

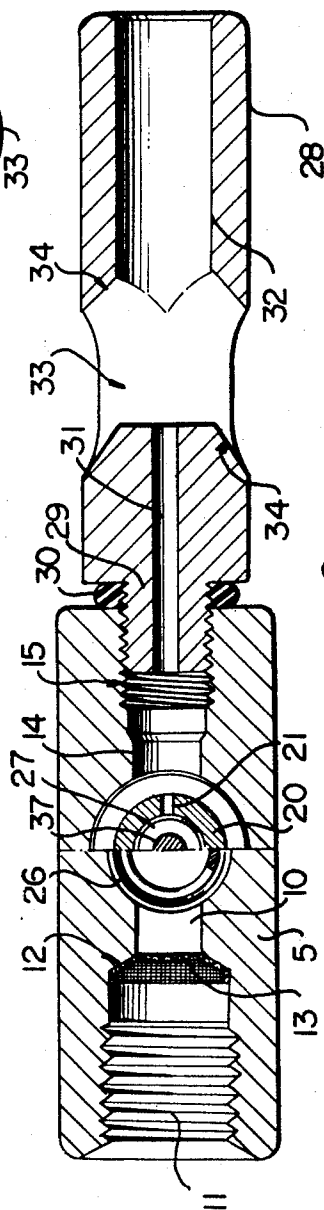
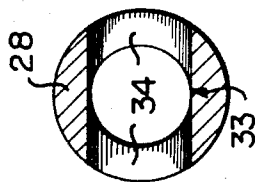
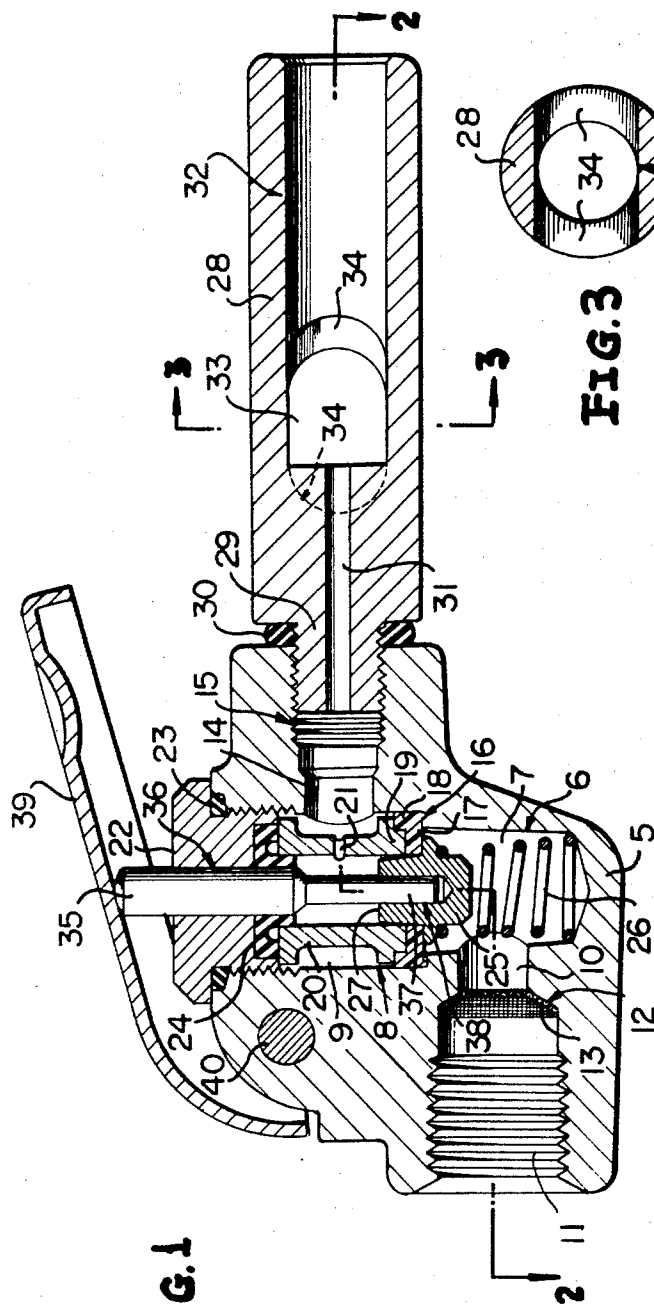
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CONTROLLED FLOW SAFETY NOZZLE

