2 Sheets—Sheet 1.

F. BEHR.

SELF-CLOSING VALVE.

No. 182,014. Patented Sept. 12, 1876.

Fig. 1

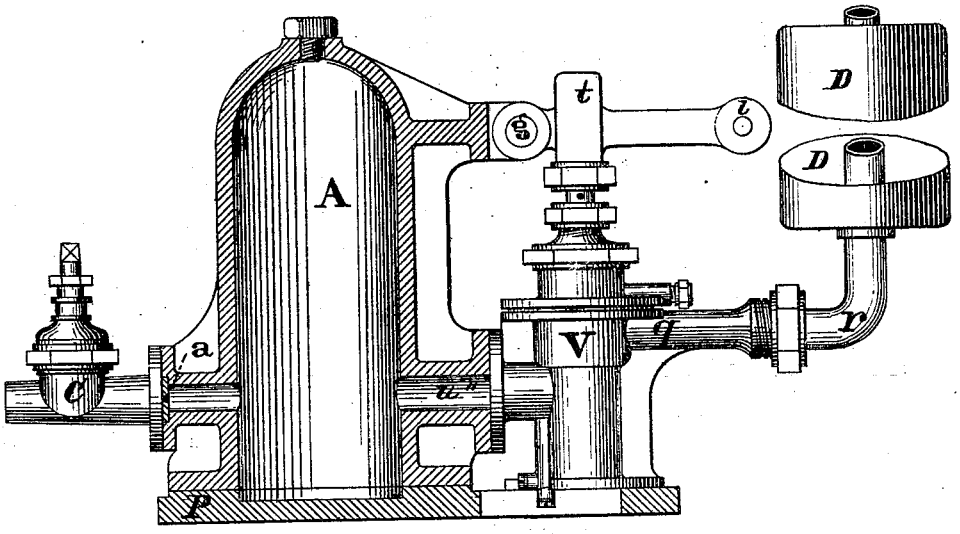
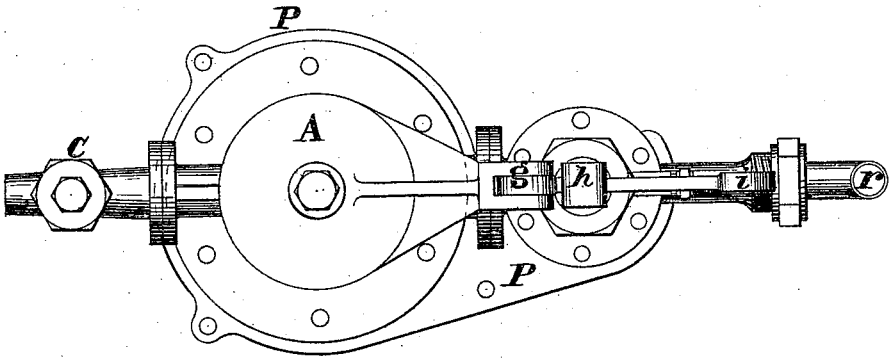


Fig. 2



Ferdinand Behr

Inventor

by

Henry Millward

atty.

Attest

Chas. F. Gessert.

