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2 SHEETS—SHEET 1.



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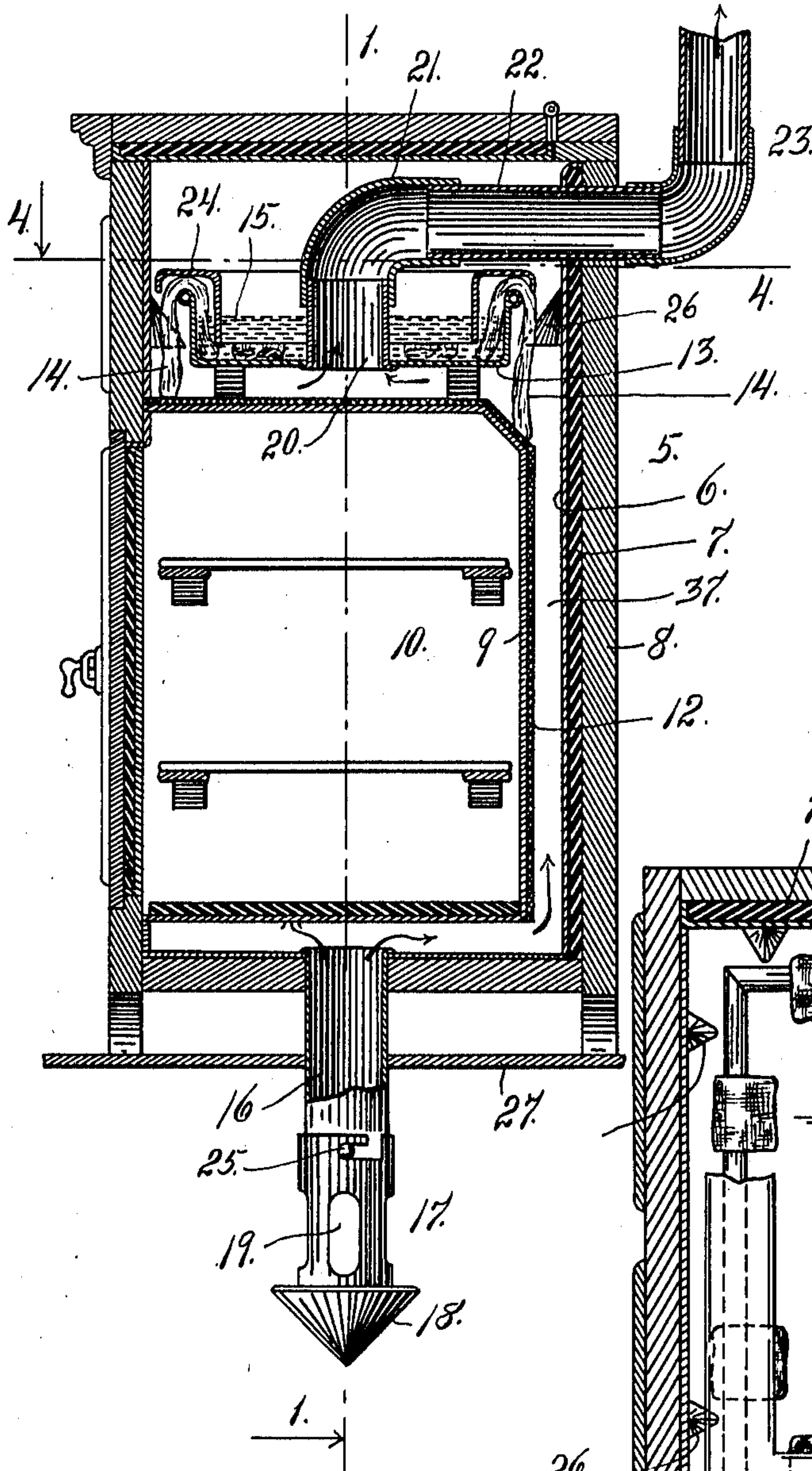


Fig. 3.

