

No. 634,986.

Patented Oct. 17, 1899.

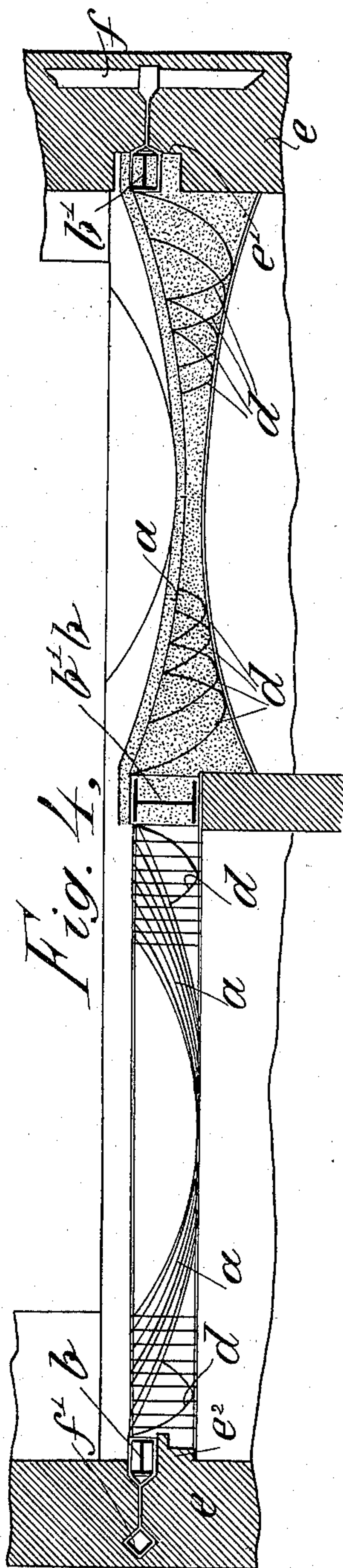
