

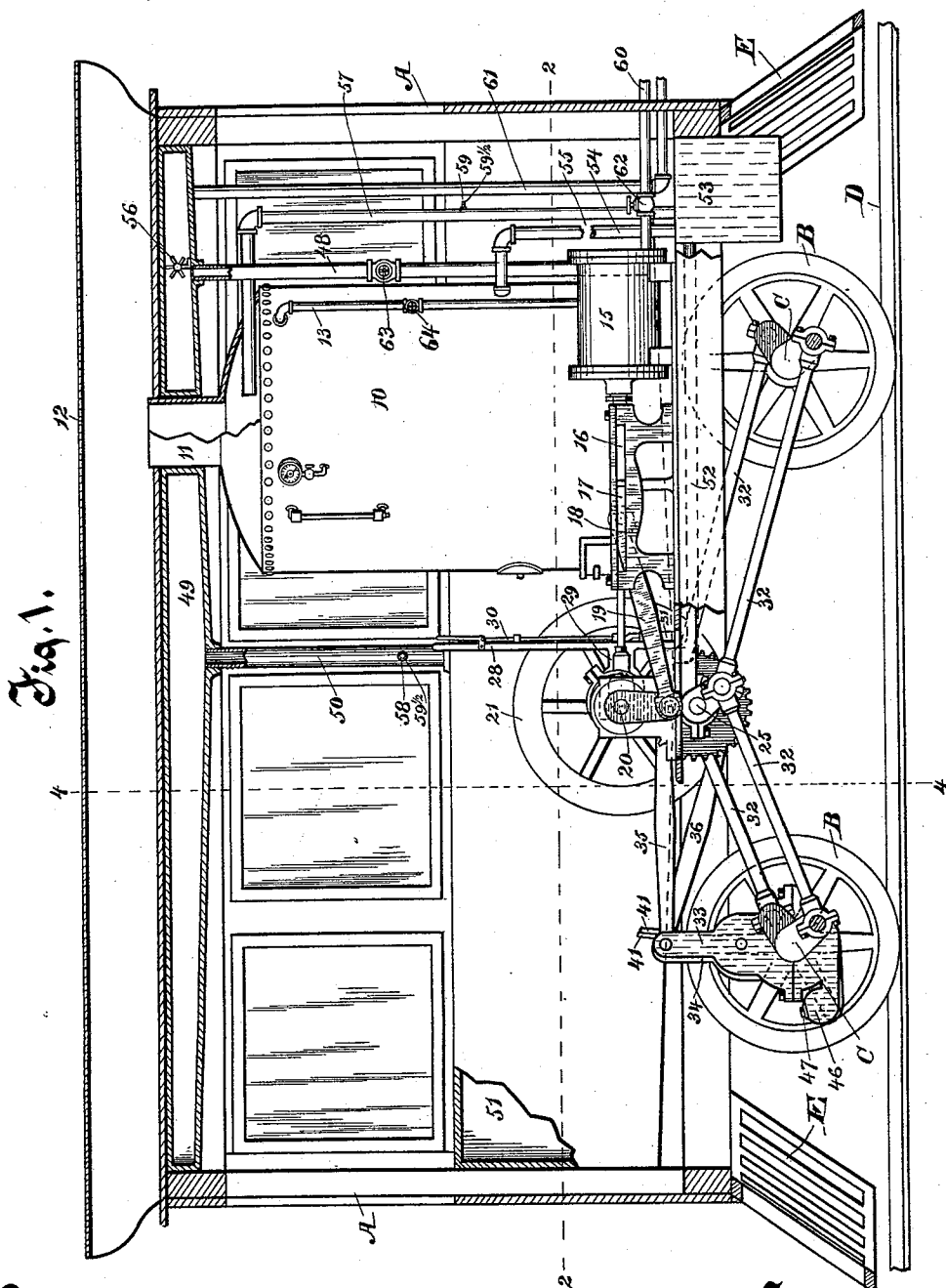
(No Model.)

3 Sheets—Sheet 1.

E. DEDERICK.  
STREET CAR LOCOMOTIVE.

No. 461,466.

Patented Oct. 20, 1891.



Witnesses.

