(No Model.) 2 Sheets—Sheet 1.

R. M. BEATTY.

ELEVATED RAILWAY.

No. 367,887. Patented Aug. 9, 1887.

Fig 1

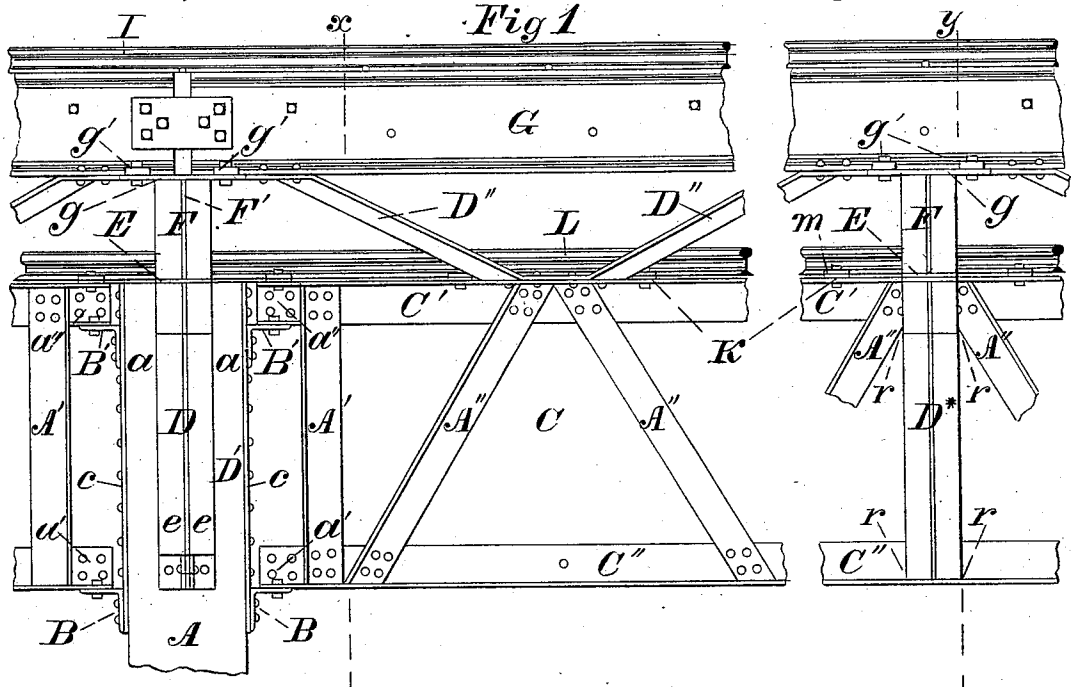
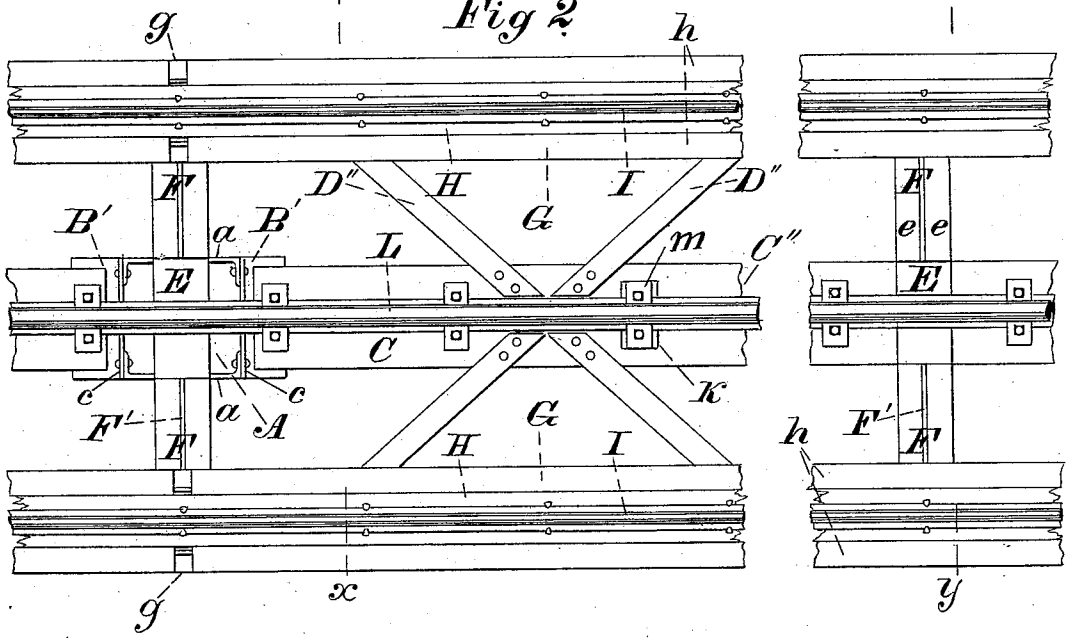


