(No Model.) 3 Sheets—Sheet 1.

B. W. SMITH.

RAILWAY CAR BRAKE.

No. 512,760. Patented Jan. 16, 1894.

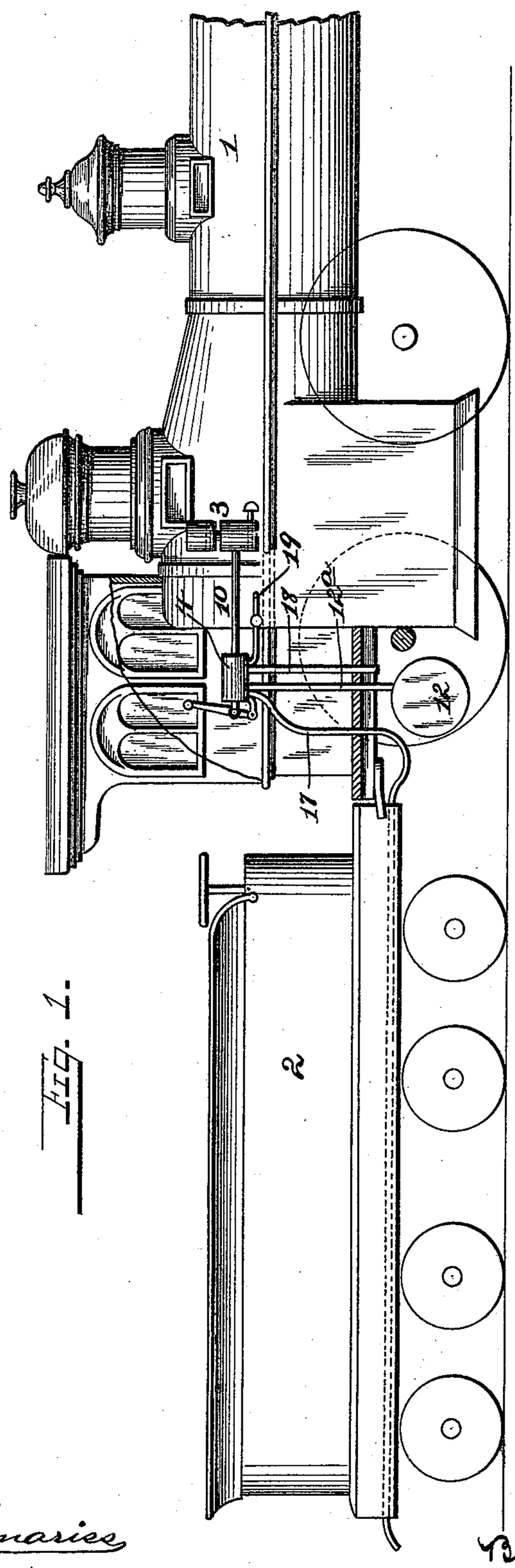


FIG. 1.

WITNESSES,
Walter Famariss
Chas. Rhodes.

Benjamin W. Smith
INVENTOR.
By Chas. J. Stockman
ATTY.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.)

3 Sheets—Sheet 2.

B. W. SMITH.

RAILWAY CAR BRAKE.

No. 512,760. Patented Jan. 16, 1894.

