P. R. JENSEN.

SILO.

APPLICATION FILED FEB. 19, 1909.

944,873.

Patented Dec. 28, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

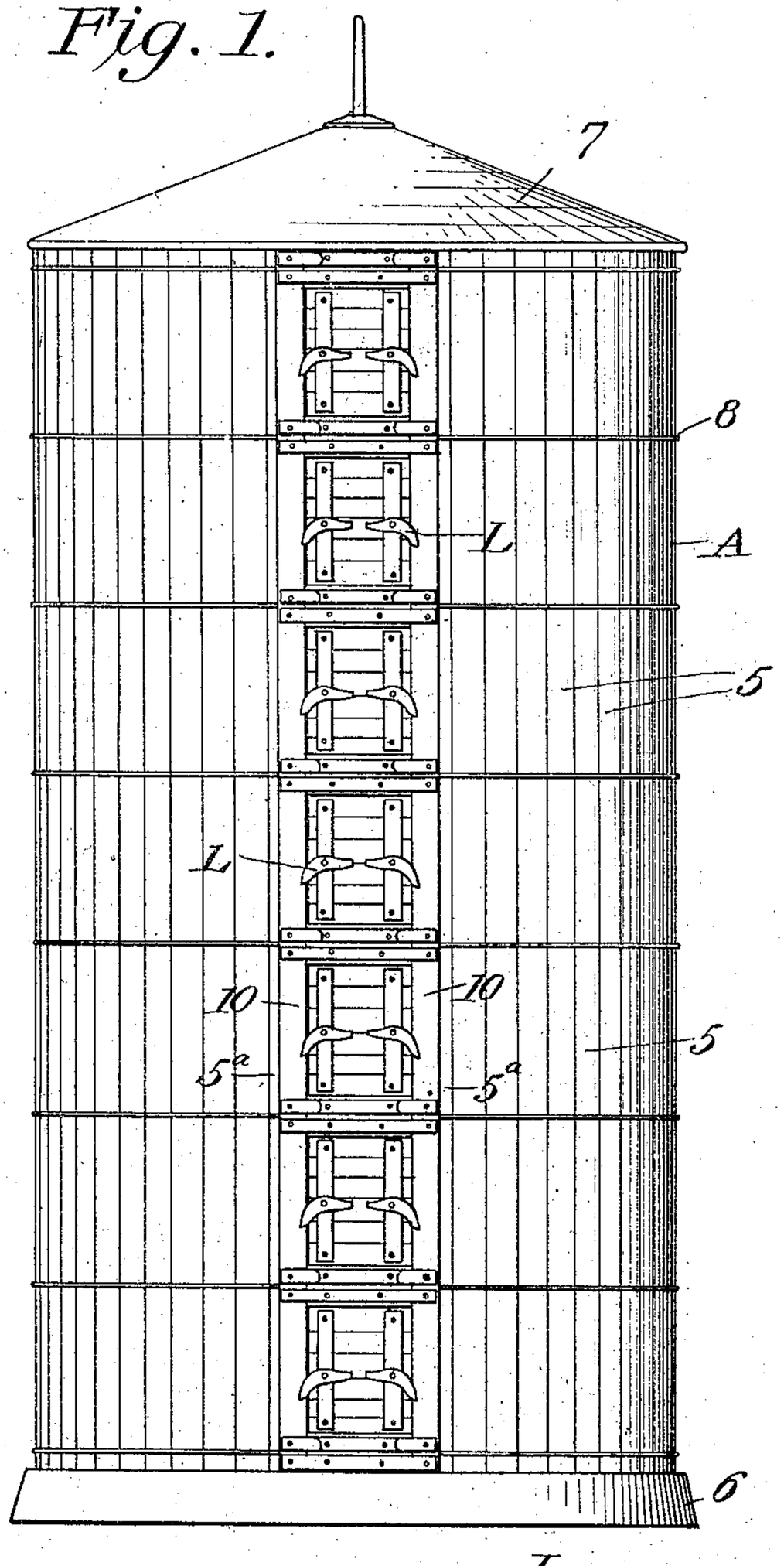
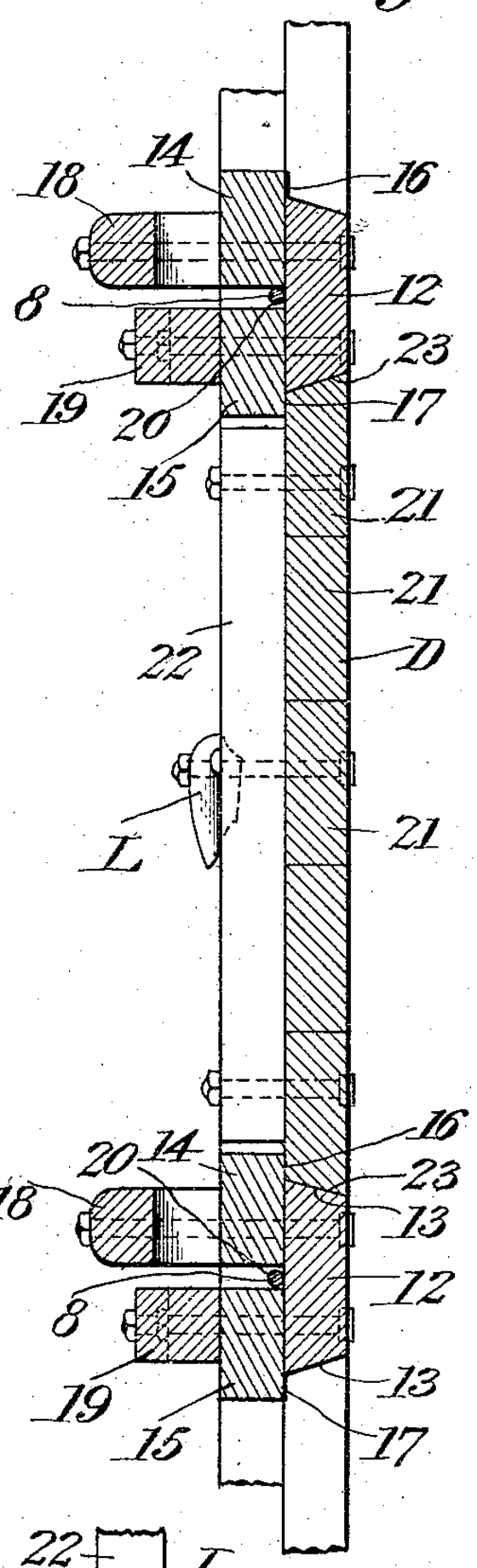


