

(No Model.)

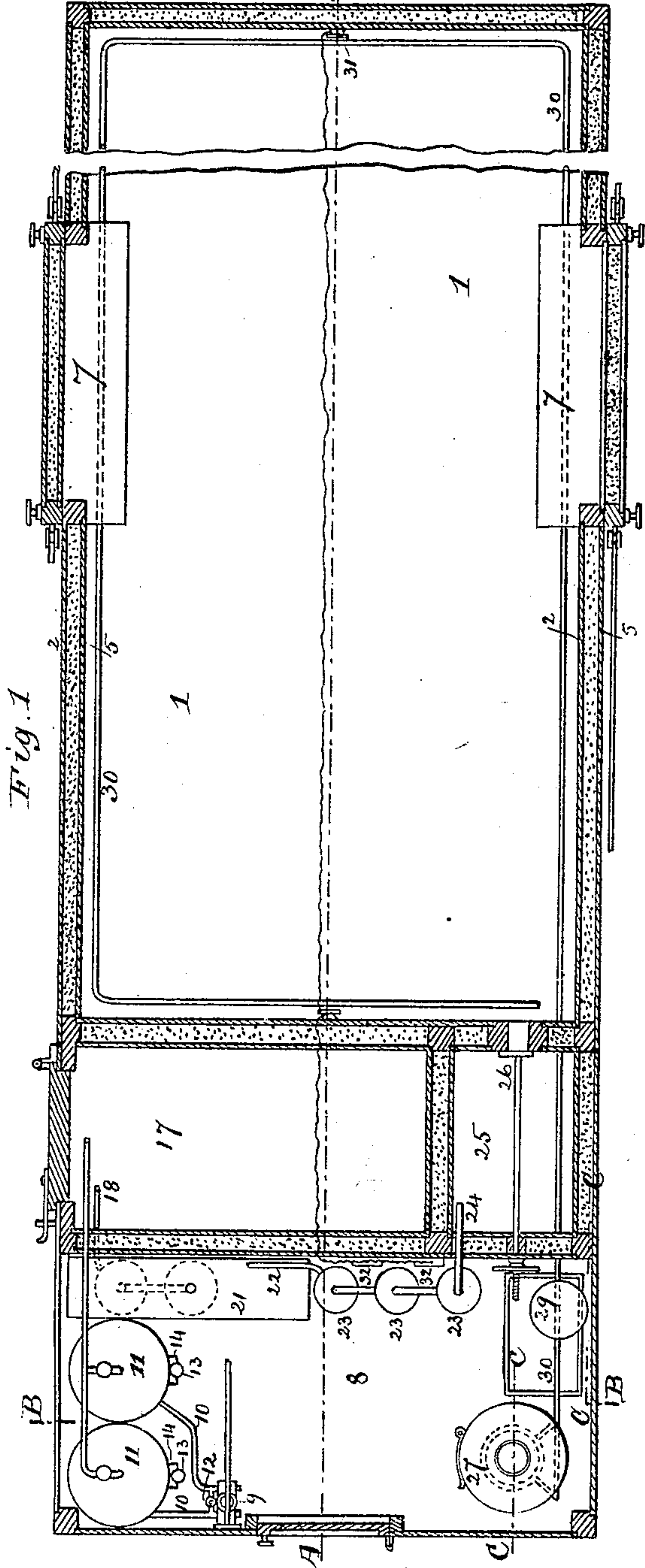
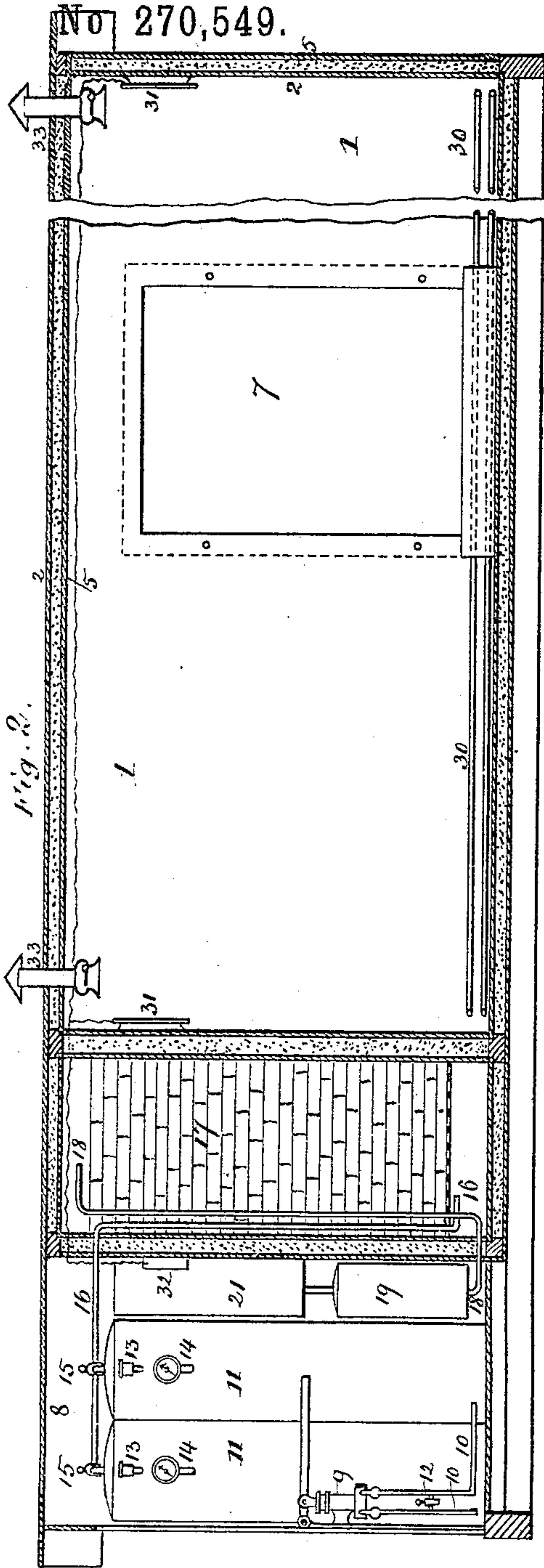
2 Sheets—Sheet 1.

