

(No Model.)

3 Sheets—Sheet 1.

W. A. BECK.
FRUIT DRIER.

No. 422,897.

Patented Mar. 4, 1890.

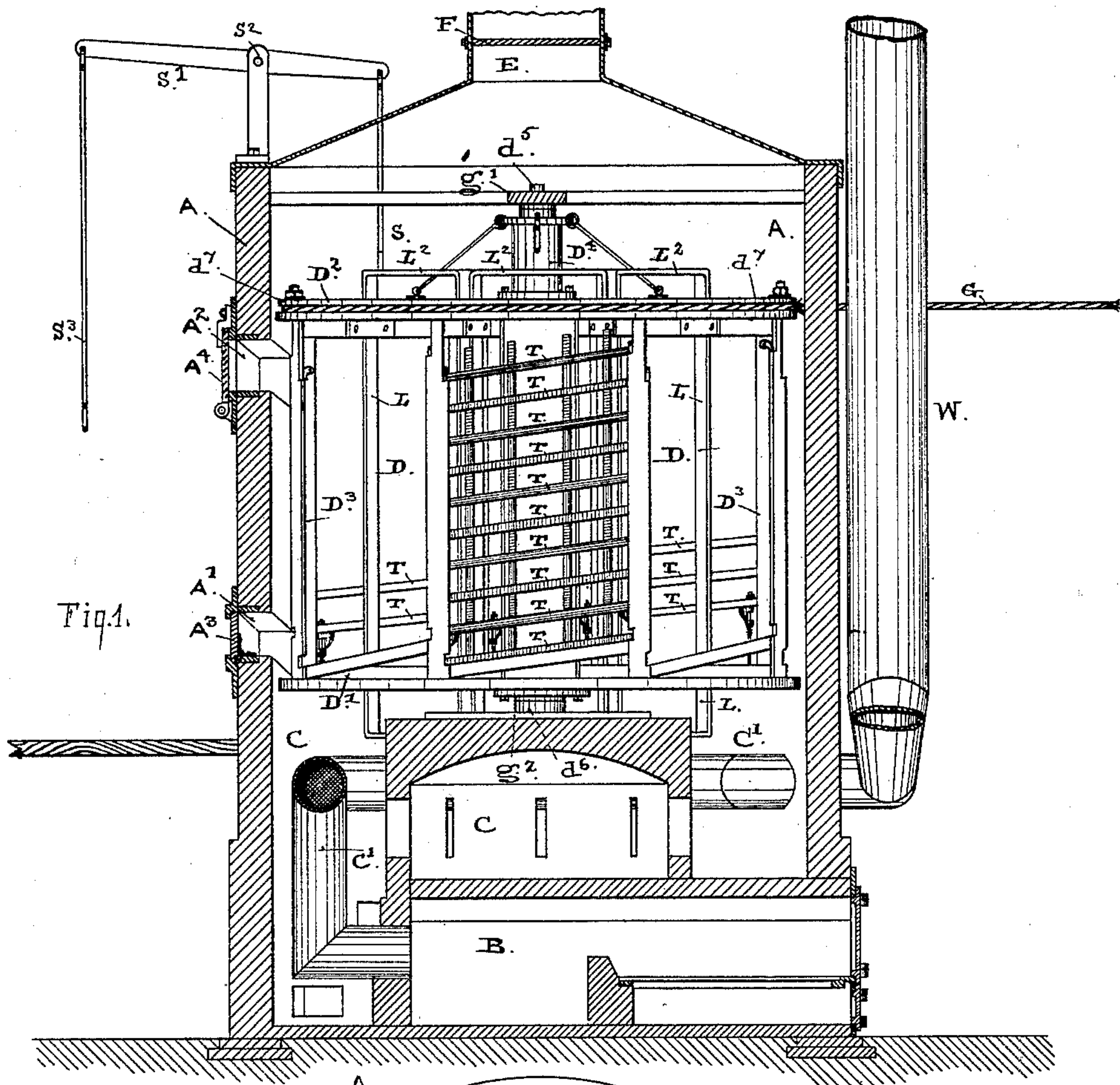


Fig. 1.