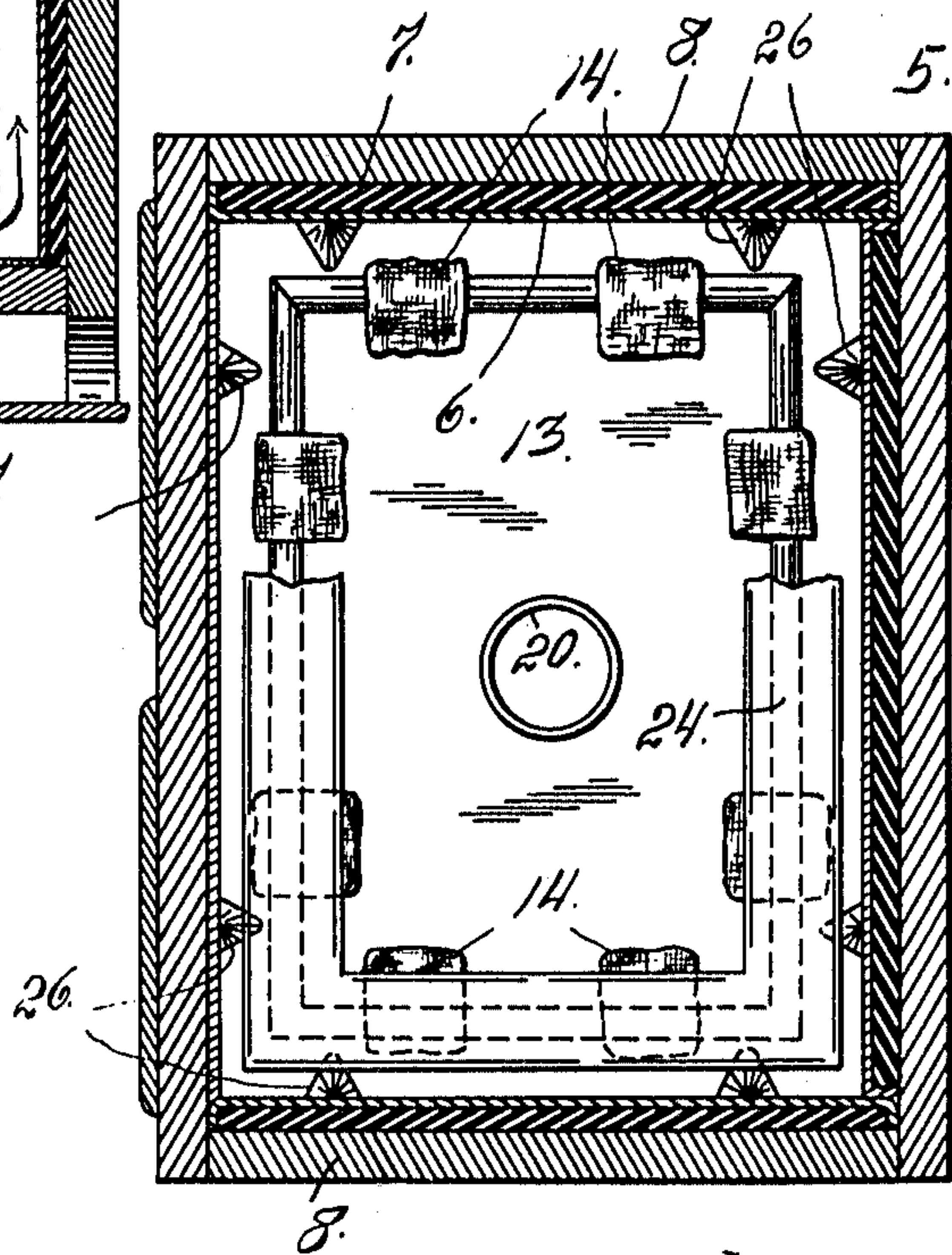


Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## REFRIGERATOR.

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Specification of Letters Patent.

Patented Apr. 18, 1911.

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*To all whom it may concern:*

Be it known that I, WILLIAM N. AMSBARY, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Refrigerators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in refrigerators in which the cooling function is performed entirely on the principle of evaporation. In other words, in my improved construction the use of ice is unnecessary. For this reason the device may be termed an iceless refrigerator.

