

J. A. RATHBONE.

MOLD.

APPLICATION FILED SEPT. 5, 1905.

949,496.

Patented Feb. 15, 1910.

2 SHEETS—SHEET 1.

FIG. 2.

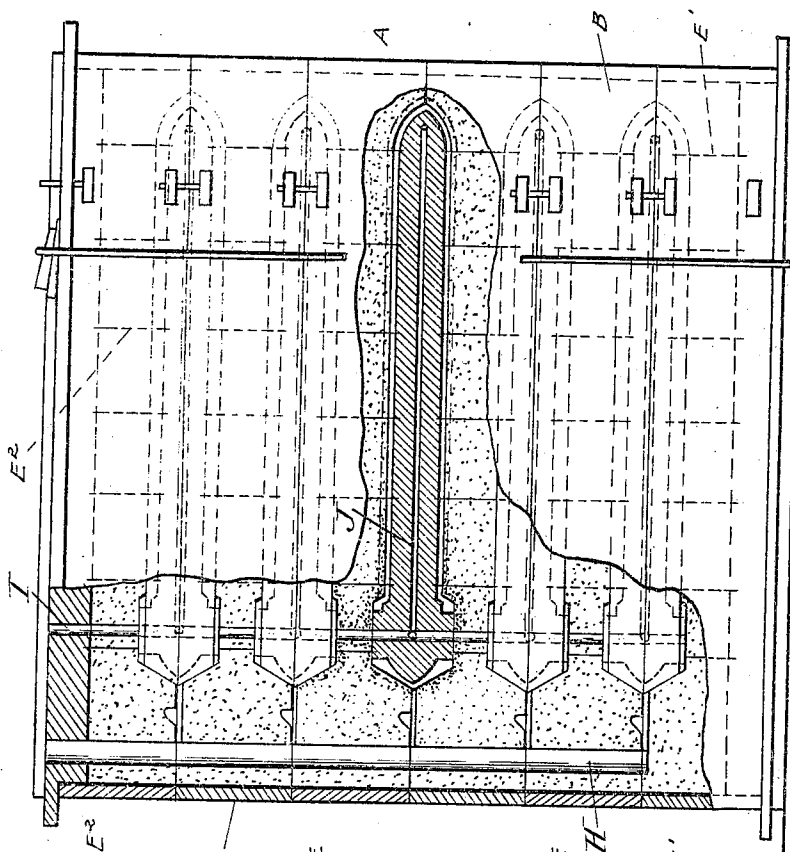
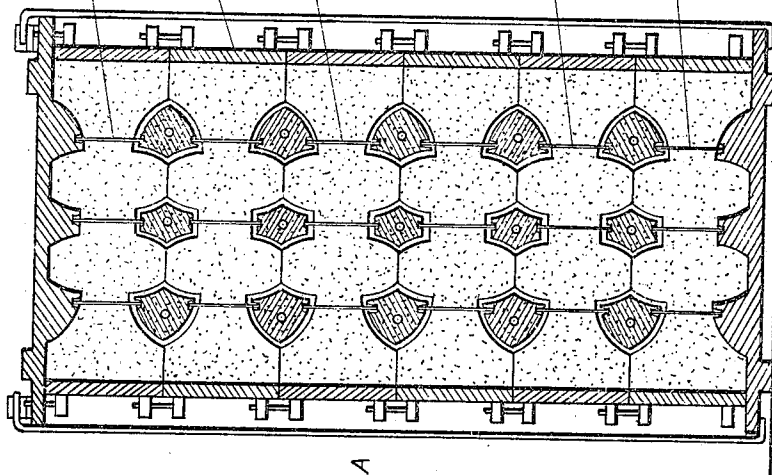


FIG. 1.



WITNESSES

Geo. H. Graves
James P. Barry

INVENTOR
JOHN A. RATHBONE.

BY *James Whittemore*

ATTY.

949,496.

J. A. RATHBONE.
MOLD.
APPLICATION FILED SEPT. 5, 1905.

Patented Feb. 15, 1910.

2 SHEETS—SHEET 2.

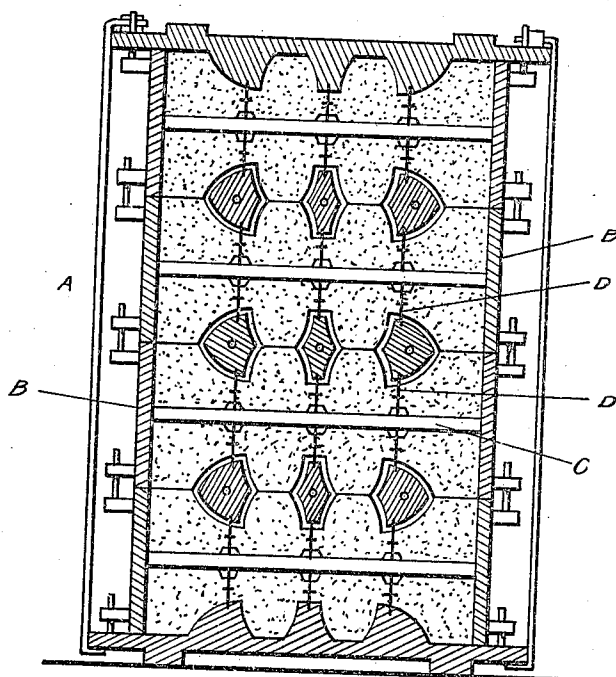


FIG. 3.

