

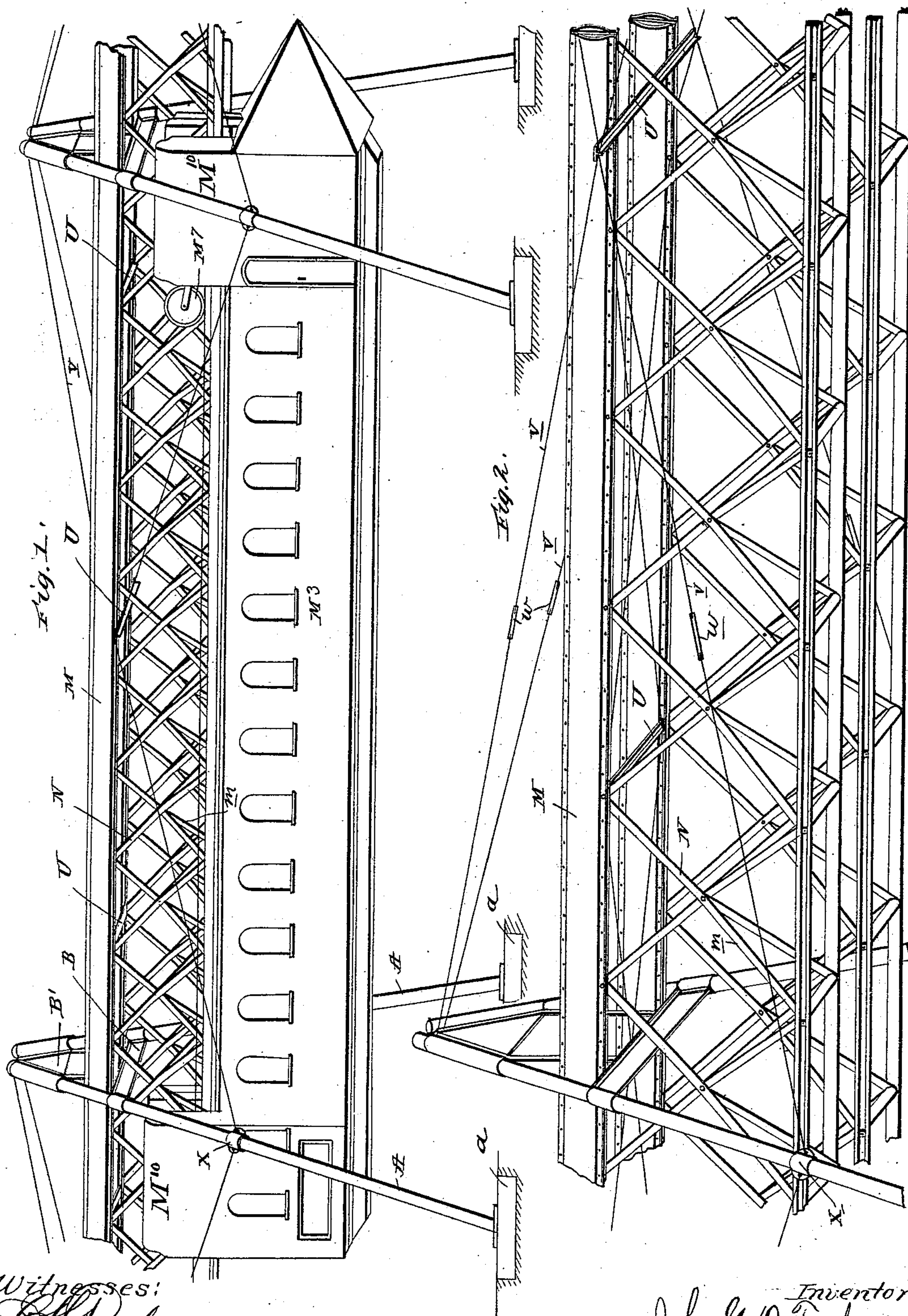
(No Model.)

4 Sheets—Sheet 1.

J. G. D. TUCKER.  
ELEVATED RAILWAY.

No. 493,132.

Patented Mar. 7, 1893.



