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C. C. ARMSTRONG

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NOZZLE

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FIG. 1.

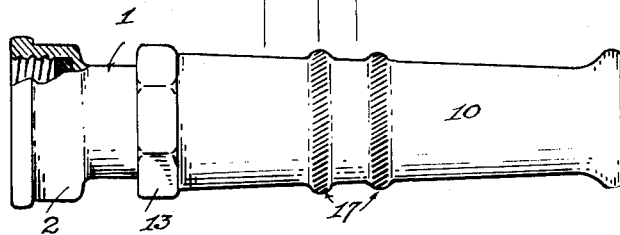


FIG. 2.

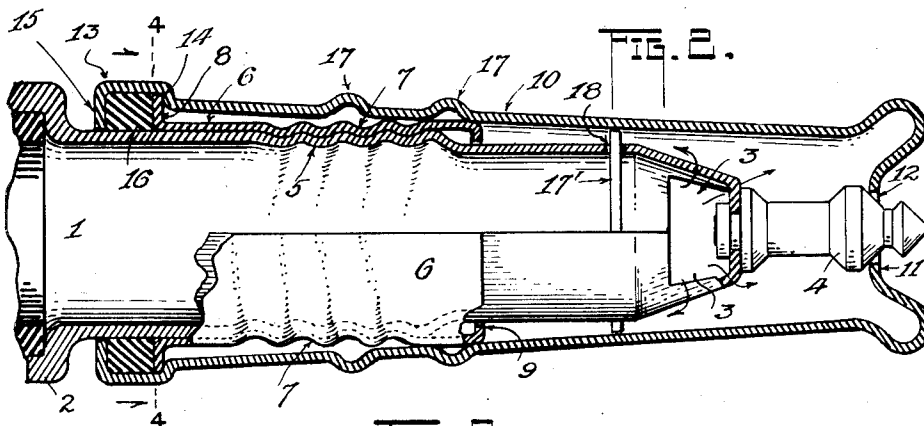


FIG. 3.

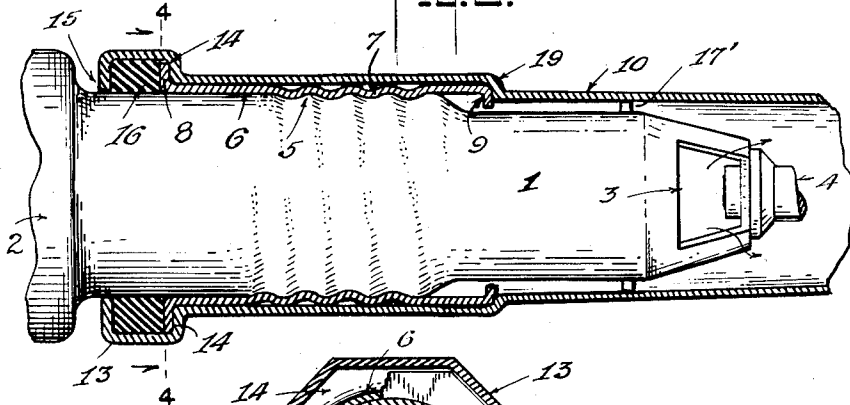
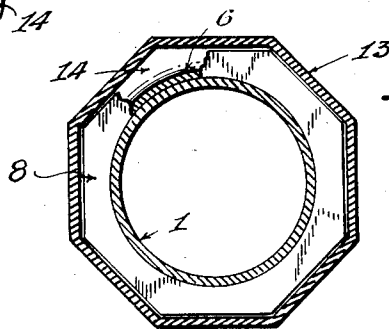


FIG. 4.



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NOZZLE

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11 Claims. (Cl. 299—131)

This invention relates to nozzles, such as hose nozzles. An object of my invention is to produce a nozzle in such manner that water pressure therein is utilized to effect a positive water-seal between the nozzles-stem and the enclosing shell.

Another object is to construct a nozzle so that water pressure therein in any adjustment of the parts can be used to act upon a compressible gasket to force the same into intimate contact with the peripheral surface of the nozzle-stem in direct proportion to the pressure existent in said nozzle.