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1

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CONTROLLED FLOW SAFETY NOZZLE

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5 Claims

ABSTRACT OF THE DISCLOSURE

A manually controlled fluid delivery nozzle is disclosed including a body having a passage therethrough, manually actuable valve means within the passage for controlling flow of fluid through the passage, fluid restrictive provisions within the passage controlling the fluid flow therethrough per given input pressure and porting provisions adjacent the outlet through which ambient fluid is drawn by aspiration and through which fluid is exhausted upon blockage of the outlet.

This invention relates generally to fluid delivery nozzles and more particularly to manually controlled nozzles for receiving fluid under pressure and discharging the same to atmosphere.

An object of the invention is to provide a nozzle of the type described that contains a replaceable member having a restricted orifice for determining the maximum flow rate through the nozzle at a given inlet pressure.

Another object of the invention is to provide a nozzle of the type described in which there is a means for increasing the amount of fluid being delivered to the nozzle outlet, such means comprising openings upstream of the outlet through which ambient fluid is drawn by aspiration, such openings also serving to discharge fluid from the nozzle in case the outlet becomes blocked.

A further object of the invention is to provide a nozzle structure of the character stated wherein the inlet and outlet are disposed in offset relation with their axes parallel and traversed by a valved flow control chamber wherein a sleeve is removably and replaceably mounted, the sleeve having therein the flow control orifice and serving at least in part as a support for flow controlling valve and seat means.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings.

In the drawings:

FIG. 1 is a central vertical longitudinal sectional view illustrating the nozzle of the invention.

FIG. 2 is a horizontal section taken on the line 2—2 on FIG. 1.

FIG. 3 is a vertical cross section taken on the line 3—3 on FIG. 1.

The nozzle includes a body 5 having therein a transverse bore generally designated 6. The bore provides a pressure fluid receiving chamber and valve chamber 7 and a counterbore 8 in the body provides a flow control and seat chamber 9.

The body 5 also is provided with a longitudinal inlet bore 10 and a counterbore which is internally threaded at 11 for receiving a supply hose connection (not shown). The counterbore provides a shoulder 12 against which a screen 13 is seated.

The body 5 also is provided with a longitudinal bore 14 leading from chamber 9 with its axis parallel and offset from the axis of bore 10 and opening into an internally threaded counterbore 15.

2

Counterbore 8 has a shoulder 16 on which a valve seat member 17 is supported, the seat being recessed at 18 to receive an annular end extension 19 on a replaceable sleeve 20. Sleeve 20 has an orifice 21 of pre-selected size for delivery fluid from the interior of sleeve 20 to bore 14.

Counterbore 8 is internally threaded at its upper end to removably mount a closure plug 22, a resilient seal 23 being interposed between plug 22 and body 5, and a resilient seal 24 being interposed between plug 22 and the upper end of sleeve 20, and also between sleeve 20 and plunger 35.

A valve member 25 is yieldably held against the seat member 17 by a compression spring 26 mounted in bore 6 and has an upwardly extending frusto-coniform portion 27 extending into sleeve 20.

A cylindrical member 28 is threaded into counterbore 15 and is sealed against body 5 by a seal 30.

Member 28 has a bore 31 opening into a counterbore outlet 32. At its receiving end counterbore 32 is connected to atmosphere by cross openings 33 defined by inwardly and forwardly tapered wall portions 34, as shown in FIGS. 1 and 2.

A valve actuator plunger 35 projects through and is reciprocable in a bore 36 in plug 22, and the plunger has a reduced end portion 37 which is seated in a recess 38 in the valve member 25.

An actuator handle 39 is pivoted at 40 on the body 5 in position for overlying plunger 35. Depressing handle 39 causes plunger 35 to move valve 25 to open position away from its sealing engagement with seat 17 against the action of compression spring 26.

