(No Model.)

S. D. LOCKE.

MOLD FOR CASTING.

No. 422,425. Patented Mar. 4, 1890.

Fig. 1.

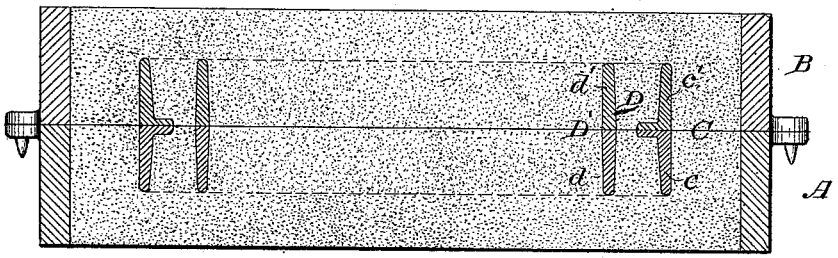
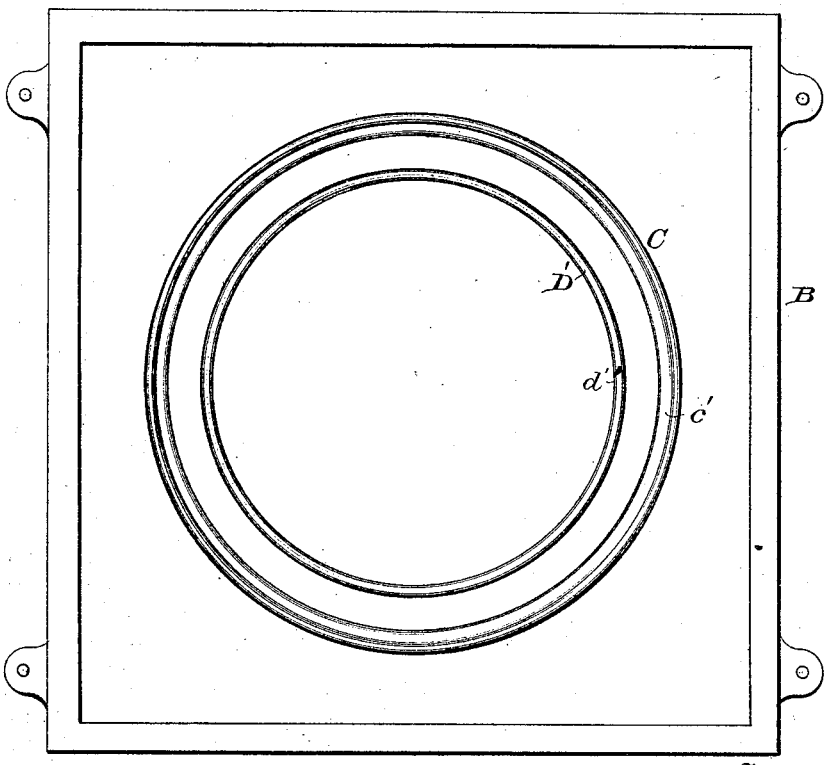


Fig. 2.



Witnesses

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MOLD FOR CASTING.

SPECIFICATION forming part of Letters Patent No. 422,425, dated March 4, 1890.

Application filed July 23, 1886. Serial No. 208,871. (No model.)

To all whom it may concern:

Be it known that I, SYLVANUS D. LOCKE, a citizen of the United States of America, residing at Hoosick Falls, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Molds for Casting Metals and other Materials, of which the following is a specification.

