(No Model.) 4 Sheets—Sheet 1.

G. B. ZANTZINGER.

REFRIGERATOR CAR.

No. 538,143. Patented Apr. 23, 1895.

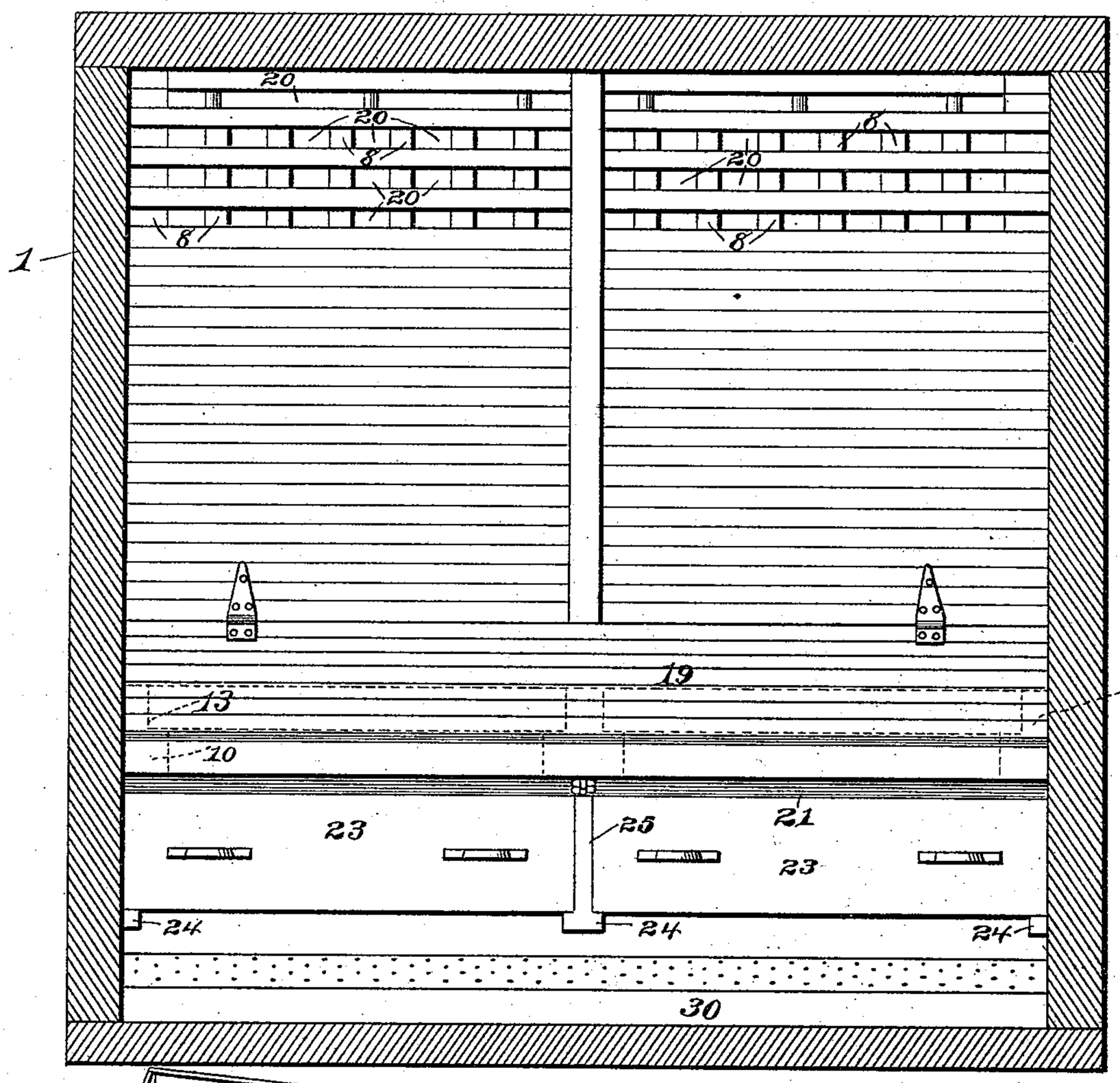

Fig. 1.

