

A. F. HOWE.  
METHOD OF AND MEANS FOR FORMING MOLDS FOR CASTINGS.  
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Fig. 1.

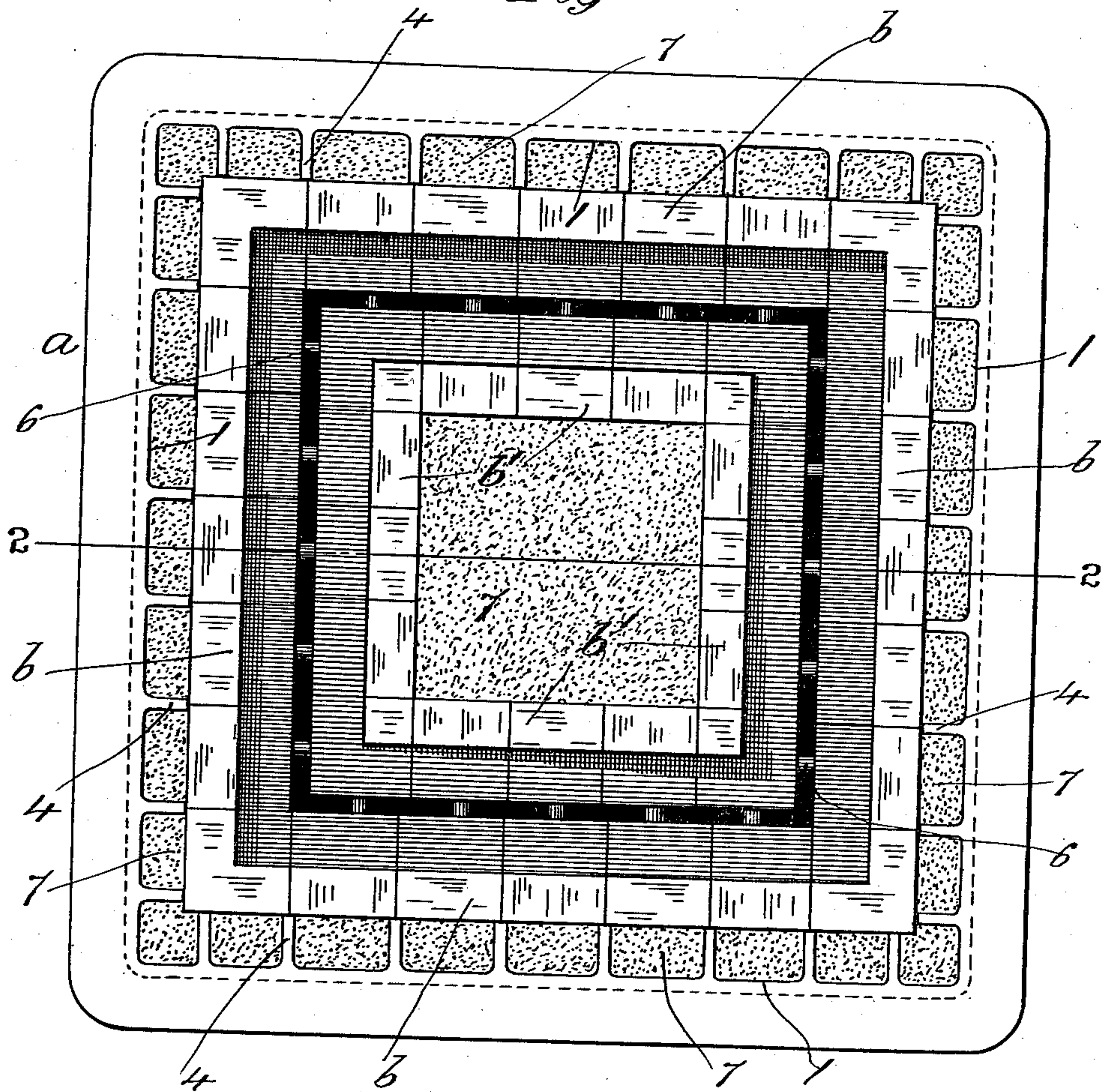
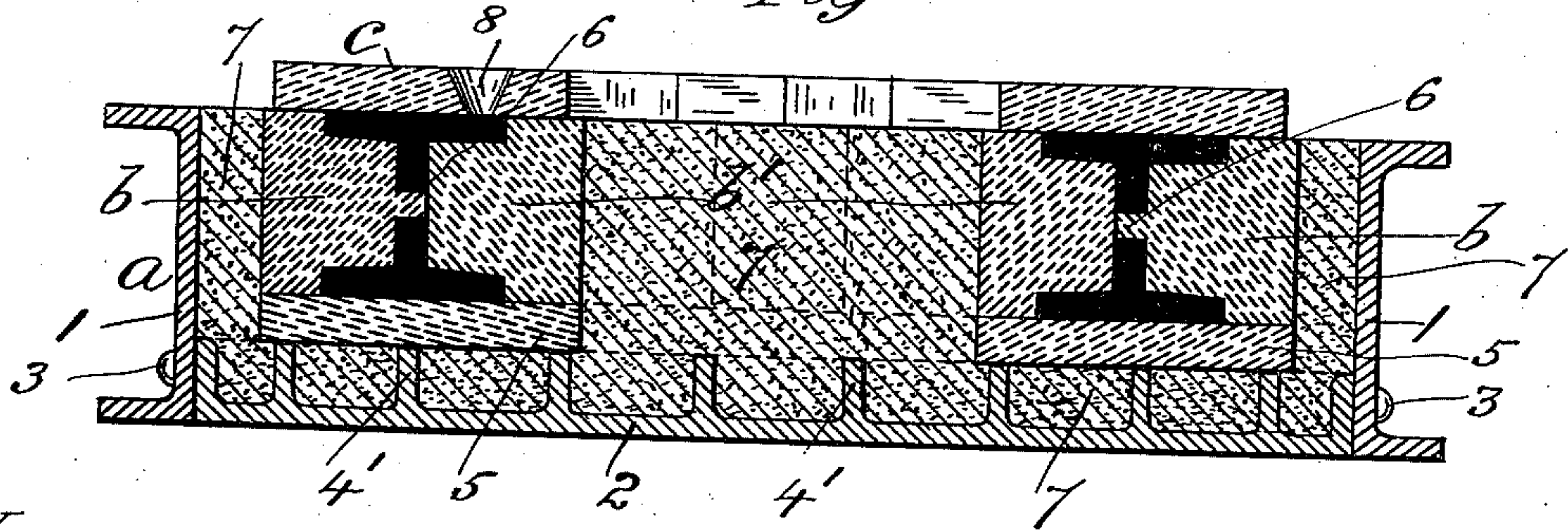


