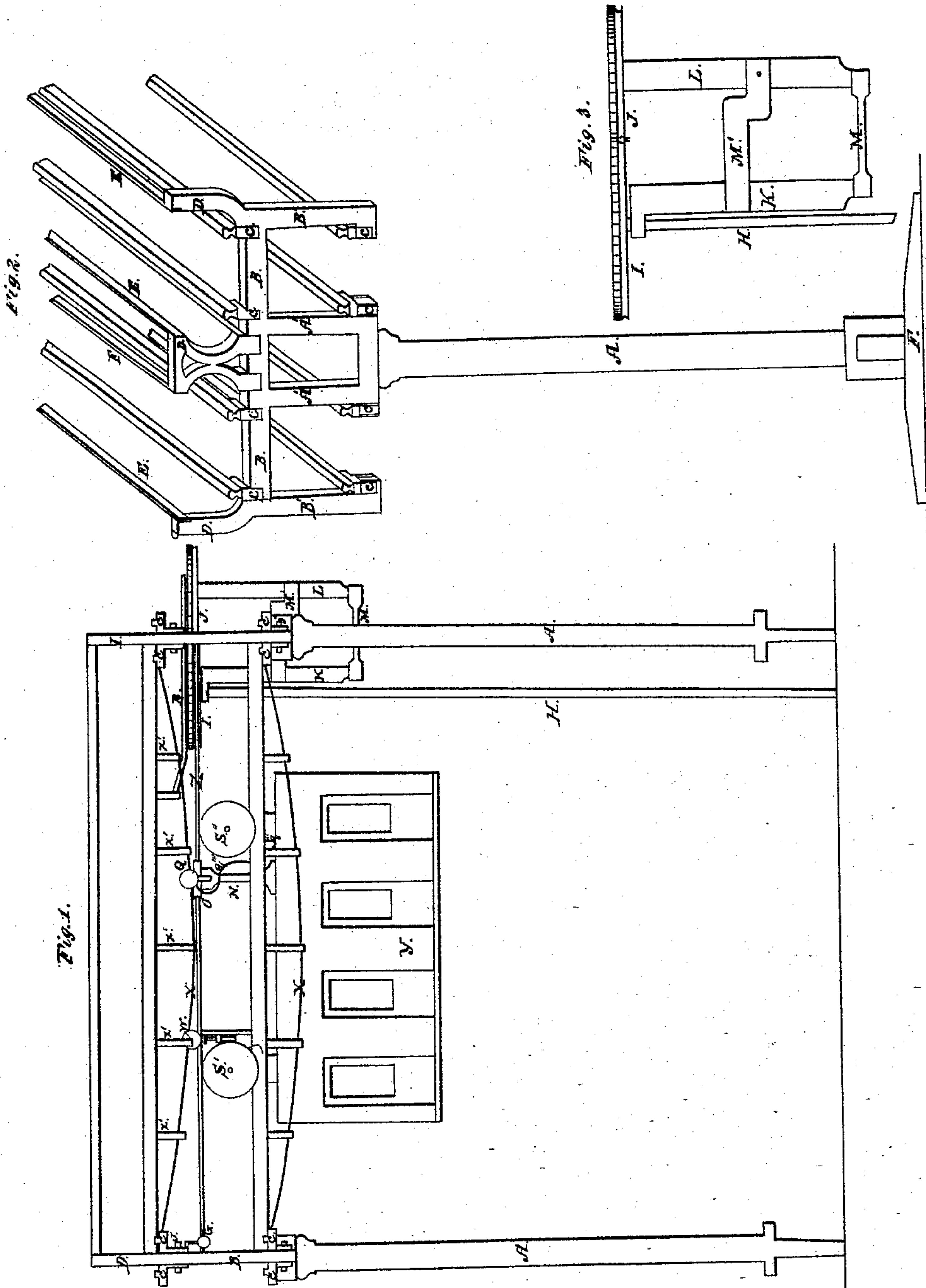


P. ANDREW.
ELEVATED RAILROAD.

No. 32,606.

