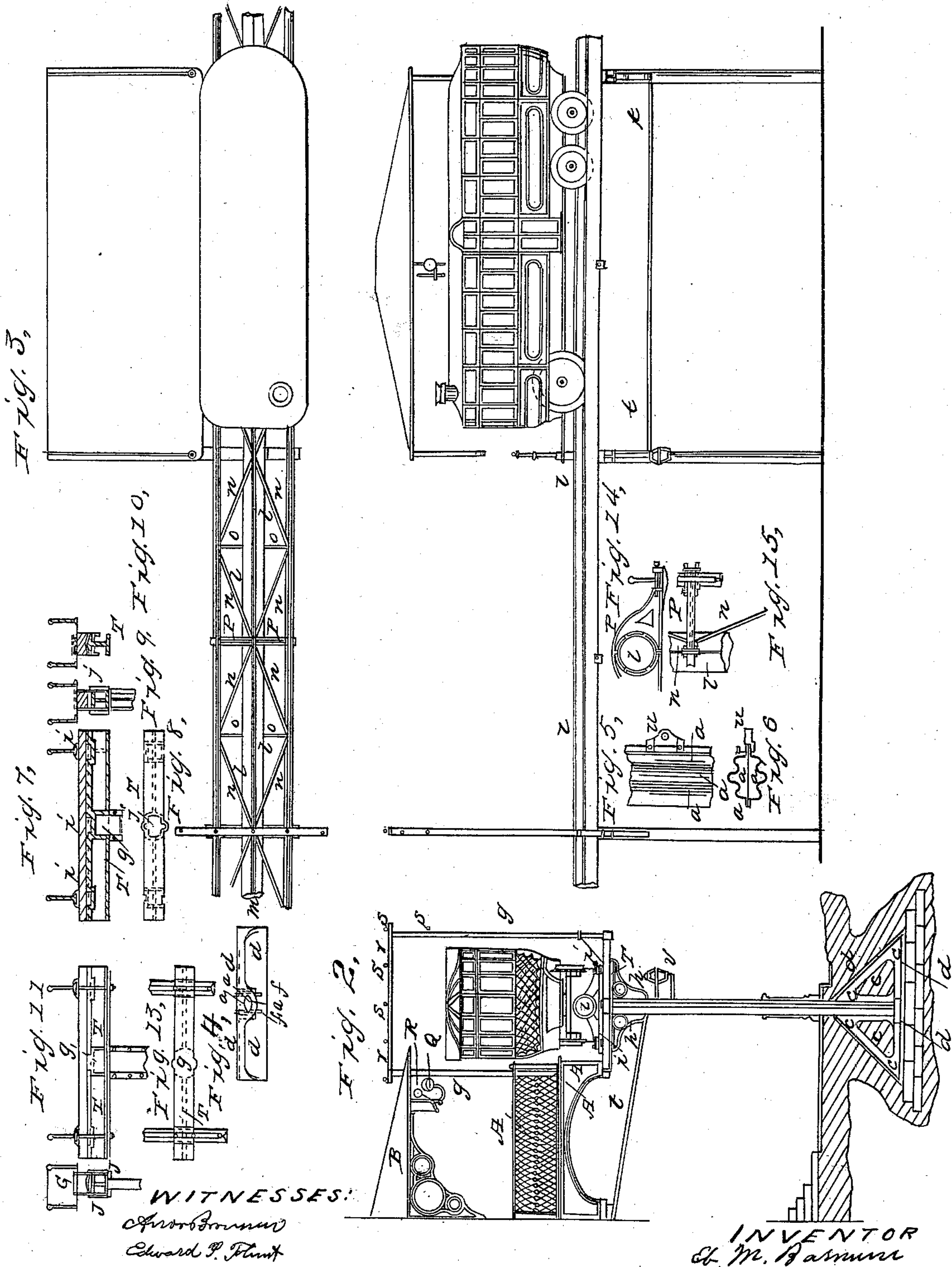


E. M. BARNUM.
Elevated Railway.

No. 80,530.

Patented Aug. 4, 1868.



United States Patent Office.

ELI M. BARNUM, OF NEW YORK, N. Y.

Letters Patent No. 80,530, dated August 4, 1868.

