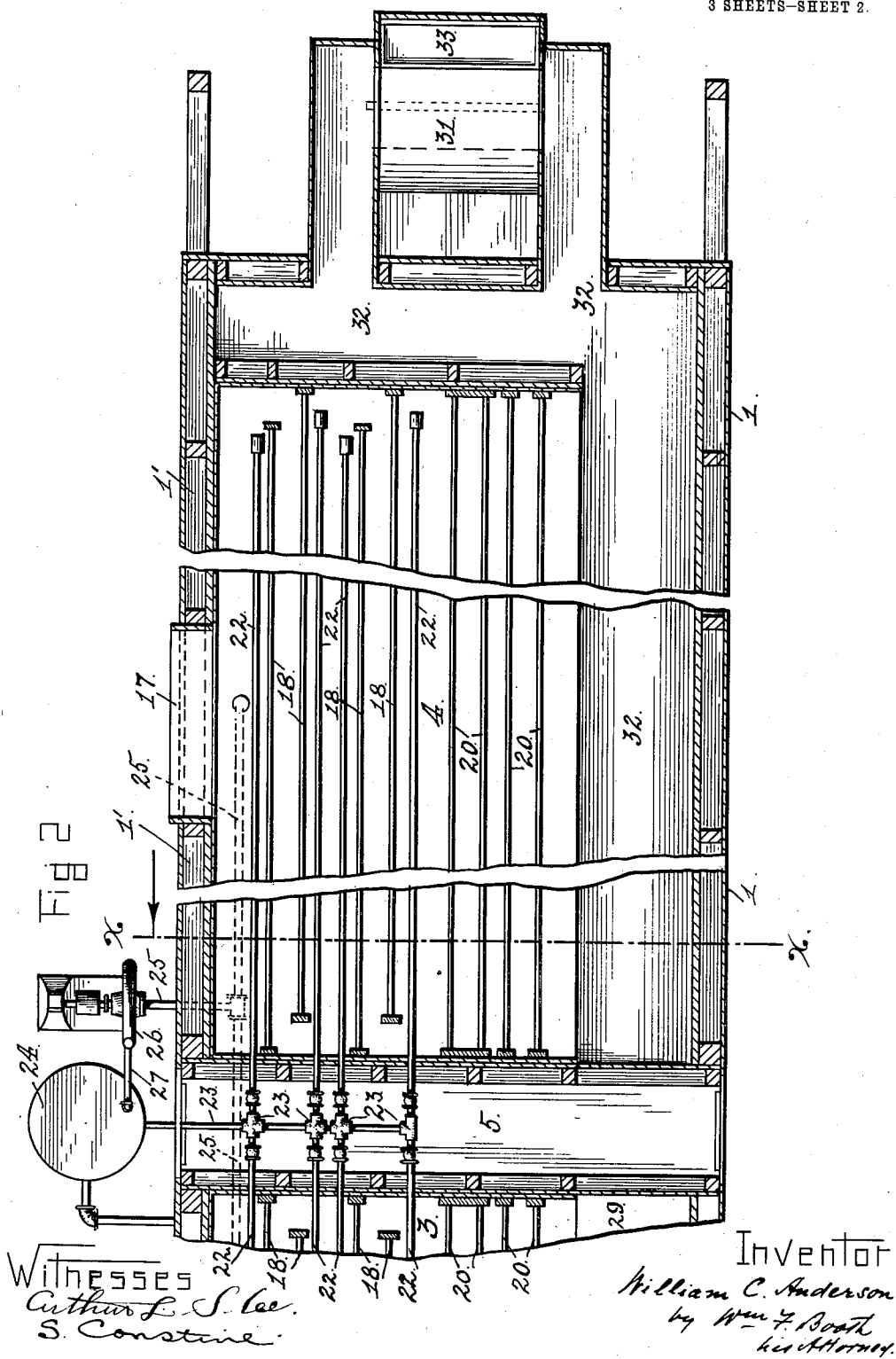
Inventor
William C. Anderson
by H. F. Booth
his Attorney

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3 SHEETS—SHEET 2.



