(No Model.) 2 Sheets—Sheet 1.

J. D. P. SCHENCK.

AUTOMATIC VALVE FOR AIR BRAKES.

No. 492,841. Patented Mar. 7, 1893.

FIG. 1.

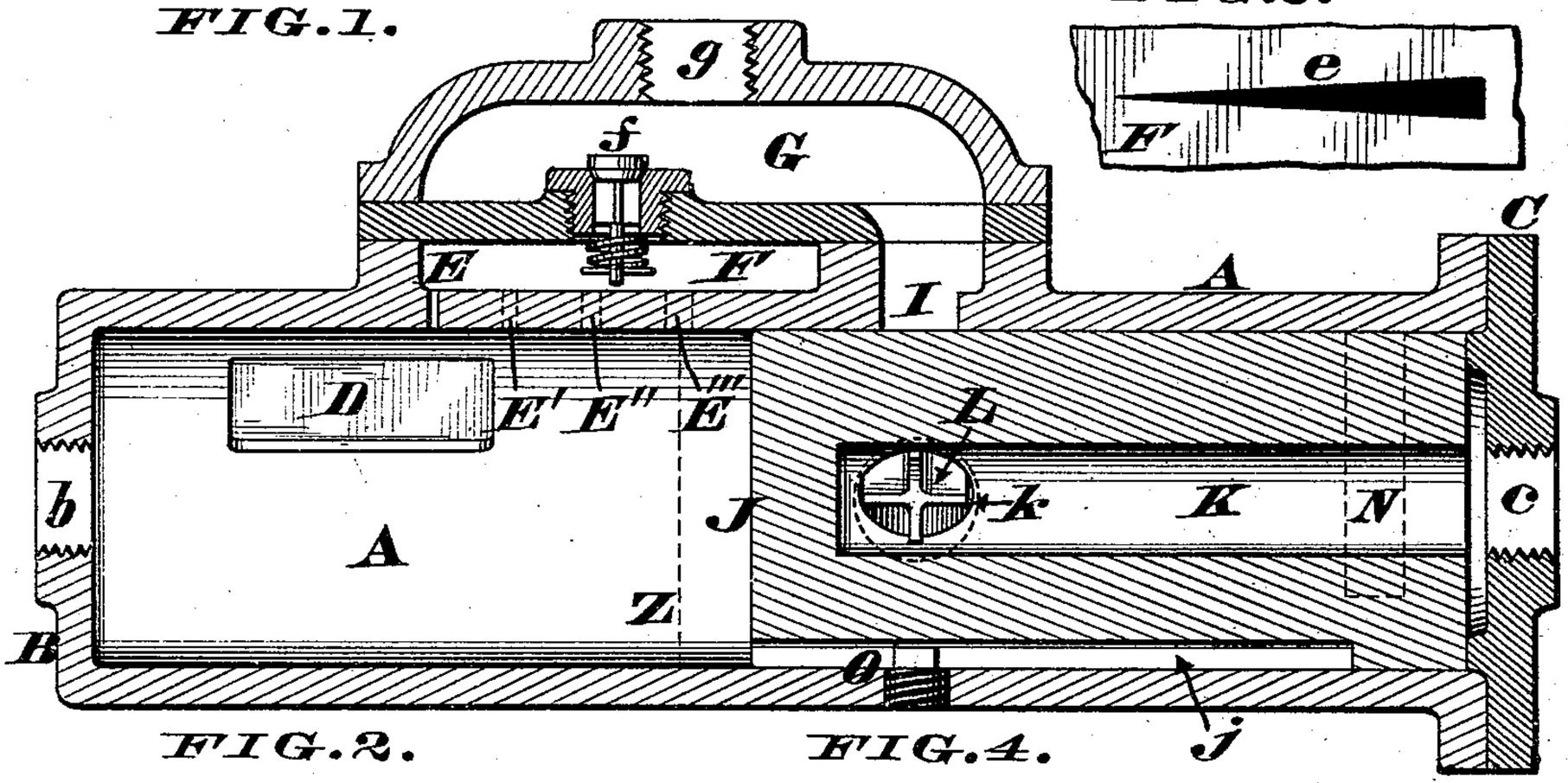


FIG. 2.

FIG. 4.

FIG. 6.

