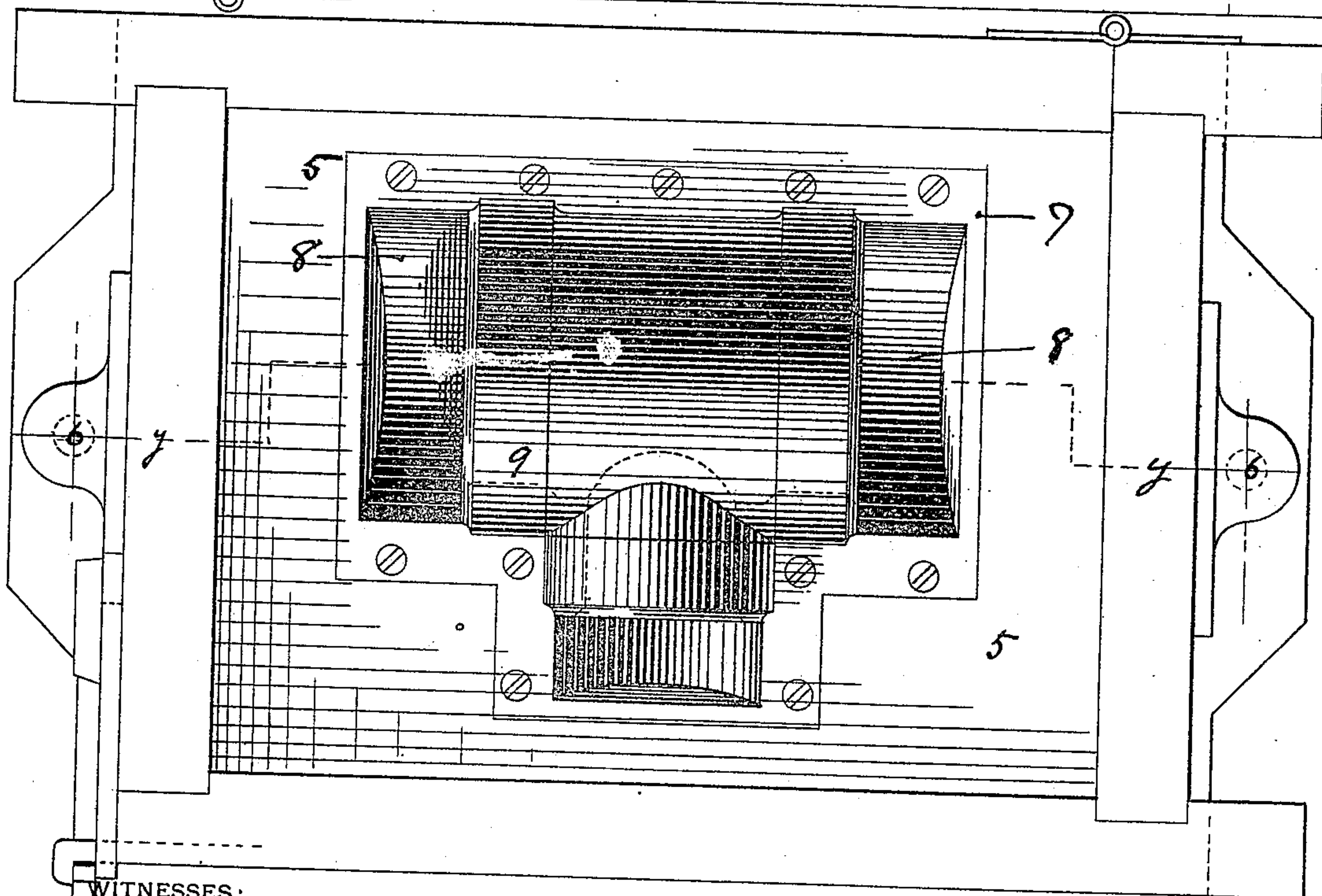
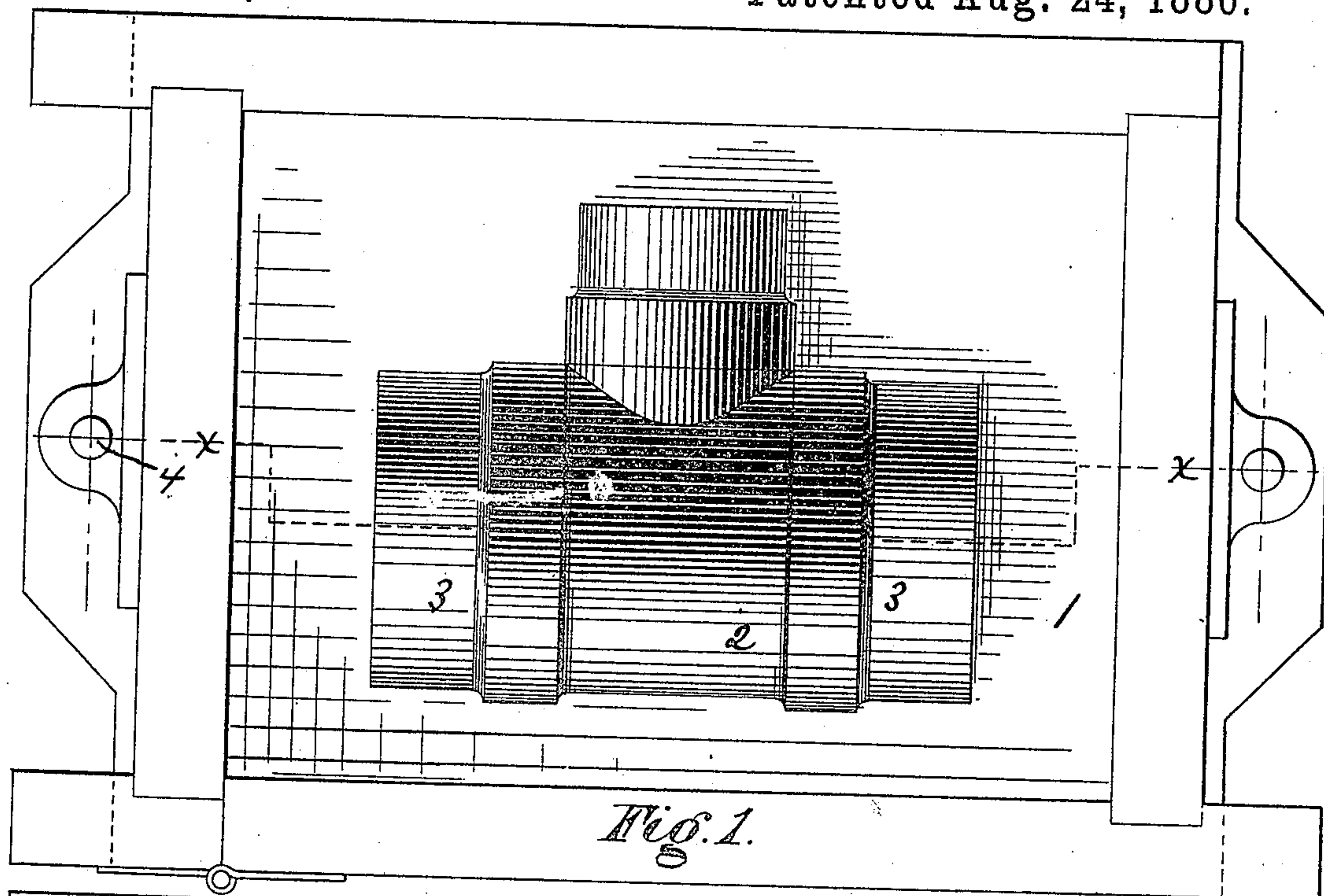


