Feb. 18, 1930. W. T. SCHAUP 1,747,530

NOZZLE FOR METAL POURING LADLES

Filed April 10, 1928

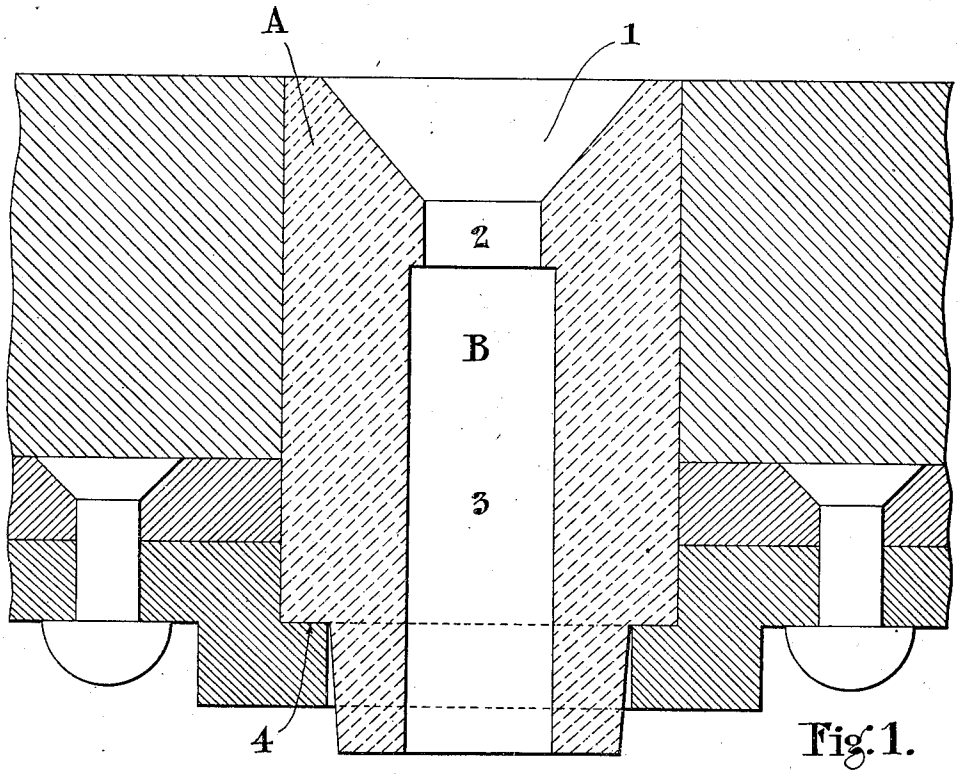


Fig. 1.

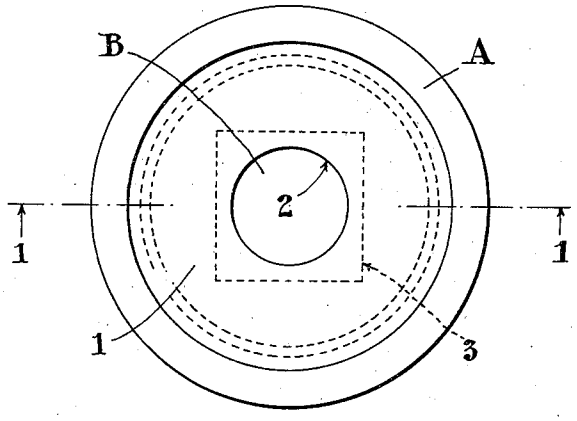


Fig. 2.

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UNITED STATES PATENT OFFICE

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NOZZLE FOR METAL-POURING LADLES

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This invention relates to the pouring of molten metals and more particularly to nozzles for pouring ladles used in the steel industry.

Well known difficulties are encountered in pouring steel, in particular, due in part to the splashing of the metal on the sides of the mold and the formation of cinder and of blow-holes or "piping" in the metal.

It is thus an object of this invention to provide a nozzle of such character as will prevent splashing on the sides of the mold, reduce the static pressure on the metal as it leaves the ladle thus making it possible to pour the metal more slowly, tend to eliminate "scabs", thus reducing waste, and partially or wholly eliminate blow-holes or "piping", thus improving the grade of the molded product.

The invention, its object and advantages will be best understood by those skilled in the art from the accompanying drawing in which,

Figure 1 is a vertical sectional view of the nozzle on line 1—1 of Figure 2, and

Figure 2 a plan view.

Reference numeral A represents the nozzle and B the orifice of the nozzle. The orifice B comprises a substantially bell-, or frustro-conical-shaped portion 1, a round portion 2 of substantially the same diameter as the smaller end of the portion 1 and a substantially square portion 3 which terminates at the outer end of the nozzle without the walls of the ladle in which it is built. The outer end of the nozzle has shoulders 4 which preferably engage a suitable casting, (not shown), which in turn is riveted to the shell of the ladle in any well known manner. The nozzle A is constructed of any suitable refractory material, either basic or acidic, depending on the character of the material under treatment. A good grade of magnesite is effective for many charges. The usual stopper, stopper rod, etc., are used as in common practice, but these are not described as they form no part of the present invention.

It will be apparent that in operation, upon the withdrawal of the stopper, molten metal will enter the wide mouth of the frustro-conical portion 1 and will converge until it enters the circular portion 2. Upon leaving the portion 2 the molten metal enters the substantially larger square portion 3 where it expands, and through which it flows in an even stream. This is of great advantage in that it overcomes undue spreading or splashing of the metal on the sides of the molds and thus avoids the formation of rough or scabby ingots. Furthermore, the formation of "icicles" or the like is largely eliminated. "Chipping" costs are also reduced.

Owing to the increased cross-sectional area of the orifice for a substantial distance adjacent its outlet, the metal may be poured more slowly in a quieter flow, due it is thought to the decrease in the pressure on the molten metal in this section of the nozzle. Moreover, this construction makes it possible to pour the metal at a lower temperature.

The benefits to be derived from the use of the nozzle of the present invention will be apparent to those skilled in the art.

What I claim is:

In a ladle for pouring molten metal, a nozzle having an orifice extending therethrough and having a plurality of sections of unlike cross-section, the outlet section being square throughout, and the section immediately adjoining said outlet section being circular and of lesser cross-sectional area than that of the outlet section whereby the velocity of liquid passing through said orifice is abruptly changed on entering and traversing said outlet section.

In testimony whereof I have affixed my signature.

WILLIAM T. SCHAUP.