

*J.P. Woodbury,  
Street Steam Car,  
No. 48,008,  
Patented May 30, 1865.*

Fig. 1.

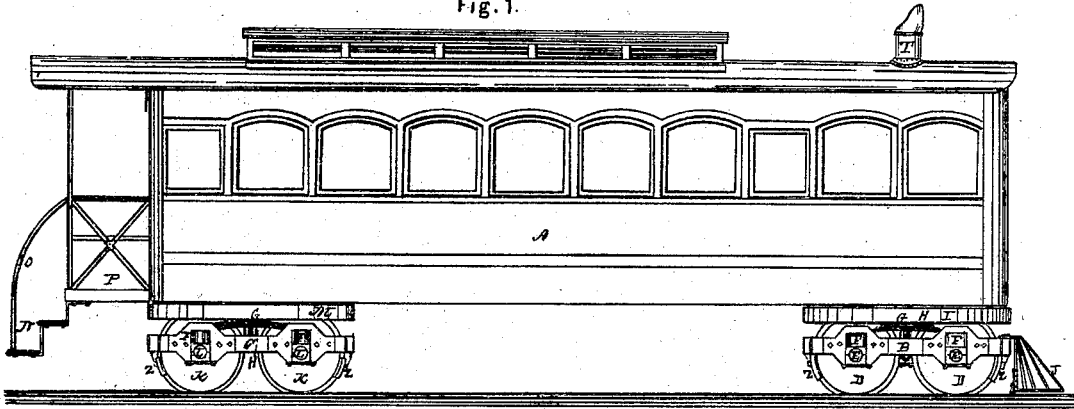


Fig. 2.

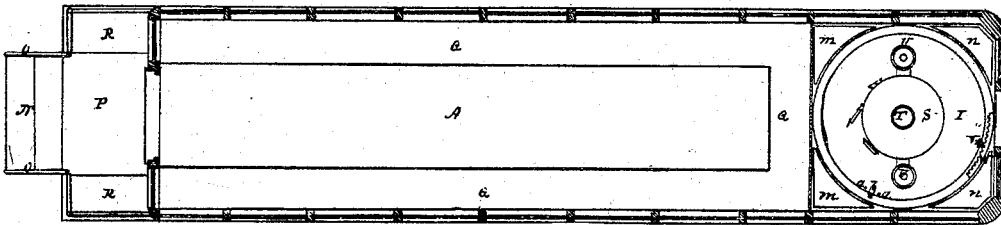
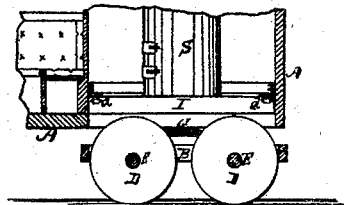


Fig. 15.



Witnesses  
*N Ames*  
*C D Smith*

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Fig. 3.

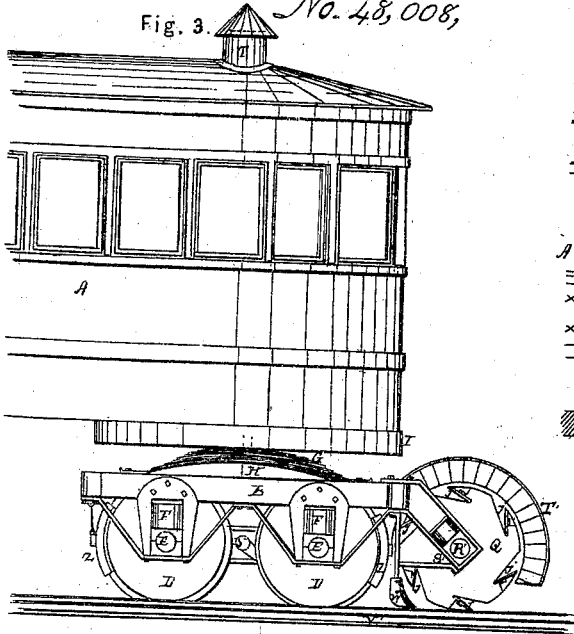


Fig. 4.

