

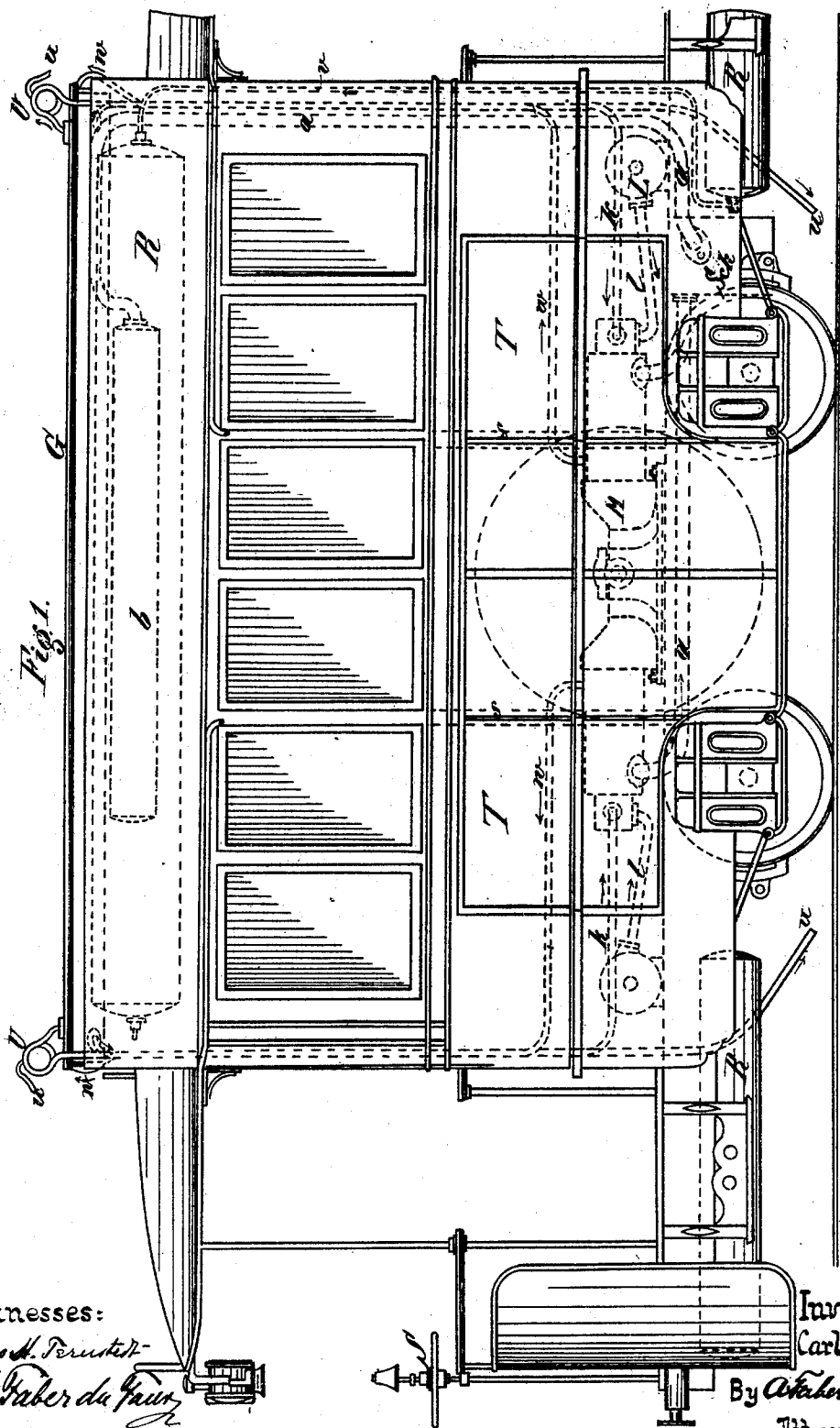
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5 Sheets—Sheet 1.

C. LÜHRIG.
LOCOMOTIVE VEHICLE.

No. 502,443.

Patented Aug. 1, 1893.



