

No. 627,850.

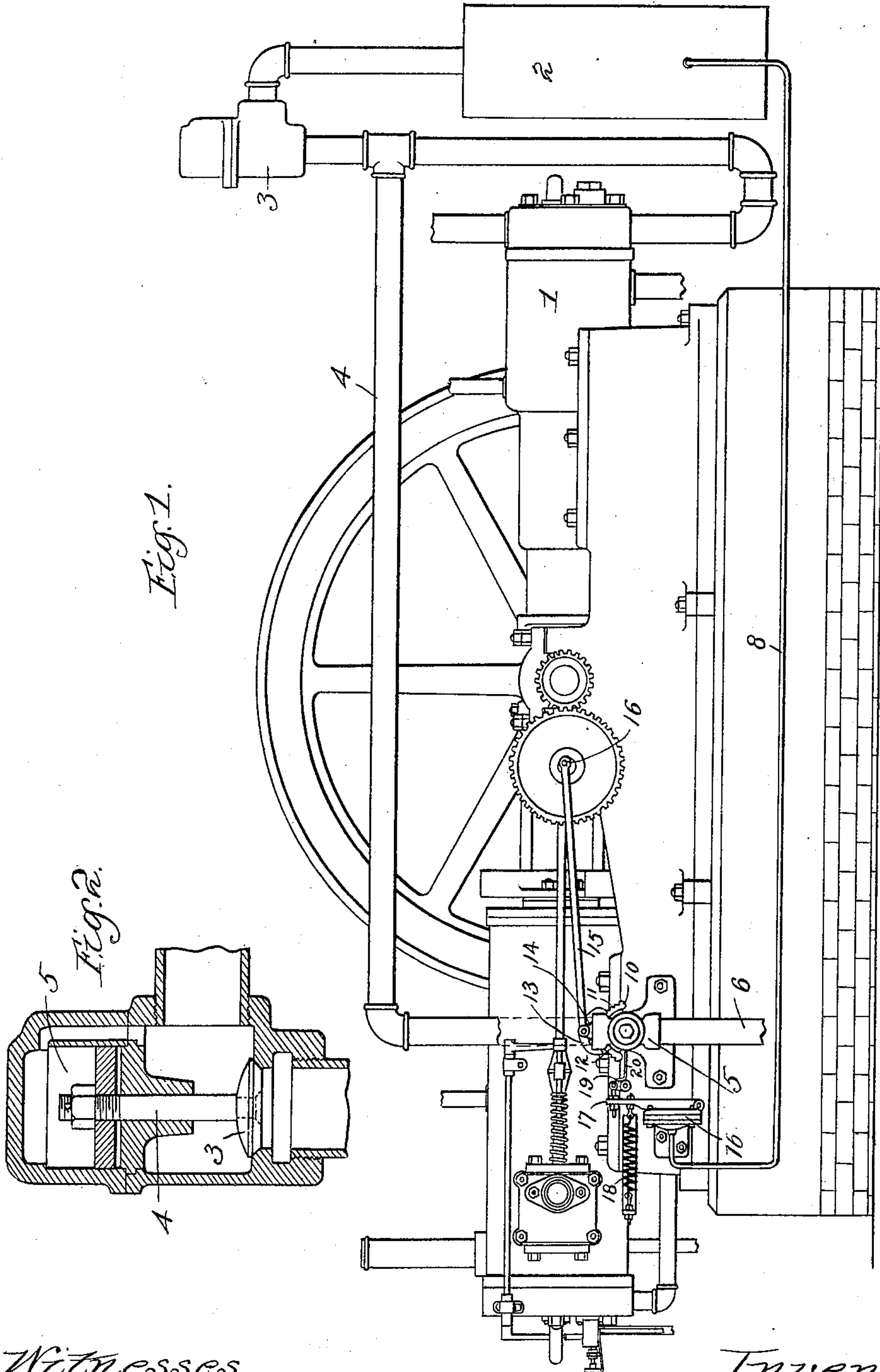
Patented June 27, 1899.