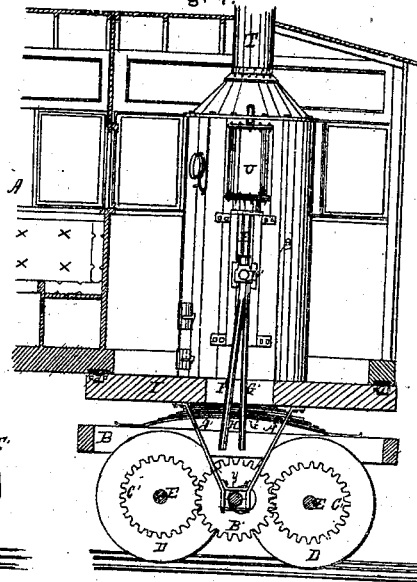


Fig. 7.

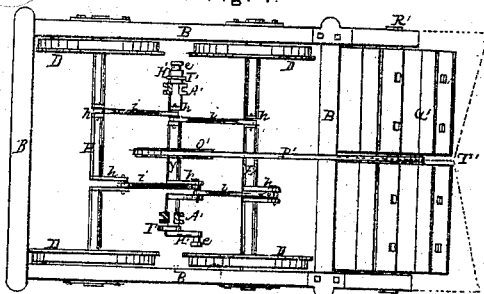


Fig. 5.

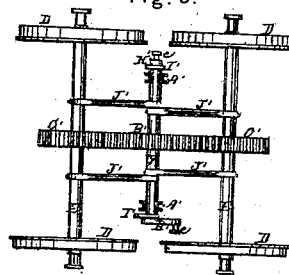


Fig. 8.

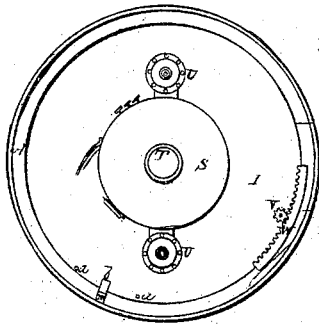


Fig. 11.

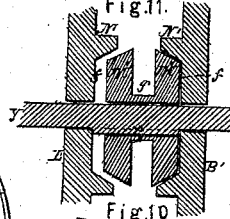


Fig. 10.

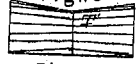
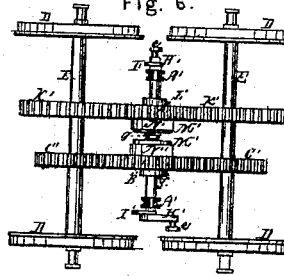


Fig. 9.



Fig. 6.



Witnesses:

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H. M. Brock

Inventor:

Joseph P. Woodbury

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Fig. 12.

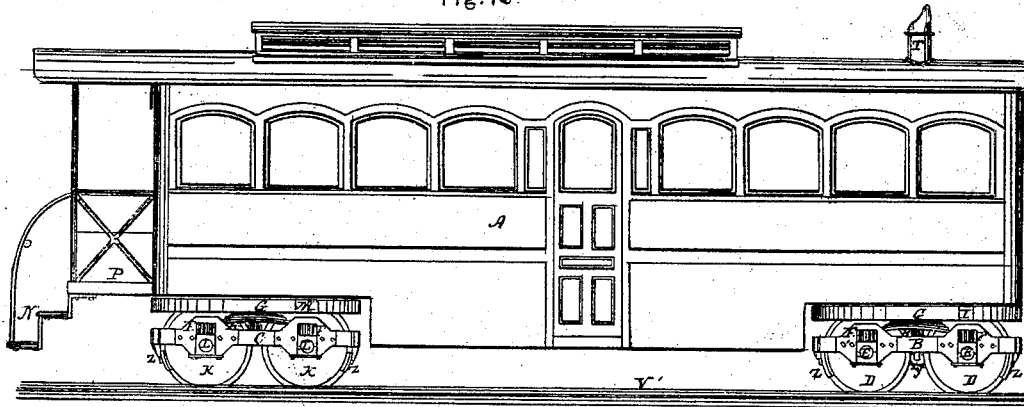


Fig. 13.

