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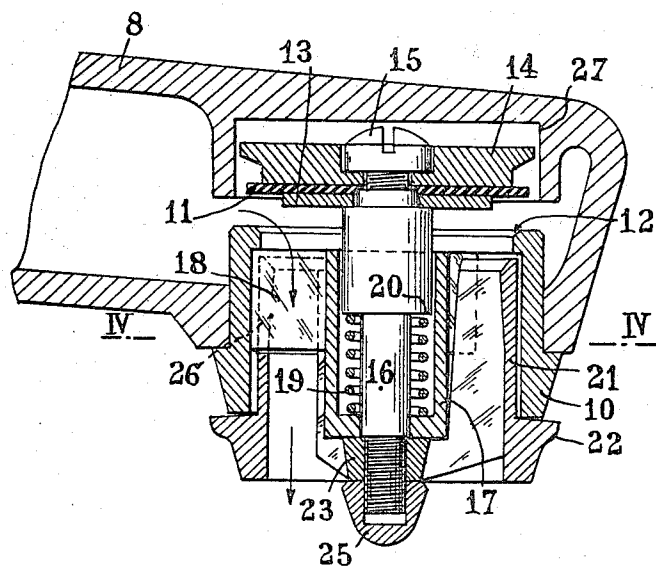
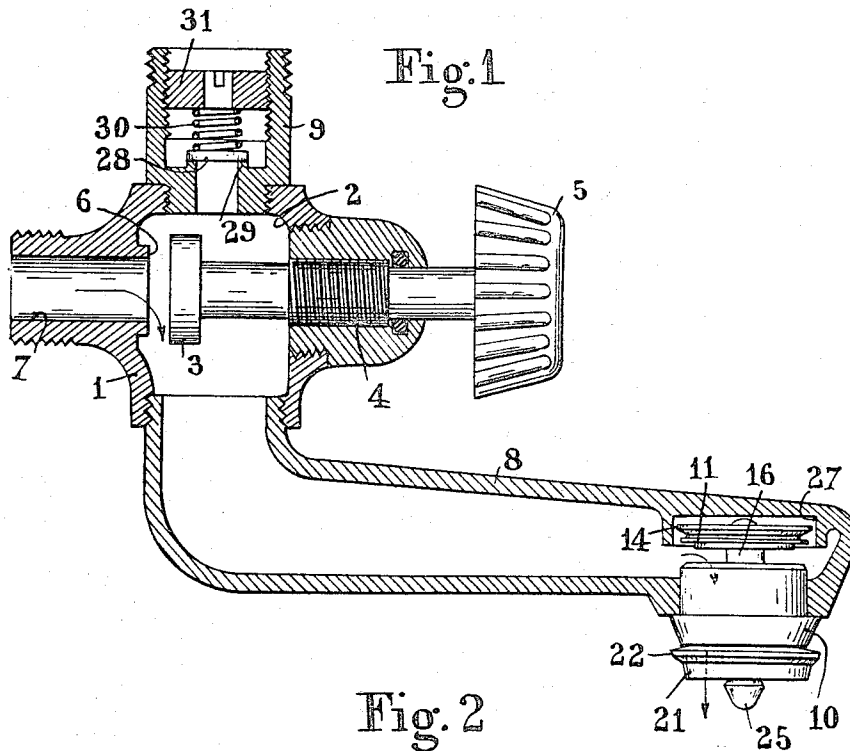
Y. CHAPOU

3,416,555

REVERSING COCKS FOR DISTRIBUTING WATER

Filed March 3, 1966

2 Sheets-Sheet 1



Inventor
Yves Chapou

by
Michael J. Striker
attorney

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Y. CHAPOU

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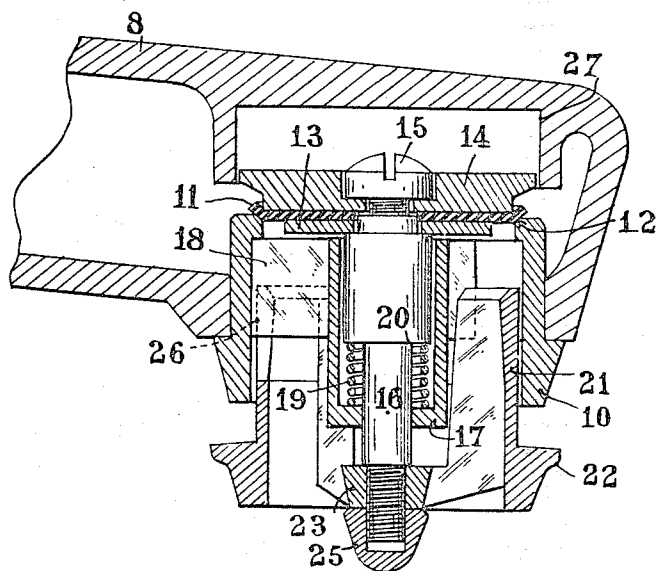


