2 Sheets—Sheet 1

D. MYERS & A. B. PULLMAN.

PNEUMATIC CAR BRAKE.

No. 108,932. Patented Nov. 1, 1870.

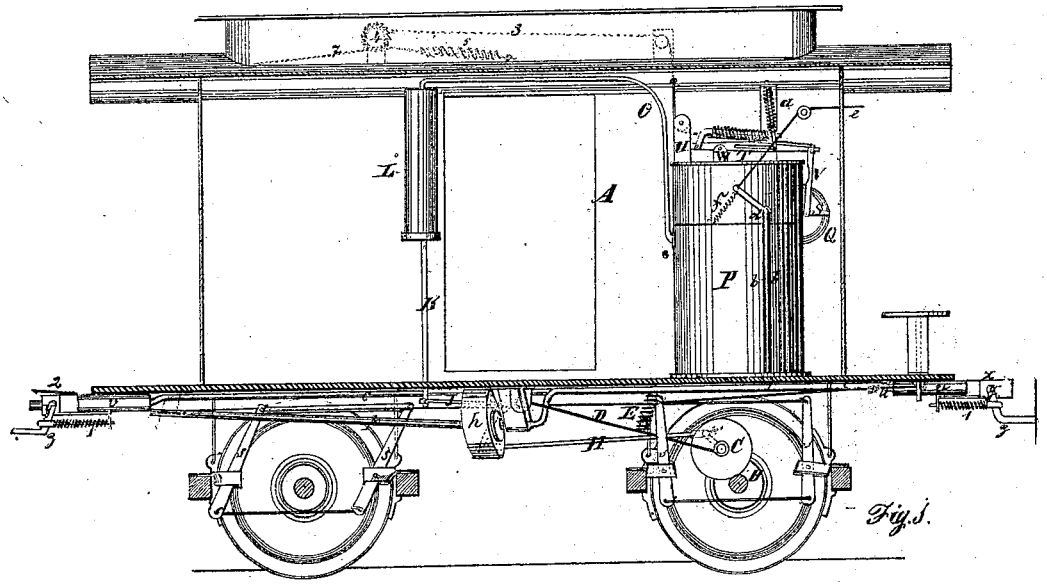

Fig. 1.

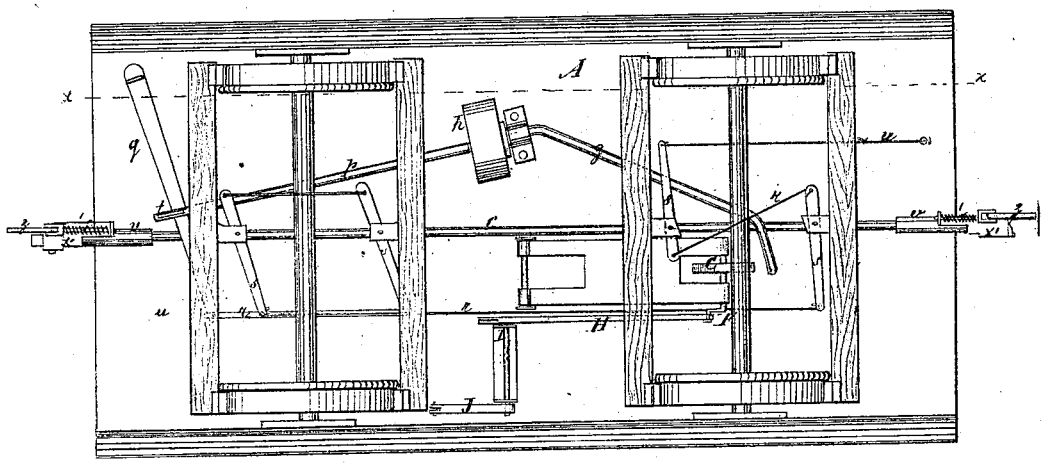

Fig. 2.

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2 Sheets—Sheet 2

D. MYERS & A. B. PULLMAN.

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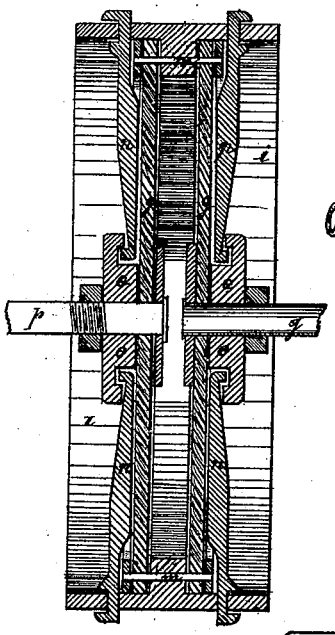

Fig. 3.

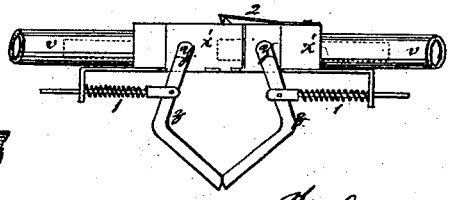

Fig. 6

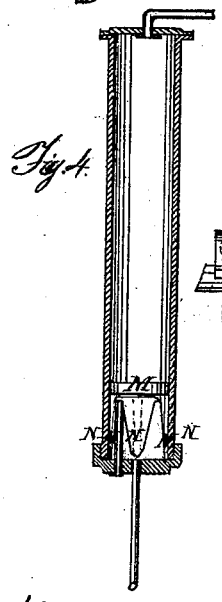

Fig. 4.

