(No Model.)

S. D. LOCKE.

MOLD FOR CASTING METALS.

No. 383,060. Patented May 15, 1888.

Fig. 1.

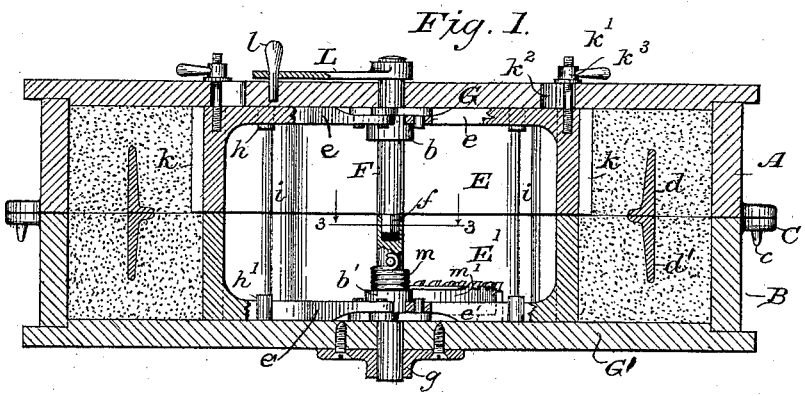


Fig 2

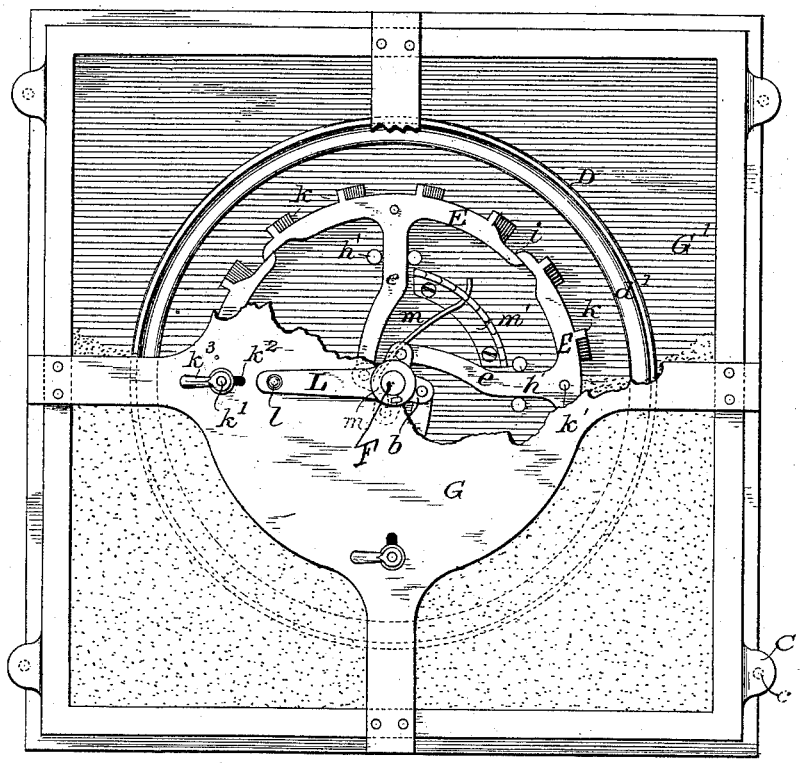
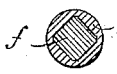


Fig. 3.



Witnesses,

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UNITED STATES PATENT OFFICE.

SYLVANUS D. LOCKE, OF HOOSICK FALLS, NEW YORK, ASSIGNOR OF ONE-HALF TO THE McCORMICK HARVESTING MACHINE COMPANY, OF CHICAGO, ILLINOIS.

MOLD FOR CASTING METAL.

SPECIFICATION forming part of Letters Patent No. 383,060, dated May 15, 1888.

Application filed July 23, 1886. Serial No. 208,872. (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.

