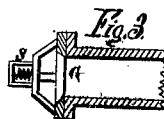
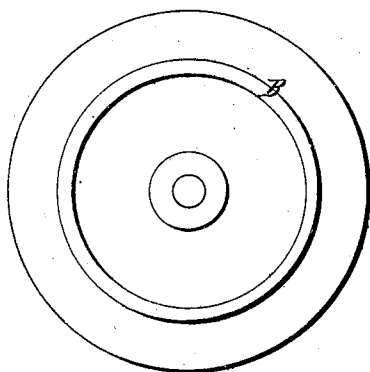
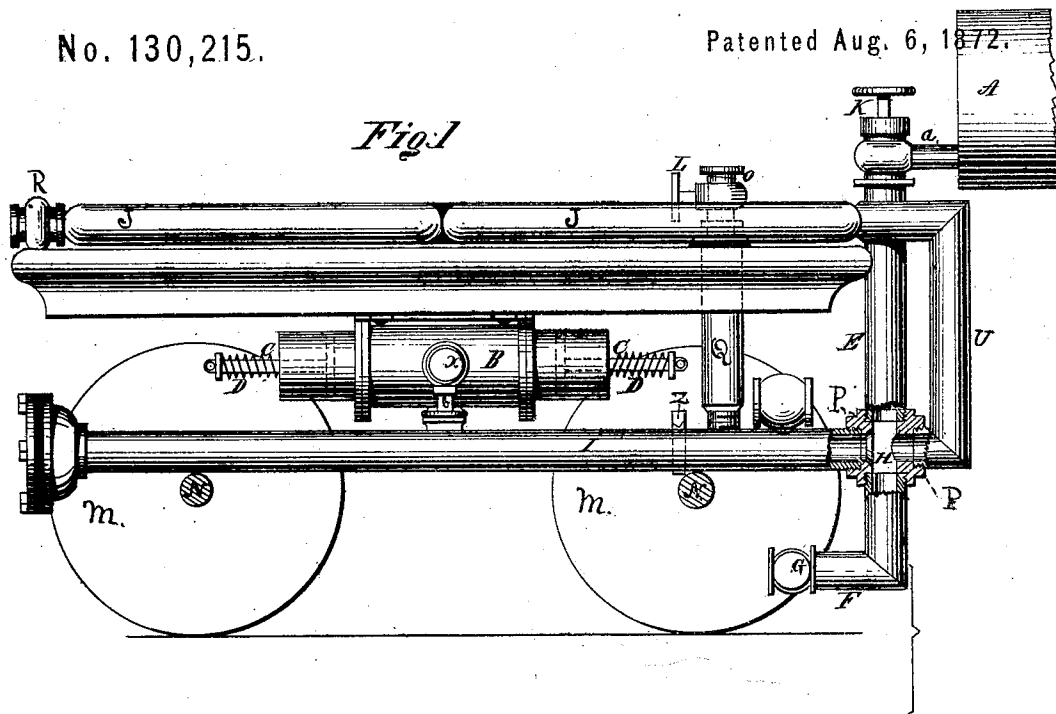


S. N. GOODALE.

Improvement in Steam and Air Brakes.

No. 130,215.

Patented Aug. 6, 1872.



Witnesses

E. H. Ross
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UNITED STATES PATENT OFFICE.

SAMUEL N. GOODALE, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN STEAM AND AIR BRAKES.

Specification forming part of Letters Patent No. 130,215, dated August 6, 1872.

To all whom it may concern:

Be it known that I, SAMUEL N. GOODALE, of St. Louis, county of St. Louis, State of Missouri, have invented certain new and useful Improvements in Operating Brakes on Railroads by Steam or Air; the same being an improvement on the car-brake for which a patent was granted to me dated May 30, 1865, and the object of which is to place the starting and stopping of a train of cars under control of the engineer by combining the use of steam and the natural pressure of the atmosphere, and thereby reduce the cost, utilize the power, and to provide a safe and economical mode for heating the car or cars; and I do hereby declare that the following is a full, clear, and exact description of the same, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, with letters of reference marked thereon, forming a part of this specification, in which—

Figure 1 is a side elevation of a device embodying my invention. Fig. 2 is an end view of the cylinder; and Fig. 3 is a longitudinal section of pipe and valve connected to a condensing-chamber, as hereinafter more fully described.