Fig. 3.



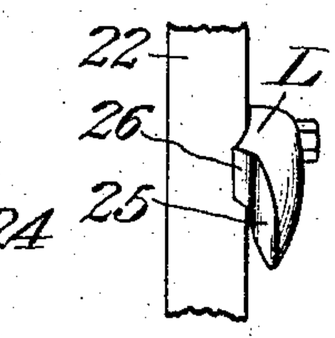
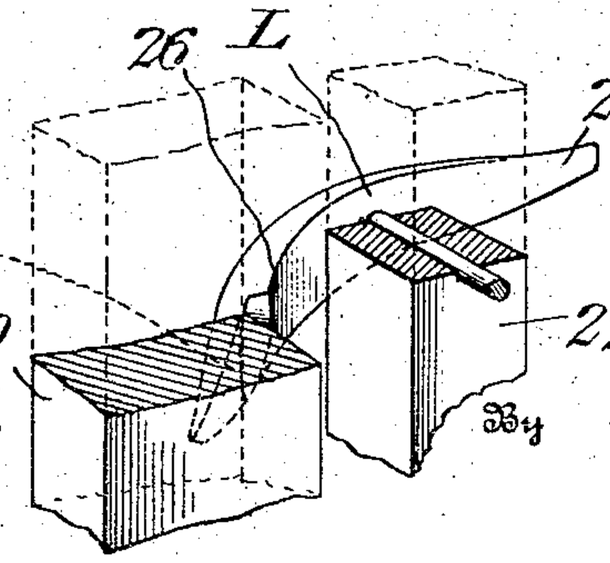


Fig. 7.

