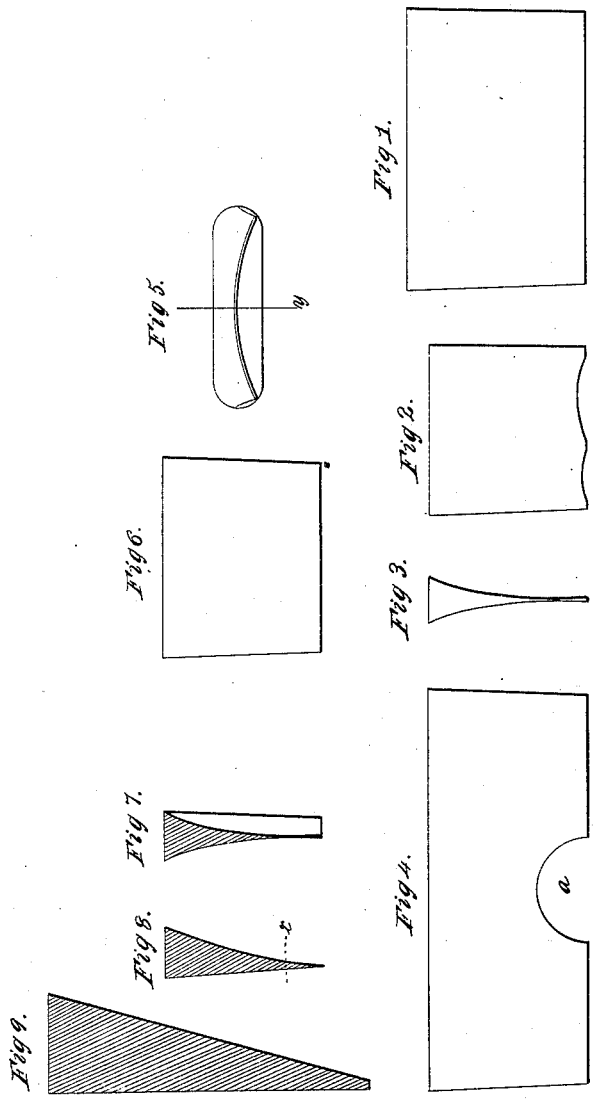
M. R. Harrell,

Molders' Sprue.

No. 45,716. Patented Jan. 3, 1865.



Witnesses.
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MARTIN R. HOWELL, OF ELIZABETHPORT, NEW JERSEY.

IMPROVED MOLDER'S SPRUE.

Specification forming part of Letters Patent No. **45,716**, dated June 3, 1865.

To all whom it may concern:

Be it known that I, MARTIN R. HOWELL, of Elizabethport, in the county of Union and State of New Jersey, have invented new and useful Improvements in Molders' Sprues; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figures 1, 2, 3, 4, 5, 6, and 7 are representations of sprues for use in casting, all constructed after my invention. Fig. 8 shows a transverse vertical section of the sprue now used in the best foundries, and Fig. 9 shows a like section of a sprue in its earliest style.

Similar letters of reference indicate like parts.

This invention consists in certain improvements in the construction of "sprues" used by molders in their art, whereby the work is facilitated, better castings are made, and less metal is wasted than when the ordinary form of sprue is used.

In molding for stove and other castings gates are formed in the face sand for the admission of the metal to the mold. They are now generally made of wood, of either a round form, like pins, or oblong. If made like pins they are such as are represented in Fig. 7, page 39, of "Overman's Molder's and Founder's Pocket Guide," published in Philadelphia, in 1851; also in Fig. 15, page 78, and Fig. 17, page 82, and are made tapering in general outline, and after they are withdrawn from the sand the holes are cut out larger, bell-mouthed shaped, at the top of the flask. If the gates are made oblong, they are made tapering on one side only, as shown in Fig. 9 of the accompanying drawings, and their ends have straight sides and angular edges or corners. The shape of the taper side has been of late years modified, as shown in Fig. 8, where the taper is made upon a curved line, and the oblong gate, or (as it is also called) the "sprue," for some years has been of the form shown in Fig. 8—to wit, with one vertical side, one concave side, and with straight rectangular ends. Its thickness also at the line *x*, and above and below that line, is about as here represented, terminating at its bottom in an edge as thin as here shown.

This form of sprue or gate has several disadvantages, some of which I will here enumerate.