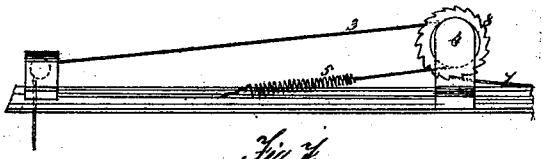

Fig. 7.

Fig. 5.

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United States Patent Office.

DAVID MYERS AND ALBERT B. PULLMAN, OF CHICAGO, ILLINOIS.

Letters Patent No. 108,932, dated November 1, 1870.

IMPROVEMENT IN PNEUMATIC CAR-BRAKES.

The Schedule referred to in these Letters Patent and making part of the same

We, DAVID MYERS and ALBERT B. PULLMAN, both of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Pneumatic Car-Brakes, of which the following is a specification, reference being had to the accompanying drawing, which forms a part thereof.

Nature and Object of the Invention.

The first part of our invention relates to the vibrating-arm hinged to the car to carry a friction-wheel so that it can move vertically to the motion of the car-axle, and a combination of the friction-wheel with one of the car-axles and an air-pump in such a manner that the motion of the axle operates the pump to pump air into the air-tank or reservoir, as hereafter more fully described. The object of this part of the invention is to cause the car while in motion to keep up a constant power to apply the brake.

The second part of our invention relates to a novel device used in the place of an engine to apply the power. It consists simply of a chamber, constructed as hereafter more fully described, with expansible sides, into which the compressed air is admitted, and, by its causing the chamber to expand, it moves the levers that apply the brakes. The object of this part of our invention is to make a cheap and durable device for transmitting the power of the compressed air to the brake without using the expensive engines commonly used.

The third part of our invention relates to the spring-arm attached to the pump-rod for operating the pump. The object of this invention is to allow this arm to spring when a certain pressure of air is attained by pumping air into the reservoir, so that the pump will not make full strokes till the pressure in reservoir is reduced.

The fourth part of our invention is the automatic attachment to the valve that governs the admission of air into the part of the tank from which it is used to apply the brakes in such a manner as to so control the valve that when the atmosphere is damp the valve will be opened with a less pressure in the tank than when the atmosphere is dry. The object of this part of our invention is to so control the application of power that there will be less power applied when the rails of the road are wet than when they are dry, in order to prevent setting the wheels and causing them to slip upon the rails.

Fifth; our invention relates to the oil-chamber and piston in the air-pump hereafter described, the object of which is to cause the pump to be self-lubricating, which is essential in a car where there is so much dust.

Description of the Drawing.

Figure 1 is a vertical longitudinal sectional view of the car on the line *x x*.

Figure 2, a bottom view of the same.

Figure 3, a sectional view of the expansible chamber.

Figure 4, a sectional view of the air-pump.

Figure 5, a bottom view of the piston-valve.

Figure 6, a side view of the pipe-coupler.

Figure 7, a side view of the ratchet-wheel, drum, rope, and pawl.

General Description.

A is an ordinary baggage-car commonly used on steam railways.

B is one of the car-axles.

We show only two two-wheel trucks, but two or more trucks may be used, and they may each contain any desired number of wheels.

C is the friction-wheel, which is hung in the vibrating-arm D, and held to press against the axle B by the spring E. The arm, being hinged to the car, will vibrate and allow the wheel to move vertically to conform to the motion of the axle.

This friction-wheel is upon a crank-shaft, F, which it revolves.

H is the pitman connecting the crank F with the rock-shaft I, and

J is the spring-arm rigidly attached to the rock-shaft I, and jointed to the pump-rod K, as shown.

When the car is in motion the spring-arm J operates the pump till the pressure of air in the tank is sufficient to cause the arm to spring, and thus prevent a full stroke of the pump; therefore the pump ceases pumping air into the tank.

The stiffness of the spring regulates the quantity of air forced into the tank.

These shafts and rods communicate motion from the axle through the friction-wheel to the air-pump, and they are so arranged that a slow motion is communicated, because that will pump air sufficient to apply the brakes in the ordinary running of a railway train.

L is the air-pump, and is constructed the same as any ordinary air-pump, with the same valves for the ingress and egress of air.

We, however, make the piston-valve M with projections, N, which extend down so as to dip into oil in the lower end of the pump; and they also rub against the interior of the pump as the piston-valve moves up and down. They, of course, take up oil and spread it upon the interior of the pump at each stroke, keeping it thoroughly lubricated.

There may be sufficient oil carried in a reservoir n the pump to lubricate the pump for a long time.

O is a pipe extending from the air-pump to the ower compartment P of the air-tank or reservoir.

The air is constantly being pumped into this tank ill there is sufficient pressure to spring the arm J, as bove described.

Q is a pipe connecting the lower compartment P of he tank with the upper compartment R, the two ompartments being separated by a diaphragm or partition.

