

(No Model.)

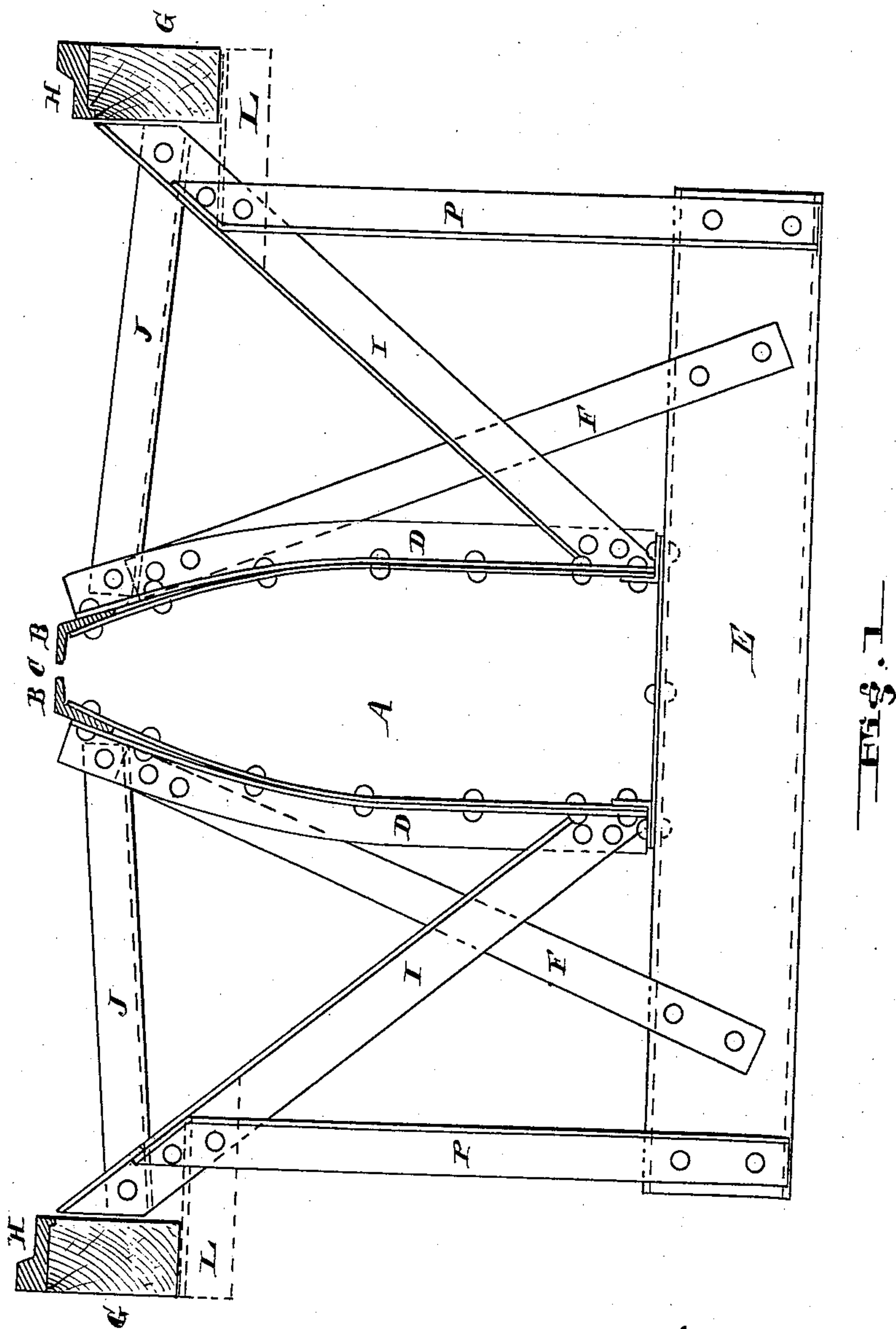
A. BONZANO.

