

Patented Dec. 15, 1914.

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UNITED STATES PATENT OFFICE.

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CHECK-VALVE STRUCTURE.

1,120,713.

Specification of Letters Patent.

Patented Dec. 15, 1914.

Application filed September 11, 1914. Serial No. 861,256.

To all whom it may concern:

Be it known that I, PATRICK W. HENNESSY, a citizen of the United States, residing at Joplin, in the county of Jasper and State of Missouri, have invented certain new and useful Improvements in Check-Valve Structures, of which the following is a specification.

My invention relates to improvements in check-valve structures.

An important object of the invention is to provide a check-valve structure which is so constructed that the flow of water there-through is not perceptibly retarded by the casing or check-valve thereof while such check-valve is open, and which is simple in construction, inexpensive to manufacture, and formed of few and simple parts which may be readily separated, assembled and adjusted.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same, Figure 1 is a central vertical longitudinal sectional view through a check-valve structure embodying my invention, Fig. 2 is a side elevation of the same, Fig. 3 is a plan view of the check-valve and seat removed, and, Fig. 4 is a fragmentary detail section through a portion of the casing showing slightly different means for connecting the parts thereof.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 5 designates the casing of the valve-structure as a whole, the same being formed in two casing-sections 6, arranged in end to end relation, with their inner engaging ends provided with a tongue and groove 7, as shown.

In Fig. 1, the casing-sections 6 are shown as connected by means of a union-sleeve 8, provided at one end with a flange 9, engaging a flange 10 carried by the upper casing-section 6. This union-sleeve is internally screw-threaded, as shown at 11, for engagement with exterior screw-threads 12, formed upon the adjacent end of the lower casing 6. The union-sleeve 8 is provided with an exterior flange 8', formed polygonal in cross-section, whereby the same may be conveniently engaged and turned by a wrench or the like. This form of connection between

the casing-sections 6 is preferred in valve structures of smaller sizes but when the valve structures are made in larger sizes, I prefer to connect the casing-sections thereof, by the means shown in Fig. 4. In Fig. 4, the casing-sections 6 are provided with outwardly extending flanges 12', having openings to receive clamping bolts 13, the casing-sections having their inner engaging ends preferably provided with grooves, for receiving packing 14 or the like.

The lower casing-section 6 is provided with a preferably internally screw-threaded inlet or inlet-neck 15, having a much smaller diameter than the upper end of the lower casing-section 6, such casing-section increasing in diameter upwardly or away from the inlet-neck 15. The upper casing-section 6 is provided with an inlet or inlet-neck 16, of much smaller diameter than the lower end of the same, the upper casing-section increasing in diameter downwardly or away from the outlet-neck 16. The inlet 15 and outlet 16 are arranged in alinement, thus expediting the passage of the water through the casing. Particular attention is called to the fact that the curvature or tapering of the casing-sections 6 are such with respect to the location of the inlet 15 and outlet 16, that they offer the minimum amount of friction or resistance to the water passing there-through.

The lower casing-section 6 is provided with an annular shoulder 17, having a lower inclined wall 18, as shown. Above and adjacent the shoulder 17, the lower casing-section 6 has internal screw-threads 19, for engaging exterior screw-threads formed upon an annular valve-seat 20. This annular valve-seat has a lower inclined wall 21, forming with the inclined wall 18, a continuous or unbroken wall, for deflecting the incoming liquid or water through the annular valve-seat, with the least resistance. It is obvious that the valve-seat may be removed or secured to its casing-section 6, by being rotated in the proper direction, and for this reason the same is provided upon its upper side with spaced openings or notches 22, for receiving the teeth of a spanner-wrench (not shown). Preferably formed integral with and arranged inwardly of this annular valve-seat are spider-arms 23, depending below the same and connected by a tubular sleeve or hub 24, as shown. Mounted to reciprocate within this tubular sleeve or hub

24 is a substantially vertical valve-stem 25, the upward movement of which is limited by a nut 26, carried thereby.

To the upper end of the valve-stem 25 is 5 secured a vertically movable gravity operated check-valve 27, having its lower face adapted for engagement with the bevel face 28 of the annular valve seat 20, the check-valve 27 being approximately conical and 10 decreasing in diameter downwardly, as shown. Particular attention is called to the fact that when the check-valve 27 is moved to the full open position, the space between the same and the valve-seat has substantially 15 the same cross-sectional area as the inlet or inlet-neck 15, whereby the passage of the water through the valve structure is not perceptibly retarded.

In operation, when the water is traveling 20 upwardly, the same enters the inlet or inlet-neck 15, passes through the lower casing-section 6, valve-seat 20, by check-valve 27, through upper casing-section 6, and outlet or outlet-neck 16. When the pressure is released upon the lower side of the check-valve 27, it is obvious that the same will 25 instantaneously drop to the closed position, the pressure above the check-valve being upon the central portion thereof.

30 It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit 35 of the invention or the scope of the subjoined claims.

Having thus described the invention, I claim:—

40 1. A check-valve structure, comprising a lower casing-section provided near its upper end with an internal shoulder having an inclined inner wall, an annular valve-seat having screw-threaded engagement with the 45 casing-section above the shoulder to engage therewith and having a lower inclined wall cooperating with the first named inclined wall to form therewith a continuous unbroken wall for directing the incoming wa- 50 ter through the annular valve-seat with the least resistance; a depending spider carried by the annular valve-seat and including a sleeve arranged in a plane below the valve-seat whereby the same does not obstruct the

passage of the water through the annular 55 valve-seat, a gravity operated check-valve arranged above the annular valve seat to engage therewith and adapted to move away from the same whereby the cross-sectional area of the space between the check-valve 60 and the valve-seat is substantially equal to the cross-sectional area of the inlet of the lower casing section, a stem secured to the valve and depending therefrom and passing through the sleeve, a stop-member carried 65 by the stem below the sleeve, an upper casing-section engaging the lower casing-section, and means to join the casing-sections.

2. A check-valve structure, comprising a lower casing-section provided near its up- 70 per end with an internal shoulder having an inclined inner wall, an annular valve-seat having screw-threaded engagement with the casing-section above the shoulder to engage therewith and having a lower inclined wall 75 cooperating with the first named inclined wall to form therewith a continuous unbroken wall for directing the incoming water through the annular valve-seat with the least resistance, a depending spider carried 80 by the annular valve-seat and including a sleeve arranged in a plane below the valve-seat whereby the same does not obstruct the passage of the water through the annular valve-seat, a gravity operated check-valve 85 arranged above the annular valve seat to engage therewith and adapted to move away from the same whereby the cross-sectional area of the space between the check-valve and the valve-seat is substantially equal to 90 the cross-sectional area of the inlet of the lower casing section, a stem secured to the valve and depending therefrom and passing through the sleeve, a stop-member carried 95 by the stem below the sleeve, an upper casing-section having a tongue and groove connection with the lower casing-section, and a union sleeve having swiveled connection with one casing-section and screw-threaded engagement with the other casing-section, 100 substantially as described.

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

PATRICK W. HENNESSY.

Witnesses:

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