

No. 631,320.

Patented Aug. 22, 1899.

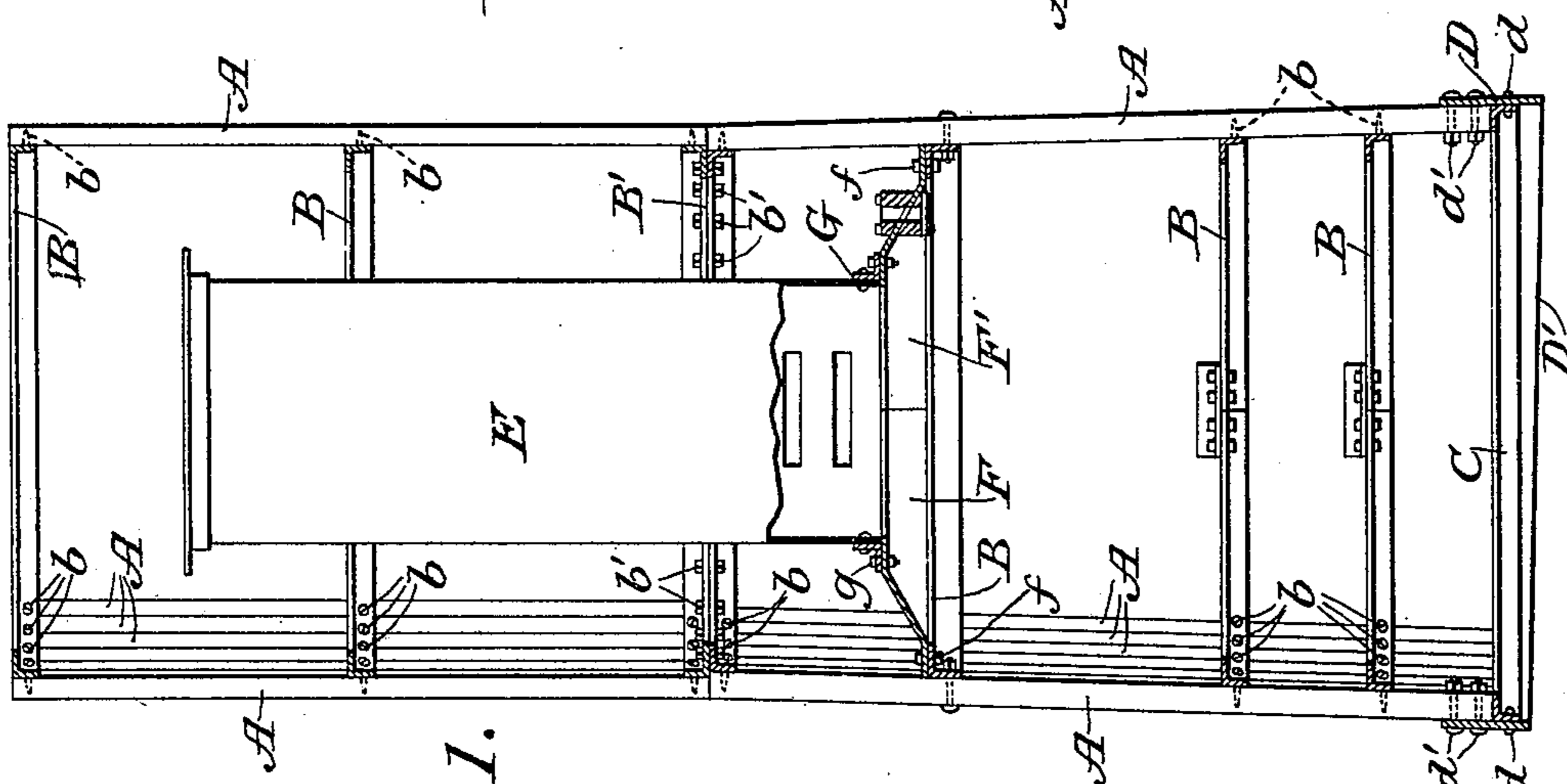
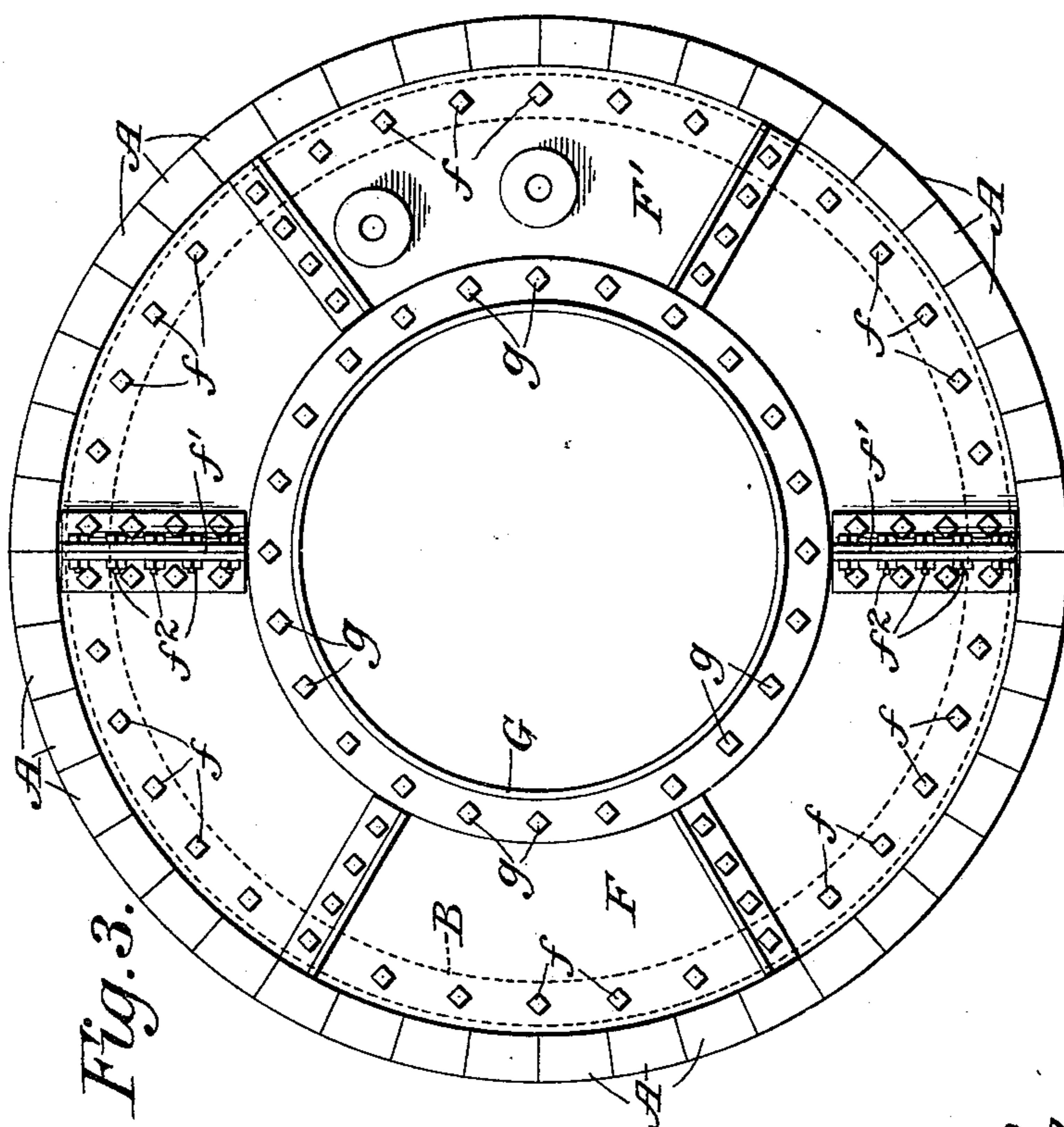