*C. N. Keeney.*

*Anna C. Faust.*

Inventor.

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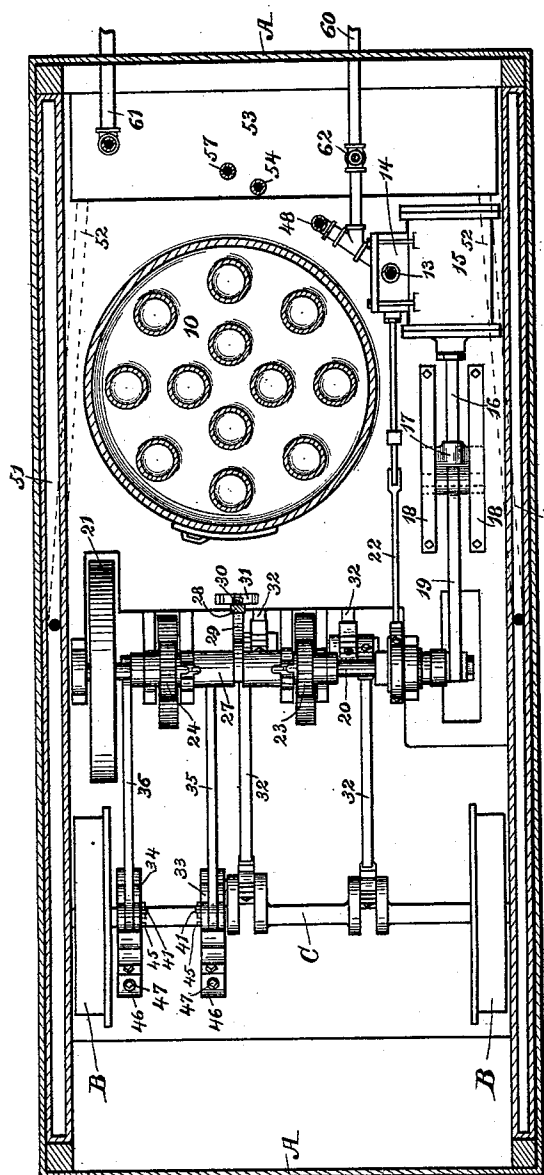
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3 Sheets—Sheet 2.

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(No Model.)

3 Sheets—Sheet 3.

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Fig. 3.

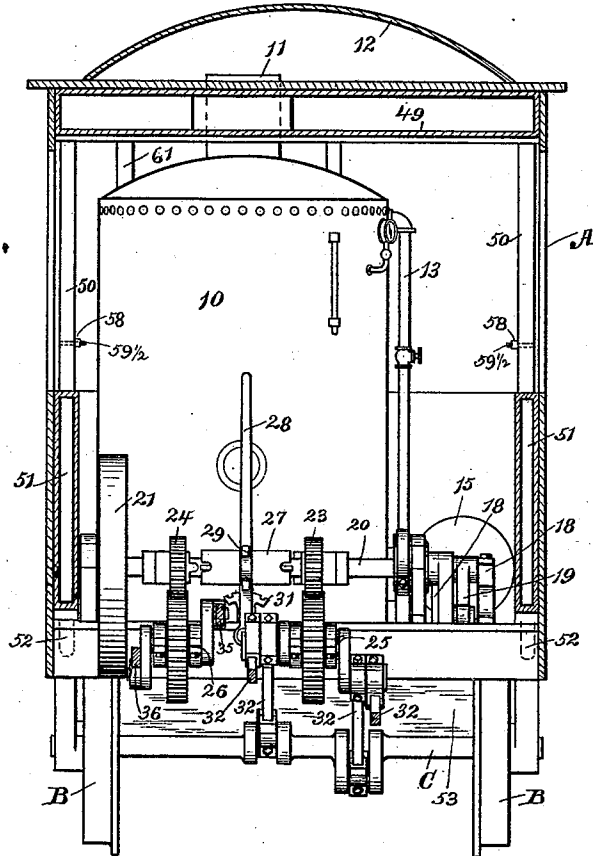
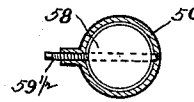


Fig. 4.



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# UNITED STATES PATENT OFFICE.

