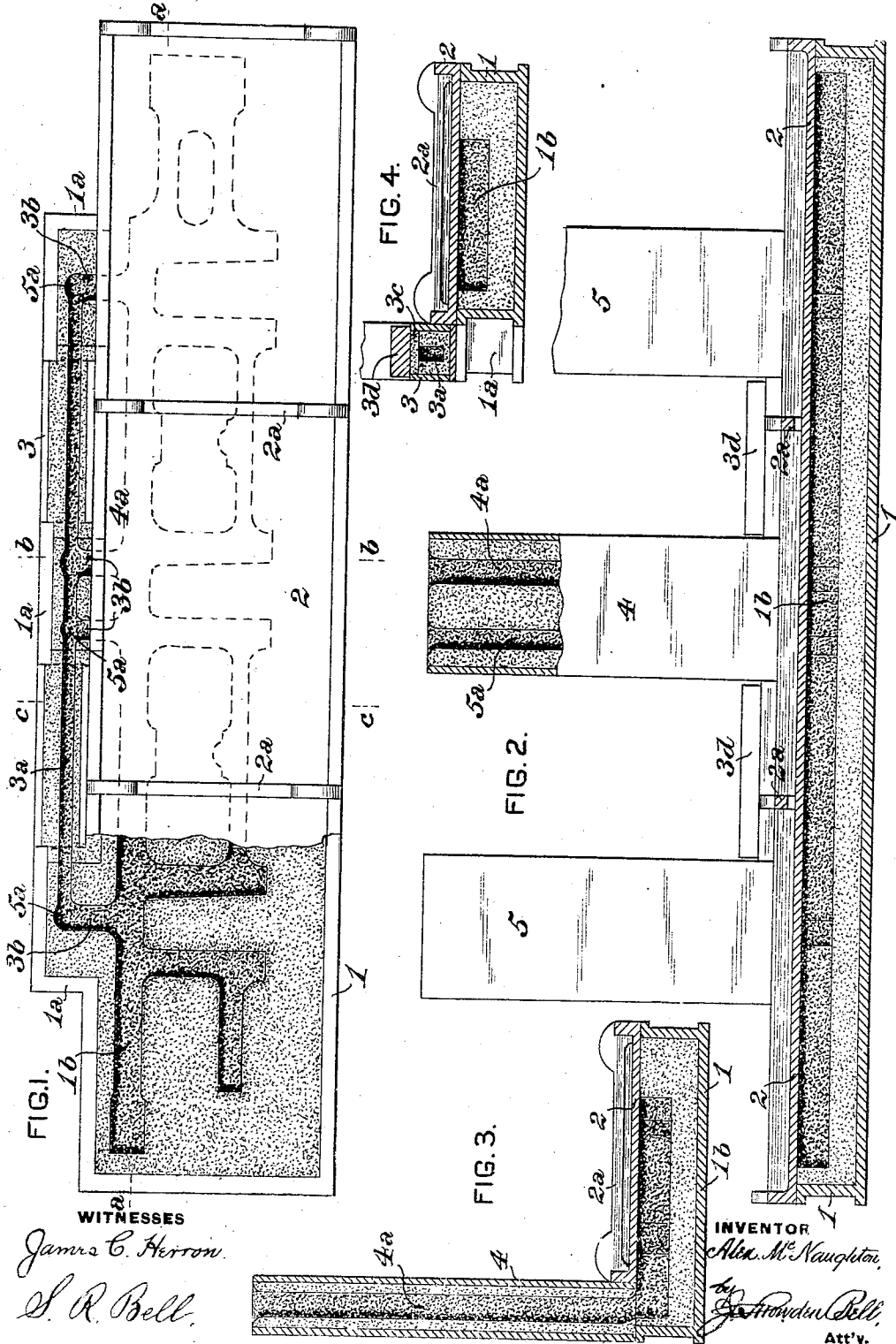


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 MOLD FOR STEEL CASTINGS.
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To all whom it may concern:

Be it known that I, ALEXANDER McNAUGHTON, of Buffalo, in the county of Erie and State of New York, have invented a certain new and useful Improvement in Molds for Steel Castings, of which improvement the following is a specification.

My invention, while particularly designed for use in the manufacture of cast steel locomotive frames, is also applicable in forming other steel castings having flat surfaces on one side, and its object is to provide a mold, in the operation of which labor and cost will be greatly reduced and a better quality of castings will be produced than in present practice.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a plan or top view of a mold for casting locomotive frames, illustrating an embodiment of my invention, the cover of the runner casing and a portion of the cope being removed to show the construction more clearly; Fig. 2, a vertical longitudinal section through the same, on the line *a a* of Fig. 1; and, Figs. 3 and 4, vertical transverse sections, on the lines *b b* and *c c*, respectively, of Fig. 1.

In the practice of my invention, I provide a mold which comprises a drag, 1, a cope, 2, a runner casing, 3, and casings, 4, 5, for the gate and shrinker passages. The drag, 1, is, as in ordinary foundry practice, a rectangular open topped casing or flask, but is, further, under my invention, widened for part of its length, by being provided with a plurality of lateral extensions or projections, 1^a, on one of its sides, the purpose of which is, as will hereinafter be more fully described, to provide means for connecting the shrinker passages and gate passage with the mold cavity, 1^b, which is formed, as heretofore, by means of a pattern, in a body or bed of sand properly packed in the drag, in such manner that the molten steel will be caused to flow through the gate passage and runner into the mold cavity, and, after filling the latter, to flow into the shrinker passages, without flowing along the top of the casting as in prior practice.

