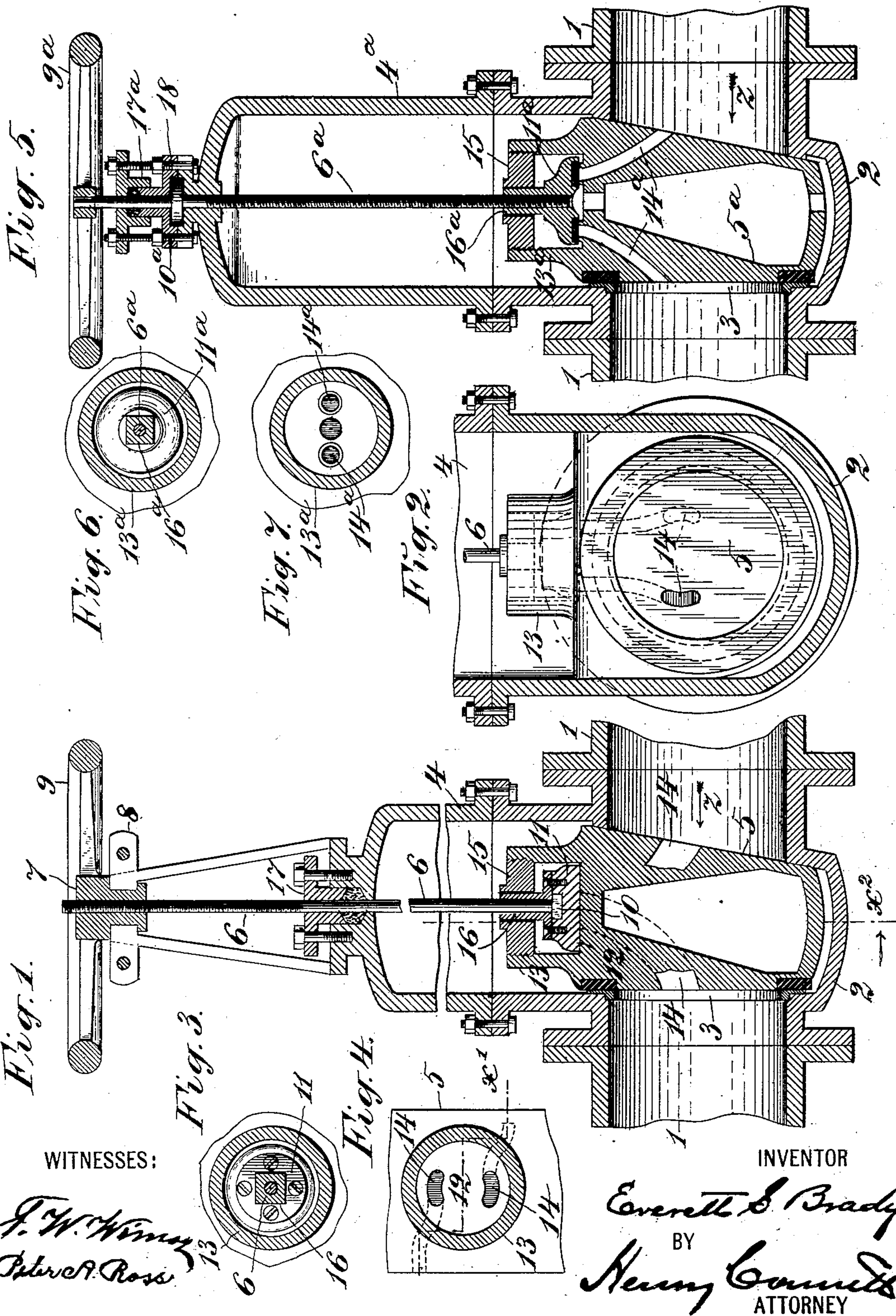


No. 745,774.

PATENTED DEC. 1, 1903.

E. S. BRADY.  
STRAIGHTWAY VALVE.  
APPLICATION FILED AUG. 21, 1902.

NO MODEL.