Patented June 25, 1861.



Witnesses:

C. P. Allen
W. G. Gale

Inventor

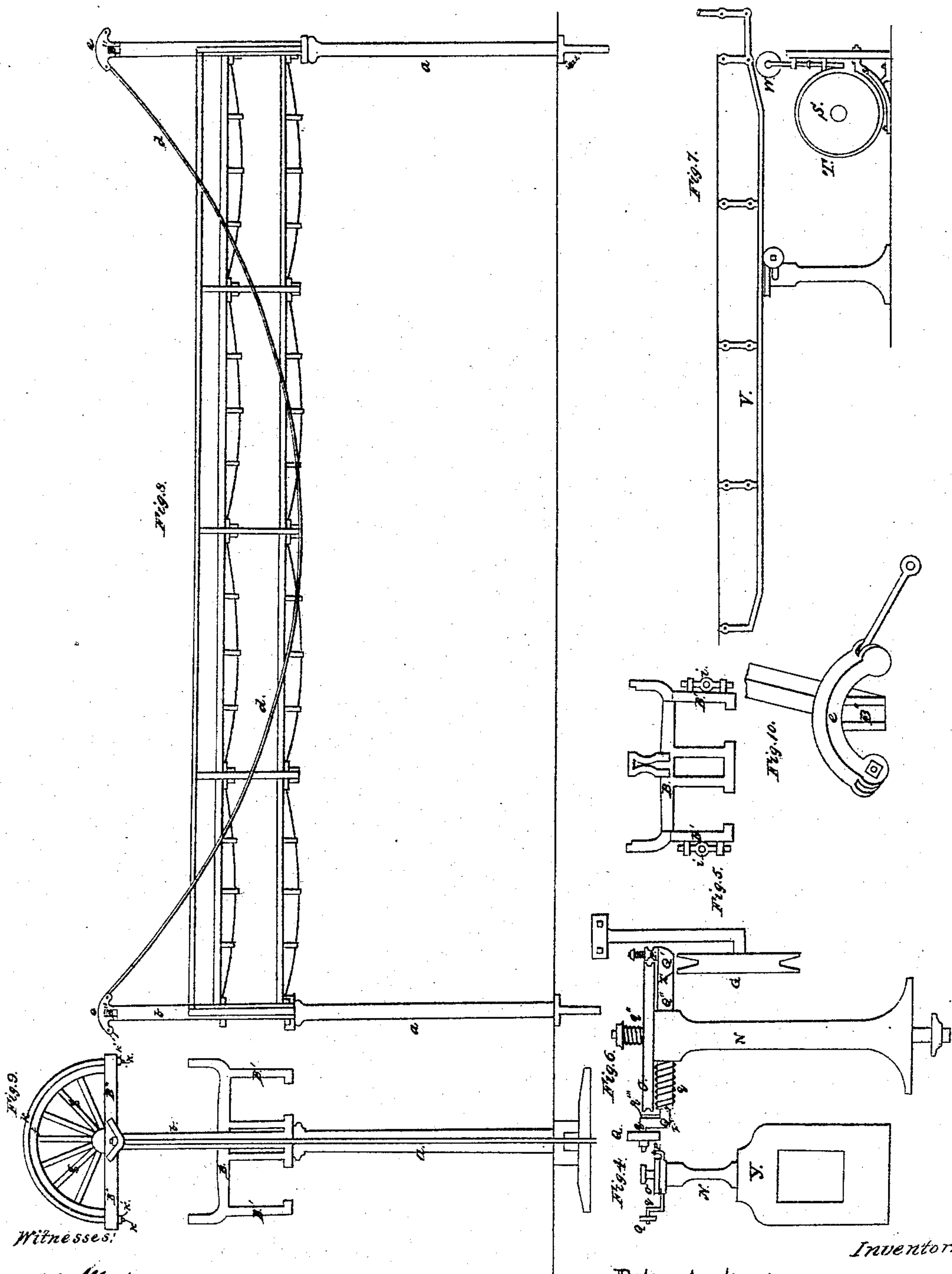
Peter Andrew
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

P. ANDREW, OF CINCINNATI, OHIO.

CITY RAILWAY.