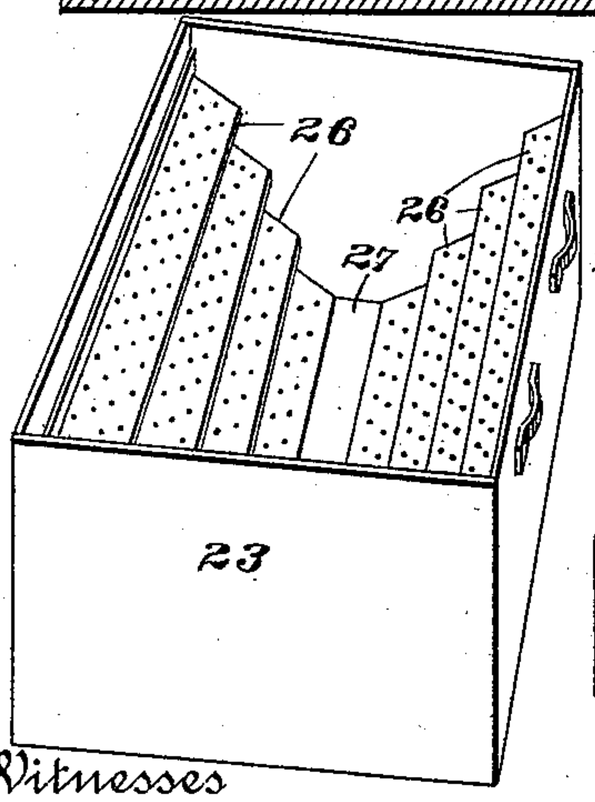

Fig. 7.

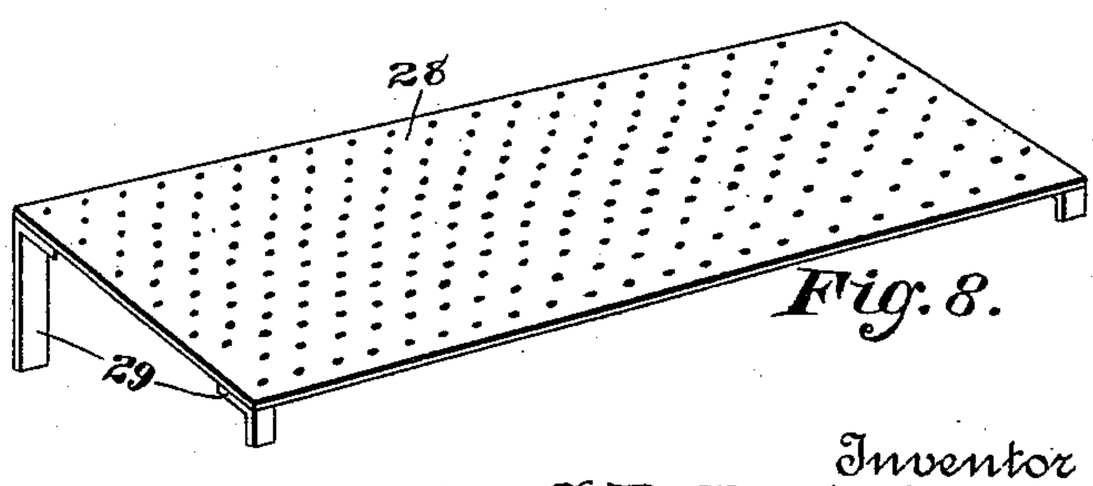

Fig. 8.

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(No Model.) 4 Sheets—Sheet 2.

G. B. ZANTZINGER.

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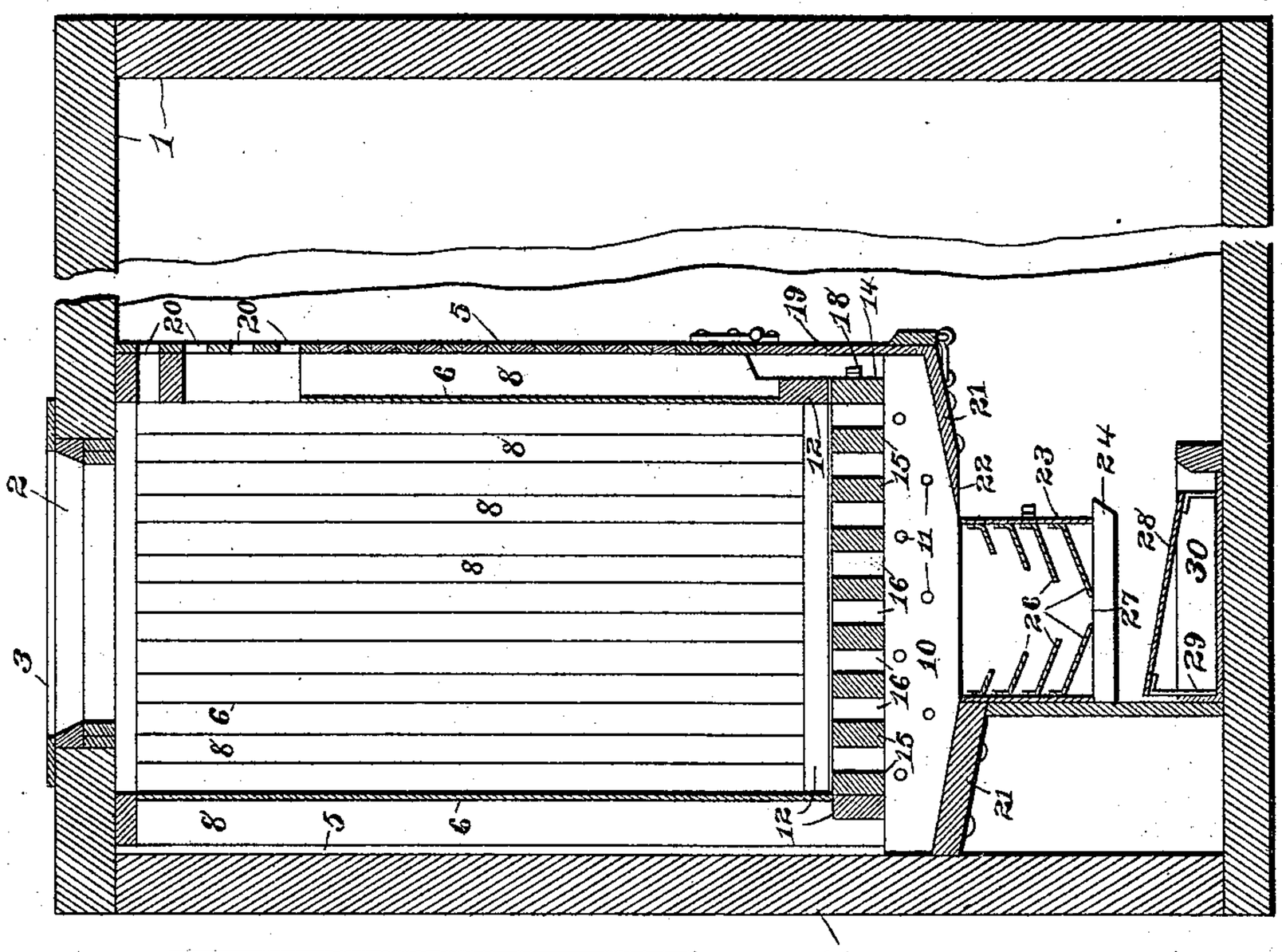

