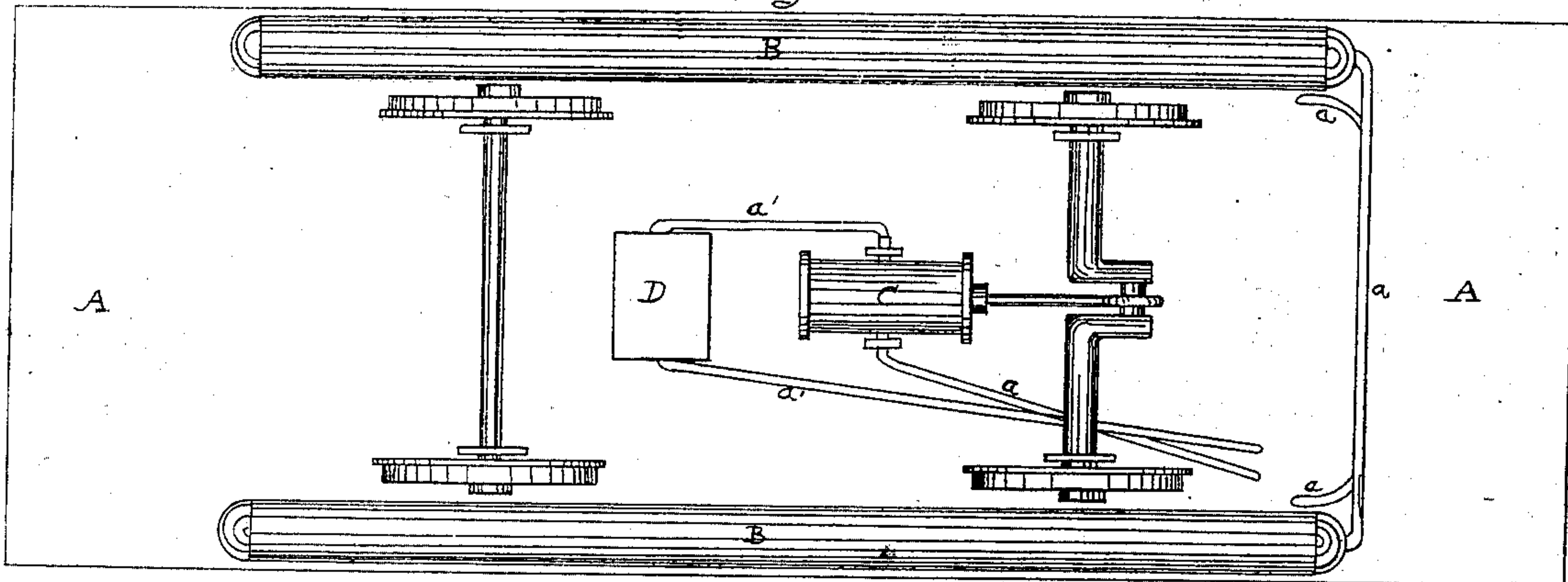


Louis Ransom

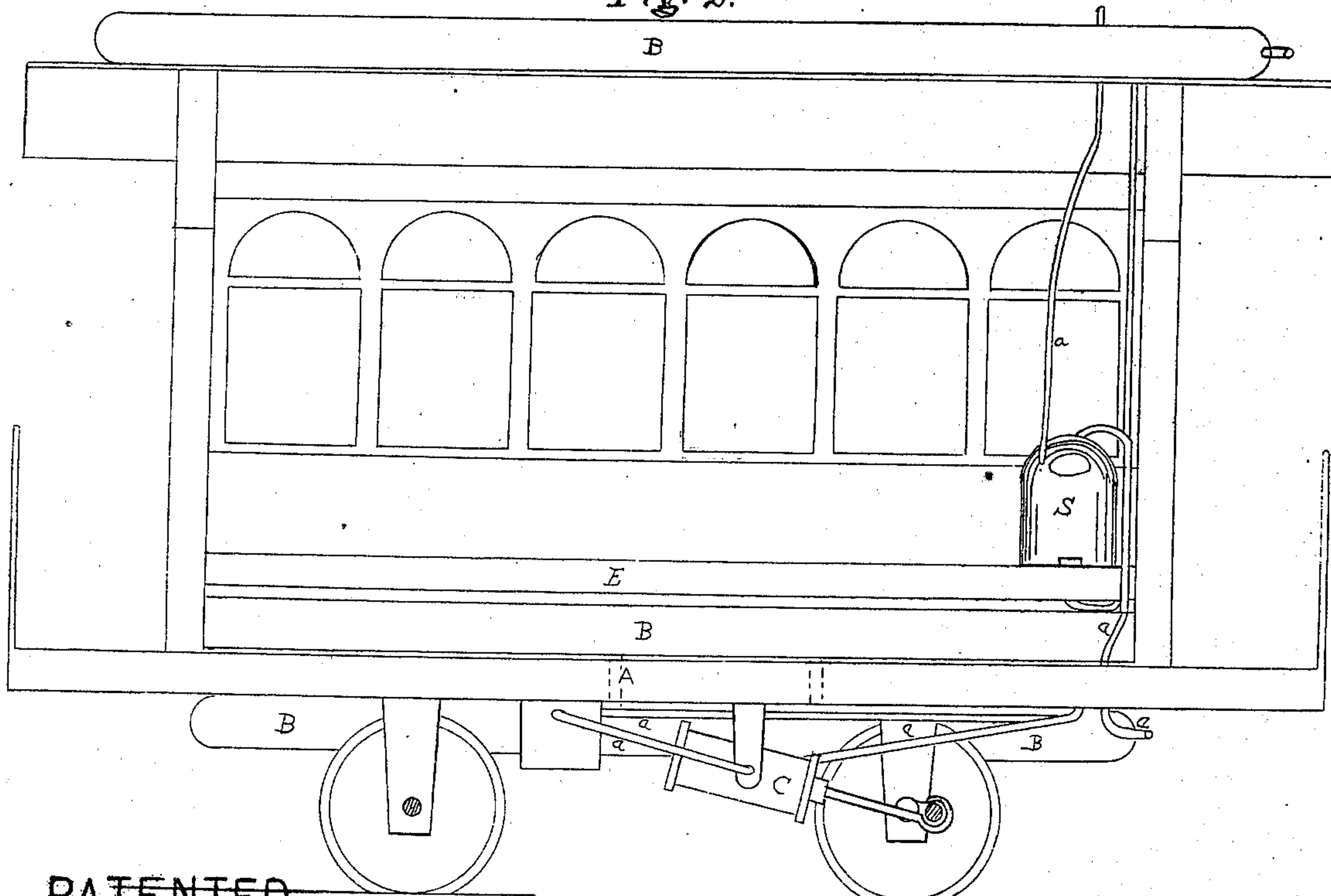
Pneumatic Car

Fig. 1



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Fig. 2.



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Fig. 4.

