

No. 661,702.

Patented Nov. 13, 1900.

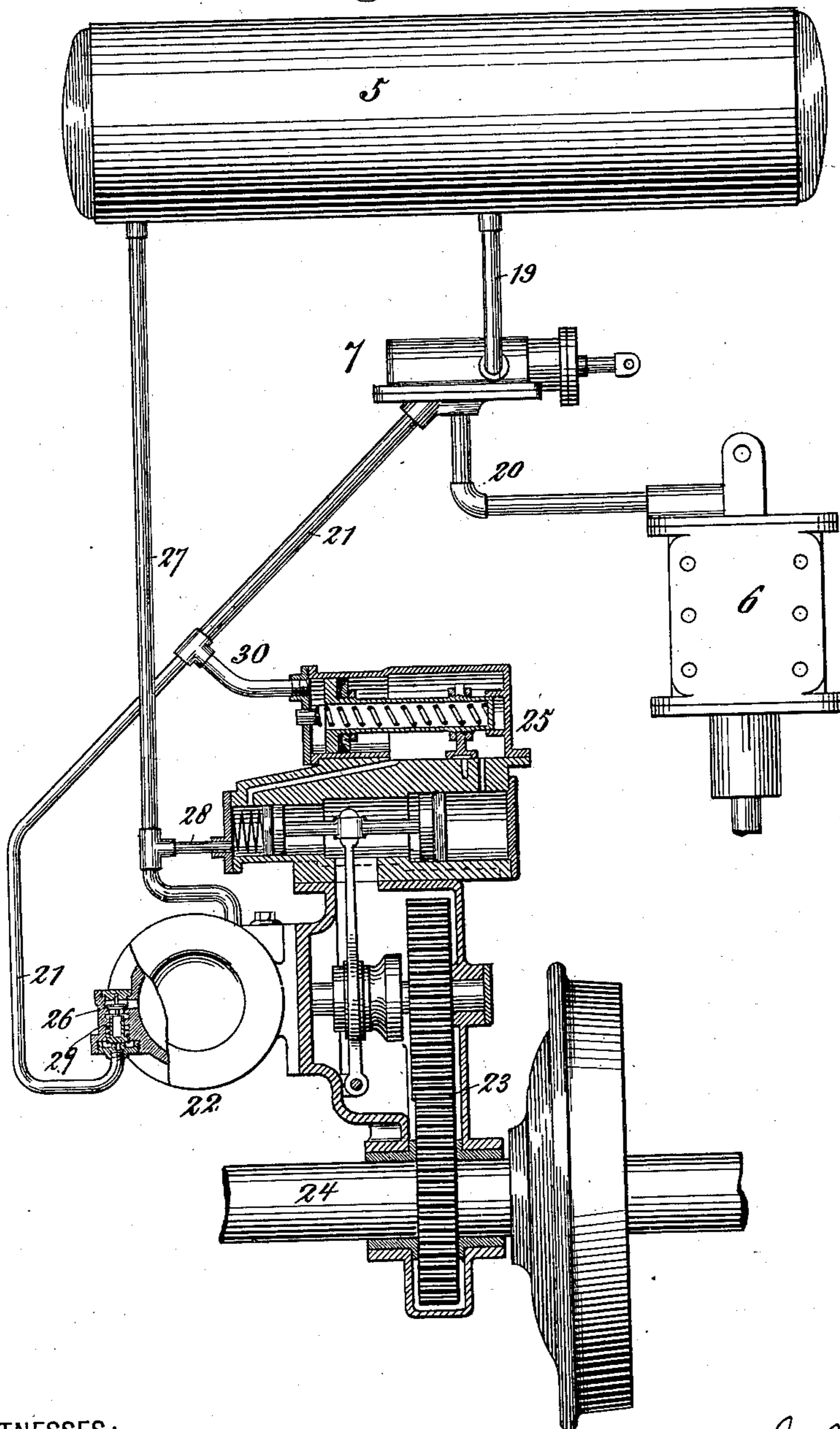
J. J. NEF.
AIR BRAKE.

(Application filed June 22, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1,



WITNESSES:

D. N. Maybrook
Edw B. Hawkins

INVENTOR

INVENTOR
John J. Keef
BY
James C. Chapin
ATTORNEY

No. 661,702.

