No. 688,870.

Patented Dec. 17, 1901.

R. F. LUDLOW.

MOLD FOR CASTINGS.

(Application filed Sept. 15, 1900.)

(No Model.)

Fig. 1.

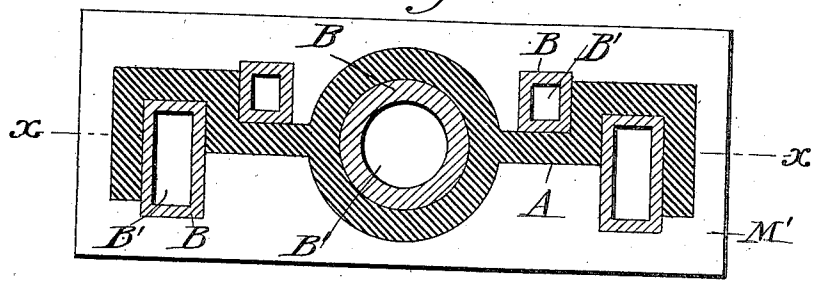


Fig. 2.

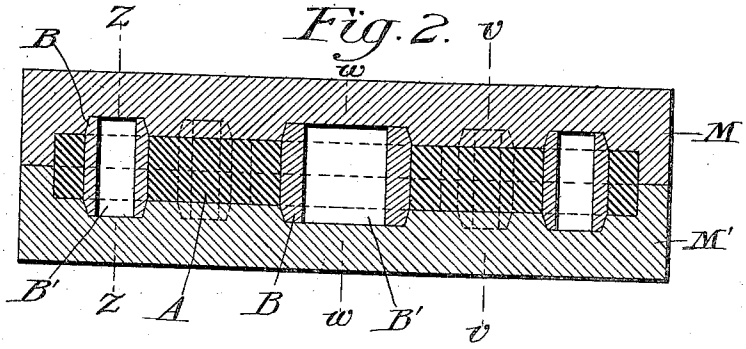


Fig. 4.

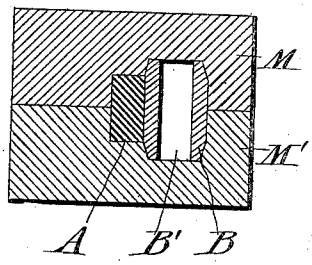


Fig. 3.

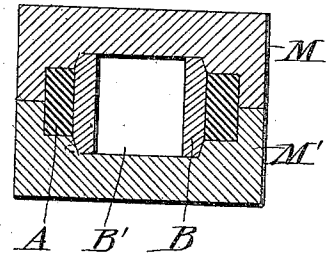
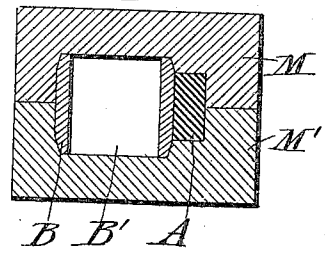


Fig. 5



Witnesses:

D. W. Edelin.

C. Eleanor Parker.

Inventor.

Rodney F. Ludlow

By H. V. Newton Atty.

UNITED STATES PATENT OFFICE.

RODNEY F. LUDLOW, OF PHILADELPHIA, PENNSYLVANIA.

MOLD FOR CASTINGS.

SPECIFICATION forming part of Letters Patent No. 688,870, dated December 17, 1901.

Application filed September 15, 1900. Serial No. 30,108. (No model.)

To all whom it may concern:

Be it known that I, RODNEY F. LUDLOW, a citizen of the United States, residing at Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Molds for Castings, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates generally to molds having cores for forming metal castings, and specifically to that class of molds employing compressible cores.

It has for its object to provide means for taking up or equalizing the strain due to contraction of the cast metal on cooling, such object being effected by providing a mold with suitable core-recesses and inserting a hollow core therein of such material that it will initially retain its shape and be unaffected in that regard by the heat of the molten metal, but will be compressed or crushed by the contractile force of the cooling metal.