Fig 2



WITNESSES:

Fred Schaller.

Charles A. Herbert.

INVENTOR

Raymond M Beatty

BY James A Whitney

ATTORNEY

(No Model.) 2 Sheets—Sheet 2.

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Fig 3

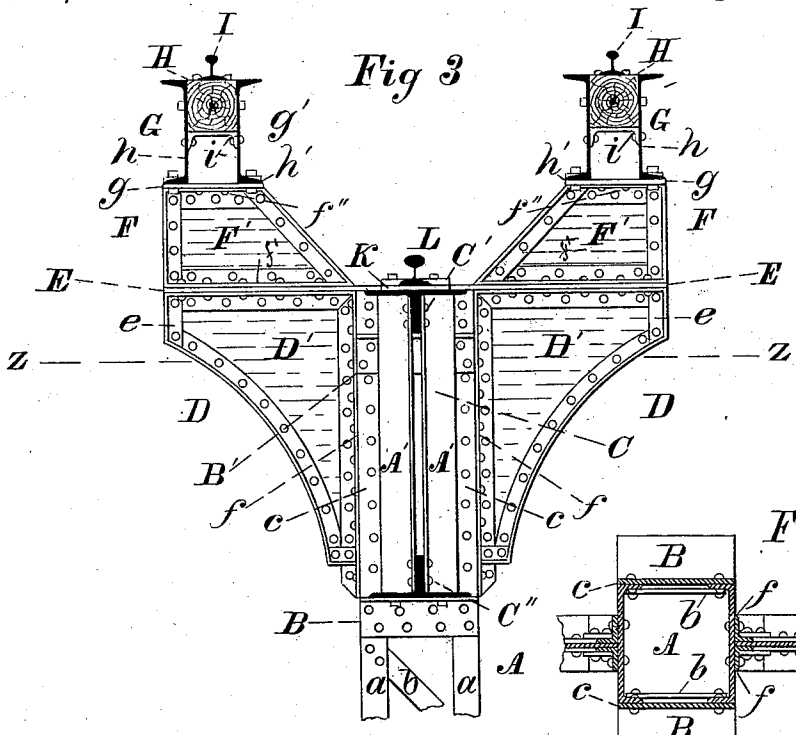


Fig 5

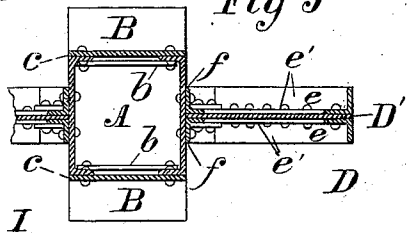
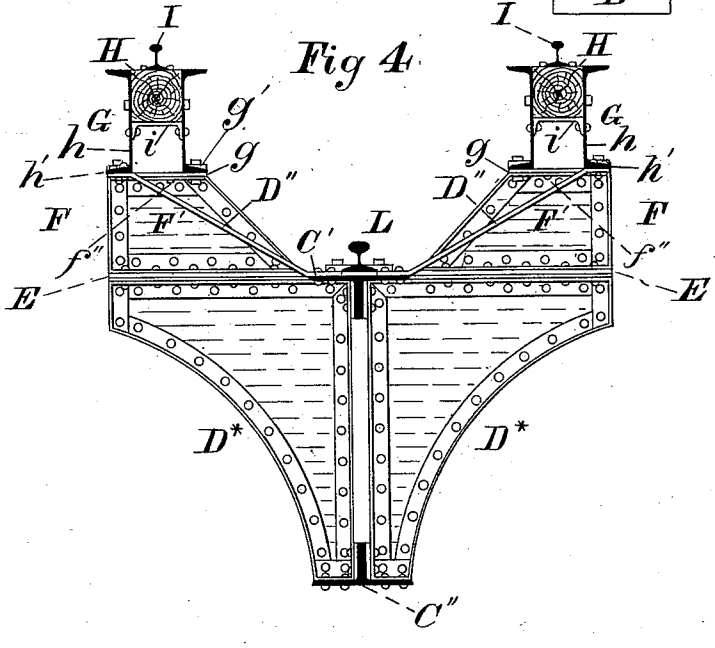


