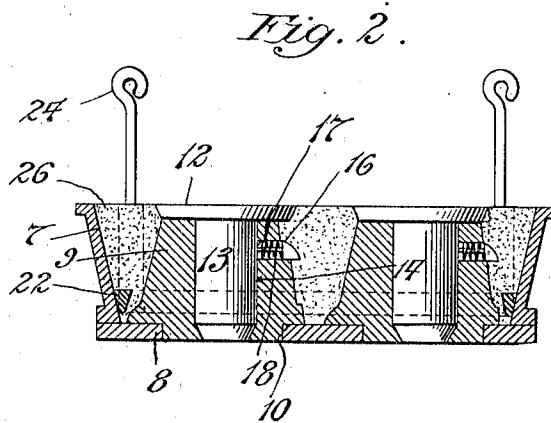
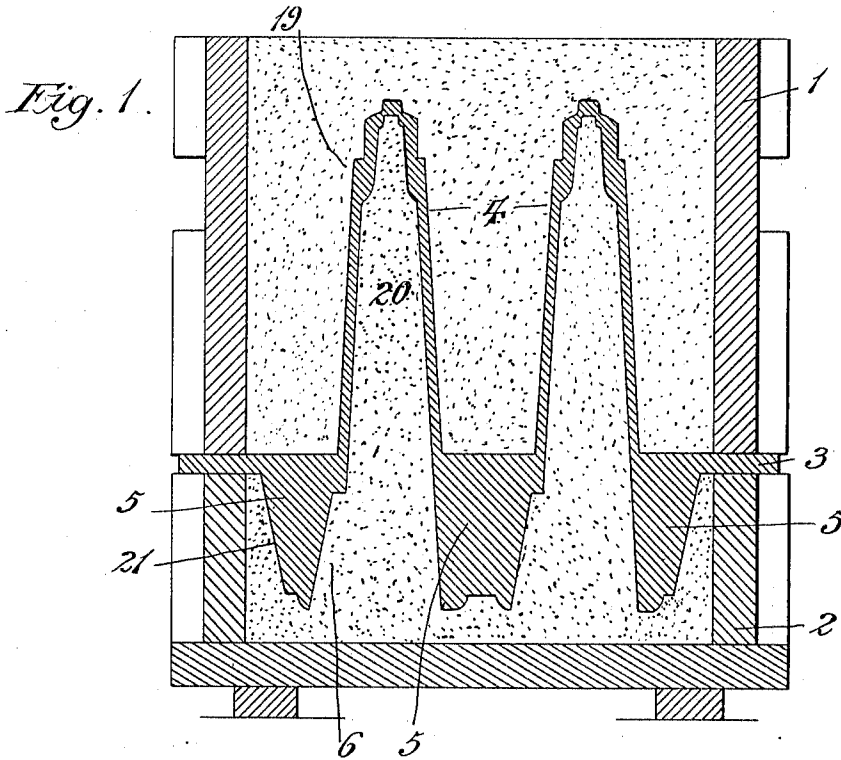


J. E. WILCOXEN.
MOLDING APPARATUS.
APPLICATION FILED AUG. 17, 1912.

1,059,249.

Patented Apr. 15, 1913.