Fig: 2.

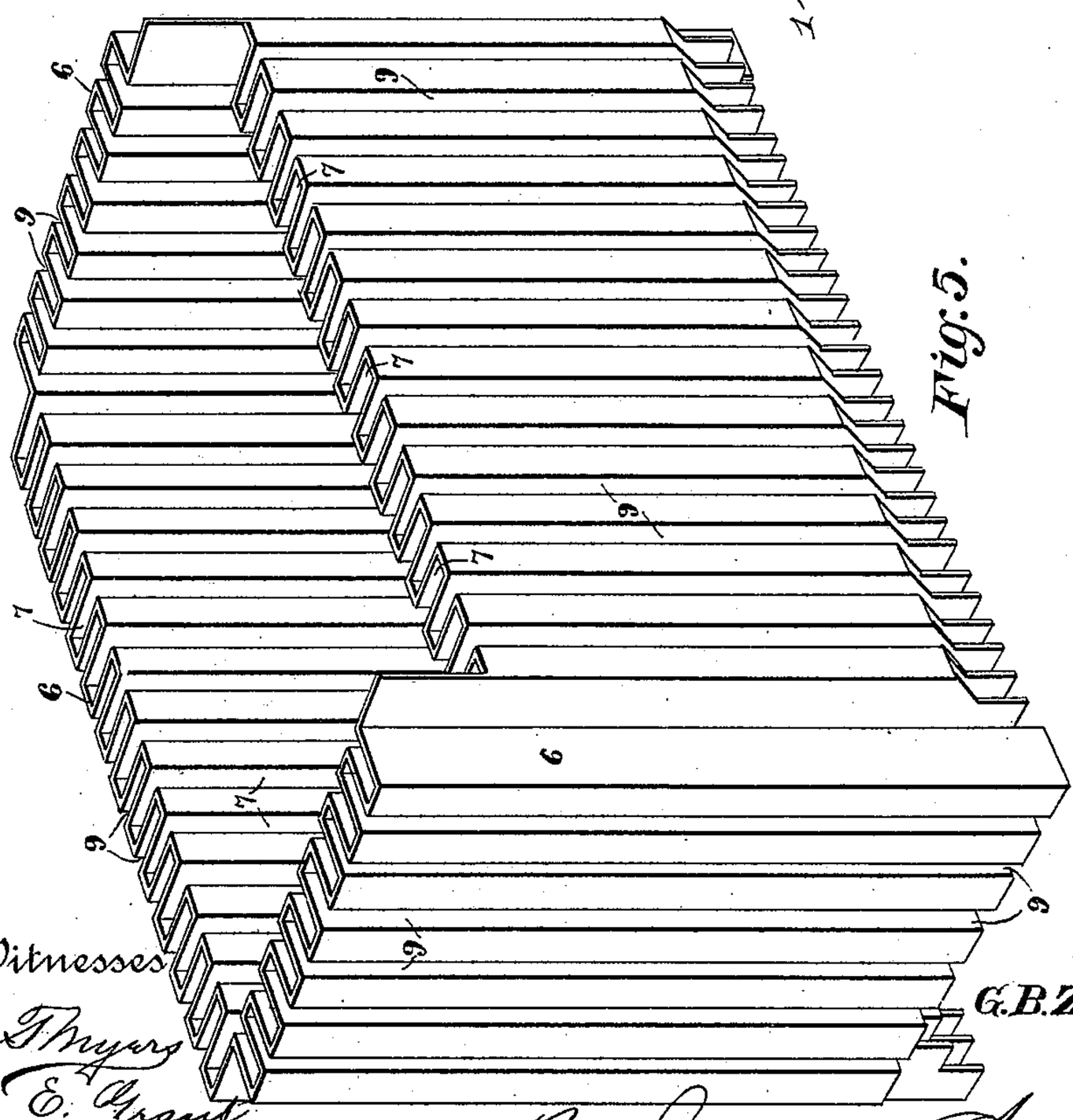

Fig: 5.

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(No Model.) 4 Sheets—Sheet 3.

