

H. & P. MUELLER.

O. B. & A. MUELLER, EXECUTORS OF H. MUELLER, DEC'D.

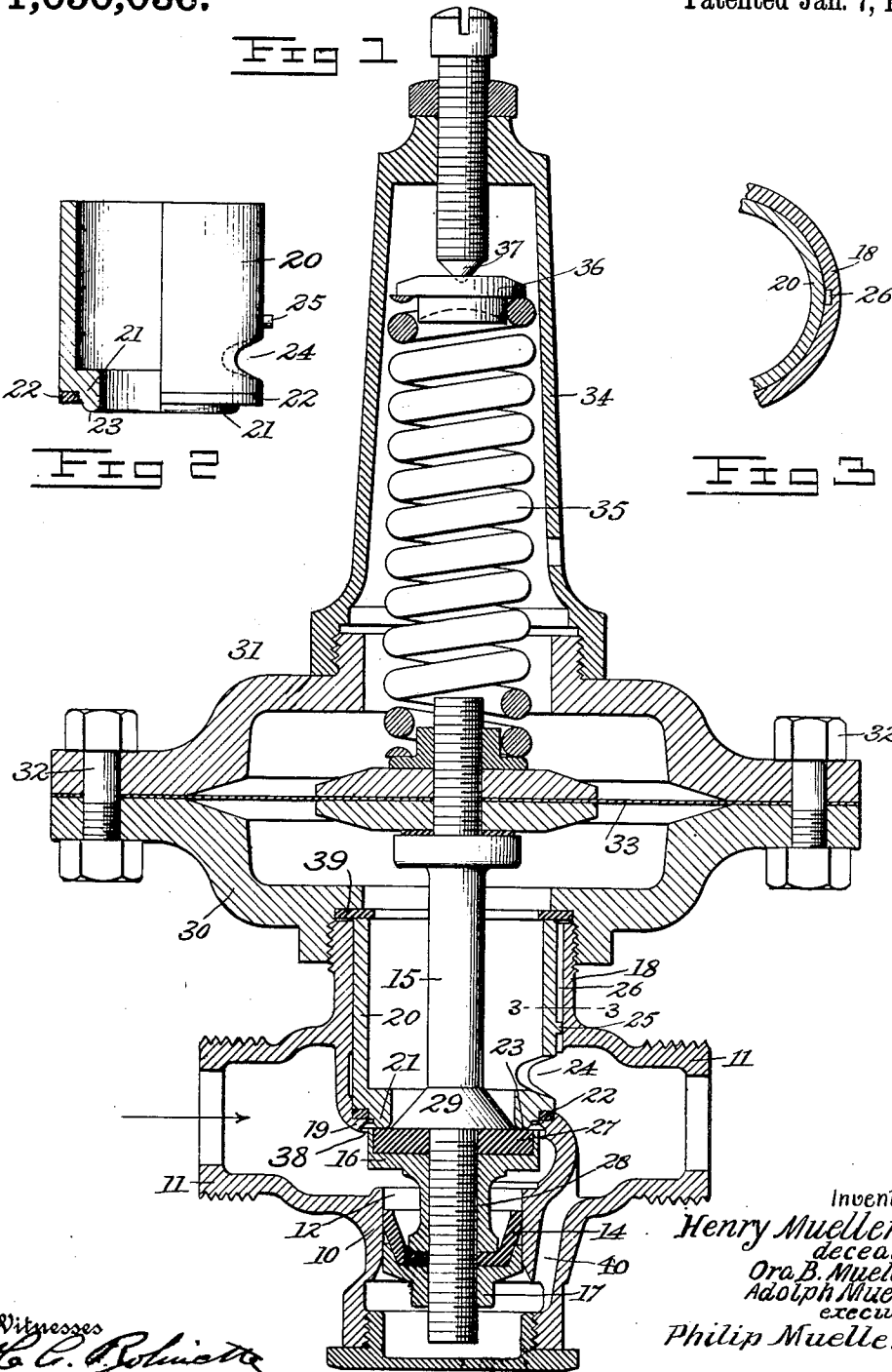
FLUID PRESSURE REDUCER OR REGULATOR.

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1,050,036.

Patented Jan. 7, 1913.

Fig 1



Witnesses
H. C. Robinson
A. J. Hollingworth

Inventors
Henry Mueller
Ora B. Mueller
Adolph Mueller
 executors
Philip Mueller

By *Meyers, Cushman & Co*
 Attorneys

UNITED STATES PATENT OFFICE.