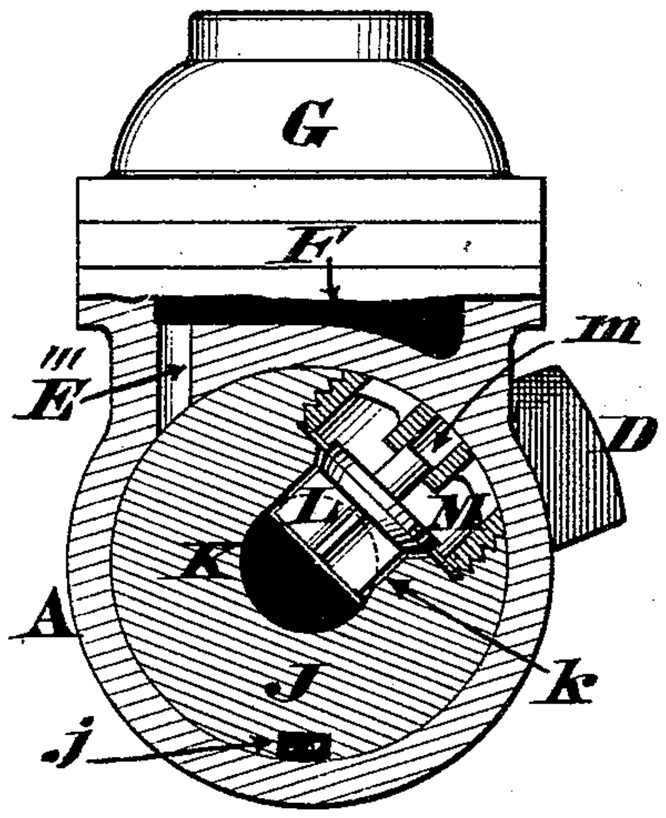


FIG. 3.