Fig. 3

Fig. 5

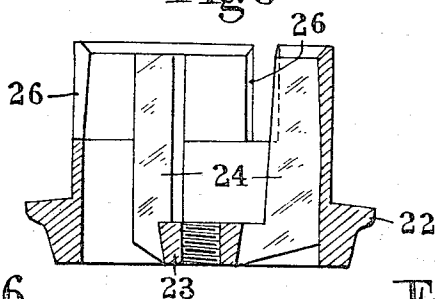


Fig. 6

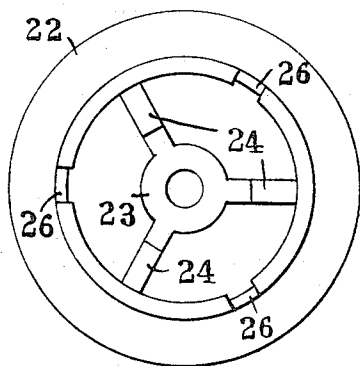
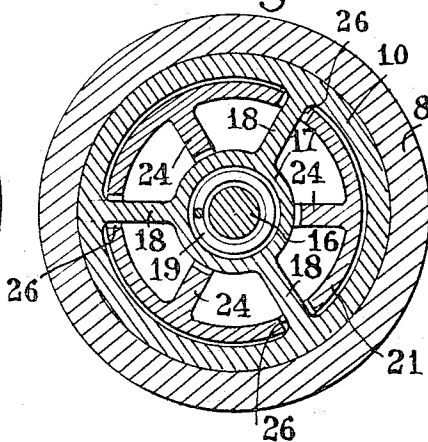


Fig. 4



Inventor
Yves Chapou

By Michael J. Sticker
Attorney

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REVERSING COCKS FOR DISTRIBUTING WATER

Yves Chapou, 21 Cours Marigny, Vincennes,
Val-de-Marne, France

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ABSTRACT OF THE DISCLOSURE

A reversing cock for distributing water under pressure in which a dispensing nozzle having an outlet orifice and a union adapted to be connected to a shower pipe branch off from the cock body forming a water receiving chamber to which ingress of water is controlled by a conventional valve, and in which a valve arranged in the outlet orifice of the nozzle is normally held in open position spaced from a registering valve seat in the orifice by a spring and provided with an outer gripping collar fixed thereto to be moved against the spring force to a closed position in which it is then held by the water pressure. On the other hand, another valve normally seated by spring means but adapted to open under predetermined pressure is provided in the union.

This invention relates to reversing cocks designed for distributing water either to a shower nozzle or to a bath.

More particularly, this invention is concerned with reversing cocks of the type wherein the cock body comprises on either side of the water-receiving chamber on the one hand a bent dispensing nose disposed at the lower portion and provided at its lower end with a downwardly directed outlet nozzle, and on the other hand at the upper end of said chamber a union for connecting the cock to a shower pipe or the like.

Of course, the main valve of these cocks controls the ingress of water into the receiving chamber. However, in the cock according to this invention another, manually-operated valve adapted to prevent the delivery of water through the outlet nozzle is provided. This other valve is normally urged to its open position by a spring so that when the main valve of the cock is opened by the user the water will flow as usual through the outlet nozzle. This is due to the fact that the water will flow more easily through the outlet nozzle than towards the upwardly directed shower pipe union.

However, if the user wishes to switch the water flow towards the shower nozzle instead of towards the bath, he simply depresses the member controlling the outlet nozzle valve so as to close same. In fact, as the outlet nozzle of the cock is closed, the water under pressure is caused to flow upwards, towards the shower pipe.