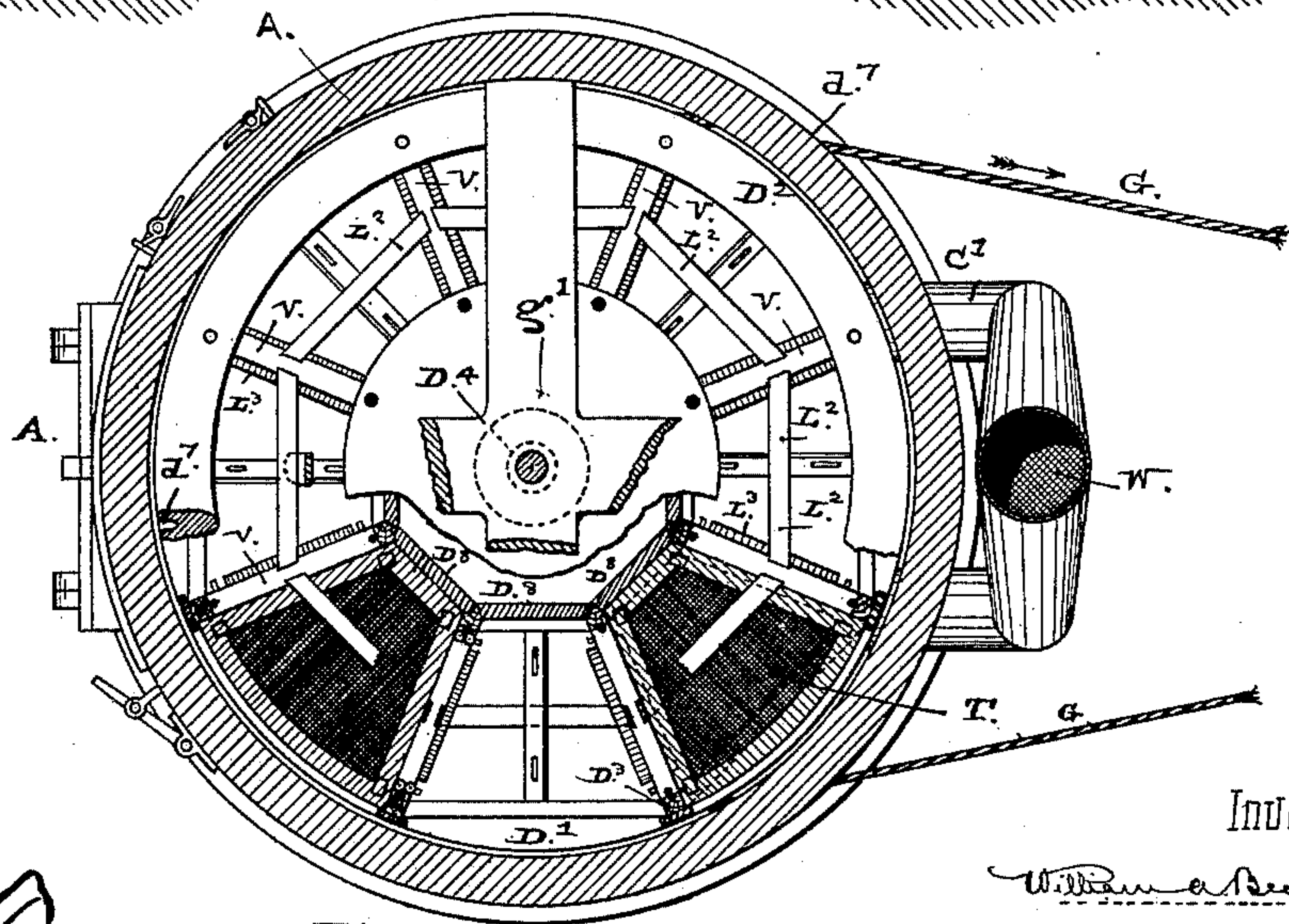


Fig. 2.

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his Attys.

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Fig. 3.