S. H. LINN.

METHOD OF AND APPARATUS FOR PRESERVING AND  
TRANSPORTING FOOD.

No 270,549.

Patented Jan. 9, 1883.



Witnesses:  
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Philip Maurel

Inventor:  
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by A. Pollok  
his attorney

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Fig. 3.

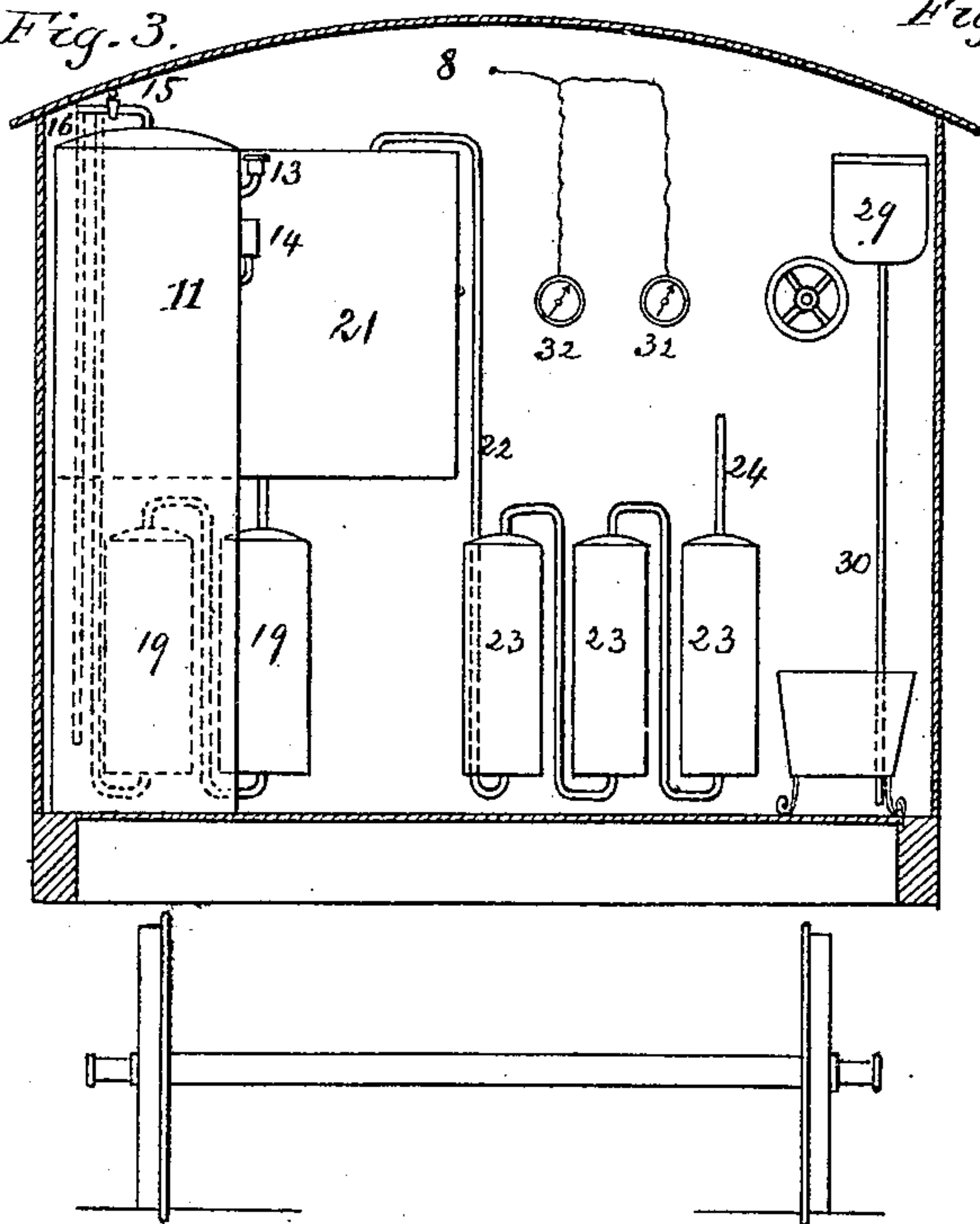


Fig. 5.

