

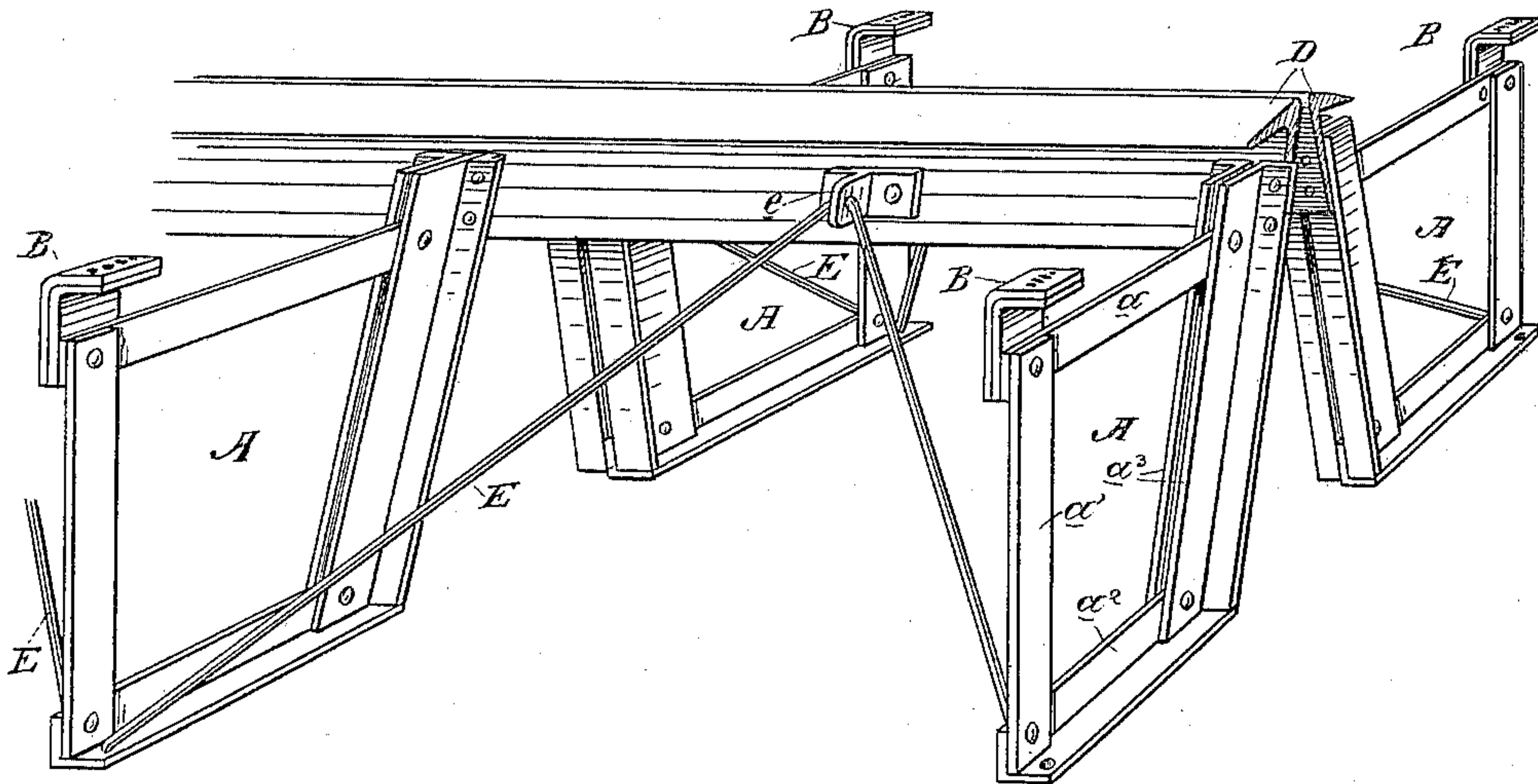
(No Model.)

