

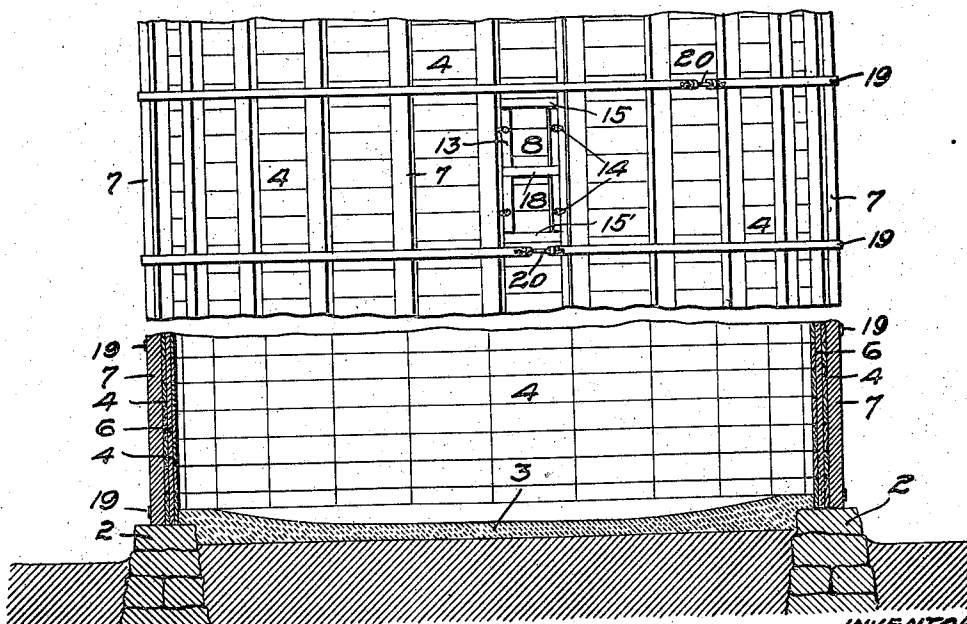
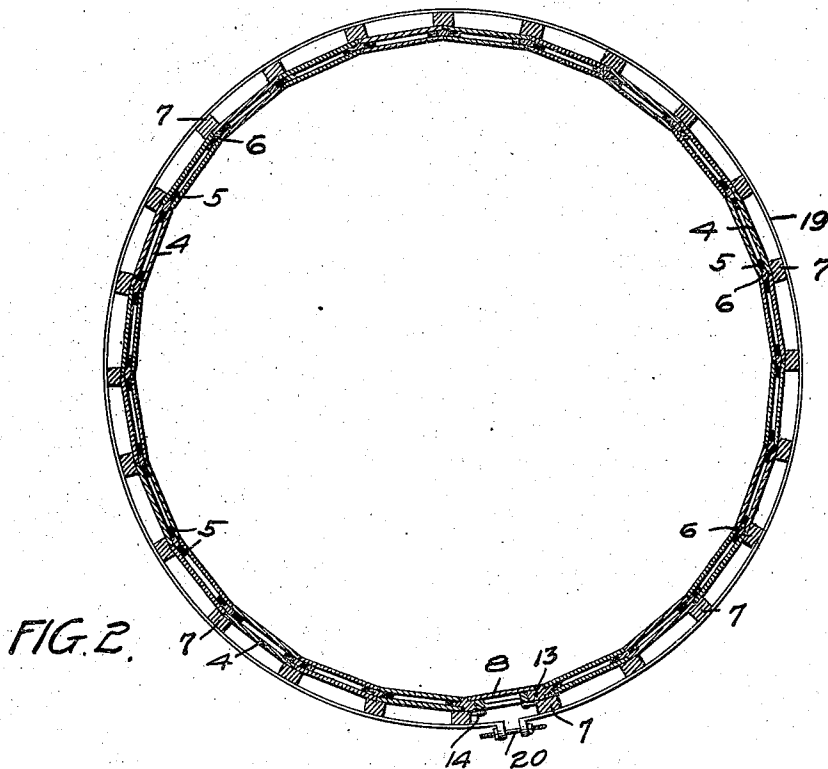
No. 853,696.