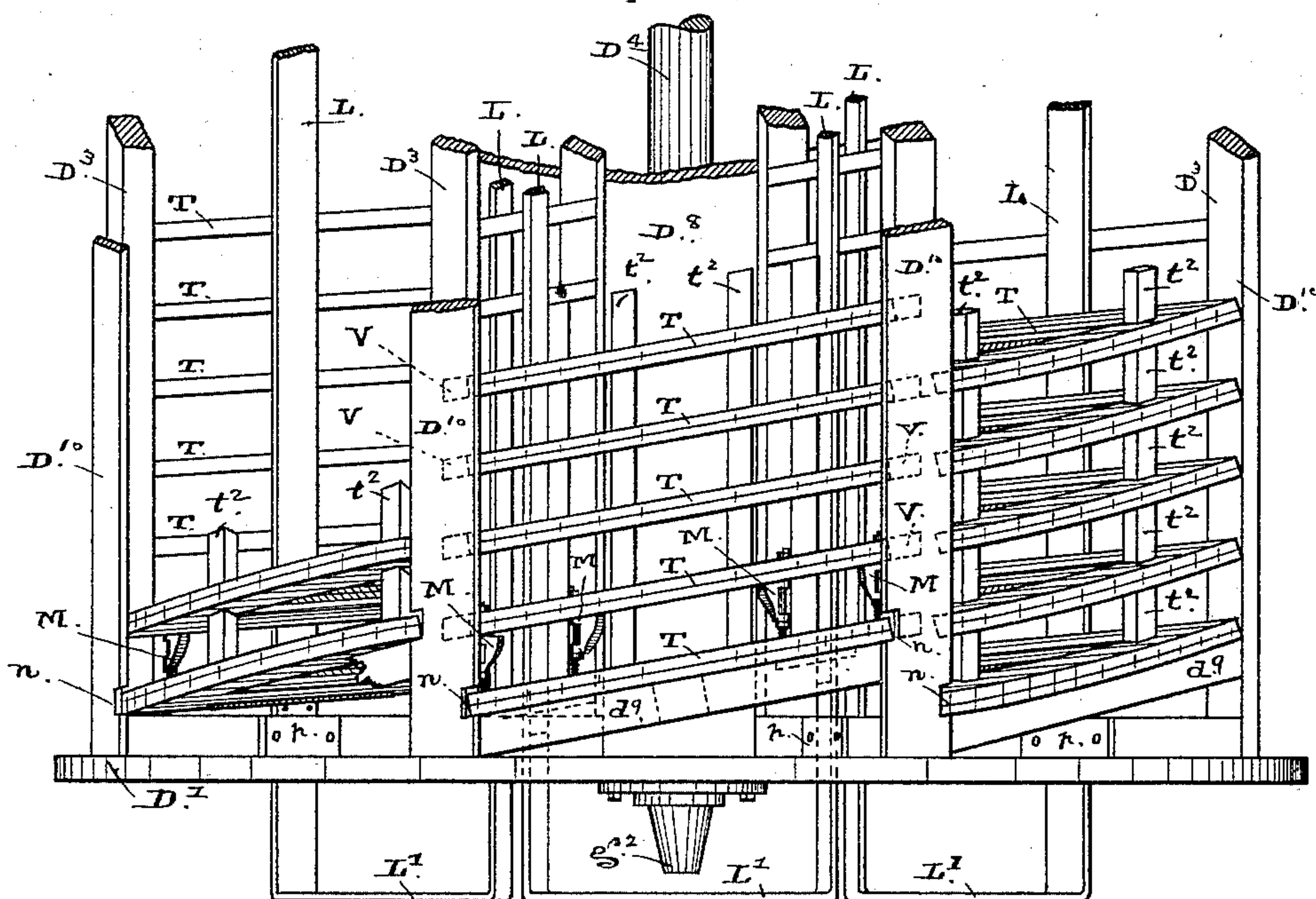
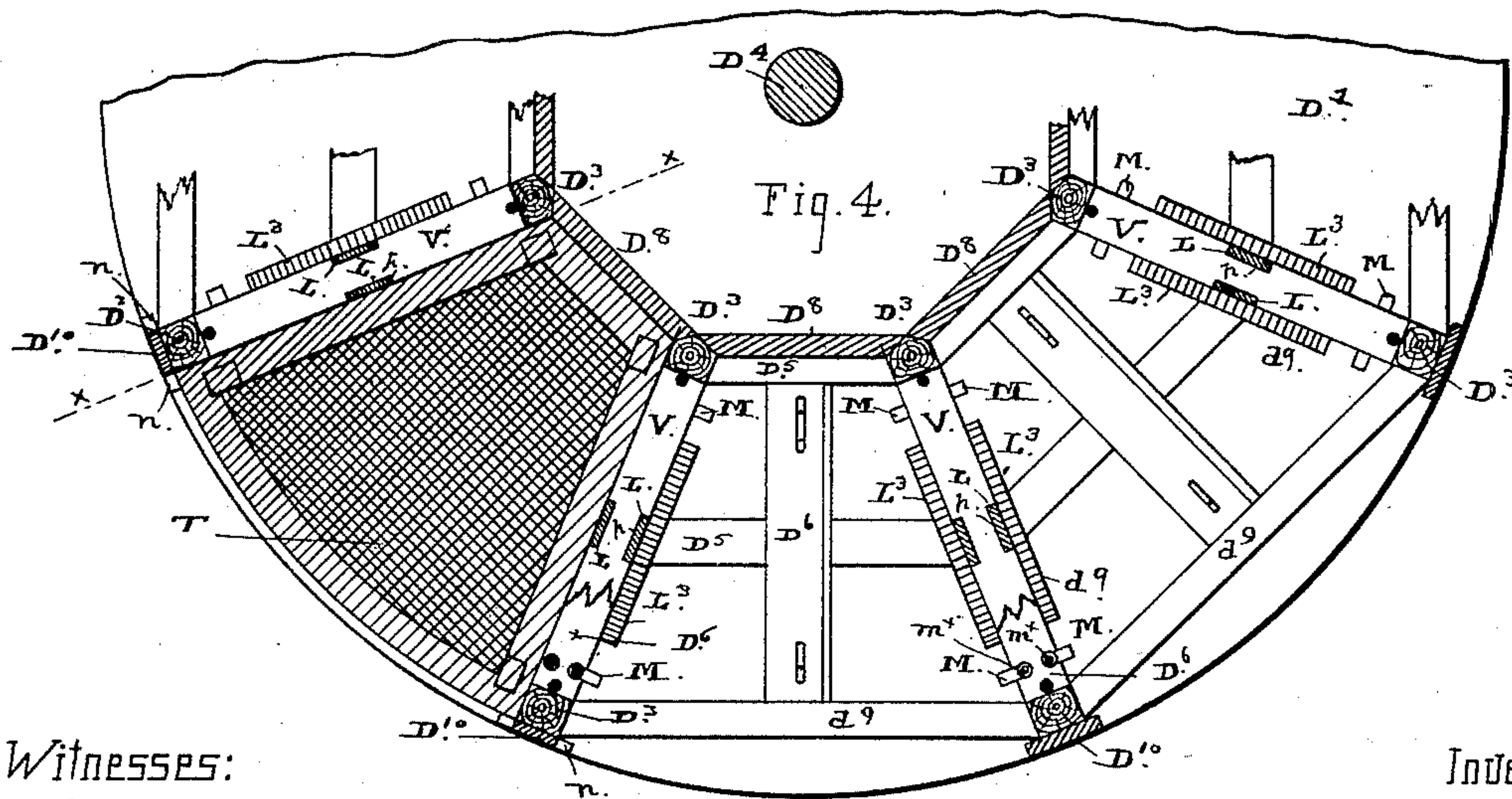


