

D. B. HOOVER.

VALVE.

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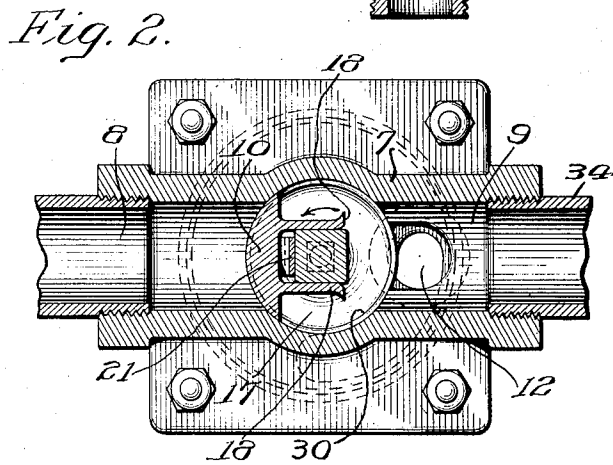
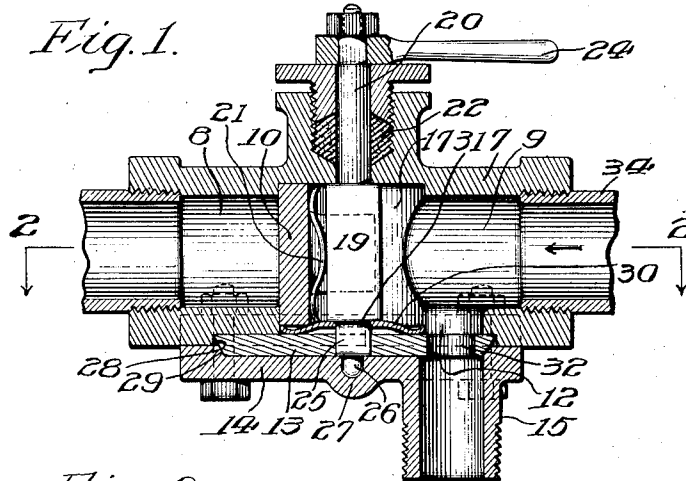
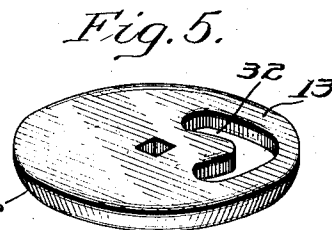
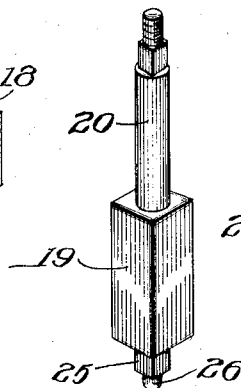
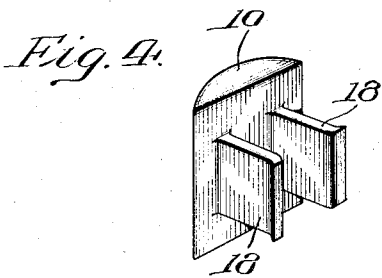


Fig. 3.



WITNESSES

W. J. Hartman.
Clifton C. Halliwell.

BY

INVENTOR

David B. Hoover.

James Feltz.

ATTORNEY

UNITED STATES PATENT OFFICE.

DAVID B. HOOVER, OF ELIZABETHTOWN, PENNSYLVANIA.

VALVE.

1,057,058.

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To all whom it may concern:

Be it known that I, DAVID B. HOOVER, a citizen of the United States, and a resident of Elizabethtown, county of Lancaster, and State of Pennsylvania, have invented certain new and useful Improvements in Valves, of which the following is a specification, reference being had to the accompanying drawings.

This invention particularly relates to that class of valves which are commonly known as "three-way valves," wherein a single stem is operative to control all of the ports.

The principal objects of this invention are to provide an efficient valve of simple construction, having means which is not only operative to selectively control its different ports, but which is arranged to contemporaneously open said ports to divide the fluid passing therethrough, or to mix two fluids, depending upon the direction of flow through the ports of said valve, and to provide a valve wherein the operative parts may be readily assembled and replaced.