PATENTED MAY 14, 1907.

A. O. HUBBARD.  
SILO.

APPLICATION FILED JAN. 8, 1906.

3 SHEETS—SHEET 1.



WITNESSES  
M. M. Lammie  
C. F. Macmillan

FIG. 1.

INVENTOR  
ARTHUR O. HUBBARD  
BY *Paul & Paul*  
HIS ATTORNEYS

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3 SHEETS—SHEET 3.

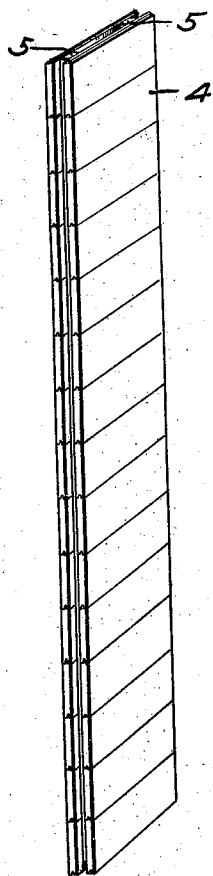
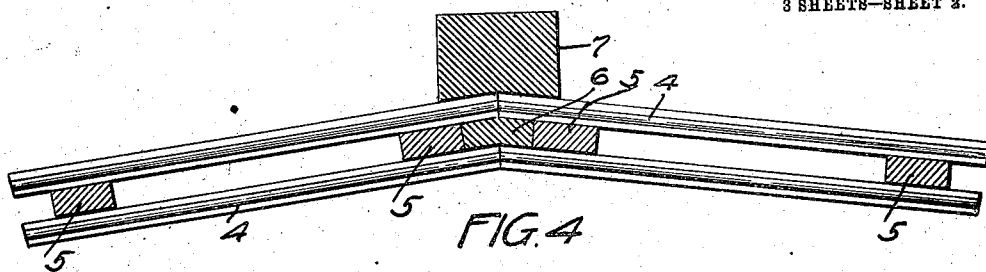


FIG. 5.