Witnesses:

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Inventor:
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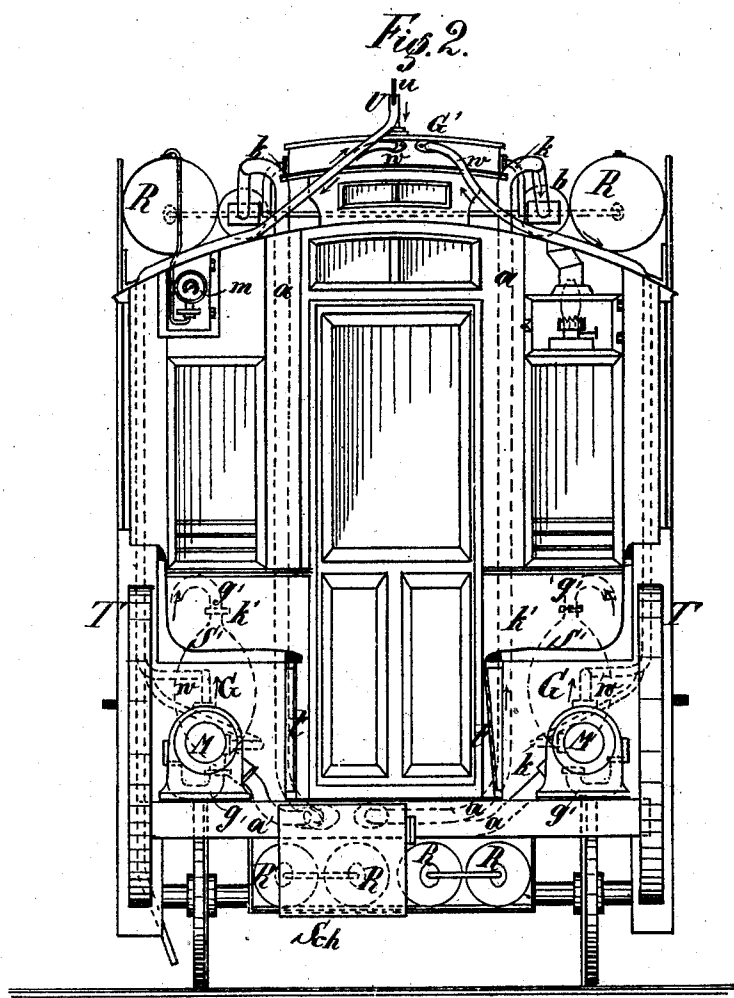
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