

(No Model.)

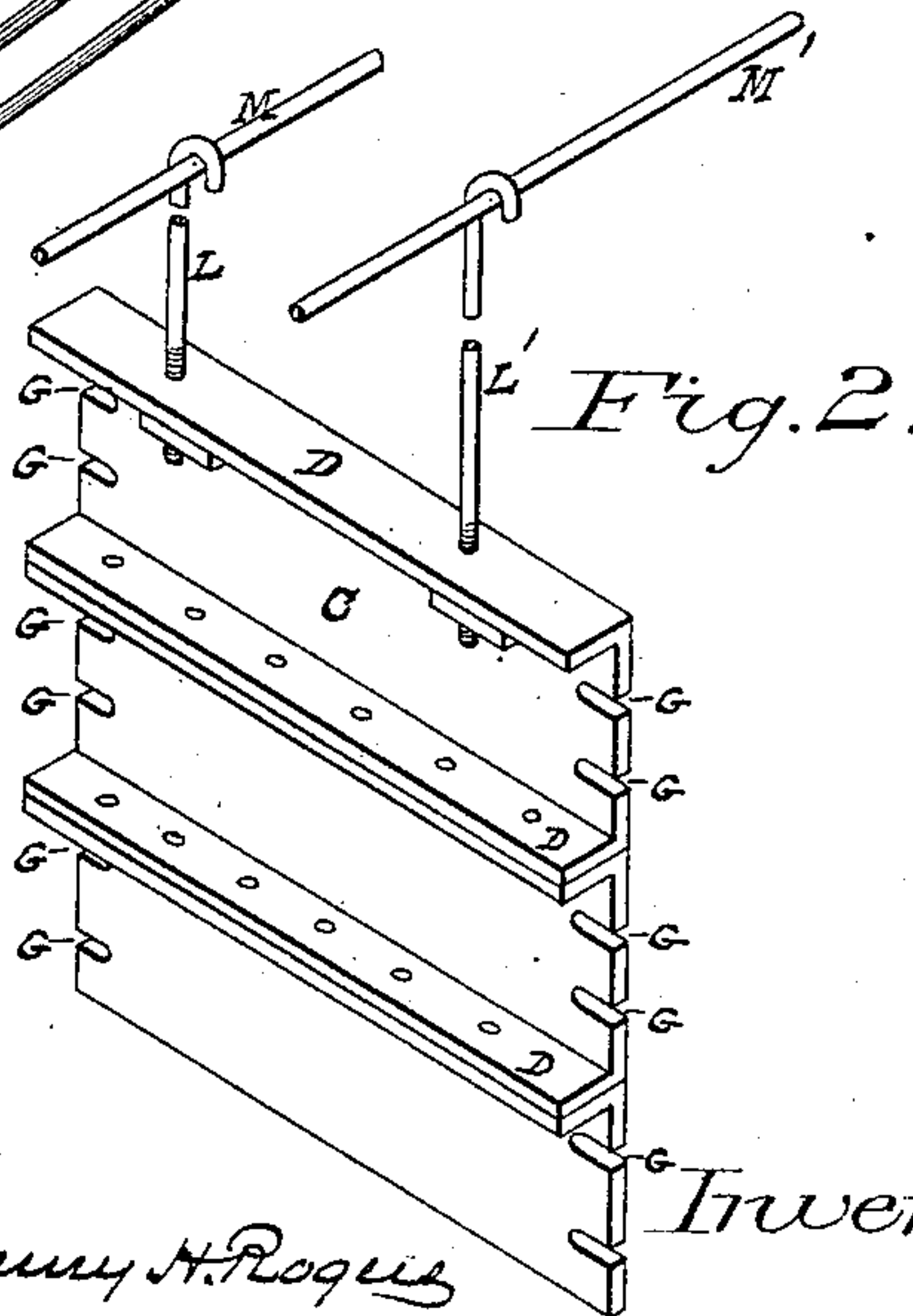
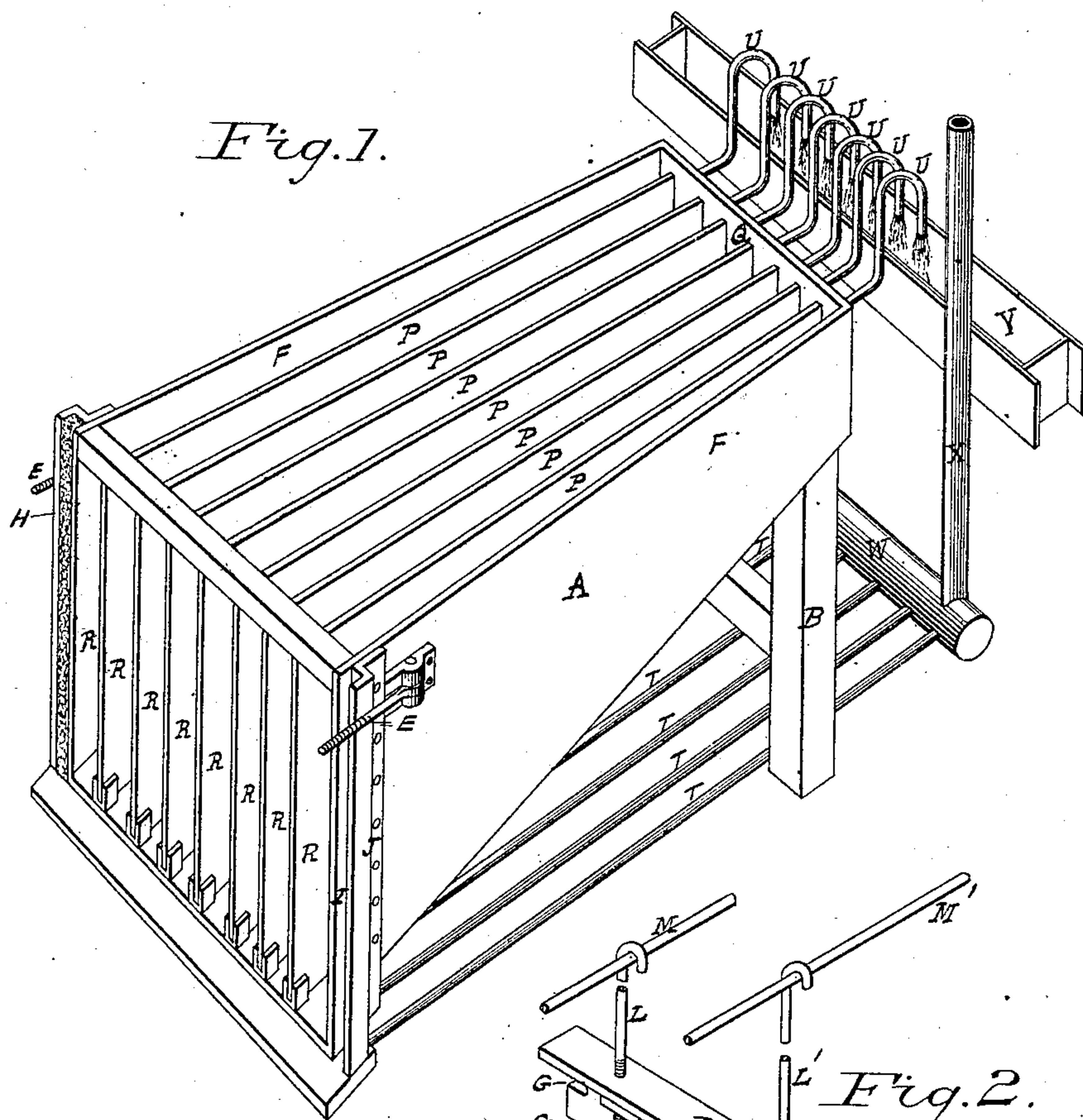
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H. H. ROGERS & C. VOSE.