Jos. L. Marty

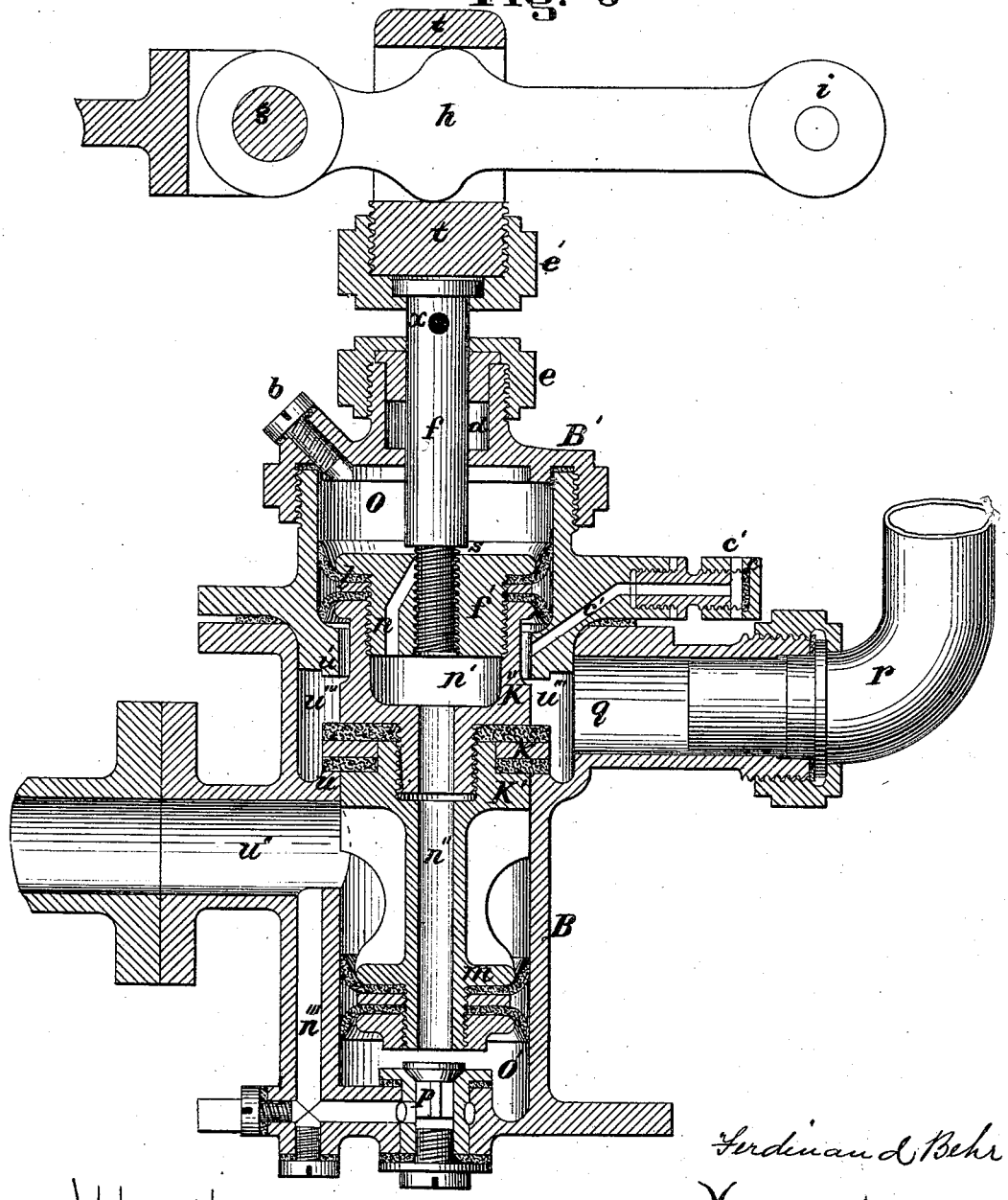
2 Sheets—Sheet 2.

F. BEHR.

SELF-CLOSING VALVE.

No. 182,014. Patented Sept. 12, 1876.

Fig. 3



Ferdinand Behr
Inventor
by
Henry Millard
atty.

Attest
Chas. F. Gessert.
Jos. A. Marty

UNITED STATES PATENT OFFICE

FERDINAND BEHR, OF FRANKFORT-ON-THE-MAIN, GERMANY, ASSIGNOR T HIMSELF AND EUGENE W. LIPPERT, OF CINCINNATI, OHIO.

IMPROVEMENT IN SELF-CLOSING VALVES.

Specification forming part of Letters Patent No. **182,014**, dated September 12, 1876; application filed April 29, 1876.

To all whom it may concern:

Be it known that I, FERDINAND BEHR, of Frankfort-on-the-Main, Germany, have invented certain new and useful Improvements in Self-Closing Valves, of which the following is a specification:

My invention relates to a device whereby a valve is made to be self-closing when the power used in opening it has been removed, and is constructed so as to obviate the hydraulic shocks resulting from the varying pressure of the feed-water.

My invention consists of a peculiar construction and combination of parts, which will be fully hereinafter described and specifically pointed out in the claims, a preliminary description being therefore deemed unnecessary.

In the accompanying drawings, Figure 1 is a partial sectional elevation of a valve of my invention, representing the air-chamber and diaphragm in section, while the valve proper is in the elevation. Fig. 2 is a plan view of the same. Fig. 3 is a sectional elevation of the valve proper, drawn to an enlarged scale.

In the annexed drawings, A represents a reservoir, which serves the purpose of equalizing the uneven pressure resulting from the feeding process or from the opening or closing of the valve, and greatly increases the durability of the pipes and valves, while the diaphragm *a*, having a small opening, regulates the speed of the water-supply, thereby securing a quick, even flow of water through the valve, and a more ready closing of the same, inasmuch as the water reaches the wide opening to the valve after passing through a small opening in the diaphragm *a*, and then through a larger space, that of the reservoir A.

