No. 639,771. Patented Dec. 26, 1899.

J. B. RENSHAW.

GATE PATTERN FOR MOLDS.

(Application filed Nov. 19, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

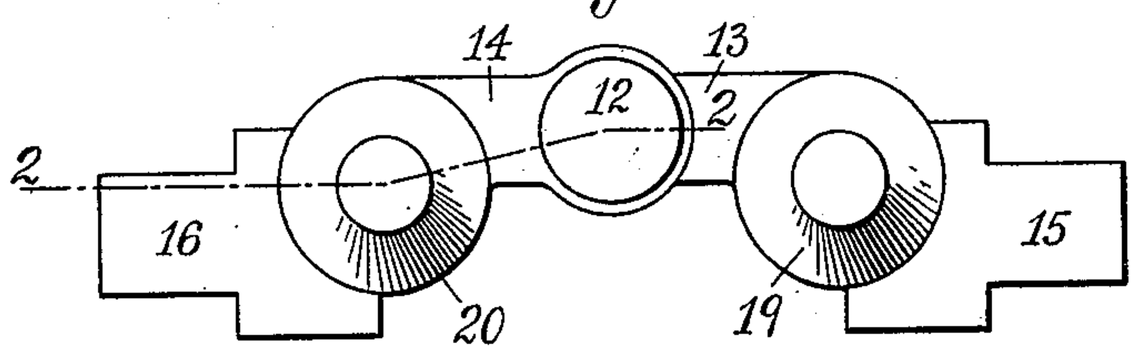


Fig. 2

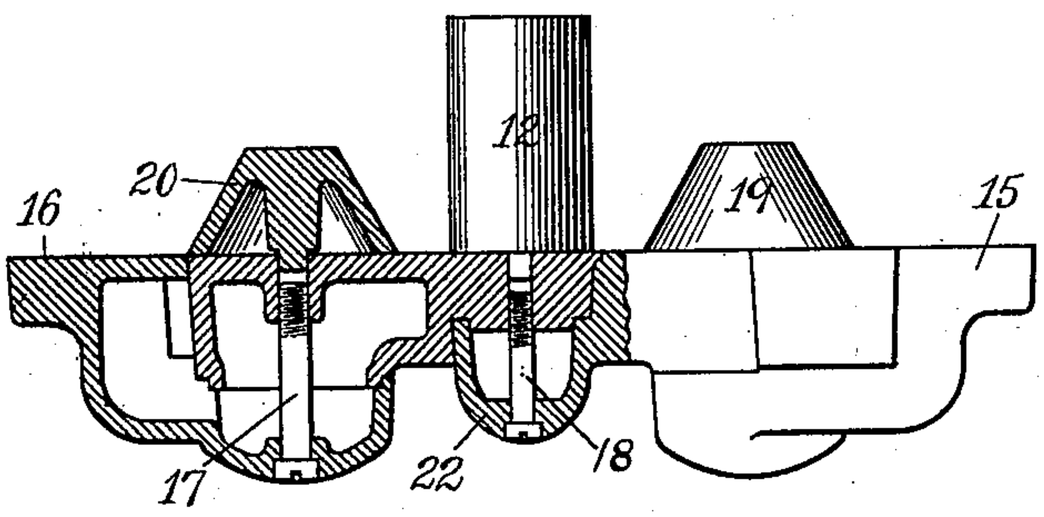


Fig. 3

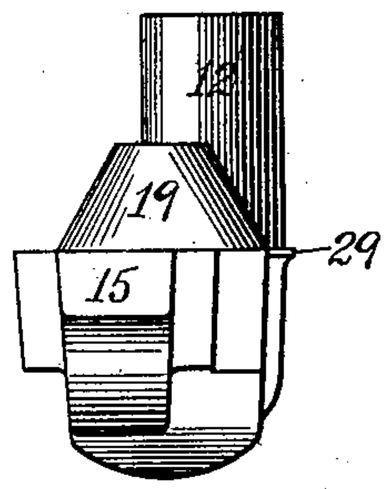


Fig. 4