HENRY MUELLER, DECEASED, LATE OF DECATUR, ILLINOIS, BY ORA B. MUELLER AND ADOLPH MUELLER, OF DECATUR, ILLINOIS, EXECUTORS, AND PHILIP MUELLER, OF DECATUR, ILLINOIS, ASSIGNORS TO H. MUELLER MFG. CO., OF DECATUR, ILLINOIS, A CORPORATION OF ILLINOIS.

FLUID-PRESSURE REDUCER OR REGULATOR.

1,050,036.

Specification of Letters Patent.

Patented Jan. 7, 1913.

Application filed April 1, 1911. Serial No. 618,490.

To all whom it may concern:

Be it known that we, HENRY MUELLER, deceased, late a citizen of the United States, and resident of Decatur, county of Macon, and State of Illinois, and PHILIP MUELLER, a citizen of the United States, and resident of Decatur, county of Macon, and State of Illinois, did during the lifetime of the said HENRY MUELLER jointly invent certain new and useful Improvements in Fluid-Pressure Reducers or Regulators, of which the following is a specification.

This invention relates to fluid pressure regulators and reducers for establishing and maintaining a continuous pressure of water in distributing systems of less force than that in the main supply pipes.

The object, therefore, of this invention is to improve devices of this class by employing within the body of the regulator and reducer a removable bushing or lining on which is formed a valve seat whereby the use of a valve and valve seat of greater diameter than heretofore is permitted so that the area of said valve exposed to pressure from above when seated will be the same as that of the lower cup piston and its cylinder. As thus constructed, a better balance of pressure is obtained with a more stable and uniform reduction of pressure. Furthermore with the present arrangement, the structure of the device is simplified and the interior parts rendered more accessible as they can all be withdrawn from the upper end of the casing by simply removing the top and without disconnecting any of said parts.

With these and other objects in view the invention consists of the novel construction, arrangement and combination of parts hereinafter described in detail and pointed out in the appended claims, reference being had to the accompanying drawing, in which:—

Figure 1 is a central vertical sectional view of the regulator in line with the fluid pressure pipe. Fig. 2 is a view partly in elevation, partly in section of a detail of the in-

vention, and Fig. 3 a cross sectional view on the line 3—3 of Fig. 1.

In the drawing, the numeral 10 indicates the body of the regulator having, in the present instance, oppositely disposed pipe connections 11 which may be made with exterior or interior threads or end flanges as desired. Within the body 10 below the pipe connections is a cylinder 12 placed with its axis perpendicular to said pipe connections and designed to receive a piston formed by a cup shaped washer 14 mounted on the threaded end of a valve stem 15 and clamped between the threaded stem of a superposed valve 16 and a retaining nut 17.

Projecting upwardly, yet forming a part of the body 10, is a neck 18 of cylindrical shape with its axis coincident with the axis of the cylinder 12. Between the cylinder and neck within the body 10 is a horizontal partition 19 of well known construction, dividing the body into two parts through which is formed a circular opening larger than the valve 16, for the passage of fluid when the valve is open. Lining the neck is a bushing or shell 20, its lower end 21 being of less diameter and adapted to fit the opening in the partition 19. On the upper side of the partition 19 is a seat for a packing washer 22, preferably lead, surrounding the reduced end 21 of the bushing to make a tight joint between said partition and the bottom of the bushing. The reduced end 21 of the bushing is rounded or tapered at its bottom edge 23 to form the seat for the valve 16, said seat, from its construction, being practically a line and of the same diameter as the lower cylinder 12. The bushing is hollow and has a slot 24 through its outlet side for the exit of water that enters from the bottom when the valve is opened. The bushing 20 has on its outer surface, a pin, key or rib 25 arranged to enter a groove 26 in the neck 18, the relative position of the pin and groove being such that when they register, the slot 24 in

said bushing is directed toward the outlet side of the body 10. The valve 16 is slightly smaller than the opening in the partition 19 so that it may pass therethrough when assembling or disconnecting the parts, and has a recess in its upper end to receive a seat washer 27 to bear against the seat 23 on the lower end of the bushing 20. The bottom of the valve is provided with a thimble 28 threaded on the valve stem 15 as heretofore described by means of which the valve seat washer is pressed against a stop 29 on said stem. The underside of the partition 19 has formed therein a groove 38 to permit high pressure water acting on the top of the valve 16 outside the valve seat 23 to equalize the pressure on the underside of the valve in excess of the area of the valve seat.

