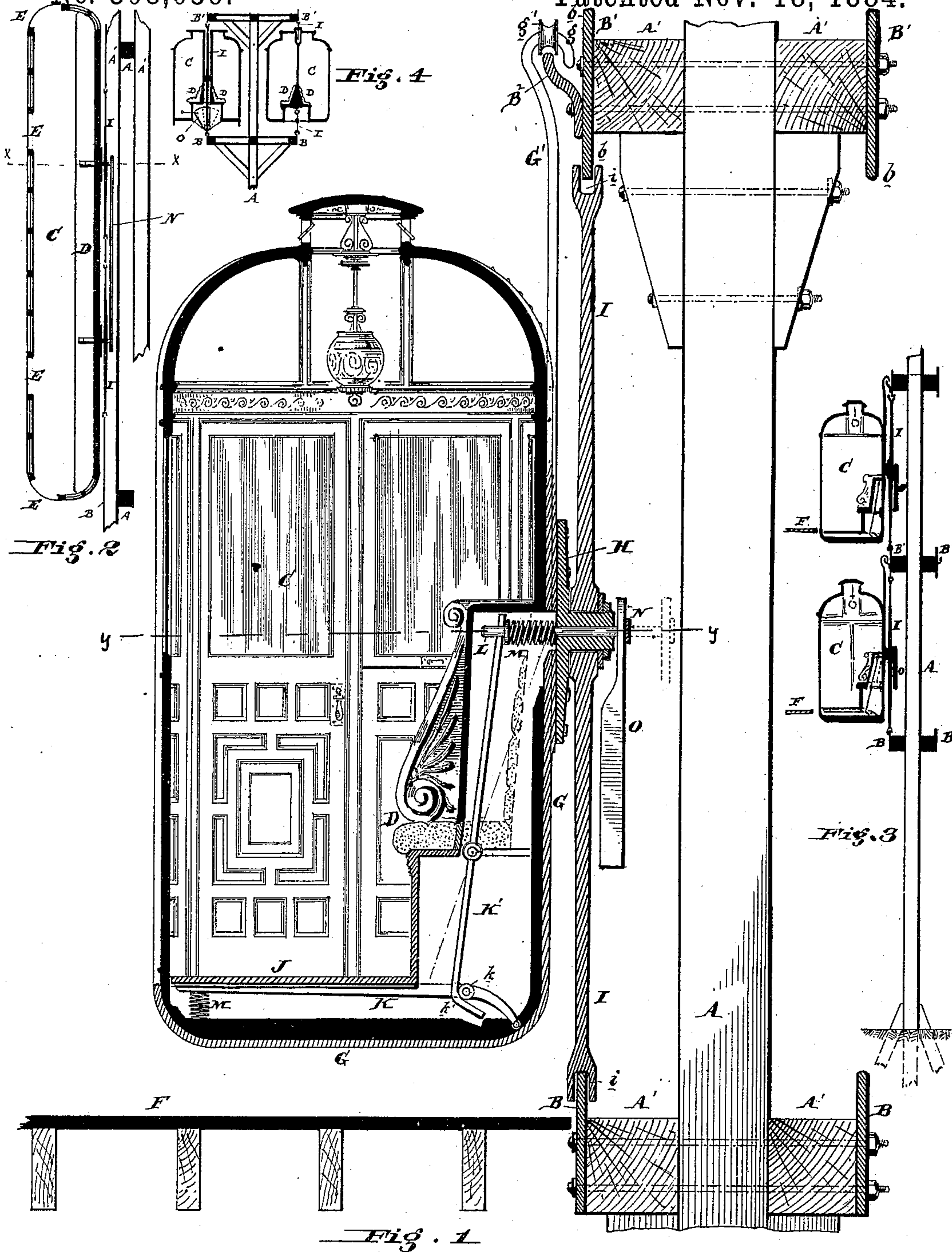


(No Model.)

T. P. CHANDLER, Jr.  
ELEVATED RAILWAY.

No. 308,059.

Patented Nov. 18, 1884.



Attest  
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Inventor  
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By *[Signature]*



# UNITED STATES PATENT OFFICE.

THEOPHILUS P. CHANDLER, JR., OF PHILADELPHIA, PENNSYLVANIA.

## ELEVATED RAILWAY.

SPECIFICATION forming part of Letters Patent No. 308,059, dated November 18, 1884.

Application filed January 30, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, THEOPHILUS P. CHANDLER, Jr., of the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Elevated Railways, of which the following is a specification.