However, devices of this type are objectionable in that they require the provision of some internal baffle means so that in the duct leading to the normal outlet nozzle and therefore to the bath the water be properly directed towards the seat of the stop valve in order automatically to hold this valve in its seated position after it has been manually moved thereto. Now the provision of this internal baffle obviously constitutes a complication in the manufacture of the cock body and increases the cost of the device.

On the other hand, when the water output is very considerable a certain quantity of water is likely to flow back towards the shower side, although the valve controlling the nozzle on the bath side is not closed. This back-flow is due to pressure losses occurring also on the bath side as a consequence notably of the existence of said internal baffle and also of the frictional contact between the water stream and the inner surface of the outlet nozzle.

Thus, a far from negligible quantity of water is likely to flow through the shower union.

In view of the foregoing, it is the essential object of the present invention to remove completely these drawbacks and to provide a reversing cock of the same general type but characterized by a number of improvements.

To this end, it is the scope of the present invention to provide a reversing cock for distributing water which comprises, on either side of the water receiving chamber, a downwardly directed outlet nozzle disposed at the lower portion of the cock body and a union or like connecting member disposed at the upper portion of the cock body for connecting same to a shower or like pipe, a valve adapted to be actuated by means of a control member being provided for stopping the flow of water towards the outlet nozzle, on the bath side, this reversing cock being characterized in that said valve is movable in the lower end of said outlet nozzle and adapted to co-act with a valve seat registering with the outlet orifice or passage of said outlet nozzle, said valve being normally urged away from its seat by spring means, the valve control member consisting of a cylindrical core mounted on a vertical shank rigid with said valve so as to constitute its control and guide member, said core being advantageously disposed at the lower portion of the outlet passage of the nozzle.

On the other hand, another valve member normally seated by spring means but adapted to open under a predetermined pressure is advantageously provided in the union for connecting the shower pipe to the cock

Thus, due to the specific mounting of the valve at the end of the outlet nozzle and also to the specific arrangement of this valve, the latter is automatically urged to its closed position by the water pressure without requiring the provision of any additional baffle means within the cock body. On the other hand, the presence of a spring-urged valve member in the outlet union on the shower side will eliminate any risk of back flow on this side when the valve on the bath is open.

According to an advantageous form of embodiment of the reversing cock of this invention, the member controlling the stop valve mounted in the outlet nozzle consists of a socket mounted in the outlet passage of this nozzle and rigid with a central core secured to the end of the valve shank, the lower end of this socket carrying gripping collar projecting radially from the outer wall of the outlet nozzle.

According to another feature characterizing this specific form of embodiment, there is provided on the inner surface of the upper wall of the outlet nozzle a cylindrical chamber open at its lower end and adapted to house the valve in the open position thereof. The purpose of this chamber is to prevent an abnormally high water pressure from acting upon the valve during the closing movement thereof, and therefore from causing a too fierce closing or seating of this valve.

Other features and advantages of the reversing cock constituting the subject-matter of this invention will appear as the following description proceeds with reference to the accompanying drawings given by way of example and illustrating diagrammatically a typical form of embodiment of the device.

In the drawings:

FIGURE 1 is a vertical section showing a reversing cock constructed according to the teachings of this invention;

FIGURE 2 is a fragmentary view showing on a larger scale the outlet nozzle of the cock with the valve in its normal open position;

FIGURE 3 is a view similar to FIGURE 2 but showing the valve in its closed position;

FIGURE 4 is a cross-sectional view taken upon the line IV—IV of FIGURE 2;

FIGURE 5 is an axial section showing the socket constituting the valve control member, and

FIGURE 6 is a plane view from above of the same socket.

The cock illustrated comprises a main body 1 in which a water-receiving chamber 2 is formed. Mounted in this chamber is a conventional valve member 3 the movements of which are controlled by a screw rod 4 carrying a knob 5. This valve member registers with a seat 6 surrounding the orifice of the water inlet duct 7.

On either side of this chamber 2 are provided on the one hand a dispensing nozzle 8 at the lower portion of the cock and on the other hand a union or like member 9 disposed at the upper end and adapted to be connected to a shower pipe. The dispensing nozzle 8 is of cranked shape and its outlet end has a downwardly directed nozzle insert 10 fitted therein.