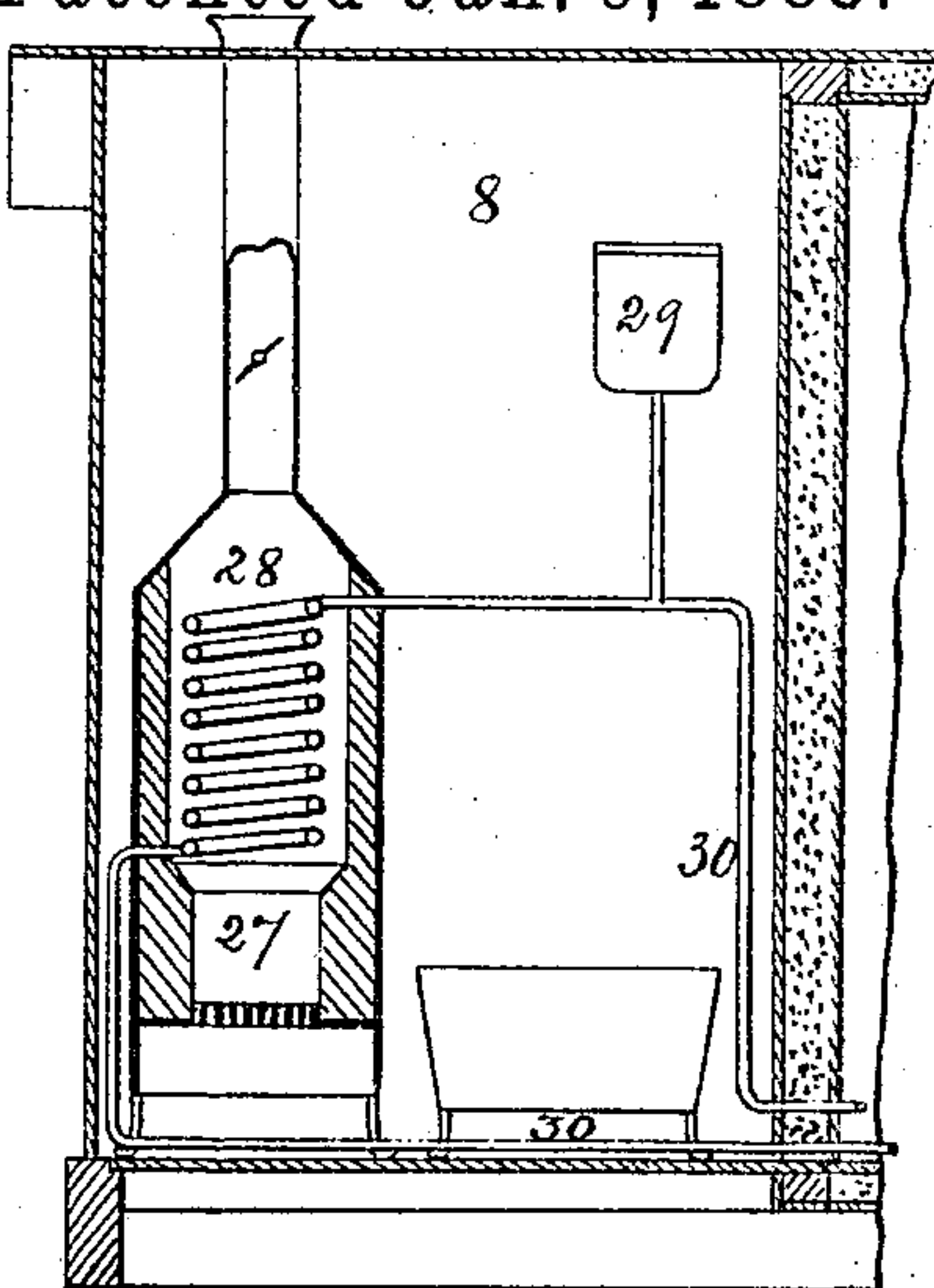


Fig. 4.