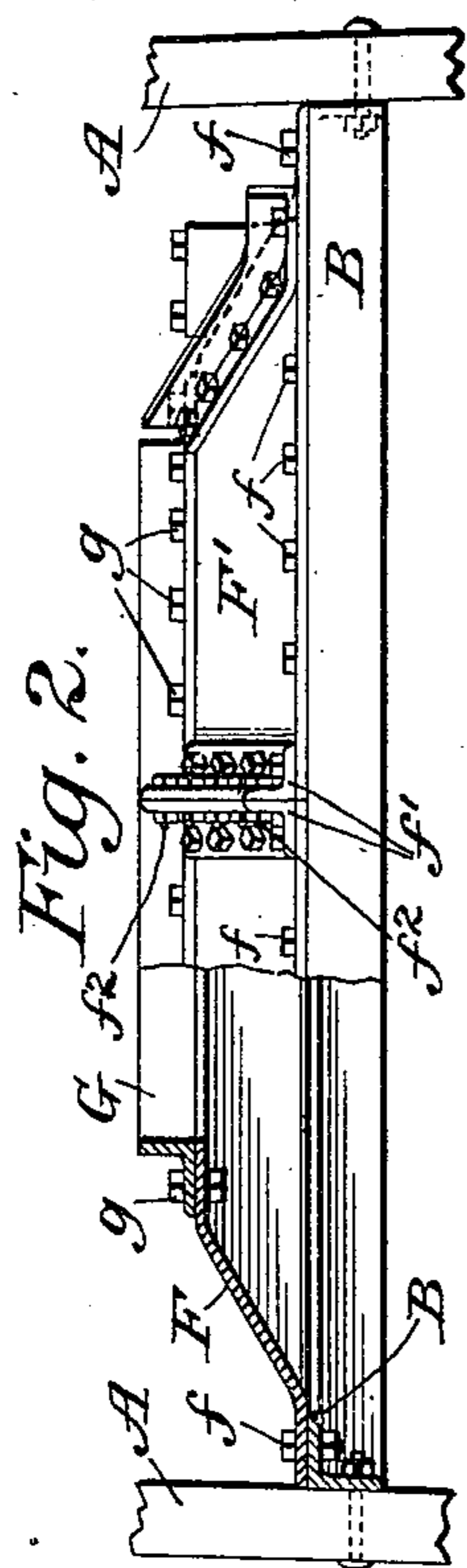
J. F. O'ROURKE.

