

No. 680,843.

Patented Aug. 20, 1901.

C. COMSTOCK.
PNEUMATIC RAILWAY SYSTEM.

(Application filed Mar. 18, 1898. Renewed Dec. 18, 1900.)

(No Model.)

4 Sheets—Sheet 1.

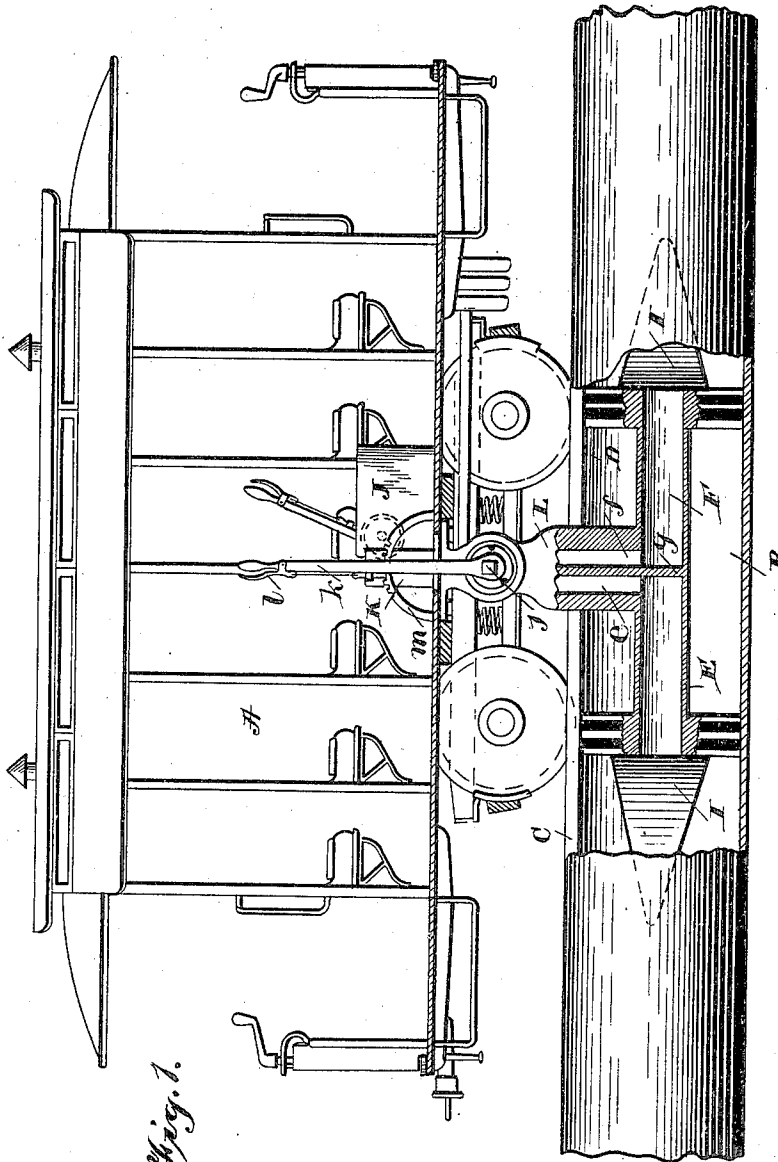


Fig. 1.

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Fig. 4.

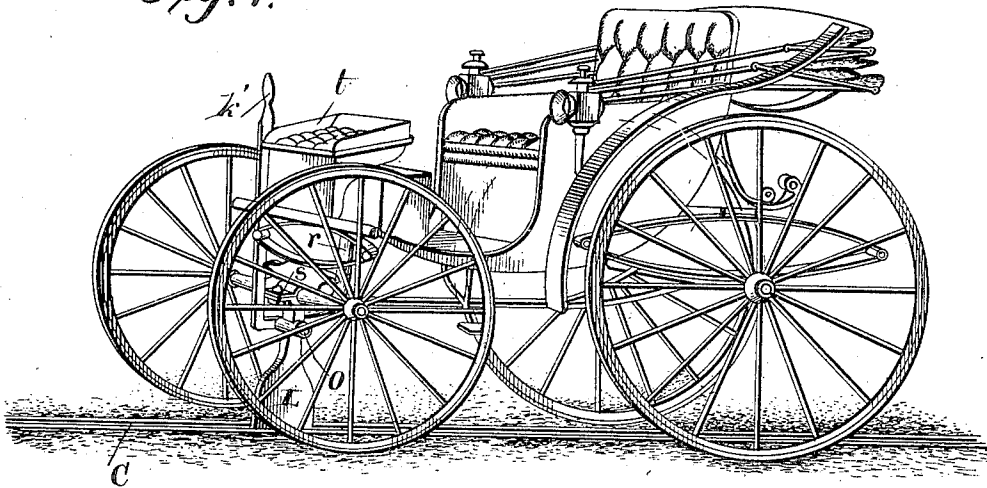


Fig. 5.