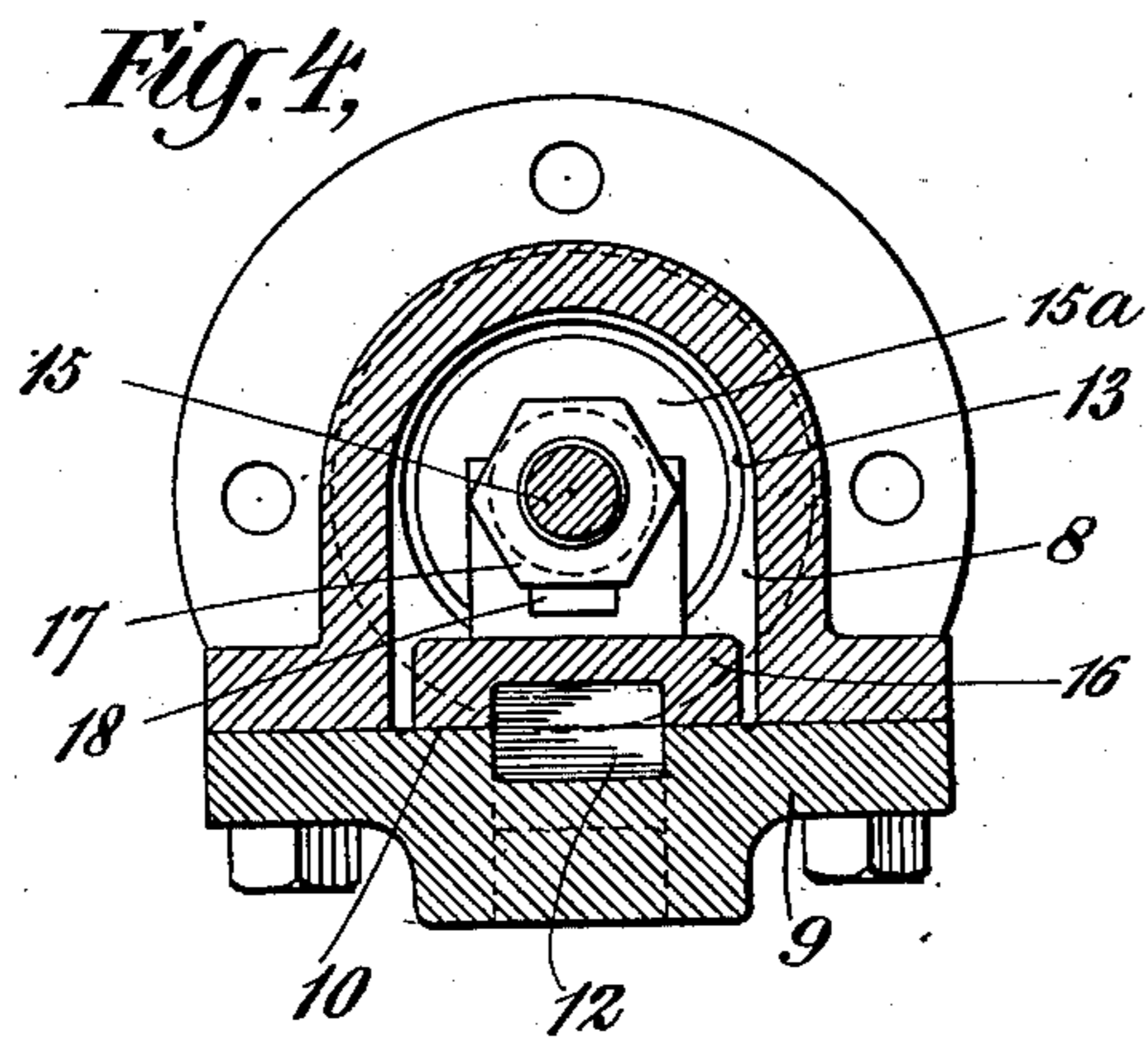
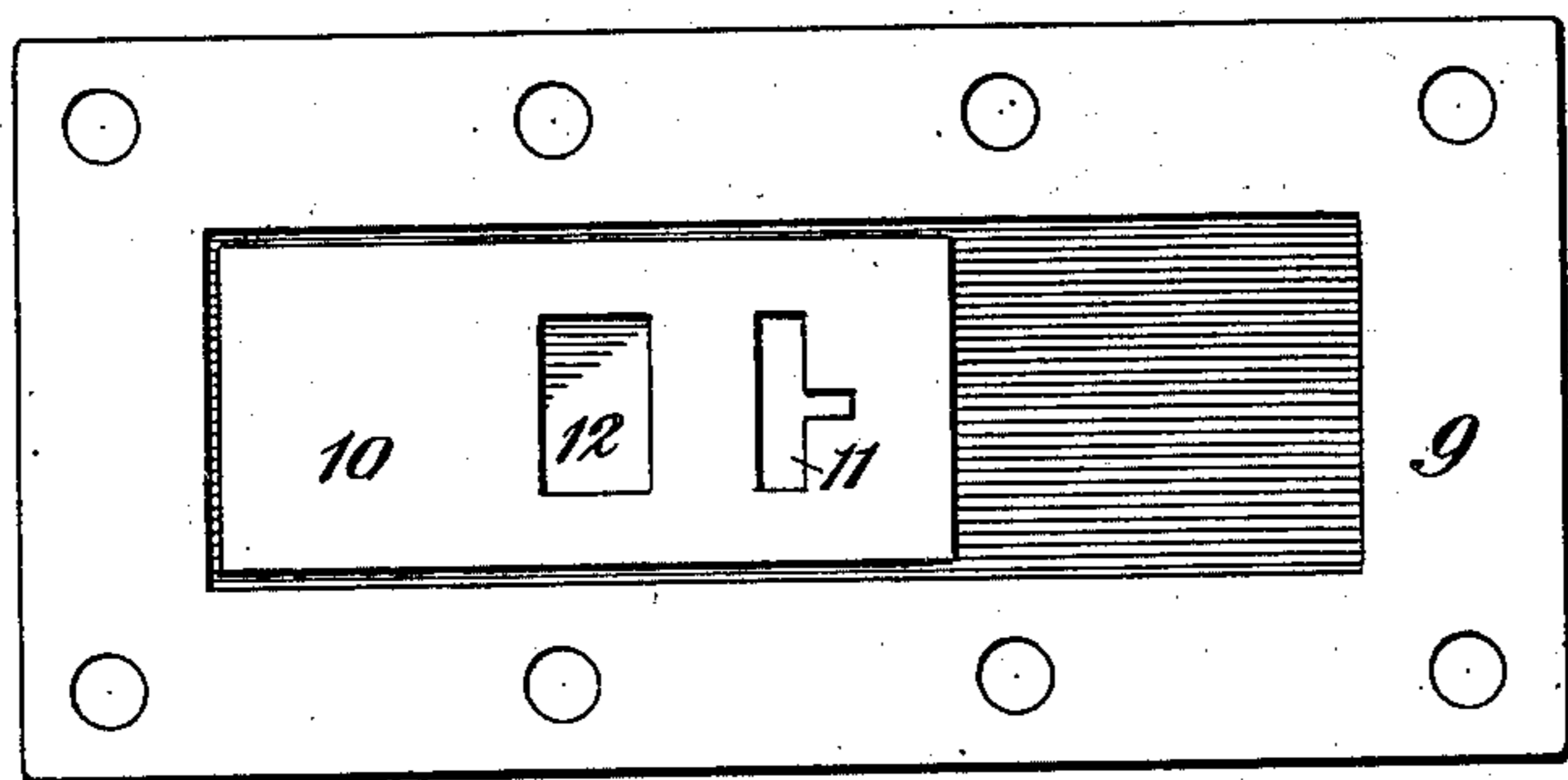
