

G. E. NICKOL.
CHECK VALVE.
APPLICATION FILED SEPT. 5, 1916.

1,236,596.

Patented Aug. 14, 1917.

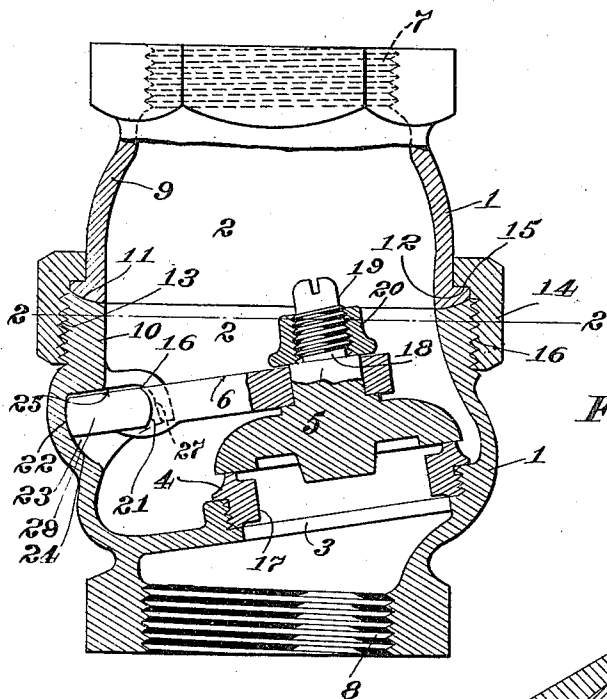


Fig. 1.

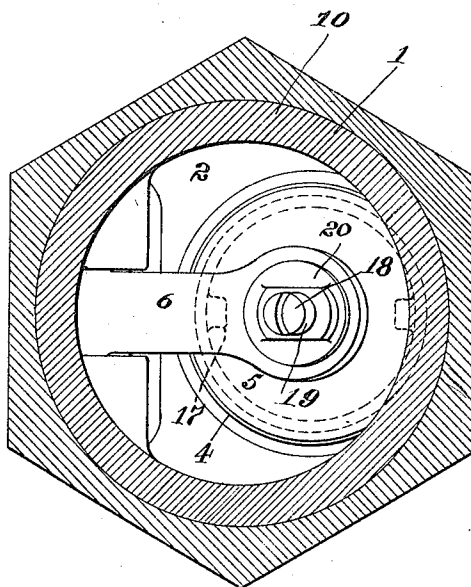


Fig. 2.

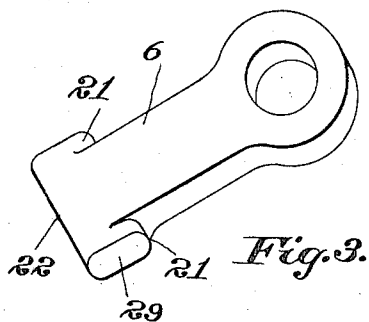


Fig. 3.

Witnesses.

Porter H. Platt.

Alice G. Ingers.

George E. Nickol Inventor

By Edwin J. Samuels

Attorney

UNITED STATES PATENT OFFICE.

GEORGE E. NICKOL, OF BALTIMORE, MARYLAND.

CHECK-VALVE.

1,236,596.

Specification of Letters Patent.

Patented Aug. 14, 1917.

Application filed September 5, 1916. Serial No. 118,444.

To all whom it may concern:

Be it known that I, GEORGE E. NICKOL, a citizen of the United States of America, residing in the city of Baltimore, State of Maryland, have invented certain new and useful Improvements in Check-Valves, of which the following is a specification.

This invention relates to a check valve in which all the parts which are subject to wear and, in fact, the valve casing itself, may be conveniently removed without taking down the line of pipe in which the valve is inserted. To this end, the valve casing which is usually elongated with the long axis in alignment with the axis of the pipe, is divided on a plane at right angles to the said axis, the plane of division in the preferred form of the valve being normally near or a little above the center of the valve when it is vertically placed.

