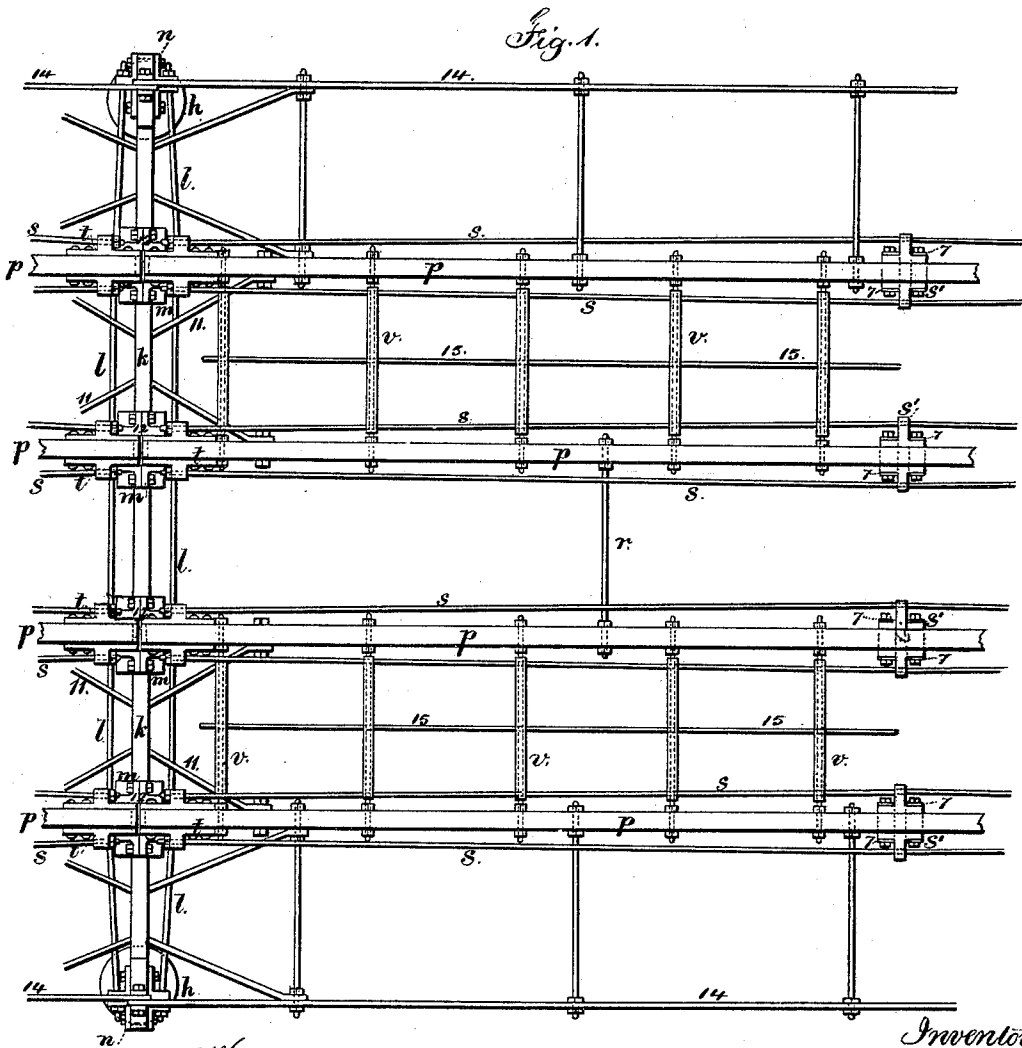
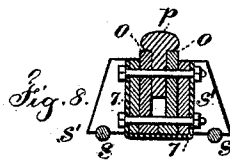
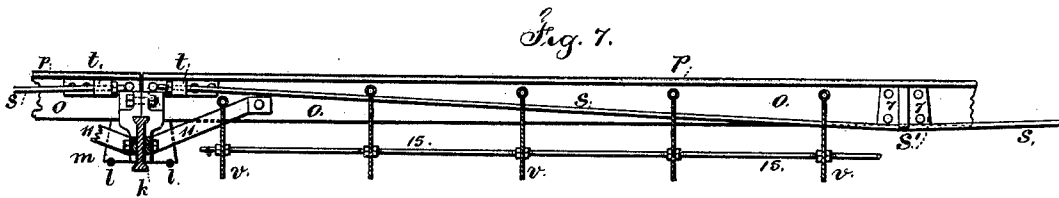


J. JOHNSON.
ELEVATED RAILWAY.

No. 176,000.