F. G. HOBART.  
COMPRESSION CONTROLLER.

(Application filed Oct. 13, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.  
Wm. M. Rheum.  
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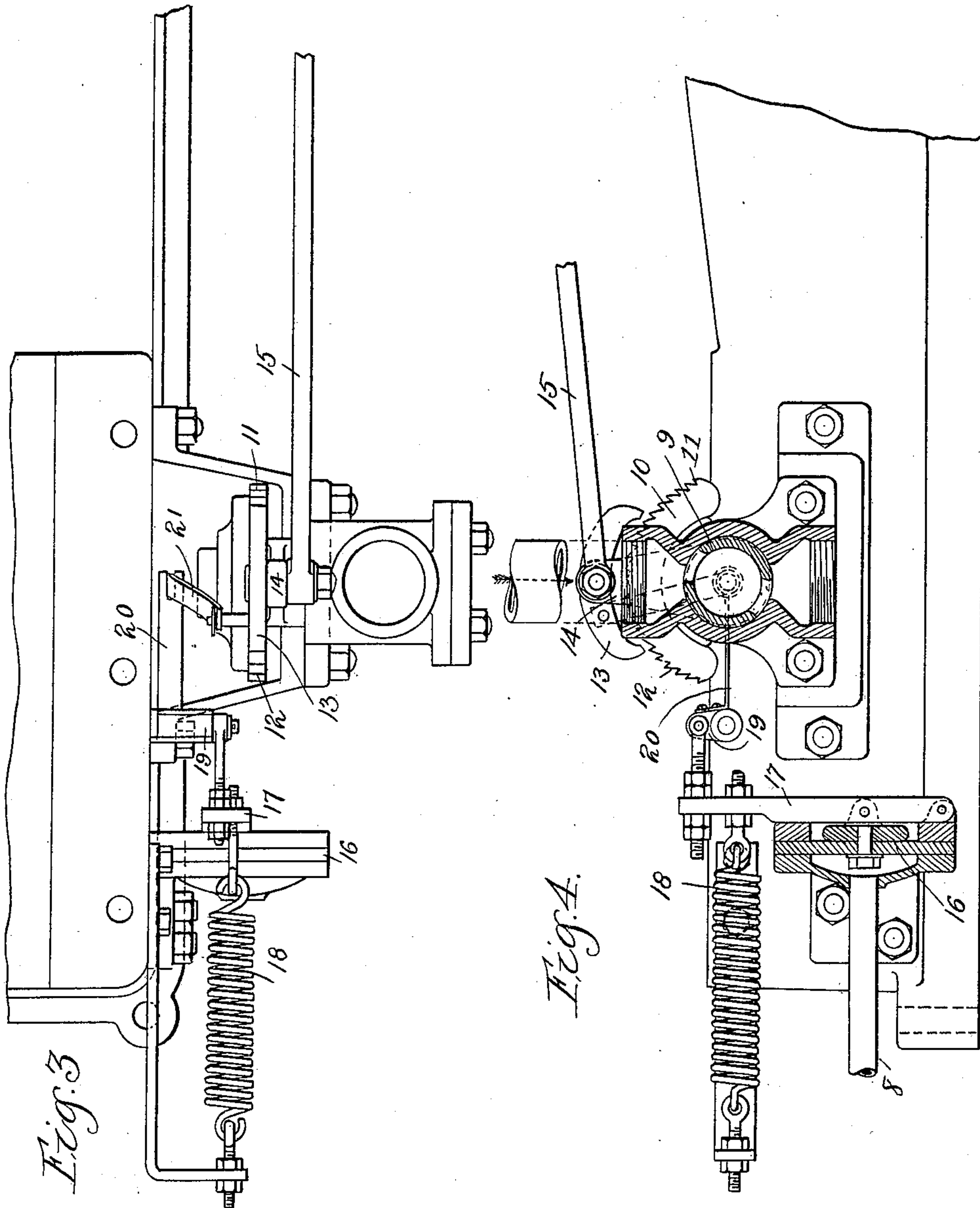
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# UNITED STATES PATENT OFFICE.