Specification forming part of Letters Patent No. 32,606, dated June 25, 1861; Reissued November 19, 1867, No. 2,799.

To all whom it may concern:

Be it known that I, PETER ANDREW, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and improved construction of railway for city purposes, designed to be extended along the outer edge of the sidewalks and over the same; and I do hereby declare the following to be a full and sufficient description thereof, reference being had to the annexed drawings and references thereon, forming a part of this specification.

The invention consists in the arrangement for operating a quadruple track railway sustained upon a single row of pillars of iron, planted firmly in bed plates or footpieces of the same metal in or under the outer part of the sidewalk, there being two tracks for cars side by side, and nearly on a level with the sidewalk; and two other tracks also side by side at a little space above the lower range of cars and sufficiently far to avoid coming into contact.

In the accompanying drawings, similar letters refer to similar parts in all the figures.

Figure 1 is a longitudinal elevation of a single reach of railway and car. Fig. 2 is a perspective of the quadruple track; Fig. 3, an elevation of a part of the propelling gear; Fig. 4, an end view of the car and a part of the propelling gear. Fig. 5 is a guide pulley to be used in keeping up the propelling rope; Fig. 6, an enlarged view of a part of the details of Fig. 4. Fig. 7 represents the brake apparatus for stopping the cars. Figs. 8, 9 and 10 represent a modification of the frame work for sustaining the track in crossing streets, in which Fig. 8 is a longitudinal elevation, Fig. 9 an end view, and Fig. 10 an end view of the frame-work sustaining the track. Fig. 11 is a separate view of the chair.

In the arrangement for the city railway here described, the propelling apparatus is designed to be located in a house, or under the sidewalk, and connected with a shaft arranged vertically and passing up through the sidewalk. That used and shown in the drawings is shaft H. The power is adapted to a distance as great as is equal to the length of a single reach of rope, or the distance between the two pulleys of the propelling ropes, and when the cars shall have arrived at the end of any reach, a new reach,

and a new stationary engine and shaft are adapted to take the car from end or terminus of the first reach and transfer it to the second and so on. As the car on approaching the terminus of the first reach has sufficient impetus to carry it forward till it shall be entirely on the rails of the new track, all that is required of the conductor will be to see that the automatic gearing and ungearing apparatus be kept in order; so that the gearing of propelling rope of one reach shall properly detach itself when the car arrives at the end, and attach itself as the car enters upon a new reach. The car may thus be carried forward from one reach to another and from one stationary engine to another until it shall have traversed the line of the road. Suppose it has arrived at the end of the road and is about to return on the contiguous track, which is on the same horizontal level, the car is to be transferred from one track to the other by a sliding table, in a manner well understood by those skilled in the art and which therefore need not be described.

In the drawings A A represent two of a row of columns on which the frame work and cars are supported. A', A', are two other columns erected on the top of the first ones for sustaining the frame work of the tracks. B, B', represent other parts of the frame work of the track.

C, C, &c., represent the chairs or seats on which rest the several tracks.

D, D', are upright posts for sustaining the guides.

E, E, are guides for keeping the upper trains of cars on the track. The lower, being suspended, need no guides.

F, F, are bed pieces, for sustaining the pillars or columns in a vertical position.

Small pulleys G may be used for guiding the propelling ropes.

H, represents the driving shaft, from it being the connection between the stationary engine and propelling ropes.

I represents the pinion wheel of driving shaft H.

K is a lever geared with another lever L, both being used to control the propelling rope on the pulleys.

J is a pinion geared with pinion I.

M is a rod for connecting and operating levers K and L to operate propelling rope and keep the same to the pulley.

