This invention relates to a water supply cock, the waterway of which is closed or opened by the oscillating turn of the water discharge pipe. The water cock assembly comprises a main casing, and an oscillatable water discharge pipe. The main casing comprises on the inner periphery slightly below the upper opening a formed circular projected edge. The oscillatable water discharge pipe comprises a cylindrical body downwardly bent at the base end. The cylindrical body comprises a flange midway the outer periphery thereof and a pad lug turnable through an angle of 180°, touchable to engaging members disposed uprightly at both sides of the inner chamber of the main casing, and located under the flange directly below the oscillatable water discharge pipe. The front portion at the lower end of the cylindrical body comprises a semicircular surface projected at the portion directly below the pad lug and an opening to the oscillatable water discharge pipe. The cylindrical body is inserted to be freely rotatable in the main casing with the flange of the cylindrical body rested on the circular projected edge of the main casing. Box nuts inlaid with packing are screwed on the outer periphery of the main casing from the upper and lower sides thereof to seal the water leaking from the gap between the outer periphery of the cylindrical body and the inner periphery of the main casing.

5 Claims, 11 Drawing Figures
BACKGROUND OF THE INVENTION

The present invention relates to a water supply cock. In general, conventional supply cocks have been unsatisfactory in the structure of the water leakage sealing portion. In prior art supply cocks, water leakage commences in a short time after initial use due to certain structural defects which make the opening and closing operation of the valve seat inaccurate and which produce a slanting of the valve seat when opening and closing the water port.

Conventional water discharge pipes of the type wherein the curved end of the screw in base portion serves as an oscillatable portion are also undesirable. In such structures water may easily leak from the gap formed by the wearing of the surface of the spiral thread due to prolonged use in the manner described above.

SUMMARY OF INVENTION

All of these shortcomings of conventional water supply cocks are satisfactorily overcome by the present invention.

One of the main objects of the instant invention is to provide a water supply cock which can open or close water flow by turning the oscillatable water discharge pipe through a angle of 90°. Regulation of the water flow rate may be advantageously carried out by stopping the oscillatable water discharge pipe at some point midway the 90° rotation.

Since the cylindrical body at the base end of the oscillatable water discharge pipe is stopped at an optional angle and set in a prescribed position without any play by pressure applied to the packing on the flange, the closing, opening and flow rate midway there-between are accurate. Furthermore, the loose fit of the extended shaft allows the valve head to suitably oscillate in correspondence to the water flow on either side of the central small waterway and thereby decreases resistance to avoid shocking problems with the first valve head and water pressure reduction.

Another object of this invention is to provide a design which allows internal repairs to be carried out with ease. In the present invention, when internal trouble occurs within the fitted body above the partition wall of the supply cock and repairs or replacement of parts are necessary, water flow may be stopped by sealing or opening the central small waterway. This is accomplished by freely screwing the regulating screw stock up-and-down to contact or separate its upper convex surface to or from the central small waterway.

A further object of the invention is to regulate the flow rate by varying the gap between the upper end convex surface of the screw stock and the central small waterway.

A still further object of the invention is to effectively prevent water leakage from the upper and lower openings of the water cock main case. This is accomplished through the use of a packing at the opening of the upper portion of the water cock main case and another packing at the lower opening of the water cock main case. The upper packing is designed to seal in three places, that is, on the flange step as shown in FIG. 7, on the inner periphery of the circular projected edge as shown in FIG. 5, and on the opening at the upper portion of the water cock main case by resting the flange of the cylindrical body on the circular projected edge at the inner periphery of the opening. Since the box nut is screwed on the outer peripheral spiral thread of the longitudinal opening and the regulating screw stock screwed therein extends outward at the lower end thereof for a substantial distance, the packing at the lower opening of the water cock main case is, thereby, designed to seal in two places, that is, around the longitudinal opening and around the contacting surface of the box nut as shown in FIG. 6.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of the oscillatable water discharge pipe in an opened position;

FIG. 2 shows a top view of the water discharge pipe in an opened position in full lines and a top view of the same water discharge pipe in a partially closed position in broken lines turned in the direction of the arrow;

FIG. 3 is an exploded side view, partially in section, of the upper and lower fitted bodies in the closed position and a sectional view of the water cock main case;

FIG. 4 is an oblique view of the intermediate fitted body;

FIG. 5 is a side view, partially in section, in which the upper and lower fitted bodies are fitted in the water cock main case in the closed or non-flow position;

FIG. 6 is a side view, partially in section, which shows the state of all the fitted bodies when the oscillatable water discharge pipe has been rotated counterclockwise 90° from the closed position shown in FIG. 5 to the opened position;

FIG. 7 is a sectional view taken along the line A—A in FIG. 3;

FIG. 8 is a sectional view taken along the line B—B in FIG. 5;

FIG. 9 is a sectional view taken along the line B—B in FIG. 5 after the oscillatable water discharge pipe has been rotated 180° in a clockwise direction;

FIG. 10 is a sectional view taken on the line C—C in FIG. 5; and

FIG. 11 is a sectional view taken along the line D—D in FIG. 6.

