(No Model.)

J. W. GALVIN.

MOLD FOR CASTING.

No. 284,407. Patented Sept. 4, 1883.

Fig: 2.

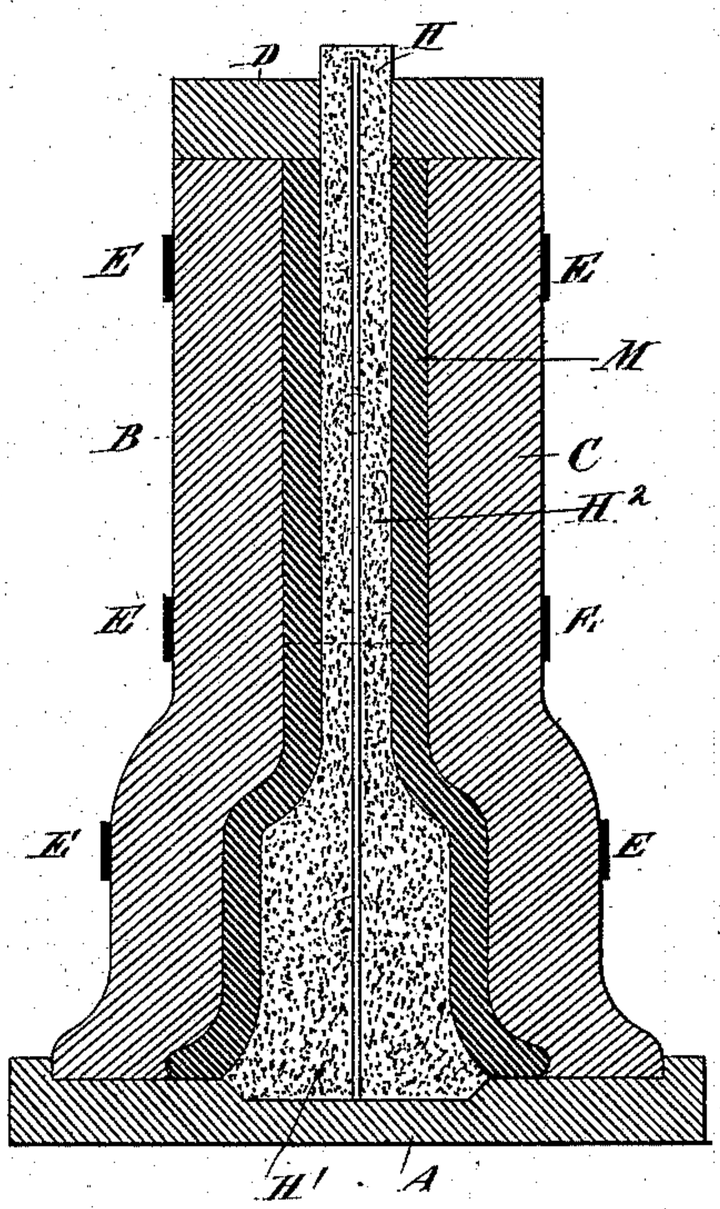
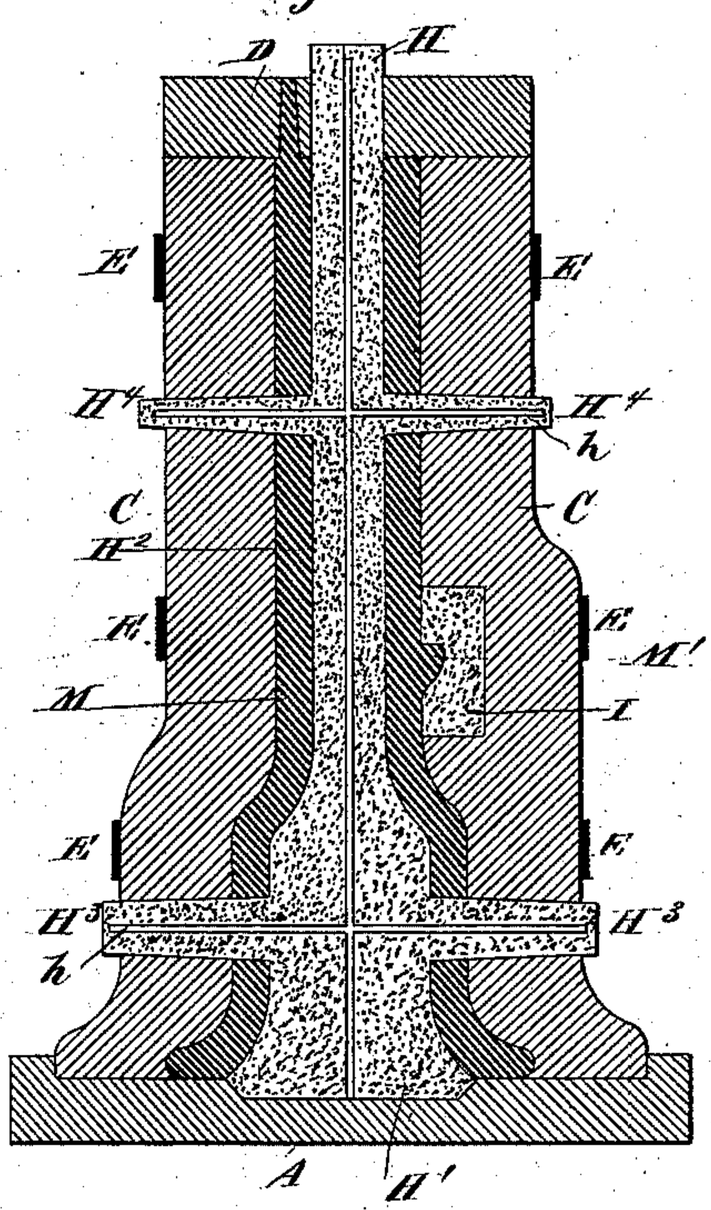


