

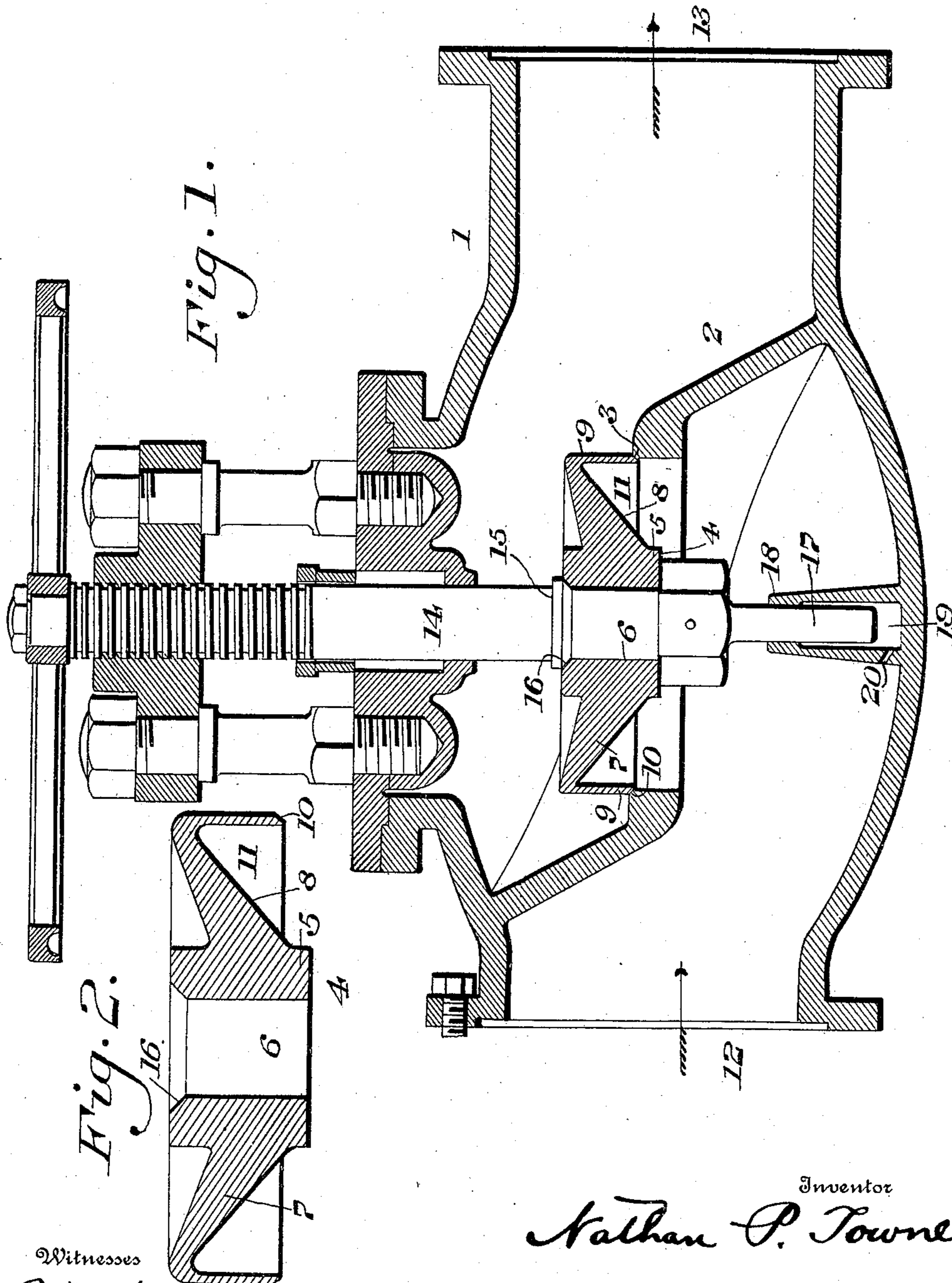
No. 820,154.

PATENTED MAY 8, 1906.