Another object is to provide a nozzle two parts or portions of which enclose between them a compressible gasket abutting the nozzle stem, one of said parts being adapted to shift with respect to the other under pressure of water whereby to deform or strain the gasket laterally and thus cause its snug engagement with the stem for preventing leakage.

Another object is to furnish a nozzle of drawn metal parts so made as to provide positive and accurate adjustments by means wholly within and separate from the outer shell or enclosure-portion, the latter presenting a smooth and finished appearance.

A further object is to construct a complete nozzle of drawn metal parts which, while having the advantages mentioned presents a clean, smooth and symmetrical appearance outwardly, and, further, the elimination from an adjustable nozzle of the well known stuffing-box arrangement for preventing leakage of water between the outer shell and the nozzle-stem, substituting therefor parts which enclose between them a deformable or strainable member, water pressure within the nozzle operating upon said parts to force said member into intimate contact with the nozzle stem as the leak-preventing means.

In the appended drawing my invention appears in an illustrative form, it being understood that such changes may be made as may lie within the spirit of the invention.

Figure 1 is a side elevation of the nozzle in one of the forms in which it may be produced, said figure illustrating the size of the article as made for domestic use.

Figure 2 is a longitudinal section of the nozzle produced on a larger scale.

Figure 3 is a similar illustration except that part of an outer shell portion is partly cylindrical in form as compared with that in Figure

2, and a nozzle-stem has been shown in elevation, and

Figure 4 is a transverse sectional view of the nozzle taken on line 4—4 of both Figures 2 and 3.

A nozzle whose main portions are constructed of stamped or drawn metal is desirable because of lightness in weight and the low cost of materials and labor in its production as compared with bulk metal and machining, and, in the present instance, a nozzle that, coupled with a very sturdy structure and accurate adjustment, besides being proof against leakage, as will be pointed out herein, makes such a type doubly desirable especially where a clean and smooth appearance is presented.

The nozzle-stem denoted at 1 is necessarily of cylindrical form and is produced by means of suitable dies by well known operations. At one end it has the customary base 2 for attachment to a hose or other part, not shown. The opposite or forward end is tapered and provided with water outlets 3, there being a valve 4 mounted on that end in a conventional manner, it being understood, however, that this latter structure may be varied according to desire. Said stem is provided with a screw thread 5 between its ends, by the familiar rolling method, and snugly enclosing part of the stem is a sleeve 6 part of which is similarly furnished with threads 7 complementary to and engaging the threads of the stem. At what may be termed the rear or inner end of the sleeve 6 is an outwardly formed annular flange 8, while at the other or forward end there may be an internal annular flange 9 which, for a purpose to be described herein, may terminate in close proximity to the stem 1, the length of the sleeve being in this instance somewhat less than that of said stem.

An outer member or shell 10 encloses the structure thus provided, and, as shown in Figure 2, this may be tapered throughout, or as in Figure 3, it may be partially cylindrical where it surrounds the sleeve 6 and then reduced in diameter forward of that member and can then be tapered, it being understood, however, that other forms are possible of use. The forward or outer end of the shell is closed by a wall 11 wherein the discharge orifice 12 is provided to receive the named valve 4. At its rear end the sleeve has an enlargement 13, in this instance, the metal as drawn for that purpose, creating a shoulder 14 to abut the flange 8 of the sleeve 6. The enlargement terminates in an inturned an-

nular flange 15 whose edge may lie in close relation to the stem 1, such flange being spaced from the said shoulder 14 and flange 8 a sufficient distance to create a cavity for the reception of a gasket 16. Finally, the shell may have one or more knurled beads 17 for convenience in adjusting the nozzle parts.

In assembling the sleeve 6 and shell 10 the former is inserted in position within the latter whereupon the terminal flange 15 of said shell is turned to the position described and shown. The gasket 16 may, of course, be readily inserted and it may be replaced by another, if and as required, upon separation of the shell from the nozzle-stem as assembled for use.