4 Sheets—Sheet 1.

CABLE RAILWAY.

No. 326,536.

Patented Sept. 15, 1885.



Attest  
*Wm. H. H. H.*  
H. A. H. H.

Inventor  
Adolphus Bonzano  
By his atty.  
Francis T. Chambers

(No Model.)

4 Sheets—Sheet 2.

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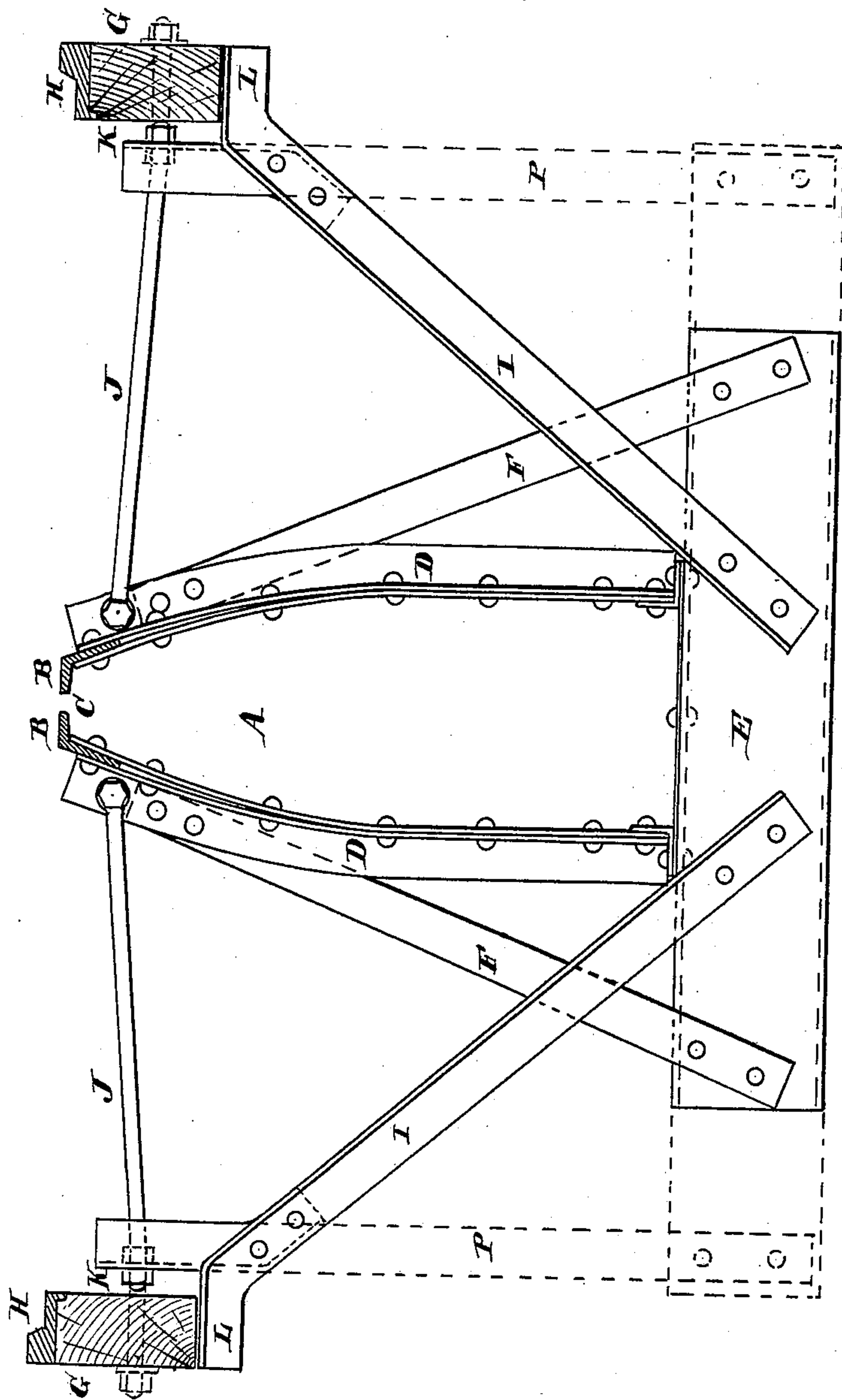


Fig. 2

Witness  
*Wm. H. Burr*  
*W. H. Burr*

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By his atty.  
*Francis T. Chambers*

(No Model.)

