

No. 855,215.

PATENTED MAY 28, 1907.

J. H. ALLENDORFER.
HYDRAULIC VALVE.

APPLICATION FILED NOV. 19, 1904.

2 SHEETS—SHEET 1.

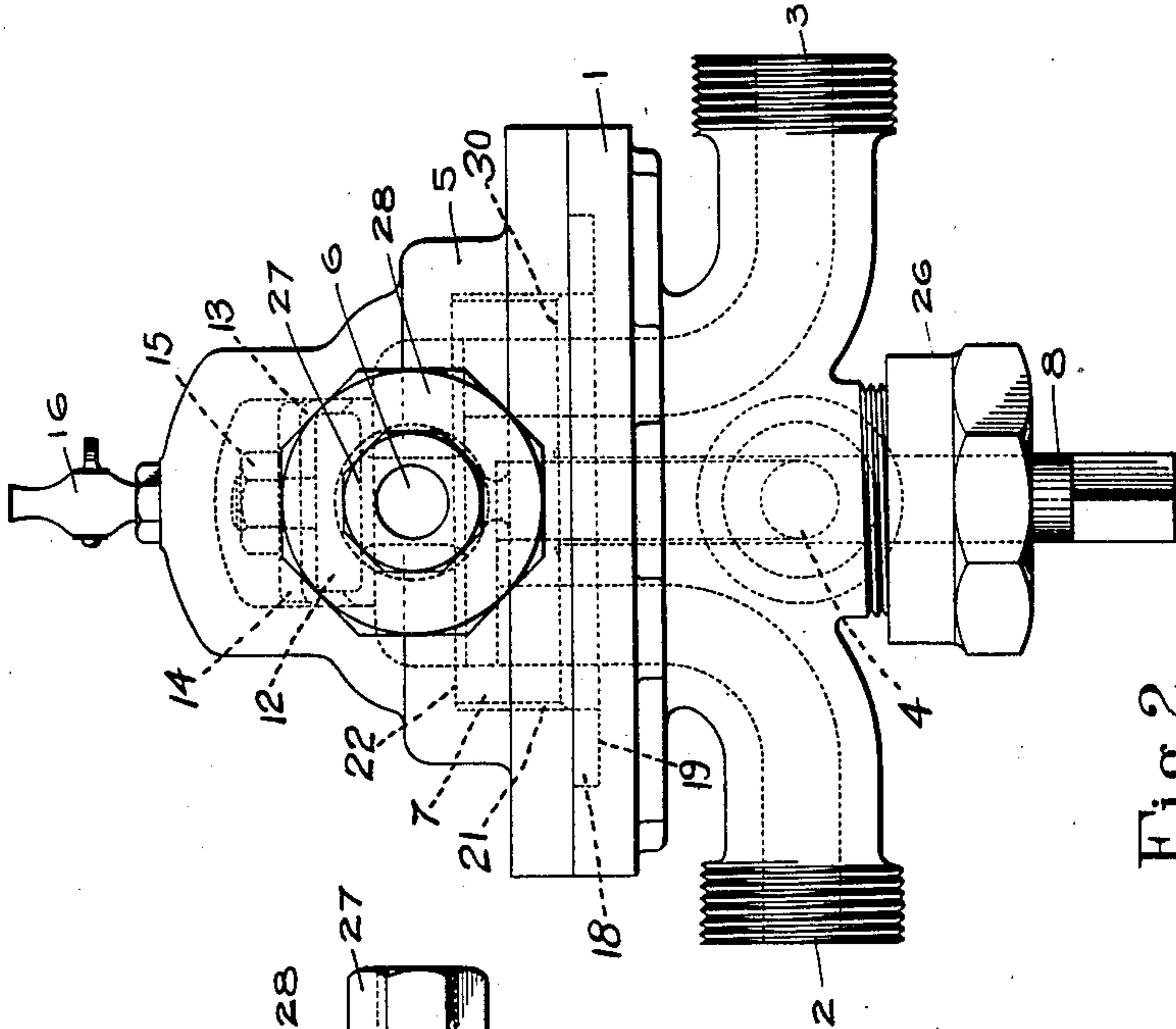


Fig. 2

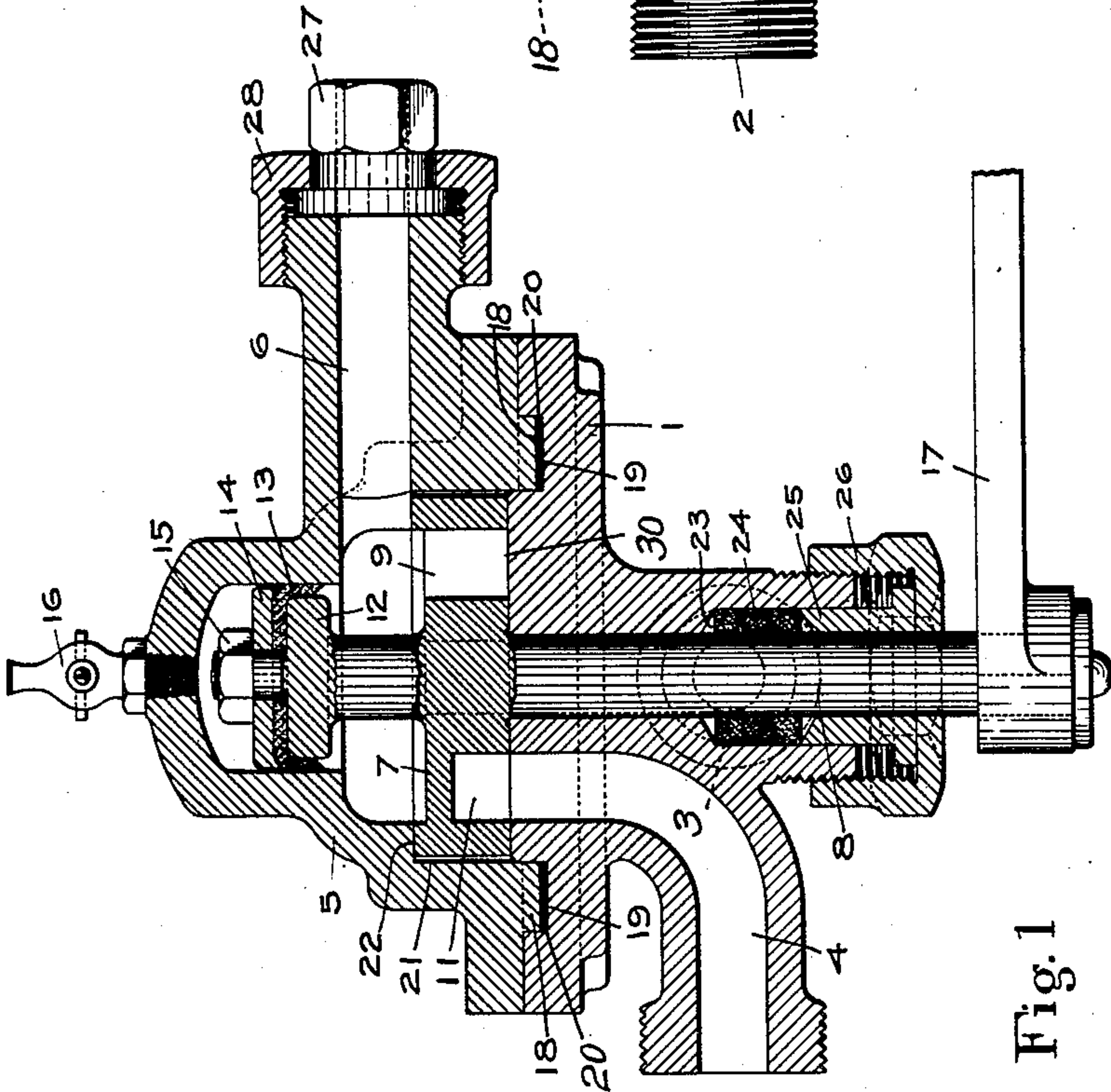


Fig. 1

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