

No. 765,200.

PATENTED JULY 19, 1904.

E. SCHMIDT.  
VALVE.

APPLICATION FILED OCT. 20, 1903.

NO MODEL.

Fig. 1.

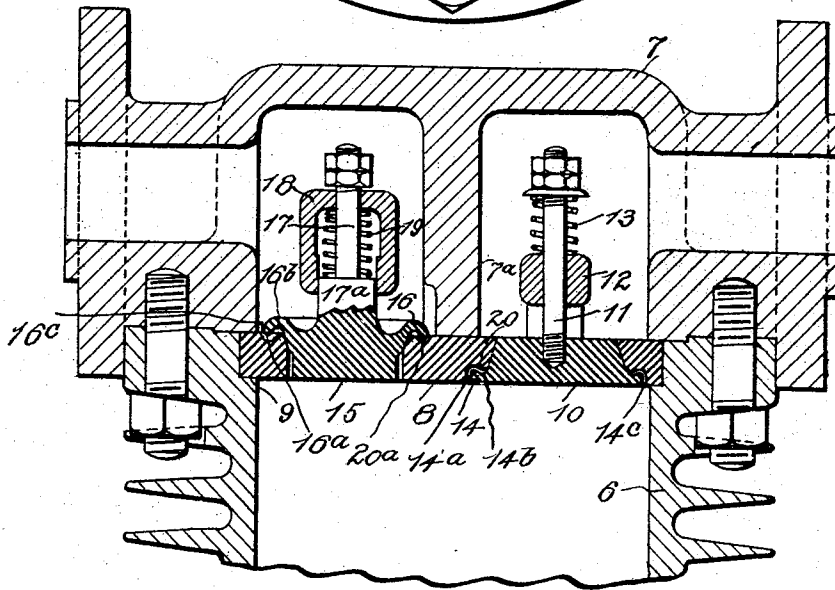
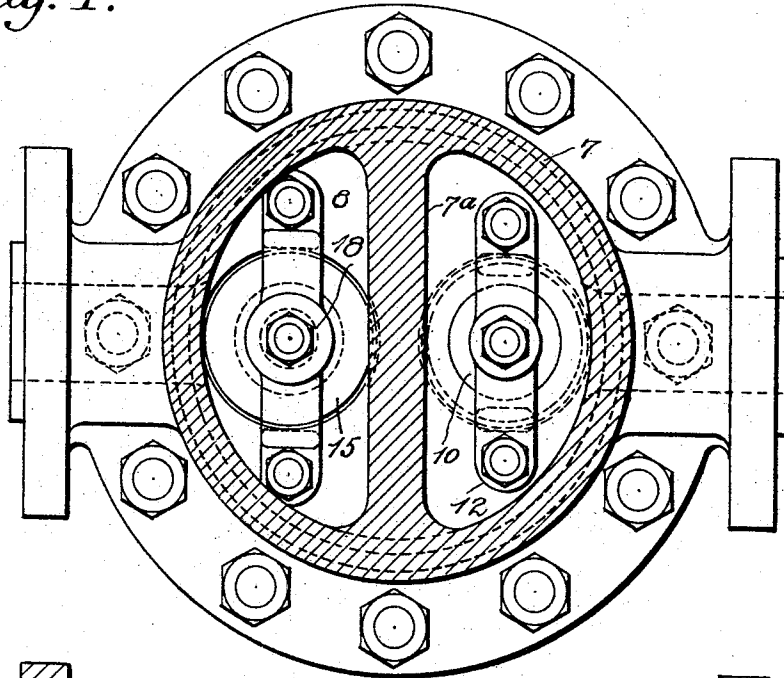


Fig. 2.

Witnesses  
M. C. Border  
Geo. E. Tew

Inventor  
Emil Schmidt  
by Milo B. Stevens & Co.  
Attorneys

# UNITED STATES PATENT OFFICE.

EMIL SCHMIDT, OF DAVENPORT, IOWA, ASSIGNOR OF ONE-HALF TO  
JOHN A. RUSSEL, OF DAVENPORT, IOWA.

## VALVE.

**SPECIFICATION** forming part of Letters Patent No. 765,200, dated July 19, 1904.

Application filed October 20, 1903. Serial No. 177,727. (No model.)

*To all whom it may concern:*

Be it known that I, EMIL SCHMIDT, a citizen of the United States, residing at Davenport, in the county of Scott and State of Iowa, have invented new and useful Improvements in Valves, of which the following is a specification.

