

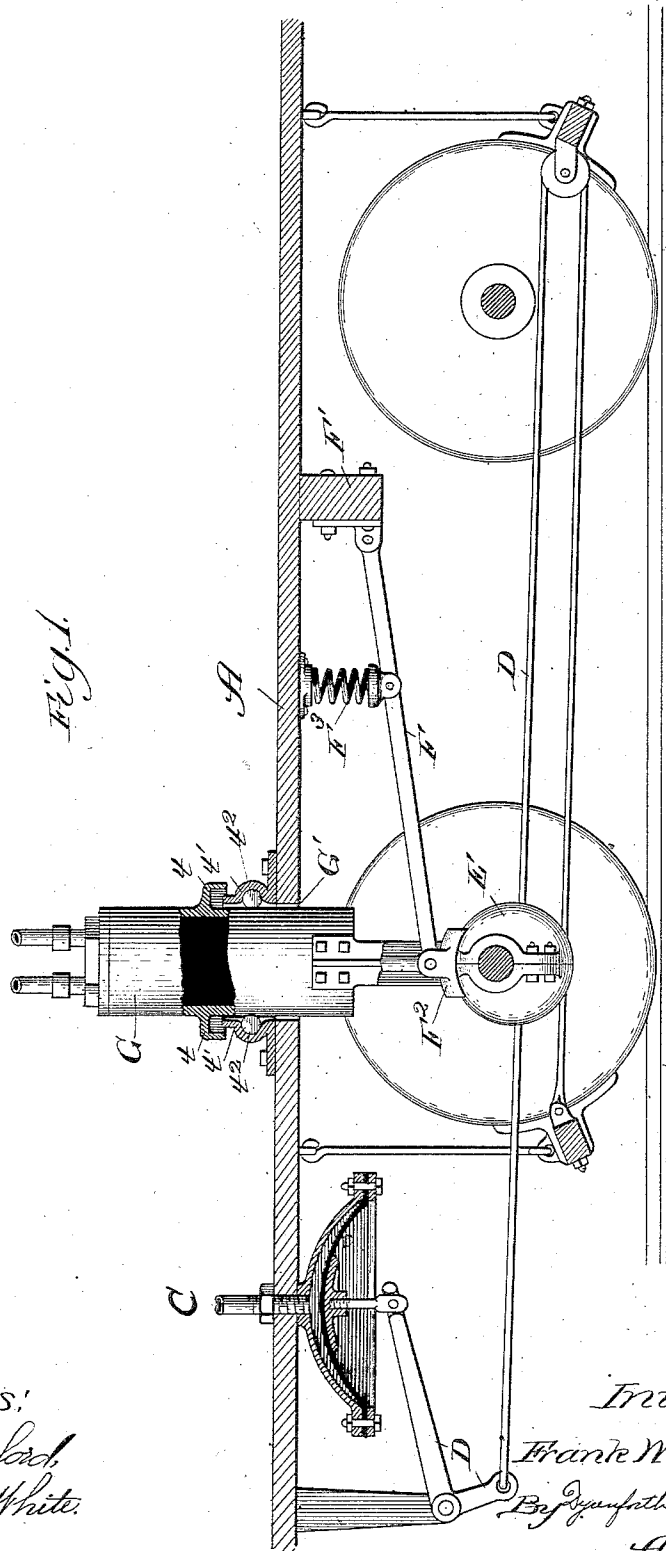
(No Model.)

2 Sheets—Sheet 1.

F. W. MILLS.
AIR BRAKE.

No. 476,546.

Patented June 7, 1892.



Witnesses:
 Jas. C. Baylord,
 Clifford N. White.

Inventor,
Frank N. Mills.
By J. Dymally & J. Dymally
Attys.