Patented April 11, 1876.



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per L. W. Perrell
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Fig. 6.

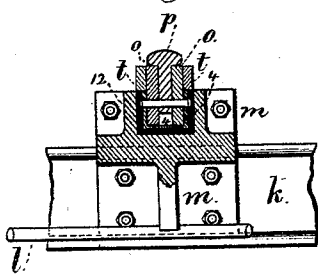


Fig. 5.

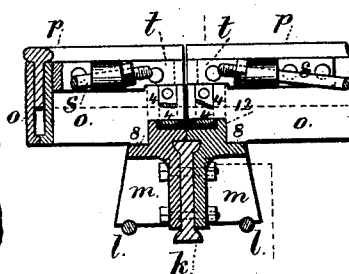
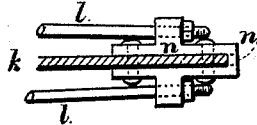


Fig. 9.



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Fig. 10.

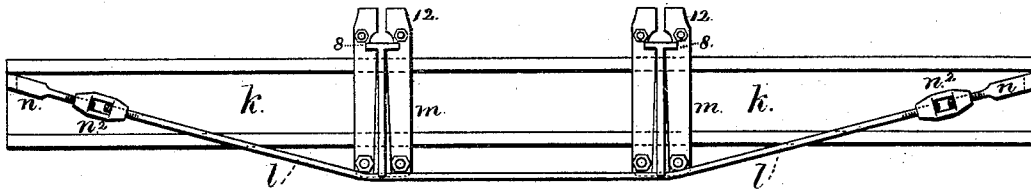


Fig. 11.

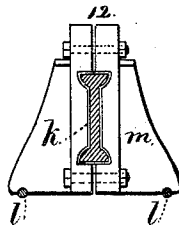


Fig. 12.

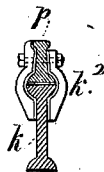


Fig. 13.

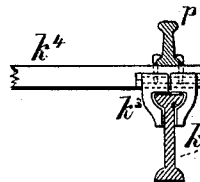
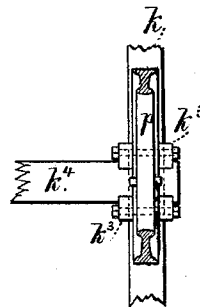


Fig. 14.



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UNITED STATES PATENT OFFICE.

JOB JOHNSON, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN ELEVATED RAILWAYS.

Specification forming part of Letters Patent No. **176,000**, dated April 11, 1876; application filed February 28, 1876.

To all whom it may concern:

Be it known that I, JOB JOHNSON, of Brooklyn, Kings county, State of New York, have invented an Improvement in Elevated Railways, of which the following is a specification:

This invention is designed to facilitate the construction and lessen the expense and labor in putting together elevated railways, and at the same time the required strength is obtained with a comparatively light structure. I also arrange a series of vertical shades to prevent animals from seeing the approaching train.

In the drawing Figure 1 is a general plan of a portion of the structure. Fig. 2 is a cross-section of the same. Fig. 3 is a section of the head of the column. Fig. 4 is a sectional plan of the column. Fig. 5 is a section of the girder. Fig. 6 is a section of the rail and its beam; and Fig. 7 is a sectional view of the vertical shades.

A foundation of masonry at *a* is laid for each column, and upon the same is the base plate *b* of the column, having a vertical pintle, *b'*, running into the masonry. A hole is to be left in the masonry to receive this pintle. Upon the plate *b* is a rib, *c*, of a size to surround the bottom of the column as it rests on said plate *b*, and a vertical block, *c'* is cast on such plate *b*, to pass into the lower end of the hollow column *d*; the said column is preferably of V angle-iron, with flanges for riveting two bars together to form the hollow column. After the column is set in place upon the plate *b* it is held firmly, and a proper bearing obtained by pouring melted lead or equivalent material into the grooves and spaces around and beneath the column and between that and the base upon which the column sets. The cap-piece *f* is recessed upon its under side, to fit loosely the upper end of the column, and a projection, *f'*, enters the column, and, previous to setting the column in place, this cap-piece *f* is attached to the column by filling the crevices between the cap and column with lead or its equivalent so as to firmly connect the parts. This, however, should be done while the column and cap are in an inverted position. The cap-piece *f* has

a vertical stud, 2, in the middle of its otherwise nearly flat upper surface, and upon this cap *f* the girder-holder *h* rests.

