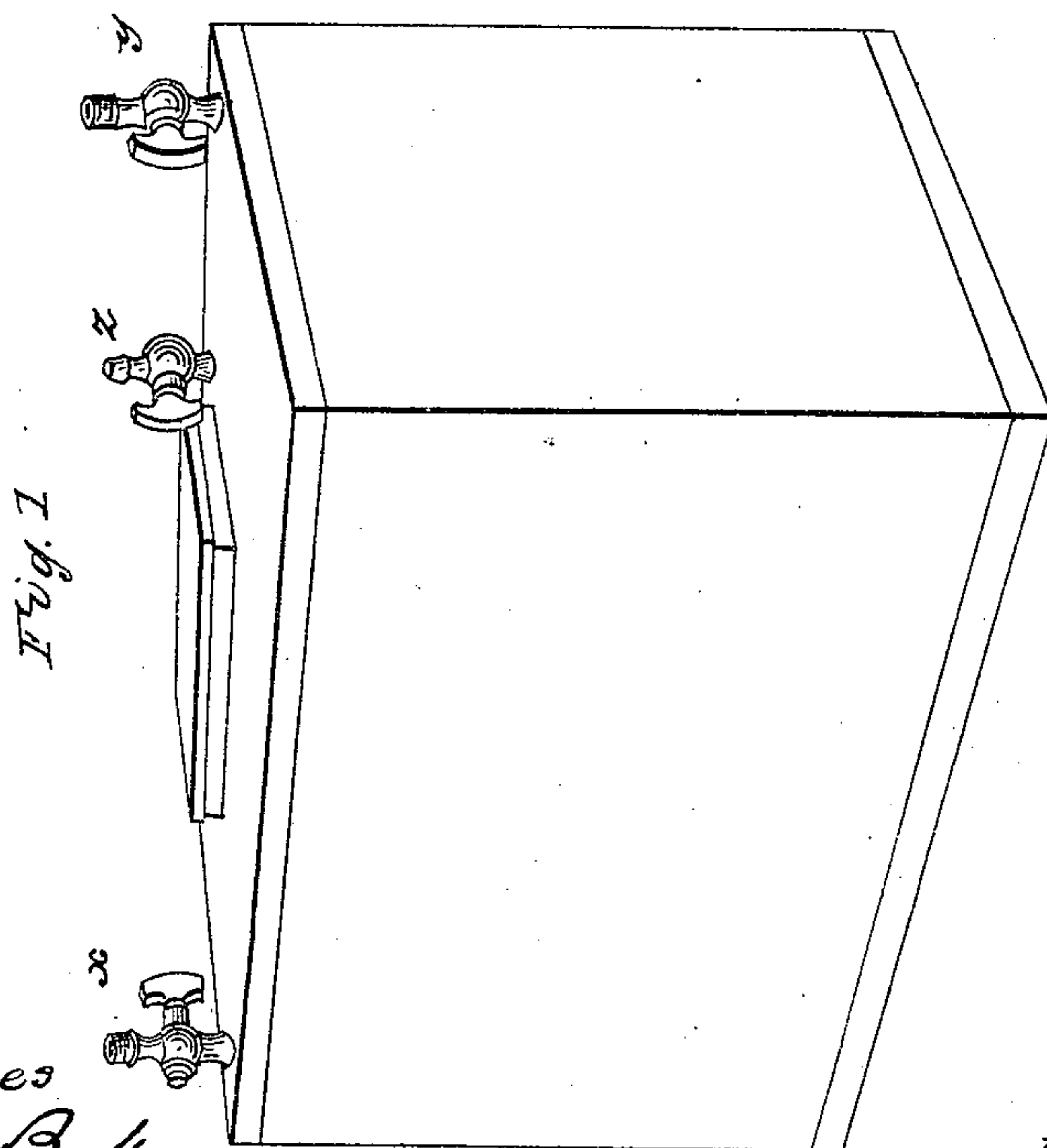
