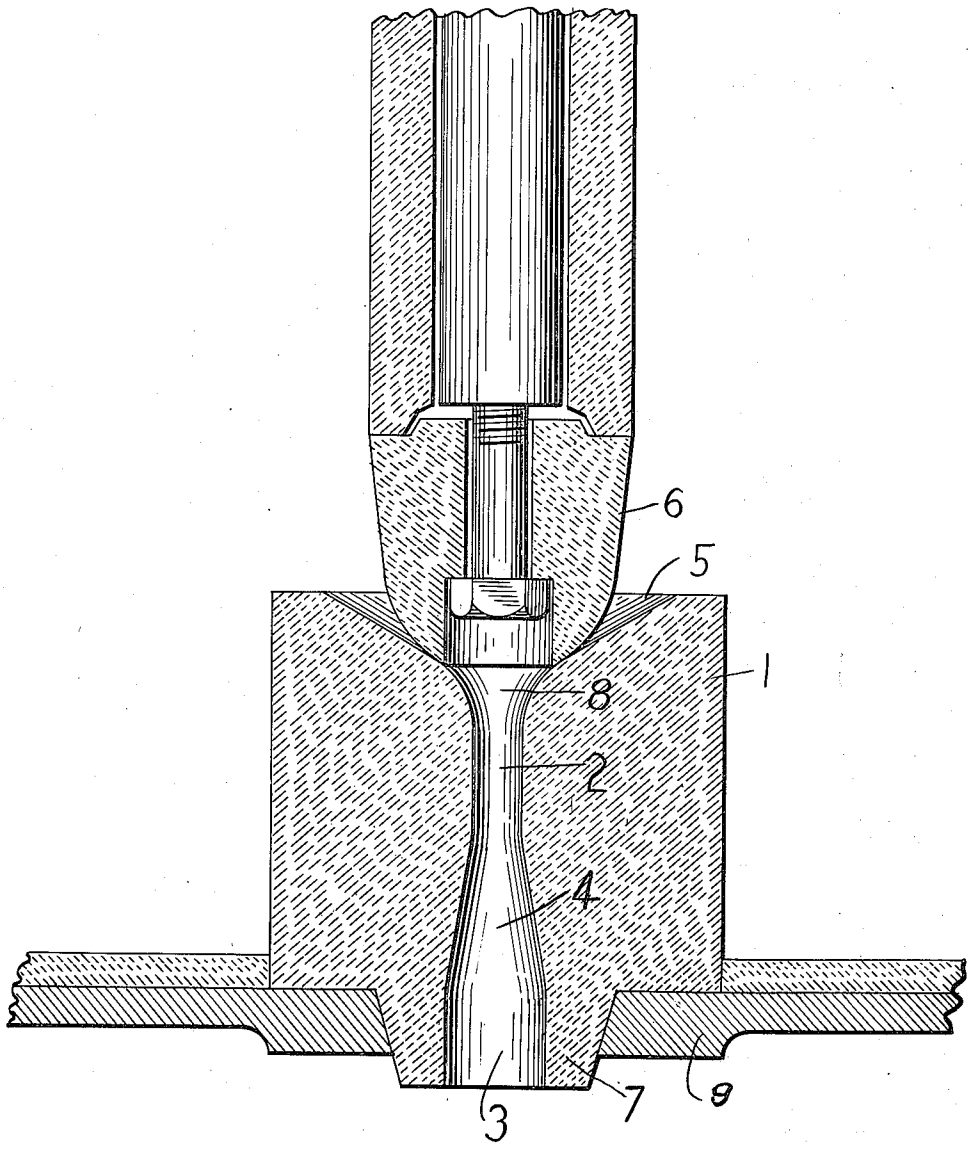
W. H. WILLS, JR.

NOZZLE.

APPLICATION FILED APR. 18, 1922.

1,426,136. Patented Aug. 15, 1922.



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NOZZLE.

1,426,136. Specification of Letters Patent. Patented Aug. 15, 1922.

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To all whom it may concern:

Be it known that I, WILLIAM H. WILLS, Jr., a citizen of the United States, residing at Charleroi, in the county of Washington and State of Pennsylvania, 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 for pouring molten metal and the like and is designed more particularly for use with a bottom pour ladle of the type now in common use for various purposes.

One object of the invention is to provide a nozzle with which a relatively large volume of metal may be poured through an opening, or conduit, of small diameter.

