2 Sheets—Sheet 1.

J. P. WOODBURY.

Steam Street-Car.

No. 46,043.

Patented Jan. 24, 1865.

Fig. 1.

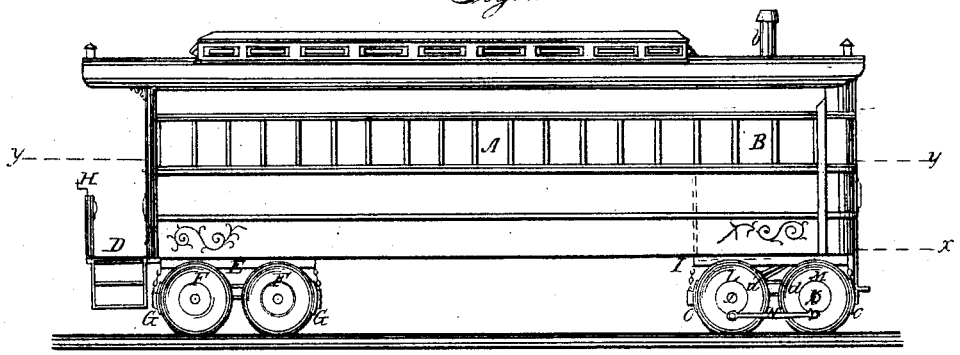


Fig. 2.

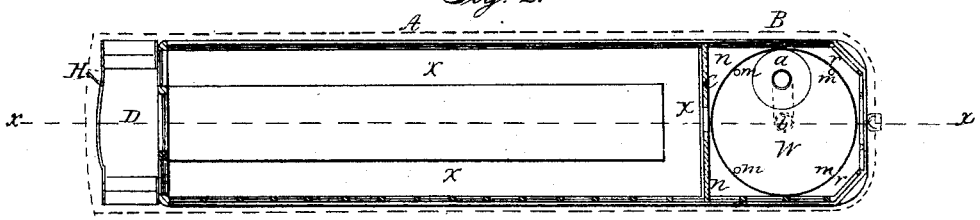


Fig. 3.

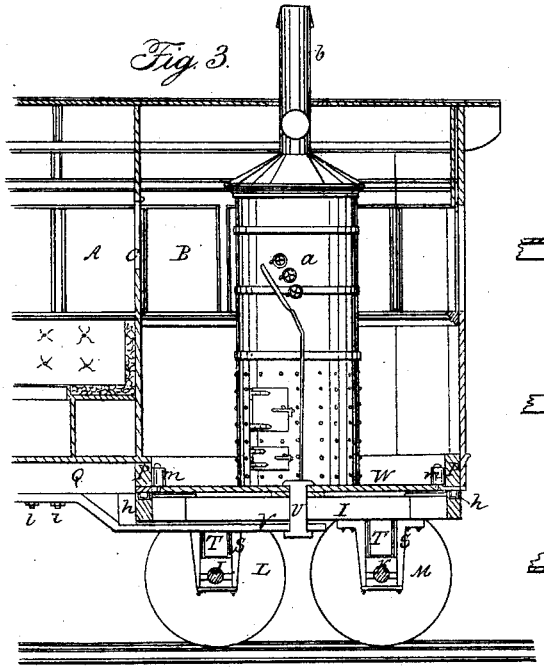
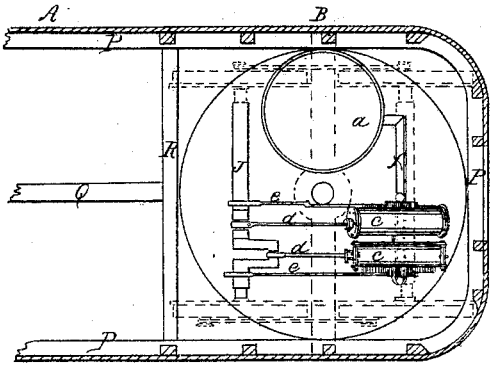


Fig. 4.



Witnesses:

N. Anus.

H. W. Brooks

Inventor:

Joseph P. Woodbury

2 Sheets—Sheet 2.

J. P. WOODBURY.

Steam Street-Car.

No. 46,043. Patented Jan. 24, 1865.

Fig. 5.

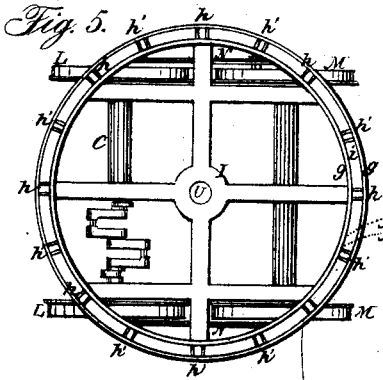


Fig. 6

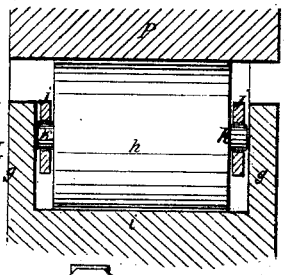


Fig. 8.