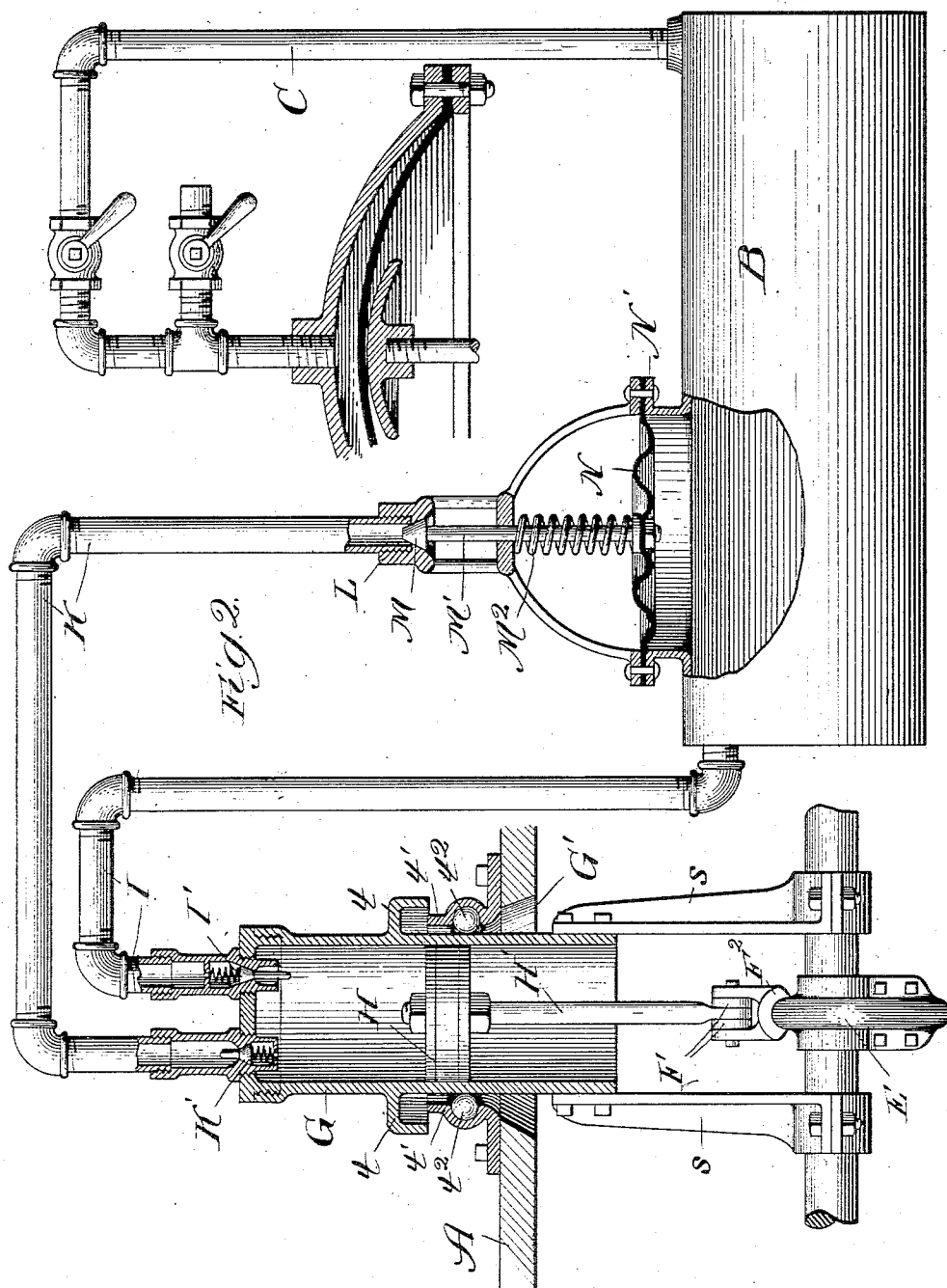
(No Model.)

2 Sheets—Sheet 2.

F. W. MILLS.
AIR BRAKE.

No. 476,546.

Patented June 7, 1892.



Witnesses:

Thos. E. Gaylord.
Clifford N. White.

Inventor:

Frank W. Mills.
By Dyerforth & Dyerforth
Attys—

UNITED STATES PATENT OFFICE.

FRANK W. MILLS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE MILLS IMPROVED
PNEUMATIC BRAKE COMPANY, OF SAME PLACE.

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 476,546, dated June 7, 1892.

Application filed August 8, 1891. Serial No. 402,102. (No model.)

To all whom it may concern:

Be it known that I, FRANK W. MILLS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Air-Brakes, of which the following is a specification.

My invention relates to an improvement in air-brake mechanism for railway-cars, and is particularly directed to a means for supplying the reservoir with air for the purpose of operating the brakes.

The object of my invention is to provide a desirable apparatus by which the supply of air in the reservoir, generally located under the car, may be furnished automatically by the operation of the brakes in stopping; and my object is, furthermore, to improve the construction of the mechanism involved in the details of the device in the particulars and for the purposes hereinafter described.

My invention consists, primarily, in a connection between the brake and an intermediate pump, whereby the operation of the brake upon the wheel shall serve to actuate the pump to supply air to the air-reservoir.

My invention consists, further, in the combination, with the air-brake mechanism, of a supplemental pump operated by an eccentric formed upon the axle of the car and released by the operation of the air-brake mechanism to pump air into the air-reservoir.

