

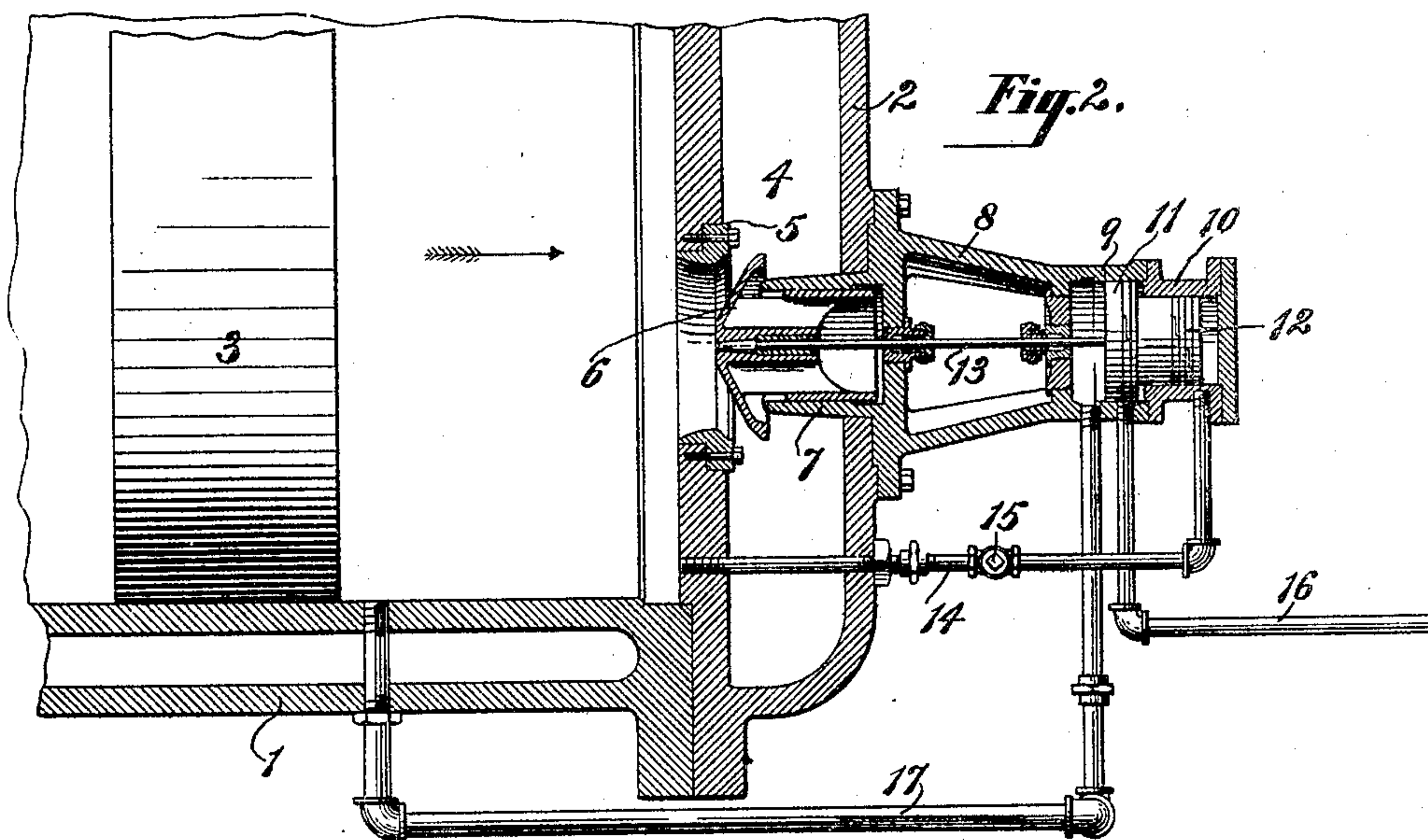
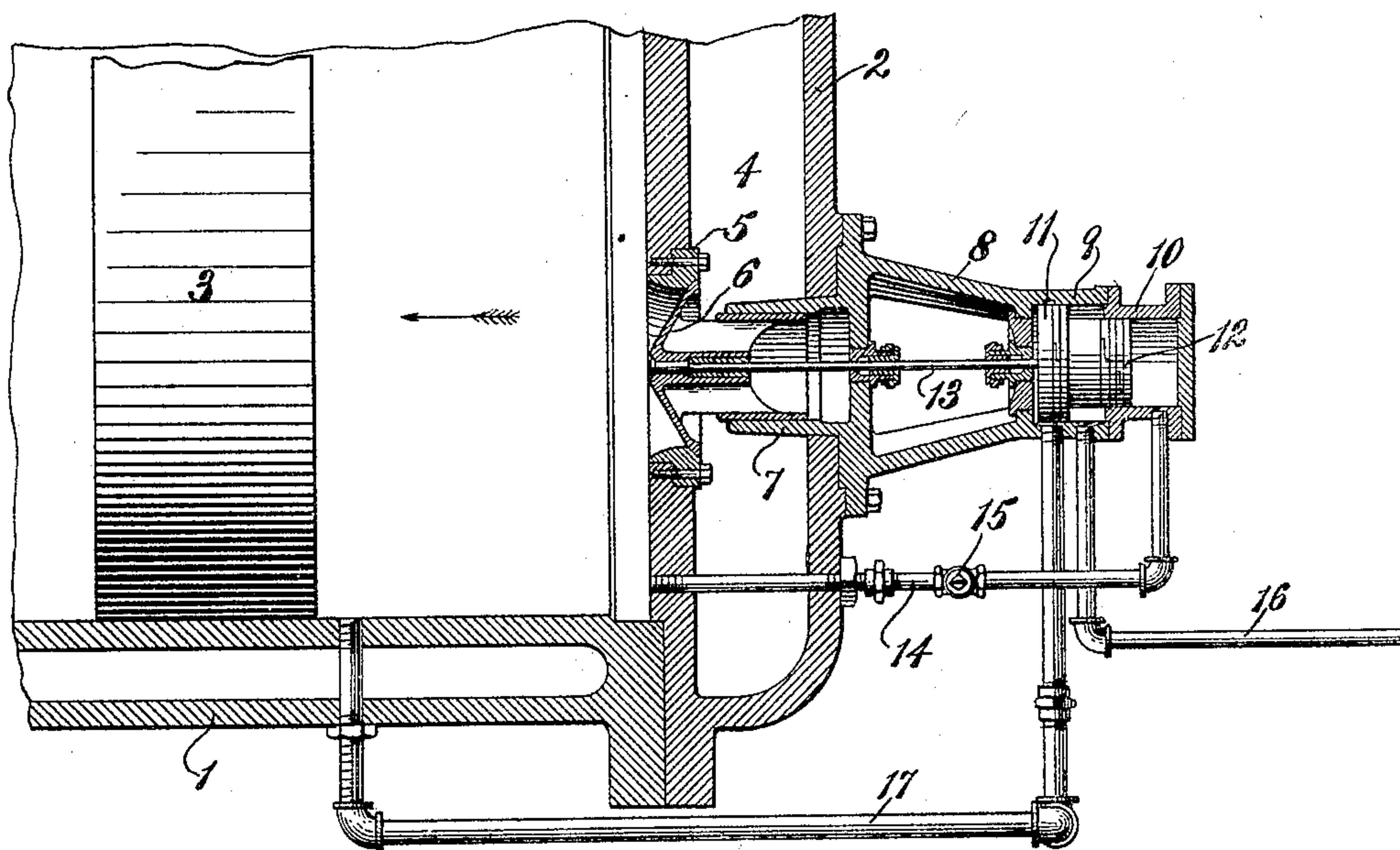
No. 803,192.

