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Patented Jan. 28, 1902.

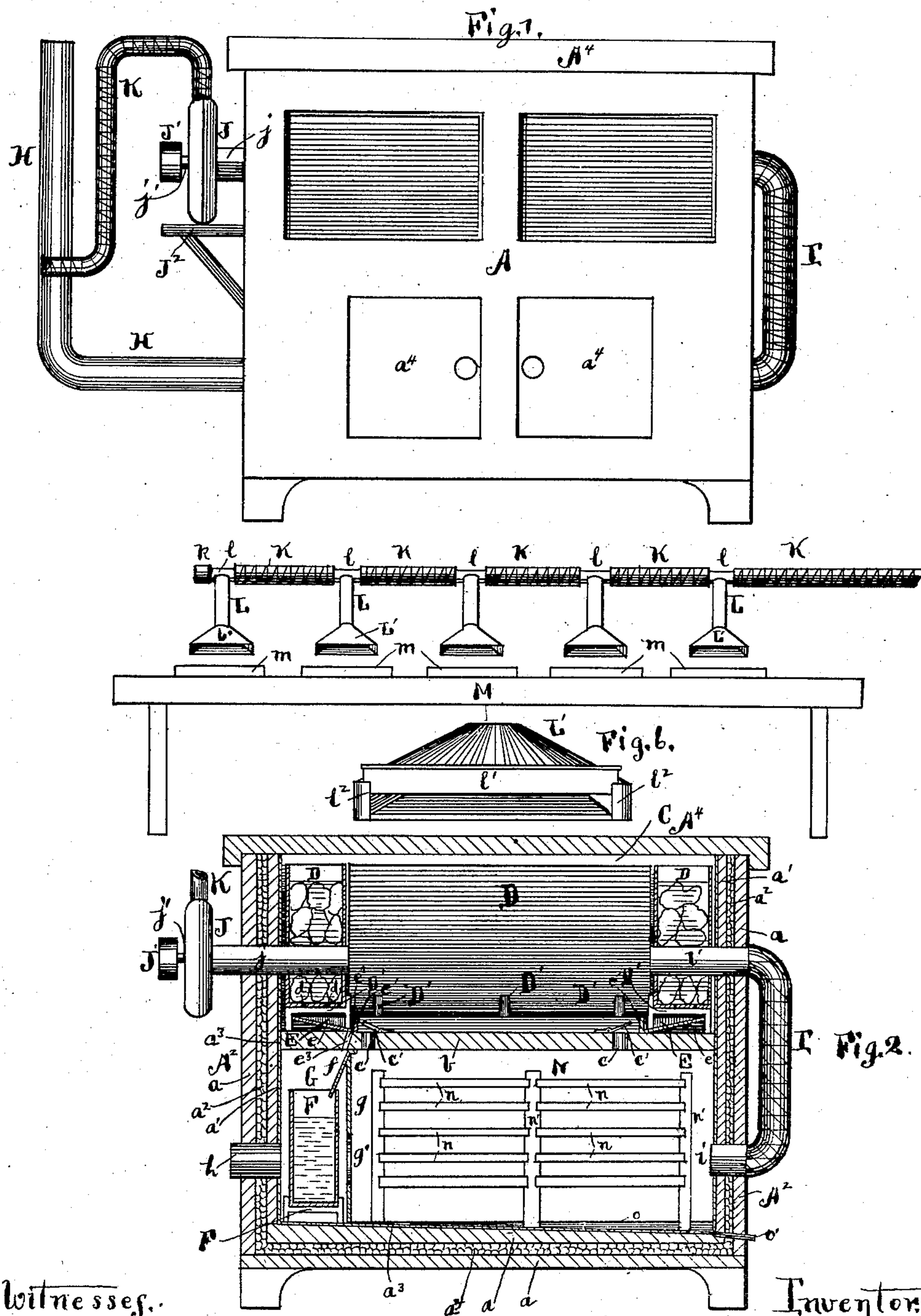
G. ALLEGRETTI.

COOLING OR REFRIGERATING APPARATUS.