In the upper part of the casing above the cooling chamber is located a tank or receptacle which is open at the top and equipped with a number of flexible cloths consisting of cloth or other absorbent material adapted to take up water by capillary attraction from the vessel or tank, and cause it to pass upwardly over the edge of the tank and then downwardly. In this construction the lower extremities of these cloths may rest upon the upper portion of the cooling chamber, the portions of the latter exposed to the water being covered with a thin layer of absorbent material, whereby the water delivered to the absorbent covering of the cooling chamber will readily distribute itself thereover in a thin layer or sheet causing it to readily evaporate, under the influence of a rising current of warm air, which is constantly passing through the refrigerator outside of the cooling chamber. This warm air current enters at the bottom of the apparatus and passes out at the top. As illustrated in the drawing, the inlet for the warm air at the bottom of the refrigerator is centrally located but the bottom of the cooling chamber is provided with a layer of packing material whereby the cooling chamber is insulated from the influence of the warm air entering at the bottom of the refrigerator, as heretofore explained.

Having briefly outlined my improved construction, I will proceed to describe the same

in detail, reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing: Figure 1 is a central vertical section taken through the refrigerator from top to bottom or on the line 1—1, Fig. 3. Fig. 2 is an enlarged sectional view in detail illustrating the tank or receptacle containing the necessary water which is drawn out by capillary attraction, as heretofore explained. Fig. 3 is a section of the apparatus taken at right angles to Fig. 1. Fig. 4 is a horizontal section taken on the line 4—4, Fig. 3.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the outer casing of the refrigerator, which is provided with the usual metal lining 6 and a suitable packing 7 interposed between the said lining and the outer or wood portion 8 of the device.

Within the main casing of the refrigerator is the auxiliary casing 9 inclosing the cooling chamber 10. This auxiliary casing is equipped exteriorly with a relatively thin absorbent covering 12 adapted to receive water from a tank 13 from the edge of which is hung a number of cloths 14 whose inner extremities dip into the water 15 of the tank and whose outer extremities extend downwardly below the bottom of the tank. These lower extremities of the cloths 14 preferably come in direct contact with the absorbent covering 12 of the cooling chamber. It will be understood that in the use of my improved refrigerator, the water follows the cloths by capillary attraction, up over the edge of the tank and thence downwardly to the lower extremities of the cloths, where the water passes to the absorbent covering of the cooling chamber, thus making the conditions exceedingly favorable for evaporation.

The bottom of the casing is provided with an air inlet pipe 16 whose lower portion protrudes below the bottom of the refrigerator, and may extend through the floor 27 of the room and communicate with the basement. To the lower end of the pipe section 16 is detachably connected a sort of drip cup 17 to whose lower extremity is secured a cone-shaped member 18 adapted to receive the drip resulting from a possible excessive supply of water by the cloths to the absorbent



covering of the cooling chamber. This detachable section 17 is provided with relatively large openings 19 to allow the air to enter freely and pass upwardly through the pipe section 16, thence into the chamber 37, thence underneath the tank 13, and thence up through a short pipe section 20 in the said tank, and thence through an elbow 21 and a pipe section 22, out of the refrigerator and into an upwardly extending draft conduit 23 which may be connected with the chimney or flue of a house for draft purposes or with a suitable stack of any kind, whereby the desired draft may be obtained for producing the upward movement of a relatively large volume of warm air through the refrigerator and surrounding the absorbent covering of the cooling chamber whereby admirable conditions are obtained for evaporating purposes. The water which passes off in vapor, mingles with the rising current of air and is removed therewith.

Set into the top of the tank 13 and overlapping the upper edge of the latter is a sort of shield 24 which protects the cloths 13 and prevents any dirt or foreign particles of matter from coming in contact with the cloths. In order to maintain the cloths in their best condition or at their maximum water carrying capacity, they should be kept perfectly clean and free from material which might have a tendency to clog the pores and thus impede the passage of the water there-through by capillary attraction. This shield affords a thorough protection to the said cloths and also conceals the same from view when the top of the refrigerator is open.

As shown in the drawing, the drip cup member 17 is connected with the lower extremity of the inlet pipe 16 by a set screw 25. Whenever the drip cup or cone-shaped receptacle 18 becomes filled, the member 17 may be quickly detached and the water emptied. In the event, it should be discovered that too much water is escaping from the refrigerator, one or more of the cloths may be removed, to prevent any surplus discharge of the water from the tank. In this specification the term surplus is intended to mean, the removal from the tank of a greater quantity of water than can be formed into vapor or evaporated through the influence of the upwardly traveling current of relatively warm air from the bottom of the refrigerator, as heretofore explained.

