

(No Model.)

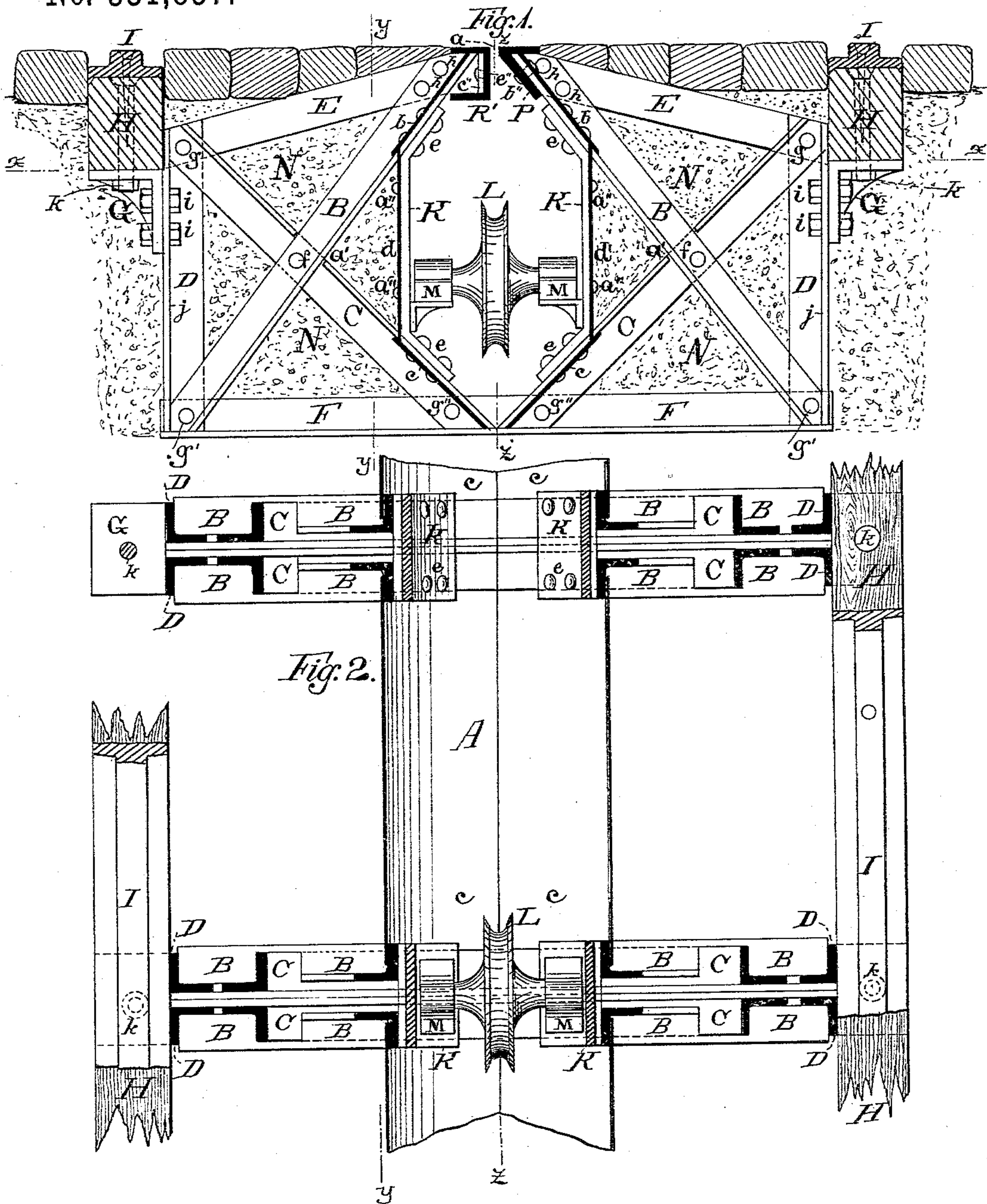
2 Sheets—Sheet 1.

R. SOLANO.

CONDUIT FOR THE CABLES OF CABLE RAILWAYS.

No. 331,837.

Patented Dec. 8, 1885.