Fig. 6.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

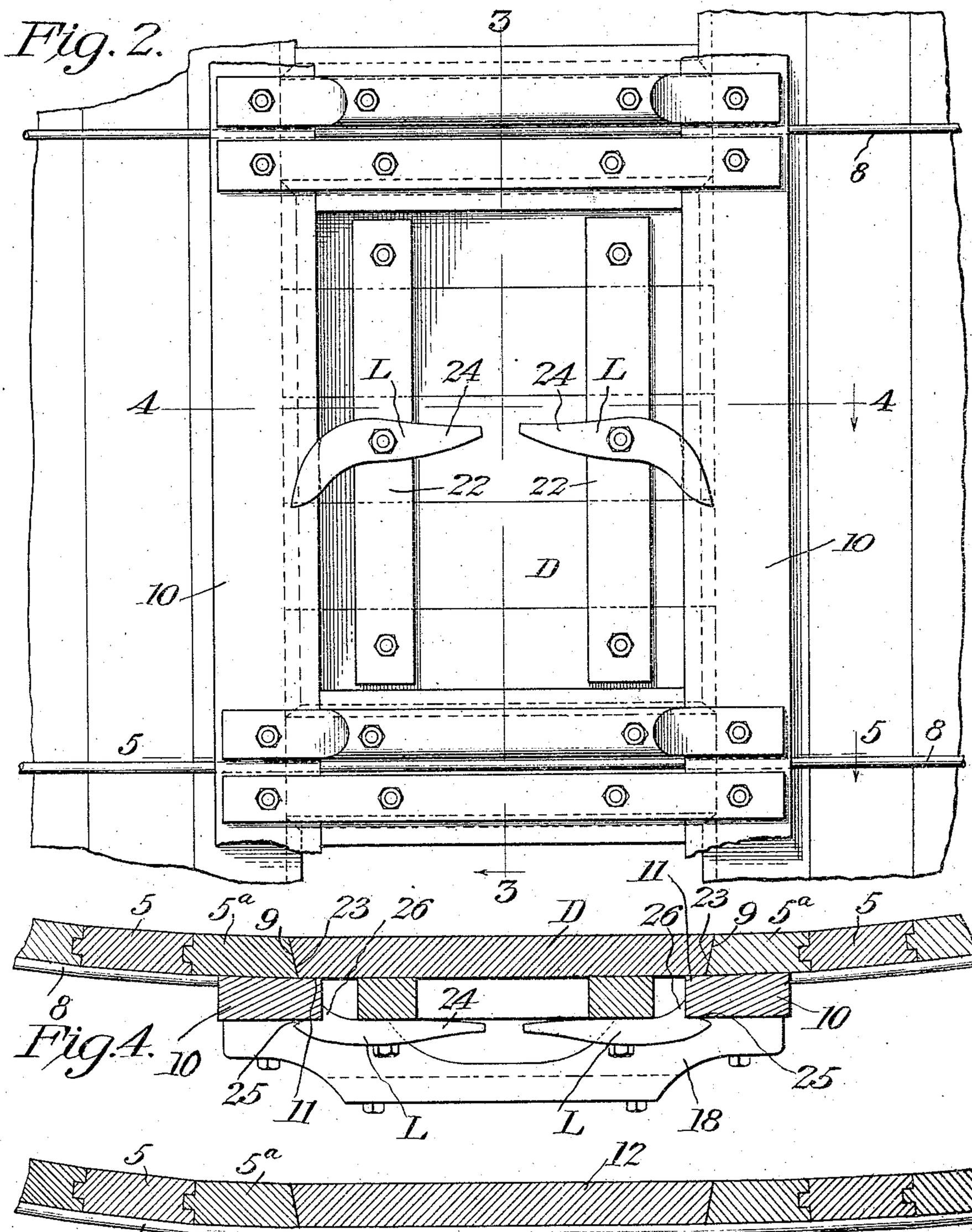

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

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SILO.

944,873. Specification of Letters Patent. **Patented Dec. 28, 1909.**

Application filed February 19, 1909. Serial No. 478,811.

To all whom it may concern:

Be it known that I, PETER R. JENSEN, a subject of the King of Denmark, residing at Denmark, in the county of Brown and State of Wisconsin, have invented certain new and useful Improvements in Silos, of which the following is a specification.

This invention relates to silos, and it has particular reference to certain improvements in the construction of the front and door-frame of the structure, and also in the construction of the doors and of the means for securing the doors in position; the objects of the invention being to provide a construction which shall be simple, inexpensive, durable, and well calculated to resist the strain and pressure as well as the general wear and tear to which the parts will be subjected.