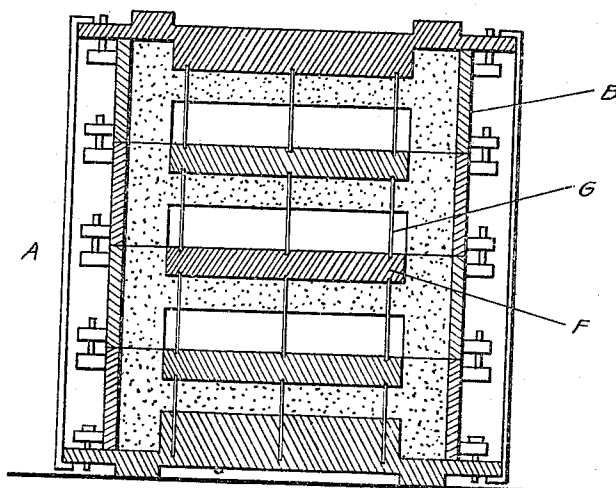


FIG. 4.

WITNESSES

Geo. H. Gove
James O. Barry

INVENTOR
JOHN A. RATHBONE.

BY *James Whittemore*

ATTY.

UNITED STATES PATENT OFFICE.

JOHN A. RATHBONE, OF UTICA, NEW YORK, ASSIGNOR TO RATHBONE MOLDING MACHINE CO., OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

MOLD.

949,496.

Specification of Letters Patent. Patented Feb. 15, 1910.

Application filed September 5, 1905. Serial No. 277,072.

To all whom it may concern:

Be it known that I, JOHN A. RATHBONE, residing at Utica, in the county of Oneida and State of New York, a citizen of the United States, have invented certain new and useful Improvements in Molds, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to the construction of sand molds, including in this term all molds in which the cavities are formed within a body of comminuted or plastic material as distinguished from a solid body such as metal.

The invention consists in the construction as hereinafter set forth.

In the drawings, Figure 1 illustrates in section a series mold constructed in accordance with my invention, and showing the means for supporting the sand between the mold cavities and the cores within the mold cavities; Fig. 2 is a side elevation, partly in section, showing means of pouring and venting; Fig. 3 shows in section a modified construction for supporting the cores within the mold cavities; Fig. 4 illustrates another modification in which a chill constituting a portion of the face of the mold cavity is anchored by my improved method.

It is one of the objects of the present invention to increase the capacity of a foundry by the formation of multiple molds having the cavities therein arranged in vertical series thereby utilizing a comparatively small floor space in the formation of a large number of castings. Vertical series molds have heretofore been employed but only to a limited extent, and the reason for this is that as heretofore constructed such molds are only adapted for the casting of small articles which are made without cores or material bulk. With my improved construction, and method of forming the molds, large castings may be formed in vertical series molds and also castings which are formed by the use of cores.

As illustrated in Fig. 1, A is a series mold which is composed of a plurality of superposed mold flasks B. Each of these flasks contains a body of sand or other molding

material and has formed therein one portion of the mold cavity, the complementary portion of which is formed in the adjacent flask. Thus all of the intermediate flasks have formed therein two of these partial mold cavities respectively at the top and at the bottom body of sand. Sectional molds of this character are particularly adapted to be formed by molding presses in which one section of the pattern is carried by the movable plunger of the press, and the other section rests upon the stationary bed of the press. This, however, forms no part of the present invention and is therefore not illustrated in the drawings.

Each of the mold sections constructed as above described has formed therein a sprue opening extending through the body of the sand and connecting the two mold cavities, and when the several flask sections are assembled, a continuous sprue H extends from the top to the bottom cavity of the mold. Thus in casting, the molten metal flows down through this sprue first filling the bottom cavity and then rising to successively fill the superposed cavities.