3 SHEETS—SHEET 1.



Witnesses:
Edward B. Dowland
Charles D. Edwards

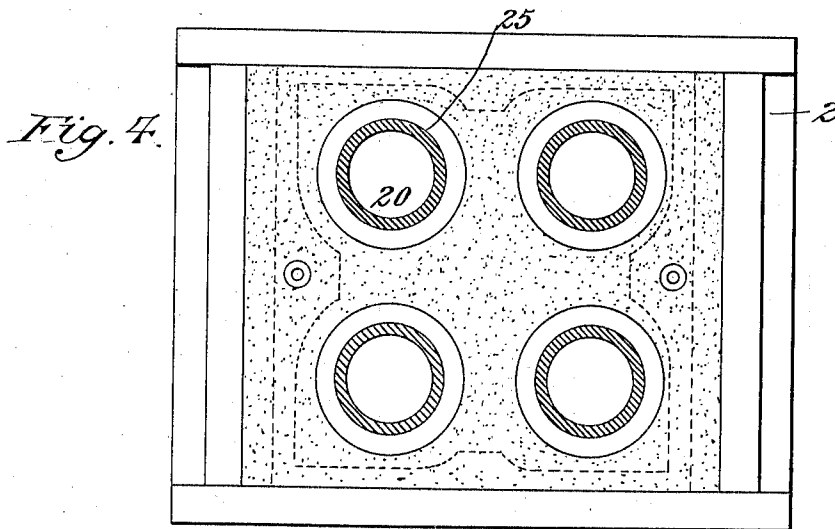
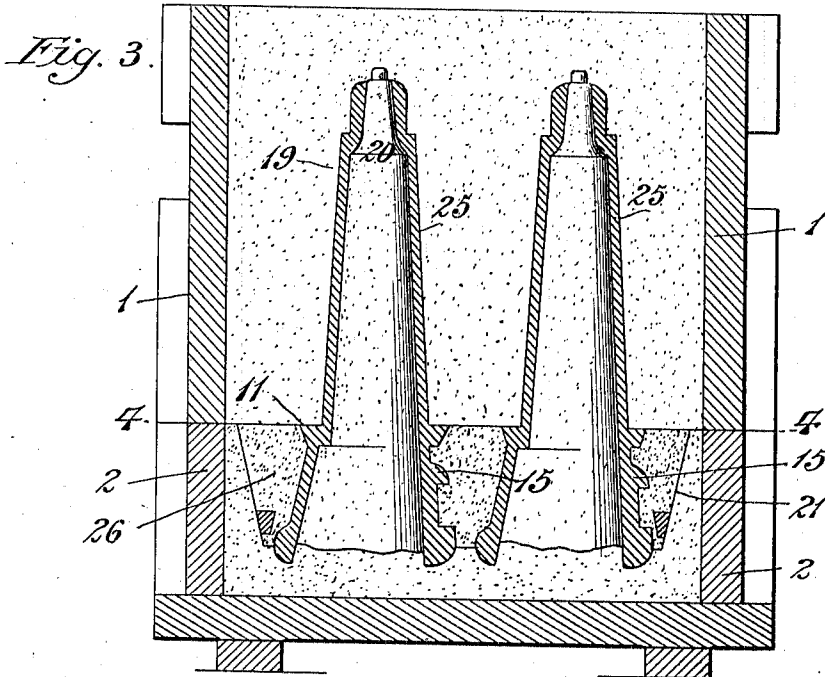
Inventor
John E. Wilcoxon
By his Attorneys
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3 SHEETS—SHEET 2.



Witnesses:
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Charles D. Edwards

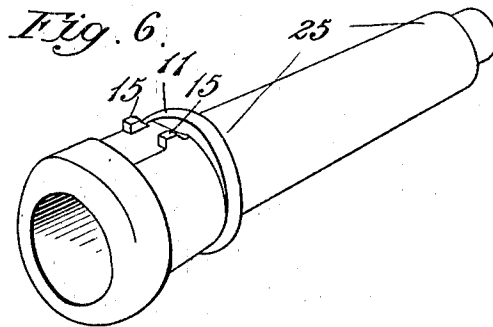
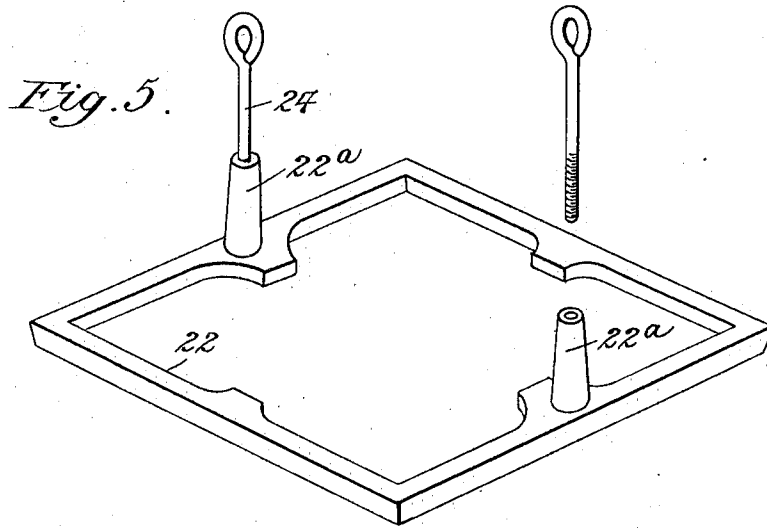
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3 SHEETS—SHEET 3.



