C. H. STEPHAN.

NOZZLE.

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1,233,417. Patented July 17, 1917.

Fig. 1.

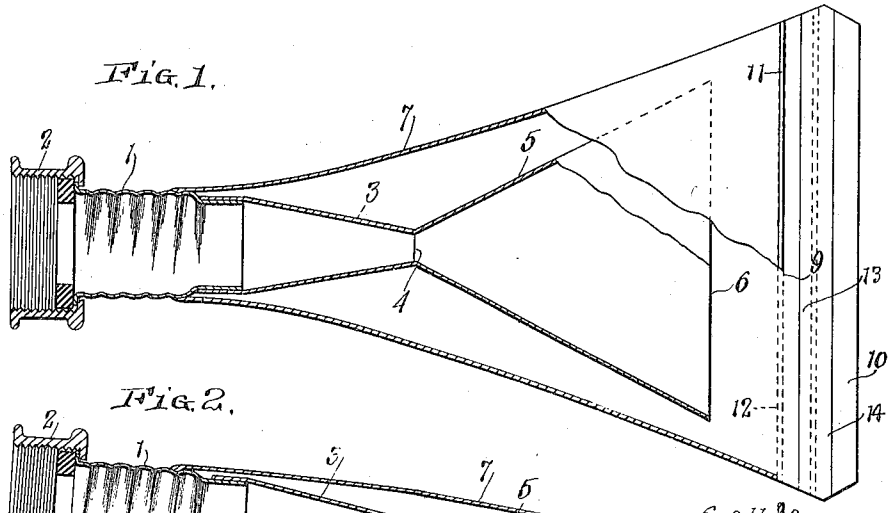


Fig. 2.

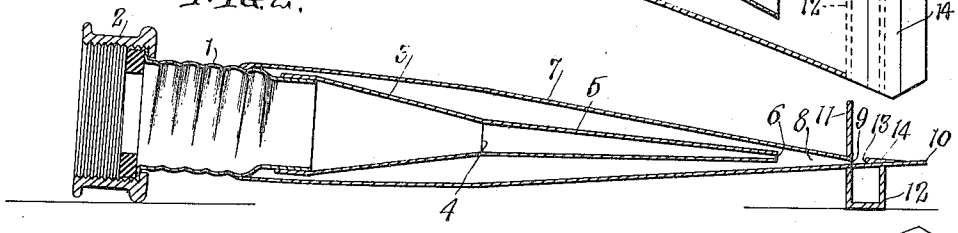


Fig. 3.

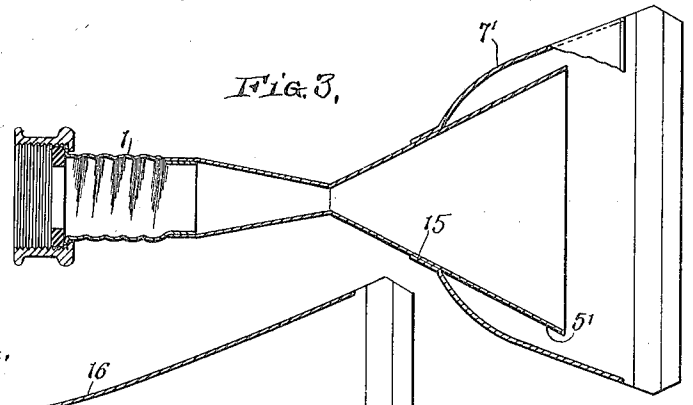


Fig. 4.

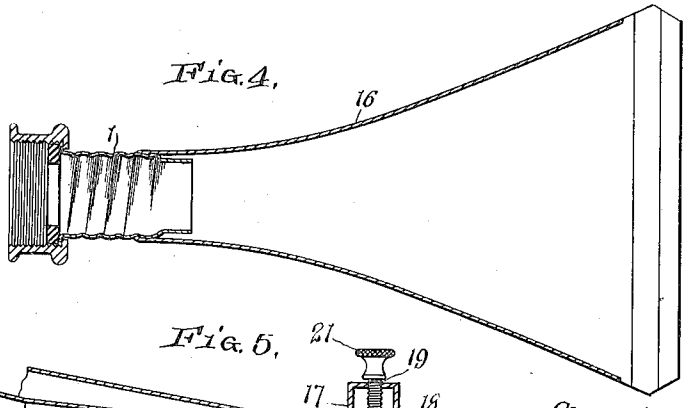
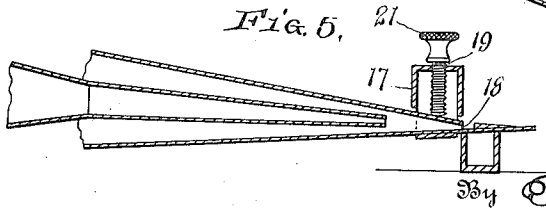


Fig. 5.



Inventor

Charles H. Stephan,

By Toulmin & Toulmin.

Attorneys

UNITED STATES PATENT OFFICE.

CHARLES H. STEPHAN, OF SPRINGFIELD, OHIO.

NOZZLE.

1,233,417. Specification of Letters Patent. Patented July 17, 1917.

