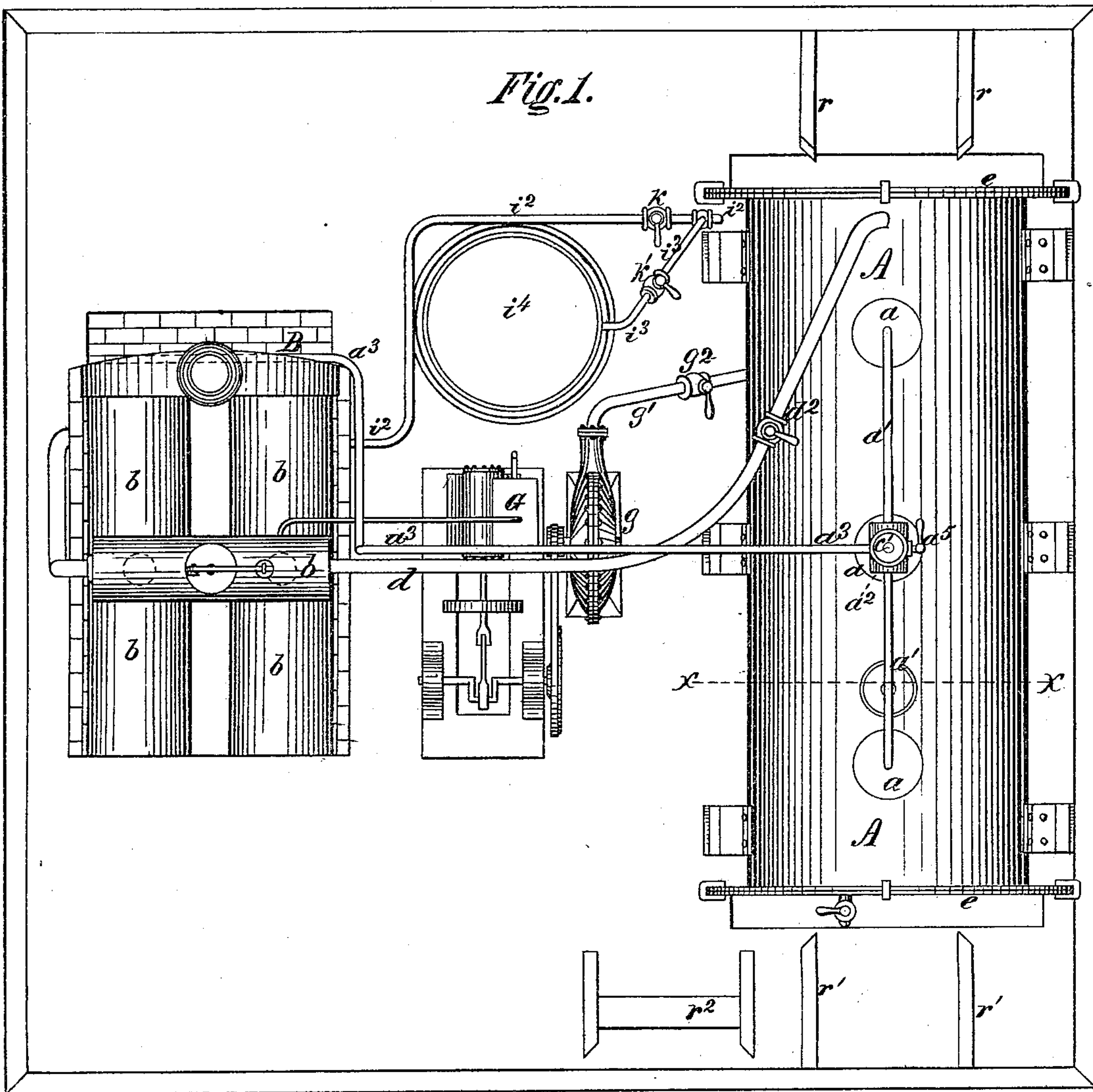


J. C. STEAD.

Apparatus for Preserving Wood.

No. 148,630.

Patented March 17, 1874.



Witnesses.

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Edw. J. Taylor

Inventor.

James C. Stead  
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Fig. 2.