(Application filed May 20, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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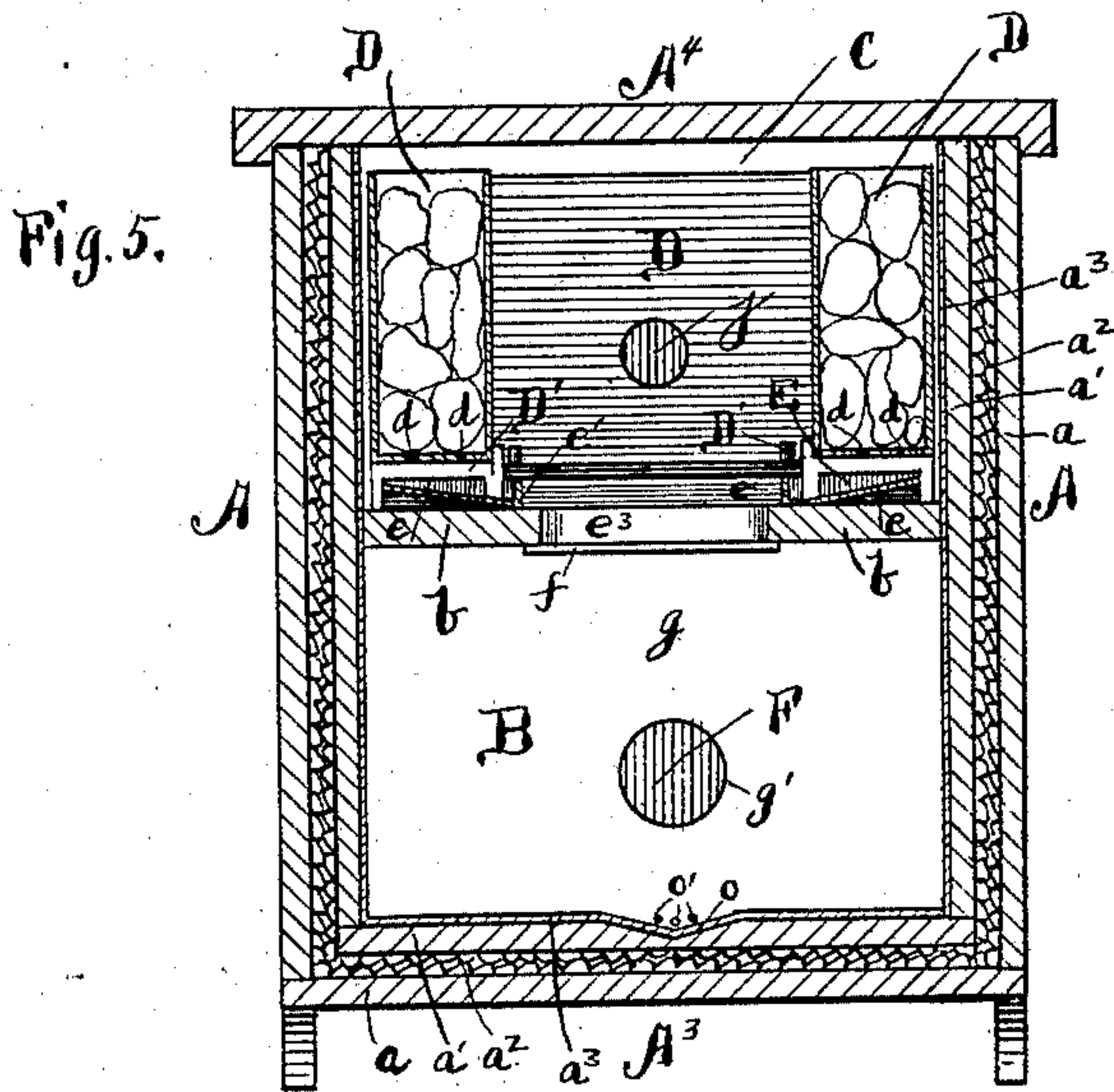
