Feb. 16, 1926. 1,573,108

B. T. WILLISTON

STOP VALVE.

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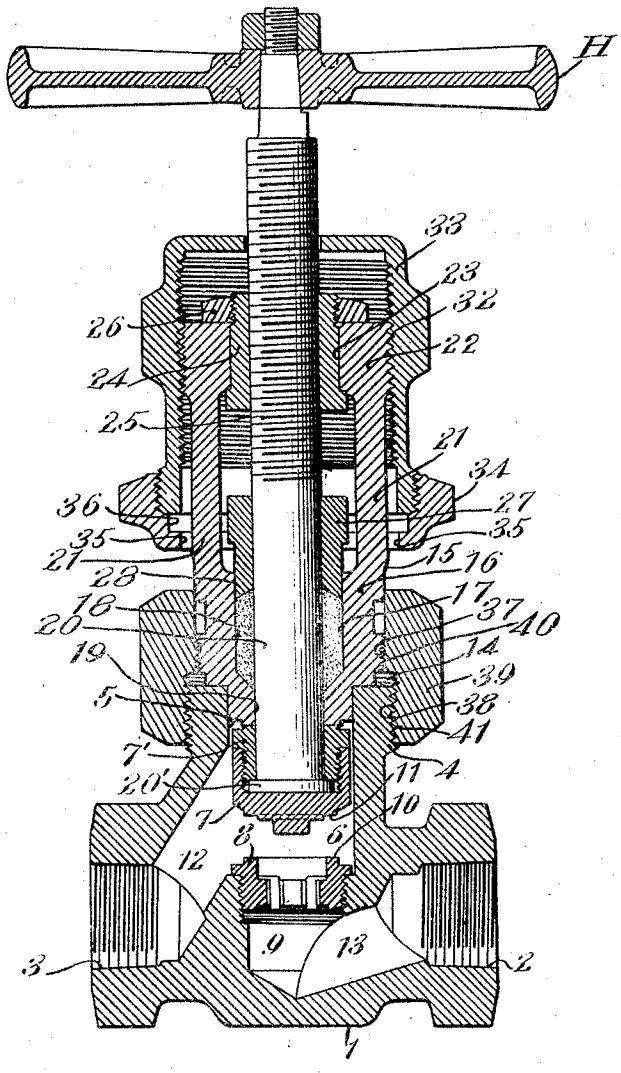
Fig. 1



Inventor
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his Attys.