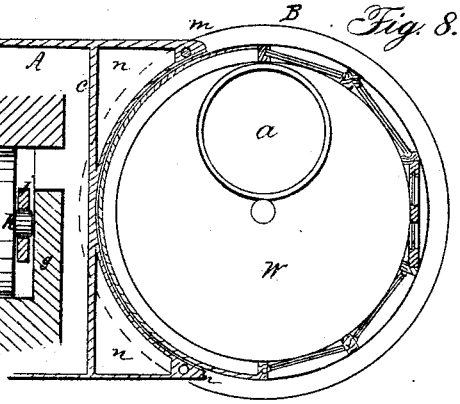


Fig. 7.

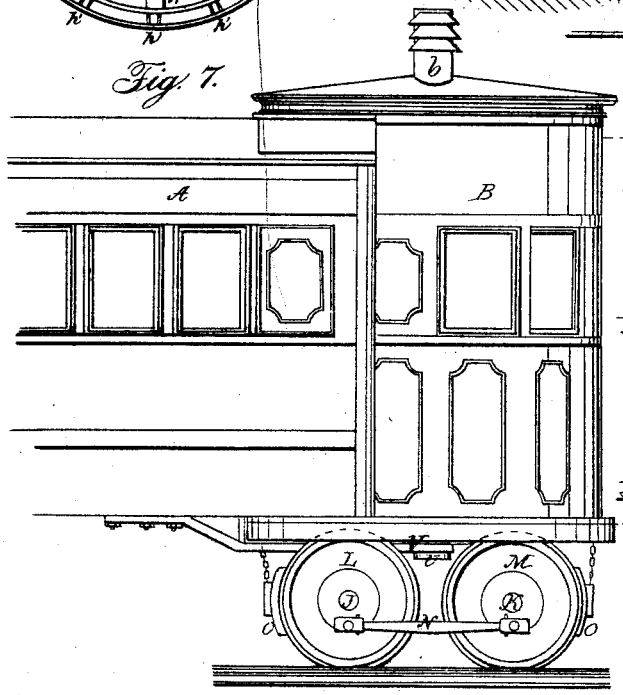


Fig. 9.

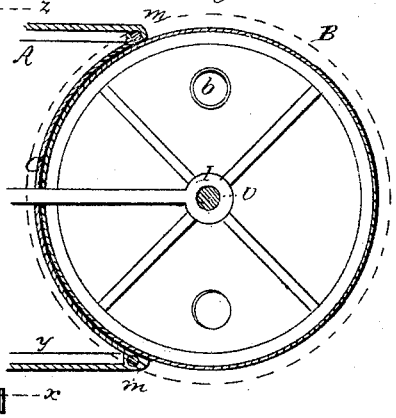
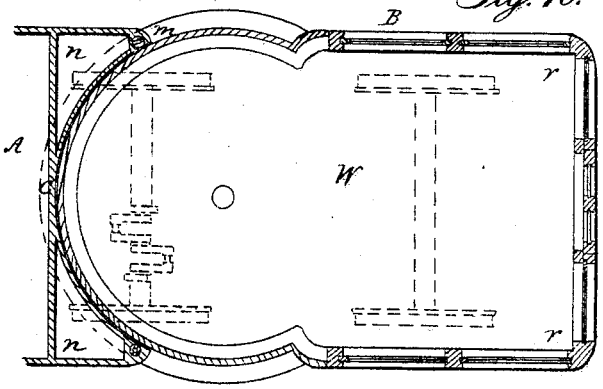


Fig. 10.



Witnesses:

N. Ames
A. W. Brooks

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. **46,043**, dated January 24, 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 Improved Street Steam-Railway Car; 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 a part of this specification, in which—

Figure 1 is a side elevation of one of my cars. Fig. 2 is a horizontal section in the line *y* of Fig. 1. Fig. 3 is a longitudinal vertical central section through the engine-room and a part of the car in the line *x x* of Fig. 2. Fig. 4 is a horizontal section in the line *x* of Fig. 1. Fig. 5 is a plan of the circular platform and truck-frame, showing the anti-friction rollers, in the line *x* of Figs. 1 and 7. Fig. 6 is an enlarged longitudinal vertical section through one of the anti-friction rollers, with its frame, and the track or groove in which it traverses. Fig. 7 is a side elevation of the boiler and engine room and a part of the car, representing the engine and boiler room as partially independent of the car, the car being attached to the center-pin of the engine-room and engine-truck frame by connecting-bars at the top and bottom, so that the engine-room may partially revolve within a part of the front end of the car, or as much as is necessary to follow the curved tracks. Fig. 9 is a horizontal section in the line *z* of Fig. 7, showing the connecting-bars connecting the top of the car with the center-pin at the top of the engine and boiler room. Fig. 8 is a horizontal section in the line *y* of Fig. 7. Fig. 10 is a horizontal section in the line *y* of Fig. 7, representing the boiler-room and truck-frame elongated, (they may be square-cornered or circular in front,) in order to give more space for the engine and boiler, if required.

