

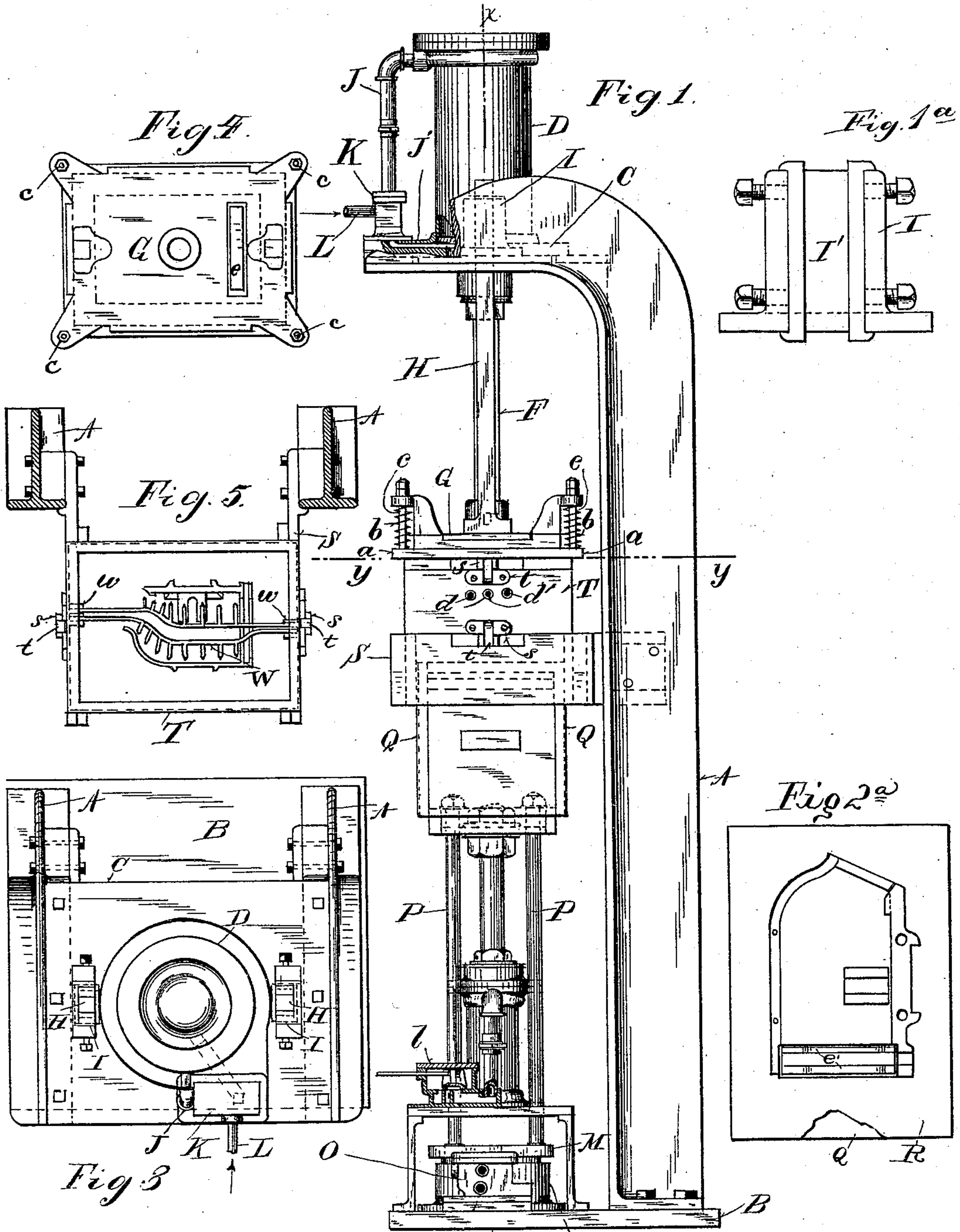
(No Model.)

3 Sheets—Sheet 1.

H. A. BILLINGS.
MOLDING MACHINE.

No. 488,055.

Patented Dec. 13, 1892.



WITNESSES
H. M. Paisted
Jos. L. Dawley

INVENTOR
H. A. Billings
By H. A. Toulmin
his Attorney

(No Model.)

