To all whom it may concern:

Be it known that I, Hugh O’Neil, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain and useful Improvements in Draft-Controlling Mechanism, of which the following is a specification.

The invention relates to means for automatically controlling the actuation of the blower or artificial draft means on a locomotive, in order to eliminate the manual actuation required when the throttle is operated to cut off or turn on the supply of steam to the cylinders. The primary object of the invention is to provide a simple construction which is reliable in operation and which secures the automatic supply of steam to the blower or draft means when the throttle is closed, and to cut off such supply of steam when the throttle is opened. One embodiment of the invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a diagrammatic side elevation view of a locomotive with my invention applied thereto, and Fig. 2 is a longitudinal section through the automatic valve mechanism.

The usual artificial draft means as employed upon a locomotive is an upright pipe in the smoke box beneath the stack, to which steam is applied by means of a pipe leading from the cab, a hand valve being provided in the cab for turning on and cutting off the supply of steam to the blower. It is customary to open this valve to supply steam to the blower and give the necessary artificial draft when the throttle is shut off and the draft incident to the supply of steam from the cylinders to the exhaust nozzle is cut off. On the other hand this valve is manipulated to cut off the supply of steam to the blower pipe when the throttle valve is opened, and the necessity of draft from the blower pipe eliminated. The labor incident to operating this blower controlling valve is very considerable, particularly where numerous stops are made calling for the repeated opening and closing of the throttle valve, and it is the purpose of my invention to provide a mechanism whereby this labor is eliminated.

To this end I provide a mechanism whereby the steam is automatically turned on to the blower when the throttle valve is closed, and wherein the supply of steam is cut off when the throttle valve is opened.

Referring first to the general arrangement as shown in Fig. 1: A is the throttle lever of the engine, which is of the ordinary type and is connected to the ordinary throttle valve; B is the steam supply pipe leading from the steam dome to the cylinders of the engine and controlled by the throttle valve; C is the usual blower pipe lying in the smoke box in alignment with the stack of the locomotive; D is the supply pipe for the blower, leading from the cab of the engine, and E is the casing of the automatic controlling valve for securing the result as above set forth.

As indicated in Fig. 2 the casing E is in effect a cylinder having portions 1 and 2 of different diameters. The portion 1 is connected at its end with the supply pipe D, and has leading from its side another pipe 3. The pipe 3 extends through the wall of the smoke box and is connected at its inner end to the blower pipe C. The end of the cylinder portion 2 is provided with a head 4, and this head is connected by means of the pipe 5 with the steam supply pipe B, the pipe 5 connecting with the pipe B on the outlet side of the throttle valve of the engine, which throttle valve is located in the steam dome in the usual manner.

Mounted in the casing E is a differential piston composed of the two parts 6 and 7 and provided with packing rings 8, 9, and 10. The portion 6 of the piston is also provided with the passage 11 leading from the end of the piston to the side thereof and communicating with the pipe 3 when the piston is in the position indicated in Fig. 2. A port 12 is provided in order to prevent an accumulation of pressure upon the front side of the portion 7 of the piston in case of leakage past the packing ring 10.

When the throttle valve of the engine is closed the piston will occupy the position indicated in Fig. 2, since there is no pressure upon the portion 7 of the piston, while the smaller end of the piston is constantly exposed to pressure from the pipe D. The piston will therefore always move to the position indicated when the throttle valve is closed, and when in this position steam is...
supplied to the blower pipe C, since the pipes D and 3 are connected by means of the passage 11. When the throttle valve is opened, thus admitting pressure to the supply pipe B the piston will be shifted to the left, since the portion 7 of the piston is of larger diameter than the portion 6, and both ends of the piston are exposed to steam of approximately the same pressure. The opening of the throttle valve will therefore cause a movement of the piston to the left, thus interrupting the communication between the passage 11 and the pipe 3, so that when the throttle valve is open and the valve is in its position to the left the supply of steam through the blower pipe D will be interrupted.

In order to prevent the rotation of the piston with respect to the casing, which rotation would carry the passage out of registration with the end of the pipe 3, a lug 14 is provided on the part 6 registering with the slot 15. The packing ring 9 is preferably made wide so as to prevent leakage when opposite the port leading to the pipe 3, and in its extreme position to the left lies to the front of the said port. The pipe D is preferably provided with a hand valve 13 to permit of the cutting off of the supply of steam to the blower when the engine is standing.

It will be understood that the structure illustrated and described constitutes only one embodiment of the invention, and that the valve mechanism shown in Fig. 1 is not limited to use in the particular relation shown. The valve may be used in other relations where a flow of steam between the passages D and 3 is desired when the parts are in the position of Fig. 2, as under these conditions any wearing away or abrading by the steam at the inlet end of the passage 3 is avoided, and a long period of wear is insured. Other advantages incident to the construction will be apparent to those skilled in the art.

What I claim is:

1. In a locomotive having a steam operated draft means and a throttle valve for controlling the supply of steam to the engine cylinders, a cylinder having a port in its side, a differential piston therein covering said port in both extremes of movement and having its smaller end exposed to steam pressure from the boiler and having leading from each end a passage whose other end leads through the side of the piston and registers with the said port when the piston is in one extreme of travel and is disconnected therefrom when the piston moves to its other extreme of travel, a connection from the port to the draft means, and a connection from the outlet side of the throttle to the other end of the piston.

2. In combination in operating mechanism for locomotives, a differential cylinder having a port in its side, a differential piston therein covering said port in both extremes of movement, and provided with a passage leading from the small end of the piston through the side thereof, such passage registering with the said port when in the extreme of movement to which the piston is moved by pressure on the small end thereof, means for applying fluid pressure to the two ends of the piston, means for varying the pressure on the large end of the piston, and a conduit leading from said port to a point of use.

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

HUGH O'NEIL.

Witnesses:
ARCHWORTH MARTIN,
LETITIA A. MYERS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."