Fig: 1.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN W. GALVIN, OF PORTSMOUTH, OHIO.

MOLD FOR CASTING.

SPECIFICATION forming part of Letters Patent No. 284,407, dated September 4, 1883.

Application filed January 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. GALVIN, of Portsmouth, Scioto county, in the State of Ohio, have invented certain new and useful Improvements in Molds for the Production of Steel Castings; and I do hereby declare that the following is a full and exact description thereof.

The mold is mainly of cast-iron, of such thickness as will afford the requisite strength, in two or more pieces properly secured together. The iron of the mold is carefully finished in the interior to the correct form, and may be faced with lime or other material to facilitate the production of sound castings with smooth surfaces. I produce hollow castings by means of cores of properly-prepared earthy material, analogous to the cores long employed in iron-casting. The casting shrinks in the course of its manufacture; but the contraction upon the core is allowed by the crushing or yielding of the core. When the exterior of a casting has imperfections which lock with the iron mold, the shrinkage of the casting, longitudinally or laterally, or both, is liable to induce serious mischief. When the exterior of the casting is to have projections which when produced in corresponding recesses in the iron mold would involve difficulty by the shrinkage, I make the recesses in the iron larger than is required, and insert therein a close-fitting core of earthy matter, having just the required recess formed therein. When the casting shrinks the projection therein changes its position relatively to the mold; but this change is allowed by the crumbling or other yielding of the core. No injury results to the iron mold or to the casting which is being produced therein. The cores by their yielding prevent the casting from becoming bound in the mold. They also prevent the casting from breaking the mold or itself.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention as applied to the production of a draw-head for use on railroad-cars. The desirability of making such draw-heads of steel has been long recognized, but as heretofore constructed the molds were not adapted for the successful production of such castings.

In the drawings, Figure 1 is a central longitudinal section through the mold, several cores, and the casting produced by the aid thereof. The casting is represented darker than the iron mold. Fig. 2 is a corresponding section in a plane at right angles to that of Fig. 1.

Similar letters of reference indicate corresponding parts in both the figures.

I cast the draw-head in the upright position, the mouth of the head being at the bottom of the mold.

A is the bed-casting, recessed to receive the other castings, and also to receive and center the lower end of the core.

B C are sides or main portions of the mold.

D is a covering-piece. Any efficient means may be employed to hold these several parts of the mold firmly in position.

E E, &c., are hoops, driven down with considerable force from above.