DETAILED DESCRIPTION

Referring to FIG. 3, there is shown a water supply cock constructed in such a manner that a circular projected edge (2) is formed on the inner periphery slightly below the upper opening of the water cock main case (1). The downwardly bent portion of the base end of an oscillatable water discharge pipe (3) is formed into a cylindrical body (7) having a flange (4) midway the outer periphery thereof and a pad lug (5) in a position directly below the oscillatable water discharge pipe (3). The front portion of the lower end of the cylindrical body (7) is of a semicircular surface (6) projected at the portion directly below the pad lug (5), and provided with an opening to the oscillatable water discharge pipe (3). The cylindrical body (7) is inserted to be freely rotatable in the water cock main case (1) with the flange (4) resting on the circular projected edge (2). A box nut inlaid with packing (8) is screwed on the outer periphery of the water cock main case (1) from the upper side to seal water leaking between the outer periphery of the cylindrical body (7) and the inner peripheral surface of the water cock main case.
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The operation of the present invention can best be described by reference to the following drawings. FIG. 1 and FIG. 2 show the general appearance of the water supply cock according to the present invention. FIG. 1 shows the oscillatable water discharge pipe (3) in a water discharging position, while the broken line in FIG. 2 shows the oscillatable water discharge pipe (3) in a closed or non-flow position. FIG. 3 is an exploded view of the members of the upper fitted body including the oscillatable water discharge pipe (3), the cylindrical body (7) with a flange (4), packing (8), and box nut (9); and the members of the lower fitted body including the regulating screw stock (23), packing (24) and box nut (25) all in the water non-flow position shown in FIG. 2 and a sectional view of the water cock main case (1). FIG. 4 is an oblique view of the body laid in the water cock main case (1) including the first valve head (15) and the second valve head (18). FIG. 5 shows the upper and lower fitted bodies and the inlaid body fitted into the water cock main case (1) in the non-flow position. Referring now to FIG. 6, which shows the upper and lower fitted bodies and the inlaid body in the water-discharging position, the pad lug (5) of the cylindrical body (7) is about midway between the engaging pieces (10)(10) on both sides of the chamber in the water cock main case (1), the semicircular surface (6) of the cylindrical body (7) is contactable wholly by the semicircular concave surface (16) on the upper surface of the second valve head (18) and since the space between the cylindrical body (7) and the partition wall (12) is slightly longer than the height of the first and second valve heads (15)(18), both valve heads (15)(18) are freely movable up-and-down. The central small waterway (11) in the partition wall (12) is opened, the supply water in the lower chamber of the water cock main case (1) is therefore opened to the water supply pipe and discharged to the oscillatable water discharge pipe (3) after being conveyed from the central small waterway (11) through the space around both valve heads (15)(18) and through the passages (19A) in the cylindrical body (7), as shown in FIG. 11. As the oscillatable water discharge pipe (3) in this position is located directly above the pad lug (5) of the cylindrical body (7) as shown in FIG. 3, it is in the position directly in front of the water cock main case (1), and the oscillating water discharge pipe (3) in this position acts similarly when it is turned in either direction, right or left, through an angle of 90° as shown in FIG. 8 and FIG. 9.

Referring now to FIG. 5 showing the oscillatable water discharge pipe (3) turned to the right side, since the flange (4) is rested on the circular projected edge (2) of the water cock main case (1) and is urged downward by the packing (8) laid in the box nut (9), the cylindrical body (7) is not movable vertically. The pad lug (5) is contacted accurately against the right side engaging piece (10) disposed at the same level therewith as shown in FIG. 8, and meanwhile, the semicircular surface (6) of the front portion of the cylindrical body (7) at the lower end thereof is turned crosswise to the semicircular concave surface (16) of the second valve head (18). As the guide pieces (13)(13) on both sides of the chamber of the water cock main case (1) are fitted in the guide ways (17)(17) on both sides of the second valve head (18) as shown in Figs. 10 and 11 and both corner portions of the lateral horizontal plane of the projected portion of the semicircular surface (6)

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(1), upright engaging pieces (10)(10) are erected on both sides of the chamber in the water cock main case (1). The engaging pieces (10)(10) are disposed in such a manner that the pad lug (5), which is touchable at an angular interval with the engaging pieces (10)(10), is turnable through an angle of 180°. In the chamber of the water cock main case (1) below the cylindrical body (7) is formed a partition wall (12) having a central small waterway therein, on both sides above the partition wall (12) are disposed guide pieces (13)(13) facing each other.

FIG. 4 shows a first valve head (15) fixed with an upwardly extended shaft (14) and a second valve head (18). The longitudinal upper surface of the substantially rectangular second valve head (18) is formed into a semicircular concave surface (16) contactable with the semicircular surface (6) of said cylindrical body (7) and provided with longitudinal guide ways (17)(17) on both sides. The extended shaft (14) of the first valve head (15) is inserted through the second valve head (18) from the lower side, the front portion of the inserted shaft (14) is extended to pass up through the longitudinal opening (19) of the cylindrical body (7) shown in FIG. 7. To make the entire extended shaft (14) freely movable up and down, the guide ways (17)(17) on both sides of the second valve head (18) are fitted closely on the guide pieces (13)(13) on both sides of the chamber of the water cock main case (1).