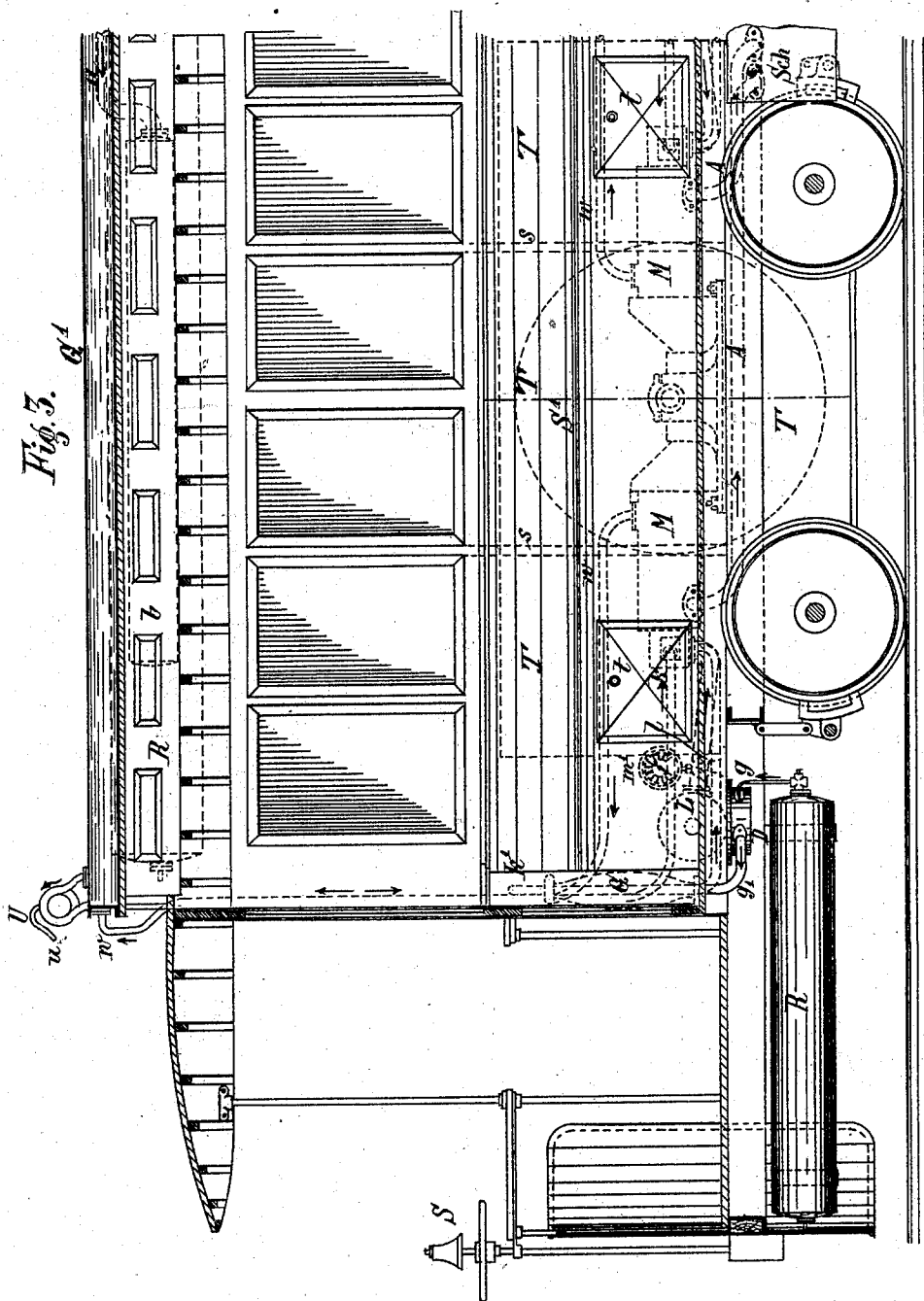
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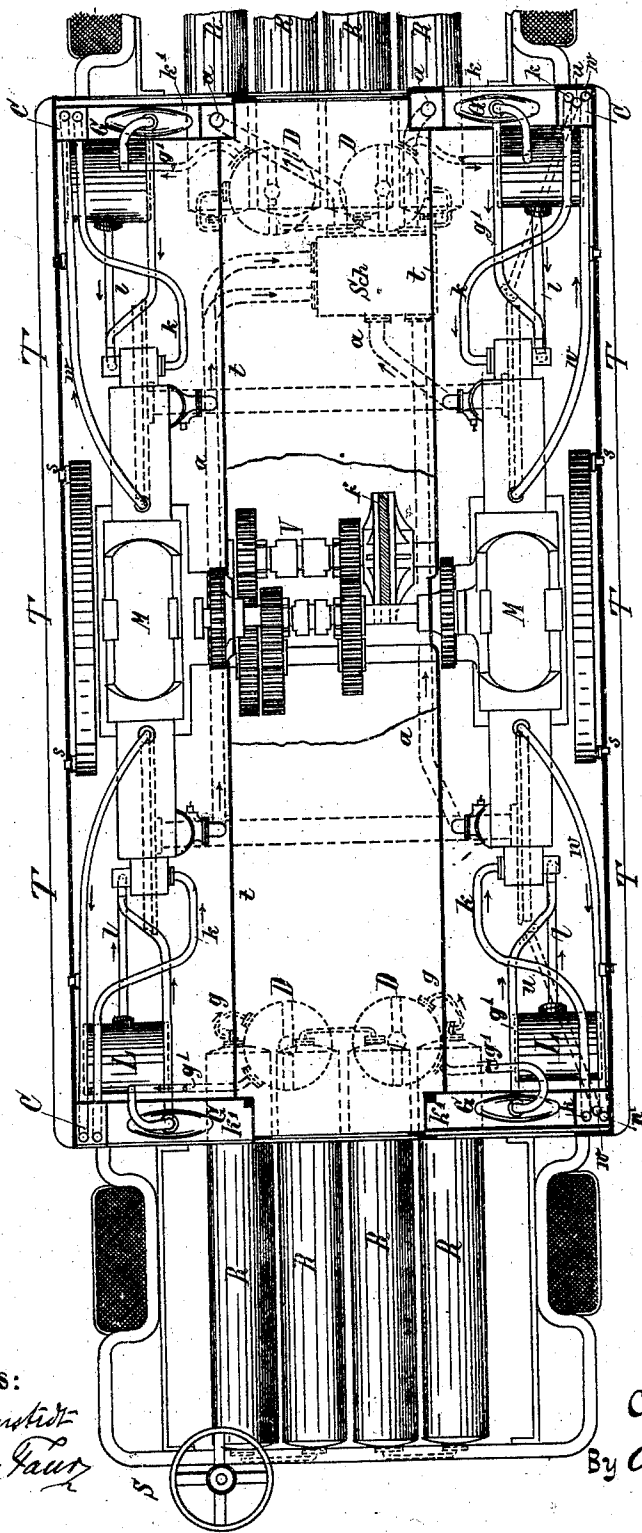
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Fig. 4