# APPARATUS FOR REFRIGERATING PARAFFINE OILS AND OTHER LIQUIDS.

No. 316,400.

Patented Apr. 21, 1885.



Witnesses:

James K. Maxwell

L. C. Fitter.

Henny H. Rogers

Clarence Rose by their attorneys

Bakewell & Kerr

<sup>G</sup>*Inventors*

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2 Sheets—Sheet 2.

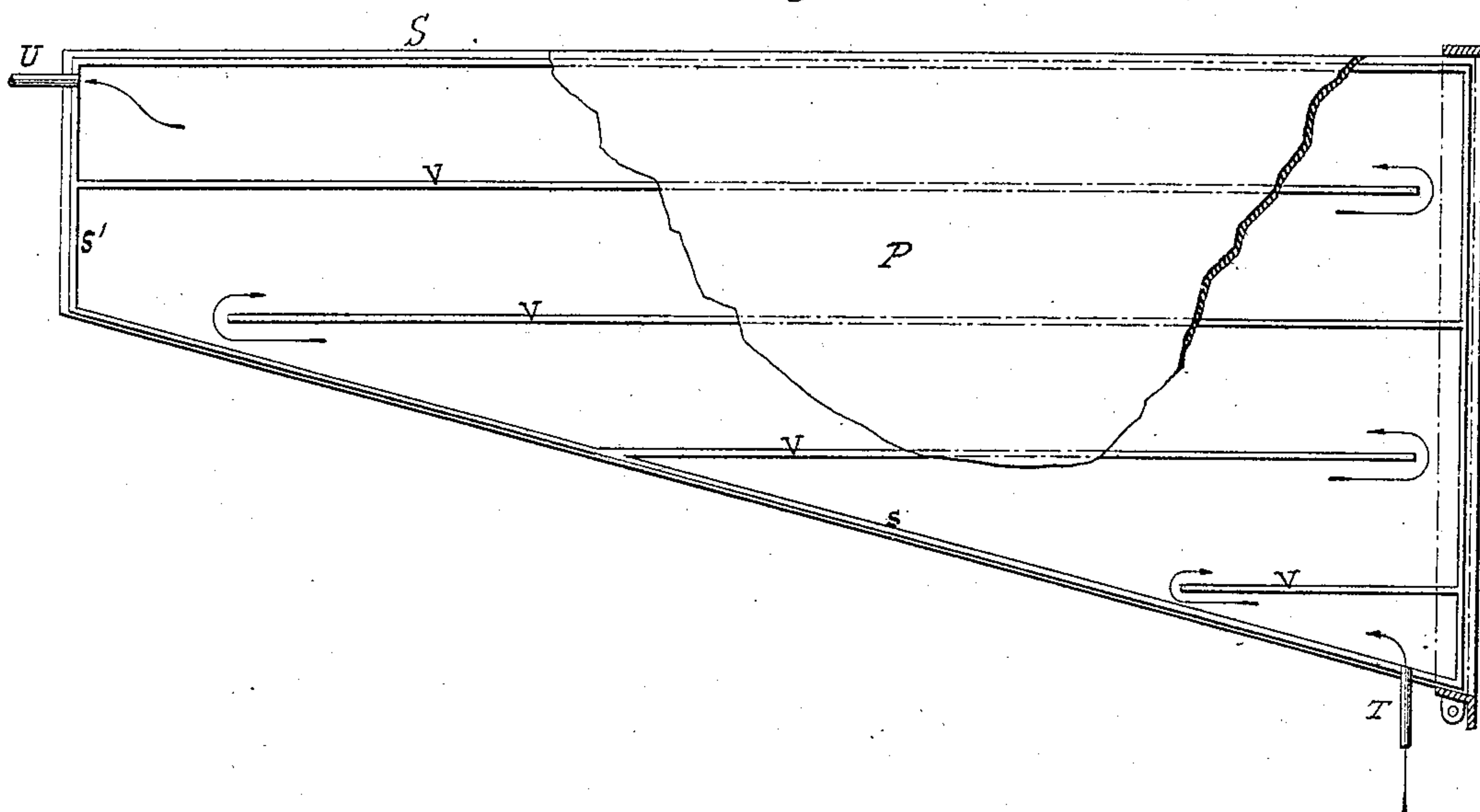
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APPARATUS FOR REFRIGERATING PARAFFINE OILS AND OTHER LIQUIDS.

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*Fig. 3.*



*Witnesses:*

*James H. Bakewell*

*L. C. Fitter*

*Henry H. Rogers*

*Clarence Vose*

*Inventors.*

*by their attorneys*

*Bakewell & Kerr.*



# UNITED STATES PATENT OFFICE

HENRY H. ROGERS, OF NEW YORK, AND CLARENCE VOSE, OF BROOKLYN,  
ASSIGNORS TO THE PRATT MANUFACTURING COMPANY, OF NEW  
YORK, N. Y.

