(No Model.)

E. M. BUTZ.

MOLD FOR CASTING BEAM BLANKS.

No. 387,764. Patented Aug. 14, 1888.

FIG. 1.

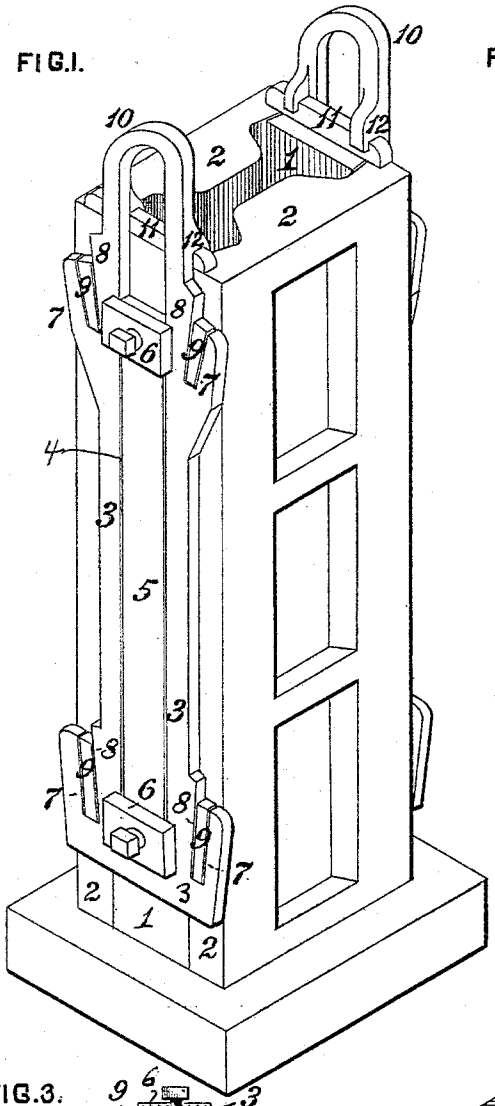


FIG. 2.

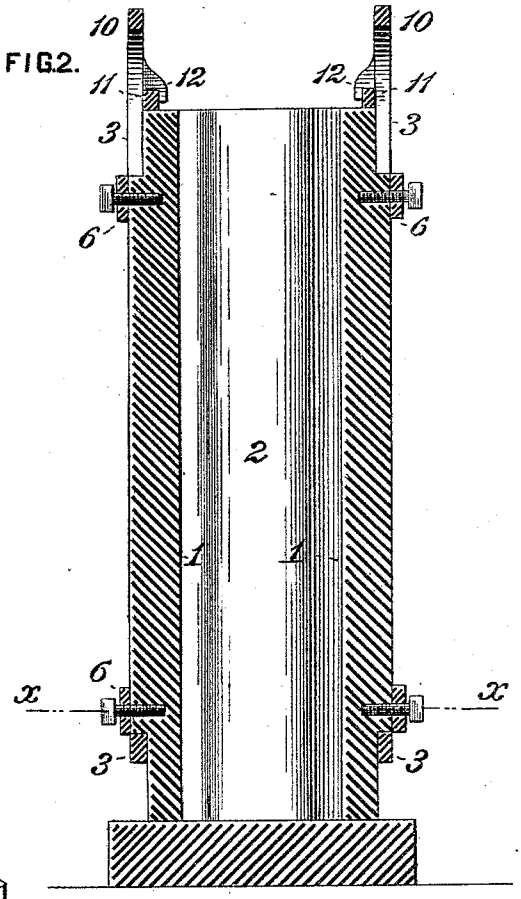


FIG. 3.

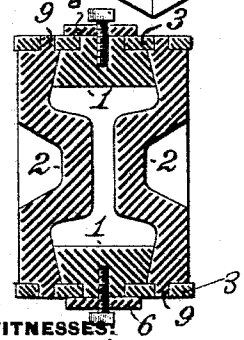


FIG. 4.

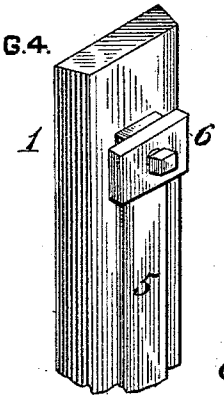
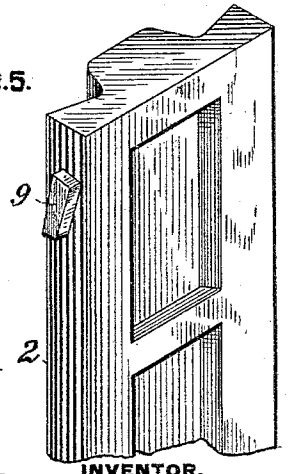


FIG. 5.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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MOLD FOR CASTING BEAM-BLANKS.

