Dec. 16, 1952

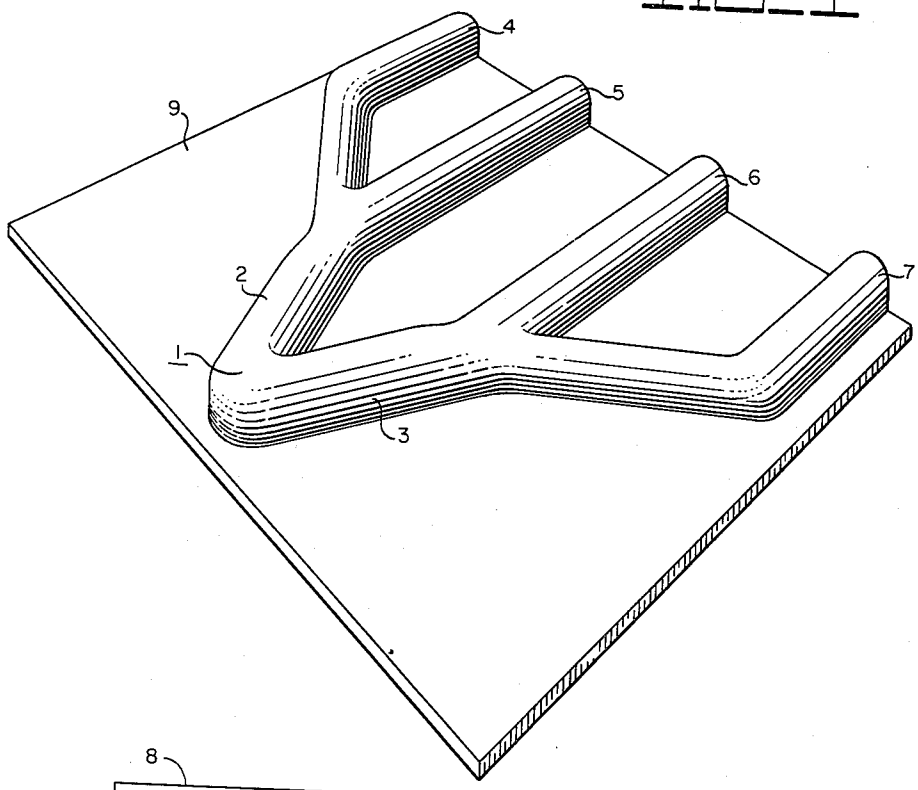
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2,621,382

PATTERN FOR HORIZONTAL CASTING SYSTEMS

Filed May 5, 1950

FIG. 1



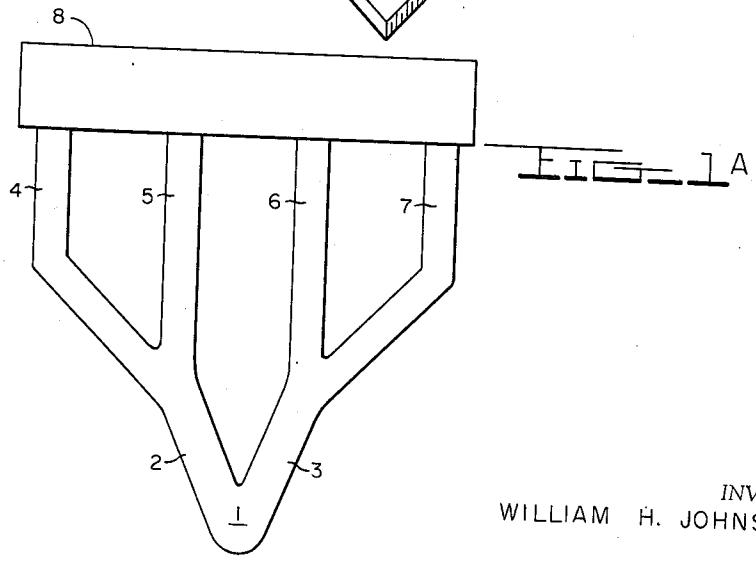


FIG. 1A

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PATTERN FOR HORIZONTAL CASTING SYSTEMS

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This invention relates to the improvements in the casting of metals more particularly to new systems for the pouring of metals in horizontal casting and to pattern plates for the molding of foundry forms which embody the new pouring systems of the invention.

Horizontal casting of metal as commonly carried out in the foundry involves a system including a straight runner, to which is connected a series of horizontally arranged conduits, called finger gates, which lead into the casting mold or cavity. The sprue may feed to the end or center of the runner which is of the conventionally larger size and equal in cross-section to the sprue. The larger size runner provides adequate volume in the runner for flow of the metal equally to all of the finger gates. The art has worked to attain smooth, quiet, uniform flow through all the finger gates but experience has shown this desirable result to be seldom obtained. With the use of a runner and finger gates of the conventional larger size, the metal generally tends to flow more copiously through some of the finger gates than others with resulting uneven flow of the metal into the mold. This uneven flow of the metal develops local areas of turbulence in the casting mold with the result that the slag is driven into the body of the casting making it an uneconomical operation to remove it. Desirably, the slag should lie on the surface of the casting where it can easily be machined out. If on the other hand, the finger gates are made small enough in cross-section to obtain uniform flow therethrough, the metal is propelled into the casting mold under a terrific jet action which develops a large degree of turbulence in the mold giving rise to sand erosion and possible poor surface appearance of the casting.

It is an object of the present invention to provide an improved system for the pouring of metal in horizontal casting.

It is a further object of the invention to provide an improved system for the pouring of metal in horizontal casting in which smooth, quiet uniform flow of the metal through all of the finger gates can be obtained without the necessity of resorting to finger gates of small area or cross-section.