Witnesses:

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*W. H. Matthews*

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By *James J. Sheehy*  
attorney



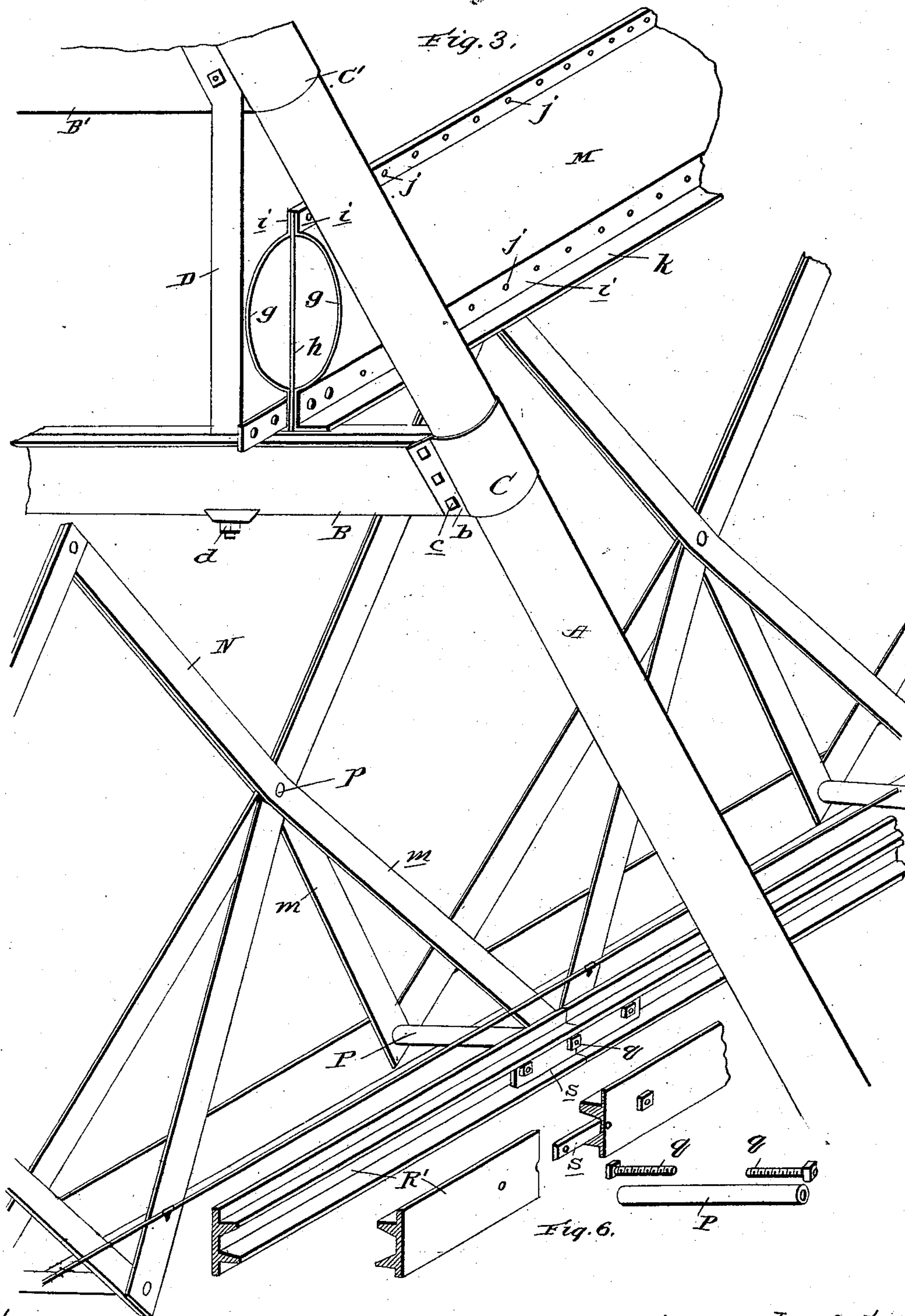
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