4 Sheets—Sheet 1.

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ELEVATED RAILWAY.

No. 184,968. Patented Dec. 5, 1876.

Fig. 1.

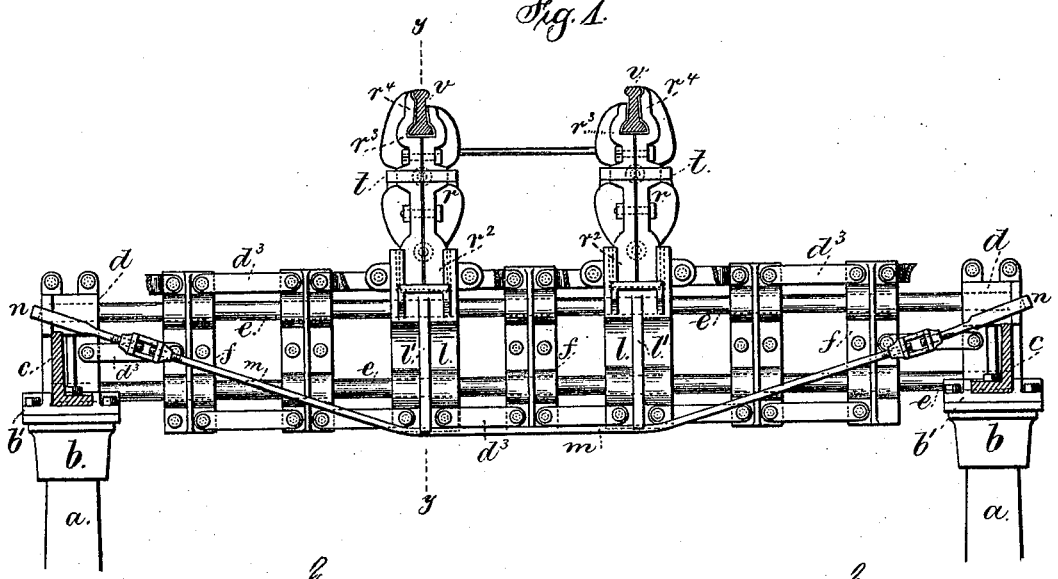


Fig. 2.

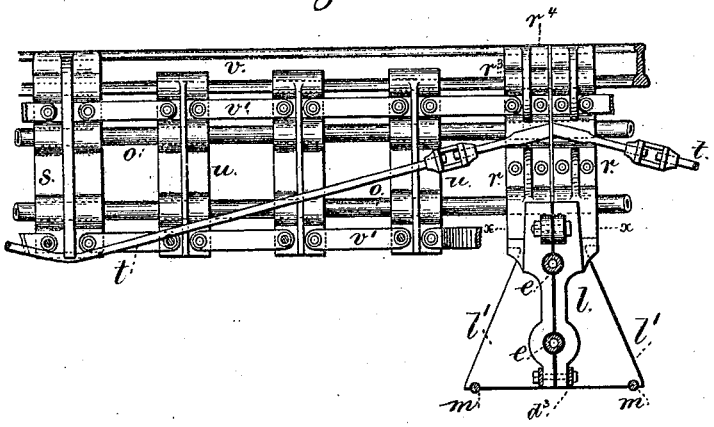


Fig. 3.

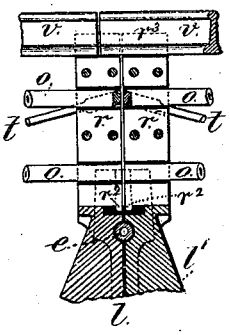
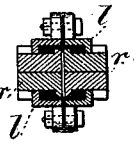


Fig. 4.



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J. JOHNSON.

ELEVATED RAILWAY.

No. 184,968. Patented Dec. 5, 1876.

Fig. 5.

