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VALVE FOR BLENDING HOT AND COLD FLUIDS.

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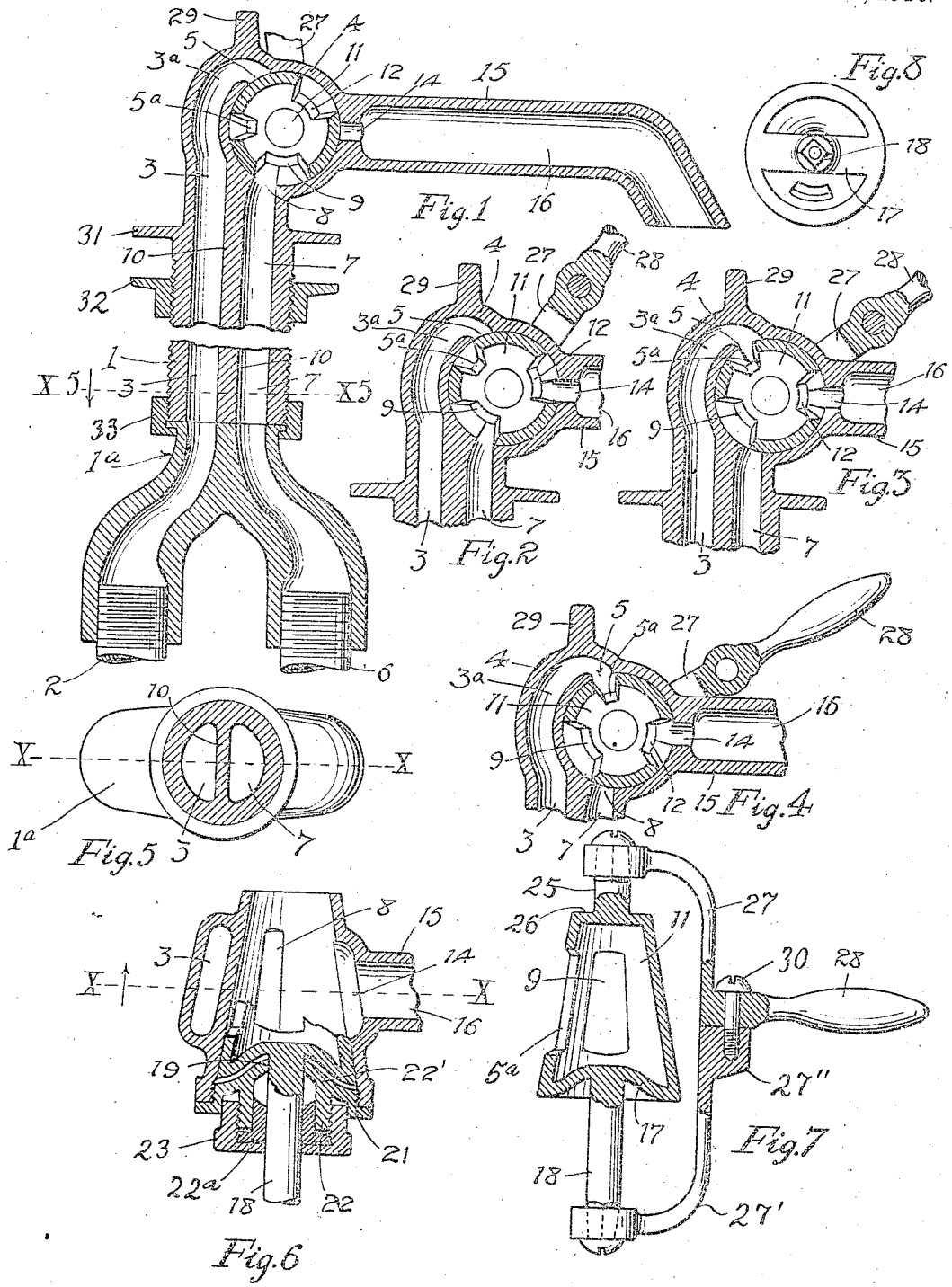

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VALVE FOR BLENDING HOT AND COLD FLUIDS.

948,520. Specification of Letters Patent. Patented Feb. 8, 1910.

Application filed March 3, 1909. Serial No. 481,193.

To all whom it may concern:

Be it known that I, SPENCER G. NEAL, a citizen of the United States, residing at Los Angeles, California, have invented a new and useful Valve for Blending Hot and Cold Fluids, of which the following is a specification.

Objects of this invention are to improve upon valves of its class in respect to simplicity, ease of operation, capacity for effecting control of the currents flowing through the valve with less movement thereof, durability and provision against leaking or getting out of order.