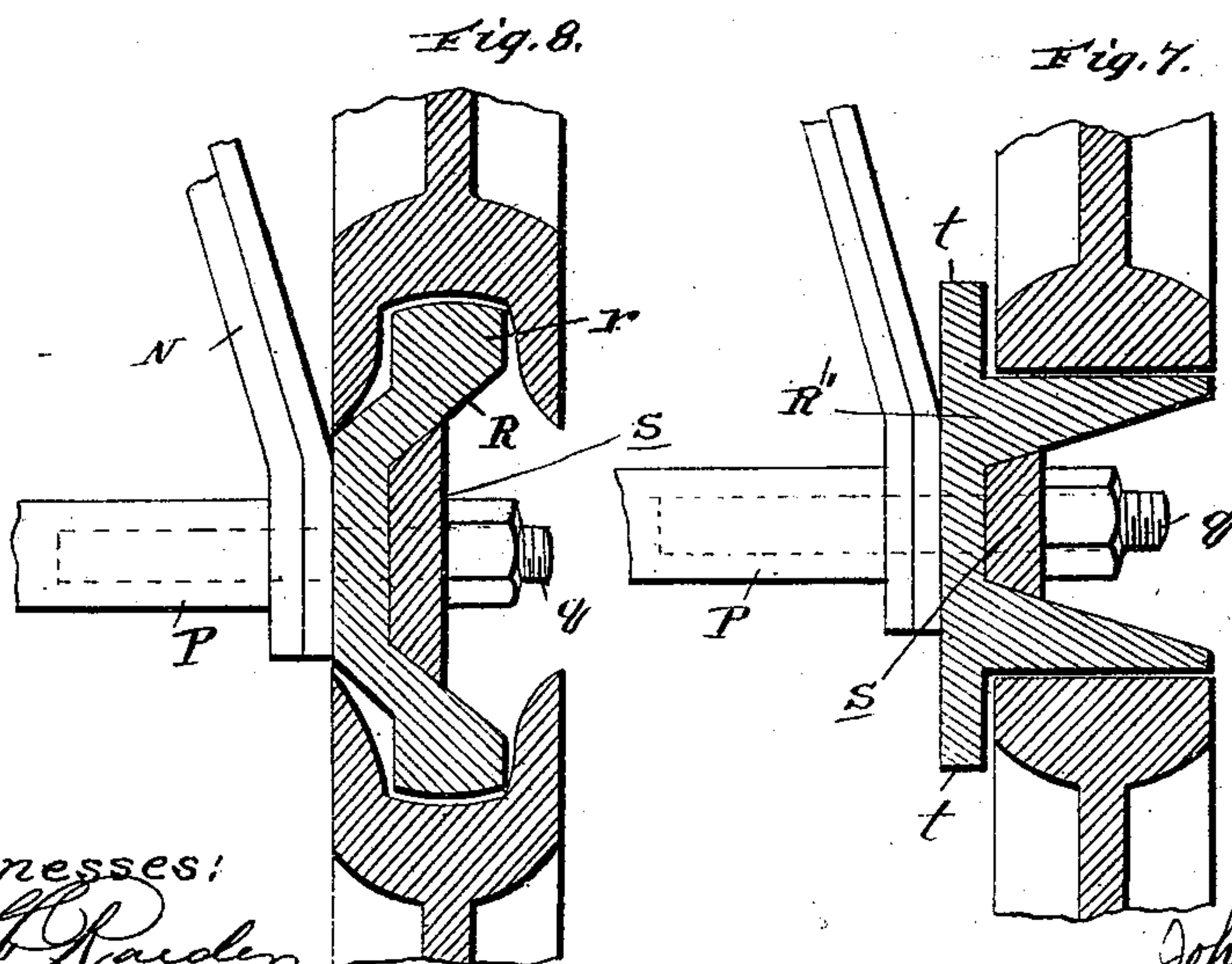
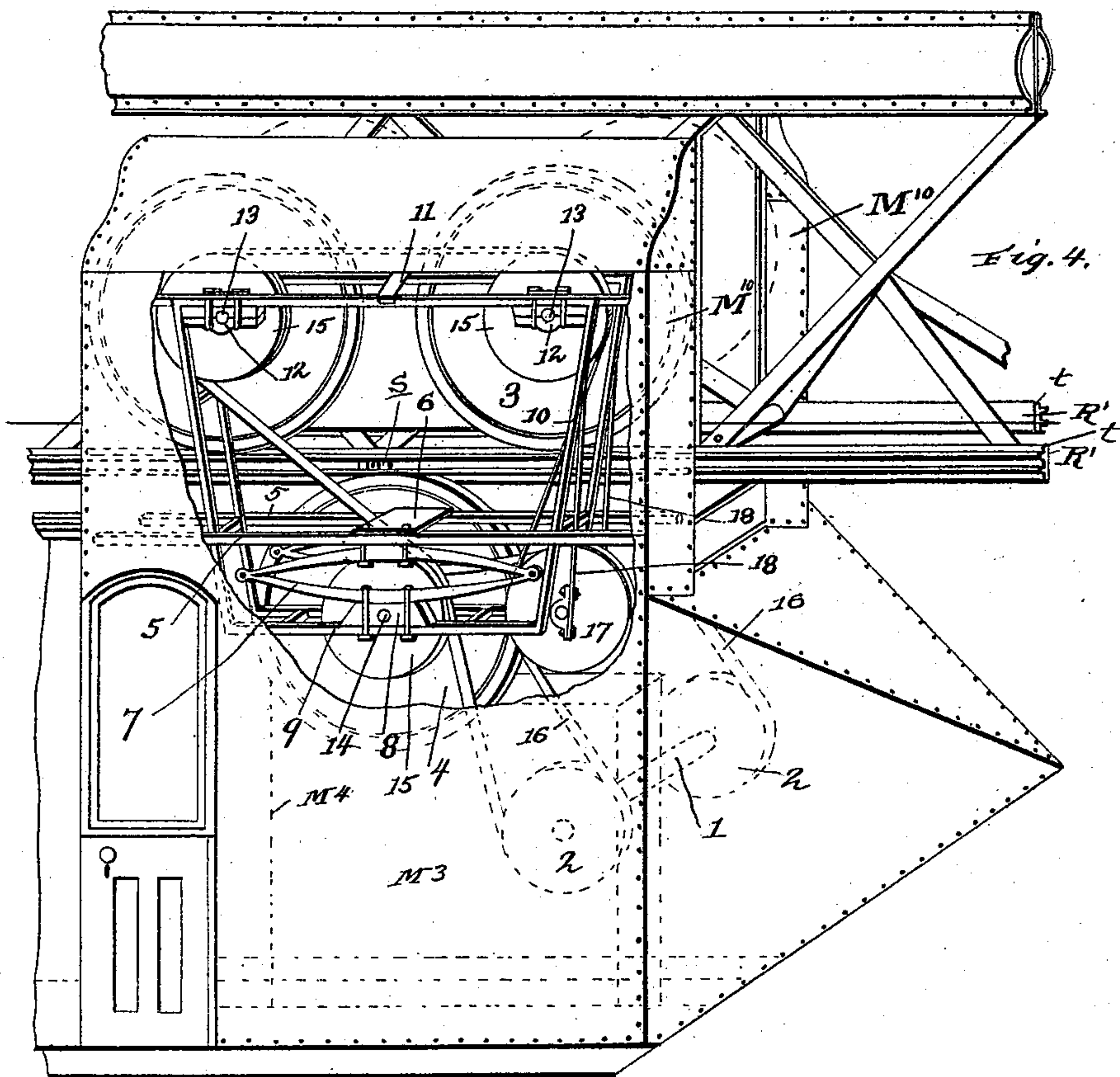
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