Such being the object of my invention and such its principle of construction and operation, it consists of the combination, with a mold having suitable recesses to receive a core, of a compressible core formed of a material that will be capable of being crushed by compression of the contractile force of the cooling casting, said material being preferably one that will soften instead of harden on exposure to the heat of the molten metal, and essentially it is made hollow, so as to yield readily to the compression of the metal as it cools.

The distinctive feature of the invention—namely, the compressibility of the hollow core under the cooling compression of the cast metal—and of minor features of novelty will be hereinafter more fully described, and definitely pointed out in the claims.

In the drawings, Figure 1 is a horizontal section of the drag or lower half of the mold and a hollow and compressible core therein. Fig. 2 is a vertical section through both cope and drag on the line *x x*, Fig. 1. Fig. 3 is a vertical section on the line *w w* of Fig. 2. Fig. 4 is a like vertical section on line *v v*, Fig. 2. Fig. 5 is a like vertical section on line *z z*, Fig. 2.

While in the present embodiment of my invention, as shown by the drawings, a particular form of mold, core, and article to be cast is represented, it is to be understood that my invention is not limited in this respect and that any desired shape or configuration may be given these parts.

Referring to the drawings, the cope or upper half of the mold is indicated at M and the drag or under half of the mold is indicated at M′ in the several figures, wherein also is shown the relative arrangement of cope and drag, the compressible hollow core B, and the article A, cast in the mold, which, as indicated, may be of any desired shape. The core B is made of any material which initially maintains its integrity of form and shape as against the heat of the molten metal, but will be capable of being crushed by compression of the contractile force of the cooling casting. Such material may be plaster, soft wood, pasteboard coated with a suitable non-inflammable material, or the like; but I preferably employ a material that will also soften rather than harden on exposure to the heat of the metal of the casting when poured into the mold—such, for instance, as mixed sand and oil; but any other materials or mixture of materials possessing the characteristics stated may be substituted. As the core B softens and is to be crushed by compression under the action of the heat and pressure to which it is subjected it becomes necessary to provide a space for the material of the core, and this I do by forming the core, as shown in the figures, hollow, as at B′, so that as the material of the core gives way under heat and pressure of the cooling casting the particles of the core may find a space for yielding to the said compression.

It will be noted in the drawings that in one form of the hollow core it is made circular in cross-section and that in the other forms it is made square; but these forms of core are merely selected for the purpose of illustrating the character of my invention, and they may be varied as circumstances render necessary and to conform to the character or shape of the article to be produced.

The operation is as follows: The compressible core B if made of the preferred material—a sand-and-oil core—will be normally hard in the cold and retain its solidity or normal

shape long enough to withstand the molten meltal poured into the mold until the casting cools sufficiently to take and retain its intended permanent form, whereupon the continued heat of the casting will soften the material of the core B, and the pressure from the contraction of the casting in cooling will crush the softened core to some extent, thereby forcing a portion of the material of the core into the hollow central portion thereof, to thereby equalize the pressure and compensate for the strain that would otherwise be attendant on the cooling of the casting. It will be noted that the hollow or interior space B′ permits the compression of the core into a smaller area under the pressure and strain of the cooling casting.

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

1. In combination with a mold for casting metals provided with suitable core-openings therein, of a hollow core formed of material that will initially withstand the heat of the molten metal without affecting its normal form and shape until the casting sets and will then be capable of being crushed by compression of the contractile force exerted by the cooling casting to thereby equalize and take up the natural strain produced by such cooling, the hollow portion of the core providing a space of sufficient size to receive and contain all the crushed material of the core as the latter is crushed by the contractile force of the casting.

2. In combination with a mold for casting metals, provided with suitable core-openings therein, of a hollow core formed of material that will initially withstand the heat of the molten metal without affecting its normal shape until the casting sets, and that will soften under the continued application of such heat, and then be crushed by the compression of the contractile force exerted by the cooling casting, the hollow portion of the core being of a form and dimension to receive and contain all the crushed particles of the core as the latter is crushed by the contractile force of the casting.

In testimony whereof I have hereunto affixed my signature this 5th day of September, A. D. 1900.

RODNEY F. LUDLOW.

Witnesses:
GEO. W. REED,
H. T. FENTON.