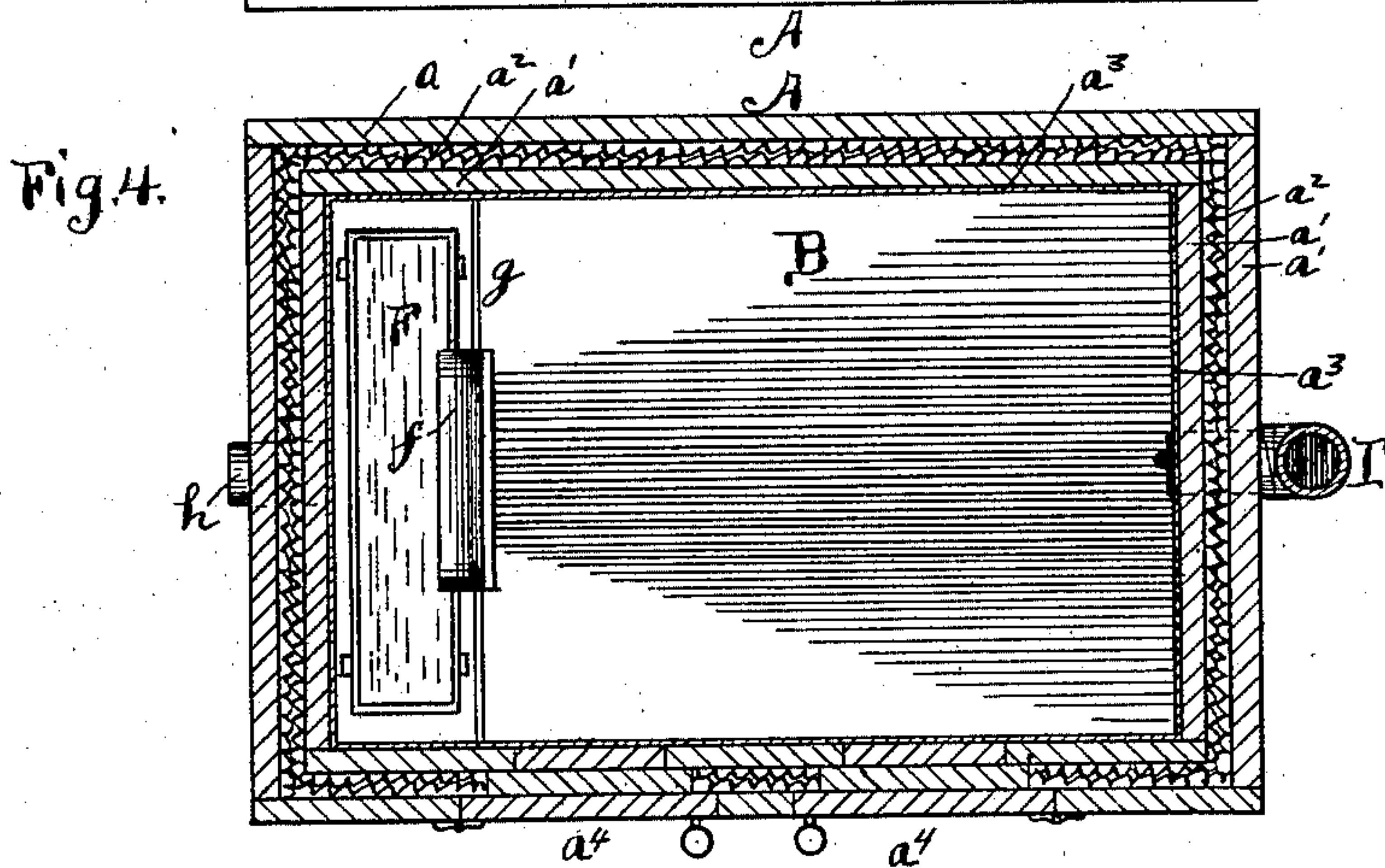
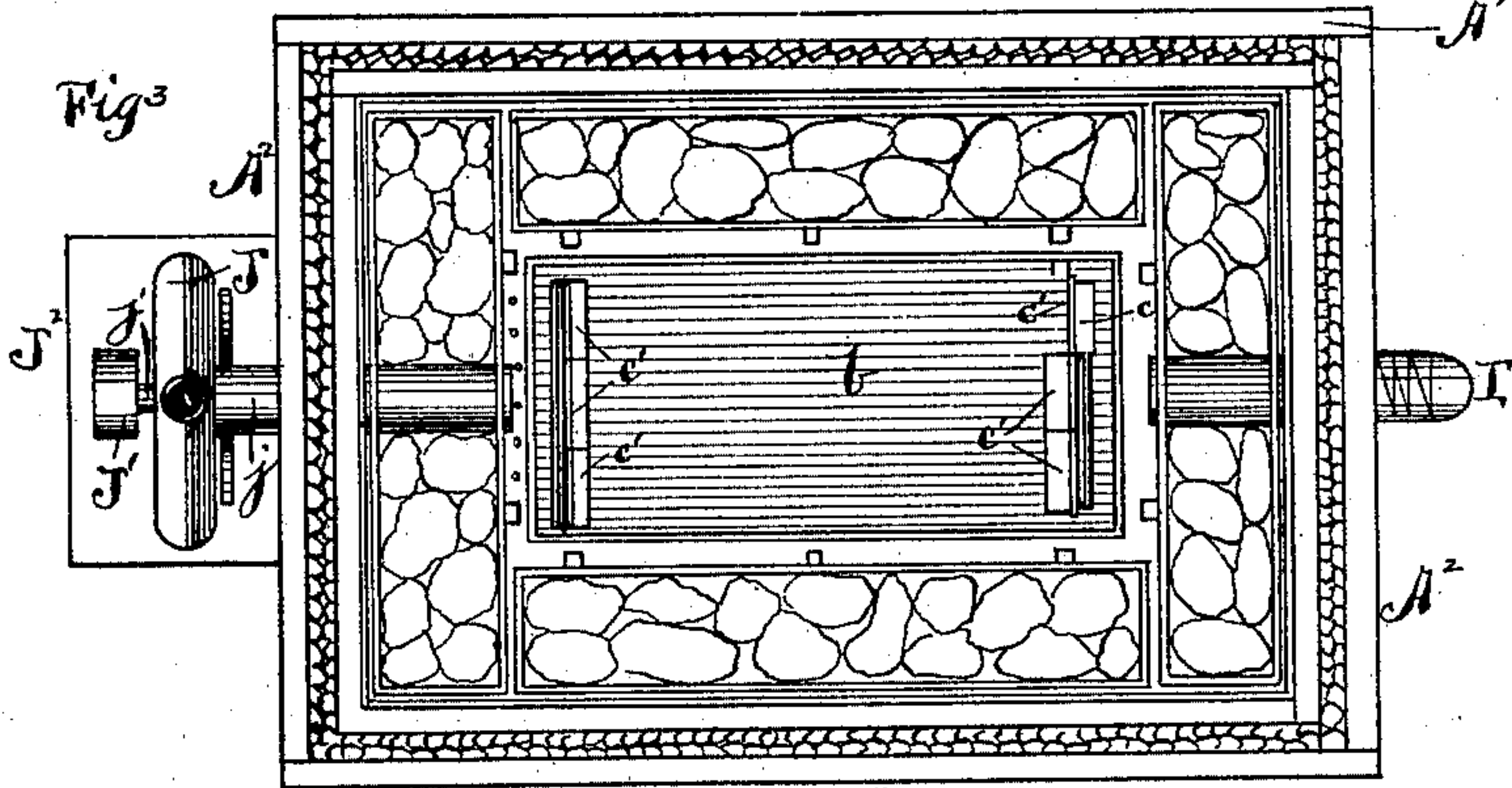
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