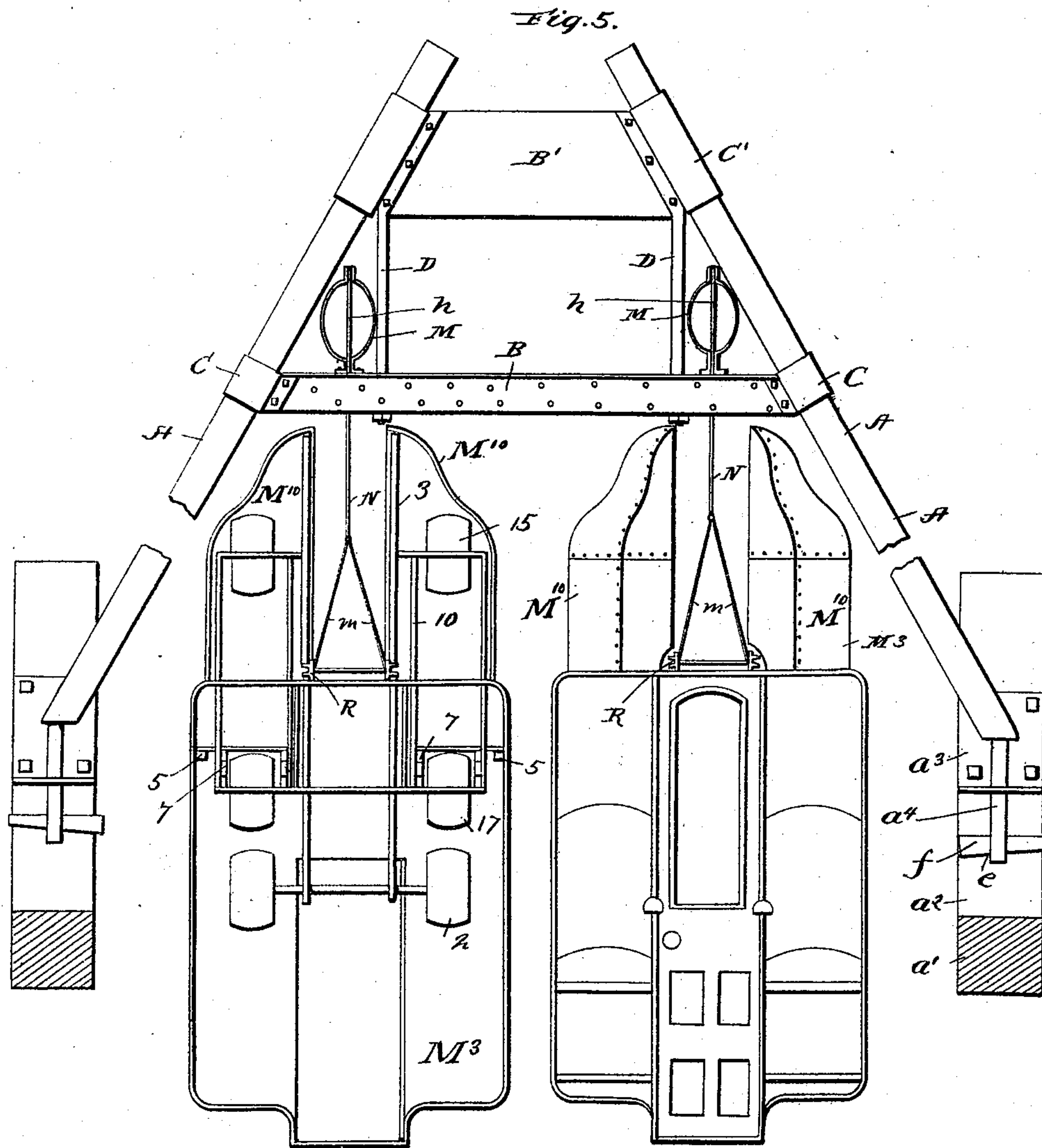
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Patented Mar. 7, 1893.



