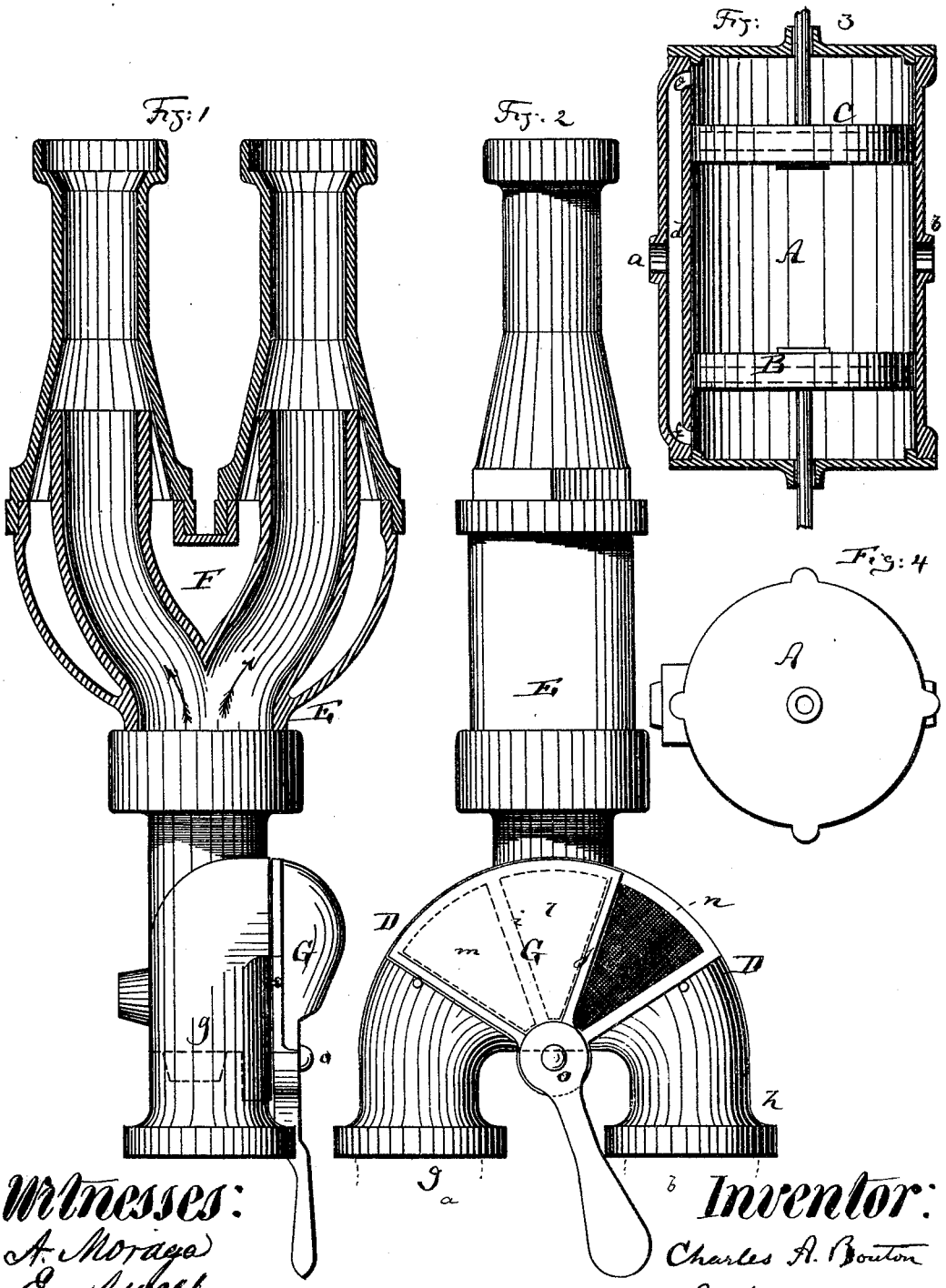
C. A. BOUTON.

VACUUM BRAKES.

No. 185,481. Patented Dec. 19, 1876.



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UNITED STATES PATENT OFFICE.

CHARLES A. BOUTON, OF NEW YORK, N. Y.

IMPROVEMENT IN VACUUM-BRAKES.

Specification forming part of Letters Patent No. **185,481**, dated December 19, 1876; application filed October 10, 1876.

To all whom it may concern:

Be it known that I, CHARLES A. BOUTON, of New York city, in the county and State of New York, have invented a new and useful Improvement in Vacuum-Brakes for Railroads, of which the following is a specification:

This invention relates more particularly to a new valve mechanism to be used for operating railroad-brakes by what is known as the vacuum process, and for all apparatus wherein the motion of a piston is caused by the creation of a vacuum on alternately opposite sides of the piston.

The invention consists principally in the use of a movable cup-shaped valve, whereby the suction-pipe can be connected with either one of the two branches of an elbow-pipe leading to the vacuum-cylinder, and the motion of the piston reversed by moving said valve, without in any other way affecting the mechanism which produces the vacuum itself.

