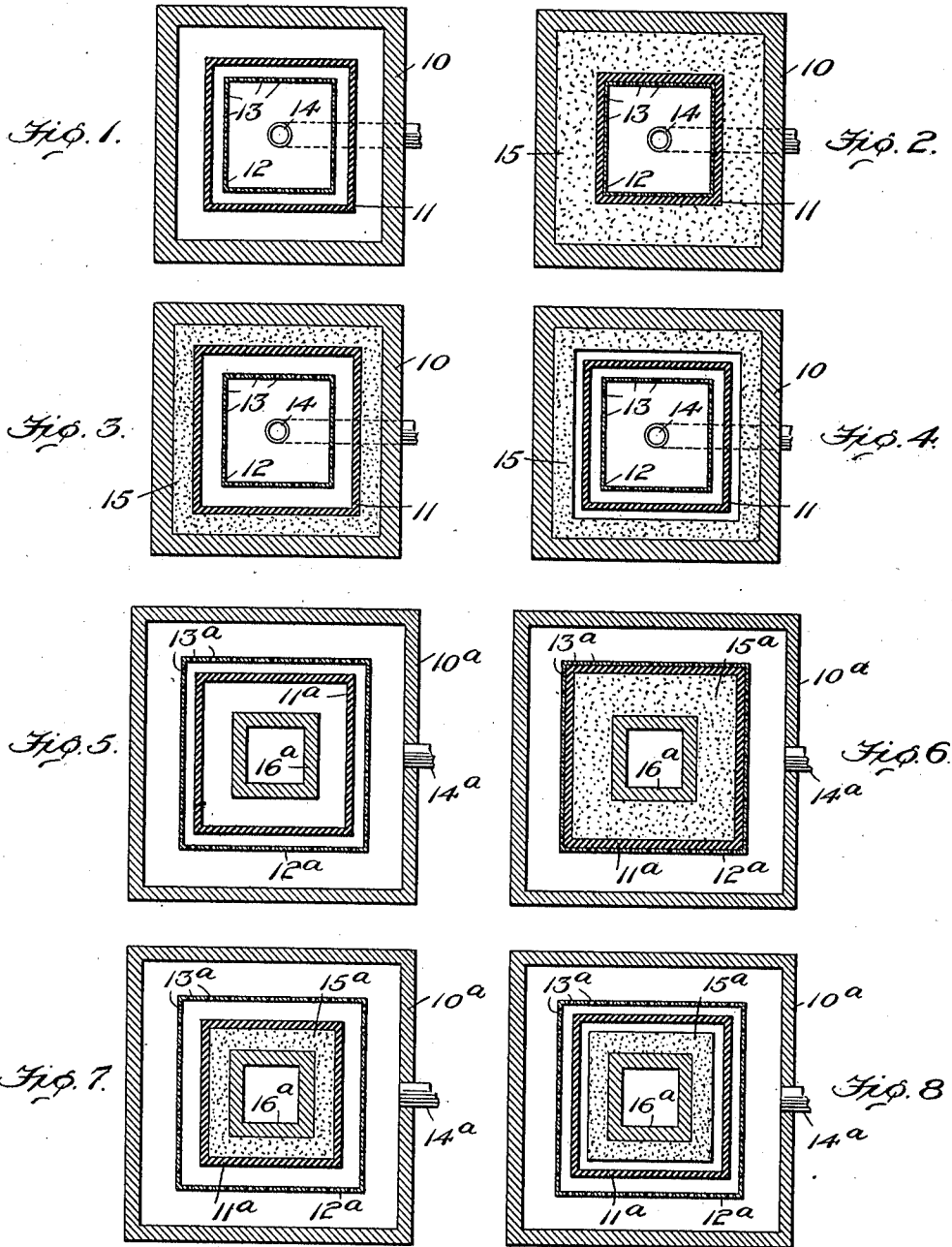


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METHOD OF FORMING MOLDS AND MOLD CORES.
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Witnesses

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METHOD OF FORMING MOLDS AND MOLD-CORES.

1,021,348.

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To all whom it may concern:

Be it known that I, JEROME F. BRYANT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Methods of Forming Molds and Mold-Cores; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to metal founding, particularly to a new and improved method or process of forming molds and mold cores for use in connection with the manufacture of cast articles.

It has for an object the simplification of methods at present in vogue, economy of both time and materials employed, accuracy and precision of workmanship, and the reduction to a minimum of imperfect and defective molds.

Ordinarily molds for the purpose stated have been made by the well-understood methods of ramming up a suitable pattern in a two-part separable flask filled with sharp sand, removing the flask-cope, extracting the pattern from the drag section of the flask, and finally replacing the gated cope section. Mold cores likewise it has been customary to make by slow, laborious, and uncertain hand methods, of which one involves the placing of a quantity of sand or other molding material upon a central core-shell or stick, packing this by hand, or by ramming it in a suitable core box, revolving the the rough core thus formed against a scraper to remove surplus sand, reducing it to the required diameter, if a cylindrical core, such as employed in pipe-making, and finally baking the core thus formed to render it more durable. There are also certain forms of mold-making machines and core-making apparatus known to the trade and used by persons skilled in the art, but so far as I am aware there has never heretofore been a method conceived or practiced which involves the use of a flexible or elastic pattern, the introduction of sand or other suitable molding material between such flexible pattern and an inelastic or non-yielding flask member, and subsequently flexing or deforming said pattern by agency of fluid pressure or otherwise to speedily and accu-

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rately press or force the molding material into final shape against the walls of the confining flask member. The manner in which this is accomplished by my invention will be hereinafter described and particularly pointed out in the claims following.