WITNESSES  
M. M. Dennis  
C. M. Mammern

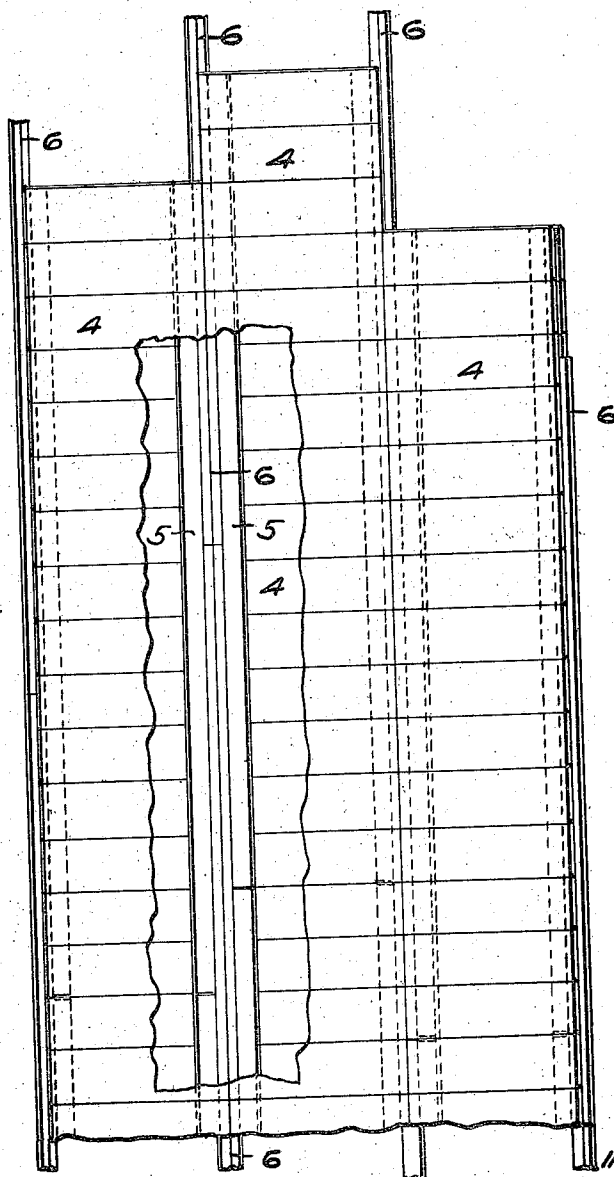


FIG. 3

INVENTOR  
ARTHUR O. HUBBARD  
BY *Paul & Paul*  
HIS ATTORNEYS

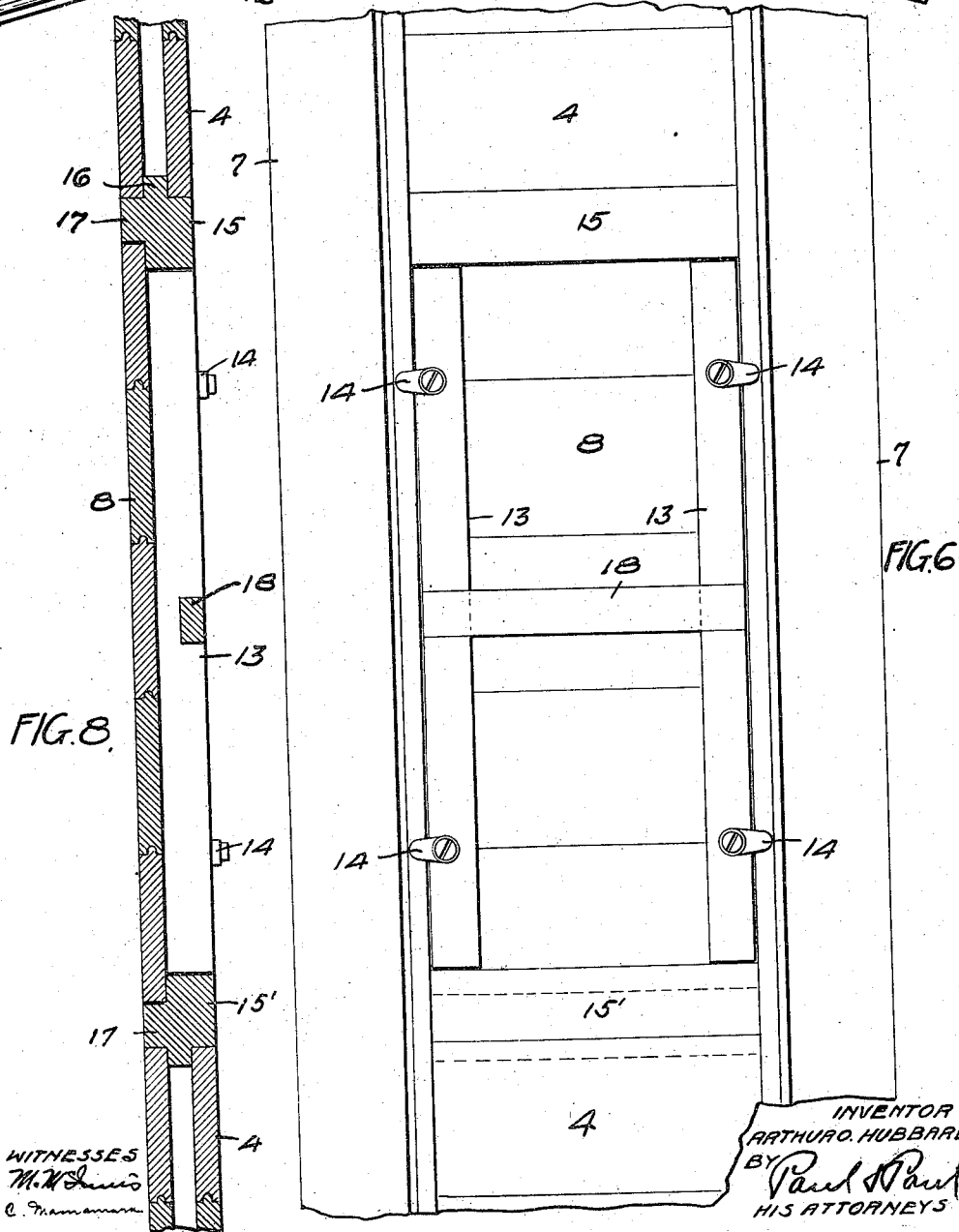
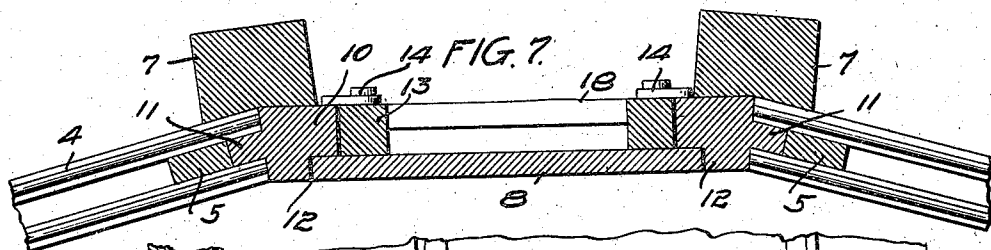
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3 SHEETS—SHEET 3.