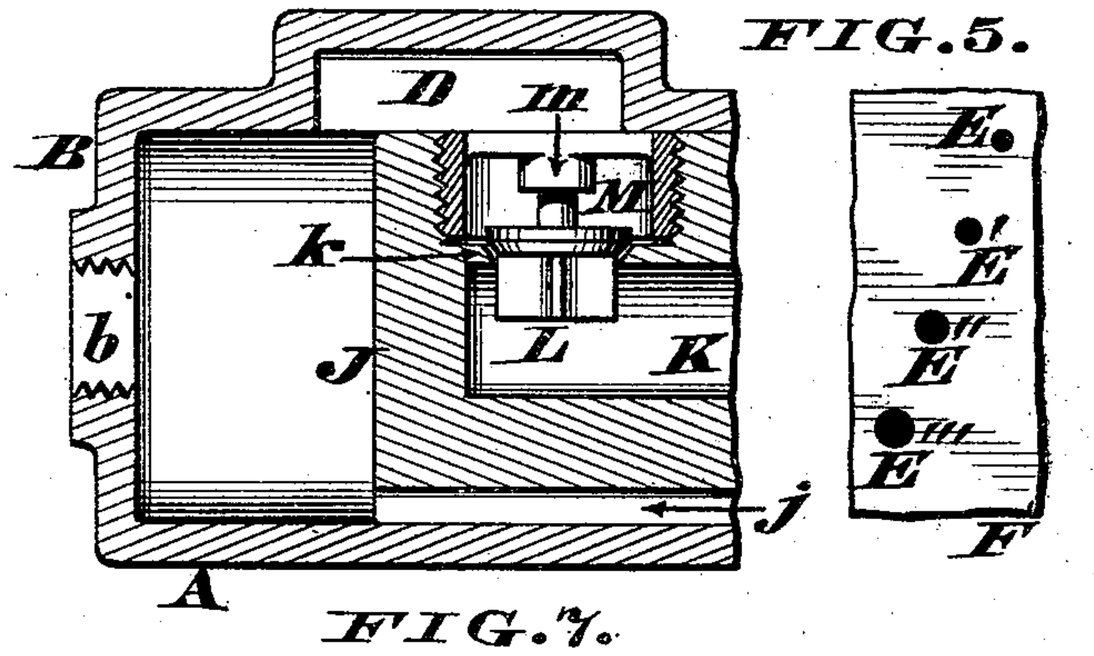
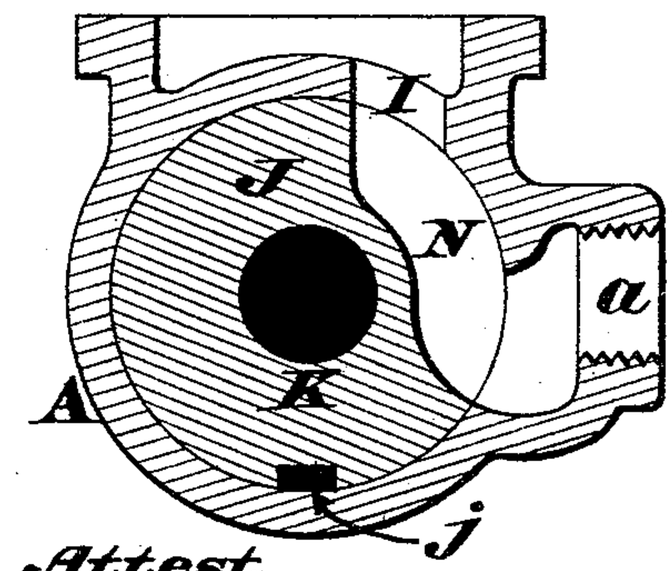
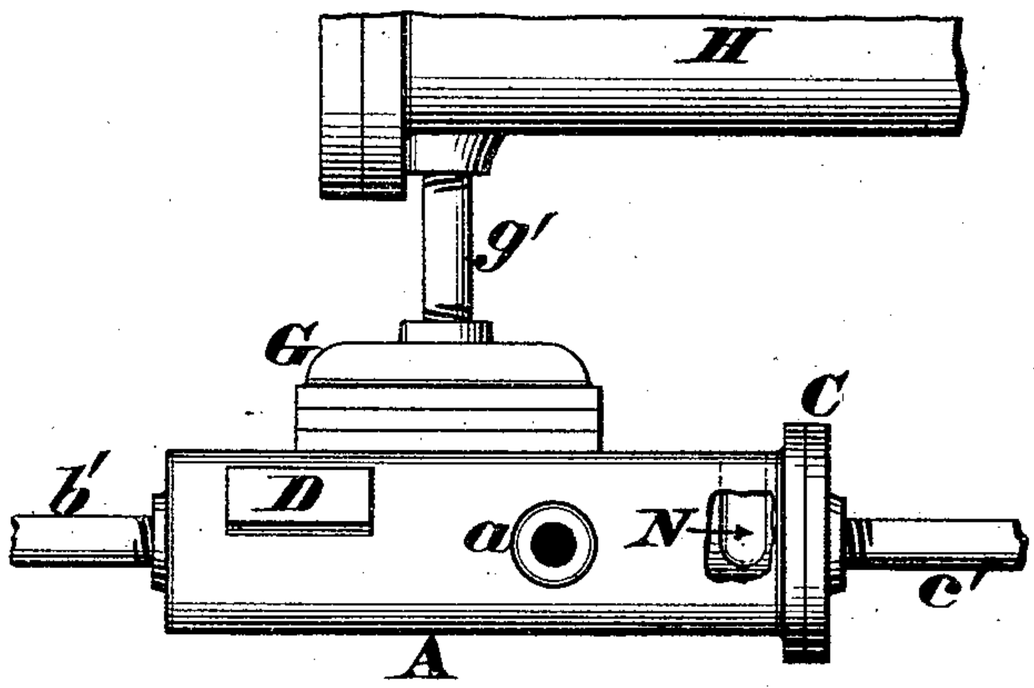


FIG. 5.

FIG. 7.





Attest
Alfred N. Davies
Arthur Moore.

Inventor.
John D. P. Schenck.
by James N. Layman.
Atty.

(No Model.) 2 Sheets—Sheet 2.

