(No Model.) 2 Sheets—Sheet 1.

F. T. MUELLER.

RELIEF VALVE.

No. 402,098. Patented Apr. 23, 1889.

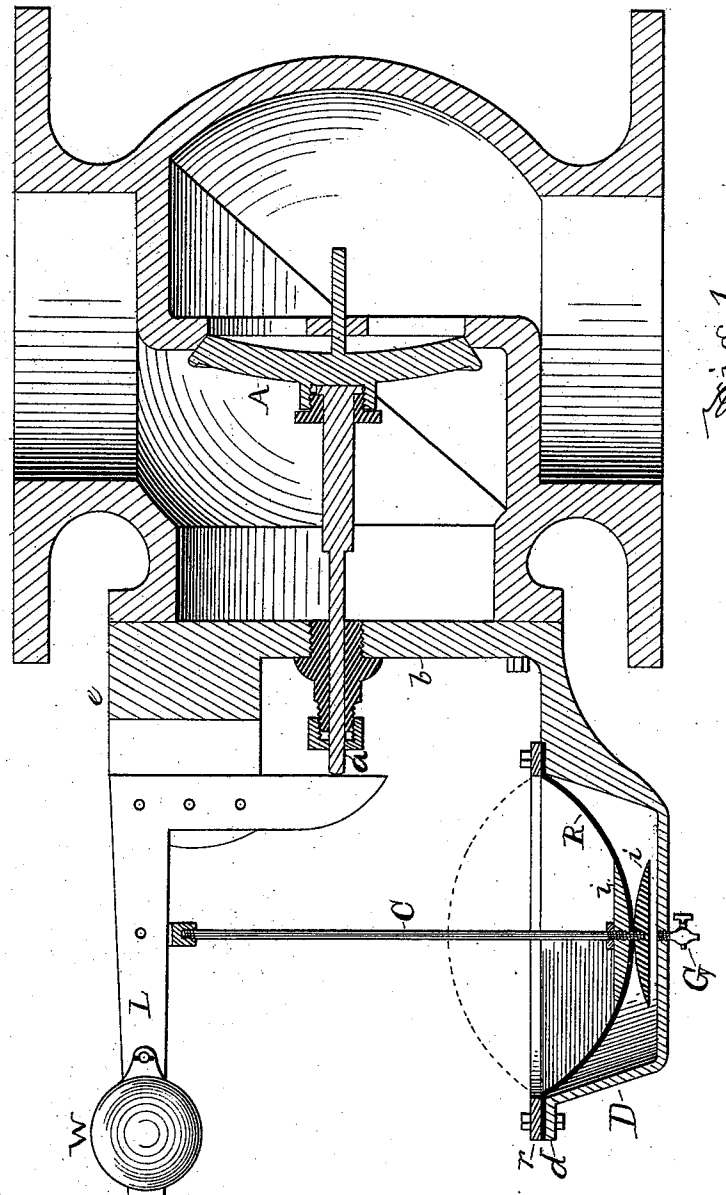

Fig. 1.

WITNESSES:

C. M. Benjamin

C. V. Clark

INVENTOR,

Frederick T. Mueller,

BY

W. F. Hapgood.

ATTORNEY.

(No Model.) 2 Sheets—Sheet 2.

F. T. MUELLER.

RELIEF VALVE.

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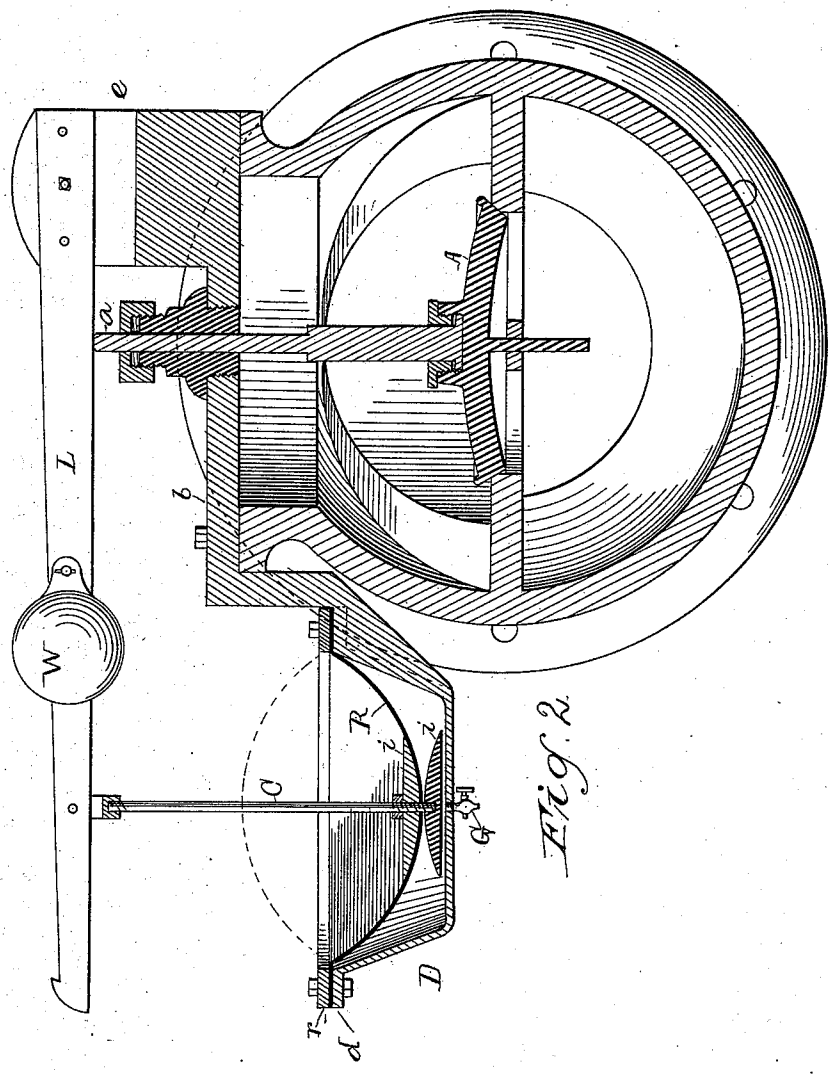

