

(No Model.)

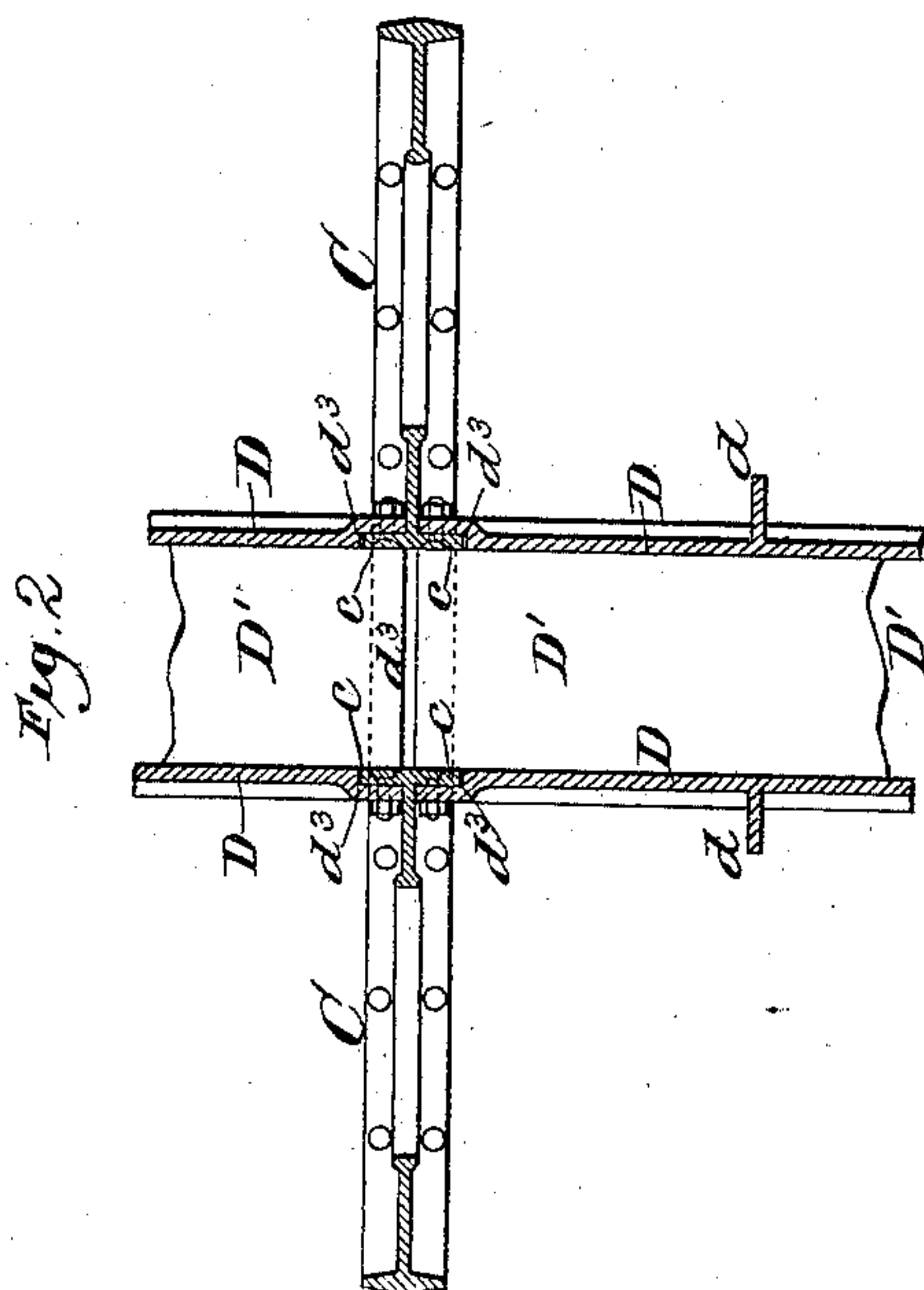
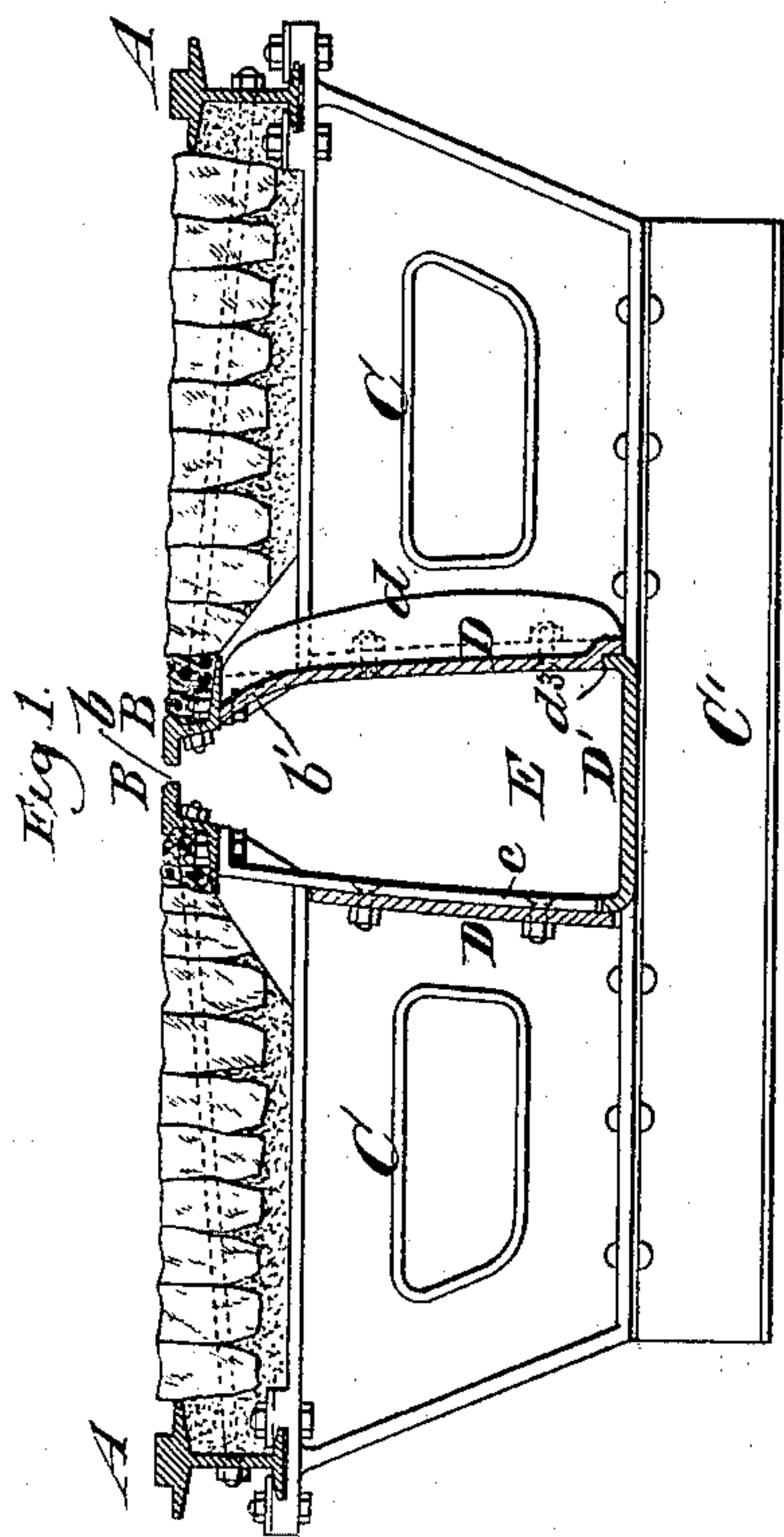
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J. JONSON.

