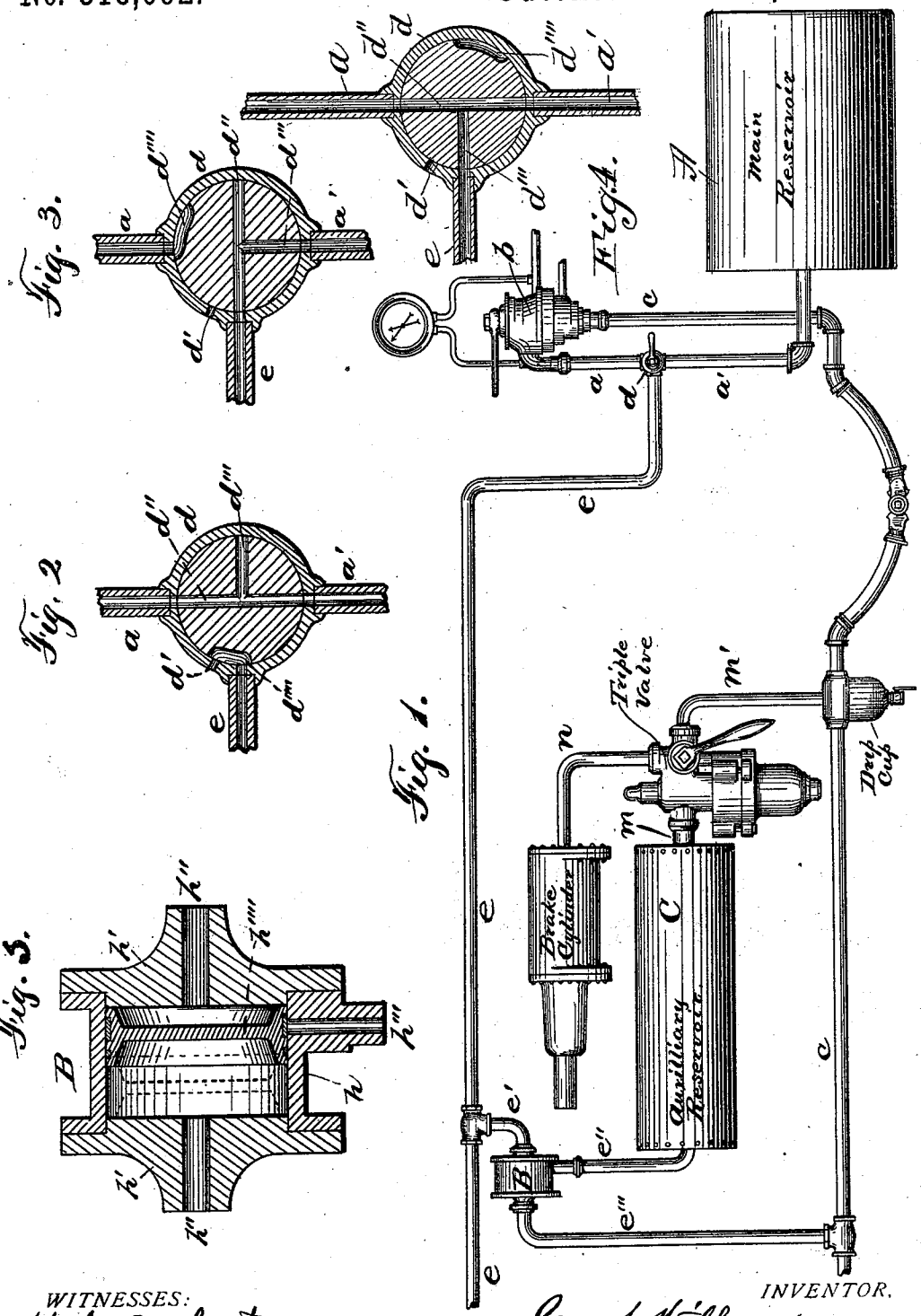
(No Model.) 2 Sheets—Sheet 1.