Fig 4



WITNESSES:

Fred. Schaller

Charles A. Herbert

INVENTOR

Raymond M. Beatty

BY James Whitney

ATTORNEY

UNITED STATES PATENT OFFICE.

RAYMOND M. BEATTY, OF HACKENSACK, NEW JERSEY.

ELEVATED RAILWAY.

SPECIFICATION forming part of Letters Patent No. 367,887, dated August 9, 1887.

Application filed December 30, 1886. Serial No. 222,960. (No model.)

To all whom it may concern:

Be it known that I, RAYMOND M. BEATTY, of Hackensack, in the county of Bergen and State of New Jersey, have invented certain Improvements in Elevated Railways, of which the following is a specification.

This invention relates to that class of railways which are supported on posts or pillars of any suitable kind—as, for example, those made up of channel bars or iron with lattice bracing; and the said invention comprises a novel combination of parts whereby a strong, durable, and economically-constructed railway of the class mentioned is provided for, and whereby provision is made on such railways for great safety to the cars or rolling-stock, and whereby in such railways there is less obstruction to light and air, less danger of capsizing or derailment of the cars, and less opportunity for snow, dust, and the like to lodge in places out of the reach of brooms carried by the cars or locomotives than exists in elevated railways heretofore known.

Figure 1 is a side view, and Fig. 2 a plan view, illustrating an elevated railway made according to my said invention. Fig. 3 is a vertical transverse sectional view taken in the line *x x* of Figs. 1 and 2, and Fig. 4 is a like view taken in the line *y y* of Figs. 1 and 2. Fig. 5 is a horizontal view taken in the line *z z* of Fig. 3.

A are posts or pillars which support the elevated structure, and which may be made of channel-iron, *a*, connected by oblique braces *b*, in a well-known manner; or, if preferred, said posts or pillars may be of any other approved construction. These posts or pillars are arranged in a single line along and underneath the longitudinal center of the elevated structure. At a suitable distance from the top of each post A, and at opposite sides thereof, are brackets or shoulders B, preferably made of angle-iron, suitably bolted or riveted to the opposite sides of the posts, as more fully illustrated in Figs. 1 and 3. Above these brackets B, and in due relation with the upper end of each post, are similar brackets, B′. These brackets B B′ have placed upon them the ends *a′ a″* of girders C, which are composed of parallel upper and lower chords, C′ C″, connected by means of suitable braces, A′ A″, &c., the said chords and braces constituting in effect a lattice-girder. These girders are of course placed end to end, with the supporting-post intervening, and constitute the central supporting part of the superstructure.

In order to more strongly and permanently secure the brackets B B′ to the posts than would be possible if they were riveted direct to the flanges of the channel-irons comprised in said posts, there is first riveted to the adjacent side of the posts a plate, *c*, and it is to these, as well as to the flanges of the channel-irons, that the outermost lateral rivets of the said brackets are connected, while the central rivets of the said brackets are connected with the plate *c*, so that the plate *c* re-enforces and strengthens the connection of each bracket to the adjacent side of the post. The chords C′ C″ should be made of angle-iron, as shown in cross-section in Figs. 3 and 4.

Secured upon the opposite sides of each post—that is to say, upon the sides which are at right angles to those which have the brackets B B′—are lateral brackets D, composed of a web, D′, strengthened around its circumference by angle-irons *e*, the flanges *e′* of which are riveted to the said web, as more fully indicated in Fig. 5. The flanges *f* of the angle-irons contiguous to the sides of the post are riveted to the said sides of said post and receive the said brackets D in position, said brackets extending laterally from the posts in a direction substantially at right angles to the longitudinal line of the structure. The tops of the brackets D are substantially flat or level with the flat upper surface of the adjacent girder, C, and a transverse horizontal binding-plate, E, is extended across the structure with its end portions resting upon the upper side of the brackets D and the central portion extending over the top of the adjacent post.