As seen in FIGS. 5 and 6, the first valve head (15) and the second valve seat (18) are laid in the water cock main case (1). The upper side of the cylindrical body (7) and the partition wall is made slightly longer as compared with the height of the inlaid valve heads (15)(18) and (15)(18) so that the projected portion of the semicircular surface (6) at the front portion of the lower end of the cylindrical body (7) urges downward the side surfaces at both ends of the semicircular concave surface (16) of the second valve head (18) with the turn of the cylindrical body (7) to seal with the lower surface of the first valve head (15) the central small waterway (11) in the partition wall (12). The central small waterway (11) is opened again with reverse turn of the cylindrical body (7). Below the partition wall (12) located to a water supply pipe, in the center of said chamber at the bottom of the water cock main case (1) is formed a longitudinal opening (21) having inner and outer peripheral spiral threads (20). Into the lower side of the internally threaded longitudinal opening (21) is screwed a regulating screw stock (23) having a convex upper end surface (22). The regulating screw stock (23) may be screwed up-and-down to close or open the central small waterway (11) with the convex upper end surface (22) and with the base and extended outward below the longitudinal opening (21). A box nut (25) laid with packing (24) is screwed tightly on the outer peripheral spiral thread (20) from the lower side to completely prevent water from leaking therefrom or escape.

The packing (8) within the box nut (9) at the upper portion of the water cock main case (1) is of a form overlapped with one or two pieces of flanged type packing. The packing (24) in the box nut (25) at the lower portion thereof is of a form overlapped with flat packing and a packing of V-shaped inner periphery, overlapped ring-shaped packings and the like.
are contacted with both side portions of the semicircular concave surface (16) as shown in FIG. 10 and the first and second valve heads (15)(18) are urged downward as shown in FIG. 5, the first valve head (15) seals the central small waterway (11) to stop the flow of water, and when the oscillatable water discharge pipe (3) is turned leftward from the non-flow position through an angle of 90°, then the condition shown in FIG. 6 is restored and water flow is restored.

It will be obvious to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown in the drawings and described in the specification.

What is claimed is:

1. A water supply cock, the waterway of which is closed or opened with the oscillating turn of a water discharge pipe, comprising:

   a valve casing having a passageway therethrough, said passageway having a constricted portion therein;

   a water discharge pipe having a downwardly extending portion at the base end thereof, said downwardly extending portion being formed into a cylindrical body with a vertical axis and being rotatably connected to said casing so as to leave said discharge pipe oscillatable in a horizontal plane, said cylindrical body having a semicircular convex surface at the lower end thereof, said surface having a semicircular shape when viewed from the front along a first cross-section through said cylindrical body and having a rectangular shape when viewed from the side along a second cross-section ninety degrees from said first cross-section, said cylindrical body further having a hole centrally disposed along the vertical axis thereof;

   a valve member, disposed below said cylindrical body, having a vertically extending hole therethrough and having a semi-cylindrical concave portion on the upper surface thereof having a radius substantially equal to the semicircular portion of said cylindrical body;

   a valve head means for opening and closing the constricted portion of said passageway, said valve head means comprising a head portion disposed above the constricted portion of said passageway and below said valve member and a shaft portion extending vertically upward from said head portion through said valve member and into the hole in said cylindrical body; and

   means within said casing for preventing the rotation of said valve member while allowing reciprocation thereof in the vertical direction;

   wherein the dimensions of said cylindrical body, said valve head means and said valve member are so arranged as to force said valve head means into a closed position when the semicircular portion of said cylindrical body is perpendicular to the semicircular portion of said valve member and said valve head means is in a fully open position when said cylindrical body is rotated 90° and said semicircular portion rests in said semicylindrical portion.

2. A water supply cock in accordance with claim 1 further including

   a lug connected to the exterior of said cylindrical body, and

   engaging means connected to said casing for engaging said lug to permit only a 180° rotation of said water discharge pipe.

3. A water supply cock in accordance with claim 2 wherein said lug is located on the front portion of said cylindrical body and said water discharge pipe extends therefrom in the same direction as said lug whereby at 0° and at 180° angles of rotation of said water discharge pipe said valve head means closes said constricted portion of said passageway and at a 90° angle of rotation said valve head means is in a fully open position.

4. A water supply cock in accordance with claim 1 further including regulating means connected to said casing below the constricted portion of said passageway for opening or closing said constricted portion independently of said valve head means.

5. A water supply cock in accordance with claim 4 wherein said regulating means comprises a regulating screw threadedly engaging the lower portion of said casing and having a convex upper surface of dimensions sufficient to close said constricted portion when said screw is turned.

* * * * *
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,834,665 Dated September 10, 1974

Inventor(s): Takashi KURIOKA

It is certified that error appears in the above-identified patent, and that said Letters Patent are hereby corrected as shown below:

Item \( 76 \), after "15-15" cancel "chome" and insert -- , 1-chome --.

Signed and sealed this 18th day of February 1975.

(SEAL)

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks