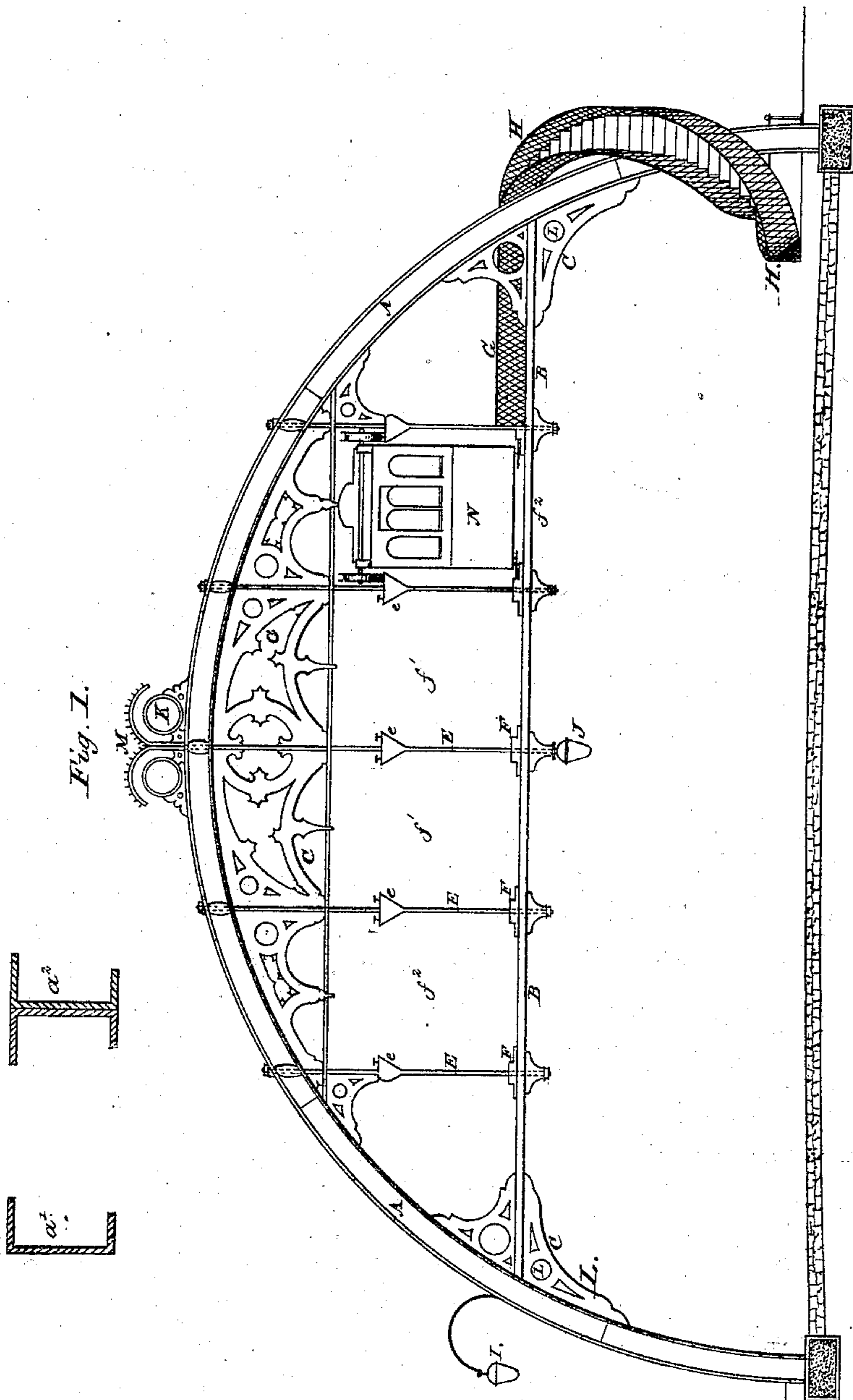


E. J. HULBERT & A. N. N. AUBIN.

Elevated Arch Railways.

No. 137,552.

Patented April 8, 1873.



$a^2$

$a^1$

Attest;  
Francis C. Hulbert  
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Inventors;  
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A. N. N. Aubin



# UNITED STATES PATENT OFFICE.

EDWIN JAMES HULBERT AND AIMÉ NICHOLAS NAPOLEON AUBIN, OF  
PORTLAND, CONNECTICUT.