WITNESSES:  
*Edmund Aas*  
*John L. Honey*

INVENTOR  
*Ronald Solano*  
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ATTORNEY

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

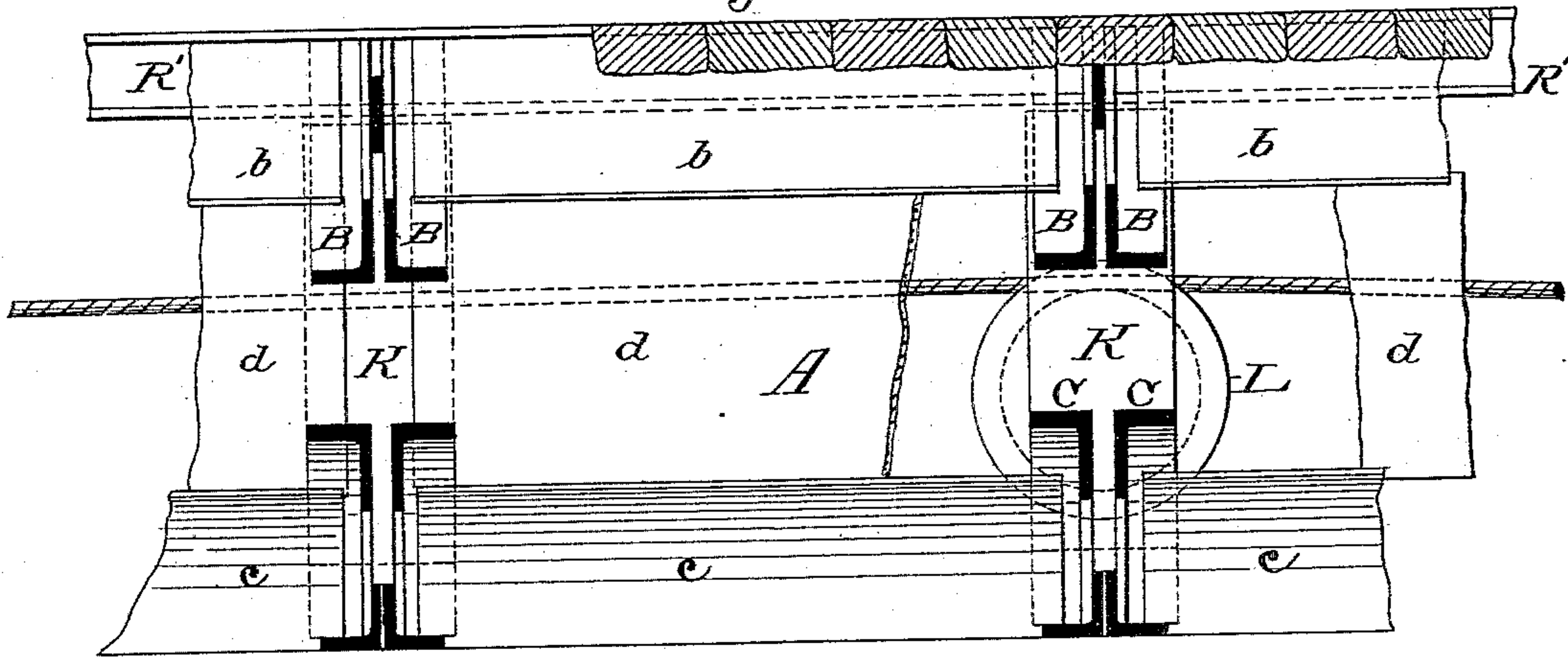


Fig. 4.