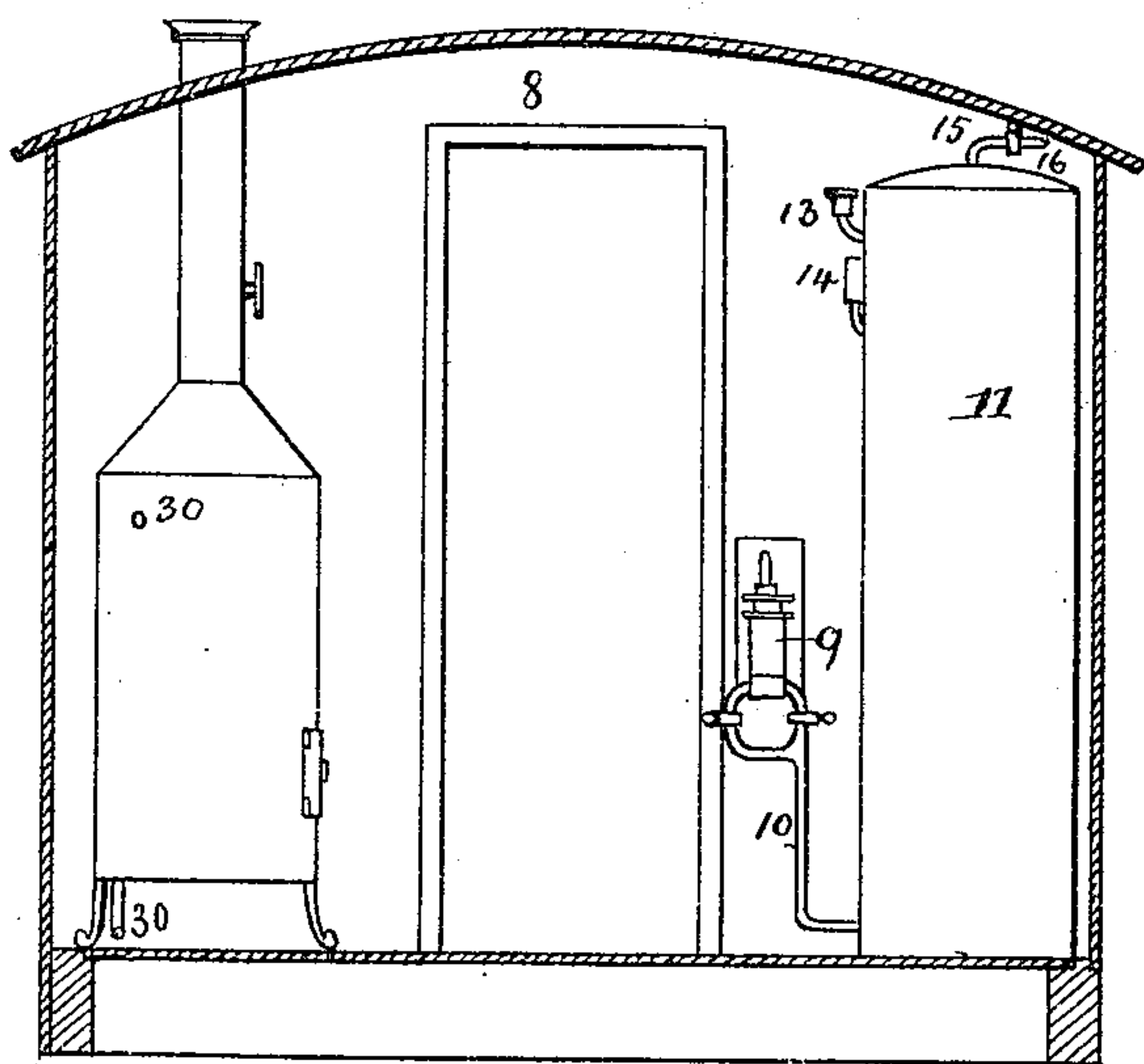
