

W. H. Williams.
Elevated Railway.

N^o 70,666.

Patented Nov. 5, 1867.

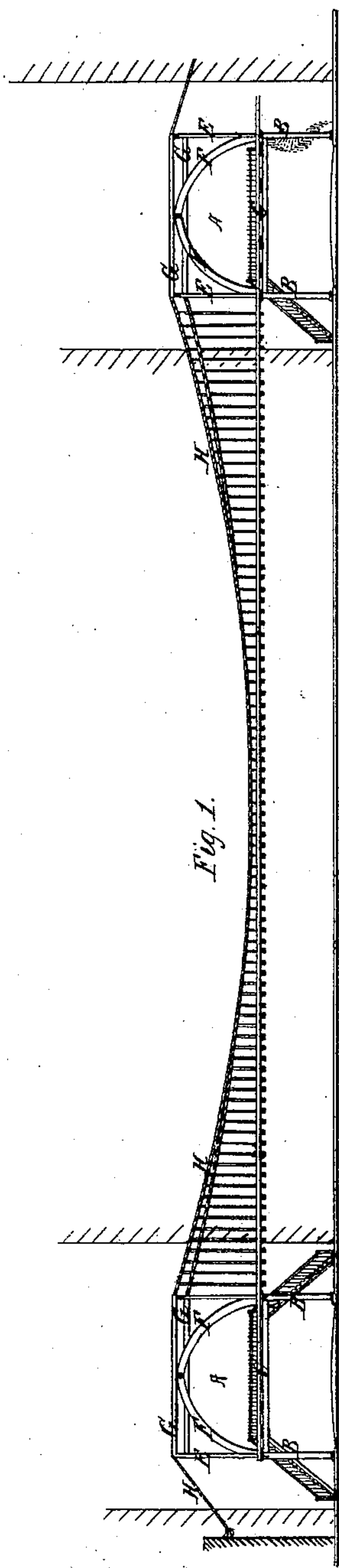


Fig. 1.