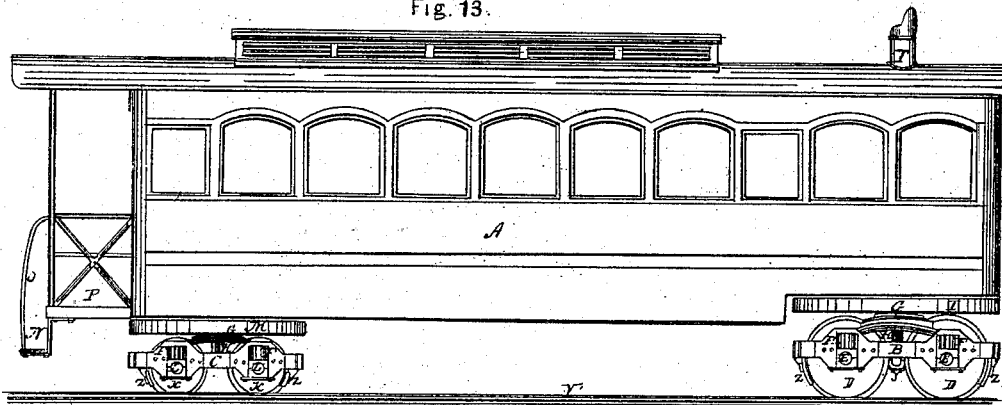
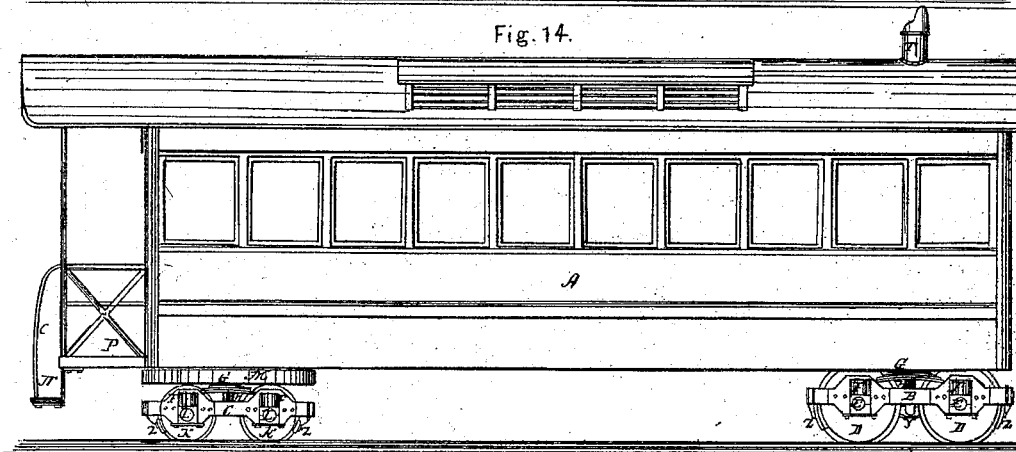


Fig. 14.



Witnesses:

N Amer.  
C D Smith

Inventor:

Inventor:  
Joseph P Woodbury

# UNITED STATES PATENT OFFICE.

JOSEPH P. WOODBURY, OF BOSTON, MASSACHUSETTS.

## IMPROVEMENT IN STREET STEAM-RAILWAY CARS.

Specification forming part of Letters Patent No. 48,008, dated May 30, 1865.

