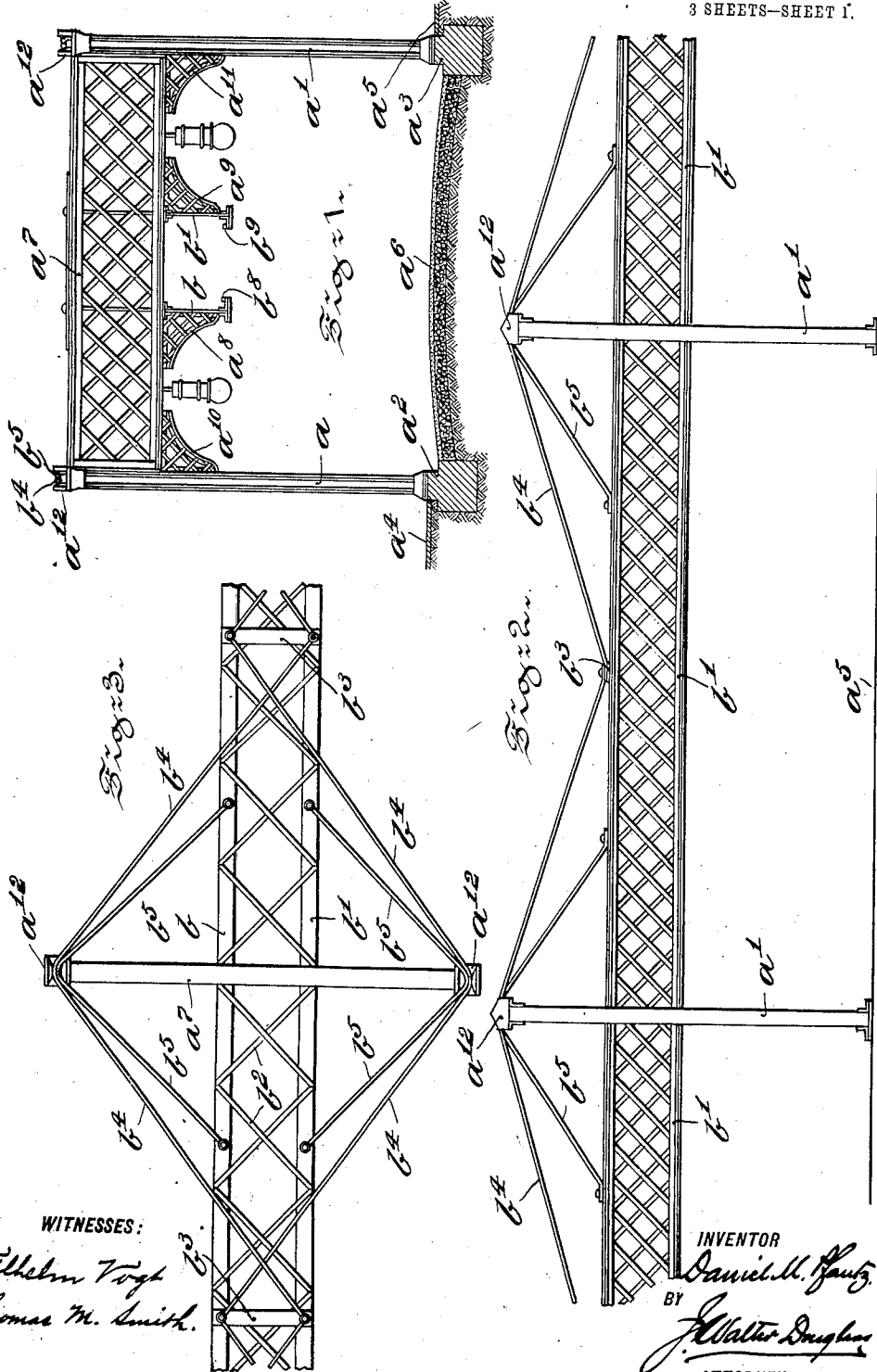


No. 840,801.

PATENTED JAN. 8, 1907.