G. W. WILLSON.

AIR BRAKE.

No. 516,692. Patented Mar. 20, 1894.



WITNESSES:
H. A. Earhart.
C. B. Kinnee.

INVENTOR.
Geo. W. Willson
BY
Smith & Denison
his ATTORNEYS

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

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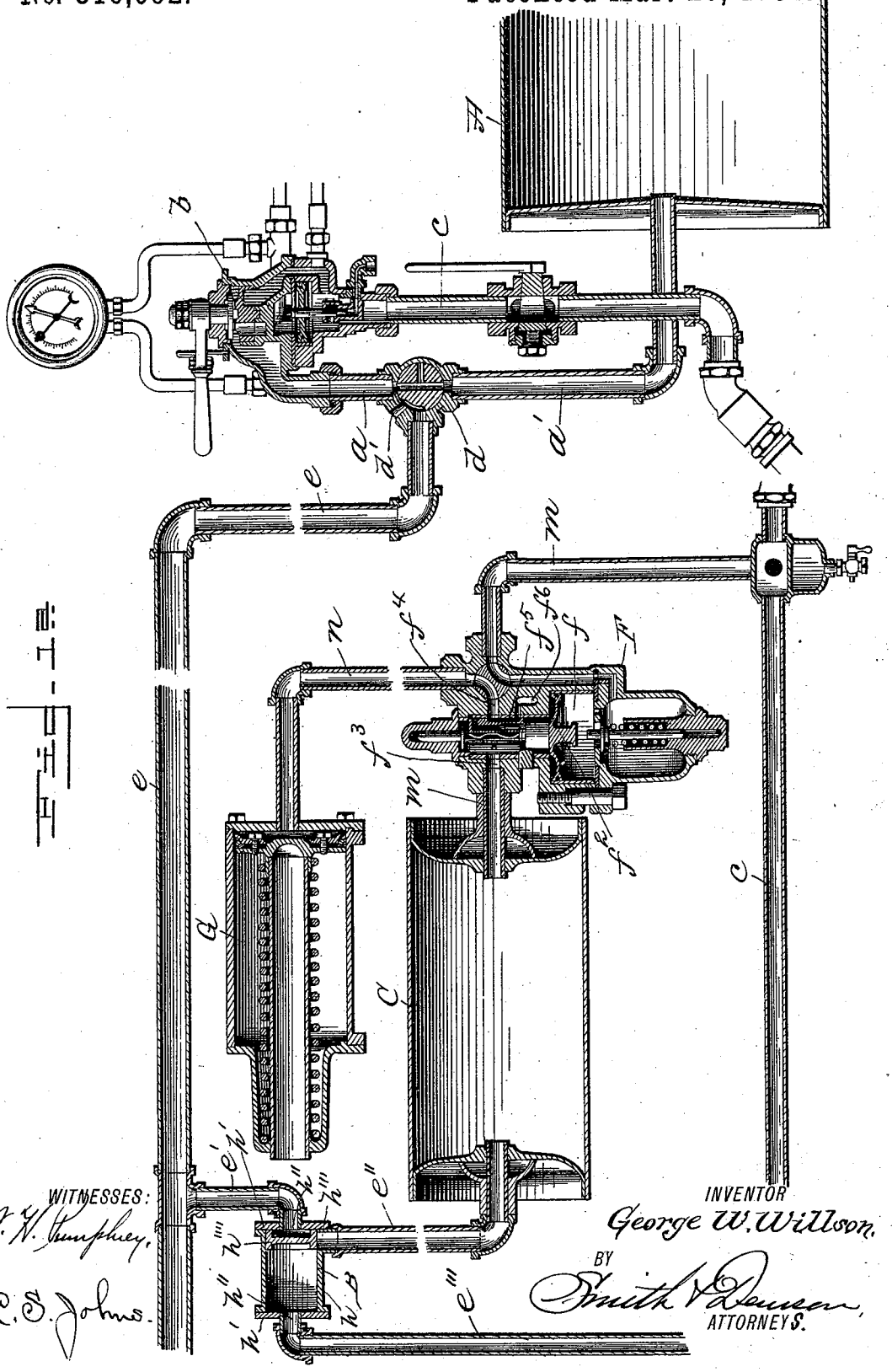

WITNESSES:
W. N. Humphrey.
C. S. Johns.

