May 19, 1970 J. C. CROWLEY, JR., ET AL 3,512,525

FLOW REGULATING IRRIGATING DEVICE

Filed July 3, 1967 2 Sheets-Sheet 1

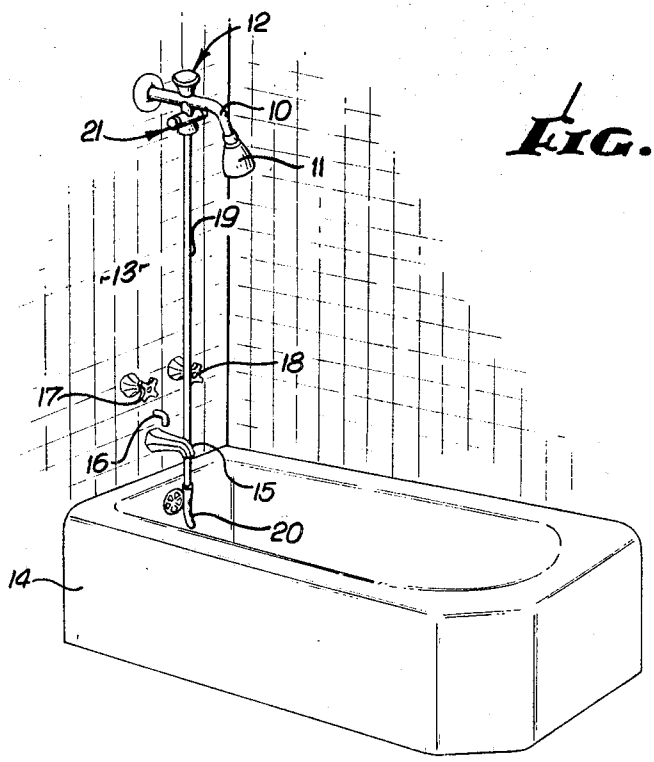



FIG. 1.

FIG. 4.

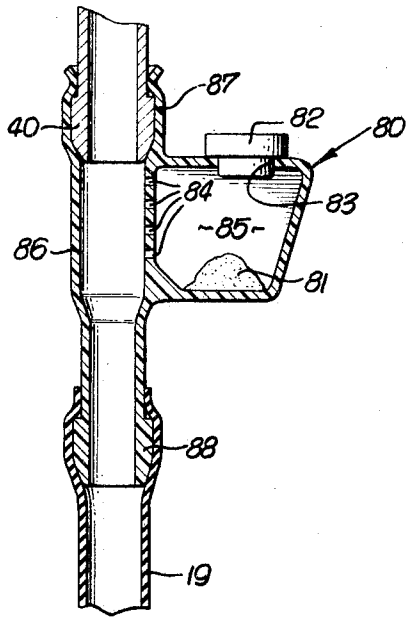
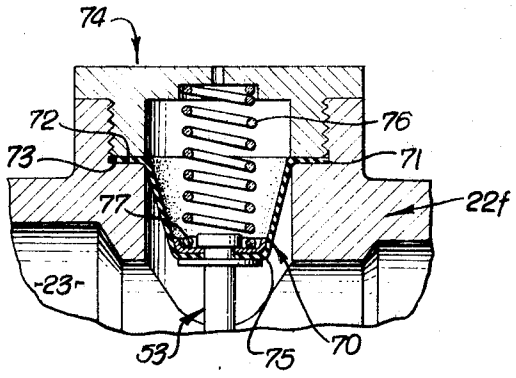



FIG. 3.