IMPROVEMENT IN ELEVATED RAILWAYS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ELI M. BARNUM, of the city, county, and State of New York, have invented a certain new and useful Combined Elevated Railway and Pneumatic Parcel-Dispatch; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawing, making part of this specification, in which—

Figure 3 is a plan of my said railway, with a car standing upon the rails thereof.

Figure 1 is a side elevation of said railway and car, and

Figure 2 is a cross-section through said railway, showing a rear elevation of the car.

Figures 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15 are parts of the fabrication to be hereinafter referred to.

The idea of an elevated railway is very old, and so, too, is the idea of a pneumatic tube, and various methods have been proposed of reducing them to practice, but the idea of uniting a pneumatic tube with an elevated railway is novel, to the best of my knowledge and belief, and, notwithstanding the various plans which have been proposed for elevated railways, nothing has thus far been presented which the people consider acceptable. The conditions necessary to fulfil are many, and difficult to accomplish. Still it is believed that they can be fulfilled, and a structure fabricated which will give general satisfaction, and supply a want that has long been felt in most cities, and especially in the city of New York. Such a structure or system of elevated railway, as near as I can judge, without absolutely building and putting in operation a road upon a large scale, I believe my invention to be, and that it will supply the want above referred to.

To enable others skilled in the art to which my said invention appertains to understand, construct, and use the same, I will proceed to describe, at large and in detail, the nature and extent thereof, and the manner of making and operating the same.

Similar letters of reference represent corresponding parts of the different figures in the drawing aforesaid.

My invention consists—

First, in a novel construction of the columns upon which both the railway and pneumatic tube are fabricated and supported, and which novelty consists in making the columns of three longitudinal sections, composed of sheet or plate-iron, or other suitable metal, two of which are corrugated, and formed with a flange along each longitudinal edge, as at *a a*, figs. 5 and 6, the flanges being represented by *a'*, and in then uniting these corrugated plates, by bolts or rivets through said flanges, upon a third plate, of plain sheet metal, arranged and secured between said corrugated plates, as shown by *b*. This construction yields a light, stiff, and cheap column, and one that is not displeasing to the eye, while, at the same time, it furnishes a ready means of applying the bracing to the structure. The central plate adds greatly to the lateral stiffness of the column, and may be corrugated without changing the principle of construction, and without very materially enhancing the cost.

Second, my said invention consists in a novel construction of the base-block or frame in which said column is to be set, and in the manner of introducing and securing said column in said base-block. The first part of this novelty consists in making said base-block of a cast-iron plate, *c*, in the form substantially of a triangle, with a broad flange, *d*, cast around the edges thereof, and with triangular pieces cut out of the disk of said plate, as shown by *e* in fig. 2; and the second part of this novelty consists in passing the column through a hole made in the top flange of the base-block, at the apex of the angle, of the exact size and shape of the column, as shown by *a*, fig. 4, and also in securing said column in said base-block only at its extreme lower end, in a socket cast in a boss made on the upper side of the lower flange of said base-block, by means of keys, *f f*, fig. 4. By these means, I secure great strength and firmness with comparatively little material, while, at the same time, I get a ready means of adjusting the column laterally (the only way it can sag) to its proper vertical position, for, by removing the earth at the side of the base-block, I have only to back one key, and drive the other, to throw the top of the column in the position required; and, moreover, by this construction of base-block, the earth can be readily forced into the inside, under, and in the flanges, as well as on the outside, making a compact mass of earth against every side and part thereof.

Third, my said invention consists in a novel method of making and applying the cross-head T to the top of the column. This novelty consists in making said cross-head in the form substantially of a compound T-rail, thus, π , as shown in fig. 13, which figure illustrates an end view of said cross-head, with the wooden cross-tie Q applied thereto; and said novelty consists in forming a socket, g , in the centre of said cross-head, with a bottom therein, to receive and rest upon the upper end of the column, as shown in figs. 7, 8, and 11 and 12, the former of which is a longitudinal section through said cross-head, taken far enough in front of the centre thereof to show the web, flanges, and socket, with the upper end of the column inserted therein, and the latter, that is, fig. 8, is a view of said cross-head turned upside down. Fig. 12 is a top view, and fig. 11 a side elevation. Said novelty consists, also, in securing and bracing said cross-head upon the top of said column by means of brackets, $h h$, the sides of which are rectangular, and the vertical side of which is made to span and fit the flanges $a a$ of the column, to which they are bolted through and through; and the horizontal or top side of said bracket is made to fit and bear against the lower side of the cross-head flange, to which it is bolted in the manner substantially as shown in the drawing. The upper sides of the brackets are made long enough to a little more than equal the gauge of the railway when applied to the column, so that, in case the cross-head should break, the broken part cannot get away from its place without also breaking the bracket.