D. M. PFAUTZ.  
ELEVATED RAILWAY SYSTEM.  
APPLICATION FILED MAY 23, 1906.

3 SHEETS—SHEET 1.



WITNESSES:

Wilhelm Topp  
Thomas M. Smith.

INVENTOR

Daniel M. Pfautz

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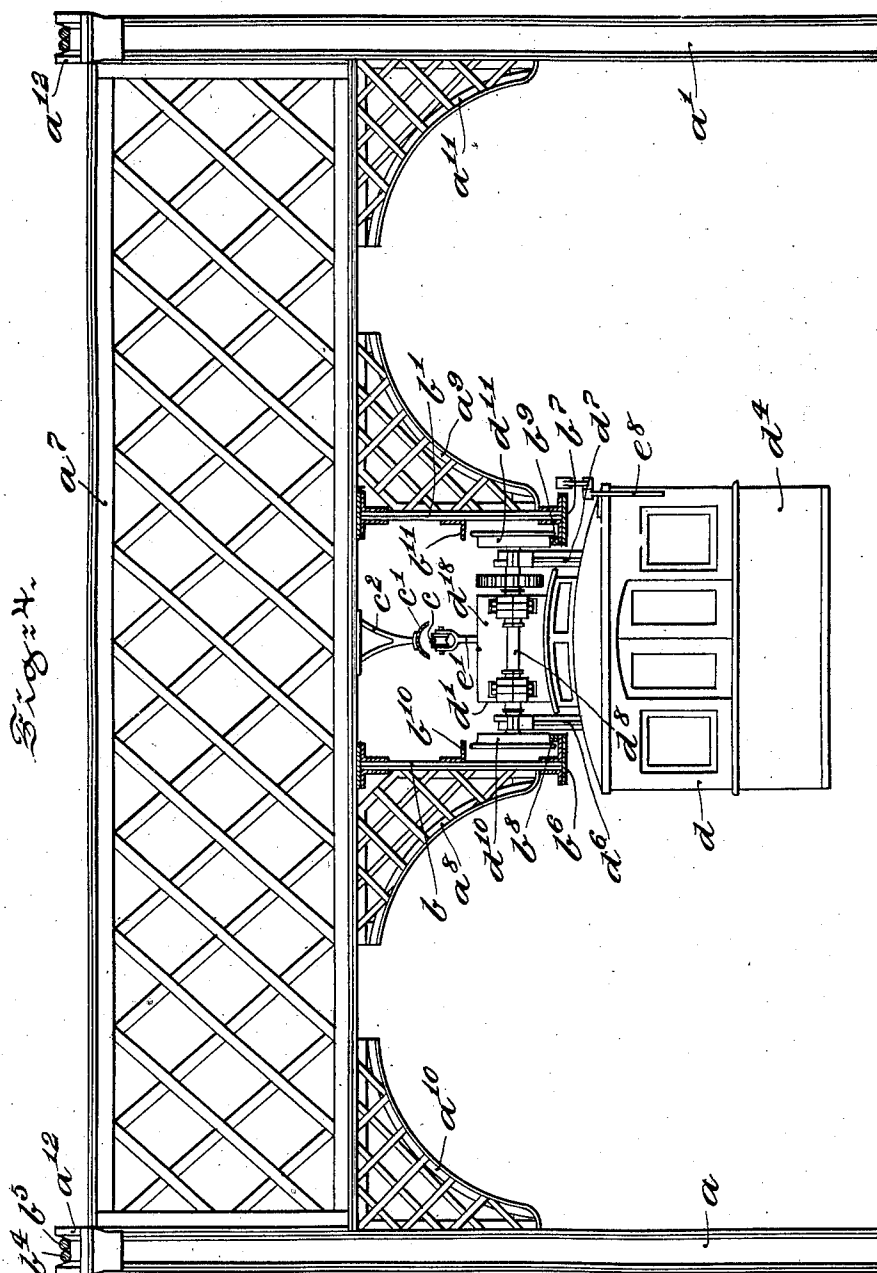
