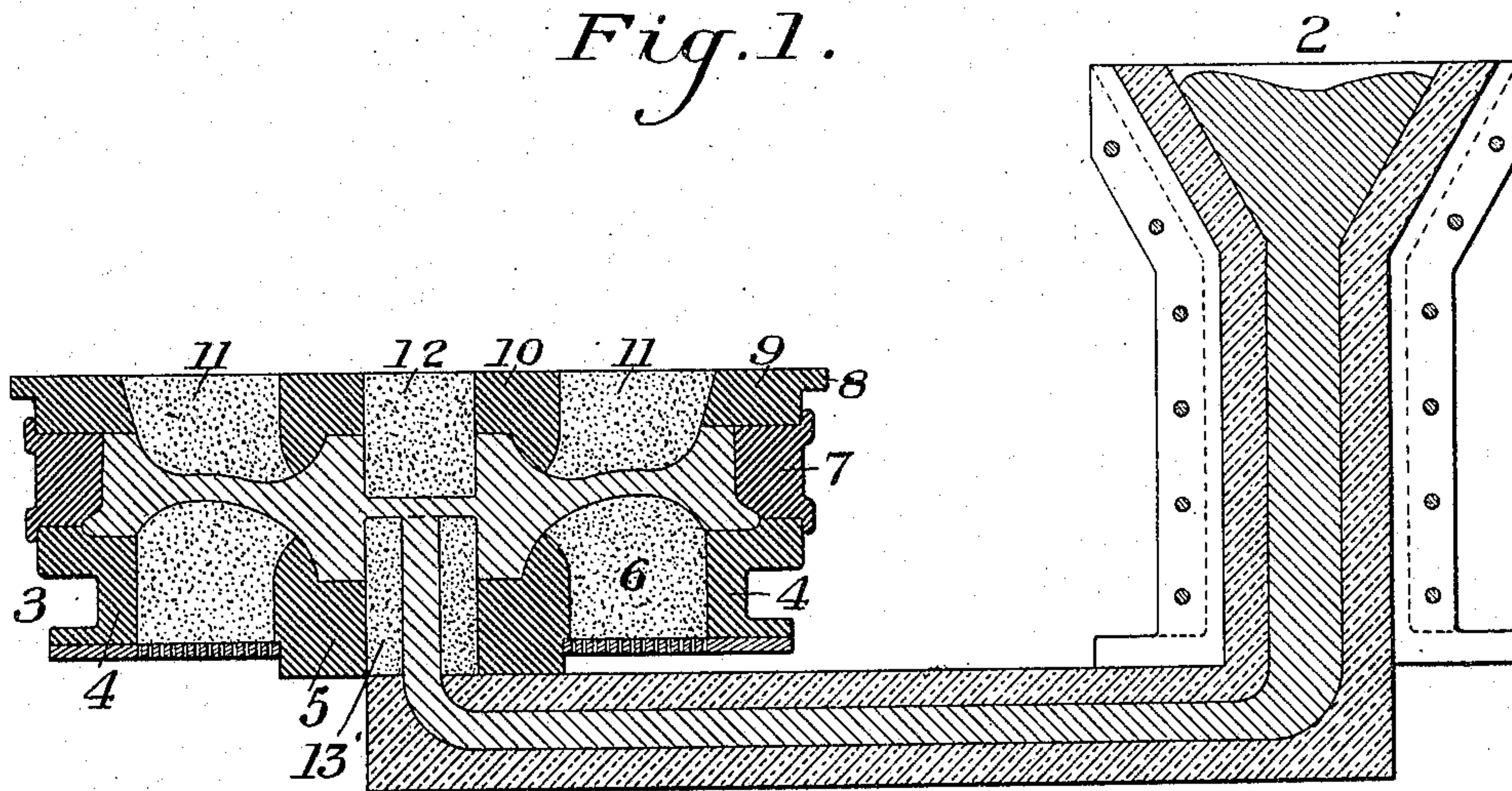


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MANUFACTURE OF STEEL CASTINGS.  
APPLICATION FILED JUNE 30, 1905.