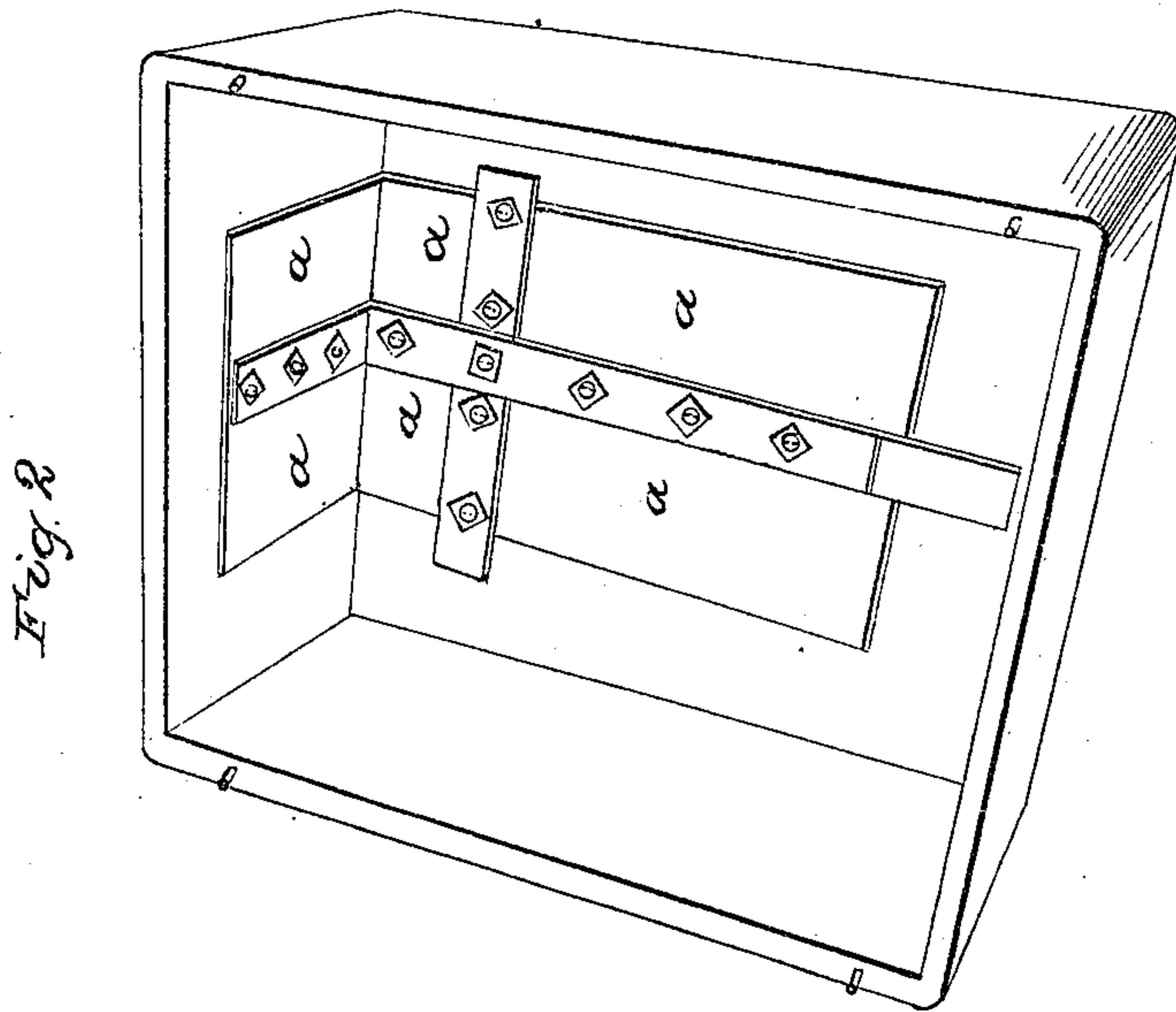


S. F. SCHOONMAKER.
Transporting and Storing Grain.

No. 77,768.

Patented May 12, 1868.



Witnesses
Charles Baker
R. E. Smith

Inventor
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United States Patent Office.

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Letters Patent No. 77,768, dated May 12, 1868; antedated April 25, 1868.

IMPROVEMENT IN TRANSPORTING AND STORING GRAIN AND OTHER PRODUCTS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, S. FRANKLIN SCHOONMAKER, of the city of New York, county and State of New York, have invented a new and useful Method in the Transportation and Storage of Grain and other Vegetable Matter; and in order that others skilled in such matters may proceed to apply and use my method, I do hereby declare that the hereinafter description is a true and exact explanation of the same, and how it may be carried into effect, reference being made to the accompanying drawings.

This invention relates more particularly to a method in the transportation and storage of grain, which is liable to become heated and damaged while being conveyed in bulk in vessels on the great lakes, or in canal-boats on their way to tide-water, but is also applicable to the storage and preservation of other vegetable matters, such as fruits, hops, &c.

It is known that immense quantities of grain every year become badly heated and damaged by being stored in bulk, while in a moist condition, in the holds of vessels during transportation, but the apparent cause of this heating has hitherto escaped investigation. It need only be stated, to be admitted, that in the case contemplated the heating is due to chemical action. This chemical action can only ensue in the relation of the elements present, and in communication with each other. In the case in view, these elements are the grain, as an organic body, its participating moisture, and the constituent elements of the air, oxygen and nitrogen. It is well known that oxygen plays a chief and highly important part in the changes which take place in all organic bodies. A simple experiment is made by saturating cotton-waste with oil, which thereupon unites with the oxygen of the air so rapidly as often to generate sufficient heat to cause it to burst into flame. Disastrous conflagrations have frequently been traced to the operation of the same cause, in a variety of ways and with a variety of substances. Moisture is a powerful agent in instituting the process of oxidization. While vegetable substances, perfectly or chiefly deprived of their moisture, are little affected by the oxygen of the air, they rapidly undergo some one of the chemical changes tending to their destruction, when containing an undue quantity of moisture, and left exposed to the free contact of oxygen.

I have explained, in a previous application for a patent on a method for preserving hops, a plan for lining with metal plates a room or compartment, so as to produce an air-tight enclosure, and at the same time provide for the expansion and contraction of the metal plates, without causing, through some one of the many joints, a leakage of the gases. Where the temperature is frequently varying, as would be the case through the different seasons of the year, in the lining, for instance, of the hold of a canal-boat, this provision is absolutely necessary.

By the aid of the accompanying drawings this plan for the lining of the interior of canal-boats and other water-transports, as well as cars, and rooms or compartments in buildings, is more particularly explained.

The metal plates *a a a a* are laid upon the sides, floor, and ceiling of the chamber, so that their edges may be separated, from a quarter to a half inch. Over this separation is then placed a metal strap, about an inch wide, under which is laid a strip of rubber cloth. A screw, which has a flat surface under its head, is then fitted with a rubber ring, and being inserted through the metal strap, passes between the edges of the plates into the wood, against which they are secured. By this method, the plates themselves need not be pierced with a single orifice to fasten them, and the metal straps, pressing the rubber against the edges of the plates, will form perfectly an air-tight enclosure. The plates are thus left free to expand and contract with the varying temperature.

Having lined the interior of a vessel or room, substantially as herein specified, it is then filled with the grain or other matter to be transported or stored. A suitable cover, lined with metal, as herein provided, is secured over the hatchway, by means of rubber strips under the points in contact. A rubber hose is then attached to the cock or opening *x*, Figure 1, and placed in connection with a suitable apparatus for containing caustic barytes, which is heated to low redness without contact with the exterior air. With this apparatus is joined another tube, which, passing through water or a cooling-mixture, leads back into the grain-enclosure, through the cock or opening *y*, fig. 1. The air confined in the chamber being made to pass over the heated

barytes, soon becomes an atmosphere of nitrogen, by the loss of its oxygen, which unites with the barytes, to form a peroxide, and no carbonic or other deleterious gas is formed in the process.

A cock or opening, z, fig. 1, is formed in connection with the grain-chamber, by which the pressure of the air outside and within the chamber is kept in equilibrium during the process. When the process is completed, the cocks communicating with the chamber are closed, and the hose or pipes are then detached.

The atmosphere in contact with the grain being now nitrogen, an inert element, the heating of the grain cannot ensue during its transportation, and until, the vessel having arrived at its destination, the enclosure is opened and its contents discharged.

I am aware, as has been explained in a previous application, that processes contemplating the absence of oxygen have been proposed, for meats, vegetables, &c., in cans; but I do not know that nitrogen gas has ever been produced as herein contemplated, for the purpose described.

I therefore claim—

1. A closed chamber or compartment, rendered impervious to air and gases by a metal lining, so applied as to permit the free expansion and contraction of the metal, substantially as and for the purpose specified.

2. In connection with a suitably-enclosed chamber or compartment, nitrogen gas, when produced from the confined air, by the agency of a chemical compound and heat, without the production of carbonic-acid gas, substantially as and for the purpose described.

3. Providing an opening or inlet, in connection with an enclosed chamber, for the passage of exterior air, to maintain, in the process, an equilibrium of pressure within and without, for the purposes substantially as described.

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Witnesses:

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