

(No Model.)

T. J. MAYALL, Dec'd.

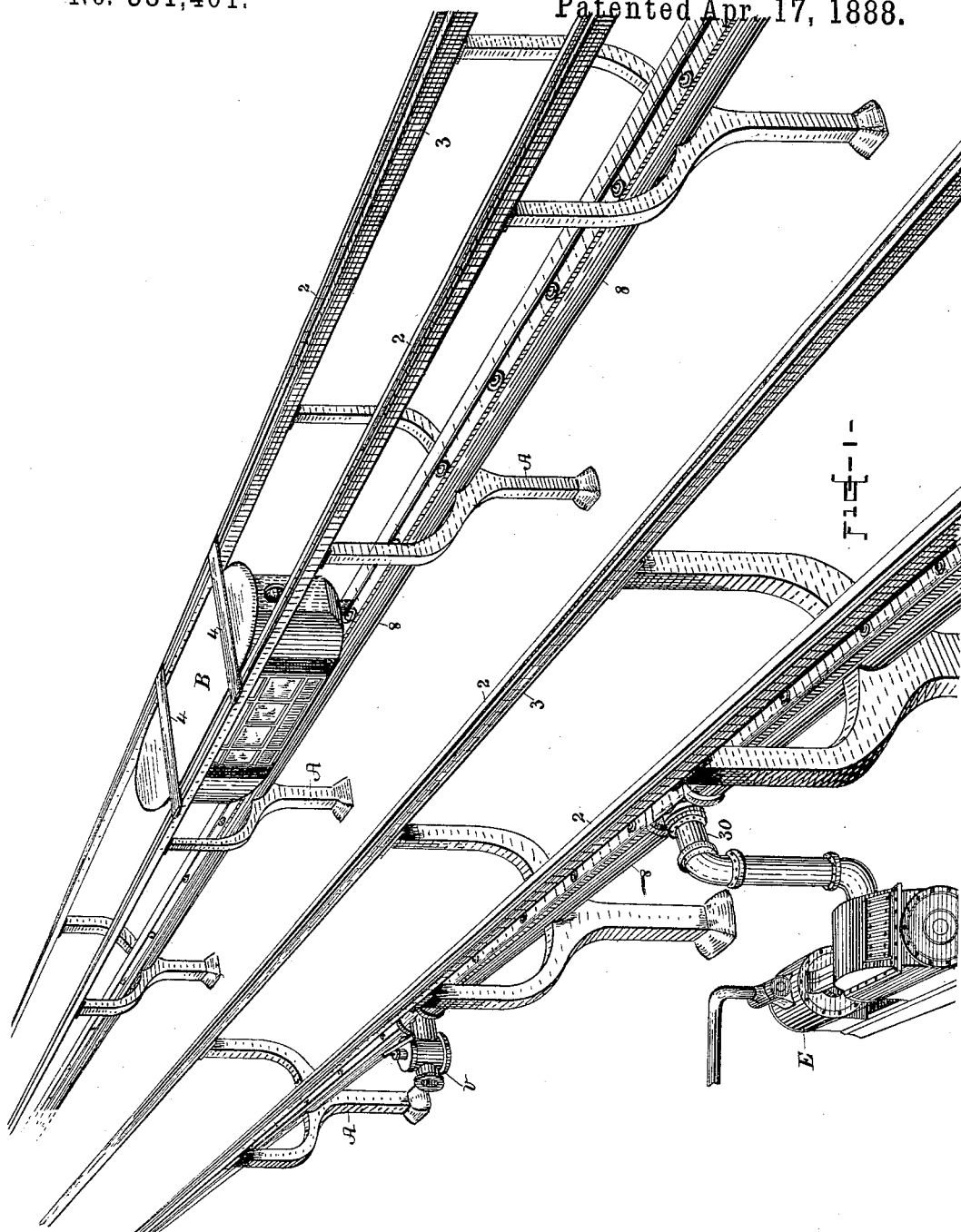
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L. A. MAYALL, Executrix.

PNEUMATIC RAILWAY SYSTEM.

No. 381,401.

Patented Apr. 17, 1888.



Witnesses
Philip H. Hume
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Inventor.
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(No Model.)