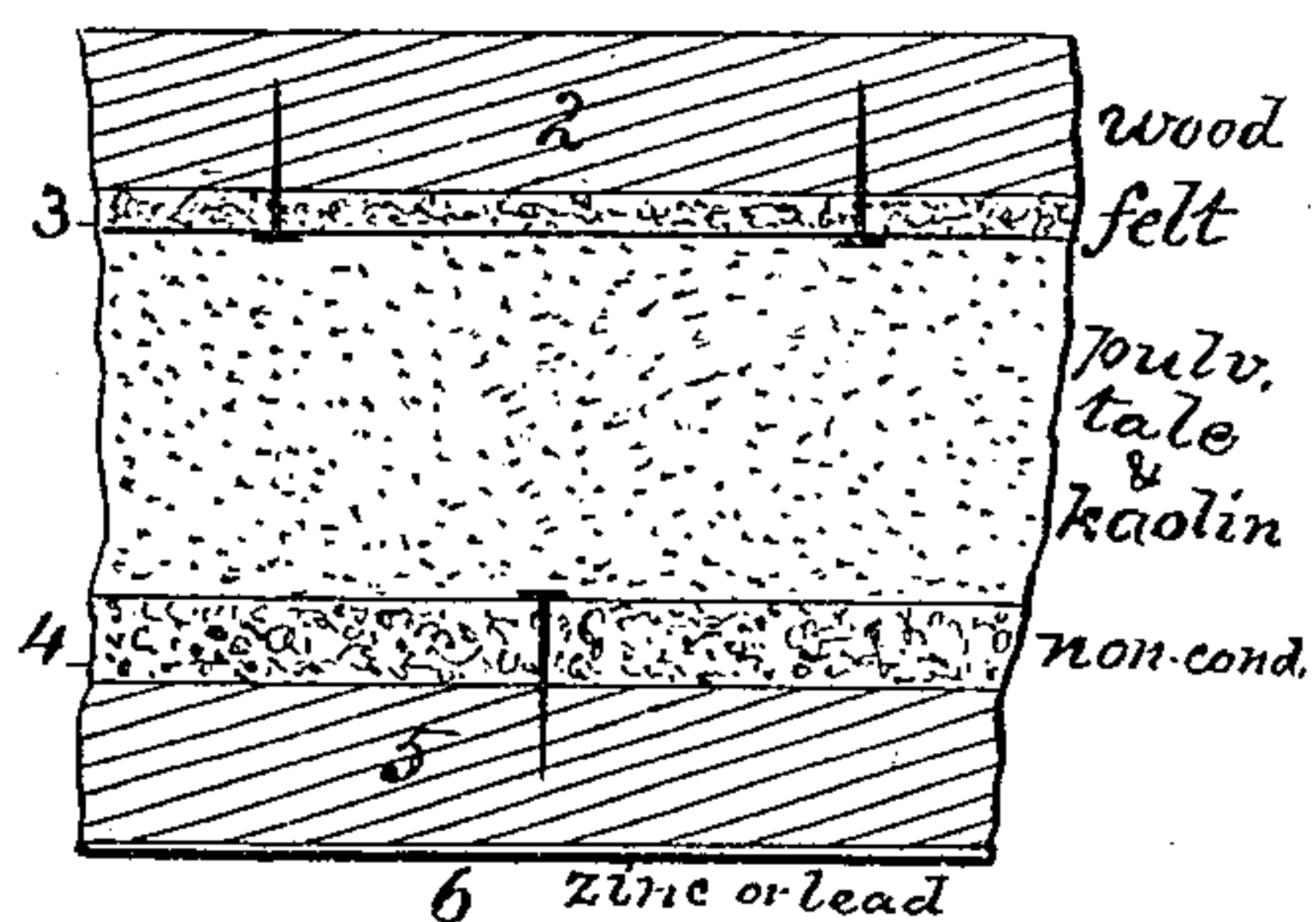