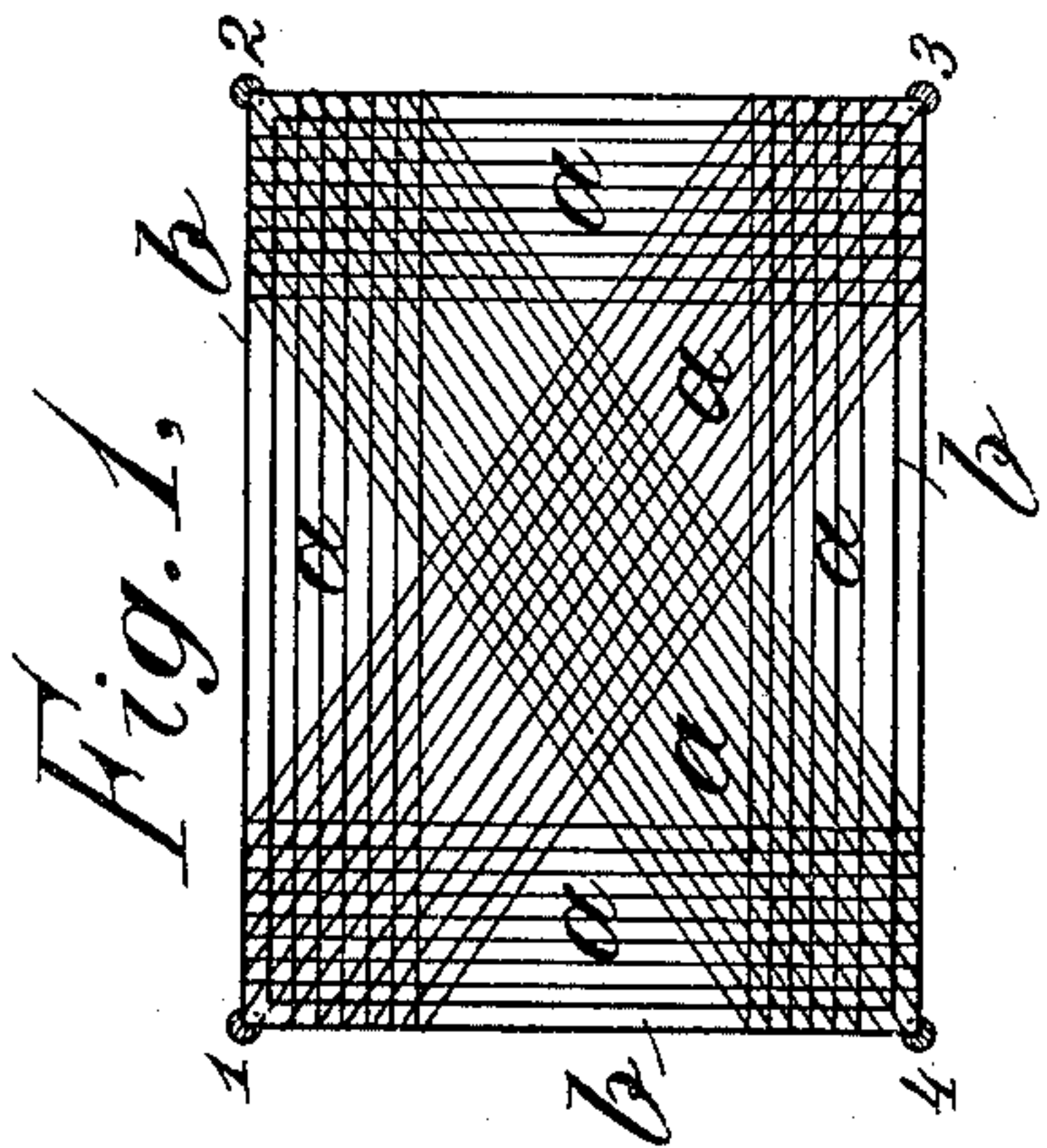
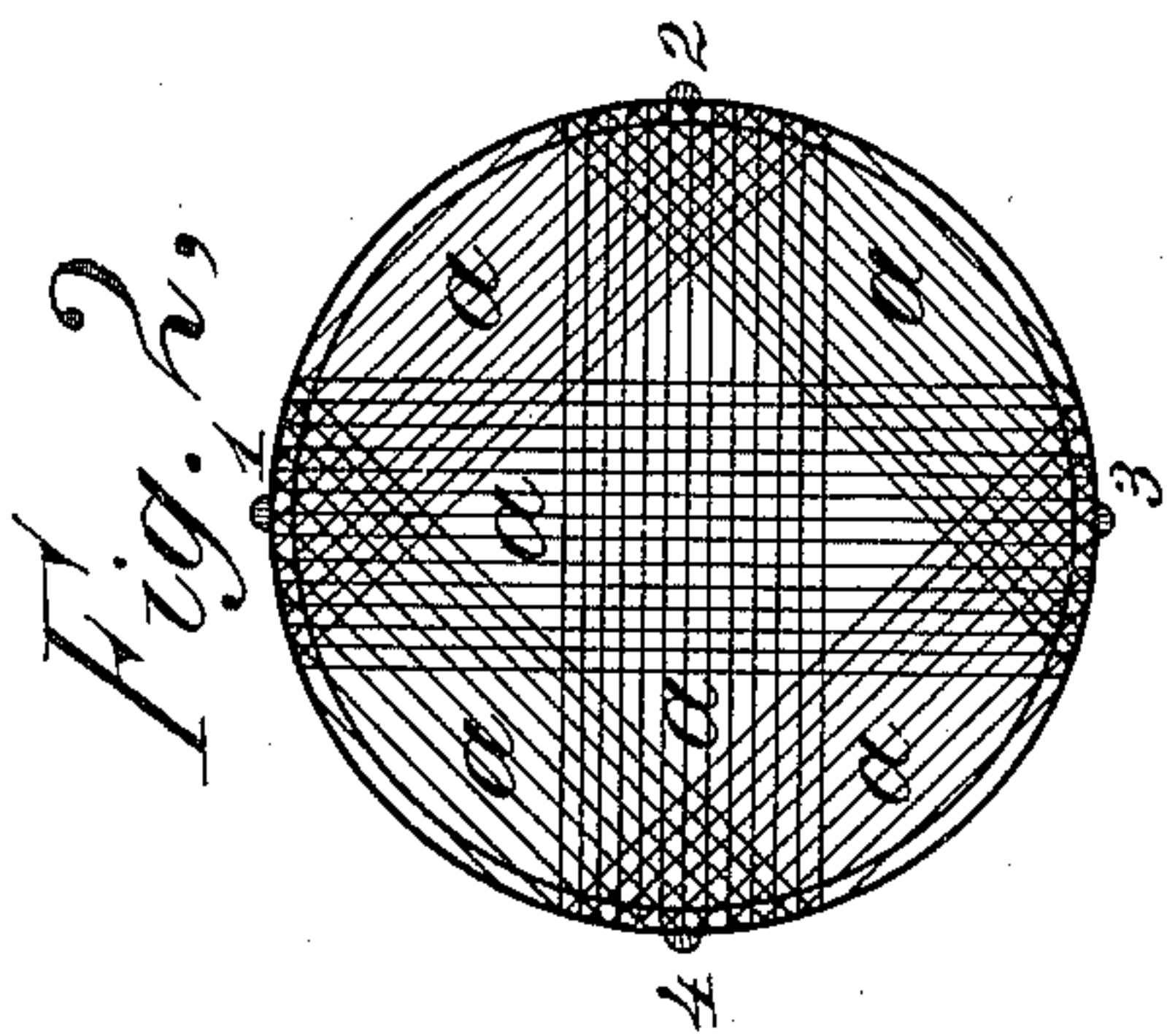