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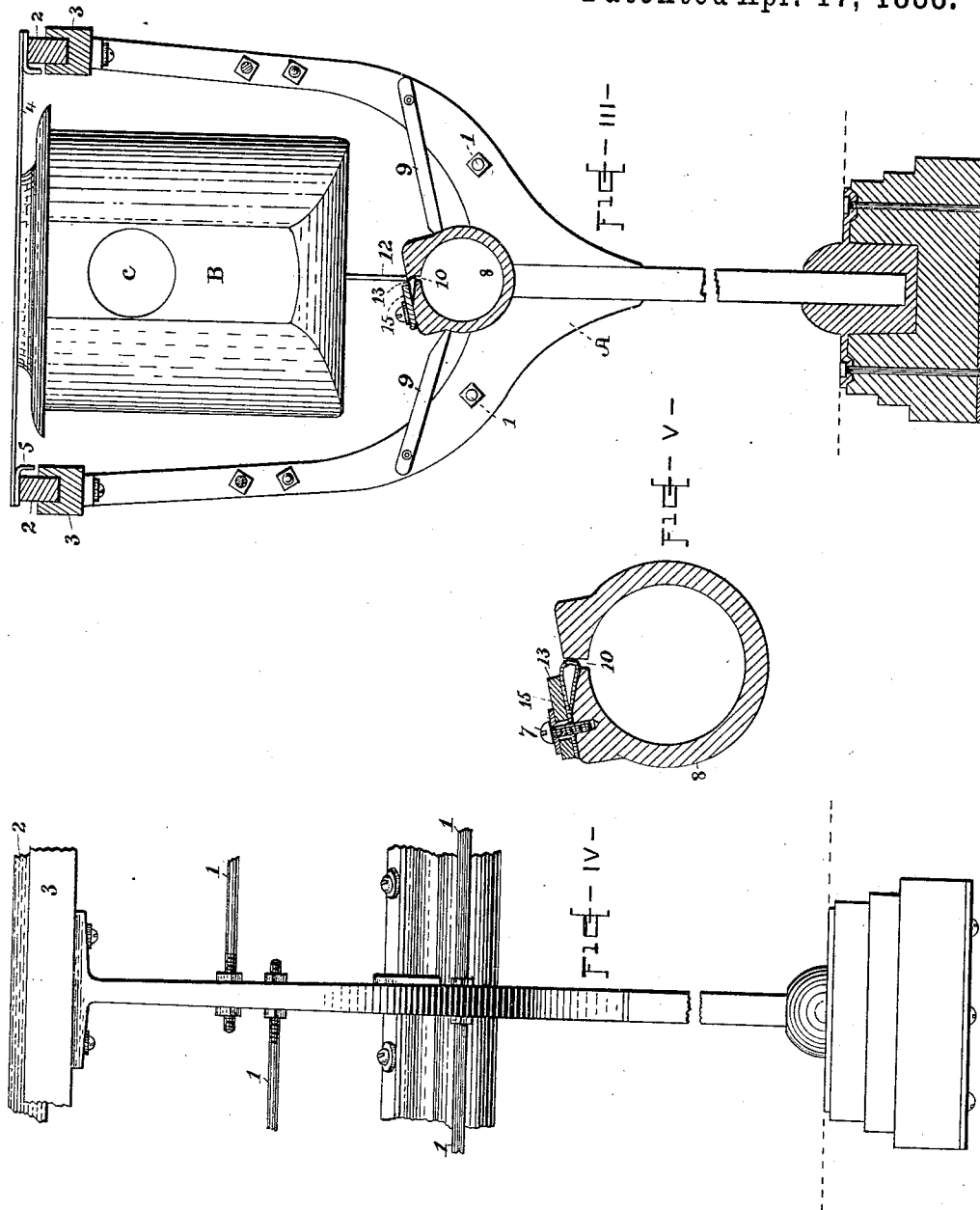
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Witnesses.