EZRA DEDERICK, OF MILWAUKEE, WISCONSIN.

## STREET-CAR LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 461,466, dated October 20, 1891.

Application filed December 15, 1890. Serial No. 374,671. (No model.)

*To all whom it may concern:*

Be it known that I, EZRA DEDERICK, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Street-Car Locomotives, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to improvements in a steam-car or locomotive-engine adapted especially for use on a street-railway.

The invention includes the engine, with devices for condensing the exhaust-steam and utilizing the water therefrom, with which is shown mechanism by which the car is propelled and controlled.

The novel features of my improved device are hereinafter described and claimed.

In the drawings, Figure 1 is an elevation of the operative parts of my improved device, the car and a portion of the mechanism being shown in vertical section. Fig. 2 is a plan and section of my improved car and mechanism, taken on line 2 2 of Fig. 1. Fig. 3 is a vertical transverse section of my improved car on the line 3 3 of Fig. 1, looking toward the right. Fig. 4 is a detail in section of a damper or valve used in the exhaust-steam pipes.

A is the frame or car as distinguished from the operative mechanism. The car is provided with flanged wheels B B, fixed on axles C C. The wheels travel on the track D, and the car is adapted to run in both directions, being provided at both ends with grated guards or cow-catchers E. The steam-boiler 10 is provided with a short smoke-stack 11, which leads from its furnace upwardly and discharges through the ceiling of the car into an air-passage formed by a centrally-arched shield or roof 12, extending the entire length of the car and open at both ends. A steam-education pipe 13 leads from the boiler to the steam-chest 14, from which there are the usual passages into the steam-cylinder 15, having a reciprocating piston provided with a piston-rod 16, provided with a cross-head 17, traveling in suitable guides or slides 18 therefor. A pitman 19 connects the cross-head 17 to a crank on the driving-shaft 20. The shaft 20 is journaled in suitable blocks therefor fixed

on the car-frame, and is provided with a fly-wheel 21. A jointed connecting-rod 22, riding at one end on an eccentric on the driving-shaft 20, carries at the other end the cut-off valve in the steam-chest 14.

The spur-wheels 23 and 24 are loose revolvably, but without endwise movement on the shaft 20. These wheels mesh, respectively, with cog-wheels on crank-shafts 25 and 26, which shafts are journaled in brackets forming a part of the car-frame. A sleeve-clutch 27 is splined on the shaft 20 between the wheels 23 and 24, and is adapted by means of the lever-handle 28 to be shifted into engagement with the hub of the wheel 23 or 24. The lever-handle 28 is pivoted at its lower end on the car-frame and is provided with a loop-bracket 29, which rides in a groove therefor in the sleeve-clutch 27, and a spring-latch 30 on the lever-handle 28 is adapted to engage a fixed segmental rack 31 and lock the lever-handle in position.

The crank-shaft 25 is provided with two cranks, one at each end, advisably arranged at right angles to each other, which cranks are connected by rods 32 to corresponding cranks in the axles C C. This crank-shaft 25 is not necessarily connected with more than one axle, but is advisably connected by the rods 32 32 to two axles, one at the front and the other at the rear of the crank-shaft, as shown in Fig. 1.

The mechanism just described is intended and adapted for operating the car and ordinarily for running it forward or rearward on the track with its load, and is a complete and perfect mechanism therefor.

For starting the car or moving it when hauling an unusual load additional devices are provided especially adapted as and for car-starting mechanism. This mechanism consists of lever-arms 33 and 34, advisably constructed in the form of cases pivoted on an axle C and connected, respectively, at their upper ends by rods 35 and 36 to the cranks on the two ends of the shaft 26. These lever-arms or cases are provided with mechanism for engaging the axle in one direction, whereby their oscillatory motion in one direction is transmitted to the axle and it is caused to rotate.