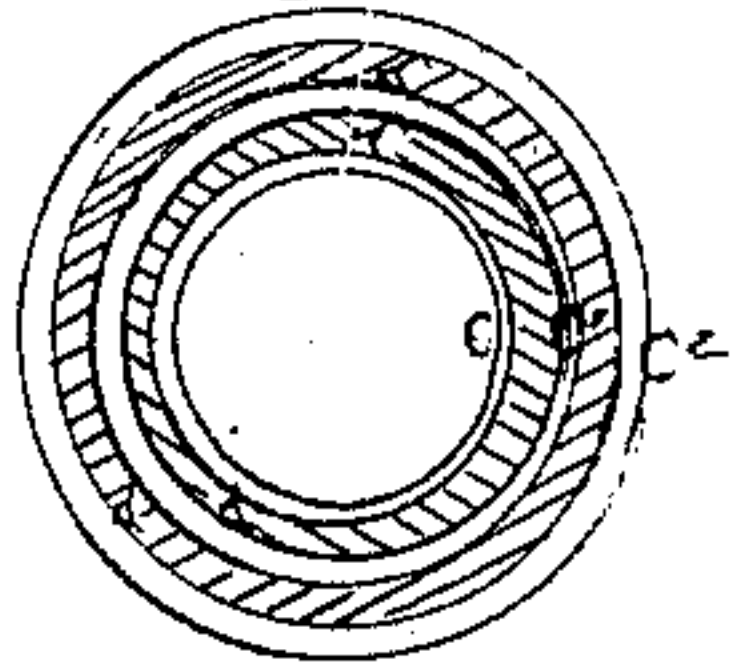
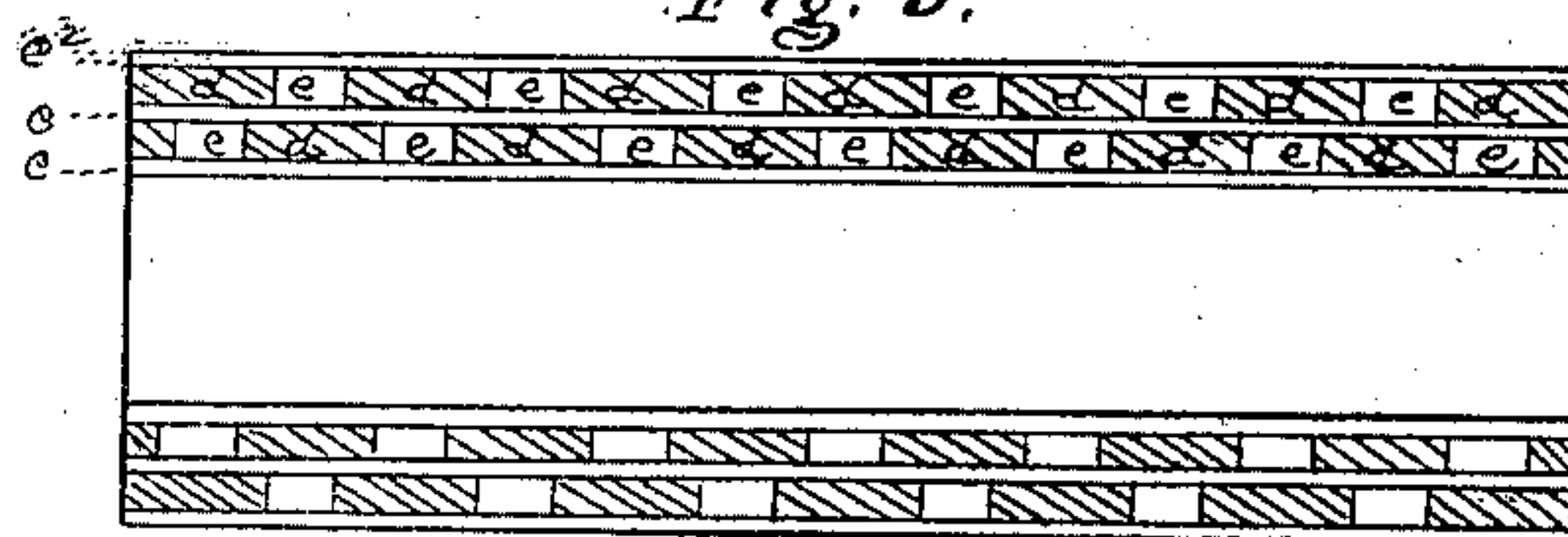


Fig. 3.



Witnesses.  
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Inventor.  
Louis Ransom  
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his Attorney.



# UNITED STATES PATENT OFFICE.

LOUIS RANSOM, OF LANSINGBURG, NEW YORK.

## IMPROVEMENT IN PNEUMATIC CARS.

Specification forming part of Letters Patent No. 72,082, dated December 10, 1867.

*To all whom it may concern:*

Be it known that I, LOUIS RANSOM, of Lansingburg, in the county of Rensselaer and State of New York, have invented a new and useful Improvement in Pneumatic Cars; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Small cylinders are capable of resisting great internal strain; and as it is desirable in operating street-cars and all other vehicles to retain the largest amount of force possible in the smallest possible space, I employ cylinders of wrought-iron, or other suitable material, for retaining compressed air on street-cars, for the purpose of propelling them, so that the air may be compressed, if need be, to a density of eighty atmospheres.

As shown in the drawings, I distribute these cylinders in the following manner: one cylinder under each seat of the car, one under each outer edge of the car-floor, just outside of the wheels, and three on the roof or deck, these being the parts of the car where the cylinders will be most out of the way, and least liable to injury.