In an application filed by me concurrently herewith I have described an improvement in the process of casting intended to compensate in the mold for the great strain caused by the contraction of the metal while it is cooling, especially where malleable iron or steel is used, and consisting, essentially, in forming relieving-chambers in the line of strain, or in so constructing the core or nowel that it may yield when the molten metal has once formed to cohesion and begins to cool and contract.

My present invention is intended to afford a flask or mold especially adapted for securing an open relieving-chamber by the employment of a yielding barrel for the core; and it is more particularly designed for use in molding wheel-rims or other objects of a circular form; but, as will be perceived from the ensuing description, the principle is applicable to the molding of practically all castings which are of such shape or outline as to inclose, or substantially inclose, one or more spaces upon which, or toward the center of which, the metal shrinks as it cools.

In the drawings, Figure 1 is a vertical central section through a flask embodying my invention; Fig. 2, a top plan view thereof, partly broken away to expose the mechanism inclosed; and Fig. 3 is a detail.

A is the cope, and B is the drag—shown as rectangular frames, but intended to be of any shape adapted to the material of which they are constructed or to the outline of the object to be cast—provided, as usual, with ears C and steady-pins *c*, whereby the cope may be properly replaced after the pattern is withdrawn.

D is the pattern, which, for the purposes of this description, is a harvester-rim dividing upon the parting-line of drag and cope, and therefore having two sections or halves, one of which, *d*, is in the drag, and the other, *d'*, in the cope and lifting off with it.

Within the space appropriated to the pattern the flask has a core-barrel composed of a series of segment-sections, E, in the cope and E' in the drag, dividing at the parting. These sections have shanks *e* in the cope and *e'* in the drag, extending inward toward the center of the flask and there pivoted to arms from hub-blocks *b* in the cope and *b'* in the nowel, pinned to a central spindle, F, which takes bearing in the cover G and a loam-plate, G', and may, to secure greater steadiness, be also stepped at its lower end in a bracket, *g*, re-enforcing the loam-plate at its outer side. This spindle, like the other parts of the flask, should divide on the parting-line; but in order that both sections may turn as one their union is accomplished by mean of a square or other locking-head, *f*, upon one and a corresponding socket in the other section, or else the spindle may be hollow from end to end to receive a suitable key that will lock both sections together and cause them to turn as one, or the spindle may be omitted, and the hub-blocks, being suitably journaled upon the adjacent plates, may receive such key; but the construction I have described is considered best.

The shanks of the barrel-sections are at first radial from such sections toward the center, and pass between guides *h* in the cope and *h'* in the drag, which steady them laterally, but permit them to slide with the sections toward and from the center, and beyond this radial portion they are bent slightly, so as to come to one side of the hub and make connection with the corresponding arm therefrom, as already stated. The sections themselves are formed to overlap and slide past each other at their ends, as indicated at *i*, to compensate for the contraction and expansion of the barrel, as they yield before the shrinkage of the casting or are put in a position for use. Upon the outer faces of the sections in the cope are formed ribs or lugs *k*, (herein shown as set obliquely,) to support the sand and prevent it from dropping out or crumbling as the cope is lifted off or the pattern withdrawn, and it is

necessary until the mold is ready for the iron that these sections should be rigidly locked in position. This I prefer to do by providing them with stud-bolts k', rising through radial slots k^2 in said cover, and at their upper ends threaded and receiving lever-nuts k^3, or else thumb-nuts, whereby the sections can be clamped against said cover. Such arrangement may also be employed in the drag, but is not so imperative there.

A lever, L, is secured to the upper end of the spindle, whereby it may be turned and the barrel-sections expanded or contracted simultaneously and co-ordinately in drag and cope. This lever serves, also, in connection with a pin, l, passed through or alongside its end into a socket in the cover, as a temporary and quickly engaged or disengaged lock to hold the sections in position when the clamping-nuts are released or to re-enforce their action. A spring, m, may be coiled around this spindle, or otherwise applied thereto or to the lever, to afford an elastic resistance to the yielding of the barrel-sections under the shrinkage of the metal of the casting, should it be deemed advisable. Means, m', may also be employed to adjust the stress or resistance of this spring to bear the proper correlation to the force of the shrinking metal.