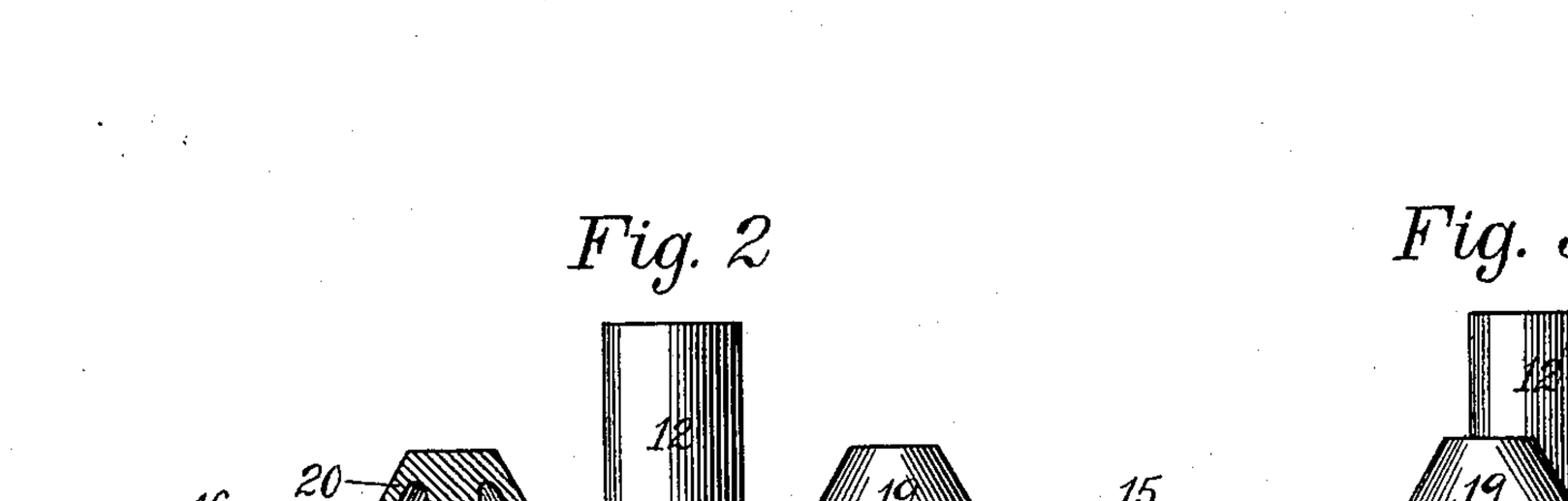


Fig. 5

Fig. 5a

Witnesses:
H. Mallner
Jennie Nellis

Inventor
J. B. Renshaw.
By his Attorney
W. H. Honiss.

No. 639,771. Patented Dec. 26, 1899.

J. B. RENSHAW.

GATE PATTERN FOR MOLDS.

(Application filed Nov. 19, 1898.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 6