The invention consists also in combining the vacuum mechanism—that is to say, the exhaust-pipe containing the usual steam-nozzle—with an elbow-pipe having three parts adapted for the application of said valve, and with a vacuum-cylinder, all as hereinafter described.

In the drawing, Figure 1 represents a side view, partly in section, of the improved vacuum mechanism; Fig. 2, a face view thereof; Fig. 3, a central longitudinal section of the vacuum-cylinder, and Fig. 4 an end view thereof.

Similar letters of reference indicate corresponding parts in all the figures.

The cylinder A, which is placed beneath the bottom of a railroad-car or other proper place, and which I prefer to supply with two pistons, B and C, has two inlet-openings, *a b*, both in line with the middle of its length, as indicated in Fig. 3. The inlet-opening *a* leads into a longitudinal channel, *d*, which terminates in two ports, *e f*, at the inner sides of the cylinder-heads, respectively. The opening *b* leads directly into the body of the cylinder. The two inlet-openings *a b*, are, by suitable pipes, connected with the vacuum mechanism, so that when the vacuum is applied through the opening *a* and the ports *e f* the pistons B and C will be drawn apart, the atmospheric air entering through the opening *b*, but when the vacuum is applied through the opening *b* the pistons will be moved together, the atmospheric air entering through the opening *a*. The inlet-opening *a* connects by a pipe (which is not shown in the drawing,) with the branch *g* of a U-shaped elbow-pipe, D, shown in Fig. 2, and the opening *b* of the cylinder connects, by another pipe, (not shown,) with the branch *h* of said elbow-pipe D. This pipe D connects, between its branches *g h*, with a vacuum-pipe, E, in which there is a suitable steam-nozzle, F, to produce a vacuum in the direction of the arrows shown in Fig. 1, the nozzle and construction of pipe E being well known, and not part of the present invention. That portion of the pipe D which joins the pipe E is separated from its branches *g h* by two partitions, *i j*, which are indicated by dotted lines in Fig. 2, and between these two partitions the pipe D has an opening or port, *l*, adjoining the partition *i*, the branch *g* of the pipe D has another opening or port, *m*, and the branch *h* of said pipe D has, adjoining the partition *j*, a further opening or port, *n*, all as indicated in Fig. 2. Two of these openings can be closed by a cup-shaped valve, G, which is pivoted at *o* to suitable support, and is of such size that its cup or concave portion will connect the port *l* either with the port *m* or *n*, and, by thus connecting two of these ports, the vacuum-pipe E will be joined either with the branch *g* or with the branch *h* of the pipe D, as may be desired. Thus, when the valve *g* is in the position shown in Fig. 2—that is to say, when it connects the ports *l* and *m*—the vacuum is created through the branch *g*, connecting-pipe, and opening *a* of the cylinder A, and the pistons B C are consequently drawn apart. The opening *b* of the cylinder connects, meanwhile, by its pipe and the branch *h*, with the port *n*, which is open to the atmosphere, so that air will rush into the cylinder A, between the two pistons, driving them apart. When, however, the valve G is swung so as to connect the ports *l* and *n*, the ends of the cylinder, which connect with the branch *g* and open port *m*, are open to the atmosphere, while a vacuum will be created in the branch *n* and middle portion of the cylinder A, so that thus the pistons will be pushed together by the air that enters

the ends of the cylinder. Therefore, by the mere motion of the valve G, the action of the brakes can be reversed. If desired, but one piston may be used in the cylinder, in which case the opening *a* will be near one end and the opening *b* near the other end of said cylinder.

I lay great stress upon the improved construction of the cylinder A, as the same is not open to the usual objection that the action of the vacuum will be interfered with by dust. All the openings of my cylinder can be properly packed, and no dust can enter, and the pipes that join it to the vacuum-pipe can be placed over the floor of a railroad-car, where heretofore the ends of the cylinder were usually open to the air and readily filled with dust and impurities of various kinds.

I lay stress, also, upon the new method described by me of applying a vacuum alternately to the opposite sides of a piston or pistons, whereby I move the piston or pistons back and forth in opposite directions by a vacuum created from the same nozzle. This method I am enabled to carry out with the aid of the cup-shaped valve G, or by the application of equivalent valve mechanism to the pipe D or elbow.

Instead of making the parts *g* and *h* branches of the same pipe, they may be made as separate pipes, without thereby affecting the operation of the apparatus.

I claim as my invention—

1. The combination of the nozzle F, vacuum-pipe E, and of the pipe D, which terminates in the branches *g* and *h*, and is provided with three ports, *l*, *m*, and *n*, with the cup-valve G, which is pivoted to said pipe E, substantially as herein shown and described.

2. In combination with the vacuum-pipe E, containing a nozzle, F, the branched pipe D, and vacuum-cylinder A, having two ports, *a* and *b*, all arranged to operate substantially as herein shown and described.

Above specification signed this 30th day of September, 1876.

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Witnesses:

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