A. BONZANO.  
CABLE RAILWAY.

4 Sheets—Sheet 3.

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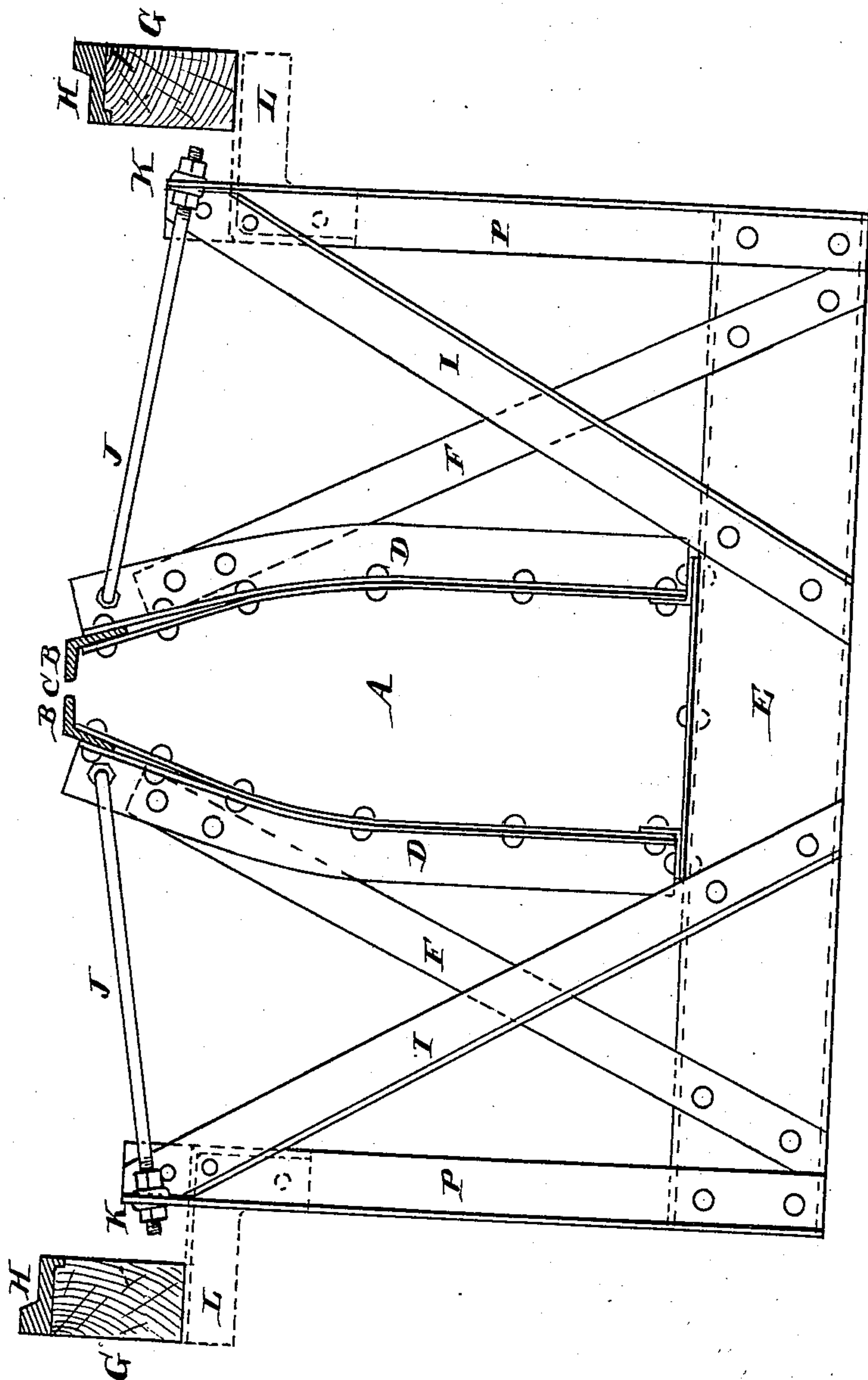