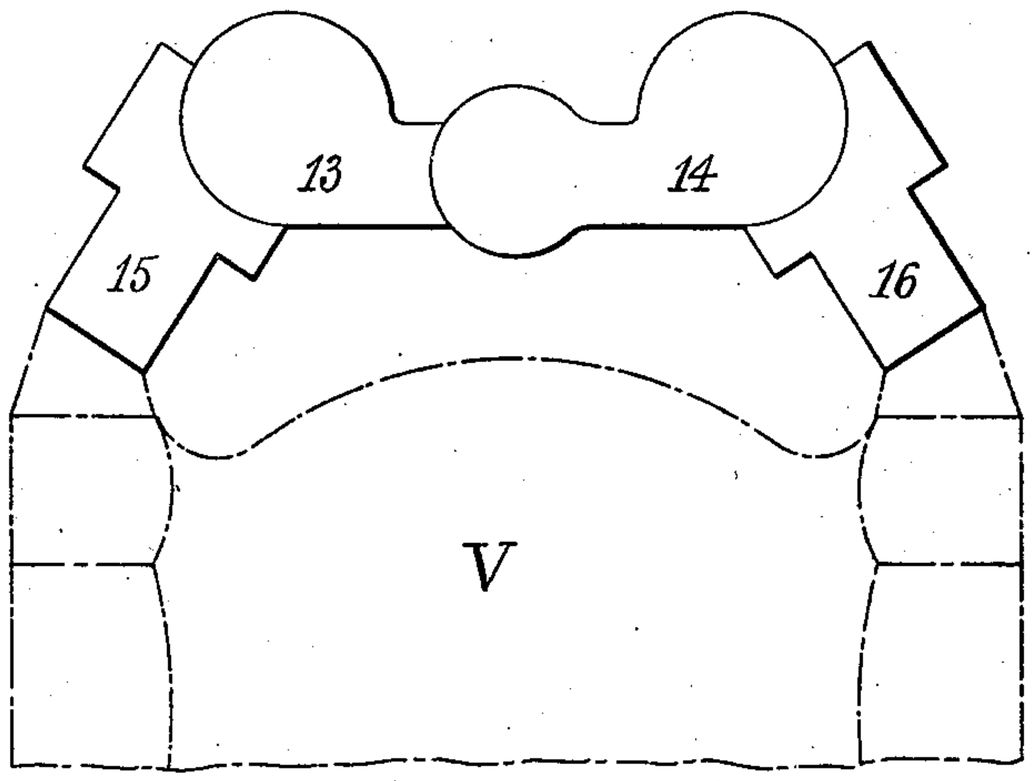


Fig. 7

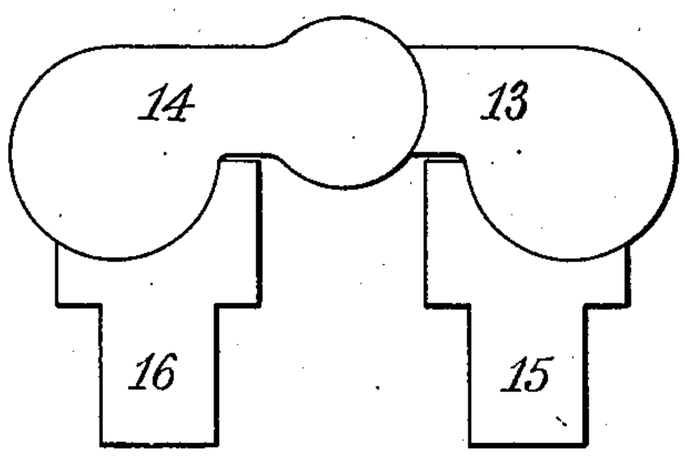


Fig. 8

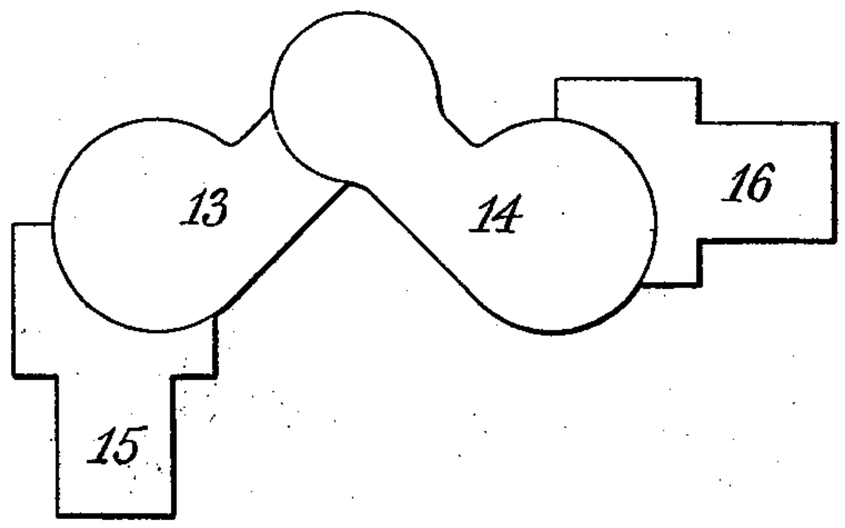


Fig. 10