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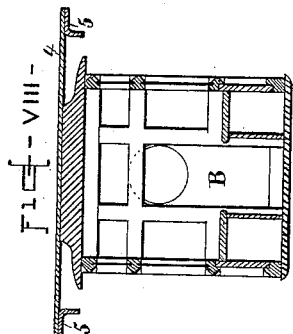


Fig. IX -

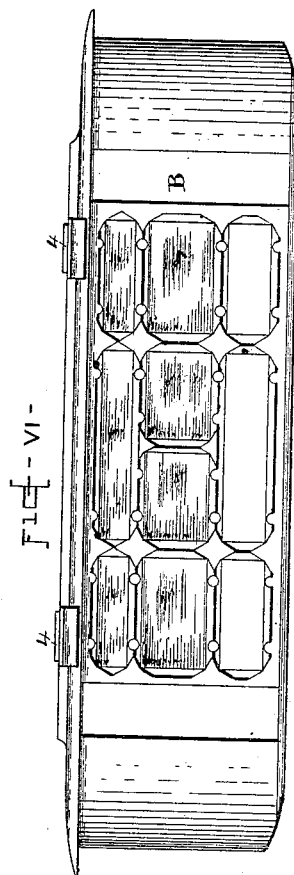
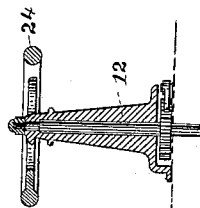
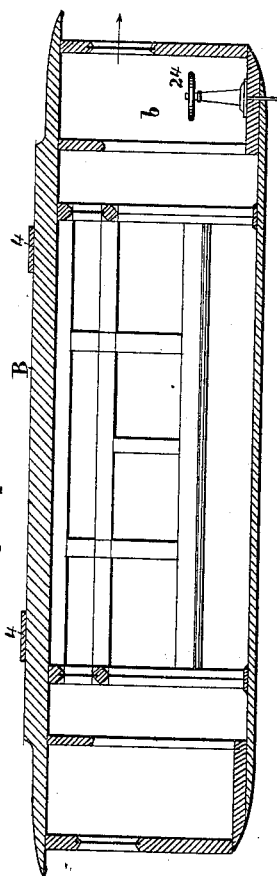


Fig. VII -



Witnesses.

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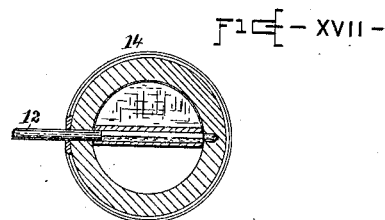
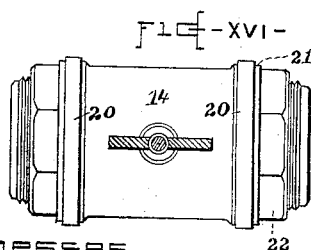
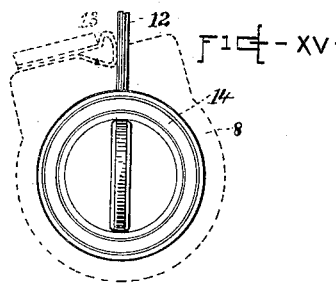
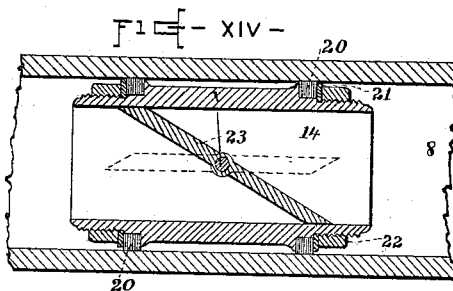
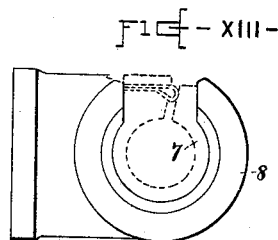
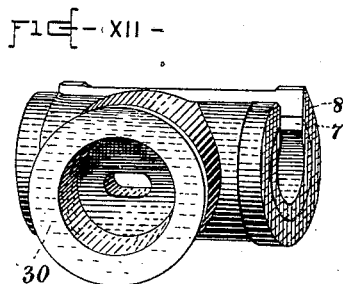
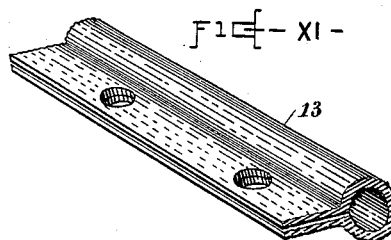
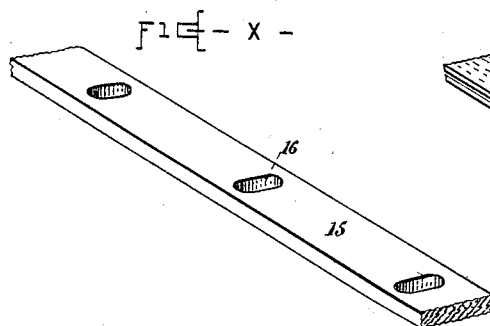
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Patented Apr. 17, 1888.



