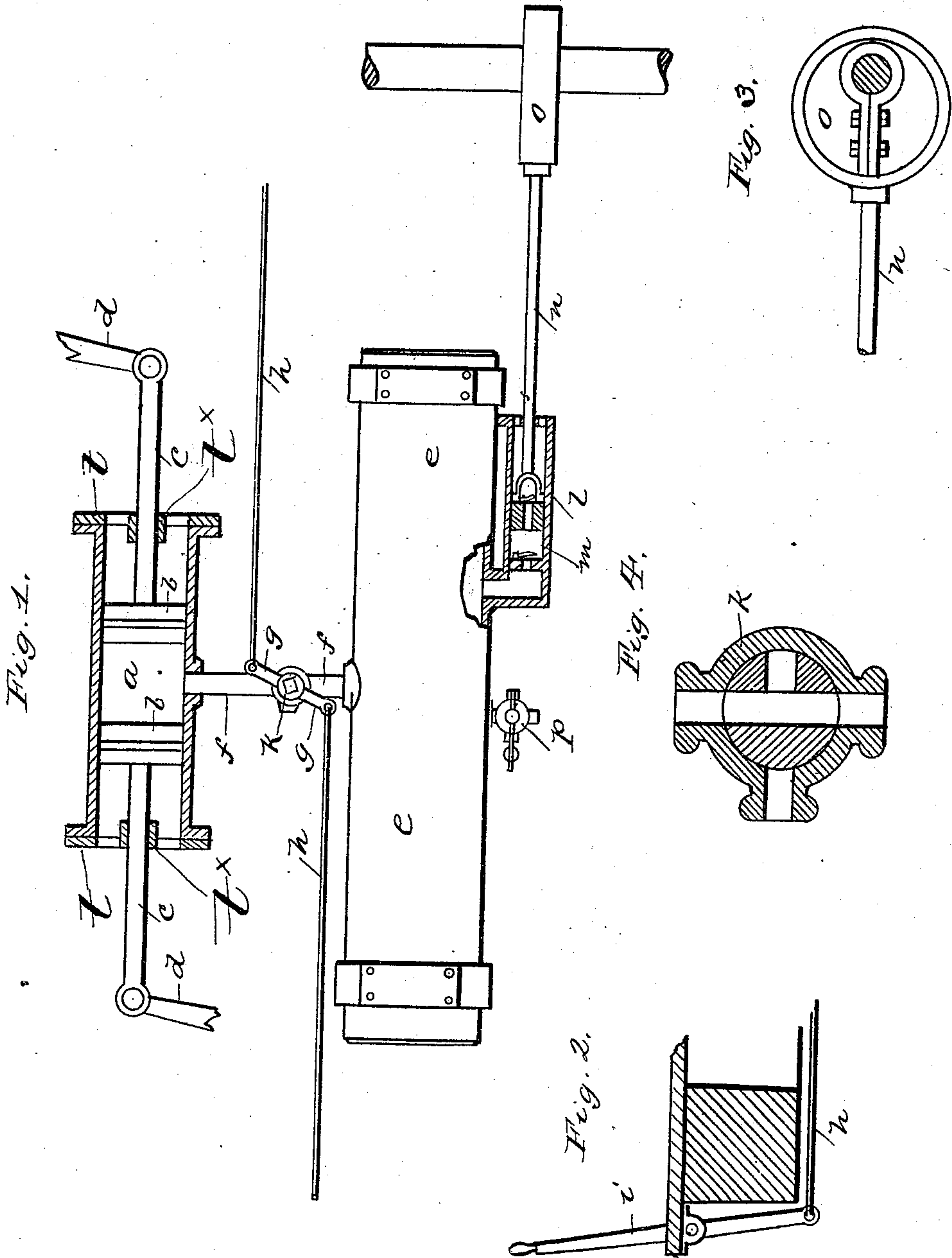


(No Model.)

R. A. KISKADDEN.  
APPARATUS FOR OPERATING RAILWAY BRAKES.

No. 519,688.

Patented May 8, 1894.



Witnesses:  
H. O. Harrison  
R. A. Kiskadden

Inventor.  
R. A. Kiskadden  
O. H. Lewis



# UNITED STATES PATENT OFFICE.

ROBERT A. KISKADDEN, OF ALLEGHENY, PENNSYLVANIA.

## APPARATUS FOR OPERATING RAILWAY-BRAKES.

SPECIFICATION forming part of Letters Patent No. 519,688, dated May 8, 1894.

Application filed June 25, 1890. Serial No. 356,683. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT A. KISKADDEN, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Operating Railway and other Brakes; 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 the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain improvements in automatically operating vacuum brakes, and the object of my invention is to provide a brake of this character of a simple and improved construction, all as will be hereinafter fully set forth.

The novel features of my invention will be carefully defined in the claim.

In order that my improvements may be the better understood, I have illustrated in the accompanying drawings a braking apparatus constructed according to my invention, in which drawings—

Figure 1 is a general view of the apparatus in position for attachment to the under side of a railway car or carriage and Figs. 2, 3 and 4 are detail views which will be referred to hereinafter.