PATENTED OCT. 31, 1905.

W. PRELLWITZ.  
MEANS FOR OPERATING THE DISCHARGE VALVES OF HIGH PRESSURE  
CYLINDERS.

APPLICATION FILED JAN. 26, 1905.

*Fig. 1.*



*Witnesses:*

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*Wm. Prellwitz*  
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# UNITED STATES PATENT OFFICE.

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MEANS FOR OPERATING THE DISCHARGE-VALVES OF HIGH-PRESSURE CYLINDERS.

No. 803,192.

Specification of Letters Patent.

Patented Oct. 31, 1905.

Application filed January 26, 1905. Serial No. 242,798.

*To all whom it may concern:*

Be it known that I, WILLIAM PRELLWITZ, a citizen of the United States, and a resident of Easton, in the county of Northampton and State of Pennsylvania, have invented a new and useful Means for Operating the Discharge-Valves of High-Pressure Cylinders, of which the following is a specification.

The object of this present invention is to provide a new arrangement of the means for operating the discharge-valves of high-pressure cylinders, whereby when the pressure in front of the piston within a cylinder becomes substantially equal to the pressure in the cylinder-head the discharge-valve will be automatically opened without requiring this additional load—viz., the pressure required to open the valve—being thrown onto the piston.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents a longitudinal central section through a discharge-valve, its adjacent parts, and a portion of a high-pressure cylinder, the valve being shown closed; and Fig. 2 is a similar view, the valve being shown open.