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APPARATUS FOR FORMING MOLDS.

No. 347,940.

Patented Aug. 24, 1886.



WITNESSES:

Danrui S. Wolcott

C. M. Clarke

INVENTOR,

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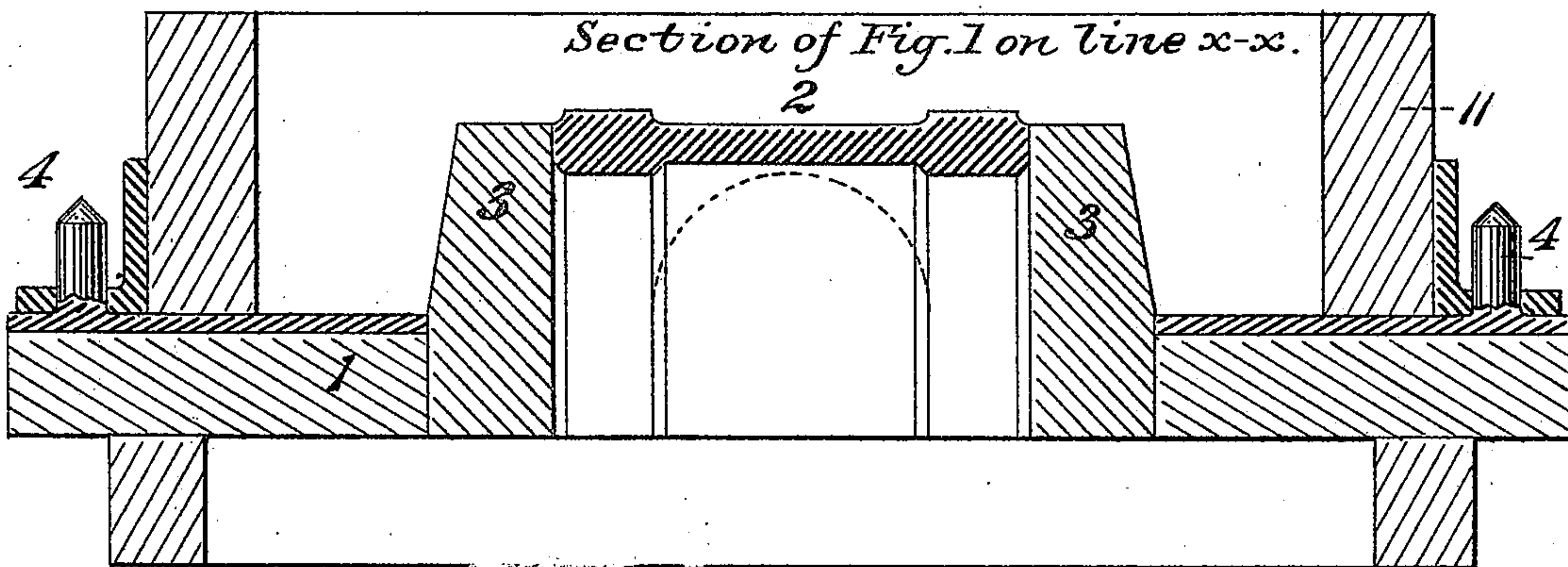
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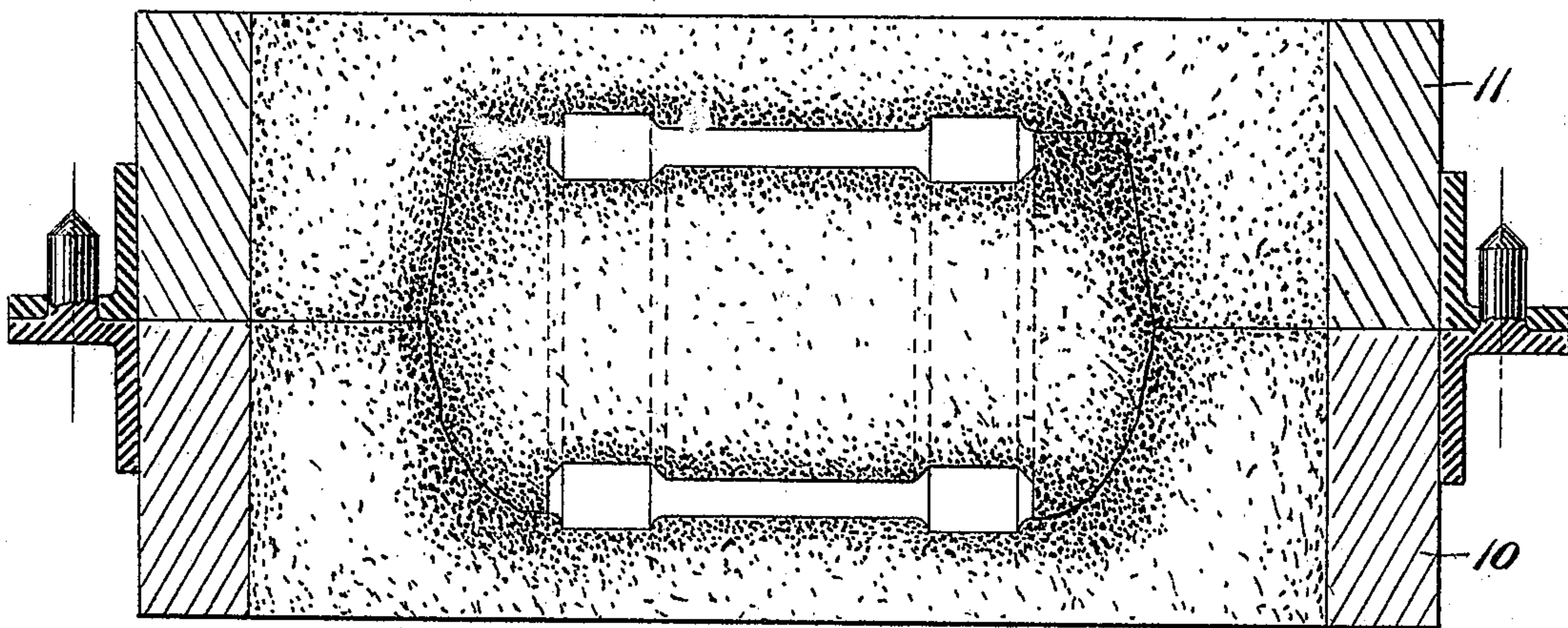
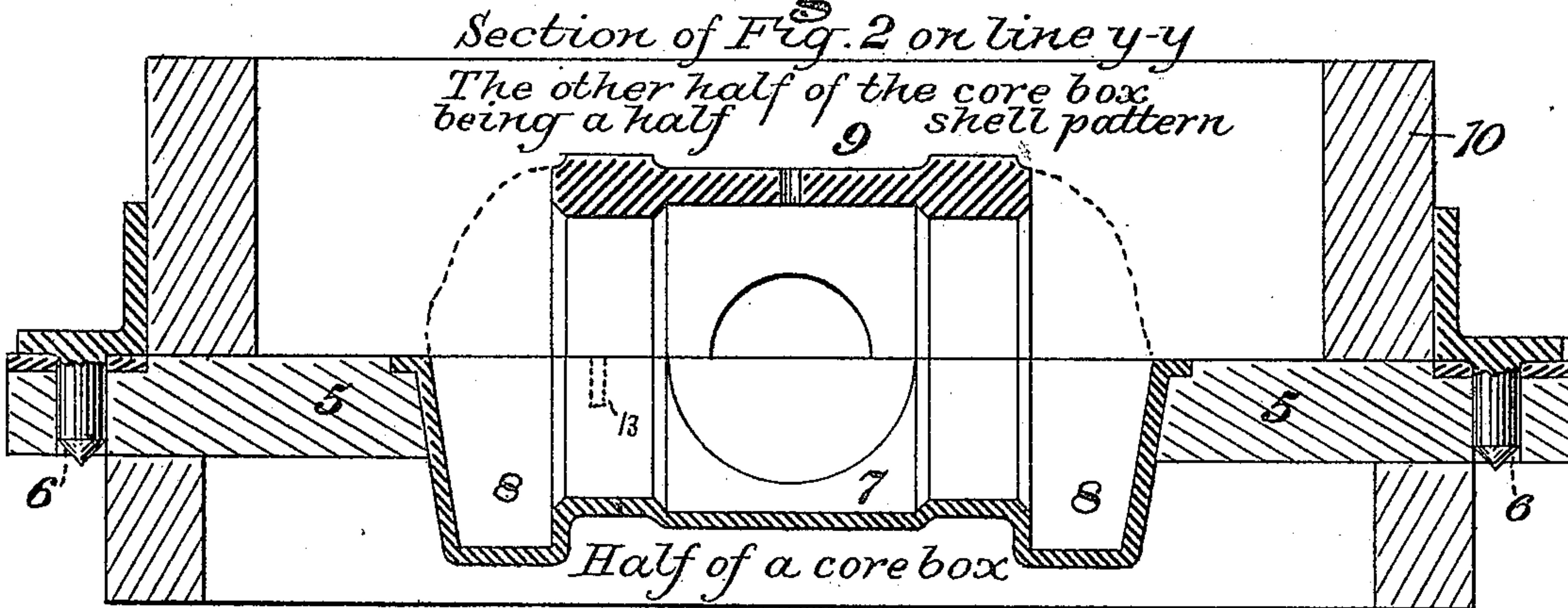
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*Fig. 3.*