My invention is intended to obviate or avoid the great liability of cracking, breaking, or scoring while the metal of a casting is cooling, due to the shrinkage of the metal. Ordinary castings of common gray iron shrink only one-eighth of an inch to the foot, and this slight shrinkage forms no great obstacle in the usual process of molding where the device to be cast is not of excessive size; but malleable-iron castings shrink about one-quarter of an inch, and "mitis" shrinks about three-eighths of an inch, while steel has about the same shrinkage as mitis. These excessive shrinkages bar the making of any light open castings where size is a requisite from malleable iron, steel, or mitis by the ordinary methods, since in cooling such castings must crowd the sand in on all inclosed sides, and if the resistance of the sand is too great to permit this the metal must give way. For instance, in casting a harvester-wheel three feet in diameter of malleable iron this will shrink three-quarters of an inch in diameter, or, in other words, it must crowd the sand in on all sides three-eighths of an inch. To do this, as the sand is ordinarily packed in the flask, the cooling metal must resist a tensile stress, where the rim is eight inches wide, of not less than five thousand pounds. Of course the casting when it is very hot cannot resist any such stress. Possibly it might if very heavy; but malleable iron is used that it may be light, and it has, before it is annealed, much less strength than the gray iron, and with its excessive shrinkage requires more bulk and a consequent increase of weight to overcome the resistance of the packed sand. I propose, therefore, to form the mold so that it has in the line of shrinkage relieving-chambers far enough away from the pattern to prevent the metal as it is poured from breaking through the intervening wall of sand, and yet not so far but that they allow the sand to give way before the stress of the shrinkage of the metal is sufficient to pull its fibers apart, and thus crack and break it, thus obtaining a green sand mold that will resist the pouring and setting of the metal until it begins to shrink, and then will yield in the line of shrinkage.

To more definitely explain my improved process, I will describe it in connection with the molding of the rim of a harvester-wheel.

In the drawings, Figure 1 is a vertical section through the center of a flask and pattern arranged to form the mold for a harvester-wheel rim; and Fig. 2 is a top view of the drag or lower half of the flask, the cope having been lifted off.

A is the drag, and B the cope, which of course will be provided with dowels or other guards to cause them to match when placed together.

C is the wheel-pattern, which, as it divides with the flask, will have one half *c* in the drag and the other half *c'* in the cope. Within the pattern and conforming to its outline, whatever that may be—in the present case regular and circular, but under other circumstances very often irregular or of skeleton outline—I form in the sand of the mold as this is filled in a relieving-chamber D, leaving between this chamber and the pattern only enough sand to hold the weight of the metal when poured. When the pattern is that of a wheel-rim, as now, the relieving-chamber may be readily obtained by using a circular pattern D' concentric with the wheel-rim pattern and at the proper distance therefrom—say about four inches when the wheel is three feet in diameter and the rim not more than one-quarter of an inch in thickness. This pattern for the relieving-chamber of course divides with the cope and drag, requiring the one half *d* to be in the drag and the other half *d'* in the cope. When the sand or loam has been sufficiently packed, both the wheel-pattern, which I will call the "working-pattern," and the pattern for the relieving-chamber, which may be termed the "false pattern" or the "relieving-pattern," are to be withdrawn, the cope and flask fitted together, and the metal poured. The annular body of sand left between the working and the false patterns will then form a core that will resist the molten metal sufficiently to hold it until it has assumed a cohesive form, and will then yield to it and before

it as it cools and shrinks. Of course the relieving-chamber may extend to the center of the inclosed space. To illustrate by the wheel-rim shown, the relieving-chamber may embrace all the space extending from the annular chamber D′ to the center of the mold. It follows from this that a block pattern may be used to form such a chamber, and such a block pattern may be employed whether the pattern is regular or irregular, or any suitable number of block patterns or skeleton patterns, for that matter, may be used to form the relieving-chambers within any of the inclosed spaces of a skeleton pattern—as, for instance, in the spaces inclosed by rim, spokes, and hub of a wheel when they all are cast integral.

It is intended that the flask shall be of any desired form and material.

The process may be applied to any form of casting that surrounds an open space or one or more spaces.

I am aware that yielding nowels have been employed for baked-sand molds, and do not intend to herein claim any such construction, my invention relating only to the forming of the relieving-chambers in green sand molds, in order that the sand itself of the mold may afford the yielding resistant to the contraction of the casting.

I claim as my invention—

A green sand mold having formed therein in the inclosed or substantially inclosed part or portions a relieving chamber or chambers in its sand and in the line of shrinkage.

SYLVANUS D. LOCKE.

Witnesses:
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