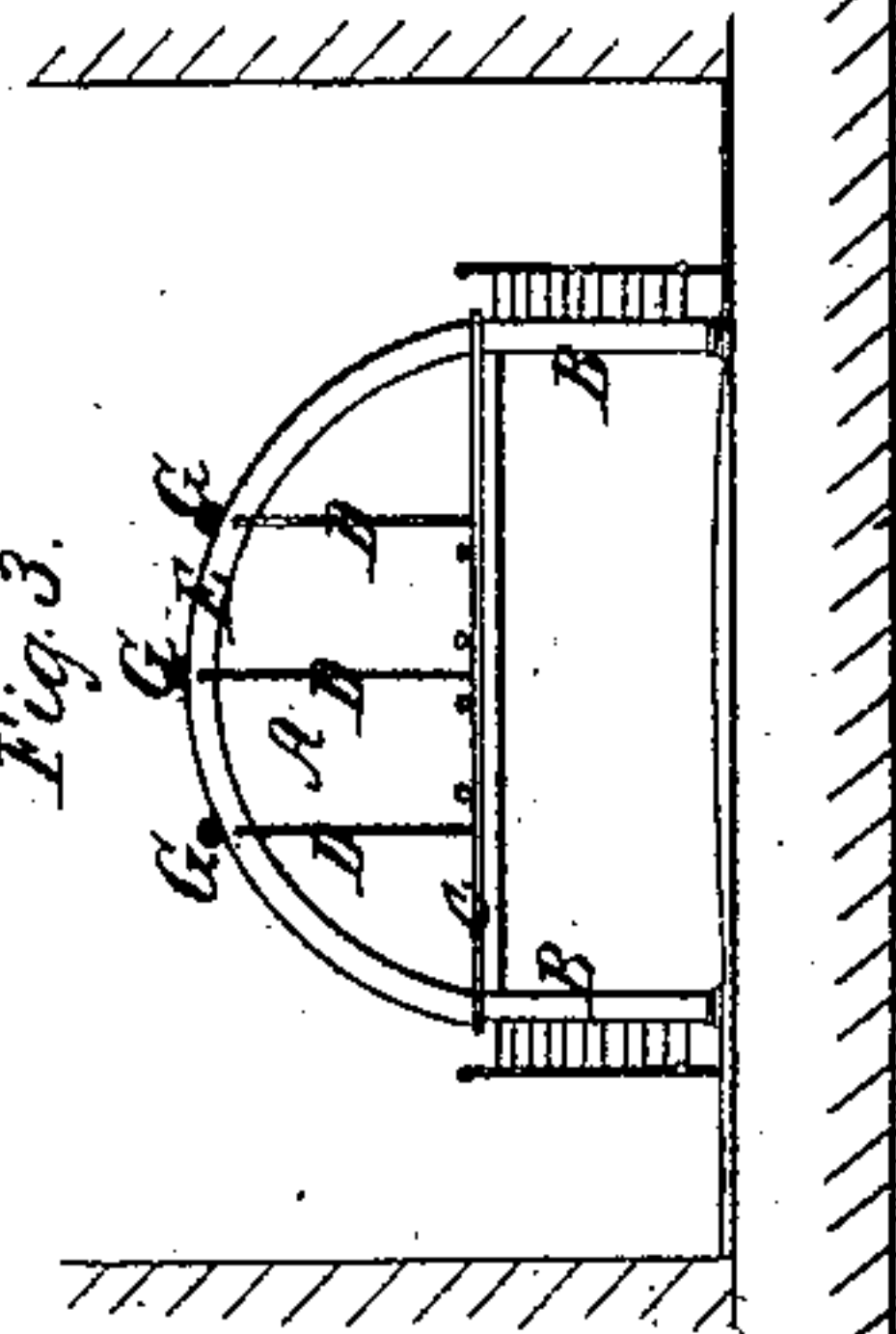


Fig. 3.