Placed upon each of the brackets D is a pillow-bracket, F, the object of which is to provide in part an elevated support to the said rails, hereinafter more fully described. These pillow-brackets F are composed of a web, F′, with circumferential angle-irons riveted thereto in substantially the same manner that the circumferential angle-irons of the brackets D are riveted to the web D′ thereof. The flanges *f′* of the circumferential angle-irons of

the brackets F are riveted to the flanges of the circumferential angle-irons of the brackets D, the rivets extending through the interposed plate E, and thus rigidly connecting the whole together.

Extending longitudinally with the line of the structure, one at each side of the latter and supported upon the pillow-brackets F, are the track-supporting girders G. These track-supporting girders G are each composed of two channel-irons, *h*, the lower flanges, *h'*, of which rest upon the pillow-brackets F, a plate, *g*, being interposed between said flanges and the contiguous flange of the angle-irons of the pillow-bracket, the plate itself being primarily riveted, as shown at *f''*, to the said flange of such angle-iron, and the flanges *h'* of the channel-iron G being bolted to said plate, as shown at *g'*, thereby securing the girder G to the other fixed parts of the superstructure. The two channel-irons *h* of each girder G are connected at intervals by horizontal braces *i*, which support a longitudinal line of timber, H, placed between the channel-irons *h* of each of said girders, the said timbers of the two girders forming a continuous longitudinal support for the elevated side rails, I, which are spiked or otherwise suitably secured to the timbers in substantially the same manner as has been heretofore practiced in fixing the rails of surface railways to longitudinal sleepers underneath.

The girders G are connected with the upper chord, C', of the girders C by the oblique braces D'', the upper and outer ends of which are bolted to the lower outer flange, *h'*, of the adjacent channel-irons, while the lower and inner ends of said braces D'' are bolted to the adjacent flange of the aforesaid upper chord, C', of the girder C, thereby causing the said girder C and the girder G to mutually strengthen and support each other. These braces D'' are repeated at any desired interval along the length of the structure, preferably one pair of each of said braces to each pair of braces A'' of the girder C, as illustrated in Fig. 1. Between the brackets D along the length of the structure are others which differ from them only in being secured direct to the sides of the girder C, as illustrated at *r* in Fig. 1, instead of directly to the sides of the posts. These intermediate brackets are indicated by the reference-letter D* in Figs. 1, 2, and 4, and are of substantially the same construction as the brackets D, except in the fact that they are attached, as aforesaid, direct to the girders instead of to the posts. These brackets D* carry pillow-brackets F, which are arranged in the same relation with the girders G as are the pillow-brackets which are placed upon the brackets D, which are carried by the posts and serve the same purpose, the office of the brackets D* and their adjuncts being to support the girders G at points intermediate between the posts or pillars A. Placed transversely upon the top of the girder C at suitable intervals along the length thereof are blocks or strips K, of wood or other suitable material, and upon these is placed the central rail, L, the latter being held in place by suitable clamps, *m*, bolted through the blocks or strips K to the chord C' of the girder C, thereby securing the rail in position. The use of the blocks or strips K is to cushion the rail L, and when this cushioning of the said rail is not desired said rail may be attached direct in any suitable manner to the upper side of the girder C. The central rail, L, is of course parallel with the side rails, I, but is at a much lower level.

The car or vehicle to be used upon said road is to be made with any suitable number of wheels arranged longitudinally at the bottom thereof to run upon the rail L, and with any desired number of wheels at its sides to run upon the rails I, it being intended that the greater portion of the weight of the car or vehicle and its load should be borne upon the depressed lower rail, L, while the elevated side rails, I, serve to steady the car or vehicle during the movement thereof and to prevent any material lateral swaying or swinging of the same, the lateral displacement of the vehicle and any liability of its being thrown from the track being also effectually provided against.