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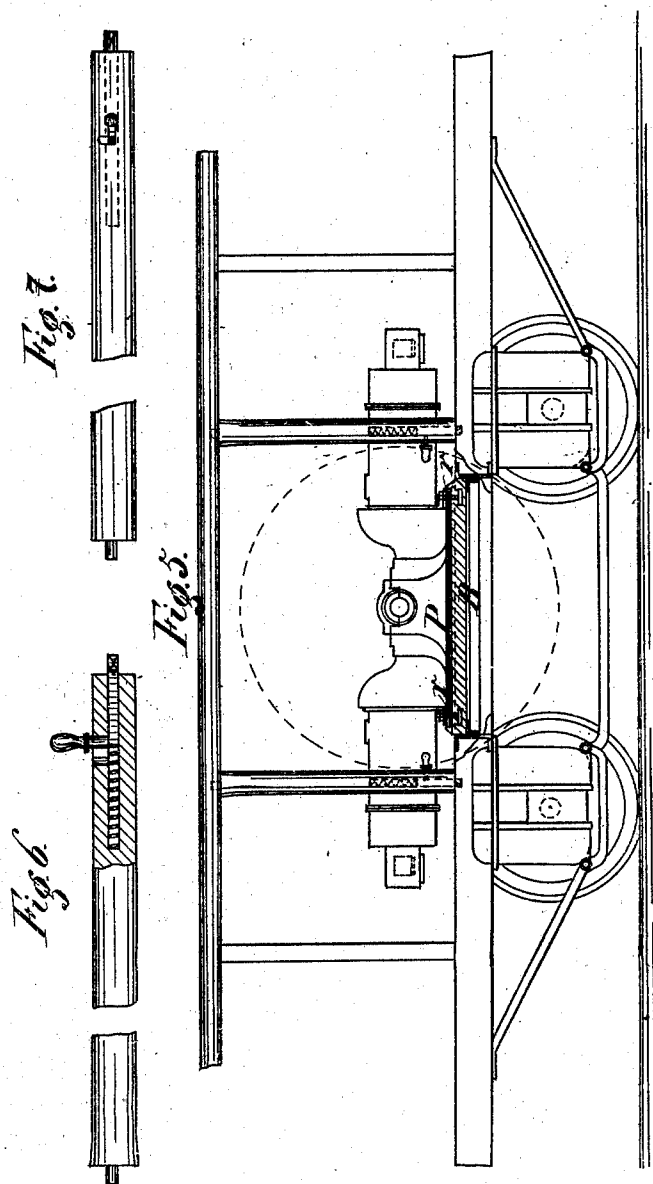
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C. LÜHRIG.
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UNITED STATES PATENT OFFICE.