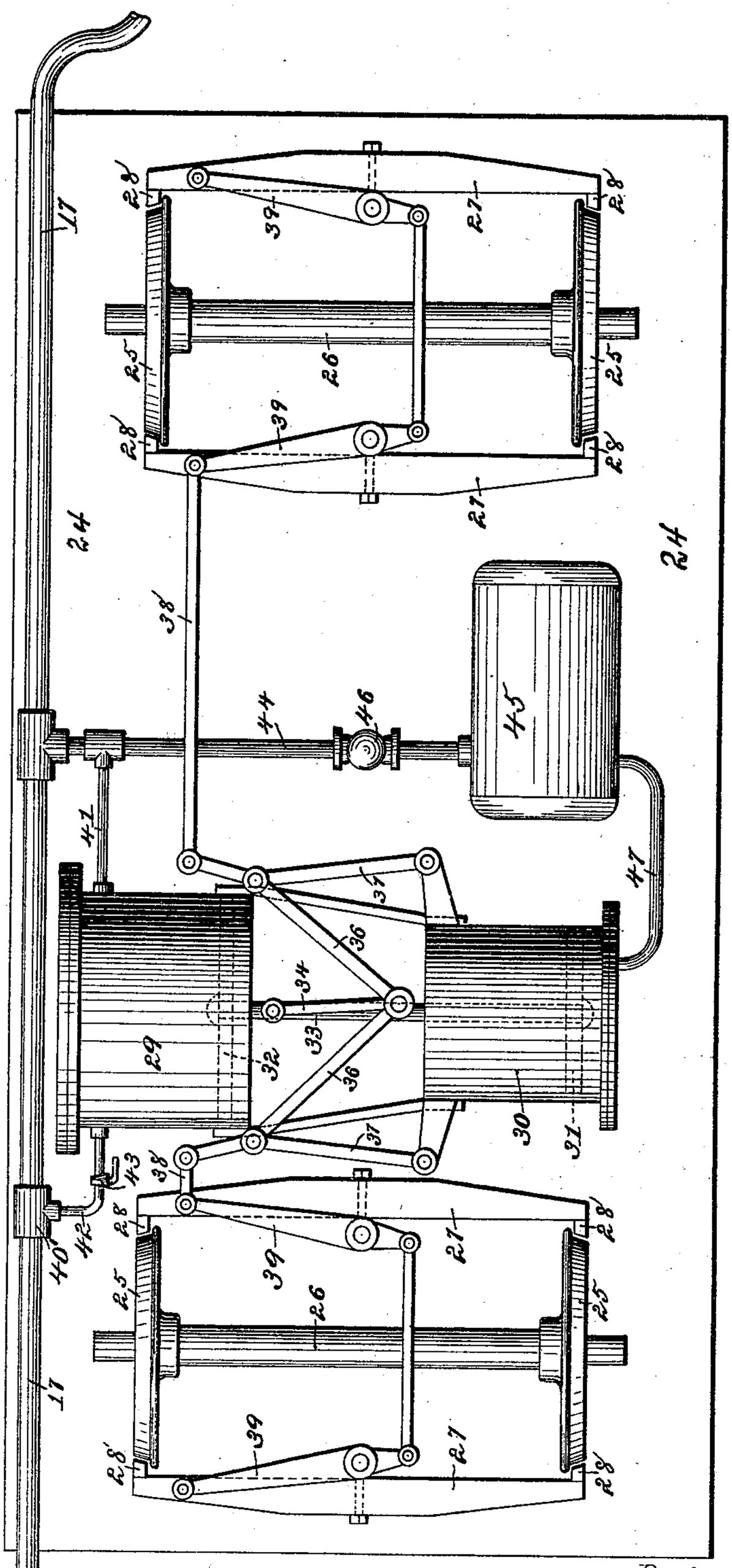


FIG. 2.

Attest
Walter Famariss
O. H. Budlong

Inventor
Benjamin W. Smith.
By Chas. J. Stockman
Principal Attorney.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

B. W. SMITH.

RAILWAY CAR BRAKE.

No. 512,760. Patented Jan. 16, 1894.

