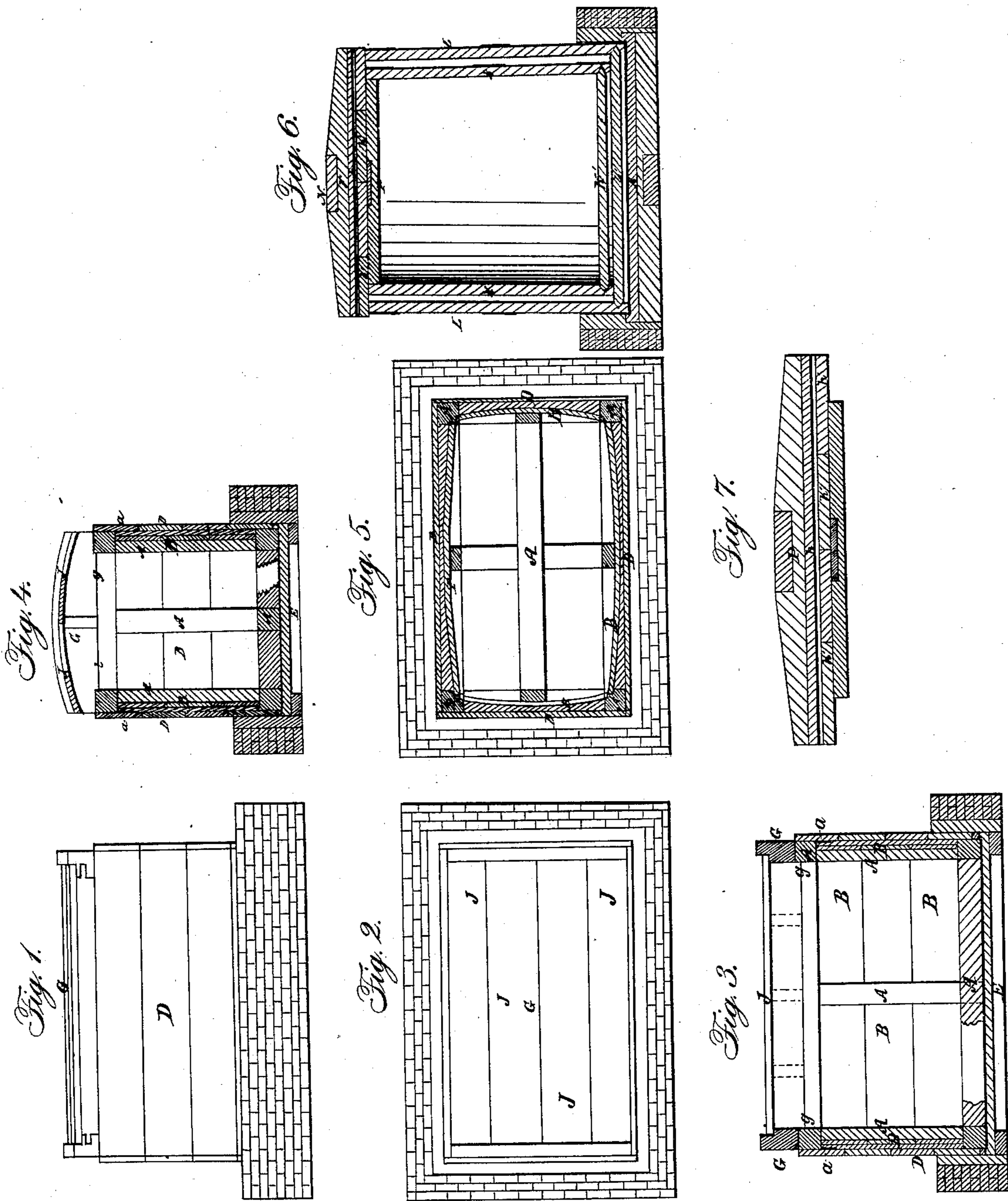


D. BRUCE.
Vacuum Pan.

No. 55,812.

Patented June 26, 1866.



Witnesses:

R. H. Campbell
Edw. S. S. S.

Inventor:

Duncan Bruce
by atty
Wm. S. S. S.

UNITED STATES PATENT OFFICE.

DUNCAN BRUCE, OF ROSSVILLE, NEW YORK.

IMPROVED MODE OF CONSTRUCTING VACUUM-VESSELS FOR EVAPORATING, &c.

Specification forming part of Letters Patent No. 55,812, dated June 26, 1866.

