No. 609,041. Patented Aug. 16, 1898.

J. J. NEF.

AIR BRAKE.

(Application filed July 31, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

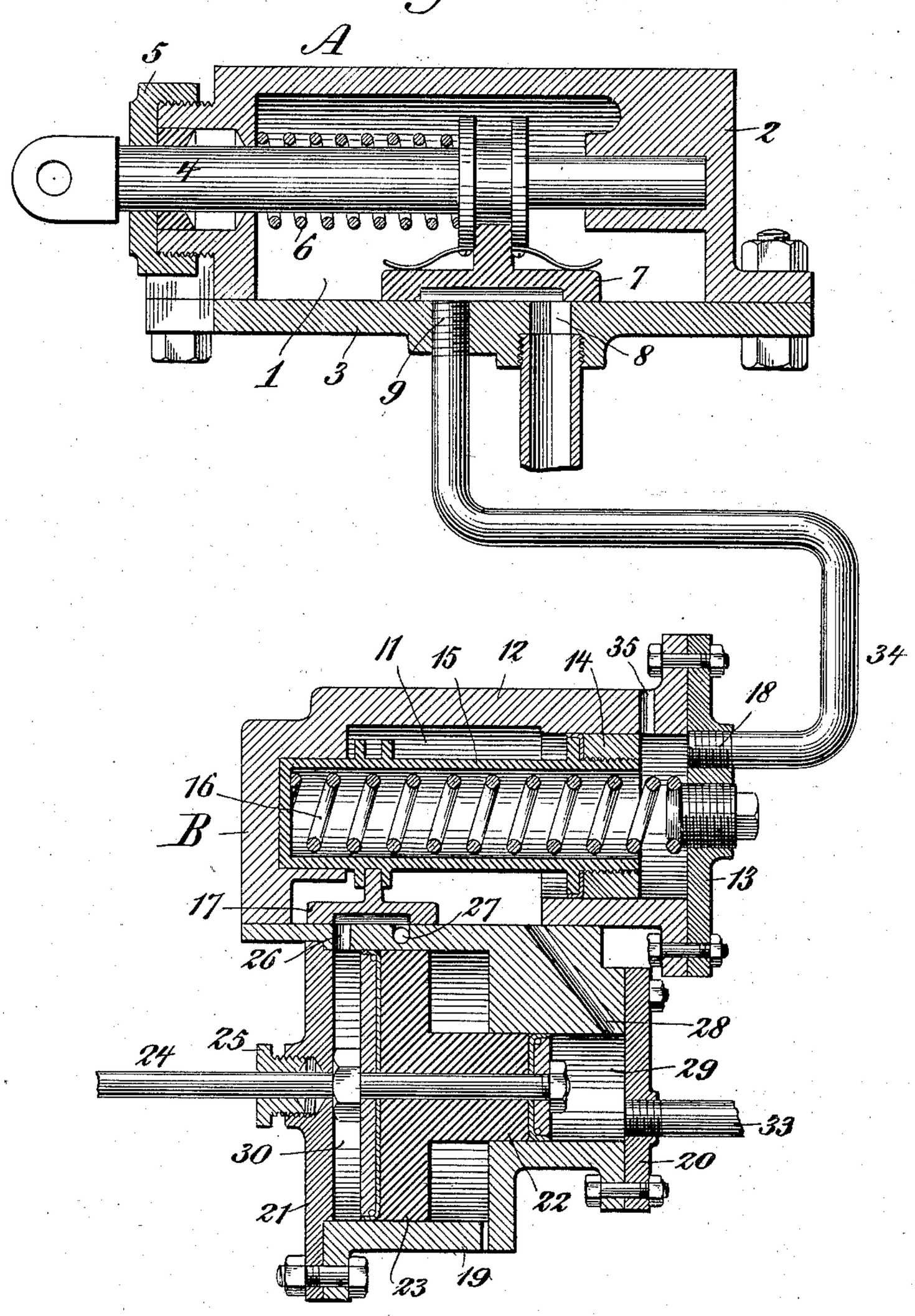

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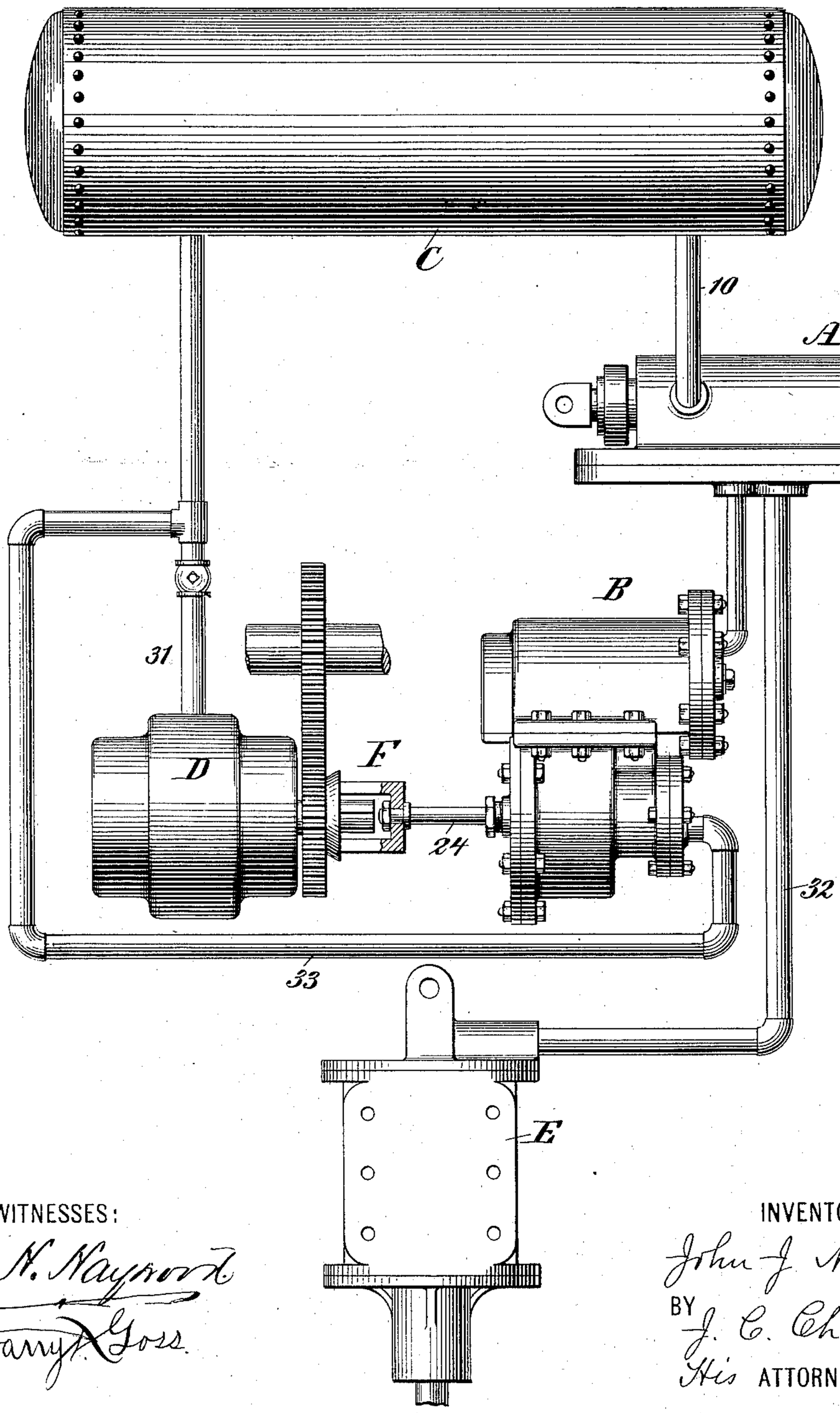
Fig. 2.