# UNITED STATES PATENT OFFICE.

ARTHUR O. HUBBARD, OF MINNEAPOLIS, MINNESOTA.

## SILO.

No. 853,696.

Specification of Letters Patent.

Patented May 14, 1907.

Application filed January 8, 1906. Serial No. 295,024.

*To all whom it may concern:*

Be it known that I, ARTHUR O. HUBBARD, of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Silos, of which the following is a specification.

The object of my invention is to provide a silo having air tight walls and one in which there will be no danger of the formation of mold on the inside of the silo while it is in use.

The invention consists generally in a silo composed of vertical panels, of suitable length, having inner and outer walls with a space between them, and means for binding the panels together.

Further, the invention consists in providing interlocking tongues in the joints between the panels, and

Further, the invention consists in various constructions and combination, all as herein-after described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification. Figure 1 is a side elevation partially in section of the lower portion of a silo embodying my invention. Fig. 2 is a partial horizontal section of the same. Fig. 3 is a detail view showing several of the panels in elevation, and the means for locking their abutting edges together. Fig. 4 is a horizontal sectional view showing the tongue between the abutting edges of the panels. Fig. 5 is a perspective view of one of the panels. Fig. 6 is a front-elevation of a panel showing the door through which access may be had to the interior of the silo. Fig. 7 is a horizontal sectional view through the door panel. Fig. 8 is a vertical sectional view of the same.

In the drawing, 2 represents a suitable base or foundation and 3 the bottom or floor of the silo. The walls of this silo are composed of vertical panels, each consisting of a series of matched pieces of timber 4, between which bars 5 are vertically arranged, separating the inner and outer walls and forming an air space between them. The ends of the boards are beveled, as shown in Fig. 5, to allow the vertical edges of the abutting panels to be fitted snugly together and conform to the circular shape of the silo. The bars 5 are of suitable thickness to form an air space of the desired area between the panels, and the matched pieces are fastened securely (as by nails) to the bars and form sections or panels

of any suitable length, preferably about six or eight feet, as that size has been found most convenient for handling. The panels are arranged vertically on the base, and into the space between the abutting ends of each pair a vertically arranged tongue 6 is inserted, being slightly concave on one side and convex on the other, to fit the curve of the joint. The ends of the panels and the tongue are arranged to break joint with one another, as indicated in Fig. 3. When the tongue 6 has been inserted between the joints the panels will be held in their proper relative position, and any air entering the joint will be compelled to follow a tortuous path from the inner to the outer wall of the panel; and where the joint is well made and the tongue fitted snugly there will be so many turns and corners that it will be practically impossible for the air to pass through the joint into the silo. The tongue may be integral with the bars 5 if preferred.