APPARATUS FOR REFRIGERATING PARAFFINE-OILS AND OTHER LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 316,400, dated April 21, 1885.

Application filed December 19, 1884. (No model.)

*To all whom it may concern:*

Be it known that we, HENRY H. ROGERS,  
of the city of New York, and State of New  
York, and CLARENCE VOSE, of the city of  
5 Brooklyn, in the county of Kings and State  
of New York, have invented a new and useful  
Improvement in Apparatus for Refrigerating  
Paraffine-Oils and other Liquids; and we do  
hereby declare the following to be a full, clear,  
10 and exact description thereof, reference being  
had to the accompanying drawings, forming  
part of this specification, in which—

Figure 1 is a perspective representation of  
one of our refrigerating-boxes, the door being  
15 removed from the front end. In this figure  
two only of the bolts used to secure the door  
in place are shown, one such bolt being used  
for each of the notches at the edge of the door.  
These refrigerating-boxes may be used singly  
20 or in a series placed side by side or otherwise,  
as may be most convenient. Fig. 2 represents  
the door of one of the boxes detached, together  
with the means employed for supporting the  
door, so that it may be readily removed or re-  
25 placed. Fig. 3 is a side view of one of the  
hollow partitions which divide the box into  
compartments, one of the side plates of the  
partition being partly removed, so as to ex-  
hibit the interior of the partition.

30 Like letters of reference indicate the same  
parts in each of the figures.

Our improved apparatus consists of a re-  
frigerating box or chamber, preferably made  
of plate-iron, of nearly rectangular shape in  
35 horizontal cross-section, the rear end being  
slightly narrower than the front end, as shown  
in Fig. 1, and the box being of trapezoidal  
shape in vertical cross-section by reason of its  
having an inclined bottom, as shown. The  
40 dimensions of this box may be greatly varied  
to suit the purpose for which it is to be used,  
or for any other reason, but a convenient size  
and proportion of the several dimensions of  
the box is as follows: fifteen feet in length,  
45 six feet and a half in width at the front end,  
tapering slightly to six feet in width at the  
rear end, six feet and a half in height or depth  
in front, and two feet eight inches in depth at  
the rear. The rear end of the box A is sup-

ported on frame-work B, so as to have the top 50  
of the box level when in use. The sides, end,  
and bottom of the box may be constructed of  
single sheets of plate-iron of suitable thick-  
ness, riveted together at the edges. When  
used for freezing paraffine or petroleum dis- 55  
tillate, the top of the box may be left uncov-  
ered, or may be covered, if desired, with loose  
boards. If the box is used for making ice, it  
should be tightly covered on top, and the cover,  
sides, and bottom may be made of double 60  
sheets of metal lined with non-conducting ma-  
terial.

As before stated, the box is preferably made  
of iron; but, if desired, it may be constructed  
in whole or in part of wood or other suitable 65  
material.

The door C at the front end of the box A,  
at which the frozen material is discharged, is  
a separate piece, preferably strengthened by  
flanges D or cross-ribs, and may be made of 70  
double sheets, filled in between them with  
some suitable non-conductor. The width of  
the door C is somewhat greater than that of  
the front end of the box, and it is secured in  
place by bolts E, which are hinged to the front 75  
end of the sides F of the box, as shown in  
Fig. 1. These bolts, when turned parallel to  
the sides of the box, enter corresponding  
notches, G, in the edges of the door C, and a  
nut screwed onto the projecting end of each 80  
bolt is screwed down against the face of the  
door, and thus holds it securely in place. The  
lower edge or bottom of the door rests on the  
bottom of the box, which projects slightly  
from the vertical plane of the front end of the 85  
side pieces, F, to receive and support it, and  
may be secured by hinged bolts in like manner.

Any suitable packing, H, is interposed be-  
tween the edges of the side pieces and the in-  
ner face of the door, so as to make a tight joint 90  
when the door is closed and the nuts are  
screwed home. This packing may be inserted  
and held in place in a recess or stuffing-box, I,  
formed at the front edge of the side pieces of  
the box, by means of a strip of angle-iron, J, 95  
riveted to the outside of the side pieces, F,  
near their front edge.