M' is the fulcrum piece to act as the fulcrum of levers K and L.

N is an upright column extending from the top of the car and having on its upper end devices for gearing and un gearing with the propelling rope; O, the wheel acting as a pulley against the groove of which the rope is held by the roller, or bearing piece, P, which bearing piece, as described below, performs the function of gearing and un-gearing the cars with the rope.

Q is a friction pulley to be received against the under face of pinion I, for un-gearing the propelling rope.

(q) is a crank on which pulley Q is geared.

Q' is the shaft on which the pulley Q and crank (q) are mounted, the shaft being bent at right angles, at end into a bearing piece, P, at the right hand end, and into crank (q) at the opposite end.

(q' q'' q''') are springs for operating the gearing rope in connection with wheel, O. When (q''') is used, q' is not needed. Although each is shown in the drawing one can be used at a time and they are therefore equivalents of each other.

R is a bar arranged in the track frame work and near the end of the reach against the under side of which pulley Q is received, for un-gearing the rope. It is inclined upward each end.

Q'' is a sheath in which the shaft lies and rotates in part, having a back and forth movement of 60 to 90 degrees.

S is a brake wheel for stopping the cars.

S' and S'' are the front and rear car wheels; (s) the attaching part of friction belt, T, to the bearing block under the arch of wheel S'.

T is a steel friction belt around the periphery of S.

U is an operating shaft for controlling band T.

(q''') is a spiral which, may at some time be used, (although not regarded necessary,) to coöperate with the spring of belt T to keep it from contact with the periphery of the wheel.

W is a plain pulley wheel on top of shaft, U.

X is a truss rod.

X' are braces for support of truss rod.

(x) is a pin in shaft Q.

(x') is the oblique truncation of sheath Q''.

(a) (a) represents an extra reach of frame support for the cars, showing how the cars herein described might cross a broad street on the same principles as are shown herein-after, and applied to the side walks of streets. The drawings of this modification introduce no new principle but a mere change of proportions so that the same truss rods or ropes are used but to span a larger

or smaller arch, over a longer or shorter reach.

b is an extra column placed upon the top of column (a).

B'' B'' represent a cross piece for sustaining arch (f).

(d, d,) are wire truss ropes for sustaining the weight of the frame.

(e, e,) are saddles for attachment of the wire ropes at each end.

(f) is an arch, (g g) braces, (h) the outer band of the arch.

(k, k',) are nuts and bolts for holding the band (h) in place.

(i' i') are spurs on chairs (C, C).

(i'' i'') are legs or downward projections.

(i i) are bolts through which wire ropes (d d) may be passed.

(j j) are bolts for fastening the chairs in place.

If we carefully examine Fig. 2, we find a perspective of an end view exhibiting four different tracks two above, side by side, and two below, side by side. The car as seen in Fig. 1. is suspended below the track, while the two pairs of wheels S', S'', rest upon the track. No cars are provided for the upper track, which is arranged only for those now in use. Supposing now the suspension car to be coming in on the left hand track of lower level (Fig. 2) and to have passed entirely out. On coming outside, the car runs upon a sliding table, so arranged on ways as to traverse from side to side between the space embraced by the two uprights B' B' by means of which the car is transferred from the left hand to the right hand track. By reversing the same movement the car may be transferred from the right to the left hand track. The sliding table and methods of operating it being well known are not here described. The great object here being to economize street room, over carriage ways and to bring the cars to a convenient position for foot passengers on the side walks, without incommoding stores and shops on the streets, the cars are arranged to run directly over the curbstone, one half being over the paved carriage way and the other over the outer edge of the sidewalk. The power is distributed among several stationary engines, one engine being required for each reach of endless rope. The cars having no great weight, may be very light, with sufficient width only for two passengers abreast. For this suspension railway a row of iron columns A, is arranged upon the outer portion of the side walk in range with the line of curbstones, resting in and upon strong iron sills or foot pieces, F, embedded in stone work underneath the walk. These foot pieces extend out on each side and thus brace the pillars and keep them in an upright position. On the top of these columns A is mounted the iron

