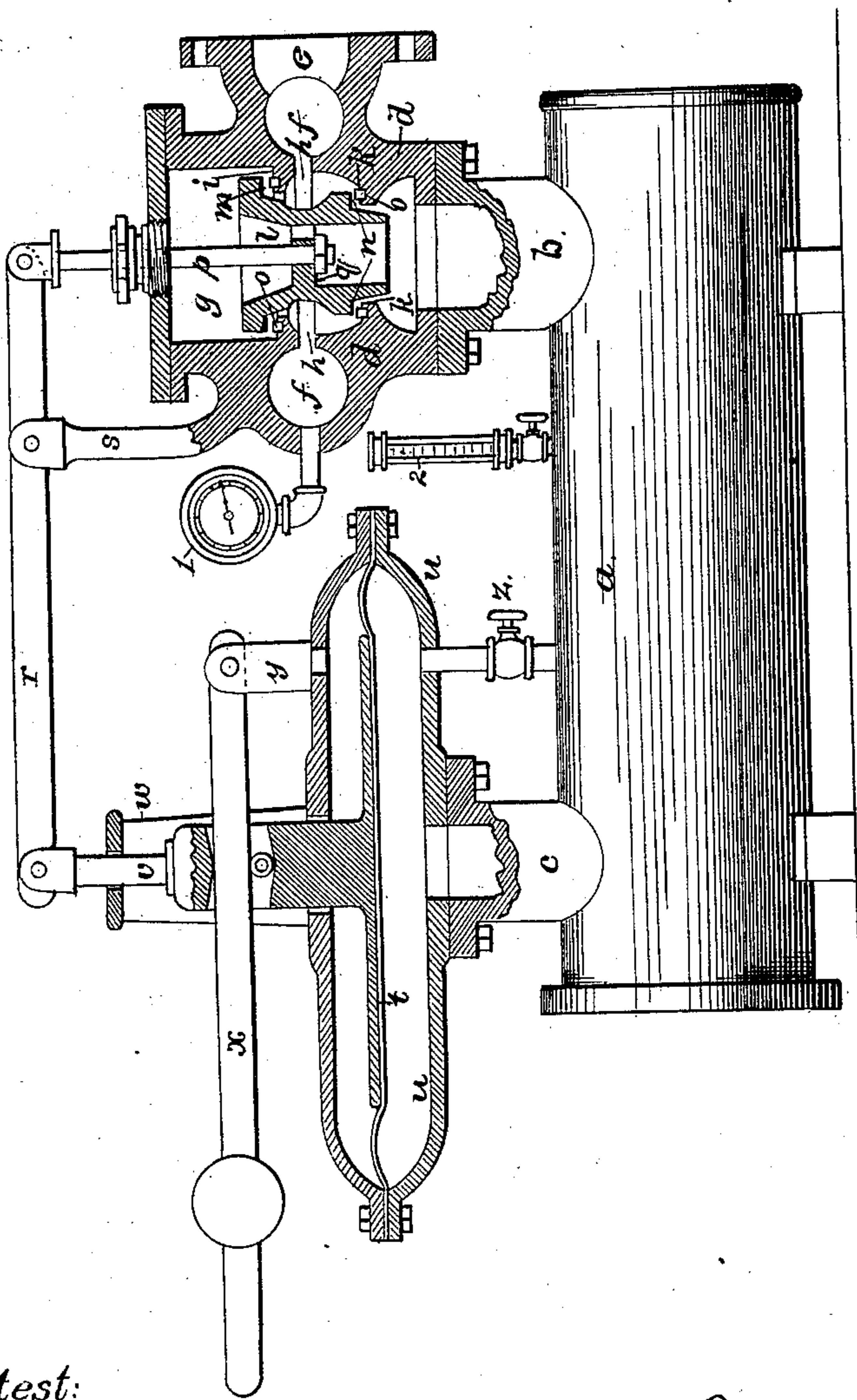


(No Model.)

J. W. RAMSEY.
PRESSURE REGULATOR.

No. 361,082.

Patented Apr. 12, 1887.



Attest:
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UNITED STATES PATENT OFFICE.

JOHN W. RAMSEY, OF BEAVER FALLS, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JOHN CORBUS, OF SAME PLACE.

PRESSURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 361,082, dated April 12, 1887.

Application filed January 27, 1887. Serial No. 225,698. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. RAMSEY, a citizen of the United States, residing at Beaver Falls, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Pressure-Regulators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to the letters and figures of reference marked thereon, which form a part of this specification.