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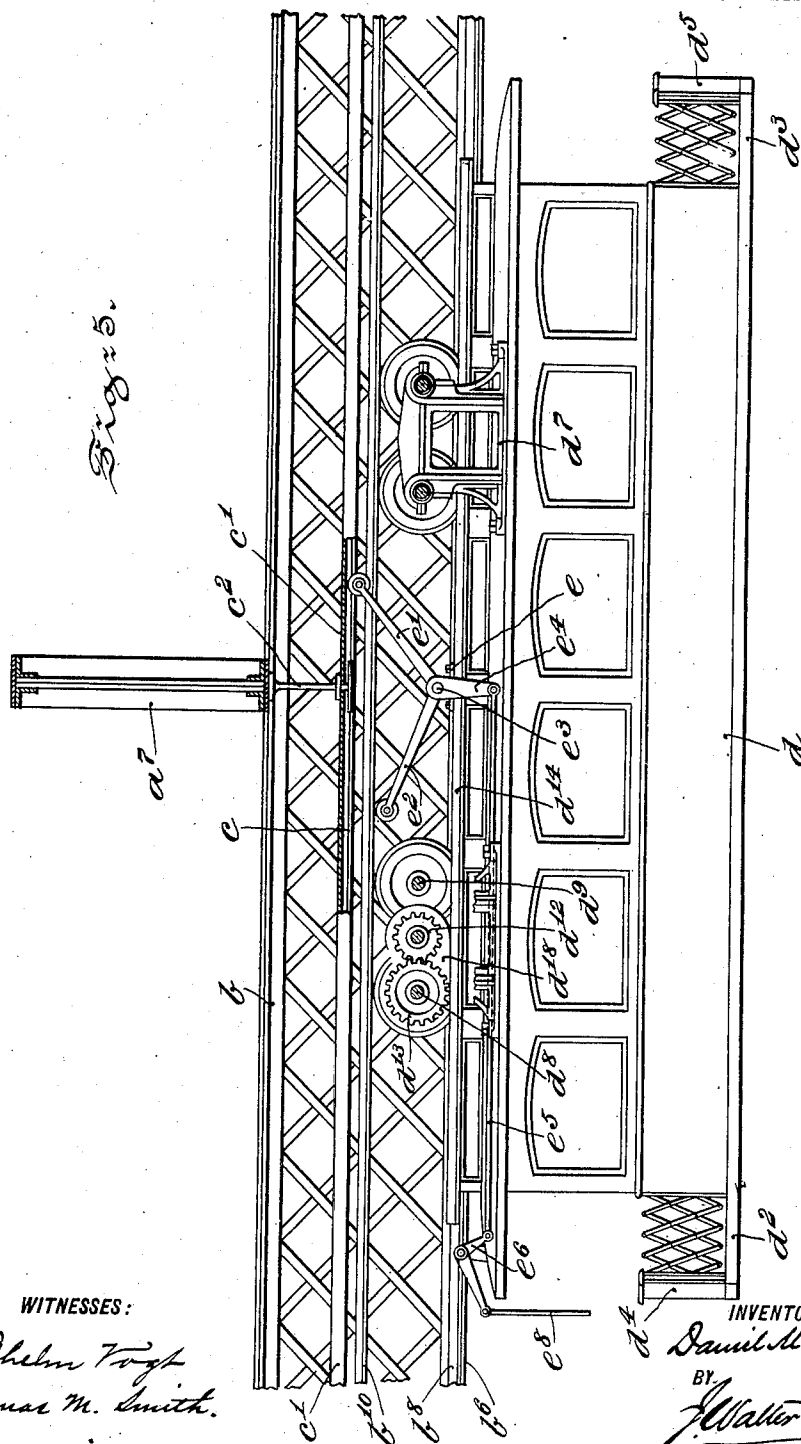
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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

