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BUBBLER FOUNTAINHEAD

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Fig. 1.

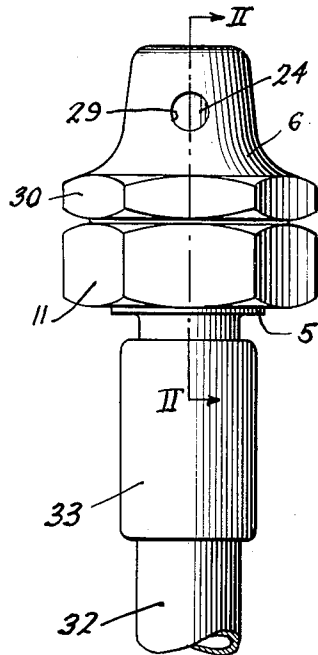


Fig. 2.

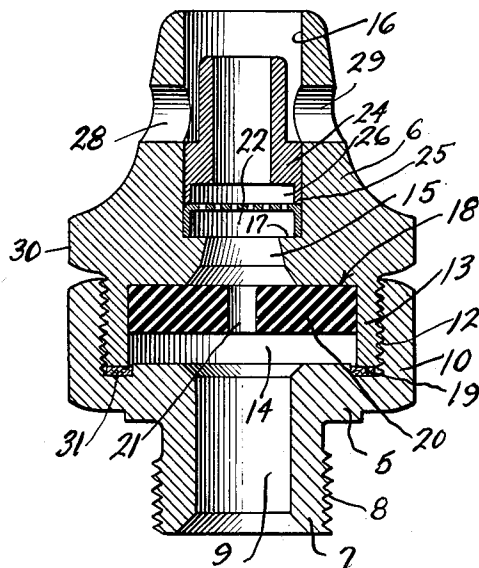


Fig. 4.

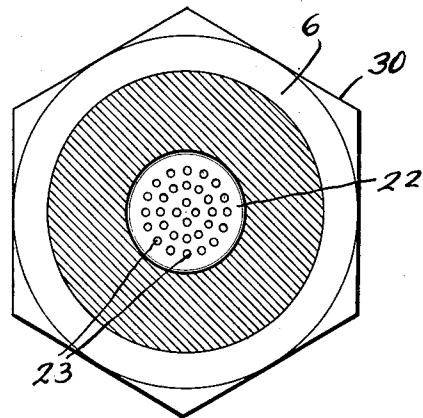
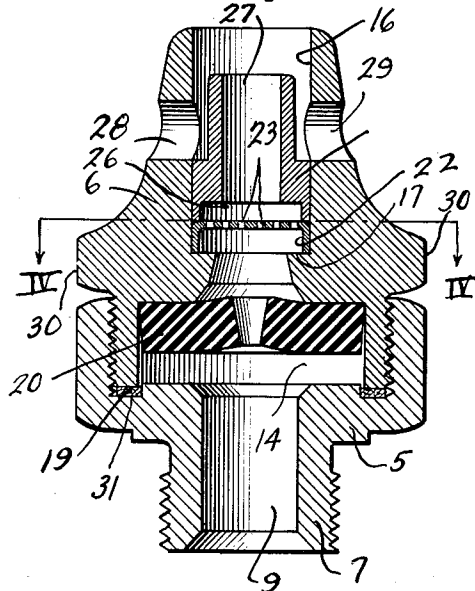


Fig. 3.



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BUBBLER FOUNTAINHEAD

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7 Claims. (Cl. 299—15)

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The present invention relates to a bubbler fountain head and more particularly to a head which may be applied directly to a water supply pipe and which head has means for reducing the supply pressure to such value as to control its issue from the head at low pressure in bubbler form.

The head of the present invention is adapted to be directly connected to a water supply pipe and, regardless of the pressure of the supply, controls the water at the outlet for convenient drinking.

Accordingly an object of the present invention is to provide a bubbler fountain head having means by which a substantially constant low pressure bubble flow through the head is secured regardless of the pressure of the water supplied to the head.

Another object of the invention is to provide a bubbler fountain head which is simple in construction and operation and which has no parts which can easily get out of order.

A further object of the present invention is to provide a bubbler fountain head which may be applied directly to a water pipe for reducing the water pressure to bubbler value at the outlet.