G. B. ZANTZINGER.

REFRIGERATOR CAR.

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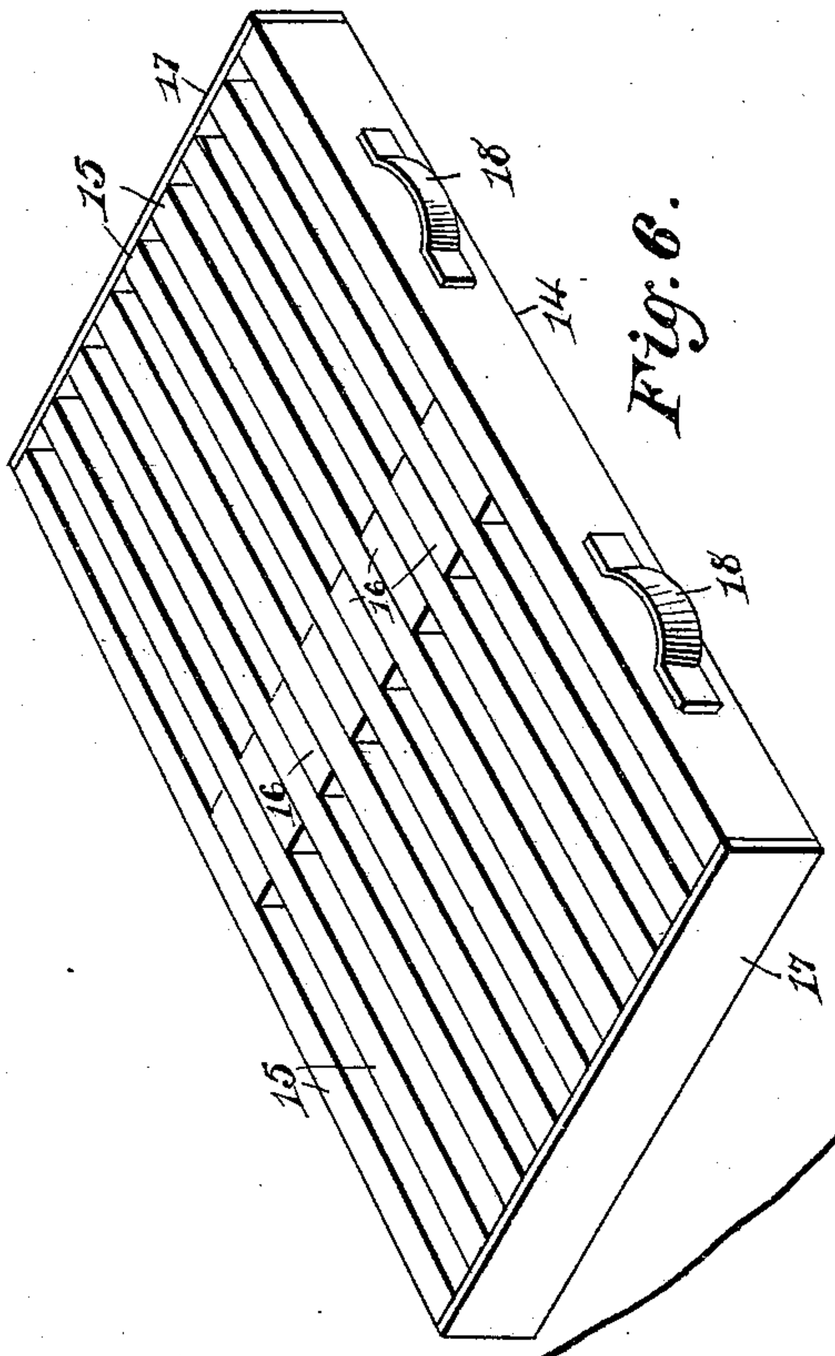

Fig. 6.