GIACOMO ALLEGRETTI, OF CHICAGO, ILLINOIS.

COOLING OR REFRIGERATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 692,044, dated January 28, 1902.

Application filed May 20, 1901. Serial No. 61,054. (No model.)

To all whom it may concern:

Be it known that I, GIACOMO ALLEGRETTI, a citizen of the United States, residing in Chicago, county of Cook, and State of Illinois, have invented a certain new and useful Improvement in Cooling or Refrigerating Apparatus, of which the following is a specification.

The apparatus of this invention is primarily designed for use in the manufacture of candy, especially creams and other candies of a soft nature, in the manufacture of which it is desirable and necessary to have a uniform and constant temperature of a room—that is to say, neither too hot nor too cold; and while the apparatus is especially adapted for the use stated it is designed and intended for use for other purposes where a uniform and constant grade of temperature is required.

The objects of the invention are to maintain the room where the manufacture of the candy is being carried on at a uniform and equal temperature constantly and at the same time have the apparatus project a blast of cooled air over the pans or trays containing the manufactured article, so as to rapidly and evenly congeal the ingredients and prevent spreading or running, which would destroy the unity and shape of the article; to construct an apparatus by the use of which the working-room will be maintained at the proper temperature and the cooled air will be projected over the pans or trays; to provide for the suction of air from the working-room and its transmission through a cooling or refrigerating structure, to be delivered therefrom and forced back into the room over the pans or trays containing the candy, and to improve generally the construction and operation of the apparatus by means of which the air is cooled and maintained in a cooled condition.

The invention consists in the features of construction and combinations of parts hereinafter described and claimed.

In the drawings illustrating the invention, Figure 1 is a front elevation of a construction of apparatus embodying the invention and showing the eduction or blast pipe for the cooled air broken away between the refrigerating or cooling box and the working-table

on which the pans or trays of candy to be cooled are placed; Fig. 2, a sectional elevation showing the construction of the interior of the cooling or refrigerating box and the arrangement of pipes for conducting air into the lower chamber or compartment of the box and up therefrom into and out from the upper chamber or compartment of the box; Fig. 3, a top or plan view of the box with the cover or lid removed and showing one of the flaps for closing the communicating passage between the upper and lower chambers or compartments raised; Fig. 4, a horizontal section taken on a line near the top of the lower chamber or compartment; Fig. 5, a vertical sectional elevation taken on a line adjacent to the receiving end for the air into the lower chamber or compartment and the discharge end for the air of the upper chamber or compartment; and Fig. 6, a detail in elevation of the discharge-nozzle for the blast of air over the pan or tray, showing a damper for gaging the discharge-opening.

In carrying out the invention a suitably-constructed cooling or refrigerating box is to be provided. The cooling or refrigerating box shown has a front wall A, a rear wall A', side walls A², and a bottom wall A³, and these walls are each formed of an outer section *a* and an inner section *a'*, with a space between the two sections for the reception of a suitable packing or filling *a*², which will make the walls less sensitive to the effects of heat and cold for the interior of the box. The box is provided with a removable cover or lid A⁴, and the lower front wall has therein openings closed by suitable doors *a*⁴, by means of which access can be had to the interior of the lower portion of the box. The box has its interior divided into a lower compartment B and an upper compartment C by a partition or floor *b*, and communication is had between the two chambers or compartments by openings or passages *c*, which are provided each with a series of flaps *c'*, by opening one or any number of which up to the full number of flaps the transmission of air between the two chambers can be regulated so as to have the temperature of both compartments the same, which will be the case when the flaps of the passages or openings are all thrown back or opened, and by