A still further object of the present invention is to provide a bubbler fountain head in which the pressure of the water supply is reduced, and issues from the reduction means in the form of a stream and then the stream is diffused to issue from the head in bubble formation.

In accordance with the general features of the invention there is provided a bubbler head having a resilient flow control ring responsive to fluid pressure to deliver a stream of substantially uniform pressure and a diffusing plate breaking up the stream into a bubbler form suitable for ready drinking.

The above, other and further objects of the present invention will be apparent from the following description and accompanying drawing.

An embodiment of the present invention is illustrated in the accompanying drawing and the views thereof are as follows:

Figure 1 is a side elevational view of the illustrated form of head, showing it in elevation, as connected to a water supply pipe by a coupling;

Figure 2 is a vertical central sectional view through the head of Figure 1 showing the elastic ring valve member in normal position, that is, when there is no flow through the head;

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Figure 3 is a view similar to Figure 2 showing the elastic ring valve member as deflected or flexed to reduce the cross-sectional area through the orifice in the valve member which occurs when water under pressure is directed against the inlet side of the valve member; and

Figure 4 is a horizontal sectional view taken in the plane of line IV—IV of Figure 3 and showing the construction of the diffusing plate.

10 On the drawing:

The head of the present invention includes casing means, herein illustrated as comprising a two-part casing having a lower part 5 and an upper part 6. The lower part 5 has a neck 7 exteriorly threaded at 8 and interiorly bored at 9 to provide an inlet. The upper portion of the lower part 5 is enlarged as at 10 with the exterior of the enlargement formed in polygonal shape, such as hexagonal, as indicated at 11, to receive a tool. The enlarged upper portion 10 of the lower part 5 has a threaded bore 12 with an internal diameter greater than the external diameter of the neck 7.

The upper part 6 is formed with a neck portion 13 exteriorly threaded to engage the threaded bore 12 of the lower part 5. The neck is counterbored at 14 to provide a chamber. Communicating with the chamber 14 is a convergent throat 15, the maximum diameter of which is less than the diameter of the chamber 14. Above the throat 15 the upper part 5 is counterbored to form a duct 16 which is open at its upper end. The diameter of the duct 16 is greater than the smallest internal diameter of the throat 15. The junction of the duct 16 with the throat 15 forms an annular shoulder 17.

Between the neck 13 of the upper part 6 and the lower part is a gasket 19 to seal the joint between them to make the head leaktight.

Within the chamber 14 is a ring valve member 20 formed of elastic material such as rubber or synthetic plastic and having a centrally disposed orifice 21 through it. The orifice 21 is of such size that it can cooperate with the yieldable character of the central portion of the rubber ring in controlling the pressure of the fluid discharged through the ring. The diameter of the ring valve 20 is such as to engage the wall of the chamber 14. The axial thickness of the ring valve member 20 is less than the axial height of the chamber 14.

A cup 22 is arranged in upside-down position within the duct 16 and with the wall of flange of the cup resting on the shoulder 17, with the diameter of the cup making a tolerant fit within

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the duct 16. The bottom of the cup, that is, the top when the cup is inverted, is formed with a plurality of perforations 23, the perforated cup constituting a diffuser interposed in the passageway through the casing.

Resting on the cup 22 is an outlet member 24 having a skirt portion 25 at its lower end, the outer diameter of which makes a tight fit with the bore of the duct 16. The skirt portion of the outlet member 24 is counterbored at 26 for a short distance in the length of the skirt. There is a central outlet bore 27 through the member 24 open at its upper end and communicating with the counterbore 26. The flange of the skirt portion 25, formed by reason of the counterbore 26, rests on top of the cup 22 when the parts are assembled, as may be readily observed in Figure 2. The upper end of the outlet member 24 stops short of the top of the upper part 6 of the casing. The casing is provided with lateral outlets 28 and 29 for disposing of overflow water.

The upper part 6 of the casing is formed with a portion, above its neck, which on its exterior is shaped as a regular polygon, as indicated at 30, such for example as a hexagonal shape, to receive a tool for use with another tool applied to the lower part for securing the parts together or for separating them as occasion should arise for so doing.