*To all whom it may concern:*

Be it known that I, JOSEPH P. WOODBURY, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Street Steam-Railway Cars; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of one of my cars, and Fig. 2 a horizontal section of the same in the line of the bottom of the windows. Fig. 3 is a side elevation of the front end of the car enlarged; and Fig. 4 is a vertical central section through the same, showing a side elevation of the boiler with its appendages. Fig. 5 is an enlarged plan of the driving-wheels and their immediate appendages; Fig. 6, a similar view of the same, showing two sets of driving-pinions. Fig. 7 is a plan of a truck in which the axles of the wheels are driven by means of cranks and connecting-rods instead of gear-wheels. Fig. 8 is a top view of the revolving circular platform. Fig. 9 is an enlarged longitudinal central section through a portion of the driving-shaft *y* of Fig. 6, showing the "cup-and-saucer friction-clutch" by means of which the driving-power may be shifted from one set of pinions to the other. Fig. 10 is a side elevation of a car having the space between the engine and back trucks brought down below the top of the same within about ten inches of the track, and with doors on each side to enable passengers to get in and out with greater ease. Fig. 11 is a side elevation of a car having the wheels of the back truck less in diameter than the wheels of the engine-truck, and the bottom of the car back of the engine brought down nearer the rails to enable passengers to get in and out with ease. Fig. 12 is a side elevation of a car, showing another method of bringing the bottom of the car nearer to the track by having the back truck-wheels less in diameter than the engine-truck wheels, and the circular platform of the engine-truck recessed up into the car the difference between the diameters of the back and the engine wheels; and Fig. 13 is a longitudinal central vertical section through the front of the car and the engine-truck, showing how the circular platform is recessed up into the end of the car.

Like parts are indicated by the same letters in all the drawings.

My present invention is intended more particularly as an improvement on the street "steam-railway car" for which Letters Patent of the United States were granted to me on the 24th day of January, 1865; and it consists, first, in arranging upon the center of the circular platform *I* a vertical boiler, *S*, with vertical engines *U U* on either side of the same, the connecting and valve rods of the said engine passing downward through said platform, and connecting below the same with the driving crank-shaft *Y*, for the purpose of making an independent locomotive and car combined, having the engines above said platform; second, in supporting the circular platform *I*, carrying the boiler and engines, by means of springs *G G* upon the truck-frame *B*, so that the latter may conform to the undulations and irregularities of the track *V*, while the said platform remains always parallel with the bottom of the car; third, in connecting the driving-shaft *Y* rigidly with the circular platform *I* by means of hangers *A' A'*, so that said driving-shaft may always be the same distance from the engines *U U*, and at the same time permit the said platform and its appendages, with the front of the car *A*, to move up and down on the springs *G G* and *F F*; fourth, in providing the engine crank-shaft *Y* with a pinion, *B*, to actuate gear-wheels *C' C'* and *C' C'* on the axles *E E* of the truck-wheels *D D*, whereby the latter are driven, while at the same time the crank-shaft is free to move up and down with the platform *I* on the springs *G G* and *F F*; fifth, in providing the driving-shaft *Y* with two pinions, *B'* and *L'*, of different diameters, and the axles *E E* of the truck-wheels with two sets of gear-wheels, *C' C'* and *K' K'*, so that by means of cup-and-saucer friction-clutches *M' M'* and *N' N'* either one of said pinions may be made to operate at pleasure on its respective gear-wheels, in order that the traction-power of the engines may be increased or diminished as required; sixth, in arranging and combining with said circular platform a rack, *W*, and pinion *V*, or their equivalents, by means of which the engineer may direct the engine-truck onto a right or left hand turn-out-track at pleasure; seventh, in providing each circular platform with stop-pins *a a*, to operate in combination with a bolt, *b*, in the

front end of the car, to prevent the engine-truck, when moving rapidly on a nearly-straight road, from ever turning too far to the right or left, or far enough round to break the same or throw it from the track; and, eighth, in supporting the back end of the car on a circular truck-frame, M, resting upon springs G G, and having between the car and truck frame anti-friction radial rollers *d*, the whole resting upon the lower truck-frame, C.