Fig. 2.

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UNITED STATES PATENT OFFICE.

FREDERICK T. MUELLER, OF NEW YORK, N. Y., ASSIGNOR TO TIMOTHY KIELEY, OF SAME PLACE.

RELIEF-VALVE.

SPECIFICATION forming part of Letters Patent No. 402,098, dated April 23, 1889.

Application filed November 21, 1888. Serial No. 291,422. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK T. MUELLER, a citizen of the United States, residing at New York, in the county and State of New York, have invented a new and useful Attachment for Back-Pressure or Relief Valves, of which the following is a specification.

These valves, connected with systems of steam-heating and other similar uses, as usually constructed are liable to very sudden and violent movements in opening and closing, which cause heavy pounding, and rapidly wear out the valve and its seat. To control and moderate these sudden movements I have devised the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a sectional view of the valve with my improved attachment, adapted for use on a vertical pipe; and Fig. 2 is a similar view of a valve and the attachment arranged for a horizontal pipe.

The valve A shown in the drawings is an ordinary disk-valve with its spindle *a* fitted to a casing of the usual form. The valve is ordinarily kept closed by a lever, L, pivoted to a lug, *e*, on the cover *b*, or to any convenient part of the casing, which is operated by an adjustable weight, W, or by a spring, if desired. A dish-shaped vessel, D, with a projecting rim, *d*, is attached to the cover *b*, and over the open top of this vessel is placed a flexible diaphragm, R, of rubber or other suitable material, which is secured in place by a ring, *r*, placed upon it and bolted through to the rim *d*, making a steam-tight joint. The rod C is secured to the center of the diaphragm R by having one end screwed through two round washers, *i i*, which are placed one on either side of the diaphragm. These washers are preferably made convex on the side next to the diaphragm, that they may more readily conform to its shape when in use. The other end of the rod C is jointed to the lever L at any convenient position, according to the pressures to be dealt with. The valve-stem *a* is also preferably jointed to the lever L, as shown in Fig. 2. G is a small cock inserted in the bottom of the vessel D. When ready for action, the diaphragm R is curved downward within D, as shown in the drawings.

The action of my improved arrangement is as follows: When the pressure below the valve A lifts it against the lever L, the upward movement of L carries with it the rod C and raises the diaphragm R. The lifting of the diaphragm creates a partial vacuum within the vessel D, which increases the higher the diaphragm is raised, thus gradually increasing the force against which the pressure on the valve has to act until the valve is brought to rest. If the vacuum created in D is too great to allow the valve to lift a sufficient distance, or causes it to open too slowly, the small cock G may be partly opened, allowing air to be drawn into D slowly, which will permit the lever L to rise in a correspondingly-moderate manner. If the valve-stem *a* is connected with the lever L, as shown in Fig. 2, the closing of the valve is controlled as effectually as its opening, but by the reverse of the operation before described—that is, the closing of the valve compresses the air within the vessel D and its escape is regulated by the cock G.

It is evident that this attachment may be applied to similar valves in hydraulic apparatus, as well as to any description of steam apparatus.

What I claim, and desire to secure by Letters Patent, is—

1. In a back-pressure or relief valve, the combination of the valve-lever with a dish-shaped vessel closed at the bottom and having its top hermetically covered by a flexible diaphragm of rubber or other suitable material, said diaphragm being connected with the lever by a rod one end of which is attached to the center of the diaphragm and the other to the lever, substantially as described.

2. In combination with the valve A and its lever L, the vessel D, covered by a flexible diaphragm, R, the rod C, connecting the diaphragm with the lever, and the cock G, substantially as and for the purpose set forth.

FREDERICK T. MUELLER.

Witnesses:
JOHANNES LI,
DAMON ETIENNE.