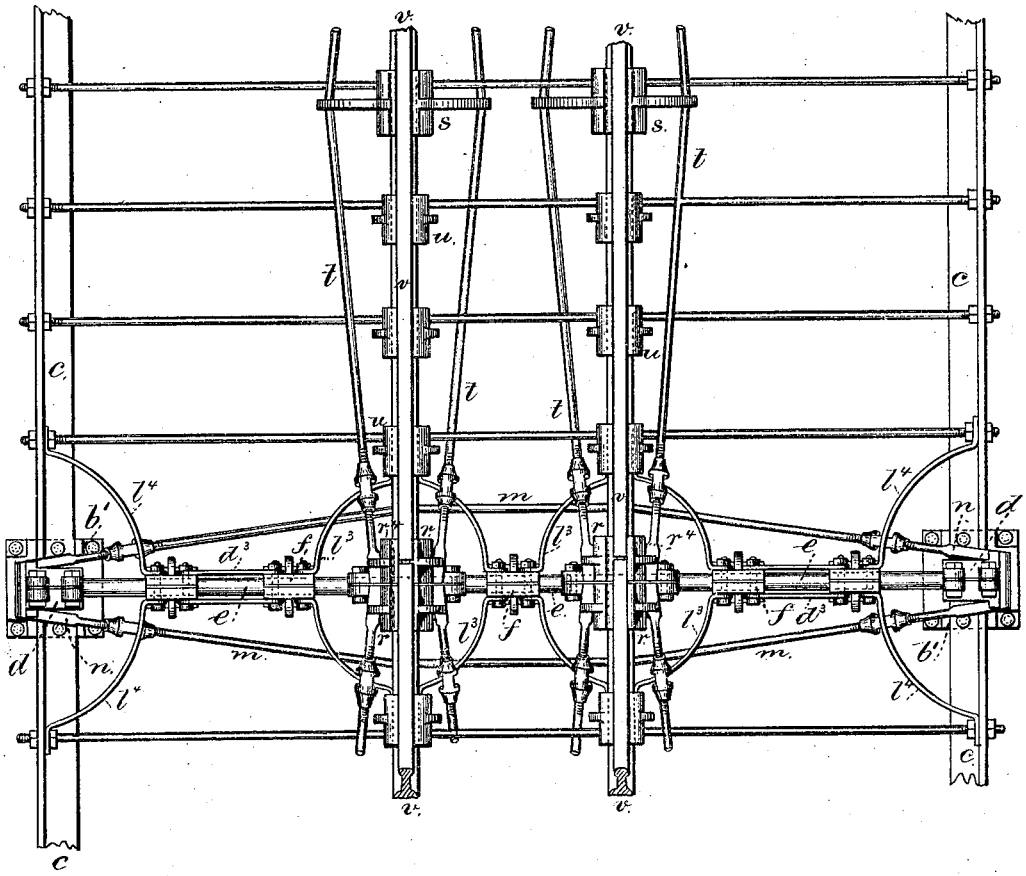

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Fig. 6.