Witnesses:
Edward Bowland
Charles H. Edwards

Inventor
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UNITED STATES PATENT OFFICE.

JOHN E. WILCOXEN, OF SOUTH BEND, INDIANA, ASSIGNOR TO THE STUDEBAKER CORPORATION, OF SOUTH BEND, INDIANA, A CORPORATION OF NEW JERSEY.

MOLDING APPARATUS.

1,059,249.

Specification of Letters Patent.

Patented Apr. 15, 1913.

Application filed August 17, 1912. Serial No. 715,594.

To all whom it may concern:

Be it known that I, JOHN E. WILCOXEN, citizen of the United States of America, residing at South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Molding Apparatus, of which the following is a specification.

This invention relates to a molding method and apparatus.

In the practice of the method of casting metal articles now most commonly employed, a pattern of the article is embedded in sand making a print in the form of the article to be cast. The pattern is then withdrawn and molten metal is poured into the mold print thus formed. However, a great many castings are of irregular form and cannot be withdrawn directly from the sand without destroying the mold. In casting articles which may be divided on a single plane into two parts, each of which has a draft, *i. e.* is capable of being drawn from the sand without destroying the print formed thereby, a two-part flask is used; the flask parts meeting on the plane of division of the pattern so that the two parts are in effect drawn toward the dividing plane, and the two molds thus formed are placed in registration to form a single mold of the entire article.

In making molds for casting articles of more irregular form, it is customary to use a flask divided into several parts and parted in the plane of the greatest dimension of each projecting portion of the pattern.

In the practice of my invention, I am able to produce by means of a two-part flask the molds and cores of tubular or hollow, or other articles having various projecting portions, the molds for which would previously have been formed in a flask of more than two parts. The operation of making such molds is thus simplified so that a molding machine may be used, and the expense in time and labor of producing such molds is much reduced.

The form of my invention shown consists of a pattern mounted on a plate and projecting on each side of the plate so that the plate occupies one of the planes of division to which I have referred. This pattern comprises a mold print forming member above the plate, this portion of the pattern having the form of a portion of the finished

article which has draft, *i. e.*, may be withdrawn from the sand without injuring the print and a filler seat forming member on the other side of the plate. This member is shaped to be drawn to the best advantage and is adapted to form a seat for a mold section separately formed and bearing a print of a portion of the article to be cast, which may be irregular in shape and which commonly will not draw. The term filler as herein used designates a portion of the mold which is produced separately from the upper and lower sections. The filler is formed in a separate flask or filler box, which in internal shape and dimensions corresponds to the shape and dimensions of the filler seat. The filler, as I have stated, bears a print of an irregular portion of the casting to be formed. The print surface of the filler is formed by means of a pattern of a corresponding section of the finished article as hereinafter described. This pattern is herein termed a filler pattern to distinguish it from the main or plate pattern.

