(No Model.)

3 Sheets—Sheet 1.

L. P. LAWRENCE.

LOCOMOTIVE BRAKE.

No. 433,413. Patented July 29, 1890.

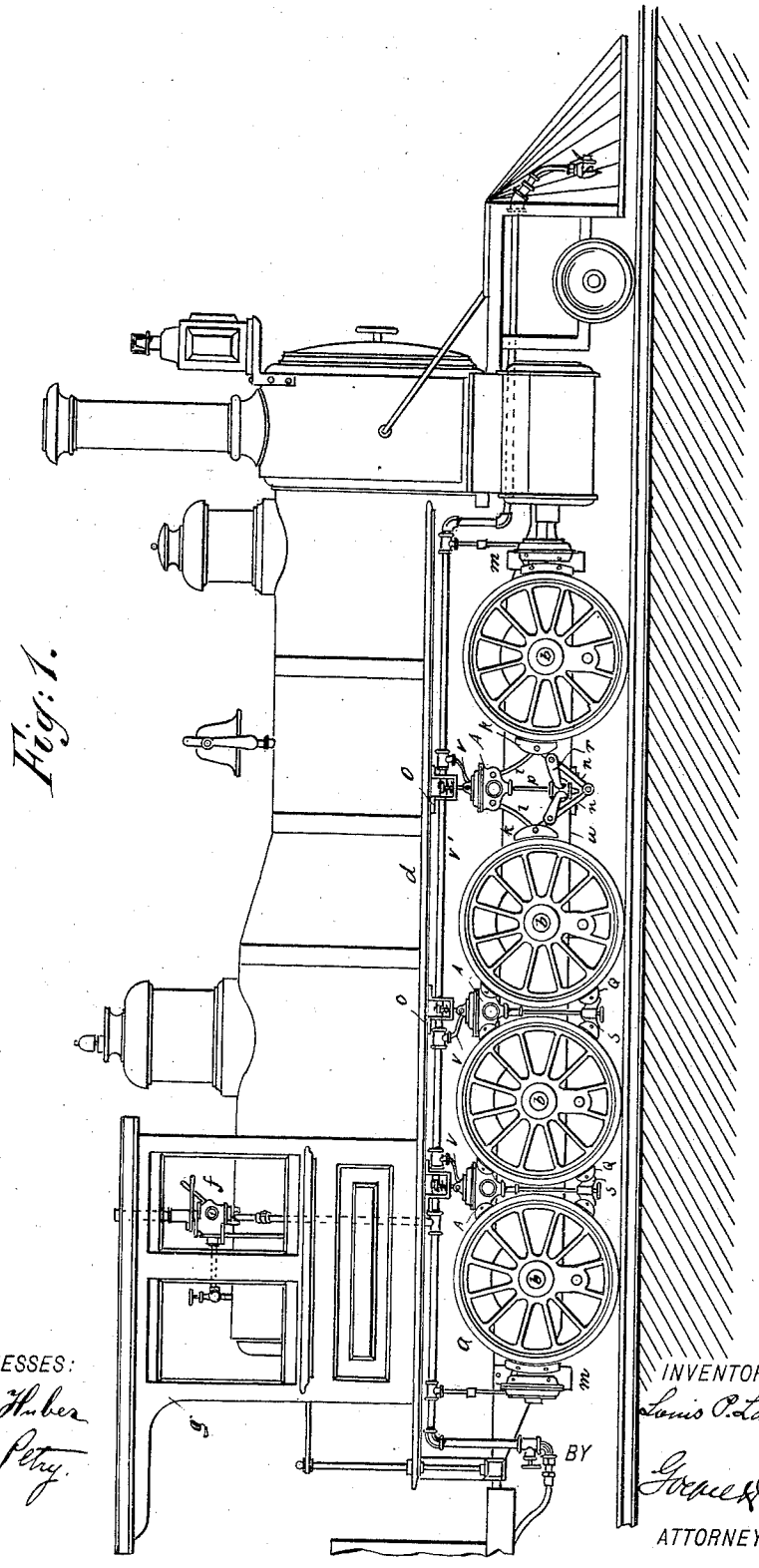


Fig. 1.