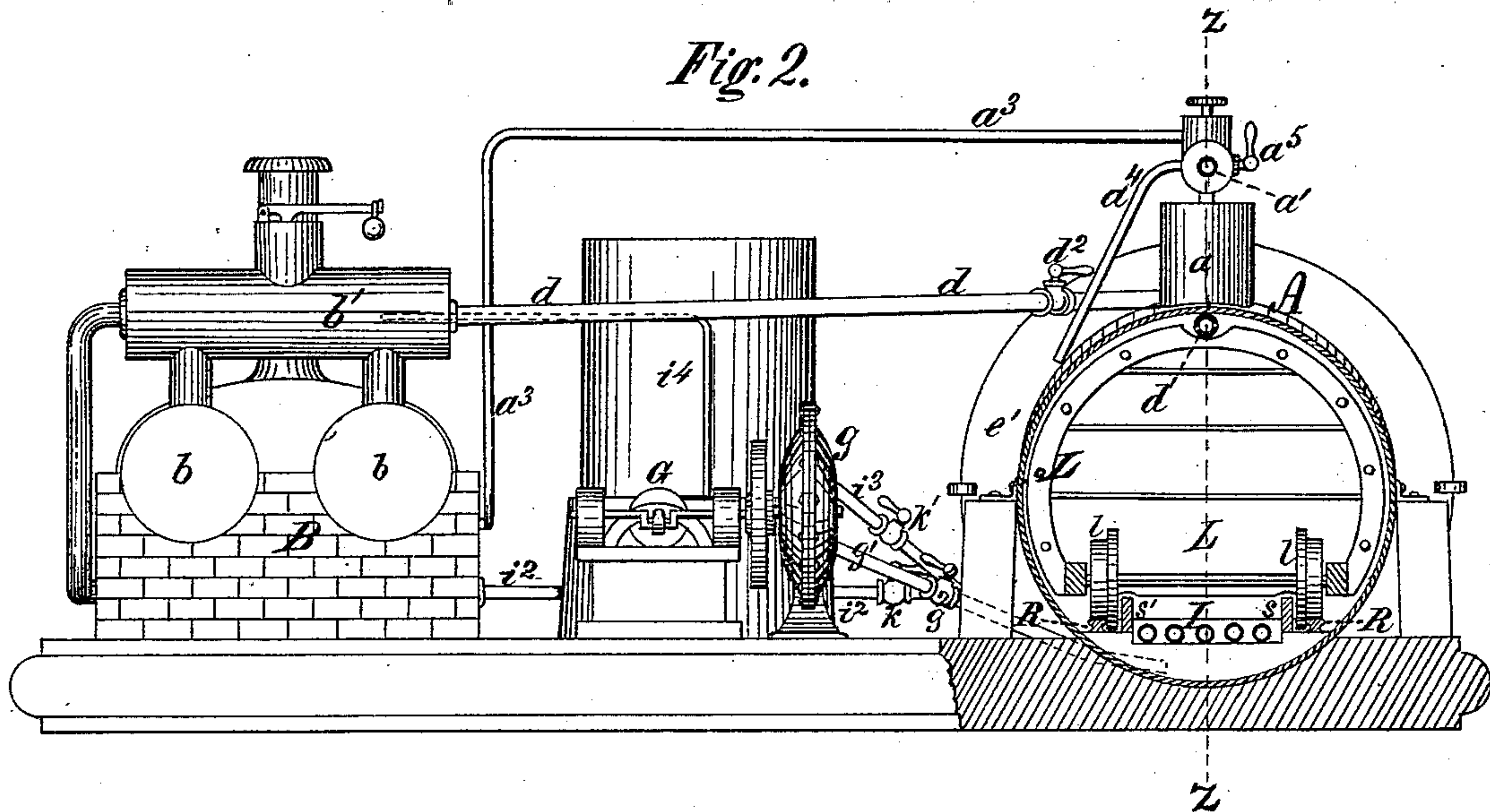


Fig. 3.