I am aware that elevated railways have been proposed in which parallel elevated side rails have been arranged parallel with a central depressed rail, the elevated and depressed rails being both supported by suitable posts, but devoid of lateral brackets, as shown in the patent of W. D. Mack, dated February 16, 1886. I am also aware that elevated railways have been proposed in which an elevated central rail has been placed within two parallel depressed rails, the three rails being supported upon posts having lateral brackets for supporting the depressed side rails, as shown in the patent of F. A. Bartholomew, dated May 25, 1886; but such arrangement of parts relates to a construction of elevated railways different from that to which my invention belongs, the raised central rail being, according to my convictions, an element of great danger in an elevated railway, inasmuch as the car or vehicle is saddled upon the raised central rail, and any lifting of the wheels from one or the other of the side rails, or any accident at either side of the vehicle, places the latter in a position from which it is liable to upset. The object of my invention is therefore, among others, to obviate what I consider the defects of the other elevated railways to which I have referred.

What I claim as my invention is—

1. In an elevated-railway structure, the combination of the following elements, to wit: a central girder supported upon suitable pillars, a central rail supported by and paraliel with the said girder, and lateral elevated tracks sustained from the posts by intermediate supports or bracketing devices, substantially as and for the purpose herein set forth.

2. An elevated-railway structure compris-

ing, in combination, the following elements, to wit: a longitudinal series of lattice-girders, C, a series of posts provided with brackets or shoulders B, for supporting said girders, lateral brackets D, attached to the said posts and having flanges at their upper sides, pillow-brackets F, having flanges at their lower parts, binding-plates E, bolts or rivets for connecting the pillow-brackets and the brackets D, through the binding-plates E, longitudinal girders supported by the pillow-brackets, elevated rails or tracks I, supported by the said girders G, and a depressed rail or track, L, supported by the girder C, all substantially as and for the purpose herein set forth.

3. An elevated-railway structure, comprising, in combination, the following elements, to wit: a longitudinal series of lattice-girders, C, a series of posts provided with brackets or shoulders B, for supporting said girders, lateral brackets D, attached to the said posts and having flanges at their upper sides, pillow-brackets F, having flanges at their lower parts, binding-plates E, bolts or rivets for connecting the pillow-brackets and the brackets D, through the binding-plates E, longitudinal girders G, composed of channel-irons *h*, braces *i*, and timbers H, supported by the pillow-brackets, elevated rails or tracks I, supported by the said girders G, and a depressed rail or track, L, supported by the girder C, all substantially as and for the purpose herein set forth.

4. An elevated-railway structure, comprising, in combination, the following elements, to wit: a longitudinal series of lattice-girders, C, a series of posts provided with brackets or shoulders B, for supporting said girders, lateral brackets D, attached to the said posts and having flanges at their upper sides, pillow-brackets F, having flanges at their lower parts, binding-plates E, bolts or rivets for connecting the pillow-brackets and the brackets D, through the binding-plates E, longitudinal girders G, supported by the pillow-brackets, elevated rails or tracks I, supported by the said girders G, a depressed rail or track, L, supported by the girder C, and oblique braces D″, all substantially as and for the purpose herein set forth.

5. An elevated-railway structure, comprising, in combination, the following elements, to wit: a longitudinal series of lattice-girders, C, a series of posts provided with brackets or shoulders B, for supporting said girders, lateral brackets D, attached to the said posts and having flanges at their upper sides, pillow-brackets F, having flanges at their lower parts, binding-plates E, bolts or rivets for connecting the pillow-brackets and the brackets D, through the binding-plates E, longitudinal girders G, supported by the pillow-brackets, elevated rails or tracks I, supported by the said girders G, a depressed rail or track, L, supported by the girder C, and brackets D*, placed at points intermediate between the posts, all substantially as and for the purpose herein set forth.

6. An elevated-railway structure, comprising, in combination, the following elements, to wit: a longitudinal series of lattice-girders, C, a series of posts provided with brackets or shoulders B, for supporting said girders, lateral brackets D, attached to the said posts and having flanges at their upper sides, pillow-brackets F, having flanges at their lower parts, binding-plates E, bolts or rivets for connecting the pillow-brackets and the brackets D, through the binding-plates E, longitudinal girders G, composed of channel-irons *h*, braces *i*, and timber H, supported by the pillow-brackets, elevated rails or tracks I, supported by the said girders G, a depressed rail or track, L, supported by the girder C, and oblique braces D″, all substantially as and for the purpose herein set forth.

RAYMOND M. BEATTY.

Witnesses:
WILLIAM J. LYNCH,
CHARLES A. HERBERT.