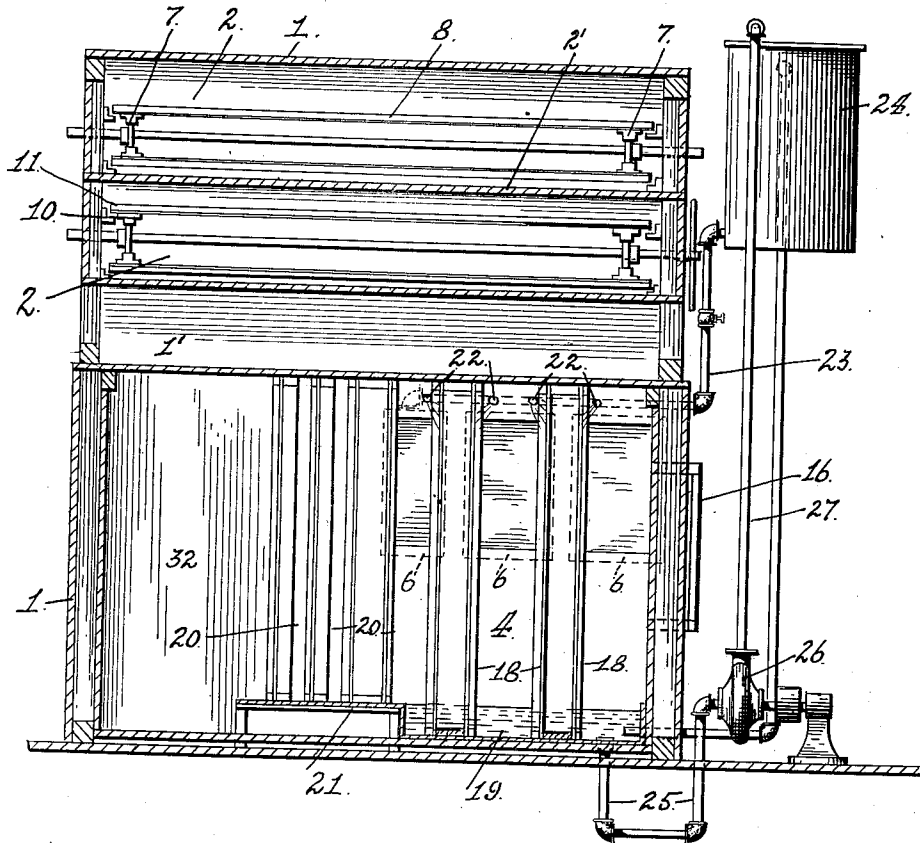
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3 SHEETS-SHEET 3.

Fig 3



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UNITED STATES PATENT OFFICE.

WILLIAM C. ANDERSON, OF SAN JOSE, CALIFORNIA.

AIR-COOLING APPARATUS FOR FRUIT.

1,024,763.

Specification of Letters Patent.

Patented Apr. 30, 1912.

Application filed October 24, 1910. Serial No. 588,702.

To all whom it may concern:

Be it known that I, WILLIAM C. ANDERSON, a citizen of the United States, residing at San Jose, in the county of Santa Clara and State of California, have invented certain new and useful Improvements in Air-Cooling Apparatus for Fruit, of which the following is a specification.

My invention relates to the class of air-cooling apparatus.

While my invention may be applied to the reduction of temperature for any purpose and upon any material, it is especially adapted for the cooling of fruit, particularly raisins, in which connection I shall, for illustration, describe its object.

In the now well known and extensively practiced art of seeding raisins, there is a preliminary process which consists in first heating the raisins and then cooling them, the object being to render their stems, especially the short, individual cap stems by which each raisin is joined to the main or cluster stem, sufficiently brittle to readily break off without injury to the raisin, when subjected to abrading action of the "cap-stemmer".

There is little difficulty in the heating process, but as the normal temperature in localities where raisins are grown and seeded is naturally very high, and as the final result is best when the cooling step is relatively quick, the matter of properly reducing the temperature of the raisins after being heated is not so easy of accomplishment, when both time and money must be considered.

The object of my invention may, therefore, be stated to be the provision of means for effectively cooling the raisins both quickly and at minimum expense, and this I attain by the use of air without regard to its normal or original temperature, and by the economical use of water to reduce the temperature of the air, both uses being under conditions of mechanical structure and application which will best serve the purpose.

To this end my invention consists in the novel apparatus which I shall hereinafter fully describe and claim, reference being made to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal sectional view of my apparatus. Fig. 2 is a

horizontal section, broken, of the same, taken through the upper portion of the air-cooling chambers. Fig. 3 is a cross section on the line $x-x$ of Fig. 2, the fruit cooling chamber of Fig. 1 being restored.

1 is a housing of suitable dimensions. This is divided horizontally by a partition 1' into a fruit-cooling chamber 2 above and an air cooling chamber below, the latter being itself divided vertically into two sections 3 and 4, access to which is had through a central passage 5 with man holes 6, the latter being indicated in Fig. 3.