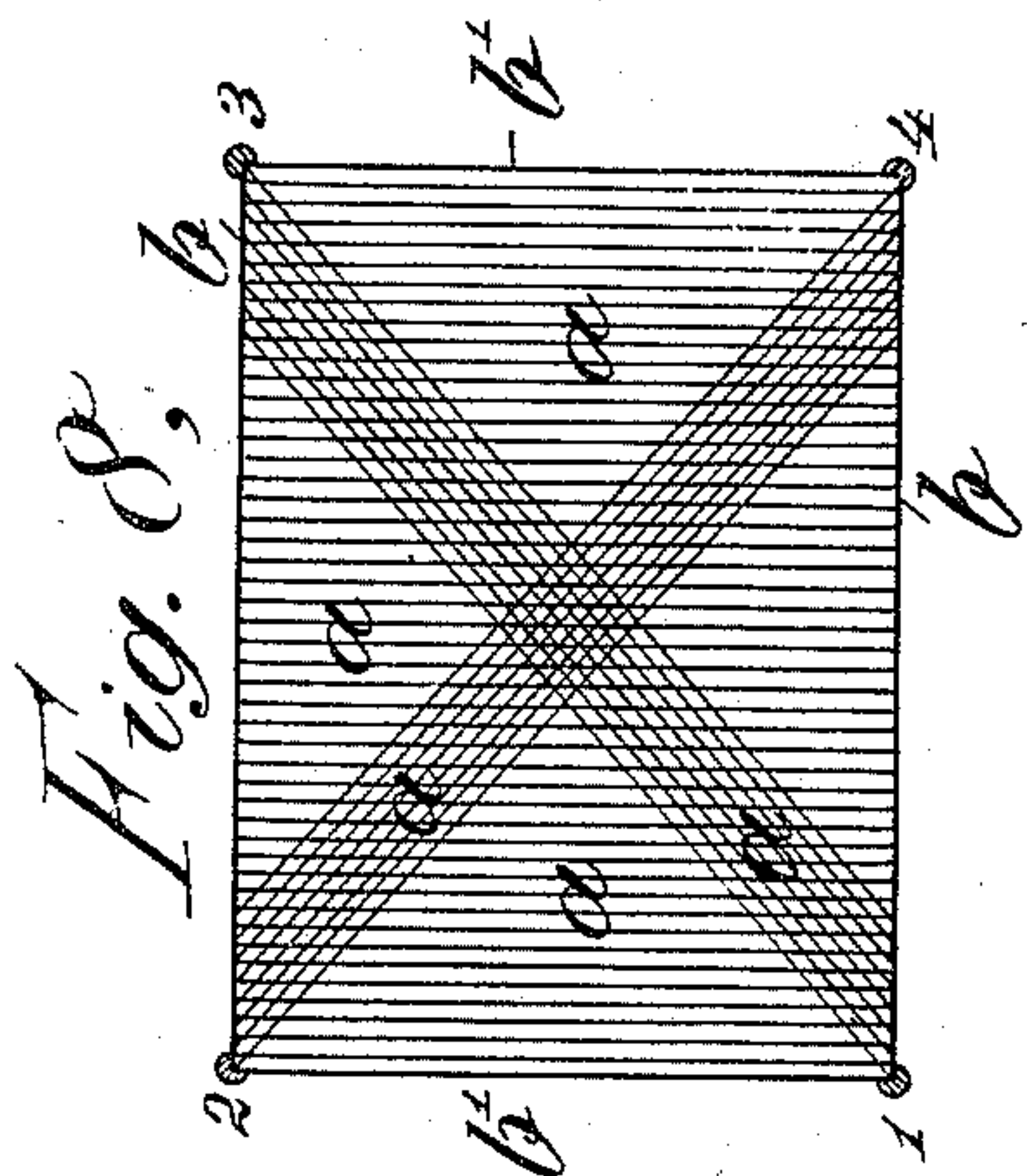
A. MATRAI.

