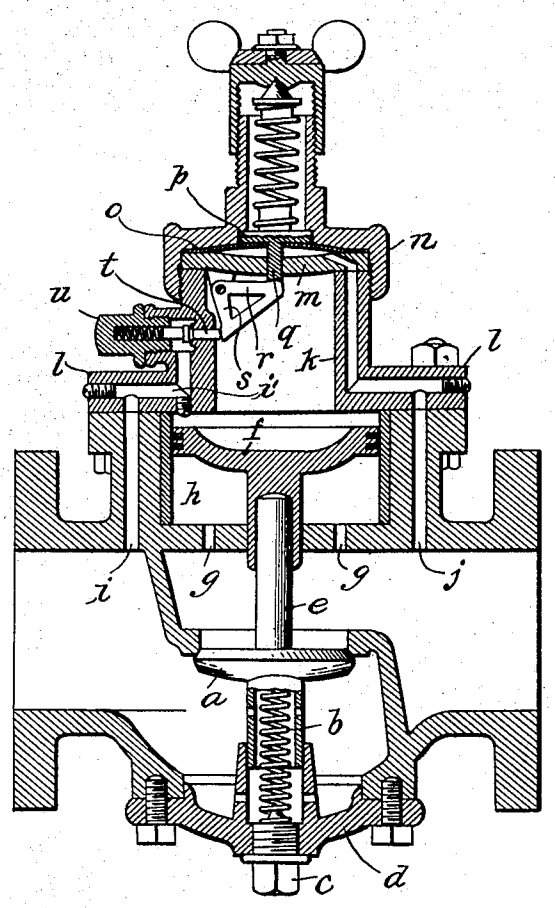
B. ZINDEL.

PRESSURE REGULATOR.

APPLICATION FILED JAN. 11, 1909.

919,513. Patented Apr. 27, 1909.



Witnesses:

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UNITED STATES PATENT OFFICE.

BARNHARDT ZINDEL, OF GREEN BAY, WISCONSIN.

PRESSURE-REGULATOR.

No. 919,513. Specification of Letters Patent. Patented April 27, 1909.

Application filed January 11, 1909. Serial No. 471,724.

To all whom it may concern:

Be it known that I, BARNHARDT ZINDEL, a citizen of the United States of America, residing at Green Bay, county of Brown, State of Wisconsin, have invented certain new and useful Improvements in Pressure-Regulators, of which the following is a full and clear specification, reference being had to the accompanying drawing, in which is represented a vertical sectional view of a pressure-regulator provided with my improvements.

The present improvements are applicable to the types of pressure-regulators shown in my two former patents No. 723,118, dated March 17, 1903, and No. 757,590, dated April 19, 1904.

One object of the present invention is to so construct the upper portion of the pressure cylinder that it may be made of standard or uniform size for connection to various sized valves; and a further object is to so construct the device that the valve will not only be accurately guided by a guide carried by the piston but will also be readily removable independently of the piston and the upper parts of the apparatus whenever it is desired to re-grind the valve on its seat, as more fully hereinafter set forth.

The valve *a* is forced upwardly against its seat by a spring *b* which bears against a screw-plug *c* carried by a plate *d* removably bolted to the under side of the valve casing and forming the bottom of the valve-casing. By removing this plate *d* the valve may be withdrawn downwardly out of the casing to enable the valve or its seat to be cleaned or re-ground. A stem *e* rises centrally from the valve and has its upper end slidably socketed in a depending sleeve carried by the piston *f*, this sleeve working freely through an opening in the top of the valve-casing, and this top portion of the valve-casing being provided with suitable openings *g* to permit the outgoing fluid to pass up under the piston. By thus employing a sleeve-like guide on the piston arranged to work through a guide-opening in the top of the valve-casing and in telescoping the upstanding stem *e* into said sleeve it will be observed that both the piston and the valve will be accurately and freely guided while at the same time each is removable independently of the other for the purposes of repairing and cleaning. The piston *f* works only in the lower portion *h* of the cylinder mounted on the top of the valve-casing, this lower portion being formed integral with the valve-casing and being provided at the inlet side of the valve with an inlet *i* leading to the pressure chamber and an inlet *j* at the outlet side of the valve leading to the chamber under the regulating diaphragm. The upper half *k* of the cylinder is smaller in diameter than the lower half and is provided with an annular flange *l* at its lower end which extends outwardly and is bolted down on top of the lower portion of the cylinder. The upper end of the cylinder is closed by a head *m* which is clamped in place by a screw-cap *n*, this cap also clamping in place the diaphragm *o*, which diaphragm is normally pressed downwardly in the usual manner by means of a suitable spring-actuated disk *p* carrying a pin *q* depending through the center of the diaphragm and the center of the head *m*. Suitable adjustable devices are carried by the cap *n* to vary the pressure on the diaphragm through the medium of said disk *p*.

Pivotally suspended from plugs depending from the head *m* is a bell-crank lever, one arm *r* of which extends horizontally inward and is adapted to receive the downward thrust of the pin *q*, and the other arm *s* of which depends from the pivotal support and is adapted to bear against the inwardly-extending stem of the controlling-valve *t* working in a horizontal port in the side wall of the cylinder portion *k*. Said port communicates with an extension *i'* of the inlet passage *i*. The valve *t* is guided by an extension working in a plug *u* screwed into a nipple formed on the side of the cylinder *k*, this plug containing a spring which normally closes valve *t*. This arrangement of the control-valve takes it out of the main inlet passage and enables it to be gotten at much more conveniently than in my former patented constructions, and besides the inlet passage *i*, *i'*, may be made smaller in diameter and thus enable the wall of the cylinder to be made stronger.

It will be observed that the forcing down of the pin *q* will cause the bell-crank to open the control-valve, and as the depending arm of the bell-crank is shorter than the horizontal arm the valve will be actuated quickly. This location and arrangement of the bell-crank lever for communicating motion from the diaphragm to the controlling-valve is a very durable and accurate device.

By making the pressure cylinder of two parts horizontally divided and confining the

operation of the piston to the lower section and housing the operating parts entirely in the upper section, I am enabled to attach to any sized valve a standard sized upper portion. This is a great advantage as nearly all the working parts are carried by the upper portion of the cylinder and I am thus required to manufacture and carry in stock only one size of this upper portion.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In a pressure-regulator, the combination of a valve, a pressure cylinder mounted on the casing thereof and having an inlet passage extending up into the wall of the cylinder and a horizontal port leading from this passage into the cylinder, a horizontally working controlling-valve in said port, a plug removably secured in the side of said cylinder opposite said valve, and suitable regulating devices adapted to coöperate with said controlling-valve.

2. In a pressure-regulator, the combination of a main valve, a pressure piston and cylinder, an inlet passage in the wall of the cylinder and a horizontally working control-valve, a spring-actuated pin depending through the head of the cylinder, a bell-crank pivotally depending from said head and having one arm in engagement with said depending pin and the other arm engaging with the inner end of the control-valve.

In testimony whereof I hereunto affix my signature in the presence of two witnesses this 7th day of January, 1909.

BARNHARDT ZINDEL.

Witnesses:

AUGUST BRAUNS,

MARTHA BRAUNS.