N. P. TOWNE.

VALVE.

APPLICATION FILED JULY 12, 1905.



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NATHAN P. TOWNE, OF PHILADELPHIA, PENNSYLVANIA.

VALVE.

No. 820,154.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, NATHAN P. TOWNE, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Valve, of which the following is a specification.

In the construction of disk or puppet valves there has heretofore been great difficulty experienced in closing the valve upon its seat, especially when the pressure is high or the valve is of large size, by reason of the yielding of the castings of valve-bodies, since the distortion of the valve-seat, which is part of the casting, leaves a space between the seat of the valve and the seat in the chest through which the steam or other fluid escapes, since the disk of the valve as heretofore made is perfectly rigid or non-resilient and does not and cannot conform itself to the distortion of the seat. By my present invention I have succeeded in overcoming this difficulty by the employment of a flexible valve-disk so constructed and proportioned that pressure of the steam, gas, water, or other fluid will act radially upon the inner surface of the depending outer annular wall of the valve, and thereby spring the valve against its seat, following all the distortions of the seat which may occur when under pressure. In devices of the prior art with which I am familiar the higher the pressure of the fluid the more imperfectly the valve will be seated, with the result that its function was impaired if not rendered almost useless, whereas in my present invention the higher the pressure of the fluid the greater pressure will be exerted between the valve and seat, making an absolutely automatic tight joint.

To the above ends my present invention consists, broadly, in the novel construction of the valve-disk, having a suitable body portion provided with a laterally-extending wall from which depends a thin or resilient annular outer wall, preferably beveled at its lower outer portion, whereby pressure of the gas, steam, water, or other fluid underneath the valve will cause the outer wall or ring of the latter to yield or distort sufficiently to bring the valve-face in contact against every part of the valve-seat in the body-casting with such force that the valve will follow such yielding and distortion as the pressure of the

fluid will cause to take place on the body of the valve, thus making a tight joint between the inclined faces of the valve and body seats.

It further consists of novel features of construction, all as will be hereinafter fully set forth.

Figure 1 represents a sectional view of the valve and its adjuncts embodying my invention. Fig. 2 represents, on an enlarged scale, a sectional view of the valve-disk in detached position.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates the valve-casing or body portion of the valve, which may be of any desired or conventional type and adapted for use in controlling the flow of water, gas, steam, or other fluid medium, said valve having a diaphragm 2, provided with the valve-seat 3, which has its upper inner portion beveled or chamfered.

4 designates the valve, comprising the body portion 5, having the opening 6 there-through, from which body portion extends the laterally or upwardly inclined portion 7, which has the under, upwardly, and outwardly inclined wall 8.

9 designates a depending annulus or ring, which is preferably beveled at its lower outer face, as indicated at 10, it being understood that said depending outer ring 9 is constructed so that an annular pressure-chamber 11 is formed, which serves as a reservoir wherein pressure is accumulated sufficiently to cause the flexible depending ring or annulus 9 to yield or distort according to requirements. It will further be observed that the ring or annulus 9 is made of such relatively thin proportions with respect to the valve-body that as the valve is forced toward its seat 3 the downward pressure whereby said seating is effected will also assist somewhat to spring inwardly the juxtaposed surfaces of the flexible ring 9 and seat.

12 designates the inlet, and 13 the outlet, passages of the valve-casing 1, it being understood that the valve may be actuated by a stem 14, which is provided with a shoulder 15, adapted to abut against the counterbore 16 of the valve, said stem being continued downwardly, whereby the extension 17 is formed, which moves in the guide 18, the latter having the chamber 19 therein, to which

pressure is admitted through the port 20. The valve-stem is preferably threaded and provided with a hand-wheel and packing devices of the usual character; but as this *per se* forms no part of the present invention I deem it unnecessary to enter into a detailed description of the same.