To all whom it may concern:

Be it known that I, DUNCAN BRUCE, of Rossville, in the county of Richmond and State of New York, have invented an Improved Mode of Constructing Air-Tight Vessels for Evaporating Liquids and for other purposes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side view of one of my improved air-tight vessels. Fig. 2 is a top view. Fig. 3 is a longitudinal section taken vertically through one of the vessels. Fig. 4 is a transverse section of the same. Fig. 5 is a horizontal section. Fig. 6 is a diametrical section through a circular vessel. Fig. 7 is an enlarged section through the cover of the circular vessel.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to an improvement in the construction of air-tight vacuum-chambers which are designed for use in the process of evaporating cane and other juices, for dissolving animal matter, evaporating brine in making salt, in tanning hides, and for all purposes where chemical and mechanical changes are caused to take place in vacuum-chambers.

In conducting such processes hitherto metallic vessels have been generally employed on account of their superior strength to any other material; but on account of the corrosibleness of such vessels and their power of conducting off heat, such vessels are very objectionable for many purposes.

It is the object of my invention to construct air-tight vessels chiefly of wood, in such manner that they shall possess the requisite strength to withstand the pressure to which they are subjected in conducting the processes above mentioned *in vacuo*, as will be hereinafter described.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawings I have represented two forms of the vessels, one of which forms is quadrangular and the other is circular. Both are constructed upon the same principle and substantially in the same manner.

In Figs. 1, 2, 3, 4, and 5 A represents a strong rectangular frame, which is composed of strong timbers arranged in horizontal and vertical planes, so as to possess the greatest possible strength. The vertical corner beams are grooved for the reception of the planks B B, which form the inclosing-sides and end walls, and before putting on the upper horizontal portion of the frame A the planks B B are curved around the intermediate vertical frame-timbers and their ends inserted into the said grooves. The inclosing-walls B B are thus made to form arches, so as to resist the strain to which they are subjected when a vacuum is produced in the vessel.

Before bending and applying the planks B B, I sustain the vertical timbers in position by means of a metallic strap, *a*, placed on the outside of said timbers, and also by means of a rectangular frame placed on the inside of said timbers.

When the planks B are applied to the frame another wall of planks, D, is nailed on the outside of it, so as to form double walls, which leave spaces between them that are filled up with cement; after which the upper horizontal frame is adjusted in place upon the upper ends of the vertical timbers, as shown in Figs. 1, 3, and 4. The box is now mounted upon a flanged platform, E, and embedded in cement, which is spread upon it. I now construct a wall of brick or stone around the vessel, one foot high, more or less, and fill in between this wall and the lower portion of the vessel with cement, which renders the bottom of the vessel impervious to air, and also prevents the rapid conduction of heat from the interior thereof.

Where weight and room are not important considerations I prefer brick and mortar with cement, instead of the outer wooden walls, D.

The cover G is also constructed of wood in the following manner: I first make a rectangular frame which is equal in area to the top of the frame A, upon which the cover is placed, and which has two arching end pieces, that are grooved to receive the ends of planks J. This frame is braced by means of arched transverse and longitudinal ribs *g g g*, the lower edges of which project below the level of the bottom of the cover, so that when this cover is adjusted upon its vessel the ends of the ribs

will serve as supports for the upper part of the frame A, and prevent it from collapsing when the air is exhausted. In applying the cover G to the vessel I use an india-rubber gasket for making the joint air-tight.

The cover itself may be constructed of two or more layers of planks having sheet metal interposed between them to render the cover perfectly air-proof.

In Fig. 6 I have represented a circular vessel which is constructed substantially in the manner described for the rectangular vessel, with arched sides. This vessel of Fig. 6 consists of an inner circular wall, K, and an outer circular wall, L, between which walls cement is put, as shown in Fig. 6.

The two vessels K and L are constructed of staves bound together with strong hoops and provided with bottoms K' L', between which latter there should also be a layer of cement.

The lower portion or bottom of the circular vessel is embedded in cement and surrounded with a wall of brick and cement, as shown in the drawings. As the cover N of this vessel is flat, I construct it in the following manner, so that it will possess the required strength and be air-tight: I use two layers, *h h'*, of planks, with the grain of one running at right angles

to that of the other, and secure these planks together with a thin plate of sheet metal between them. I now secure battens P P on each side of the cover, and make those battens which are on its lower side sufficiently short to enter the inner wall, K, and serve to strengthen it at its upper end from outward pressure.

The cement which I use in the construction of the walls of the vacuum-vessels not only strengthens these walls and renders them impervious to air, but it also prevents in a great degree the escape of heat from the interior of the vessels during the process of treating substances therein.

I will here state that the liquids which are put into my improved vacuum vessels are to be heated and kept hot by means of steam or hot air or water.

What I claim as new, and desire to secure by Letters Patent, is—

The method, substantially as herein described, of strengthening and rendering wooden vessels air-tight, for the purposes set forth.

DUNCAN BRUCE.

Witnesses:

G. R. SAMPSON,

F. O. WIER.