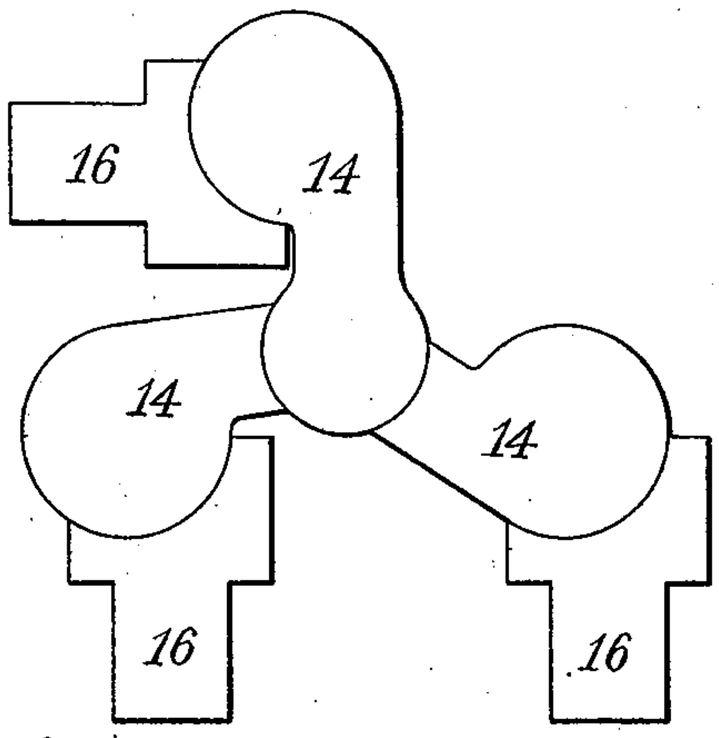
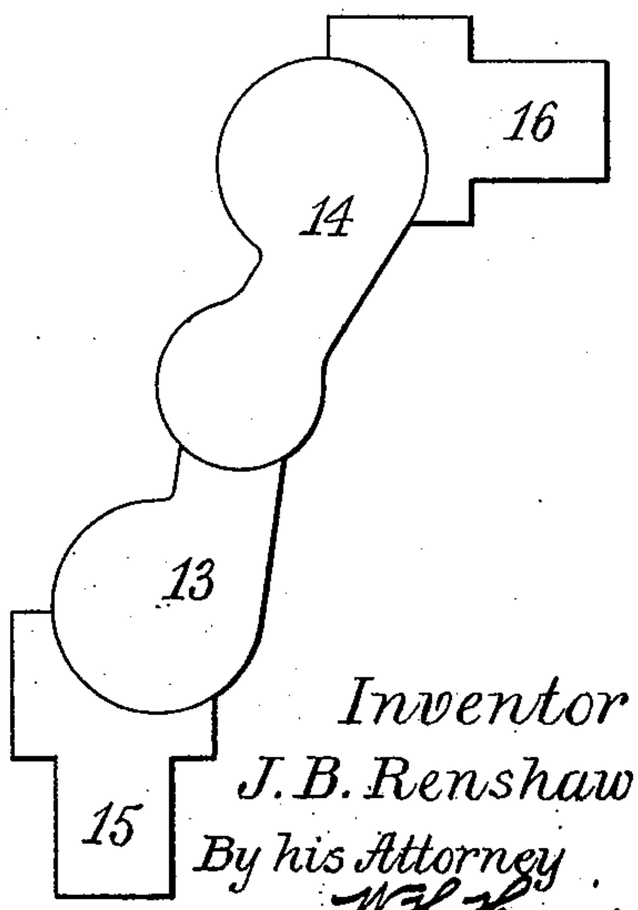


Fig. 9



Witnesses:
H. Maltner
Jennie Nelles

Inventor
J. B. Renshaw
By his Attorney
W. H. Honiss.