CONSTRUCTION OF WALLS, FLOORS, CEILINGS, &c.

(Application filed Oct. 2, 1896.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES.

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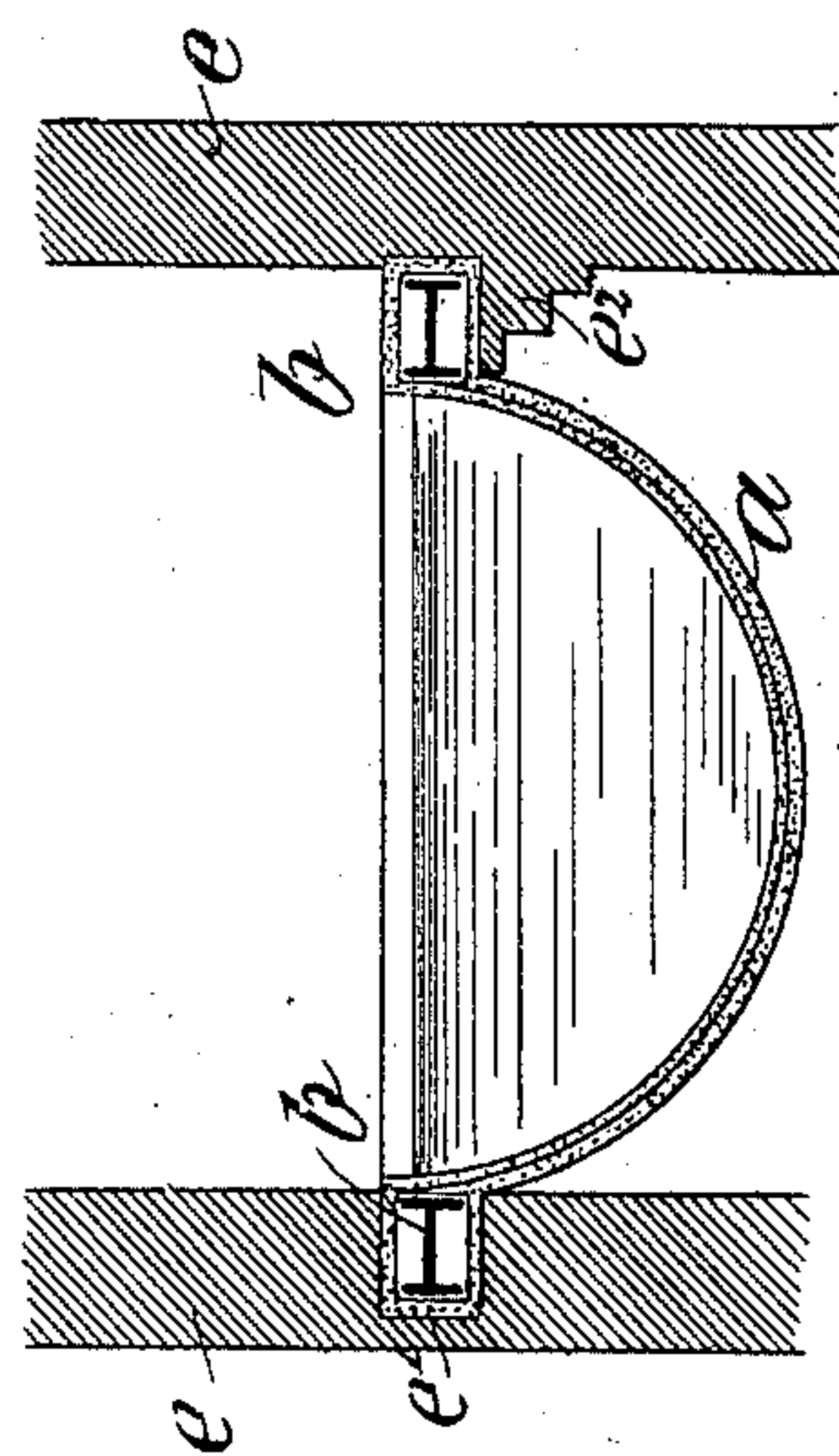
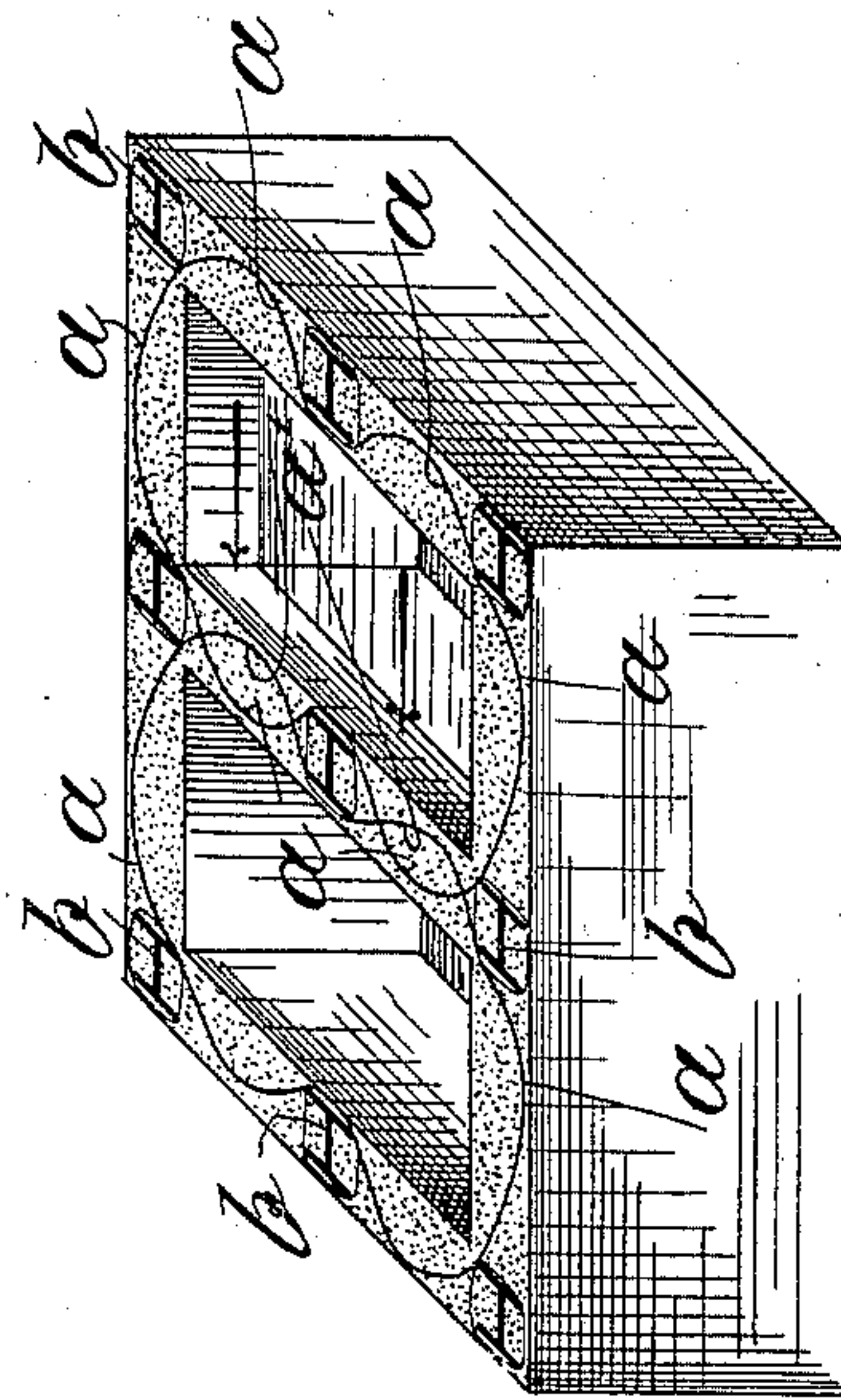
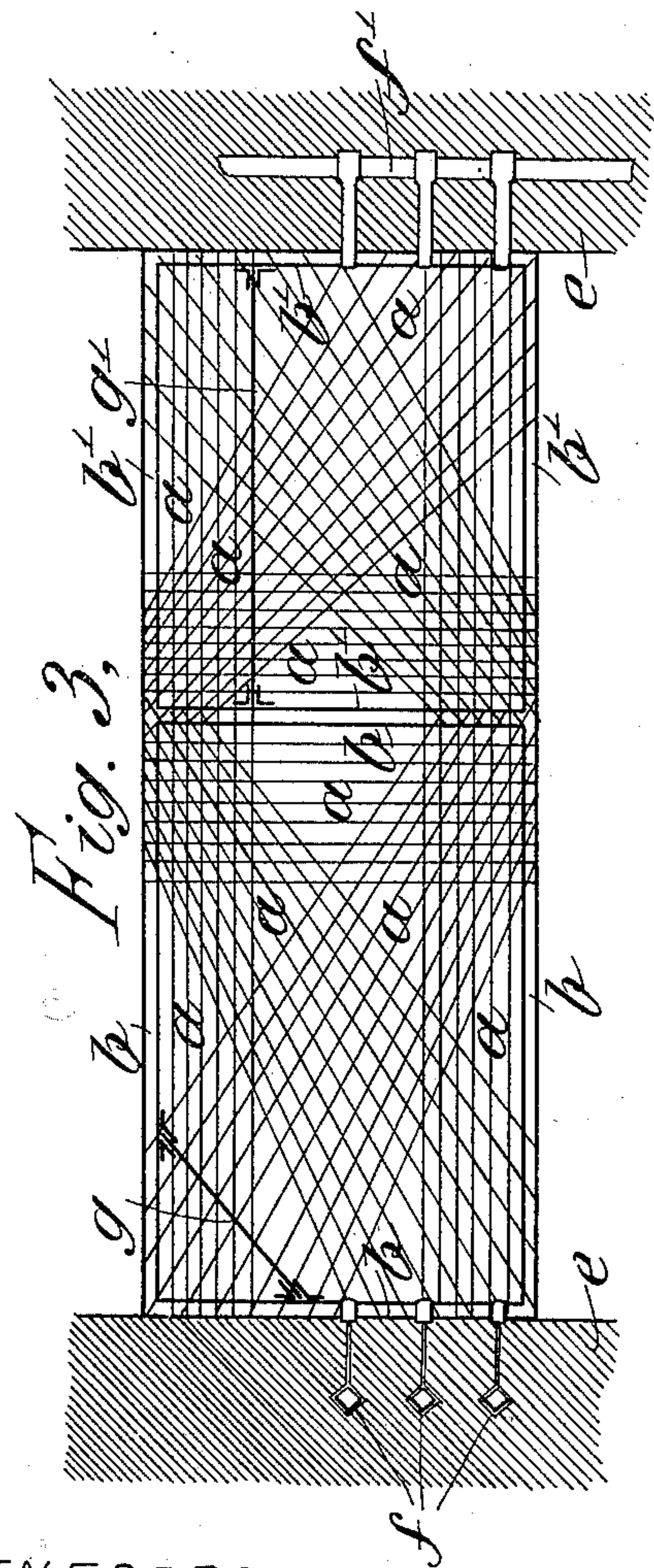
