

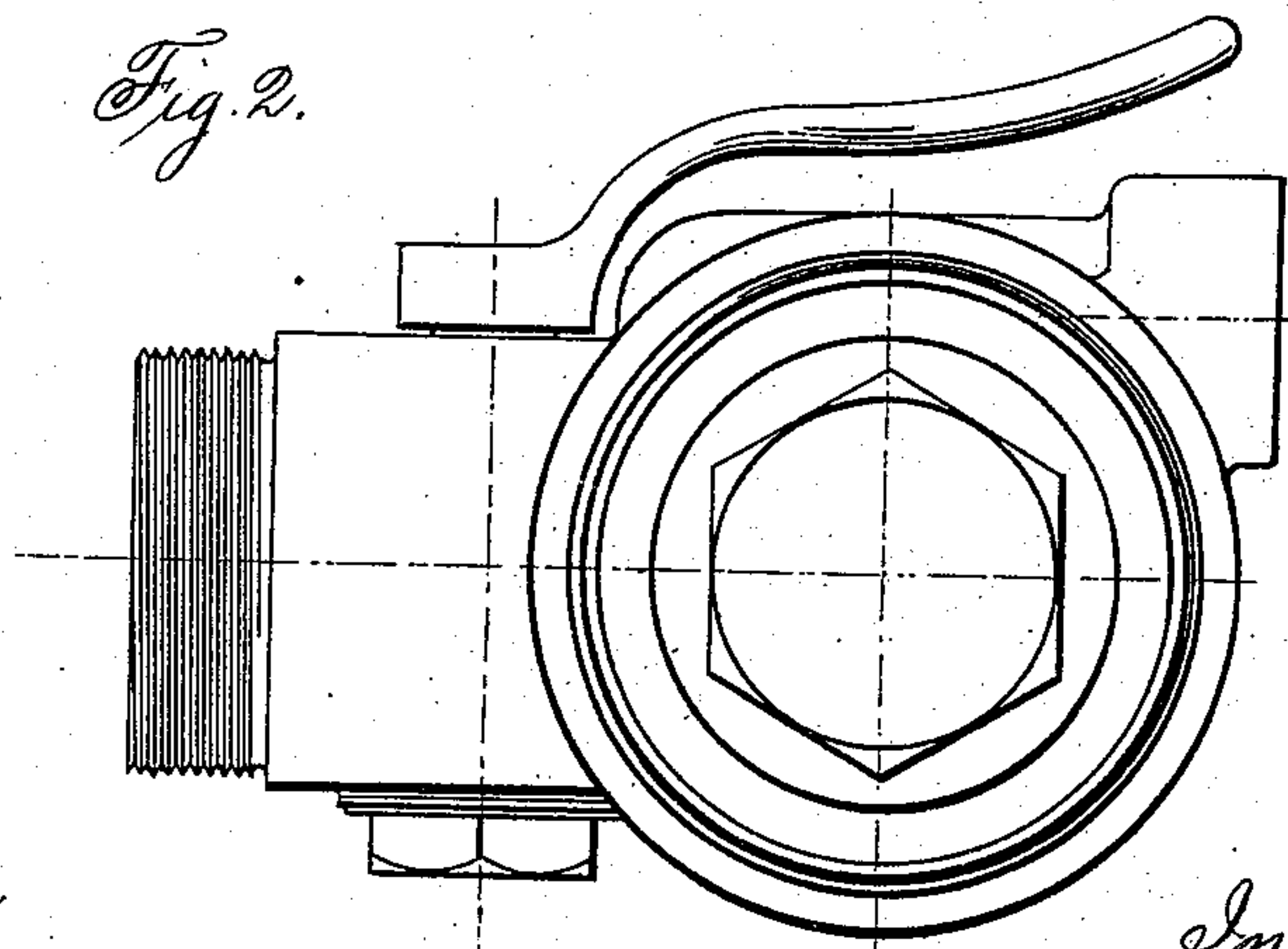