To enable others skilled in the art to make and use my improvements, I will now proceed to describe the construction and operation of the same.

A is the main body of the car, which is constructed substantially as described in the specification of my patent alluded to above, Q being the seats inside; P, the platform; R, the external seats; N, the steps, and O the hand-rails on either side of the steps and platform. This car rests upon two sets of four-wheel trucks, B and C, the construction and arrangement of which I will now describe.

The forward truck, B, rests on the axles E E of the wheels D D D D, said axles turning in suitable boxes in hangers of the usual construction, as clearly shown in Figs. 1 and 3, F being the springs in general use for railway-cars.

Fast to the top of the two side beams of the truck-frame B are springs G G, arranged as clearly shown in Figs. 3 and 4. On the top of these springs G G rests the circular platform I, which turns on friction-rollers *d* on a circular track on the bottom of the front end of the car, as represented in Fig. 4, and fully described in my patent alluded to above.

A is a strong loosely-fitting bolt passing vertically through the spring G into the frame B and platform I, by means of which the latter are securely held together, but leaving the truck-frame B free to move as the undulations and irregularities of the track V may require, while at the same time the said circular platform preserves its parallelism with the bottom of the car, the front end of which (the car) rests upon it, as described above.

On the center of the platform I is placed the vertical boiler S, as clearly shown in Figs. 4 and 8. On each side of this boiler is a vertical engine, U, of which E' is the piston, and D' the cross-head, F' the connecting-rod, and G' the valve-rod, the said valve-rod and connecting-rod passing through an opening in the platform I, as seen in Fig. 4, down to the driving-shaft Y, which latter turns in suitable boxes in the lower ends of the hangers A' A', the upper ends of which are bolted fast to the bottom of the platform.

H' H' are the cranks, and *e e* are the crank-pins of the driving-shaft Y, connected, in the usual manner, with the connecting-rods F' F'.

I' I' are the eccentrics, connected in the usual manner with the valve-rods G' G'.

Fast on the center of the shaft Y is a pinion, B', which meshes into the two gear-wheels C' C', fast to the axles E E of the truck-wheels D D,

as clearly shown in Figs. 4 and 5. Thus it will be seen that the distance between the engines U U and the driving-shaft Y will always be the same, and the latter will have the same vertical movements as the platform I, to which it is rigidly connected, by means of the hangers A' A', and also that the pinion B' will move up and down past the center of the gear-wheels C' C' with the shaft Y. As the motion, however, is never more than an inch or two, it is never sufficient to throw the said pinions out of gear. I propose, however, to connect the axles E E with the shaft Y by means of links J' J' J' J', which will prevent them from ever separating enough to affect the working of the pinions on the gear-wheels. In this latter case, however, the boxes in which the axles turn must be so constructed as to be capable of a slight lateral movement to and from a vertical line passing through the center of the shaft Y as the latter moves up and down.

In Fig. 5, in addition to the pinion B' and gear-wheels C' C', I propose in some cases to make use of another pinion, L', and another set of gear-wheels, K' K', and for the purpose alluded to above in setting forth the nature of my invention.

The pinion B', as clearly shown in Fig. 4, is of the same diameter as that of the gear-wheels C' C', whereas the pinion L', I make only one-half the diameter of the gear K' K', into which it meshes. Thus it is obvious that the pinion L' will have twice the traction-power of the pinion B', and may be used in ascending uphill grades when the pinion B' would be inadequate to drive the car. There may be other occasions, also, when it may be desirable to employ the pinion L' instead of the pinion B'.