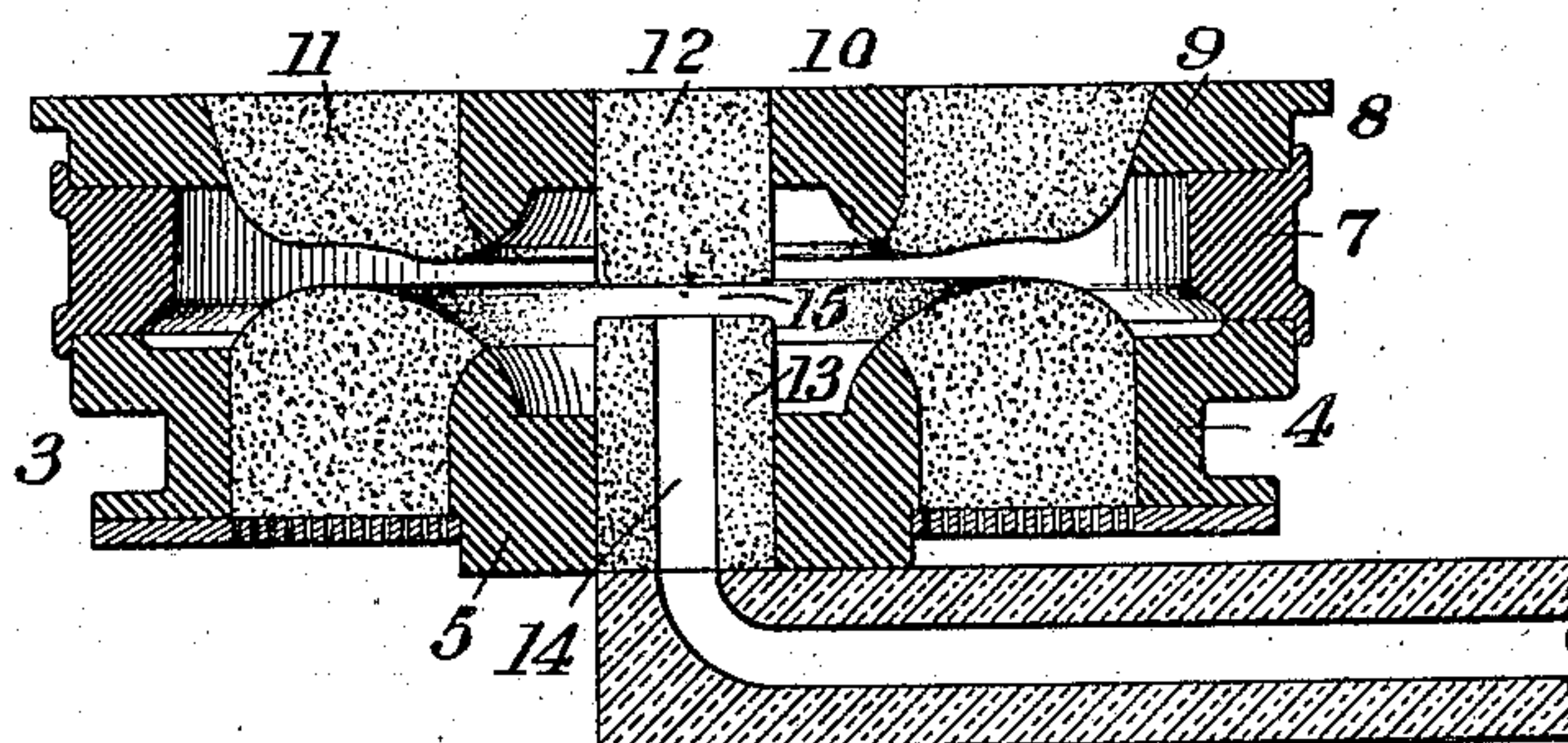
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