My invention has reference to elevated railways; and it consists in arranging central supports or pillars with pairs of rails on one or both sides, and, if desired, one or more pairs arranged above the others, the rails forming each pair being secured to said pillars, one above the other, preferably in the same vertical line; further, in combining with a railway-bed, such as above set forth, a car having supporting-wheels and adapted to run upon said rails; further, in providing such a car with counterbalanced weights, preferably adjustable, whereby the strain upon the supporting-wheels may be transmitted vertically down through the lower rail; further, in combining with said counterbalancing-weights automatic mechanism, whereby said counterbalanced weights are automatically adjusted to counterbalance the car under all conditions of a varying load; further, in providing a car such as above set forth with a safety device, whereby if from any cause the wheels should leave the lower rail the said car will be supported by said device from the upper rail; further, in a car having a less height than the distance between said upper and lower rails, whereby the said car is enabled to turn corners or be switched off upon sidings or lines; further, in a car having a row of seats upon one side only and one or more doors upon the other side, and in many details of construction, all of which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

The object of my invention is to provide a simple and economical mode of travel for cities or suburbs, or for long-distance travel where speed is required.

By constructing a railway as herein set forth, the rails may be set in a horizontal line at a minimum cost, as the cost of the erection of the supports would be but trifling compared with the cuts and fills required in laying the foundation or bed of a modern rail-

way. By using wheels of large diameter I am enabled to attain speeds which are impracticable with the use of the small wheels now found upon all railway-coaches. By having a single-rail track, (the upper rail being simply a safeguard,) I am enabled to provide a high-speed railway with the least possible width of space.

In the drawings, Figure 1 is a cross-sectional elevation, taken on line *x x*, and shows my improved elevated railway system. Fig. 2 is a sectional plan, or same view, taken on line *y y*. Fig. 3 is a cross-section of the rail-bed with the cars thereon, showing a number of pairs of rails. Fig. 4 is a cross-section showing a modified form of supporting-wheels, and also the supporting-wheels passing up through the car, and the seats arranged on each side of said wheels, and the adjustable weights arranged to counterbalance the varying load carried by the car and arranged to be shifted to either side of said wheels.

A are the vertical posts or supports, and may be made of iron or wood and any suitable design. B are the main rails, and are secured to said posts by blocks A' or otherwise. These rails B may be formed on the outer edges of iron girders, the ends of which are supported by said posts A.

C is the car, which is preferably made long and narrow, and is provided with a row of seats, D, preferably on one side only and adjacent to the rails or supporting-wheels. The opposite side of the car is provided with doors E, opening out onto the platforms F at the stations. If desired, doors may also be placed at the ends. If desired, the supporting-wheels may be arranged to pass up through the car, as shown in Fig. 4, in which case two rows of seats may be used in any manner desired; but it is preferable to arrange them back to back and on each side of said supporting-wheels. The car-body should be made as light as possible consistent with strength, and is secured to the iron framing G, which extends down back of the seats and under the floor. This frame G has secured to it the wheel-bearings H, preferably two in number, and arranged comparatively close to each other. Upon these bearings the wheels I revolve, said wheels being made preferably of wrought-iron and of a diameter greater than the height of the car-



body A, as shown. The peripheries of said wheels are grooved, as at *i*, to fit upon the rails B B' with a small amount of lateral play necessary in turning sharp curves. Supported upon the outside of said bearings H is a bar, N, to which weights O are secured to counterbalance the weight of the car-body A and its load. By adjusting these weights to or from the wheel a less or greater leverage is obtained, and hence the counter-balance may be adjusted to suit the varying load carried by said car. To reduce this load to a minimum, the said seats D are arranged as close to the supporting-wheels as possible. To make the counter-balance automatic in its action, I support the car-floor J or seats D, or both, upon any suitable system of levers, as used, for instance, in platform-scales, or allow it to act upon the lever K, provided with a roller, *k*, which acts upon the bend *k'* of lever K', connected with the rod L, secured at the outer end to the rod N.

M are springs to resist the action of the floor J. In its normal condition the car-body A is counterbalanced by the weights O when close to wheels I; but should a number of passengers get upon the car this automatic device, above set forth, causes the springs M to be compressed and the rod L moved away from the car, which in turn increases the leverage of the counterbalance-weights O, and automatically counterbalances the car, with its increased load. In the case of the wheels I passing up through the center of the car, then the counterbalance-weight is shifted under the car or seats from one side to the other of said wheels.

From the foregoing it is seen that when running, the car is in all practical sense a velocipede, and theoretically will require no other support; but when slowing down or turning a curve where centrifugal force comes into play, the car would become derailed. Therefore, to guard against this, I place above the wheels I another rail, B', which I will call the "guard-rail," and this rail should expose an upper as well as a lower edge, *b*, the latter to fit the groove of the wheels I, and the upper to form a support for the guards G' to catch onto should one of the wheels I become broken and the car derailed, or to form the base-rail for the next system or railway above, in which case a rail, B<sup>2</sup>, is secured to said rail B, as shown, over which the guard G' runs. These guards G' are extensions from the frame G, and extend up over each wheel I and terminate in a hook, *g*, and, if desired, may be provided with a roller, *g'*. Under normal circumstances these guards are not in contact with the rails B' or B<sup>2</sup>, as the case may be. By making the wheels I of larger diameter than the height of the car-body A, the said wheels may be placed comparatively close together, and a long car used, as, in turning quick curves, the ends of said car may swing in between the rails B B', and which is also necessary when switching off onto sidings or branch tracks.

