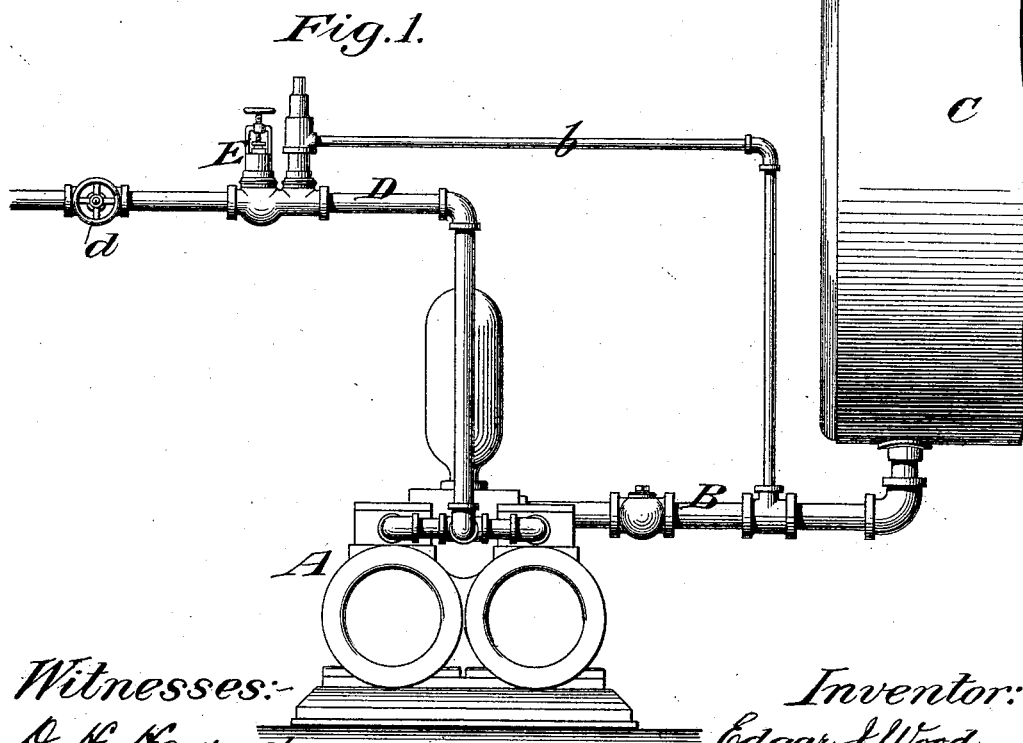
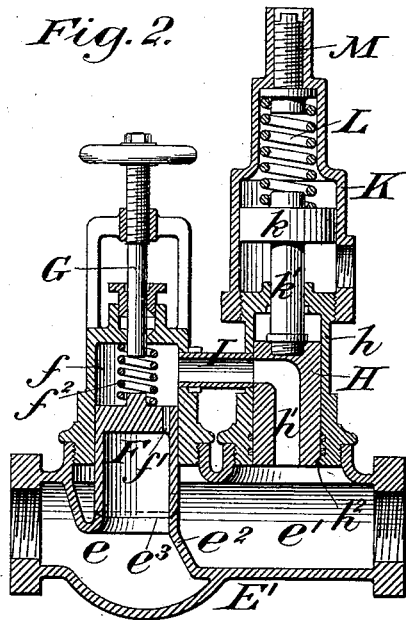


(No Model.)

E. J. WOOD.
PUMP REGULATOR.

No. 489,516.

Patented Jan. 10, 1893.



Witnesses:
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UNITED STATES PATENT OFFICE.

EDGAR J. WOOD, OF BROOKLYN, NEW YORK.

PUMP-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 489,516, dated January 10, 1893.

Application filed July 16, 1892. Serial No. 440,208. (No model.)

To all whom it may concern:

Be it known that I, EDGAR J. WOOD, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful
5 Improvement in Pump-Regulators, of which the following is a specification.

My invention relates to improvements in pump regulators in which the pressure of the fluid upon the delivery side of the pump serves
10 to cut off the supply of motive power for driving the pump.

My invention contemplates the introduction of a reducing pressure valve in the pipe which conducts the motive force to the pump and
15 the attachment to a movable part of said reducing valve of an operating piston under the control of the pressure of the fluid on the delivery side of the pump to operate the reducing valve independently of the pressure of the
20 motive force.

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

Figure 1 shows the regulator in side elevation in connection with a pump, its delivery
25 pipe and the pipe for transmitting the motive force to the pump and Fig. 2 is an enlarged sectional view of the regulator in detail.

A represents a pump of any well known or
30 approved form, shown in the present instance as a duplex pump. Its delivery pipe is represented by B and is here shown as extending to a tank C, as is common in connection with the operation of hydraulic elevators. The
35 pipe for admitting the motive force, as for example steam, to the pump is denoted by D and is provided with a throttle valve *d*. Intermediate of the throttle valve and the pump the pipe D is intercepted by a reducing pressure valve and pump regulator, represented as
40 a whole by E. The delivery pipe B is in communication with the regulator E through a pipe *b*.