The form of this invention hereinafter described, provides a three port valve, with a stem carrying a valve plug operative to control two of said ports, and a disk gate movable with said plug and operative to control the other port.

This invention is advantageous in that it provides a valve having a plurality of ports with a single valve stem having means operative to control all of the ports contemporaneously, whereby two ports may be maintained completely open to permit the unrestricted passage of fluid through the valve, while the other port may be opened and closed, or its area varied by said means without restricting the flow through said open ports, or may be actuated to effect the contemporaneous control of two of said ports, to effect the opening of one while closing the other, and said means may be further actuated to completely close or open all of said ports.

This invention includes all of the various novel features of construction and arrangement hereinafter more definitely specified.

In the accompanying drawings, Figure 1 is a central vertical longitudinal sectional view of a valve constructed in accordance with this invention; Fig. 2 is a plan sectional view of the valve shown in Fig. 1 taken on

the line 2—2 in said figure; Fig. 3 is a perspective view of the valve stem; Fig. 4 is a perspective view of the valve plug; and Fig. 5 is a perspective view of the valve gate.

In said figures, the valve casing 7 provides the ports 8 and 9 which are arranged to be controlled by the valve plug 10, and the port 12 which is arranged to be controlled by the disk gate 13 which is mounted for rotation between the casing 7 and the plate 14, having the outlet nipple 15 in alinement with said port 12.

The plug 10 preferably comprises the cylindrical segment which is fitted in the cylindrical chamber 17 and which has the extended lugs 18 respectively fitted to, and embracing the squared region 19 of the valve stem 20, and is maintained in operative position against the cylindrical wall of the chamber 17 by the spring 21, preferably formed of a non-corrodible material, such for instance, as phosphor bronze. Said plug 10 may be rotated to control either of the ports 8 and 9 by the rotation of the valve stem 20, which extends through the stuffing box 22 in the casing 7, and which is conveniently provided with the handle 24 disposed exterior to said casing.

As best shown in Fig. 3, the lower end of the stem 20 is provided, adjacent to the squared region 19, with the squared region 25 upon which the gate 13 is mounted and the reduced trunnion 26 which latter is conveniently seated in a recessed bearing 27 provided therefor in the plate 14.

The gate 13 has its periphery 28 chamfered to fit the seat 29 in the plate 14 to prevent the leakage into the outlet nipple 15, and said gate 13 is arranged to be maintained upon its seat in said plate 12 by the spring 30 which is also mounted on the squared region 25, and bears against the shoulder 31 between the respective squared regions 19 and 25 of said stem. The gate 13 is provided with the arcuate aperture 32 which is arranged to register with the port 12 in the casing 7 to permit the passage of fluid through said port 12 and nipple 15, as shown in Fig. 2, and to maintain the port 12 open during substantially a quarter rotation of the plug 10 in the direction of the arrow indicated in said figure.

Referring again to Fig. 2 of the drawing,

it will be seen that by the movement of the segmental plug 10 approximately 90° from the position shown in said figure in the direction of the arrow indicated thereon, a free passage will be effected, not only through the ports 8 and 9, but through the port 12 which will be maintained open during said movement of the gate 13 by its arcuate or elongated aperture 32; by a further rotation of said plug 10 and gate 13 to a position substantially 180° from the position shown in Fig. 2, all of the ports of the valve will be closed; by rotation of the plug segment 10 and the gate 13 to a position approximately 270° from the position shown in Fig. 2 in the direction of the arrow, the ports 8 and 9 will be wide open, and the port 12 closed; and by the movement of the plug and gate from the position shown in Fig. 2 in opposition to the arrow in Fig. 2, the relative areas of the ports 8 and 12 may be varied inversely.

It will be seen that the valve above described is effective to divide the fluid passing from the pipe 34 and direct it through the respective ports 8 and 12 in any desired proportions, or to selectively direct said flow through either one of the ports 8 and 12 as desired. It is equally obvious that said valve may be utilized for mixing different fluids by reversing the direction of flow therethrough and connecting the respective ports 8 and 12 with pipes conveying different fluids and controlling their flow in any desired proportions through the port 9 and into the pipe 34.