UNITED STATES PATENT OFFICE.

JOSEPH B. RENSHAW, OF HARTFORD, CONNECTICUT.

GATE-PATTERN FOR MOLDS.

SPECIFICATION forming part of Letters Patent No. 639,771, dated December 26, 1899.

Application filed November 19, 1898. Serial No. 696,924. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH B. RENSHAW, a citizen of the United States of America, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Gate-Patterns for Molds, of which the following is a specification.

This invention relates to improved means for forming distributing-channels in molds for casting metals, by which the metal poured from a single ladle may be distributed to different molds in the same flask, or to different portions of the same mold, as may be desired, the object being to provide a simple, convenient, and inexpensive gate-pattern whereby smooth and uniform branch channels leading from a single pouring-gate to the different molds may easily and quickly be made at any desired location and angle with relation to each other and to the sides of the flask containing the mold.

A further object of this invention is to provide means for forming, in connection with each of the branch or distributing channels of the mold, a separating-chamber for the metal which flows through each, whereby the molten metal is freed from the dross and dirt, so that only the pure metal is allowed to flow into the mold, thereby producing sounder and better castings, the member of the pattern which forms the discharge-channel leading from the separating-chambers into the mold being pivotally connected with the portion forming the chamber, so that the discharge-channel may be made at any desired angle with relation to the branch channel leading from the main gate to the separating-chamber. In this way and by the use of these smaller branch separators the available space in the flask outside of the mold impression may be utilized to best advantage, permitting in many instances the use of a flask smaller than would be required for a single large separating-chamber connected with the main pouring-gate.

Figures 1, 2, and 3 of the drawings are a plan view, a side view, and an end view, respectively, of a device embodying the features of this invention, the left-hand portion of Fig. 2 being in section taken along the line 2 2 of Fig. 1. Fig. 4 is a plan view of the lower or nowel portion of a mold formed by the pattern of Figs. 1, 2, and 3, showing in connection therewith a portion of the mold impression for the casting. Fig. 5 is a front view in section, taken substantially along the line 5 5 of Fig. 4, showing both the nowel and the cope or upper portion of the mold. Fig. 5^a is an end view in section, taken on the line 5^a 5^a of Fig. 5, showing the main gate of the mold, the cupped well beneath it, and the rounded or chamfered upper edge of the well at its junction with the main gate. Fig. 6 is a diagrammatic plan view representing the application of one of these gate-patterns to a mold for casting a globe-valve, the wings for forming the discharge-openings being connected to the opposite flange portions of the mold. Figs. 7, 8, 9, and 10 are diagrammatic views of this gate-pattern with its wings or delivery-channel-forming members turned to different angular positions. Fig. 7 represents the device, showing both of its delivery-wings facing in the same direction and upon the sides of their respective separating-chambers, which enables them to be brought quite closely together. Fig. 8 represents the discharge-chambers arranged at right angles to each other. Fig. 9 also represents the discharge-chambers at right angles to each other, but at a greater distance apart, due to the changed relation of the branch members. Fig. 10 represents an arrangement of the device modified in two respects—first, by the addition of a third branch, and, secondly, in the respect that all the branch members and their respective discharge-wings are shown to be left-handed instead of mated, these members being made interchangeable, so that they may be used in mated pairs, as in the preceding figures, or may be right-handed or left-handed, as may best suit the conformation of the mold or of the space available for the pouring-gate, distributing channels, and separating-chambers.