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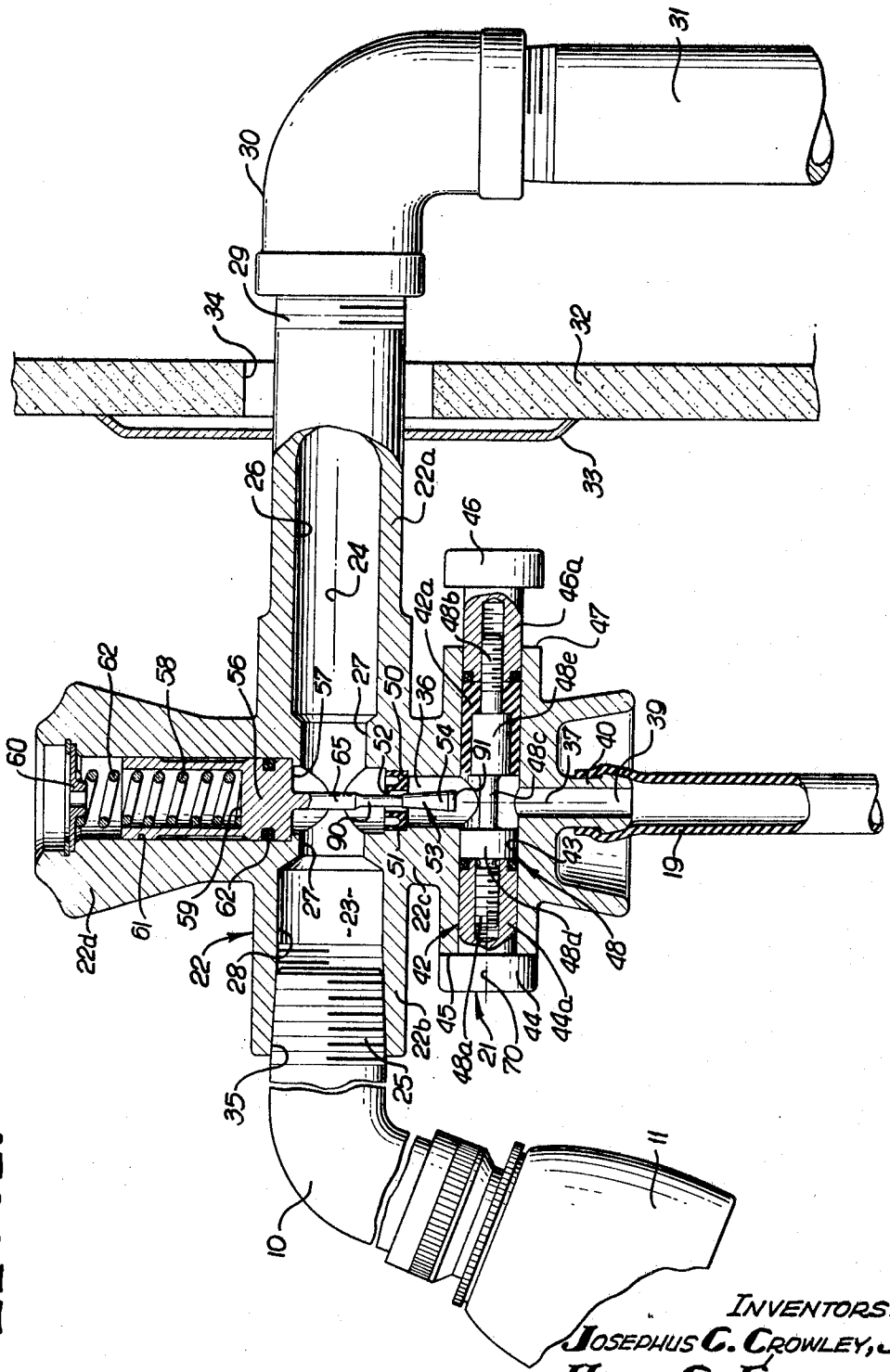



FIG. 2.

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# FLOW REGULATING IRRIGATING DEVICE

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## ABSTRACT OF THE DISCLOSURE

This invention relates generally to hygenic equipment, and more specifically concerns regulation of water flow in a side stream from a main flow line, and to an irrigation tip.