frame work to support the tracks as seen in Figs. 10 and 2. The frame work consists of upright pieces A' , A' , sufficiently far apart to allow room for the tracks. Across these
 5 pieces rest the bearing arms B , B , extending to the extreme sides of the tracks. From the ends of arms B , B , are erected the vertical, B' , B' , on the inner face of the lower part of which are projections for supporting the
 10 outer tracks, while the inner are supported from like projections from the outer faces of the upright pieces A' , A' . The upper tracks or rails rest on the bearers B , B , or on projections from the upper part of the sides
 15 of the said pieces A' , B' respectively. In all of the tracks, between the projections or bearing parts and the rails are interposed seats or chairs, C , in each case, as seen in Fig. 11. in a separate view, also in place in
 20 other figures. Chair (C) is a flat piece of iron of the width of the rail, the center of which rests upon the prejection or arm. Across the upper portion of it, and extending from side to side thereof is a spur
 25 (i') received into a corresponding slot in the under side of the rail, but not shown in the drawings. On the lower part of the chair depend two projections (i'' i'') embracing
 30 bearers B , B , or otherwise the projections for sustaining the rails of the lower track. A bolt, (j j) &c., make a firm fastening of the chairs in their places. Curved up-
 35 rights D , D' , and compound side rails E , E , are used to guide the cars and prevent them from running off from the track as shown in Figs. 1 and 2, and avoid the necessity of
 40 flanges on the wheels. The rails between the chairs are sustained by truss rods X , screwed into the ends of the chairs and braced by rods X' , at sufficient intervals for giving
 suitable strength.

The cars, Y , are of a sufficient width to seat comfortably two persons abreast and are designed to be supplied with a door on
 45 each side of the car, thus reducing the car to the smallest width, and affording the greatest facility of egress and ingress, each seat being separate and independent of those before and behind it. The cars are propelled
 50 by a succession of endless ropes, Z , which may be supported at intervals by guide pulleys sustained on the frame. The form of such a pulley is seen in Fig. 5. The cars are suspended from the axles of S' , S'' by
 55 interposed block pieces, (not represented in the drawings) and properly bolted thereto, while the blockpieces, generally made of wood, have resting upon their upper surfaces, the metallic bearings of the axles S' S'' .
 60 There being nothing peculiar in these bearings they are not shown in the drawings. Between wheels, S' , as seen in Fig. 1, is arranged brake wheel, S , seen on a larger scale in Fig. 7, and being made fast to the axle
 65 of the car, controls its motions as follows:

The steel band T being made fast at its lower part to the block piece, lying between wheels, S' , and immediately under wheel, S , by the interposed metallic attachment (s) and connected at its upper end by means of
 70 the shaft, U , to wheel, W , by which the shaft and belt are operated, by bearing the belt T against the periphery of wheel S , and thus control the motion of the car. Spiral spring
 75 (q'''') surrounds the shaft, U , whenever it should be found that the spring of T is insufficient, but in ordinary use the spiral spring is not necessary. When the cars are
 80 in motion, belt T , is not in contact with wheel, S , but is sustained at a little distance from it by its own spring. This brake apparatus may be operated solely by the conductor who has a station in that part of the
 85 car immediately under it, by means of a cord attached to shaft U , in any convenient way, or there may be arranged at certain stopping places, fixed horizontal bars against which
 90 wheel W shall impinge to operate the brake automatically, in the same way as bar R , operates the gearing apparatus presently to be described.