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(No Model.)

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Fig: 2.

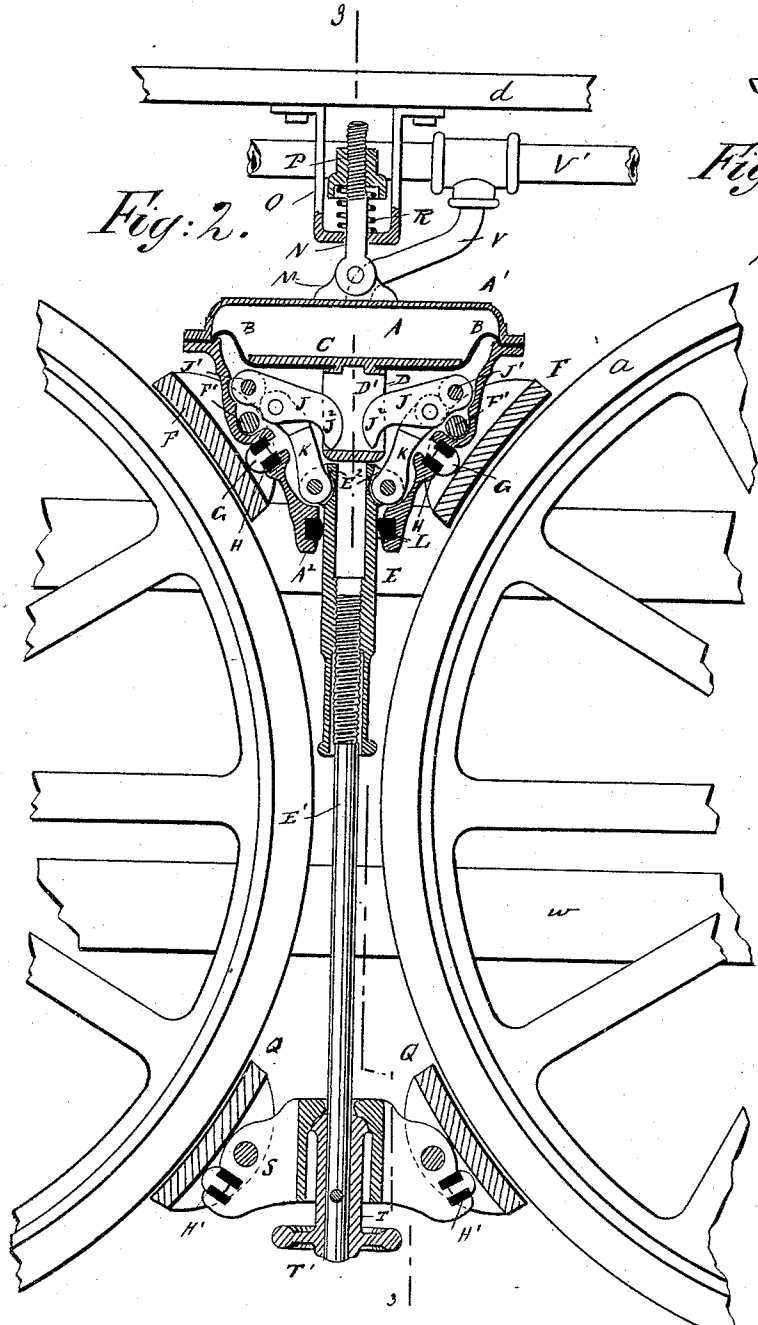
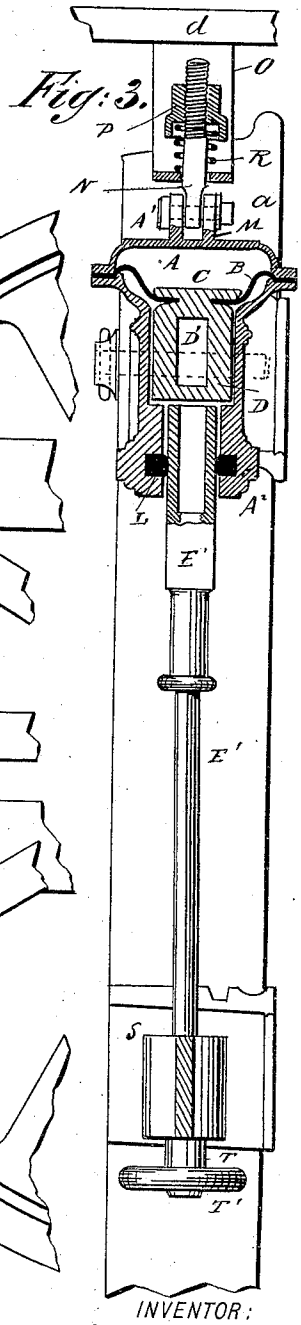