Fig. 4

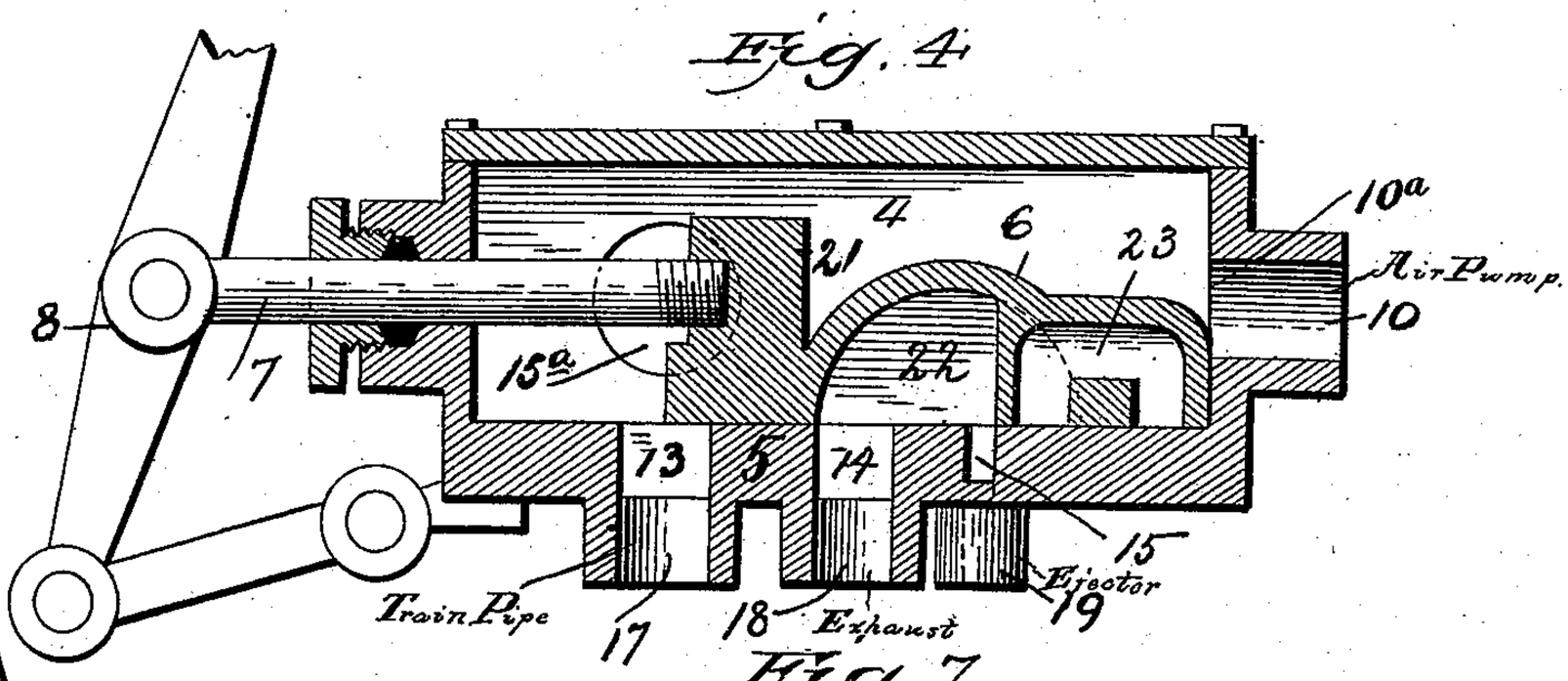


Fig. 7.

