C. N. SOWDEN.

REDUCING VALVE.

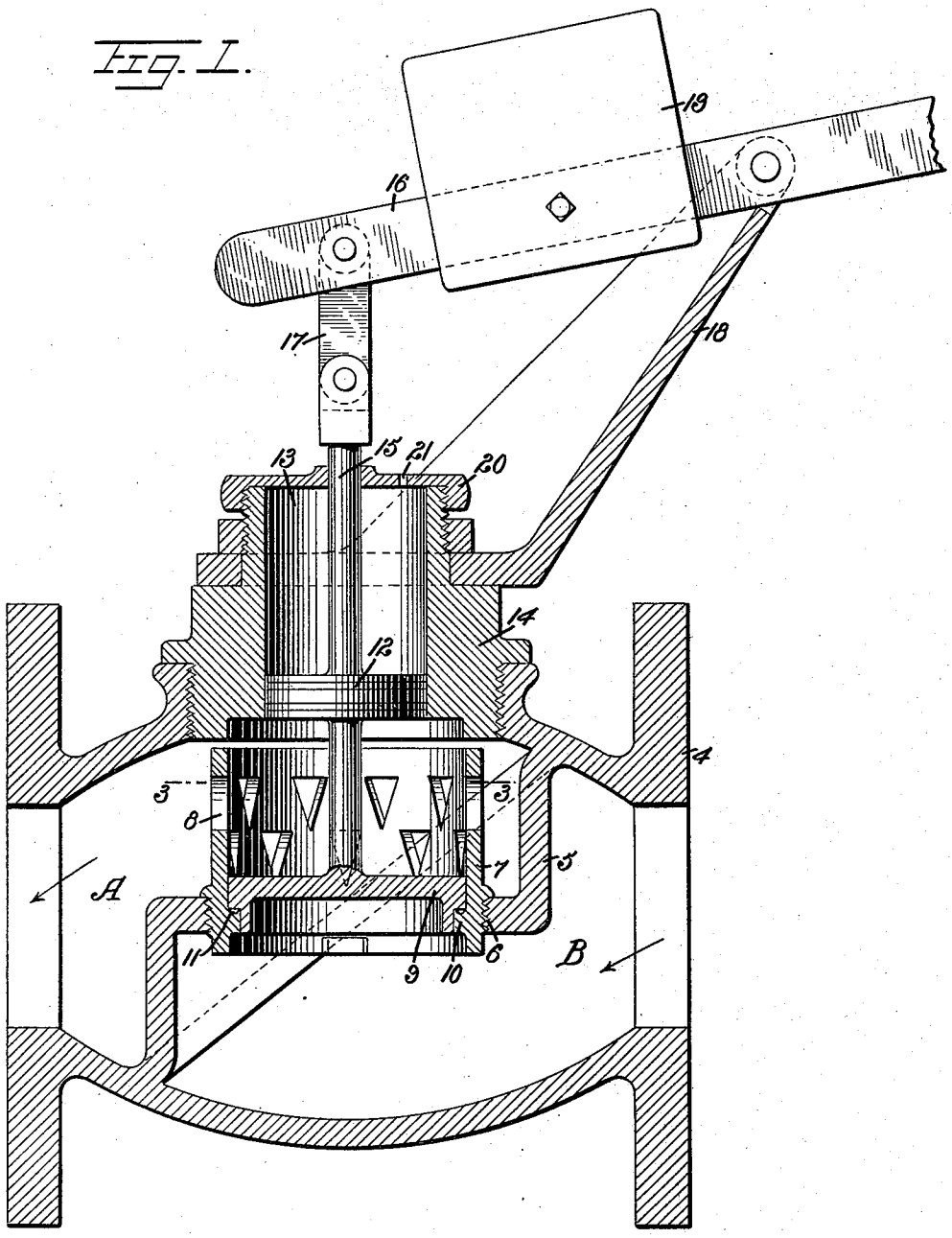
APPLICATION FILED JUNE 24, 1916.