In addition to the advantage of simplicity and economic manufacture, the disclosed valve structure permits direct use of maximum supply pressure without the necessity of employing regulators. Thus a sleeve may be selected that has an orifice 21 of a size to provide a predetermined rate of fluid flow through the nozzle for a given maximum pressure of fluid at inlet 11. Also, fluid flowing from bore 31 past openings 33 into outlet counterbore 32 has as aspirating effect, drawing atmospheric air through openings 33 for delivery through the open end of outlet 32. Because of the large diameter of outlet 32 as compared with bore 31, the fluid discharges from outlet 32 at relatively low velocity. Also, the open end of outlet 32 can be placed directly against a work piece or a person's body without danger of pressure buildup, the fluid in such case being freely exhausted to atmosphere through cross openings 33. In most cases, the fluid supplied to the nozzle is air.

While a preferred form of the nozzle has been disclosed herein, it is to be understood that variations in structure may be resorted to without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A fluid delivery nozzle including a body having a passage leading from an inlet to an outlet, the passage including an inlet bore, an outlet bore and a further bore intermediate and intersected by said inlet and outlet bore, valve means located in said further bore for controlling flow of fluid through said passage, fluid restrictive means within said further bore for controlling fluid flow through said outlet bore and including an orifice of constant preselected cross-sectional area, smaller than any further cross-sectional area of said passage, and a port transversely intersecting the passage adjacent the outlet and open to atmosphere whereby fluid flowing through the passage past said port will draw ambient air into the passage to be delivered through the outlet with the fluid introduced through the inlet, and whereby also, upon obstruction of the outlet, fluid in the passage will flow freely through the porting to atmosphere, said fluid

3

restrictive means including a sleeve located in said further bore, having a portion on the length thereof spaced radially inwardly from the walls of the bore, defining a chamber therebetween, said orifice being provided in said portion of the length of the sleeve and connecting said further bore, chamber and outlet bore.

2. The nozzle according to claim 1 wherein said valve means is located in said further bore adjacent said sleeve and intermediate said sleeve and said inlet bore, said further bore extending to the exterior of said body, plug means closing said further bore and means extending through said plug means and through said sleeve for actuating said valve means, said plug means being removable for replacement of said sleeve, whereby the fluid flow through said passage for a given input pressure may be selectively determined by the insertion of sleeves having orifices of preselected cross-sectional area.

3. A fluid delivery nozzle including a body having a passage therethrough, the passage having an inlet and an outlet, a sleeve replaceably mounted in the body and forming a part of the passage and having a central wall portion spaced radially inwardly from the interior passage wall to form a chamber, said sleeve having a fluid restrictive orifice of preselected size connecting the passage to the chamber and outlet, and valve means for controlling flow of fluid from the inlet into said sleeve, said orifice being of smaller cross-sectional area than any further portion of said passage, whereby the maximum fluid flow through said passage for a given input pressure is fixed, said valve means including a reciprocable valve member spring held against an end of the sleeve to close the passage, a plunger for actuating the valve, said plunger extending axially through the sleeve, and an actuator handle mounted on the body and overlying an end of the plunger for actuating the same, a plug threadably mounted on the body in a portion of said passage communicating with the exterior of said passage, said plug forming a bearing for the plunger, a frusto-

4

conical end on the valve member extending into said sleeve and recessed to receive an end portion of the plunger, and means sealing the plug against an end of the sleeve and engaging said plunger in sealing contact therewith, said plug being removably joined with said body, allowing replacement of said sleeve within said passage, whereby the fluid flow through said passage for a given input pressure may be selectively determined by the insertion of sleeves having orifices of preselected cross-sectional area.

4. Nozzle structure as defined in claim 3 wherein the outlet is in the form of a bore having in the sidewall thereof means defining porting opening laterally to atmosphere whereby fluid flowing through the passage and past said porting will draw ambient air into the passage to be delivered through the outlet with the fluid introduced through the inlet, and whereby also, upon obstruction of the outlet, fluid in the outlet will flow freely through the porting to atmosphere.

5. The nozzle of claim 3 in which the body has a shoulder surrounding the passage, and a seat member clamped against said shoulder by said sleeve, and said valve means including a valve member engageable with said seat member.

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