3 Sheets—Sheet 2.

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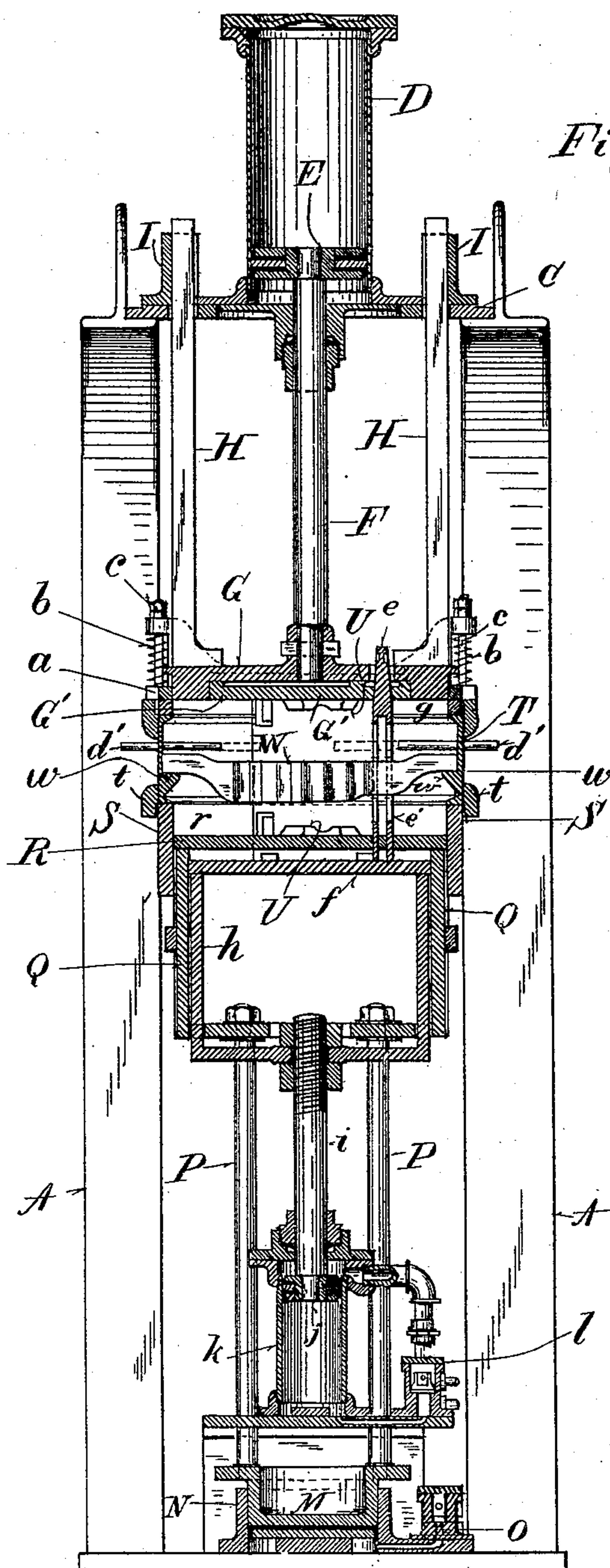


Fig. 2.

WITNESSES
H. M. Haisted
Jas. C. Dawley

INVENTOR
B Henry A. Billings
By H. A. Goutrier
His Attorney.

(No Model.)

3 Sheets—Sheet 3.

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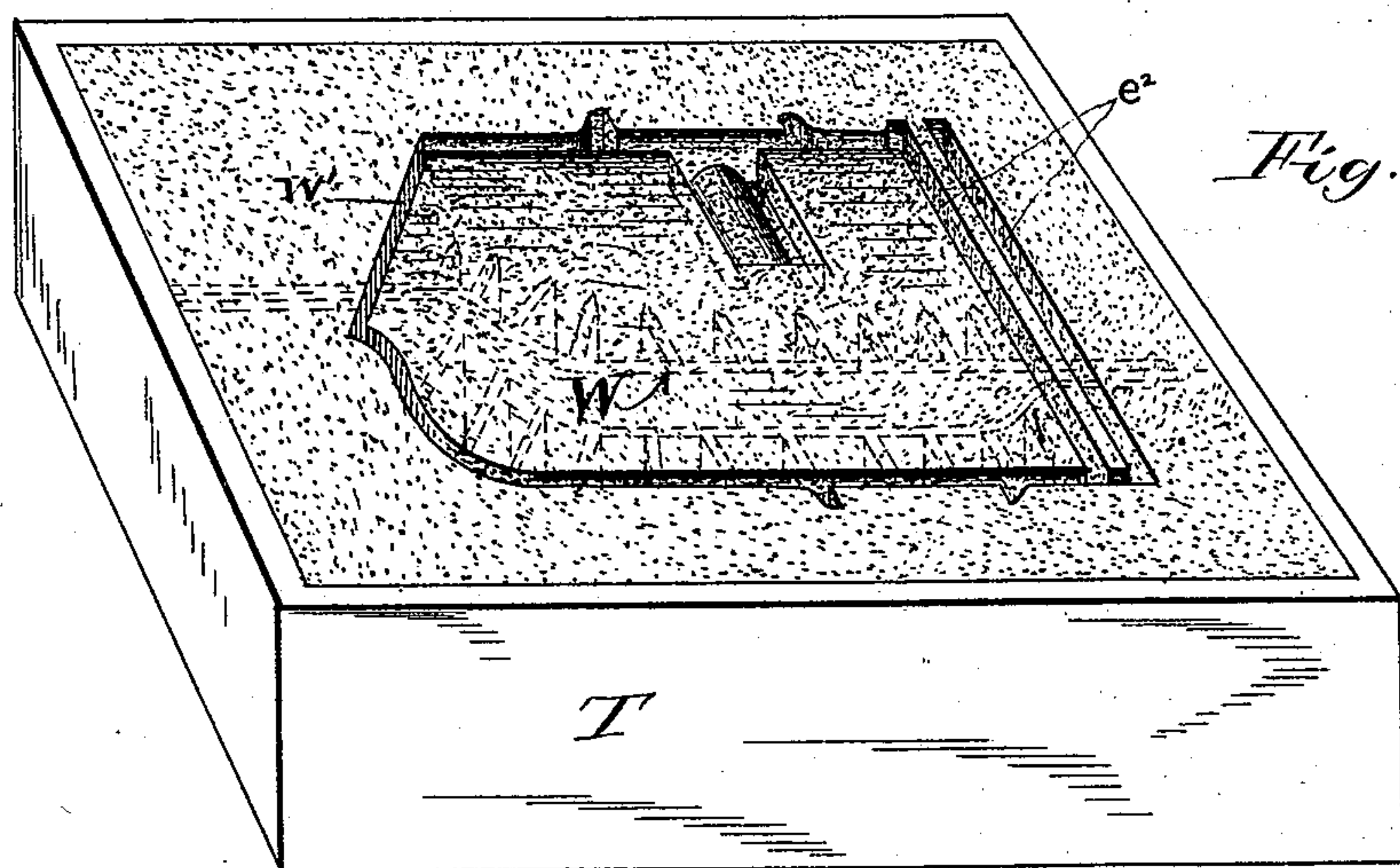