The figure presents a central sectional view of a fluid-pressure regulator to which I have applied my improvements.

The object of my present invention is to provide a pressure-regulator, which is adapted for use in connection with gas, steam, water, or other fluid apparatus, for the purpose of regulating the fluid-supply or reducing the same from a high pressure to any desired degree.

The drawing shows a particular form of regulator, which is particularly designed to reduce the pressure in gas-mains to any predetermined low pressure which is desired.

In the drawing, *a* represents a low-pressure pipe, open at both ends.

b is a T-connection, upon which the pressure-reducing valve is located.

c is another T-connection, upon which the regulating-diaphragm is located.

d is the valve-casing of the pressure-reducing valve.

e is the high-pressure inlet of the valve.

f is an annular opening in the valve-chamber, in communication with opening *e*, and also with the interior chamber, *g*, of the valve, through the annular slot or channel *h*.

i is a valve-seat above channel *h*, and *k* is a similar seat below the channel. Seats *i* and *k* are of different areas, and the valve *l*, which works thereon, has two seats, *m* and *n*, of corresponding areas.

o o are packing-rings on the valve-seats, of any suitable material.

Valve *l*, below the valve-seats *m* and *n*, is

cone-shaped, and the valve itself has a central longitudinal passage through it. *p* is the valve-stem of valve *l*. It is secured centrally of the valve in a spider-frame, *q*, arranged across the opening therein. The other end of the valve-stem passes up through a stuffing-box, where it is pivoted to a rock-lever, *r*, fulcrumed in the end of the post *s*, cast on the valve-chamber.

t is a diaphragm, exposed to the pressure of the fluid in the low-pressure pipe *a*. *u* is the diaphragm-chamber, formed of two dish-shaped castings placed face to face and bolted together.

The elastic diaphragm *t* is secured between two disks, one of which has a slotted stem, *v*, and projects through a central aperture in the diaphragm-chamber. To the upper end of this stem the other end of the rock-lever *r* is pivoted. The stem *v* passes through a hole in the yoke or bail *w*, which is secured or formed on the diaphragm-chamber *u*.

x is a lever pivoted to a projection, *y*, of the chamber *u*, and passes through a slot in the stem *v*. It is provided with the usual sliding weight. The lever *x* bears upon the stem *v* and depresses the diaphragm *t* with a varying pressure, due to the position of the weight upon the lever.

z is a pipe leading from the low-pressure pipe *a* to the diaphragm-chamber *u*, and is provided with a valve.

1 is a pressure-indicator for the high-service pressure, and 2 is a pressure-indicator for the low-service pressure.

The operation of my device is as follows: Upon gas being introduced into the valve-chamber, the valve *l* rises and allows the pressure to be transmitted into the low-pressure pipe. Instantly upon the high pressure being admitted to pipe *a* the diaphragm *t*, in communication therewith, is acted upon by the pressure, and it rises and rocks the lever *r*, pivoted to the valve-stem of valve *l*, with a pressure tending to close said valve. The area of the diaphragm greatly exceeding the area of the valve *l*, the low pressure in pipe *a* thereby compensates for the pressure in the high-service pipe. By means of the sliding

weight on lever x the force exerted by the diaphragm t is caused to vary, so as to graduate the opening in the regulating-valve, whereby any desired low pressure may be had in pipe a , independent of the varying pressure in the high-service pipe.

The purpose of the pipe z is as a substitute for pipe c . When so used, the diaphragm-chamber casting is not bored out, so as to communicate with pipe c , but is left solid and imperforate. The valve in pipe z is employed to graduate the admission of the gas or vapor, so that the regulator will work when very low pressures are desired in pipe a .

By the employment of the two levers y and x a compensating or balancing device of marked sensitiveness or responsiveness is produced. Acting conjointly, as they do, they constitute a compound lever and admit of a smaller sliding weight being used than is pos-

sible where a single weighted lever is used. These results are highly desirable in a fluid-pressure regulator.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

In a pressure-regulator, a diaphragm, a diaphragm-stem, a weighted lever arranged to bear upon said stem, a regulating valve and stem, a rock-lever fulcrumed at an intermediate point and pivoted at the one end to the valve-stem and at the other to the diaphragm-stem, and pipe-connections between the valve and diaphragm, all in combination.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN W. RAMSEY.

Witnesses:

THEO. LAMPERT,
JOSEPH WILSON.