Application filed April 13, 1916. Serial No. 90,802.

To all whom it may concern:

Be it known that I, CHARLES H. STEPHAN, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Nozzles, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to nozzles. The object of the invention is to provide a nozzle with the parts thereof so arranged and organized that the stream will be directed therefrom flared and spreading, producing more or less of a spray.

In the accompanying drawings, Figure 1 is a plan view, partly in section, of one embodiment of my invention; Fig. 2 is a vertical section through the same; Figs. 3 and 4 are plan views, partly in section, of modified forms of nozzle; and Fig. 5 is a sectional view showing a device for adjusting the size of the orifice of the nozzle.

In the embodiment of the invention shown in Figs. 1 and 2 I have provided the usual attaching member 1 with an adjustable coupling 2 mounted at one end thereon. The opposite end of the member 1 is provided with a shell comprising a conical nozzle portion 3 which converges to a reduced orifice 4 and is here provided with a flared portion or extension 5. The flared extension, as will be seen by considering Fig. 1, diverges considerably in plan and converges in section as shown in Fig. 2. As there shown the depth is very much restricted compared with the depth of the portion 3. The flared portion 5 is provided with a narrow orifice 6 extending from end to end thereof transversely, as shown in Fig. 1. Surrounding the portions 3 and 5 is a second shell or member 7 which incloses, but is separated from these portions. The shell is fastened at the rear to the member 1 and is flared at its opposite end which projects beyond the orifice 6. The portion of the member 7 which extends in front of the orifice 6, as indicated at 8, is much restricted in depth and converges, as shown in Fig. 2. The member 7 is also provided with a narrow elongated transversely extending orifice 9, as shown in Fig. 2. The arrangement above described serves to cause the stream to spread out and flare and to be ejected through the orifice 9 in a thin widely extended sheet. On account of the converging feature of the member 3 and the restricted opening 4 the fluid is more or less crowded in passing through the same and the pressure, as the fluid flows through the same into the flared portion 5, causes the fluid to spread and accommodate itself to the flare of the portion 5. The depth of the stream will also be lessened proportionately. It will then be apparent that the stream will issue from the orifice 6, greatly spread out and attenuated. The thin flared member 7 will also tend to accentuate the attenuation and the flaring form of the stream. The lower side of the member 7 is extended beyond the orifice 9, as shown at 10, and the upper surface of the member 7 is provided with a transversely extending rib 11 adjacent the orifice 9 to prevent the pressure of the fluid going through the orifice from causing the upper side of the member 7 to bulge and vary the size of the orifice. In a like manner the lower side adjacent the orifice is also provided with a combined reinforcing strip and rest 12. Immediately in front of the orifice 9 and located upon the projecting portion 10 of the lower side of the shell is a spray-forming abutment or deflector 13. This abutment, in the present instance, is formed from a transversely extending strip which extends from end to end entirely across the orifice 9 and tapers at its outer edge, as shown at 14. The thin spread out stream as it issues from the orifice strikes this abutment, is deflected and formed into a spray.

In Fig. 3 I have shown a slightly modified form in which the outer shell 7′ is not attached to the member 1 but is directly attached at 15 to the outer end of the flared portion 5′ of the inner shell. The form shown in Fig. 1 is more durable and stronger, protects entirely the inner portions 3 and 5 and presents a neater appearance. The form shown in Fig. 3, however, when in operation produces the same results as the form shown in Figs. 1 and 2. But in the form shown in Fig. 3 the cost of material is less and the device is cheaper. With the exception that the shell 7′ is attached to the flared portion 5′ instead of to the member 1, as shown in Fig. 1, the structure is otherwise the same as in the form first described.

In some cases it is desirable to omit the inner shell entirely and in Fig. 4 I have

shown such a construction. The shell 16 shown in Fig. 4 is attached to the coupling member 1 in a manner similar to that shown in Fig. 1. The structure of the shell is identical with the structure of the outer shell 7 shown in Figs. 1 and 2, the inner portions 3 and 5 being omitted however.

In Fig. 5 I have shown a novel means for adjusting the depth and size of the orifice 9 shown in Figs. 1 and 2. In this construction I have provided in place of the reinforcing rib 11, shown in Figs. 1 and 2, a suitable U-shaped support 17 which extends from end to end and parallel with the orifice 18. The U-shaped member is provided with a screw-threaded opening 19 in which is located a knurled adjusting screw 21 having its end in engagement with the top of the shell. It will be seen that by adjusting this screw the upper surface of the shell will be more or less bent, thus restricting the size of the orifice. It is desirable when this form is used to omit the reinforcing rib 11 shown in Fig. 2.

While I have shown and described one embodiment of my invention and a modification thereof it will be understood that this has been chosen for the purposes of illustration only, and that I do not desire to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a nozzle, an inner shell having an orifice, a surrounding shell having sides flaring from a point to the rear of said orifice and projecting in front thereof, said sides converging toward each other in front of said orifice, forming an elongated orifice in front of said first-mentioned orifice and a deflector extending from end to end of said last mentioned orifice and in front of the same.