CONSTRUCTION OF TUNNELS FOR CABLE RAILWAYS.

No. 368,834.

Patented Aug. 23, 1887.



Witnesses:

O. Sundgren  
Emil Hertner

Inventor:

Julius Jonson  
by his Atty  
Rowan Hall

(No Model.)

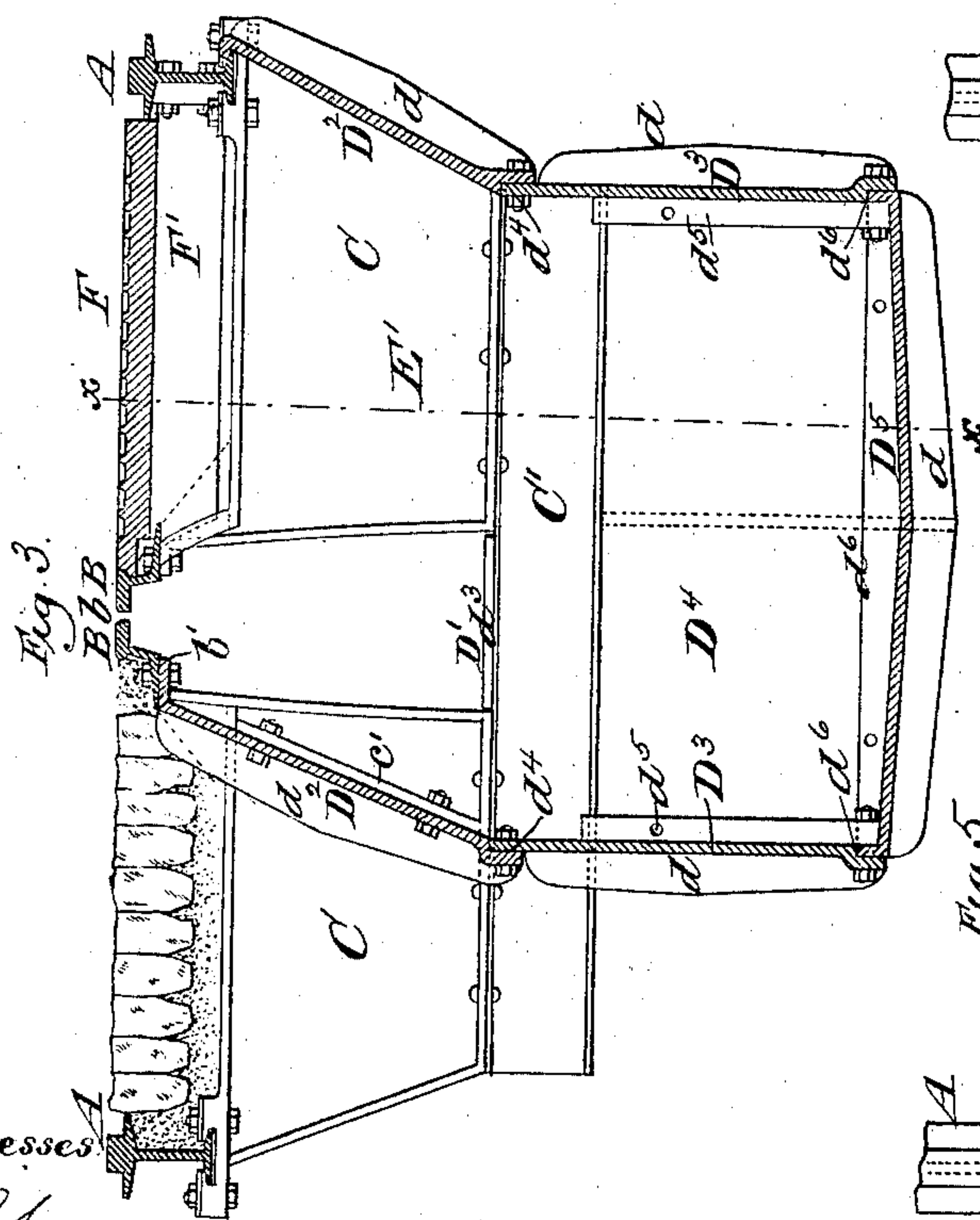
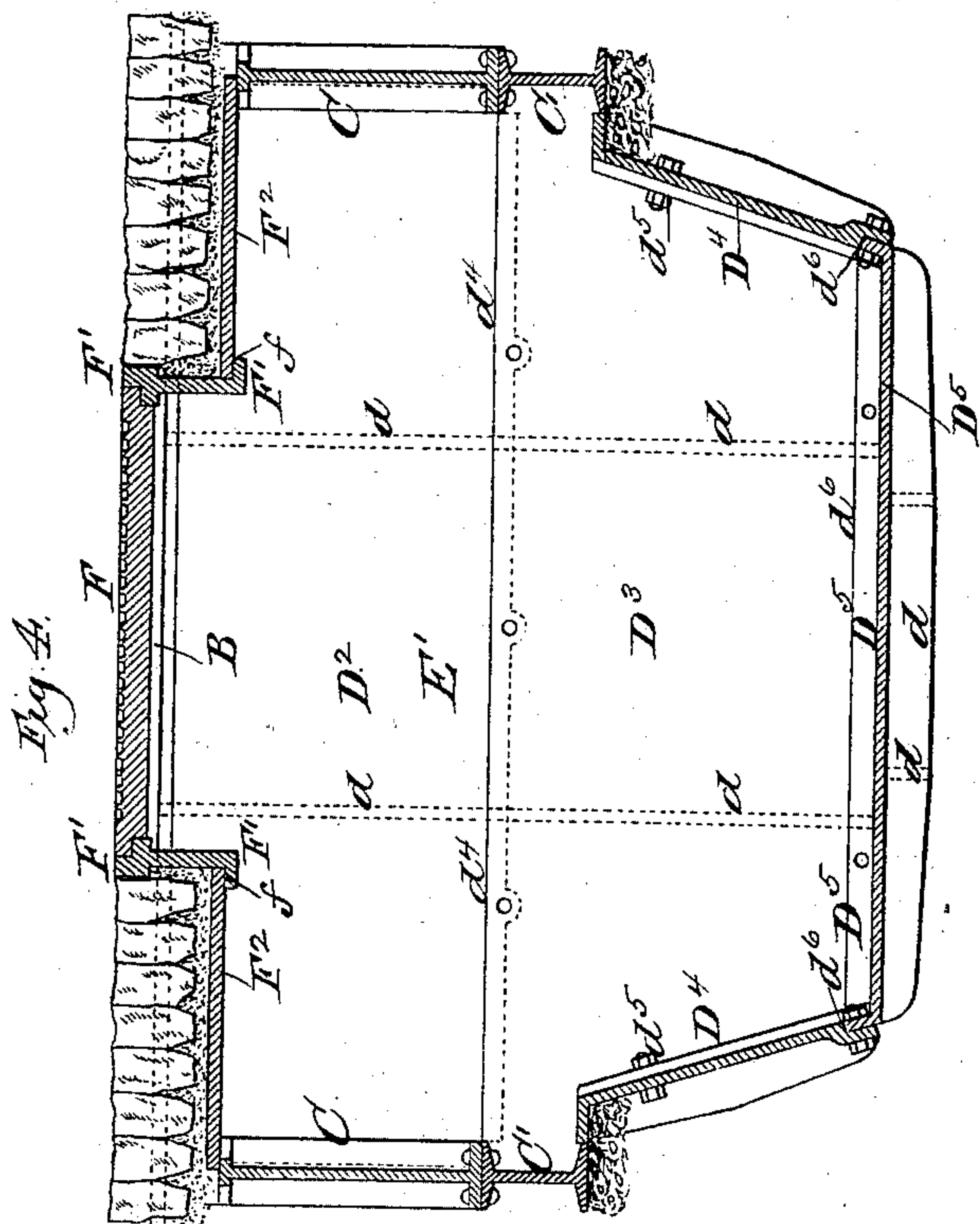
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J. JOHNSON.