WITNESSES:

J. W. Winger  
Peter A. Ross

INVENTOR

Everett S. Brady  
BY  
Henry Connelley  
ATTORNEY



# UNITED STATES PATENT OFFICE.

EVERETT S. BRADY, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF  
TO ALBERT V. KING, OF NEW YORK, N. Y.

## STRAIGHTWAY VALVE.

SPECIFICATION forming part of Letters Patent No. 745,774, dated December 1, 1903.

Application filed August 21, 1902. Serial No. 120,472. (No model.)

*To all whom it may concern:*

Be it known that I, EVERETT S. BRADY, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, and city and State of New York, have invented certain new and useful Improvements in Straightway Valves, of which the following is a specification.

This invention relates to valves for controlling the flow of fluids under pressure, and particularly to the class of gate-valves or "straightway" valves, so called; and the object of the invention is to provide a valve-controlled by-pass for the fluid at the top of the main gate-valve, the controlling by-pass valve seating downward or substantially perpendicular to the seating of the main valve and adapted to be operated automatically by the same means that are employed for opening the main valve. The purpose of this by-pass is to relieve the pressure on the main valve before it is opened by effecting a balancing of the pressure on both sides of said valve.

In the accompanying drawings, which illustrate two embodiments of the invention, Figures 1 to 4 illustrate one of said embodiments. In these Fig. 1 is a section taken along the axis of the pipe through which the fluid flows and along the axis of the valve-operating stem. Fig. 2 is a transverse section of the valve-casing, taken at line  $x^2$  in Fig. 1, the valve being in elevation. Fig. 4 is a cross-section of the valve-chest, showing the seat of the by-pass valve; and Fig. 3 is a similar section showing the by-pass valve in plan. Figs. 5, 6, and 7 illustrate the other embodiment of the invention. Fig. 5 is a section similar to Fig. 1; and Figs. 6 and 7 are sections similar, respectively, to Figs. 3 and 4.

In the first-named embodiment the operating-stem is non-rotative and moves longitudinally when the valve is displaced, and in the last-named embodiment the stem is rotative, but does not move longitudinally, being collared.

Referring, primarily, to the first four figures of the drawings, 1 represents a pipe or conduit through which a fluid under pressure—as steam, for example—flows in the direction indicated by the arrow  $z$  in Fig. 1. In the pipe

is a valve-casing 2, having in it a seat 3 and on it a box 4. A gate-valve 5, which closes to the seat 3, serves to control the flow of fluid through the pipe. The pressure of the fluid holds the gate-valve pressed up to its seat with a force corresponding to the area of the said valve in square inches multiplied by the pressure per square inch of the steam or other fluid. In order to operate the valve 5 and to relieve the pressure of the fluid thereon at the time of opening said valve, the mechanism now to be described is employed.

6 is the operating-stem of the gate-valve. This stem is screw-threaded and screws through a nut 7, which has in it a circumferential groove that is engaged by a sectional bearing 8, secured to the top of the box 4. The nut 7 forms the hub or boss of a hand-wheel 9. The lower or inner end of the stem 6 has a square head 10, which fits in a recess in the back or top of a by-pass valve 11, which rests on a seat 12 in a valve-chest 13, formed in the top of the gate-valve 5, controlling two passages 14 in the valve 5 and leading out through the respective opposite faces thereof. It may be stated here that the chest 13 is closed above by a screw-plug 15, having in it a squared aperture to receive a tubular squared stem 16 on the by-pass valve. This stem has a flange which is screwed to the back of the by-pass valve to form a cage or keeper for the head 10 of the stem and keep the latter in its recess.

To operate the valve, the hand-wheel 9 is turned, thus rotating the collared nut 7, which forms its hub. This has the effect to draw up the screw-threaded stem 6, which cannot rotate, and thereby lift the by-pass valve 11 from its seat. This permits the fluid to flow by or over the valve 5 by way of the passages 14 and equalize the pressure on both sides thereof; but after the valve 11 has been elevated to a slight but sufficient extent its back engages the cover of the chest 13 and the further movement of the stem lifts or displaces the gate-valve 5 and opens a full passage for the steam or other fluid. The displaced valve passes into the box 4, which will be made steam-tight by means of a stuffing-box 17, through which plays the smooth or unthreaded portion of the operating-stem 6.