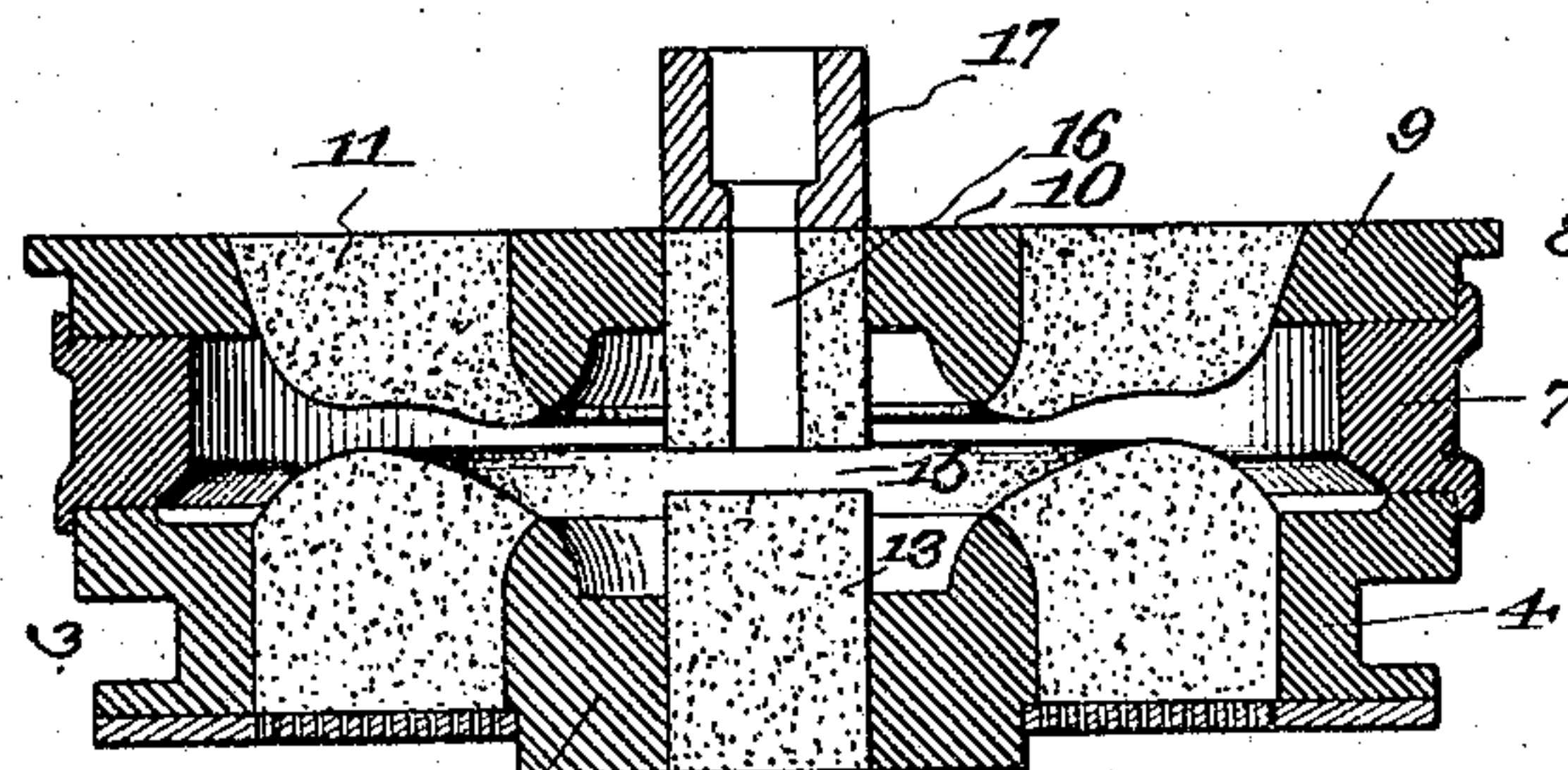
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