G. F. GRAY.  
CABLE RAILWAY CONSTRUCTION.

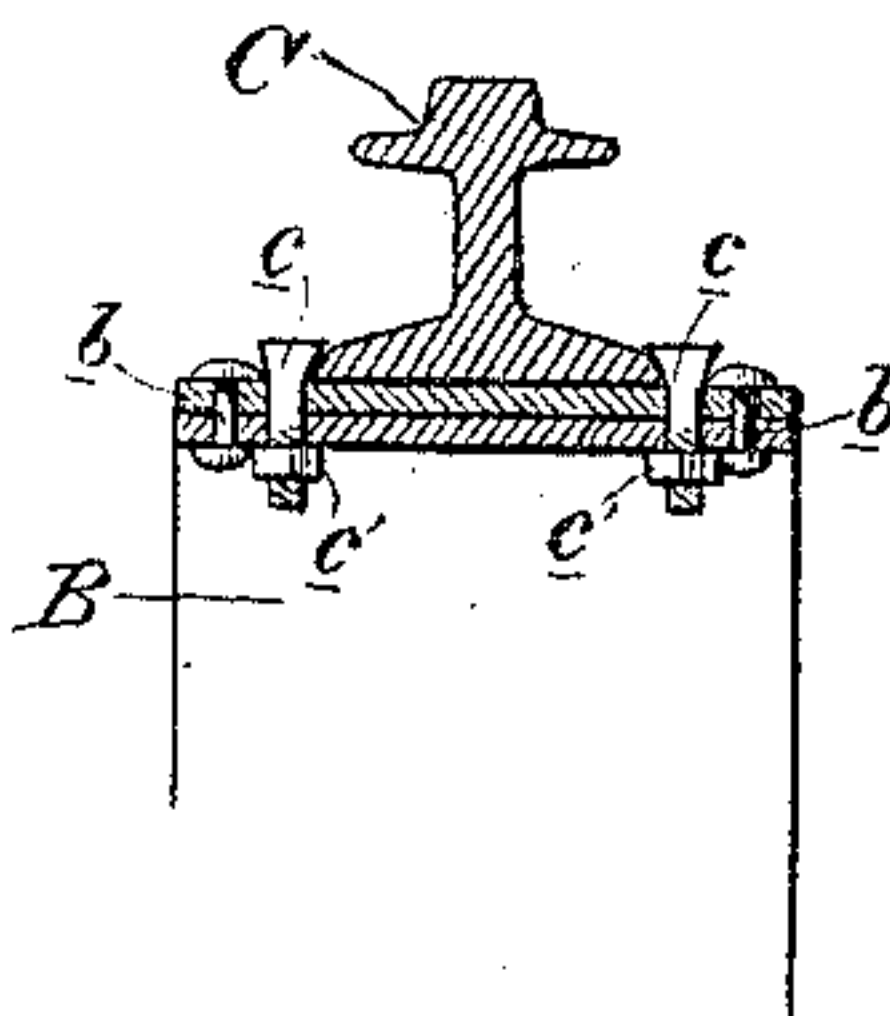
No. 432,730.

Patented July 22, 1890.

*Fig. 1.*



*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

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## CABLE-RAILWAY CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 432,730, dated July 22, 1890.

Application filed April 29, 1890. Serial No. 349,941. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE F. GRAY, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Cable-Railway Construction; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of cable railways, and especially to the construction of the road-bed therefor.

It consists in the novel frames which carry the track-rails and the slot-irons, in the braces connecting adjoining frames with the slot-irons, and in the means for securing the track-rails, all of which will be hereinafter fully described, and the features of novelty specifically pointed out in the claims.

The object of my invention is to provide simple and effective supporting-frames or iron work of the road-bed, which, while being cheap and strong enough to answer all the purposes of such constructions, will permit the use of much less concrete than is generally employed.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a perspective view of my frames and connections, showing them in their relative arrangement, it being understood that they are let into the ground and embedded in a mass of concrete, which, to avoid confusion, need not be here shown. Fig. 2 is a detail cross-section showing the manner of securing the track-rails.

The frames A are composed of metal bars secured together in the shape shown. They consist of a top bar  $a$ , a vertical outer bar  $a'$ , an angle or flanged base-bar  $a^2$ , and two inclined angle or flanged inner bars  $a^3$ . The inner end of the top bar is bolted between the inclined bars  $a^3$  and its outer end is bolted to the upper end of the vertical bar  $a'$ . The base-bar  $a^2$  is bolted at its inner end between the lower ends of the inclined bars  $a^3$  and its outer end is bolted to the lower end of the vertical bar  $a'$ . These frames are arranged in opposing pairs, as shown, the members of each pair being wholly independent. The space for the traveling cable and carrying-sheaves and other usual parts (which said space is usually termed the "tube or tunnel")

is formed between the opposing inclined bars  $a^3$  of each pair of frames.