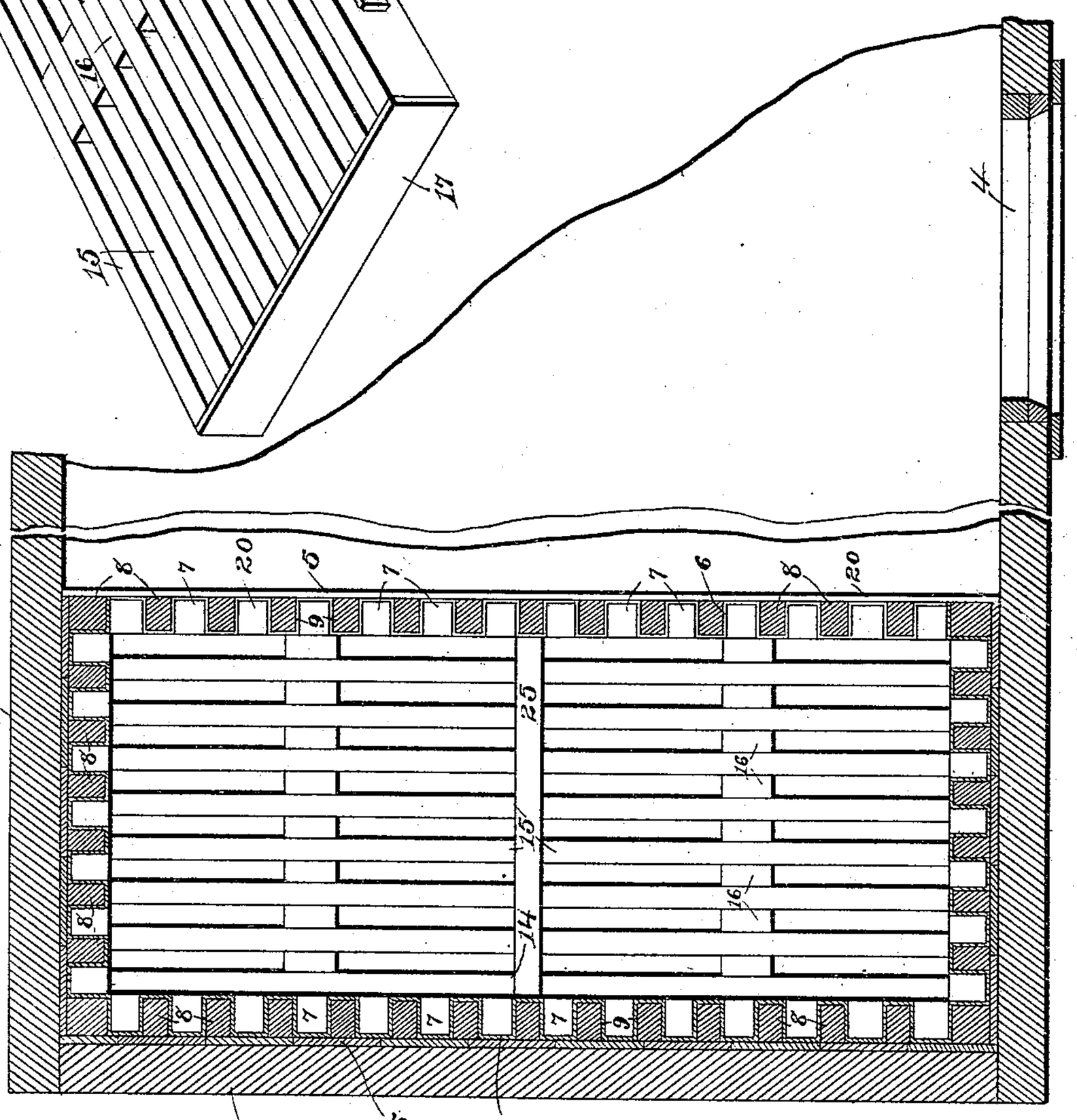

Fig. 3.

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(No Model.) 4 Sheets—Sheet 4.