In place of wheels of larger diameter than the height of the car, smaller wheels may be

used, as shown in Fig. 4; but in any event the car-body must be of less height than the distance between the rails B and B'.

By arranging two pairs of rails upon each side of the support A, the lower pair may be utilized for accommodation trains, and the upper pair for express-trains, with but a small additional cost. In depots a series of platforms may be arranged one above the other, thereby requiring but a small amount of space—an important feature in city depots. These same supports A may be used for the telegraph-wires in lieu of the poles now in use.

I have not shown or described any specific means of locomotion; but it is evident that either a locomotive, cable, or any other means of propulsion may be used.

While I have described specific details of construction I do not limit myself thereto, as they may be modified in various ways without in anywise departing from my invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A railway consisting in rails arranged in pairs, one above the other, the top rail of one pair forming the bottom rail of the pair next above, between which the supporting-wheels of the car run, substantially as and for the purpose specified.
2. A railway consisting of central posts or supports having two or more pairs of rails located upon each side thereof, the said rails in each pair being supported one above the other in the same plane, the rails on each side of the central support being substantially in the same horizontal line and fully exposed throughout upon their outer sides, substantially as and for the purpose specified.
3. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car having supporting-wheels upon one side only, substantially as and for the purpose specified.
4. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car having supporting-wheels upon one side only and a counterbalancing-weight arranged upon the other side of said wheels, substantially as and for the purpose specified.
5. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car having supporting-wheels upon one side only and an adjustable counterbalancing-weight arranged upon the other side of said wheels, substantially as and for the purpose specified.
6. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car having supporting-wheels upon one side only, and a counterbalancing-weight arranged upon the other side of said wheels, and automatic mechanism to adjust



said weight to counterbalance the car under its varying load, substantially as and for the purpose specified.

7. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car having supporting-wheels upon one side only, and a safety-guard to catch upon the upper rail should said car become derailed, substantially as and for the purpose specified.

8. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car having supporting-wheels upon one side only, and a safety-guard to catch upon the upper rail should said car become derailed, and a counterbalancing-weight arranged upon the other side of said wheels, substantially as and for the purpose specified.

9. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car having supporting-wheels upon one side only, a safety-guard to catch upon the upper rail should said car become derailed, and an adjustable counterbalancing-weight arranged upon the other side of said wheels, substantially as and for the purpose specified.

10. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car having supporting-wheels upon one side only, a safety-guard to catch upon the upper rail should said car become derailed, a counterbalancing-weight arranged upon the other side of said wheels, and automatic mechanism to adjust said weight to counterbalance the car under its varying load, substantially as and for the purpose specified.

11. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car having supporting-wheels and seats upon one side only, substantially as and for the purpose specified.

12. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car having supporting-wheels upon one side only, and a counterbalancing-weight arranged upon the other side of said wheels, said wheels being of greater diameter than the height of the car, substantially as and for the purpose specified.

13. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car having supporting-wheels

upon one side only, and a safety-guard to catch upon the upper rail should said car become derailed, said wheels being of greater diameter than the height of the car, substantially as and for the purpose specified.

14. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car having supporting-wheels upon one side only, a counterbalancing-weight arranged upon the other side of said wheels, and automatic mechanism to adjust said weight to counterbalance the car under its varying load, said mechanism being directly acted upon by the floor or seats of the car, substantially as and for the purpose specified.

15. A railway consisting of supports or posts carrying two or more pairs of rails, the rails of which are arranged one above the other, said pairs of rails also being arranged on opposite sides of the supports, as set forth, one above the other, the top rail of one pair being integral with the bottom rail of the next pair above, substantially as and for the purpose specified.

16. The combination of supports A, rails B B', arranged in pairs, one pair above the other, and platforms F, on or about the levels of the lower rails, B, of said pairs, substantially as and for the purpose specified.

17. The combination of rails B B', wheels I, bearings H, frame G, and car-body A, substantially as and for the purpose specified.

18. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car provided with seats and its supporting-wheels, the seats of said car being arranged against or close to the said wheels, and counterbalancing-weights to balance the said car upon its supporting-wheels, substantially as and for the purpose specified.

19. A railway consisting in rails arranged in pairs, one above the other, between which the supporting-wheels of the car run, in combination with a car provided with seats and its supporting-wheels, the seats of said car being arranged against or close to the said wheels, and adjustable counterbalancing-weights to balance the said car upon its supporting-wheels, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

THEOPHILUS P. CHANDLER, JR.

Witnesses:

R. M. HUNTER,  
ISAIAH MATLACK.