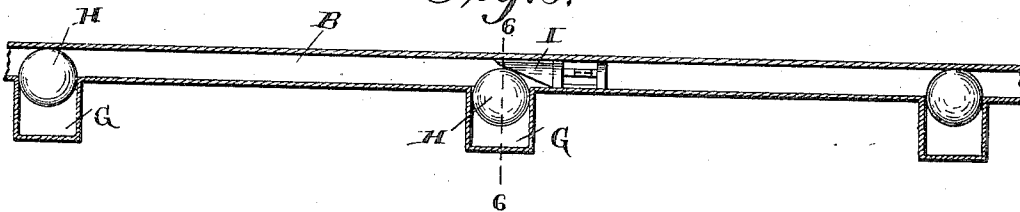


Fig. 6.

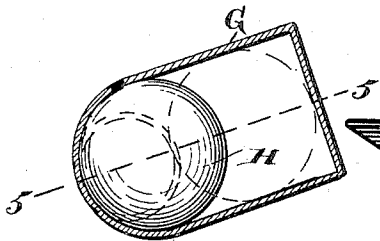
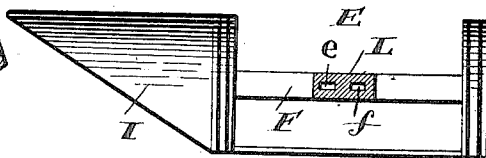


Fig. 7.



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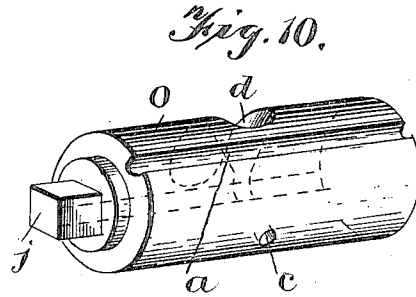
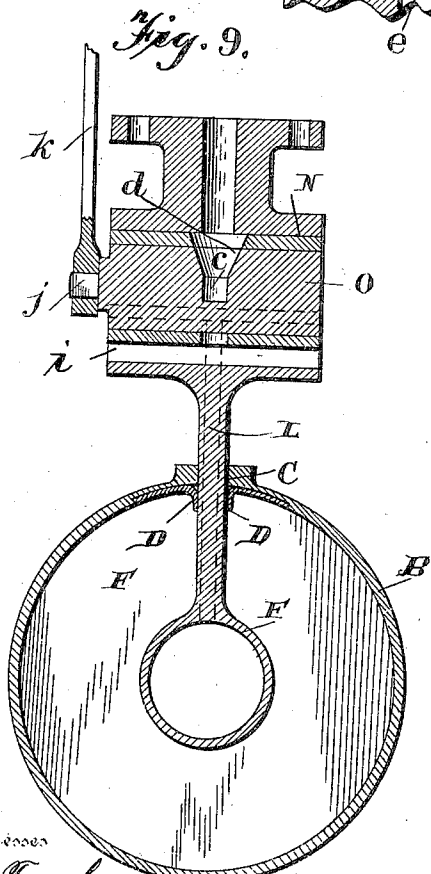
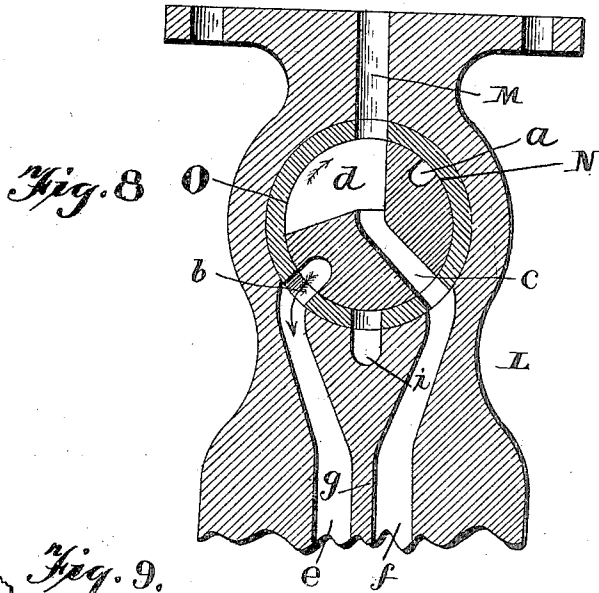
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4 Sheets--Sheet 4.