A further object is to provide, in combination with other features of the valve, an arrangement that will cause the cold water necessarily to begin flowing first to prevent accidental scalding of the operator.

With these objects in view the invention consists in the various combinations of parts and features of construction described in connection with the accompanying drawings and then particularly pointed out in the claims.

Referring to the accompanying drawings which illustrate the invention in the form at present deemed preferable,—Figure 1 is a vertical section of the complete valve on line x—x of Figs. 5 and 6. Fig. 2 is a view of a fragment of Fig. 1 showing the valve plug in a different position. Figs. 3 and 4 are similar to Fig. 2 except that the valve plug is shown in a third and fourth position. Fig. 5 is a transverse section on line x^5 of Fig. 1. Fig. 6 is a transverse section of the valve casing, the plug being partly broken away. Fig. 7 is a transverse section of the valve plug in the position shown in Fig. 1, the handle being applied thereto at a different angle. Fig. 8 is a view of the valve plug looking at the large end thereof.

Referring in detail to the drawings:—The supply conduit 1 is provided with a lower section 1^a having an inlet branch 2 for hot water which leads into an upwardly extending passage 3 and communicates with the upper portion of the valve casing 4 through a casing port 5. Said section 1^a also has a branch 6 from which cold water flows upwardly through a passage 7 and into casing 4 by way of the cold water inlet port 8. A plug port 9 coöperates with the casing port 8 to control the admission of cold water to the valve. 5^a designates the plug port for controlling the admission of hot water, said port corresponding in shape and size to the casing inlet port 5 with which it coöperates. Said inlet passages 3 and 7 are preferably segmental in cross-section, being separated by a partition 10, as best shown in Fig. 5. At the point where said passages enter the valve casing they conform to the shape of the elongated inlet ports 5 and 8 best shown in Figs. 1 and 6. Within valve casing 4 is rotatively fitted a hollow valve plug 11 preferably in the shape of a truncated cone. Said valve plug is provided with an outlet port 12 to establish and cut off communication with the casing outlet port 14 which leads to the spout 15 provided with an outlet passage 16. Plug 11 is provided at its large end with a cross bar 17 to which is attached an operating stem 18, which projects through an internally threaded tubular extension 22, having an internally convexed portion 22′ to provide sufficient room within the stuffing-box without the necessity of having the stuffing-box project unnecessarily from the end of the valve casing. The cross bar 17 of the plug is likewise depressed to make room for the stuffing-box.

The large end of the valve is open above and below the bar 17 so that the fluid pressure is admitted to that end of the plug to hold the valve constantly seated. This construction coöperates with the arrangement of the ports for always supplying pressure to the interior of the plug. Onto said extension 22 of cap 21 is screwed a packing nut 23 there being an inwardly projecting gland 22^a therein to compress the packing, said cap, nut and gland combining to form the stuffing-box around the stem 18. The other end of plug 11 is provided with a short stem 25 which projects from a wall 26 which closes that end of the plug. Each of the stems 18 and 25 is desirably provided with angular ends for mounting thereon the yoke 27 having an operating handle 28 extending therefrom. The yoke 27 consists of two arms as best shown in Fig. 7, the arm 27′ being provided with an enlargement 27″ into which screws the screw 30 to attach said arm and form the completed yoke. Said yoke is limited in its movement by a stop 29, the top of the spout also serving as a stop

to coöperate with the yoke. Said stops are so positioned as to prevent both the inlet ports 5 and 8 being closed at the same time.

31 is the usual supporting flange which coöperates with the nut 32 to attach the valve to the bath tub or other fixture (not shown).

33 is a union for uniting the upper and lower conduit sections 1 and 1ª.

In operation, referring first to Fig. 1 where the valve is shown closed, in order to turn on cold water the plug is rotated in a clock-wise direction until the outlet port 12 thereof is moved partly into register with the casing outlet port 14 thus bringing the plug into the position shown in Fig. 2. In passing through this movement the cold water plug port 9 is at all times fully opened to the cold water inlet 7, but the outlet is not fully opened until the close of the movement. The hot water, however, is entirely shut off from the casing inlet port 5 during the entire movement just described. In order to blend hot and cold water the plug is moved farther in a clock-wise direction from the position of Fig. 2 until the plug port 5ª is partly in communication with the casing port 5 and the plug port 9 is moved partly out of register with casing port 8. It will be seen that the outlet is now wide open by reason of plug port 12 standing opposite to the casing outlet port 14. In order to turn on hot water only the plug is moved still farther in a clock-wise direction until it reaches the position shown in Fig. 4, where plug port 12 still remains in communication with casing outlet port 14, but plug port 9 has moved out of communication with the cold water inlet 8, the plug port 5ª having in the meantime been brought into full communication with the hot water inlet port 5. The stop 29 is so positioned as to engage yoke 27 in such a manner as to properly limit the range of movement of the operating handle. The cold water inlet port 9 of the plug is desirably about twice the width of the hot water inlet port 5ª of the plug. Said ports are so positioned with relation to each other and to the discharge port 12 of the plug, that, in rotating the plug to open the valve from the closed position, as soon as the discharge port has become fully opened if the clock-wise movement is continued, the cold water inlet port begins to close and the hot water port begins to open. Such movement of the plug as will open the hot water inlet will, to the same extent, close the cold water inlet, and vice-versa, permitting an adjustment of the plug to furnish fluid of any temperature between the hot and cold supply. Upon the hot water inlet being fully opened the spout engages the handle and acts as a stop therefor. The segmental extent of the plug ports 12 and 9 is for each port substantially twice that of the hot water inlet port 5ª, in order that the outlet port 12 may be brought to full open without closing the cold water port 9 and without opening the hot water port 5ª and also so that upon a further movement of the valve the outlet port 12 shall remain fully open during the act of closing the cold water port 9 and the opening of the hot water port 5ª.

