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S. SAMARAS

2,159,452

FAUCET

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FIG. 3

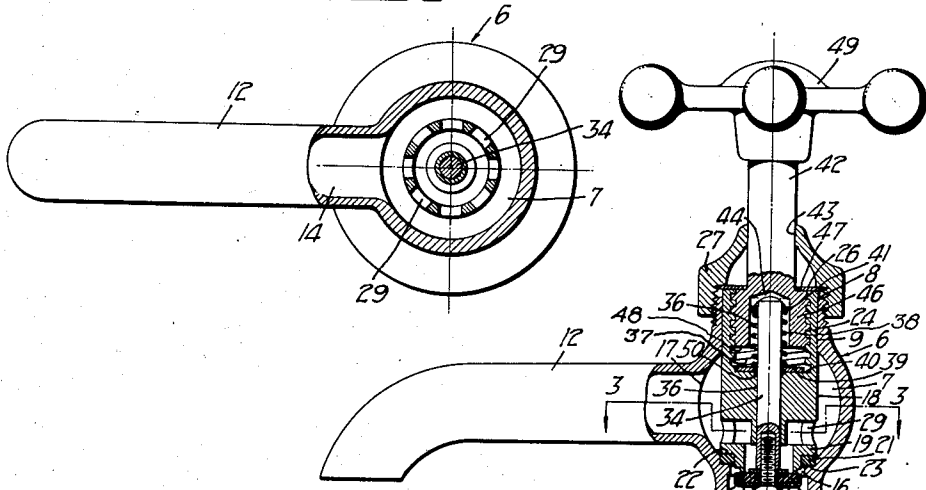


FIG. 1

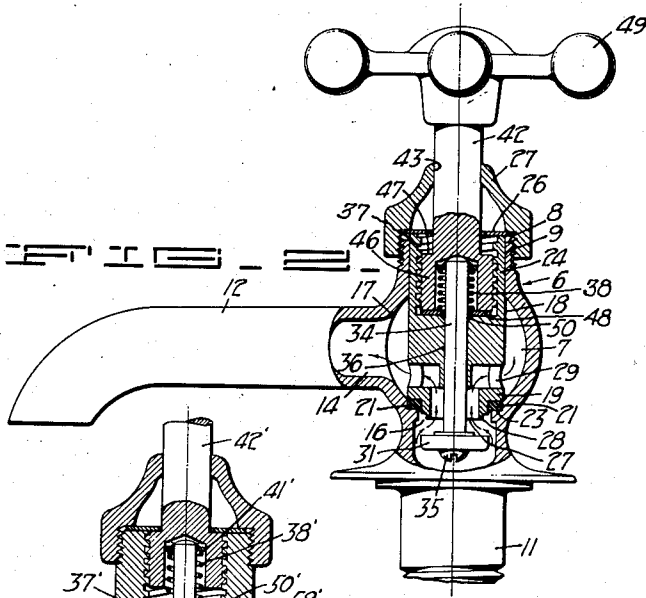
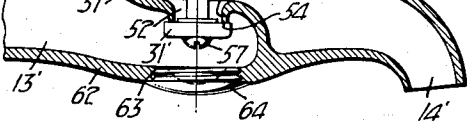


FIG. 2



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FAUCET

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4 Claims. (Cl. 251-141)

The invention relates to faucets and particularly to the types and sizes used in homes and the like for controlling the flow and dispensing of water for domestic uses.

5 An object of the invention is to provide a faucet of the character described which will afford an improved fluid tight closure of the faucet valve and at the same time greatly reduce the amount of wear and strain on the valve in comparison with faucets of a similar type heretofore available.

10 Another object of the invention is to provide a faucet of the character described which in its partially and fully opened position will be substantially quiet and silent in operation.

15 Another object of the invention is to provide a faucet of the character above which will be constructed of a few simple and ruggedly formed parts which will insure long and positive operation of the faucet and enable a manufacturing cost comparable with faucets heretofore in use.

20 The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description 25 may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawing:

30 Figure 1 is a vertical sectional view of a faucet constructed in accordance with the present invention, and showing the faucet valve in closed position.

Figure 2 is a view similar to Figure 1, but showing the faucet valve in open position.

40 Figure 3 is a transverse sectional view of the faucet and is taken substantially upon the plane of line 3-3 of Figure 1.

Figure 4 is a vertical sectional view of a modified form of the faucet.

45 The faucet of the present invention, and as illustrated by the preferred embodiment in the accompanying drawing, comprises a main body 6 which is formed at the interior thereof with a ball shaped valve chamber 7 which opens to the top side 8 of the body by way of a cylindrical bore 9. Formed in extensions 11 and 12 of the body are inlets and discharge passes 13 and 14 which open to the chamber 7 at the bottom 16 and an intermediate side 17 thereof respectively. The passages 13 and 14 are normally 55 sealed from each other by the interposition of

a valve casing 18 which is inserted into the chamber 7 through the bore 9 at the upper end 8 of the body and extend from this end to the bottom 16 of the chamber. The casing is sealed to the walls of the body at the lower end 19 of the casing by means of a gasket 21 which is compressed between an annular shoulder 22 formed at the lower end 19 of the casing and a seat 23 formed around the lower end 16 of the chamber. If desired, the gasket 21 may be dispensed with 10 and the shoulder 22 caused to engage directly in the seat 23 where a relatively good metal to metal contact is provided. The upper end 24 of the valve casing is also sealed to the side walls of the valve chamber by preferably using a relatively snug fit between the periphery of the casing and the bore 9 and by providing over the top of the casing and the top 8 of the body a washer 26 which is held in place by a threaded cap 27 15 surrounding and secured to the top of the valve body. Due to the substantially complete lack of pressure at the top of the valve chamber, by reason of the full flow afforded the liquid by the discharge passage 14, the requirement for sealing the valve casing in the top of the valve chamber presents no substantial difficulty. 25

The liquid or fluid flow through the faucet and more particularly through the valve chamber 7 from the inlet passage 13 to the discharge passage 14, is provided by way of a passage 27 formed in the lower end 19 of the valve casing and opening to the lower end face 28 of the casing and being communicated with the interior of the chamber for flow into the discharge passage 14 by way of a plurality of circumferentially spaced 35 ports 29 formed around the periphery of the valve casing adjacent the lower end thereof. The flow of fluid through the passage 27 is controlled by a valve 31 carried by the valve casing and disposed below the bottom face 28 thereof in the inlet passage 13 and being movable into and from 40 a position in engagement with the end face 28 for shutting off the communication of the inlet passage 13 with the valve casing passage 27. The valve itself is composed of a supporting receptacle 32 for a washer or packing member 33 which is engaged with the lower end face 28 of the casing and to insure a proper seating of the washer 33 against the face 28, the latter is preferably reduced in thickness somewhat, as here shown, so 45 as to increase the unit area pressure of the engaged sealing surfaces of the end face and the washer. The valve piece 32 in the present embodiment is connected as by means of a screw 35 to a valve stem 34 which extends longitudinally 55

through the valve casing by way of a central bore 36 into an enlarged bore or chamber 37 provided in the upper end of the valve casing. Secured to the valve stem in this latter chamber 37 is a spring 38 which is compressed between a washer 39 at the bottom 40 of the chamber and a cap washer 41 at the top of the stem for drawing the stem lengthwise through the valve casing and the valve 31 against the lower end face 28 of the casing in closed position. Preferably the portions of the washer 39 and the bottom wall 40 opposed to the stem are cut away to define a chamber for the receipt of a packing ring 50. Depression of the stem 34 for causing an opening of the valve is here effected by an operating member 42 which is extended through an opening 43 in the cap 27 and is threaded into the chamber 37 of the valve casing, the lower end of the member being provided with a socket 44 for engagement over the upper end of the stem 34 and the spring 38 and being adapted to engage with the cap washer 41 on the stem for depressing the latter and opening the valve upon screwing of the member into the chamber 37. The lower portion of the member 42, which is threaded into the socket 37, is preferably formed as a slight enlargement 46 over the remainder of the member extending from the faucet and preferably the size of this enlarged portion 46 is such that with the member 42 unscrewed to a position slightly beyond a position disengaging the stem 34, and as illustrated in Figure 1, the upper shoulder 47 of the enlargement 46 will be substantially flush with the top of the valve casing and of the faucet body. In this manner the washer 26, clamped over the top of the faucet body and the valve casing, may also overlie the portion 46 of the actuating stem and thereby limit the outward movement of the operating member relative to the valve casing and the faucet. In this position of the faucet the lower end 48 of the portion 46 will lie somewhat spaced above the bottom 39 of the chamber 37 so as to allow an appreciable advancement of the operating member into the valve casing and an ample displacement of the valve stem 34 and opening of the valve 31 when the operating member has been screwed to its innermost position in the valve casing chamber 37, as shown in Figure 2. Any suitable hand engagable member 49, such as the hand wheel here shown, may be attached to the upper end of the operating stem 42 for rotating the same. Such a means is well known in the art and may take the form of a wheel or lever, or the like.