WITNESSES

*R. A. Balderson*  
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INVENTOR

*J. K. Griffith*  
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*his attys*



# UNITED STATES PATENT OFFICE.

JACOB K. GRIFFITH, OF LATROBE, PENNSYLVANIA.

MANUFACTURE OF STEEL CASTINGS.

936,623.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed June 30, 1905. Serial No. 267,749.

*To all whom it may concern:*

Be it known that I, JACOB K. GRIFFITH, of Latrobe, Westmoreland county, Pennsylvania, have invented a new and useful Improvement in the Manufacture of Steel Castings, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section showing the casting of one form of car-wheel in accordance with my invention; and Fig. 2 is a corresponding section of the mold ready for pouring. Fig. 3 is a view similar to Fig. 2, but showing a modification.

My invention relates to the manufacture of steel castings having a rim, hub, and intermediate web or spokes; and is especially designed to improve the method set forth in my U. S. Patent No. 790,202, dated May 16th, 1905. In carrying out the method therein described I employed a central runner or gate having radial branch gates leading outwardly therefrom; and in practice I found that the use of these separated radial gates led to certain difficulties. These were principally the welding of the metal to the outside chill-ring at certain points, the liability to washing the sand and the forming of blow-holes at points in the rim where the two streams came together.

My present invention overcomes these difficulties, and it consists in providing a complete annular opening for the lateral flow of the metal. By the use of this gate open on all sides, the metal flows evenly and equally toward all parts of the circumference, there is no rapid stream flowing through a fixed channel; no direct impingement of a stream of metal directly against any part of the mold chills; and consequently, there is no liability of welding to the rim or washing the sand.

Referring to the drawings, in which I show apparatus well adapted for the practice of my invention, 2 is the head-box of a runner through which the molten metal is supplied to the casting.

3 is the drag, composed of an outer chill 4, which is adapted to come in contact with and to chill the bottom face of the casting at its periphery, a central chill 5, which is in contact with the exterior of the hub portion of the wheel, and a portion 6, which is made of non-conducting material, such as

sand, and is in contact with the thinner intermediate or web portion of the wheel.

7 is an intermediate cheek-piece, which is also a chill and which comes into contact with the periphery of the wheel.

8 is the cope, consisting of an outer chill 9, which is in contact with the top face of the periphery of the wheel, an inner chill 10, which is in contact with the top of the hub, and an intermediate portion 11, of non-conducting material, such as sand, in contact with the top of the web.

The central core, according to my present invention, is made in two parts, one part having the central gate extending through it while the other part is preferably solid and is spaced apart leaving an annular gate between the two. Thus in the form shown, 12 is the upper half of the core, and 13 is the lower half containing the main passage 14 for the inflow of the metal. These two parts are spaced apart from each other to leave the annular gate 15 between them, through which gate the metal flows simultaneously in all directions toward the rim.

Instead of casting the wheel by the bottom-pour system, I may top-pour it by perforating the upper half of the central core as shown at 16 in Fig. 3, making the lower half solid and applying the ordinary head-box 17. The annular gate 15 or 16 should be as near the center of the hub as possible; and the mold is preferably filled as quickly as possible. It will be noted that the metal is introduced into the mold through the core at substantially the plane of the web. This prevents the direct impingement of the metal against any part of the mold, and also (which is of great importance) makes the metal at this place of the casting the last to solidify, thereby bringing the shrinkage to the neutral zone of the casting.

In the preferred method as set forth in my previous patent, the steel wheel is chilled in the mold at its rim more rapidly than it is chilled in the web and at the interior of the rim, so that the fluid compression which results from the contraction of the periphery will be exerted inwardly in the plane of the web. I also prefer, in addition to chilling the periphery as above described, to also chill at the hub beyond the inner end of the web, causing this portion of the hub to cool more rapidly than the portion joining the web or where the runner enters. The rapid



chilling of the metal at the ends and outer sides of the hub affords a resistance to the strong inner compression of the web transmitted from the contraction of the rim.

5 By the term "web" as used in my claims, I intend to cover the portion of the wheel connecting the rim and hub, whether it be of continuous plate form or in divided form such as spokes.

10 The advantages of my invention result from the use of the continuous annular gate which allows the metal to enter the wheel cavity simultaneously at all points and thus spreads evenly in all directions. This gives  
15 a rapid filling, prevents welding to the chilling-ring, avoids liability of washing, and reduces the liability to blow-holes where the streams came together in the former apparatus.

