

No. 877,563.

PATENTED JAN. 28, 1908.

E. GRISWOLD.  
HYDRAULIC PUMP REGULATOR.

APPLICATION FILED DEC. 12, 1906.

2 SHEETS—SHEET 1.

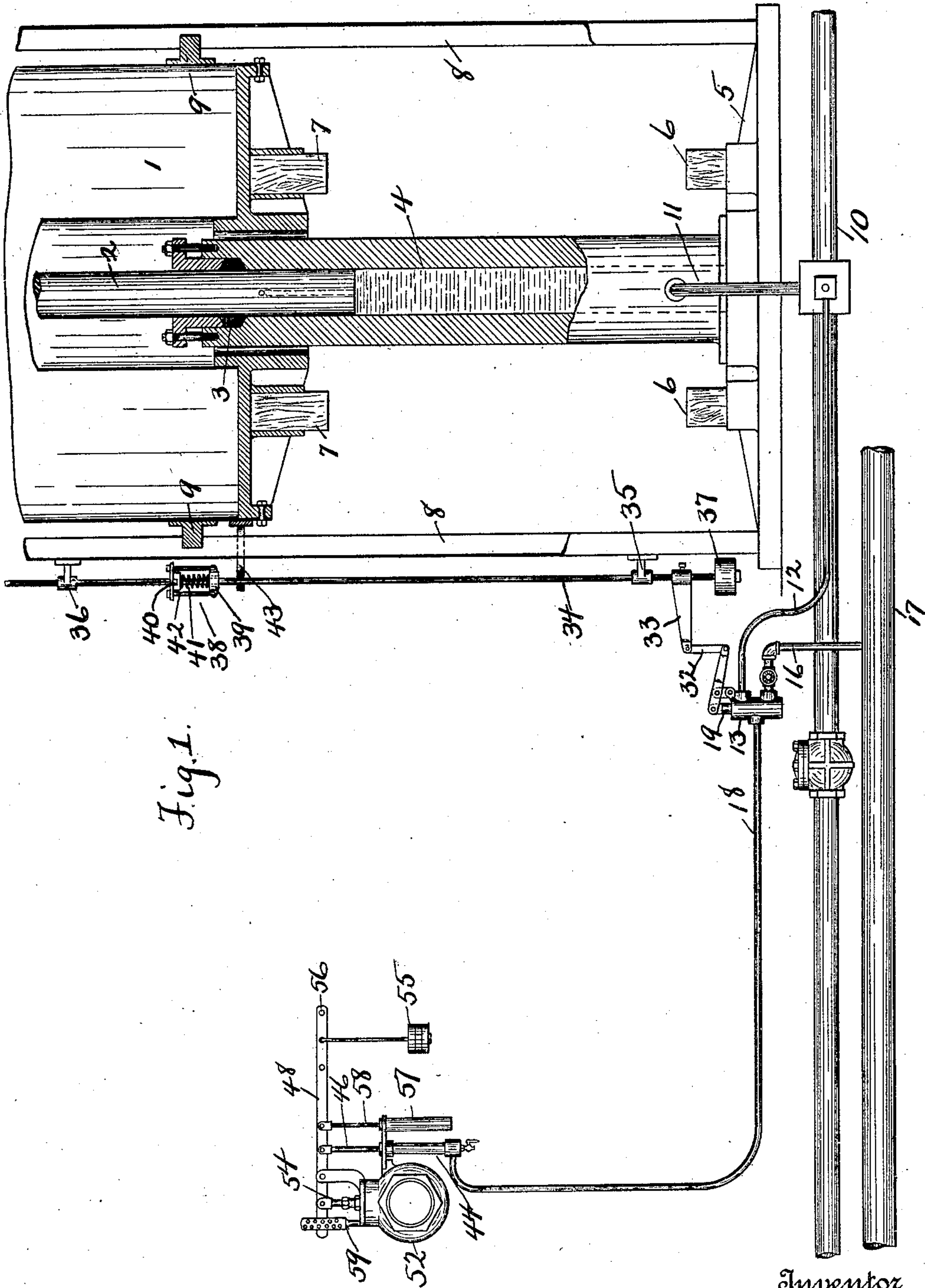


Fig. 1.