A further object of the invention is to provide a nozzle with which the stream of metal will be substantially uniform and will have little tendency to spray.

A further object of the invention is to provide a nozzle of such a kind that there will be little tendency to freeze up when the metal is not sufficiently hot for proper pouring, and in which there will be a better opportunity to reopen the nozzle in case it does freeze up.

A further object of the invention is to provide a nozzle, having these several advantages, which can be produced at a low cost and which can be substituted for the present nozzle without material change in the ladle.

Other objects of the invention may appear as the device is described in detail.

The accompanying drawing is a sectional view taken vertically through a nozzle embodying my invention.

In constructing my improved nozzle I provide a body portion preferably of clay, or other heat resisting material and provide that body with a conduit in the form of a compound tube, through which the metal is discharged from the ladle. In the particular form of the nozzle here shown the body portion 1 is cylindrical in shape and is adapted to be built into the bottom of the ladle in the usual manner. The conduit comprises an upper portion 2 which preferably is substantially cylindrical in shape, and a lower portion 3 which also is preferably substantially cylindrical in shape and which is of greater diameter than the upper portion 2. These two parts of the conduit are connected one to the other by an intermediate portion 4, the walls of which preferably diverge uniformly from the lower end of the upper portion 2 to the upper end of the lower portion 3 of the conduit. The diverging walls of the intermediate portion merge into the walls of the substantially cylindrical upper and lower portions. In the present drawing I have slightly exaggerated the angular relation of the walls of the intermediate portion to the walls of the upper and lower portions, in order to clearly show the characteristics of these parts, but in practise the several portions of the tube will merge gradually one into the other and the angular relation thereof will be less readily discernable than it is in the drawing. The conduit will, however, retain the essential characteristics above set forth, that is, the upper and lower portions of different diameters and the diverging intermediate portion connecting the upper and lower portions and having its walls in angular relation to the walls of said upper and lower portions.

The body portion 1 is provided in its upper surface with a cavity 5 to form a seat for the head 6 of the usual stopper and this cavity converges at 8 into the upper portion 2 of the conduit. The lower part of the body portion 1 is provided with a downwardly projecting portion 7 which extends through the nozzle plate 9 of the ladle and through which the lower portion 3 of the conduit extends.

The nozzle is used in the same manner as is the ordinary nozzle, but because of the character of the conduit a somewhat larger volume of metal will pass through the nozzle than will pass through the ordinary nozzle of the same diameter and the stream of metal discharged from the nozzle will be substantially uniform and will have little, if any, tendency to spray. Further, the shape of the conduit permits of the ready passage of the metal and it is less likely to freeze up due to insufficient heating of the metal than is the ordinary straight nozzle and in the event it does freeze up it can be more readily opened. The character of the nozzle is such that it can be built at substantially the same cost as the ordinary nozzle and can be embodied in the ladle with little or no change in the construction thereof.

While I have shown and described one embodiment of my invention I wish it to be

understood that I do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

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

1. A nozzle for pouring molten metal and the like, comprising a body portion having a conduit, the upper and lower portions of which are of different diameters and are connected one to the other by an intermediate portion, the walls of which diverge downwardly and are arranged at an angle to the walls of both the upper and lower portions of said conduit.

2. A nozzle for pouring molten metal and the like comprising a body portion having a conduit provided with an upper substantially cylindrical portion, a lower substantially cylindrical portion, and an intermediate portion connecting said upper and lower portions.

3. A nozzle for pouring molten metal and the like comprising a body portion having a conduit provided with an upper substantially cylindrical portion, a lower substantially cylindrical portion, and an intermediate portion, the walls of which diverge appreciably from said upper portion to said lower portion.

4. In a nozzle for pouring molten metal and the like, a body portion having a conduit comprising an upper substantially cylindrical portion and a portion extending downwardly therefrom and having downwardly diverging walls, said conduit having its discharge end of a greater diameter than said cylindrical portion.

5. In a nozzle for pouring molten metal and the like, a body portion having a conduit comprising a lower substantially cylindrical portion and a second portion merging into and extending upwardly from the upper end of said cylindrical portion and having its upper end of a smaller diameter than said cylindrical portion.

6. A nozzle for pouring molten metal and the like comprising a body portion having a stopper seat and a conduit, said conduit having an upper cylindrical portion of least diameter, a lower cylindrical portion of greater diameter and a portion converging from said stopper seat to said portion of least diameter.

In testimony whereof, I affix my signature hereto.

WILLIAM H. WILLS, JR.