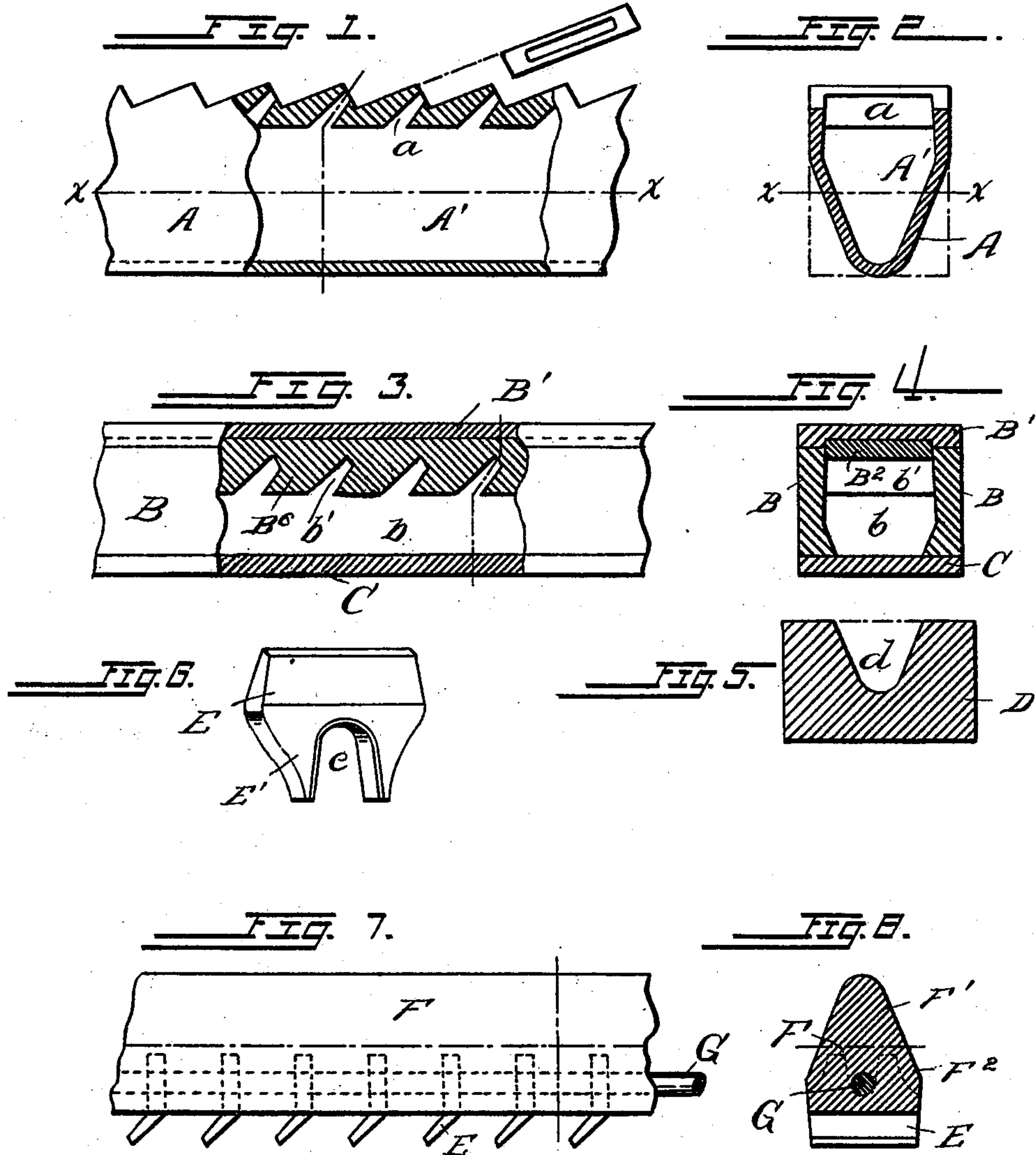


(No Model.)

J. SHAABER.  
MOLDING APPARATUS.

No. 517,489.

Patented Apr. 3, 1894.



Witnesses

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# UNITED STATES PATENT OFFICE.

JACOB SHAABER, OF READING, PENNSYLVANIA.

## MOLDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 517,489, dated April 3, 1894.

Application filed September 8, 1893. Serial No. 485,062. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB SHAABER, a citizen of the United States, residing at Reading, in the county of Berks, State of Pennsylvania, have invented certain Improvements in Molding Apparatus, of which the following is a specification.