1,216,872.

Patented Feb. 20, 1917.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

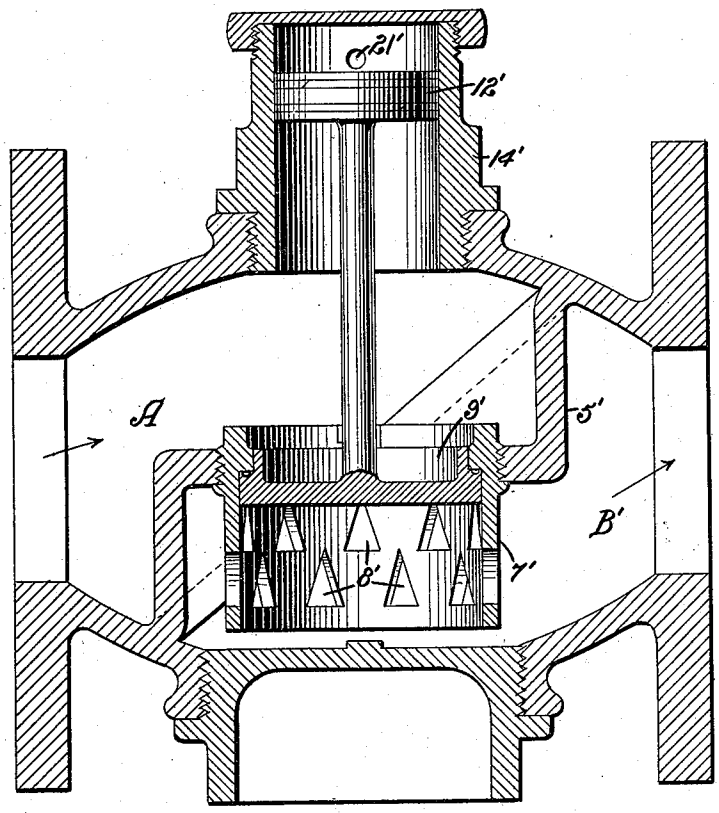
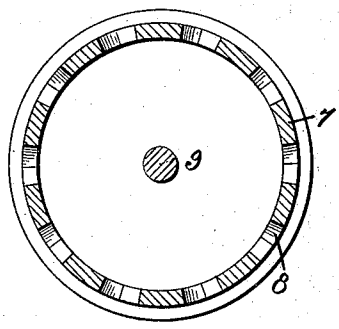


Fig. 3.



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UNITED STATES PATENT OFFICE.

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REDUCING-VALVE.

1,216,872. Specification of Letters Patent. Patented Feb. 20, 1917.

Application filed June 24, 1916. Serial No. 105,571.

To all whom it may concern:

Be it known that I, CHARLES NEVILLE SOWDEN, a citizen of Canada, and a resident of Toronto, in the Province of Ontario and Dominion of Canada, have invented a new and Improved Reducing-Valve, of which the following is a full, clear, and exact description.

My invention relates to reducing valves to be used in connection with apparatus in the sugar industry, and particularly to multi-effect evaporators to regulate the vacuum between each body or where the reducing pressure for evaporating purposes should be in proportion to the initial pressure used for power purposes.

An object of the invention is to provide a simple, inexpensive and efficient reducing valve.

A further object of the invention is to reduce the pressure automatically and without excessive shocks.

With the above and other objects in view, the nature of which will more fully appear as the description proceeds, the invention consists in the novel construction, combination and arrangement of parts as herein fully described, illustrated and claimed.

In the accompanying drawings, forming part of the application, similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a vertical section of a vacuum reducing valve embodying my invention;

Fig. 2 is a similar section of a pressure reducing valve for pressures above the atmospheric pressure; and

Fig. 3 is a horizontal section on line 3—3, Fig. 1.