Fig. 2.



WITNESSES

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# UNITED STATES PATENT OFFICE.

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METHOD OF AND MEANS FOR FORMING MOLDS FOR CASTINGS.

995,968.

Specification of Letters Patent. Patented June 20, 1911.

Application filed August 24, 1910. Serial No. 578,611.

To all whom it may concern:

Be it known that I, ANDREW F. HOWE, a citizen of the United States, residing at Granite City, in the county of Madison and State of Illinois, have invented a new and useful Improved Method of and Means for Forming Molds for Castings, of which the following is a specification.

My invention relates particularly to that class of mold in which the cope and drag of the desired casting are respectively, composed usually of suitable molding material baked in a single piece, which in being handled, baked, and re-handled, is liable to be warped or broken, so that when assembled the casting formed therein is rough and irregular; moreover, it offers resistance to the shrinkage and so causes breakage of the casting when cooling, besides obstructing the free escape of the gases from the mold, whereby blow-holes are liable to be formed in the casting.

My invention has for its object to insure the accurate shape of the mold, and to prevent warping and breakage of the casting from shrinkage, and waste of material.

It consists in features of novelty as hereinafter described and claimed, reference being had to the accompanying drawing forming part of this specification, whereon,

Figure 1, is a top plan view of a mold formed according to my invention, omitting the cope, and Fig. 2, a vertical cross section thereof, and through the cope, on line 2, 2, in Fig. 1.

Like letters and numerals of reference denote like parts in all the figures.

In carrying out my invention I preferably use a metallic flask *a* which may be of any suitable configuration according to the nature of the desired casting, and is in the present case rectangular, open at the top and preferably, closed at the bottom, the sides 1 of the flask *a* being preferably, channel-shaped in cross section with their flanges outward and united at the corners, and the bottom 2 similarly shaped with its flanges inward, and removably fixed thereby to the sides 1 by rivets (or bolts) 3 as shown.

