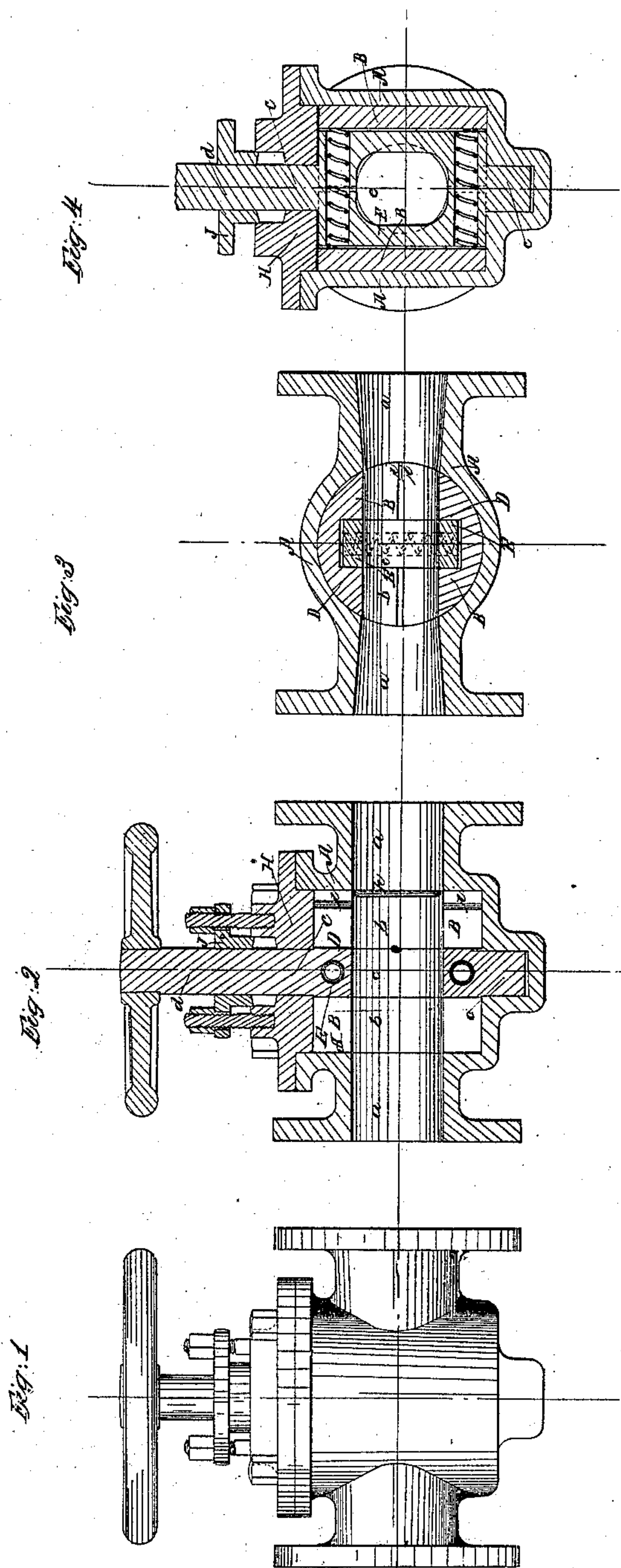


J. R. & H. S. Robinson,
Stop Cock.

N^o 21,366.

Patented Aug. 31, 1858.



Inventors:
J. R. Robinson
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UNITED STATES PATENT OFFICE.

J. R. ROBINSON AND H. S. ROBINSON, OF CLINTON, MASSACHUSETTS.

VALVE-COCK.

Specification forming part of Letters Patent No. 21,366, dated August 31, 1858; Reissued August 16, 1859, No. 795.

To all whom it may concern:

Be it known that we, J. R. ROBINSON and H. S. ROBINSON, of Clinton, in the county of Worcester and State of Massachusetts, have
5 invented new and useful improvements on that form of sliding valves which slide in the arc of a circle and which have the pressure of the fluid upon the back of said valves, tending to press them upon their seats when
10 shut; and we do hereby declare that the following is a full and exact description.

The nature of our invention consists in so improving the round sliding valve that there shall be a straight passage through the
15 valve, valve case and valve spindle, thereby causing less friction to the water, steam, air, illuminating gas, (or any other fluid whether elastic or non-elastic) passing through it, and thus obviating a loss of pressure or
20 head. And moreover of so forming the valve that it will effectually withstand a pressure from either end of the valve case alternately without moving the valve spindle, and also of balancing said spindle.

25 To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

We construct the interior of our valve case of a cylindrical form, as shown at A in Figs.
30 2, 3 and 4 of the accompanying drawings, having this cylindrical opening and the two ports or passages *a, a*, so placed that when the valve B is placed in said cylindrical opening as shown in Figs. 2, 3 and 4, the
35 passage through it shall coincide with the ports in the valve case, thereby making a straight passage from end to end of the valve case. The general form of the case aside from these points may be as in the accompanying drawings or in any other form
40 found necessary to adapt it to the place where it is to be used.

The valve B, whether made in one or two pieces, is turned straight to fit the cylindrical hole in the case; it has a port *b* through
45 it of an area equal to that in the said case; it has also a recess (or recesses when made in two pieces) D for the valve spindle to fit into, and is so arranged that when placed in
50 the position shown in Figs. 2, 3 and 4 the passage *b*, in it shall coincide with the ports *a, a*, in the case, thereby making a straight passage from end to end of said case. And moreover the valve B is made large enough,
55 so that when turned at right angles to this

position there will be lap enough on the sides of the port to make it tight.

