

(No Model.)

W. J. ACHESON.  
FLUID PRESSURE REGULATOR.

No. 334,326.

Patented Jan. 12, 1886.

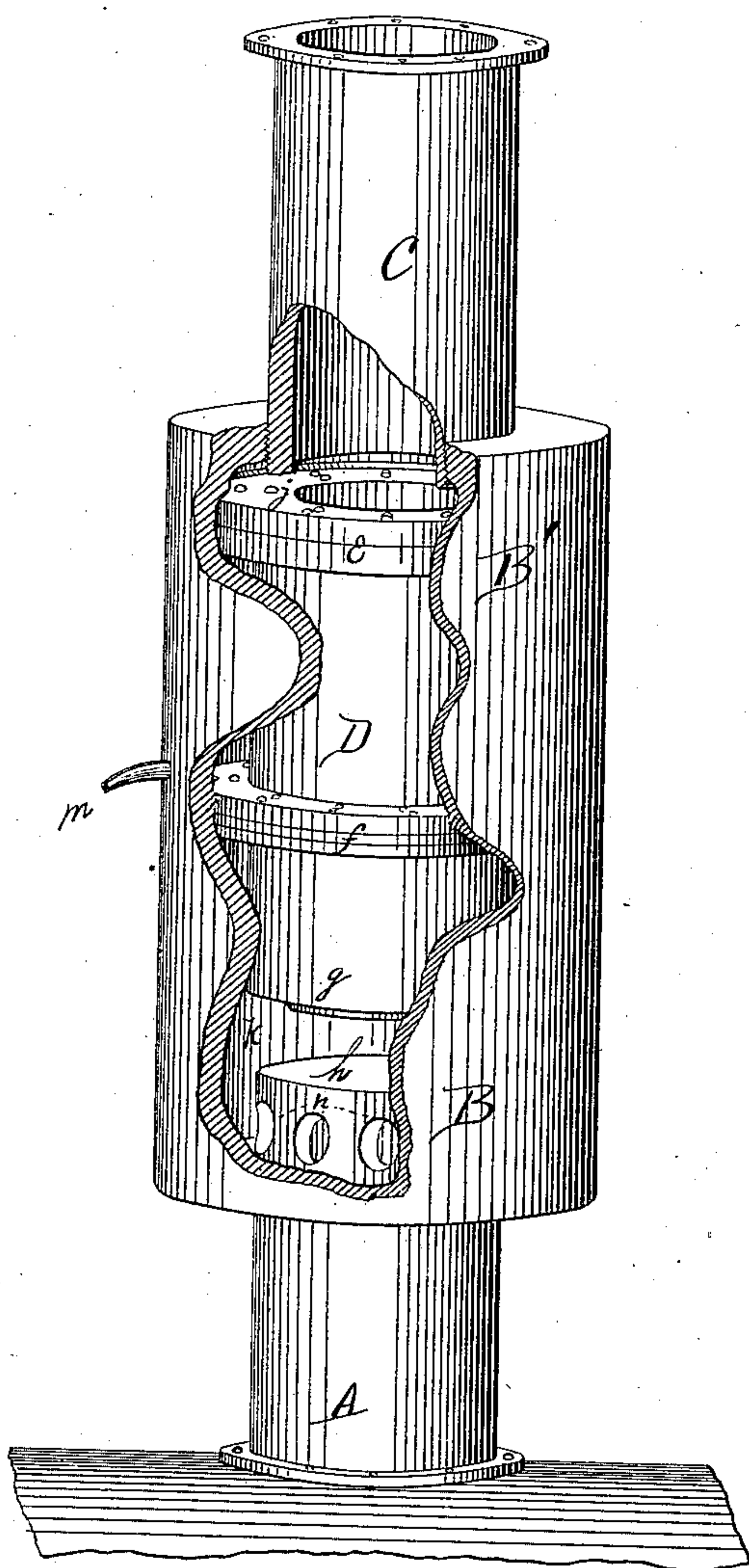


Fig. 1.