The cooling chamber 2 is for the fruit, which may be contained therein in any suitable manner, either being deposited, treated and removed in batches or carried through said chamber by continuous operation. In the full expression of my invention in this regard, the latter course is deemed best, and is carried out as follows: The cooling chamber 2 is divided horizontally by a partition 2' into an upper and a lower compartment. In the upper compartment is mounted an endless traveling screen carrier 7 with cross flights 8, said carrier being driven by a pulley 9. In the lower compartment is mounted a second similar carrier 10 with flights 11, and driven by a pulley 12. The feed hopper 13 communicates with one end of the upper course of the carrier 7. At the end of this course the carrier communicates through a chute 14 with the upper course of the lower carrier, and at the end of this course of the lower carrier the fruit is discharged over an apron 15, convenient means, not shown, being employed to receive and transport the material as it comes from the apron. The carriers travel in opposite directions, and this system may be multiplied to any extent desired.

In one side of the housing 1, is an air-intake 16 which opens into the air cooling chamber 3. A similar air-intake 17 opens into the air cooling chamber 4. In each of these air cooling chambers is a series of spaced wet curtains 18. These are near the air-intake side of the chamber and hang from the ceiling to the floor, the latter being formed as a drip tank 19. These curtains may be of any suitable material such as burlap or other similar absorbent fabric. Adjacent curtains are arranged to terminate short of opposite ends, so that the space

between the intake and the first wet curtain communicates at one end with the space between the first and second curtains, and said last named space communicates at the other

5 end with the space between the second and third wet curtains, and so on, so that the air is thus forced to travel through a long and tortuous course between the wet curtains.

10 In the air cooling chamber sections 3 and 4, beyond the series of wet curtains, is a series of dry curtains 20, spaced from each other and hanging from above, their lower edges terminating on a portion 21 raised

15 above the level of the tank floor 19, so that they do not hang in the water. These dry-curtains are also of some fabric, pervious to air, and their arrangement in the chambers is such that the air from the wet curtain series must pass through them.

20 22 are sprinkler pipes besides the upper portions of the wet-curtains, whereby water is delivered to said curtains. These pipes are supplied through valve controlled con-

25 nections at 23 from a water supply tank 24. The water from the wet curtains dripping into the tank floor 19 is taken by pipes 25 to a centrifugal pump 26, the discharge 27 from which leads back into the water supply

30 tank 24, so that the same water is used over again.

At one end of the housing 1 is a fan 28, the suction conduit 29 of which leads from the air cooling chamber section 3 at one side

35 of the series of dry-curtains 20, and said fan delivers the air through a discharge conduit 30 into the upper compartment of the fruit cooling chamber, just above the upper course of the carrier therein, and at that end of said

40 carrier where it delivers its material upon the lower carrier, so that the course of the cooling air through the upper compartment, as shown by the arrows, is against the travel of the fruit, said upper compartment being

45 open at A to provide a discharge for the air. At the other end of the housing 1 is a similar fan 31, drawing through a conduit 32 from the air cooling chamber section 4, and delivering through a conduit 33 into the

50 lower compartment of the fruit-cooling chamber, at that end of the carrier therein where it discharges its fruit, so that the course of the air in this compartment is also against the travel of the fruit, as shown

55 by the arrows, this lower compartment being also provided with an air discharge outlet B.

The operation of the apparatus is as follows:—The fruit is fed at 13 to the carrier

60 7, and by it is conveyed forwardly. In its course it meets and is cooled by the cool air, which flows in an opposite direction to the travel of the material. This air is from the intake 16, which passing back and forth be-

65 tween the series of wet curtains is reduced in

temperature, and, by the rapid evaporation of its moisture carried particles in passing through the dry curtains, is further cooled. In like manner the fruit on the second carrier 10 is exposed to an oppositely flowing

70 cool air current, derived from the intake 17, and cooled and dried by the wet and dry curtains in chamber section 4. The water itself by the course indicated soon parts with its heat and may be used over and over

75 again.
Having thus described my invention, what I claim as new and desire to secure by Letters Patent is—

1. An apparatus of the character set forth comprising a housing having a plurality of compartments for the material to be cooled, a plurality of separate air cooling chambers one of said chambers for each one of the first mentioned compartments, and each

85 provided with means for cooling air, and means for conveying air from each one of the cooling chambers respectively to one of the material cooling chambers.

2. An air-cooling apparatus comprising a housing having a chamber for the material to be cooled and a separate chamber for cooling the air, said last named chamber having an intake communication with the outer air; a fan having a suction-conduit

95 communication with the air-cooling chamber, and a discharge-conduit communication with the material-cooling chamber; a series of vertical curtains in said air-cooling chamber with which the air in its flow from the intake to the suction-conduit of the fan is brought in contact; means for keeping said

100 curtains wet with water; and a separate series of vertical dry curtains pervious to air, in said air cooling chamber, disposed

105 therein to intercept the air in its flow from the wet curtains to the suction-conduit of the fan and cause said air to pass through them.