Basically, the invention employs a body connectible in water ducting and having a principal passage for passing water in main stream to a principal outlet, as for example a shower head, the body having a side passage communicating with the principal passage for receiving a side stream of the water therefrom, and the side passage terminating at an auxiliary outlet through which the side stream is flowable to an irrigation tip or instrumentality; first valving carried by the body and movable between a first position blocking the side stream flow to the auxiliary outlet and a second position unblocking the side stream flow; and side stream flow control means including an orifice element carried by the body and through which the side stream is flowable, a plunger element projecting through the orifice element, one of the elements having variable cross-section along its length, an actuator having a piston surface exposed to the main stream and movable to displace one of the plunger and orifice elements relative to the other to vary the clearance between them, and a spring to yieldably resist actuator displacement tending to reduce such clearance in response to an increase in main stream pressure applied to the actuator piston surface. Typically, the body has thread connections for the ducting at opposite ends of the principal passage, and the ducting includes a shower head terminal. Further a flexible tube typically attached to the body at a nipple defining the auxiliary outlet, the tubing hanging downwardly in a shower stall to the douche tip.

## SUMMARY OF THE INVENTION

At the present time, equipment used in douche and enema apparatus generally lacks certain unusual features of construction and modes of operation which characterize the recent invention. Among such features are automatic flow control of a side stream of water released at the applicator tip, irrespective of pressure variations in a main stream from which the side stream branches; temperature control of such side stream water at the valve handles of a bath or shower stall; equalization of temperature of the side and main streams, the main stream typically being delivered at a shower nozzle or head; provision for addition of medicaments to the side stream flow; and other features and advantages as will appear.

It is a major object of the invention to provide apparatus of such advantageous construction as will enable realization of the above modes of operation, as well as provide additional results of unusual advantage.

Other objects and advantages include the provision of a dispenser adapted to contain medicament and connected to have an outlet communicating with the flexible tubing upstream of the douche tip; the provision of a body bore receiving the actuator and spring at the side of the main passage opposite the side passage inlet, the plunger projecting transversely across a portion of the side passage of a diameter substantially larger than the diameter of the plunger; and the provision of another body passage containing the first valving and defining an axis normal to the plane defined by axes of the main and side passages, in order to facilitate operation of the first (or on-off) valving.



These and other advantages of the invention, as well as the details of illustrative embodiments, will be more fully understood from the following detailed description of the drawings, in which:

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view of a bath and shower installation wherein the invention is incorporated;

FIG. 2 is a vertical section taken through the flow controller of the invention;

FIG. 3 is an enlarged section showing an alternate plunger actuator and spring structure; and

FIG. 4 shows a medicament attachment.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIG. 1, the illustrated bath and shower installation includes ducting **10** terminating at a shower head **11**. Connected in series with the ducting is the apparatus of the invention indicated generally at **12** and projecing outwardly and generally horizontally from the wall **13** of the stall. The head **11** is directed downwardly toward a bath tub **14** which may be filled from a water spigot **15** when control lever **16** is turned downwardly, as is conventional. When lever **16** is turned upwardly, water is diverted to the shower head **11**. Water temperature and flow rate are controlled by hot and cold water control knobs **17** and **18**. A flexible tube **19** hangs downwardly from apparatus **12** to terminate at a douche tip **20** in position for convenient use while showering. The water diverted to tip **20** is at substantially the same temperature as that issuing from the shower head, under the control of knobs **17** and **18**. Also apparatus **12** includes a so-called first valve **21**, operated by the user to stop or start the water flow through tubing **19** to tip **20**, as will be described.

Extending the description to FIG. 2, the equipment **12** is illustrated to include a body **22** having a principal passage **23** defining a first axis **24**, and operable to pass water in a main stream to a principal outlet **25**. Passage **23** is defined by elongated bore **26**, reduced bore **27**, and enlarged bore **28**. Bore **26** is formed in body section **22***a* externally threaded at **29** for connection to a fitting in water supply ducting **31** behind the bath stall wall **32**, a cap **33** covering the opening **34** in that wall. Body section **22***b* is internally threaded at **35** for attachment to the ducting gooseneck **10**, to which shower head **11** is connected.