With these and other ends in view which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts which will be hereinafter fully described and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of the invention; it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that changes, alterations and modifications within the scope of the invention may be resorted to when desired.

In the drawings—Figure 1 is a front elevation of a silo constructed in accordance with the invention. Fig. 2 is a front elevation showing, on a larger scale, a portion of the door-frame with one of the doors in position. Fig. 3 is a vertical sectional view taken on the plane indicated by the line 3—3, in Fig. 2. Fig. 4 is a horizontal sectional view taken on the plane indicated by the line 4—4, in Fig. 2. Fig. 5 is a horizontal view taken on the plane indicated by the line 5—5, in Fig. 2. Fig. 6 is a perspective detail view illustrating one of the door securing members. Fig. 7 is a detail side edge view of one of the door-securing members or levers.

Corresponding parts in the several figures are denoted by like characters of reference.

In the construction of the silo, it is of primary importance that the walls of the structure shall be adapted to resist a heavy internal pressure; the silo structure which has been selected for illustration in connection with the present invention is in the nature of a tank A, composed of staves 5, 5, of matched lumber, said staves being provided with inter-engaging grooves and tongues. The tank or receptacle is supported upon a base 6, which may be of masonry, concrete or other suitable material; and the tank or structure is provided with a conical roof or cap 7. Hoops or bands 8, 8, encircle the tank at suitable intervals.

One side of the tank or structure 9, which for convenience, will be regarded and referred to as the front side, is provided with a vertical aperture extending from the top to the bottom of the tank, and constituting the door-opening; said opening being conveniently formed by the omission of several staves; the staves adjacent to the door-opening, which are specially designated 5^a, are provided with inwardly beveled side edges 9. Upon the outer or front faces of the staves 5^a are bolted or otherwise suitably secured the door-posts 10, which consist of timbers extending from the top to the bottom of the tank, and projecting beyond the beveled side edges 9 of the staves 5^a to form shoulders or flanges 11. The staves 5^a are spaced at suitable intervals by cross-pieces 12, having inwardly inclined upper and lower side edges 13; cross-braces 14 and 15 are disposed between the door posts 10, 10, adjacent to the front sides of the cross-bars 12, the upper and lower inclined edges of which are slightly overlapped by said braces 14 and 15, which thereby form flanges or shoulders 16, 17, at the lower and upper margins of the individual door openings or apertures formed by the cross-bars 12. The cross-braces 14 and 15 are slightly spaced apart for the accommodation of the hoops or bands 8 which encircle the tank or structure in alinement with the cross-bars 12. Cleats or handle-bars 18 are strongly bolted or otherwise secured upon the door-posts and the cross braces 14 adjacent to the outer or front sides of the latter; and cross-braces 19, are similarly bolted or secured upon the door-posts 10 and the braces 15 adjacent to the front sides of the latter; in this manner an extremely solid, substantial and durable construction is attained, and some of the parts, in addition to being utilized for bracing and strengthening purposes, are made to serve other useful ends, as will be presently more fully described. The rear

or inner faces or faces of the door-posts 10 are bored or grooved, as shown at 20, for the passage of the hoops or bands 8.

It will be seen by the insertion of the cross-bars 12, the opening or aperture extending vertically through the front side of the tank or structure is subdivided into individual door-openings of suitable dimensions, said individual door-openings having inwardly beveled side edges 9, and top and bottom edges 13; the side edges being overhung by the shoulders or flanges 11 formed by the door-posts 10, while the top and bottom edges 13 are overhung by the shoulders or flanges 16, and 17, formed by the cross-members 14 and 15, respectively. Frames are thus formed for the doors D, which are strongly constructed of planks or timbers 21, bolted or otherwise suitably secured upon vertical front cleats 22. These doors, which are obviously fitted to the individual door apertures, are provided with inclined edges 23, to correspond with the inclined edges 9, and 13, of the door-openings; and the doors, when fitted and tightened in the openings are intended to abut upon the shoulders or flanges 11, 16, and 17.