Referring to the drawings, 4 is a valve casing the partition wall 5 of which has a threaded bore 6. A sleeve 7 is threaded into the bore. The sleeve has apertures 8 on one side of the partition wall. A piston valve 9 fits snugly into the sleeve 7. The sleeve 7 has an interior annular shoulder 10 below the openings 8 which forms a stop for the piston valve 9. This shoulder carries a fluid in a groove 11 to eliminate chattering.

A piston 12 in rigid connection with the piston valve 9 fits snugly into a cylindrical chamber 13 provided in a valve head 14 which is secured to the valve casing. The piston 12 has a rod 15 which is connected to a lever 16 by a link 17. The lever is fulcrumed on a bracket 18 extending from the valve head 14. An adjustable weight 19 is provided on the lever 16 between the fulcrum and link 17. If a cylinder cap 20 is used to protect the piston 12, a vent 21 should be provided in the cap.

Fig. 1 shows the valve 9 closed. The initial vacuum formed in the chamber A of the valve casing will raise the piston valve 9 and piston 12 against atmospheric pressure on the piston 12 and establish communication between the chambers A and B of the valve casing. The piston valve 9 is held in raised position by the vacuum in chambers A and B to give the proportional reduction. The vacuum in chamber A times the difference in area between the piston valve 9 and the piston 12 equals the vacuum in chamber B times the area of the piston valve 9. By means of the weight 19 the vacuum in chamber B may be varied to be more or less than that which the valve is calculated to give. It will be seen that the vacuum in chamber B will vary in exact proportion to the variation of the vacuum in the chamber A.

If the valve is to be used for pressures above atmospheric and the flow is from the chamber A′ to chamber B′ (see Fig. 2) the sleeve 7′ is threaded into the partition 5′ so that the openings 8′ are within the chamber B′, the piston valve 9′ separating the openings from the chamber A′. The piston 12′ is rigid with the piston valve 9′ and fits snugly into the cylindrical chamber formed in the head 14′ of the valve. A vent 21′ is provided in the head to subject the upper surface of the piston to atmospheric pressure.

In Fig. 2 the piston valve 9′ is shown closed. The initial pressure is in chamber A′ and it will force the piston valve from its seat when the pressure in A′ times the difference in area between the piston valve 9′ and the piston 12′ equals the pressure in chamber B′ times the area of the piston valve 9′. The piston valve will be held in the displaced position by the pressure in the chambers A′ and B′ and maintain the difference in pressure. Any variation in pressure in chamber A′ will vary the pressure in chamber B′ in exact proportion. A weight can also be applied to this valve structure if so desired.

I claim:

1. A reducing valve comprising in combination a valve casing having a partition

wall, an apertured sleeve threaded into the partition wall so that the apertures are wholly on one side of the partition, a piston valve in the sleeve controlling the communication between the two sides of the partition wall, said sleeve having a shoulder forming an additional seat for said valve at the closed position, a valve head having a cylindrical chamber in communication with the valve casing on one side of the partition and also with the atmosphere, and a piston in the chamber separating the communication of the chamber with the casing from that of the chamber with the atmosphere, said piston being in rigid connection with said piston valve to participate in all the movements of said piston valve.

2. A reducing valve comprising in combination a valve casing having a partition wall presenting a threaded bore, an apertured sleeve threaded into the bore of the partition so that the apertures are wholly on one side of the partition, a piston valve in the sleeve controlling the communication between the two sides of the partition, said sleeve having a shoulder forming an additional seat for said valve at its closing position, a valve head having a cylindrical chamber in communication with the valve casing on one side of the partition and also with the atmosphere, a piston in said chamber separating the communication of the chamber with the casing from that of the chamber with the atmosphere, said piston being of smaller diameter than the piston valve and in rigid connection therewith to participate in the movement of the valve, and an adjustable weight associated with the piston for varying the pressure thereupon substantially as and for the purpose set forth.

CHARLES NEVILLE SOWDEN.

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