

No. 726,220.

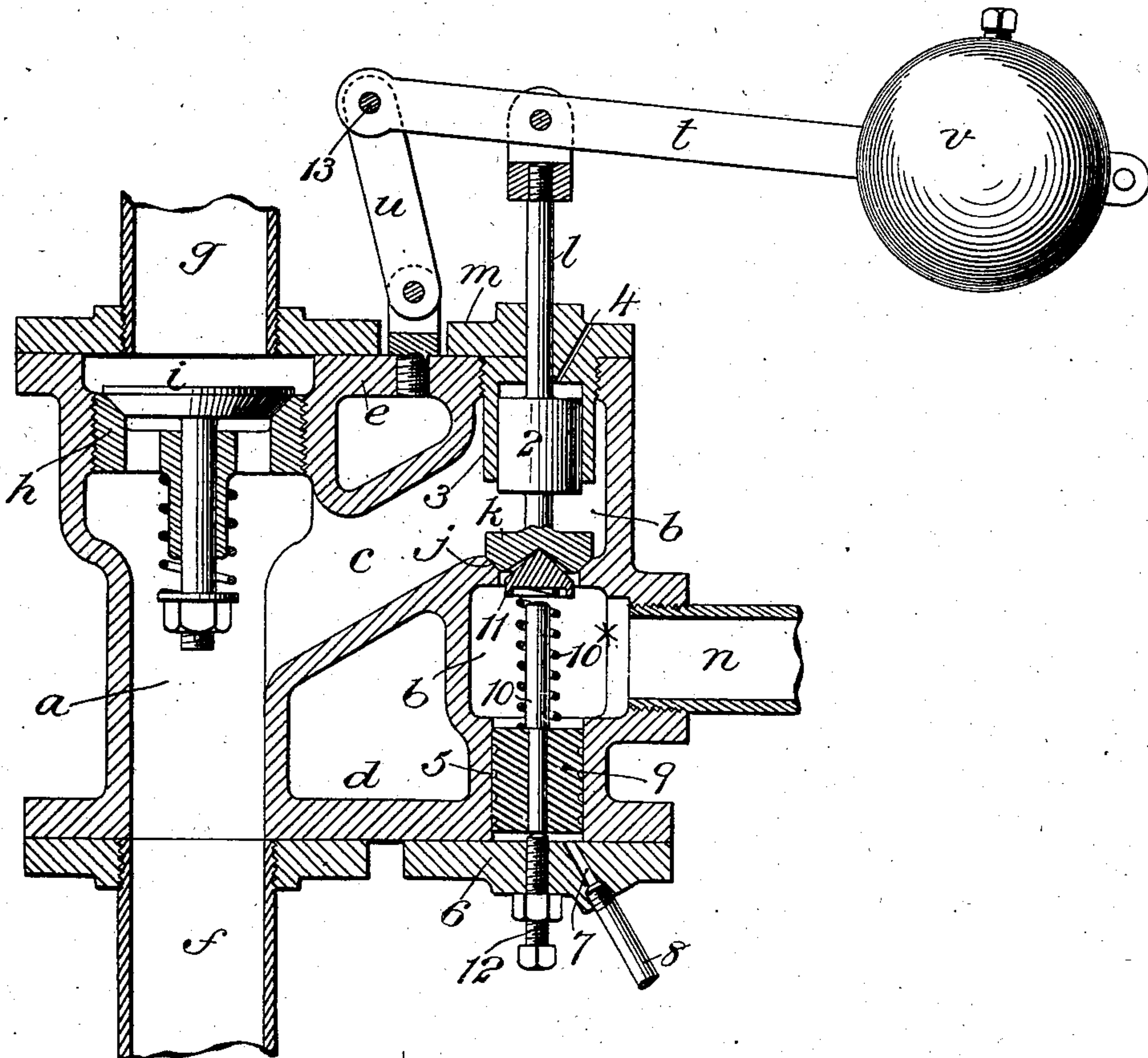
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W. S. FAIRHURST.

UNLOADING DEVICE FOR AIR OR GAS COMPRESSORS.

APPLICATION FILED JULY 8, 1902.

NO MODEL.



Witnesses:-

George Barry Jr.
Henry Thime.

Inventor:
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by attorney
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UNITED STATES PATENT OFFICE.

WILLIAM S. FAIRHURST, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO JOHN J. RILEY, OF BROOKLYN, NEW YORK.

UNLOADING DEVICE FOR AIR OR GAS COMPRESSORS.

SPECIFICATION forming part of Letters Patent No. 726,220, dated April 21, 1903.

Application filed July 8, 1902. Serial No. 114,750. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. FAIRHURST, a citizen of the United States, and a resident of the borough of Brooklyn, in the city and State of New York, have invented a new and useful Improvement in Unloading Devices for Air or Gas Compressors, of which the following is a specification.

This invention relates to that class of unloading devices for compressors sometimes designated as "pressure-relief" governors, in which there is employed between the compressor and the receiver or pipe system to which it delivers or supplies the gas or air compressed by it a valve which is so loaded as to be kept closed while the pressure in said receiver or system remains at or below the maximum desired therein, but which is opened to the atmosphere by the pressure in said receiver or system when such pressure exceeds that maximum; and my invention consists in the combinations hereinafter described and claimed, which constitute a very simple yet effective unloading device in which such a valve is an essential element.