CAISSON.

(Application filed Oct. 28, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Attest:

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Fig. 1.

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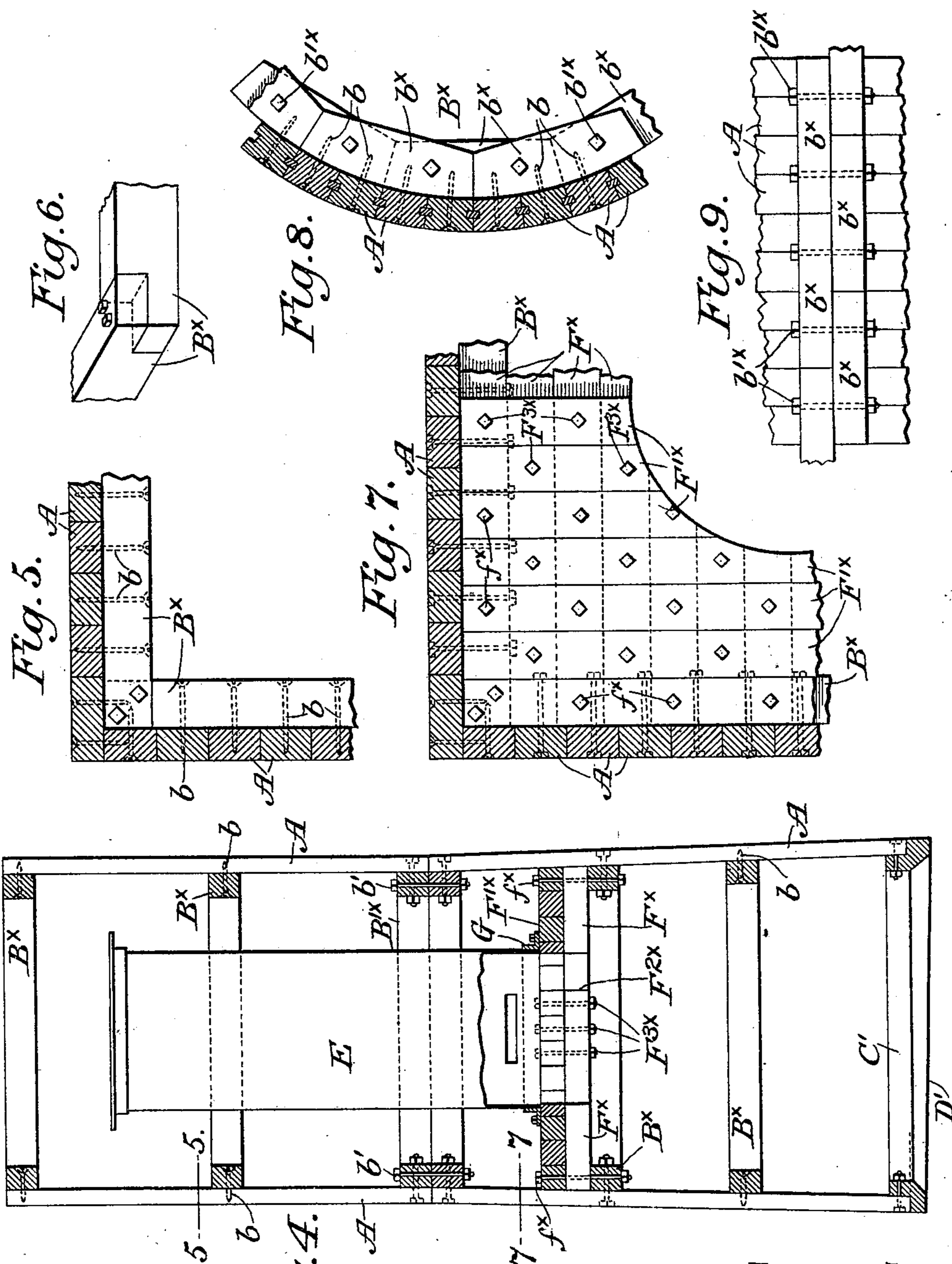
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## CAISSON.

(Application filed Oct. 28, 1898.)

(No Model.)

**2 Sheets—Sheet 2.**



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# UNITED STATES PATENT OFFICE.

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## CAISSON.

SPECIFICATION forming part of Letters Patent No. 631,320, dated August 22, 1899.

Application filed October 28, 1898. Serial No. 694,777. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN F. O'ROURKE, a citizen of the United States, residing in the borough of Manhattan, in the city of New York, State of New York, have invented certain new and useful Improvements in Caissons, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

10 This invention relates generally to the construction of caissons; and it consists in several features which may be advantageously combined in one structure, although they are not of necessity so combined, but are capable  
15 of use independently of each other.

One object of the invention is to permit the use of wood to form the walls of caissons, whereby the expense and delay in procuring the necessary steel plates for special contracts  
20 are avoided and it becomes possible to construct a satisfactory caisson very quickly and upon short notice and whereby, also, the caisson, although subjected to the action of water, is practically imperishable.

25 Another object is to control the outflow of compressed air beneath the lower edge of the caisson, so that it will be guided out where disturbance of the surrounding soil will do the least damage, which is an exceedingly important consideration in making excavations  
30 beside the foundations of heavy buildings.