In the present form of my device the enlargement 13 is in the form of an octagon, by choice, see Figures 1 and 4, the flange 8 of the sleeve 6 being of like form to seat in the octagonal cavity of such enlargement, but other forms may, of course, be employed with the whole object of providing a structure such as will prevent the sleeve and shell having rotative movement relatively to each other. Or, again, other means for preserving the mentioned relation of these parts may be possible, as is clear. However, the polygonal form of the enlargement is quite ornamental and provides a convenient grip for the hand of the user of the nozzle as a means of adjusting the shell with respect to the stem 1.

Having assembled the parts of the nozzle, a suitable stop is provided for maintaining the stem 1 and shell 10 in inseparable relation while in use. This stop may be, for example, a pin 17' which lies transversely of the nozzle-stem, its ends extending through appropriate apertures 18 in the walls of the latter, but one of which is shown, Figure 2, the flange 9 of the sleeve 6 being adapted to abut the pin when the shell is moved forward to expose the discharge orifice 12. The insertion of the pin is made possible by inserting it into the stem in a deformed condition and after its extremities have been guided through the apertures the pin is straightened by pressure thereagainst; an old and well known expedient.

In Figure 2 the sleeve 6 abuts the shoulder 14 and it can have no longitudinal shift with respect to the stem 1 since having threaded engagement therewith, and in Figure 3, for example, the shell when reduced in diameter, as explained, may provide a further shoulder 19 for the abutment of the sleeve-end thereagainst, but this may not be used as evidenced by Figure 2.

In the practical use of the nozzle the said shell 10 is designed to partake of a slight longitudinal movement with respect to the stem and sleeve, as will now be brought out, and which is the important object of the invention. That is to say, when the parts are adjusted to close the discharge orifice 12 the water pressure within the nozzle tends to shift the shell 10 forwardly with the result that the gasket 16 will be compressed between the flanges 15 and 8 and thereby, since reduced in thickness, its bulk must be extended in the direction of its own plane and since it is prevented enlarging in diameter by the outer wall of the enlargement 13 it must be closed upon the periphery of the stem, hugging the same throughout its circumference and positively preventing leakage of water at that location. When the orifice 12 is entirely closed the pressure upon the gasket is naturally greatest and therefore the compression of that member

about the stem is extreme. The degree of pressure is, of course, in direct proportion to the water pressure, which is to say that the gasket is affected to the extent that the water is entirely imprisoned, as well as during varying rates of discharge thereof. At a full opening of the orifice the pressure exerted on the gasket is least while at the same time sufficient to seal what would otherwise be a leaking joint.

It is evident that my construction thus provides for a nozzle all of whose parts, except the valve 4, can be of drawn metal of relatively light gauge and since the sleeve 6 is employed to have direct operative connection with the shell there is no defacing of the outer shell 10 for the purpose, coupled with the very important advantage that said shell while still being the stream-adjusting member as heretofore, is capable of independent longitudinal movement for gasket-compression to the end that a leak-tight joint is preserved. Such a construction also provides that the shell 10 can be made smooth throughout its exposed surface to closely simulate the older common types of heavy machined nozzles.

In the interest of brevity, the sleeve 6 with its flange 8, and the shell 10 with its flange 15 will be termed "parts" in some of the claims herein.

What is claimed:

1. A nozzle comprising a stem, a shell encircling the stem and having an inwardly directed flange terminating in close proximity to the stem, a sleeve within the shell and having an end lying in spaced relation to the flange, and a gasket encircling the stem between the flange and the end of the sleeve, said shell being longitudinally slidable with respect to the sleeve and arranged to be moved by the pressure of the water in a direction which will compress the gasket, forcing it into intimate contact with said stem.

2. A nozzle comprising a threaded stem, a shell enclosing the stem and provided near its inner end with an inwardly extending annular flange approaching the stem, a sleeve interposed between the shell and stem and threaded to adjustably engage the thread of the latter, said sleeve having an outwardly extending annular flange spaced from the said flange of the shell, and a gasket encircling the stem and disposed between said flanges said shell being slidable longitudinally with respect to the sleeve and arranged to be moved by the pressure of the water in a direction which will compress the gasket between said flanges.