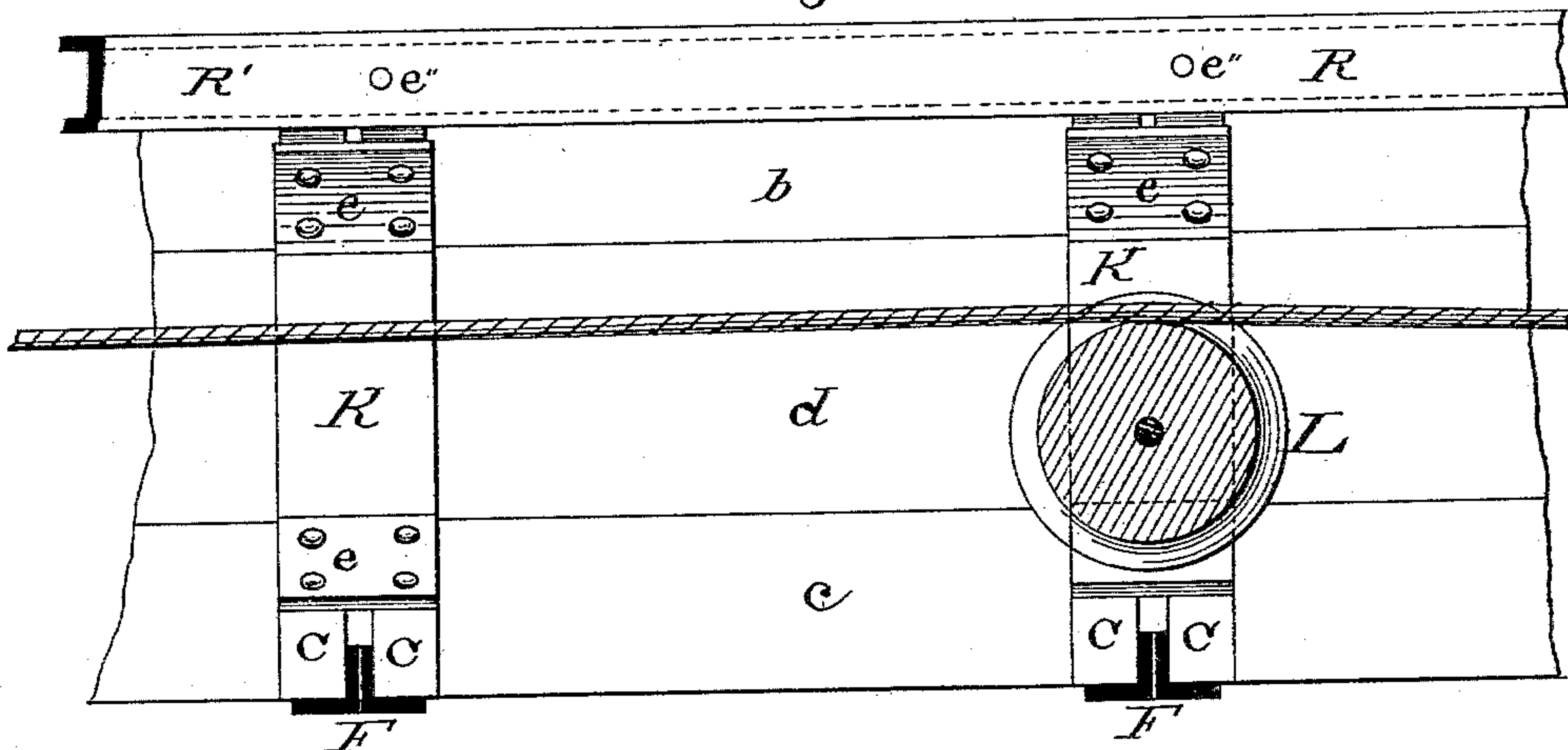
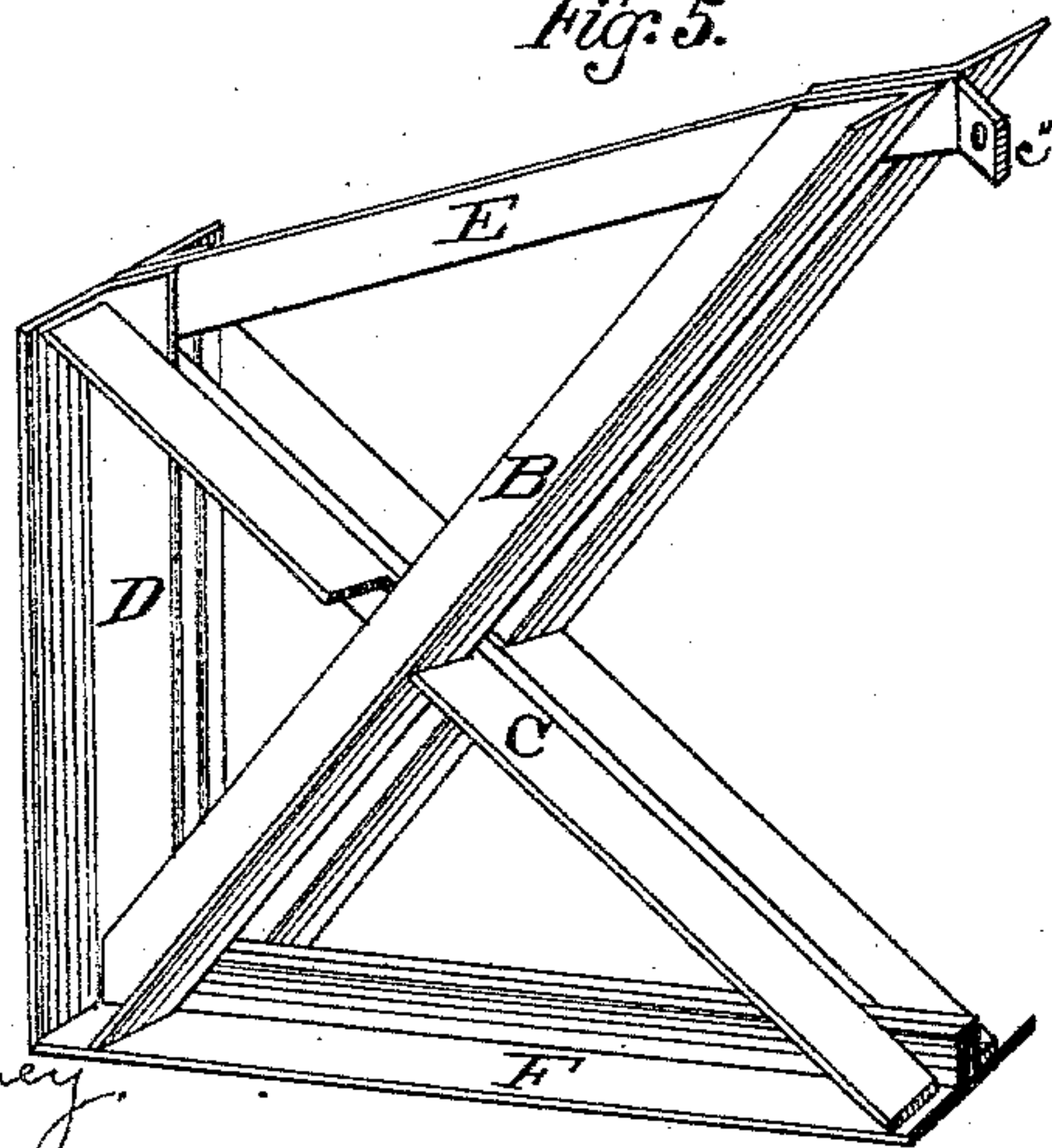