G. B. ZANTZINGER.

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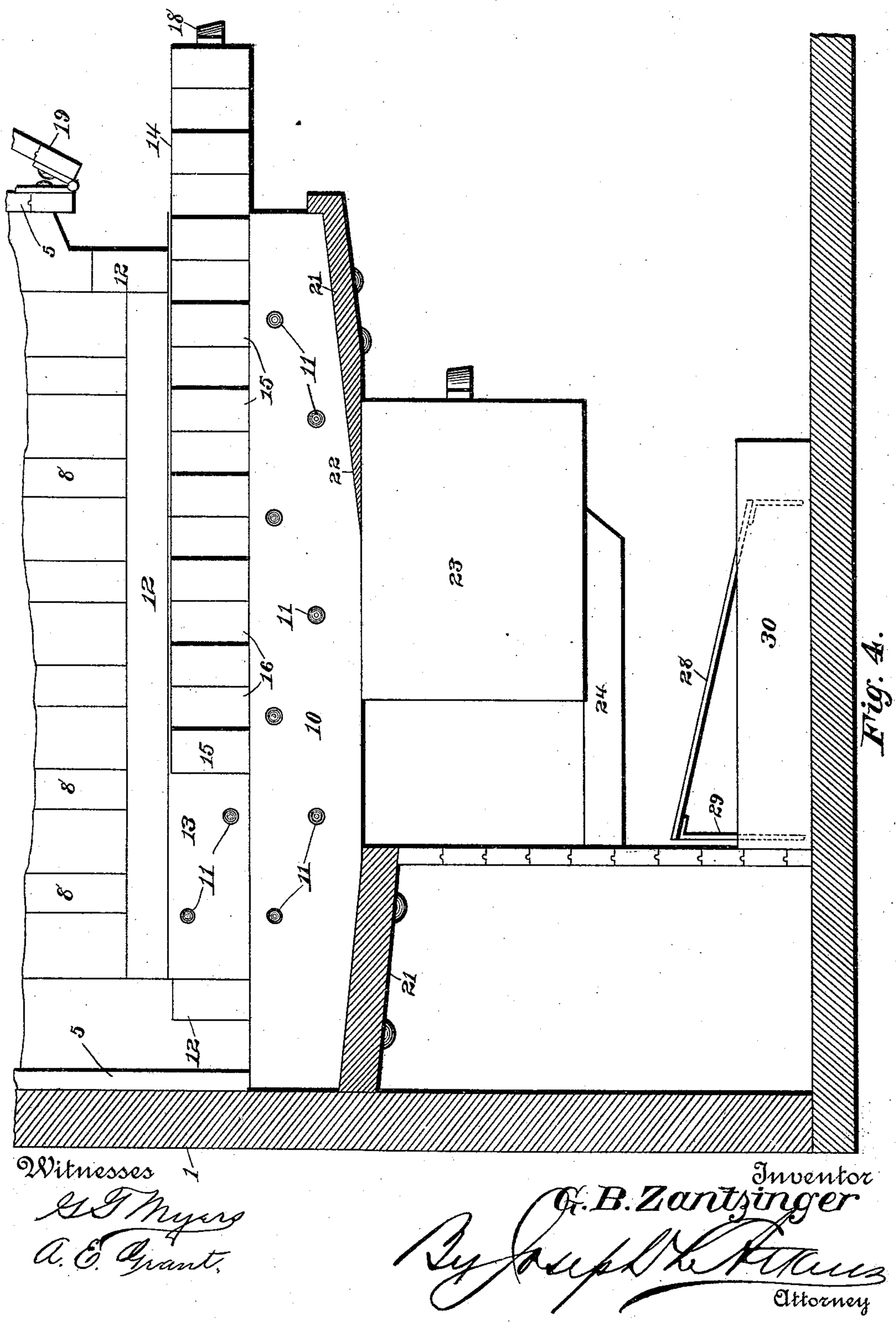

Fig. 4.

Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE B. ZANTZINGER, OF ROCHESTER, NEW YORK.

REFRIGERATOR-CAR.

SPECIFICATION forming part of Letters Patent No. 538,143, dated April 23, 1895.

Application filed February 15, 1894. Serial No. 500,219. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. ZANTZINGER, of Rochester, county of Monroe, State of New York, have invented certain new and useful Improvements in Refrigerators, of which the following is a specification, reference being had to the accompanying drawings.

The object of my invention is to produce a refrigerating device possessing distinct merits of construction which render it economical in cost and use and which insure perfect cleanliness in operation; that is adapted to be inclosed within a refrigerating chamber, such for example, as a car and to set up within the same a powerful and active current of cold air so as to thoroughly cool the interior of the car and to preserve its contents located in whatever part thereof they may be.

In the accompanying drawings: Figure 1 is a front elevation of my refrigerator proper. Fig. 2 shows a portion of a car and a vertical section of the refrigerator within the same. Fig. 3 is a top plan view of the same. Fig. 4 is an enlarged view of a section of the refrigerator with the outer side wall removed, showing the movable parts partially removed. Fig. 5 is a perspective view of a preferred form of ice chamber lining. Fig. 6 is a view of the grid removed. Fig. 7 is a view of the drip box. Fig. 8 is a view of the deflecting plate.

In Figs. 1 and 3 of the drawings I have illustrated the refrigerator as made in duplicate, since more than one may be used to advantage for fitting up a large space. Each, however, works independently and it will be sufficient to refer in the description to the component parts of one of the refrigerators.

Referring to the figures on the drawings: 1 indicates the walls of a car or compartment to be cooled, which may be made in any suitable and usual manner so as to be non-conductive. The refrigerator proper is preferably located in one end thereof and may be adapted to be filled with ice from the outside through an opening 2 in the top wall of the car which is designed in use to be covered by a cap 3. The car may also have a side door 4 for permitting access to its interior.