3. A nozzle comprising a stem having a passage for the flow of a fluid therethrough under pressure, a packing surrounding said stem, a shell slidable over said stem and packing and having an outlet orifice, said stem and said shell having means for engaging said packing to strain said packing when the shell is slid under the fluid pressure effective on the orifice portion of said shell to effect a leak-tight joint between said stem and said shell, said shell arranged to be moved by the pressure of the fluid in a direction which will compress the packing.

4. A nozzle comprising a stem having a passage for the flow of a fluid therethrough under pressure, a packing surrounding said stem, a shell surrounding said stem and packing and having means for engaging said packing, said stem having means for engaging the packing on the opposite side thereof from the engaging means of the shell, said shell having an outlet

orifice and being slidable over said stem and packing under the fluid pressure acting against the orifice end of said shell to cause said engaging means to strain said packing to prevent leakage between said stem and shell.

5 5. A nozzle comprising a stem having a passage for the flow of a fluid therethrough under pressure, a packing surrounding said stem, an adjustment means surrounding and adjustably engaging said stem, a shell surrounding and slidable over said adjustment means and said packing and having an outlet orifice, said shell and said adjustment means having engaging means for said packing for straining said packing when said shell is slid under the fluid pressure effective against the orifice portion of said shell, the latter arranged to be moved by fluid pressure in a direction which will compress the packing to effect a leak-tight joint between said stem and said shell.

20 6. A nozzle comprising a stem having a passage for the flow of a fluid therethrough under pressure, a packing surrounding said stem, an adjustment means surrounding and adjustably engaging said stem, a shell surrounding and slidable over said packing and said adjustment means and having an outlet orifice at an end thereof, means at the other end of the shell for engaging said packing, means on said adjustment means for engaging the packing opposite from the engagement means of said shell, said engagement means arranged to act on said packing to effect a leak-tight joint between said stem and said shell in a sliding movement of said shell, the latter arranged to be moved by fluid pressure acting on the outlet end portion of said shell to compress said packing.

40 7. A nozzle comprising a tubular stem having a threaded portion, a tubular sleeve surrounding said stem and threaded to said threaded portion of said stem and having a flange at an end thereof, a tubular shell surrounding and slidable over said sleeve and having a flange at an end thereof and an outlet orifice at the other end thereof, a packing between said flanges and surrounding said stem and strainable to form a leak-tight joint between said stem and shell upon the sliding of said shell under the fluid pressure acting against the orifice end portion of said shell, said shell arranged to be moved by pressure of the fluid to compress the packing.

8. A nozzle comprising a stem having a pas-

sage therethrough for the flow of a fluid under pressure, a member threaded to said stem, a shell encircling said member and stem and having a flange and a discharge opening, packing interposed between said flange and an abutment integral with said member, and an operative connection between said shell and member permitting rotation of said shell and member in unison about said stem and longitudinal movement with respect to each other to compress said packing.

9. A nozzle comprising a stem having a passage therethrough for the flow of a fluid under pressure, a sleeve threaded to and rotatable on said stem and having a radially extending abutment, a shell encircling said sleeve and stem and having a radially intumed abutment and a discharge opening, packing interposed between said abutments, and an operative connection between said shell and sleeve permitting rotation of said shell and sleeve in unison about said stem and longitudinal movement with respect to each other.

10. A nozzle comprising a stem having a passage therethrough for the flow of a fluid under pressure, a sleeve threaded to and rotatable on said stem and having a radially extending abutment, a shell encircling said sleeve and stem and having a radially intumed abutment and a discharge opening, a valve carried by said stem in operative relation to said discharge opening, packing disposed about said stem and arranged between said abutments, and an operative connection between said shell and sleeve permitting rotation of said parts in unison about said stem and longitudinal movement with respect to each other.

11. A nozzle including in its construction a stem having a passage therethrough for the flow of a fluid under pressure, a member threaded to said stem, an outer shell encircling said member and stem, said shell having a discharge opening at one end, the member and shell having operative connection permitting both to be rotated in unison about the stem, and a packing-ring encircling the stem abutting at one side the said member, the said shell carrying an abutment portion abutting the other side of said packing-ring, said connection being arranged to permit longitudinal movement between said shell and member.

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