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ONE-HALF TO WILLIAM H. TIGERMAN, OF PHILADELPHIA, PENN-  
SYLVANIA.

## ELEVATED-RAILWAY SYSTEM.

No. 840,801.

Specification of Letters Patent.

Patented Jan. 8, 1907.

Application filed May 23, 1906. Serial No. 318,306.

*To all whom it may concern:*

Be it known that I, DANIEL M. PFAUTZ, a citizen of the United States, residing at Germantown, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Elevated-Railway Systems, of which the following is a specification.

My invention has relation to an elevated railway to the general construction and arrangement of the superstructure thereof.

The principal object of my invention is to provide a comparatively safe and efficient elevated-railway structure for rapid transit in large and congested cities, to which end my invention consists of an elevated-railway structure in which the means of conveyance or cars are suspended from the structure and electrically or otherwise propelled in such condition from said structure.

The nature and scope of my present invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is an end elevational view of an elevated-railway structure embodying main features of my invention. Fig. 2 is a side elevational view thereof. Fig. 3 illustrates in top or plan view a portion of the structure. Fig. 4 is an end elevational view of a portion of the elevated-railway structure and a car enlarged, illustrating the manner of supporting the same in suspended condition from the said structure; and Fig. 5 is a longitudinal sectional view of the upper portion of the structure enlarged, illustrating in side elevation the car and the means for supporting and propelling the same along the structure.

Referring to the drawings,  $a$  and  $a'$  represent columns suitably connected to and supported by pedestals  $a^2$  and  $a^3$ , located back of the curb-line and adjacent to the sidewalks  $a^4$  and  $a^5$  of a street or roadway  $a^6$ , so as to offer no obstruction to the street or roadway. These columns  $a$  and  $a'$ , as shown in Fig. 2, are arranged at suitable distances apart on either side of the street or roadway, and to each pair of oppositely-arranged columns  $a$  and  $a'$  is suitably secured a cross-girder  $a^7$  of open-web or lattice work, spanning the entire street  $a^6$ . Midway between the columns  $a$  and  $a'$  and a proper distance apart are ar-

ranged two longitudinal lattice-girders  $b$  and  $b'$ , suitably secured to said cross-girders  $a^7$ , which support the same. These longitudinal girders  $b$  and  $b'$  are furthermore rigidly connected with the cross-girders by lattice-brackets  $a^8$  and  $a^9$ , and a similar pair of brackets  $a^{10}$  and  $a^{11}$  connect the cross-girders  $a^7$  with the supporting-columns  $a$  and  $a'$ . In order to avoid vibrations and deflections of the longitudinal girders  $b$  and  $b'$  the same are braced laterally by lattice-work  $b^2$  and cross-beams  $b^3$  and stiffened by tie-rods  $b^4$  and  $b^5$ , passing over saddle-pieces  $a^{12}$ , secured to the top of the columns  $a$  and  $a'$ . The said manner of forming the cross-girders  $a^7$  and longitudinal girders  $b$  and  $b'$  and bracing and stiffening the same gives a structure not only easy to erect, but also light in weight and rigid without in any way offering an obstruction to light and air in the street and the adjoining buildings along which the structure passes.

The foregoing character of structure presents little surface to the pressure of the wind and resists the sway of passing cars suspended from the same at a height sufficient to permit the passage of vehicles or the like beneath the cars. The structure is also especially adapted to support lamps for lighting the streets and sidewalks and the telegraph, telephone, and other electric wires, which otherwise are carried by separate poles, and also to properly protect the same against the elements.

To the lower inner flanges  $b^6$  and  $b^7$  of the longitudinal girders  $b$  and  $b'$  are secured rails  $b^8$  and  $b^9$ . Above these rails  $b^8$  and  $b^9$  are secured to the longitudinal girders  $b$  and  $b'$  guard-rails  $b^{10}$  and  $b^{11}$ , adapted to prevent the derailment of the wheels of a truck from which the car-body is suspended, as will be hereinafter more fully explained. To the cross-girders  $a^7$  are secured brackets  $c^2$ , carrying a hood  $c'$ , within which the electric trolley-wire  $c$  is located. The hood  $c'$  protects the same against the influence of the elements and, especially in wintry weather, prevents ice formation thereon.