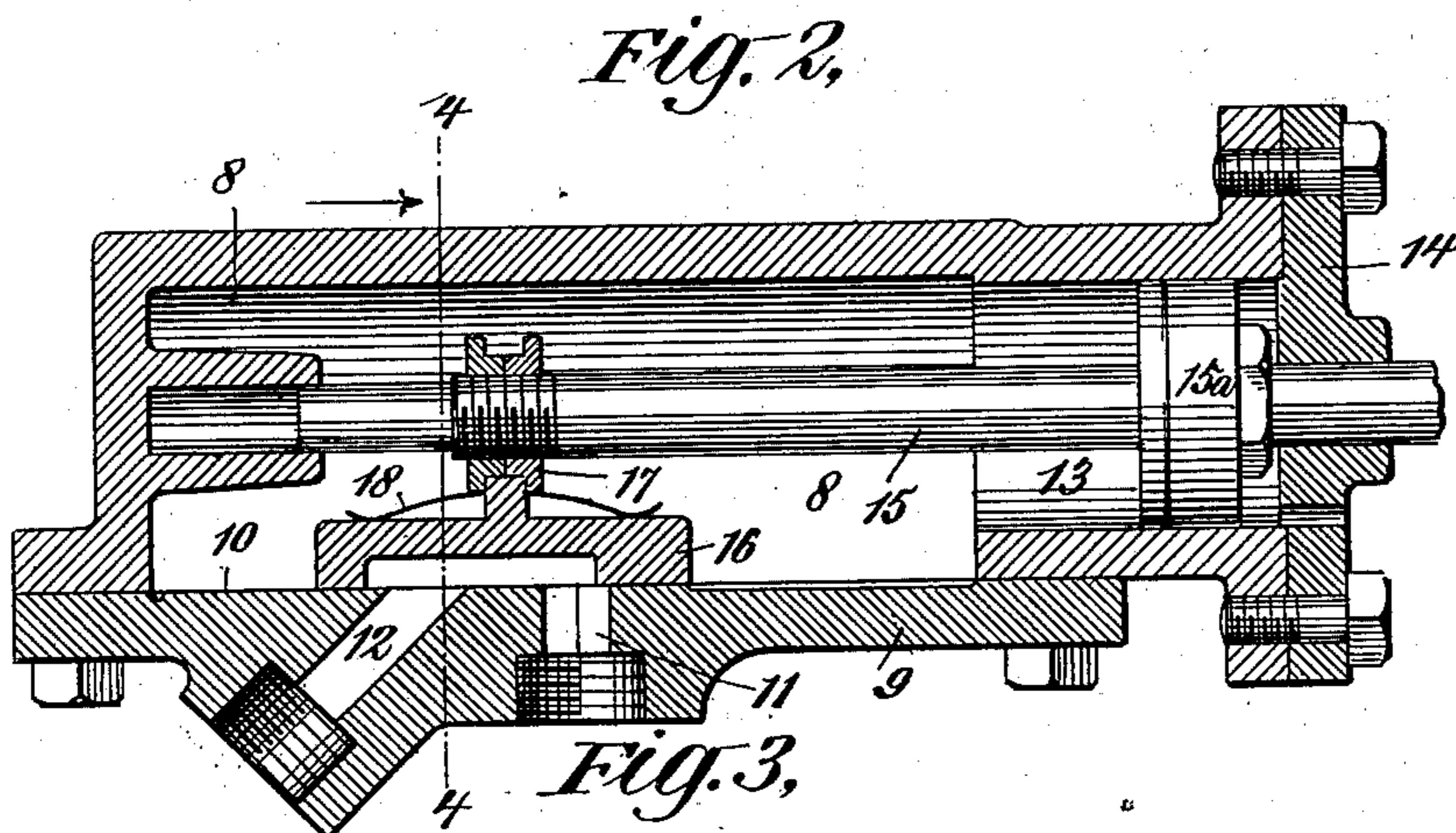
Patented Nov. 13, 1900.