The body means **22** also has a side passage **36** communicating with the main passage **23** for receiving a side stream of water from passage **23**. Such a side passage may be formed by a depending section **22***c* of body **22** to have an axis **37** intersecting axis **24** at right angles, axes **24** and **37** together defining a vertical plane. Side passage **36** terminates at an auxiliary outlet **39** through which the side stream is flowable to the tubing **19** and tip **20**. Outlet **39** is typically defined by a nipple **40** to which the upper terminal of the hose is removably attached, as shown. Thus, the user may detach the tubing or hose **19** when use of the tip **20** is completed.

The above mentioned first valve **21** typically includes a plunger assembly **42** movable back and forth in another passage **43** in the body section **22***c*, and between a first position blocking the side stream flow to outlet **39**, and a second position unblocking the side stream flow. FIG. 2

illustrates the latter position, wherein a pushbutton **44** connected to the plunger structure has been moved against end face **45** of the body section. When pushbutton **46** is moved leftwardly against end face **47** of structure **22***c*, the valving is in first position, and a tubular shut-off seal component **42***a* of the plunger structure blanks the side passage **36**. The plunger structure includes pushbutton sleeves **44***a* and **46***a* and **48***b* of a spool **48**. The latter has a reduced section **48***c* past which the side stream flows downwardly in FIG. 2 position. The spool **48** also includes cylindrical sections **48***d* and **48***e*, the latter mounting the seal **42***a* as shown. Passage **43** defines an axis **70** which is normal to the plane defined by axes **24** and **37**, whereby the user facing the apparatus **21** from within the bath stall may operate the pushbutton **44** and **46** left and right. FIG. 2 shows axis **70** rotated 90 degrees, for description purposes only.

An important aspect of the invention concerns the provision of side stream flow control means incorporating orifice and plunger elements, an actuator and a spring. Typically of these are the orifice element or insert **50** having press fit within body counter bore **51**. The orifice element has a bore **52** coaxial with axis **37** and through which the plunger element **53** projects, also coaxially. One of these elements, as for example the plunger, has a variable cross section along its length, indicated at **54**, to vary the size of the clearance between the plunger and orifice bore as the plunger is moved vertically as will be described, for regulating the flow of side stream water at a substantially constant rate, i.e. between about 0.00082 and 0.0014 cubic feet per second for most desirable usage; however, the apparatus is adapted for other flow rates consistent with irrigation usages.

The flow control means actuator is referenced in FIG. 2 in the form of a piston **56** having a piston surface **57** exposed to the main stream flow in passage **23** and movable to displace plunger element **53** relative to the orifice element as described. Also, a spring **58** yieldably resists upward displacement of the actuator piston that tends to reduce the side stream water passing clearance between the plunger section **54** and the orifice bore **52** in response to an increase in main stream pressure applied to surface **57**. Spring **58** may comprise a compression spring confined at one end against internal face **59** of the piston, and at the other end by retainer **60**. The actuator piston is movable vertically in a bore **61** found in body section **22***d*, bore **61** being coaxial with axis **37**. An O-ring seal at **62** seals off between the piston and bore **61**.

It will be noted that the plunger element **53** projects transversely across the reduced bore section **27** of passage **23**, and has a diameter at **65** which is substantially less that the diameter of the bore section **27**, whereby the main flow through passage **23** is not appreciably restricted.

Referring now to FIG. 3, a modified actuator is shown in the form of a cup-shaped diaphragm **70** with a peripheral flange **71** retained between shoulder **72** on body structure **22***f* and shoulder **73** on the cap **74**. The diaphragm has a piston surface **75** exposed to the main stream flow in principal passage **23**, and plunger **53** is connected to the diaphragm as in FIG. 2. Coaxial compression spring **76** is retained between the plate **77** attached to the diaphragm and the cap **74**, for yieldably resisting pressure induced upward displacement of the diaphragm, as before.

Referring to FIG. 4, a dispenser **80** contains a douche medicament and is removably connected with nipple **40** and with flexible tubing **19** to have outlet communication with the flexible tubing upstream of the tip **20**. Medicament **81**, either solid or liquid, may be added to the dispenser after removal of a cap **82** from an inlet **83**. Ports **84** communicate between the interior **85** of the dispenser and the interior of line **86**, to allow water



to flow into the dispenser and to mix with the medicament, after which it is carried out of the dispenser via the lower elevation ports **84**. Upper tubular portion **87** of the dispenser body fits over the nipple **40**, and lower tubular portion of the dispenser receives the upper terminal of tubing **19**.