CARL LÜHRIG, OF DRESDEN, GERMANY.

LOCOMOTIVE-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 502,443, dated August 1, 1893.

Application filed October 11, 1892. Serial No. 448,581. (No model.) Patented in Luxemburg September 3, 1892, No. 1,683.

To all whom it may concern:

Be it known that I, CARL LÜHRIG, a subject of the King of Saxony, residing at Dresden, in the Kingdom of Saxony, German Empire, have invented new and useful Improvements in Locomotive-Vehicles, (for which I have obtained Letters Patent in Luxemburg, No. 1,683, dated September 3, 1892,) of which the following is a specification.

10 This invention relates to the general arrangement of a tramway vehicle for transportation of passengers or freight. Instead of horses, locomotives or other independent detachable engines, motor engines worked by
15 gas, petroleum, air or the like are mounted in the carriage.

The main feature of the invention consists in the arrangement of the motor engines, gearing, and accessories of same in such parts
20 of the carriage as could not be used for either passengers or freight and are hidden from view. So for instance in passenger cars the motive parts are arranged under the seats which constitute at the same time a protective
25 covering and a hermetically closed casing preventing odor and noise from penetrating into the interior of the carriage. The fly wheels of the engines are placed in the hollow side
30 walls, the bags of india rubber for gas in the hollow front walls and the driving gear underneath the floor. By placing the different parts of the apparatus in this manner accidents and damages to the machinery from
35 outside interference are entirely avoided. Below the windows the carriage is provided with a number of doors which can be removed or swung out of the way, so that the different parts of the apparatus may at any time
40 be easily repaired, substituted or examined, and it is not even necessary to stop the carriage and engines while doing this. The exterior of a carriage of this kind does not differ from any of the ordinary types.

45 In competition with carriages of other construction and propelled by horses, air, electricity, &c., the herein described carriage has the advantage of being cheap, comfortable and safe and it can be used without expensive preparations in places where hitherto a
50 tramway or the like could not be employed on account of the first costs, or because the working expenses were too high to leave any profit.

In the accompanying drawings: Figure 1 is a side view of the carriage; Fig. 2 a cross section; Fig. 3 a longitudinal section; Fig. 4 a horizontal section; Fig. 5 a detail view showing how the motors can be exchanged, and
55 Figs. 6 and 7 are details of the exchangeable columns.

Similar letters of reference indicate corresponding parts.

As shown in Fig. 4 the driving gear V, requiring only a small space on account of its construction, is placed under the central part
65 of the carriage and is covered by the floor. The motor engines M—two double cylinder gas, or petroleum engines—are disposed under the seats while the two lateral fly wheels are put into the side walls. Below the plat-
70 forms on both ends of the carriage, and on both sides of the roof, are placed the holders R for gas or petroleum in a compressed condition. Below the floor are located the sound dampeners S *ch*, and the gas pressure regu-
75 lators D, while the bags of india rubber G are arranged in the interior of the front walls. The air-valves L are under the seats. The gas is taken through the conduit *g* from the gas holders R and passes first to the gas pressure regulators D and from thence through
80 the pipe *g'* to the india rubber bags G and finally to the motor engines M. Through the air valves L atmospheric air is by pipe *l* led to the engine. The exhaust gases go through
85 pipe *a*, which with other pipes is incased in a casing in the front and side walls, first to the sound dampeners S *ch*, and from thence up into the two purifying vessels *b* arranged
90 on the roof of the carriage. These vessels are filled with pieces of cork, brush-wood or other hygroscopic matters to purify and filter the gases which escape through fine openings distributed throughout the whole surface of the
95 receivers into the open air. By these means the adherent smoke and odor are entirely avoided. On the roof are also the two gas holders R communicating with other holders and like them with each other through pipe
100 *v*. From one of these gas holders a branch pipe leads to the manometer *m* (Fig. 2) on the platform of the carriage. This manometer serves to indicate the quantity of gas used during the trips or for each kilometer and
105 shows the driver when the gas holders need to be charged again. Inside the carriage,

close to the engines, a second manometer is inserted in the induction pipe to indicate the charge. Another receiver G' in the central part of the carriage roof contains water, which is kept in continuous circulation by its heating and cooling. The cold water flows through pipe K from the bottom of the receiver to the engines while the warm water ascends through pipe w owing to the pressure exerted by the cold water, and flows back into the receiver.