The high-pressure cylinder is denoted by 1 and its head by 2. The piston, which is fitted to reciprocate within the cylinder, is denoted by 3. The discharge-space in the cylinder-head is denoted by 4. The inner wall of the cylinder-head is provided with the usual valve-seat 5, which is opened and closed by a discharge-valve 6. This discharge-valve 6 is guided in its movements toward and away from its seat by the valve-box 7, which is secured in the usual manner to the outer wall of the cylinder-head. The valve-box 7 is provided with a frame 8, which supports a larger cylinder 9 and a smaller cylinder 10 in alignment with each other. The chamber of the cylinder 9 is provided with a piston 11, and the chamber of the cylinder 10 is provided with a piston 12. These pistons 11 and 12 are connected rigidly together and are connected to the valve-stem 13 of the discharge-valve 6. A pipe 14 leads from the interior of the high-pressure cylinder 1, at the end thereof, through the cylinder-head 2, to the interior of the chamber of the cylinder 10 in front of the piston 12. This pipe 14 may have a regulating-valve 15 therein. A sec-

ond pipe 16 leads from a source of low pressure—such, for instance, as the intercooler—to the chamber in the larger cylinder 9 in front of the piston 11, near the outer end of said chamber. A third pipe 17 leads from the space in the high-pressure cylinder 1, at a short distance from its end, to the space in the larger cylinder 9, near the inner end thereof.

The operation of the device is as follows: As the piston 3 moves toward the cylinder-head 2 the discharge-valve 6 will remain closed until the pressure in the cylinder in front of the piston 3 equals the pressure in the discharge-space 4 in the cylinder-head. It will also be seen that the cylinder-pressure will be led through the pipe 17 to the space in the larger cylinder 9 back of the piston 11; also, that the cylinder-pressure will be led through the pipe 14 into the space in the smaller cylinder 10 in front of the piston 12. At the same time low pressure from the intercooler passes through the pipe 16 into the chamber in the larger cylinder 9 in front of the piston 11. It will thus be seen that the fluid-pressure on the back of the piston 11 is greater than the combined pressure in front of the pistons 11 and 12, so that the moment the pressure in the high-pressure cylinder in front of the piston 3 nearly equals the pressure in the discharge-space 4 the discharge-valve will be immediately opened without requiring the piston 3 to do any more work in the way of forcing the valve open. The moment the piston-head 3 in the high-pressure cylinder passes beyond the mouth of the pipe 17 in the cylinder it will be seen that the space in the larger cylinder 9 back of the piston 11 is open to the space in the high-pressure cylinder back of the piston 3. This will reduce the pressure back of the piston 11 to intercooler-pressure. This will enable the combined pressure on the front of the piston 11 and high pressure on the front of the piston 12 to immediately close the valve.

It will be seen that by the use of the device herein set forth none of the fluid is lost by being permitted to exhaust to the atmosphere, as the pipe 17 only exhausts to the intercooler-pressure back of the high-pressure-cylinder piston when permitted to do so.

It is to be understood that each one of the discharge-valves is operated in the manner



herein shown and described, and it is therefore not thought necessary to show and describe more than one of the valves and its operating device.

5 By the arrangement herein set forth I am enabled to overcome the weight of the discharge-valve. With the machine running at high speed it ordinarily takes considerable extra pressure to overcome the weight of the  
10 valve. This objectionable feature is overcome by applying the extra pressure on the valve-operating piston, as described.

What I claim is—

1. A compression-cylinder, its piston, a discharge-valve, operating-pistons therefor of  
15 varying areas, means for applying a combination of high and low pressure to one side of the valve-operating pistons and means for applying first high and then low pressure to the  
20 other side of the said pistons as the compression-cylinder piston moves toward the discharge-valve.

2. A fluid-compression cylinder, its piston, a discharge-valve, operating-pistons therefor  
25 of varying areas, the front of the smaller piston being in open communication at all times with the interior of the compression-cylinder in front of its piston, the front of the larger piston being at all times in open communica-

tion with a source of low-pressure supply and  
30 the back of the larger piston being in open communication with the interior of the compression-cylinder alternately to the front and back of its piston as the piston reciprocates.

3. A fluid-compression cylinder, its piston, 35 a discharge-valve, operating-pistons therefor of varying areas, a pipe leading from the end of the compression-cylinder to the front of the smaller valve-operating piston, a pipe leading from a source of low-pressure supply to  
40 the front of the larger valve-operating piston and a pipe leading from the interior of the compression-chamber at a distance from its end, to the back of the larger valve-operating piston for permitting the back of the said  
45 larger valve-operating piston to be brought into open communication alternately to the compression-cylinder in front and back of its piston.

In testimony that I claim the foregoing as  
50 my invention I have signed my name, in presence of two witnesses, this 23d day of January, 1905.

WILLIAM PRELLWITZ.

Witnesses:

JOHN R. CHICKEY,  
CHAS. B. BRUNNER.