Witnesses  
B. F. Parker.  
W. C. Cadwell

Inventor  
E. Griswold  
by W. R. L. and  
Attorney

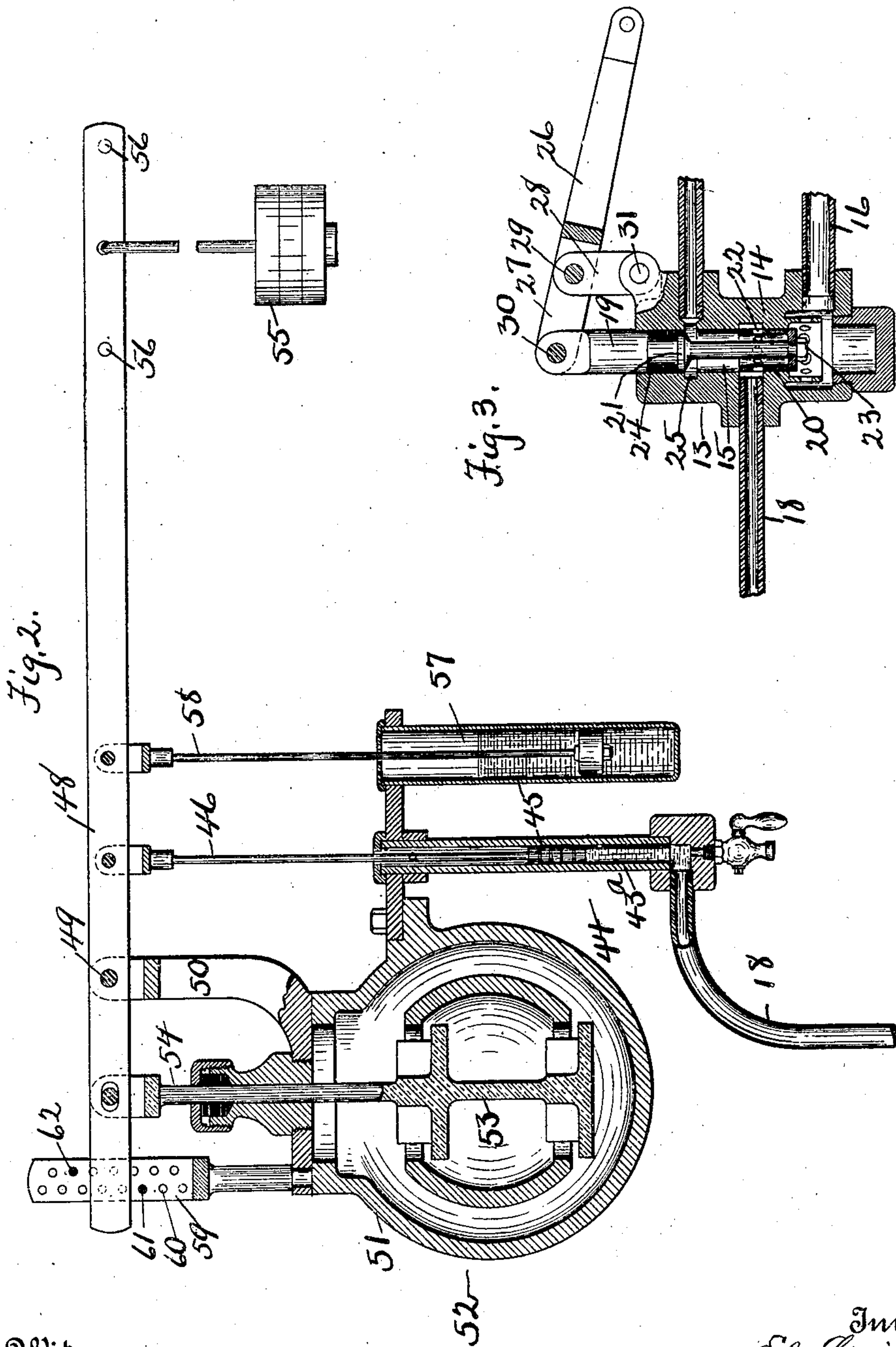
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B. F. Parker,  
W. C. Cadwell

Inventor  
E. Griswold  
By H. R. Lead  
Attorney



# UNITED STATES PATENT OFFICE.

ELY GRISWOLD, OF ERIE, PENNSYLVANIA.