INVENTOR
George W. Willson.
BY
Smith & Dawson,
ATTORNEYS.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE WINTERS WILLSON, OF EASTON, PENNSYLVANIA.

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 516,692, dated March 20, 1894.

Application filed July 22, 1891. Serial No. 400,365. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WINTERS WILLSON, of Easton, in the county of Northampton, in the State of Pennsylvania, have invented new and useful Improvements in Air-Brakes, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to certain new and useful improvements in "air brake systems," as applied to railway trains, and especially to the mechanism by which the pressure on all the brake-cylinders may be equalized, also by which the entire system may be simultaneously recharged and the brakes forced to act efficiently at all times and under all circumstances.

My object is to provide the brake system with novel mechanisms and combinations of mechanisms, all under the direct control of, and manipulated by the engineer, by which he can successively apply the brakes, bleed or exhaust the cylinders, recharge them, store up compressed air in the auxiliary cylinders and apply this stored up pressure, forcing the brakes to operate when the main reservoir is exhausted or fails to operate them properly; all of which is attained by applying to the well known air brake system, an auxiliary safety attachment, consisting of piston valve cylinders, a three-way cock located in the cab of the locomotive and piping connecting said valve cylinders and cock with the main air brake piping and the main and auxiliary reservoirs.

My invention embraces various novel features of construction which will be hereinafter described and specifically pointed out in the claim hereunto annexed.

In describing the attachment in detail, reference will be had to the accompanying drawings, which form part of this specification and wherein like letters indicate corresponding parts in the several views, in which—

Figure 1:— is a plan view of a well known construction of air brake system, with my improvements shown applied thereto. Fig. 1ª:— is a similar view, in sectional elevation. Fig. 2:— is a vertical section of the three-way cock, showing the vent open. Fig. 3:— is a like view of the same, showing the vent closed. Fig. 4:— is a like view, showing the valve adjusted to open communication between the main and auxiliary reservoirs. Fig. 5:— is a vertical section of the piston-valve cylinder, showing the ports opening into and from the valve chamber.

In the drawings: A, denotes the main reservoir, connected by pipes a, a', to the engineer's brake-valve b, which latter is located in the cab of the locomotive; and c, is the main brake-pipe, leading from said valve to the brake system of the cars, all constructed in the ordinary manner.

In the pipe a, adjacent to the brake-valve b, the three-way cock d, is mounted and consists of a casing of ordinary T-form of construction, to permit three pipes to be coupled thereto, and having a vent d', opening out through its wall. The valve is seated in the casing and is provided with a diametrical port d'', and a radial port d''', opening into each other, also with a port d'''', cut in its periphery and adapted to be brought into connection with the vent, by the rotation of the valve, for a purpose hereinafter explained.

The train-pipe e, is secured to the three-way cock, and a branch e', leads therefrom to the piston-valve cylinder B. This cylinder comprises a tubular casing h, heads h' provided with passages h'', opening into the chamber within the casing, also with a port h''', opening through the casing into the chamber and with a piston-valve h'''', fitting within said casing and adapted to traverse it, to open and close the port h''', from which port, the pipe e'', leads to the auxiliary air reservoir C. A pipe e''', leads from the cylinder B, to the brake-pipe c, to which it is connected. The cylinder B, reservoir C, and the piping e, e', e'', and e''', are all suspended beneath the body of the car, and a similar set of pipes, cylinder and reservoir, is applied to every car.

When the automatic air-brake has been applied, or where the pressure is exhausted and fails to sufficiently actuate the brakes, or where for any cause it is desired to use my attachment, it is brought into use in the following manner, it being of course understood, that a low pressure in the pipe c, is sufficient to retain the triple-valve closed, owing to the peculiar and well known construction of the same.