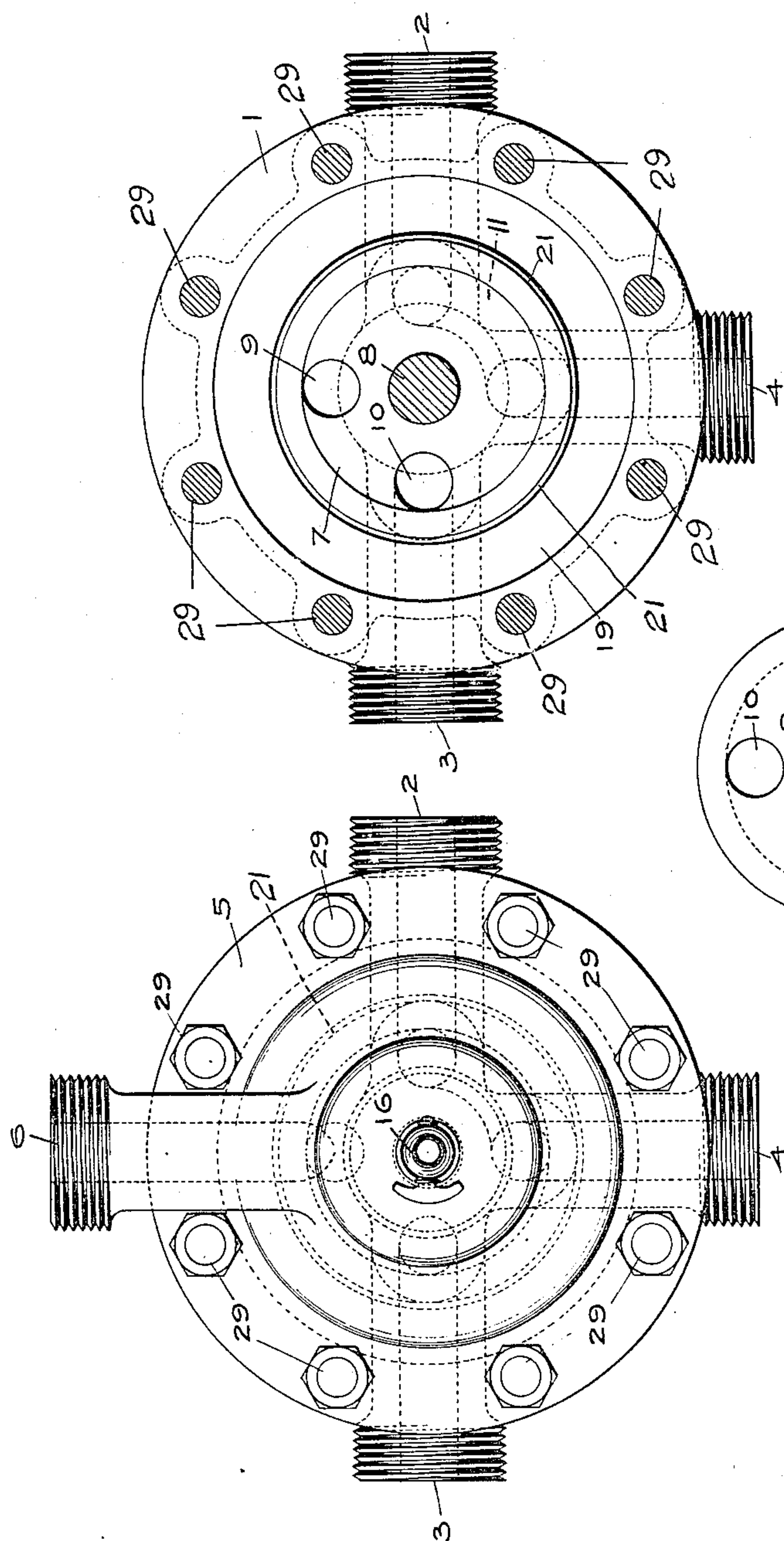


Fig. 4

Fig. 5

Fig. 3

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UNITED STATES PATENT OFFICE.