The gasket 19 is set in an annular groove 31 in the marginal portion of the chamber 14.

The head is assembled as follows:

All of the parts being separate, the gasket 19 is introduced into the groove 31, the ring valve member 20 is then applied to the counterbore within the neck 13 of the upper part 6, that is, the chamber 14, and against the shoulder 18 whereupon the upper and lower parts are screwed together to make a leaktight joint between them. The cup 22 is then put in place in the duct 16 with its flange resting on the shoulder 17. Then the outlet member 24 is introduced into the duct with its lower margin resting against the cup 22. The fit of the parts is such that they will not become dislodged because of the flow of liquid through the head.

When the head of the present invention is to be used, it may be attached to a water supply pipe 32 in any manner. The construction shown employs a coupling 33 for connecting the head to the pipe 32.

It is to be understood that a valve (not shown) will be installed in the pipe 32 at some place convenient for a person desiring to drink from the bubbler head.

In the operation of the head of the present invention, the valve in the pipe 32 is opened whereupon water under city pressure enters the inlet 9 and chamber 14 against the downside of the ring valve member 20. Because of the pressure of the incoming water, the ring valve member will be deformed or flexed, centrally thereof, as shown in Figure 3, a part of the central portion of the ring valve member being forced into the mouth of the throat 15 which action tends to reduce the cross-sectional area of the ring orifice 21 in such manner as to reduce the pressure of the water issuing from the ring valve member 20 so that a stream of substantially uniform pressure is discharged through the ring regardless of the incoming pressure. The water issuing from the ring valve member 20 will be in the form of a stream which, if not constrained, would be discharged upwardly through the upper end of the duct 16.

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In order to prevent discharge of such a stream, the diffuser cup 22 is employed. By reason of the fact that the cup is provided with a plurality of perforations or holes 23, the water issuing from the ring valve member under certain pressure, but at a pressure less than the inlet pressure, will fill the underside of the cup. Resistance to flow of the water is interposed by the cup and some of the water escapes through the holes or perforations 23 in the cup bottom, whereupon entering the outlet bore 27 of the outlet member 24 in an ebullient stream, or in the form of a bubbler stream. The pressure of the bubbler stream is such that the stream issues from the duct 16 under a head of several inches for convenient drinking.

It will be noted that the bubbler head of the present invention contemplates a casing structure having passageways through it of varying cross-sectional areas, with means for reducing the inlet pressure together with means for diffusing the stream issuing from the pressure reducing means to thereby provide a head for ebullient discharge of liquid.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is therefore, not the purpose to limit the patent granted hereon other than necessitated by the scope of the appended claims.

I claim as my invention:

1. An outlet head for a bubbler type fountain structure comprising casing means formed with a passageway through it of varying cross-sectional area and including an inlet, a valve chamber, a throat, and an outlet arranged in the order of flow; the junction between said valve chamber and throat providing an annular shoulder as a seat for a valve member of the type comprising an elastic ring compressible against the seat by pressure of liquid from the inlet; said throat being convergently shaped to receive a portion of the compressed ring to bend it, whereby the cross-sectional area of the ring orifice may be reduced to restrict flow through the throat; and a diffuser in said passageway beyond said throat to diffuse the liquid flowing therethrough.

2. An outlet head for a bubbler fountain comprising casing means having passageway through it of varying cross-sectional areas; said casing means passageway in the order of flow through it comprising an inlet, a chamber of greater diameter than the inlet, a convergent throat whose maximum diameter is less than the diameter of the chamber, and a duct having a diameter greater than the maximum diameter of the throat; there being an annular shoulder at the junction of the chamber and the throat; a second shoulder at the junction of the throat and the duct; a cup having a perforated bottom disposed on said last mentioned shoulder in upside-down position with its flange resting on said shoulder; an outlet member resting on said cup; the lower end of said member having an outside diameter substantially that of the duct with the outside diameter of the portion above the lower end of less diameter than the duct; said member having a bore through it and with a counterbore in its lower end having a diameter greater than the bore; and constructed to receive a deformable elastic ring valve positioned against the first mentioned shoulder for reducing the pressure of water entering the throat from the inlet.