Fig. 4.



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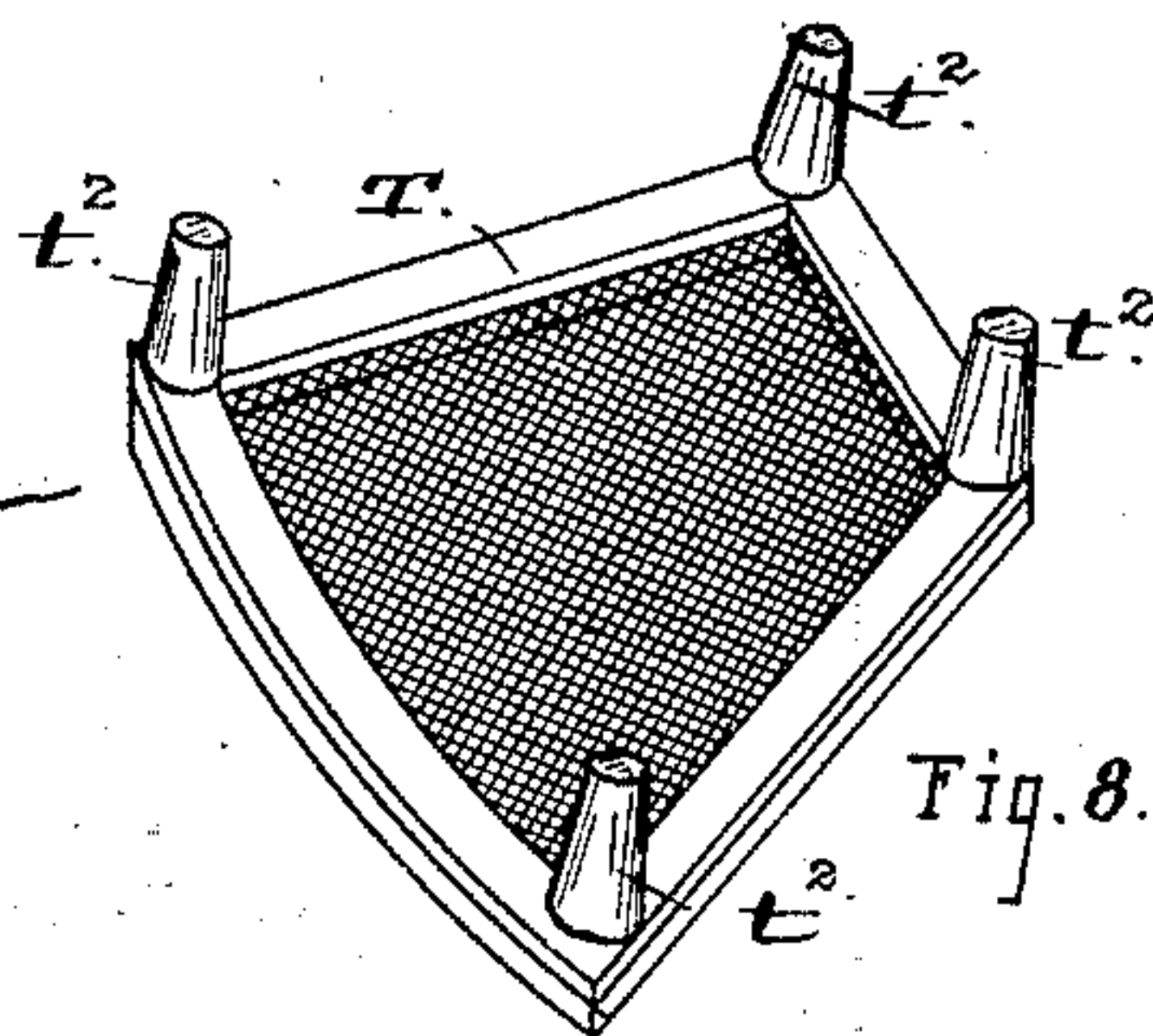