Screwed on the upper end of the neck 18 projecting from the body 10 is a large shallow cup 30 communicating with the interior of the bushing and packed by means of a washer 39, preferably of lead, between said bushing and the bottom of the shallow cup 30. The cup 30 is closed by a similarly shaped cover 31 secured thereon by bolts 32 passing through a marginal flange on each part, the two parts forming a diaphragm chamber. Between the cup and its cover is a flexible diaphragm 33 to the center of which the valve stem 15 is secured in any suitable manner. A cap 34, preferably tapering toward its upper end is screwed on the center of the cover 31 and contains a coil spring 35 pressing at its lower end on the diaphragm 33 and against a button 36 at the top, said button bearing against the point of a screw 37 for changing the tension of the spring 35.

The pressure regulator of the type shown in the drawing is connected on the left or inlet side to the high pressure service and on the right to the low pressure, or distributing system. Let it be assumed that the distributing system is filled with water at the desired pressure regulated by the spring 35 tending to open the inlet valve 16 and the diaphragm 33 acting through the water pressure, to close it. The area of the diaphragm being so much greater than the area of the inlet valve, the latter is closed by the low pressure of the distributing system. This low pressure is obtained in the known way by adjusting the spring 35 to bear with greater or less force on the diaphragm and the valve stem connected thereto. With the parts in the position shown and described, if water be permitted to escape from any distributing pipe the pressure against the diaphragm will be lessened, thereby permitting the spring to expand and open the valve 16, for the entrance of water under

high pressure which will reestablish the pressure in the distributing system, raise the diaphragm and close said valve, as soon as the outlet from the distributing pipe is closed.

It is to be noted that equilibrium of pressure on the inlet side of the valve 19 is maintained by reason of the fact that the contact areas of the valve 27 on its seat 23 and the piston 14 in the cylinder 12 are the same, the bottom of the valve and top of the piston 14 being subjected to high pressure. Furthermore, as the entire area of the valve is greater than that of the piston, water pressure is admitted to the top of the valve exterior the valve seat, through the groove 38 in the underside of the partition 19 to balance the excess area of the valve. On the outlet or low pressure side of the valve, equilibrium is established by means of a by-pass 40 connecting said outlet side with the bottom of the cylinder 12 below the piston therein.

Having thus described the invention what is claimed as new is:—

1. A fluid pressure regulator and reducer comprising a casing interiorly divided by a partition into an inlet chamber and an outlet chamber, a cylindrical neck projecting from the outlet chamber, said partition having an opening therethrough connecting the chambers, a removable hollow bushing in the outlet chamber and the neck having an exit port in its side, said bushing extending at one end into said opening, a valve seat on said end of the bushing smaller than the opening, a balanced valve adapted to be inserted in the inlet chamber from the outlet chamber through said opening in the partition and to bear on the valve seat of the bushing, a cylinder in the casing concentric with the neck and opening at one end directly into the inlet chamber and at the opposite end by a by-pass into the outlet chamber, a piston on the lower end of the balanced valve movable in said cylinder, and yielding means automatically controlled by the pressure in the outlet chamber for opening and closing the valve.

2. A fluid pressure regulator and reducer comprising a casing interiorly divided by a partition into a high pressure inlet chamber and a low pressure outlet chamber, said partition having an opening connecting the chambers, a neck projecting from the outlet chamber concentric with the opening in the partition and continuous with said chamber and open at its outer end, a hollow bushing inserted in said neck from its open end and projecting into the opening in the partition, a valve seat on the projecting end of the bushing and an exit port in one side

thereof opening into the outlet chamber, a
balanced valve in the inlet chamber inserted
thereinto through said neck and adapted to
bear on the valve seat, a balancing piston
5 on the valve stem movable in a cylinder con-
nected at its ends with the inlet and outlet
chambers respectively, and means automati-
cally controlled by the pressure in the out-
let chamber for opening and closing the
10 valve.

In testimony whereof we have hereunto

set our hands in the presence of two sub-
scribing witnesses.

ORA B. MUELLER,
ADOLPH MUELLER,

*Executors of the last will and testament of
H. Mueller, deceased.*

PHILIP MUELLER.

Witnesses:

LEONARD F. MCKIBBEN,
WILLIAM R. BIDDLE.