It is not desired to limit this invention to the precise details of construction and arrangement as herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of the invention as defined in the appended claims.

Having thus described my invention, I claim:

1. A valve comprising a casing having an inlet and a plurality of outlets, a rotary valve plug operative to control one of said outlets, and a gate connected to rotate with said plug to control the other of said outlets, said plug and gate each being operative to close its respective outlet when the other outlet is open.

2. A valve comprising a casing having a plurality of ports, and oscillatable means comprising separate members contemporaneously operative to selectively connect one of said ports with any one of the other ports to the exclusion of the others and to open all of said ports contemporaneously.

3. A valve comprising a casing having a plurality of ports, and means comprising a plug and gate operative to contemporaneously close all of said ports, and arranged to be shifted to contemporaneously open all of

said ports or to selectively connect one of said ports with any one of the other ports, to the exclusion of the others.

4. A valve comprising a casing having a plurality of ports, a valve plug operative to control two of said ports, a gate operative to control another port, and a valve stem connected to simultaneously rotate said plug and gate to open or close all of said ports contemporaneously, or to selectively connect one of said ports with any one of the other ports.

5. A valve comprising a casing having a plurality of ports, a valve stem rotatable in said casing, a valve plug carried by said stem operative to control two of said ports, and a gate carried by said stem operative to control another port, said plug and gate being arranged to contemporaneously open all of said ports, to connect one of said ports with each of the other ports, and to close all of said ports during one cycle of rotation.

6. A valve comprising a casing having a plurality of ports, a valve stem arranged to rotate in said casing and provided with a handle exterior thereto, a valve plug having the form of a cylindrical segment provided with lugs engaged with and embracing said valve stem and arranged to control two of said ports, and a disk gate carried by said valve stem and having an aperture arranged to register with another port, said plug and gate being operative to contemporaneously open all of the ports, to connect one of said ports with each of the other ports, and to close all of said ports by a complete rotation.

7. A valve comprising a casing having a plurality of ports and having a plug chamber opening through one wall thereof, a valve stem extending through said chamber, a valve plug having the form of a cylindrical segment provided with lugs embracing said stem, operative to control two of said ports, when said plug is rotated, a disk gate mounted on said stem and provided with an aperture arranged to register with another port, and a plate separable from said valve casing, comprising a seat for said gate and arranged to seal the opening in said casing.

8. A valve comprising a casing having a plurality of ports and a cylindrical plug chamber, a valve stem having a squared region extending through said chamber and rotatable therein, a handle operative to rotate said stem, a valve plug for controlling certain of said ports, formed of a cylindrical segment and having its outer face conforming to said chamber, and provided with lugs engaged with the squared region on said stem, whereby said plug may be rotated, a spring disposed between said plug and stem, operative to maintain said plug in engagement with the wall of said chamber, a disk gate carried by said stem and provided with an elongated aperture concentric with the

axis of said gate, and operative to register with another port, and a plate comprising a seat for said gate, secured to said casing and provided with an outlet in alinement with the port controlled by said gate.

5 9. A valve comprising a casing having a plurality of ports, a cylindriform chamber extending through said casing, a rotary valve stem extended through said casing and having a squared region in said cham-
10 ber, a stuffing box for said stem, a handle exterior to said casing for rotating said stem, a segmental valve plug conforming to said chamber and arranged to control cer-
15 tain of said ports, and having a bifurcated portion embracing the squared region on said stem, a spring disposed between said stem and plug operative to maintain the latter in contact with the wall of said cham-
20 ber, a disk gate carried by said stem and having an elongated aperture registerable

with another of said ports in said casing, during substantially a quarter rotation of said stem, a removable plate having a seat for said gate and a bearing for said stem, and provided with an outlet in alinement with the port, controlled by said gate, and a spring carried by said stem arranged to maintain said gate in operative engagement with its seat.

10. A valve comprising a casing having a plurality of ports, a valve stem rotatably mounted in said casing, and separate port closing members operatively connected with said stem and removable therefrom without displacing said stem.

In witness whereof, I have hereunto set my hand this 19th day of November, 1910.

DAVID B. HOOVER.

Witnesses:

A. W. MUMMAU,
PHILIP SINGER.