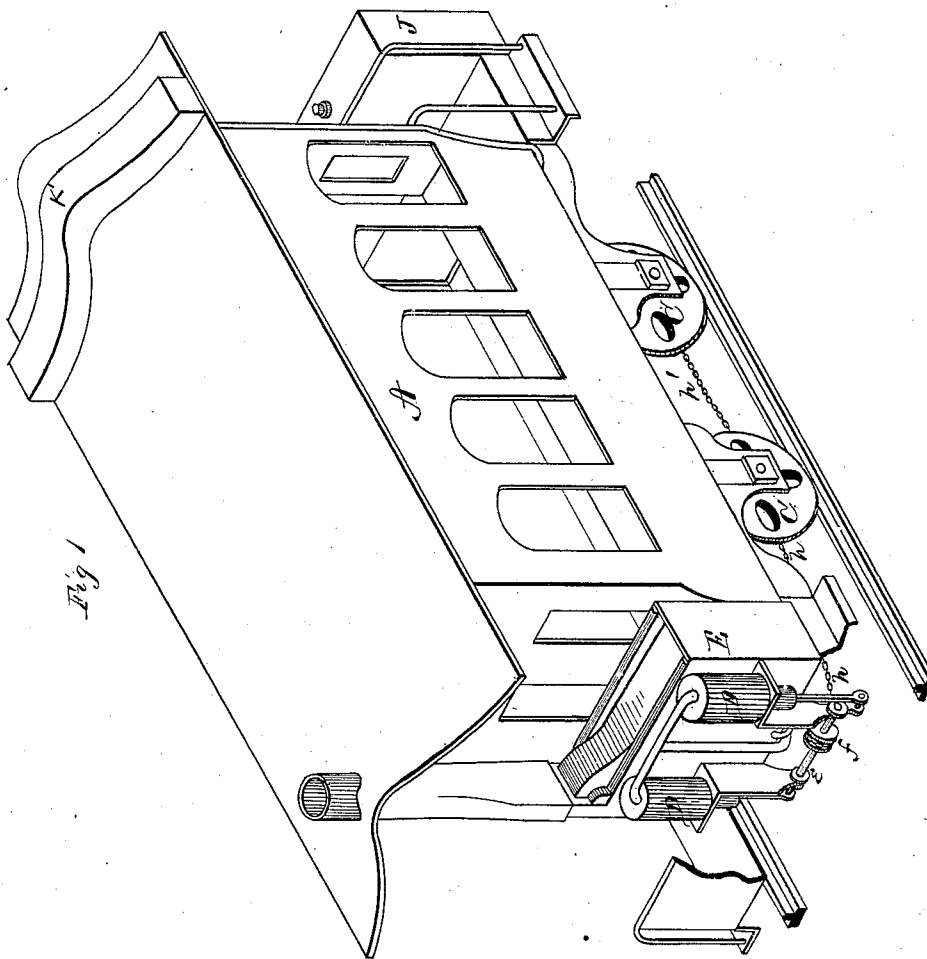


W. W. CRANE.

Devices for Applying Steam-Power to Street
Railway Cars.

No. 138,793.

Patented May 13, 1873.



Witnesses:

Frank L. Curand
C. L. Evers

Inventor.

Wellsley W. Crane,
per
Alexander Mason

Attorneys.

W. W. CRANE.

Devices for Applying Steam-Power to Street
Railway Cars.

No. 138,793.

Patented May 13, 1873.

Fig 2

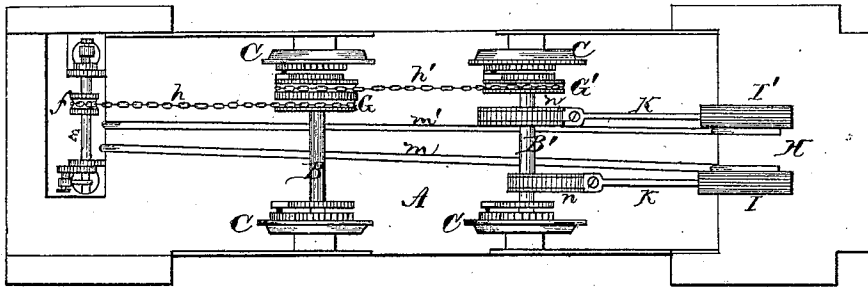


Fig 3

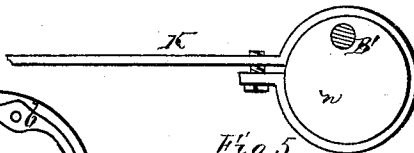


Fig 4

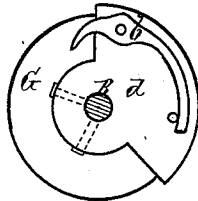
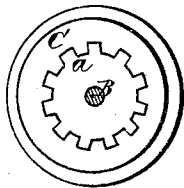
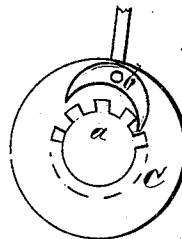


Fig 5



Witnesses:
Frank L. Curand
C. L. Ewert.

