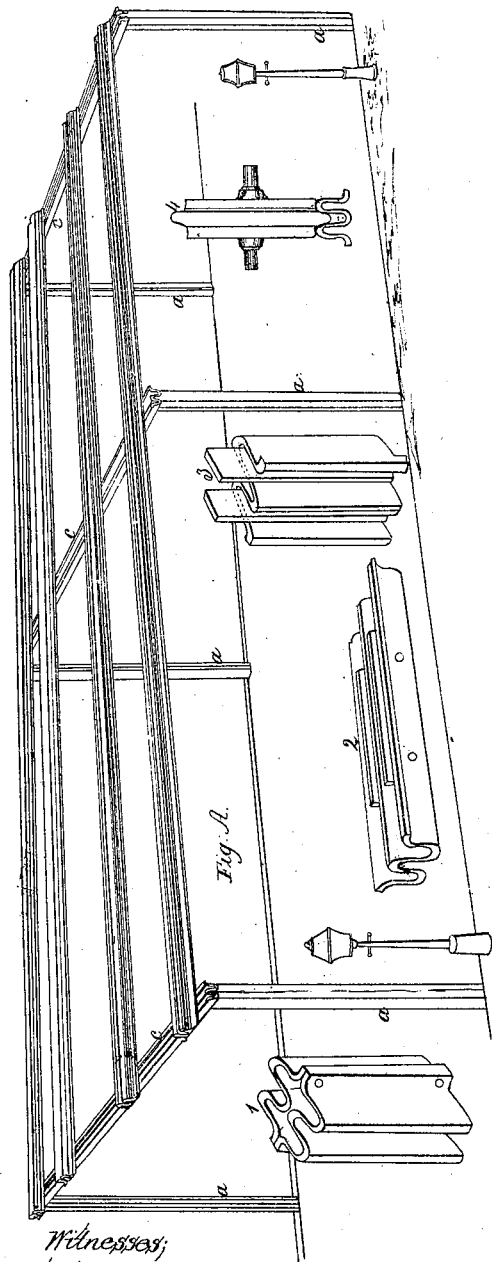


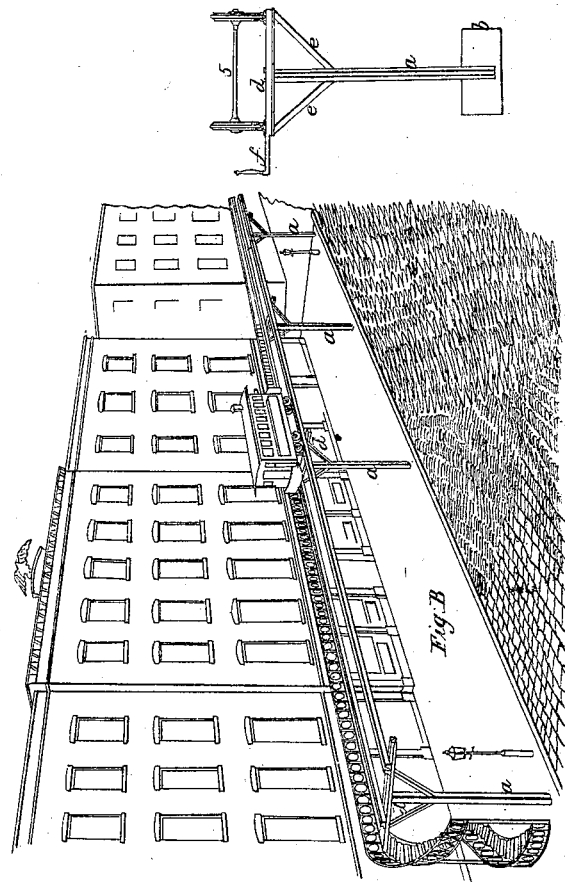
*R. Montgomery,
Elevated R.R.,*

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UNITED STATES PATENT OFFICE.

RICHARD MONTGOMERY, OF NEW YORK, N. Y.

IMPROVEMENT IN RAILROADS.

Specification forming part of Letters Patent No. 46,482, dated February 21, 1865.

To all whom it may concern :

Be it known that I, RICHARD MONTGOMERY, of the city and county of New York, in the State of New York, have invented certain Improvements in Railroads or in the Construction thereof; and with the view of securing to myself, my legal representatives, and assigns the exclusive right thereto under and in accordance with the patent laws of the United States, I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, constituting a part of this specification.