J. D. P. SCHENCK.

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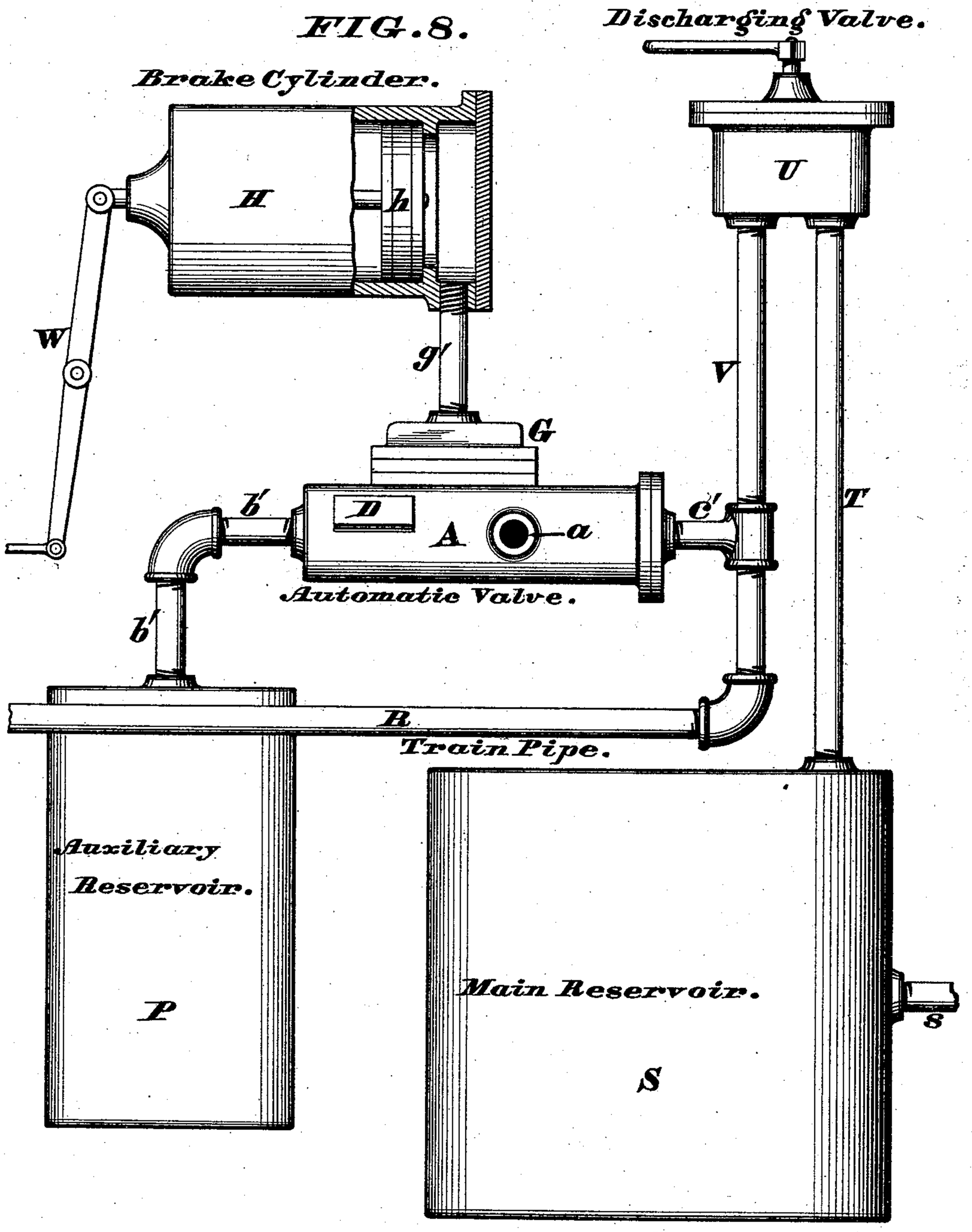
FIG. 8.



Attest.
Arthur Moore
John W. Layman.

Inventor.
John D. P. Schenck.
by James N. Layman.
Atty.

UNITED STATES PATENT OFFICE.

JOHN D. P. SCHENCK, OF NASHVILLE, TENNESSEE, ASSIGNOR OF ONE-HALF TO GEORGE MATHEWS, OF CINCINNATI, AND WILLIAM W. PEABODY, OF MADISONVILLE, OHIO.

AUTOMATIC VALVE FOR AIR-BRAKES.

SPECIFICATION forming part of Letters Patent No. 492,841, dated March 7, 1893.

Application filed March 4, 1892. Serial No. 423,735. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. P. SCHENCK, a citizen of the United States, residing at Nashville, in the county of Davidson and State of Tennessee, have invented certain new and useful Improvements in Automatic Valves for Air-Brakes; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the annexed drawings, which form part of this specification.

This invention relates to those automatic valves which open and admit compressed air to a brake-cylinder the instant an engineer reduces the pressure in a train-pipe, by the proper adjustment of an equalizing and discharging valve, and my improvement consists in constructing these automatic valves in such a manner as to render them very prompt in action, and to free them from all side-pipes and other objectionable extraneous accessories, as hereinafter more fully described.