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UNITED STATES PATENT OFFICE.

CHARLES COMSTOCK, OF RICHMOND, VIRGINIA.

PNEUMATIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 680,843, dated August 20, 1901.

Application filed March 18, 1898. Renewed December 18, 1900. Serial No. 40,307. (No model.)

To all whom it may concern:

Be it known that I, CHARLES COMSTOCK, of Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Pneumatic-Railway Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in pneumatic railways; and it consists of a railway having a propelling-tube with a piston therein, the propelling-tube having a slot through which an extension from the piston passes to be connected to a car or other vehicle.

The primary object of my invention is the providing of a propelling-tube in a road-bed, the propelling-tube having a longitudinal opening with a closing member therefor and a piston within the tube having an extension passing through the slot which is adapted to be connected to a car or other vehicle, the vehicle being provided with an air-pump and an engine for running it, whereby air is exhausted from the propelling-tube at either end of the piston, according to the will of the driver, whereby the vehicle or car will be propelled in either direction.

In the accompanying drawings, Figure 1 is a sectional view of a grip-car, showing my invention connected therewith and the propelling-tube and part of the cylinder and the extension thereof in section. Fig. 2 is a similar view showing my invention applied to the front end of an ordinary street passenger-car. Fig. 3 is a perspective view of a road-bed, showing my invention applied thereto and adapted to be connected to any vehicle provided with a pump and engine for propelling it. Fig. 4 is a perspective view of a vehicle provided with an engine and pump shown connected up with the piston. Fig. 5 is a horizontal sectional view through a part of the propelling-tube, showing means for dividing the propelling-tube into sections. Fig. 6 is an enlarged sectional view on the line 6 6 of Fig. 5. Fig. 7 is a detached top view of the piston. Fig. 8 is an enlarged vertical sec-

tional view taken through the upper end of the piston-standard in a direction longitudinal the car or vehicle and showing the valve construction. Fig. 9 is a vertical sectional view at right angles to Fig. 8. Fig. 10 is a detached perspective view of the valve.

Referring now to the drawings, A in Fig. 1 represents a grip-car, and B a propelling-tube, which is embedded in a road-bed or roadway, said propelling-tube having a longitudinal slot C, adapted to be closed by a flap or closing member D. Situated within this propelling-tube B is a double-headed piston E, the connecting portion or center thereof being of tubular form, as clearly shown. By reference to Fig. 5 it will be seen that the propelling-tube B is provided with a series of pockets G, which contain balls H, the pockets being arranged at an incline, as shown in Fig. 6, so that the balls will roll down the incline and across and close the tube, as shown in Fig. 5. The object of this is to divide the tube up into short sections, which sections may be of any desired length best adapted for practical purposes. The piston E is provided at each end with a tapered projection I, adapted to engage the ball H and force it back into its pocket as the piston passes, the piston at this point being carried by the momentum of the car until the ball closes behind it, the operation of which will be more fully described hereinafter.

The car or vehicle, as the case may be, is provided with a gasoline-engine inclosed within a box J, and this engine will run a pump K, the said pump having communication with the upper end of the piston-standard L through the opening M thereof. As shown in Figs. 1 and 2, the upper end of this standard L is bolted to the under side of the car either at the center or in the front, and the communication M will be in communication with the air-pump K. The pump will be of the form for exhausting air from the propelling-tube B in a manner to be presently described, and the pump may be of any form, as also the engine, and as the construction of either of these does not form any part of my present invention the specific construction has not been shown, it being deemed unnecessary.

The upper end of the hollow standard L is

provided with a transverse cylindrical portion N, which receives a solid portion constituting a valve O, the said valve being provided with the longitudinal grooves *a* and *b*, which have their ends in communication with the atmosphere. This valve is also provided with a transverse communication *c*, having its upper end enlarged, as shown at *d*, and communicates with the opening M, which is in communication with the air-pump. The standard L is provided with the passage-ways *e* and *f*, which are divided by the vertical web *g*. This vertical web extends down and divides the connecting-tube F of the piston into two parts, whereby the passages *e* and *f* communicate, respectively, with the forward and rear end of the piston, and consequently with the propelling-tube at opposite ends of the piston. Passing transverse the upper end of the standard L is a passage-way *i*, having its ends communicating with the atmosphere. One end of the valve O is provided with a square shoulder *j*, adapted to receive the operating-lever *k*, which extends up within the car and may or may not be provided with a spring-catch *l*, adapted to engage a quadrant *m*.