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Fig. 2

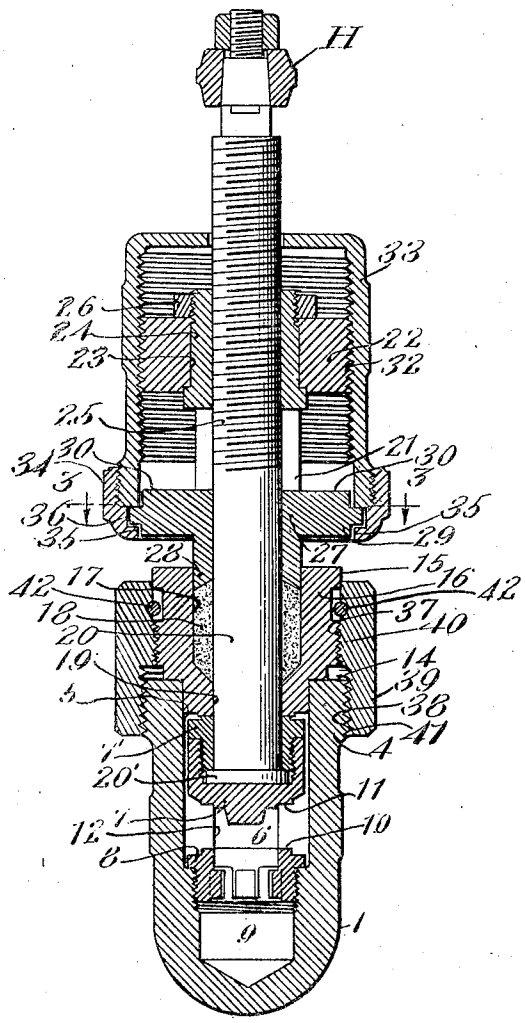


Fig. 3

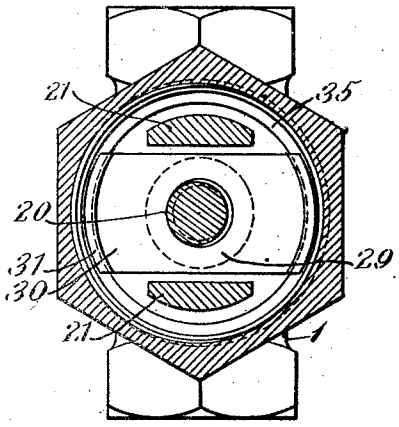
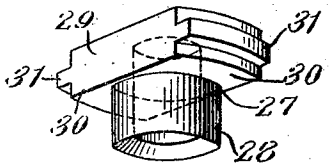


Fig. 4



Inventor
Belvin T. Williston:
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Patented Feb. 16, 1926. 1,573,108

UNITED STATES PATENT OFFICE.

BELVIN T. WILLISTON, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO MANNING, MAXWELL & MOORE, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

STOP VALVE.

Application filed March 30, 1925. Serial No. 19,284.

To all whom it may concern:

Be it known that I, BELVIN T. WILLISTON, a citizen of the United States of America, and resident of Somerville, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Stop Valves, of which the following is a specification.

This invention relates to valves, and more particularly to high pressure valves suitable for use in controlling the flow of superheated steam or similar fluids and comprising a stationary seat and a relatively movable valve member reciprocable toward and from the seat to regulate the fluid flow.

Principal objects of the invention are to provide an improved valve comprising means for protecting the valve stem from gritty material which might wear the gland or cut the packing; to provide means for positively applying pressure to the gland or for removing such pressure, said means being of such a character that the pressure is applied uniformly and without danger of cramping or distorting the moving parts; and means for attaching the yoke to the valve of such character that a joint may be effected between the bonnet or yoke of the valve and the body of the latter with less effort and more certainty than in valves of usual construction; and so to shape the valve body proper as to permit it readily to be machined from a forging without undue effort or waste of material.

In the accompanying drawings, in which one embodiment of the invention is disclosed for purposes of illustration,

Fig. 1 is a central vertical section;

Fig. 2 is another central vertical section, the plane of said section being at right angles to the section of Fig. 1;

Fig. 3 is a horizontal section on the line 3—3 of Fig. 2; and

Fig. 4 is a perspective of the gland.

In the specific embodiment of the invention shown in the drawings the numeral 1 designates the valve body, which may be a steel forging, and which is provided with aligned passages 2 and 3 internally threaded for the reception of pipe connections. Substantially midway between its ends the body 1 is provided with a boss 4 having a bore 5 terminating in the inlet chamber 6. A valve 7 is disposed in chamber 6. This valve is reciprocable to and from a seat member 8 having threaded engagement with a threaded opening in a septum or partition separating the inlet chamber 6 from an outlet chamber 9. The seat member 8 is provided with a plane annular seat 10 which cooperates with a corresponding annular surface 11 upon the valve 7 when the latter is in closed position.

The inlet opening 3 is connected with the chamber 6 by a passage 12 which may be formed by drilling at an angle through the upper end of the passage opening 5. The opening 2 and the outlet chamber 9 are connected by a bore 13 drilled diagonally through the passage 2. From the construction so far described it will be apparent that the valve body may be made by forging and all of the openings and chambers therein produced by drilling, while the valve seat may be inserted through the passage 5.

The upper end of the boss 4 is finished to provide a surface 14 upon which a yoke or bonnet portion 15 of the valve is mounted. This portion of the valve structure comprises the bonnet proper 16 having an axial bore 17 for the passage of the valve stem 20. The bore 17 is enlarged just above the lower end 19 of the bonnet to provide a pocket for the reception of packing material 18. The stem 20 has a flange 20′ at its lower end which seats in a socket in the valve 7 and is clamped to the valve by means of a sleeve 7′, threadedly engaging the inside of the valve member and abutting the upper side of the flange 20′. At its upper end the stem carries a hand-wheel or handle H.