*Fig. 4.*



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*The mold*  
*Fig. 5.*

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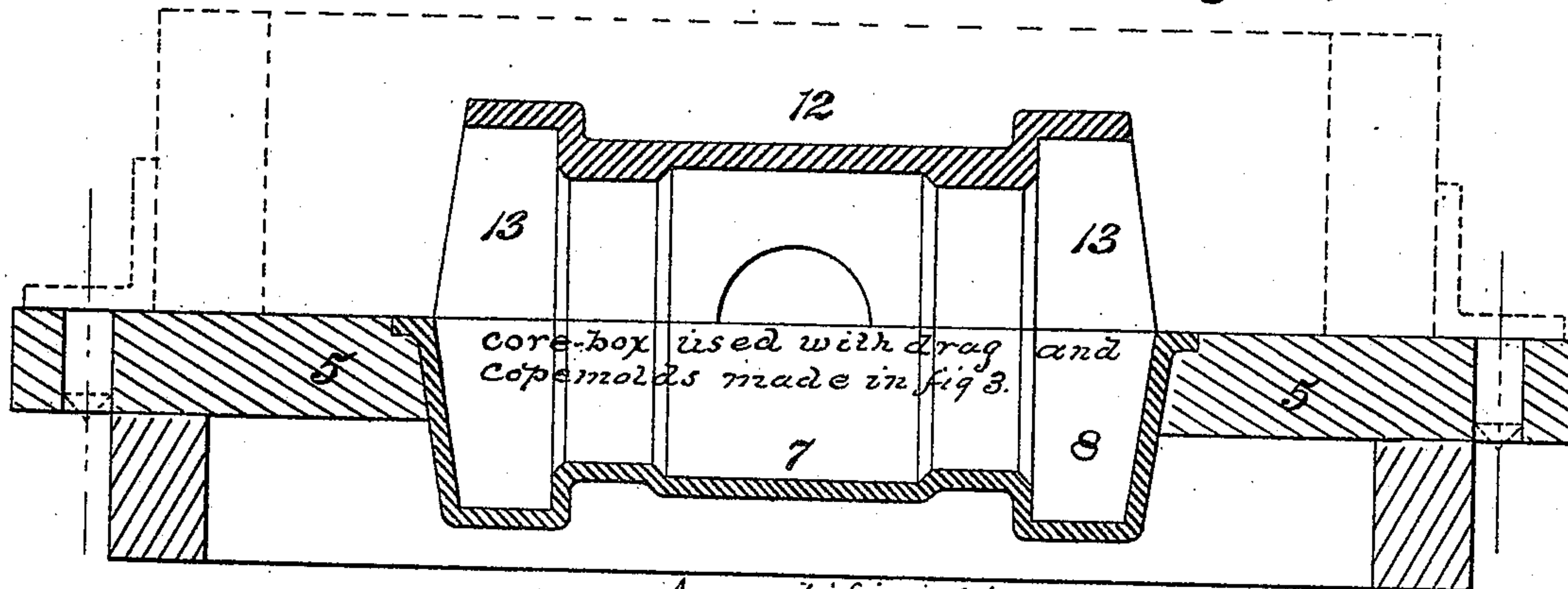
Att'y.