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

The nature of my invention consists in certain improvements in the construction of what are known as "dummy-engines," or "street steam-railway cars," whereby they are enabled to run with perfect ease and freedom round the shortest curves that ever occur in any street or other railway tracks.

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.

The car is divided by the partition C into two compartments, A and B. The rear and larger compartment, A, (provided with seats X X X, as shown in Fig. 2,) is the passenger-room. The front and smaller compartment, B, is the engine and boiler room, or rather the shell or cover in and under which the forward truck, with the engine and boiler, moves horizontally around a center-pin, as the curvature of the railway-track may require. The general construction of the body of the car, with the above exception, is substantially like that of other railway-cars in common use.

The car rests upon two four-wheel trucks, E and I, as represented in Fig. 1, the wheels of which are fast to their axles. The front and rear wheels of the truck E are disconnected, so that the two sets may turn independently of each other; but the front and rear wheels, L and M, of the truck I are united by two connecting-rods, N, in the manner of locomotive-engine wheels, so that both sets of wheels must turn together in order to secure the requisite traction.

D is the passenger-platform.

O O are the brakes of the engine-truck, under the control of the engineer and conductor.

G G are the brakes of the rear truck, and H is the crank-shaft by which they are operated.

I is the frame-work of the engine-truck, of wood or iron, to the under side of which, as seen in Fig. 3, are attached the hangers S, which are provided with suitable boxes for the axles J and K to turn in, T T being the rubber springs in general use. On the top of this truck-frame I is firmly secured a circular track or way, *i*, as represented in Fig. 5. This track *i* may be a separate piece or pieces, or cast in one with the truck-frame I.

g g are two vertical flanges extending round the outer and inner edges of the circular track *i*, as shown in Figs. 5 and 6, forming between them a groove in which traverse the anti-friction rollers *h*.

j j are two concentric rings, between which the rollers *h* are arranged, as represented in Figs. 5 and 6, to turn upon their axles *k k*, whereby they are kept at a fixed and proper distance apart, (by fixed studs *h' h'*, as shown

in Fig. 5,) the rings and rollers forming, in effect, a circular carriage. These rollers, in order to traverse on the circular track with perfect freedom, should be slightly conical—*i. e.*, the opposite sides of a longitudinal central section through one of them should be described by two radii of the circular track itself. In some cases, however, (as in Figs. 7, 8, 9, and 10,) in place of this traveling circular carriage I propose to make use of friction-wheels turning on axles fixed either in the bottom of the car (where it rests upon the engine-truck frame) or in the top of the engine-truck frame, directly under the car-frame, (where the circular end rests on the engine-truck-frame.)

W is a suitable platform or covering, of wood or metal, placed upon the truck I, inside of the circular track, and forming a floor for the engine, boiler, and engineer.

a is an upright boiler, which rests, as shown in Figs. 2 and 8, upon the platform W.

b is the smoke-stack and exhaust-pipe, so bent as to pass through a circular opening in the top of the car, directly over the center-pin U, which opening is also large enough to allow the pipe to turn with freedom when the truck and boiler turn upon said center-pin.

c c are a pair of oscillating engines, whose piston-rods *d d* are connected with the crank-axle J of the driving-wheels L, as shown in Fig. 4, and are suspended by means of a frame-work under the engine-room floor in any obvious manner.

f is the steam-pipe leading from the boiler to the engines, and *e e* are the valve-rods.

The general inclination of the engines is indicated by the piston-rods *d d* in Fig. 1. They should be as nearly horizontal as possible, and not interfere with the front axle of the truck.

The drawings represent oscillating engines. Any other engine may be used, however, if desired.

Thus it will be seen that the engine and boiler rest entirely upon the forward truck I, and that all three of them are entirely independent of the main body of the car, and are capable of moving independently of it in a horizontal plane, as will appear from the description which I am about to give of the devices by means of which the car and truck are connected together.

P P are the two outer bottom sills of the car, which are continued beyond the main body A, as shown in Fig. 4, so as to form the foundation of the engine-room B.

Q is the center-beam of the car-bottom, and R is the cross-beam uniting the two side sills directly under the partition C.

To the under side of the sills P of the engine-room B is attached a circular track, whose diameter is the same as that of the circular track *i*, with which it is intended to be concentric. Thus it will be seen that one-half of the weight of the car will rest upon the anti-friction rollers *h*.