## HYDRAULIC-PUMP REGULATOR.

No. 877,563.

Specification of Letters Patent.

Patented Jan. 28, 1908.

Application filed December 12, 1906. Serial No. 347,411.

*To all whom it may concern:*

Be it known that I, ELY GRISWOLD, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Hydraulic-Pump Regulators, of which the following is a specification.

This invention relates to hydraulic pump regulators and consists in certain improvements in the construction thereof as will be hereinafter fully described and pointed out in the claims.

More particularly the invention is adapted for use where it is desired to maintain a constant pressure, usually through the medium of an accumulator, under varying conditions. Where this is done, it is often desirable to have the accumulator near to the discharge of the system and it is sometimes very desirable to have the pump at some distance from the accumulator. My invention is well adapted for such a contingency.

The invention is illustrated in the accompanying drawings as follows:

Figure 1 shows a central vertical section of an accumulator and the steam valve of the pump. Fig. 2, a section through the pump valve and actuating device. Fig. 3, a section through the valve controlling the pressure on the pump valve regulating device.

1 marks the accumulator weight; 2 the accumulator piston. This piston passes through the gland 3 into the cylinder 4. This cylinder is supported on the base 5. This base is provided with the stops 6 in the path of the stops 7 on the weight. Guides 8 are arranged at each side of the weight 1. The lugs 9 extend from this weight into the guide. The high pressure line 10 is connected with the cylinder 4 by means of the pipe 11. A pipe 12 extends from this to a controlling valve 13. This controlling valve has the chamber 14 from which leads the pipe 12, the pipe 18 to the pressure device controlling the pump valve and the pipe 16 forming the exhaust. The exhaust ordinarily leads to what is known as the low pressure line 17. The valves in the valve chamber are carried by the stem 19. The valve 20 is cup shaped and operates over the inlet from the pipe 18. This is provided with perforations 22 which may be brought into or out of register with the opening leading to the pipe 18. This is secured to the stem 19 by means of a nut 23. The valve 21 is provided with the packing rings 24 and operates over a cavity 25 con-

trolling the entrance from the pipe 12. The upper end of the stem 19 is connected with a lever 26. This lever has the throated end 27 and is fulcrumed on a swinging post 28 by means of a pin 29. The lever is pivoted to the stem 19 by means of the pin 30. The post 28 is pivotally mounted on the chamber 14 by means of a pin 31.

The lever 26 is connected by a link 32 with an arm 33 extending from the governing rod 34. The governing rod is carried by the guides 35 and 36 extending from the main guide 8. This is provided with a weight 37 at its lower end of the weight having sufficient mass to actuate the valve. A stop 38 is arranged near the upper end of the governing rod. It comprises the sliding stop block 39 which is slidably mounted on the rod 34, the spring 41 between the fixed block and the sliding block and the bolt 42 which telescopically connects the blocks 39 and 40, but permits of the movement of the block 39 to prevent jar. An arm 43 extends from the weight 1 and is provided with an eye at its outer end. This eye is arranged on the rod 34. The stop 38 is so adjusted that the arm 43 contacts the block 39 when the accumulator weight reaches its desired uppermost position. As soon as the accumulator drops away from the block 39, the weight 37 returns the governing rod, thus opening the valve 13.