Fig. 6.



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# UNITED STATES PATENT OFFICE.

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TO ROSEWELL G. ROLSTON, OF NEW YORK, N. Y.

METHOD OF AND APPARATUS FOR PRESERVING AND TRANSPORTING FOOD.

SPECIFICATION forming part of Letters Patent No. 270,549, dated January 9, 1883.

Application filed June 16, 1882. (No model.) Patented in France September 22, 1880, No. 138,192; in Belgium September 30, 1880, No. 52,548; in England October 11, 1880, No. 4,122; in Russia April 5, 1881, No. 2,894, and in Germany July 15, 1881, No. 13,909.

*To all whom it may concern:*

Be it known that I, SAMUEL HENRY LINN, now residing in St. Petersburg, in the Empire of Russia, have invented a new and useful Improvement in Method of and Apparatus for Preserving and Transporting Food, which improvement is fully set forth in the following specification.

This invention relates to the preservation and transportation of meats, vegetables, and other articles of food in store-rooms, or during transportation in vessels or railway-cars; and it consists, first, in the construction of the chambers for preserving the articles of food, so that they may be little or not at all affected by outside temperature; secondly, in the method and means of circulating air through the chamber; thirdly, in the method of and apparatus for drying, cooling, purifying, and in certain cases warming the air to be circulated through the chambers; and, fourthly, in the special arrangement and construction of the apparatus employed, as hereinafter more fully set forth.

The accompanying drawings, which form a part of this specification, illustrate the invention as embodied in a railway carriage or car.

Figure 1 is a horizontal longitudinal section of a railway-car; Fig. 2, a longitudinal vertical section of same on line A A, Fig. 1; Fig. 3, a transverse section, looking right of line B B, Fig. 1; Fig. 4, a transverse section, looking left of line B B, Fig. 1; Fig. 5, a section on lines C C C C, Fig. 1; and Fig. 6, details of sides of wagon or car.