In Fig. 1 the middle portion of the box and stem are broken away for want of room. In closing the valve to cut off the flow of fluid the by-pass valve 11 closes first and then the main valve 5 closes.

Obviously any form of valve 11 may be employed according to the form, size, and kind of gate-valve to which it is to be applied, and the stem 6 may be coupled non-rotatively to the valve 11 in any way desired. Preferably, however, the coupling will be loose enough to allow the valve a little freedom or play for seating evenly. The ports and passages 14 may also be of any desired shape or form. In the embodiment described the ports covered by the valve 11 open at the respective sides of the center of the valve and are of a somewhat crescent shape in cross-section. In some kinds of straightway valves this construction and arrangement is desirable as economizing available space.

In the embodiment of the invention illustrated in Figs. 5 to 7 and which is the form preferred where the space for placing the valve is contracted the main valve 5<sup>a</sup> is substantially the same as in the first-described embodiment, and the by-pass valve 11<sup>a</sup> is the same also, so far as its valve functions are concerned. In this embodiment, however, the inner end of the operating-stem 6<sup>a</sup> is screw-threaded and screws through the valve 11<sup>a</sup> as a nut, and on the upper part of said stem is a collar 10<sup>a</sup> in a bearing and keeper 18 exterior to and on the box 4<sup>a</sup>. The hand-wheel 9<sup>a</sup> in this form is fixed on the outer end of the operating-stem, and the stuffing-box 17<sup>a</sup> is situated between the collar and the hand-wheel. The stem 16<sup>a</sup> in this construction is or may be integral with the by-pass valve. The ports 14<sup>a</sup>, controlled by the by-pass valve, are represented as disposed, respectively, in front of and back of the center of the said valve or in a vertical plane perpendicular to that of the said ports, as shown in Fig. 4. In Fig. 5, also, the valve 11<sup>a</sup> is shown provided with packing on its face, and the seats about the ports 14<sup>a</sup> are shown as slightly elevated. These are not material differences, but such as may be made under certain conditions to accord with the judgment or particular views of the constructor.

In the operation of the device, as shown in Fig. 5, the collared screw-stem 6<sup>a</sup> is rotated and first lifts the by-pass valve. Then the main valve lifts. The screw-stem passes through the main valve as the latter lifts.

The dotted line  $x'$  in Fig. 4 indicates substantially the plane through the by-pass ports where the section is taken in Fig. 1.

Obviously the present invention is not restricted to the specific details of construction shown in the drawings, as these may be varied without departing materially from the invention, the characteristic feature of which is the gate-valve or straightway valve having the face of its seat in a plane transverse to the axis of the pipe through which the fluid flows and the by-pass valve on the top of the gate-valve, with the plane of its seat substantially perpendicular to the seat of the main valve, the said by-pass valve controlling ports in the main valve and being operated by the same stem as the main valve. Obviously, also, the operating-stem may be disposed above, below, or at the side, and the invention may be applied to any valve to which it is adapted. The language of the description relates to the application of the invention as illustrated.

Having thus described my invention, I claim—

1. A main straightway valve, having a cylindrical valve-chest formed on its top and port-passages leading from opposite faces of the valve into said chest, a screw-plug 15 in and closing the top of said chest, said plug having in it a square aperture, a circular by-pass valve in said chest and having a tubular, square stem which fits and plays in the aperture in the plug 15, and the lifting valve-stem engaging said squared tubular stem on the by-pass valve, substantially as set forth.

2. A main straightway valve, having a cylindrical valve-chest formed on its top, ports in the bottom of said chest disposed in a plane at right angles to the main conduit, passages in the main valve connecting the opposite faces of the latter with the respective ports, a by-pass valve in said chest, said valve having a square, tubular stem, a screw-plug in and closing the top of the valve-chest and having in it a square aperture through which extends the square stem on the by-pass valve, and the lifting-stem connected with the by-pass valve.

In witness whereof I have hereunto signed my name, this 19th day of August, 1902, in the presence of two subscribing witnesses.

EVERETT S. BRADY.

Witnesses:

HENRY CONNETT,  
PETER A. ROSS.