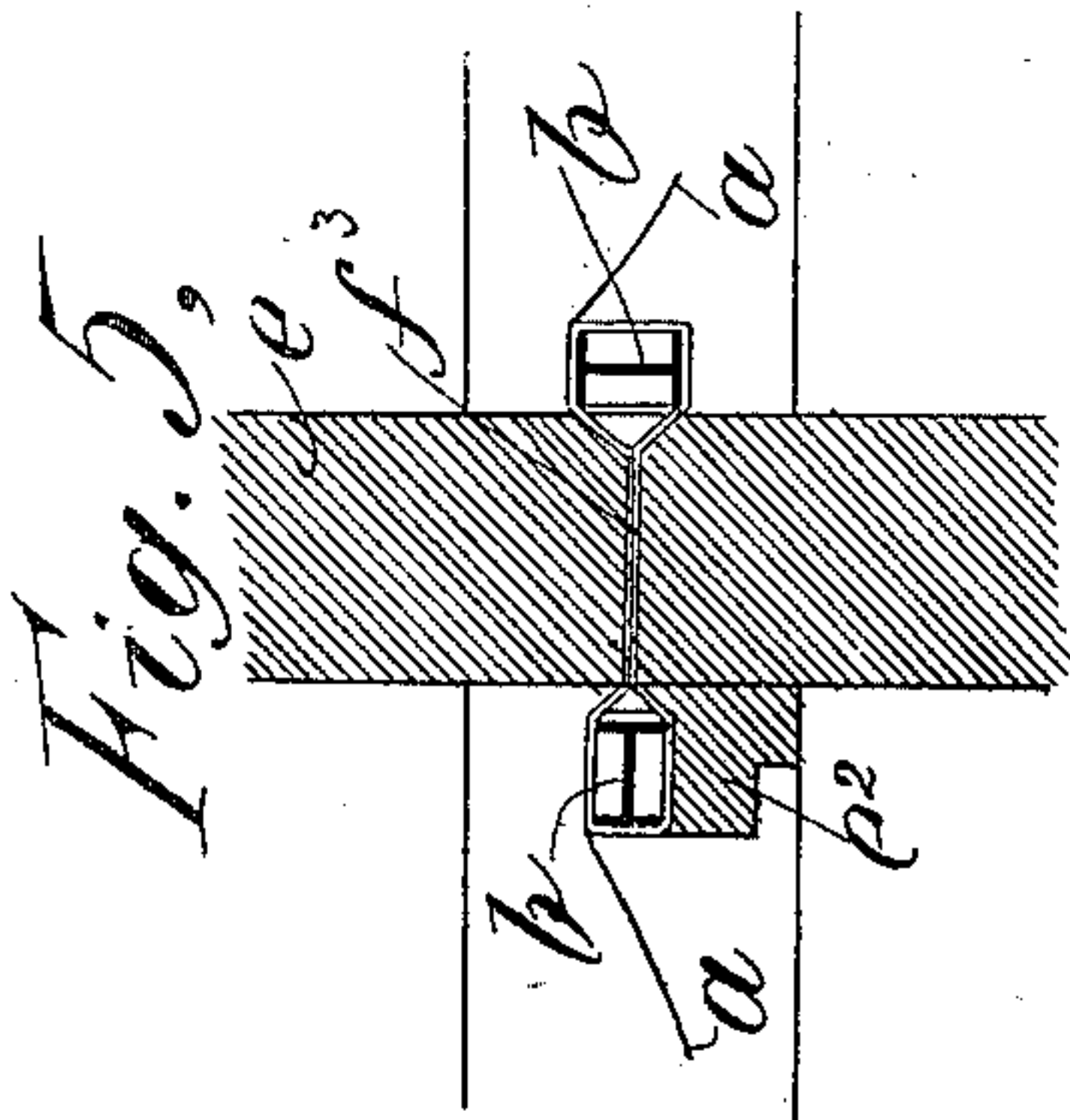
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2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