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# UNITED STATES PATENT OFFICE.

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## ELEVATED RAILWAY.

SPECIFICATION forming part of Letters Patent No. 493,132, dated March 7, 1893.

Application filed May 14, 1891. Serial No. 392,789. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN GOULD DUSTON TUCKER, a citizen of the United States, residing at Perrysville, in the county of Ashland and State of Ohio, have invented certain new and useful Improvements in Electric Elevated Railways; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to improvements in that class of elevated railways in which the cars are suspended from the tracks, and it has for its general object to provide an elevated railway and cars for use in conjunction therewith of such a construction that a high rate of speed may be attained without danger of derailment.

A further object of the invention is to provide a cheap, simple, and durable construction of elevated railway and one that occupies but a minimum amount of space in cross section.

A further object of the invention is to suspend the cars from the tracks in such a manner that lateral movement of the cars will be prevented and all jar and shaking will be taken up.

With the foregoing ends in view, the novelty of the invention will be fully understood from the following description and claims when taken in conjunction with the accompanying drawings, in which:—

Figure 1, is a perspective view of a section of my improved railway with one of my improved cars in position. Fig. 2, is an enlarged detail perspective view of a portion of one section of the railway. Fig. 3, is an enlarged detail perspective view better illustrating the construction of the standards or struts, the girders and the track hangers. Fig. 4, is a broken perspective view of a portion of my improved railway together with one of the cars, illustrating the manner of suspending the cars from the tracks. Fig. 5, is an end elevation of my improved railway, illustrating a modification in the manner of connecting the standards or struts in the anchors.

Fig. 6, comprises a series of views in perspective, illustrating the track, the thimble for

holding the tracks apart and the bolts for connecting the tracks and the thimble. Fig. 7, is an enlarged, detail transverse section illustrating a track rail, portions of the traveling wheels, and a portion of one of the thimbles, and:—Fig. 8, is a similar view illustrating a modified form of track rail.

Referring by letters and numerals to the said drawings:—A, indicates the standards or struts of my improved railway, which are arranged in pairs as shown, at suitable distances apart and from the ends of each section of the railway, as will be presently described. These standards or struts A, which converge upwardly, as illustrated, are connected at their lower ends to suitable anchors *a*, sunk and suitably secured in the ground; and the said standards or struts are connected together, and laced adjacent to their upper ends by a transverse beam B, (better illustrated in Fig. 3, of the drawings,) which beam comprises two sections of an inverted L-form in cross section, suitably connected together and arranged so as to form a T-beam, or a beam of T-form in cross section.

C, indicates the thimbles which are mounted upon the standards or struts A, and provided with flanges *b*, which straddle the ends of the beams B, and are provided with bolt holes for the passage of the bolts *c*, which also take through the beams and serve to securely connect the same to the thimbles.

Interposed between the upper ends of each pair of standards or struts A, is a brace plate B', which is connected to the said standards or struts by thimbles C', similar to the thimbles C, before described. This brace plate B', is supported and braced by suitable metallic straps as D, which are of an approximately obtuse angular form and are connected at their upper ends to the said plate B', while their lower ends extend down between the sections of the beam B, and are suitably secured by a nut as *d*, or other suitable means.

For the sake of economy and lightness I design forming the standards or struts A, of tubular metal, as when braced and connected in the manner just described, they possess ample strength for the purpose designed.

In Fig. 5, of the drawings I have illustrated a modified construction of the standards or



struts and the anchors for securing the lower ends of the same in the ground. In this construction, I provide the anchor  $a'$  which is sunk in the ground, with an upright  $a^2$ , which carries an angle plate  $a^3$ , having an opening in its horizontal branch to receive the tongue  $a^4$ , of the standard or strut A. This tongue in operation, is provided with an aperture  $e$ , at a suitable point in its length for the passage of a key  $f$ , which serves to prevent it from being drawn out of the angle plate of the anchor.

The construction of anchors and standards or struts just described, is especially adapted for railways of a temporary character, although such construction is desirable in a permanent railway, inasmuch as by reason of the same, an anchor may be readily removed and be replaced by another when necessary without disturbing the other construction.

Mounted and suitably secured upon the beams B, preferably between the straps D, and the standards or struts A, are the girders M, from which the tracks are hung, as will be presently described. These girders M, which connect the pairs of beams, and extend the length of each section, respectively comprise two concavo-convex sections  $g$ , and a middle, flat section  $h$ , as shown. The sections  $g$ , are provided at their upper edges with flanges  $i$ , which rest on opposite sides of the middle section  $h$ , and are provided with holes for the passage of bolts or rivets  $j$ , which serve to connect the upper edges of the three sections together. The said sections  $g$ , are also provided at their lower edges with flanges  $i$ , having holes for the passage of connecting bolts or rivets  $j$ , and these lower flanges  $i$ , merge into horizontal flanges  $k$ , through the medium of which the girders are preferably connected to the beams B.