The cold water receiver G' is provided with an overflow contrivance in case the carriage should tilt. This contrivance consists of a coiled pipe leading from the top of the receiver to the ground. To prevent the pipe U from acting as a siphon and continuously discharging water, a small air tube u is inserted into the upper bend of the same.

The casing C for the pipes k and U is extended into the engine room and serves as an air shaft, so that the heat produced by the engine is carried off without heating the interior of the carriage. In winter this shaft may be closed up and the heat produced used for heating the carriage.

The seats can be lifted up as a whole or opened in part as they are provided with doors or flaps t ; the panels T on the outside of the side walls and the columns s can be taken out as shown in Figs. 2 and 5 to 7. The bed plates P of the engines being loosely mounted upon a fixed plate B are held down by bolts r , the heads of which fit into slots in the bottom plate B . When the nuts are unscrewed the engines can be drawn out for repairs or exchange.

Having now fully described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A tram car having hollow side walls and the spaces beneath the longitudinal seats closed on all sides, and provided with openings in the outside walls closed by suitable doors, and motor engines (one or more) disposed under the seats within the inclosed spaces with their fly wheels arranged to project into the hollow side walls,—whereby the available space of the car is not reduced; the engine parts are protected, and the penetration of odor into the car is prevented, substantially as described.

2. A tram car having the spaces beneath the longitudinal seats closed on all sides, motor engines disposed under the seats within the inclosed space with their fly wheels arranged to project into the hollow walls, a driving gear located beneath the floor of the car, and gas collectors placed in the hollow end walls,—the side and front panels of said car being constructed to open up to gain access to the several parts, substantially as and for the purpose specified.

3. In a tram car having its side walls re-

movable and the spaces beneath the longitudinal seats inclosed, one or more motors having their frames arranged to slide upon suitable supports within said inclosed spaces, whereby the motors can be removed from the outside of the car on opening the side walls, substantially as described.

4. In a tram car the means described for obtaining a substantially noiseless and odorless exhaust consisting of a sound dampener Sch placed in connection with the exhaust of the engine, a perforated receiver containing dry filtering and purifying material, and a connection between said receiver and the sound dampener substantially as described.

5. In a tram car the combination with the motor engines and the receiver G' for the cooling water, of a coiled discharge pipe U connected to said vessel permitting the water to overflow only at the highest level when the car is in an oblique position and a tube u connected with the coil of the discharge pipe to prevent the liquid from being siphoned off, substantially as described.

6. A tram car having the spaces beneath the longitudinal seats closed on all sides and provided with openings in the outside walls closed by suitable doors, motor engines (one or more) disposed under the seats within the inclosed spaces, a driving gear located beneath the floor of the car, gas holders distributed beneath the platforms, ventilating shafts for the several inclosed spaces, and sound dampeners and filters through which the exhaust gases are led, all arranged and operating substantially as specified.

7. A tram car having its seats, the floor beneath the same and the side walls capable of being opened up, engines located within the spaces inclosed by the seats, floor and side walls, and ventilating shafts for said spaces, substantially as described.

8. In a tram car the combination of the motor engines disposed within the inclosed spaces beneath the seats, gas or petroleum holders located beneath the platform of the car, a driving gear connected with the engines and located beneath the car, pressure regulators D , bags G arranged in the hollow front walls of the car, sound dampeners Sch , purifying vessels b disposed on the top of the car, a manometer m , a water receiver G' , on the roof of the car connected with the water jackets of the engines, and ventilating shafts for the inclosed spaces, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CARL LÜHRIG.

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ERNST DEMUTH,

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