The embodiment of this invention represented in Figs. 1, 2, 3, 6, 7, 8, and 9 consists of a mated pair of patterns for two branch channels pivotally jointed together and provided with a main-gate pattern 12, located substantially concentric with the joint. The right and left hand branch-channel patterns 13 and 14 are provided with wings 15 and 16, respectively, for forming the discharge-channel lead-

ing to the molds from the separating-chambers, with which these devices are preferably combined, the discharge-channel-forming wings being jointed to their respective branch-channel patterns, so as to turn upon axes substantially concentric with the location of the separating-chamber, which is formed by the jointed portion of the two members, enlarged to a suitable extent. These patterns, if made of metal, as preferred, are jointed together, as represented in section in Fig. 2, being held together by means of the screw 17, which is adjusted so as to allow the joint to work with a suitable degree of freedom. The branch patterns 13 and 14 are similarly jointed together and are held in proper tension by means of the screw 18. The dome-patterns 19 and 20 for forming the domes of the respective separating-chambers and the main-gate pattern 12 for forming the gate or opening into which the metal is poured from the ladle are preferably made detachable from the other members along the parting-line 21 21 of the mold in order to enable the patterns to lie flat upon a mold-board, being held to place by dowels or centering-pins entering the holes for the screws 17 and 18. When these patterns are made in metal, and particularly in the larger sizes thereof, they are preferably cast in hollow form, as shown in section in Fig. 2, so as to lessen their weight and make them easier to manipulate.

These patterns are preferably provided with a boss 22, immediately below the main gate 12, which forms in the nowel of the mold a cupped well 22 to receive the first metal poured from the ladle and thereafter remains full of metal, so as to prevent the continued washing away of sand into the separating-chamber and even into the mold. The bosses 22 are also enlarged just below the parting-line 21 21 of the flask by the addition of a bead 29 for forming a corresponding chamfer 29^a, which, as best shown in Fig. 5^a, serves to round off the upper edge of the cup-shaped well of the nowel at its junction with the main gate 12^a, thus preventing the formation of a sharp shoulder in the sand of the nowel at this point, which might by the mismatching of the flask or of the gate-pattern 12 project inside the gate to be washed away and carried into the mold by the flow of metal.

The separating-chambers 23 and 24, shown in connection with each of the branch channels, are preferably circular or cylindrical in form, the branch channels 13^a 14^a entering the upper portion of these chambers at a tangent to the sides thereof, as best shown in Fig. 4, while the discharge-channels 15^a 16^a extend tangentially from the chamber at the lower portion thereof, rising thence by an easy turn to or toward the parting-line of the mold, as best shown in Fig. 5, so that the metal flows from the branch channels 13^a and 14^a tangentially into the chambers 23 and 24, respectively, thereby setting up a whirling motion of the liquid within the chamber, carrying the heavier portion of the metal by centrifugal action to the outside of the whirling mass, the dirt and scoria remaining in the center and rising with the lighter portion of the metal above the level of the discharge-channels 15^a and 16^a and, if required, into the domes 19^a 20^a, so that only the heavier and purer metal passes out through the discharge-channels 15^a and 16^a into the molds 25 and 26. The upper surface or roofs of the discharge-channels 15^a and 16^a adjacent to the separating-chambers are preferably formed by the cores 27 and 28, suitable core-prints for making the impression in the mold required to receive and support these cores being made upon the wing-patterns 15 and 16, as shown in Fig. 1.

These patterns should be made in several sizes, each covering a suitable range of work, so as to leave the cross-sectional area of the channels properly proportioned to the size of the castings to be made. The discharge-channels 15^a 16^a should be somewhat smaller than the branch channels 13^a 14^a to insure a smooth regular flow of the molten metal. The outer sides of the patterns should have ample draft, so as to draw easily out of the mold and leave a smooth impression therein. These gate-patterns are employed in every respect like ordinary patterns. The molder selects a size suited to the casting or castings to be made and arranges it in proper relation to the patterns according to their contour. In most cases it may be desirable to leave a small space between the gate-pattern to be cast through which the inlet-channels 30 may be cut by hand, so as to distribute the metal to best advantage, and, in some instances, to leave a reduced thickness at the edge of the casting so that the sprue will break off at the desired place. In all other respects the manipulation of this pattern is like that of any ordinary pattern, its sides being made with suitable draft in accordance with the well-known practice of the art.