JOHN H. ALLENDORFER, OF WESTMONT BOROUGH, PENNSYLVANIA.

HYDRAULIC VALVE.

No. 855,215.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed November 19, 1904. Serial No. 233,485.

To all whom it may concern:

Be it known that I, JOHN H. ALLENDORFER, a citizen of the United States, residing in the borough of Westmont, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Hydraulic Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a type of hydraulic valves that is used to control the supply of fluid or liquid which is under high pressure; and its object is to provide a valve of the class described which shall remain tight when closed, and in which the pressure on the valve disk is balanced so that it can be operated easily and freely in all its positions.

A further object is to provide a simple and economical hydraulic valve, in which the moving parts will wear evenly, thus preventing breakages due to uneven wear, and otherwise so constructed as to facilitate the convenient inspection and substitution of all movable and wearing parts.

These objects are attained by the arrangement of parts and mechanism illustrated in the annexed two sheets of drawings, in which—

Figure 1 is a central vertical sectional elevation of the complete valve. Fig. 2 is an elevation of the valve at right angles to the section shown in Fig. 1. Fig. 3 is a plan of the valve. Fig. 4 is a plan of the valve with the upper portion or shell removed. Fig. 5 is a plan view of the under side of the valve disk showing the peculiar disposition of the ports and passageway.

Referring now to the various drawings in which like characters of reference refer to like parts: 1 is the body of the valve, arranged with the delivery ducts 2 and 3 and the exhaust duct 4; 5 is the valve chest or shell arranged with the inlet duct 6.

7 is the valve disk provided with a stem 8 and arranged with ports 9 and 10 and a passageway 11, as shown in Figs. 1, 4, and 5. The ports 9 and 10 extend through the valve disk but the passageway 11 is arranged to extend only part of the way into the body of the said disk and does not communicate with the valve chamber above, and the said passageway 11 is arranged so that, when either port 9 or 10 coincides with its corresponding

delivery duct, the passageway 11 forms a continuous channel between the other delivery duct and the exhaust duct.

The valve stem is provided with a collar 12 and this in turn is arranged with a leather or rubber cup 13 and a washer 14 both of which are securely fastened thereto by a nut 15 which screws on the reduced neck of the valve stem; all of which are located in the upper chamber of the valve shell 5, as clearly illustrated in Fig. 1.

The collar 12 is of such dimension that the area of its lower face exposed to the fluid pressure is nearly equal to the area of the upper face of the valve disk 7. Thus, the pressure which tends to force the valve-disk 7 downward against its seat 30 is equalized by the upward pressure against the collar 12 together with the upward back pressure of the exhaust fluid against the valve-disk, while the valve is changed from one operative position to the other.

Any leakage past the collar 12 and its packing, can be released by opening the stop-cock 16, so that no downward pressure may exist on the collar 12 to counteract the upward pressure thereon.

17 is a handle which serves to operate the valve-disk 7 and is fitted and secured to the valve stem, as shown in Fig. 1. The valve stem is preferably formed with a square end as shown in Fig. 2, in which the handle 17 is removed for clearness of illustration.

The body 1 and the shell 5 are secured together, preferably by stud bolts 29 (shown in Fig. 3), and the shell 5 is further arranged with an annular projection 18 which fits in a corresponding groove 19 in the body 1, in which a gasket 20 of rubber or similar material is placed. As the bolts 29 are tightened, this gasket is strongly compressed and leakage past these parts is thus prevented.

The valve-disk 7 is ground fluid tight against its seat 30 and in order to reduce friction, a space 21 is provided between the sides of the said disk and the surrounding walls of the shell 5. To prevent the valve-disk from being inadvertently raised from its seat, a shoulder 22 forming part of the shell 5 is arranged to project over the edge of the said valve-disk, as shown in Fig. 1.

A packing space 23 is provided in the body 1 and this is filled with suitable packing 24 which is held in place by a gland 25 and compressed by a nut 26.

27 is a coupling whereby the pressure supply can be connected to the inlet 6, and 28 is a coupling nut or union for uniting said parts. The delivery and exhaust ducts may be provided with similar parts or they, as well as the inlet pipe, may be secured to their respective adjuncts by any other suitable means.