throwing back or opening one or more of the flaps and not the full number the temperature in the two chambers or compartments can be varied more or less as to the coolness of each. The box can be provided with a lining a^3 , which may be zinc or other suitable metal or material, and the bottom of the lower chamber or compartment of the box can have a zinc or other metal covering a^3 , the same as the sides and ends. The upper chamber or compartment has located therein receptacles D for containing ice, each receptacle having a perforated bottom d , and each receptacle is supported on stands D' , each stand having a body, on which the bottom of the receptacle rests, and legs by which the body is raised, so as to support the receptacle above the partition or floor between the two chambers or compartments. The partition or floor between the two chambers or compartments on its upper side has located thereon a trough or receiver E, into which the water from the melting ice flows through the perforated bottoms of the ice-receptacles, and this trough extends entirely around the chamber or compartment, adjacent to the walls thereof, and has an inclined bottom e and a vertical front side e' , so that the discharged water will flow toward the front side of the trough or receiver. An end section of the trough in the arrangement shown has in the inclined bottom adjacent to the front side holes e^2 , through which the water deposited in the trough can discharge or escape, and these holes are in line with holes e^3 through the partition or floor between the chambers or compartments for discharging or escaping the water into the lower chamber or compartment at one end. The discharged or escaped water flows onto a guide-plate f , by which it is transmitted to a receptacle F, located at one end of the lower chamber or compartment, such location being at the end of the chamber or compartment into which the air is drawn. The receptacle F is supported on stands F' , resting on the bottom of the box, and this receptacle is located in a chamber G, separated from the chamber or compartment B by a partition-plate g , having therein an opening g' , which furnishes a communication between the chamber containing the receptacle for the discharged or escaped water and the lower chamber or compartment and through which opening air admitted or drawn into the chamber or compartment G passes into the chamber or compartment B, but does not have a direct passage, owing to the interposition of the receptacle F between the induction for the air and the opening into the lower chamber or compartment, as shown in Fig. 2. The air is drawn or entered into the chamber G through a tube or thimble h , passing through the wall of the box, and this tube or thimble has connected thereto one end of a supply-pipe H, the other end of which has communication with the room in which the candy is manufactured or with such other place from which

the air-supply is to be taken. The air entered or drawn into the chamber G from the supply-pipe H passes into the chamber or compartment B through the opening g' and is educted or drawn therefrom through a tube or thimble i , entered through the wall of the box, with which tube or thimble a conducting-pipe I is connected at one end, and its other end is connected with a thimble or tube i' , passing through the wall of the box and, as shown, through the receptacle for the ice at one end of the chamber or compartment C, so that the air from the lower chamber or compartment will be exhausted or drawn into the upper chamber or compartment. A suction-fan J has communication with the upper chamber or compartment through a pipe or tube j , passing through the wall of the box and, as shown, through the ice-receptacle, which pipe or tube j is at the opposite end of the chamber or compartment to the pipe or tube i' . The suction-fan can be of any usual and well-known form of construction driven by a belt running over a pulley J' on the shaft j' of the wheel of the fan or by other suitable driving means, and the fan, as shown, is supported on a shelf J^2 , attached to the wall of the box. The air drawn into the fan is forced out therefrom through a pipe K, which pipe for use in the manufacture of candy is extended into the room in which the manufacture takes place and is carried over the table on which the candy is made, and at suitable points this pipe is divided into sections and is closed at its terminal end by a suitable cap k , so that air cannot escape at the terminal end of the pipe. The sections of the pipe have between them discharge-tubes L, which, as shown, have cross-tubes at one end to enter the ends of the sections of the main pipe, so as to allow the discharge-tube to be raised and lowered, and each discharge-tube has a spread discharge end L' , which may be left of its full width, as shown in Fig. 1, or may be provided with a damper, formed of a plate l' , sliding in guides l^2 , by means of which the discharge-opening can be increased or diminished, so as to regulate the blast. The discharge-pipes are for the purpose of discharging a blast of air over the pans or trays containing the manufactured goods, and for this purpose a pan or tray m is properly located in relation to the discharge end of a pipe, so that the blast will blow over the contents of the pan or tray, and the pans or trays are placed on a suitable table M, which may be the table on which the goods are made. The lower chamber or compartment, if desired, can be provided with suitable racks or frames N, formed of cross-bars n and supports n' , with the cross-bars arranged so as to receive the pans or trays and have the goods on the pans or trays kept in a cooled condition.