Fig. 5.



WITNESSES:

Gunnwald Aas  
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# UNITED STATES PATENT OFFICE.

RENALDO SOLANO, OF BROOKLYN, NEW YORK, ASSIGNOR OF TWO-THIRDS  
TO JOHN W. HOWARD AND DAVID R. MORSE, BOTH OF SAME PLACE.

## CONDUIT FOR THE CABLES OF CABLE RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 331,837, dated December 8, 1885.

Application filed May 5, 1885. Serial No. 164,454. (No model.)

*To all whom it may concern:*

Be it known that I, RENALDO SOLANO, late of San Francisco, in the State of California, but now of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in the Conduits for the Cables of Cable Railways, of which the following is a specification.

This invention relates to the conduits or subterranean channels having a longitudinal slot at top, and in which are placed the carrying-pulleys and the running or propelling cables of cable railways.

The object of my invention is to reduce the expense heretofore ordinarily incident to the construction of such conduits, and at the same time to provide a conduit capable of successfully and permanently resisting the superincumbent pressure of traffic and travel incident to city streets, and of such a character as to effectually resist any tendency to the closing of the longitudinal slot of the conduit from the action of frost either upon the conduit itself or upon the circumjacent soil.

My invention comprises certain novel combinations of parts, whereby said objects are effectually secured.

Figure 1 is a vertical transverse sectional view illustrating my said invention. Fig. 2 is a horizontal sectional view taken in the line  $x x$  of Fig. 1. Fig. 3 is a vertical longitudinal sectional view taken in the line  $y y$  of Figs. 1 and 2. Fig. 4 is a similar view taken in the line  $z z$  of Figs. 1 and 2. Fig. 5 is a detail perspective view of certain parts of the apparatus illustrated in the other figures.

The shell A of the conduit, at the top of which is the longitudinal slot  $a$ , is composed of metal plates, preferably what are commonly known as "boiler-plates." Of these plates the essential ones are those indicated by the reference-letters  $b$  and  $c$ . The lower lateral edges of the plate  $b$  may, if desired, be continued until they meet or intersect at the points  $a'$ ; but a stronger and better structure is obtained by the use of narrower plates than just indicated, and by interposing between the lower edges of the said plates  $b$  and the upper edges of the plates  $c$  the vertical side plates,  $d$ .