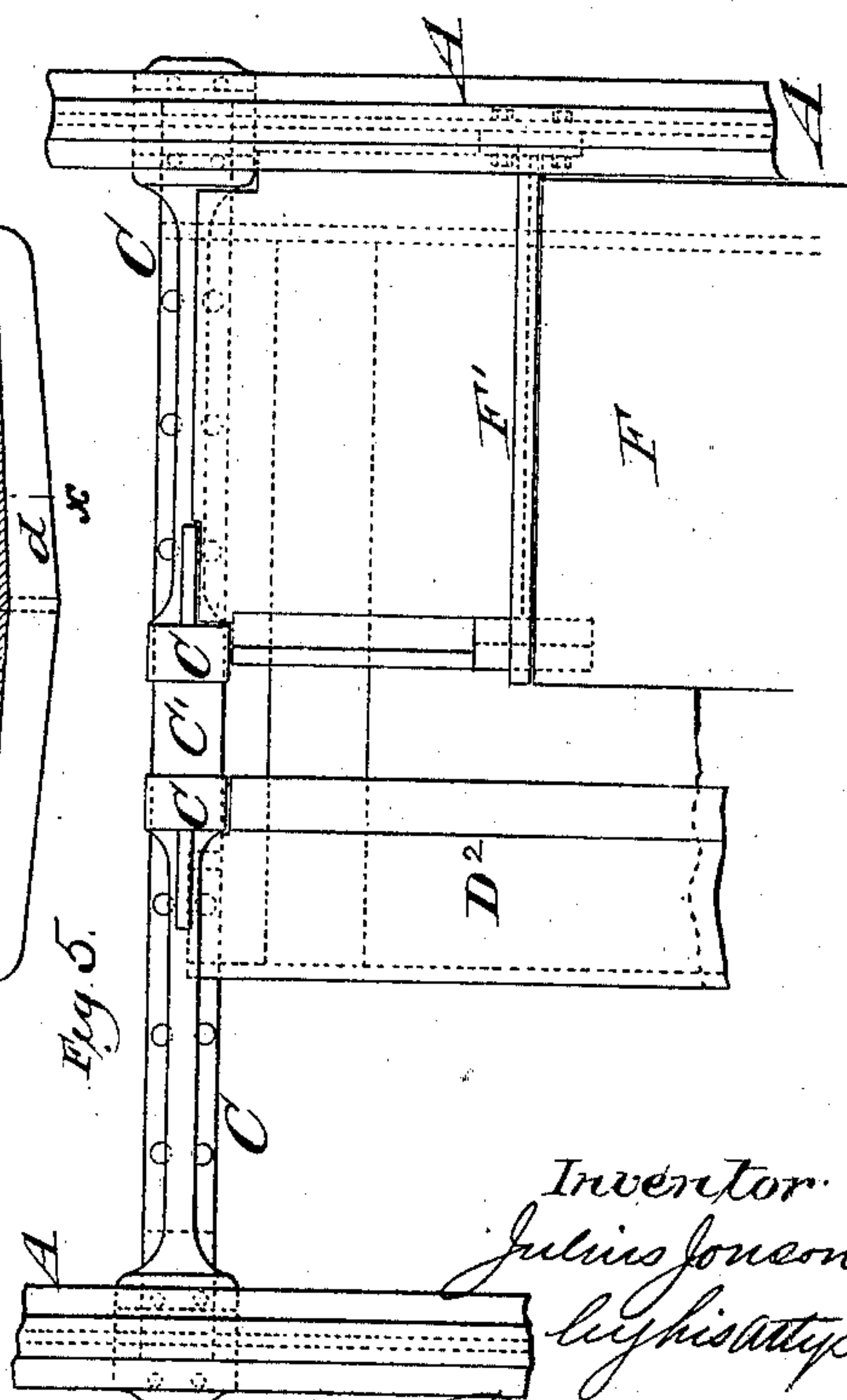
# CONSTRUCTION OF TUNNELS FOR CABLE RAILWAYS.