Inside of the box thus formed are a series



of vertical partitions, P P, placed preferably at uniform distances apart and extending from the front to the rear end of the box. The rear end of each of these partitions P P abuts  
 5 against the rear end piece, Q, of the box, and is removably connected therewith, and the front end of each partition P may be flush with the front end of the sides of the box, so as to come in contact with the inner face of  
 10 the door C when it is closed; but this is not necessary. The lower edge of each partition P is supported slightly above the bottom of the box, or openings may be made in the lower edge of each partition if it rests on the bottom  
 15 of the box, so as to form a communication between the compartments R of the box, which are formed by these partitions. The purpose of this is to enable all the compartments R to be filled at the same time by means of a single charging-pipe, or by pouring the article  
 20 to be frozen or refrigerated into one of the compartments, thus avoiding the necessity of filling each separately. If, however, it is preferred that the compartments should not communicate, the lower edge of each partition  
 25 may rest on the bottom of the box throughout its entire length.

The partitions P are hollow, being constructed of two sheets of metal riveted near  
 30 the edges to a skeleton frame, S, of iron bars welded together at the four corners, the shape of the skeleton frame S corresponding to that of a longitudinal vertical cross-section of the interior of the box. The thickness of the bars  
 35 of the skeleton frame S—say three-fourths of an inch, more or less—determines the width of the cavity of the partition. A hole is bored through the bottom bar, s, of the skeleton frame S, near to the front end of each parti-  
 40 tion, into which is screwed a pipe, T, for the introduction of the refrigerating liquid or fluid, and a similar hole is bored through the rear end bar, s', of the skeleton frame near to the top, into which is screwed a pipe, U, for  
 45 the discharge of the refrigerating liquid or fluid.

In order to secure a more perfect circulation of the refrigerating liquid or fluid through each partition strips of iron V, of the same  
 50 width as the bars forming the skeleton frame, are placed in a horizontal direction therein, as shown in Fig. 3. These strips V are not as long as the interior or cavity of the partitions, and are so disposed therein as to compel the  
 55 refrigerating liquid or fluid traversing the partition to take a circuitous course after entering the pipe T, at one end of the bottom of the partition, backward and forward, gradually rising until it reaches the exit-pipe U  
 60 at the top of the partition, at the other end, as indicated by arrows in Fig. 3.

The strips V V, &c., may be secured in position by rivets passing through the plates forming the sides of the partitions and through the strips V, and likewise serve to stiffen and strengthen the partitions.

The pipes T, which serve for the introduc-

tion of the refrigerating liquid or fluid, are all connected with a transverse horizontal main, W, which may be extended to supply a series  
 70 of cooling-boxes placed side by side, the main W itself being supplied by a pipe, X, from a reservoir or generator of liquid or fluid placed above the level of the top of the cooling-box, so as to secure the outflow at the pipes U, and  
 75 thus create the requisite circulation. The exit-pipes U empty into a common waste pipe or trough, Y.

In order to facilitate the removal and replacement of the door, it is suspended on a  
 80 couple of pendent rods, LL', which are attached to or connected with the flange at the top of the door, as shown in Fig. 2, and which slide on a pair of parallel bars or ways, M M', placed at a suitable height.

The operation of our apparatus, when used for freezing paraffine, will now be described, from which its application to the freezing of water and other substances will be readily understood. The heavy paraffine distillate is  
 85 run into the refrigerating-box A (the door being first secured in place) and occupies the spaces or compartments between the partitions. Cold water at a temperature of about 52° Fahrenheit is then introduced through the  
 90 pipes T and circulates through the interior of the partitions P, escaping at the upper or exit pipes, U, into the waste pipe or trough Y. This operation is continued until the heavy distillate—consisting chiefly of paraffine—is frozen  
 95 into a solid mass throughout, which generally requires a period of about twenty-four hours. The operation might be performed, if desired, much more rapidly by using water or other refrigerating liquid at a lower temperature;  
 100 but that is not desirable, as the paraffine would chill too rapidly and become imperfectly crystallized. When the paraffine is sufficiently hardened, the door of the cooling-box is removed, being slid backward on the ways or  
 105 bars M M', and the paraffine is readily removed from the compartments by means of bars inserted into it from the top, the workmen standing on planks laid over the top of the box and resting on its sides and on the  
 110 partitions.