An important feature of the present construction is the use of the plurality of circumferentially spaced ports 29 for communicating the interior passage 27 of the valve casing with the valve chamber 7 and the discharge passage 14. This arrangement acts to expand rather than contract the passage area afforded the liquid after passing through the valve seat and it otherwise serves in conjunction with the general arrangement illustrated to very substantially reduce the noise of the liquid flow at partial and full open positions of the valve.

A modified form of the faucet has been illustrated in Figure 4 wherein the body 6' of the faucet has been designed in a manner not requiring the use of the separate valve casing 18 of the first embodiment. In this form of the invention, the inlet passage 13' and the discharge passage 14' are formed in the body in substantially longitudinal alignment and separated by the wall 51 which is formed, in part, with a horizontal por-

tion having an opening 52 therein for the passage of liquid from the inlet to the discharge passage. The sides 53 of the wall 51 surrounding the opening 52 are extended downwardly from the remainder of the wall so as to define at their lower end face 54 a seat for the valve 31'. The latter is secured as by means of a screw 57 to the lower end of a valve stem 34' which is reciprocally carried in a bore 58' provided in a top wall portion 59 on the body and extends into a chamber 37' in the top of the portion 59 and resembling the equivalent chamber 37 in the top of the valve casing 18 of the first embodiment. The upper end of the valve stem is supported in the chamber 37' by a cap washer 41', spring 38' and packing means 50' as in the first embodiment. Similarly, the actuation of the stem by a manually operated member 42' is effected in the manner described in connection with the first embodiment. Preferably the lower wall portion 62 of the faucet is provided with an opening 63 in registration with the opening 52 and the valve 56 for enabling an assembly of the valve structure and a renewal of the valve, and as here shown, is normally closed by a threaded plug 64.

A particularly important feature of the present invention and as illustrated in both of the above embodiments, is that the valve 31 is moved from open to closed position by means of the fluid pressure assisted by the spring 38 or 38', both of which are completely out of the control of the operator, and that when the valve is moved to closed position, the manually operating stem 42 or 42' is disconnected from the valve stem and the valve is held in closed position entirely by the fluid pressure and the spring 38 or 38' and no further manual turning of the manually operated member is effective to apply any further pressure or wedging or compression of the valve against the valve seat. Also in the present faucet there is absolutely no forced turning of the valve against the valve seat, such as is present in faucets now in common use and which is so destructive to the relatively soft compressible valve washers used, since in the first place the top of the valve stem 34 is journaled in the top of the socket 44 of the actuating member and can freely rotate relative thereto and furthermore the manually controlled member is disconnected from the valve when the latter is moved to its seat. Thus, the initial engagement of the operating member with the valve stem causes a longitudinal displacement of the stem together with any turning force that might be present and as a result the pressure of the valve washer 33 against the end face 28 is immediately relieved and these opposed surfaces spaced before any appreciable turning force exists. Also, upon the return movement of the valve to its seat, any turning force between the valve stem and the operating member immediately disappears upon the seating of the valve due to the disengagement of the operating member and the valve stem at this point. This complete elimination of any twisting or turning action tending to wedge the valve washer into its seat under the usually severe manually applied pressure, multiplies the useful life of the valve washer many times over that heretofore obtained and substantially improves the ability of the valve to properly engage the valve seat. Furthermore the elimination of the compression of the valve against its seat and providing a free unrestricted movement of the valve to and away from the seat, makes the

faucet vastly easier to operate than faucets heretofore.