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# UNITED STATES PATENT OFFICE.

JULIUS JONSON, OF NEW YORK, N. Y.

## CONSTRUCTION OF TUNNELS FOR CABLE RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 368,834, dated August 23, 1887.

Application filed February 8, 1887. Serial No. 226,882. (No model.)

*To all whom it may concern:*

Be it known that I, JULIUS JONSON, of the city and county of New York, in the State of New York, have invented a new and useful  
5 Improvement in the Construction of Tunnels for Cable Railways, of which the following is a specification.

My invention relates to that class of railway structures in which there is a cable-tunnel of  
10 comparatively small size between the track-rails, and communicating with the surface by a narrow slot, which receives a connection between the car traveling on the surface, and  
15 mechanism for grasping the cable which moves in the tunnel. In such railways the track-rails are commonly supported by transverse frames or yokes at short intervals apart in  
20 their length, and at intervals in the line of the tunnel are pulley-vaults or sheave-pits, in which are arranged the pulleys or sheaves carrying a cable or cables.

The object of my invention is to provide a construction for such cable-tunnel and pulley-vaults that will permit of their being made  
25 entirely or almost entirely of cast-metal plates which are substantially flat or plane surfaces; and the invention consists in novel combinations of parts which are hereinafter described, and pointed out in the claims.

30 In the accompanying drawings, Figure 1 is a transverse section of a cable-railway structure embodying my invention. Fig. 2 is a horizontal section through the transverse yokes or frames and the side plates of the tunnel. Fig. 3 is a transverse section similar to Fig. 1,  
35 but taken through one of the pulley-vaults or sheave-pits. Fig. 4 is a longitudinal section upon about the plane indicated by the dotted line *x x*, Fig. 3, through one of the pulley-vaults or sheave-pits; and Fig. 5 is a plan view  
40 showing a cover or man-hole plate which closes a pulley-vault or sheave-pit and the means which are employed for supporting the same.

Similar letters of reference designate corresponding parts in all the figures.

45 A designates the track-rails, and B the slot-bars which are supported between them at such a distance apart as to form the slot *b*. The rails and slot-bars are supported at suitable  
50 intervals in their length by transverse frames or yokes, which are or may be of ordinary

form, and which are shown as consisting of upright stands or castings C, securely riveted or bolted at proper distances apart in the length of a transverse beam or girder, C', which may  
55 be in the form of an I-beam, as shown in Fig. 4.

The tunnel itself I have represented as composed of side plates, D, and bottom plates, D'. All these plates are substantially flat, and they are provided with strengthening-ribs *d* on  
60 their surfaces, as shown in Figs. 1 and 2. The several plates D D' are constructed so as to form rabbeted joints with lateral flanges *c* on the transverse yokes or frames, and the side  
65 and bottom plates are rabbeted or constructed to form rabbeted joints one with another, as shown in Fig. 1, the side plates, D, being rabbeted at *d*<sup>3</sup>, so as to form suitable joints with the bottom plates. The side plates, D D', may  
70 extend upward to the slot-bars B, as shown at *b'*.

The several plates D D' of which the tunnel is composed, being made substantially flat and of cast metal, with strengthening-ribs upon their surfaces, they may be arranged and se-  
75 cured together to form the tunnel E with the least possible labor, and without the necessity of leaving the street or excavation open for a long time in order to enable cement or masonry to become properly dried before being  
80 covered with earth. The plates being provided of proper size, they can be arranged in place and secured together to form the tunnel E almost as rapidly as the excavation can be  
85 made, and in building the structure the least amount of interference with surface travel will be created.