Fastened between the sections  $g$ , of the girders M, by bolts or rivets and depending therefrom in an oblique direction, are the track hangers N, which extend alternately in opposite directions and respectively comprise two strips of metal  $m$ , as shown.

The oppositely extending hangers N, cross each other as shown and are suitably connected at the point of intersection by a bolt  $p$ , or the like; and from the said point of intersection the two strips  $m$ , of each hanger diverge and are held in such position by the thimbles P, which are interposed between the ends as better illustrated in Fig. 3, of the drawings. These thimbles P, are interiorly threaded to receive the bolts  $q$ , which take through and serve to connect the rails R, the strips  $m$  of two oppositely-directed hangers and the thimbles.

In the practice of my invention, the girder, the hangers, and the rails are preferably formed from iron, and by arranging and connecting the same in the manner described, it

will be seen that they will naturally contribute to each others strength and will securely support the track rails.

The rails R, (better illustrated in Fig. 8, of the drawings) are provided with the upper and lower tread branches  $r$ , between which is formed a space for the fish plate  $s$ , through which takes one of the thimble bolts  $q$ . These rails R, are provided on their upper and lower edges with curved surfaces, whereby it will be readily perceived that traveling wheels with concave peripheries may be employed upon the cars without danger of derailment.

In Fig. 7, of the drawings I have illustrated a modified form of track rail  $R'$ , which is connected to the hangers M, and thimbles P, in the manner described, and is designed to be employed when traveling wheels with flat peripheries are employed upon the cars.

Connected to the under side of the girders M, about midway the length of each section of the railway, and extending transversely, is a brace bar U, which is preferably of a T-form in cross section, as shown, and is connected by brace rods  $v$ , with the pairs of standards or struts as shown. All of these brace rods  $v$ , are provided with turnbuckles  $w$ , whereby any slack may be taken up, and they are preferably connected to the standards or struts at the upper end and at intermediate points in the length thereof, the latter connection being preferably effected through the medium of suitable thimbles as  $x$ . In some cases it is desirable to arrange the brace rods  $v$ , in a manner different from that described, and I therefore do not desire to limit myself to the specific arrangement shown in the drawings.

From the foregoing description taken together with the drawings, it will be seen that I have provided a comparatively narrow, elevated railway structure, embodying two suspended tracks upon which the cars  $M^3$ , are designed to travel. These cars  $M^3$ , which are better illustrated in Figs. 1, 4, and 5, are long and narrow and may have their forward or their forward and rear ends pointed, whereby it will be seen that they will meet with but little atmospheric resistance, which is an important desideratum.

Extending upwardly from the top of the cars adjacent to the ends thereof, are projections  $M^{10}$ , which rest on either side of the tracks as shown; and situated preferably in the forward ends of the cars, is the motor  $M^4$ , which is provided with the drive shaft 1, having the fixed pulleys 2, for transmitting motion to the axles of the upper and lower drive wheels 3, 4, presently to be described.

Suitably connected to the side walls of the projections  $M^{10}$ , as better illustrated in Fig. 5, are the longitudinal supporting strips 5, which are connected by a transverse bridge piece 6, and are provided on their under side with the bow springs 7. These bow springs 7, are provided on their under sides with the



journal boxes 8, to which are connected the lower horizontal bars 9, of the truck frame 10, which is preferably of a rectangular form, as shown, and has its upper horizontal bars connected by a cross piece 11, and provided with journal boxes 12.

Journalled in the upper boxes 12, of the frame 10, are the axles or shafts 13, of the upper traveling wheels 3, which shafts extend inwardly from their supporting frame and carry the traveling wheels at their inner extended ends. The axle or shaft 14, of the lower traveling wheel 4, is journalled in the journal box 8, and the said shaft 14, and the upper shafts 13, are provided with fixed pulleys 15, which are arranged between the bars of the frame as shown.