The accompanying drawings which form part of this application for Letters-Patent are intended to represent a simple form of apparatus for carrying out my improved method. These illustrations, it should be understood, however, are purely diagrammatical, and are here employed merely as exemplifying other forms of apparatus in connection with which my improved method or process may be practiced, in the production of cast articles of merchandise either hollow or solid, large or small, rectangular, or of any other possible size, shape or configuration.

Figure 1 represents diagrammatically an outer rigid flask, a flexible pattern—a non-yielding perforated former, and a fluid exhaust and supply pipe leading to the center of the structure. Fig. 2 is a view corresponding to Fig. 1, after the fluid pressure has been exhausted and molding sand introduced between the contracted pattern and the confining flask, Fig. 3, a view corresponding with Fig. 2, the pattern having been subjected to fluid pressure and the molding sand packed thereby, and, Fig. 4, a view corresponding with Fig. 3, with pattern returned to its normal position. The remaining figures represent in like manner a modified form of apparatus capable of producing mold cores wherein, Fig. 5 represents diagrammatically an outer rigid flask, provided with a fluid exhaust and supply pipe, a within contained non-yielding perforated former, a flexible pattern within said former, and a centrally arranged core barrel. Fig. 6 is a view corresponding with Fig. 5, after the fluid pressure has been exhausted and the molding sand introduced between the expanded pattern and the core barrel aforesaid, Fig. 7 is a view corresponding with Fig. 6, the pattern having been subjected to fluid pressure to contract it and thereby pack the molding sand upon the core barrel, and, Fig. 8 is a view corresponding with Fig. 7, the pattern having been returned to its normal position.

Reference being had to the diagrammatic

illustrations, it will be noted that like numerals indicate corresponding parts in the several figures wherever used.

The numeral 10 indicates an outer non-yielding flask, and within flask 10 is a flexible pattern 11, preferably of elastic material, of any desired size, shape or configuration, provided only that flask 10 is of a size suitable to receive it. Within the confines of pattern 11 is a rigid former 12 perforated as at 13, and preferably, though not necessarily, of a shape to substantially conform with that of the pattern 11; while as shown by Figs. 1-4, a fluid exhaust and supply pipe 14 leads from a source of fluid supply (not shown) to the interior of former 12. Air or other fluid having been exhausted via pipe 14, the elastic pattern 11 contracts and is drawn snugly upon former 12 as shown by Fig. 2, and sand or other granular comminuted molding material is then introduced between said pattern and the inner inelastic walls of flask 10. Thereupon the fluid pressure is introduced via pipe 14 to the interior of former 12, and, operating through its perforations 13, inflates the said pattern 11 to press the molding sand against the confining walls of flask 10 as indicated by Fig. 3 of the drawings. This accomplished, the pressure is again exhausted via pipe 14 as before, whereupon the pattern resumes its normal position, as shown by Fig. 4, and in such position can readily be removed without risk of contacting with the face of the mold thus formed.

In the modified form of apparatus shown diagrammatically by Figs. 5-8, the elements are the same as those hereinbefore mentioned with exception of a reversal of the position of the elastic pattern and perforated former, the pattern here being located within the former; moreover, the exhaust and supply pipe here will be seen to open directly into the flask and a central core barrel 16^a has been added. All of the said elements in their modified arrangement are designated by the same reference numerals heretofore employed to represent corresponding parts, except that the numerals upon said modified figures are augmented by the exponent *a*.

In forming mold cores in accordance with my new and improved method, the several method steps are substantially as follows:

Air or other fluid pressure having been exhausted via pipe 14^a from flask 10^a, a pattern 11^a is expanded until arrested by the inner walls of perforated former 12^a, whereupon suitable molding sand is next introduced between said pattern and the core barrel 16^a. A reversal of the fluid pressure next causes the parts to assume the relative positions indicated by Fig. 7, and to pack the molding sand firmly and uniformly against and upon the core barrel 16^a. This accomplished, the pressure is again exhausted allowing pattern 11^a to assume its normal position, whereupon the core-barrel and core may readily be lifted from the flask for baking after it has been stripped from its core barrel.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. The method of forming molds and mold cores which consists in introducing molding sand between a flexible pattern and a non-yielding flask member, and subsequently flexing said pattern to press the molding sand against the confining flask member.

2. The method of forming molds and mold cores which consists in introducing molding sand between a flexible pattern and a non-yielding flask member, and subsequently employing fluid pressure for flexing said pattern to press the molding sand against the confining flask member.

3. The method of forming molds and mold cores which consists in introducing molding sand between an elastic pattern and an inelastic flask member, and subsequently employing fluid pressure for flexing said pattern to press the molding sand against the confining flask member.

4. The method of forming molds and mold cores, which consists in exhausting fluid pressure from within the molding flask, in introducing molding sand between an elastic pattern and the said inelastic molding flask, and finally subjecting said pattern to fluid pressure, thereby causing the pattern to compress the molding sand into final shape.

In testimony whereof I affix my signature, in presence of two subscribing witnesses.

JEROME F. BRYANT.

Witnesses:

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