5 indicates the outer wall or jacket of the ice chamber made preferably of wood and surrounding an inner wall or casing 6. The inner wall consists of a series of interior preferably vertical flues 7 which may be defined by strips 8 secured to the interior of the jacket at regular intervals. In practice, I prefer to make the inner casing of metal, as for example, galvanized iron bent to form the vertical flues, as is clearly illustrated in Fig. 5 of the drawings. By the employment of a metallic casing the strength, cleanliness and neatness of the structure are materially enhanced, but I do not wish to be understood as limiting myself to the use of a metallic casing. Where the metallic casing is employed the strips 8 may be used to fill spaces 9 and render them rigid, the casing acting merely as an armor or covering for the same.

10 indicates cross beams which may be supported in any suitable manner, as for example, by screws 11 passing into the side walls of the car and which in turn serve to support the bottom frame pieces 12 upon which rest the lower ends of the vertical strips 8, thereby supporting the inner casing and the jacket 5 which is secured thereto. The lower frame pieces are preferably made narrower than the vertical strips so as to leave the flues 7 unobstructed. The cross beams 10 are provided with longitudinal rabbets 13 within which move as a drawer a grid 14 which may be made of pieces of wood 15 separated by suitable spacing blocks 16 and secured in any suitable manner to end plates 17. The grid being designed to be readily movable is preferably provided with handles 18 by which it may be operated as a drawer. A flap hinged door 19 is preferably provided on the front of the jacket which, while the refrigerator is in operation, is kept closed but may be raised for the purpose of withdrawing the grid or for otherwise cleaning the interior of the refrigerator. The upper part of the jacket is preferably open to provide supply ports 20 through which the rarefied air may gain access to the interior of the refrigerator.

21 indicates drip ledges carried beneath the bottom of the ice chamber and adapted to receive the drippings therefrom. They may be supported, for example, upon the cross beams 10 or in any other suitable manner. The front ledge is horizontally beveled, as indicated at 22, to accommodate a sliding drip box 23 supported on suitable ways 24, which may be se-

cured to the side walls 1 of the car; or, where a plurality of refrigerators are employed, to a medial wall 25. The drip box is preferably made of metal of suitable dimensions to receive all discharges from the ledges 21. Upon its front and rear walls are provided oblique baffling plates 26 which are preferably perforated. Each baffling plate is wider than the one immediatly above it, the topmost ones being comparatively narrow and the lower ones being so wide as to leave between them only a narrow throat 27.

28 indicates a deflecting plate which may be also made of metal preferably perforated and carried upon supports 29 so as to receive the discharges from the drip box. It is inclined toward the interior of the car and is designed to deflect the cold currents of air from the refrigerator into the car. Beneath it is a drip pan 30 to receive the drippings after they shall have passed from the ledges through the drip box and the deflector. The drip pan is drained by any ordinary and suitable means.

It is important that the joints formed by the flap door 19 and the wall of the jacket 5 and between the box and the ledges 21 should be made substantially air-tight, in order that the refrigerator may be closed, except at the top of the ice chamber and the bottom of the drip box.

In operation, the ice is placed inside of the ice chamber in any usual form in which it is cut or manufactured. It may fill the interior of the casing, but the flues 7 necessarily remain open to insure an unobstructed free passage for currents of air, permitting them in passing to strike the naked walls of ice contained within the ice chamber. In this way the utmost refrigerating capacity of the ice is utilized and a constant current of air within the car passing downwardly through the refrigerator is set up. This current being divided in passing through the different flues is reunited, after passing through the grid, into a cold volume of air and is discharged down through the drip box against the deflecting plate, whence it is directed into the interior of the car. Not only is the full refrigerating capacity of the ice in the first place rendered available, but by the employment of the drip box and baffling plate the frigidity of the water from the melted ice is utilized as an active refrigerating agent and not allowed to go to waste. Moreover, by the employment of baffling plates in the drip box, and keeping them constantly wet by the water of liquefaction from the ice chamber, the downward currents of air are passed over an expansive sheet of water. On account of the well-known affinity which water has for them, the noxious gases with which the air becomes laden in passing through the refrigerating compartment are taken up and the air is thoroughly purified before it is discharged through the throat 27.

By providing perforations in the baffling plates, the water of liquefaction, passing through the perforations, is distributed over both surfaces of the baffling plates, thereby increasing the superficial area of the interior of the drip box, not only by the area of the upper surfaces of the baffling plates, but also by the area of their lower surfaces. The inclination and the perforation of the baffling plates also serve another distinctly useful purpose.

It is well understood in practice that the parts of a refrigerator from use become foul and, in some instances, are rendered inoperative thereby. I practically eliminate this objectionable feature by the employment of the inclined, perforated baffling plates, for the reason that the water of liquefaction, falling upon them, is kept in constant motion both over their upper and lower surfaces, respectively, thereby washing and cleansing them.