Fourth, my invention consists in a novel method of making, applying, and securing the cross-ties to the cross-heads of the columns. This novelty consists in making cavities in the under side of said tie, and in filling the same with pieces, i , of India rubber, formed to correspond in shape with the top of the cross-heads, which said ties are firmly held by bolts, $j j$, leading from the rail-chairs down each side of the tie and cross-head, and through grooves made in the sides of said ties and cross-head, fastening in a strap, k , passed under the cross-head somewhat in the form of a yoke. The arrangement is shown in figs. 11 and 9. The object of the intervening pieces of India rubber between the rail and the cross-head of the column is to deaden the noise and neutralize the vibration of the structure, and thus avoid, as far as may be, the crystallization of its metal parts.

Fifth, my said invention consists in combining, with an elevated railway, a pneumatic tube or pipe, l , for the transportation of letters and small parcels. This tube I prefer to make in semi-cylindrical sections, of convenient length, with a flange, raised or cast, on their opposite diameters, by which I join them together with bolts or rivets. I then make suitable bearing-pieces or blocks, either of wood or metal, for said pipe to rest in, and locate them on the centre of the cross-ties, directly over the top of the columns, and secure them there with suitable fastenings. I then arrange the tube in its bearing, so as to bring the flanges aforesaid directly upon a vertical plane, in the manner shown, the bearing-blocks having grooves made in them, to receive the lower flange on the tube, and aid in holding it in position. The bearing-blocks or brackets may, however, be cast on the tube, in case it be made of cast iron, but whether these bearing-pieces or blocks be cast on the tube, or are made separately, is a matter of not much importance, and may be left to the discretion of the engineer constructing the railway. Care, however, must be taken, in making and uniting the pipe, to provide for its expansion and contraction. This I propose to provide for by means of a slip-joint of the usual construction, that is, a joint formed by making a parallel enlargement on one end of the section big enough to receive the end of the contiguous section or length, making the joint tight and smooth either by accurate fitting or suitable packing. Having thus made and located the tube, I make it an integral and essential part of the railway, by means of braces $n n$, the stays $o o$, and the supporting-arms $p p$, the braces leading from the upper flange of the tube, to which they are fastened at a point over the cross-ties, to the rail, to which they are likewise fastened, at a point about midway between the tie and the supporting-arm p , upon the stays o , the latter being bolted to the lower flange of the tube, thus forming a system of triangular bracing between the tube and the rails, both vertically and horizontally, the braces reaching from the top of the tube to the bottom or centre of the rails, supporting them vertically, and at the same time, through the agency of the stays o , tie them firmly to the tube horizontally, the whole forming a ridged trestle-work of superior strength and firmness. The supporting-arms p are made to span the tube, and are fastened to the flanges thereof, and are long enough to reach out and down under the bottom of the rails, there being a jaw formed on the outer ends of said arms to receive the rails. Said jaws are fitted with set-screws on each side of the rails, and also under the bottom thereof, if need be, to adjust them upon parallel planes.

Sixth, my said invention consists in combining, with an elevated railway, a framework, or a series of poles or staffs, to carry a line or lines of telegraph-wires upon the line of said road. This combination, as illustrated by the drawing, consists of staffs or poles, $q q$, raised upon each side of the railway, the bottoms whereof are secured to the cross-ties at proper intervals, and the tops whereof are united by means of a tie, r , reaching from one pole to the other, and in which as many insulators s may be put as circumstances may require.

Seventh, my said invention consists in combining, with the columns of an elevated railway, a rod, reaching from column to column, for the support of awnings over the sidewalks of cities, or wherever such things may be necessary for the convenience of shopmen or merchants. This awning-rod is shown in the drawing by t , and it is secured to the columns by means of lugs u , bolted or fastened by set-screws to the flange of the columns, and may be on the inside or outside of the columns, to suit the convenience of the persons using it.