In order to secure the performance of the above described operations and cause perfect blending of the hot and cold water above set forth, when the valve is used in combination with a valve casing having a port adapted to discharge into a horizontal spout, the hot water passage 3 is provided with a curved upward portion 3ª which opens downwardly into the upper portion of the valve casing, while the cold water supply passage communicates with the lower side of the valve casing.

When combined with the fixture illustrated in the drawings the casing ports 5, 8 and 14 are spaced apart substantially one-third the distance around the valve seat, the ports 5 and 8 being approximately in vertical alinement and located back of the center of the valve seat and the port 14 at the other side of the center of the seat discharging into the horizontal spout 15.

I claim:

1. In combination with a valve casing having an interior seat and two inlets and a single outlet spaced around said seat, of a hollow valve plug provided with two inlet ports and an outlet port spaced there-around, one of the inlet ports and the outlet port in said valve plug having approximately twice the segmental extent of the other inlet port, means for rotating said plug and devices for restricting the rotation of said plug.

2. In combination with a valve casing having an interior conical seat and two inlets and a single outlet in said conical seat, spaced around the seat, of a truncated conical hollow valve plug having its larger end open to the interior of the casing and provided with two inlet ports and an outlet port spaced apart around the plug, one of the inlet ports and the outlet port in this valve plug having approximately twice the segmental extent of the other inlet port, a device for rotating said plug, and means for restricting the rotation of said plug.

3. The combination, with an upright conduit having a double inlet passage and a substantially horizontal discharge spout projecting therefrom, of a rotatable horizontal valve plug to control the communication between the inlet passages and spout, a radial operating arm connected to an end of said plug, and a stop, said spout constituting another stop, said stops limiting the movements of said arm to control the operation of the valve.

4. An upright supply conduit provided

with two inlet passages, a valve casing formed on the upper end and at one side of said conduit, said casing having a horizontally extending valve seat circular in cross-section, one of said passages communicating with the lower portion of said seat, and the other of said passages communicating with the upper portion of said seat, said inlet passages both being located within a semi-circumference of each other with respect to the valve seat, there being a discharge port leading from the side of said seat opposite said inlet ports, a hollow valve plug rotatively fitting said seat, said plug being provided with inlet ports differing in segmental extent to coöperate with the casing inlet ports, and having a discharge port to coöperate with the casing discharge port.

5. In combination with a valve casing having an interior seat and two inlets and a single outlet spaced around said seat, of a hollow valve plug fitting said seat and provided with two inlet ports and an outlet port, said ports being spaced and proportioned in such manner that when the plug is rotated the outlet port shall remain fully open while the inlet ports are simultaneously closing and opening respectively in equal proportions, whereby the proportions of the two liquids to be mixed may be exactly varied without restricting the volume of the outflow, a device for rotating the plug and means for restricting the rotation of the valve.

6. In a valve for blending fluids of different temperatures, a valve casing provided with a hot water inlet port and a cold water inlet port and an outlet port, a truncated hollow valve plug rotatively fitting said casing and adapted to be held to its seat by the pressure of the supply, said plug having a cold water inlet port and a hot water inlet port to coöperate with the corresponding inlet ports of the casing, and means for rotating said plug, said means being limited to a movement such that at all times one or both of the inlet ports admits water to the interior of the plug, the arrangement of the inlet ports being such that when the supply is turned on the cold water inlet closes to the same extent that the hot water inlet opens, so that the amount of liquid discharged remains constant after the hot water begins to flow.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses at Los Angeles, in the county of Los Angeles and State of California, this 24th day of February 1909.

SPENCER G. NEAL.

Witnesses:
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