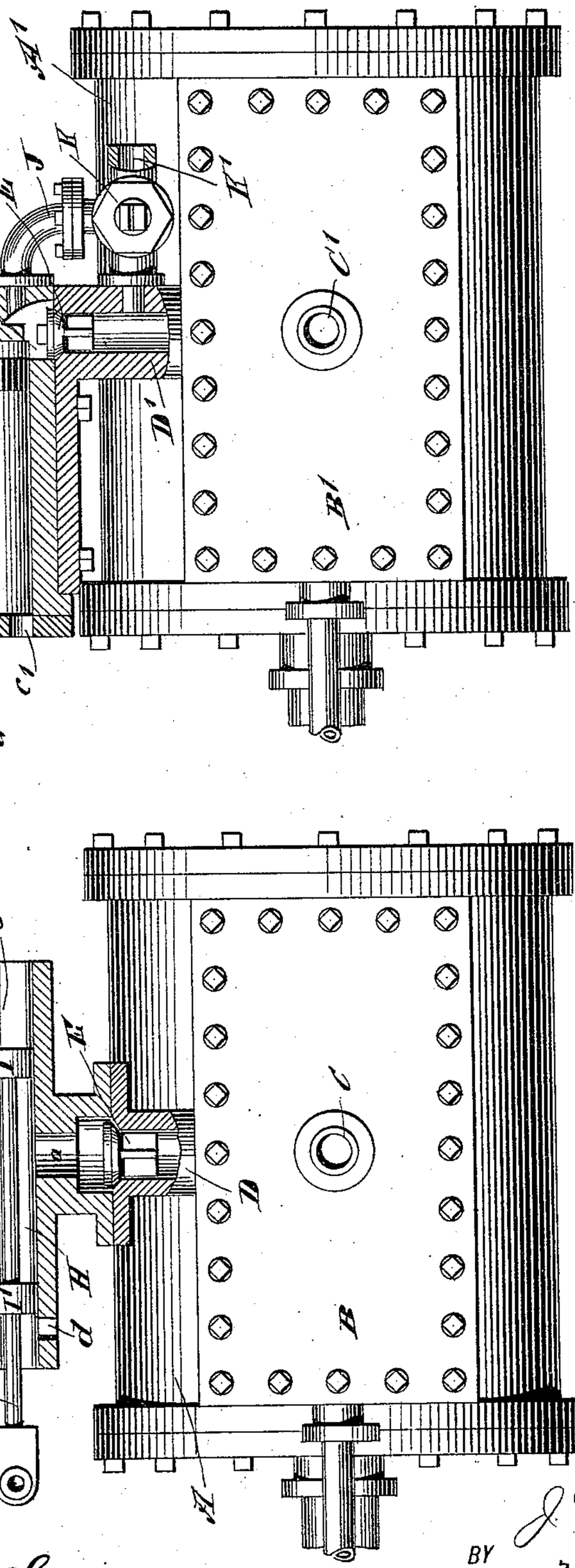
(No Model.)

J. McINTYRE.

FLUID PRESSURE MOTOR AND BRAKE.

No. 575,525. Patented Jan. 19, 1897.

Fig. 1.



WITNESSES:

William P. Goebel.

Geo. G. Hoskins.

INVENTOR

J. McIntyre

BY

Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN McINTYRE, OF JERSEY CITY, NEW JERSEY.

FLUID-PRESSURE MOTOR AND BRAKE.

SPECIFICATION forming part of Letters Patent No. 575,525, dated January 19, 1897.

Application filed October 9, 1896. Serial No. 608,377. (No model.)

To all whom it may concern:

Be it known that I, JOHN MCINTYRE, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Fluid-Pressure Motors and Brakes, of which the following is a full, clear, and exact description.

The invention relates to motors having a fluid under pressure as the motive agent and used for the propulsion of street-cars, vessels, &c., or for other purposes.

The object of the present invention is to provide certain new and useful improvements in fluid-pressure motors and brakes whereby waste of the fluid is reduced to a minimum and the exhaust fluid of the motor is utilized for applying the brakes to stop the motor and the car.

The invention consists principally of a fluid-pressure motor and a fluid-pressure brake connected with the exhaust of the said motor.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both the figures.

Figure 1 is a sectional plan view of the improvement, and Fig. 2 is a similar view of a modified form of the same.

In street-cars as heretofore constructed and using compressed air or other fluid as the motive agent, both for propelling the motor and for actuating the brake mechanism, it was necessary in order to stop the car that the live-fluid supply should be shut off from the motor and that live fluid should be taken from the reservoir and let into the brake-cylinder to apply the brakes. Now it is evident that in order to make the numerous stops along the line a large amount of power was wasted by the motor and a large amount of fluid was used and wasted at the brake mechanism. By my improvement, presently to be described in detail, all loss of power and waste of fluid is avoided, as the exhaust fluid of the motor is utilized for actuating the brake mechanism and for stopping the car, and at the same time for using the brake mechanism as a resistance for the moving piston in the motor-cylinder to stop the motor without shutting off the live-fluid supply from the said motor.

As illustrated in Fig. 1, the cylinder A of a single compressed-air motor is provided with the usual chest B, having an inlet C, connected with the compressed-air-supply tank or reservoir, and from the cylinder leads an exhaust-pipe D, containing a check-valve E and supporting the brake-cylinder F of the fluid-pressure brake mechanism, the said cylinder containing a piston G, having its piston-rod G′ connected with the brake-levers in the usual manner.