SPECIFICATION forming part of Letters Patent No. 387,764, dated August 14, 1888.

Application filed April 3, 1888. Serial No. 269,463. (No model.)

To all whom it may concern:

Be it known that I, EDWARD M. BUTZ, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Molds for Casting Beam-Blanks, of which improvement the following is a specification.

The object of my invention is to provide a metallic mold by the employment of which steel ingots of greater transverse section at or adjacent to their sides than at an intermediate point or points may be cast without tendency to rupture by contraction in cooling, thereby enabling blanks for the formation of **I**-beams, deck-beams, channels, &c., to be cast approximately to finished form and correspondingly reducing the time and expense involved in completing the same by rolling.

To this end my invention, generally stated, consists in a separable metallic mold composed of independent sides or sections, in combination with sliding clamps by which the sections are secured together during the pouring and preliminary solidification of the metal, and thereafter uniformly released throughout their entire length to admit of the unrestrained contraction of the ingot.

The improvement claimed is hereinafter fully set forth.

In the manufacture of beams and other shapes by rolling from steel ingots the operation of rolling by which the ingot is brought to finished form will be materially facilitated and economized by the production of an ingot which approximates such form. Ingots of transverse section analogous to that of **I**-beams, deck-beams, channels, and the like—that is to say, having end flanges or projections of greater width than the thickness of their webs or bodies—cannot be cast in the solid or integral molds ordinarily employed, for the reason that the contraction of the web induces strain by pressure of the end projections or flanges upon the adjacent faces of the mold, which strain, acting in reverse direction to that due to the expansion of the mold, causes the rupture of the ingot at the junction of the web with the flanges.

My invention is designed to enable an ingot or blank of the character above indicated to be cast in as close approximation to finished form as may be desired by obviating any liability to rupture from contraction and admitting of the ready removal or stripping of the mold from the ingot when the latter has become sufficiently solidified for the purpose.

In the accompanying drawings, Figure 1 is a view in perspective of a mold for casting beam-blanks embodying my invention; Fig. 2, a vertical longitudinal central section through the same; Fig. 3, a horizontal section at the line *x x* of Fig. 2; Fig. 4, a view in perspective of one of the narrow sections of the mold, and Fig. 5 a similar view of one of the wide sections.

In the practice of my invention as applied in a mold for casting blanks for **I** beams I provide a mold composed of four independent and separable metal sides or sections, 1 1 2 2, which, when fitted together, inclose a space for the reception of molten metal corresponding in transverse section with that of the ingot or blank to be cast. The members of each pair of opposite sections are of similar form, the two narrower sections, 1 1, which fit between the ends of the two wider sections, 2 2, having faces which are plane or in correspondence with those of the flanges or projections of the blank to be formed, and the two wider sections, 2 2, having faces which are depressed adjacent to each end from a plane central portion corresponding in width with the depth of the web or body of the blank to form the inner boundaries of end recesses for the reception of the metal of the flanges or projections of the blank. The abutting faces of the sections 1 1 and 2 2 are inwardly and similarly tapered or inclined, as shown in Fig. 3, so that when the sections are clamped together to form the mold the sections 1 1 will be firmly held as against outward movement by the sections 2 2, and when released from the pressure of the clamping device the sections 2 2 will be free to move outwardly through any desired and admitted range of traverse.

The connection and release of the section is effected by means of a pair of sliding clamps, 3, each of which is provided with a longitudinal slot, 4, fitting a central tongue or guide, 5, on each of the sections 1, said guide having blocks fixed upon it near its ends provided

with lips or flanges 6 to prevent the outward displacement of the clamp from the section. The sections 2 2 are moved up to and held in contact with the sections 1 1 to close the mold for the reception of the molten metal, and moved outwardly from the sections 1 1 to admit of the contraction of the metal, respectively, by the action of inclined faces 7 7 and 8 8, formed upon the clamps 3 on correspondingly-inclined bearing-faces 9, fixed upon the end faces of the sections 2 2. A pair of inclined closing-faces, 7, and a pair of releasing wedging-faces, 8, are located upon each clamp 3 adjacent to each of its ends, and similar pairs of intermediate inclined faces may be added where the mold is of sufficient length to render their employment desirable. The closing-faces 7 bear against the outer surfaces of the fixed bearing-faces 9 in the upward movement of the clamps 3, and the releasing wedging-faces 8 similarly bear against the inner surfaces of the bearing-faces 9 in the downward movement of the clamps 3, the adjacent surfaces of the faces 7 and 8 being located a sufficient distance apart to admit of the draft of the clamps upon the sections 2 in either direction in closing and releasing the mold, respectively. The clamps 3 are provided with lugs 10 at the top, by which the mold may be lifted and swung into desired position, and are preferably moved into and held in position to close the mold and secure the sections firmly together by keys 11, bearing against the upper ends of the sections 1 1 and against inclined lugs 12 on the inner faces of the clamps.