The operation of the apparatus in connection with the manufacture of soft-candy goods or other similar articles is as follows: The

box can be located either in the room where the manufacture is being done or outside of such room and arranged to have the air in the room drawn from the upper portion of the room, next to the ceiling, to pass through the supply-pipe H into the chamber G and be spread out in such chamber by the water-receptacle F to pass through the opening g' into the lower chamber or compartment, and out therefrom through the pipe I into the upper chamber or compartment, and out therefrom into the exhaust-fan and through the pipe from the exhaust-fan back again into the working-room for discharging over the pans or trays containing the finished goods, so that the cooled air thus blown over the pans or trays will congeal the finished goods and keep them against melting and spreading and in their proper shape. The circulation of air thus had will keep the working-room in approximately the same temperature, and this temperature should be one that will enable the manufacture of the goods to be carried on without trouble and inconvenience from melting and softening to an extent that would prevent the formation of the goods into the shape required. The operation of withdrawing air from the room and forcing it back again into the room to pass over the pans or trays containing the finished goods can be continued until the work is completed. With the completion of the work the fan can be stopped, when the circulation and forcing of the air will be discontinued.

The apparatus is especially desirable for use in warm weather, when it is exceedingly difficult to maintain a working-room in a sufficiently-cool condition to operate in making creams or other soft goods, as with the apparatus a low temperature can be maintained, in which the creams and other similar goods can be successfully and easily handled. The cold water from the melted ice, passing into the trough or receiver beneath the ice-receptacle, flows into the cold-water receiver in the lower chamber or compartment of the box, making this receiver exceedingly cold, with the result that the air drawn or forced through the induction tube or pipe strikes against the cold-water receptacle and is spread and diffused around the chamber in which the receptacle is located, spreading the air so that it is very susceptible to the action of the cold produced by the water in the receptacle, and this cooled air is drawn into the lower chamber or compartment, where its nature is also materially changed, and passes from such chamber up into the upper chamber or compartment, where it is subjected to the coolness in such chamber or compartment and is drawn therefrom and discharged into the working-room at the proper temperature for use. The temperature of the air can be regulated by keeping the passages or openings between the two compartments either fully closed or fully opened, or partially opened, it

being understood that naturally the upper chamber or compartment is cooler than the lower chamber or compartment, but by admitting air from one chamber into the other the difference in temperature can be regulated so as to be even or uniform or only a slight difference in degree between the two chambers.

The apparatus is simple in construction, and by its use the maintenance of an equalized temperature in the working-room is assured, which temperature is the proper one and the one best adapted for operation in manufacturing creams and other soft goods or candies.

The apparatus can be utilized as a cooling or refrigerating box for keeping perishable articles, and when so used the air drawn into the lower chamber can be forced around by the fan, maintaining a constant circulation of air between the two chambers or compartments, by which the temperature will be kept of a uniform and steady degree, insuring the preservation of any perishable article contained in the lower chamber or compartment or in the upper chamber or compartment, where such preservation is dependent on a uniform cool temperature.

The conducting-pipe between the lower compartment and the upper compartment is shown outside of the box and can be wound with any suitable material which will be a preventive against the effects of outside air and heat, and the pipe leading from the fan can also be wound with any suitable material which is a non-conductor of heat, if so desired. The overflow from the receptacle F can be discharged by the channel o in the bottom of the box and the tubes o' through the wall of the box.

What I regard as new, and desire to secure by Letters Patent, is—

1. In a cooling or refrigerating apparatus, the combination of a box having its interior divided into an upper chamber or compartment and a lower chamber or compartment, both chambers being arranged for the reception of the materials to be cooled, an induction opening or passage for air into the lower chamber or compartment and means for initially cooling it therein, a pipe or tube for educting the air from the lower chamber or compartment and inducting the cooled air into the upper chamber or compartment, means for finally cooling it therein and means for educting the cooled air from the upper chamber or compartment, substantially as described.

2. In a cooling or refrigerating apparatus, the combination of a box having its interior divided by a division-wall into upper and lower compartments in communication with one another, the chambers providing cooling-spaces within their interior, an induction opening or passage for air into the lower chamber or compartment for allowing air to enter and freely circulate therein, an eduction open-

ing or passage for the air from the lower chamber or compartment, an induction opening or passage for the air into the upper chamber or compartment, a pipe or tube connecting the eduction of the lower chamber or compartment and the induction of the upper chamber or compartment, an eduction opening or passage for the cooled air from the upper chamber or compartment, and means for inducting the air into the lower chamber or compartment and withdrawing the cooled air from the upper chamber or compartment and means for giving the air an initial cooling in the lower chamber or compartment and a final cooling in the upper chamber or compartment, substantially as described.