Between the brake-cylinder F and the exhaust-pipe D is arranged a valve mechanism under the control of the operator and preferably in the form of a piston-valve having a cylinder H, in which operate the piston-valves I I′, secured on a stem I^2, connected with a lever under the control of the operator. The cylinder H is connected by a port *a* with the exhaust-pipe D above the valve E, and the said cylinder H is also connected by the ports *b c* with the ends of the brake-cylinder F. A port *d* is formed in the cylinder H to connect the interior thereof, near one end of the cylinder, with the atmosphere, as shown in Fig. 1.

When the several parts are in the position shown in Fig. 1, then the exhaust fluid passing through the pipe D passes through the port *a* into the cylinder H and from the latter through the port *c* into the front end of the brake-cylinder F to force the piston G rearward and release the brakes. When this has been done, then the operator shifts the valves I I′ to the left to bring the piston-valve I′ in front of the port *d*, so that the exhaust fluid passes through the cylinder H and port *d* to the atmosphere, part of the exhaust fluid keeping sufficient pressure on the piston G to hold the brakes in release.

Now when it is desired to apply the brakes and to stop the motor without shutting off the supply of fluid at the pipe C the operator moves the piston-valves I and I′ to the right to open the port *c* to the atmosphere and to connect the ports *a* and *b* with each other by the cylinder H. In doing so the exhaust passing through the pipe D passes into the cylin-

der F to exert its pressure against the piston G therein and to force the same outward and apply the brakes, the air in front of the piston being forced out through the port *c* and cylinder H to the atmosphere.

Now it will be seen that when the exhaust fluid passes into the cylinder F to apply the brakes, as above described, it is evident that the exhaust fluid, with the piston G of the brake mechanism, forms a resistance for the piston in the cylinder A to finally stop the motor without shutting off the supply of live fluid to the motor. Thus the application of the brakes causes a stopping of the car and at the same time a stopping of the motor and an indirect stopping of the car by the motor, owing to the resistance given to the cylinder in the piston A.

When it is desired to again start the car, it is only necessary for the operator to move the piston-valves I I′ into the position shown in Fig. 1, so that the port *b* is open to the atmosphere and the exhaust in the pipe D and cylinder H can pass through the port *c* into the front end of the brake-cylinder F to return the piston G to its former release position. As the resistance previously given to the piston G is removed upon shifting the valves I I′, it is evident that the motor at once starts running, it being only necessary for the operator to move the piston-valves I I′ into an outermost position to the left, as previously explained, to connect the ports *a d c* with each other to let the exhaust pass to the atmosphere.

As illustrated in Fig. 2, the motor-cylinder A′ is provided with a chest B′, having a supply-pipe C′ and an exhaust-pipe D′, containing a check-valve E′. The port *a′* connects the exhaust-pipe D′ with one end of the brake-cylinder F′, in which is fitted the piston G^2, connected at the outer end of its piston-rod G^3 with the brake-levers. A coil-spring G^4 presses on the piston G^2 to hold the same normally in a release position, as indicated in the said figure, the forward end of the cylinder being connected by a port *c′* with the atmosphere. The port *a′* is connected by a pipe J with a three-way valve K, held in a discharge-pipe K′, connected with the exhaust-pipe D′ between the chest B′ and the check-valve E′.

When the motor is running, the valve K is open, that is, connects the pipe J with the outlet of the pipe K′, so that the exhaust fluid passing through the pipe D′ will pass through the pipe J, the valve K, and the pipe K′ to the atmosphere. When it is desired to apply the brakes, the operator simply closes the valve K, so that the exhaust fluid passes through the pipe D′ and port *a′* into the end of the cylinder F′ to force the piston G^2 outward against the tension of the spring G^4 and to apply the brakes. The exhaust fluid from the motor is confined within the cylinder F′ to hold the brakes applied, and the back pressure of the confined fluid acts on the piston G^2 in the cylinder F′ so as to stop the motor in the manner described.

When it is desired to release the brakes and start the motor, it is only necessary to again open the valve K, so that the exhaust fluid can pass to the atmosphere both from the cylinder F′ and the pipe D′, the spring G^4 returning the piston G^2 to the release position upon the escape of the exhaust fluid to the atmosphere. The cylinder F′ is also connected by a pipe L, having a valve L′, with the air-storage tank or reservoir, so that upon opening the valve L′ the fluid can pass into the cylinder F′ to force the piston G^2 outward and supply the brakes by the use of live fluid from the tanks. This is only to be used in an emergency.

The check-valves E and E′ in the exhaust-pipes D D′ prevent the pressure once formed in the brake-cylinders from falling to a possible lower pressure than might occur in the motor-cylinders. The check-valve E′ also prevents live fluid entering the brake-cylinder by the pipe L from passing to the motor-cylinder A′.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A fluid-pressure brake and a fluid-pressure motor having its exhaust connected with the said brake to directly actuate the latter by the exhaust fluid from the motor as the motive agent for the brake, substantially as described.

2. A fluid-pressure brake, a fluid-pressure motor and a valved exhaust connection from the said motor to the brake to cause the exhaust fluid of the motor to directly actuate the said brake, substantially as described.

3. A fluid-pressure motor, a fluid-pressure brake, and a valved connection between the said motor and the said brake, for releasing the brakes by the exhaust motive agent from the said motor, substantially as shown and described.

4. A fluid-pressure motor, a fluid-pressure brake, an exhaust-pipe connecting the said motor with the said brake, and a check-valve in the said exhaust-pipe to prevent the pressure in the motor from falling below the pressure in the brake-cylinders, substantially as shown and described.

5. A fluid-pressure motor, a fluid-pressure brake, an exhaust-pipe connecting the said motor with the said brake, a check-valve in the said exhaust-pipe, and a live-fluid supply for the said brake, the said check-valve preventing the live fluid from passing into the said motor, substantially as shown and described.

JOHN McINTYRE.

Witnesses:
THEO. G. HOSTER,
JNO. M. RITTER.