

(No Model.)

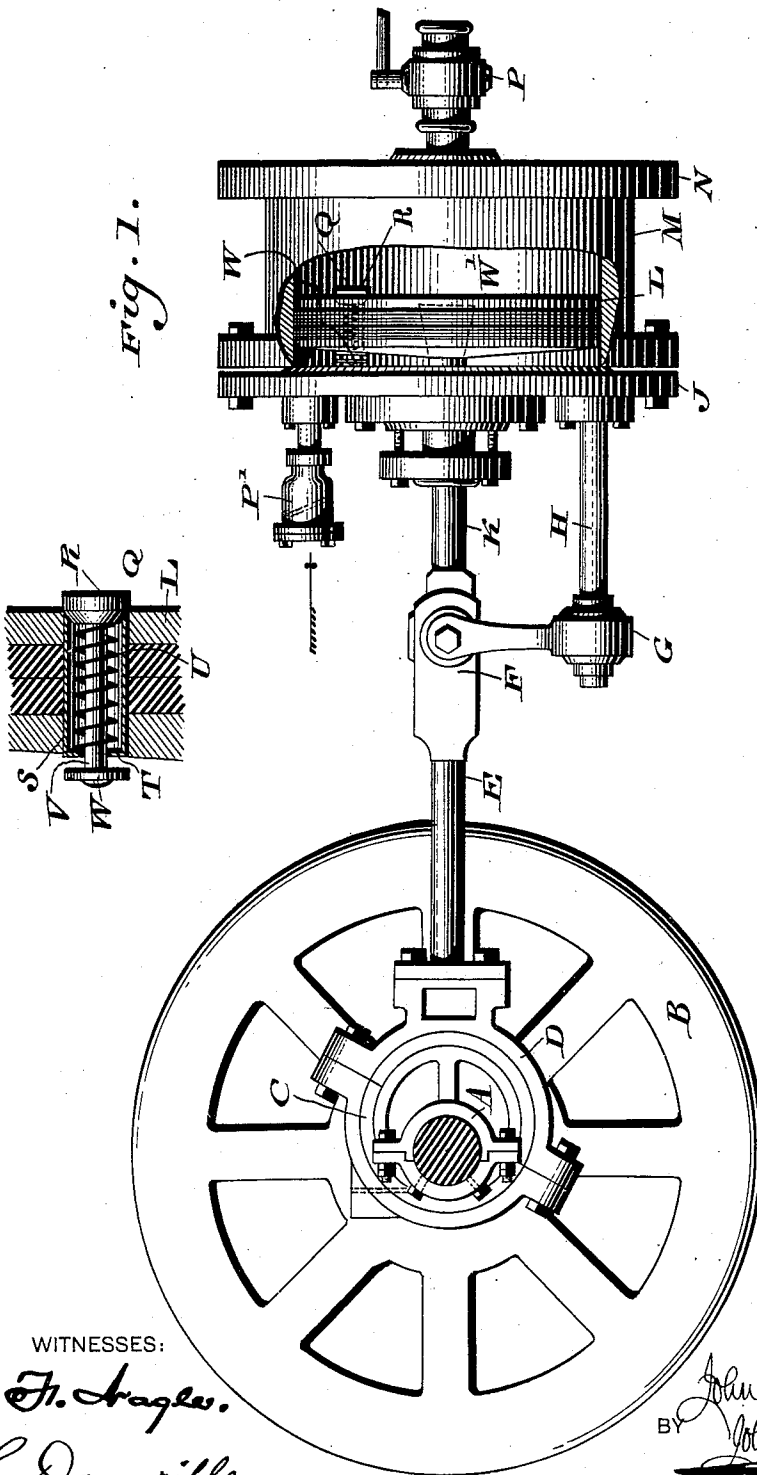
J. E. REYBURN.
RAILWAY BRAKE.

No. 568,371.

Patented Sept. 29, 1896.

Fig. 1.

Fig. 2.



WITNESSES:

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RAILWAY-BRAKE.

SPECIFICATION forming part of Letters Patent No. 568,371, dated September 29, 1896.

Application filed November 12, 1895. Serial No. 568,668. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. REYBURN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Railway-Brakes, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to railway-brakes; and it consists of a novel construction of apparatus in which the revolution of the axle of a car-wheel is caused to supply the energy whereby friction is applied to an eccentric mounted on said axle, so as to retard and eventually cause a cessation of rotation of the same, by the proper manipulation of a suitable cock or valve.

It further consists of novel details of construction, all as will be hereinafter set forth.

Figure 1 represents a side elevation of a brake apparatus embodying my invention, a portion of the same being shown in section. Fig. 2 represents on an enlarged scale a detail view of a valve employed in the piston seen in Fig. 1.

Similar letters of reference indicate corresponding parts in the two figures.

Referring to the drawings, A designates the axle of a car, upon which the wheel B of the usual construction is mounted.

C designates an eccentric which is attached to said axle A and which is engaged by the eccentric strap or yoke D, to which the eccentric-rod E is attached.

F designates a cross-head which is mounted upon said eccentric-rod and which has an extension or arm G attached thereto, which has a hole therein through which the rod H passes, which latter is attached to the head J of the cylinder M, said rod and arm thus serving to guide and support the cross-head F.

K designates a piston-rod which has one end attached to said cross-head, while the other end is secured to the piston L, which reciprocates in the cylinder M.