I have described the mold print forming member of the pattern as above the plate and the filler print forming portion below the plate, but, if desired the relative position of these members may be changed and varied to suit the particular and varying conditions presented. The main or plate pattern is shown with a core forming aperture or core box open at the bottom and extending through the filler seat forming portion of the pattern and upward through the plate and into the mold print forming member, the size of the core box depending upon the thickness of the casting and the extent to which it is to be hollowed out and also upon the thickness of the plate. I thus have a pattern mounted on a plate and comprising a mold print forming member above the plate, a filler seat forming member below the plate and a core aperture or box open at the bottom through the filler seat forming portion of the pattern and extending through the plate, so that in molding I form a mold print in the cope and a core in the drag, the latter being surrounded by a filler seat.

The casting shown has an encircling flange near its base, and it is also provided below the flange with projecting lugs. To mold the flange, a removable top plate may be used which rests on top of the filler pat-

tern just beneath the plane of the top edges of the box, and the filler pattern is made with an aperture to receive a shank which is secured to the plate near its center. The plate is positioned by means of its shank, which occupies the central aperture in the pattern, or other means may be used. The lug prints are formed by means of movable members which slide into apertures in the pattern, being withdrawn by springs or other suitable means, and forced out in any convenient manner as by the plate shank when inserted.

The method and apparatus are adapted to produce castings of any form and the one described is intended merely to illustrate the principles which I have invented.

In the accompanying drawings I have shown an apparatus for making molds constructed in accordance with my invention in its preferred form.

Figure 1 is a vertical cross-section showing a pattern in position in a two-part flask, the sand being tamped ready to withdraw the pattern. Fig. 2 is a vertical cross section of a filler box showing the patterns in place and the sand tamped prior to withdrawal of the filler. Fig. 3 is a vertical section showing a flask and mold constructed in accordance with my invention. The metal has been poured. Fig. 4 is a horizontal section on the line 4-4 of Fig. 3. Fig. 5 shows in perspective an anchor frame for use in lifting and supporting the filler. Fig. 6 is a perspective of an axle skein.

Referring to the drawings, Fig. 1 shows a two-part flask consisting of a cope 1 and a drag 2, and a plate pattern or patterns constructed in accordance with the preferred form of my invention. The pattern shown is adapted to produce molds for four axle skeins in a single flask, and is mounted on a plate 3, which is placed between the cope and drag engaging the adjacent edges of the two flask members. As illustrated in Fig. 1, the pattern consists of mold print forming members 4 on top of the plate and a body member or filler seat forming member 5 beneath the plate. The members 4 are adapted to produce molds of the tapering bearing portions 25 of the axle skeins. The body or filler print member 5 tapers downward, as seen in vertical cross-section, and in its preferred form is pierced by apertures 6 which are continuous with the hollow portions in the mold print members 4 and serve as core boxes. The core boxes open at the bottom at right angles to the plate.

In Fig. 2, I have shown a filler box 7 of internal shape and dimensions identical with those of the filler print forming member 5 of the pattern. This filler box has in its bottom, seating apertures 8 adapted to

position the filler patterns 9 which are constructed with projecting members 10 at their lower ends to fit the openings 8. These filler patterns conform to the external shape and dimensions of the lower portions of the castings in so far as these have a downward draft, but the casting as shown is provided with an encircling flange or shoulder 11, at the top. To produce this shoulder, a circular plate 12 is placed on top of the filler pattern so that its top surface is in the plane of the top edge of the filler box. To position this plate and prevent displacement thereof, it is provided with a shank 13 which is seated in an aperture 14 in the filler pattern. The casting shown is also provided with laterally projecting lugs 15, and to form these I use movable members 16. These are mounted in the filler pattern in slots or apertures 17 extending laterally, and coil springs 18 tend to retract the movable members. However, when the plate is seated, the shank 13, passing through the aperture 14, expels the movable members 16 and causes them to take the position shown in Fig. 2.