The valve proper V consists of eight principal parts, viz: The casing B B′; the valve K′, for shutting off the supply at *u*; the valve K″, for shutting off the escape at *u′*; the two regulating-pistons *l* and *m*; the regulating valve-rod *f*, with valve at *s*; the counter-current channels *n n′ n″ n‴*, with valve at *p*; the escape-opening *q*, for escape-pipe *r*; the aperture *b*, for the escape of air.

The regulating valve-rod *f* enters the valve-casing B through the stuffing-box *e*, which is secured to the upper part of the lid B′ by means of a screw-coupling. The staple *t*, fo the reception of the lever *g h i*, is secured t the valve-rod *f* by means of a screw-coupling *e′*, in such a manner as to permit the said ro to revolve in the said screw-coupling for th purpose of regulating the speed of the valv K′ and K″ and pistons *l* and *m*. Inside th casing B B′ the valve-rod *f* supports the valve K′ K″ and pistons *l* and *m*. The chamber C is connected with the chamber O′ by mean of the channels *n n′ n″* and valve *s*, and agai the chamber O′ is connected with the pressure supply *u″* by means of the valve *p* and chan nel *n‴*. The chamber *u‴* communicates witl the elevator-pipe *r* and with the escape-pip *c′*. The stop-screw *c* regulates the escape The closing of the aperture of supply at *u* i attained by means of pistons of unequal di ameters at *l* and *m*. The piston at *l* having the greater diameter, and, consequently, th greater pressure-surface, forces the valve K to its seat at *u*. The speed of the said valv can be regulated, and the hydraulic shock ob viated, by screwing together in a greater o less degree of the valve-surface at *s*, whicl occurs when the valve-rod *f* is screwed int the piston *l* at *f′* to a greater or less exten by means of a rod inserted into the hole at *x* In this manner the opening cross-cut at *s* which communicates with the counter-chan nels *n n′ n″ n‴*, may be narrowed or widened at pleasure, thereby securing a more or less rapid transfer of water from the chamber C to the chamber O′.

A point of great importance in this con struction is the fact that by attaining a clos ing of the valve entirely free from any jar the durability of the whole apparatus is great ly increased. The screw-valve C is used fo cutting off the supply when repairs may be necessary.

The entire apparatus is secured to a plate P, by means of screws. All the brass parts in the interior of the apparatus may be nickel-plated, thus obviating the formation of verdigris, and its deleterious effects on the health of the public, and increasing the durability of the valve.

The mode of operation is briefly described as follows: When by means of any of the fa-

niliar appliances the lever *g h i*, turning on a ixed axis at *g*, is lifted, the pistons *l* and *m* ınd valves K′ K″ move in the same direction, ›eing connected with the lever *g h i* by the ralve-rod *f* and the valve K″, and then the eather packing above the disk K shuts off he escape-valve at *w′*. The leather packing ›eneath the disk K, and then the valve K′, ›pen the aperture at *u*, and the water in the hamber O enters through the channels *s n n′ n″* into the chamber O′. The water in the ir-reservoir A reaches the escape *q* in passing through *w″* and *w‴*, and then through the elevating-pipe *r*.

When the upward draft ceases the difference of pressure between the large piston *l* and the small piston *m* has its effect. The water in chamber O′ forces itself through the channel *n″ n′ n* and through the valves *s* into the chamber O, and here exerts its influence on the larger piston-surface. The channel *n‴* and valve *p* effect the equalization of pressure between the supply and the chambers O and O′. The piston K′, in moving downward, shuts off the passage of water to the escape at *u*, and K″ opens the aperture to the drain-pipe *c′* at *u*. The leather packing below K closes completely at *u*, and the elevator-pipe *r* empties itself into the chamber *w‴*, and finally, through channel *c′*, into the open air.

If it is desired to save the water which here escapes after each draft, the least waste of water may be entirely prevented by the insertion of a cylindrical vessel between the valve and elevator-pipe, as shown at D, and leading the water here escaping into the elevatorpipe by means of an injector adjusted at the bottom of this cylindrical vessel. The water accumulating in the vessel D after each draft is carried away with each succeeding draft, thus obviating entirely any waste of water.

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

1. The channels *n*, *n′*, and *n‴* through the valve, in combination with the spaces O and O′ above and below said valves, for the purpose of transferring water from one to the other of said spaces, substantially as described.

2. The valve K′ K″, which cuts off the escape through channel *c′* before the passage of water into the chamber *w‴*, and in reverse order cuts off the feed-water before opening the entrance to channel *c′*, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand this 18th day of March, 1876.

FERDINAND BEHR. [L. S.]

Witnesses:
THEO. DE WITT ZUGIN,
HCH. LANDWEHR.