J. J. NEF.
AIR BRAKE.

(Application filed June 22, 1898.)

(No Model.)

2 Sheets—Sheet 2.



WITNESSES:

O. H. Raymond
Edw B. Hawkins

INVENTOR.

John J. Nef
BY
James C. Chapin
ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN JACOB NEF, OF NEW YORK, N. Y.

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 661,702, dated November 13, 1900.

Application filed June 22, 1898. Serial No. 684,159. (No model.)

To all whom it may concern:

Be it known that I, JOHN JACOB NEF, a citizen of the United States of America, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Air-Brakes, of which the following is a specification.

My invention relates to improvements in air-brakes in which the pressure of air is supplied by a pump actuated from the axle of a car; and my invention consists in a novel and improved form of service-valve for admitting air from the air-supply to the jam-cylinder and exhausting therefrom and in a means controlled from the service-valve for automatically relieving the pump from its work of compressing air while the pump is being connected with its pump-operating mechanism.

The objects of my invention are to simplify the construction of the service-valve and to do away with the use of a spring therein for returning the parts to their initial position; also, to insure the perfect connection of the pump with its operating mechanism before the work of compressing is begun, thereby saving a large amount of wear of the connecting parts which otherwise occurs where the pump commences to operate against a high pressure in the reservoir before the connecting parts are firmly set against each other; and my invention further consists in certain novel details of construction and combination of parts, as shall be hereinafter more fully described. I will now proceed to describe my invention with reference to the accompanying drawings and will then point out the novel features in the claims.