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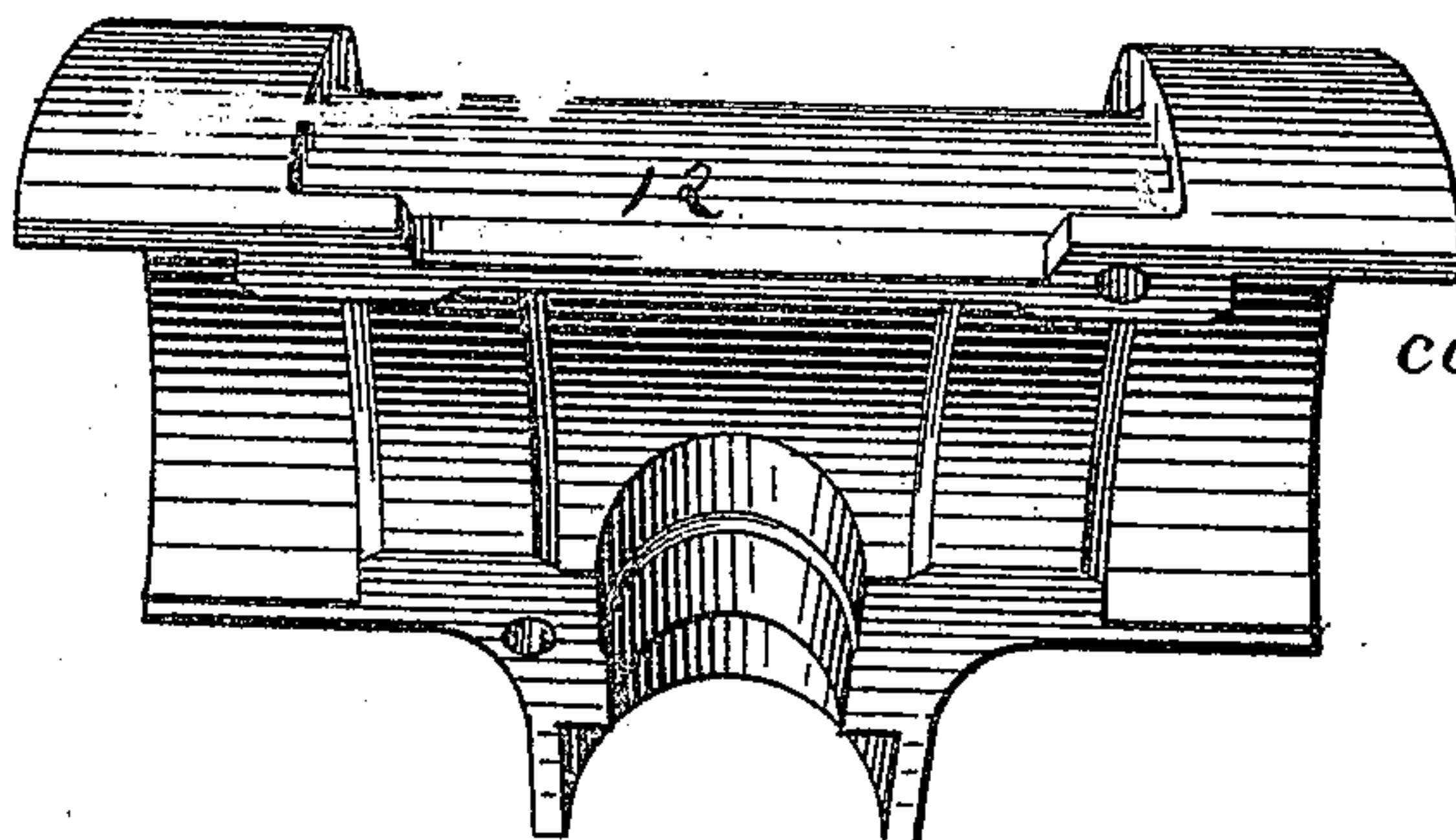