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## COMPRESSION-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 627,850, dated June 27, 1899.

Application filed October 13, 1898. Serial No. 693,433. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK G. HOBART, a citizen of the United States, residing in Beloit, Rock county, Wisconsin, have invented certain new and useful Improvements in Compression-Controllers, of which the following is a specification.

My invention relates to that class of apparatus which is designed for the purpose of controlling or regulating the amount of pressure delivered to and held within a fluid-compressor receiver or reservoir, a class to which the term "unloading device" is not infrequently applied.

Heretofore it has been quite common to construct mechanism in which when the desired pressure in the reservoir was reached an unloading or escape valve from the compressor was opened by the operation of the pressure in the receiver exerted against a diaphragm or piston, the diaphragm or piston being the moving force which opened and closed the unloading-valve. Such an arrangement I have found to be objectionable for the reason, first, that if a piston is employed leakage is almost sure to result, whereas if a diaphragm be used but little range of movement is available, and the satisfactory operation of the unloading-valve requires not only the exercise of suitable force, but also a suitable range of movement in the moving handle or lever.

The first of the objects of my invention is to overcome these difficulties by combining with an automatic pressure-operated device an unloading-valve designed to be actuated from some moving part of the compressor, the opening or closing of the valve being determined by the amount of the pressure itself.

Another difficulty which I aim to overcome by my invention arises out of the tendency of the check-valve, which is ordinarily located between the compressor or point of attachment of the unloading-valve and the receiver, to seat with every stroke of the compressor during all that time when the unloading-valve is open. Of course there is no flow of air in the discharge-pipe at any stroke of the compressor except during that portion of the time in which the pressure within the compressor-cylinder is at a point greater in amount than

the pressure within the receiver. During the balance of the time not only the compressor discharge-valves, but also the check-valve between the unloading device and the receiver, become seated. The result of this is that when the unloading-valve is closed the check-valve seats at every stroke of the compressor, resulting in unnecessary wear and expense and also in a not inconsiderable increase in the resistance against which the compressor is forced to do its work. My invention contemplates the entire removal of any such trouble as this by the employment, in combination with the unloading-valve, of a check-valve provided with a retarding device constructed to permit the slow seating of the check-valve whenever the unloading-valve opens, but to prevent the seating of the check-valve at every stroke of the pump.

I will now proceed to describe my invention in connection with the accompanying drawings, in which—

Figure 1 is a side elevation showing a compressor having my improvements applied thereto. Fig. 2 is an enlarged view in section, showing my slow-seating check-valve. Fig. 3 is a plan view of part of the mechanism, and Fig. 4 is a partial elevation of some of the parts on a larger scale.

Referring now more particularly to Fig. 1, it will be seen that in the connection leading from the compression-cylinder 1 to the receiver 2 I have introduced a check-valve 3, and between the check-valve 3 and the compression-cylinder there is a connection 4, leading to an unloading or escape valve 5, the outlet 6 of which goes to the atmosphere. The valve 5 is bolted to the frame of the compressor, and adjacent thereto is an automatic pressure-operated device 7, having its pressure-inlet connected with the receiver by means of a pipe 8. The plug 9 of the valve 5 (see Fig. 4) is secured to a handle 10, which is provided with a double set of ratchet-teeth, 11 12, pointing in opposite directions. Mounted above these teeth is a double ratchet-pawl 13, pivoted upon the outer end of a rocking lever 14, and arranged so that the reciprocating movement imparted to it through the rod 15 and the eccentric-pin 16 will tend to rotate the plug 9, so as to open or close the un-



loading-valve, according to which of the two sets of ratchet-teeth is engaged by the pawl 13. This is determined by the amount of pressure in the receiver acting against the diaphragm 16 and lever 17 in opposition to the spring 18, the upper end of the lever 17 being connected to a rocker-arm 19, the movement of which is transmitted to the pawl 13 through the spring 20 and the link 21. (See Fig. 3.) By suitable adjusting devices the tension of the spring 18 can be set at any point desired, so that the unloading-valve will open at any predetermined pressure in the receiver.