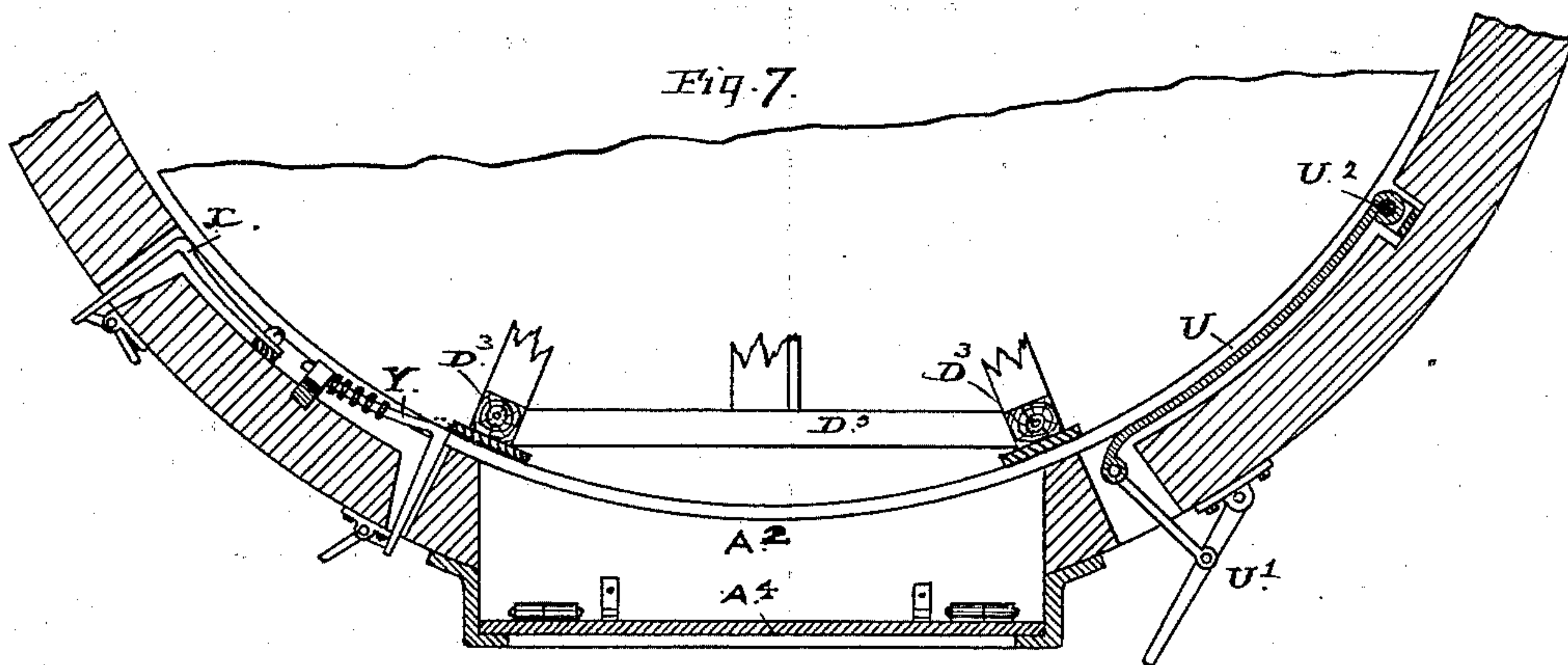
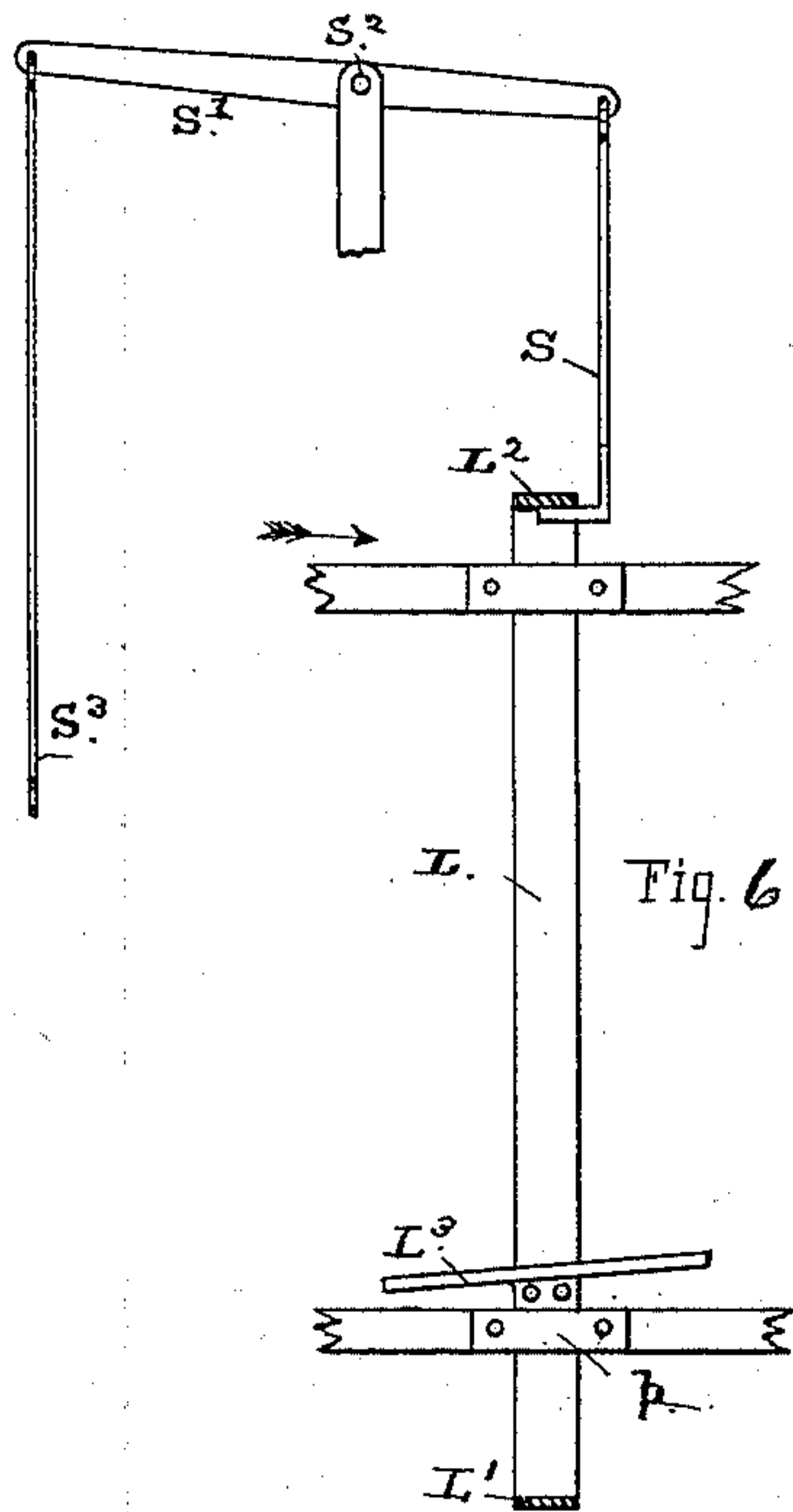