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

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 609,041, dated August 16, 1898.

Application filed July 31, 1897. Serial No. 646,578. (No model.)

To all whom it may concern:

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

This invention relates to air-brakes of that class where the pressure of air is supplied by a pump actuated from the axle by the car, and has for its object the provision of an air-brake apparatus of reliable and effective construction and one in which the pump supplying the air or fluid under pressure is set in operation by the same movement by which the brake is released and is automatically thrown out of operation when the air in the reservoir is again raised to its normal pressure. Thus the operation of the pump is begun in a gradual manner after the car has been stopped and is again started or after its speed has been slackened and is automatically stopped when the pressure in the reservoir is restored.

It also consists in the novel construction, combination, and arrangement of parts hereinafter described.

In the drawings accompanying and forming part of the specification, Figure 1 is a central sectional view of a service-valve and governor. Fig. 2 is a general view of the service-valve and governor, showing also the air-reservoir, brake-cylinder, and pump, with its operating mechanism.

Similar characters of reference designate like parts in all figures.

This mechanism comprises in a general way the service-valve A, the governor B, the reservoir C, the pump and pump-operating mechanism D, and the brake-cylinder E.

In the preferred form of my invention herein shown and described the service-valve A comprises a valve-chamber 1, formed of valve-casing 2 and base-plate 3, a valve-rod 4, stuffing-box 5, spring 6, valve 7, port 8, leading to the brake-cylinder E, port 9, leading to the governor B, and a connection 10 with the reservoir C. Governor B comprises a valve-chamber formed of the valve-casing 12, with head 13, having within it a piston 14, hollow piston-rod 15, spring 16, and valve 17, and comprises also the compound cylinder 19, having heads 20 and 21, pistons 22 and 23, piston-rod 24, stuffing-box 25, and provided with port 26, admitting air from chamber 11 to larger cylinder 30, an exhaust-port 27, and passage-way 28 from small cylinder 29 to valve-chamber 11.

Pump D is of any approved form and supplies air to the reservoir through connection 31 and is thrown into and out of operation by engagement of a suitable clutch, as F. The brake-cylinder E is of any approved form, is provided with the usual piston and connections, and has a pipe connection 32 with port 8 of service-valve.

As shown in the drawings, the brakes have just been released by the movement of valve 7 to the position shown in Fig. 1, allowing the air to exhaust from the brake-cylinder through pipe 32 underneath valve 7, through exhaust-port 9 and pipe 34, connecting with valve-chamber 11 on the right side of piston 14, thereby equalizing the fluid-pressure on both sides of the piston and allowing the spring 16 to move it to the left, as shown, and finally exhausting to the atmosphere through opening 35.

Prior to the exhaust of the air through opening 35 the movement of piston 14 to the left will carry with it the valve 17 to the position shown, allowing the air in cylinder 30 to exhaust through port 26, thus enabling the pressure upon smaller piston 22 in cylinder 29, which is in open communication at all times with the reservoir through connection 33, to move said piston and its rod 24 to the left, thereby throwing the pump into operation through clutch F.

It will be noted that the action just described will not take place until valve 17 is carried to the left sufficiently far as to uncover port 26 to the exhaust 27 or to what is practically its extreme left position.

When the air has exhausted through the opening 35, the reservoir-pressure will return piston 14 and with it valve 17 to the position each occupied just prior to the release of the brakes. This position may be any point intermediate of their extreme right and left positions, but is usually that assumed through the decrease in pressure below that of maximum due to the application of the brakes. The pump will remain in operation until maximum pressure has been restored, when

such pressure will overcome the tension of spring 16 to move piston 14 and valve 17 to practically their extreme right position and open communication between valve-chamber 11 and cylinder 30 and admit air to cylinder 30. The pressure in cylinder 30 acting upon the piston 23 being of the same intensity as that in cylinder 29 acting upon piston 22, and piston 23 being of much larger area than piston 22, the pressure upon piston 23 will move the piston and rod 24 to the right and disengage the clutch F.