The girder-holder is made with a central opening for the stud 2 of the cap *f*, and there are jaws, 3 3, coming up at each side of the girder *k*, and grasping the base thereof. These jaws may be cast with the other part of the girder-holder, or made separate and riveted or bolted in place.

Any slight inaccuracy in placing the column is allowed for, because the girder-holder can be placed upon the cap *f* so that the difference in the size of the strap 9 and the hole in the girder-holder allows of this adjustment. There are to be columns placed opposite to each other upon the edges of the sidewalk, and at suitable distances apart, and the girders *k* pass across the street from one column to the other.

In order to strengthen each girder in sustaining a vertical weight and in resisting lateral strain, resulting from the passage of a train, I provide the brace-rods *l*, that pass from the sides of the girders at each end down below the brackets *m*, which project from each side of the girder, and the rods diverge while passing downwardly beneath these brackets *m*, so as to stiffen the structure both vertically and laterally. One of the peculiarities of the construction of this compound girder consists in the straps *n* that receive the ends of the brace-rods *l*. Each strap *n* is U-shaped, as seen in Fig. 9, and the bend of the strap is received into a notch at the end of the girder *k*, and the side portions of the strap extend down at the sides of the girder and receive, through eyes or turnbuckles at the sides, the said brace-rods *l*. These straps *n* are also bolted or riveted through the girders when required, but in consequence of the straps at the opposite sides of the girder being connected in the U form aforesaid, the strain upon the bolts or rivets is lessened by being taken directly upon the end of the girder.

It is generally preferable to form the ends of the U-strap as screws, and to connect them to the braces by turnbuckles *n*², as seen in Fig. 10. This allows the braces to draw in a

straight line upon the ends of the girder, and the risk of injury to the parts is lessened.

There are as many of the brackets *m* as there are lines of rails, so that there may be a bracket beneath each intersection. and these brackets are made in two parts to fit the girder, and may be riveted upon the same. These brackets also extend above the girder, and form saddles, 12, (see Figs. 5 and 6,) for the compound or other rails. In some cases it is preferable to extend these brackets *m* below the girder, as shown in Figs. 10 and 11. The braces *l* thereby are carried down farther, and the bolts do not go through the girder, and hence it is not weakened, and the bracket can be shifted upon the girder if necessary.

The rails, which are compound, are made of the side bars *o o*, receiving between them the T-rail *p*, as seen in Figs. 5 and 6, and they are secured together by bolts or rivets. This compound rail and beam is also strengthened and stiffened by the tie-bars *r* passing from one line of rails to the next, and by the brace-rods *s* that diverge and pass beneath the brackets *s'*, and are provided with U-shaped straps, *t*, at each end, connected and recessed into the ends of the beams the same as the straps *n*. The brackets *s'* are in two parts, applied at each side of the compound rail, as in Fig. 8; and two straps, 7, passing across beneath the brackets and rails, and up upon each vertical face of the brackets, receive the connecting bolts or rivets, and aid in tying the parts together in the most firm and reliable manner, allowing for the use of comparatively small rivets, and thereby maintaining the strength of the parts. The ends of the side bars *o* are notched, as seen in Fig. 5, so that the bottoms of said bars *o* rest upon the shoulder 8 of the brackets, and the notched portions come above the saddle 12. At this place a strap, 4, is attached that passes below the ends of the bars *o* and rail *p*, and within a recess in the surface of the saddle, and the intervening spaces are filled with lead or other suitable material poured in in a molten state. This fills the interstices, as seen by the blackened portions in Figs. 5 and 6, makes an even bearing, lessens vibrations and noise, allows for expansion and contraction, and the strap 4 serves to prevent the rails from slipping endwise. The upper portions of the brackets, coming up around the rails at their ends, effectually sustain them in position. It is preferable to curve the braces 11 slightly to allow for inequalities of expansion and contraction.