In the drawing, M M represent car-wheels and axles of ordinary construction. A represents a portion of a boiler, from which steam is conveyed to the upright pipe E by the short connecting-pipe a. The pipe E is provided with a stop-cock, K, at its top to shut off the flow of steam when desired. Said pipe E extends downward and into connecting-joint P, which has openings upon its top, bottom, front, and rear sides, each of which is provided with screw-threads, as shown. At the rear of the joint P the pipe I is attached, and extending rearward the entire length of the car. Each car is provided with a similar pipe, I, each pipe being provided with an automatic valve or cock, Z, in or near the ends of the pipe, said pipes being coupled between the cars by suitable flexible joints. To the lower side of the joint P a pipe, F, is attached, or a coil of pipe of any desired size, to serve as a condensing-chamber, having connected at its lower end a valve, G, held in place by a spring, S, said spring being of sufficient stiffness to hold the valve G in place until a pressure of steam or

air is applied, when it will yield and allow the valve G to open. B represents the cylinder, which is supported from the under side of the car and connected to the pipe I by the short connecting-pipe b, said cylinder being provided, at or in each end, with pistons C C, which are provided with springs D D, as shown. X represents an automatic valve placed in the cylinder B; closing inward, and having a spring on the under side to aid in removing the pressure from the cylinder or wheels more quickly than can be done by the valve O (which will be presently described) when long trains are used. The pipe Q is connected to the pipe I and extends upward within reach of the engineer, and having a valve, O, at the top, said valve being connected by a T placed in the pipe I and operated by a hand or foot lever, L, when desired by the engineer. To the front of the connecting-joint P the pipe U is attached, having a check-valve, H, at its lower end. Said pipe U extends upward and is connected to the pipe J, which extends around on each side of the car for the purpose of heating the car, and having at the rear a connecting-joint, R, each car being provided with similar pipes, J, and connected between the cars by suitable flexible connections.

The brakes are applied to the car-wheels by means of a chain or rod extending from the upright lever of the ordinary brakes to the piston-rods C C, but not shown in this application, as I make in this application no claim to same. The piston-rods C C may be operated by natural outside pressure of the atmosphere by creating a vacuum within the cylinder, or by compressing the air or steam within, as may be desired. In applying the brakes, if the first exhausting of the chamber formed by the pipes E, F, and U does not give sufficient pressure, it may be repeated in rapid and instantaneous succession, until thirty pounds to the square inch on each cylinder is attained. The engineer may instantly or gradually remove the pressure of the brakes upon the car-wheels by placing his foot or hand upon the lever L and raising the valve O, when the air will rush in through the pipe I to the cylinder B and crowd back the pistons C C, being assisted by the springs D D. By connecting the pipe U between the pipes E and F, as shown, I greatly increase the dimensions of the ex-

haust-chamber formed by the pipes E and F, as well as provide an economical mode for heating, as my arrangement of parts permits a constant flow of steam as a radiator through the car or cars at all times when the brakes are not being used.

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

1. The pipe E provided with the stop-cock K, and pipe F provided with the valve G, in combination with the check-valve H, pipes I and b, and cylinder B provided with pistons C C and valve X, the parts being arranged in

relation to each other substantially as described, and for the purpose set forth.

2. The pipe U, when arranged in relation to the pipes E, F, I, and J, as shown and described, and for the purpose specified.

3. The arrangement of the connecting-joint P with the pipes E, F, I, and U, and the check-valve H, substantially as and for the purpose set forth.

SAMUEL N. GOODALE.

Witnesses:

E. K. MOSS,
CHAS. LEWIS.