In case a greater degree of cold is required, water cooled to near the freezing-point may be circulated through the partitions, or, for a still lower temperature, brine previously re-  
 115 frigerated may be employed.

If our apparatus is to be used in the manufacture of ice, the sides, bottom, and door of the box should be double and have a lining of some good non-conductor—as plaster-of-paris,  
 120 cork-shavings, or the like—and refrigerated brine, ammonia-gas, or other liquid or fluid such as is used for refrigerating may be circulated through the partitions.

The advantage of our improved apparatus  
 125 arises from the facility with which the congealed mass can be removed from the compartments, which is due to the smooth plane surface of the partitions to the sloping surface of



the bottom of the box, which inclines toward the point of discharge, and to the slightly-tapering shape of the compartments formed by the partitions.

5 If the apparatus is used for the manufacture of ice, the ice may be readily discharged from the box in large cakes by passing steam or hot water for a few moments through the partitions, so as to loosen it from adherence to the  
10 surfaces of the compartments, after which, the door being first removed, the blocks of ice will slide out by their own gravity.

The strips inside of the partitions, instead of being placed horizontally, as described, may,  
15 if preferred, be placed vertically or in an inclined position, and so arranged that the refrigerating liquid or fluid will circulate up and down instead of horizontally; or they may be dispensed with altogether, in which case the  
20 refrigerating liquid would enter at the bottom and pass out at the top without circulating. This arrangement, while it would retain some of the advantages of our improvement, is not so good as that which we have before described,  
25 as the water or other refrigerating liquid would be constantly warmer at the upper than at the lower part, and the freezing effect would not be uniform in degree. So, also, the hollow partitions might be used in boxes which do  
30 not have a sloping bottom, or the partitions might be placed parallel to each other; but the greatest benefit of our improvement is obtained by constructing the boxes, as described, with sloping bottom with hollow plane-surfaced  
35 partitions furnished with strips inside to form a tortuous passage for the refrigerating liquid or fluid, and with the partitions converging slightly toward the rear end of the box, as before described.

40 Instead of the hollow partitions having each a separate exit and inflow pipe, the lower front end of all the partitions might be connected directly with a single transverse inflow-pipe, and similarly the upper rear end of all of the  
45 partitions might be directly connected with a single exit-pipe; or the inflow and exit pipe or pipes might be situated at the same end of

the box, one at the bottom and the other at the top of the partitions; but these and other obvious modifications which might be suggested are mere matters of detail of arrangement and of economy of construction not affecting the principle of our invention. 50

Having thus described our improvement, what we claim as our invention, and desire to 55 secure by Letters Patent, is—

1. A refrigerating chamber or box slightly tapering in width from the front to the rear end, furnished with a door at its front end, and having its bottom inclining downward 60 from the rear to the front, and its interior divided into a series of compartments by plane-surfaced hollow partitions communicating at bottom and top with a pipe or pipes for the introduction and outflow of the refrigerating 65 liquid or fluid into and out of the partitions, substantially as and for the purpose described.

2. A refrigerating chamber or box furnished with a door at its front end, having its bottom inclined downward toward the front end and divided into compartments by vertical plane-surfaced partitions extending longitudinally from front to rear, said partitions being hollow and furnished with strips so placed as to form a tortuous internal passage communicating at 70 bottom and top with a pipe or pipes for the passage through the partitions of a refrigerating liquid or fluid, substantially as and for the purpose described.

3. A refrigerating chamber or box furnished 80 with a door at one end, and either covered on top or not, divided into compartments by vertical plane-surfaced hollow partitions extending from end to end, arranged for a refrigerating liquid or fluid to pass or circulate through 85 them, substantially as described.

In testimony whereof we have hereunto set our hands this 12th day of December, A. D. 1884.

HENRY H. ROGERS.  
CLARENCE VOSE.

Witnesses:

A. C. BEDFORD,  
N. P. HEFFLEY.