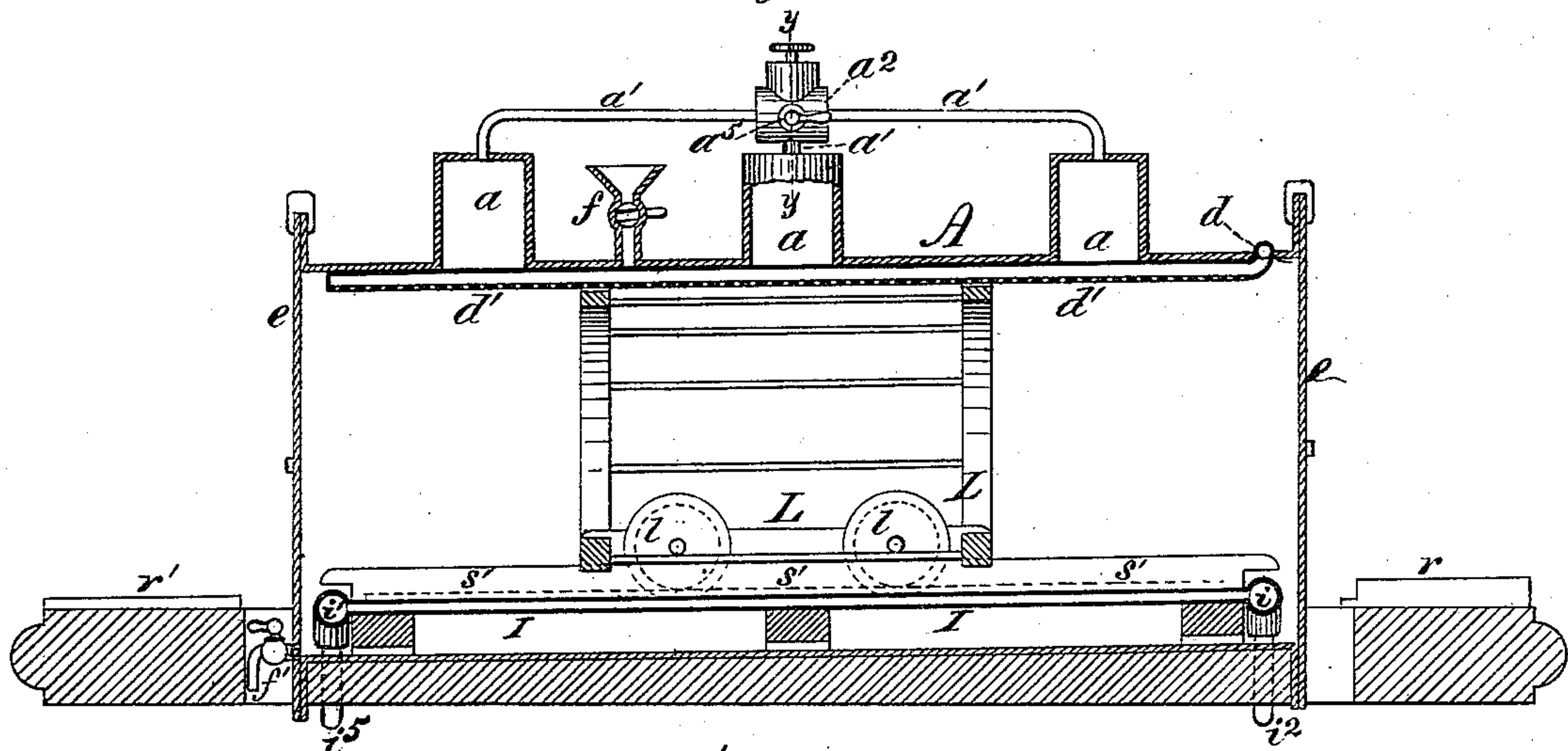
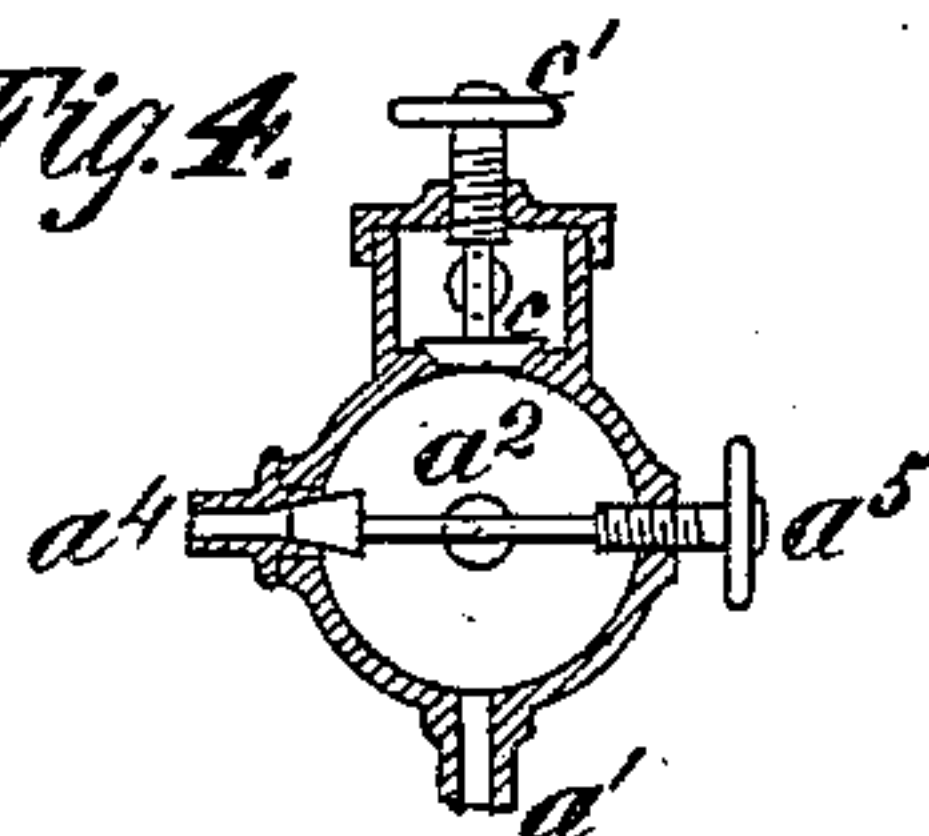