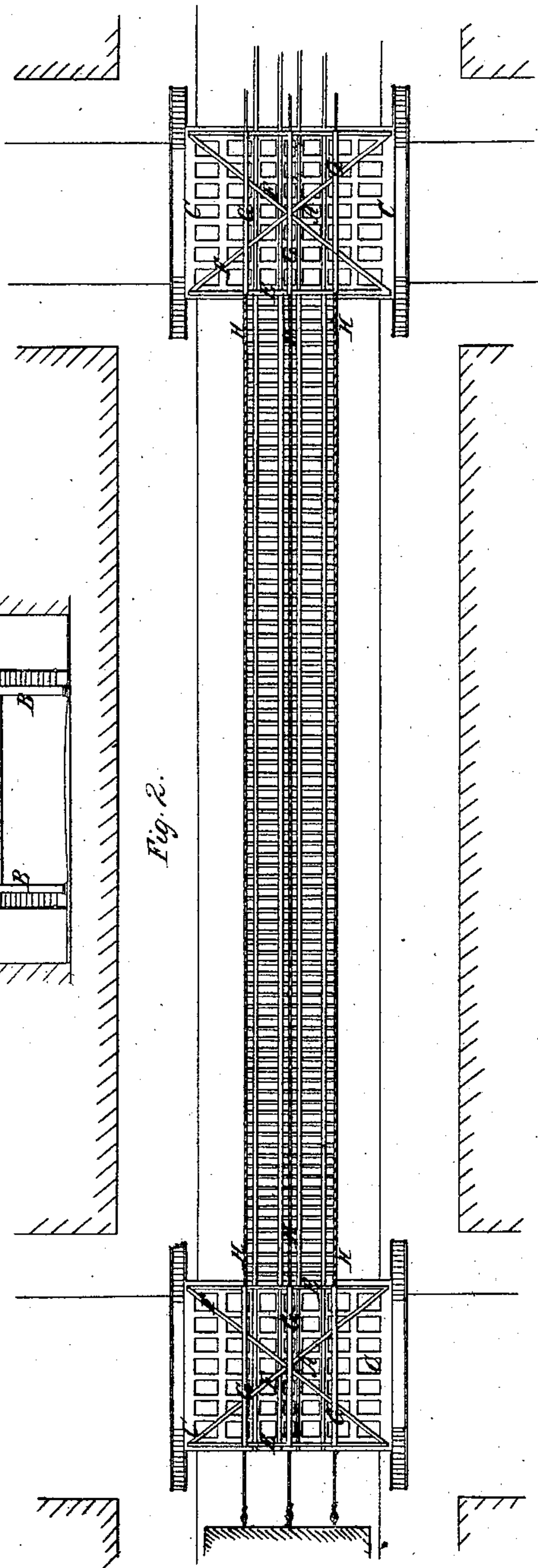


Fig. 2.

Witnesses;
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UNITED STATES PATENT OFFICE.

WILLIAM H. WILLIAMS, OF LITTLE FALLS, NEW YORK.

IMPROVEMENT IN ELEVATED RAILROADS.

Specification forming part of Letters Patent No. 70,666, dated November 5, 1867.

To all whom it may concern:

Be it known that I, WILLIAM H. WILLIAMS, of Little Falls, in the county of Herkimer, in the State of New York, have invented a new and useful Improvement in Elevated Railroads; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which drawing—

Figure 1 is a central longitudinal section of an elevated street-railroad whose track is suspended from towers placed at the intersections of cross-streets and other places. Fig. 2 is a plan. Fig. 3 is an end view.

Similar letters indicate corresponding parts.

This invention relates to elevated railroads, and is especially adapted for use in cities where it is desirable to provide means for transporting passengers and freight without interfering with the ordinary use of the streets and thoroughfares.

It consists of an elevated suspended railroad track or tracks, which are carried along the course of a street which has the proper direction over the roadway thereof, being suspended above the same from towers of peculiar construction, which are placed at the intersections of the cross-streets or at other suitable places.

Where cross-streets are very near to each other it is not necessary to place a supporting-tower at each cross-street, and where they are at very great distances apart it may be desirable to place a tower at a point intermediate of the cross streets.

The track here shown is a double track, so that trains can move in opposite directions at the same time, and it is laid upon ties or cross-pieces extending from side to side of the structure, which are held up by strong cables that extend throughout the line of the railroad, which cables are connected to the frame of the track in any suitable way.

The towers are so constructed and arranged that teams and passengers can go in every direction beneath them without obstruction, being elevated upon columns which rise from the corners of the sidewalks within the line of the curb-stone, so that the intersecting

cross-streets as well as the street beneath the railroad are wholly unobstructed.

The letter A designates supporting-towers, which rest upon iron columns B, whose foundations are beneath the pavement. The foundations are made strong, and the columns are of suitable size to give the strength required. The columns are connected to each other by a horizontal frame composed of iron girders C, of great strength, which are placed at a suitable height above the ground to allow vehicles of any size or character to pass beneath without interference. The track of the railroad rests on said frame, and the latter is connected to the top of the tower by strong cable connections D D, or by strong rods of iron or steel.

From the columns B spring a series of powerful arches, as shown in the drawing—to wit, transverse arches E E, which span the main thoroughfare at right angles, and arches F F, which span it in diagonal directions. The diagonal arches intersect each other at their highest points, and are permanently secured together at the place of intersection, so as to form a compound arch, whose members rest on distinct bases—that is to say, on the columns B—and meet at their crowns or summits. The diagonal arches and the transverse arches are tied or connected together firmly by hollow cross beams or rods G, which extend from one transverse arch across the diagonal arches to the other transverse arch, being permanently secured to each arch by means of bolts, bands, straps, or other suitable devices, or by going directly through the several arches. I use at least as many such tie beams or rods as there are suspension-cables, not confining myself to that number, however; but I use as many such connecting tie-beams as are required to hold the several arches in their proper positions. Said hollow beams, rods, or tubes G hold the cables in place on the towers, and cover and protect them.