To apply the brakes, the rod 4 in the service-valve A is moved to the left, thereby opening the port 8 and allowing the air in the reservoir to communicate with the brake-cylinder E.

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 and brake-cylinder of a service-valve through which the brake-cylinder is controlled, and means for throwing the pump into operation by the exhaust from the brake-cylinder when the brakes are released, substantially as described.

2. In an air-brake system the combination with an air-reservoir, a pump and pump-operating mechanism, a pump-governor and brake-cylinder of a service-valve through which the brake-cylinder is controlled, and means for throwing the pump into operation by the exhaust from the brake-cylinder when the brakes are released, and means for automatically throwing the pump out of operation by the pressure of air in the reservoir, substantially as described.

3. In an air-brake system the combination with an air-reservoir, a pump and pump-operating mechanism, a pump-governor and brake-cylinder of a service-valve, and means whereby upon the movement of the service-valve in one direction air may be admitted to the brake-cylinder and means whereby upon the movement of the service-valve in the opposite direction the air may be exhausted from said brake-cylinder to the governor and cause the same to throw the pump into operation, substantially as described.

4. In an air-brake system the combination with an air-reservoir, a pump and pump-operating mechanism, a pump-governor and brake-cylinder of a service-valve communicating with said air-reservoir, a port leading from said service-valve to the brake-cylinder, an exhaust-port leading from said service-valve to the pump-governor through which air may be exhausted from said brake-cylinder to said pump-governor and cause the same to throw the pump into operation, substantially as described.

5. In an air-brake system the combination with an air-reservoir, a brake-cylinder, a pump and pump-operating mechanism, an automatic governor having a valve, said valve being impelled in one direction by air under pressure and in the opposite direction by a spring, of a service-valve communicating with said air-reservoir having a port leading to the brake-cylinder, an exhaust-port leading to the valve-chamber of the governor, and a valve arranged within the service-valve chamber adapted upon its movement in one direction to admit air to the brake-cylinder, and in its opposite direction to exhaust such air from the brake-cylinder to the valve-chamber of the pump-governor whereby the air-pressure opposing the spring in said valve-chamber is counterbalanced and the action of the spring is permitted to operate the valve in said valve-chamber, substantially as described.

6. In an air-brake system the combination with an air-reservoir, a brake-cylinder, a pump and pump-operating mechanism, an automatic governor having a valve, said valve being impelled in one direction by air under pressure and in the opposite direction by a spring, of a service-valve communicating with said air-reservoir and having a port leading to the brake-cylinder, an exhaust-port leading to the valve-chamber of the governor, and a valve arranged within the service-valve chamber adapted upon its movement in one direction to admit air to the brake-cylinder and in its opposite direction to exhaust such air from the brake-cylinder to the valve-chamber of the pump-governor whereby the air-pressure opposing the spring in said valve-chamber is counterbalanced and the action of the spring is permitted to operate the valve in said valve-chamber and at the same time open an exhaust-port and permit the air from the brake-cylinder to exhaust to the atmosphere, substantially as described.

7. In an air-brake system the combination with an air-reservoir, a pump and pump-operating mechanism, a brake-cylinder and service-valve controlling said brake-cylinder of an automatic pump-governor having a piston adapted to throw the pump into and out of operation and connections with said brake-cylinder through which air is exhausted from said brake-cylinder to actuate said piston to throw the pump into operation, and mechanism for automatically actuating said piston to throw the pump out of action when the pressure in the reservoir has reached a predetermined point, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN J. NEF.

Witnesses:
CHARLES G. STEVENSON,
J. C. CHAPIN.