First. Its straight and angular ends make it difficult for the molder to withdraw it from the sand without breaking the corners, and whenever that occurs he is compelled to patch and smooth the fracture, so that in "pouring" the metal shall not carry any sand before it into the mold, and thereby make a defective casting.

Second. The workman, when pouring the metal, approaches the sprue opposite the curved side. When large plates are to be cast—such as stove-plates—several gates are formed in the box. With sprues like the one shown in Fig. 8 it is evident that when they are set on opposite sides of the flask the molder must handle his ladle differently for different sides—that is, left-handed for one side and right-handed for the other side—to cause the metal to impinge upon the convex face of the sprue. This difficulty occurs at each end of the flask, if two sets of sprues are formed in each end. It is also to be remarked that the metal must be poured into each sprue of the same mold or casting simultaneously and not successively, and therefore it is necessary and usual to have a separate workman with a ladle of metal at each separate sprue. Each alternate one of them must of course pour "left-handed," and as very few workmen can handle the ladle expeditiously and efficiently in more than one way, constant inconvenience results therefrom in the foundry and much bad work. Furthermore, as the molder who prepares the work which has more than two sprues must ask the assistance of his fellow workman in pouring the metal therein, jealousies, which often arise among the men, continually impede the work.

Third. In the form of sprue shown in Figs. 8 and 9, any slag which may be poured with the metal is likely to be carried down before the metal into the mold.

Fourth. The great body of metal which is left in the sprue or gate in molding with forms such as are shown in Figs. 8 and 9, and which are often thicker immediately above their bottom than the casing to be made, causes injury to the casting by reason that the metal therein, being thicker and in greater body, cools less rapidly, and the casting for a considera-

ble distance about their line of contact becomes "burnt," in the technical language of the molding-shop.

In order to overcome these and other difficulties, I have invented a sprue or gate, the principle of which is illustrated in the examples shown by Figs. 1 to 7, both inclusive.

Fig. 1 is a side elevation and Fig. 3 an end elevation of a sprue with a straight lower edge, for plain work. Its ends are rounded for the purpose of enabling the molder to make a smooth sprue without the difficulty and hinderances which attend the making of sharp angles in molding. Each side or face is also made concave, and the thickness of the sprue is reduced so as to be nearly of the same diameter in cross-section for a considerable distance from its lower edge or foot upward. It results from this construction that a right or left handed man can approach the flask from any direction, as both faces of the sprue are curved alike. The sprue or gate, in the process of pouring, being kept full of the molten metal, and the sprue being for so considerable a distance above its foot of dimensions or of a diameter about equal to its foot, it follows that the slag which may escape from the ladle will float in the upper part of the sprue, where the sudden enlargement of the diameter affords it room to float.

Fig. 2 is a sprue constructed on the same principle, but having an edge or foot formed to suit the contour of the pattern from which the casting is to be made, showing how an oblong sprue may be used for a casting of an irregular surface.

Fig. 4 shows a sprue also made on the same principle, with a break, *a*, in it, to enable me to use one sprue for separate castings in one flask instead of a separate sprue for each casting. It is evident that the use of this form of sprue will save the labor of one workman in pouring the metal.

Figs. 5, 6, and 7 represent still another modification, made on the same principle, in which provision is made for casting plates whose exterior lines are curved. Fig. 5 shows this sprue from below; Fig. 6, an elevation, and Fig. 7 a cross-section, on the line *y* of Fig. 5.

Other modifications may be made to suit the varying forms of the castings to be made, and the illustrations in Figs. 2 and 5 will suffice to show how this can be accomplished without departing from the principle of my invention.

A great saving is made in the work by the use of sprues of my construction, by reason of the small amount of metal left in the sprue after pouring over the amount left therein when the old styles are used, the difference in favor of my sprue being from two hundred (200) to three hundred (300) pounds to the ton of metal poured. The waste metal thus formed, called also the "sprue," is knocked off the casting when the flask is opened, and is wheeled to the cupola to be remelted. I am able to save, therefore, much of the labor and expense of remelting this large amount of waste metal.

I claim as new and desire to secure by Letters Patent—

A molding-sprue constructed with concave sides and curved ends, as above explained, as a new article of manufacture.

M. R. HOWELL.

Witnesses:

M. M. LIVINGSTON,

C. L. TOPLIFF.