The car  $d$ , suspended from the truck  $d'$ , is provided with rear and front platforms  $d^2$  and  $d^3$  and dashboards  $d^4$  and  $d^5$ , and within the same is arranged a suitable metal framework, (not shown,) to which the brackets  $d'$  and  $d''$  of the truck  $d'$  are secured. In the

brackets  $d^6$  and  $d^7$  are arranged the bearings for the axles  $d^8$  and  $d^9$ , as shown in Figs. 4 and 5. To the axles  $d^8$  and  $d^9$  is secured a housing  $d^{10}$ , within which an electric motor (not shown) is mounted, which motor positively drives a pinion  $d^{11}$ , meshing with a gear-wheel  $d^{12}$ , secured to the axle  $d^8$  of the truck  $d'$ . This gear-wheel transmits the rotary movement of the pinion to one set of the wheels and in such manner propels the truck  $d'$  and car  $d$  over the rails  $b^8$  and  $b^9$ .

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

1. In an elevated railway, the combination of two parallel series of columns, a series of vertically-arranged cross-girders uniting the upper ends of opposite columns in series, two parallel longitudinal girders suspended from beneath the cross-girders and each supporting a track upon which a car is adapted to travel, a guard-rail for said car, and a bracket for each longitudinal girder adapted to connect the outside of said girder directly with the under side of the cross-girder, substantially as and for the purposes described.

2. In an elevated railway, the combination of two parallel series of columns, a series of vertically-arranged cross-girders uniting the upper ends of opposite columns in series, two parallel longitudinal girders suspended from beneath the cross-girders and each supporting a track upon which a car is adapted to travel, a guard-rail for said car, brackets for each longitudinal girder and column, said brackets connecting the outside of said girders and the inside of said columns directly to the under side of the cross-girder, substantially as and for the purposes described.

3. In an elevated railway, the combination of two longitudinal girders each supporting a track upon which the vehicle is adapted to travel, braces spanning and tying the upper faces of the longitudinal girders together and closing the same at their upper ends, and tie-rods connected with said longitudinal girders and passing over columns to connect both of said longitudinal girders with each of said columns, substantially as and for the purposes described.

4. In an elevated railway, the combination of two parallel series of columns, a series of cross-girders connecting the upper ends of opposite columns in series, two parallel longitudinal girders suspended from the cross-girders and each supporting a track upon which a car is adapted to travel, braces spanning and tying the longitudinal girders together at their upper faces, and tie-rods con-

nected with said longitudinal girders and passing over said columns to connect both of the longitudinal girders with each of said columns, substantially as and for the purposes described.

5. In an elevated railway, the combination of two parallel series of columns, a series of cross-girders uniting the upper ends of opposite columns in series, two parallel longitudinal girders suspended from beneath the cross-girders and each supporting a track upon which a car is adapted to travel, braces spanning and tying the longitudinal girders together at their upper faces, tie-rods connected with the upper faces of said longitudinal girders and passing over said columns to connect the longitudinal girders and columns adapted to connect the outside of the longitudinal girders and the inside of said columns directly to the under side of said cross-girders, substantially as and for the purposes described.

6. In an elevated railway, the combination of two parallel series of columns, a series of vertically-arranged cross-girders uniting the upper ends of said opposite columns, two parallel longitudinal girders suspended from the cross-girders and each supporting a track upon which a car is adapted to travel, guard-rails arranged intermediate of the upper and lower faces of said longitudinal girders and above the tracks thereof, brackets for each longitudinal girder adapted to connect the outside of said girders directly to the under side of the cross-girders and braces spanning and tying the upper faces of the longitudinal girders together, substantially as and for the purposes described.

7. In an elevated railway, the combination of two parallel series of columns, a series of vertically-arranged cross-girders uniting the upper ends of said opposite columns, two parallel longitudinal girders suspended from beneath the cross-girders and each supporting a track upon which a car is adapted to travel, brackets suspended from beneath the cross-girders intermediate of the longitudinal girders and adapted to support a hood, a trolley-wire arranged in said hood and carried by the same and said brackets, substantially as and for the purposes described.

In testimony whereof I have hereunto set my signature, in the presence of two subscribing witnesses, at Philadelphia, Pennsylvania, this 22d day of May, A. D. 1906.

DANIEL M. PFAUTZ.

Witnesses:

J. WALTER DOUGLASS,  
THOMAS M. SMITH.