The object of my invention is to furnish an aerial railroad particularly adapted to the streets of cities and towns, but applicable also wherever else such a structure would be found advantageous; and its nature consists in the use in the construction thereof of corrugated beam-iron, its several parts properly secured together, and the whole supported upon a solid base, and the use of a condensing-engine, or what is known as a "dummy-engine," attached to each car for propulsion, the wheels of the car being constructed in a manner particularly adapted to this form of rail.

To enable others skilled in the art to make, construct, and use my invention, I promulge the following description thereof, reserving to myself, however, in doing so all the rights guaranteed to me, my legal representatives, or assigns by the laws and by the acts of Congress of the United States in such cases.

In the drawings hereto attached, forming, as before stated, a part of this specification, Figure A shows a section of the railroad constructed upon my plan when the structure occupies the whole width of the street from curbstone to curbstone. Fig. B shows a section of the road along and over the pavement or foot-walk. Nos. 1, 2, 3, 4, and 5 are details of parts which will be referred to and more fully explained hereinafter.

It is a well known fact that many of the principal streets and other thoroughfares of the larger cities are so crowded with omnibuses, carriages, drays, and other vehicles in that portion assigned them, while the footways are so obstructed with boxes, bales, barrels, &c., as to render them very inconvenient, and even dangerous to pedestrians. Even street-rail-

roads as now constructed upon the surface of the ground afford but a partial relief in such cases, and, where the streets are very narrow, become themselves an additional cause of obstruction and danger. Subterraneous ways and aerial roads of various kinds have been proposed to obviate this difficulty, and some of the former have actually been constructed and are now in use. There are, however, so many grave objections to these underground roads that they will probably never come into general use. The aerial roads are free from many of these objections, and if constructed so as to offer but little if any obstruction to travel, transportation, and the ordinary business of the street over and along which it runs, combining at the same time such solidity of structure as to remove all apprehension of danger from the mind of the most timid person, and affording free and easy access to and egress from the vehicles passing along them, there seems no reason why they should not be adopted where the exigencies of the case require some such additional mode of transportation. The aerial railroad which I have invented fulfills all these requirements, as will be seen from the following description.

This railroad is supported upon columns, as shown at *a a a a* in Figs. A and B and in the detail sketch 5. These columns are constructed of two corrugated beams brought together and properly fastened by rivets through their flanges. Detail Fig. 1 shows a section of a column thus made. They are intended to be of such a length as will raise the railroad to the required height above the general plane of the street or pavement to give free and unobstructed passway for loaded vehicles, banners, and such other things as may require this condition of things. As a general rule, this height appears to be about fifteen feet; but I do not confine myself to this or any other particular elevation. The lower end of this column or these columns is firmly fixed in a solid base-block or sill, *a*, (seen at *b* in detail, Fig. 5,) buried at a proper depth in the ground. This base-block or sill may be of stone, iron, wood, or any other appropriate material. In Fig. A the columns are represented as placed opposite each other, one on each side of the street in line with or near the curbstone. In this arrangement the cross-ties *c c c* rest upon the tops of the two opposite columns,

and consequently stretch entirely across the wagon or carriage way of the street. They may be made of a single corrugated beam, as represented in the drawings, or, where greater stiffness is required, they may be doubled and united as in the columns. Generally, however, a single beam will be sufficient, in which case I prefer to place them, as shown, inverted—that is, with the flanges upward—for the greater convenience of connecting them properly with the rail. The head of the columns and the end of the cross-ties must be firmly secured together, and this may be done by plates of iron passing from the outer corrugation of the column up into the inverted corrugation of the cross-tie, and riveted or in any other appropriate manner—as, for instance, as shown in diagram No. 3. The rails are also of corrugated beam-iron laid with their flanges downward, and riveted or otherwise firmly fastened to the cross-ties. If it should be deemed necessary, these rails may also be doubled or made of two beams united as in the columns; but this would rarely be necessary for cars devoted only to the transportation of passengers, particularly if the supports, the columns, and cross-ties are not placed too far from each other. Whether the single or double beam be used, however, the rail must be so laid upon the cross-ties as to make the central and inverted arch of the beam to look upward to receive the flange of the car-wheel, as shown in Diagram 4. The rails at their junctions are secured together by means of flat plates of iron extending a proper distance beyond the joint, placed in the double arches of the corrugation, and firmly riveted through and through, as shown in Diagram 2, which is an inverted section of the rail, showing graphically this mode of connecting the rails to each other. These rails are of course fastened properly by riveting or otherwise to the cross-ties. The number of tracks to be laid will be determined by the capacity of the highway and the travel. In Fig. A, I have shown two tracks; but I do not confine myself to this or any particular number.