S is a valve in the pipe Q, which is opened, as hereafter described, to allow the air to pass from the ower compartment P to the compartment R.

T is a lever, with its fulcrum at U, and

V is a rod connecting this lever to the valve S.

W is a piston-rod attached to the lever T and passng through an air-tight packing in the top of the compartment R.

It will be readily seen that as soon as a certain pressure of air is attained in the compartment R, by forcing air through the pipe Q, the piston W is raised and the lever T is vibrated, which closes the valve S.

The power which is required to thus vibrate the ever T is regulated by the spring *a*, which is constantly pressing down on the lever T to keep the valve S open.

If the spring *d* is so regulated that the valve S is kept open till the pressure in the compartment R is forty pounds to the square inch, which pressure would raise the lever T and close the valve, the pressure in the compartment P might be increased to any extent, say to even three or four hundred pounds to the square inch, and still the valve would remain closed; but as soon as the air is used from the compartment R to reduce the pressure therein, the valve is immediately opened and the air rushes in to keep the pressure at forty pounds.

b is an air-pipe extending from the compartment R to the main air-pipe *c*, beneath the car; and

d is a three-way valve in this pipe, to which a cord, *e*, that extends to the engineer, is attached.

f is a spring for keeping this valve closed except when it is desired to apply the brakes.

There is a branch-pipe, *g*, beneath each of the cars, leading into the chamber *h*.

The chamber *h* is made with an outside ring, *i*, and flexible sides *j*.

I usually make these sides of rubber, and the edges resting upon the projection *k* is securely fastened thereto by the rings *l* and bolts *m*, so as to pack them air tight.

These sides *j* are held and prevented from expanding only to a certain extent by the clamps *n*, several of which are secured to each disk *e* and the ring *i*, as shown.

When the compressed air is allowed to pass through the pipe *g* into the chamber *h*, the sides are expanded, which, of course, moves the rod *p*, which is connected with the lever *q*.

This lever, when vibrated, applies the brakes through the ordinary brake-rods and levers *r* and *s*.

There is a slot, *t*, in the end of the rod *p*, so that when the brake is applied by hand the lever *q* will vibrate without disturbing the rod *q*, but when that rod is moved as above described, it vibrates the lever and applies the brake.

u are chains connected with the ordinary brake-wheels for applying the brakes by hand.

The main air-pipe C has a flexible tube, *v*, at each end, to which a metallic coupling, *x*, is attached.

These couplings are each provided with valves, *y*, and rods *z*, which, when the cars are coupled, the rods strike against each other and open the valves.

When the cars are uncoupled the springs 1 close the valves and prevent the air from escaping.

2 are hooks for coupling the couplers together.

3 is an ordinary cord or rope placed on the outside of the car when it is exposed to the action of the weather. It passes over the drum or pulley 4, and is attached to the spring 5, while the other end passes into the car and is attached to the lower end of the swinging arm 6 that the spring *a* is on.

7 is a pawl, and it engages with the teeth 8, so as to prevent the drum 4 from turning in only one direction.

It will readily be seen that when the cord 3 becomes damp and shrinks and shortens, which would always be the case when the railway cars are wet, it moves the lower end of the arm 6 in the slot in the lever T, and less pressure would be required in the compartment R to move the piston W so as to vibrate the lever T and open the valve S.

When the rail and cord become dry again, the cord stretches and the spring 9 throws the arm 6 back to its original position; but if that does not take up all the slack in the rope 3, the spring 5 draws it around the drum 4, and the pawl and ratchet-wheel prevent its being drawn back when it shrinks again.

In applying brakes to cars it is essential to apply as much power as possible without setting the wheels to cause them to slide upon the rails, and it is very important not to cause them to slide, as it wears flat places on their thread, which is very injurious to the wheels.

It requires considerable more power to set the wheels so as to cause them to slide when the rails are dry than when they are wet; therefore, we deem it important to have an automatic device that will vary the power that can be applied in such way that more power can be applied to the brake when the wheel and track are dry than when they are wet.

Instead of using one tank with two compartments, two tanks may be used, one receiving air from the pump and the other fed therefrom, as above described.

Claims.

What we claim, and desire to secure by Letters Patent, is—

1. The hinged arm D and friction-wheel C, when constructed and arranged substantially as and for the purposes as described.

2. The combination and arrangement of the arm D, wheel C, the car-axle, the air-pump, and air-tank or reservoir P, when constructed and arranged substantially as and for the purposes specified and shown.

3. The spring arm J, when constructed and arranged substantially as and for the purposes specified and shown.

4. The projections N attached to the piston-valve M of the pump, when constructed and operating substantially as and for the purpose described.

5. The expansible sides *j* and clamps *n*, when constructed and arranged substantially as and for the purpose described.

6. The cord or rope 3, in combination with the swinging arm 6, when constructed and arranged substantially as and for the purposes described.

7. The drum 4, spring 5, pawl 7, and ratchet-wheel 8, when arranged and operating substantially as and for the purposes described and shown.

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ALBERT B. PULLMAN.

Witnesses:
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HEINRICH F. BRUNS.