While I have in this instance illustrated the mold as composed of four separate sections, in two pairs of similar members, I do not limit myself to such number, as my invention may be embodied without variation of principle in a two or a three part mold. In the former case the sections would correspond with the sections 2 2 herein shown, and in the latter, which may be found desirable in the formation of blanks for deck-beams or analogous shapes, a single section similar to the sections 1 would be combined with two sections corresponding substantially with the sections 2. In each case the clamping and releasing devices would be similar structurally and operatively to those herein shown.

In the formation of a beam-blank the sections are drawn and held together by the clamps, as above described, and the mold is heated until it has been expanded as nearly as practicable to its maximum degree. The molten metal is then poured into the mold either from above or below in the usual manner, and as soon as it has become sufficiently solidified to retain its form the keys 11 are withdrawn and the sections released by the downward movement of the clamps, the slight outward movement of the sections 2 2 effected in the release of the mold drawing said sections sufficiently far from the body of metal to admit of its free contraction without contact with or resistance from any portion of the mold. The downward or releasing movements of the clamps 3 are effected by the application of pressure to the lugs 10, such pressure being transmitted through the wedging-faces 8 to the inner surfaces of the bearing-faces 7, and acting through the same to effect outward movement of the sections 2 upon which the bearing-faces 7 are fixed. It will be seen that while the sections are firmly clamped together without liability to displacement in the preliminary stage of the formation of the ingot they may be readily and quickly released and separated to any desired degree as soon as required, and as the clamping and releasing action of the clamps, when moved in one or the other direction, respectively, is exerted with equal force upon the opposite sections and with substantial uniformity throughout their length the mold will be stripped from the ingot without liability to sticking or to irregular release.

I am aware that separable molds of different constructions have been heretofore known, and such, therefore, I do not broadly claim.

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

1. The combination, in a mold for casting beam-blanks, of separable sections forming the walls of the mold and sliding clamps provided with inclined faces adapted to bear alternately against opposite faces of inclined projections on said sections in alternately-opposite movements of the clamps, substantially as set forth.

2. The combination, in a mold for casting beam-blanks, of a pair of mold-wall sections having their inner faces elevated at their central portions and depressed at and near their ends in conformity with the contour of the longer sides of a beam or other shape, one or more sections, each having its inner face corresponding with those of the flanges or projections constituting the shorter sides of a beam or other shape and interposed between the side-contour sections, projections having inclined bearing-faces fixed upon the longer side-contour sections adjacent to their ends, and a pair of clamps fitted to slide upon longitudinal guides on the shorter side-contour sections, and provided with inclined faces adapted to bear against said inclined bearing-faces, substantially as set forth.

3. The combination, in a mold for casting beam-blanks, of two pairs of opposite sections forming the walls of the mold and adapted to fit closely together at the angles thereof, inclined projections fixed upon the sides of one pair of said sections, longitudinal guides fixed upon the other pair of sections, and a pair of clamps fitted to slide freely upon said guides, and provided with wedging-faces adapted to bear against said inclined projections, substantially as set forth.

4. The combination, in a mold for casting beam-blanks, of two pairs of opposite sections forming the walls of the mold and adapted to fit closely together at the angles thereof, in-

clined projections fixed upon the sides of one pair of said sections and having inner and outer bearing-faces, and a pair of clamps fitted to slide freely upon the other pair of sections and provided with inner and outer inclined faces adapted to bear against the inner and outer faces, respectively, of said inclined projections in the movement of the clamps in one or the other direction, substantially as set forth.

5. The combination, in a mold for casting beam-blanks, of a pair of mold-wall sections having two or more inclined projections on two opposite sides, a pair of interposed mold-wall sections fitting between those first specified and provided with longitudinal guides on their outer faces, a pair of clamps fitted to slide longitudinally on said guides, shoulders or projections fixed to said guides for preventing displacement of the clamps, inner and outer inclined faces fixed upon said clamps and adapted to bear against corresponding faces on the inclined projections, and transverse keys or wedges bearing against the ends of the sections on which the guides are formed and against projections on the clamps, substantially as set forth.

In testimony whereof I have hereunto set my hand.

EDWARD M. BUTZ.

Witnesses:
R. H. WHITTLESEY,
J. SNOWDEN BELL.