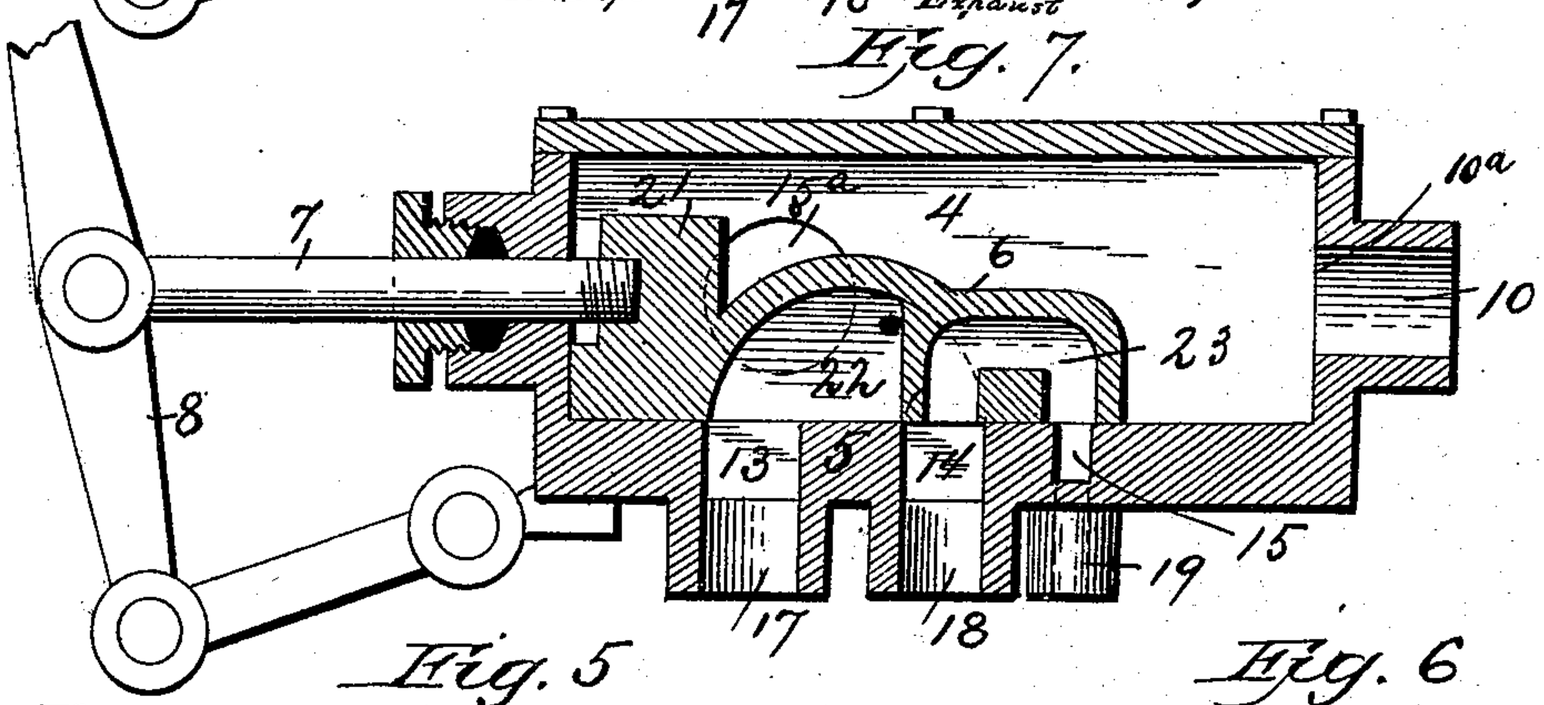


Fig. 5

Fig. 6

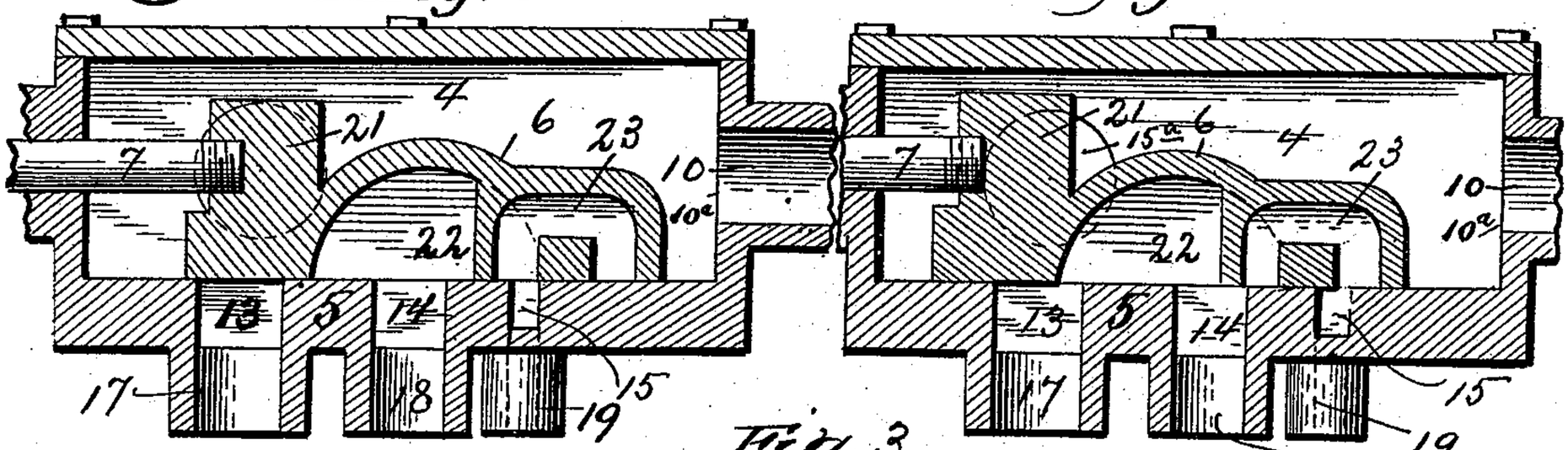


Fig. 3

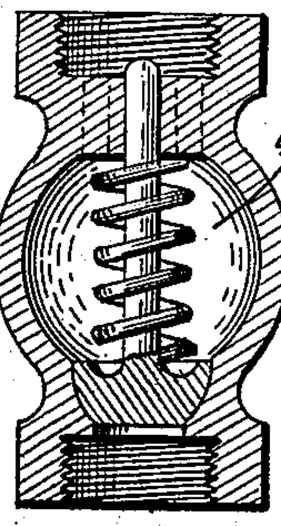


Fig. 9

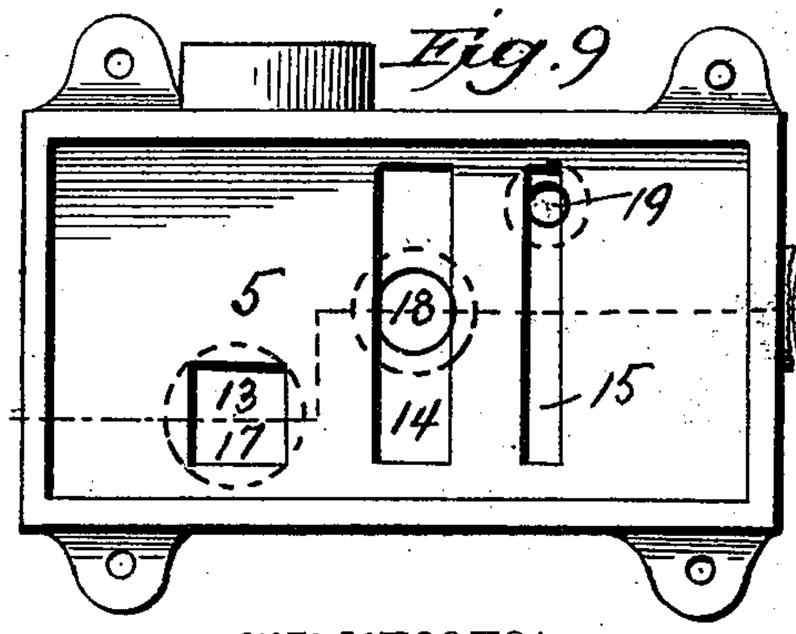
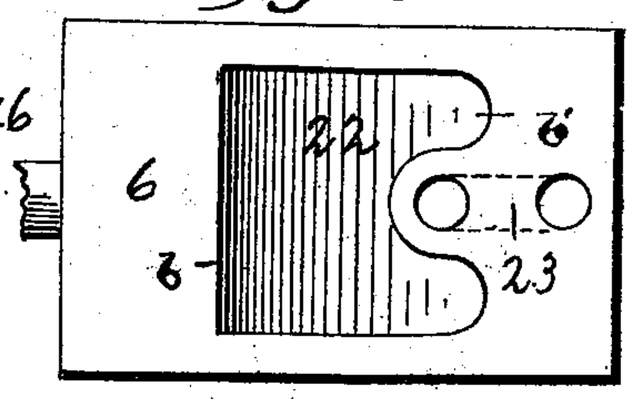


Fig. 8



WITNESSES:
F. L. Ouraud.
H. L. Coombs

INVENTOR:
Benjamin W. Smith.
by Louis Bagger & Co.
Attorneys

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

BENJAMIN W. SMITH, OF ROCKPORT, INDIANA.

RAILWAY-CAR BRAKE.

SPECIFICATION forming part of Letters Patent No. 512,760, dated January 16, 1894.

Application filed May 16, 1891. Serial No. 392,990. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN W. SMITH, a resident of Rockport, in the county of Spencer and State of Indiana, have invented certain new and useful Improvements in Railway Car Brakes; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which the invention appertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in air brakes for railway cars, of that class in which the air to operate the same is compressed upon the locomotive and supplied to the brake mechanisms of the different cars, the brakes being released by the pressure of the air in one cylinder, and set when any decrease in the pressure takes place in said cylinder, either by the operating of a suitable valve by the engineer, or by uncoupling of the cars, or by a serious leak.

The invention consists in certain peculiarities in the construction, arrangement and combination of the several parts, substantially as hereinafter described and particularly pointed out in the subjoined claims.

The objects of my invention are, first, to simplify the construction and increase the durability of brake mechanisms of the class stated; second, to reduce the quantity of air heretofore required to operate the brakes; third, to place both the releasing and the setting of the brakes entirely under the control of the engineer; fourth, to place under the control of the engineer a reserve power for use in an emergency; fifth, to reduce the shock incident to the application of the brakes in long trains. These objects are accomplished by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side view of a tender and the rear part of a locomotive, with part of the cab broken away, said locomotive being provided with a valve and its connections constructed in accordance with my invention. Fig. 2 is a bottom plan view of a car provided with my improved brake mechanism. Fig. 3 is a longitudinal sectional view of the check valve which is located intermediate of the main train pipe and auxiliary reservoir. Figs. 4, 5, 6 and 7 are longitudinal sectional views of the valve chest and valve in the engineer's cab, showing the valve in its different positions. Fig. 8 is an inverted plan view of the valve, and Fig. 9 is a plan view of the valve seat.