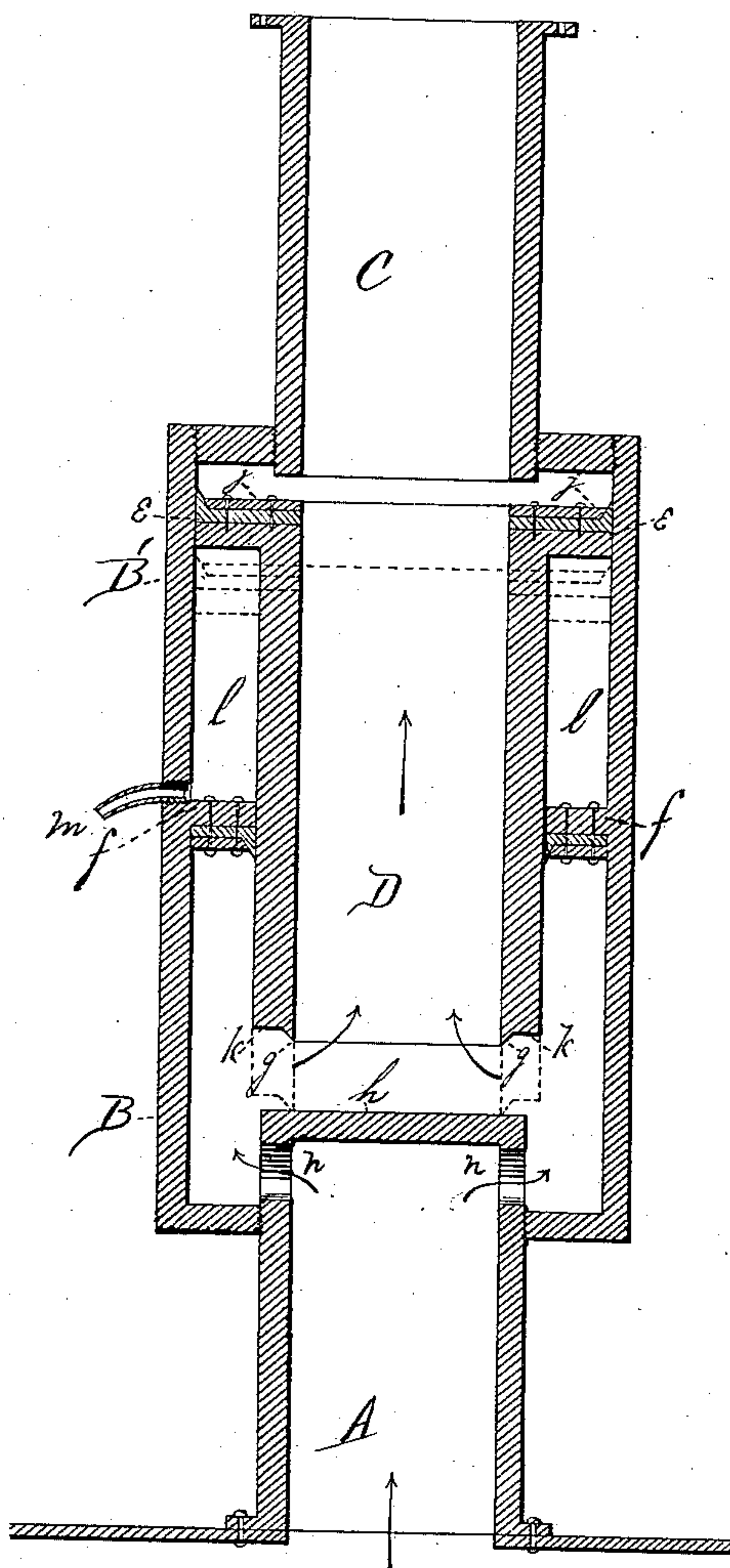


Fig. 2.

WITNESSES

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# UNITED STATES PATENT OFFICE.

WILLIAM J. ACHESON, OF DENVER, COLORADO.

## FLUID-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 334,326, dated January 12, 1886.

Application filed June 8, 1885. Serial No. 167,959. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM J. ACHESON, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented a new and useful Fluid-Pressure Regulator, of which the following is a specification.

The object of my invention is in the case of steam to regulate and reduce by means of an automatic valve working inside of the steam-pipe before the steam reaches the engine, radiator, or other place where the steam is to do its work, and to reduce the pressure from a high point in the boiler to a lower point in the steam-pipe beyond the valve; and in the case of water or other fluids conveyed through pipes to regulate its delivery and to reduce its pressure from a high point in the main pipe or pipe leading from the pump, reservoir, &c., to a lower point in the delivery-pipes. To accomplish these objects I use the mechanism illustrated in the accompanying drawings.