In the annexed drawings, Figure 1 is a vertical section of an automatic valve embodying my improvement, the piston thereof, being completely advanced to admit a full supply of air to the brake-cylinder, for the purpose of making an "emergency stop." Fig. 2 is a transverse section of the valve, the piston being supposed to have receded so far as to bring the main check-valve to the position indicated by the dotted line Z, in Fig. 1, the upper part of the chest being in elevation. Fig. 3 is a transverse section of a sufficient part of the valve to show the piston port in line with the exhaust passage of the valve cylinder. Fig. 4 is a horizontal section of a sufficient part of the valve to show the piston completely retracted and the main check valve in line with a side passage of the valve-cylinder. Fig. 5 is a plan showing a series of graduated ports through which the compressed air escapes from the valve-cylinder. Fig. 6 is a plan of a substitute for these openings. Fig. 7 shows the general arrangement of my valve and its connections. Fig. 8 shows the general arrangement of the main reservoir, auxiliary reservoir, engineer's discharging-valve and the automatic valve, the exact position of these parts and the relative size of the pipe connections &c. not being rigidly adhered to.

A represents a cylinder, which usually has an integral head B, at one end, and a removable cover or head C, at the opposite end, the head B being screw-threaded at *b* to permit the secure attachment of a pipe *b'*, leading to the auxiliary air-reservoir P, the pipe connections being seen in Fig. 8. Head C is tapped at *c*, for the engagement of a pipe *c'*, communicating with a supply pipe R that conducts compressed air through the entire train. Located near the head B is a side-passage D of the cylinder, the duty of which passage will presently appear.

E, E', E'', E''', are ports made in the cylinder and communicating with a chamber F, which is completely closed except where said ports, and a secondary check-valve *f*, are arranged. Valve *f* opens into a chest G, having an internally-threaded neck *g*, for the attachment of a pipe *g'*, leading to the brake-cylinder H. Chest G has a passage I, vertically in line with an outlet *a* of the cylinder, but communicating with said outlet only when the piston J is in a proper position. This piston is adapted to reciprocate within the cylinder A, and has a longitudinal bore K, open at the end nearest the head C, but closed at its opposite end. *k* is a lateral branch leading into this bore near its closed end, the outer end of this branch being arranged to serve as a seat for the main check-valve L.

Main check-valve L, opens outwardly and is designed to gravitate to its seat, but this closure may be assisted by a spring coiled around the valve stem or fitted within the guide *m* of said stem. This guide is part of a cylindrical bushing M, screwed into the side of piston J, and in line with the branch *k*. Running a suitable distance around this piston, and near the open end of its bore K, is a groove N, capable of affording communication between the passage I, and outlet *a*, as seen in Fig. 3.

O, is a stop-screw tapped in cylinder A, and

having its point inserted in a longitudinal groove *j* of the piston, by which arrangement turning of the latter is prevented and its receding stroke arrested.

S, in Fig. 8, is the main reservoir, and *s* is a pipe leading from it to an air-brake pump. T is a pipe connecting this reservoir with an equalizing and discharging valve U, that is operated by an engineer, in the usual manner. V, is a pipe leading from this valve U, to the regular supply-pipe R, which latter furnishes compressed air to all the brake cylinders in a train.

W is a lever or other connection wherewith the piston *h* imparts its power to the brakes, the retraction of said piston being effected with a spring or its equivalent.