The same letters and numerals of reference are used to designate the same parts in the several figures.

1 designates an ordinary locomotive, and 2 the tender thereof.

3 designates an air pump which may be of any suitable construction, and is suitably mounted on the locomotive. Also mounted on the locomotive is what, in general terms, may be referred to as the engineer's valve, which consists of a valve chest 4 suitably constructed to provide a valve seat, 5, and formed with ports or openings 10^a, 13, 14, 15 and 15^a; and a valve 6 mounted so as to reciprocate within the valve chest and having a stem 7 to which is secured an operating lever 8. The opening 10^a is located in one end of the valve chest, and secured to the valve chest adjacent to said opening is a pipe 10 which affords communication between the interior of the valve chest and the air pump, 3, and the interior of the valve also has communication with pipes 17, 18, 19 and 12^a by means of the ports 13, 14, 15 and 15^a, respectively, said pipe 17, leading throughout the length of the train, and being connected with the several auxiliary reservoirs (hereinafter described) thereof, said pipe 18 leading to the atmosphere and serving for the exhaust, said pipe 19 leading to the boiler of the locomotive and serving as an ejector pipe, and having, intermediate of its length, a suitable globe valve (indicated at 20, Fig. 1) and said pipe 12^a leading to the main reservoir 12. The valve 6 is provided with an exhaust passage 22 by means of which communication may be established between ports 13 and 14, and also with a passage 23 for establishing communication between ports 14 and 15.

In Fig. 2 the reference numeral 24 designates the platform of a railway car; 25 the wheels; 26 the axles; 27 the brake beams; and 28 the brake shoes; all of which parts may be of the ordinary or any suitable construction.

Located at or near the center of the car

bottom, in alignment with each other, are two cylinders 29 and 30, said cylinders being open at their inner ends, and cylinder 29 being larger than cylinder 30. These cylinders are provided with pistons 31 and 32, which are connected together by means of the common piston rod 33.

Pivoted at one of its ends to the piston rod is an equalizing bar 34, the other end of which is connected by a system of levers with the brakes. The system of levers shown in the drawings consists of two toggle levers 36, 36 the adjacent ends of which are pivoted to said equalizing bar and the other ends pivoted to the intermediate portions of levers 37, 37, each of which latter is fulcrumed to cylinder 30 at one end and has the other end connected by rod 38 with the respective brake levers 39, 39, which latter may be of any suitable construction and are suitably connected with the brake beams, as shown in Fig. 2.

The equalizing bar 34 is an important and advantageous element of my construction, as it relieves the great strain to which the piston rod would otherwise be subjected by the surging back and forth of the trucks when the car is in motion.

The train pipe 17 is shown in the drawings in front of cylinder 29, and it is provided with a T 40′ from which leads a pipe 42 to afford communication of the train pipe with said cylinder. This pipe 42 is provided with a stop cock 43 by means of which communication of the cylinder 29 with the atmosphere may be established and the pressure in said cylinder thereby reduced. In practice such communication will be established only in a few places in a long train, and its purpose is to lessen the shocks which would otherwise occur from slack couplings. The train pipe 17 is connected with the auxiliary reservoir 45 by means of a pipe 44, and said pipe 44 is itself connected, by means of branch pipe 41, with the cylinder 29. This pipe 44 is provided with a check valve, 46, which is so constructed as to open automatically when the pressure is applied in the train pipe 17 and to close when said pressure is reduced. This valve may be of any suitable construction that will permit it to open automatically when subjected to air pressure and close automatically when relieved of such pressure.

