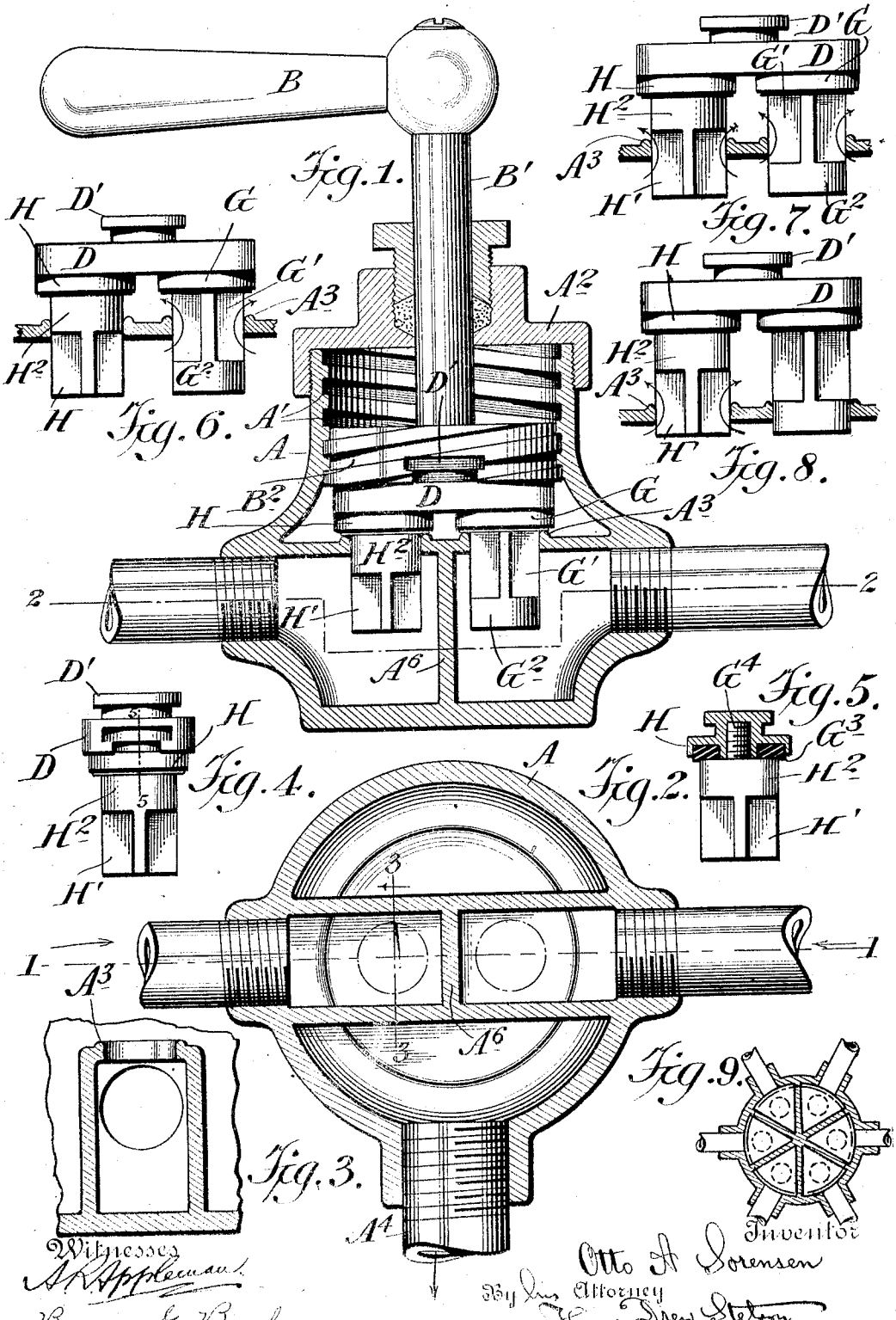
No. 820,610. PATENTED MAY 15, 1906.

O. A. SORENSEN.

VALVE.

APPLICATION FILED NOV. 23, 1904.



Witnesses
A. R. Applemans
Bessie G. Brad...

Inventor
Otto A. Sorensen
By his Attorney
Thomas Drew Staten

UNITED STATES PATENT OFFICE.

OTTO A. SORENSEN, OF NEW YORK, N. Y.

VALVE.

No. 820,610. Specification of Letters Patent. Patented May 15, 1906.

Application filed November 23, 1904. Serial No. 233,925.

To all whom it may concern:

Be it known that I, OTTO A. SORENSEN, a citizen of the United States, and a resident of New York city, in the county of New York, in the State of New York, have invented a new and useful Improvement in Valves, of which the following is a full and exact specification.