In forming the mold (in the case of the harvester-wheel supposed) the barrel-sections are first expanded and secured—those in the drag by inserting, say, a bar of wood between two opposite sections and those in the cope by the means already described—the lower half of the pattern is set on a "follow" or parting board, and the drag inverted thereon. Then the bottom or cover board is removed from the drag, the sand rammed, the bottom replaced, the drag turned right-side up, the follow-board and wooden expansion-bar removed, and the sand faced for parting. Next the upper half of the pattern and cope are placed in position, the sand also rammed therein, to which the top plate offers no obstruction, as it is of skeleton form. The cope is then lifted off, and the patterns having been removed the cope is again fitted in place and the metal poured. Before the pouring, however, the clamping-nuts should be loosened, and immediately after the pouring is accomplished and before the metal begins to shrink the lever should be unlocked by withdrawing the stop-pin or removing whatever fastening device there may be. Then all of both series of barrel-sections will yield together and uniformly, as the stress of the shrinking metal determines. Even should there be a weak place in the sand or loam of the core it will be held to its work by the sections, and cannot yield or break in at that point more than at any other point, the yielding thus being uniform throughout.

I am aware that collapsing or collapsible barrels have heretofore been used for the purpose of facilitating withdrawal after the operation of casting, and such I have no intention of broadly claiming.

It will be understood that I do not intend to limit myself to the configuration of the barrel-sections as herein shown, which are adapted to casting wheel-rims and other cylindrical bodies, the essential requisite being that the outline presented by the exterior of the barrel should conform in a general way to the outline required in the face of the core.

I claim—

1. The combination, substantially as hereinbefore set forth, in a flask, of core-barrel sections having a common controlling device, whereby they are simultaneously governed in their expansion and collapsing, a lock whereby they are held in position at the extremity of their expansion, and whereby they may be released and left to yield before the pressure of the contracting casting, and a spring applied to said controlling device to afford elastic resistance to such yielding.

2. The combination, substantially as hereinbefore set forth, in a flask, of core-barrel sections in each division of the flask, and an interlocking connection, whereby said sections may be simultaneously expanded and collapsed throughout the entire flask.

3. The combination, substantially as hereinbefore set forth, in a flask, of core-barrel sections in each division of the flask, a common controlling device, whereby they are simultaneously expanded and collapsed, and a spring applied to said device to afford an elastic resistance to the collapse.

4. The combination, substantially as hereinbefore set forth, in a flask, of core-barrel sections in the cope and drag, and a sectional operating-spindle dividing upon the parting-line.

5. The combination, substantially as hereinbefore set forth, in a flask, of core-barrel sections in cope and drag, an interlocking connection for simultaneously expanding and collapsing said sections, and a spring applied to said connection, whereby elastic resistance is afforded to such collapse.

6. The combination, substantially as hereinbefore set forth, in a flask, of core-barrel sections in cope and drag, and an interlocking connection for simultaneously expanding and collapsing said sections, a spring applied to said connection, whereby an elastic resistance is afforded to such collapse, and means whereby the stress of said spring may be adjusted.

7. The combination, substantially as hereinbefore set forth, in a flask, of the overlapping core-barrel sections in each division of the flask, the central sectional spindle connected with said sections in said divisions, the crank on said spindle, and a locking device therefor.

8. The combination, substantially as here-

inbefore set forth, in a flask, of the core-barrel sections in each division thereof, the sectional interlocking spindle, its hubs and arms connected with said barrel-sections, the crank on said spindle, and the locking-pin.

9. The combination, substantially as hereinbefore set forth, with the core-barrel sections in the cope, of the pins projecting through the slotted top plate of said cope, and the clamping-nuts.

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Witnesses:
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