Fig. 3

Attest  
*Wm. H. H. H.*  
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Francis T. Chambers.

(No Model.)

A. BONZANO.  
CABLE RAILWAY.

4 Sheets—Sheet 4.

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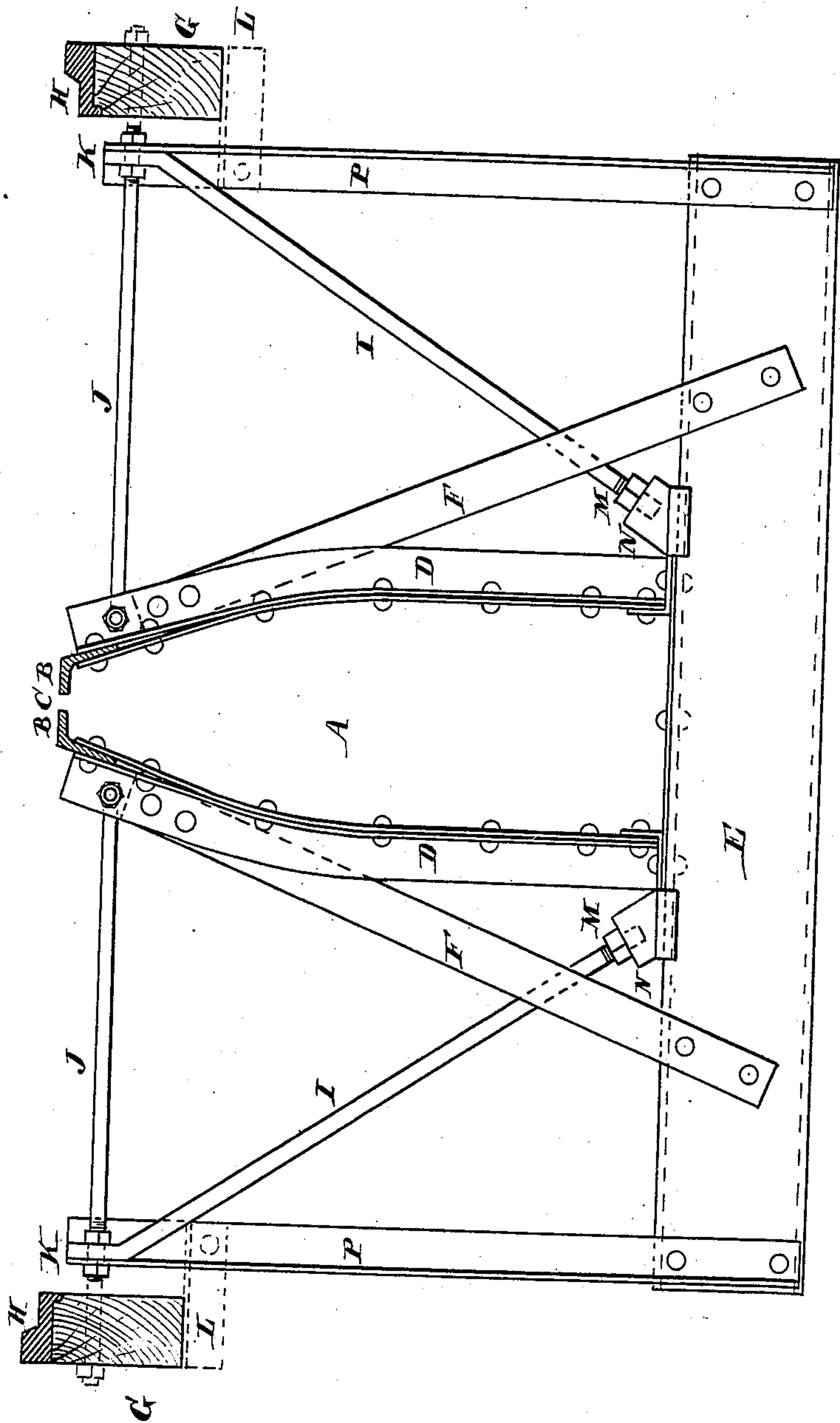