The invention will serve in all cases where it is required to vary the amount of opening for two liquids or two gases—as, for example, the admission of air and combustible gas to supply a fire; but I have in my experiments worked mainly with water, the difference being simply in the temperature, and I will describe it as thus used. The name "bath-valve" may be applied to it for brevity. It is capable of giving an equal area of aperture for each supply of fluid or to vary therefrom to any required extent, even to making the entire delivery one kind alone. It may also serve usefully, by properly varying the area of opening, to give equal quantities when the pressures are unequal. All is effected by a single shaft and a single lever or wheel thereon.

I employ a separately-formed valve for each different fluid, grinding or otherwise fitting each tightly and easily to its seat and giving them such difference of form that the equal endwise movement I give to each produces a great variety of conditions and insures their certainty.

I have devised a means of uniting the parts by grooves of T-shaped cross-sections and corresponding buttons to engage them. This fastening is strong and reliable and gives unusual facilities for separating and reassembling when required.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a central section on the line 1 1 in Fig. 2. Fig. 2 is a horizontal section on the line 2 2 in Fig. 1. In each some of the parts are presented fully in elevation and plan, respectively. Fig. 3 is a section of a portion on the line 3 3 in Fig. 2. Fig. 4 shows a detail detached. It is in elevation, being a view at right angles to the view in Fig. 1. Fig. 5 is a corresponding view, partly in vertical section. The section is on the line 5 5 in Fig. 4. Figs. 6, 7, and 8 are corresponding vertical sections, partly in elevation, representing three positions of the same parts. The series shows, with the view in Fig. 1, four different conditions of the mechanism. Fig. 1 shows the conditions when the flow is entirely closed. Fig. 6 shows the conditions when the stem has been partly turned. This gives cold water alone. Fig. 7 shows the conditions when the stem has been further turned. This gives both cold and hot water. Fig. 8 shows the conditions when the stem has been turned as far as it will go. This gives hot water alone. Fig. 9 is on a smaller scale. It shows a modification—a horizontal section corresponding to Fig. 2

Similar letters and marks of reference indicate like parts in all the figures where they appear.

I have shown two valves, which are formed as separate parts and fitted in separate seats, operated with the axial motion sometimes designated "puppet." Both are operated by a single operating device and are always raised and lowered alike, but with a different effect in one valve from that in the other. There may be more than two; but a description of two, as shown, will suffice for all.

A is the casing or body of the valve.

B is a manipulating device or handle turning a stem B′, which is guarded by a stuffing-box, as usual. This stem carries a screw-threaded part B^2 of large diameter, which engages with internal screw-threads A′ in the upper portion of the casing. The under side of B^2 has a radial groove of T-section, which receives a button or headed pivotal projection D′ in the center of the upper face of a yoke D. The under side of this yoke is radially grooved, so as to provide means for engaging the buttons of eccentrically-placed valve-disks—one a valve-disk G, having guiding-wings G′ and a cylinder G^2 at the lower end of the wings, and the other a valve-disk H, having guiding-wings H′ and a cylinder H^2 at the top of its wings. I will for brevity sometimes use the letters G and H to indicate the whole of the respective valves. Each is locked to the yoke by its button, (see Fig. 4,) so that it is raised and lowered therewith.

I will designate by A^3 the horizontal partition in which the valve-seats are formed, and by A^6 the upright partition which separates the receiving-chambers.

In the position shown in Fig. 1 neither valve allows the water to pass it. The dif-

ference in the arrangement, the cylindrical portion or piston G^2 being at the bottom and the corresponding portion H^2 being at the top of the respective valves, exerts an important influence.

In the condition shown in Fig. 6 both valves are raised to a small extent. The cold-watervalve G delivers water, because its waterway is only slightly obstructed by the wings G'. The hot-water valve H is also in one sense open, because it is equally raised; but it cannot deliver any appreciable quantity of water, because its waterway is stopped by the solid cylindrical part H^2. If in this condition the screw B^3 is partially revolved so the valves are raised or lowered slightly, the quantity of cold water delivered past G will be increased or diminished, because its cylindrical portion G^2 will be farther from or nearer to its seat, but although the hot-water valve H will be equally raised or lowered the change will have no influence. No hot water will be delivered; but when the manipulating device or handle is turned so much as to raise the yoke D, and consequently the valves G and H, to a sufficient extent, depending on the depth of the cylindrical part H^2 of the hot-water valve, hot water begins to be delivered with the cold. This condition is shown in Fig. 7. Both valves deliver water, each allowing it to flow up through the angular spaces between its slender wings. The water discharged from the casing A through the discharge-pipe A^4 is a mixture of hot and cold. Raising the valves increases the flow past the hot-water valve H, because it raises the cylinder H^2, and the same movement by the rise of the cylinder G^2 restricts the flow past the cold-water valve G. A slight turning of the stem in this condition will modify the ratio of the hot to the cold. It can give nearly all hot or nearly all cold, and, finally, if the stem B' is turned still farther, so far as to raise the large screw-threaded part B^2 into contact with the under face of the cap A^3, and thus attain the limit of the upward movement, it lifts the yoke D and the valves G and H so much that the valves assume the relations shown in Fig. 8. Now the flow of cold water is stopped entirely. The flow past the cold-water valve G is stopped, because its cylinder G^2 is raised into the waterway, filling it completely, but the flow past the hot-water valve H continues. In this condition any slight turning of the manipulating device or handle B, raising or lowering of the yoke, varies the quantity of the hot water in the same manner as the quantity of cold water was varied in one of the previously-described conditions. The reverse turning of the screw B^2 induces the same changes in the reverse order. With an adequate supply of cold and of nearly boiling water it is easy by turning rapidly to put the valves in the condition desired and to attain the temperature desired and also to induce all the required changes in the quantities delivered.