It is another object of the invention to provide pattern plates from which can be molded foundry forms embodying the new pouring systems of the invention.

Other objects of the invention will become apparent from the description thereof which follows:

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Briefly stated, I have found that metals can be induced to flow through all the finger gates in a smooth, quiet uniform manner to the casting mold of a horizontal casting system, with the advantages of materially reducing turbulence in the mold, by providing in combination a split-stream runner of V-shape with which is connected four finger gates of equal cross-section which lead to the casting mold or cavity.

In another aspect of my invention, I have provided pattern plates from which, in the usual way, can be molded foundry forms which embody the new pouring systems. These pattern plates carry on a broad face thereof a raised design of the new pouring systems, the raised design taking the form of a series of interconnected bosses corresponding to the several elements of the pouring system.

The split-stream runner is constituted by a pair of diverging arms each of which is connected with a pair of finger gates of equal cross-section which, in proximity to the casting cavity or mold, are parallel and equi-spaced. The diverging arms are set at an angle to each other of between about 40° and about 50°, preferably at an angle of about 45°. The outer one of each pair of finger gates extends outwardly from the respective divergent arm at an angle thereto of 22.5° and, after extending a substantial and equal distance from the end of the respective divergent arm, is rebent inwardly through an angle of 45° so as to enter the casting mold in parallelism with the companion inner finger gate which extends outwardly from the divergent arm at an angle thereto equal to that made by the outer finger gate therewith. Each of the diverging arms of the runner has a cross-sectional area equal to that of the sum of the cross-sectional areas of the two finger gates attached thereto. The runner is fed at the apex of the two diverging arms by means of the usual sprue which is of a cross-sectional area equal to that of one of the diverging arms.

In another aspect of my invention, I have provided plates for the new pouring systems from which, in the usual way, can be molded foundry forms which embody the new pouring systems. These pattern plates carry on a broad face thereof a raised design of the new pouring systems, the raised design taking the form of a series of inter-connected bosses corresponding to the several elements of the pouring system.

The invention will be more fully understood by reference to the following description taken in conjunction with the accompanying drawing

in which like parts carry like numerals and in which:

Figure 1 is a perspective view of a pattern plate carrying a raised design of an improved pouring system of the invention, and

Figure 1A is a schematic showing, in operative set up with a casting mold or cavity, of the improved pouring system forming the subject matter for the pattern plate of Figure 1.

Referring to Figure 1A, the usual sprue (not shown) leads to the split-stream runner 1 having divergent arms 2 and 3 set apart at an angle of 45°. A series of four finger gates are shown at 4, 5, 6 and 7, of which the outer finger gates 4 and 7 are connected with arms 2 and 3, respectively, at an angle of 22.5° and at an equal distance from the ends of the respective arms are rebent through an angle of 45° so as to be in parallelism with inner finger gates 5 and 6 which are connected at an angle of 22.5° with the arms 2 and 3 respectively. The finger gates in their parallel relationship are equi-spaced and lead into the casting mold or cavity, shown at 8 in conventionalized form.

In operation of the pouring system in Figure 1A, a metal, for example, steel, is poured into the sprue and enters the runner 1 at the apex thereof. At this point the stream of metal is split and flows through each of the diverging arms 2 and 3 to the respective pairs of finger gates 4, 5 and 6, 7. The flow through the finger gates to the casting mold 8 is accomplished in a quiet, smooth, uniform manner.

In Figure 1, pattern plate 9 is shown provided with a raised design of the pouring system of Figure 1A. The raised design is constituted by a series of connected bosses which correspond to the elements of the pouring system and are identified by the like numerals. The pattern plates may be made of wood, metal or other suitable material and the raised design provided thereon in known manner.

Since various modifications and changes may be made in the invention without departing from the spirit or scope thereof, it is not intended that it shall be limited to the herein described specific embodiments thereof but only as is required by the appended claims.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

What is claimed is:

1. A pattern plate for molding foundry pouring forms having a horizontal V-shaped runner fed at the apex thereof, said pattern plate having attached thereto on a broad face thereof a system of bosses of generally rectangular cross-section having the upper edges thereof rounded off, said system of bosses including a V-shaped boss having arms of equal length and cross-sectional area which diverge at an angle of between about 40 and 50°, a pair of bosses branching from the end of each of said divergent arms, each of the bosses of said pairs being of a cross-sectional area equal to half that of the divergent arm and extending from the end of the latter at an angle of about 22.5°, the inner boss of each of said pairs being a straight boss and extending parallel to each other and the outer boss of each of the same extending outwardly from the respective divergent arm for a substantial and equal distance and thence being turned inwardly through an angle of about 45° to extend parallel to its companion inner boss.

2. A pattern plate as defined in claim 1, wherein the arms of the V-shaped boss diverge at an angle of about 45°.

3. A pattern for molding foundry forms having a horizontal V-shaped runner fed at the apex thereof, said pattern comprising a system of flat-bottomed bars of generally rectangular cross-section having their upper edges rounded off, said system of bars having the flat bottom surface of the bars lying in a common plane and including a V-shaped bar having arms of equal length and cross-sectional area which diverge at an angle of between about 40 and 50°, a pair of bars branching from the end of each of said divergent arms, each of the bars of said pairs being of a cross-sectional area equal to half that of the divergent arm and extending from the end of the latter at an angle of about 22.5°, the inner bar of each of said pairs being a straight bar and extending parallel to each other and the outer bar of each of the same extending outwardly from the respective divergent arm for a substantial and equal distance and thence being turned inwardly through an angle of about 45° to extend parallel to its companion inner bar.

4. A pattern as defined in claim 3, wherein the arms of the V-shaped bar diverge at an angle of about 45°.

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