3. In a cooling or refrigerating apparatus, the combination of a box having its interior divided by a division-wall provided with hinged doors into upper and lower compartments in communication with one another, an induction opening or passage for air into the lower chamber or compartment allowing the air to enter and freely circulate therein, an eduction opening or passage for the air from the lower chamber or compartment, an induction opening or passage for the air into the upper chamber or compartment, a pipe or tube connecting the eduction of the lower chamber or compartment and the induction of the upper chamber or compartment, an eduction opening or passage for the cooled air from the upper chamber or compartment, receptacles in the upper chamber or compartment for containing ice, and means for inducting the air into the lower chamber or compartment and withdrawing the cooled air from the upper chamber or compartment, substantially as described.

4. In a cooling or refrigerating apparatus, the combination of a box having its interior divided into an upper chamber or compartment, and a lower chamber or compartment providing space for the reception of materials to be cooled, an induction opening or passage for air into the lower chamber or compartment allowing the air to enter and freely circulate therein, an eduction opening or passage for the air from the lower chamber or compartment, an induction opening or passage for the air into the upper chamber or compartment, a pipe or tube connecting the eduction of the lower chamber or compartment and the induction of the upper chamber or compartment, an eduction opening or passage for the cooled air from the upper chamber or compartment, receptacles in the upper chamber or compartment for containing ice through which the induction-passage is carried, each receptacle having a perforated bottom, a trough or receiver beneath the receptacles into which the water from the melting ice discharges, and means for inducting air into the lower chamber or compartment and initially cooling it therein, and means for withdrawing the cooled air from the upper chamber or compartment, substantially as described.

ber or compartment, substantially as described.

5. In a cooling or refrigerating apparatus, the combination of a box having its interior divided into an upper chamber or compartment and a lower chamber or compartment, an induction opening or passage for the air into the lower chamber or compartment, an eduction opening or passage for the air from the lower chamber or compartment, an induction opening or passage for the air into the upper chamber or compartment, a pipe or tube connecting the eduction of the lower chamber or compartment and the induction of the upper chamber or compartment, an eduction opening or passage for the cooled air from the upper chamber or compartment, receptacles in the upper chamber or compartment for containing ice arranged to leave a cooling-space within its interior each receptacle having a perforated bottom, a trough or receiver beneath the receptacles into which the water from the melting ice is discharged, holes or openings in one section of the trough for escaping the water from the trough, a receptacle for the escaped water in the lower chamber or compartment, and means for inducting air into the lower chamber or compartment and allowing it to circulate around the water-receptacle and for withdrawing the cooled air from the upper chamber or compartment, substantially as described.

6. In a cooling or refrigerating apparatus, the combination of a box having its interior divided into an upper chamber or compartment and a lower chamber or compartment, an induction opening or passage for air into the lower chamber or compartment, an eduction opening or passage for the air from the lower chamber or compartment, an induction opening or passage for the air into the upper chamber or compartment, a pipe or tube connecting the eduction of the lower chamber or compartment and the induction of the upper chamber or compartment, an eduction opening or passage for the cooled air from the upper chamber or compartment, receptacles in the upper chamber or compartment for containing ice, each receptacle having a perforated bottom, a trough or receiver beneath the receptacles into which the water from the melting ice discharges, holes or openings in one section of the trough or receiver for escaping the water from the trough or receiver, a receptacle for the escaped water into the lower chamber or compartment, a chamber in which the water-receptacle is located and into which the air-induction opening or passage enters for the air to strike on the water-receptacle, and means for inducting the air into the lower chamber or compartment and withdrawing the cooled air from the upper chamber or compartment, substantially as described.

7. In a cooling or refrigerating apparatus, the combination of a box having its interior

divided into an upper chamber or compartment and a lower chamber or compartment providing a cooling-space for the storage of materials, an induction opening or passage for allowing air to enter into the storage-space in the lower chamber or compartment, an eduction opening or passage for the air from the lower chamber or compartment, an induction opening or passage for allowing air to enter into the storage-space in the upper chamber or compartment, a pipe or tube connecting the eduction of the lower chamber or compartment and the induction of the upper chamber or compartment, an eduction opening or passage for the cooled air from the upper chamber or compartment, and an exhaust-fan connected with the eduction opening or passage of the upper chamber or compartment for inducing air into the lower chamber or compartment and withdrawing the cooled air from the upper chamber or compartment, substantially as described.

8. In a cooling or refrigerating apparatus, the combination of a box having its interior divided into an upper chamber or compartment and a lower chamber or compartment, both chambers providing space for the storage of materials to be cooled, an induction opening or passage for air into the lower chamber or compartment, an eduction opening or passage for the air from the lower chamber or compartment, an induction opening or passage for the air into the storage-space of the upper chamber or compartment, a pipe or tube connecting the eduction of the lower chamber or compartment and the induction of the upper chamber or compartment, an eduction opening or passage for the cooled air from the upper chamber or compartment, an exhaust-fan connected with the eduction opening or passage of the upper chamber or compartment for inducing air into the lower chamber or compartment and withdrawing the cooled air from the upper chamber or compartment, and a discharge-pipe leading from the fan, substantially as described.