3. An air-cooling apparatus comprising a

110 housing having a chamber for the material to be cooled and a separate chamber for cooling the air, said last named chamber having an intake communication with the outer air; a fan having a suction-conduit

115 communication with the air cooling chamber, and a discharge-conduit communication with the material-cooling chamber; a series of spaced wet curtains disposed within the air cooling chamber in the vicinity of the

120 air intake and between which the air from said intake first flows; and a series of dry curtains pervious to air, in said chamber disposed between the series of wet curtains and the suction-conduit of the fan and arranged

125 to effect the passage of the air through said dry curtains.

4. An apparatus of the character set forth comprising a housing having a chamber divided into two compartments for the ma-

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terial to be cooled, a traveling carrier in one of said compartments with means for supplying material to one end thereof, a second traveling carrier in the other of said compartments with means for receiving the material from the other end of the first named carrier and means for discharging said material from its end opposite to that at which it receives it, and means for supplying a blast of air to the first compartment of the material cooling chamber at the delivery end of the carrier therein, and to the second compartment at the delivery end of the carrier in said compartment.

5. An air-cooling apparatus comprising a housing having a chamber for the material to be cooled and a separate chamber for cooling the air, said last named chamber having an intake communication with the outer air; a traveling carrier in the material-cooling chamber; means for supplying material to the carrier at one end; a fan having a suction-conduit communication with the air-cooling chamber, and a discharge-conduit communication with the material-cooling chamber at that end of the carrier therein opposite to its material-receiving end, whereby the flow of air is directed against the travel of the material; curtains in said air cooling chamber with which the air in its flow from the intake to the suction-conduit of the fan is brought in contact; means for keeping said curtains wet with water; and dry curtains pervious to air, in said air cooling chamber disposed therein to intercept the air in its flow from the wet curtains to the suction-conduit of the fan and cause said air to pass through them.

6. An air-cooling apparatus comprising a housing having a chamber for the material to be cooled and a separate chamber for cooling the air, said last named chamber having an intake communication with the outer air; a traveling carrier in the material-cooling chamber; means for supplying material to the carrier at one end; a fan having a suction-conduit communication with the air-cooling chamber, and a discharge-conduit communication with the material-cooling chamber at that end of the carrier therein opposite to its material-receiving end, whereby the flow of air is directed against the travel of the material; a series of spaced wet curtains disposed within the air cooling chamber in the vicinity of the air intake and between which the air from said intake first flows; and a series of dry curtains pervious to air, in said chamber disposed between the series of wet curtains and the suction-conduit of the fan and arranged to effect the passage of the air through said dry curtains.

7. An air-cooling apparatus comprising a housing having a chamber divided into

separate compartments, for the material to be cooled, and a separate chamber for cooling the air, said last named chamber being divided into two sections each having an intake communication with the outer air; a traveling carrier in one compartment of the material-cooling chamber, with means for supplying the material to one end thereof; a second traveling carrier in the other compartment of the material-cooling chamber, with means for receiving the material from the other end of the first carrier and means for discharging said material from its end opposite to that at which it receives it; a fan having a suction-conduit communication with one of the sections of the air cooling-chamber and a discharge-conduit communication with the first compartment of the material-cooling chamber at the delivery end of the carrier therein; and a second fan having a suction-conduit communication with the other section of the air cooling chamber and a discharge-conduit communication with the second compartment of the material-cooling chamber at the delivery end of the carrier therein.

8. An air-cooling apparatus comprising a housing having a chamber divided into separate compartments, for the material to be cooled, and a separate chamber for cooling the air, said last named chamber being divided into two sections each having an intake communication with the outer air; a traveling carrier in one compartment of the material-cooling chamber, with means for supplying the material to one end thereof; a second traveling carrier in the other compartment of the material cooling chamber, with means for receiving the material from the other end of the first carrier and means for discharging said material from its end opposite to that at which it receives it; a fan having a suction-conduit communication with one of the sections of the air cooling-chamber and a discharge-conduit communication with the first compartment of the material-cooling chamber at the delivery end of the carrier therein; a second fan having a suction-conduit communication with the other section of the air cooling chamber and a discharge-conduit communication with the second compartment of the material-cooling chamber at the delivery end of the carrier therein; curtains in each of the sections of said air cooling chamber with which the air in its flow from the intakes to the suction-conduits of the fans is brought in contact; and means for keeping said curtains wet with water.