It will be apparent to those skilled in the art that after the valve 5 has been moved toward its seat the pressure of the fluid entering the inlet 12 will instantly accumulate within the chamber 11 and will instantly cause the resilient ring or annulus 9 to yield or distort sufficiently to bring the outer lower beveled face 10 against every portion of the valve-seat 3 with such force that the valve will follow such yielding or distortion as the pressure of the fluid causes within the chamber 11, thereby making a tight joint between the juxtaposed surfaces of the valve and body seats. In prior devices with which I am familiar I have found from an extended experience that the higher the pressure the more imperfect is the throttling function of the valve, as the distortion of the valve-seat will leave a space between the seat of the valve and the seat in the casing through which the fluid will leak to some extent, whereas in my present invention the higher the pressure of the fluid the greater will be the pressure exerted between the valve and its seat, thereby making an automatic tight joint. It will further be apparent to those skilled in the art that by the employment of my invention the necessity for employing great force to seat the valve, which is frequently attended with the distortion of the valve-seat, is obviated by my device, since it is only necessary to form a moderately tight contact between the outer depending resilient annulus or ring 9 and its seat, since the pressure within the chamber 11 will complete and perfect the seating action.

I am aware that it has heretofore been proposed to construct leathers of a hydraulic press so that the same may be expanded outwardly by the pressure thereupon; but this device is not analogous to my present invention, nor could it be used on an ordinary puppet or disk valve in the manner I have devised.

So far as I am aware I am the first in the art to produce as a concrete unitary device a valve having a pressure-chamber formed between its outer end portion, said pressure-chamber being surrounded by a depending resilient ring or annulus, whereby the pressure within the pressure-chamber is exerted to effectuate a perfect seating of the valve under all conditions, and my claims to these features are therefore to be interpreted with corresponding scope.

It will be apparent that the broad principle of my invention is applicable to any type

of disk or puppet valve and is also applicable to any use to which the valve may be put for throttling water, steam, gas, or other pressure medium, and I therefore do not desire to be restricted in the application of my invention to any particular type of valve or to any application of the same, nor do I desire to be restricted to the precise form or structure herein shown, since various changes may be made by those skilled in the art which will come within the spirit of my invention. It will thus be apparent that the broad principle of my invention does not embody merely a change in degree of the size or proportion of the parts, but consists more especially in the employment of the pressure-chamber 11 in conjunction with the outer depending flexible or resilient wall or annulus 9, which latter is adapted to be distorted, as explained, according to requirements, whereby a perfectly tight joint is obtained.

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

1. As an improved article of manufacture, a valve having an outer, depending, resilient ring with its acting edge beveled to engage an interior surface of a valve-seat, said ring being of such thickness that the pressure of the fluid being throttled will force said ring against the valve-seat.

2. As an improved article of manufacture, a valve comprising a body portion and an outer, depending, flexible ring with its free end extending toward the valve-seat and having a pressure-chamber intermediate said ring and said body, the lower portion of said ring being adapted to contact at its free end with an interior surface of the valve-seat.

3. In a device of the character named, a casing having a valve-seat, a valve, means for actuating said valve and an outer resilient ring depending from said valve with its free end bearing upon an interior surface of the valve-seat, whereby a pressure-chamber is formed within said ring, and said ring having its free end extended toward the valve-seat, said ring being of such thickness that the fluid being throttled will force said ring against said seat.

4. The combination of a body, a disk valve having an internal pressure-chamber, and an outer, depending, resilient ring with its free end bearing upon an interior surface of the valve-seat, a valve-stem for said valve, said pressure-chamber being adapted to receive the pressure of the fluid being throttled, whereby the pressure of the valve against its seat caused by the valve-stem is increased by the pressure of the steam, gas or other fluid underneath the valve.

5. In a device of the character described, the combination of a valve-casing having a valve-seat therein, a valve comprising a body

5 having an upwardly-inclined inner wall 8 and a depending, outer, flexible ring 9, whereby a pressure-chamber 11 is formed between said body and ring, said chamber being adapted for the reception of the pressure medium, whereby said ring with its free end bearing upon an interior surface of the valve-

seat is pressed against the valve-seat proportionately to the distortion of the latter under pressure.

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