For the purpose of obviating the discharge

of steam from the cylinder directly into the air, which is objectionable on streets where persons and teams are necessarily in the immediate vicinity of street-cars, a system of tanks or condensers is provided adapted to receive the exhaust and dispose of it noiselessly and without forming a vapor or cloud in the surrounding air. For this purpose an exhaust-pipe 48 leads from the steam-cylinder 15 to a shallow steam-tight condenser or tank 49, located just beneath the ceiling of the car and extending throughout its length and breadth, the bottom of which condenser 49 is inclined downwardly toward its central part at the sides, and pipes 50 50 lead therefrom downwardly into the condensers 51 51, located in or along the side walls of the car, and other pipes 52 lead from the lowest parts thereof to the drip-tank 53. It will be observed that this system of condensers is so arranged that the water formed therein will by gravity run into the drip-tank. From the drip-tank the water is raised through the pipe 54 and forced into the boiler by means of a pump, (not shown in the drawings, but of such form and arranged in such manner as is usually in locomotives,) the location of which pump is merely indicated in the drawings at 55. Advisedly a steam-disseminating device, preferably a small paddle-wheel 56, is located in the condenser 49 at the mouth of the discharge-pipe 48, to receive and break up to a certain extent the current of discharging steam entering the condenser from the pipe 48. A vapor-exhaust pipe 57 leads from the drip-tank 53 into the case of the boiler discharging into the smoke-passage, and is adapted for carrying off vapor from the drip-tank into the smoke-flue of the boiler-furnace. Dampers or valves 58 and 59 are preferably located in the pipes 50 and 57, which are adapted for regulating the size of the aperture therein and of the passage of steam therethrough. The stems 59½ of the dampers turn by screw-thread through the wall of the pipe, whereby the position of the dampers may be regulated and secured.

A steam-pipe 60 branches and leads from the exhaust-pipe 48, which is arranged to connect with corresponding steam-pipes passing through the several cars of the train and to conduct steam thereto for heating the cars, which steam is returned therefrom through the pipe 61 to the condenser 49. Steam-cocks 62, 63, and 64 are inserted in the pipe 60, 48, and 13, respectively, for closing and opening the pipes for the passage of steam when desired.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a steam-railway locomotive, a system of steam-condensers consisting of a condenser located just beneath the ceiling of a car, comprising a single chamber extending substantially throughout the length and breadth of the car, other condensers located along the

sides of the car, comprising single chambers extending substantially throughout the length of the car, a pipe connecting the steam-cylinder directly with the upper condenser, and a pipe or pipes running from the lowest parts of the upper condenser to the lower or side condensers, and suitable pipes running from the lowest parts of the lower or side condensers to a lower steam-tight drip-tank, substantially as described.

2. In a steam-railway locomotive, a system of steam-condensers consisting of a condenser located just beneath the ceiling of a car, comprising a single chamber extending substantially throughout the length and breadth of the car, other condensers located along the sides of the car, comprising single chambers extending substantially throughout the length of the car, a pipe connecting the steam-cylinder directly with the upper condenser, and a pipe or pipes running from the lowest parts of the upper condenser to the lower or side condensers, suitable pipes leading from the lowest parts of the lower or side condensers to a lower steam-tight drip-tank, and a vapor-exhaust pipe leading from the drip-tank to the smoke-passage of the boiler, substantially as described.

3. In a steam-railway locomotive constructed substantially in the form of a car having sides and an elongated top, the combination of a condenser located just beneath the ceiling of the car, comprising a single chamber extending substantially throughout the length and breadth of the car, and a roof raised centrally longitudinally above the ceiling of the car and above the condenser, forming an air-passage between the roof and ceiling or condenser of the car open at both ends, substantially as described.

4. The combination, with a locomotive, of an exhaust-pipe, as 60, leading from the steam-cylinder to the train of cars drawn by the locomotive, which pipe continues in and becomes a return steam-pipe, as 61, a condenser in the top of the locomotive into which the return steam-pipe discharges, other condensers located in the locomotive below the one at the top, and a drip-tank below all the condensers into which the water of condensation flows by gravity from the first or highest condenser through and from the other condensers, substantially as described.

5. In a steam street-car locomotive, an exhaust-pipe running from the steam-cylinder to a condensing-tank, and a steam-disseminator consisting of a revolving paddle-wheel, as 56, arranged in the tank at the mouth of the steam-discharging pipe, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EZRA DEDERICK.

Witnesses:

C. T. BENEDICT,  
C. H. KEENEY.