Diametrically opposed arms 21 extend upwardly from the body portion of the bonnet 16 and at their upper ends unite with an annular rim 22. A nut 24 is seated in the bore 23 of rim 22 and is clamped in place by means of a radial flange at its lower end and a retaining nut 26 at its upper end, any suitable means being provided for positively preventing relative rotation of the nut and rim. For example the flange at the lower end of the nut may be angular and seated in an angular socket in the lower surface of the rim. The nut 24 is internally screw-threaded for engagement with external threads 25 on stem 20.

The numeral 27 designates a gland provided with a cylindrical portion 28 having

a sliding fit within the enlargement of the bore 17 and furnished with a transversely extending portion 29 comprising arms 30 extending outwardly between the upwardly extending arms 21. Axial movement of this gland serves to compress the packing 18 and thus to prevent leakage along the stem 20. The arms 30 are provided with arcuate ribs 31 at their ends, whose function will shortly be apparent.

The outside of the annular rim 22 is screw-threaded at 32 and an internally threaded hollow cylindrical cap 33 may be screwed up or down upon the threads 32. The exterior of the member 33 is formed in any suitable manner to permit the cooperation therewith of a wrench or the like. The lower part of the peripheral surface of the member 33 is externally threaded and a collar 34 threadedly engages the latter. The threads engaging the collar 34 are of opposite pitch to those engaging the nut 22 so that turning the cap 33 does not tend to unscrew the collar 34. This collar 34 is provided with an inwardly directed flange 35 at its lower edge. The ribs 31 of the arms 29 and 30 project into the groove 36 between the lower edge of the cap 33 and the flange 35 so that upward or downward movement of the cap 33 raises or lowers the gland 27. Since the cap 33 forms a complete cylinder, the application of a wrench or other suitable means for turning it does not appreciably distort it, as might be the case if it were cut away or open on opposite sides, while at the same time the pressure applied to the gland is always substantially parallel to its axis so that there is little tendency to cramp the parts.

The bonnet 15 is externally threaded at 37 near its lower end, and the boss 4 on the body 1 is also externally threaded at 38, the threads upon the bonnet being of finer pitch than those on the body, the threads both being right hand or both left hand, as desired.

The numeral 39 designates a nut having threaded portions 40 and 41 cooperating respectively with the threads on the bonnet and body. This nut is rotatable to draw the bonnet to a seat upon the surface 14, the differential action of the two sets of screw threads serving to produce a very tight engagement between the bonnet and body by the application of a relatively small force. Preferably the nut is provided with one or more stops, for example pins 42 engaging an axially elongate groove in the bonnet 15, to prevent undue movement of the nut toward the body which might result in seating the nut instead of the bonnet against the surface 14.

By reason of the construction described it will be evident that leakage will be absolutely prevented, as a perfectly tight joint may be obtained. Also by reason of the construction of the hollow cap 33 and related parts the valve stem is wholly enclosed from above and from the sides so that gritty material is kept from it most successfully.

While there is herein described one embodiment which the invention may assume in practice it is to be understood that the same may be substantially modified without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. In a valve, a valve body having a seat therein, a valve adapted to cooperate with said seat, a valve stem secured to the valve, a bonnet surrounding said stem, a gland reciprocable relative to said bonnet, and means for adjusting said gland including a member having a cylindrical wall surrounding the portion of said valve stem between the top of said gland and the top of said bonnet.

2. In a valve, a valve body having a seat therein, a valve adapted to cooperate with said seat, a valve stem for moving the valve, a bonnet surrounding said stem, a gland reciprocable relative to said bonnet, and means for positively adjusting said gland in either direction including a member having threaded engagement with said bonnet and rotatable but axially immovable relatively to said gland.

3. In a valve, a valve body having a seat therein, a valve adapted to cooperate with said seat, a valve stem connected to the valve, a bonnet surrounding said stem, said bonnet having at its upper end an annular rim surrounding said stem, a gland reciprocable relatively to said bonnet, and means for adjusting said gland including a hollow cylindrical cap having threaded engagement with said bonnet rim and having a connection with said gland including means providing an annular groove coaxial with said stem on said cap, and means fixed relatively to said gland seated within said groove, said cap having an unbroken peripheral wall extending between said groove and said bonnet rim.

Signed by me at Boston, Massachusetts, this 9th day of March, 1925.

BELVIN T. WILLISTON.