Figure 1 is a perspective view of my invention, with a part broken out so as to exhibit the internal parts in position. Fig. 2 is a vertical section of the same.

B B' is a cylindrical valve-chest, made with two heads. It has the pipe A entering below, and the pipe C entering it above in direct line. It has a shoulder or partial partition, *f*, fixed about midway between the two heads and partially dividing it into a lower compartment, B, and an upper compartment, B'. The valve D works inside of it with a reciprocating motion. It has an air-hole at *m* to admit air to the air-space *l*.

A is a pipe connected with the boiler. Its upper end is closed with the head *h*, which forms a seat for the valve D when closed. It has holes *n* near its upper end, and is fitted into the valve-chest B B', and extends inside of it sufficiently to allow steam to pass through the holes *n*.

C is a pipe, which connects the valve-chest with the steam-engine, radiator, or other place where the steam is to do its work. C and A are made of smaller bore than B B'. A, B B', and C combined form a continuous pipe for the steam.

D is a valve, made of a cylindrical tube of

about the same bore as A and C. It has a flange, E, at its upper end, which has packing attached, and works steam-tight in the valve-chest B B'. The valve works steam-tight inside the shoulder *f*. Its lower end has a small projection, *g*, which strikes against the valve-seat *h*. The valve works up and down in the valve-chest B B', as actuated by the steam above and below it. The shoulder *f*, in combination with that part of the valve D below the shoulder, separates the high-pressure steam in A and B from the low-pressure steam in B'. The area of the surface on the top of the valve D and the flange E at *j* is greater than the area of the surface at the lower end of the valve at *k*, and the ratio of the areas of these two surfaces is in proportion to the reduced pressure desired in B' compared with the pressure in B and A. Outside and below the valve D is the high-pressure steam, and inside and above the valve D is the reduced pressure.

*l* is an air-space with an outlet at *m*.

The method of operating is as follows: Supposing the top surface of the valve D to be twice the area of the bottom surface of the same, the downward pressure on the valve (with an equal pressure throughout the valve-chest) will be twice the upward pressure, and consequently an upward pressure of two pounds per square inch in A and B will be counterbalanced by a downward pressure of one pound per square inch in B'. On steam being admitted into the pipe A it flows in the direction of the arrows through the holes *n* into B, and filling it, presses against the bottom of the valve D and forces it upward. The steam passes upward through D, fills B', and presses against the top surface of the valve and forces it downward toward or against the valve-seat *h*. If the downward pressure becomes greater than the upward pressure, the valve is forced against the seat and the passage for steam is closed. If the downward pressure on the valve is relieved, the valve is forced up and open and more steam is admitted to B'. Thus the two opposing pressures—one forcing the valve open and the other forcing the valve shut—counterbalance each other, and the pressure in B' is maintained at one-half of the pressure in B and A—that is to say,

the pressure maintained in B' by the automatic action of the valve D working inside of the valve-chest B B' as compared with the pressure in B and A is in proportion to the  
5 area of the surface of the bottom of the valve D as compared with the area of the surface of the top of the valve D.

In the above illustration the upper surface of the valve is supposed to be twice the area  
10 of the lower surface of the same. If the relative pressure desired to be maintained in B' is any other than the above named, the relative areas of the upper and lower surfaces of the valve are made to conform accordingly, and  
15 spiral springs may be attached above or below the valve to further govern its motions and regulate the relative pressures above the valve.

In the case of water or other fluid the working of the invention is after the same manner  
20 as steam, the pipe A being connected with the pump or reservoir and the pipe C being connected with the delivery-pipe.

A, B B', D, and C may be made round, square, or other desired shape.

What I claim as my invention, and desire 25 to secure by Letters Patent, is—

1. The valve-chest B B', in combination with the shoulder *f*, the pipe A, the valve-seat *h*, and the pipe C, substantially as described, and for the purposes herein set forth. 30

2. The valve D, working inside of the valve-chest B B', in combination with the valve-chest B B', the shoulder *f*, the pipe A, the valve-seat *h*, and the pipe C, substantially as described, and for the purposes herein set forth. 35

3. The valve-chest B B', in combination with the shoulder *f*, the pipe A, the valve-seat *h*, the pipe C, and the valve D, all substantially as described, and for the purposes herein set forth.

WILLIAM J. ACHESON.

Witnesses:

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H. H. THOMAS.