From the inner face of each side 1 at suitable intervals along the same, project a series of vertically arranged ribs 4 which extend downward within the flask *a*, preferably to the top level of similar ribs 4' which project upward within the flask *a* from the

bottom 2 and extend preferably, entirely across the flask *a*, either in one direction only as shown, or in both directions at right angles to and intersecting each other, or otherwise as found most desirable in practice. On the upper edges of the bottom ribs 4' is laid a base piece (or series thereof) 5, composed of suitable baked molding material which is adapted to support a series of outer and inner sectional blocks *b*, *b'*, respectively, forming corresponding parts of the mold and composed of suitable baked molding material, the blocks *b*, *b'*, being arranged in proper order within the flask *a* to form the complete mold, which in the present case is that of a rectangular I-shaped frame, the upright ribs 4 operating as gages for determining the relative positions of the blocks *b*, *b'*, on their supporting base 5, that is to say, the outer blocks *b*, which in the aggregate form the corresponding half of the mold, are arranged longitudinally endwise against each other and laterally against the edges of the upright ribs 4, which thereby determine the alinement of the blocks *b* respectively, along and at the required distance from each side 1 of the flask *a*, while the inner blocks *b'* which in the aggregate form the other or inner half of the mold, are similarly arranged on their supporting base 5 longitudinally endwise against each other and laterally at the required distance from the inner faces of the assembled outer blocks *b* (corresponding in the present case to the thickness of the web of the desired casting or frame) by interposed studs 6 which are preferably integral, either with the outer blocks *b* as shown, or the inner blocks *b'* as the case may be.

The spaces within the flask *a* unoccupied by the blocks *b*, *b'*, viz: the spaces between the ribs 4, and the adjacent inner faces of the sides 1 and outer faces of the blocks *b*, the spaces between the ribs 4' and the adjacent inner face of the bottom 2 of the flask *a*, and the underside of the base 5, and the space between the inner sides of the blocks *b'*, are preferably filled with sand (or other suitable material) 7 which is lightly packed about the blocks *b*, *b'*, the whole forming a complete mold which is then covered by the cope *c* composed of suitable baked molding material and having the ingate 8 to the mold. It is here noted that by lightly packing the sand 7 within the space between the



inner blocks  $b'$ , the latter are held sufficiently firmly in position to resist the pressure of the inflowing metal to the mold, but not sufficiently to resist the shrinking stress of the casting when cooling; furthermore, owing to the rough texture of the material composing the blocks  $b, b'$ , their abutting joints are imperfectly closed, thereby affording more or less vent for the gases from the mold, and also enabling the blocks  $b, b'$ , to yield toward each other when subjected to the shrinking stress of the casting.

The great advantage of my invention is that, by forming each half of the mold in sections instead of a single piece, and adjusting the accurate alinement of these sections while being assembled, by predetermined fixed surfaces formed within an inclosing flask, a perfect and uniform mold is obtained having its parts yieldable when subjected to the shrinking stress of its contents, whereby a smooth unbroken casting free from blow-holes is produced therein without waste of material.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a mold for castings a flask, comprising walls and a bottom plate, inwardly projecting ribs on said walls, upwardly projecting ribs on the bottom plate, sectional members supported by said ribs, and forming the walls and bottom of the mold cavity, and a yieldable body within the spaces between the sectional blocks and the ribs.

2. In a mold for castings, the combination of a suitable flask containing a plurality of surfaces, a series of mold forming blocks arranged together in their proper order within the flask to form the complete mold, a part of the said series being adapted to bear laterally against the said surfaces, and means for holding the said blocks in place yieldably to the shrinking stress of the contents of the mold.

3. In a mold for castings, the combination of a suitable flask containing a plurality of surfaces, a series of mold forming blocks arranged together in their proper order with-

in the flask to form the complete mold, a part of the said series being adapted to bear laterally against the said surfaces, means for holding the said blocks in place positively against the inflowing, and yieldably to the shrinking stress of the contents of the mold.

4. In a mold for castings, the combination of a suitable flask containing a plurality of surfaces, a series of mold forming blocks arranged together in their proper order within the flask to form the complete mold, a part of the said series being adapted to bear laterally against the said surfaces, means for holding the said blocks in place positively against the inflowing and yieldable to the shrinking stress of the contents of the mold, and a cope to the mold.

5. In a mold for castings, the combination of a suitable flask containing a plurality of surfaces, a series of mold forming blocks arranged together in their proper order within the flask to form the complete mold, a part of the said series being adapted to bear laterally against the said surfaces, means for holding the said blocks in place positively against the inflowing, and yieldably to the shrinking stress of the contents of the mold, and a cope to the mold.

6. The herein described method of forming molds for castings, which consists in forming a mold cavity with sectional side walls and a sectional bottom, maintaining the sectional side walls in proper alinement positively against outward movement, due to the inflow of molten metal into the wall cavity, and yieldable to the shrinking stress of said metal, and maintaining the sectional bottom of the mold cavity positively against downward movement by reason of the inflow of molten metal into the mold cavity and yieldable to the shrinking stress of said metal.

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Witnesses:

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