Where the pressure is so intense, it is necessary that all joints and connections be perfectly tight, and be so constructed that they will not be liable to work loose. It is also desirable that all the cylinders be so connected as to form one receptacle for force; and if they were united by rigid tubes of iron or other metal, the slight independent motion of the cylinders, induced by the movement of the vehicle, would very soon cause the joints to work loose, while the connection of the cylinders with the engine is of such a character that rigid tubing would not answer the purpose at all, the motion between these parts being quite free. In order to obviate this tendency to loosening in the joints, I make the connections between the cylinders, and between the cylinders and engine, and, in fact, all the connections for the passage of air, of flexible pipes, constructed as hereinafter described.

To enable others skilled in the arts to which my invention most nearly pertains to make

and use my said invention, I will now proceed to describe its construction and operation.

In the accompanying drawings, Figure 1 is a view of the under side of the car-floor, the car being inverted. Fig. 2 is a longitudinal vertical section of the car through line *x x*, Fig. 1. Fig. 3 is a vertical longitudinal section of the flexible connecting-pipe, and Fig. 4 is a cross-section of the same.

Like letters refer to the same parts in all the figures.

A is the floor of the car. B B are the cylinders for containing compressed air, and *a a'* are the flexible connecting and exhaust pipes. C is an oscillating cylinder, in which the compressed air operates to drive the wheels by means of a piston, pitman, and crank. D is a muffling-box, through which the exhaust-air is conducted by the exhaust-pipe *a'*, for the purpose of deadening the puffing noise peculiar to all high-pressure engines. This box may be made of wood or other suitable material, and may be lined with quilted cotton or other similar material, if need be; or it may consist of one box inclosed within another, with or without the lining.

I construct the flexible connecting-pipe as follows: Reference being had to Figs. 3 and 4, *c*, *c'*, and *c''* are continuous rubber tubes. Around the inner tube *c* I place, alternately, a series of metal bands, *d*, and rubber bands *e*, of equal thickness, but the metal bands being twice as wide as the rubber bands. I then draw or form over this series of bands the rubber tube *c'*; then outside of this I place another series of metal and rubber bands, *d* and *e*, the metal bands being so placed as to break joints with those of the inner series, as shown in Fig. 3. I then draw or form over this series of alternating bands the outside rubber tube *c''*, which keeps all the parts in place, and gives a smooth finish to the compound pipe. Any other sufficiently strong and elastic substance adapted to that use may be substituted for india-rubber; but I know of no other substance which will answer the purpose as well. This compound pipe will be sufficiently flexible to save the joints from wrenching, while at the same time it will have the strength of a rigid metal tube, to withstand an internal pressure.



Stoves are being introduced on street-cars in the winter, for adding to the comfort of the passengers. In that season the presence of ice and snow on the track will often render it necessary to expend more power in propelling the cars than in summer. In order to supply this increase of power, I fix a metallic tube or tubes inside or outside of the stove S, where the same will be heated, and pass the compressed air through said tube or tubes, thus heating it, and, of course, expanding it, and increasing its force before going to the engine.

In order to make the utmost use of the condensed air in summer, it is conducted from the "muffler," and discharged directly into the car by means of the escape-pipe *a'*, thus supplying the passengers with plenty of cool, fresh air, while the windows may be closed to exclude the dust and heat. In winter this exhaust air may be passed again through other pipes heated by the stove, and thence discharged into the car, warming the whole interior with fresh, warm air.

I place three air-cylinders on the roof of the car, (one in the center and one on each side,) one under each seat E, and one on each

side of the car, under the floor, and outside of the wheels.

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

1. In combination with a pneumatic car, a series of metal cylinders for containing compressed air, the said cylinders being connected by pipes, so as to form one common reservoir, substantially as described.

2. In combination with a stove for warming the car, or other heating apparatus, a conducting-pipe for the compressed air, so located, with reference to the stove or other heating apparatus, that the compressed air, in passing through it, will become heated, and have its expansive power increased thereby, substantially as described.

3. The compound flexible pipe, constructed substantially as described.

4. The muffler D, for the purpose of deadening the sound of the escaping air, as described.

LOUIS RANSOM.

Witnesses:

A. SEAMAN,

C. J. LANSING,

WM. JAS. BOWDEN.