In Figs. 3, 4, and 5 I have represented a pulley-vault or sheave-pit such as will be constructed at suitable intervals in the line of  
90 the tunnel, and which is designated by the letter E'. The ends of this pulley-vault or sheave-pit E' down to the level of the beams C' may be formed solely by the transverse yokes or frames C C', as best shown in Fig. 4, and  
95 the longitudinal walls, or those walls of the vault which are lengthwise of or parallel with the track-rails A, may be formed by upper plates, D<sup>2</sup>, and lower plates, D<sup>3</sup>, as is shown in Fig. 3. The plates D<sup>2</sup> are here represented  
100 as secured at *b'*, respectively, to one of the slot-bars B, and also to the transverse frames or



yokes C C', formed on opposite walls of the pulley-vault. The plates D<sup>2</sup> D<sup>3</sup> are provided on their surface with strengthening-ribs *d*, and one or both of them are bolted to flanges *c'*, projecting from the transverse yokes or frames C C', as is shown at the left hand of Fig. 3. The lower plates, D<sup>3</sup>, which form the longitudinal walls of the pulley-vault, are united by rabbeted and bolted or riveted joints *d'* with the upper plates, D<sup>2</sup>, as shown in Fig. 3, and the lower end plates, D<sup>4</sup>, forming the lower portion of the end walls of the vault, may extend only to the transverse beams or girders C', as is shown in Fig. 4, and may be bolted or riveted at *d'* to the plates D<sup>3</sup>, which form the longitudinal lower walls of the vault.

The bottom of the vault is formed by a plate, D<sup>5</sup>, which is constructed to form a rabbeted and bolted or riveted joint *d'* with the longitudinal side plates, D<sup>3</sup>, and the end plates, D<sup>4</sup>, which form the lower portions of the walls of the pulley-vault. Each pulley-vault has a man-hole at the street-surface, which is closed by a cover, F. This cover may be supported by transverse bars or bearers F', one of which is shown in Fig. 5 and both of which are shown in Fig. 4, and these transverse bars or bearers may extend from one of the slot-bars B to the track-rail A, which is upon the same side of the slot, and form an adequate support for the man-hole cover F. The space between each of the transverse bars or bearers F' and the transverse yoke or frame C C' which is nearest adjacent thereto may be closed by a plate, F<sup>2</sup>, which rests upon the top of the transverse yoke or frame and also upon the ledge or shoulder *f*, provided on the adjacent bar or bearer.

It will be readily seen that I provide for constructing the pulley-vaults in the same simple manner as the tunnel proper, and the plates for both these purposes having been

previously made in proper sizes and shapes, may be secured together and the structure completed almost as rapidly as the excavation can be made.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a cable-railway structure, the combination, with the transverse yokes or frames for supporting the rails and slot-bars, of a tunnel composed of substantially flat base and side plates ribbed upon their surfaces and secured together and to the said yokes or frames, substantially as herein described.

2. The combination, with the transverse yokes or frames for supporting the rails and slot-bars, of a tunnel composed of substantially flat plates ribbed upon their surfaces and forming rabbeted joints with the yokes or frames and with each other, substantially as herein described.

3. The combination, with the transverse yokes or frames for supporting the rails and slot-bars, of a tunnel and pulley-vaults at intervals in the length thereof, both formed of substantially flat plates ribbed on their surfaces and forming rabbeted joints with the yokes or frames and with each other, substantially as herein described.

4. The combination, with the transverse yokes or frames supporting the slot-bars and rails, of the transverse bars or bearers F', extending between the slot-bars and one of the rails, the man-hole cover F, supported on and between said bars or bearers, and the plates F<sup>2</sup>, for sustaining the road-bed, supported on said bars or bearers and the adjacent yokes or frames, substantially as herein described.

JULIUS JONSON.

Witnesses:

FREDK. HAYNES,  
EMIL HERTER.