The front cleats 22 of the doors are made of a thickness approximately equal to the thickness of the door posts 10, and it follows that when the doors are in position the front sides or faces of the cleats 22 will lie approximately in the planes of the front sides or faces of the door-posts 10. Pivotally mounted upon the cleats 22, are levers or turn-buttons L, having inward extending arms 24 and provided adjacent to their outer ends with inclined or cam-shaped eccentric rear faces 25, adapted to engage, and bear against the front faces of the door-posts; the rear sides of the levers L are also provided adjacent to the cam faces 25 with shoulders or projections 26, constituting stops that are adapted to engage the inner side edges of the door-posts. It will readily be seen that by properly manipulating the levers or turn-buttons L, said levers may be placed in alinement with the cleats 22, thus enabling the doors to be placed in position or removed from the interior of the tank or structure; after placing the doors in position, the levers may be turned to cause the eccentric or cam-faces to engage the front faces or sides of the door-posts, thus drawing the doors forward and seating them in their respective frames; the stops 26 being so arranged as to engage the door posts to prevent the movement of the levers L, beyond points at which the inward extending arms 24 of said levers occupy approximately a horizontal position, as clearly indicated in Figs. 1 and 2 of the drawings. These turn-buttons or levers may now be utilized as handles and as foot-steps and to enable or assist a person in climbing to the top of the tank or structure, said levers being used alternately with the cleats 18, which constitute handles and the cross-bars 19, which may be utilized as foot-steps. It will be seen that a person thus ascending or descending, and utilizing the levers L as handles and as foot steps, will operate by gravity to turn the levers or turn-buttons to their respective seats, and thus to tighten the doors and to make the structure solid and secure.

From the foregoing description taken in connection with the drawings hereto annexed, the operation and advantage of this invention will be readily understood by those skilled in the art to which it appertains. The general construction is simple and inexpensive and at the same time it will be found highly efficient and useful for the purpose for which it is devised.

Having thus described the invention, what is claimed is:

1. In a silo of the character described, a tank structure composed of matched staves having an opening in front extending from the top to the bottom, and staves adjacent to said opening having inwardly beveled side edges, cross-pieces inserted between and spacing apart said beveled edged staves, said cross-pieces having inwardly beveled upper and lower edges, door posts secured upon and overlapping the beveled edged staves, cross-braces arranged in pairs upon and overlapping the beveled edged cross-pieces spacing the door-posts, and hoops encircling the tank structure, said hoops being disposed adjacent to the cross-pieces spacing the beveled edged staves and intermediate the pairs of cross-braces adjacent to the said cross pieces.

2. In a silo of the character described, a tank structure composed of matched staves and having a vertical opening in front, the staves adjacent to said opening having inwardly beveled edges, beveled edged cross-pieces spacing said staves at intervals, door posts secured upon and overlapping the beveled edged staves, pairs of cross braces secured upon and overlapping the upper and lower edges of the cross pieces spacing the staves, hoops encircling the structure adjacent to the beveled edged cross-pieces and intermediate the pairs of braces secured upon the latter, cleats and cross braces secured exteriorly to the cross-braces spacing the door posts, said cleats and cross-braces being extended in front of and secured upon the door-posts, beveled edged doors provided upon their front sides with cleats, the front faces of which are adapted to lie in the planes of the front faces of the door posts, and fastening members mounted upon said cleats and engaging the door posts.

3. In a silo of the character described, a tank structure composed of matched staves

and having a vertical opening in front, cross pieces spacing the staves adjacent to said opening, door posts secured upon the spaced staves, pairs of cross-braces secured adjacent to the cross-pieces and spacing the door-posts, said door posts and cross braces overlapping the staves and cross pieces and forming individual door frames, doors fitted in said frames and having cleats upon the front sides thereof, and fastening members pivoted upon the cleats, said fastening members consisting of levers having inwardly extending arms and provided adjacent to their outer ends with eccentric or cam-shaped rear faces and with shoulders forming door post engaging stops adjacent to said cam faces.

4. In a silo of the character described, a tank structure having a series of door frames or apertures and overhanging flanges surrounding said apertures, horizontally disposed cleats and cross bars arranged in pairs between the door apertures, doors fitted to the apertures, fastening members pivoted upon the doors and having eccentric faces and door post engaging shoulders adjacent to said faces, and inwardly extending arms forming handles and foot-steps, and hoops encircling the tank structure intermediate the pairs of cleats and cross braces between the door apertures.

In testimony whereof I affix my signature in presence of two witnesses.

PETER R. JENSEN.

Witnesses:
D. M. Enz,
Geo. J. Enz.