The large diameter of the screw-threaded part B^2 and of the corresponding internal threads A' of the casing allows the mechanism to be all taken out together through the top when the cap A^2 is removed. The T-section radial groove is cut through the threaded part B^2 without appreciably interfering with the efficiency of the working.

It is preferable that the lower edge of the cylindrical part H^2 and the upper edge of the cylindrical part G^2 be finished evenly; but if irregular the opening and closing of the passages by the movement of these parts out of and into coincidence with the seats will be effected successfully. It is essential that the upper face of each seat be adapted to make an absolutely tight joint with the lower face of the disk G or H, so that when the valves are depressed they will stop the passages with absolute tightness. To attain this more easily, I cast the metal a little raised at each seat, as shown at A^5, Figs. 1, 6, 7, and 8, and finish smoothly the tops of such rims. I promote the tightness if the surfaces are slightly uneven by providing a yielding surface on the under face of each valve-disk G and H. The valve-disk H is thus shown in section in Fig. 5. The valve is made in three parts. The upper part (the disk H) has an annular recess in which is confined a ring of soft rubber or analogous yielding material G^3 and is also tapped and receives a screw G^4, which is integral with the lower winged part H^2.

Among the advantages of my invention is the fact that however much the pressures may vary and however much the valves, especially the piston portions thereof, may leak there is no mixing of the fluids before passing their respective valves. Another advantage lies in the compact form of the device. The pivot D' of the yoke D lies very near the extreme top of the interior when the shaft is fully turned in the proper direction.

The connection of the eccentrically-placed valves G H through the intermediary of the yoke K with the wide screw B^2 by means of buttons on the valves G H engaging the grooved under side of the yoke K and a button on the latter engaging the grooved under side of the screw B^2 (which latter is of sufficient diameter to cover the said valves) gives a construction of which the parts can very readily be made and assembled. The slight looseness due to the button-and-groove connections involves no mischief, but is rather advantgeous with ordinary slight imperfection of alinement in allowing the valves to match tightly on their seats when allowed to sink or when forcibly screwed down thereon.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. I have shown

the valve with the manipulating device or handle uppermost and have referred to the parts as correspondingly placed; but the valve can be worked horizontally or variously inclined. There may obviously be two or any other number of outlets. I have indicated four wings for each valve G and H. The number may be varied. It is only essential that the construction be open-work to allow the water or other fluid to flow as described.

Fig. 9 shows one of the forms in which the invention can be carried out with more than two separate inductions and a corresponding number of valves. I have shown provisions for six inductions. The casing is provided with a deck or horizontal plate having six finished apertures, with the space below divided by six tight partitions. It will be understood that each aperture has a corresponding valve—part puppet and part piston—and that there is a circular yoke above with which each valve is engaged. The pistons in the several valves vary in distance from their respective heads—the puppet portions—and as all are raised and depressed alike the several valves contribute each its respective supply to the mixture in different ratios as the manipulating device or handle is turned.

Parts of the invention may be used without the whole. The screw-threaded part B^2 may be omitted and other means adopted for effecting the rapid raising and lowering and the reliable holding of the yoke and of the valves.

I claim as my invention—

A valve-casing having a chambered portion divided into receiving-chambers and a discharge-chamber, the former located on opposite sides of a wall common to both and provided with adjacently-placed outlets in the decks thereof and the latter located at the side of the said receiving-chambers with which it communicates through said outlets, and also having an internally-threaded portion of sufficient diameter inside to surround said outlets threaded nearly to the plane of said decks, in combination with a screw which engages said threaded portion, a yoke which is connected by button and groove with said screw and whose length is less than the diameter of said screw, and winged puppet and piston valves in said outlets, which valves are eccentrically placed within the peripherical limits of said screw and are connected by button and groove with said yoke, substantially as described.

Signed at New York city, in the county of New York and State of New York, this 19th day of November, A. D. 1904.

OTTO A. SORENSEN.

Witnesses:

THOMAS DREW STETSON,

BESSIE G. BRADY.