Fig. 4.



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# UNITED STATES PATENT OFFICE.

JAMES C. STEAD, OF JERSEY CITY, NEW JERSEY.

## IMPROVEMENT IN APPARATUS FOR PRESERVING WOOD.

Specification forming part of Letters Patent No. 148,630, dated March 17, 1874; application filed March 10, 1874.

*To all whom it may concern:*

Be it known that I, JAMES C. STEAD, of Jersey City, New Jersey, have invented certain Improvements in Apparatus for Preserving Wood, of which the following is a specification:

My invention relates to apparatus used to preserve wood by first expelling the sap therefrom, and then impregnating the wood with some preservative material. Its object is to improve the safety, rapidity, effectiveness, and economy of the process.

In the accompanying drawings, Figure 1 is a ground plan of my improved apparatus; Fig. 2, an end elevation, showing section of treating-cylinder through line  $x x$ , Fig. 1; Fig. 3, a longitudinal vertical section of the treating-cylinder through line  $z z$  on Fig. 2; and Fig. 4, a vertical section of the check-valve and its connections through line  $y y$ , Fig. 3.

I use the ordinary treating-cylinder or metallic boiler A, but I set it in a slightly-inclined position. Both ends or heads of the cylinder  $e e$  are detachable, but are capable of air-tight application by means of clamps or other well-known devices. Within the cylinder is the inclined railway R, in line with the external tracks  $r$  and  $r^1$ , with which it is connected, when the cylinder-heads are off, by means of movable bridges, one of which,  $r^2$ , is shown in Fig. 1. Below the track in the cylinder is a system of inclined pipes, I, placed parallel to each other, and connected at opposite ends with the transverse chests  $i$  and  $i^1$ . The more elevated chest  $i$  is connected, by the pipe  $i^2$ , with the steam-boilers  $b b$ , and also, by means of the branch pipe  $i^3$ , with a cold-water tank,  $i^4$ —each pipe being provided with a valve or stop-cock,  $k$  and  $k'$ , so that either a hot or a cold fluid can be injected into the chest  $i$ , as desired. The less elevated chest  $i^1$  is connected with the outlet-pipe  $i^5$ . Within the track inside the cylinder I place the elevated guide-flanges  $s s'$ , to preserve the alignment with the track of the car-wheels  $l$ , in case the car L should float when the treating fluid is first introduced into the cylinder, which sometimes happens. My treating-cylinder A has several domes,  $a a a$ , connected, by the pipes  $a^1 a^1$ , with the check-valve chamber  $a^2$ , from which proceeds the pipe  $a^3$ , which conveys the products of distil-

lation to the fire-box B under the steam-boilers  $b b$ . The valve-chamber  $a^2$  has another outlet by means of the pipe  $a^4$ , which is provided with a stop-cock,  $a^5$ , so that the products of distillation can be blown off, if desired, without being passed into the furnace, in which case the check-valve  $c$  is immovably held down upon its seat by means of the screw  $c'$ . My boiler and furnace are provided with suitable means for superheating vapor, and a pipe,  $d$ , proceeds from the superheated-vapor chamber  $b'$  into the treating-cylinder. This pipe  $d$  extends longitudinally along the top of the cylinder inside, and is perforated with fine apertures at regular intervals, as shown at  $d^1$ , Fig. 3, and is also provided with a suitable stop-cock or valve,  $d^2$ . Treating fluid is introduced into the cylinder by means of the cock  $f$ , and drawn off by means of the cock  $f'$  when desired. A small steam-engine, G, operates the rotary blower  $g$ , by means of which fresh air may be forced into the treating-cylinder through the pipe  $g^1$ , which is provided with the valve or stop-cock  $g^2$ .

It will be seen that by means of the inclined pipes I, I am enabled to establish parallel currents of steam, and to have the aid of gravity in expelling from the pipes the water of condensation.

