No. 732,588. PATENTED JUNE 30, 1903.

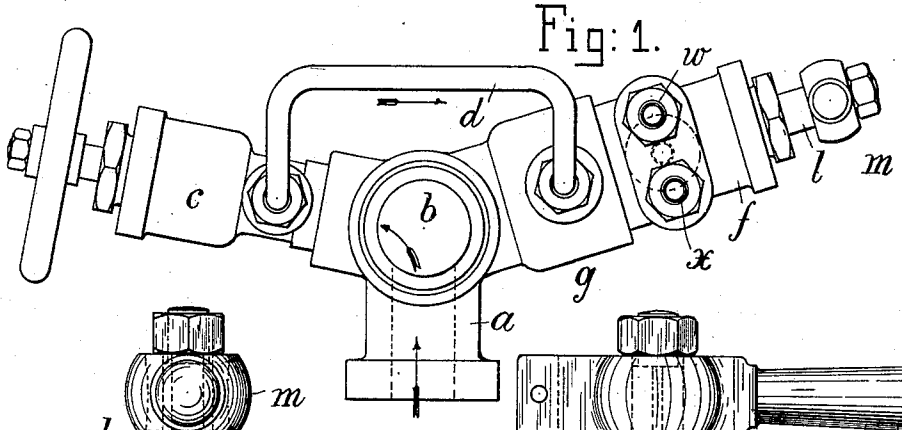
T. REUTER.

CONTROLLING VALVE.

APPLICATION FILED DEC. 29, 1902.

NO MODEL.

Fig: 1.



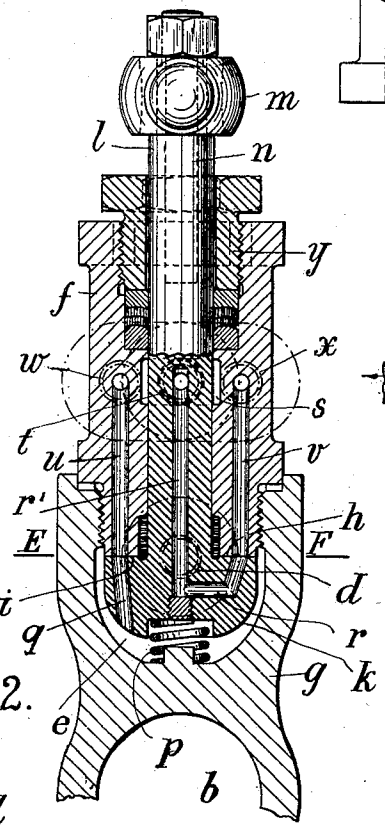


Fig: 2.

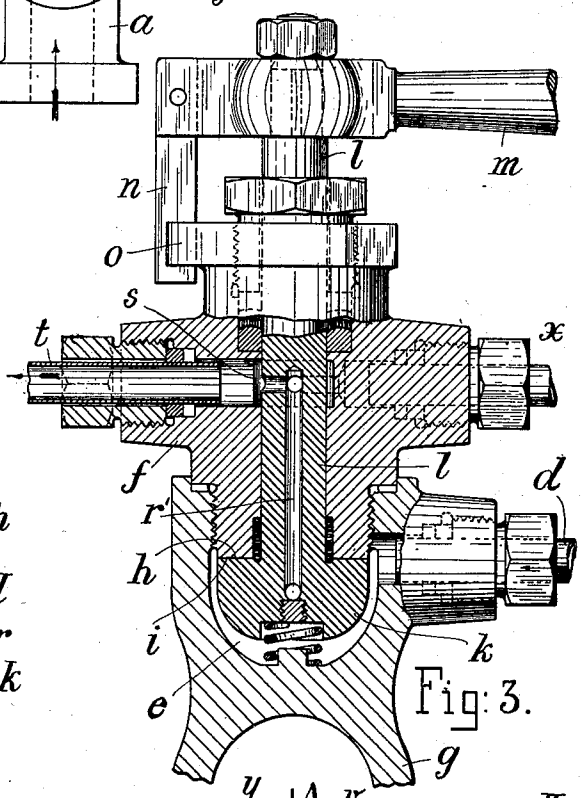


Fig: 3.

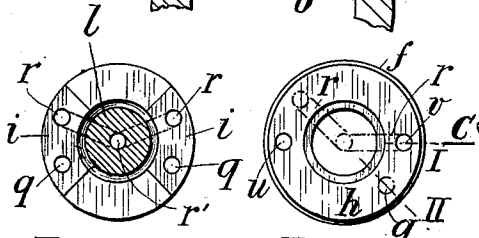


Fig: 5.

Fig: 6.

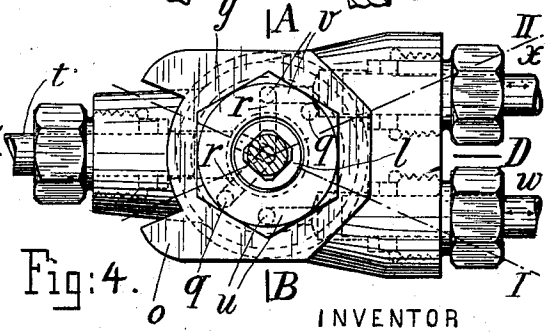


Fig: 4.

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No. 732,588. Patented June 30, 1903.

UNITED STATES PATENT OFFICE.

THEODOR REUTER, OF WINTERTHUR, SWITZERLAND.