Taking around the pulleys 2, of the motor shaft and around the pulleys 15, of the upper and lower axles or shafts are the belts 16, through the medium of which motion is transmitted from the motor to the traveling wheels to propel the car.

In order to render the action of the cars more positive I design creating a great friction between the belts 16, and the pulleys 15, and to this end I provide the friction pulleys 17, which are carried by the spring arms 18, which are connected to the frames 10, as shown.

By having the guard flanges *t*, upon the rails and the traveling wheels arranged above and below the rails as described, it will be seen that the cars will be prevented from any material upward movement and the liability of derailment will be reduced to a minimum. By the arrangement and connection of the wheels to the car, it will be further perceived that the cars will be prevented from swaying or moving laterally, and all jar and shaking will be taken up.

In the practice of my invention, the electric wires may be connected to the structure in any approved manner, as shown in Fig. 3, and the power may be transmitted from said wire to the motor  $M^3$ , through the medium of a trolley wheel  $M^7$ , or other suitable means, as desired.

Although I have in some respects specifically described the construction and relative arrangement of the several elements of my improvements, I do not desire to be confined to the same as such changes or modifications may be made as fairly fall within the scope of my invention.

Having described my invention, what I claim is—

1. In an elevated railway, substantially as described, the combination with the standards or struts arranged in pairs, and the beams connecting the standards or struts of each pair; of the girders *M*, resting upon and secured to the beams of each pair, and serving to connect the pairs of standards or struts, the said girders respectively comprising the sections *g*, and the section *h*, connected as de-

scribed, the track rails, and the hangers *N*, connected to the girders and depending therefrom in an oblique direction, and pitched alternately in opposite directions so as to intersect each other, the said hangers *N*, respectively comprising two strips which diverge below the point of intersection, substantially as and for the purpose set forth.

2. In an elevated railway, substantially as described, the combination with the upwardly converging standards or struts, arranged in pairs as set forth, the beams *B*, connecting the standards or struts of each pair, the thimbles connecting said beams to the standards or struts, the interposed plate *B'*, the thimbles connecting the same and the standards or struts, and the straps *D*, connecting the beam *B*, and plate *B'*, of the girders, the track rails, and the hangers for suspending the track rails from the girders, substantially as and for the purpose set forth.

3. In an elevated railway the combination with the girders and a suitable means for supporting the same; the said girders comprising the concavo, convex sections *g*, and the flat section *h*, suitably connected together; of the track rails and the hangers connected to the girders and adapted to hang the tracks therefrom, the said hangers being pitched alternately in opposite directions so as to intercept each other and respectively comprising two strips connected at the point of intersection and diverging downwardly therefrom, as and for the purpose set forth.

4. In an elevated railway, substantially as described, the combination with the girders, and the hangers connected to the girders and depending obliquely therefrom; the said hangers being pitched alternately in opposite directions so as to intercept each other and respectively comprising two strips connected at the point of intersection and diverging downwardly therefrom, of the track rails, the thimbles arranged between the diverging strips of the hangers, and the bolts connecting the track rails, the hangers strips, and the thimbles, substantially as specified.

5. In an elevated railway, substantially as described, the combination with the track rails suspended as described, and having the parallel longitudinally disposed and the upper and lower treads; of a car having upwardly extending projections resting on either side of the rails and the upper and lower traveling wheels carried by the car and adapted to engage the rails, substantially as specified.

6. In an elevated railway, substantially as described, the combination with the suspended track rails having the upper and lower treads provided with curved surfaces, of a car having the projections  $M^{10}$ , and the upper and lower traveling wheels carried by the car and having concave peripheries adapted to engage the rails, substantially as specified.

7. In an elevated railway, substantially as



specified, the combination with the suspended track rails; of the car having the projections M<sup>10</sup>, the bars 5, connected to the side walls of the projections, the spring 7, connected to and depending from the side bars, the truck frames connected to the springs and the upper and lower traveling wheels journaled in bearings carried by the truck frames and adapted to engage the track rails, substantially as specified.

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Witnesses:

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