The valve stem 8 projects outwardly beyond the body 1 as shown and is made tight against leakage by the packing and adjusting means for same, as heretofore described, and this arrangement of the valve stem thereby simplifies the construction of the valve as a whole and prevents complication or interference with the balancing collar and adjustments as would otherwise be the case if the valve stem should be extended through the shell in the opposite direction to that which it now has. This arrangement and position of the valve stem 8 also facilitates independent adjustment of it and its attached parts without interfering with the balancing collar and its packings.

The operation of the valve is as follows: Assuming the several elements in the position shown in Figs. 1 and 4, the fluid is admitted above the valve-disk through the inlet 6 and flows downward through the port 10 into the delivery duct 3; meanwhile, the port 9 is closed by the solid part of the valve-seat 30. At the same time, the fluid which returns through the delivery duct 2 rises upward into and through the passage 11 and escapes through the exhaust 4. The valve-disk is now turned through an angle of ninety degrees by means of the handle 17 and the port 9 thus made to coincide with the delivery duct 2, while the delivery duct 3 is connected with the exhaust duct 4, and the operation goes on as before, and vice versa.

During the greater part of the period of rotation of the valve-disk, both ports 9 and 10 are closed and the pressure of the disk against the seat 30 which would otherwise be excessive, is balanced by the upward pressure of the fluid against the collar 12, as explained hereinbefore, so that the valve may be shifted easily from one position to the other.

It will be noted that, owing to the fact that the high pressure fluid is admitted above the valve-disk, there will not be any tendency to raise the said disk from its seat, notwithstanding the shoulder 22, which may be omitted, if desired. Furthermore, on account of its circular shape, the valve-disk will wear evenly and, therefore, no leakage will result from this source.

Although I have shown my improvements applied to a four-way valve, it will readily be understood that they can be applied equally well to three-way or two-way valves, and I do not wish to be limited to the exact arrangement of the parts shown and described, but may introduce such changes as are with-

in the scope of this invention and as defined in the claims.

What I claim and desire to secure by Letters Patent is:

1. In a valve, a body having exhaust and delivery ducts formed therein, a shell secured to said body, arranged with an inlet duct and a valve chamber, a revoluble flat disk in said chamber provided with a stem or spindle projecting outwardly of said body, a collar upon said stem or spindle subjected to the fluid pressure acting upon the said disk and arranged to balance the same, means for preventing leakage past the said collar and means for releasing any fluid that may collect thereabove.

2. In a valve, a body having outlet and delivery ducts formed therein, a shell secured to said body arranged with an inlet duct and a valve chamber, a revoluble flat disk mounted in said chamber, ports or openings through said disk and a passageway underneath and within the body thereof, each of said ports or openings being adapted to register with one of said delivery ducts while the said passageway forms a continuous channel between the other delivery duct and the outlet or exhaust duct, a stem or spindle connected with said flat disk and projecting outwardly of said body, means for packing the stem, a collar upon said stem or spindle above the valve-disk subjected to the fluid pressure acting upon the said disk and arranged to balance the same, a cup and washer secured above said collar and located therewith in a recess within the shell, and a stopcock attached to said recess for releasing any fluid that may collect above said collar.

3. In a valve, a body having exhaust and delivery ducts formed therein, a shell secured to the said body arranged with an inlet duct and a valve chamber, means for securing the body and the shell, and a packing space therebetween, a revoluble flat valve-disk seated in said valve chamber and upon the said body, ports or openings through said valve-disk and a passageway underneath and within the body thereof, a stem or spindle connected with said flat disk and projecting outwardly of the valve body, packing surrounding the stem and compressed by a gland secured to the said body, a collar upon the said stem or spindle above the valve-disk, a cup and washer secured to said collar located therewith in a recess within said shell, and a stopcock attached to said shell communicating with the said recess.

In testimony whereof I hereto affix my signature in the presence of two witnesses.

JOHN H. ALLENDORFER.

Witnesses:

GEO. BEATTY,
STONE EDELEN.