3. A head for a bubbler type drinking fountain

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comprising casing means having passageway through it of varying cross-sectional areas; said casing means passageway in the order of flow through it comprising an inlet, a chamber of greater diameter than the inlet, a convergent throat whose maximum diameter is less than the diameter of the chamber, and a duct having a diameter greater than the maximum diameter of the throat; there being an annular shoulder at the junction of the chamber and the throat; a second shoulder at the junction of the throat and the duct; means resting on said last mentioned shoulder for diffusing water issuing from said throat; an outlet member disposed in said duct, the lower end of said member having an outside diameter substantially that of the duct with the outside diameter of the portion of the member above the lower end being of less diameter than the duct; said member having a bore through it and having a counterbore in its lower end of greater diameter than its bore; said chamber constructed to receive a relatively thin elastic ring valve member in contact with the wall thereof and movable against said first mentioned shoulder by water entering the passageway, the edges of said convergent throat constructed to deform the central portion of said ring against the flow of water against its inlet surface and through its orifice to decrease the cross-sectional area of the orifice in the ring.

4. In a drinking fountain nozzle wherein inlet water flow is automatically regulated and a water jet is directed through baffle means, the improvement of, a casing structure with an inlet, an outlet and a body portion intermediate thereto, said structure defining a substantially cylindrical channel of varying cross-sectional areas, a removable diffusion mechanism comprising a perforated baffle bowl and a hollow cylindrical retainer of such an outside diameter as to locking-ly engage the walls of the cylindrical channel defined by said casing structure, said mechanism transversely interposed within upper portion of said casing structure and operative to convert the inlet jet stream of liquid into an ebullient liquid mass, and a pressure control chamber formed in said channel to receive a deformable resilient ring valve to automatically control flow of liquid by delivering a constant rate of flow through said nozzle irrespective of pressure variations in the fluid acting upon said valve, there being an annular shoulder at the outlet end of said chamber engageable with the ring valve positioned in said chamber to flexibly deform said ring valve against the liquid flow moving toward said outlet.

5. In a bubbler fountain head including detachable aligned housing members, one of which is connected to a source of water under pressure and the other of which has a discharge orifice, a pressure control chamber in one of said members in communication with said source and said orifice and adapted to receive a resilient rubber-like flow control ring with its central aperture aligned with said discharge orifice, said housing member having said orifice forming an annular shoulder engageable with the edge of the ring around said central aperture to support said

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ring for deflection in response to variations in pressure whereby a relatively constant rate of fluid will be delivered from the head regardless of variations in pressure of the incoming fluid, and a perforated diffuser plate between said pressure chamber and said discharge orifice of the head for breaking up the liquid stream passing through the orifice into an ebullient flow for drinking purposes.

6. In a bubbler fountain head including detachable aligned housing members, one of which is connected to a source of water under pressure and the other of which has a discharge orifice, hollow cylindrical wall portions in one of said housing members forming a pressure control chamber shaped to receive and position a resilient rubber-like flow control ring between the housing members with its central aperture aligned with said discharge orifice, an annular shoulder on the orifice end of said chamber to engage the edge of the ring around said central aperture and to deflect said ring against fluid flow through said chamber to effect a relatively constant rate of fluid delivery from the head regardless of variations in pressure of the incoming fluid, a perforated diffuser plate between said chamber and the discharge orifice of the head for breaking up the liquid stream leaving the orifice into an ebullient flow for drinking purposes, said diffuser plate and said pressure chamber being coaxially aligned with the discharge orifice.

7. In a bubbler head structure including a hollow cylindrical housing having a liquid inlet and also defining a liquid discharge and a drinking orifice, a shouldered chamber inwardly of the orifice but in communication with both the inlet and the orifice to receive a resilient ring of rubber-like material engageable with said chamber shoulder with a central pressure control orifice in alignment with said discharge orifice, said shoulder presenting a substantially flat side engageable with the ring so that pressure of the incoming liquid from said inlet will deflect the central portion of said ring in the locale of said central control orifice towards the discharge orifice in response to variations in pressure to control the flow of liquid through and out of the discharge orifice, and diffusion means in said housing between said shoulder chamber and said orifice to break up the liquid stream through the orifice into an ebullient flow for drinking purposes.

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