The operation of this construction is as follows: The tube F having its opposite ends in communication with the propelling-tube B through the head of the cylinder and the passages *e* and *f* being in communication with the tube F, when the valve is in the position shown in Fig. 8 the pump will be exhausting air from the propelling-tube at the right-hand side of Figs. 1 and 2, while air is admitted to the propelling-tube at the opposite ends of the piston through the passage-way or groove *b* of the valve and the passage-way *e* of the standard L. By turning the valve so that its passage-way *c* will be in communication with the passage-way *i* the pump will be exhausting from the atmosphere, and by applying the brake the car will stop and be held. By turning the valve in the same direction indicated by arrow in Fig. 8 until the passage-way *c* is in communication with the passage-way *e* the pump will be exhausting air from the opposite side of the piston, as will be readily understood, and atmosphere will be passing in the propelling-tube at the other end of the piston through the passage-way *a* of the valve and the passage-way *f* of the standard L. Owing to this construction a slight movement of the valve will cause the air to be exhausted from either end of the piston, as may be desired, and the car thereby propelled by the exhaustion of the air and the admission of the air or atmosphere at the opposite end of the piston.

By dividing the propelling-tube B into short sections the car will be propelled more quickly than if in large sections, for the reason that there will be a smaller space for the pump to exhaust the air from.

By reference to Fig. 3 it will be noticed that the upper end of the standard is pro-

vided with a tube or pipe connection *r*, adapted to have connection with the pump of an ordinary vehicle, as shown in Fig. 4, in any desired manner, and the upper end of the standard is provided with a socket *s*, adapted to receive the front axle of the vehicle and to be clamped thereto, whereby the vehicle will be attached ready for operation, the operating-lever *k'* extending up alongside of the seat *t* of the vehicle, as shown in Fig. 4, to be operated by the driver. Owing to this construction any vehicle which is provided with an engine and a pump can be connected with the standard and propelled as desired along the roadway.

From the above description it will be noted that aside from the equipment being connected to cars, as shown in Figs. 1 and 2, it is a complete equipment projecting in the roadway and adapted for connection with any vehicle provided with the pump and engine, whereby that vehicle can be drawn along the same as the car.

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

1. A pneumatic-railway system comprising a propelling-tube, a piston therein having two heads, a hollow tube connecting them, a standard projecting from the hollow tube and having communication with the propelling-tube at opposite ends of the piston, a vehicle connected with the standard and having a pump and an engine, and a valve mechanism situated between the propelling-tube and the engine adapted to admit air to either end of the piston and to exhaust air from the opposite end of the piston, substantially as described.

2. A pneumatic system comprising a propelling-tube, and movable balls adapted to move in and out of said tube for dividing it into sections, substantially as described.

3. A pneumatic system comprising a propelling-tube, provided with laterally-projecting pockets, and balls situated in said pockets and adapted to move across and close said tube, substantially as described.

4. A railway system comprising a propelling-tube having a longitudinal slot, a piston therein having passage-ways communicating at opposite ends thereof with the propelling-tube, a standard projecting from the piston through the said slot and having passage-ways in communication with the piston passage-ways, a pressure-producing device in communication with the standard passage-ways, and a valve situated between the piston and the pressure-producing device, said valve having a passage-way adapted to be thrown into communication with either of said standard passage-ways, and passage-ways adapted to be thrown in communication respectively with the atmosphere, substantially as described.

5. A railway system comprising a propelling-tube having a longitudinal slot, a piston within the tube having communication there-

with, a standard connected with the piston
and having a passage-way in communication
with the piston communication, a valve-seat
having passages in communication respec-
5 tively with the atmosphere and with said pro-
pelling-tube, and a pressure-producing de-
vice in communication with said valve-seat,
and a valve having a passage-way adapted to
be thrown into communication respectively

with either the tube passage-way or the at- 10
mospheric passage-way substantially as and
for the purpose described.

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

CHARLES COMSTOCK.

Witnesses:

PHILIP PALM,
RICHARD W. BENDULL.