9. An air-cooling apparatus comprising a housing having a chamber divided into separate compartments, for the material to be cooled, and a separate chamber for cooling the air, said last named chamber being divided into two sections each having an

intake communication with the outer air; a traveling carrier in one compartment of the material-cooling chamber, with means for supplying the material to one end thereof; 5 a second traveling carrier in the other compartment of the material-cooling chamber, with means for receiving the material from the other end of the first carrier and means for discharging said material from its end 10 opposite to that at which it receives it; a fan having a suction-conduit communication with one of the sections of the air cooling-chamber and a discharge-conduit communication with the first compartment of 15 the material-cooling chamber at the delivery end of the carrier therein; a second fan having a suction conduit communication with the other section of the air cooling chamber and a discharge-conduit communication with the second compartment of the 20 material-cooling chamber at the delivery end of the carrier therein; curtains in each of the sections of said air-cooling chamber with which the air in its flow from the intakes to the suction-conduits of the fans is brought in contact; means for keeping said 25 curtains wet with water; and dry curtains pervious to air, in each of said sections of the air cooling chamber disposed therein to intercept the air in its flow from the wet 30 curtains to the suction-conduits of the fans and cause said air to pass through them.

10. An apparatus of the character set forth comprising a housing having in the 35 upper part thereof a chamber for the material to be cooled, an air cooling chamber located beneath the first mentioned chamber and having an intake communication with the outer air, air cooling means in said 40 chamber, means for drawing air through the air cooling chamber to the material cooling chamber, and a passage within the housing extending longitudinally thereof beneath the material cooling chamber and leading from 45 the air cooling chamber to said last mentioned means.

11. An apparatus of the character set forth comprising a housing having in the 50 upper part thereof a chamber for the material to be cooled, an air cooling chamber located beneath the first mentioned chamber and having an intake communication with the outer air, air cooling means in said 55 chamber, means for drawing air through the air cooling chamber to the material cooling chamber, and a passage within the housing extending longitudinally thereof beneath the material cooling chamber to one side of the 60 air cooling chamber and leading from the air cooling chamber to said last mentioned means.

12. An apparatus of the character set forth comprising a housing having in its 65 upper part a chamber for the material to be cooled extending longitudinally thereof, an

air cooling chamber extending transversely of the housing beneath the first mentioned chamber and terminating short of one of the side walls of the housing, said air cooling chamber having an intake opening 70 through one side of the housing air cooling means in said chamber, means for drawing air through the air cooling chamber to the material cooling chamber, and a passage within the housing leading from the inner 75 end of the air cooling chamber to said last mentioned means.

13. An apparatus of the character set forth comprising a housing having in its upper part a chamber for the material to be 80 cooled extending longitudinally thereof, an air cooling chamber extending transversely of the housing beneath the first mentioned chamber and terminating short of one of the side walls of the housing, said air cooling 85 chamber having an intake opening through one side of the housing, means for drawing air through the air cooling chamber to the material cooling chamber, a passage within the housing leading from the inner end of 90 the air cooling chamber to said last mentioned means, a series of spaced wet curtains disposed within the air cooling chamber adjacent its air-intake opening, and a series of 95 dry curtains, pervious to air, in said chamber disposed between the series of wet curtains and said passage.

14. An apparatus of the character set forth comprising a housing having a chamber divided into two compartments for the 100 material to be cooled, and a separate air cooling chamber divided into two sections each having an intake communication with the outer air, a traveling carrier in one compartment of the material cooling chamber, 105 means for supplying material to one end of said carrier, a second traveling carrier in the other compartment of the material cooling chamber with means for receiving the material from the delivery end of the first mentioned carrier and means for discharging 110 said material from its end opposite to that at which it receives it, air cooling means in each compartment of the air cooling chamber, and separate means for drawing air 115 through each of said compartments to the respective sections of the material cooling chamber.

15. An apparatus of the character set forth comprising a housing having in its upper portion a chamber extending longitudinally thereof and divided into two compartments for the material to be cooled, and separate air cooling chambers extending transversely of the housing beneath the first 120 named chamber, each of said chambers being provided with air openings extending through a side wall of the housing, a fan having a discharge conduit communicating with one of the compartments of the ma- 125 130

5 terial cooling chamber, a second fan having a discharge conduit communicating with the other compartment of the material cooling chamber, and separate passages in the housing leading from the respective cooling chambers to the suction inlets of the respective fans.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM C. ANDERSON.

Witnesses:

WM. F. BOOTH,
D. B. RICHARDS.