I claim:

1. A faucet comprising, a body having an open
 5 top valve chamber and inlet and discharge passages opening respectively to the bottom and side of said chamber and being formed with a seat at the base of said inlet passage, a valve casing slidably mounted in said chamber for removal
 10 therefrom and extending to and closing the upper open portion of said chamber, said casing being provided with a passage extending from the lower end thereof in registration with said inlet passage to the side thereof opening into said chamber,
 15 a valve positioned at the lower end of said casing in said inlet passage and movable to and from an engaged position with the lower end of said casing closing the passage therein, said casing being provided at its upper end with an
 20 enlarged opening and a smaller passage extending to the lower end and separated from said discharge passage, a stem connected to said valve and extending through said smaller passage into said enlarged opening, a spring secured to said
 25 stem in said last named opening and urging said valve to a closed position against the lower end of said casing, a cap secured to said body and covering said valve chamber and casing and provided with an opening therethrough, and an operative member extending through said cap opening
 30 and threaded into said enlarged casing opening and journaled on the upper end of said stem for depressing the latter against the resistance of said spring for opening said valve.

2. A faucet comprising, a body having an open
 35 top valve chamber and inlet and discharge passages opening respectively to the bottom and side of said chamber and being formed with a seat at the base of said inlet passage, a cap threadably mounted on said body over said chamber
 40 and having an opening therethrough, a valve casing enclosed in said chamber and extending to and closing the upper open portion of said chamber, said casing being provided with a passage
 45 extending from the lower end thereof in registration with said inlet passage to the side thereof opening into said chamber and an enlarged threaded opening at the top thereof, a valve positioned at the lower end of said casing
 50 in said inlet passage and movable to close said casing passage, valve actuating means extending through said cap opening and having an enlarged threaded portion engaged in said enlarged casing opening and having an annular shoulder
 55 formed at the top of said portion, and a packing washer mounted between said cap and body portions and covering the top of said casing and said shoulder to provide an upward stop for said ac-

tuating means and to seal the top of said chamber against leakage.

3. A faucet comprising, a body having an open
 5 top valve chamber and inlet and discharge passages opening respectively to the bottom and side of said chamber and being formed with a seat at the base of said inlet passage, a cap threadably mounted on said body over said chamber and
 10 having an opening therethrough, a valve casing enclosed in said chamber and extending to and closing the upper open portion of said chamber, said casing being provided with a passage extending from the lower end thereof in registration
 15 with said inlet passage to the side thereof opening into said chamber and a vertical bore extending axially through said casing and communicating with an enlarged threaded opening at the top thereof, a valve positioned at the lower
 20 end of said casing in said inlet passage and movable to close said casing passage, valve actuating means extending through said cap opening and having an enlarged threaded portion engaged in said enlarged casing opening, a stem fastened to
 25 said valve and extending through said vertical casing bore and engageable with said valve actuating means, packing means surrounding said valve stem at the bottom of said enlarged casing opening and a washer mounted above and engageable
 30 with said packing means, said packing means being wedged about said valve stem by said washer on depression of said actuating means.

4. A faucet comprising, a body having an open
 35 topped valve chamber and inlet and discharge passages opening respectively to the bottom and side of said chamber and being formed with a seat at said inlet passage and a cylindrical bore at the open top thereof, a cylinder valve casing mounted through said bore and engaged with the
 40 wall thereof and extending to and engaged with said seat at one end of said casing, said casing end being formed with a longitudinally extending opening and a plurality of radial openings communicated therewith and opening to the interior
 45 of said valve chamber adjacent said discharge passage, a valve mounted at said casing end in said inlet passage and movable longitudinally of said end to cover and uncover said opening, said casing being provided with
 50 a substantially axially extending bore, a stem connected to said valve and slidably mounted in said bore, a portion of the side wall of said bore provided by said valve casing extending longitudinally across substantially the full longitudinal width of said radial openings so as to shield the water passing therethrough from said
 55 stem, and actuating means engageable with said stem for opening said valve.

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