The accompanying drawing represents a central vertical section of my unloading device.

a b c d e designate a valve-box containing two chambers *a* and *b*, arranged side by side and connected by a lateral passage *c* and united by an externally-flanged bottom and an externally-flanged head *e*. At the bottom of the chamber *a* there is communication with the delivery-pipe *f* of the compressor, and at the top of said chamber there is a pipe *g*, which leads to the receiver. Between the two pipes *f g* there is in said chamber *a* the seat *h* for the check-valve *i*, such as is commonly employed between a compressor and the receiver to which it delivers. In the chamber *b* below the lateral passage there is the seat *j* for the upwardly-opening relief or unloading valve *k*, which is represented of the puppet kind. This valve has a stem *l*, which passes upward through a guide in a cap *m*, which covers the top of said chamber. Below the valve-seat *j* there is an escape-outlet *n* from the chamber *b* to the atmosphere.

The valve-stem *l* is provided above the valve with a piston 2, which is fast to or forms

part of said stem and which fits a bored cylinder 3, provided in the upper part of the chamber *b*. This cylinder, which is open at the bottom, is represented as formed on the cap *m*. The area of said piston 2 is somewhat less than that of the valve *k*, so that while the upward pressure from the compressor on its under side balances the downward pressure from the same source above said valve to a considerable extent the excess of said downward pressure will tend to close the said valve. In the upper part of said cylinder 3 there is a vent-opening 4 through the cover *m* to provide for the escape of any compressed air or gas that might leak past the piston and cause an accumulation of pressure above the piston 2. The said valve *k* is loaded for the purpose of keeping it positively closed until it is required to be opened by the means to be hereinafter described for that purpose when the pressure in the receiver or pipe system exceeds the desired maximum, the said loading being produced by a weighted lever *t*, which is connected with or bears upon the valve-stem *l*. This lever is shown as having its fulcrum 13 in a rocking stand *u*, which is pivoted to the top of the valve-box. The weight *v* applied to said lever is made adjustable to put a greater or less load on the valve.

The lower part of the chamber *b*, below the relief-valve *k* and below the escape-outlet *n*, is bored to form a cylinder 5, which is open at the top to the space in said chamber below the outlet-valve, but is closed at the bottom by a plate 6, in which is a small opening 7, which is in constant communication by a pipe 8 with the receiver or the pipe system to which the compressor delivers. Within this cylinder is fitted a piston 9, the bottom of which is always subject to the pressure in the said receiver or system entering the cylinder 5 through the pipe 8. The piston 9 has an upwardly-projecting stem 10, around which is coiled a spring 10*, which is supported on the piston and which carries at its upper end a conical button or cap 11, the crown of which enters and centers itself in a recess in the bottom of the valve *k*. This spring normally exerts a pressure between the piston 9 and the valve *k*, which pressure

tends to depress the piston and to raise and open the valve. Through the bottom 6 of the cylinder 5 there is screwed a screw 12, which limits the descent of the piston and which by being screwed up or down increases the force which is stored up in the spring for raising the valve k from its seat and opening it against the pressure produced upon it by the loaded lever t .

10 The load on the lever t for keeping the valve k closed is so regulated by adjusting the weight v on the lever t , and the upward pressure produced by the spring 10* tending to open the valve is so adjusted by the screw 12 that said tendency to open is overcome by the said weight until the pressure in the receiver or pipe system acting through the pipe 8 on the bottom of the piston 9 reaches or exceeds the desired maximum sufficiently to raise the piston 9 gradually against the downward pressure of the spring 10* and so to increase the force exerted upwardly by the spring on the valve until said force becomes sufficient to overcome the downward pressure of the lever. The spring then instantly opens the valve to its full width and forms free communication between the delivery-pipe of the compressor and the atmosphere through the outlet n . The valve remains steadily thus open until the pressure in the receiver or pipe system acting under the piston 9 is sufficiently reduced for the load on the lever acting on the valve to close the latter and, by overcoming the force of the spring, to depress the piston to its position of rest on the adjusting-screw 12.

What I claim as my invention is—

1. In an unloading device for a compressor, a chamber in which is a valve-seat, an upwardly-opening relief-valve adapted to said seat, a loading device applied to said valve for closing it, a cylinder in said chamber below the valve-seat having its lower part in communication with the receiver to which the compressor delivers, a piston in said chamber, a communication between said chamber and the outlet of the compressor above said valve, an outlet from said chamber to the atmosphere between said valve and piston, a spring interposed between said piston and valve for opening the latter and an adjusting-

screw in the bottom of said cylinder for adjusting the piston therein to adjust the force exerted by said spring for opening the valve, substantially as herein described.

2. In an unloading device for a compressor, a chamber in which is a valve-seat, an upwardly-opening relief-valve adapted to said seat and the stem of which passes through the upper part of said chamber, a valve-loading device applied to said stem, a cylinder in said chamber above the valve-seat and a piston on the valve-stem fitted to work in said cylinder, a communication between the outlet of the compressor and the space in said chamber between the valve and said piston, a cylinder located in said chamber below the valve-seat and having its lower part in communication with the receiver to which the compressor delivers, a piston fitted to the latter cylinder, and a spring applied between the latter piston and the valve for opening the valve, substantially as herein described.

3. In an unloading device for a compressor, a chamber in which is a valve-seat, an upwardly-opening relief-valve adapted to said seat and the stem of which passes through the upper part of said chamber, an adjustable valve-loading device applied to said stem, a cylinder in said chamber above the valve-seat and a piston on the valve-stem fitted to work in said cylinder, a communication between the outlet of the compressor and the space in said chamber between the valve and said piston, a cylinder located in said chamber below the valve-seat and having its lower part in communication with the receiver to which the compressor delivers, a piston fitted to the latter cylinder, a spring applied between the latter piston and the valve for opening the valve, and an adjusting-screw in said cylinder for adjusting the latter piston to regulate the force exerted by said spring for opening the valve, substantially as herein described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 24th day of June, 1902.

WILLIAM S. FAIRHURST.

Witnesses:

FREDK. HAYNES,
HENRY THIEME.