According to an essential feature of this cock, a valve 11 is disposed inside the delivery end of the dispensing nozzle 8, in alignment with a substantially horizontal seat 12 at the inlet end of the nozzle insert 10. This valve consists of a disk of rubber or like material suitable for this purpose, this disk being clamped between a pair of metal washers 13 and 14, this valve assembly being secured by a screw to the upper end of a control rod or valve shank 16.

This shank extends substantially vertically within, and is coaxial with, the nozzle insert 10. Besides, this shank is mounted for axial sliding motion in a cylindrical core or socket 17 disposed centrally of the nozzle insert and fastened through a number, for example three, of radial vanes 18 as shown in FIGURE 4, to the insert 10; a coil compression spring 19 surrounds the shank 16 and is fitted between a shoulder 20 of this shank and an inner flange provided at the lower end of said core 17. Thus, the spring 19 constantly urges the control shank 16 upwards, so that the valve 11 rigid therewith is normally unseated.

The valve control member consists of a substantially cylindrical socket 21 mounted inside the nozzle insert 10. However, the lower end of this socket 21 is provided with an integral gripping collar 22 projecting radially from the outer wall of this socket. At the same lower end the socket 21 carries a central boss 23 connected through radial vanes 24 to the cylindrical wall of the socket, these radial vanes being for example three in number, as shown in FIGURE 4.

This central boss 23 has an axial hole formed therethrough which is engaged by the lower end of the valve control shank 16, the latter projecting beyond the guide core 17. This boss 23 is secured to the end of the shank by a blind nut 25 screwed on the screw-threaded lower end of this shank. Under these conditions, the socket 21 is rigidly secured to the control shank 16.

At its upper end the socket 21 has formed therein three radial slots 26 engaged by said radial vanes 18 connecting the central core 17 to the cylindrical body of insert 10 (see FIGURES 3 and 4). At the same time, this arrangement will guide the socket 21 during its vertical movements while preventing this socket from rotating about its axis.

The inner face of the upper wall of the dispensing nozzle comprises a substantially cylindrical chamber 27 open at the bottom towards the outlet nozzle insert 10. This chamber 27 is adapted to house the valve member 11 when the latter is in its open position (see FIGURE 2). By construction, a very small clearance is left in this valve position between the wall of chamber 27 and the valve member 11 or the washer 14 holding this valve member. The function of this chamber will be explained presently during the description of the mode of operation of the reversing cock.

Besides, another valve 28 is provided within the union

9 for connecting the cock to a shower pipe. This valve is normally closed by engagement of a seat 29 under the pressure of a spring 30 counteracting the force exerted by the water pressure on this valve. This spring reacts against a nut 31 screwed in the union 8 and formed with a central hole permitting the passage of water when the valve 28 is open.

The purpose of this valve 28 is to compensate the residual pressure prevailing within the cock body when water is being directed towards the bath, that is, when the first valve 11 is open. In this case, even if a considerable water output is produced, no water can flow towards the shower pipe when the cock is set for causing water to flow only towards the bath.

The cock according to this invention operates as follows:

When the user opens this cock by turning the control knob 5 as in conventional cocks, water will normally tend to flow towards the dispensing nozzle 8 through the nozzle insert 10, since valve 11 is urged to its open position by the spring 19.

However, when it is desired to deliver water to the shower nozzle, it is only necessary to grip with one hand the projecting collar 22 of socket 21 and pull the latter downwards. This movement will move the control shank 16 in the same direction against the resistance of spring 19, thus seating the valve 11.

When this valve 11 is seated the user can safely release the control socket 21 since the water pressure is now sufficient to hold the valve in this position. But now, due to this valve closing, the water tends to flow towards the union 9 and the shower pipe by unseating the valve 28.

It should be noted that the provision of chamber 27 will prevent an abnormally high water pressure from being applied to the valve 11 during its closing movement. In fact, during the valve opening movement a condition of balance obtains between the pressure prevailing above the valve and that prevailing under this valve, since a communication between these two zones is provided by the clearance existing between the valve member and the wall of chamber 27. However, at this time, this pressure is relatively low since the water flow takes place in the free atmosphere. Thus, this pressure may be for example of the order of 2 p.s.i. (150 grams/sq. cm.).