The walls of the wagon, or at least those of the compartment 1, are made double. They may be constructed of wood or iron, wood, however, being preferable, as being a worse conductor of heat. The outer wall, 2, (see Fig. 6,) is covered on its outer face with a suitable paint, being in a high degree impermeable to air and dampness. For this purpose I preferably use a paint known in the trade under the name of "John's Water-Proof Asbestos Paint." The internal face of this wall 2 is covered with a putty composed of bitumen dissolved in alcohol, the object of which is to

close the pores of the wood, and then this face is lined with a layer of felt, 3, which is kept in place partially by the putty and partially by flat-headed copper nails. The external face of the inside wall, 5, is lined with a layer of a suitable non-conducting material, kept in place, like the layer of felt, by means of putty and copper nails, while the internal face of this wall—that is to say, that which presents itself to the interior of the compartment 1—is covered with zinc or lead plates. The substance with which the external face of the wall 5 is lined is composed of a mixture of pulverized cork, talc, and sulphur, with rubber, and can be had in the trade all ready for use.

The space between the walls 2 and 5 is filled in with a mixture of talc and kaolin. These substances must be well calcined and pulverized. Equal parts of the same are well mixed together, and this product is rammed firmly into the said space. The ceiling and bottom of the wagon or car are also constructed in the manner described, as well as the doors 7. The latter are provided with any suitable arrangement whereby an air-tight closing may be obtained.

In order to maintain in the compartment 1 a completely pure and dry air, but charged with a preservative substance and of a uniform temperature, I make use of the following arrangements:

The compartment 8 of the wagon, which is separated from the compartment 1, contains on one side a complete apparatus for compressing, cooling, and drying the air, and for charging it with ozone or with a preservative substance—such as salicylic acid or any other antiseptic—and on the other side a hot-water heating apparatus, by means of which the compartment 1 can be heated.

The apparatus for compressing the air consists of two receptacles or reservoirs, 11, connected by pipes 10 with a small hand-pump, 9. One of these receptacles is filled with water. It will be seen that if this water is, by means of the pump, forced out of this receptacle into the other receptacle the air in this latter will



be compressed. When one of these receptacles has thus been emptied and the other filled, the operation is reversed by changing the position of the cocks of the pumps, and the described operation is repeated in the opposite direction. The small air-valves 13 permit the entrance of fresh air into the receptacle which is being emptied. By opening the cock 12, which unites the two pipes 10, and consequently the two receptacles 11, the different pressures existing in the two receptacles may be equalized, if desired. Both receptacles are provided with a pressure-gage, 14. At the top of the receptacles 11 are adapted the pipes 15, provided with cocks, and which terminate in the common pipe which leads into the lower part of the ice-chamber 17. The air traverses this ice-chamber in the upward direction, which causes it to be cooled to the desired degree, and from thence it arrives, through the tube 18, in the lower part of the first one of the receptacles 19. This first receptacle 19 is nearly filled with ordinary sulphuric acid as found in the market, while the second one is filled with pure sulphuric acid. From the upper part of the first of these receptacles 19 a pipe leads into the lower part of the second one, (see Fig. 3,) so that the air is compelled to rise in a state of fine division through the sulphuric acid contained in these two receptacles, whereby I obtain the purification of the air and the nearly complete absorption of the moisture it contains. From the second receptacle 19 the air thus purified enters into the box 21, which is filled with well-calcined kaolin, and in its passage through the substance it loses its last trace of moisture and arrives finally completely cooled, purified, and dry, through the pipe 22 in the first of the three receptacles 23, which contains salicylic acid, and which receptacles are connected with each other by pipes. As the air is compelled to rise successively in these three receptacles from the bottom to the top, traversing thus the salicylic acid, it becomes impregnated with this preservative substance and arrives in this state, through the pipe 24, in the chamber 25, from whence it may be admitted as required, by opening the valve 26, into the compartment 1, when it is desired to lower the temperature therein. When ozone is used to purify the air and impart to it preservative properties the salicylic acid need not be employed. The methods of generating ozone are well understood and need not be described. Any convenient method may be employed. The ozone may be added to the air in the desired quantities from a suitable tank or reservoir before the air passes into the provision-chamber.