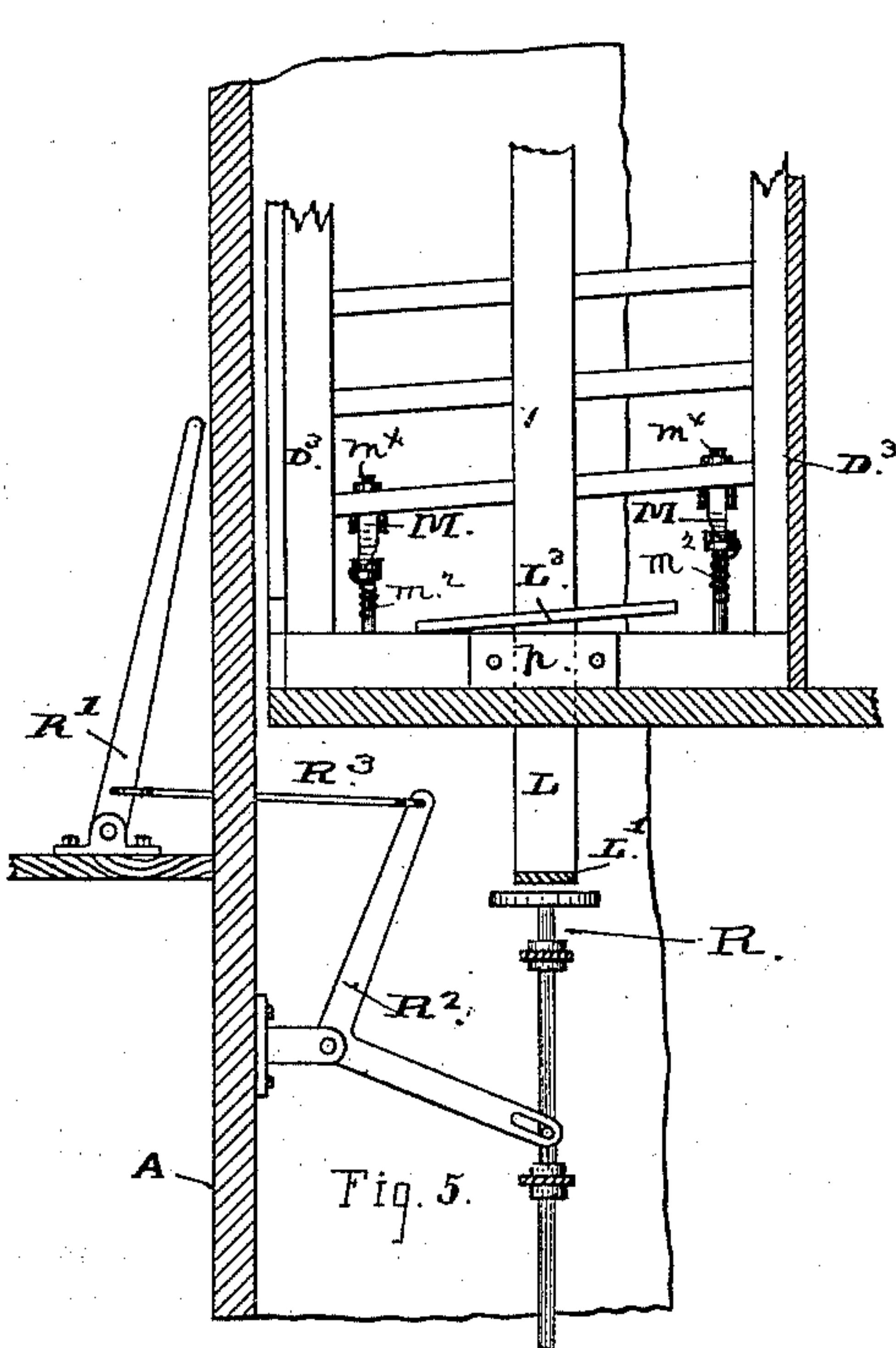
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3 Sheets—Sheet 3.