N designates the outer head of said cylinder, upon which the valve P is mounted, which is normally open and through which the air is discharged when the apparatus is ordinarily running, the air being admitted to the cylinder through the passage P', which is

always open and communicates with the lower portion of the cylinder.

Q designates the valve apparatus employed in the piston L, the same consisting of the valve proper, R, which seats upon the shell S, which is mounted in the piston L, said shell having a shoulder or ledge T at one extremity, against which one end of the spring U is adapted to abut, its other end being in contact with the adjacent portion of said valve R.

V designates a valve-stem which depends from said valve R and has a head W attached thereto.

The operation is as follows: The revolution of the axle A causes the rotation of the eccentric C, and by reason of the intermediate connections the eccentric-rod E, cross-head F, piston-rod K, and the piston L are actuated, the latter being thus reciprocated within the cylinder M. The reciprocation of the piston L will draw in air through the suction or inlet P', and if we assume the valve P to be open the pressure on either side of the piston will be equal and the piston normally in equilibrium, and the air will be discharged through the valve P. If now it is desired to cause a cessation of the rotation of the wheel B and axle A, and thus stop the train, it is only necessary for the operator to close the valve P by any suitable mechanism, whereupon it will be seen that the air at each revolution of the axle will be compressed in the right-hand portion W' of the cylinder M and will instantly act as a cushion and tend to retard the rotation of the eccentric, and this retardation will be communicated to the axle upon which said eccentric is mounted, thus establishing a reciprocal pressure which will alternately check and release as the speed increases or decreases, thereby effectively stopping the car or cars without sliding the wheels on the rails, thereby reducing to a minimum, if not entirely preventing, the liability of the flattening of the wheels.

The efficiency of the above-described apparatus constituting my invention can be seen at a glance if we investigate graphically the effects produced by compressing air as described, starting at the fundamental law governing the operation of the same. Boyle's

law for air (for other gases and vapors, it being not exact) is as follows: "The temperature remaining the same, the volume of a given quantity of a gas is inversely as the pressure which it bears," from which I deduce:

$$V.P. = v.p. \text{ or } P = \frac{V.P.}{V}$$

In the example before us, assuming that we have a cylinder nineteen inches diameter, then the area of the piston is $\frac{\pi d^2}{4} = 283$ square

inches. A pressure of fifteen pounds per square inch is being exerted on this piston in its position in the drawings. Therefore we have $283 \times 15 = 4,245$ pounds total pressure on the piston, both before and behind it, or it is neutralized. Now let the axle A revolve one hundred and eighty degrees or to the full extent of the crank movement of the eccentric, taking the throw at four inches, we have $283 \times 2 = v$. Substituting these values in the above formula we have $p = \frac{V.P.}{v} = \frac{1,698 \times 4,245}{566}$

$= 12,735$ pounds total pressure on the piston, or $\frac{12,735}{283} = 45$ pounds per square inch

pressure on the piston. This pressure per square inch is increased to ninety on the second revolution of the axle A, and so on, provided the theoretical conditions are maintained. I thus obtain a powerful force acting against the crank motion of the eccentric, which constitutes the brake action, and to which especial attention is called.

When it is desired to take off the brake, it is only necessary to open the cock P, it being understood that the moving of said cock is controlled by suitable rods or connections operated by the train-hands. It will thus be evident from the foregoing that a simple and effective brake is produced, and one from which positive and effective results are obtained.

In order to get the best results, I provide the inlet P' with a check-valve P², adapted to open inwardly, in which case suitable relief-valves may be attached to the proper portions of the cylinder, if desired, while the accumulation of pressure within said cylinder may be regulated with great exactness by the proper manipulation of the valve P, as is evident.

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

1. In a device of the character described, a

cylinder with a piston therein, an eccentric mounted on a rotating axle, a stem on said piston connected with said eccentric, air inlet and outlet valves in said cylinder, and a check-valve in a passage in said piston, said parts being combined substantially as described.

2. In a device of the character described, a cylinder, a piston therein, an axle, an eccentric mounted thereon, an eccentric-strap, connections from the latter to said piston, whereby the latter reciprocates in unison with the rotation of said eccentric, a valved outlet at one end of said cylinder, an inlet at the other end of the same, a check-valve in said inlet and a valve mounted in said piston, substantially as described.

3. In a brake system, a cylinder, a piston therein, a suction and discharge pipe for said cylinder, a check-valve in said suction-pipe a valve mounted in said piston having a head, a seat, a valve-stem and a spring holding said valve normally in the desired position, an eccentric mounted on a car-axle, an eccentric-strap and connections from the latter to said piston, substantially as described.

4. The cylinder M, the piston L therein, a valve R in said piston, the shell S, the stem V, the spring U, and the head W, the suction and discharge openings P' and P for said cylinder, said openings being provided with check and cut-off valves, respectively, the piston-rod K, cross-head F, arm G, guide H, and the eccentric-rod E having one end attached to said cross-head, and the other end attached to the eccentric-strap D, the latter being mounted on the eccentric C, in combination with the axle N to which said eccentric is attached, substantially as described.

5. In a device of the character described, a cylinder having air inlet and outlet valves at opposite ends, a piston in said cylinder having a passage in its head, a check-valve in said passage, an eccentric connected with a rotating car-axle, a stem on said piston connected with said eccentric, a cross-head connected with said stem, and having an arm with an opening therein, and a rod secured to said cylinder and passing through said opening, said parts being combined substantially as described.

JOHN E. REYBURN.

Witnesses:

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