ALEXANDER MATRAI, OF BUDA-PESTH, AUSTRIA-HUNGARY.

## CONSTRUCTION OF WALLS, FLOORS, CEILINGS, &c.

SPECIFICATION forming part of Letters Patent No. 634,986, dated October 17, 1899.

Application filed October 2, 1896. Serial No. 607,708. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER MATRAI, engineer, a subject of the Emperor of Austria-Hungary, and a resident of Buda-Pesth, Austria-Hungary, have invented certain new and useful Improvements in the Construction of Walls, Floors, Ceilings, and the Like, of which the following is a full, clear, and exact description, and for which I have obtained patents in Italy, dated October 2, 1896, No. 84/260; in Belgium, dated September 26, 1896, No. 123,714; in England, dated September 5, 1896, No. 19,698; in Switzerland, dated October 3, 1896, No. 14,297, and in Canada, dated September 5, 1896, No. 74,867.

The present invention relates to the construction of walls, floors, roofs, and other flat or concave surfaces requiring great bearing strength; and it consists in the construction substantially as hereinafter set forth, and more particularly pointed out in the claims.

In order to render the present specification more easily intelligible, reference is had to the accompanying drawings, in which similar letters of reference denote similar parts throughout the several views.

Figure 1 shows the arrangement of the wires or chains on a rectangular frame; Fig. 2, the arrangement on a circular frame; Fig. 3, the arrangement on two rectangular frames combined and supported between brickwork. Fig. 4 is a vertical section showing the constructions of two kinds of roofs or floors on the present principle. Fig. 5 is a vertical section showing the attachment of the girders forming the frame to the brickwork. Fig. 6 is a vertical section through a reservoir or cistern constructed according to the present invention. Fig. 7 is a perspective view showing the adaptation of the invention to a duplicate cistern. Fig. 8 is a similar view to that of Fig. 1, showing the arrangement of the wires when the short sides of the rectangle are not supported and are not intended to bear much strain.