The sections as shown are connected by a ground joint and coupling ring, though this connection may be varied within the scope of the invention, and the lower half of the casing contains a valve seat which is parallel or nearly parallel to the plane of division of the halves of the casing and screw-threaded into or otherwise secured to the casing and provided with means for engagement by a spanner or wrench so that it may be conveniently removed and replaced by merely loosening the coupling ring, swinging the two halves of the casing slightly apart and inserting a suitable spanner, wrench or other tool. The plane of the seat and the plane of the juncture of the parts, being nearly parallel, provides conveniently for the swing of the spanner in removing and replacing the seat.

In addition to an interchangeable seat, a removable and interchangeable valve lever and valve member are provided. The valve lever and valve member are separate parts, the valve being connected to the lever or arm by a rotary spindle so that it rotates from time to time bringing new surfaces of the valve member and valve seat in contact retarding wear, and if the valve member becomes worn and requires replacement before the lever proper or vice versa, either may be replaced independently of the other.

In the preferred form of the invention, the lever is provided with an integral pivot or trunnion seated in an arcuate pocket or

bearing in the wall of the casing, so constructed that the pivot can be removed from the pocket only when the lever is upright, a position which it can take only when the parts of the casing are separated so that once the valve lever and valve are properly mounted, they cannot be displaced until the casing is opened.

In the accompanying drawing I have illustrated a valve and casing involving the various features of my invention in the preferred form.

In the drawing, Figure 1 is a vertical central section;

Fig. 2 is a horizontal section on the line 2, 2 of Fig. 1, looking downward; and

Fig. 3 is a perspective of the lever arm.

Referring to the drawing by numerals, each of which is used to indicate the same or similar parts in the different figures, the whole device, referred to broadly as a valve, consists of a casing 1 inclosing the valve chamber 2 having a valve opening 3 with a valve seat 4 and a valve member 5 mounted on a lever arm 6. The two ends of the casing are apertured and threaded at 7 and 8 to receive the ends of the pipe line after the manner of the usual pipe fitting.

The casing is divided on a plane substantially at right angles to its axis into an upper section 9 and a lower section 10 and the meeting surfaces 11 are ground or otherwise suitably treated to form a tight joint, the upper section having a circumferential shoulder at 12 and the lower section being threaded at 13 so that the sections 9 and 10 may be held in their assembled relation by a collar 14 having a shoulder 15 to engage the shoulder 12 and being threaded at 16 beyond the shoulder to engage the thread 13.

The lower section 10 which cannot be so distinguished when the casing is placed horizontally, which position will not interfere with its operation if it be placed with the seat downward, contains the seat and moving parts of the valve as well as the pocket for the valve arm or lever to be described. The valve seat 4 is directly beneath, though not shown as concentric with the opening formed by the separation of the two parts 9 and 10 of the casing at the surfaces 11, and the valve seat is substantially parallel to these surfaces. This seat or ring 4 is threaded into the valve opening 3 formed

in the casing and provided with suitable lugs or other means 17 for engagement of the valve seat by means of a wrench or spanner, and it will be clearly apparent that such a spanner may be conveniently inserted and operated by disengaging the two sections 9 and 10, that is, unscrewing the ring 14 and slightly separating the sections 9 and 10 by springing the pipe line, it being understood that in most instances there is a right angle bend in the pipe somewhere in the vicinity of the valve which provides for such springing of the line.