Fig. 4

Attest  
*[Signature]*  
H. A. H. H.

Inventor  
Adolphus Bonzano  
By *[Signature]*  
Francis T. Chambers



# UNITED STATES PATENT OFFICE.

ADOLPHUS BONZANO, OF PHOENIXVILLE, PENNSYLVANIA.

## CABLE RAILWAY.

SPECIFICATION forming part of Letters Patent No. 326,536, dated September 15, 1885.

Application filed March 18, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, ADOLPHUS BONZANO, of Phoenixville, in the county of Chester and State of Pennsylvania, have invented an Improvement in Cable Railways, of which the following is a specification.

My invention has reference to conduits for cable railways and their appendages, but more specifically to an improvement upon Letters Patent No. 287,220, and dated October 23, 1883, granted to me; and it consists in certain improvements by which the slot through which the grip passes may be prevented from becoming closed or partly closed, all of which is fully set forth in the following specification, and shown in the accompanying drawings, which form part thereof.

In cable railways in which metallic tubes such as set forth in my patent hereinbefore referred to are used, when the pavements between the tracks are imperfectly laid down—as, for instance, when the blocks forming the pavements are larger on the upper surface than on the lower, forming wedges, or when the joints between the pavement-stones are not properly filled with an elastic and waterproof cement—there is a tendency of wedging and expansion due to frost, which action has the effect of causing the slot to be contracted.

The object of my invention is to overcome this difficulty by providing suitable means by which the angle-irons forming the slot are bolted or otherwise secured to the vertical braces from the transverse beams, or, if desired, to the stringers or rails, and also by suitable supporting-braces in the form of angle-irons or struts connecting the vertical braces, stringers, or rails with the lower part of the tube or the ribs thereon, or the lower transverse beams. If desired, these struts and the cross-braces may be made adjustable, by which the width of the slot may be varied to compensate for any decrease in its width due to the cause above specified.

In the drawings, Figure 1 is a cross-section of a cable-railway conduit-tube and railway, showing bracing embodying my invention. Fig. 2 is a similar view of a modified construction, in which the horizontal or upper braces are made adjustable. Fig. 3 is a view substantially similar to that shown in Fig. 2, including the dotted portions thereof, and show-

ing a slight modification in the bracing, and Fig. 4 is also a similar view, in which both the horizontal and oblique braces are made adjustable.

A is the tube or conduit, of which B B represent the angle-irons secured to the upper edges of the side walls and form the slot C, and D are the re-enforcing side ribs, formed of angle-iron. E is the lower transverse beam, commonly made of channel-beams. F are oblique struts connecting the upper part of the angle-irons or braces D with the lower and outer ends of the transverse beam E. So far the construction is similar to that covered in Letters Patent to me, hereinbefore referred to.