The gearing apparatus is seen in Figs. 1, 4, and 6, as supported on the top of column N , and consists mainly of pulley wheel O ,
 95 bearer piece, P , and friction wheel, Q , and shaft Q' , and sheath Q'' ; besides these are the crank (q) of the shaft. The spiral spring (q'') to keep pulley wheel O , at the
 100 proper level to correspond with the height of the propelling rope. Springs (q''' , or q') are designed to control the reciprocal rotation of shaft, Q' . Only one of these springs is required to be used. If (q''') be used, (q')
 105 is not wanted. If (q') be used (q''') is not necessary. Letter (x) represents a pin in shaft Q' , and (x') the oblique truncation of the end of, Q'' , where it meets the corresponding
 110 face of shaft, Q' , on one part of which is an enlargement which acts as a stop. This stop is not seen in the drawing, but being a device well known in mechanics, need not be particularly described. Now
 115 keeping the eye on Fig. 6, it will be readily seen that if the wheel Q , or crank (q) be pushed away from the operator so as to give a partial rotation to shaft, Q' , the spring
 120 (q''') the spiral truncation of sheath (Q'') at each end, that is, at (x) and (x') conspiring together, cause the partial rotation of the shaft to be attended by a sliding motion of the shaft to the right; so that the
 125 bearing piece P , which being carried away from the operator, and bent downward toward the horizontal line, is at the same time moved toward the right, and away from pulley wheel, O , and the car being in motion
 130 detaches itself from the rope, which was before firmly held to the groove of the pulley by bearing piece P . Now fixing the eye upon Fig. 1, and supposing the car to be mov-

ing toward the right, and to be nearly at the end of the reach of this endless rope, the pulley Q is now received under the inclined portion of bar, R, and so depressed as to be detached from the propelling rope, as already explained, and the car, from the motion already communicated to it, rides freely out of the reach and stops at the terminus, or enters upon a new reach as the case may be. If it enters upon a new reach, then at the commencement of this reach a bar like bar, R, again depresses pulley, Q, and the propelling rope of the new reach drops into its place between the groove of O, and bearing piece P.

It is found that as considerable strain comes upon rope, Z, in long reaches and especially when heavy loads are put upon the cars, the driving pulley I, has a tendency to be drawn away from pulley J. To obviate this tendency the leverage shown in Fig. 3, has been devised. K and L are the levers bearing upon the pinions I and J geared to the fulcrum piece M' resting upon column A, to the top of which M' is firmly bolted. M is the connecting rod holding the two levers parallel with each other, so that whatever be the movement of one lever, the corresponding portion of the other lever shall have a like movement in the same direction, and hold a corresponding position. Thus if the weight of the ropes, or the load put upon them, have a tendency to draw pinion I away from pinion J; and if the upper part of lever, K, be supposed to be moved by shaft, H, so that the cogs of pinion I shall tend to diverge or separate from those of pinion, J, then the lower part of lever, K, by this movement presses against the lower part of lever L, through connecting rod M, and forces or tends to force it outward, and the upper part of the same

lever inward in the same proportion, and the rope will consequently be held close against the groove of pinion I, and pinions I and J will be held firmly in contact. Any movement of pinion I being made therefore, either toward or from the propelling rope, would be attended by a corresponding movement of pinion J, and in the same direction. This arrangement therefore causes the pressure upon the rope to be in proportion to the weight of the load to be drawn.

What I claim as my invention and desire to secure by Letters Patent is—

1. The arrangement of a quadruple track upon a single row of pillars provided with cross arms for suspending the cars therefrom as set forth.

2. The arrangement of the guide rails E, to obviate the necessity of using flanges on the car wheels in the manner and for the purpose set forth.

3. The arrangement and combination of levers K, and L for holding the propelling rope firmly against the groove in wheel I.

4. Operating a car or cars by a succession of endless ropes, so arranged that on leaving one endless rope the car detaches itself therefrom, and attaches itself to that of the next succeeding reach in the manner and for the purpose set forth.

5. The combination of the gear apparatus O, P, Q with rope, Z, and bar R for attaching and detaching the cars from the propelling ropes.

6. The arrangement and combination of wheels, S, and band, T, as described and for the purpose set forth.

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