The construction of the reducing pressure valve and regulator in detail is as follows:
45 The barrel or coupling section of the regulator is separated into an inlet chamber *e* and an outlet chamber *e'* by a web or diaphragm *e²* in which is an opening around which a
50 valve seat *e³* is formed. A piston valve F with a hollow face is adapted to seat upon the valve seat *e³* and to reciprocate within a tubu-

lar plug *f* screwed into the barrel or coupling section E'. The outer end of the tubular plug
55 *f* is closed and the head of the valve F is closed with the exception of a small perforation *f'* therethrough through which communication is established between the inlet chamber E and the interior of the hollow plug *f* exterior
60 to the valve. A spring *f²* inserted between the head of the valve F and the end of the plug *f* exerts its tension to throw the valve F toward its seat. As a matter of convenience,
65 I have provided a screw threaded stop-rod G extending through a suitable stuffing box in the head of the plug *f* for the purpose of positively limiting the opening of the valve F and for holding it positively to its seat, if circumstances render it desirable.

A piston valve H is fitted to reciprocate
70 within a tubular plug *h* screwed into the barrel or coupling section E' on the outlet or low pressure side of the valve F. The valve H is provided with a port *h'* leading from its face in communication with the chamber *e'* to a
75 branch pipe I between the tubular plugs *h* and *f* so that when the valve H is in its normal position, or at the limit of its movement toward the outlet chamber *e'*, there will be open communication between said outlet
80 chamber *e'* and the interior of the tubular plug *f* exterior to the valve F. The valve H is limited in its downward movement by a shoulder *h²*. The outer end of the tubular plug *h* is closed and there is fitted thereon a
85 casing K within which a piston *k* is adapted to reciprocate. The piston *k* is provided with a rod *k'* which extends through the head of the hollow plug *h* and connects with the outer
90 end of the piston valve H. The branch pipe *b* leading from the delivery side of the pump, communicates with the casing K at a point below the piston *k*. A spring L is inserted between the piston *k* and a screw-threaded
95 plug M at the outer end of the casing so that by screwing the plug M more or less, tension may be exerted upon the piston *k* to prevent it from moving either under the pressure of the valve beneath it or under the impulse of
100 the fluid within the outlet chamber *e'*.

In operation, whenever the pressure upon the delivery side of the pump reaches a predetermined degree, it will, by its action upon the under side of the piston *k*, lift the said

piston and thereby slide the piston valve H in a direction to cut off communication between the chamber e' and the interior of the hollow plug f exterior to the valve F. When-
 5 ever this takes place, the high pressure within the chamber e will be established through the perforation f' , within the hollow plug f exterior to the valve F and the latter will close under the influence of gravity or of the
 10 spring f^2 , or both, and the action of the pump A will be arrested. As soon, however, as the pressure on the delivery side of the pump is diminished, the piston k will again return and thereby open communication through the
 15 port h' with the chamber e' and the interior of the plug f , the high pressure within the plug f exterior to the valve F will be thereby immediately relieved and the valve F will be thrown open and the pump A again set in
 20 action.

In addition to its functions under the pressure of the fluid on the delivery side of the pump, the regulator will also act simply as a
 25 reducing pressure valve under the pressure of the actuating fluid, entering the pump through the pipe D. That is, whenever the pressure within the chamber e' passes beyond a predetermined degree, it will act upon the piston valve H to lift it and thereby cut
 30 off communication between the chamber e' and the interior of the plug f , equalizing the pressure upon the opposite sides of the valve F and permitting it to approach its seat. Upon the lowering of the pressure within the
 35 chamber e' , the piston valve H will again return, opening the communication through its port h' with the interior of the plug f , relieving the pressure upon that side of the valve F and again causing it to open to admit the
 40 actuating fluid.

What I claim is:

1. The pump regulator comprising three valves, one under the control of the high pressure motive fluid to operate it, a second under the control of the low pressure motive
 45 fluid to operate it and a third under the control of the pressure at the outletting side of the pump to operate it, the second and third named valves being connected to operate as
 50 one and located in chambers independent of each other, and a conduit leading from the outer side of the first named valve into communication with the low pressure motive
 55 fluid said conduit being under control of both the second and third named valves to close and open it, substantially as set forth.

2. The reducing pressure valve comprising a barrel or coupling section separated into high pressure and low pressure chambers, a
 60 valve for controlling the passage of fluid from one chamber to the other, a closed casing for said valve, the interior of said casing being in communication with the high pressure chamber through an opening in the valve
 65 and a piston valve in communication with the low pressure chamber and provided with a port through it in communication with the interior of the casing of the first named valve, in combination with a piston within an
 70 enclosed casing and connected to move with said piston valve, and means for connecting the casing containing said piston with the delivery side of a pump and for connecting the barrel or coupling section with a pipe for
 75 the transmission of a motive fluid, substantially as set forth.

EDGAR J. WOOD.

Witnesses:

FREDK. HAYNES,
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