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UNITED STATES PATENT OFFICE.

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EXECUTRIX OF SAID THOMAS J. MAYALL, DECEASED.

PNEUMATIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 381,401, dated April 17, 1888.

Application filed June 9, 1887. Serial No. 240,723. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. MAYALL, of Reading, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Pneumatic-Railway Systems, which improvement is fully set forth in the following specification.

This invention contemplates the utilization of air-pressure for the propulsion of vehicles; in other words, the utilization of a pneumatic tube for transportation of passengers and freight.

Attempts have been made heretofore to utilize air-pressure for the propulsion of vehicles, but from one defect or another they have been unsuccessful.

The principal advantages to be attained by a pneumatic railway are greatly increased speed with decreased running expenses and costs of repairs. These objects are believed to be attained by the invention herein described, which involves certain improvements in pneumatic railways designed to render the same entirely practical.

According to this invention the car or vehicle, instead of being mounted on wheels, is provided with runners, and slides over the rails. Owing to the heat developed in the journal-boxes, it is unsafe to run a car mounted on wheels at such speed as could easily be obtained with air-pressure as the motive power. The same objection would apply to a sliding car, but it is entirely overcome by forming the rails of an anti-friction or self-lubricating compound. The compound which I have specially devised for this purpose is composed of rubber, sulphate of antimony, graphite, oxide of iron, and finely-powdered asbestos, mixed and vulcanized. Rails made of this compound possess advantages, as ascertained by practical tests, that contribute largely to the success of the pneumatic railway. It is sufficiently tough and durable to withstand the wear, the car-runners slip over it at the highest speed and under great weight with little friction and without developing enough heat to affect injuriously either the runners or rails. It can be made at a much less cost than steel rails, and it is not

affected by changes of temperature, so that the rails can be laid without a break and all jolting of the car avoided.

It has been proposed heretofore to connect the car or vehicle with a carrier inside the pneumatic tube by means of a bar or rod passing through a longitudinal slot in the tube. The objections to such construction have been, first, the amount of friction between the rod or bar and the edges of the slot, and, second, the difficulty of opening the slot quickly and easily for the passage of the rod or bar and keeping it tightly closed in front of and behind the same. It has been proposed to employ a line-valve composed of links connected by rule-joints, and to provide the car with a device for opening the valve just in advance of the rod or bar and closing it after the passage thereof. Such contrivance, however, would be open to both the objections above pointed out, and could not be practically employed.

According to the present invention, the slot in the tube is closed by a flexible packing which the rod or bar pushes aside in its passage. This packing is made of an anti-friction compound, such as above described, only containing less sulphate of antimony, so as to render it sufficiently flexible. This packing keeps the tube perfectly tight in advance of the car, and the contact of the bar or rod therewith at very high speeds produces but little friction and heat, as actual experiments have demonstrated.

The invention includes other improvements and details of construction, as will be hereinafter more fully described.

In the accompanying drawings, which form part of this specification, Figure I is a perspective view of a portion of a track showing the car in transit; Fig. II, a side elevation of the same; Fig. III, a cross-section of the track; Fig. IV, a detail view of one of the supports; Fig. V, a sectional detail of the pneumatic tube; Fig. VI, a side view; Fig. VII, a longitudinal section, and Fig. VIII a cross-section, of the car, and Figs. IX to XVII are detail views.

The track and road-bed are supported by Y-shaped uprights or pillars A, connected by tie-bars 1, the rails 2 being at the top of the pillars and resting on bars 3. The latter are grooved out, as shown, Fig. III, and the rails 2, which are of a suitable self-lubricating or anti-friction substance, as before specified, are set in these grooves.

The car B has at its top suspension-plates, 4, which extend beyond the sides of the car and rest at their ends upon the rails 2. The car therefore hangs from the plates 4 between the branches of the Y-shaped uprights, as shown. The plates 4 are preferably of steel, but they may be of any material having the requisite strength, and be provided with shoes 5, Figs. III and VIII, of steel, to slide on the rails 2. The shoes 5 are turned down or formed with flanges at their inner edges to prevent the car getting off the track.