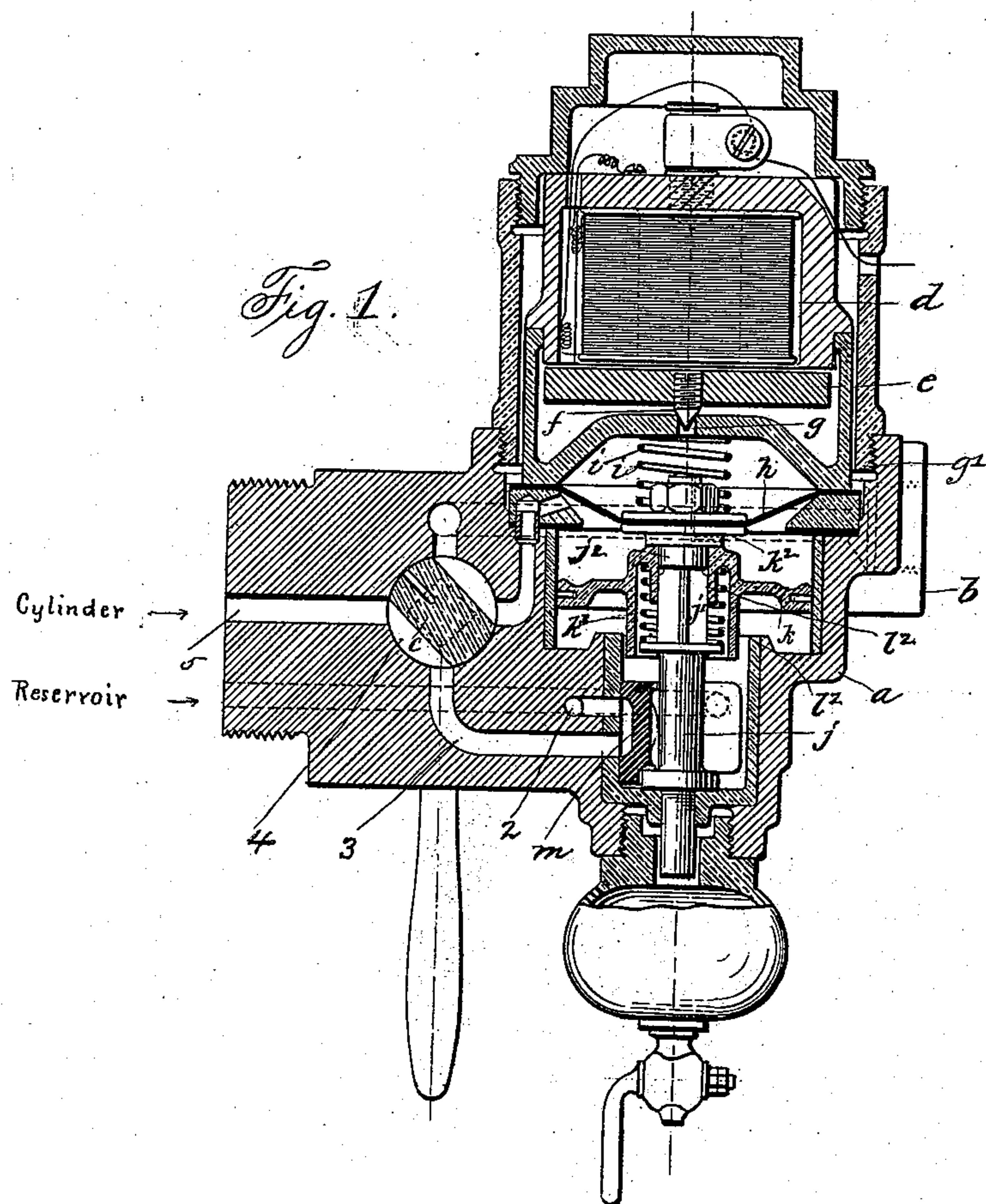
(No Model.)

