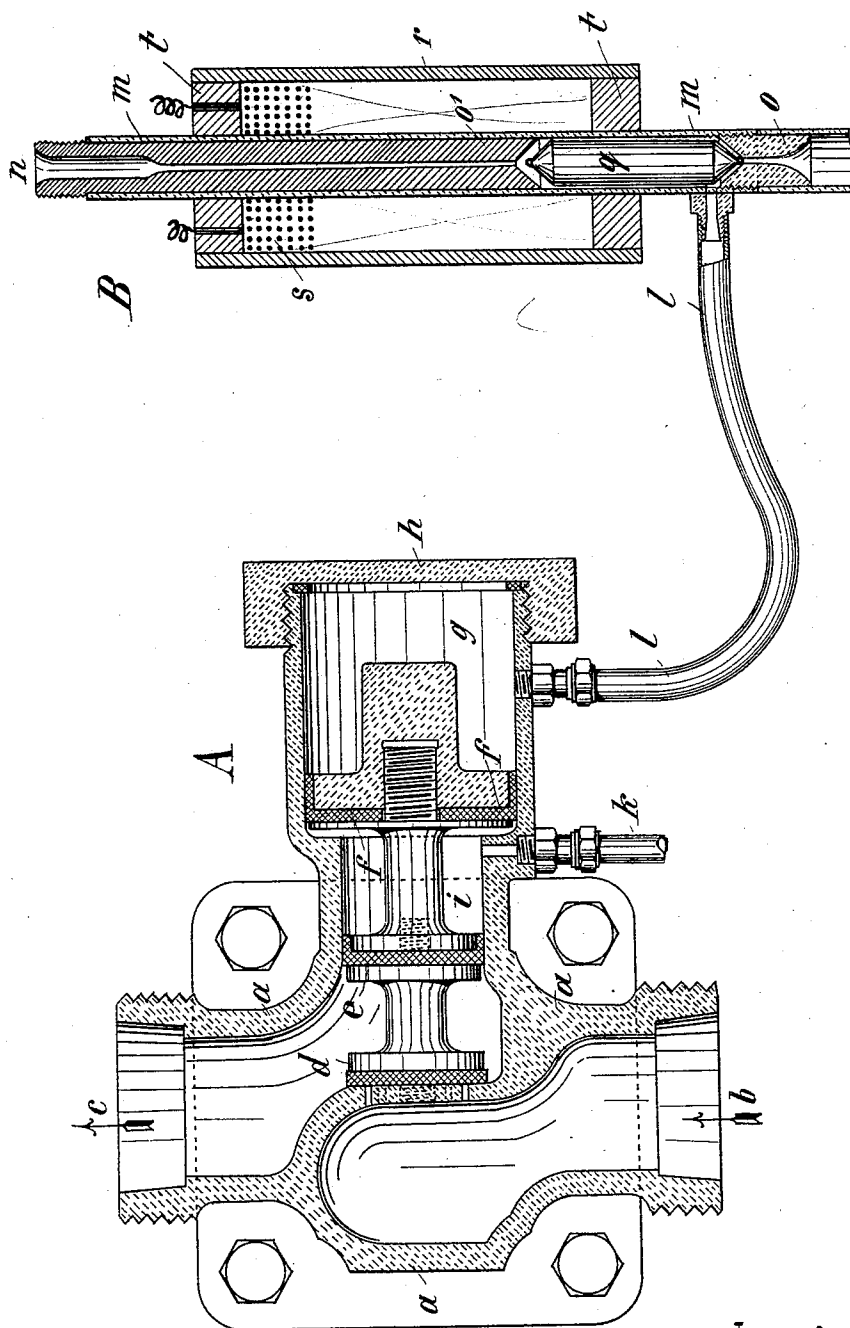


(No Model.)

A. FRANKE.
ELECTRICAL STOP VALVE.

No. 483,108.

Patented Sept. 20, 1892.



Witnesses:
Klas A. Peruski
J. J. Malle,

Inventor:
Adolf Franke
By *Arthur duPont*
Attorney

UNITED STATES PATENT OFFICE.

ADOLF FRANKE, OF BERLIN, GERMANY, ASSIGNOR TO THE URANIA-UHREN-
UND-SÄULEN-COMMANDIT-GES. Breslauer & Dr. von Orth, of same
place.

ELECTRICAL STOP-VALVE.

SPECIFICATION forming part of Letters Patent No. 483,108, dated September 20, 1892.

Application filed May 6, 1892. Serial No. 432,074. (No model.)

To all whom it may concern:

Be it known that I, ADOLF FRANKE, a subject of the King of Prussia, residing at Berlin, in the Kingdom of Prussia, German Empire, have invented new and useful Improvements in Electrically-Actuated Stop-Valves, of which the following is a specification.

This invention relates to an electrically-actuated valve for water-pipes for high pressure.

The accompanying drawing shows the arrangement of the valve A and of the electrical device B for actuating same, the two devices being represented in longitudinal section. It is immaterial whether the stop-valve is used for liquids or for gases.

a is the valve-box, into which, say, water under pressure, enters in the direction of the arrow *b*, while the water escapes after having passed through the valve in the direction indicated by the arrow *c*. The valve consists of the valve-disk *d*, packed by leather or by means of an india-rubber plate, and of the pistons *e* and *f*, connected to the said plate *d*. The diameter of the piston *e* is smaller than that of the piston *f*. The latter moves in a case *g*, closed at its front end by a cover *h*.