In the drawings, Figure 1 is a general view showing the pump with its actuating mechanism, a pump-governor, a reservoir in which the compressed fluid is stored, a service-valve, and a jam-cylinder, certain portions of the pump and pump-operating mechanism and the pump-governor being shown in section. Fig. 2 is a central longitudinal section through the service-valve. Fig. 3 is a face view of the lower plate, showing the ports. Fig. 4 is a vertical cross-section on the plane of the line 4 4, Fig. 2.

Similar reference characters designate cor-

responding parts throughout the several figures.

5 designates the reservoir for containing the supply of compressed air.

6 designates the brake or jam cylinder, and 7 the service-valve as a whole. In detail, as shown more clearly in Figs. 2, 3, and 4, the service-valve comprises an air-chamber 8, closed at the bottom by a plate 9, which plate has a valve-slideway 10, a port 11, leading to the jam-cylinder, and a port 12. One end of the air-chamber 8 is finished off with a cylindrical bore 13 and closed by a head 14.

15 designates a valve-stem guided in the head 14 and in a projection in the air-chamber 8, secured to the valve-stem, and fitted to the cylindrical bore 13 is a piston-head 15^a.

16 designates a slide-valve adapted to reciprocate upon the slideway 10 and operated through a connection between a lug on its upper side, with adjustable collars 17 on the valve-stem. A spring 18 tends to keep the valve seated at all times.

19 is a pipe which connects the reservoir 5 with the air-chamber 8, in which then there is pressure at all times. The pressure in this chamber acting on the piston-head 15^a tends to keep the parts in position, as shown in the drawings, in which position the valve closes both the ports 11 and 12. When now it is desired to set the brakes, the valve-stem and valve are forced over to the left by hand or otherwise against the pressure of air in the air-chamber until the port 11 is uncovered. The air will then rush through this port and through the pipe 20 into the jam-cylinder. When it is desired to throw the brakes off, the valve-stem is released and the pressure of the air in the chamber 8 will bring the parts back to the position shown in the drawings. This will connect the ports 11 and 12 through the recessed portion of the valve, and the exhaust-air from the jam-cylinder will rush through the said ports and along the pipe 21.

Referring back now to Fig. 1, 22 designates the pump, and 23 the pump-operating mechanism, comprising the axle 24 of a car, a train of gearing, and one member of a clutch. The other member of the clutch is mounted to rotate with the pump and is under the con-

2
 5 trol of a governor 25. The operation of the governor moves in and out of engagement the member of the clutch carried by the pump-shaft, and hence connects and disconnects the pump with its operating mechanism.

10 The governor herein shown forms the subject-matter of a separate application filed simultaneously herewith, the serial number being 684,160, and the date of filing June 22, 1898. It is not therefore described in detail herein, but briefly comprises a compound cylinder, as shown, having heads of different diameters corresponding to the bores of the cylinder. The small bore is in open communication with the reservoir through the pipes 15 27 28. The large bore has a port opening into a valve-chamber secured thereto or integral therewith, and another port leads from the said valve-chamber to the small bore. With 20 the parts in their present position air under pressure is in both ends of the compound cylinder and in the valve-chamber. The valve in said chamber is controlled in its movement by a piston and hollow piston-system. The said piston is forced in one direction normally by a spring, as shown, which 25 is set at any desired tension. When the pressure of air in the reservoir, and hence in the said valve-chamber, shall have overcome the tension of the spring, the valve will be forced over in the other direction and the port leading from the large bore of the compound cylinder will be closed to air in the interior of the valve-chamber and opened to an exhaust-port through the said valve in a manner well known. 30 35

26 designates one of the suction-valves of the pump, and 27 the discharge from the pump to the reservoir. A branch 28 from the discharge-pipe 27 connects with the governor, as shown. 40

29 designates a piston or plunger below the suction-valve 26, and connected with the cylindrical portion carrying the piston is the pipe 45 21, leading to the exhaust-port 12 of the service-valve.

A certain amount of air having been removed from the reservoir for the purpose of setting the brakes to stop or slacken the speed 50 of the car and it being desirous to start up or accelerate the speed, the brakes are thrown off. As before stated, the air from the jam-cylinder will rush down the pipe 21 and will lift the suction-valves. At the same time the 55 automatic governor will, owing to the lowering of pressure in the reservoir, be thrown over and the pump connected to its operating mechanism while the pump is being connected. However, the pump will meet with 60 no resistance, owing to the lifting of the suction-valves. This will enable a perfect connection to be made before the pump has any work to do, saving wear and tear of the connecting parts and possible slipping due to 65 imperfect connection. The plunger 29 is arranged to fit loosely in its cylinder. Hence the air will gradually leak past it, and the plunger

will resume its seat after an interval, and the suction-valve will be permitted to perform its function. The pump will then operate to 70 compress air in the reservoir until a predetermined pressure has been restored, when the automatic governor will disconnect the parts.