2 Sheets—Sheet 1.

J. F. CARPENTER.
VALVE FOR AIR BRAKES.

No. 377,989.

Patented Feb. 14, 1888.



Witnesses:
Edwin A. Finckel:
H. J. Davis

Inventor.
J. Fairfield Carpenter
by Wm H. Finckel.
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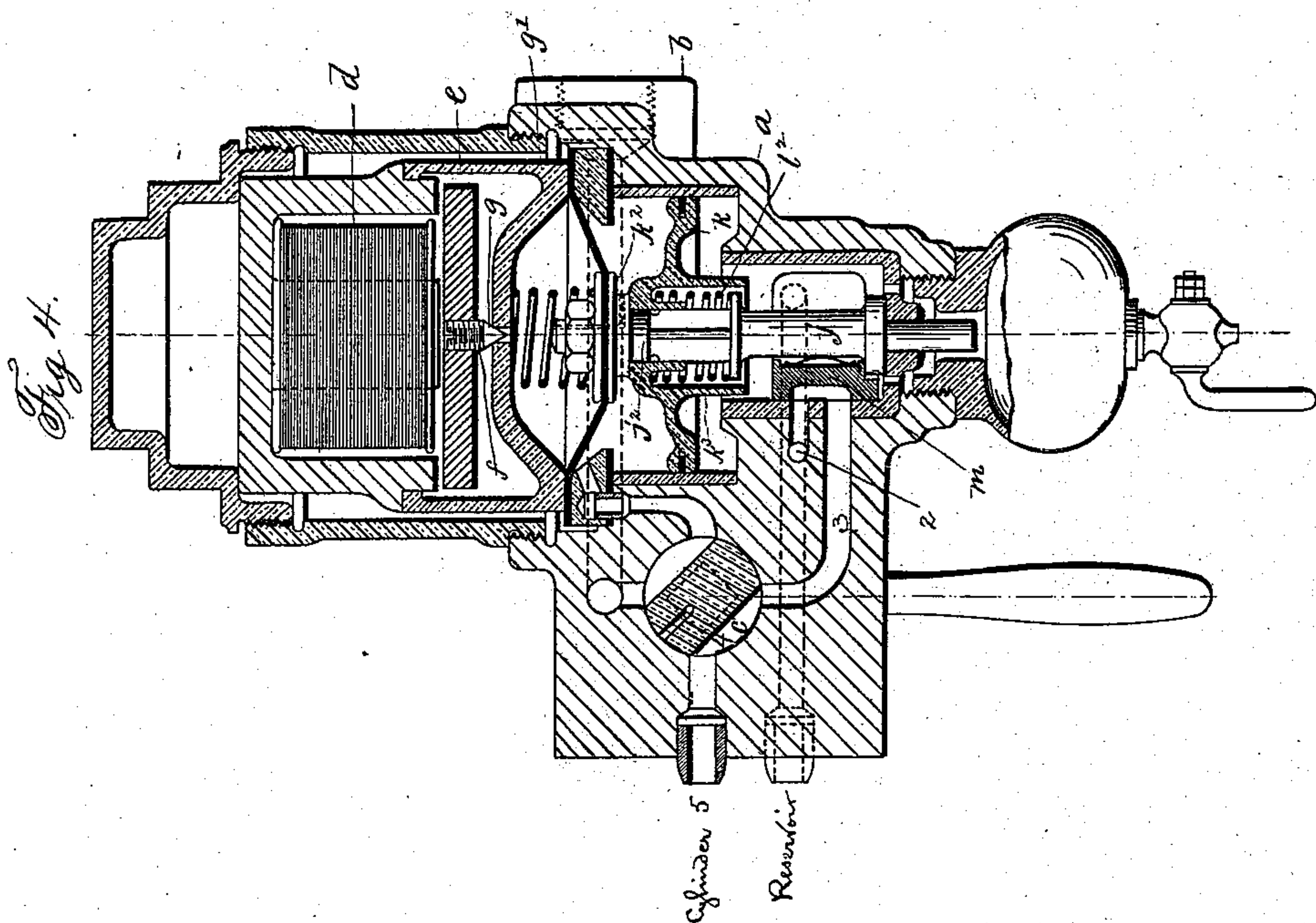
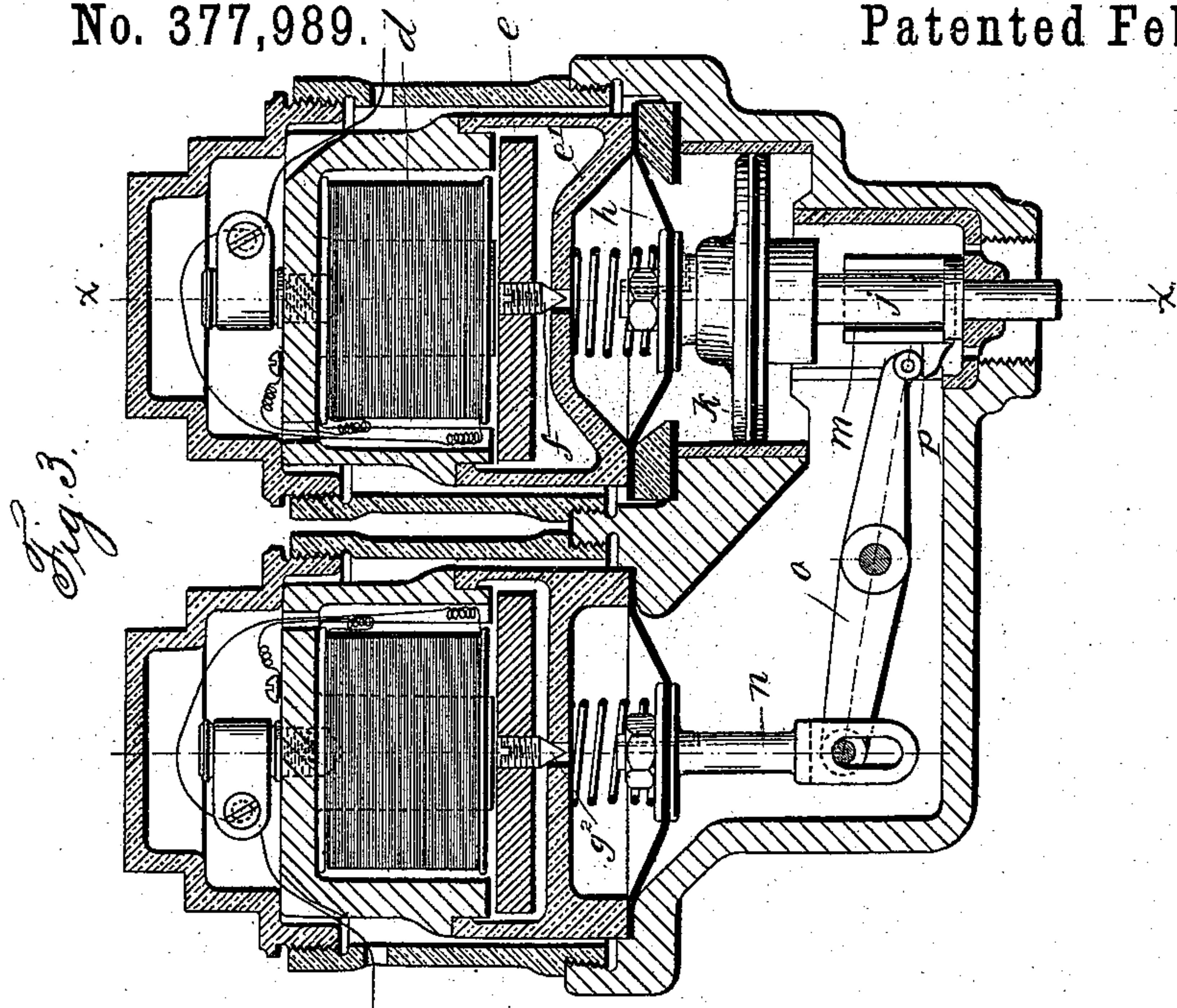
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UNITED STATES PATENT OFFICE.