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No. 422,897.

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Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM A. BECK, OF SAN FRANCISCO, CALIFORNIA.

FRUIT-DRIER.

SPECIFICATION forming part of Letters Patent No. 422,897, dated March 4, 1890.

Application filed June 27, 1889. Serial No. 315,797. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. BECK, a citizen of the United States, residing in the city and county of San Francisco, and State of California, have invented certain new and useful Improvements in Fruit-Driers, of which the following is a specification.

My invention relates to apparatus for drying fruit and vegetables; and it has for its object to produce a drier or apparatus in which considerable quantities of fruit or other substances to be dried can be readily handled and treated with small amount of labor and attention, and in which, also, uniform results can be secured.

The following description clearly explains the nature of my said improvements and the manner in which I proceed to construct, combine, and apply the same to produce a drier for operating on a large scale, the accompanying drawings being referred to by figures and letters.

Figure 1 of the drawings represents my improved drier set up for use, and shows the walls of the surrounding chamber cut away on a vertical plane through the center to show the interior construction. Fig. 2 is a sectional view on a horizontal plane, which is taken at a line above the top of the revolving rack, portions being broken away to show the trays. Fig. 3 is a side view, on a larger scale, showing parts of the revolving rack and the trays. Fig. 4 is a top view of the rack in detail. Fig. 5 shows the construction of the mechanism for raising the trays from the bottom toward the top of the rack in the operation of filling the drier. Fig. 6 is a modification of this lifting mechanism. Fig. 7 is a sectional view of a portion of the surrounding chamber at the upper door or opening through which the trays are taken out. Fig. 8 shows one of the trays in perspective.

A is a chamber or building, of cylindrical form internally and constructed, preferably, of brick, containing a furnace B, air-heating passages, and spaces C C in the lower part, and adapted to entirely inclose a revolving rack D.

A' A² are openings in this chamber, of suitable size for inserting and taking out the trays, and provided with doors A³ A⁴ for clos-

ing them during work. The lower one of these openings is located on a level with the bottom D' of the rack, and through it the trays with the green fruit are introduced, while the upper opening is provided for drawing out the trays at the end of the drying operation.

The pipes C' in the heating-space are connected with a chimney or smoke-pipe W on the outside, and the chamber has a conical roof, terminating in an outlet E, in which is placed a valve or damper F for controlling the escape of the heated air, and thereby to regulate the circulation and temperature within the chamber.

The revolving rack D is a light skeleton frame formed of the circular top and bottom plates D' D² and upright bars D³ D³ around a vertical shaft or post D⁴ in the center. This post has journaled portions d⁵ d⁶ on the ends, for which bearings g' g² are provided in stationary parts in the surrounding chamber, and on these centers the rack is balanced to turn smoothly. The top plate D² of the rack has a circular rim d⁷, grooved to receive a belt G, which may run from an engine-shaft or suitable motor outside for imparting a regular rotary motion to the rack, the belt being carried through openings in the walls. This is a simple and direct way of applying power to turn the rack; but a skillful mechanic can substitute other means for the purpose, such as a shaft and bevel-gearing, to connect the center pivot D⁴ and the driving-shaft together, or by applying power to the periphery of the top plate of the rack through the medium of gears.

The uprights of the frame divide the rack into spaces or open compartments of uniform size, and the trays are shaped accordingly to slide into and out of these compartments. They are in form, therefore, a section of a polygonal figure, being curved at the front edge to conform to the circular shape of the rack and taper regularly toward the rear.

The manner of framing the rack will be understood from Figs. 3 and 4 of the drawings. The two sets of inner and outer posts D³ D³ are braced and held by the rails D⁵ D⁶, and the top and bottom plates D' D² and the rails or supports d⁹ are placed only at the bottom

of each compartment, so that above them the sides of the compartment are without projections, and a tray, when introduced at the bottom, can be moved readily upward to the top.