Referring to Fig. 1ª, the apparatus is shown in its normal condition, that is, with the pipe *e*, open to the atmosphere, the port *h'''*, closed by the piston valve *h''''*, the auxiliary reservoir charged with a working pressure and the triple-valve closed, the train will be in running order and the brakes will be off. If now the engineer wishes to apply the brakes, he shifts the brake-valve in the usual manner, to lower the pressure in the brake-pipe *c*, and chamber *f*, of the triple-valve F, causing a down-stroke of the piston f^2, of said valve and opening communication between the auxiliary reservoir and the brake-cylinder, through the valve ports and passages f^3, f^4, so as to apply the brakes with more or less force, according to the pressure in the pipe *c*, and the rapidity of reduction of pressure in said pipe —*c*— directly controls the action of the brakes, as will be readily apparent.

The operation thus far described, differs in no material respect from that of well known apparatus in use at the present day, but it is of the greatest importance, in the running of heavy trains down steep or long gradients, that an easily regulated and constant pressure be maintained throughout the system and to effectually and conveniently accomplish this result, I provide the attachment and connections aforesaid. Thus, after the brakes are applied, should it be found that the pressure in the auxiliary reservoirs has become reduced, by leakage or from any other cause, and it is not sufficient to set the brakes, either full on or partly so, it is within the power of the engineer to direct and introduce the main reservoir pressure into the brake-cylinders by the mere adjustment of the three-way cock, to the position shown in Fig. 3, when the compressed air will enter and pass through the pipe *a'*, passages *d'''*, *d''*, of the cock *d*, pipes *e*, *e'*, into cylinder B, forcing piston *h''''*, to the left, by overcoming pressure in pipe *c*, thence into pipe *e''*, auxiliary reservoir C, triple-valve F, and on through pipe *n*, into the brake-cylinders, thereby insuring positive action by the combined pressures. Should it be required, as in case of emergency, when the main reservoir pressure has become exhausted, to suddenly release the brakes after they have been applied, it is only necessary that the engineer's valve —*b*— be operated to reduce the pressure in the pipe —*c*— to that of the atmosphere and the three-way cock be adjusted to the position shown in Figs. 1ª and 2—which would thereby retain the piston *h''''* at the left and the piston f^2 at its lower position, thus opening communication from the brake cylinder through the triple-valve, auxiliary reservoir, piston-valve-chamber, pipes —*e'*—*e*— and vent —*d'*— of three-way cock to the atmosphere. This would effect a bleeding or exhaustion of the entire system, as will be obvious, or with pressure in the main-reservoir, the three-way cock may be adjusted to restore the pressure in the brake-pipe *c*, and thus operate or force the piston of the triple-valve upwardly, which thereby opens communication between the brake-cylinders and the external atmosphere through the pipe *n*, passages and ports f^4, f^5 and vent f^6. (Fig. 1ª.) With pressure in the pipe —*c*— and the three-way cock adjusted as in Fig. 4, the auxiliary reservoir may be charged through pipe —*a'*— passages —*d''*—*d'''*— pipes —*e*—*e'*— valve—B— and pipe —*e''*—, without applying the brakes, since proper pressure in said pipe —*c*— would be sufficient to retain the interposed triple-valve closed and thereby interrupt communication between the auxiliary reservoir and the brake cylinder.

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

The combination with the herein described air-brake system, of an attachment comprising a three-way cock mounted to control the discharge from the main reservoir, a piston-valve slidingly mounted in a cylindrical casing, pipes connecting said cock with one end of said valve cylinder, a connection between the opposite end of said cylinder and the main brake-pipe, and a suitable connection between the auxiliary reservoir and a lateral port of said valve cylinder, said port being opened and closed by the piston-valve proper, as and for the purpose specified.

In witness whereof I have hereunto set my hand this 30th day of June, 1891.

GEORGE WINTERS WILLSON.

In presence of—
JOHN BRUNNER,
HOWARD P. DENISON.