A further object is to provide for the removal of the hood or roof as the building of a foundation within the caisson progresses,  
35 so that the hood or roof shall not occasion an imperfect joint, as oftentimes heretofore, when the foundation is carried higher than the hood or roof and the hood or roof is built in, and so that the hood or roof may be used over  
40 again and instead of becoming part of the material used shall become a part of the contractor's plant, thereby avoiding the expense in money and time of having to provide a new roof in every case.

45 The several features of the invention will be more fully described hereinafter with reference to the accompanying drawings, in which they are illustrated for the purposes of explanation, and in which—

50 Figure 1 is a vertical central section of a caisson which embodies the several features of this invention. Fig. 2 is a detail view, on a larger scale, partly in side elevation and partly in vertical section, illustrating the con-

struction of the hood or roof and its relation 55 to the side walls. Fig. 3 is a plan view of the parts shown in Fig. 2. Fig. 4 is a view similar to Fig. 1, but showing a construction in which strengthening-bands of wood are employed instead of strengthening-bands of angle-iron. Figs. 5 and 6 are detail views illustrating the mode of construction of rectangular caissons with strengthening-bands of wood. Fig. 7 is a detail view illustrating the mode of construction of a roof or hood of wood. 60 Figs. 8 and 9 are detail views illustrating the mode of construction of circular caissons with strengthening-bands of wood.

It is obviously desirable, so far as cheapness and facility of construction are concerned, to employ wood for the side walls of caissons; but in order that a satisfactory caisson may be produced it is necessary that correct principles of construction be followed and that the lower edge of the caisson shall 65 be practically the same as the lower edge of a steel caisson. In order to meet these requirements the walls of the caisson, in accordance with the present invention and as shown in the several figures of the drawings, 70 are formed of planks or timbers A, which are disposed vertically, being suitably shaped or joined to make tight joints at their vertical meeting edges. At intervals within the caisson these vertical timbers A are firmly joined 75 together and braced against external pressure by horizontal bands of angle-iron or other suitable form B, as shown in Fig. 1, or bands of wood B<sup>x</sup>, as shown in Figs. 4, 5, 6, 8, and 9, which may be secured to the timbers by heavy wood-screws b. If one vertical section is to be superimposed upon another, such bands are secured at the meeting edges of the respective sections, as at B in Fig. 1, and at B<sup>x</sup> in Fig. 4, and are firmly 80 united by bolts, as at b'. The lower ends of the timbers are secured to a shoe, which protects them and holds them rigidly in line. As shown in Fig. 1, the ends of the timbers rest upon an angle-iron C, the width of the 85 upper face being substantially equal to the thickness of the timbers, and a vertical band D is bolted or riveted to the vertical face of the angle-iron band C by bolts or rivets d, the end of each timber A being also bolted 90 securely to such vertical band D by bolts d'. As shown in Fig. 4, the shoe is formed by a timber C', bolted to the inner faces of the 95 100 105

vertical timbers and, if desirable, carried down under the ends of the timbers, being rabbeted to receive them.

When a caisson stands absolutely vertical, with its lower edge in a horizontal plane, the compressed air will escape at one point or another, according to the nature of the material about it, and as a consequence the escaping air may disturb the surrounding soil beneath a foundation adjacent to which the new work is being carried on. It is important to prevent such disturbance, and for this purpose provision is made for controlling the outflow of the compressed air. To this end the lower or cutting edge of the caisson is inclined or made oblique to the vertical axis of the caisson, as shown at D' in Figs. 1 and 4. The air will escape at the highest point of this cutting edge, and by setting the caisson with such highest point away from the adjacent foundation the disturbance of the soil beneath the foundation by the escape of the compressed air will be wholly avoided. It is obviously immaterial whether this feature be applied to a caisson with wooden walls or to one with steel walls.