The metallic lining 6 of the refrigerator is provided with outwardly flared ears 26 which are arranged to guide the pan 13 into position on the top of the auxiliary casing, and to prevent the same from lateral displacement.

It will be evident that my improved construction, whereby cloths are employed for transferring the water in carefully regulated quantities from the tank to the absorbent

covering of the cooling chamber, is an important feature, by virtue of the ease and facility with which the number of these cloths may be regulated. It is evident that if too little water is being removed, one or more additional cloths may be put in place; while if too much water is removed as disclosed by an excess of discharge at the bottom of the refrigerator, one or more cloths may be removed, thus diminishing the removal of the water from the tank to the outer absorbent covering of the cooling chamber.

Having thus described my invention, what I claim is:

1. A refrigerator depending upon the principle of evaporation for the performance of its cooling function, comprising an exterior casing, an auxiliary casing inclosing a cooling chamber, a water receptacle in the upper part of the casing above the cooling chamber, cloths applied to the said receptacle and having one extremity entering the water of the tank, the said cloths passing upwardly over the edge of the tank and thence downwardly below the bottom thereof, whereby the drip from the cloths falls upon the exterior surface of the cooling chamber, and a shield extending over the edge of the receptacle and covering the portion of the cloths extending into the receptacle for the purpose set forth.

2. A refrigerator having a cooling chamber, a water receptacle located above the cooling chamber, flexible cloths applied to the water receptacle and hanging downwardly from the edge of the latter, one extremity of each cloth entering the water, while the opposite extremity projects below the bottom of the tank and engages the exterior surface of the cooling chamber, and a shield extending over the edge of the water receptacle and covering the extremities of the cloths entering the receptacle, for the purpose set forth.

3. A refrigerator having an outer casing, an inner casing, the two casings being separated by a suitable space, the outer casing having an air inlet at its lower portion and an outlet at its upper portion for the passage of a current of air therethrough, a water tank mounted above the inner casing and having cloths supported upon its upper edge and hanging downwardly therefrom both interiorly and exteriorly, and a shield extending over the edge of the water receptacle and extending downwardly thereinto for covering the extremities of the cloths entering the receptacle, substantially as described.

4. A refrigerator comprising an outer casing, an inner casing, provision for passing a current of air from the bottom of the device upwardly therethrough between the two casings, the outer casing having an outlet for the air at its upper extremity, a water recep-



tacle located in the upper part of the device, and means for removing water from said receptacle and discharging it upon the outer surface of the inner casing by capillary attraction, and a shield extending over the edge of the receptacle and protruding downwardly thereinto for protecting the water-removing means, substantially as described.

5. A refrigerator having an exterior casing, an interior casing, the two casings being separated by a suitable space, the interior casing being covered with an exterior layer of absorbent material, means for passing a current of air through the space between the two casings from the lower part of the device upwardly, a water receptacle located in the upper part of the refrigerator, a shield covering the edge of the receptacle and extending downwardly thereinto, and means positioned between the shield and the edge of the receptacle for discharging water from the water receptacle to the exterior absorbent covering of the inner casing by capillary attraction, for the purpose set forth.

6. A refrigerator comprising an outer casing, an inner casing inclosing a cooling chamber, the two casings being separated by a suitable space, a warm air inlet conduit at the bottom of the outer casing projecting downwardly therefrom, a drip cup detachably connected with said inlet conduit, the said cup having openings for the entrance of the air to the conduit above its bottom and the normal level of the liquid contained

therein, and an outlet for the said air at the upper portion of the outer casing.

7. A refrigerator, comprising an outer casing, an inner casing, inclosing a cooling chamber, the two casings being separated by a suitable space, means for passing a current of air from the bottom of the outer casing through the space between the two casings and discharging it at the top of the outer casing, a water receptacle located above the cooling chamber, means supported upon the upper edge of the water receptacle for removing water from the latter by capillary attraction and discharging it upon the exterior surface of the cooling chamber, and a shield extending over the edge of the water receptacle and projecting downwardly thereinto, for the purpose set forth.

8. A refrigerator having an interiorly located casing inclosing a cooling chamber, a water receptacle located above the said casing, means for discharging water from the receptacle to the exterior surface of the cooling chamber by capillary attraction and a shield extending over the edge of the receptacle and protruding downwardly thereinto for protecting the water discharge means, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM N. AMSBARY.

Witnesses:

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