Referring back to FIG. 2, when the piston actuator is fully downwardly advanced with plunger section **90** in the orifice bore **52**, the clearance between the plunger and orifice bore is at a maximum, at which time the water pressure in passage **23** is typically about 8 p.s.i. or lower. As the pressure increases, the plunger retracts upwardly until such time as the plunger section **91** projects in bore **52**, at water pressures in passage **23** of about 60 p.s.i. These pressures are typical of what might be encountered in a shower unit; however, other pressures may also be encountered, and the invention does not exclude such other pressures. A small clearance exists when plunger section **91** projects in bore **52** to allow side stream water flow near desired rate, provided valving **21** is not shut off.

We claim:

**1.** For connection in water ducting,

body means connectible in series with said ducting and having a principal passage for passing water in a main stream to a principal outlet,

said body means having a side passage communicating with said principal passage for receiving a side stream of said water therefrom, said side passage terminating at an auxiliary outlet through which said side stream is flowable to an irrigation tip,

first valving carried by said body means and movable between a first position blocking said side stream flow to said auxiliary outlet and a second position unblocking said side stream flow,

and side stream flow control means including an orifice element carried by said body means upstream of said first valving and through which said side stream is flowable, a plunger element projecting through said orifice element, one of said elements having variable cross-section along its width, an actuator having a piston surface exposed to said main stream and movable to displace one of said elements relative to the other element to vary the clearance there between, and a spring to yieldably resist actuator displacement tending to reduce said clearance in response to an increaes in main stream pressure applied to said actuator piston surface, said body means having a bore receiving said actuator and said spring at a side of the principal passage so that a reduced diameter portion of the plunger projecting in open communication with the principal passage extends opposite the side passage inlet, said reduced diameter being substantially less than the diameter of said principal passage proximate said inlet.

**2.** The combination of claim **1**, including said irrigation tip, and flexible tubing interconnecting said auxiliary outlet with said tip for passing said side stream thereto.

**3.** The combination of claim **2** including a dispenser adapted to contain a medicament and connected to have an outlet communicating with said flexible tubing upstream of said tip.

**4.** For connection in water ducting,

body means connectible in series with said ducting and having a principal passage for passing water in a main stream to a principal outlet,

said body means having a side passage communicating with said principal passage for receiving a side stream of said water therefrom, said side passage terminating at an auxiliary outlet through which said side stream is flowable to an irrigation tip,

first valving carried by said body means and movable between a first position blocking said side stream

flow to said auxiliary outlet and a second position unblocking said side stream flow,

and side stream flow control means including an orifice element carried by said body means and through which said side stream is flowable, a plunger element projecting through said orifice element, one of said elements having variable cross-section along its width, an actuator having a piston surface exposed to said main stream and movable to displace one of said elements relative to the other element to vary the clearance therebetween, and a spring to yieldably resist actuator displacement tending to reduce said clearance in response to an increase in main stream pressure applied to said actuator piston surface, said body means having a bore receiving said actuator and said spring at the side of said main passage opposite the side passage inlet, said plunger element projecting transversely across a portion of said principal passage and having a diameter substantially less than the diameter of said principal passage portion.

**5.** The combination of claim **4** wherein said body has thread connections at opposite ends of said principal passage and including said ducting connected with said thread connections, said ducting including a shower head terminal.

**6.** The combination of claim **5** wherein said first valving is downstream of said orifice element.

**7.** The combination of claim **1** wherein said principal passage and side passage define first and second axes defining a plane, and said body includes another passage within which said first valving is movable, said other passage defining a third axis extending substantially normal to said plane.



**8.** The combination of claim **7** wherein said first valving is movable in the direction of said third axis and between said first and second positions.

**9.** The combination of claim **1** wherein said actuator comprises a piston.

**10.** The combination of claim **1** wherein said actuator comprises a diaphragm.


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U.S. Cl. X.R.

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