20 I claim:—

1. The method of making steel castings, having a rim, a cored hub, and an intermediate web, consisting in pouring the metal in through a central gate in a hub core, allowing it to spread simultaneously in all directions from said gate, and chilling the metal more rapidly at the rim than through the web; substantially as described.

2. The method herein described of making  
30 steel castings having a rim, a cored hub and an intermediate web, which consists in pouring the metal through a central runner in a hub core and allowing it to spread radially at all points toward the rim, chilling the  
35 metal during the operation of casting more rapidly at the rim than throughout the web and inside of the rim, chilling the metal at the hub, and maintaining communicating portions of the interior of the hub and web  
40 in a fluid condition until the rim is solidified; substantially as described.

3. The method herein described of making steel castings having a rim, a cored hub and an intermediate web, which consists in pouring the metal through a central runner in a  
45 hub core and allowing it to spread radially at all points toward the rim, chilling the sides of the rim more rapidly than the web and inside of the rim, and maintaining in a  
50 fluid condition the interior portion of the web and a zone of the hub coincident with the inner edge of the web, until the rim has solidified; substantially as described.

4. The method herein described of making  
55 steel castings having a rim, a cored hub and an intermediate web, which consists in pouring the metal through a central runner in a hub core and allowing it to spread radially at all points toward the rim, chilling the  
60 metal during the operation of casting more rapidly at the rim than throughout the web and at the inside of the rim, chilling the hub portion and affording an opening between the chilled portions of the hub of such  
65 width as to maintain the interior of the hub

and web fluid until the rim has solidified; substantially as described.

5. The method herein described of making steel castings having a rim, cored hub and an intermediate web, which consists in  
70 pouring the metal through a central runner in a hub core and allowing it to spread radially at all points toward the rim, chilling the metal during the operation of casting more rapidly at the rim than throughout  
75 the web and at the inside of the rim, chilling the hub portion and affording an opening between the chilled portions of the hub of such width as to maintain the interior of the hub and web fluid until the rim has solidified, and confining the metal by a core  
80 at the inside of the hub; substantially as described.

6. The method herein described of making steel castings having a rim, cored hub and an  
85 intermediate web, which consists in pouring the metal through a central runner in a hub core into the central portion of the mold cavity and allowing it to spread radially therefrom at all points toward the rim, chilling the metal  
90 during the operation of casting more rapidly at the rim than throughout the web and at the inside of the rim, and chilling the hub portion at the top and bottom and outer sides; substantially as described. 95

7. The method herein described of making steel castings having a rim, hub and an intermediate web, which consists in pouring the metal through a central runner and allowing it to spread radially at all points toward the rim, chilling the metal during the operation of casting more rapidly at the rim than throughout the web and at the inside of the rim, chilling the hub portion at the top and bottom, confining the metal  
105 by a core at the middle of the hub, and introducing the molten metal through the core at substantially the plane of the web; substantially as described.

8. The herein described method of making  
110 steel castings having a rim, a hub, and an intermediate web, which consists in introducing fluid metal into a disk-like space at the central hub-forming portion of the mold in the plane of the web portion to be cast,  
115 which space has uninterrupted communication with the mold space at all sides, whereby the metal flows radially in all directions into the mold, and chilling the metal more rapidly at the rim than at the hub; substantially  
120 as described.

9. The herein described method of making castings which consists in introducing molten material longitudinally into a core and then permitting the same to flow simultaneously in all radial directions laterally through a gate in the core into the mold,  
125 substantially as described.

10. The herein described method of making castings which consists in introducing  
130

molten material longitudinally into a core and then permitting the same to flow simultaneously in all radial directions laterally through a gate in the core into the mold at the median line thereof, substantially as described.

11. The herein described method of making castings, which consists in introducing molten metal into a mold cavity at the central plane thereof, and permitting it to flow

simultaneously outward in all radial directions in said plane from the point of introduction; substantially as described.

In testimony whereof, I have hereunto set my hand.

JACOB K. GRIFFITH.

Witnesses:

CHAS. M. ST. CLAIR,  
P. C. TONER.