Another form of constructing an aerial street-railroad upon this principle is shown in Fig. B. Here the track is chiefly within and over the pavement or footway, supported by a single line of columns formed and supported or fixed below the surface of the ground, as described in Fig. A. The cross-ties *d d* are made to rest upon and are secured to the upper end of the column *a a a*, and supported at their outer extremity by arms *e e*, as shown in detail, Fig. No. 5. This gives a very solid support to the rails; but if greater steadiness should be deemed necessary the cross-ties may be fastened to the adjacent building. The rails, cross-ties, and arms may be made of single beams or double ones, like the columns as already described. In both the forms of tracks footways may be made along the sides, as is shown in Fig. B and at *f* in the detail, Fig. 5, and from them steps, arranged at

proper intervals, may descend to the pavement below, as also seen in Fig. B. It will also often be found a matter of great convenience, both in dwellings, hotels, and stores, situated on a street where such a railway is constructed, to have steps or a platform extending from one or more of the second-story windows to this footway along the track.

In neither one of the plans shown in Figs. A and B will the columns interfere much more with the ordinary use of or travel upon the streets than is now done by the lamp-posts and hydrants; and, indeed, with columns constructed upon my plan they may be made a substitute both for the lamp-post and hydrant-box. It will be seen from detail, Fig. 1, which is a section of the column, that by its construction it necessarily forms two oval cavities in its interior, extending from the bottom to the top. Through one of these, gas-pipe may be carried and connected by a side tube to the lamp suspended from the cross tie or rail above, or otherwise supported, and through the other cavity the water-pipe may be carried up to a proper height and a nozzle or stop-cock attached thereto, passing through an orifice in the side of the column. Where streets are well lighted, as they generally are now along the principal thoroughfares of large cities, the lamp-posts occur at about the intervals that would be required by the columns of a railroad constructed according to my invention; when that is the case, the lamp post by the plan proposed might be entirely dispensed with.

By placing the beams for the line of the track as shown in diagram figure No. 4—that is, with the central arch of the corrugation inverted—a deep groove is formed between the two outside arches, which groove receives the flanges of the wheels of the car. I prefer placing the flange about midway around the face or periphery of the wheel, as seen in diagram, as this throws an equal pressure and wear upon the two arches of the beam or rail. The flange might be placed on the inner edge of the wheel, as is ordinarily done with railroad-cars, or on the outer edge or on both the inner and outer edge. These modifications would probably present themselves to any person entertaining fears of the filling up of the central groove by dirt, stones, snow or ice. In either case the tread of the wheel should be wide enough to rest on both the arches, because if only wide enough to cover one of them the weight of the car on this one would have a tendency to destroy the horizontal parallelism of the surface of the two arches of the beam or rail and cause the rail on which the wheel ran to wear much more rapidly than it would if the weight of the car were equally distributed between both.

I propose to use as the motive power for propelling the cars on the track a small condensing steam-engine, commonly known as a “dummy” or “dummy-engine.” Many objections present themselves to a stationary en-

gine and endless chain; one which would be fatal to it in cities and towns is that the numerous stoppages that would necessarily take place when several cars were attached to the same chain would produce so many interruptions to the progress of the whole, and so impede the movement of each, as to reduce the actual speed to a very low rate—too slow, indeed, for most persons who would otherwise avail themselves of this mode of transportation. Like objections present themselves to what is known as the “pneumatic” system, as a motive power in this case.

Dummy-engines, I am well aware, have heretofore been used on ordinary street-railroads; but I am not aware that they have ever before this been used as a means of propulsion on aerial railroads.

Having thus fully set forth the nature of

my invention, what I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The use of corrugated iron-beams in the construction of aerial railroads, substantially as set forth.

2. The use of flat beams or bars of iron for connecting the ends of the rails together, and also for connecting and fastening the columns of support to the cross-ties, in the manner and for the purpose set forth.

3. The use of corrugated iron-rails, in combination with corrugated iron cross-ties, and corrugated iron columns of support in the construction of aerial railroads.

RICHARD MONTGOMERY.

Witnesses:

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