It will also be seen that I have the aid of gravity in maintaining parallel currents of cold liquid when I desire to use the system of pipes for cooling the contents of the treating-cylinder.

An inclined railway in a closed chamber is not new, it being found in the rejected application of Jameson T. Hawkins, dated December 29, 1851; but, so far as I am aware, it has never been used in a chamber or cylinder capable of being made steam-tight, and provided with a system of pipes for effecting prescribed variations in the temperature of the interior of the cylinder by the alternate circulation of hot and cold liquids.

Steam-pipes for heating the contents of a closed cylinder are common for various purposes. They were suggested for use in the wood-preserving process described in John Bethel's English Patent, dated December 3, 1864; also, in the United States Patent of W. T. Pelton, dated February 27, 1872. But, so far as I know,



pipes used for this purpose have been arranged in coils, and my system of parallel inclined pipes for maintaining several currents in a downward direction is new, both in itself and in its relation to the other parts of the apparatus.

The process of wood-preserving consists in first exposing the wood to a hot vapor in a high state of tension, and then subjecting it to a cold bath of the desired impregnating material.

By means of the arrangement I have described, cars loaded with wood to be impregnated are readily introduced into the cylinder by the aid of gravity, and are discharged with equal facility from the opposite end, and by having two sets of cars the two operations of charging and discharging the cylinder may be carried on simultaneously.

When the loaded cars have rolled into the cylinder, the cylinder-heads have been applied, and the material to be boiled introduced, I am enabled to instantly establish currents of steam in the pipes, so as to apply the desired heat with the least possible delay, and rapidly vaporize the treating material. On the other hand, when this part of the operation is completed and the wood is ready for immersion in the cold bath, I can as rapidly substitute for the steam currents of cold liquid, to assist in condensing the vapor in the cylinder, and in keeping cool the impregnating material, which constitutes the cold bath, and which is then pumped into the cylinder.

It will be seen that upon the conclusion of the first part of the operation, after the vapor has been allowed to blow off, so as to reduce the pressure within the cylinder, and the escape-valve is closed, the passage of the cold liquid through the pipes will, to some extent, condense the vapor remaining in the cylinder, so as to create a partial vacuum therein, and thus increase the avidity with which the wood will absorb the impregnating fluid.

By the improved convenience of operating the apparatus which proceeds from this arrangement of the parts, and by the increased rapidity of the operations of heating and cooling which it permits, I greatly lessen the time as well as the labor of the process.

By means of the perforated pipe  $d^1$  for use in the vapor treatment of wood, the heated vapor is equally diffused, and acts with superior uniformity upon the entire contents of the cylinder.

The object of forcing fresh air into the cylinder is to expel any hot or deleterious gases which may be contained therein, so that, in case of necessity, the operators may enter the cylinder without experiencing injury or discomfort.

The connection of the treating-cylinder with the fire-box by the pipe  $a^3$  enables me to use lighter oil, which is distilled in the process for making steam, and thus to save coal. Light oil and naphtha are of no use for impregnating wood, and are dangerous substances to handle. Heretofore they have been condensed and reintroduced into the treating-cylinder. I find it more economical to burn them, and I provide the check-valve  $c$  to prevent any danger of communicating fire to the inside of the treating-cylinder.

I claim as my invention—

1. The arrangement, with relation to a cylinder having detachable ends or heads, capable of steam-tight application, and provided with pipes for the admission and discharge of liquids or vapor, of an inclined railway and a system of pipes arranged within the cylinder, and having an outside connection or connections, operating to effect prescribed variations in the temperature of matter contained within the cylinder, the whole constructed substantially in the manner described, and for the purpose set forth.

2. The system of inclined pipes and transverse cylinders, constructed and arranged substantially as described, in combination with a supply-pipe and steam-boiler, substantially as and for the purpose described.

3. The system of inclined pipes and transverse cylinders, constructed and arranged substantially as described, in combination with a cold-water-supply pipe, substantially as and for the purpose described.

4. The combination, with the treating-cylinder and the railway, of the guide-flanges  $s$   $s'$ , substantially as and for the purpose described.

5. The combination of a cylinder, substantially such as is described, with a pipe or pipes contained within the cylinder, provided with a series of apertures, and connected with an exterior boiler, substantially as and for the purpose described.

6. The arrangement with relation to a cylinder, substantially such as described, of a blower or other instrument capable of forcing air into the cylinder, substantially as and for the purpose set forth.

7. The combination, with the treating-cylinder A and the fire-box B, of the pipe  $a^3$ , provided with the check-valve  $c$ , substantially as and for the purpose set forth.

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Witnesses:

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