The operation performed with the type of apparatus described, *i. e.*, the preferred form of my invention, is as follows: The pattern plate is placed on a suitable support with the filler seat forming member up, then the drag is placed on the plate inclosing the filler seat member. The drag in this position and the core boxes, the openings in which are also turned upward, are filled with sand and tamped. A bottom board is then placed on the drag and fastened and the pattern, plate and drag turned over; the cope is then placed on the pattern plate inclosing the pattern print forming member and filled with sand and tamped; the parts of the flask are separated and the pattern withdrawn, leaving mold prints 19 in the cope and cores 20 standing upright in the drag and surrounded at their bases by a filler print 21. The filler 26 is formed at any convenient time, an anchor frame 22, conforming in a general way to the outline of the bottom portion of the filler, being first placed in the filler box. This frame is provided with upright studs 22^a, each of which has a screw-threaded aperture in the top thereof and is of a length equal to the thickness of the filler. The shanks 24 can be screwed into these apertures for the purpose of handling the filler and unscrewed when the same is placed in position in the print prepared for the same in the drag. The filler patterns 9 are seated with their feet 10 in the apertures 8 in the bottom of the box. Plates 12 are placed on top of the patterns, their shanks 13 being inserted in the apertures 14. The shank 13, as it enters, engages the rear end of the movable member 16 and forces it outward. The filler

forming mechanism is then ready for tamping. After tamping, the plates 12 are first withdrawn, the movable member 16 is thus released by withdrawal of shank 13 and is retracted by spring 18. Then shanks 24 of the anchor frame 22, which supports the filler, are manually or otherwise engaged, withdrawing the filler from the box. It is handled by means of these shanks and placed in the filler seat in the drag and the shanks removed. The cope is then returned to its position on the drag and the mold is ready for pouring.

I have thus described in detail a single preferred embodiment of the molding method and apparatus which are the subject of my invention in order that its nature and operation may be clearly understood. However, the specific terms herein are used in their descriptive rather than in their limiting sense and the scope of the invention is defined in the claims.

What I claim is:

1. In combination with a two-part flask, a pattern consisting of a mold print forming member having draft and conforming to a portion of the casting to be produced, a filler seat forming member, means for forming a filler to fit such seat and a filler pattern to form in the filler a print of another portion of the casting, and means in the plane dividing the mold print and filler seat forming portions for supporting the first-named pattern.

2. In combination with a two-part flask, a pattern consisting of a mold print forming member having draft and conforming to a portion of the casting to be produced, a filler seat forming member, means for forming a filler to fit such seat and a filler pattern to form in the filler a print of another portion of the casting, the first-named pattern having an aperture opening through the filler seat member for forming a core.

3. In combination with a parted flask, a pattern consisting of a mold print forming member having draft and conforming to a portion of the casting to be produced, a filler seat forming member means for forming a filler to fit such seat and a filler pattern to form in the filler a print of another portion of the casting, and means in the plane of division of the mold print and filler seat forming portions for supporting the first-named pattern, the pattern having an aperture opening through the filler seat forming member beneath the support for forming a core and fashioned internally to form the base of the casting.

4. In combination with a parted flask, a pattern plate, a pattern thereon consisting of a mold print forming member on one side of the plate and a filler seat forming member on the other side of the plate, the pattern being provided with an aperture adapted to serve as a core box extending through the plate, and means for forming a filler having a mold print to encircle the core.

5. In combination, a parted flask and means for forming a mold-print in one flask member and a core surrounded by a filler-seat in another flask member, consisting of a pattern plate adapted to be seated between the members of the flask, a pattern mounted on the plate and consisting of a mold-print forming member above the plate, a filler-seat-forming member below the plate, the pattern having an aperture extending substantially at right angles to the plate, open at the bottom and serving as a core-box.

Signed by me at South Bend, county of St. Joseph and State of Indiana, this 29th day of July 1912.

JOHN E. WILCOXEN.

Witnesses:

JOHN F. COTTER,
ADOLPH COLBERG.