The use of series molds constructed as thus far described is limited, first, for the reason that the sand in the intermediate flasks is supported merely by the frictional engagement with the inner face of the flask and by the sand in the flask beneath. It is therefore obvious that where the mold cavities are of considerable size, the stress exerted on the body of sand in an intermediate flask is often greater than the resistance offered by the sand, with the result that the mold breaks down. Furthermore, the upward pressure caused by the hydrostatic pressure of the molten metal within a mold cavity will frequently cause the upheaval of the body of sand above. Another limitation to the use of these series molds is that where cores are employed, the ordinary method of supporting said cores by chaplets is not adapted for use in the intermediate mold cavities. Thus if the chaplets for a core in an intermediate cavity were merely embedded in the sand between cavities (deriving their support from the sand alone), this would exert an additional stress tend-

ing to break down the mold. To overcome these difficulties, I have first devised a means of supporting the sand of the intermediate flasks which is rigidly secured to the flask itself and constitutes an anchor for holding the sand both from downward movement due to the weight above and upward movement due to hydrostatic pressure. I have further devised a means for rigidly anchoring the chaplets which support the cores in intermediate mold cavities so that the stress is not exerted upon the body of sand intermediate to the cavities, these results being accomplished by the following construction:—For supporting the body of sand in the intermediate flasks, each of said flasks is provided with one or more transversely extending bars C which are preferably arranged in the central plane of the flask. These bars may be either straight bars as illustrated in Fig. 3 or where the flask is used for one kind of work they may conform to a greater or a less extent to the shape of the pattern. As the mold is rammed by a pressure on the sand from opposite sides of these intermediate bars, it is evident that the latter will not in any way interfere with the solidity or compactness of the sand between the same and the mold cavities, but on the contrary will increase the rigidity of the body and firmly connect it to the sides of the flask. Where cores are employed, these may be anchored either as illustrated in Fig. 1 or as in Fig. 3. In the latter figure, chaplets D are employed which abut against the cross bars C and extend through the intervening sand and through the mold cavity into contact with the core. Thus, the weight of the cores is sustained by the bars C through the medium of the chaplets, without any stress being exerted upon the intermediate sand while on the other hand the upward flotation pressure on the core due to the molten metal within the mold cavity is transferred to the bars C of the superposed flask through the medium of downwardly-extending chaplets D'.

In Fig. 1 a modified construction is employed in which the bars C are dispensed with. This is particularly adapted for a class of work, the size of which is not too great for the body of sand in the intermediate flasks to be self-sustaining. This sand body would not, however, be capable of carrying the additional stress of the core if the chaplets were merely anchored in the sand. As illustrated, the several cores in the superposed cavities are supported by each other through the medium of chaplets E extending completely through the intervening sand and connected to adjacent cores. The lowermost core may be supported by chaplets E' rest-

ing upon the bottom board or otherwise firmly anchored, and the superposed cores are also supported by these through the medium of the intermediate chaplets E. At the top are chaplets E² which bear against an upper bar plate or other device which may be fastened to the flask or clamped to the bottom board, or may resist the upper pressure by its own weight.

Either of the constructions just described is equally well adapted for the supporting of chills and this is illustrated in Fig. 4 of the drawings, in which F is a chill of any desired construction forming a portion of the molding face of one of the mold cavities. This chill is sustained by chaplets G which abut thereagainst or are secured thereto and at their opposite ends are sustained by a series of intermediate chaplets and the cores or chills from the bottom or the top of the mold.

In the construction illustrated in Fig. 2, in addition to providing the mold with a common sprue H, I also preferably provide a common vent I which connects to each of the cores and the vent passages J formed therein.

What I claim as my invention is:—

1. In a multiple mold comprising a series of superposed mold cavities, an anchor for a core within one cavity embedded in the sand between cavities, and means for sustaining said anchor without stress upon the sand.

2. In a multiple mold comprising a series of superposed mold cavities, a chaplet for supporting a core within one mold cavity embedded in the sand between the cavities, and means for relieving the sand in which said chaplet is embedded from the stress transmitted through the chaplet.

3. In a multiple mold provided with a series of superposed mold cavities, a plurality of vented cores respectively in said cavities, a continuous sprue connected with each of said cavities, and a continuous vent passage connecting with the vents of each of said cores.

4. In a multiple mold, a mold section comprising a flask, a rigid bar extending across the same, pressed sand upon opposite sides of said bar within said flask, having opposed molding faces formed therein which are sustained from displacement by the embedded bar, and chaplets projecting oppositely from said bar and anchored thereby.

5. A multiple mold comprising a series of superposed mold cavities and a rigid supporting member embedded in the sand between the cavities.

6. A multiple mold comprising a series of superposed mold cavities, a supporting mem-

ber embedded in the sand between the cavities, and means for relieving the sand in which said supporting member is embedded from the stress transmitted through said
5 supporting member.

7. A multiple mold comprising a series of superposed mold cavities, a member fitting in each cavity, a supporting member therefor embedded in the sand between the cavi-

ties, and means independent of the sand for 10 supporting said supporting member.

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

JOHN A. RATHBONE.

Witnesses:

JAMES P. BARRY,
EDWARD D. AULT.