The hot-water heating apparatus is auxiliary to the cooling apparatus, and is arranged to be brought into operation when the temperature of compartment 1 becomes too low. It consists in a furnace, 27, of suitable construction, in the combustion-chamber of which are arranged one or more coils, 28, from which branch

off in the well-known manner the heating-pipes 30, which run along the bottom of the compartment 1, and which are fed with water coming from the reservoir 29.

The control of the temperature is effected by the self-acting thermometers, or reservoirs of air affected by temperature, which control the valves of admission of the air to the chambers, as also the valves of exit, if required.

In the compartment 1 are arranged metallic or electric thermometers 31, which serve to indicate, by means of conducting-wires connected with the dials 32, and with suitable acoustic signals, when the temperature rises above or sinks below the desired degree; or the apparatus may be made automatic by the expanding volume of mercury or air by any of the well-known apparatus.

The surplus of old air produced by the admission of fresh, purified, and cooled air escapes through the flues or pipes 33, which are preferably provided with light flap-valves.

In a wagon or car constructed according to the above directions all sorts of food may be transported at any time of the year and in every climate to any desired distance without the risk of deterioration, because in consequence of my system it is rendered possible to keep the articles constantly surrounded by air adapted to the circumstances, of suitable temperature, and perfectly purified and impregnated with a preservative substance.

Although a railway-carriage may contain the whole necessary apparatus, it will be found more convenient in many cases to have one carriage, called the "operating-car," constructed to hold the apparatus either for forcing the air, the ice for cooling, or the furnace for heating, and the air purifying, drying, or impregnating apparatus, and from thence to distribute the air to the carriages containing the articles of food, the carriages being coupled by suitable air-pipes and connecting with the operating-car.

Many modifications may be made in the details of this invention without deviating from the general and essential principles upon which it is based.

Having now described and particularly set forth the nature of the said invention and the manner of carrying the same into effect, what I claim is—

1. The method of treating air, for the purposes specified, by causing the same to pass through an ice-box, next in a state of fine division through vessels containing sulphuric acid, which purifies and partly deprives it of moisture, then through kaolin, which removes the remaining moisture, and finally through one or more vessels containing salicylic acid, with which it becomes impregnated, substantially as described.

2. In combination with the provision-chamber of a refrigerator-car, a separate chamber or car containing an air-pump, an ice-box, receptacles containing an absorbent medium, and



vessels containing preservative agents such as specified, said pump and receptacles being connected by pipes leading finally to said provision-chamber, substantially as described.

5 3. The combination, in a refrigerator car or chamber, of the air-forcing apparatus, the ice-box, the receptacles containing sulphuric acid, the chamber containing kaolin, the vessel or vessels containing a suitable antiseptic—such  
10 as salicylic acid—and the pipes or air-passages connecting said chambers or receptacles and leading finally to the provision-chamber, substantially as described.

15 4. A refrigerator car or chamber constructed as described, and provided with an air-pump, pipes connected with said pump for conducting the air successively through an ice-chamber, a moisture-absorbent medium, vessels containing preservative agents, and finally delivering it to the provision-chamber, and provided,  
20 also, with a heater and connections for supplying hot air at will to said chamber, whereby the desired temperature therein can be readily obtained, substantially as described.

25 5. A refrigerator-car having a provision-chamber, in combination with a separate car or

chamber containing apparatus, substantially as specified, for supplying thereto air which has been previously cooled, deprived of moisture, and charged with preservative agent, and  
30 also with an auxiliary heating apparatus for admitting hot air to said provision-chamber, as and for the purpose set forth.

6. The method of treating air, for preserving articles of food, by cooling it by contact with  
35 ice, drying by passing through an absorbent medium—such as kaolin—and charging it with ozone, substantially as described.

7. A refrigerator car or chamber having double wood walls, the outer wall covered with a  
40 putty, as described, and lined with a layer of non-conducting material—such as felt—the inner wall being similarly protected, and the space between the two walls filled with talc and kaolin, calcined and pulverized, as set forth. 45

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

SAMUEL HENRY LINN.

Witnesses:

BENJ. F. LINN,  
WILLIAM GOHL.