This invention relates particularly to the valves of air and gas pumps; and its object is to produce a valve which will not pound or ram, whereby a noiseless and easy-acting valve is produced.

A further object is to produce a valve having the minimum of wear on the seat and disk. These objects are effected by so forming the valve and its seat that a gas or air cushion is produced between the valve and its plate by forming a recess under the rim having a small or narrow outlet, whereby when the valve seats the air or gas contained in the recess will have a retarded escape, thereby forming a cushion for the valve.

An embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a cross-section through the valve-chest, showing the valves in plan; and Fig. 2 is a central longitudinal section.

Referring specifically to the drawings, the cylinder is indicated at 6, the valve-chest at 7, and the cylinder-head or valve-plate at 8. The latter is let into a rabbet 9 in the end of the cylinder and is lapped at its outer edges and held in place by the valve-chest, which is bolted to flanges on the end of the cylinder. The valve-chest has a central partition 7<sup>a</sup>, which reaches to the cylinder-head and forms inlet and outlet chambers in which the inlet and outlet valves, respectively, work. The inlet-valve comprises a disk 10, the stem 11 of which works through a guide-bore in a bridge 12, which is bolted to the cylinder-head and spans the valve-opening. The valve is normally closed by a spring 13, coiled around the stem and held in compression between the bridge and nuts, and a washer on the end of the stem. The disk has the usual inclined or beveled edge fitting a corresponding seat in the cylinder-head and has also at the back thereof an extended rim 14, which laps the

edge of the plate around the valve-opening and fits within a recess or rabbet produced therein, as indicated at 20. The opposite or inner faces of the rim and rabbet are preferably curved, as shown, forming at the outer edge of the rim an annular rib 14<sup>a</sup> and groove 14<sup>b</sup>. The corresponding face of the rabbet has a similar groove and rib. A narrow slit or space 14<sup>c</sup> is left between the extreme edge of the disk and the edge of the plate at the rabbet for the slow escape of the gas when the valve seats. The outlet-valve is in the main similarly formed. It consists of a disk 15, fitting an appropriate seat in the cylinder-head, and this disk has an overlapping rim 16, the inner face of which has a rib 16<sup>a</sup> and groove 16<sup>b</sup> corresponding to an opposite rib and groove around the valve-seat and producing therebetween a recess 20<sup>a</sup>, having similar function to the recess 20 of the inlet-valve. A narrow space 16<sup>c</sup> is also produced for the escape of the gas forming the cushion. The disk has a stem 17, which works through a tube 18, supported by a bridge over the valve, and the bore of the tube is fitted by an enlarged diameter 17<sup>a</sup> of the valve-stem, whereby the movement of the valve is guided. A spring 19, in compression between the shoulder produced by the larger diameter of the valve-stem and the head of the tube, normally seats the valve.

Although the inlet and outlet valves are of slightly-different shape, incident to the local conditions, the cushion action of both is the same. When the valve opens, the gas, air, or other medium fills the space 20 or 20<sup>a</sup>. When the valve seats, this gas is confined by reason of the narrow escape-opening at 14<sup>c</sup> or 16<sup>c</sup> and is compressed to form a cushion which gradually yields by the limited escape of the gas through said opening. This cushions the valve and forms a noiseless closure without the pounding or jar incident to ordinary valves. Wear does not affect the action, but, if anything, improves it, because as the lines of the ribs and grooves approach each other a contracted opening is formed not only at the points 14<sup>a</sup> and 16<sup>a</sup>, but also at the line where the rib changes into or joins the groove, producing a double contracted opening.

Necessarily the gas underneath the extended rim of the valve must be forced out, and the pressure on the outer side being greater the nature of the cushion formed will be dependent upon the relative size of the recess and the escape-opening, the proportions of which may be varied at will. The cushion will protect the seat and disk from wear, and the construction has obvious advantages of simplicity and utility. It may also be remarked that the two diameters 17 and 17<sup>a</sup> of the stem of the outlet-valve working in different bores in the tube produce a double guide, which makes the seating of the valve perfect.

15 What I claim as new, and desire to secure by Letters Patent, is—

The combination with a valve-seat having

around outside the same an inner rib and outer groove, of a solid disk valve which fits against the seat and has a laterally-extending rim at the back edge thereof, said rim having on its under side an inner groove and an outer rib, corresponding to and fitting over the rib and groove around the seat, without contact therewith, the space between being contracted at the outer edges of the grooves, forming a cushion independent of the valve-seat.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EMIL SCHMIDT.

Witnesses:

F. D. LETTS,

S. L. WADSWORTH.