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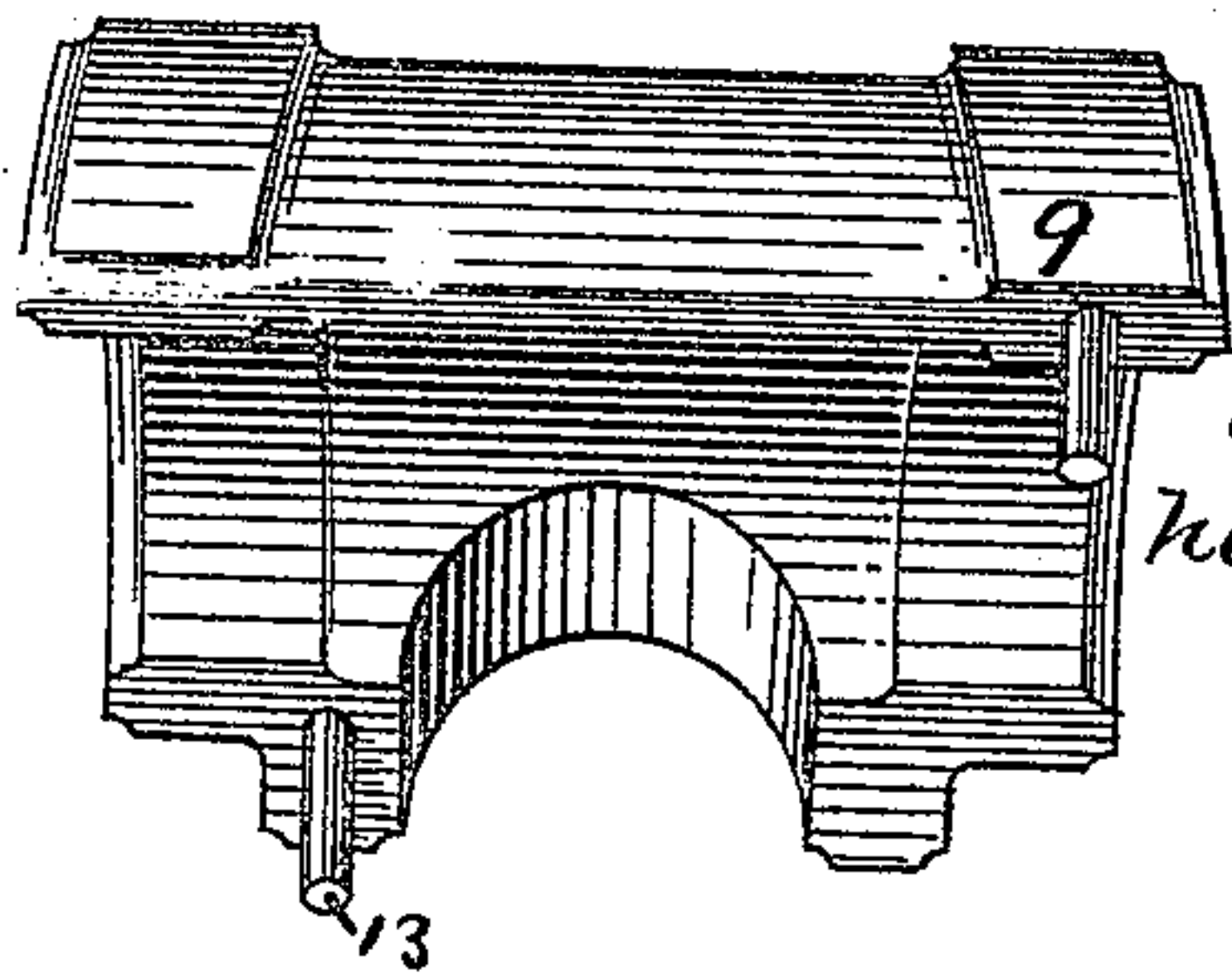
A modification

Fig. 6.