Bolted to the outer top end of each frame is the support or chair B for the track-rails C. This consists of one or more bent plates, the rail being secured in a manner presently to be described.

To the upper ends of the inclined bars  $a^3$  of the frames, on their inner surfaces, are bolted the slot-irons D. It will be seen, therefore, that the frames on one side carry one track-rail and one slot-iron, while the frames on the other side carry the other track-rail and the other slot-iron, and the iron or skeleton work of the road-bed is therefore in two distinct parts, but bound together by the mass of concrete which is to surround them. To further stiffen the frames on each side, I may use the brace-rods E. One of them is bolted at each end to the outer base of adjacent frames and its bent middle passes through a lug  $e$ , bolted to the slot-iron at a point midway between the frames.

The track-rails are secured to the frames in the manner shown in Fig. 2. The support or chair B, as there shown, is formed of two plates secured together by the bolts  $b$ . The track-rail rests upon the upper plate and is secured thereto by means of the spike-headed bolts  $c$ , the heads of which overlap and bear on the rail-foot, and their bodies pass through plates B, their projecting ends receiving tightening-nuts  $c'$ . An object of using two plates B is for strength; but the bolts  $b$  serve a purpose for their heads, form bearings for the spike-headed bolts  $c$ , which, being passed through between the heads of bolts  $b$  and the rail-foot, are wedged or cramped upon said foot with proper force, thereby rendering them very tight.

In the ordinary cable-road construction, which involves the use of an iron skeleton or frame work combined with concrete, the iron-work consists of yokes or ties bent into approximately a V shape stretching across the whole road-bed, passing their middles under the tube or tunnel and supporting the track-rails at the ends of their outstretched arms. Suitable bars are bolted to these yokes or ties and carry the slot-irons, the idea being to connect by a single structure both track-



rails and both slot-irons. My construction differs from this in that my frames are in pairs, the members of each pair being separate, and as they do not collect below the tube or tunnel there need not be the great mass of concrete under them that is found necessary in the common construction.

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

1. In cable-railway construction, the separate frames A, those on one side carrying one track-rail and one slot-iron and those on the other side carrying the other track-rail and the other slot-iron, substantially as herein described.

2. In cable-railway construction, the frame for carrying the track-rail and slot-iron, composed of the top bar, the base-bar, and the vertical outer bar, all bolted together, and the two inclined angle or flanged inner bars, between which the inner ends of the top bar and the base-bar are bolted, substantially as herein described.

3. In cable-railway construction, the iron-work of the road-bed, composed of the separate opposing frames A, each consisting of a top bar, a base-bar, an outer vertical bar, and inner inclined angle or flanged bars, all bolted together, as described, the track-rails carried by the outer ends of the frames, and the slot-irons bolted to the inner tops of the inclined bars of said frames, substantially as herein described.

4. In cable-railway construction, supporting-frames set at intervals and carrying the

track-rails and slot-irons, and braces on each side, secured to adjacent frames and to the slot-irons at points between said frames, substantially as herein described.

5. In cable-railway construction, a series of separate opposing frames, those on one side carrying one track-rail and one slot-iron and those on the other side carrying the other track-rail and slot-iron, and the braces secured to adjacent frames on the same side and to the slot-iron on said side at a point between said adjacent frames, substantially as herein described.

6. In cable-railway construction, the series of pairs of separate frames carrying at their outer ends the track-rails and at their inner ends the slot-irons, and the braces on each side secured at each end to adjacent frames and passing at their centers through lugs on the slot-irons located between the frames, substantially as herein described.

7. In cable-railway construction, the supporting-plate B for the track-rail, the bolts *b* in said plate, having heads, and the spike-headed bolts *c*, passing through the plate B between the rail-foot and the heads of bolts *b*, the heads of said bolts *c* engaging the rail-foot and their lower ends receiving nuts, substantially as herein described.

In witness whereof I have hereunto set my hand.

GEORGE F. GRAY.

Witnesses:

LEE D. CRAIG,  
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