The letter H designates the cables from which the railroad is suspended. Said cables are made, in the ordinary manner, of metal, and rest upon and are supported by the towers, over which, or through which, if preferred, they go, being held in their proper places on the towers by the hollow tie-beams

G aforesaid, through which they are passed. The mode of connecting the cables H with the track of the railroad is by vertical connecting cables or rods I, in the usual manner of making suspension-bridges, or in any other proper manner, and the usual or other suitable provision is made in building the structure for preventing lateral or other displacement of the several parts of the track.

The railroad is reached by means of staircases, which rise from the sidewalks or from the roadway, as may be most convenient in different localities, and said staircases are straight or spiral, or continuous, or in successive flights, as may be desired, depending on the width allowed for the staircases, and on circumstances of position and elevation.

The girders or frame C, which connect the columns B and aid to sustain the railroad, are made open, in order to allow light to be transmitted through to the street below. The open spaces between the girders or frame C may be filled with glass or other transparent material which will allow passengers to walk thereon. The track of the railroad is open throughout, its several parts being made of steel, iron, or other suitable metal, which combines the least bulk with the required strength, so that the transmission of light to the street below it will not be materially obstructed.

The rails of the tracks rest directly upon ties or cross-pieces, which each extend from side to side of the railroad, and are firmly and permanently secured to them. The cables on which the road is suspended are connected to the ties or cross-pieces by the vertical connections D, so that in making and supporting the track or tracks I use only a series of ties combined with the rails on which the cars run, and with the cables through said vertical connections D, a flooring on the track being used or not, as desired, and the bars at the ends of the ties, which in this example connect their ends, being used or not used, as may be preferred.

It will be observed that my suspended or elevated railroad does not extend over the sidewalks of the street along which it is taken, but that it is confined to the road or carriage-way above which it extends along its center for a width suitable for two or more tracks.

If desired, the interspaces of the rails and the spaces outside of and between the tracks may be covered with a flooring of glass or other transparent material like that proposed for the frame C; or said spaces may be covered with wire-cloth, which will serve to prevent objects

from falling through the track, and yet allow the transmission of light. I apply india-rubber, or equivalent material, in the usual manner, for deadening sound under the rails of the track. When the railroad crosses wide squares or open spaces, additional towers are provided; but I make the towers and the other parts of the structure of such strength as to sustain a line of railroad from one hundred to ten hundred feet in length between the towers.

The mode above shown of making a supporting-tower combines an unyielding support in a vertical direction with a perfect resistance to lateral strain, the burden put thereon by the track itself and by trains going upon it being equally sustained by all the arches, which are all alike supported upon the same columns at a distance from the points where the cables rest on the arches.

I am, by this construction, enabled to combine simplicity and economy in the supporting-towers on which the elevated railroad rests with a small degree of bulk, so that light is obstructed to only a slight degree, while the utmost security desired is obtained; and I am enabled by means of my invention to extend my suspension-railway in continuity for many miles, the towers being the "rests," which elevate and support the track in successive span. The suspending-cables H are anchored, in the ordinary manner, at the ends of the railroad.

What I claim as new, and desire to secure by Letters Patent, is—

1. The elevated railroad consisting of a track or tracks suspended over a street by means of towers A and cables H, substantially as described.

2. The supporting-towers A, constructed as above described—namely, by combining and arranging together, substantially as shown, the transverse arches E and the compound diagonal arches F, said arches all springing from the columns B.

3. The hollow connecting-beams G, which tie the arches to each other, in combination with the supporting-cables H, which pass through said beams, so that they are protected and also held in place by the beams, substantially as shown.

This specification signed by me this 19th day of June, 1867.

WILLIAM H. WILLIAMS.

Witnesses:

GUSTAV BERG,
GEO. F. SOUTHERN.