Inventor.
Wellsy W. Crane,
per
Alexander M. Mason

Attorneys.

UNITED STATES PATENT OFFICE.

WELLSLY W. CRANE, OF AUBURN, NEW YORK.

IMPROVEMENT IN DEVICES FOR APPLYING STEAM-POWER TO STREET-RAILWAY CARS.

Specification forming part of Letters Patent No. **138,793**, dated May 13, 1873; application filed April 12, 1873.

To all whom it may concern:

Be it known that I, WELLSLY W. CRANE, of Auburn, in the county of Cayuga and in the State of New York, have invented certain new and useful Improvements in Street-Cars; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

The nature of my invention consists in the construction and arrangement of a street-rail-road car having a steam-engine, boiler, and water-tank attached to it for propelling the car by steam, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a perspective view, and Fig. 2 a bottom view, of my street-car. Figs. 3, 4, and 5 are enlarged views of certain parts.

A represents the body or coach of a street-railroad car, which may be constructed in any of the known or usual ways. B is the front and B' the rear axle, each having a wheel, C, at each end. These wheels are constructed in the usual manner for car-wheels, and are placed loosely on their axles. Each wheel C has on its inner side a toothed or ratchet wheel, *a*, either cast with or attached to it, and a spring-pawl, *b*, pivoted on a collar, *d*, attached to the axle, works in said wheel, so that as the axle is revolved forward the wheels C C will also be revolved.

On cars which are turned around on a turn-table or similar device at the end of the route, a single-acting pawl, as shown in Fig. 4, but on cars that are not turned around, a double-acting pawl, substantially such as shown in Fig. 5, must be used, and this pawl so arranged that it can be readily reversed from the platform, where the engine is situated.

The object of making all the wheels loose on their axles is to allow the wheels on either side to run faster than those on the other side when going around curves.

On the front platform of the car are located the boiler E and engine or engines D, the pis-

tons of which operate a crank-shaft, *e*, below the bottom of the car and parallel with the axles B B'. On this shaft *e* is a pulley, *f*, connected by a chain, *h*, with a double pulley, G, on the front axle, and this pulley by another chain, *h'*, connected with a pulley, G', on the rear axle, thus making the wheels on both axles driving-wheels.

Heretofore, in street-cars driven by steam, only the front wheels have been made driving-wheels; and, hence, when, as often happens, several passengers are in the rear part of the car and none in the front, the front wheels become enough raised from the rails to slip on the same and, therefore, not move forward; but by making all the wheels driving-wheels, as above described, it will make no difference in what part of the car the passengers are seated.

The exhaust steam from the engines D D is conveyed through a pipe, *m*, under the bottom of the car to a condenser, H, under the rear platform, and having an air-pump, I, connected with it to relieve the condenser of the surplus water. The air-pump I is worked by a rod, K, from an eccentric, *n*, on the rear axle B'. I' represents a force-pump, operated by a similar rod and eccentric to pump water from the condenser to the boiler E through a pipe, *m'*, also running under the bottom of the car.

The water-tank J is situated, as shown in Fig. 1, in rear of the rear platform, and is elevated sufficiently to bring its top at the same height or above the high-water line of the boiler.

This arrangement is of great importance, particularly for two reasons. In the first place it counterbalances the weight of the boiler and engine on the front platform; and, secondly, in the winter time it is absolutely necessary that both the tank and boiler should be emptied at night when the cars stop running; and then when they are to be filled in the morning it is only necessary to fill the tank, the water, on account of the elevation of the tank, rising at the same time in the boiler, so that when the tank is filled there is enough water in the boiler to start the fire.

On cars having no rear platform the water-tank may be situated on top of the car at the rear end, as shown in Fig. 1 at K'.

n winter time the exhaust steam instead of passing through the pipe *m* may pass through pipes in the interior of the car for the purpose of keeping the same heated.

All the devices herein described may be applied to any of the street-railroad cars now in use.

Having thus fully described my invention, I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a street-car, A, of an engine and a rectangular boiler, D E, upon one end of the car, the elevated tank J placed on the other end of the car, and the pipe *m* under the bottom of the car, substantially as described for the purposes herein set forth.

2. The combination, with a street-car, of the axles B, loosely-fitting wheels C, ratchets *a*, collars *d*, and pawls *b*, all constructed and op-

erating substantially as and for the purposes specified.

3. The combination of the axles B B', loosely-fitting wheels C C, ratchets *a*, collars *d*, pawls *b*, chains *h h'*, pulleys G G', crank-shaft *e*, pulley *f*, and engine D, with a street-car A, all constructed and operating substantially as and for the purposes herein set forth.

4. The combination of the tank J, condenser H, air-pump I, force-pump I', connecting-rods K K', eccentrics *n n*, and the axle B' of a street-car, A, all substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of April, 1873.

Witnesses: WELLSLY W. CRANE.

A. N. MARR,
C. L. EVERT.