In order to cause the pinion B' or L' to operate on their respective gear-wheels at pleasure, I make use of what are well known as "cup-and-saucer friction-clutches" M' M' and N' N', the construction and arrangement of which are clearly shown in Figs 6 and 11. The two pinions L' B', when not acted upon by the cups M' M', are free to turn upon the crank-shaft Y, whereas the cups M' M', by means of the "spline" *x*, are made to revolve with the said shaft, but are free to slide horizontally from the one pinion to the other, being moved by means of a forked lever in the groove *g*. When, as in Fig. 11, the cups M' M' are moved to the right, so that the right-hand one fits into the corresponding saucer, *f*, formed by the flange N' in the side of the pinion B', the latter will be driven. When the said cups are moved to the left, so that one of them fits into the saucer *f* in the side of pinion L', the latter will be driven and the other released.

In Fig. 7, instead of employing pinions and gear-wheels, the axles E E of the truck-wheel are driven by means of six cranks, *h h h h h h* and four rods, *i i i i*, connecting the driving shaft Y and each of the axles E E, as clearly shown in the drawings.

The hind truck, C, with its wheels K K,

axles L L, and springs F F, as well as the circular platform M, springs G G, and bolts H H, being all constructed and arranged substantially as the same parts supporting the front end of the car already described, need no further explanation.

W (see Fig. 8) is a rack of sufficient length to allow all the necessary movement, right or left, fast to the bottom frame of the front end of the car; and V is a pinion pivoted to the top of the circular platform I, and engaging with said rack. This pinion V, (being provided with a suitable upright shaft and a wheel or crank at the top of a convenient height to handle,) may be moved in either direction by the engineer, whereby he is enabled to turn the said platform and the car itself either to the right or left onto another track at pleasure and for the purpose specified above, thereby avoiding the necessity of employing switches and tenders.

*a a*, Fig 8, are two pins projecting above the surface of the platform I, near its edge, and *b* is a hinge or bolt fast to the car-frame between said pins, the design of which is to allow the truck, when running on a nearly-straight track, a slight vibration between the said pins to conform to the slight deviations and irregularities of the track, while at the same time it will prevent the possibility of the truck ever turning too far to either side while in rapid motion, as it might otherwise do, and thereby occasion serious damage by running off the track.

W' is a brush or scraper, to assist in clearing the track of snow, ice, and other obstructions.

Z are brakes such as are generally used on railway-cars.

*m m* (see Fig. 2) are water-tanks, which are to be connected with the pump and boiler by means of a flexible pipe, and *n n* are coal-bunkers.

The engines must be provided with the necessary levers and link-motion to move the valves. Other necessary and well-known parts and appendages of a steam locomotive-engine need not be described.

I also propose to attach, in any obvious manner, a rack and pinion or othersuitable device to the periphery of the circular platform M of the back truck, to enable it to be turned horizontally by the engineer or conductor to suit the different curves of the rails, or to enable the car to be backed upon the track in case of its accidentally running off the same.

I also propose to connect an index and a graduated plate or dial with the circular platforms I and M, to enable the engineer or conductor to move horizontally both the engine and back trucks, so as to accommodate the same to the different curves of the railway, the radii of which curves are supposed to be known to both the conductor and engineer.

Having thus described the construction and operation of my improvements, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the gear-wheels C' C' (or cranks and rods, as shown in Fig. 7) on the axles E E with the crank-shafts Y and pinion B' and vertical boiler S and engines U U, when constructed and operating in the manner and for the purposes set forth.

2. The combination of the friction-clutches M' M' N' N' with one or more pinions, B' and L', and gear-wheels C' C' and K' K', in the manner and for the purpose set forth.

3. The rack W and pinion B, when combined with the circular platform I, in the manner and for the purpose herein described.

4. The stop-pins *a a* and bolt *b*, in combination with the platform I, in the manner and for the purpose herein set forth.

5. Connecting the driving-shaft Y rigidly with the circular platform I by means of the hangers H' H', when constructed and arranged in the manner and for the purpose herein set forth.

JOSEPH P. WOODBURY.

Witnesses:

N. AMES,

H. W. BROOKS.