The drip box, in its preferable form as illustrated, is comparatively much narrower than the ice chamber, and the baffling plates are located in the constricted portions of the apparatus defined by the drip box for a special purpose, namely, in order that the currents of air from the flues of the ice chamber may be kept moving with sufficient velocity. If it were not so, portions of the volume of air would become stagnant and impair or totally prevent the proper operation of the apparatus. For a similar reason, the throat 27 through which the air currents are ultimately discharged from the refrigerator proper is still further constricted, it being desirable that the air should issue from the throat into the interior of the refrigerating compartment at a comparatively high velocity and with considerable force, so that the air in every part of the refrigerating compartment may be set in motion and purified by being passed through the refrigerating apparatus. Therefore, while, as above explained, it is desirable to multiply the superficial area of the interior of the drip box, so as to purify the currents of air, it is equally essential that precaution should be taken not to obstruct the free passage of air currents through the constricted portion of the refrigerating apparatus. Otherwise, the velocity of the air currents would be impeded and the practical efficiency of the apparatus seriously impaired. For that reason, as will appear upon reference to Fig. 2 of the drawings, there is a clear passage way throughout the constricted portion of the apparatus so that the currents of air, while brought into contact with the wet surfaces of the baffling plates and purified thereby, are at no time met by a positive obstruction.

The baffling plates are separated and are inclined toward the throat 27 which is defined by the narrow space between the respective members of the last pair of baffling plates.

In consequence of the features of construction and the mode of operation above referred to, my device is adapted to produce the best results with a small consumption of ice. It

is, therefore, especially adapted for use in railway cars for transportation purposes in which a small consumption of ice is a desideratum.

What I claim is—

1. In combination with an inclosed ice chamber having a constricted air passage below the same and a throat adapted to discharge air currents therefrom, of air flues in the walls of the ice chamber open on one side to the mass of ice contained therein, and delivering to said air passage, substantially as described.

2. The combination with an inclosed ice chamber having a constricted air passage below the same, and air flues in the walls of the ice chamber opening on one side to the mass of ice contained therein, and delivering to said air passage, of means for multiplying the superficial area of the constricted air passage, said means being adapted to receive the water of liquefaction and expose it to the descending currents of air, and having a clear and unobstructed passage way through part of the constricted air passage, substantially as set forth.

3. The combination with an inclosed ice chamber having a constricted air passage below the same and air flues in the walls of the ice chamber open on one side to the mass of ice contained therein, and delivering to said air passage, of means for multiplying the superficial area of the interior of the constricted air passage, said means being located at the side of and defining the otherwise unobstructed air passage through the same, substantially as set forth.

4. The combination with an inclosed ice chamber, having a constricted air passage below the same, and air flues in the walls of the ice chamber open on one side to the mass of ice contained therein, and delivering to said air passage, of perforated baffling plates located in said constricted air passage, substantially as set forth.

5. The combination with an inclosed ice chamber, having a constricted air passage below the same, and air flues in the walls of the ice chamber open on one side to the mass of ice contained therein, and delivering to said air passage, of baffling plates located in the sides of said constricted air passage, and defining between them a free passage for the air currents, substantially as set forth.

6. The combination with an inclosed ice chamber, having a constricted air passage below the same, and air flues in the walls of the ice chamber open on one side to the mass of ice contained therein, and delivering to said air passage, of inclined, perforated, transverse baffling plates within said constricted air passage, and an otherwise unobstructed air passage between the same through said constricted air passage, substantially as set forth.

7. The combination with an inclosed ice chamber, having a constricted air passage below the same, and air flues in the walls of the ice chamber open on one side to the mass of ice contained therein, and delivering to said air passage, of an inclosed drip box underneath the ice chamber constituting the constricted air passage aforementioned, baffling plates within the drip box, and an otherwise unobstructed air passage, substantially as set forth.

8. The combination within a refrigerator compartment, of a separate ice chamber therein, vertical flues in the ice chamber, with a sliding removable drip box below the ice chamber, forming a tight joint at its juncture with the ice chamber, inclined baffling plates within the same, and openings at the top of the ice chamber and below the drip box, substantially as and for the purpose specified.

9. The combination within a refrigerator compartment, of a separate ice chamber therein, and vertical flues in the ice chamber, with a sliding grid, inclined ledges supporting the same, a drip box below the grid, baffling plates within the drip box, tight joints between the grid, the chamber and the drip box, the front inclined ledge being horizontally beveled, and openings at the top of the chamber, and below the drip box, substantially as set forth.

10. The combination within a refrigerator compartment, of a separate ice chamber and vertical flues in the ice chamber, with a sliding removable drip box below the grid, inclined baffling plates within the drip box, the grid forming a close joint with the ice chamber and with the drip box, and openings at the top of the ice chamber and underneath the drip box, substantially as set forth.

In testimony of all which I have hereunto subscribed my name.

GEORGE B. ZANTZINGER.

Witnesses:
A. L. MONROE,
C. E. SHUSTER.