My invention consists, further, in the general and specific details of mechanism and combinations of parts hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a view in sectional elevation of a car provided with my improved air-brake mechanism, and Fig. 2 is a sectional elevation showing the details of mechanism.

A represents the floor of the car; B, the air-reservoir; C, the valved air-pipe leading to the brake mechanism, and D the brake-operating lever and cord, all of common construction. Upon the axle of the car, at any convenient location and caused to revolve therewith, is the eccentric E. A lever F, pivoted at one end in the hanger F', carries at its opposite end the shoe F², adapted to press upon the eccentric E. The connection be-

tween the shoe F² and the lever F is pivotal, as shown. A spring F³ controls the operation of the lever F in the manner hereinafter set forth.

Through an aperture G', formed in the floor of the car, extends vertically, to move freely therein, a pump-cylinder G, provided with the external cup-shaped flange t. Surrounding the opening G', I prefer to provide the flanged and annularly-recessed collar t', carrying in the annular recess friction balls or rollers t². The purpose of this construction, as will readily be apparent, is to provide a means for holding the cylinder G in its vertical position while permitting a slight play in the floor of the car independent of the movement of the trucks. The piston H, within the cylinder G, is connected through its rod H' with the arm or lever F, the connection being made through the medium of a pin passing through the lever, shoe, and piston-rod, for the connection of which hangers s are provided to depend from the cylinder G. A pipe I affords communication between the reservoir B and the upper part of the cylinder G, being provided at the latter point with an outgoing valve I'. The ingoing pipe K leads from the top of the cylinder G, where it is provided with an ingoing valve K', to a perforated collar L, and at the latter point it is provided with a valve M, the stem M' of which extends through the base of the collar and connects with a diaphragm of flexible material N, supported in the annular flange N', extending from the wall of the reservoir B. Between the diaphragm and the collar the stem M' is surrounded by a spring M², the normal tendency of which is to keep the valve closed upon its seat.

The operation of the device is as follows: The reservoir B being filled with air, upon an opening of the valve in the pipe C for the purpose of applying the brakes the pressure on the diaphragm N is withdrawn, permitting the valve M to be drawn from its seat by the action of the spring M². At the same time the spring F³, assisting gravity, causes the shoe F² to rest upon the eccentric E, and the revolution of the latter, in connection with the spring F³, causing the raising and lowering of the shoe, also effects the raising and

lowering of the piston H, the latter movement sucking into the cylinder through the pipe K air admitted through the perforated collar L, and the former or upward movement serving to expel the air through the pipe I into the cylinder B. When the proper pressure has been obtained in the reservoir B, the valve M closes, and no more air thus being admissible in the cylinder B a vacuum is formed which holds the piston, and hence the shoe F², in the raised position against the resilience of the spring F³, this position being maintained until pressure is again drawn from the reservoir B, when the operation above described is repeated.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an air-brake mechanism, in combination with the air-reservoir for the brakes, pump mechanism for pumping air into the reservoir, and means, substantially as described, actuated by the operation of the brake-applying mechanism for bringing the pump-piston into engagement with a part moving with the wheel, whereby the application of the brakes shall cause the pump to eject air into the reservoir to renew the supply therein, substantially as described.

2. In an air-brake mechanism, the combination, with the air-reservoir, of a pump actuated by the revolution of the car-axle, pipe I for conveying air from the pump to the reservoir, pipe K for admitting air into the pump and provided at its opposite end with a valve, and a diaphragm connected with the valve-stem and operated by the pressure in the reservoir, whereby the reduction of pressure in

the reservoir shall open the valve to admit air to the pump-cylinder and the access of sufficient pressure to the cylinder shall close the valve admitting air to the pump, substantially as described.

3. In an air-brake mechanism, in combination with the reservoir B, the vertically-arranged pump G, having a vertically-sliding support on the car-floor, and means for operating the same, substantially as described.

4. In an air-brake mechanism, in combination, the reservoir B, the eccentric E, moving with the wheel, the shoe F², normally held in engagement with the eccentric, an air-pump and its piston, and a connection between the piston and shoe, pipes leading from the pump-cylinder to the reservoir B and the open air, respectively, and an automatic valve in the open-air pipe actuated by the pressure in the reservoir to open or close communication of said pipe with the open air, substantially as described.

5. In an air-brake mechanism, in combination with the reservoir B and diaphragm N, located thereon to receive the air-pressure therefrom, and with the pump-cylinder G, the outlet-pipe I, leading from the pump to the reservoir, the inlet-pipe K for the pump, and the spring-controlled valve M at the open end of the pipe K, having its valve-stem connected with the diaphragm N, substantially as and for the purpose described.

FRANK W. MILLS.

In presence of—
J. N. HANSON,
M. J. FROST.