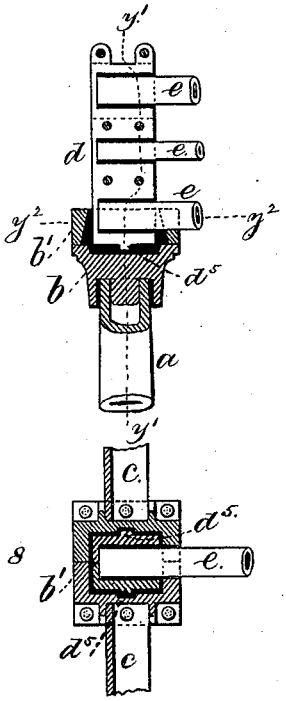

Fig. 8

Fig. 7

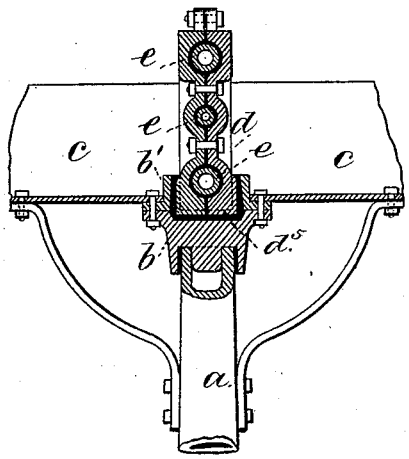

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Fig. 9

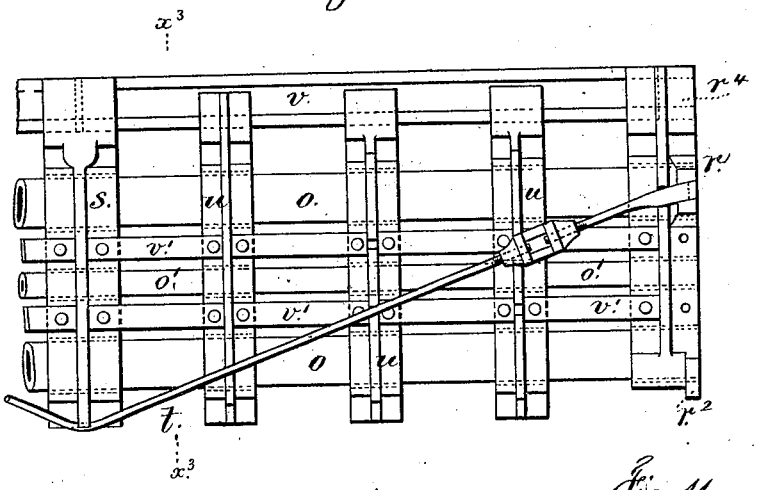


Fig. 10.

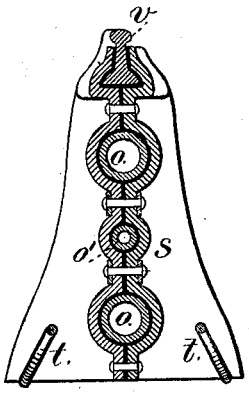


Fig. 11.

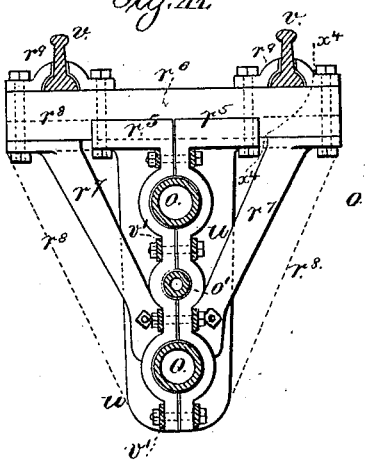


Fig. 12.

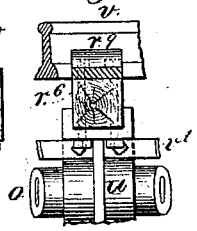
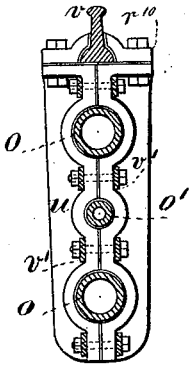


Fig. 13.



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per L. W. Serrell

Atty.

UNITED STATES PATENT OFFICE.

JOB JOHNSON, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN ELEVATED RAILWAYS.

Specification forming part of Letters Patent No. **184,968**, dated December 5, 1876; application filed October 5, 1876.

To all whom it may concern:

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

In the drawings, Figure 1 is an elevation of a girder between two supporting columns and a cross-section of the track. Fig. 2 is a side view of the beam and track, and a cross-section of the girder. Fig. 3 is a cross-section at the line *y y* through the tie-block of the track-beam. Fig. 4 is a sectional plan of the same at the line *x x* of Fig. 2. Fig. 5 is a plan of the parts shown in Fig. 1. The other figures are separately referred to.

The columns *a a* are placed at the proper distance apart, both longitudinally and transversely of the railway. These columns are placed upon suitable foundations of masonry, with an intervening bed-plate secured by bolts passing through the masonry.

It is preferable to employ lead to hold the bottom of the column and bed-plate together and insure a proper bearing, and the top plate or capital *b* of the column should be similarly secured. In Letters Patent No. 176,000, granted to me, a similar mode of attachment is illustrated.

The columns *a* are tied together longitudinally by the angle-iron beams *c*, and upon said columns the ends of the transverse girders rest.