The operation of my invention is as follows: Supposing that the tension of the spring 18 be adjusted at seventy pounds, when the pressure in the receiver reaches that point the diaphragm 16 will be moved to the right. This will move the levers 17 and 19 in a direction to press down upon the spring 20, pulling the pawl 13 down upon the left side into engagement with the ratchet-teeth 12. The reciprocating movement of the pawl 13 will then gradually turn the handle 10 to the left and open the plug 9, making an escape for the pressure that comes from the compressor-cylinder to the atmosphere, relieving the compressor of its load and preventing the accumulation of any excess in the receiver. When this takes place, the check-valve 3 of course seats.

In order to prevent the seating of the check-valve 3<sup>a</sup> at every stroke of the compressor, I provide the stem 4 of the same upon its upper end with a dash-pot piston 5, arranged, as shown in Fig. 2, made sufficiently loose to permit the ready seating of the valve whenever the unloading-valve opens, but to prevent the seating of the valve for each stroke of the compressor.

When the pressure in the receiver falls below the desired limit, the movement of the parts connected with the diaphragm 16 is reversed until the pawl 13 assumes a position in which it engages the ratchet-teeth 11, in which position the reciprocating movement of the pawl, due to the rotation of the eccentric-pin 16, will move the handle 10 to the right, closing the unloading-valve, and thus permitting the compressor to again discharge into the receiver.

By the arrangement which I have described I secure considerably better practical results than can possibly be obtained in any construction where the unloading-valve is operated directly by the movement of the diaphragm. Especially in the case of large compressors, where the unloading-valve is of considerable size, a great deal of force is required to move it, and this force must be exerted through a considerable range of motion. If a diaphragm mechanism be constructed suitable for this purpose, it will be so clumsy as

not to be sensitive or accurate in its operation, whereas if it be made sensitive and accurate it would be too delicate and small to positively and readily move the unloading-valve.

It is obvious that very many of the details of the construction which I have shown and described could be considerably modified without departing from the spirit of my invention, and I do not, therefore, desire to be considered as limiting myself to the precise construction shown, but include all equivalent mechanism as clearly in the scope of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a compressor having an unloading-valve applied thereto, of a check-valve between said unloading-valve and the compressor-receiver, said check-valve being provided with means whereby its seating is retarded.

2. A compressor unloading device or controller comprising an unloading-valve, means whereby said valve may be opened and closed by motion received from some moving part of the compressor, and means whereby said first-mentioned means is thrown into or out of action automatically by the pressure in the receiver.

3. A compressor unloading device comprising an unloading-valve, a ratchet-handle secured thereto, a pawl designed to engage said ratchet-handle, connection between said pawl and some moving part of the compressor whereby said pawl receives a reciprocating motion, and an automatic pressure-operated device whereby said pawl is thrown into or out of action to open or close said unloading-valve.

4. A compressor unloading device comprising an unloading-valve, a ratchet-handle secured thereto, a pawl designed to engage said ratchet-handle, connection between said pawl and some moving part of the compressor whereby said pawl receives a reciprocating motion, and a spring and diaphragm device whereby said pawl is thrown into or out of action to open or close said unloading-valve.

5. A compressor unloading device comprising an unloading-valve, a ratchet-handle secured thereto, a pawl designed to engage said ratchet-handle, an eccentric-pin rotated by the compressor whereby said pawl receives a reciprocating motion, and an automatic pressure-operated device whereby said pawl is thrown into or out of action to open or close said unloading-valve.

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Witnesses:

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