Now when seated this valve is subjected to a relatively high force equal to the product of the surface area of this valve by the value of the high pressure prevailing on the shower outlet side, this pressure being for example of the order of 14 to 22 p.s.i. Therefore, if the valve 11 were not housed within the chamber 27 during the initial part of its closing movement, it would be subjected to a considerable and fierce pressure variation, so that its closing movement would be attended by a severe shock.

However, this inconvenience is avoided by the provision of the valve-receiving chamber 27. In fact, due to the small clearance existing between the valve 11 and the chamber 27, no sufficient time is available for allowing the increasing pressure built up in the cock dispensing nozzle during the valve closing movement to spread to the bottom of this chamber 27. Thus, the pressure prevailing above the valve will remain considerably lower as long as the valve is not completely closed.

Under these conditions, it is clear that the mounting of valve 11 in chamber 27 constitutes a particularly advantageous improvement since it prevents a too fierce closing of this valve.

Of course, on the shower outlet side the pressure applying the valve 28 against its seat 29 must be properly adjusted. To this end, it is only necessary to open the main valve 3 of the cock in order to deliver the maximum water output to the bath. Then the adjustment consists in screwing the nut 31 until no water flows towards the shower nozzle.

Due to the provision of the valve 11 in the end portion of the dispensing nozzle 8 and to the specific mounting of

this valve, the reversing cock according to the present invention is advantageous in that it is not necessary to provide any additional baffle means within the cock body or the outlet nozzle. This obviously constitutes a substantial simplification in the cock structure and therefore a reduction in its cost.

On the other hand the member controlling the outlet nozzle valve is advantageous in that it is extremely sturdy and that its presence does not impair the appearance of the cock as a whole. Moreover, the mounting of this control member is not attended by any leakage problem since it is located at the outlet end of the nozzle.

Although the present invention has been described in conjunction with a preferred embodiment, it is to be understood that modifications and variations may be resorted to without departing from the spirit and scope of the invention, as those skilled in the art will readily understand. Such modifications and variations are considered to be within the purview and scope of the invention and appended claims.

What I claim is:

1. A reversing cock for distributing water under pressure comprising, in combination, a cock body forming a water receiving chamber having an inlet opening; a dispensing nozzle having an outlet orifice at one end and communicating at the other end with said water receiving chamber; a union connected to said cock bodies spaced from the other end of said nozzle for connecting said cock to a shower pipe; a conventional valve in said receiving chamber for controlling ingress of pressure water through said inlet opening; a valve movably mounted in the end portion of said nozzle forming said outlet orifice; a valve seat registering with said valve and aligned with said outlet orifice; spring means urging said valve to its open position spaced from said valve seat; a shank fixed to and projecting from said valve into said outlet orifice of said nozzle; a valve control member arranged in said outlet orifice of said nozzle and comprising a cylindrical core secured to said shank and a socket about said core and fixed thereto, said socket having at an outer end thereof a gripping collar projecting radially outwards from the outer edge of said outlet orifice and from the outer surface of said dispensing nozzle.

2. A reversing cock as set forth in claim 1 and including a chamber formed in the upper wall portion of said dispensing nozzle, opposite to the outlet orifice thereof, and adapted to receive said valve, said valve being adapted to penetrate with a moderate clearance into said chamber for avoiding the application of an abnormally high water pressure to said valve during the closing movement thereof.

3. A reversing cock as set forth in claim 1 and including a chamber formed in the upper wall portion of said dispensing nozzle, opposite to the outlet orifice thereof, and adapted to receive said valve, said valve being adapted to penetrate with a moderate clearance into said chamber for avoiding the application of an abnormally high water pressure to said valve during the closing movement thereof, said valve control shank being slidably mounted in said cylindrical core disposed centrally of said outlet nozzle and solid with said outlet nozzle insert, said spring means consisting of a coil compression spring surrounding said valve control shank between a shoulder formed thereon and a flange formed at the lower end of said central cylindrical core.

4. A reversing cock as set forth in claim 3, wherein said central cylindrical core is rigidly connected to said nozzle insert by means of radial vanes engaging corresponding slots formed in said valve control socket.

5. A reversing cock as set forth in claim 4, wherein said union adapted to connect the cock to a shower pipe has a normally closed spring-loaded adjustable valve mounted therein.

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WILLIAM F. O'DEA, *Primary Examiner*.

W. H. WRIGHT, *Assistant Examiner*.

U.S. Cl. X.R.

137—269.5, 614.19, 627.5