Fig: 3.



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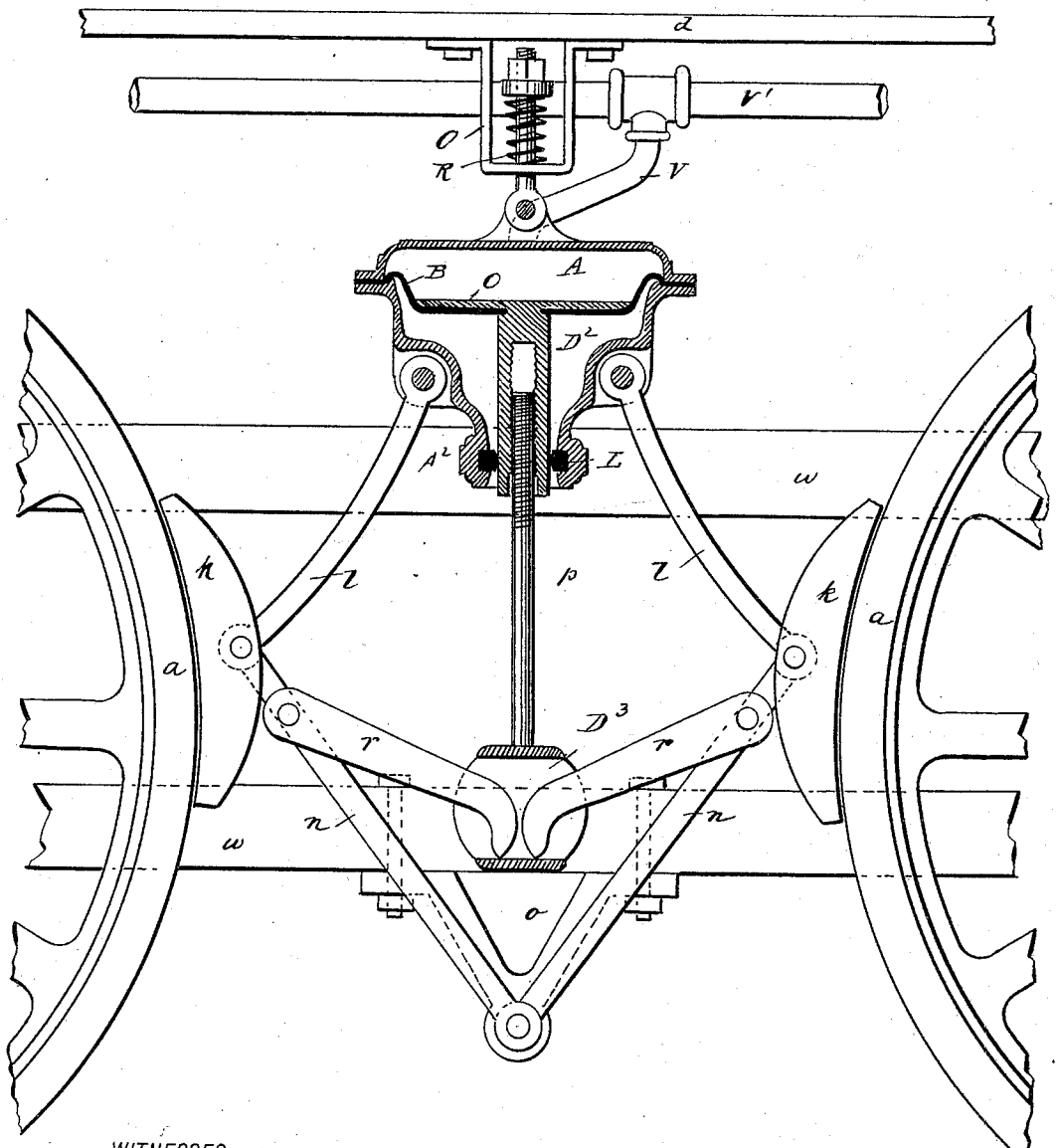
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Fig: 4.



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UNITED STATES PATENT OFFICE.

LOUIS P. LAWRENCE, OF PASSAIC, NEW JERSEY.

LOCOMOTIVE-BRAKE.

SPECIFICATION forming part of Letters Patent No. 433,413, dated July 29, 1890.

Application filed January 2, 1890. Serial No. 335,564. (No model.)

To all whom it may concern:

Be it known that I, LOUIS P. LAWRENCE, of Passaic, in the county of Passaic in the State of New Jersey, have invented certain new and useful Improvements in Locomotive-Brakes, of which the following is a specification.

This invention relates to improvements in that class of brakes that are to be applied between the driving-wheels of a locomotive; and the object of my invention is to provide a brake in which the brake-shoes are applied to the rims of two adjacent wheels in such a manner that the wheels are not interfered with in their lateral or vertical movements caused by the unevenness in the track, and so that the pressure of the brake-shoes does not act injuriously on the bearing of the axles.

The invention consists in the construction and combination of parts and details, as will be fully described hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a side view of a so-called "Mogul" engine provided with my improved brakes and with other locomotive-brakes that I have previously patented. Fig. 2 is a vertical longitudinal section of my improved locomotive-brake. Fig. 3 is a vertical transverse sectional view of the same on the line 3 3, Fig. 2. Fig. 4 is a vertical longitudinal sectional view of the brake as used for wheels that are separated a greater distance.

Similar letters of reference indicate corresponding parts.

In that class of engines known as "Mogul" engines, and in many others, the driving-wheels are so located that their rims are sometimes but a few inches apart, thus excluding the use of brakes in which a cylinder is placed between the wheels, brakes of this kind being described in my patent, No. 417,194, dated December 10, 1889.

In my improved brake the cylinder or chamber A, which is made oblong—that is to say, its length is greater than its width—is arranged between the driving-wheels *a*, but above the planes of the axles *b*. Said cylinder contains a diaphragm B, resting against and secured to a piston-plate C, from which the stem D projects downward, said stem having a slot D′. The upper brake-shoes F are pivoted to the cylinder or chamber A by pivots F′ in such a manner as to be adjacent to the wheel-rims, and below their pivots they rest against the heads of pins G, placed into tubular rubber cushion-springs H, resting in suitable sockets in the side parts of the cylinder or chamber A. Said cushion-springs H and pins G prevent the upper ends of the shoes from tilting downward sufficiently to rest upon the wheel-rims when the brakes are not applied, and thus serve to hold the brake-shoes at all times in proper position in relation to the wheel-rims.

In the cylinder or chamber A two levers J are arranged—one at each side—the outer ends of the levers J being pivoted by pivots J′ to the cylinder or chamber, which pivots J′ are above and slightly to one side of the pivots by which the brake-shoes are pivoted to the cylinder or chamber, and the inner ends of said levers J are bent to form toes J^2, which pass into the slot D′ of the stem D and rest on the bottom of said slot. To each lever J the upper end of a link K is pivoted a short distance from the turning-point or pivot J′ of said lever J, the lower ends of said links K being pivoted to lugs E^2 of a tubular pull-rod E, passing up through the bottom neck A^2 of the cylinder or chamber A. The power part of said tubular pull-rod E is threaded internally, and into the same the upper end of the pull-rod E′ is screwed, which supports the lower brake-shoes in a manner that will be described hereinafter. A packing-ring L is placed in the bottom neck of the cylinder or chamber A, and against the inner edge of the same the tubular pull-rod E rests, which ring serves to prevent undue rattling.

The head A′ of the cylinder or chamber A, between which head and the cylinder or chamber the diaphragm B is clamped securely, is provided on its top with a suitable lug M, to which a bolt N is pivoted, said bolt passing up through the bottom aperture of a box-shaped hanger O, securely bolted to the frame or running-board *d* of the locomotive. On the upper end of said bolt N a nut P is screwed, having its lower end formed cup-shaped, and

between the bottom of said box and the cup-shaped lower end of said nut P a powerful spiral spring R surrounds the bolt N. The entire brake device is thus supported by means of the bolt N, nut P, and spring R from the box or bracket O.

The lower brake-shoes Q, which are arranged between the wheel-rims and below the planes of the axles, are pivoted to the opposite ends of a block S, resting on a sleeve T, that is bolted or riveted to the lower end of the rod E′, and is provided at its lower end with a cross-piece or hand-wheel T′. In said block S cushion-springs H′ are arranged, like those described above, for supporting the lower parts of the shoes Q, and thus prevent the shoes from coming in contact with the rims of the wheels when the brake is not applied. A flexible pipe V connects the head A′ of the cylinder A with the vacuum-pipe V′ for the purpose of exhausting the air, said pipe V′ being connected with the ejector *f* or other vacuum apparatus in the cab *g*.

The operation is as follows: When the air is exhausted from the space between the piston C and the head A′ of the cylinder or chamber A, the exterior pressure of the air forces the piston C upward, whereby the slotted stem D′ is also forced upward and in turn pulls up the free ends of the levers J. Thereby the links K are pulled upward and in turn pull up the tubular pulling-rod E and the rod E′. Thereby the block S is raised and the shoes Q pressed against the wheel-rims, said shoes Q forming an abutment. As the free ends of the levers J can only be pulled up until the shoes Q rest against the rims of the wheels, it follows that the pivot-points J′ of the levers J within the cylinder or chamber A must move downward, and with them the entire chamber A moves downward, whereby the upper brake-shoes F are pressed against the wheels. By the downward movement of the brake-cylinder the spring R is compressed more or less. When the vacuum is destroyed, the piston C moves downward, cylinder A is moved upward, the rod E′ moved downward, and all the brake-shoes are released. By turning the nut P the cylinder or chamber A may be so adjusted as to hold the brake-shoe F the desired distance from the wheel-rims, and by turning the rod E′ the same is screwed a greater or less distance into the tubular rod E, and thereby the lower brake-shoes are adjusted to be in proper position. As the cylinder A can swing on its bolt M, and as the pull-rod E is connected with the cylinder or chamber A by pivot-links and levers, it is evident that even when the brake-shoes are firmly applied on the wheels said wheels can move up and down or laterally without causing any undue strain on the working parts of the brake, such up and down movement being caused by irregularities in the track, which are frequently quite considerable. As the wheels are braked at opposite sides either by the shoes of a brake such as the one herein described or by means of brakes *m*, which are fully described in my patent, No. 417,194, dated December 10, 1889, there is no danger of undue strain on the axles or bearings of the same.