To illustrate the operation of the valve, I will suppose some emergency necessitates the stopping of the train as quickly as possible, which stoppage is effected by the engineer throwing his discharge-valve *u* wide open to relieve the train pipe, and its connections *c'* R of the compressed air contained therein. Now, by thus removing the pressure from one end of the cylinder while the other end has a full pressure on, owing to the pipe *b'*, communicating with the auxiliary-reservoir P the piston J, will be instantly thrown forward and brought in contact with the cover C, as represented in Fig. 1. This advance of the piston opens all the ports E, E', E'', E''', and allows the compressed air from the auxiliary reservoir to pass through said ports, fill the chamber F, lift the secondary check-valve *f* of the same, then ascend the pipe *g'*, and operate the piston of the brake-cylinder H, in the usual manner, thereby arresting the train. But, if for any reason, the air pressure in the train-pipe should, momentarily, exceed that of the auxiliary reservoir, this excess will flow through the bore K, lift the main check-valve L, escape up passage I, into the chest G, and thus obtain access to the brake cylinder. It is evident this excess can have no outlet but through the pipe *g'*, because the secondary check valve *f* opens upwardly and prevents air flowing back through the ports E, and thereby entering the auxiliary reservoir. To release the brakes, the engineer so operates his controlling valve as to allow the full pressure from the main reservoir to flow through the train-pipe, and consequently enter the pipe *c'*, thus causing the air to act against that end of piston J, which is now in close proximity to the head C. The first result of this full pressure is to open the main check valve L, and allow the air to flow up the passage I, into chest G, pipe *g'*, and thereby enter the brake-cylinder. This excess of pressure is, however, but for an instant, and is not objectionable, because the train is at rest. Furthermore, this excess can not accumulate behind the piston and balance the same, because the secondary check-valve *f*, opens upwardly and prevents air entering the closed chamber F. Therefore, as the cylinder has an increased pressure at the end C, and a reduced pressure at the end B, the piston J is at once driven back as far as the groove *j*, and stop screw O, will permit, and when this takes place, the main check-valve L is brought to a position where it communicates with side-passage D, as seen in Fig. 4. The compressed air accordingly lifts said valve, flows through side-passage D, fills up the rear portion of cylinder A, enters the pipe *b'*, and thus charges the auxiliary reservoir P with a pressure equal to that in the train pipe R and main reservoirs. This retraction of the piston brings its circumferential groove N, in line with the passage I, thereby connecting the latter with the outlet *a*, of the cylinder, as seen in Fig. 3. Evidently, there is now a free communication between brake-cylinder H, and said outlet, through the pipe *g'*, chest G, passage I, and groove N, and, as a natural result, said cylinder is at once relieved of its charge of compressed air, the entire-brake system restored to its normal position, and ready to act again, as previously described. For ordinary service, the engineer's valve U is opened only a sufficient distance to enable the piston J to advance so far as to uncover the port E, and thereby allow air to escape from the auxiliary reservoir quite slowly, while the shifting of said piston to open either of the other ports E' or E'', will cause the brakes to be applied with corresponding promptness. These various ports are preferably arranged in a line obliquely across the chamber F as seen in Fig. 5, in order that cutting of the piston may be reduced to a minimum. But practically the same increase of discharging area can be effected by omitting the graduated openings and providing said chamber with a long slot that gradually widens toward one end, as seen at *e*, in Fig. 6.

I claim as my invention—

1. The combination, in an automatic valve for air brakes, of the cylinder A, having an exhaust outlet *a*, auxiliary-reservoir connection *b*, train-pipe connection *c*, side passage D, port E, closed chamber F, into which said port leads, secondary check-valve *f*, serving the only outlet from said chamber, and a chest G into which said valve opens, said chest being provided with a brake-cylinder connection *g* and having a passage I that communicates with a groove N of a reciprocating piston J traversing said cylinder, said piston being provided with a longitudinal bore K, open at one end, but closed at its other end and having a branch passage *k* furnished with a main check-valve L, all as herein described.

2. In an automatic valve for air brakes, a cylinder having a train-pipe connection at one end, an auxiliary-reservoir connection at its other end, and traversed by a reciprocating piston adapted to open communication between said connections, a port leading from

said cylinder to a closed chamber, a check valve applied to this chamber and serving as its only outlet, and a chest within which said valve opens, the chest being provided with a brake-cylinder connection and a passage into the valve cylinder, for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN D. P. SCHENCK.

Witnesses:
JAMES H. LAYMAN,
ALFRED N. DAVIS.

Corrections in Letters Patent No. 492,841.

It is hereby certified that in Letters Patent No. 492,841, granted March 7, 1893, upon the application of John D. P. Schenck, of Nashville, Tennessee, for an improvement in "Automatic Valves for Air-Brakes," errors appear in the printed specification requiring correction as follows: In line 80, page 2, the word "reservoirs" should read *reservoir S*, and in line 116, same page, the word *as* should be inserted after the word "serving"; and that the Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 28th day of March, A. D. 1893.

[SEAL.]

CYRUS BUSSEY,
Assistant Secretary of the Interior.

Countersigned:

N. L. FROTHINGHAM,
Acting Commissioner of Patents.