From the above the operation of my invention will readily be understood to be the following: When the engineer's valve is in the position shown in Fig. 4, communication is established between the valve-chest, 4, and train pipe, 17, and the compressed air will now have free passage through said train pipe 17 into and through pipe 41 (and also through pipe 42 when the valve in the latter is open) into said cylinder 29, forcing inward the piston in said cylinder and thereby releasing the brakes, by reason of the connection of the brake beams with the piston rod. At the same time the air will pass through pipe 44 into auxiliary reservoir 45 (opening check valve 46 in its passage) and from said reservoir 45 will be forced through pipe 47 into cylinder 30. When the requisite pressure is attained, the engineer pulls the lever 8 backward, moving the valve 6 into position to close port 13, as shown in Fig. 5, thus cutting off all communication between the valve chest, main reservoir and train pipe. If it is desired to set the brakes, the engineer pulls the lever still farther back, which will cause the passage or port 22 in the valve 6 to establish communication between train pipe 17 and exhaust pipe 18 and permits the air in pipe 17 and cylinder 29 to pass out to the atmosphere. The check valve 46 closes down and retains the pressure in reservoir 45, which operating through pipe 47 on piston 31 in cylinder 30 forces said piston toward the opposite end of said cylinder and causes said piston rod to pull upon the system of levers and set the brakes. If it is desired to set the brakes quickly the engineer pulls the valve back the full length of its travel. The passage or port 22, at *b*, will then be in line with the port 13 at its near edge next to the operating lever 8, the opposite end of passage 22, at *b′*, will be in line with the far edge of port 14, and the outlet end of port 23 will be over the center opening of port 15; the valve being in this position establishes perfect communication between ports 13 and 14 and also between ports 14 and 15, and the steam from the boiler has free course through port 23, down through exhaust port 18, and, will draw out to the atmosphere the air in train pipe 17 and in that portion of cylinder 29 lying between the closed end thereof and the piston therein. By this means the brakes can, when necessary, be set in a minimum space of time, as there is obtained the atmospheric pressure on one side of one piston, unopposed by any pressure on the opposite side thereof, and also the power of compressed air on one side of the other piston. The globe valve 20 remains open while the train is in motion, and the area of port 15 being small the vastly greater area of the top of valve 6 will permit of more than sufficient pressure thereon from the main reservoir to hold it down against the steam pressure from the boiler, but if considered necessary or desirable a spring may be placed between the valve and chest cover of sufficient power to hold the valve down. To release the brakes the engineer pushes the valve clear forward which closes communication to the boiler and shuts off the steam therefrom, and at the same time communication is established through port 13 of the train pipe 17 with main reservoir 12, and the compressed air in the main reservoir rushes into cylinder 29 which, being of greater area than cylinder 30, the excess of pressure therein will force the piston to the first position,

thus giving the engineer the same control to force off the brakes that he has to force them on.

Having now described my invention, what I believe to be new, and desire to secure by Letters Patent, and what I therefore claim, is—

1. In an air brake, the combination of an air pump, and the main air reservoir, with the valve chest, having a valve seat and formed with openings or ports 10^a, 13, 14, 15 and 15^a, a pipe leading from said port 10^a to the air pump, the train pipe leading from said port 13, the exhaust pipe leading from said port 14, the ejector pipe leading from said port 15, a pipe leading from said port 15^a to said main reservoir, and the reciprocatory valve within said chest, said valve having an operating lever and provided with passages 22 and 23, substantially as described and for the purposes specified.

2. In an air brake, the combination of the air pump, the main air reservoir, the valve chest having communication with said air pump and main reservoir, said valve chest having a valve seat and formed with ports 13 and 15 and with an exhaust port 14, the train pipe leading from said port 13, and an ejector pipe leading from said port 15, the reciprocatory valve within said chest, provided with passages, 22 and 23, an auxiliary reservoir having communication with said train pipe, a cylinder, 29, having communication with said train pipe, a cylinder, 30, having communication with said auxiliary reservoir, pistons in said cylinders, the piston rod connecting said pistons, and the brakes connected with said piston rod, substantially as shown and described.

3. In an air brake, the combination with the engineer's valve, the air pump, and the main air reservoir, of the train pipe, an auxiliary reservoir, a pipe, 44, connecting said train pipe with said auxiliary reservoir and provided with a check valve, cylinders 29 and 30, a branch pipe, 41, connecting said pipe 44 with said cylinder 29, a pipe, 42, connecting said train pipe with said cylinder 29, and provided with a stop cock, a pipe 47 connecting said auxiliary reservoir with said cylinder 30, pistons in said cylinders, a piston rod connecting said pistons, and brakes, connected with said piston rod, substantially as shown and described.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

BENJAMIN W. SMITH.

Witnesses:

THOMAS SIBERT,

WALTER G. HUDSON.