The transverse girders are composed of the tubes *e e*, connected together at the ends by the tie-blocks *d*, and at intervals by the clamping trestle-blocks *f f*. There are two or more of the tubes *e e*; and the trestle-blocks are made in two parts and placed at opposite sides of the tubes *e*, and bolted together, having leaden strips between the tubes and trestle-blocks, so as to clamp such tubes in the most firm and durable manner, and at the same time looseness from inequalities is avoided. There are connecting-bars d^3 extending from one of the trestle-blocks to the next, to give additional strength, and to retain the blocks in their proper relative positions.

One of the end tie-blocks *d* is shown in Fig. 6 by a vertical longitudinal section; in Fig. 7 by a vertical cross-section at the line y^1 y^1, Fig. 6, and in Fig. 8 by a sectional plan at the line y^2 y^2. Said tie-blocks *d* are each made in two parts and bolted together after the ends of the tubes *e* have been inserted in the openings provided for them.

Sheet lead is placed between the two surfaces of the end blocks that come together, and the space surrounding the tubes in said blocks is also leaded. The lead prevents sound being transmitted from one part to another of the girder and the tubes can be more firmly clamped to the end blocks, when the lead intervenes between said tubes and blocks.

The end block *d* sets upon the cap *b*, and said cap is recessed beneath the base of the block; and there is a flanged plate, *b′*, with an opening slightly larger than the base of the end block, that sets upon the cap *b*, and to which it is securely bolted.

After the end block has been properly positioned upon the cap *b*, molten lead is poured into the space between *b b′* and *d*, which firmly secures the end block in place; and for further security I provide a flange, d^5, upon the bottom and sides of the end block, which acts as an anchor against the lead to hold the end block in place, but allows for expansion and contraction without injury to the parts.

The supplemental-ribbed trestle-blocks *l l* are made in two parts, bolted together, and adapted to receive and support the longitudinal track-beams, and for this purpose they are made heavier than the trestle-blocks *f*, and provided with lateral wings l^1, beneath which the tie-rods *m m* pass, and these tie-rods diverge and also descend from the end straps *n*, as in my aforesaid patent, so as to stiffen the girder both longitudinally and transversely. The longitudinal track-beams or girders are made in a similar manner to the transverse girders, the tubes *o′* being provided with the two-part end tie-blocks *r*, supplemental trestle-blocks *s*, tie-rods *t*, passing beneath flanges upon said blocks *s*, and trestle-blocks *u*, and these trestle-blocks *u* are represented as extending above the top tube *o*, to form clip-chairs for the flanges and sides of the rails *v*. Connecting-bars *v′* are

also provided, extending from one trestle-block to the next, to keep said blocks properly in position, and wherever the tubes *o* are clamped by the trestle-blocks and end tie-blocks lead is placed in between said tubes and blocks.

The tie-blocks *r* rest upon the supplemental trestle-blocks *l* of the transverse girder, and said blocks *l* are recessed to form seats for the tie-blocks *r*, as shown in Figs. 3 and 4, and each tie-block *r* is made in two parts, bolted together, for clamping the ends of the tubes *o*, and it is provided with an anchor-flange, r^2, and melted lead is poured into the space between the recessed seat portion of the trestle-block *l* and the base of block *r*, and around the flange r^2, to secure the latter block in place and lessen vibration and sound.

By reference to Figs. 2 and 3, it will be seen that the trestle-block *l* receives the tie-blocks *r* of two adjoining girders, and that there is a slight space between the two girders, in order that the girders may expand and contract independently of each other.

The upper part of the tie-block *r* is made as a clip, r^3, surrounding the flange and sides of the rail, and one side, r^4, of the clip is carried up even with the thread of the rail, as shown in Fig. 1, in order that the car-wheel shall run upon this portion of the clip and pass over the space between the ends of two rails without noise or jar; or if the joint between two rails comes opposite either a trestle-block, *u*, or a supplemental trestle-block, *s*, the clip of said block may be made similar to that just described for the tie-block *r*.