The pipe 18 enters the cylinder 43<sup>a</sup> of a pressure device 44. A piston 45 is arranged in this cylinder and is connected by a stem 46 with the pump valve lever 48. The lever 48 is pivoted by means of a pin 49 on an arm 50 extending from the chamber 51 of the pump valve 52. The valve disks 53 are of the ordinary balanced type and are connected with the lever 48 by means of the stem 54. A weight 55 is provided at the outer end of the lever 48. The lever is provided with a series of holes 56 by means of which the arm of the lever may be varied as desired. The amount of weight necessary depends on the amount of water pressure desired in the line. The lever 48 is also connected with a dash pot 57 by means of the stem 58 so as to prevent a sudden opening of the pump valve and consequent injury to the pump and the line. A post 59 extends upwardly from the valve cap and is provided with a series of openings 60 in which may be arranged pins 61 and 62, limiting the downward and upward movement of a lever 48. The purpose of these is to con-



trol the maximum and minimum opening to the valve.

In the operation of the device, as the accumulator reaches its uppermost position, the arm 43 contacts the stop 38 thus lifting the governing rod 34. This action operating through the lever 26 depresses the stem 19. This stem is shown in the open position in Fig. 3. The depressing of the stem so moves the valve 21 as to close off the connection through the high pressure pipe 12 and moves the perforations 22 below the closure at the bottom of the chamber so as to form a connection between the pipe 18 and the pipe 16. When this happens, the pressure is relieved from the pressure device 44 and the weight 55, depressing the outer end of the lever 48, closes the pump valve 52. When the accumulator weight drops, the arm 43 is carried away from the stop 38 and the rod 34 acting under the influence of the weight 37, drops. This effects an upward movement of the stem 19 and consequent closure of the connection between the pipes 18 and 16 and the opening of the connection between pipes 12 and 18, so that pressure is turned in to the pressure device 44. This, acting on the lever 48, lifts the outer end of the lever and opens the valve 52 so that the pump is set in motion. It will be noted that if there is any break in the high pressure line, so that there is an absence of pressure, the pressure device 44 will not be in operation and consequently the valve 52 will not be open. The mechanism therefore operates as a safety device, preventing the running away of the pump when there is any break in the line.

What I claim as new is:

1. In a hydraulic pump regulator the combination with the pump valve; of an accumulator having its liquid controlled by said pump valve; a fluid actuated pressure device controlling said pump valve; a connection for conveying pumped fluid controlled by the pump valve to actuate said pressure device and means actuated by the movement of the accumulator for controlling the fluid actuating said device.

2. In a hydraulic pump regulator the combination with the pump valve; of an accumulator having its liquid controlled by said pump valve; a fluid actuated pressure device controlling said pump valve; a connection for conveying pumped fluid controlled by the pump valve to actuate said pressure device and means actuated by the

movement of the accumulator for controlling the pumped fluid actuating said device, said device being arranged to open the pump valve as the fluid under pressure is admitted in the pressure device and to close the valve as the pressure in the pressure device is released.

3. In a hydraulic pump regulator the combination with the pump valve; of the accumulator having its liquid controlled by said pump valve; a fluid actuated pressure device controlling said pump valve; a controlling valve controlling the fluid acting on the pressure device having a chamber connected with the high pressure line, with said pressure device and with an exhaust; valve mechanism arranged in the chamber for connecting the high pressure line with the pressure device with one movement, closing said connection and opening a connection between the pressure device and exhaust with another movement; and connections between said valve mechanism and the accumulator for actuating said valve mechanism with the movement of the accumulator.

4. In a hydraulic pump regulator the combination with the pump valve; of the accumulator having its liquid controlled by said pump valve; a fluid actuated pressure device controlling said pump valve; a controlling valve controlling the fluid acting on the pressure device having a chamber connected with the high pressure line, with said pressure device and with an exhaust; valve mechanism arranged in the chamber for connecting the high pressure line with the pressure device with one movement, closing said connection and opening a connection between the pressure device and exhaust with another movement; and connections between said valve mechanism and the accumulator for actuating said valve mechanism with the movement of the accumulator, said pressure device being arranged to open the pump valve when actuating fluid is turned into the pressure device by the controlling valve and to permit the closing of the pump valve when the actuating fluid is exhausted from the pressure device.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ELY GRISWOLD.

Witnesses:

J. M. SHERWIN,  
MATTHEW GRISWOLD, Jr.