## IMPROVEMENT IN ELEVATED ARCH RAILWAYS.

Specification forming part of Letters Patent No. 137,552, dated April 8, 1873; application filed  
March 25, 1872.

*To all whom it may concern:*

Be it known that we, EDWIN JAMES HULBERT and AIMÉ NICHOLAS NAPOLEON AUBIN, of Portland, in the county of Middlesex and State of Connecticut, have invented certain Improvements in Elevated Arch Railways, of which the following is a specification:

The nature of our invention relates to the construction of arches which extend across the street and support the elevated railway; and it consists in the combination and arrangement of the arches, transverse binding-girders, stiffening-brackets, and vertical braces to support the suspension and guiding rails.

The drawing No. 1 represents a front elevation, as seen from the center of the street, of one of the arches intended to span, from curb to curb, the streets along which the elevated railroads are to run. It shows the mode of suspension of the tracks and cars; also the arrangement of the platforms and stairs for passengers, street-lamps, telegraph wires, pneumatic tubes, &c. The drawing No. 2 represents the arches as seen from the sidewalk; also the mode of suspending cars.

A A is the body of the arch. It is composed of segments of wrought-iron rolled in plates, the section of which is shown at  $a^1$ , by which it will be seen that the flange intended to be inside of the curve of the arch is shorter than the other, which forms one-half of the surface of the periphery of the arch. These plates are firmly riveted or bolted together, crossing the joints so that when united their section presents the shape seen at  $a^2$ . These arches can be placed at intervals to suit convenience, and may be distant from each other from fifteen to fifty feet, more or less. They would rest upon cast or wrought iron base-plates supported by a foundation of masonry, or of metal cylinders or boxes filled with concrete. In wide streets the arches would form a semicircle; but in very narrow ones, where only one or two tracks can find room, the arch can be elliptical, so as to obtain sufficient height for the tracks above the roadway. B B is a girder thrown across from one leg of the arch to the other, performing the double part of supports for car-guides, and, if desired, of railway tracks, and of a

main tie to the arch, preventing the spreading apart of its side segments; C C, cast-iron ornaments fixed to the roof of the arch and at the ends of the cross-girder, to secure the perfect rigidity of the construction; D D D, supplementary girders placed between the arches, supported vertically from longitudinal girders  $d^1 d^1$ , and diagonally by rods from the arches  $d^2 d^2$ . (Drawing No. 2.) These bind the arches together and support the tracks and car-guides. E E E E, upright bars, with shoulders  $e e e e$ , bearing the tracks when cars are to be suspended. They also serve as stays and struts to keep the tie-girders B B in a perfectly straight line. F F F F, angle-iron car-guides to prevent the side oscillations of the cars when suspended, as shown. The inside tracks  $f^1 f^1$  can be used for rapid transit; the outside ones,  $f^2 f^2$ , for local or slow cars. N, passenger-car, to be propelled by compressed air, steam, or other convenient power.  $n^2 n^2$  are the suspending-wheels. They are grooved to the shape of the track  $n$ , and the bottom of the groove furnished with a semi-elastic band of India rubber, so as to deaden the noise which would result from the contact of a hard tire upon the metal rails. The tracks, wherever supported, are resting upon India-rubber cushions, to prevent the communication of the vibrations of the rails to the other parts of the structure.  $n^3 n^3$ , horizontal wheels, placed under the car to run against the angle-iron guides to prevent the side oscillations of the car;  $n^4 n^4$ , rollers or wheels, running vertically to receive and sustain the car in case of the breaking of an upper wheel, axle, or rail;  $n^5 n^5$ , rollers, placed upon both ends of the shafts of the suspending-wheels. They are loose upon the shafts and free to run upon them whenever they come in contact with the safety-rail or angle-iron bar  $n^6 n^6$ , placed above the main rail, but outside of the suspending-wheels.

This arrangement secures the cars against all danger of running off the track, and when combined with the lower guides (the vertical and horizontal wheels) it will easily be admitted that an elevated road constructed upon the before-described system can be made much

safer than ordinary ground roads, and might, in fact, be considered as perfectly free from danger.

What we claim as our invention is—

In elevated arch railways, the combination of the segments  $a^1$ , binding-girders B B, cast-iron stiffeners C C, upright bars E E with shoulders  $e$ , and angle-iron guides or plates F,

all constructed and arranged substantially as and for the purpose set forth.

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Witnesses:

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