Eighth, my said invention consists in combining, with the columns of an elevated railway, the lamps used to light the city, and commonly known as the city lamps, the column, in this case, serving the double purpose of supporting the railway and the lamp, the columns taking the place along the sidewalk of the lamp-post, now in common use. The relation of the lamp and column is shown in the drawing by v , the lamp being attached to the column by means of a suitable bracket, ornamented or otherwise, as the taste may require.

Ninth, my said invention consists in combining, with an elevated railway, a balcony, or a series of balconies, reaching from the railway to and connecting with the buildings at proper intervals along the line of said

railway, by which passengers are enabled to walk from said buildings to said railway, and get into the cars thereof. This combination is shown in the drawing by A. It consists of a simple platform, enclosed by a railing, and with one end or side thereof supported by brackets, columns, timbers, or bolts, against or in the wall of the buildings, and with the other end or side resting on a suitable projection or support attached to the railway; or it may be supported by columns, though I prefer to let it rest on the railway, to which, however, it must not be fastened, but left to rest simply on the supports made to receive it. Said balconies or platforms are to be covered with a suitable roof, as shown by B, and are to provide the means of ingress and egress to the cars of said railway at the various stations along the line thereof.

Tenth, my said invention consists in combining and connecting, with an elevated railway, a series of signals, for the purpose of regulating the running of the cars thereon. Said combination consists of a lamp or light, attached to said balcony, or the roof thereof, or to the telegraph-poles, or to a staff or frame attached to or set by the railway, and of a shade arranged in connection with said light, by which it can be covered and uncovered by the station-master, at pleasure. The operation of this signal is as follows: At night, when the lamp is burning, the station-master raises the shade R, and informs the conductor that there are passengers in the station by exposing the light, and, per consequence, informs him that there are no passengers by leaving the shade down in front of the light; or the operation may be reversed, as the rule may be. In the day-time the station-master informs the conductor that there are passengers in the station by raising the shade so as to show two objects, viz, the lamp and shade, and, per consequence, informs him that there are no passengers by leaving the shade down, showing but one object; and the operation may also be reversed in this case, as the rule of the company may require. The shade R is set on a pivot or shaft near the lamp, and is operated by means of a lever and cord, leading into the station-room, as shown in fig. 2.

Eleventh, my said invention consists in combining the various improvements hereinbefore described with each other, respectively and collectively, in one system of elevated railway, united with pneumatic tubes for transporting small parcels.

Having now described the nature and extent of my said invention, and the manner of making and using the same, I claim as new herein, and desire to secure by Letters Patent—

1. The construction and arrangement of the supporting-columns of three plates, two outside corrugated plates joined upon a third central plate, arranged substantially as described.

2. The construction and arrangement of the base-block of the columns, substantially in the manner described, with a bearing in the top and bottom thereof, the bottom bearing being fitted with keys, by which the column can be adjusted to a vertical position after the base or foundation-block has been set, and without disturbing the same, the upper bearing acting as a fulcrum, by which the keys in the bottom bearing bring the tops of the columns to their proper position, in the manner substantially as described.

3. In combination with the top of the columns, a separate cross-head, T, constructed, applied, and secured, substantially as described.

4. Combining, between the wooden cross-tie Q and the iron cross-head T, when constructed, the latter with a V-shaped top and the former with a V-shaped bottom, the India-rubber bearing-pieces *i i*, inserted in the recesses cut in the bottom of the cross-tie, so as to shed the water, and avoid the accumulation of ice and dirt around the rubber.

5. The method and arrangement of securing the cross-tie and rail-chair to the cross-head, substantially as described.

6. Combining, with the columns and rails of an elevated railway, a pipe or tube, for the purpose of supporting, sustaining, and bracing the same, substantially as described.

7. In combination with the supporting-columns, the adjustable brackets *u*, figs. 5 and 6, for supporting the awning-rods *t t*, and by which they can be moved up or down, or attached to the inside or outside of the columns, substantially as described.

8. In combination with an elevated railway, and as part of the system herein described, the construction and arrangement of the described signals to govern the movements of the cars, substantially as described.

ELI M. BARNUM.

Witnesses:

AMOS BROADNAX,
EDWARD P. FLINT.