30 is a branch pipe from the pipe 21 to insure the prompt action of the governor after an application of the brakes. The construction and arrangement of the service-valve not only obviate the use of a spring, but also avoid the necessity of a stuffing-box, which 80 is always a fruitful source of annoyance.

What I claim is—

1. In an air-brake system the combination with an air-reservoir, a pump and pump-operating mechanism, a pump-governor, a brake-cylinder, and a service-valve through which the brake cylinder is controlled, of means for throwing the pump into operation through the control of the governor, and means for relieving the pump from work for a limited 90 period by the exhaust from the brake-cylinder when the brakes are released, substantially as specified.

2. In an air-brake system the combination with an air-reservoir, a pump and pump-operating mechanism, a pump-governor, a brake-cylinder, and a service-valve through which the brake-cylinder is controlled, of means for throwing the pump into operation by the exhaust from the brake-cylinder when the 100 brakes are released and means operated by the said exhaust, at the same time for temporarily relieving the pump of its work, substantially as specified.

3. In an air-brake system the combination 105 with an air-reservoir, a pump and pump-operating mechanism, a pump-governor, a brake-cylinder, and a service-valve through which the brake-cylinder is controlled, of means for throwing the pump into operation by the exhaust from the brake-cylinder when the 110 brakes are released and a connection between the said exhaust and the suction-valves of the pump whereby the exhausting of air from the brake-cylinder will hold the suction-valves 115 open for a limited period, substantially as specified.

4. In an air-brake system the combination with a pump and pump-operating mechanism, of suction-valves in the pump having 120 plungers adapted in their movement to hold the suction-valves open, a pump-governor, an air-reservoir, a brake-cylinder, a service-valve through which the brake-cylinder is controlled, and a communication between the exhaust-port of the service-valve and the 125 plungers of the suction-valves whereby the exhaust of the brake-cylinder through the service-valve will raise the plungers and the suction-valves as and for the purpose set forth. 130

5. In an air-brake system the combination with a pump and pump-operating mechanism, of suction-valves in the pump having

plungers adapted in their movement to hold the suction-valves open, a pump-governor, an air-reservoir, a brake-cylinder, a service-valve through which the brake-cylinder is controlled, and a communication between the exhaust-port of the service-valve and the plungers of the suction-valves whereby the exhaust of the brake-cylinder through the service-valve will raise the plungers and the suction-valves, said plungers being provided with such apertures as shall gradually allow the air to escape and the suction-valves to resume their seat substantially as set forth.

6. In an air-brake system the combination with an air-reservoir, a pump, and a pump-operating mechanism, a pump-governor and a brake-cylinder, of a service-valve having a pressure-operated device constantly exposed to fluid-pressure unbalanced in one and always the same direction, and constantly tending to maintain said valve in, or move it toward, a certain position, substantially as specified.

7. In an air-brake system the combination with an air-reservoir, a pump and pump-operated mechanism, a pump-governor and a brake-cylinder, of a service-valve through which the brake-cylinder is controlled, said service-valve having a pressure-operated device, constantly exposed to fluid-pressure un-

balanced in one and always the same direction, said pressure constantly tending to maintain said valve in, or move it toward, the position in which it will close communication between an air-reservoir and the brake-cylinder, said valve adapted to be moved against said pressure to open said communication, substantially as specified.

8. A service-valve for an air-brake system consisting of a casing inclosing an air-chamber in open communication with a compressed-air supply, a valve in said air-chamber controlling the supply of air to and from a brake-cylinder, pressure-operated means secured to move with said valve, the said pressure-operated means being in open communication at all times on one and always the same side with the said air-chamber and at all times unbalanced as to fluid-pressure on the other, the said pressure-operated means constantly tending to maintain said valve in, or move it toward, a certain position, and mechanical means for moving the said valve away from such position, substantially as specified.

Signed by me at New York, N. Y., this 7th day of May, 1898.

JOHN JACOB NEF.

Witnesses:

D. H. BATES, Jr.,
J. C. CHAPIN.