The cope, 2, is an open topped casing, consisting of a cast or malleable iron or steel plate body, corresponding in plan dimensions and contour (except as to the lateral projections, 1^a) with the drag 1, and having continuous vertical side and end flanges,

forming a receptacle for water on its top. The cope may be stiffened by transverse braces, 2^a, which are spaced a short distance above the bottom of the water receptacle, so as to admit of the passage of water, with which said receptacle is supplied, below them, and the body of the cope is machined on its lower side, so as to present a truly plane surface, which abuts against the top of the body of sand in the drag and constitutes the upper closure of all portions of the mold cavity, 1^b, therein.

Molten steel to fill the mold cavity is supplied thereto through a horizontal runner or passage, 3^a, which is formed in a body of sand properly packed in a horizontal runner casing, 3, which extends in a vertical plane exterior to the cope, along the side of the latter adjoining the lateral projections, 1^a, of the drag, and covers said projections, the runner being connected with the mold cavity, 1^b, at different points in the length of the latter, by short channels, 3^b. The runner casing is covered by a cope, 3^c, which may be held in position by weights, 3^d, and the molten steel is poured from the ladle into a vertical gate passage, 4^a, formed in sand in a casing, 4, projecting above the runner casing, and above one of the lateral projections, 1^a, of the drag, the gate, 4^a, communicating, at its bottom, with the runner and the mold cavity, as shown in Figs. 1 and 3.

In order to admit of the supply of sufficient molten steel to properly provide for the shrinkage of the same in the mold cavity, vertical shrinker passages, 5^a, communicating at the bottom with the runner, 3^a, are formed in bodies of sand packed in the casing, 4, of the gate passage, and in similar casings, 5, projecting above the top of the runner casing, 3, above each of the lateral projections, 1^a, of the drag, other than that covered by the gate passage casing.

In the operation of my improved mold, sand is rammed or packed around a pattern placed in the drag, in the ordinary manner, and the pattern is then withdrawn, leaving a mold cavity, 1^b, in the sand, of the form of the article to be cast, which, in the instance illustrated, is a locomotive frame having a top rail, three pairs of pedestal jaws, and a bottom rail. The runner passage is then formed in the runner casing and connected with the mold cavity, and the gate and shrinker passages are formed in sand in the vertical casings, 4 and 5, and connected with

the runner. To form the casting, molten steel is poured into the gate and flows therefrom into the runner, and thence, through the channels, 3^b, into the mold cavity, which it fills. A sufficient excess of molten metal is supplied to provide for shrinkage in the mold cavity, such excess passing into the shrinker passages, 5^a, and forming shrinkers or shrinking heads therein, which are afterwards removed from the casting, without flowing along the top of the casting as it does in molds of the ordinary construction.

The advantages of my invention will be manifest to those familiar with the manufacture of steel castings. The cope, which is cooled and protected by the water contained in the receptacle on its top, can be removed from the mold within a few minutes after the same is poured, and be used thereafter on other molds, thus effecting a very material economy as compared with ordinary practice, in which a new sand flask cope is required for each mold. A further advantage is attained in obtaining a better casting by closing the top of the mold cavity by a truly surfaced iron or steel plate than can be produced by the sand flask closure of the molds heretofore known and used.

I claim as my invention and desire to secure by Letters Patent:

1. In a mold for steel castings, the combination of a drag having a part of its length of greater width than the cope, an exterior runner casing adapted to rest on said greater width section, and an upper cope removable independently of the runner casing and having a plane lower surface adapted to constitute the upper closure of a mold cavity formed in a sand bed in the drag.

2. In a mold for steel castings, the combination of a drag having a part of its length of greater width than the cope, an exterior runner casing adapted to rest on said greater width section, and an upper water cooled cast

metal cope removable independently of the runner casing and having a plane lower surface adapted to constitute the upper closure of a mold cavity formed in a sand bed in the drag.

3. In a mold for steel castings, the combination of a drag having a part of its length of greater width than the cope, an exterior runner casing adapted to rest on said greater width section, an upper cast metal cope removable independently of the runner casing and having a plane lower surface adapted to constitute the upper closure of a mold cavity formed in a sand bed in the drag, and means for supplying molten steel to the mold cavity through the channel or runner located in a vertical plane exterior to the cope.

4. In a mold for steel castings, the combination of a drag having a part of its length of greater width than the cope, an exterior runner casing adapted to rest on said greater width section, an upper cast metal cope removable independently of the runner casing and having a plane lower surface adapted to constitute the upper closure of a mold cavity formed in a sand bed in the drag, said runner casing located exterior to the cope and communicating with the drag, and gate and shrinker casings communicating with the runner casing.

5. In a mold for steel castings, the combination of a cast metal cope having a plane lower surface adapted to constitute the upper closure of a mold cavity formed in a sand bed in a drag, a drag which for at least a part of its length is of greater width than the cope, a runner casing located exterior to the cope and communicating with the drag, and gate and shrinker casings communicating with the runner casing.

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Witnesses:

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