An important feature of the invention is found in the mounting of the valve. Integral with the valve member 5 there is a central stud 18 projecting upward. This stud has a running fit in an aperture in the lever arm 6 and is threaded at the upper end 19 to receive a nut 20 by which the valve member 5 and lever arm are held in engagement. The lever arm 6 has at the pivot end a transverse stud or trunnion 29 which is flat top and bottom and has front surfaces 21 curved and concentric with the axis of the lever arm, and at the rear a surface 22 curved on a considerably longer radius drawn about an axis parallel to the axis of the lever and, as shown, near the center of the lever. As a bearing for the trunnion of the valve lever arm, the lower half 1 of the casing is provided with a socket 23 having its outer, lower surface 24 a little less than 90 degrees curved on an arc concentric with the surface 22, its upper surface 25 substantially flat and inclined slightly downward toward the outer surface of the casing, and the inner, upper quadrant 26, *i. e.* toward the center of the casing, drawn on a curve concentric with the surface 21 of the trunnion; the lower, inner quadrant 27 is open to the valve chamber. With the bearing pocket thus formed, the trunnion can only be inserted when the valve lever arm is vertical, the valve being up, and the valve can only take this position when the upper section of the casing is removed so that when the structure is properly assembled with the cap in position, the trunnion is locked in the pocket and cannot be displaced in any way until the sections are separated and the parts become accessible.

I am aware that various check valves have been constructed having in view some of the objects of the present invention but they are all more or less difficult of access and embody complications, or their construction involves extra grinding of joints and the like; or worse, the valve seat is made integral so that the whole case is destroyed when it becomes worn. By the present invention I have produced a check valve in which all the parts are locked in their operative relation as long as the sections are combined, the parts being released when the sections are

disconnected and all the wearing parts are capable of convenient removal and replacement.

Having thus described my invention specifically and in detail, I desire to have it understood that the specific terms are used descriptively rather than in their limiting sense and the scope of the invention is defined in the claims:

1. In a check valve, a casing adapted to be connected at its ends to a pipe line and formed in two sections meeting and coming in contact on a plane substantially at right angles to the axis, one section having contacting surfaces substantially at right angles to the axis of the casing and having a valve opening threaded to receive a seat, a seating ring threaded into said opening substantially parallel to the plane of junction of the sections, a socket in the said section, a valve member cooperating with the seat, a valve lever arm carrying the valve member and provided with a trunnion engaging the socket as a bearing, the said socket and trunnion cooperating to prevent disengagement of the valve and lever when the casing is assembled.

2. In a check valve, a casing formed in two sections, one section having a valve opening threaded to receive a seat, a seating ring in said opening substantially parallel to the juncture of the sections, a socket in the said section, a valve member cooperating with the seat, a valve lever arm carrying the valve member and provided with a trunnion engaging the socket as a bearing, the said socket and trunnion cooperating to prevent disengagement of the valve and lever at all times except when the valve lever is vertical, the casing and lever being so formed that the valve lever cannot reach vertical position when the casing is assembled.

3. In a check valve, a valve casing formed in two sections meeting on a plane substantially at right angles to the length of the casing, means for joining the sections, one section having a valve opening with means for engaging a seating ring, a seating ring therein which is removable by rotating in a plane substantially parallel to the meeting surface of the sections, a valve member cooperating with the seat, a lever arm on which the valve member is mounted, the lever arm having a pivot member at one end, and means in the section in which the seat is mounted for engaging the pivot, the valve arm being removable when the parts of the casing are separated and the said engaging means being so formed that the valve arm cannot be displaced without separating the two sections of the casing.

4. In a check valve, a casing formed in two sections, a valve seat and a socket in one section, a valve member cooperating with the seat, a lever arm carrying the valve and hav-

ing a trunnion engaging the socket, the socket being curved on a small radius in the upper, inner quadrant and on a larger radius as to the lower, outer quadrant and
5 open below into the interior of the casing, the trunnion being flat and having its rear face curved on a radius corresponding to the outer surface of the socket and its front face

on a radius corresponding to the inner surface.

Signed by me at Baltimore, Maryland,
this 1st day of September 1916.

10

GEORGE E. NICKOL.

Witnesses:

ZELLA KUHN,
ALICE G. DONEGAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."