5 Swinging catches M M are placed in each compartment to support the bottom tray of the tier, and are constructed to yield when struck by the upwardly-moving tray, but to swing again into place when passed. Two of these
10 catches are placed at the back and one at each side. They are formed of hinged blocks held on upright pintles m^x , and have coil-springs m^2 applied like the spring of a hinge to throw them forward after the tray is raised above
15 their top edges. Suitable space is left between one tray and the next for circulation of the hot air by fixed spacing-posts t^2 at the corners of each tray.

The front edge of the tray is curved to
20 conform to the circular shape of the surrounding chamber, while the back and sides are fitted closely to the back and sides of the compartment. Upright strips D^{10} at the front are fixed against the posts D^8 to overlap and
25 set outside of the corners of the trays to prevent them from slipping forward; but at the front and bottom of the compartment the strips are notched, as seen at $n n$, to let in the trays at the bottom. Thus in the operation
30 of filling each compartment the rack is turned to bring the compartment in front of the opening A' and the trays are slipped in one at a time, one tray being raised up to admit the next one beneath it, and the last elevated tray always being held up by the yielding catches M M.

The means for raising the trays consists of the straps or bars L L, joined at top and bottom by cross-bars $L' L^2$, and the lifting-strips
40 L^3 , fixed on the inner sides of the uprights, all of which revolve with the rack, these parts L setting through guide-slots $p p$, and the cross-strips L^3 being placed about on a level with the supports at the bottom of the
45 rack, in order to take under the tray introduced through the chamber-aperture and raise the tray when the frame L L is elevated. The movement of the frame at such time is sufficient to bring the bottom tray past the
50 catches M and leave it there supported as the frame is lowered for the next tray.

Various means may be employed to work this lifting-frame. In Figs. 5 and 6 I have shown two different means of raising it. The
55 first of these consists of an upright rod R on the inside of the chamber and in line with the lifting-frame, so arranged that by its vertical movement it will strike against the bottom cross-piece L' and lift the frame from
60 beneath. This rod is connected with a hand-lever R' outside for working it by means of the elbow-lever R^2 and the cord or connecting-rod R^3 . In another way, as represented in Fig. 6, the frame is lifted by means of the
65 hooked rod S, lever S' , pivoted at S^2 to some fixed point above outside the chamber, and the cord or wire S^3 , the hook being set to

take under the cross-bar L^2 of each lifting-frame as the rack is turned around to bring each frame successively into position. Either
70 of these means will serve to work the lifting-frames, and it is understood that such device is so placed as to act on each lifting-frame at the time when a compartment to be loaded or emptied is brought into position at the
75 chamber-openings.

A novel feature of the present invention is the arrangement of the trays in spiral order around the center post, which feature, in connection with the rotary motion imparted to
80 the rack, has the effect to produce intimate contact and thorough circulation of heated currents between and over the entire surfaces of the trays. In this arrangement the trays are set at an inclination out of the horizontal
85 and in such position that the lines of trays carried around the rack form so many spirals extending from the bottom to the top, and to prevent upward passage of air-currents between one compartment and the next the
90 spaces between the adjacent edges of the trays between every compartment are filled by boards or strips V. Instead of setting the trays at an angle in this manner, however, the same effect, practically, may be secured
95 by arranging the trays horizontally and in stepped order around the rack, so that the trays in one compartment set a short distance above those in the next adjacent compartment, and the spaces between the trays will
100 have spiral progression around the rack from top to bottom.

To regulate the motion of the rotating rack and for stopping it in position to be loaded or unloaded at any of its compartments through
105 the openings $A' A^2$, I have applied a friction-brake U at one side of the opening A^2 and a spring-stop Y at the opposite side. The brake is a simple friction-band x' , bearing against the rim of the bottom plate and attached to
110 a lever U' outside the chamber at one end and to a point U^2 at the opposite end. The catch X can be thrown into play to arrest the movement of the rack, while the catch Y serves to prevent retrograde movement.
115

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a fruit-drier, a revolving tray-holding rack having compartments adapted for trays
120 of a shape corresponding to sections of a polygonal figure, combined with trays having spacing blocks or posts and arranged in ascending spiral order around the rack, substantially as set forth.
125

2. In a fruit-drier, a revolving tray-holding rack having compartments adapted for trays
of a shape corresponding to sections of a polygonal figure, combined with trays that are
130 arranged in ascending spiral order around the axis of rotation, the filling boards or strips by which the spaces between the adjacent sides of the trays in the same spiral are closed against ascending currents, and mechanism,

substantially as described, by which rotation is imparted to the rack, substantially as set forth.

3. In a fruit-drier, a revolving rack having
5 regular rotary movement on an upright axis and fruit-holding trays arranged therein in ascending spiral order around said axis, as set forth.

4. In combination with the revolving fruit-
10 rack arranged for regular rotation on an upright axis within a hot-air chamber, the

catches X Y, and the hand-brake U, located in the walls of the housing and applied for engagement with the revolving rack, in the manner and for the purpose as set forth.

In testimony that I claim the foregoing I
have hereunto set my hand and seal.

WILLIAM A. BECK. [L. S.]

Witnesses:

CHAS. E. KELLY,
EDWARD E. OSBORN.