J. FAIRFIELD CARPENTER, OF BERLIN, GERMANY.

VALVE FOR AIR-BRAKES.

SPECIFICATION forming part of Letters Patent No. 377,989, dated February 14, 1888.

Application filed April 8, 1887. Serial No. 234,194. (No model.)

To all whom it may concern:

Be it known that I, J. FAIRFIELD CARPENTER, a citizen of the United States, residing at Berlin, Prussia, in the Empire of Germany, have invented certain new and useful Improvements in Valves for Air-Brakes, of which the following is a full, clear, and exact description.

This invention relates to valves for electro-pneumatic systems of car-brake mechanism; and the invention consists in an electro-pneumatic valve constructed and operating substantially in the manner hereinafter particularly set forth.

In the accompanying drawings, in the several figures of which like parts are similarly designated, Figure 1 is a sectional elevation of one form of valve. Fig. 2 is a top view of the same. Fig. 3 is a vertical sectional elevation of a modification; and Fig. 4 is a section in the plane of line $x x$, Fig. 3.

The valve is designed for use more especially in connection with that system of air-brakes employing an auxiliary reservoir and a brake-cylinder under each car of a train, connected with the main air-pipe.

The shell a has a nipple, b , for connection with the main air-pipe, and also has a three-way cock, c , interposed between the valve proper and the auxiliary reservoir. This three-way cock may be of any approved construction. A horseshoe-magnet, d , is arranged in a proper electric circuit, and this magnet has for its armature a plate, e , carrying a valve, f , which operates in connection with a port, g , in a plate, g' , which latter is shaped to form a chamber beneath it, the bottom of the chamber being formed by a flexible diaphragm, h . This diaphragm is normally depressed by a spring, i . To the diaphragm is secured a stem, j , which is winged at j' , and has a head, j^2 , which acts as a valve to a floating piston-valve, k , the said valve being normally seated in said piston, so as to close its port by means of a spring, l' , interposed between the piston k and a shoulder on the stem j . The piston is provided with an internal annular wall, l^2 . A passage or port, k^2 , is provided in the upper end of the stem, and opens at one end in a chamber between the diaphragm and plate g' and at the other end in the chamber in which the piston k floats. The stem is further provided with a slide-valve,

m , in frictional contact therewith—as by means of a spring—said slide-valve being arranged to cover the exhaust-port 2 and passage 3 4 5 to the brake-cylinder.

The operation of this valve is as follows: When the magnet d is energized, the valve f will be opened and the air in the chamber between the plate g' and diaphragm h will escape into the magnet-chamber, and thence into the atmosphere through any suitable opening in said magnet-chamber. The valve normally being under pressure from the main pipe, the pressure below the said diaphragm will lift the piston-valve or floating piston k , and with it the slide-valve m , thereby opening the passage from the brake-cylinder (not shown) to the reservoir. When the circuit is broken and the valve f is again seated, air-pressure immediately fills the space above the diaphragm through the port k^2 , forcing said diaphragm down, and with it the slide-valve; but inasmuch as the slide-valve has a certain amount of play on the stem j , it will, by this movement, be forced only about half-way down and stand in a position to close the port to the cylinder without opening the exhaust. Whenever extra pressure from the main reservoir at the engine is let in through the pipe on top of the piston k , said piston is forced down, and its boss k^3 , then coming in contact with the slide-valve, completes the stroke of said slide-valve, so as to open the exhaust-port and permit the air to escape from the brake-cylinder into the atmosphere through such exhaust-port, thus releasing the brake.

Letting the air out of the main pipe will cause the piston k to rise, owing to the pressure from the reservoir, thus applying the brake the same as if operated by the electrical devices above set forth. It will thus appear that this valve may be used as an automatic air-brake and as an electro-pneumatic brake quite independently of each other.

It will be observed that by this valve the brakes are only applied electrically, their release being effected by means of air-pressure, and in order to avail of this form of valve for electrically releasing the brakes I may combine therewith, as indicated in Figs. 3 and 4, a releasing-valve, g^2 , which is of substantially the same construction as the valve f , (shown in Fig. 1,) and has connected to its diaphragm

a stem or rod, *n*, which is connected by a slip-joint with a lever, *o*, pivoted in the case, which lever has a tappet engaging a toe, *p*, on the slide-valve *m*, so that when the stem *n* is operated electrically by its magnet the lever *o* will be actuated to shift the slide-valve when the brakes are to be released.

What I claim is—

1. A valve for electro-pneumatic brakes, comprising a shell having an inlet-port from the main pipe, ports for connecting with the brake-cylinder and auxiliary reservoir, and an exhaust-port, a cock for controlling such ports with relation to the valve proper, a septum dividing the shell into two air-chambers, an electrically-operated release-valve in one of said chambers, a floating piston-valve in the other chamber controlling the inlet, the reservoir, and the cylinder-ports, and a slide-valve ar-

ranged in connection with the cylinder and exhaust ports and operated from the floating piston-valve, substantially as described, the valve as a whole being rendered operative by the electric device, by air, or by the two combined, as set forth.

2. An electro-pneumatic valve comprising a magnet, a valvular armature, a floating piston-valve, and a slide-valve, combined with an electro-pneumatic valve and an interposed lever operated thereby and connected with the slide-valve, substantially as described.

In testimony whereof I have hereunto set my hand this 5th day of April, A. D. 1887.

J. FAIRFIELD CARPENTER.

Witnesses:

R. FENMISCH,
C. D. HAND.