According to Fig. 1, the frame is formed of girders *b*, supported at the points 1, 2, 3, and 4, six series of wires *a* being employed, said series being arranged parallel to the four sides of the rectangle and diagonally across the same. Fig. 2 shows a similar arrangement of the wires in connection with a circu-

lar frame, also supported at four points 1 2 3 4. In both cases the wires are attached to the frames near their points of support, so that the central or weaker parts of the girders will remain partially unloaded. The series of wires may be connected together at the points where they cross each other by binding-wires, so as to distribute the load occurring at any particular point as far as possible among all the wires at such point.

Fig. 3 shows two frames coupled, *b* and *b'*, said frames being supported at their point of juncture by a common girder, the end girders *b* and *b'*, which are parallel to the said common girder, being supported along the whole of their length by brickwork *e* or other means. In this case the girders *b* and *b'*, lying on the brickwork *e*, must be suitably anchored in the brickwork in order to withstand the strain on the wires or they must be provided with corner diagonal or parallel stays. They may either be fixed in the brickwork by means of anchor-bolts *f* or by stays connecting with a bar bricked in the walls, as shown at *f'*, according to circumstances. The said frames may either be provided with diagonal stays at the corners, as at *g*, or with longitudinal stays, as at *g'* at the right-hand side of the figure. In this case it is advantageous to arrange the wires extending across the frame from one wall to the other along the whole length of the girders resting on the wires. The method according to which the wires are stretched diagonally across the frame will be clearly seen from Fig. 3.

In Fig. 4 a side elevation or section of the device shown in plan in Fig. 3 is illustrated, at the right-hand side with and at the left without the plastic filling mass. The left-hand side of the figure shows a floor having a flat lower surface, while the right-hand side of the figure shows an arched undersurface. *d* represents in this figure chain-like suspended wires which are attached at their ends to the wires *a* and help to bear the plastic mass filling out the interstices.

The girders *b* of the frame may either be anchored within the walls, as at *e'* at the right-hand side of Fig. 4, or may be supported on bracket-like projection, as at *e''* at the left-hand side of the figure.

If girders of the frames are to be fastened



at each side of the wall, this may be done, as shown at Fig. 5, by connecting the two girders through the wall, as at  $f^3$ .

Fig. 6 shows a hemispherical basin or reservoir the wires of which may be arranged as shown in plan at Fig. 2, the frame-girder being supported in either of the ways as described with regard to  $e'$  or  $e^2$  in Fig. 4.

The vertical or slanting walls in buildings may be constructed in the manner shown with regard to Fig. 1.

In connection with reservoirs for holding fluids the wires in the walls are advantageously bent, as shown at Fig. 7, in the direction of the water-pressure in the outer walls, as at  $a$ , while the wires in the intermediate wall separating the two basins or reservoirs are interlaced, as at  $a$  and  $a'$ , so as to bring those wires into play which form the continuation of the wires encircling the reservoir in which at the time the fluid may be contained.

If in connection with a rectangular frame two opposite girders  $b' b'$  are not required to bear any great strain, the wires may be advantageously grouped in the manner shown at Fig. 8, in which case, as will be clear from the figure, the strain will be communicated to the side girders  $b b$  at the points 1 2 and 3 4, at which they are supported, while the end girders  $b' b'$  will have to bear practically no strain at all.

I claim as my invention—

1. In a structure such as described the combination of a frame adapted to be supported at suitable points 1, 2, 3, 4, groups of wires extending from points in proximity to one of said points of support to points in

proximity to another point of support and conforming to the shape of the bearing-surface to be formed, and a filler in which said groups of wires are embedded, for the purpose set forth.

2. In structures such as described the combination with a frame adapted to be supported at suitable points, groups of wires extending from points in proximity to one of said points of support to points in proximity to another point of support and conforming to the shape of the bearing-surface to be formed, and a filler in which said groups of wires are embedded, of looped anchor-wires attached to wires of the aforesaid groups and extending through the filler, for the purpose set forth.

3. In structures such as described the combination with a frame adapted to be supported at suitable points, groups of wires extending from points in proximity to one of said points of support to points in proximity to another point of support and conforming to the shape of the bearing-surface to be formed, and a filler in which said groups of wires are embedded, of looped anchor-wires attached to wires of the aforesaid groups and extending through the filler with their bights or loops in the direction of the strain on the structure, for the purpose set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ALEXANDER MATRAI.

Witnesses:

M. HOENNGERF,  
RICHARD KAUT.