In casting extended objects, especially if they are quite thin, it is desirable to have the molten metal enter the mold at opposite or widely-separated points of the mold, inasmuch as the metal becomes rapidly chilled in flowing a considerable distance, especially in a thin sheet. In the casting of a globe-valve, for example, like that represented by V in Fig. 6 it is desirable to have the molten metal enter the mold at the opposite flanges and flow therefrom so as to meet substantially across the center of the mold. The two streams having thus flowed approximately the same distance are still substantially equal in temperature and in a suitable state to fuse together thoroughly, so as to form a sound and homogeneous casting. To this end it is also highly important that the two streams of metal shall be approximately equal in temperature in entering the mold, and to secure this equality it is highly desirable that both shall be poured from the same ladle, inas-

much as it is difficult to obtain two ladles of metal of the medium or smaller sizes of equal temperature at the start. For this reason it is best thus to provide a single pouring-gate with means for distributing the metal equally to the two or more inlets of the mold.

In combining means for distributing the metal from the main pouring-gate to two or more inlets in the mold with means for separating the pure metal from the dross and scoria, with which it is usually mixed to a greater or less extent, it is advisable to employ independent separating-chambers in each of the branch channels, for the reason among others that these branch separating-chambers, being much smaller in diameter, permit of the use of a smaller flask than would in many cases be permissible with the single larger chamber equaling their combined capacity. These branch channels and their smaller separating-chambers may by suitable manipulation be applied to almost any mold without materially increasing the size of the flask that would be required for the mold itself, it being usually possible to arrange these gates in an unoccupied corner or end of the flask or between the different sections of the mold, thereby permitting the use of adequate separating-chambers without materially extending the size of the flask.

I claim as my invention—

1. A distributing-gate pattern consisting of a main-gate-forming member and of a plurality of patterns pivotally jointed together substantially at the main gate to form distributing branch channels therefrom.

2. A distributing-gate pattern consisting of a main-gate-forming member and of a plurality of patterns pivotally jointed together substantially at the main gate to form distributing branch channels therefrom, and a downwardly-extending boss located below the main-gate pattern to form a cupped well in the mold at the center of distribution.

3. A distributing-gate pattern comprising branch-channel patterns having a jointed connection provided with a pattern for forming the main gate, and having a boss for forming a cupped well below the gate, and having also a projecting bead for correspondingly chamfering the upper edge of the cupped well at its junction with the main gate, for the purpose specified.

4. An adjustable distributing-gate pattern, comprising a plurality of branch-channel members, pivotally jointed together at substantially the location of the main gate, each branch-channel member having a delivery member pivotally connected therewith.

5. An adjustable distributing-gate pattern, comprising a plurality of branch-channel members pivotally jointed together, with means for forming a separating-chamber in each branch channel, and having a discharge-channel-forming member pivotally connected therewith.

6. An adjustable distributing-gate pattern, comprising a main-gate-forming member and a plurality of branch-channel members, pivotally jointed together at substantially the location of the main gate, each branch-channel member being constructed to form a centrifugal separating-chamber in the mold for the metal, and having a discharge-channel-forming portion pivotally connected in tangential relation to the separating-chamber-forming portion.

7. An adjustable distributing-gate pattern, comprising a plurality of branch-channel members, pivotally connected at substantially the location of the main gate, each branch-channel member comprising means for forming in the mold a metal-separating chamber located in tangential relation to the branch channel, and having a discharge-channel leading tangentially therefrom, the member for forming the tangential discharge-channel being pivotally connected with the branch-channel-forming member at a point substantially concentric with the separating-chamber-forming portion thereof.

Signed by me at Hartford, Connecticut, this 17th day of November, 1898.

JOSEPH B. RENSHAW.

Witnesses:
JENNIE NELLIS,
W. H. HONISS.