My invention consists in certain improvements designed particularly to facilitate the production of satisfactory castings for a certain class of grate bars, wherein a chamber is formed by coring out the bar so as to leave it hollow throughout its length and provide a series of openings through the wall for the exit of steam or vapor from the chamber into the fire box. The apparatus which I have designed for this purpose is fully described in connection with the accompanying drawings and the novel features of the invention are specifically pointed out in the claims.

Figures 1 and 2 show respectively an elevation and cross-section of a portion of a cast iron grate bar for the production of which my apparatus is more especially adapted. Figs. 3 and 4 illustrate in elevation and cross-section the box which I employ for making the upper portion of the core (above the horizontal line  $xx$  Figs. 1 and 2) which forms the central chamber of the bar. Fig. 5 is a cross-section of the box for making the portion of the core below the line  $xx$ . Fig. 6 shows separately one of the metal pieces or chills used to form the exit openings through the wall of the casting. Figs. 7 and 8 show in elevation and section the completed core as it appears when ready to be placed in the mold.

The casting to be produced, as represented in Figs. 1 and 2, is a bar A, having a central chamber A' extending the full length of the bar and a series of inclined outlets  $a$  from said chamber formed in the upper wall. The ends of the bar which are not shown may be shaped as desired and are open so as to permit cleaning out of the core which forms the chamber A' and outlets  $a$ .

B B represent the sides of the core box for forming the upper portion of the core above the line  $xx$  Figs. 1 and 2.

B' is the bottom of the box and B<sup>2</sup> a separate strip fitted between the sides B B and resting upon the bottom piece B'. This strip

has transverse grooves  $b'$  corresponding in shape with the outlets  $a$  which are to be formed. The sides and bottom of the box are separate pieces but are provided with any suitable means, not shown, for holding them together as shown while forming the core.

In making the main portion F<sup>2</sup> of the core the box is placed in the reverse position from that indicated in Figs. 3 and 4 with the opening of the space  $b$  upward. Instead of running the loam into the grooves  $b'$  I provide metal or chill pieces E (Fig. 6) the tapered blades of which correspond in form with the grooves, into which they are set. The shanks E' of these metal pieces project into the space  $b$  and are recessed as shown at  $e$  so as to engage the core rod G which extends the whole length of the core, and thus at the same time serves to strengthen the core and firmly hold the pieces E in proper position. The core having been rammed up and leveled the core board C is placed upon it and the box is then reversed so as to rest in the position shown in Figs. 3 and 4. In order to release the core the box is then taken off of it as is permitted by the sectional construction; first the bottom B' (now the top) being loosened from the sides B B and the parts removed, after which the strip B<sup>2</sup> is lifted off from the metal pieces E being raised in an angular direction. The remainder of the core F' below the horizontal line  $xx$  may be formed in any ordinary core box D hollowed at  $d$  to the required shape, and afterward placed upon the main portion F' as shown in Figs. 7 and 8. The completed core F may be rested upon the projecting points of the metal pieces E without danger of breakage.

In cleaning the core from the casting the bar is placed top side up and the metal pieces E are then loosened by the removal of the strengthening rod G so that assisted by their tapering shape they readily drop down into the core space from which they are easily removed.

By means of my improved apparatus more uniform and satisfactory castings of the character described can be produced than has been possible heretofore and at the same time far less care is required in making and handling the cores so that a considerably larger number can be made in a given time, thereby



effecting both a saving in the cost of production and an improvement in the castings the openings of which are invariably clean and uniform. The metal pieces E may be used indefinitely but can be readily renewed.

What I claim is—

1. An apparatus for forming the core of hollow castings substantially such as described consisting of a core box made up of separably connected side top and bottom sections and a separately removable transversely grooved strip B<sup>2</sup>, and chill pieces E fitted to said grooves and having shanks engaged by a longitudinal core strengthening bar G, substantially as set forth.

2. The core box B made up of side sections B B and bottom piece B' separably connected, and strip B<sup>2</sup> provided with transverse grooves

b' inclined toward the horizontal, said strip being separably removable from the core by lifting the same in the direction of said inclined grooves, as described.

3. The core box B made up of side sections B B and bottom piece B' separably connected, and strip B<sup>2</sup> provided with inclined transverse grooves b', said strip being separably removable, in combination with metal pieces E adapted to fit said grooves and provided with shanks to engage the core material, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JACOB SHAABER.

Witnesses:

W. G. STEWART,

HOWARD P. WANNER.