H are the rails, and rest upon the stringers G. These stringers or rails may be connected, if desired, with the upper part of the tube by the dotted bolts, Fig. 2, and with the bottom of the conduit-tube by oblique braces I, as shown in Fig. 1, or to the transverse beam E, as shown in Fig. 2. The upper part of the conduit or the irons D thereof are connected by angle-irons or ties J to the stringers or upper edges of the struts I, or to both. As shown in Fig. 1, these ties are made of angle-irons, but in Fig. 2 they are shown as being formed of rods which pass through the upper ends of the oblique or vertical braces, or through the stringers, and are made adjustable by nuts.

P are vertical braces or ties, which are secured at the lower ends to the transverse beams E and extend up, preferably, on the inner side of the stringers and rails, and rigidly secured to the oblique brace I, as clearly shown in Fig. 3. The ties J are put through the upper ends of the vertical tie or brace P, or, if desired, the oblique strut I, at or about their junction, and may be rigidly secured thereto or made adjustable by nuts K. The stringers and their rails may be loosely supported upon the brackets L, or, if desired, the stringers may be rigidly secured to the bracing.

In the modification shown in Fig. 4, both the oblique struts and horizontal ties are made adjustable and formed of rods, the struts being supported upon shoes N and adjustable by nuts M, working thereon. The upper ends of the struts I may be provided with supports



L, as indicated in Fig. 2, or in dotted lines in Fig. 1 and Fig. 3. It is immaterial to my invention what the particular construction of these struts or vertical ties or braces may be, and the conduit or tube may be of any suitable design or construction, though that shown is what I prefer and have been using for cable railways.

By this construction of bracing and struts any downward pressure of the stringers and the rails will tend to cause the slot to become enlarged in place of being closed, and by forming the struts I of angle-iron they expose a large surface to the material above, which when forced down acts thereon and prevents the stringers being drawn toward the conduit, and these, through the agency of the ties J, prevent the conduit from becoming closed. The tie J, also prevents any wedge action of the paving stones forcing the angle-irons B toward each other. Thus the distance between the said angle-irons and the rails H or their stringers may be practically fixed.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a sheet-metal conduit with the lower transverse beams, vertical ties or braces secured thereto, and oblique or inclined struts extending from the lower part of the conduit or the transverse beams thereof and secured at their top to the vertical ties or braces, and horizontal ties connecting the upper edges of the conduit with the upper ends of the struts, and vertical ties to prevent the closing of the slot, substantially as and for the purpose specified.

2. The combination of a sheet-metal conduit with the lower transverse beams, vertical ties or braces secured thereto, oblique or inclined struts extending from the lower part of the conduit or the transverse beams thereof and secured at their top to the said vertical

ties or struts, and horizontal adjustable ties connecting the upper edges of the conduit with the upper ends of the struts or vertical ties, or both, to prevent the closing of the slot, substantially as and for the purpose specified.

3. The combination of a sheet-metal conduit with the lower transverse beams, vertical ties or beams secured thereto, oblique or inclined struts extending from the lower part of the conduit or the transverse beams thereof and secured at their top to the vertical ties, and horizontal ties connecting the upper edges of the conduit with the upper ends of the struts or vertical ties to prevent the closing of the slot, the said ties and struts both being adjustable, substantially as and for the purpose specified.

4. The combination of a sheet-metal conduit with the oblique struts extending from the lower part of the conduit or the transverse beams thereof, horizontal ties connecting the top of said oblique struts with the conduit near its top, and rails loosely supported upon the upper ends of said struts, but so arranged that they cannot approach the conduit through the intervention of the extended ends of said struts, substantially as and for the purpose specified.

5. The conduit A, having angle-irons B B, forming slot C, and re-enforcing ribs D, stringers G, rails H, struts I, and ties J, arranged substantially as and for the purpose specified.

6. The conduit A, having angle-irons B B, forming slot C, and re-enforcing ribs D, stringers G, rails H, ties P, transverse beams E, struts I, and ties J, arranged substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

ADOLPHUS BONZANO.

Witnesses:

R. M. HUNTER,  
ANDREW ZANE, Jr.