Upper  
core box of Fig.

Fig. 7.



Upper half of a core  
box: used also as a  
half shell pattern in  
Fig's. 2 and 4.

Fig. 8.

WITNESSES:

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George H. Christy  
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# UNITED STATES PATENT OFFICE.

JACOB KINZER, OF PITTSBURG, PENNSYLVANIA.

## APPARATUS FOR FORMING MOLDS.

SPECIFICATION forming part of Letters Patent No. 347,940, dated August 24, 1886.

Application filed April 22, 1886. Serial No. 199,725. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB KINZER, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Apparatus for Forming Molds, of which improvements the following is a specification.

In the accompanying drawings, which make part of this specification, Figure 1 is a top plan view of a follow-board having a half-pattern and core-prints attached thereto and a half-flask in position thereon. Fig. 2 is a similar view of a follow-board and one half of a core-box secured thereto, a half-pattern and the other half of the core-box and a half-flask being shown in position on the follow-board. Fig. 3 is a vertical section on the line *x x*, Fig. 1. Fig. 4 is a similar view on the line *y y*, Fig. 2. Fig. 5 is a sectional elevation of a completed mold. Fig. 6 is a view similar to Fig. 4 of a modified form of the core-box. Fig. 7 is a detail view of half of the core-box shown in Fig. 6. Fig. 8 is a similar view of the half-pattern and half core box shown in Figs. 2 and 4.

The invention herein relates to certain improvements in apparatus for molding crosses, T's, couplings, and similar pipe-fittings, and has for its object such a construction and combination of parts as to permit of the formation of the molds for such articles with green-sand cores in an easy and expeditious manner.

In general terms, the invention consists in the construction and combination of parts, substantially as hereinafter more fully described and claimed.

Heretofore in forming green-sand cores a shell-pattern formed of two parts, each similar to the half-pattern shown in Fig. 8, is placed in a suitable bed formed in a molding-board. The green sand is then packed in the interior of the shell-pattern. At the ends of the core thus formed sufficient sand is left projecting to form supports for the core in the mold. After the formation of the core and its projecting supports, as above stated, parting-sand is sprinkled on the supports, and a

half-flask or cope is placed on the board. Sand is then packed in this flask around the pattern and the core-supports. The molding-board and cope are then turned over and the molding-board removed. The cope will then contain one-half the mold-matrix with the half-pattern therein, the core resting in said half-pattern and its supports, and the other half-pattern resting upon the core. The other half flask or drag is then placed upon the cope, and, after parting-sand has been sprinkled upon the face of the formed mold, sand is packed in the drag in the usual manner. This drag is then raised, turned over, and set to one side. Then one-half the pattern is removed from its position on the core in the cope, which is next lifted, turned over, and placed upon the drag, the core-supports fitting into the prints in the mold. The cope is again lifted, the core remaining in position in the drag, turned over, and the pattern removed. Then the cope is finally placed in position. The step described of placing the cope on the drag before removing the pattern from the former is necessary in order to properly place the core, it being impossible to handle a green-sand core, and even proceeding as above described the core is frequently broken by the weight of the pattern above when the cope is turned face downward, as described in the step referred to.

In Figs. 1 and 3 is shown a follow-board, 1, on which is placed a half-pattern, 2, of a T or branch coupling, said pattern being provided with core-print patterns 3. The follow-board 1 is provided at its ends with guide-pins 4, for properly locating the parts of the flask during the formation of the mold therein.

In Figs. 2 and 4 is shown a follow-board, 5, provided at its ends with suitable holes, 6, for the reception of the guide-pins on a flask, thereby securing the proper location of the flask during the molding operation. In the follow-board 5 is formed an opening, in which is secured the half core box 7, the position of said core-box on the board 5 corresponding, as regards the guide-holes 6, to the position of the pattern 2 on the board 1. At the ends of the



core-box proper are formed suitable matrices, 8, for the formation of supports on the ends of the core, said matrices corresponding in shape and dimensions to the core-print patterns 3 on the ends of the pattern 2. On the portion 7 of the core-box is placed the shell-pattern 9, which is held in position by suitable dowelpins. (Shown in dotted lines in Fig. 4, and shown in full lines in Fig. 8.)