2. In a nozzle, a flared shell having a narrow elongated orifice and means for further spreading out and attenuating the stream from said orifice comprising a surrounding shell having flared sides adjacent the first-mentioned shell and converging forwardly and forming a narrow elongated orifice, the arrangement of the shells relatively to each other and their respective sizes serving to so attenuate and spread out the stream.

3. In a nozzle, a flared shell having a narrow elongated orifice and means for further attenuating and spreading out the stream from said orifice comprising a surrounding shell having flared sides projecting beyond said orifice converging forwardly and likewise provided with a narrow elongated orifice, said shells being so arranged relatively to each other and of such comparative sizes that the last-mentioned orifice is adapted to receive the stream from said first-mentioned orifice only.

4. In a nozzle, an inner shell having a narrow elongated orifice and means for spreading out and attenuating the stream issuing from said orifice comprising a surrounding shell having flaring sides projecting in front thereof and converging forwardly toward each other forming an elongated orifice in front of the first-mentioned orifice, the arrangement of the shells relatively to each other and the respective sizes serving to so attenuate and spread out the stream.

5. In a nozzle, an inner shell having a narrow elongated orifice and means for spreading out and attenuating the stream from said orifice comprising a surrounding shell having flaring sides projecting in front thereof and converging forwardly toward each other forming an elongated orifice in front of the first-mentioned orifice adapted to receive the stream issuing from said first-mentioned orifice only.

6. In a nozzle, a shell provided with an inner conical portion and an outer portion having flared sides converging forwardly to form an elongated narrow orifice, and an outer shell to increase the spreading effect of the first shell and comprising flared sides converging forwardly and likewise provided with a narrow elongated orifice, said outer shell adapted to receive liquid only from the inner shell.

7. In a nozzle, a shell provided with an elongated narrow orifice therein, and the upper part of said shell having its outer portion bent upwardly to reinforce said shell.

8. In a nozzle, a shell provided with an elongated narrow orifice, and an angular reinforcing strip extending transversely of said shell adjacent the orifice and having a vertical portion at right angles to the shell and a horizontal portion constituting a rest.

9. In a nozzle, a shell provided with an elongated narrow orifice, the lower portion of said shell extending beyond said orifice and in front thereof, a narrow strip with its edge facing the orifice and mounted flatwise upon said forwardly extending portion, the portion of said strip remote from said orifice converging and tapering into said projecting portion.

10. In a nozzle, a shell provided with an inner conical portion and an outer portion having flared sides converging forwardly to form an elongated narrow orifice and an outer shell arranged adjacent the front shell to increase the spreading effects of the first shell and comprising flared sides converging forwardly and likewise provided with a narrow elongated orifice and a deflector in front of said last-mentioned orifice.

11. In a nozzle, a shell having flared sides

converging to form an elongated narrow orifice, and means for further spreading out and attenuating the stream as it issues from said orifice comprising an inclosing shell adapted to receive the fluid issuing from said orifice.

12. In a nozzle, a shell having flared sides converging forwardly to form a narrow elongated orifice whereby the stream is spread out into a thin sheet, means for additionally spreading out and thinning said stream, and a spray-forming deflector mounted in front of the same.

13. In a nozzle, a shell having an inner conical portion and an outer flared portion converging to form an elongated narrow orifice, means for further spreading out and attenuating the stream issuing from said orifice comprising a surrounding shell which converges to form an elongated narrow orifice in front of said first mentioned orifice and a flat strip with its edge facing and in front of said last mentioned orifice for deflecting said stream as it issues from said last mentioned orifice and causing the same to spray.

14. In a nozzle, a shell provided with a portion having sides converging forwardly to form an elongated narrow orifice, and a second shell converging forwardly to form an elongated orifice, said first mentioned shell being so constructed that the stream will first enter it and then pass through its orifice and said second shell being so constructed that it will receive only the stream passing through the orifice of said first shell and permit it to escape only through its said orifice.

15. In a nozzle, a shell provided with a portion having flaring sides converging forwardly to form an elongated narrow orifice, and a second shell having a portion with flaring sides converging forwardly to form an elongated orifice, said shells being so constructed that the entire stream passing through the nozzle will first enter said first mentioned shell, then pass through its said orifice and into said second mentioned shell, and thence out through the orifice of said second mentioned shell.

16. In a nozzle, a shell provided with a portion having flaring sides converging forwardly to form an elongated narrow orifice, a second shell having a portion with flaring sides converging forwardly to form an elongated orifice, said shells being so constructed that the entire stream passing through the nozzle will first enter said first mentioned shell, then pass through its said orifice and into said second mentioned shell, and thence out through the orifice of said second mentioned shell, and a deflector in front of said orifice of said second mentioned shell.

17. In a nozzle, a shell provided with a portion having flaring sides converging forwardly to form an elongated narrow orifice, a second shell having a portion with flaring sides converging forwardly to form an elongated orifice, said shells being so constructed that the entire stream passing through the nozzle will first enter said first mentioned shell, then pass through its said orifice and into said second mentioned shell, and thence out through the orifice of said second mentioned shell, and means for adjusting the size of the orifice in said second mentioned shell.

In testimony whereof, I affix my signature.

CHARLES H. STEPHAN.