For reasons hereafter to be stated we prefer to make the valve B in two pieces when
60 used as a stop cock.

The valve spindle C is constructed as shown in the drawings, having its ends *d* and *e* made cylindrical to fit into and be capable of turning in the cap and bottom of the valve case, the end *d* being made long
65 enough to project through the cap H and gland J where it is made tight in the usual manner; and having the middle portion E made of an oblong rectangular section, having a passage *e* left through it of an area
70 equal to that in the valve and valve case. This rectangular portion E of the valve spindle fits loosely into the recess (or recesses when made in two parts) of the valve B, and enables said valve to be turned so as
75 to cover or uncover the ports in the case, by turning said spindle, at the same time leaving the valve free to move up toward its seat as it wears upon it by frequent use. It will be seen that the valve case, the valve
80 spindle and the valve, are so constructed that when placed in the position shown in Figs. 2 and 3 of the accompanying drawings the ports *a, a*, in the case and the ports *b* in the valve and *e* in the valve spindle shall coincide, thus making a straight passage through
85 the whole from end to end of the case.

To hold the valve against its seat, when there is no pressure upon it, we put springs into the spindle, pressing against the valve,
90 and when the valve is made in two parts we run these springs through the spindle, as shown in the accompanying drawings.

That the valve may be tight with a pressure coming from either end of the valve
95 case alternately without moving the spindle, we make the valve B in two parts, as shown in the accompanying drawings. And when the valve is so made and the springs are run through the spindle we remove the side
100 strain of the springs from the spindle, thereby balancing it, and causing it to remain much longer in a perfect shape.

It will be seen that when this valve is open there is no tendency (save the springs) to
105 press the valve against its seat; and when closed the only tendency, in addition to this, is that due to the difference between the pressure on the two sides of the valve.

To prevent the "chattering" of the valve 110

(when made in two pieces) when opening or shutting and when the valve is but little open, the induction end *h* of the port *b* in said valve is made a very little larger than the other end, thereby causing this part of the valve to begin to expose its port before the other side (which at this time is acting to stop the flow of the fluid) begins to uncover its port whichever way the spindle is turned.

To have the same area of bearing surface on either side of the recess *D* in the valves we put on as much surface at *i*, as we take off at *h*.

We place an arrow upon the spindle of the valve, or the arm or wheel by which it is moved, so that when said spindle is turned, so as to bring the arrow into line with the longitudinal middle line of the valve case, the valve will be open, and when turned at right angles to the said longitudinal line, it will be closed. To enable the user to tell when the valve is open or closed (when it is operated by hand): We put upon the case or cap, the words Open and Shut, or place stops, so that when turned to the proper position, these stops shall prevent any further moving of the valve.

To obtain advantage of having the induction end of the valve larger than the education end already alluded to we place the arrow upon the spindle or its appendage pointing in the direction which we intend the fluid to flow through the valve.

We are aware that round sliding valves have been made, with the spindle separate from the valve and fitting into said valve, so as to leave it free to move toward or from the center of motion of the valve spindle, independently of said spindle, but the passage for the fluid in said valves, is not through the center of the valve and spindle, but around it, and is consequently a crooked passage; and the valve being made in one piece, it stops the flow of fluid from one end only of the valve case, without moving the spindle, the effect of letting the pressure come from the other end of the valve case being to press the valve from its seat against the spindle and let the fluid around the valve. Although this falling off of the valve is of use, when the valve is used as a steam valve to a steam engine, whenever the engine primes or works water, or when used

as an exhaust valve to a non-condensing engine by letting the steam back from the exhaust pipe, into the cylinder when the pressure in said cylinder runs below the atmosphere, yet in many cases when used as a stop valve it is objectionable, as for instance when placed in a steam pipe, leading to a dye tub, or any box containing a liquid, where the valve is shut against the pressure of steam, and the pressure going down in the pipe, a vacuum is produced in said pipe; when the atmospheric pressure forces the liquid against the face of the valve, presses it away from its seat and lets the liquid into the pipe. Another objection to having the valve in one piece is that the springs have to be so placed as to bring all the wear upon one side of the spindle. When used in a steam engine therefore, our valve, being then made in but one piece has only the advantage of the "straight port," but when used in other places, it has in addition to this, the other merit of stopping a pressure from either end alternately, and of balancing the spindle.

We are also aware that plug-cocks have a straight passage through them, but when the plug cock is shut, the pressure is tending to force the plug away from its seat; the only way to make it tight, being to draw it into a conical seat and hold it there by some mechanical contrivance against the pressure of the fluid; and when the pressure is high, it has to be jammed into its seat so hard as to require a great power to move it, even when open. Moreover the plug being made larger at one end, wears unequally and does not long remain tight.

What we claim as our inventions are—

1. The construction of the valve, whether in one or two pieces, valve spindle, and valve case, in the manner described, so as to make a straight passage through the valve, valve spindle and case for the reasons specified.

2. Making the valve in two pieces for the reasons specified.

3. When the valve is so made, running the springs through the spindle for the reasons specified.

J. R. ROBINSON.
H. S. ROBINSON.

Witnesses:

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EZRA SAWYER.