On the outside of the silo I arrange a vertical studding 7 having its inner face concaved slightly to conform to the joint between the panels and fit in snugly against the same to brace the panels and hold them in proper relation with one another, and at the same time form a further covering or protection for the joint to prevent the air passing therethrough.

There are as many of these pieces of studding around the outside wall of the silo as there are vertical joints between the abutting ends of the panels. One or more of the panels is provided with a series of vertically arranged doors 8 located at intervals in the panel between the pieces of studding 10 which have tongues or ribs 11 to fit between the inner and outer walls of the adjacent panels and rabbeted inner edges 12 to receive the vertical edges of the doors. Vertical strips 13 are provided on the doors between the studding 10 and the outer faces of said strips being flush substantially with the corresponding faces of studding 10 and provided with suitable buttons 14 which lap said studding and locking the doors in place thereon. The pressure of the material on the doors will only serve to hold them more securely in the panel. As fast as the silo is filled, the doors will be put in place and then as the silo is gradually emptied may be removed. At the top and bottom of each door I prefer to provide a top rail 15 and sill 15' having tongues 16 to enter the spaces

between the inner and outer walls of the panels and rabbeted inner edges 17 to receive the ends of the doors. The pieces of lumber of which the doors are composed are matched, as indicated in Fig. 8, and the vertical side strips are connected by a cross bar 18 which forms a handle for use in opening or closing the door. The silo is inclosed by suitable hoops 19 which pass around the outside of the studding 7 and have suitable adjusting means 20 by means of which the hoops can be tightened or loosened at will. These hoops may be arranged at suitable intervals according to the size of the silo and the probable outward pressure to which the walls will be subjected. A silo of this kind will be simple in construction and comparatively inexpensive to manufacture and having a dead air space between its inner and outer walls will be impervious to moisture and will positively prevent the collection of mold on the inner surface.

I claim as my invention:

1. A silo composed of vertical panels having inner and outer walls with a space between them, and vertical tongues provided in the joints between the abutting panels, substantially as described.

2. A silo having walls composed of vertically arranged panels having beveled abutting edges fitting snugly together and composed of inner and outer walls with a space between them, and removable tongues fitting into said space and uniting the abutting edges of the panels.

3. A silo composed of a series of vertical panels each consisting of short horizontally arranged pieces of lumber having matched contiguous edges, and vertical strips separating an inner and outer wall and forming an air space between them, and means for uniting the vertical edges of said panels and

forming an air tight joint between them, substantially as described.

4. A circular silo composed of panels with vertical joints between them, vertical tongues connecting said panels in said joints and locking them securely together, and said tongues being curved in cross section to conform to the curve of the silo substantially as described.

5. A silo composed of panels having vertical joints between them, and tongues fitting between the edges of said panels and forming a tortuous joint through the same from one side of the wall to the other, and studding arranged outside of said joints and concealing the same, and hoops arranged to bind said studding and joints securely together.

6. A silo composed of vertical panels having inner and outer walls with a space between them, vertical tongues provided in the joint between said panels and holding them in alinement with one another and preventing the direct passage of air through the joint, vertical studding provided outside said joint and concealing the same, and hoops binding said studding and joints together.

7. A silo composed of vertical panels having inner and outer walls with spaces between them, vertical studding 10 having tongues 11 fitting into said spaces, the inner surfaces of said studding being rabbeted, a horizontal door sill and top rail also having tongues and rabbeted inner surfaces and a door fitting into said panel between said studding 10 and said sill and rail.

In witness whereof, I have hereunto set my hand this 2d day of January 1906.

ARTHUR O. HUBBARD.

Witnesses:

RICHARD PAUL,  
C. MACNAMARA.