The pneumatic tube 8 is supported in the fork of the uprights A and braced by braces 9, Fig. III. The tube is of cast-iron, steel, or other suitable material, and is preferably provided, as shown in Figs. XII and XIII, with a lining, 7, of anti-friction material, such as that of which the rails are composed. The tube has along the top a slot, 10, through which passes the bar 12, connecting the carrier 14 with the car B. The slot 10 is closed by a packing-tube, 13. It is important that the tube 13 should be sufficiently flexible to offer little resistance to the passage of the bar 12; that it should close tightly around said bar, and that there should be a minimum amount of friction between it and the bar. To accomplish these objects, the tube is made of rubber combined with anti-friction material, as already explained. The tube 13 is held down by a metal strip, 15, Fig. X, having slots 16 for screws 17. The strip 15 can be moved toward and away from the slot 10 in tube 8.

The carrier 14 (see Figs. XIV, XVII) consists of a tube of slightly less diameter than the internal diameter of the pneumatic tube 8. It is made to fit the latter tightly by means of packing-rings 20, of anti-friction material, which are slipped over the cylinder 14 and are held in place by washers 21 and nuts 22. In the cylinder 14 is a pivoted or wing valve, 23, which, when turned as shown in Fig. XIV, completely closes the inside of the tube. The valve 23 is carried by the bar 12, which passes up into the front compartment, *b*, of the car, and is provided with a hand-wheel, 24, for turning. By means of this valve the car can be stopped or its speed regulated.

The sides of the car B converge toward each end. The bottom is also curved upward at the ends. The object is to diminish the resistance of the air opposed to the car in transit. Furthermore, in case of the car falling by any accident its peculiar shape would prevent its being suddenly arrested, as it would be supported by the tube 8 and the rods 1 until its

momentum should be checked. The compartment *b* of the car has a small window, *c*, through which the conductor can survey the track ahead.

The tube 8 has a number of valves, V, Fig. 70 I, at suitable intervals, which may be opened after passage of a car to restore the normal pressure within the tube 8. These valves may be of any suitable construction, but are preferably constructed as described in my application filed November 18, 1886, No. 219,248.

In operating the road it will be necessary to have a number of stationary engines and pumps, E, Fig. I, connected by branch pipes 30, Figs. II and XII, with the pneumatic tube 8 for exhausting the air in advance of the car.

It is obvious that modifications can be made in the details of construction without departing from the spirit of the invention, and that parts of the invention may be used without others. For example, anti-friction rails made of the compound described could be used in railways operated by other than pneumatic power.

Having now fully described my said invention and the manner in which the same is or may be carried into effect, what I claim is—

1. A pneumatic-railway system provided with a pneumatic tube and with rails or tracks of an anti-friction compound, substantially as described.

2. The combination, with the pneumatic tube and the anti-friction rails, of the car or vehicle provided with runners for sliding on said rails, substantially as described.

3. The combination, with the car and means for propelling the same, of the rails or tracks composed of rubber compounded with anti-friction substances, substantially as described.

4. The combination, with the car having runners, of the rails composed of rubber compounded with graphite and powdered asbestos, substantially as described.

5. The combination of the pneumatic tube, the carrier adapted to travel therein, the anti-friction rails, the car provided with runners, and the bar connecting said carrier with said car, substantially as described.

6. The combination of the Y-shaped pillars, the anti-friction rails at the top of the same, the car hung by suspension-plates on said rails, the pneumatic tube, and means for propelling the car therefrom, substantially as described.

7. A car for pneumatic-railway systems having suspension-plates and runners consisting of shoes secured to said plates, substantially as described.

8. The combination of the slotted pneumatic tube and the flexible packing consisting of rubber compounded with anti-friction material, substantially as described.

9. The combination of the pneumatic tube having a continuous longitudinal slot, the flexible anti-friction packing therefor, the car,

the carrier within said tube, and the rod or bar passing through said slot and connecting said car and carrier, substantially as described.

10. The combination of the slotted pneu-
5 matic tube having a lining composed of rubber mixed with graphite and asbestos, the carrier within said tube, the car sliding on rails, the bar connecting said car and carrier, and the anti-friction packing, substantially as
10 described.

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

THOS. J. MAYALL.

Witnesses:

PHILIP MAURO,
C. J. HEDRICK.