The segmental braces l^3 between the track-beams and the transverse girders, and similar braces l^4 between the transverse girders and the longitudinal angle-iron beams *e*, aid to keep the girders in their proper position and prevent longitudinal and transverse vibration of the parts of the structure, and said braces yield if the girders expand or contract, and lessen the risk of breaking parts and tearing off the nuts.

The girder shown by a partial side view in Fig. 9, and by a cross-section at line x^3 x^3 in Fig. 10, is precisely the same as that shown in Figs. 1 and 2, except that an intermediate and smaller tube, *o'*, is added to the girder.

Fig. 11 is a cross-section of the track beam or girder, adapted to receive cross-ties for supporting the rails, and Fig. 12 is a section of the same at the line x^4 x^4. This girder is made on precisely the same plan as that before described, being composed of trestle-blocks, supplemental trestle-blocks, end tie-blocks, and connecting-bars; but each block is made with shoes or flanges r^5 upon the upper part, to receive the cross-tie r^6, and braces r^7, bolted to the respective blocks and to the cross-ties, support the outer ends of the latter. The flange r^5 and the rib of the trestle and tie blocks might be extended sidewise, as shown by dotted lines at r^8, to support the cross-ties and rails, and thus dispense with the braces r^7. The rails *v* are held by the clips r^9, bolted to the cross-ties, and lead is placed between the clips and rails for the purpose before mentioned.

The girders and cross-ties shown in Figs. 11 and 12 may be placed directly over the range of single columns, said columns having suitable chairs or head-blocks for their reception; but I prefer to use two or more of these longitudinal girders, and extend the cross-ties r^6 from one girder to the other, so as to receive two or more tracks, and in this case it will generally be preferable to employ transverse girders between one row of columns and the other.

The girder or track-beam shown in Fig. 13 is the same as that shown in Figs. 1 and 2, except that the upper part of the trestle and end tie-blocks does not inclose the flange and sides of the rails; but a flat seat is made for the rails to rest upon, and separate clips r^{10} are provided for holding the rails.

I claim as my invention—

1. In a tubular truss or girder, the connecting trestle-blocks formed in two parts, bolted together, and having semicircular recesses for the tubes and longitudinal ribs or flanges running at right angles to the tubes, for strengthening the trestle-blocks, substantially as set forth.

2. The combination of the tubes *o*, trestle-blocks *u*, and rails *v*, the latter being clamped by the jaws at the upper ends of the trestle-blocks.

3. The combination, in an elevated railway, of transverse girders and longitudinal rail-beams, each made of tubes and trestle-blocks, and bearing-blocks upon the girders receiving the end blocks of the rail-beams, substantially as set forth.

4. The transverse girder composed of the tubes *e*, end blocks *d*, trestle-blocks *f*, supplemental trestle-blocks *l*, connecting-bars d^3, and tie-rods *m*, as set forth.

5. The track-beam or girder composed of the tubes *o*, end blocks *r*, trestle-blocks *u*, supplemental trestle-blocks *s*, connecting-bars *v'*, tie-rods *t*, and rail *v*, the latter forming also a member of said girder, as set forth.

6. The combination, in a tubular girder, of the longitudinal tubes *e e*, the transverse trestle-blocks, and the intermediate smaller tubes *o*, substantially as set forth.

7. The two-part end block *r*, or supplemental trestle-block *s* made with a clip portion surrounding the base of the rail, and with one part extended up even with the tread of the rail, for the purposes specified.

8. The trestle-block *f*, made in two parts, bolted together, and clasping the tubes *e*, and with a packing of lead between said tube and block, for the purposes set forth.

9. The end block *d*, made in two parts, bolted together, with lead between the sur-

faces coming in contact, and provided with holes or openings to receive the ends of the tubes *e*, as set forth.

10. The combination, with the longitudinal and transverse girders, of braces l^3 l^4 inserted at the angles between said girders, when such braces are curved or elliptical, for the purposes set forth.

Signed by me this 29th day of September, A. D. 1876.

JOB JOHNSON.

Witnesses:
GEO. D. WALKER,
HAROLD SERRELL.