CONTROLLING-VALVE.

SPECIFICATION forming part of Letters Patent No. 732,588, dated June 30, 1903.

Application filed December 29, 1902. Serial No. 137,034. (No model.)

To all whom it may concern:

Be it known that I, THEODOR REUTER, a citizen of the Republic of Switzerland, residing at Winterthur, in the canton of Zurich, Switzerland, have invented a new and useful Controlling-Valve, of which the following is a specification.

My invention relates to improvements in controlling-valves for liquids, gases, steam, or air under pressure; and the object of my invention is to provide such a valve that can be operated with the least amount of movements and power, at the same time being continuously in a tight fit with practically no wear. I attain these objects by a device hereinafter described, and shown in the accompanying drawings, in which—

Figure 1 is a valve in connection with the stop-valve of a hydraulic rock-drilling machine; Fig. 2, a section of the valve on the line A B of Fig. 4; Fig. 3, a section on the line C D of Fig. 4; Fig. 4, a top view of the valve; Fig. 5, a section through the valve-stem, showing the bearing-surface of the valve-head; and Fig. 6, a face view of the valve-seat.

Similar letters refer to similar parts throughout the several views.

The inlet-stud *a* is in direct connection with the stop-valve *c* by the passage *b*. The connecting-pipe *d* leads from this valve to the pressure-chamber *e* in the part *g* of the controlling-valve casing. The part *f* of the casing, which is screwed into the part *g*, is provided at its bottom with the seat or bearing-surface *h*, which is in direct contact with the bearing-surface *i* of the valve-head *k*, the contact-surface being at right angles, or nearly so, to the center line of the valve-stem *l*. The latter is provided at its upper end with a handle *m*, which has a stop *n*, moving between the cheeks *o*, thus limiting the motion of the valve-stem. The valve-head *k* has on its lower end a recess for taking up a spring *p*. It is furthermore provided with two channels *q q*, which pass from the pressure-chamber *e* to the bearing-surface *i*, and two channels *r*, which extend from the contact-surface *i* into the head and then unite radially into a common channel *r'*, extending part the way up the stem *l* and leading into the annular chamber *s*, which latter is connected with the exhaust-pipe *t* by a suitable stuffing-box. The part *f* of the casing is provided with two channels *u* and *v*, which are situated opposite each other and extend from the seat *h* to the outlet-pipes *w* and *x*. The channels *r* and *q* are so arranged that the opening on the head *k* of a channel *r* is diametrically opposite that of the corresponding channel *q* and that the connecting lines between the two corresponding openings form an acute angle to each other, as shown in Fig. 5. The valve-stem *l* is held at the top in the stuffing-box *y*, and by means of the pressure in the chamber *e* a tight fit between the surface *i* of the valve-head *k* and the seat *h* is positively maintained, the more so since these surfaces *i* and *h* are easily turned true from the start, and wearing of the same rather makes the fit a better one. The spring *p* prevents the head from loosening when the chamber *e* is not under sufficient pressure.

The operation is as follows: Referring to the figures and assuming the valve-stem *l*, or rather the handle *m*, to be in a position marked I, the liquid or gas, &c., under pressure, which enters through the inlet *b*, valve *c*, and pipe *d* into the pressure-chamber *e* of the controlling-valve casing, passes through one of the channels *q* into the corresponding channel *u*, from whence it is led through the pipe *w* to, say, one side of the piston of a rock-drill or similar machinery, (not shown,) thus driving the piston forward. The liquid or gas, &c., which is ahead of the piston is exhausted into the pipe *x*, then passes through the channel *v* into the corresponding channel *r* of the valve-head *k*, from whence it is exhausted through the channel *r'* into the annular chamber *s* and the pipe *t*. When the piston has arrived at the end of its stroke—*i. e.*, if the hole of the drill has attained the desired depth—the valve-handle *m* is turned to the position II, whereby the channel *v* and pipe *x* is connected with the pressure-chamber *e* by the other channel *q*, thus applying reverse pressure to the piston, which reverses the motion of the latter and exhausts the liquid or gas, &c., previously fed through the pipe *w*, which latter has before been the pressure-pipe, the channel *u*, again into the head *k*, through the channel *r* and *r'*, and then through the exhaust-pipe *t*.

This controlling-valve may be provided

with but one channel q and r; but in this case the valve-head would have to be turned at a larger angle to acquire the same results.

Although I have explained my invention in connection with a rock-drill, I do not wish to confine the same to the application to this kind of machinery.

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

1. In a controlling-valve for liquids, gases, steam or air under pressure, the combination of a valve-casing with a valve proper, which latter consists of a valve-stem and valve-head whose bearing-surface is at right angle or nearly so to the valve-stem center line, said head projecting into a pressure-chamber of said casing, said head being provided with feed and exhaust channels, the latter extending along the inside of said valve-stem, all for the purpose of giving pressure to and exhausting from one or more working chambers alternately, through channels of said casing, substantially as described.

2. In a controlling-valve for liquids, gases, steam or air, the combination of a valve-casing with a valve proper, which latter consists of a valve-stem and valve-head whose bearing-surface is at right angle or nearly so to the valve-stem center line, said head projecting into an inlet-chamber of said casing, said head being provided with feed and exhaust channels, the latter extending along the inside of said valve-stem, all for the passage of liquid, gas, steam or air through chambers of said casing, substantially as described.

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

THEODOR REUTER.

Witnesses:
U. STEIGER,
A. ALBERTINE.