A strap, 9, Figs. 2 and 3, similar to the strap 4, is used at each end of the girder to prevent endwise movement by the strap projecting down into the lead packing; and at the same time the movement of the beam endwise, from the expansion or contraction under atmospheric changes and the vibrations under weight, are allowed for.

Diagonal braces are inserted, as at 10, between the column and girders, and at 11 be-

tween the girders and rails, and there should be longitudinal tie-bars, 14, to connect the girder at one column with the girders of the next columns.

In order to prevent the horses from observing an approaching train and becoming frightened, I make use of the vertical blind-plates *v* attached at their upper edges to bars that run across between the tracks, and these blind-plates may also be connected by a rod, 15, to prevent them from swinging by the wind. The plates become shades that intercept the view of a train approaching overhead until it is close at hand and passes quickly, and hence horses are not frightened by observing it approach. The light is but slightly obstructed, as it passes vertically between these shades.

In the construction of an elevated railway there are often instances where the rail will come over the girder, and for curves it may come intermediate to the bearing-beam. To provide for this I make the clamping-jaws *k*², Fig. 12, to bolt at the sides of the rail, and allow the rail to rest upon the girder. It is preferable to place a piece of sheet-lead between the rail and the girder, at the places where the clamping-jaws are applied, and also to apply sheet-lead between the metallic surfaces of the clamp, to prevent any sound in consequence of vibration of the metallic surfaces against each other when a train is running along the road. These intervening layers of lead are of great importance in deadening sound.

In cases where it is necessary to make use of wooden cross-ties between the bearing-beams, so that the rails may be supported upon them in turning curves, &c., I make use of the clamps *k*³, (see Figs. 13 and 14,) that are secured upon the beams or girders by screws or rivets, and each clamp has a recessed top surface, into which is received the cross-tie *k*⁴, and such tie is notched at the clamp, as seen in plan Fig. 14, and hence the clamp holds the cross-tie firmly in place and presses upon the projecting parts as the clamp is screwed up.

The clamp *k*², that holds the rail to the top of the beam or girder, is not bolted to both ends of the rails where they come together, so that one end is free to expand or contract, and the outer part of the clamp comes up to the height of the top of the rail, so that the passing wheels will be sustained and not batter the ends of the rails.

I claim as my invention—

1. The plate *b*, made with a central block, *c'*, passing up into the hollow column *d*, and a rib, *c*, around the column, in combination with the column and a filling of lead or similar material introduced into the interstices, as set forth.

2. The cap *f*, made with a projection, *f'*, entering the column, and a flange surrounding such column, and secured by means of lead or

similar material introduced into the interstices, as set forth.

3. The girder-holder *h*, with the jaws 3, to receive the lower part of the girder at the end, in combination with the cap *f*, vertical connecting-pin 2, and the filling of lead or similar material introduced into the interstices, as set forth.

4. The strap *n*, made U-shaped, and introduced into the notched end and at the sides of the bar or girder *k*, in combination with the brace-rods *l*, brackets *m*, and bars or girder *k*, substantially as set forth.

5. The brackets *m*, fastened at each side of the girder *k*, and extending up to form a recessed saddle, in combination with the girder *k*, the rail-bars *o o p*, and the filling of lead or similar material, for the purposes set forth.

6. The straps 4, passing below and secured to the ends of the rail-bars or girders, in combination with the recessed holder or bearing for such rail or girder; and the filling of lead or similar material, as set forth.

7. The compound rail composed of the rail-bars *o o* and T-rail *p*, in combination with the brace-rod *s*, U-shaped straps *t*, brackets *s'*, and connecting-straps 7, passing beneath such rails, as set forth.

8. The combination, with an elevated railway, of plates *v*, sustained by rods passing across between the tracks and forming blinds to the passing trains, for the purposes and as set forth.

9. The combination, with the beam or girder and the rail, of the clamp *k²*, that grasps both the beam and the rail, and is extended at one side up to the top of the rail, for the purposes set forth.

Signed by me this 25th day of February, A. D. 1876.

JOB JOHNSON.

Witnesses:

GEO. T. PINCKNEY,
CHAS. H. SMITH.