At each side of the shell A are cross-braces

B and C, which are made of angle-iron, and bolted or riveted together at their intersection, as shown at  $f$ . The outer ends of these cross-braces B and C are connected by bolts or rivets  $g$  to vertical bars D, also of angle-iron, and from the thus connected upper ends of the brace C and vertical bar D extends a brace, E, which may be a flat iron, and which has its inner and upper end securely bolted or riveted, as shown at  $h h$ , to the upper and inner end of the brace B. The outer end of the brace E may be secured to the brace C and vertical bar D by the same bolt or rivet,  $g$ , which connects the said brace C and bar D, as just explained. The lower ends of the vertical bar D and braces B and C are secured to a horizontal transverse sleeper, F, by bolts or rivets, as shown at  $g'$  and  $g''$ . The vertical bar D is connected by a bracket, G, which may be of cast-iron, with the stringers H of the railway-tracks I. The vertical bar D may be attached to the bracket by bolts or rivets  $i$ , passed through suitable holes through the flanges  $j$  of the said bar D, the bracket being in its turn secured to the under side of the stringer H by vertical bolts  $k$ ; but when desired the flange  $j$  may be bolted directly to the side of the stringer. The plates  $b$  and  $c$ , at each side of the shell A, are connected by internal vertical braces, K, the extremities of which are bent to a position corresponding to that of the said plates and united thereto by suitable bolts or rivets, preferably the bolts or rivets  $e$ , which connect the said plates  $b c$  to the braces B and C, as hereinbefore explained. The carrier-pulleys L, for supporting the cable, are themselves supported on bearings M in the usual or any suitable manner, and are arranged at the usual or any suitable intervals apart within the conduit. The bearings M may be secured in place by any appropriate arrangement of brackets and bolts or other devices.

The system of braces B C E, &c., is duplicated at intervals along both sides of the length of the conduit. In general the distance between the sets of braces aforesaid may be, say, four feet. The braces K, within the conduit, are placed a like distance apart. The vertical plates  $d$  are bolted or riveted to the braces K, as shown at  $a''$  in Fig. 1. The spaces between



and around the braces B C E, &c., are filled by a bed, N, of concrete, longitudinal with the conduit and preferably extending laterally to or beyond the bars D. Along one side of the slot *a* is a continuous line of angle-iron, as shown at P, which is secured by bolts or rivets *b''* to the adjacent flanges of the braces B. At the opposite side of said slot the inner ends of the braces E are turned laterally to provide a flange, *c''*, to each of said braces E, and to the series of flanges *c''* thus presented is bolted or riveted, as shown at *e''*, a continuous line of angle-iron, R', the cross-section of which is shown in Fig. 1. These parallel lines of angle-iron, P and R', not only form smooth sides to the slot *a*, but by uniting the inner ends of the series of braces E at each side of the slot strengthen the said braces and keep them in position throughout the length of the conduit. It is of course to be understood that the slot *a* serves the usual purpose of permitting the gripping device for connecting the car to the cable to pass to and act upon the cable.

What I claim as my invention is—

1. In a metallic conduit for the cables of cable railways, the combination of inclined plates *b c* and vertical braces K, bolted or riveted thereto to form the shell of the conduit, substantially as and for the purpose herein set forth.

2. The combination, with the plates *b c*, of the system of braces and bars B C D E F, arranged and connected substantially as and for the purpose herein set forth.

3. The combination, with the plates *b c* and

vertical braces K, of the system of braces and bars B C D E F, all substantially as and for the purpose herein set forth.

4. The combination, with the plates *b c* and vertical braces K, of the intermediate plates, *d*, substantially as and for the purpose herein set forth.

5. The combination, with the shell of a conduit for cable railways, of the stringers H and the system of braces and bars B C D E F, secured to said stringers, substantially as and for the purpose herein set forth.

6. The combination, with the shell of a conduit for cable railways, of the stringers H, the brackets G, and the system of braces and bars B C D E F, all substantially as and for the purpose herein set forth.

7. The combination, with the shell of a conduit for cable railways, of the system of braces and bars B C D E F and angle-irons P and R', all substantially as and for the purpose herein set forth.

8. The combination of the plates *b c*, vertical braces K, system of braces and bars B C D E F, and angle-irons P R', substantially as and for the purpose herein set forth.

9. The combination of the plates *b c*, vertical braces K, system of bars and braces B C D E F, flanges *c''* on braces E, and angle-irons P R', substantially as and for the purpose herein set forth.

RENALDO SOLANO.

Witnesses:

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JOHN G. HONEY.