In case the wheels are separated a greater distance from each other—as shown, for example, in Fig. 1, between the first and second driving-wheels from the front, or in Fig. 4—the construction must be somewhat modified. In this case the brake-shoes *k* are connected by links *l* with the cylinder or chamber A, which is constructed and hung in the manner previously described. The shoes are also connected by links *n* with a bracket *o* on the locomotive-frame *w*. The pull-rod *p* is screwed into the downwardly-projecting piston-stem D^2, and is provided at its lower end with a box D^3. Levers *r*, pivoted to the links *n*, have their free ends placed into the box D^3 and rested on the bottom of the same.

When the air is exhausted from the cylinder or chamber A, the air-pressure forces the piston upward, whereby the rod *p* and the box D^3 are pulled upward, and thereby the shoes *k* are pressed against the wheel-rims and form an abutment. As now the piston cannot move upward, the chamber or cylinder A moves downward under the action of the atmospheric pressure, and thereby, by means of the links *l*, assists in pressing the shoes *k* against the wheel-rims. When the vacuum is destroyed, the spring R pulls the cylinder or chamber upward and the rod *p* is moved downward.

If desired, the brake can be operated in analogous manner by compressed air, gas, steam, or any other motive fluid.

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

1. A brake cylinder or chamber mounted on a locomotive-frame between the wheels to move vertically, and a movable piston in said cylinder or chamber, substantially as set forth.

2. The combination, with a locomotive-frame, of a brake cylinder or chamber held by a spring hanger or support between the wheels, substantially as set forth.

3. The combination, with a locomotive-frame, of a brake cylinder or chamber mounted vertically movable between the wheels, brake-shoes connected with and operated by said cylinder or chamber, and a movable piston in said cylinder or chamber and connected with the brake-shoes, substantially as set forth.

4. The combination, with a locomotive-frame, of a cylinder or chamber mounted vertically movable between two wheels, a piston in said cylinder, and a pull-rod operated from said piston and passing down between the two wheels, substantially as set forth.

5. The combination, with a locomotive-frame, of a cylinder or chamber mounted vertically, a piston in said cylinder, brake-shoes on the cylinder, and another set of brake-shoes

connected with the piston, substantially as set forth.

6. The combination, with a locomotive-frame, of a cylinder or chamber mounted between the wheels, a piston in said cylinder or chamber and provided with an extension or piston-rod, levers pivoted on the cylinder or chamber and engaging said piston-rod or extension, a pull-rod, links connecting the pull-rod with the said levers, and brake-shoes at the lower end of said pull-rod and operated by the same, substantially as set forth.

7. The combination, with a locomotive-frame, of a cylinder or chamber mounted between the wheels to move vertically, a piston in said cylinder or chamber and provided with an extension or piston-rod, levers pivoted in said cylinder or chamber, a pull-rod which is adjustable in length and connected with the said levers in the chamber, brake-shoes applied on said cylinder or chamber, and brake-shoes supported by the lower end of the pull-rod, substantially as set forth.

8. The combination, with a locomotive-frame, of a cylinder or chamber mounted between the wheels to move vertically, a piston in said cyinder or chamber provided with an extension or piston-rod, a tubular pull-rod extending downward from the cylinder, levers pivoted on the cylinder and engaging the piston-rod, links connecting said levers with the tubular pull-rod, a rod screwed into the lower end of the tubular pull-rod, brake-shoes supported by the lower end of said rod, and brake-shoes applied on the cylinder or chamber, substantially as set forth.

9. The combination, with a vehicle-frame, of a cylinder or chamber, a hanger or box on the vehicle-frame, a screw-bolt pivoted to the cylinder or chamber and passed into the box, a nut on said bolt, a spring on which the nut rests, and brake-shoes operated from the cylinder, substantially as set forth.

10. In a power-brake for vehicles, a power-cylinder mounted movably on the frame or body of the vehicle, brake-shoes operated from said chamber or cylinder, and a movable piston in said chamber or cylinder, and also operating brake-shoes, combined substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

LOUIS P. LAWRENCE.

Witnesses:
OSCAR F. GUNZ,
THOS. M. MOORE.