The air-shaft E commonly terminates in a spreading hood or roof, which extends to the surrounding wall of the caisson. It is usual, when the masonry within the caisson has been built up as closely as possible to the roof, to fill in the remaining space with grouting and to continue the masonry above the hood or roof. Notwithstanding the exercise of the greatest care it is sometimes impossible to make a perfect joint in this manner. This difficulty is overcome in accordance with the present invention by making the roof or hood removable, so that when the masonry has been carried up nearly to the roof or hood it may be removed. Furthermore, as already indicated, the expense and delay incident to the provision of a new roof in each case is avoided, as the old roof, when removed, can be used again for another caisson. For the more convenient removal of the roof or hood it is made in separate sections. These sections F and F', as shown in Figs. 1, 2, and 3, are bolted at their outer edges to one of the angle-bands B, the bolts  $f$  being removable from the upper side of the roof or hood. At the meeting edges of the sections are secured deck-splice angles  $f'$ , through the vertical opposing flanges of which are passed bolts  $f^2$ . An angle-band G may be secured to the inner edges of the sections F F' by bolts  $g$  to afford a convenient means for securing the air-shaft E in place. It will be readily understood that after withdrawing the bolts  $f f^2$  and  $g$  these sections F and F' can be readily separated and removed, permitting the masonry-work to be continued from below. These removable sections may also be formed wholly of timber, as shown in Figs. 4 and 7. In this construction timbers  $F^x$ , fitting closely together and forming one layer, rest upon one of the bands  $B^x$ . Other timbers  $F'^x$ , also fit-

ting closely together but disposed transversely with respect to the timbers  $F^x$ , constitute a second layer, which rests upon the first, the roof or hood thus formed being secured by bolts  $f^x$  to the band  $B^x$ . The air-shaft E may be secured to the hood by an angle-iron G, as in the construction shown in Fig. 1. It will be understood, of course, that the opening of the air-shaft is continued through this roof or hood, the timbers being cut to form it before they are secured together. To form two separable and removable sections, the timbers of the lower layer are cut transversely, as indicated at  $F^{2x}$ , but so as to lap joints, and the overlying timbers  $F'^x$  are bolted to the ends of the timbers  $F^x$  below them by bolts  $F^{3x}$ . This construction retains the necessary strength of the hood and yet permits the two sections to be released by withdrawing the bolts  $F^{3x}$ . The entire hood can thus be removed, as already described with respect to the construction shown in Fig. 1.

It will be obvious that the caisson may have any desired shape in cross-section. As represented in Fig. 1 it is circular in cross-section, and as represented in Fig. 4 it is rectangular. If the caisson is to be circular in cross-section, with strengthening-bands of wood, such bands will be formed, as shown in Figs. 8 and 9, of short sections  $b^x$ , which are bolted together with overlapping joints by bolts  $b'^x$ , the wall of timbers A being secured to the bands thus formed by wood-screws, as in the construction shown in Figs. 4 and 7.

It will be understood, of course, that the several features of the invention are not to be limited to the precise construction and arrangement of parts shown and described herein.

I claim as my invention—

1. A caisson comprising vertically-disposed timbers fitting closely together, internal bands to which said timbers are secured, an angle-iron band upon which the ends of said timbers rest, and a vertical band secured to the angle-iron band and to the ends of said timbers.

2. A caisson having its cutting edge oblique to its vertical axis.

3. The combination of a caisson, a roof or hood secured to the caisson-wall and removable from above, said roof or hood having an opening therethrough, and an air-shaft secured to said roof or hood around said opening.

4. The combination of a caisson, a roof or hood formed in sections detachably secured together and to the caisson-wall and having an opening therethrough, and an air-shaft secured to said roof or hood around said opening.

This specification signed and witnessed this 26th day of October, A. D. 1898.

JOHN F. O'ROURKE.

In presence of—

ANTHONY N. JESBERA,  
W. B. GREELEY.