H is a core of baked earthy material, certain portions being designated, when necessary, by additional marks of reference, as H′ H^2. A good composition for these cores is ten (10) of bank or lake sand, five (5) of common molding-sand, and one (1) of wheat or rye flour. They may be shaped in core-boxes in the ordinary way, and dried or baked at the ordinary temperature, so as to obtain strength and firmness. The composition may be varied considerably. Instead of flour, stale beer, a solution of horse-dung, and other approved materials may be employed to secure the proper amount of adhesion. Venting may be effected in the ordinary way by inserting sticks, straws, or the like to produce a hole leading out through the print, preferably taking out the stick or straw before the core is set in the mold. The core is large at that portion, H′, which molds the large cavity in the draw-head to receive the link. It extends in smaller diameter the entire length of the draw-head, as indicated by H^2. Both ends are received in recesses in the end pieces, A and D. The core is made considerably larger than the casting which is to be produced. Its lower end is received in a recess in the casting A. Its upper end is received in a hole in the covering-piece D.

H^3 H^4 are smoothly-rounded projections ex-

tending outward from the main body of the core H′ H². They are received in holes or core-prints in the parts B and C.

I is a core of baked earthy material matching in a large cavity in the part C, and having its small cavity adapted to receive a portion of the metal in the act of casting, and to thereby give the desired form—the converse of that of the recess in the core I.

M is the draw-head being cast. The main core H′ H² produces a continuous hole throughout its length, and the branches H³ H⁴ produce corresponding holes in the casting M in the positions required. The recess in the core I produces the projection M′, required for the efficient holding of the draw-head in place in the car. The main core H′ H² H³ H⁴ is represented as strengthened by stout wires *h*. They aid in supporting the core, while offering no appreciable resistance to the crushing and general yielding of the core in any required direction when the melted metal which flows around it and forms the casting M M′ changes its form by subsequent shrinkage.

The melted metal to form the casting M M′ may be iron, brass, or various other metals. I will assume it to be steel. The invention is mainly intended for use in molding this difficult material, which requires for the highest success a finished surface of iron to mold the main exterior of the casting. The projection M′ and the general surface immediately adjacent thereto are molded by the core I with less perfection; but the imperfection thus introduced is too small to be of serious importance.

I have represented the mold as standing in an upright position, receiving the melted metal to form the casting M M′ through a small hole, *d*, in the covering D. This may be varied. All the details may be varied within wide limits without departing from the principle or sacrificing the advantages of the invention.

I have represented the invention as applied to the manufacture of draw-heads. This is a good example of the advantages, but there are many others equally requiring the allowance for change of form which this invention provides, while molding the general exterior surface with the perfection due to the iron molds A B C D.

In the shrinkage of the casting M M′ the portions H′ H² of the core H are simply crushed by the contraction upon it of the casting M. The branches H⁴ are sheared off by the movement of the casting longitudinally within the mold. The longitudinal portions B and C of the mold remain of a relatively uniform diameter and length, while the internal portion, which is shaped within it, in changing from the temperature at which it first assumes a solid form down to the temperature at which it is usually removed from the mold, contracts longitudinally. The form of the large end holds that part against movement, and consequently the small end makes a movement, shifting the hole produced by the core to a new position nearer the large end of the mold. The core allows this movement to be produced without mischief.

The cores H and I are subjected to less distortion and crushing by virtue of the metal moving to a less extent in shrinking; but it is important, also, to employ yielding cores in place of rigid cast-iron at these points to allow for the slight movements which are likely to occur there.

The bed-casting A may be secured to the side castings, B C, by stout hooks or other means, (not shown,) or the joint made tight by inserting the whole a little distance in the ground or in any suitable flask and ramming damp earth around it. The whole mold may be buried in the earth, care being taken to secure by a rope of straw each side, or by other efficient means, ample vent for any gases which may be discharged through the prints of the cores. To reduce the risk of bubbles in the steel casting it is well to surface the interior of the castings with whitewash, preferably made from lime having a large proportion of magnesia, sometimes known as "dolomite."

I claim as my invention—

The employment of cores of earthy material, as H I, in combination with metal molds, as A B C D, and adapted for joint operation, as herein specified.

In testimony whereof I have hereunto set my hand, at Portsmouth, Ohio, this 25th day of January, 1883, in the presence of two subscribing witnesses.

JOHN W. GALVIN.

Witnesses:

WM. B. GRIER,

JOHN H. MCGRATH.