10 Green sand is packed into the core-box thus formed, by hand or otherwise, one half of the core-support being formed in the matrices 8, and the other half being shaped by hand, as indicated in dotted lines in Fig. 4. Parting-  
15 sand is now sprinkled upon the hand-molded portion of the core-support which projects above the follow-board, and the drag 10 having been properly adjusted on the board 5, sand is packed therein around the pattern 9  
20 and the projecting core-supports. The drag is then lifted from the follow-board, the pattern 9 removed from the core, and the drag replaced over the core, the holes 6 in the follow-board and the guide-pins on the drag insur-  
25 ing the proper readjustment of the drag. The next step is to turn the drag and follow-board over. In this position of the drag and follow-board the half core box 7 8, being secured to the follow-board, does not fall onto or rest on  
30 the core, as does the separate half-shell pattern heretofore used. The next step is to remove the follow-board and its attached half core box 7 8 together from the half-mold, leaving the core in position in the drag, as shown  
35 in the lower half of Fig. 5.

The drag portion of the mold, with the entire core having been completed, as above described, the half-flask 11 is placed on the follow-board 1, and green sand is packed around  
40 the half-pattern 2 and around the core-print patterns 3, arranged on this follow-board, thus forming the cope portion of the mold. The half-flask or cope 11 is then lifted from the follow-board 1 and placed upon the drag 10,  
45 completing the mold, as shown in Fig. 5.

As hereinbefore stated, the positions of the half-patterns 2 and 3 and the half core box 7 and 8 on the follow-boards 1 and 5, as regards the guide-pins 4 and holes 6, must correspond  
50 exactly, in order that the cope 11 may properly fit when placed upon the drag, as illustrated in Fig. 6.

If desired, both the drag and cope portions of the mold may be formed on the follow-board 1, in the manner above described, in  
55 which case a half core box, 12 13, is used in connection with the half core box 7 8 in place of the half-shell pattern and half core box, 9, as shown in Fig. 6. This half core box 12 is  
60 provided at its ends with matrices 13, corresponding to the matrices 8 for forming the core-supports. After the core is formed in the box formed by the parts 7 8 and 12 13 the part 12 13 is lifted off, and the drag previously formed on the follow-board 1, as  
65 above stated, is placed on the follow-board 5,

over the core resting in the part 7 8. The drag and follow-board 5 are then turned over, and the follow-board being removed the cope, formed as above described, is placed on the  
70 drag, thus completing the mold.

It will be perceived from the above that the core is carefully supported by one-half of the core-box during the molding operation, and is not subjected to the weight of the half  
75 core box or of any pattern at any time, and that by using a half core-box follow-board provided with guide pins and holes the proper adjustment or location of the core is easily secured.  
80

It is characteristic of the invention herein that by the use of my combined follow-board and core-box I am enabled to form a mold with either a half-shell pattern, or without any shell-pattern, one or both parts of the  
85 mold being formed on a solid pattern—i. e., one having the contour of only the exterior of the cavity which is to be made—thus avoiding the use of complete shell-patterns—i. e., two half-shell patterns—for forming not only  
90 the core, but also both parts of the mold, and also avoiding the frequent turning of the parts of the mold, necessary when molding with complete shell-patterns, as hereinbefore described.  
95

It will be noticed that when the matrices of the mold are formed on a follow-board separate from and independent of the board carrying the half core box, then the board carrying the half core box serves only as a  
100 means for connecting the half core box to guides, whereby the core contained in or supported by the half core box may be properly transferred and centered in the matrix of a mold formed in the half-flask. When used as  
105 above stated, the board 5, carrying the half core box, is in no sense a "follow-board," as that term is used in the art.

The main characteristic of my invention is the providing a half core box with guides,  
110 in order that a core may be properly transferred in and centered in the matrix of a mold formed in a half-flask having guides complementary to the guides on or connected to the half-core box.  
115

I claim herein as my invention—

1. In an apparatus for forming molds, the combination of a half-flask and a half-core box, each provided with complementary guides, whereby the core may be transferred and centered  
120 in the matrix of the mold formed in the half flask, substantially as set forth.

2. The combination of a half-flask and a follow-board provided with a half core box, the two elements having complementary  
125 guides, and a separate half core box being or not being a half-shell pattern, whereby a separate core may be formed and transferred to its due position in the matrix of a mold formed in the half-flask, substantially as set  
130 forth.

3. In an apparatus for forming molds, a



follow-board provided with guides for locating a half-flask thereon, and having a core-box secured thereto, in combination with a second follow-board provided with guides for  
5 locating a half-flask thereon, and a pattern, the pattern and core-box being correspondingly located on each board in relation to the flask-guides of said boards, substantially as set forth.

In testimony whereof I have hereunto set to my hand.

JACOB KINZER.

Witnesses:

DARWIN S. WOLCOTT,  
R. H. WHITTLESEY.