V is a stout connecting-bar of flat iron or steel, the back end of which is attached to the beam Q by the bolts *l l*, while the front end is continued a little beyond the center of the engine-room, as shown in Fig. 3.

U is a strong bolt or linchpin, which passes up through the connecting-bar V and the floor W of the truck I. This bolt U is prevented from having any lateral motion by means of two arms or continuations of the connecting-bar V, extending to the two side sills, P P, as represented by dotted lines in Fig. 4. I also propose to make use of friction-wheels *m*, arranged on vertical axes around the circular floor of the engine-room, as shown in Fig. 2, in such a manner that they shall bear against the edge of the circular hole in the bottom of the room B, and thereby remove a great deal of the strain that would otherwise come upon the pin U. I also propose to use similar friction-wheels *m* at the top and bottom of the car, where the engine-room and passenger-room unite, as represented in Figs. 8, 9, and 10.

Thus it is obvious that the truck I, which carries the engine and boiler, will draw the car, and at the same time be free to turn independently of it in a horizontal plane, and thereby enable the car, however long it may be, to move with freedom around the shortest curves.

The rear truck, E, I also propose to furnish with anti-friction rollers and a track, in the same manner as the truck I, and attach it to the bottom of the car by means of a center-pin similar to U.

Fig. 7 represents a slight modification of the principle of connecting the engine-room with the main body of the car, in which modification the engine-room is circular and only partially surrounded by the front of the main body of the car, as more clearly shown in Figs. 8 and 9.

Fig. 10 also shows another modification of the engine-room, to afford more space for the boiler and engines in case larger and more powerful ones are required.

n n represent water-tanks, and *r r* coal-bunkers. The space under the seats of the passenger-car may also be used for water-tanks, if required. The passenger-car may be heated by means of pipes leading from the boiler or exhaust-pipe.

In case my steam-car should be needed to carry freight instead of passengers, I propose to use the style of engine-truck frame shown in Figs. 7, 8, 9, and 10, in order that it may have room for a boiler or boilers large enough to do the work required. In some cases it may also be desirable to disconnect this engine from one car and connect it to another of a similar construction, which can be readily done by withdrawing the center-pin U, having previously placed under the car a hand truck or jack to keep the car in position while the engine is being removed. It is also obvious that a car to be used for freight alone would require neither seats nor windows.

I propose to make a removable casing or box of sheet metal around and under the engines and working machinery, below the floor of the engine-room, with suitable doors or openings for oiling and inspection. This casing is to protect the machinery from dust and prevent it from frightening horses or other animals on the highway.

I propose to construct my locomotive-truck frame and springs, and also the truck-frame and springs at the rear end of the car, on the plan of any of the known varieties of construction, with a center bearing where the weight of the car rests on the lower frame crosswise at nearly right angles with the railway-track, in a manner well known to mechanics, so that while the upper frame and radial anti-friction rollers and the lower circular rail shall always be kept up in close contact with the rail on the under side of the locomotive or car body the lower and independent frame may vibrate or oscillate longitudinally and vertically with the railway-track with perfect freedom to accommodate itself and follow all of the undulations in the railway-track.

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

1. The combination of the boiler and engine of a locomotive with a car-truck provided with a circular truck-frame and anti-friction rollers, so adjusted as to be received within one end of a car, so that the truck can turn independently of the car, in the manner and for the purpose herein set forth.

2. The combination of one end of a railway-car with an independent circular locomotive car-truck, when constructed in the manner and for the purpose herein described.

3. Constructing the truck I with a circular track, *i*, provided with anti-friction rollers *h*, to support the forward portion of the car and allow the truck to turn with freedom under it, substantially as described.

4. The independent circular carriage of radial anti-friction rollers, to operate in combination with the top of the truck and the bottom of a railway-car, substantially as described.

5. Connecting the car to the center-pin of the truck-frame, at the bottom, by means of the connecting-bar V, substantially as described.

6. The employment of a center-pin and connecting-bar, to connect the top of the car with the top of the engine and boiler truck, substantially as shown in Fig. 9.

7. Forming the front of the passenger-car concave and the engine and boiler room convex and circular, so that the one may turn in the other, substantially as represented in Figs. 7, 8, 9, and 10.

8. Making the rear truck to turn on a center-pin in the rear end of the car-body, in combination with the circular tracks and carriage of radial anti-friction rollers which support the car body on the truck, substantially as described.

9. The anti-friction wheels *m*, to operate in combination with the revolving engine-room and passenger-car, substantially as described.

10. So constructing and arranging the smoke and exhaust pipe as to pass through the top of the car, directly over the center-pin U, wherever the boiler is placed, so that when the truck-frame turns on a curve said pipe may also turn with freedom through the car-top, substantially as described.

JOSEPH P. WOODBURY.

Witnesses:
H. W. BROOKS,
N. AMES.