9. In a cooling or refrigerating apparatus, the combination of a box having its interior divided into an upper chamber or compartment and a lower chamber or compartment, both chambers providing space for the storage of materials to be cooled, an induction opening or passage for air into the lower chamber or compartment, an eduction opening or passage for the air from the lower chamber or compartment, an induction opening or passage for the air into the upper chamber or compartment, a pipe or tube connecting the eduction of the lower chamber or compartment and the induction of the upper chamber or compartment, an eduction opening or passage for the cooled air from the upper chamber or compartment, an exhaust-fan connected with the eduction opening or passage of the upper chamber or compartment and inducing air into the lower chamber or compartment and withdrawing the cooled air from the upper

chamber or compartment, a discharge-pipe leading from the fan, and a series of blast-pipes connected with the discharge-pipe, substantially as described.

10. In a cooling or refrigerating apparatus, the combination of a box having its interior divided into an upper chamber or compartment and a lower chamber or compartment providing space for the storage of materials to be cooled, an induction opening or passage for air into the lower chamber or compartment, an eduction opening or passage for the air from the lower chamber or compartment, an induction opening or passage for the air into the upper chamber or compartment, a pipe or tube connecting the eduction of the lower chamber or compartment and the induction of the upper chamber or compartment, an eduction opening or passage for the cooled air from the upper chamber or compartment, an exhaust-fan connected with the eduction opening or passage of the upper chamber or compartment and inducing air into the lower chamber or compartment and withdrawing the cooled air from the upper chamber or compartment, a discharge-pipe leading from the fan, a series of blast-pipes connected with the discharge-pipe, and a series of pans or trays for containing the articles or goods to be cooled, one pan or tray for each blast-pipe, for projecting a cooled blast over the contents of the pan or tray, substantially as described.

11. In a cooling or refrigerating apparatus, the combination of a box having its interior divided into an upper chamber or compartment and a lower chamber or compartment providing space for the storage of materials to be cooled, an induction opening or passage for air into the lower chamber or compartment, an eduction opening or passage for the air from the lower chamber or compartment, an induction opening or passage for the air into the upper chamber or compartment, the eduction from the lower chamber or compartment and the induction into the upper chamber or compartment connected one to the other, an eduction opening or passage for the cooled air from the upper chamber or compartment, an exhaust-fan connected with the eduction opening or passage of the upper chamber or compartment, and receptacles in the upper chamber or compartment surrounding the storage-space for containing a cooling medium and through which the induction and eduction passages will be, substantially as described.

12. In a cooling or refrigerating apparatus, the combination of a box having its interior divided into an upper chamber or compartment and a lower chamber or compartment, both chambers providing space for the storage of materials to be cooled, an induction opening or passage for air into the lower chamber or compartment, an eduction opening or passage for the air from the lower chamber or compartment, an induction opening or passage for the air into the upper

chamber or compartment, the eduction from the lower chamber or compartment and the induction into the upper chamber or compartment being connected one to the other, 5 an eduction opening or passage for the cooled air from the upper chamber or compartment, an exhaust-fan connected with the eduction opening or passage of the upper chamber or compartment, receptacles in the upper chamber or compartment for containing cooling 10 medium through which the induction and eduction passages will be, and a passage in the partition or floor between the two chambers or compartments, substantially as described.

15 13. In a cooling or refrigerating apparatus, the combination of a box having its interior divided into an upper chamber or compartment and a lower chamber or compartment, an induction opening or passage for air into 20 the lower chamber or compartment, an eduction opening or passage for the air from the lower chamber or compartment, an induction opening or passage for the air into the upper chamber or compartment, the eduction from 25 the lower chamber or compartment and the induction into the upper chamber or compartment being connected one to the other, an eduction opening or passage for the cooled air from the upper chamber or compartment, 30 an exhaust-fan connected with the eduction opening or passage of the upper chamber or compartment, receptacles in the upper chamber or compartment for containing a cooling

medium, a passage in the partition or floor between the two chambers or compartments, 35 and a series of flaps for the passage for regulating the opening between the two chambers or compartments, substantially as described.

14. In a cooling or refrigerating apparatus, 40 the combination of a box having its interior divided into an upper chamber or compartment and a lower chamber or compartment, both chambers providing space for the storage of materials to be cooled, receptacles for 45 containing ice in the upper chamber or compartment, a receptacle for the water from the melting ice in the lower chamber or compartment, an eduction opening or passage for air into the lower chamber or compartment, 50 projecting the air against the water-receptacle, an escape-opening for the air from the chamber of the water-receptacle into the lower chamber or compartment and a connection between the lower chamber or compartment 55 and the upper chamber or compartment furnishing a circulation for the air from the lower storage-space of the chamber or compartment through the ice-receptacle and into the upper storage-space of the chamber or 60 compartment, substantially as described.

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