In the views, *a*, represents the brake cylinder having open ends, and *b, b*, are the pistons mounted in said cylinder and connected by rods *c, c*, with the brake levers *d, d*, in an ordinary manner. Secured to opposite ends of the brake cylinder *a*, are heads *a'*, having openings corresponding with the bore of the cylinder *a*, and these heads have diametrical arms or webs extending across said openings, at the center of which are formed bosses *a''* through which the piston rod *c* plays and is guided. By this arrangement it will be seen that lightness and cheapness of construction is attained and at the same time the pistons are held in place and guided in their movements in the cylinder and any water or dirt which may collect therein is allowed to fall freely therefrom.

Between the pistons *b, b*, is comprised the air space of the brake cylinder, which space communicates through an air pipe *f*, with a

reservoir or receiver *e*, the capacity of which is considerably in excess of that of the brake cylinder. On this receiver *e* is mounted an air pump communicating with the interior thereof and adapted to draw the air therefrom, said pump consisting of the barrel *l* having a lift valve in its inlet and provided with a valved piston adapted to be reciprocated by an eccentric *o* mounted on the car axle, through the medium of the rod *n*.

Arranged in the air pipe *f* between the brake cylinder and the receiver *e* is a three way cock or valve *k*, seen in detail in Fig. 4. This valve has one passage extending diametrically through it and adapted to communicate between the two sections of air pipe *f* when set as shown in Fig. 4, but it is further provided with a radial passage extending at right angles from said diametrical passage whereby when the valve is given a quarter turn to the left the interior of cylinder *a* is placed in communication with the outer air and when the valve is given a quarter turn to the right said receiver *e* is opened to the outer air.

Valve *k* is adapted to be operated through the medium of a lever *g* secured to its stem, to the ends of which lever are connected rods or chains *h, h*, extending to opposite ends of the car, and attached to the lower ends of hand levers *i*, pivoted to the car floor, whereby the valve may be operated to open either the brake cylinder or the receiver to the outer air at will.

Arranged on the receiver *e* is a safety valve *p*, of ordinary construction adapted to control the admission of air to the interior thereof through an inlet provided for the purpose in case the tension of the air therein should become too high for reasons to be hereinafter explained.

The operation is as follows:—The car being in motion the rotation of the axle operates the pump so as to exhaust the air from the receiver *e*, the valve *k* being set to open communication between the interior of the brake cylinder and the outer air, whereby the brake shoes act by gravity to withdraw the pistons to the outer ends of the cylinder, this position of the valve cutting off the inlet to receiver *e* through pipe *f*. This is the normal position of the parts when the brakes are "off."



The continued operation of the air pump gradually exhausts the air from the receiver *e* up to the limit and as the air in the receiver becomes more and more rarefied, it is evident  
 5 that a considerable degree of heat and much friction of the piston in the pump barrel will ensue, whereby the piston and valves would in a very short time wear out. To overcome this defect, I have provided the valve *p* adapted  
 10 to be set to admit small quantities of air into the receiver when the air within the same shall have reached a certain degree of rarefaction, whereby heating of the valves and piston and consequent friction and wear of the parts  
 15 is reduced. When it is desired to apply the brakes, the valve *k* is turned so as to open the passage between brake cylinder *a* and the receiver *e*, when the air pressure in the brake cylinder will be suddenly reduced by expansion of the air in said cylinder into the partial vacuum maintained in the receiver *e*. This expansion and reduction of pressure takes place  
 20 instantaneously, with the operation of the valve *k*, and in consequence of the difference of pressure between the inner and outer surfaces of the pistons *b*, *b*, said pistons are each forced inward toward the center of the brake cylinder, whereby the brakes are applied with a force equal to the pressure on the outer face  
 25 of such pistons. When it is desired to release the brakes, it is only necessary to turn valve *k* in the reverse direction, whereby the interior of the brake cylinder is opened to the outer air and the brakes drop from the  
 30 wheels by gravity as before described.

Having thus described my invention, I claim—

In a vacuum brake, the combination with a

brake cylinder having its opposite ends open to the atmosphere, of the annular heads secured to the opposite ends of said cylinder with their openings coinciding with the bore thereof, each of said heads having a diametrical web provided with a central perforated boss, the pistons arranged in said cylinder  
 40 and having piston rods which pass in opposite directions through and are guided in the said central perforated lugs of the cylinder heads, a receiver having an air-inlet, a safety valve controlling said air inlet, a pipe connecting the said receiver with the central portion of the brake cylinder between the pistons therein, a three-way cock in said pipe, said cock having a passage extending diametrically through it and affording communication between the brake cylinder and the receiver and being further provided with a radial passage extending at right angles to said diametrical passage and affording communication with the atmosphere, means for  
 45 operating said cock whereby said brake cylinder is alternately placed in communication with said receiver and with the atmosphere, an air pump connected to said receiver and adapted to exhaust the air therefrom, and an  
 50 eccentric mounted on the car axle whereby said pump is operated while the car is in motion, substantially as set forth.

In testimony that I claim the foregoing I hereunto affix my signature this 30th day of  
 April, A. D. 1890.

ROBERT A. KISKADDEN. [L. S.]

In presence of—

M. E. HARRISON,  
 C. C. LEE.