In opening the valve—*i. e.*, in lifting off the valve-disk *d* from its seat—the pistons *e* and *f* move to the right hand, while in closing the valve they move in the opposite direction.

The space *i* in front of the piston *e* is provided with a discharge-pipe *k* for evacuating the water which may have passed through the packing of the pistons *f* and *e*, so that there is always atmospheric pressure in the space *i*. The space *g* communicates through a pipe *l* with the pipe *m*, connected at *n* with the water-pressure pipe. There is arranged in the lower part of the pipe *m*, below the orifice of pipe *l*, a valve-seat *o*, and at some distance above the said orifice a second valve-seat *o'*. The latter, prolonged upward, is made of soft iron and fills, with the exception of its small passage, the upper part of the pipe *m*. An iron rod *q*, having conically-shaped ends, is arranged between the two valve-seats. The diameter of the iron rod is smaller than the interior diameter of pipe *m*. The upper and lower extremities of the iron

rod carry small brass cones ground in so as to fit into the narrow passages of the valve-seats *o* and *o'*.

In the accompanying drawing the iron rod *q* rests, for instance, on the lower valve-seat *o*. It closes, therefore, the lower orifice of pipe *m* just beneath the discharge-opening of pipe *l*, discharging into the pipe *m*. The latter is surrounded by a spiral coil, so that when a current flows through the latter the iron rod *q* is raised and pressed against the valve-seat *o'*, so that the pipe *m* is shut off upward. The spiral coil is closed at top and bottom by two disks *t*, made of soft iron and the whole is inclosed by a pipe *r*, which is also of soft iron. This valve works as follows: Assuming the stop-valve A to be closed, the several parts of the valve are then in the position shown in the drawing. The several parts of the electric device B for actuating the valve are also in the position shown in the drawing—*i. e.*, the upper part of pipe *m* is in communication with the pressure-water pipe, and the water under pressure flows through the narrow passage of the valve-seat *o'*, and surrounding the iron rod it runs through pipe *l* into the space *g* in front of the piston *f*, which stands, therefore, under the full pressure of the pressure-water pipe. The diameter of piston *f* is larger than that of the valve-disk *d*. The stop-valve will remain closed as long as piston *f* stands under the above said pressure.

When it is intended to open valve A—*i. e.*, to raise the valve-disk *d* from its seat—an electric current is caused by means of any suitable contact device to flow through the spiral coil *s*, surrounding the pipe *m*, whereby the iron rod *q* is lifted from the lower valve-seat *o* and pressed against the upper valve-seat *o'*. The lower part of pipe *l* is connected, therefore, with the space *g* in front of the piston *f*. There is at present the space in front of the piston *f*, communicating with the water-discharge under atmospheric pressure, so that the water entering from the pressure-pipe in the direction of the arrow *b* moves the valve-plate *d* and moves the pistons *e* and *f* to the right hand, opening thus the valve. By the motion of piston *f* to the right hand the water being in front of the same is evacu-

ated through pipe *l* into the discharge end of pipe *m*. For closing again the valve *A*, opened in the described manner, it is only necessary to break the current running through the
 5 above-mentioned spiral coil *s*. In this moment the pressure-water contained in the upper part of pipe *m* acts upon the iron rod *q*, which after the breaking of the electric current is released again and pressed against
 10 the lower valve-seat *o*. The water under pressure passes then again through pipe *l* into the space *g* in front of the piston *f* and moves the latter, owing to the larger diameter of the same, to the left hand, thereby closing the
 15 stop-valve *d*. The whole operation of the stop-valve *A* consists, therefore, only in the breaking and making of the electric current by means of a suitable contact device. The openings in the valve-seats *o'* and *o* are made
 20 very small, so that at a high pressure in the pressure-water pipe not too strong a current is required for lifting the iron rod *q* from the valve-seat *o* and pressing the same against the valve-seat *o'* to keep thus the passage in
 25 this valve-seat closed.

As above mentioned, the two disks closing the spiral coil at top and bottom and also the pipe inclosing the spiral coil, are made of soft iron, so that the magnetic power lines find a
 30 nearly completely closed circle of iron, which

is broken only by the small intermediate space between the iron core *q* and the valve-seat *o'*. By these means a current proportionally weak passing through the spiral coil may produce a very powerful action upon the
 35 iron core *q*.

I claim—

In an electrical stop-valve, the combination of a valve-box *a*, a valve-disk *d*, pistons *e* and
 40 piston *f* being larger than that of piston *e* and that of valve-disk *d*, a spiral coil *s*, a pipe *m*, extending through said coil and connected at its upper end to the pressure-pipe and having
 45 interior valve-seats *o* and *o'*, an iron rod *q*, arranged between said valve-seats and provided with faces at its ends to fit the valve-seats, and a connection between the space intermediate of the valve-seats and the space
 50 in the valve-box in front of piston *f*, all combined and operating substantially as and for the purpose set forth.

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

ADOLF FRANKE.

Witnesses:

LUDWIG VON ORTH,
 GUSTAV HÜLSMANN.