Fig. 10.

Fig. 6.

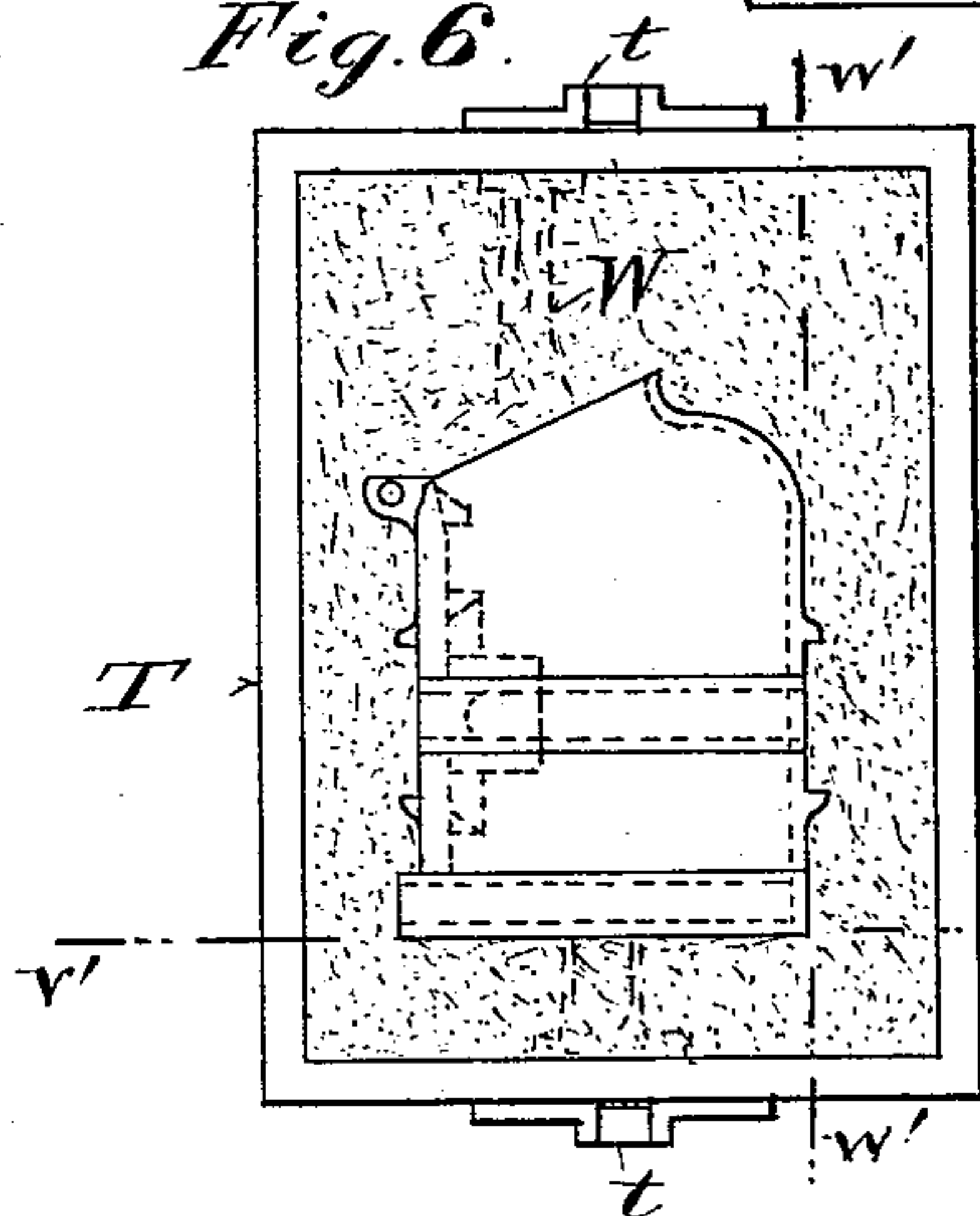


Fig. 9

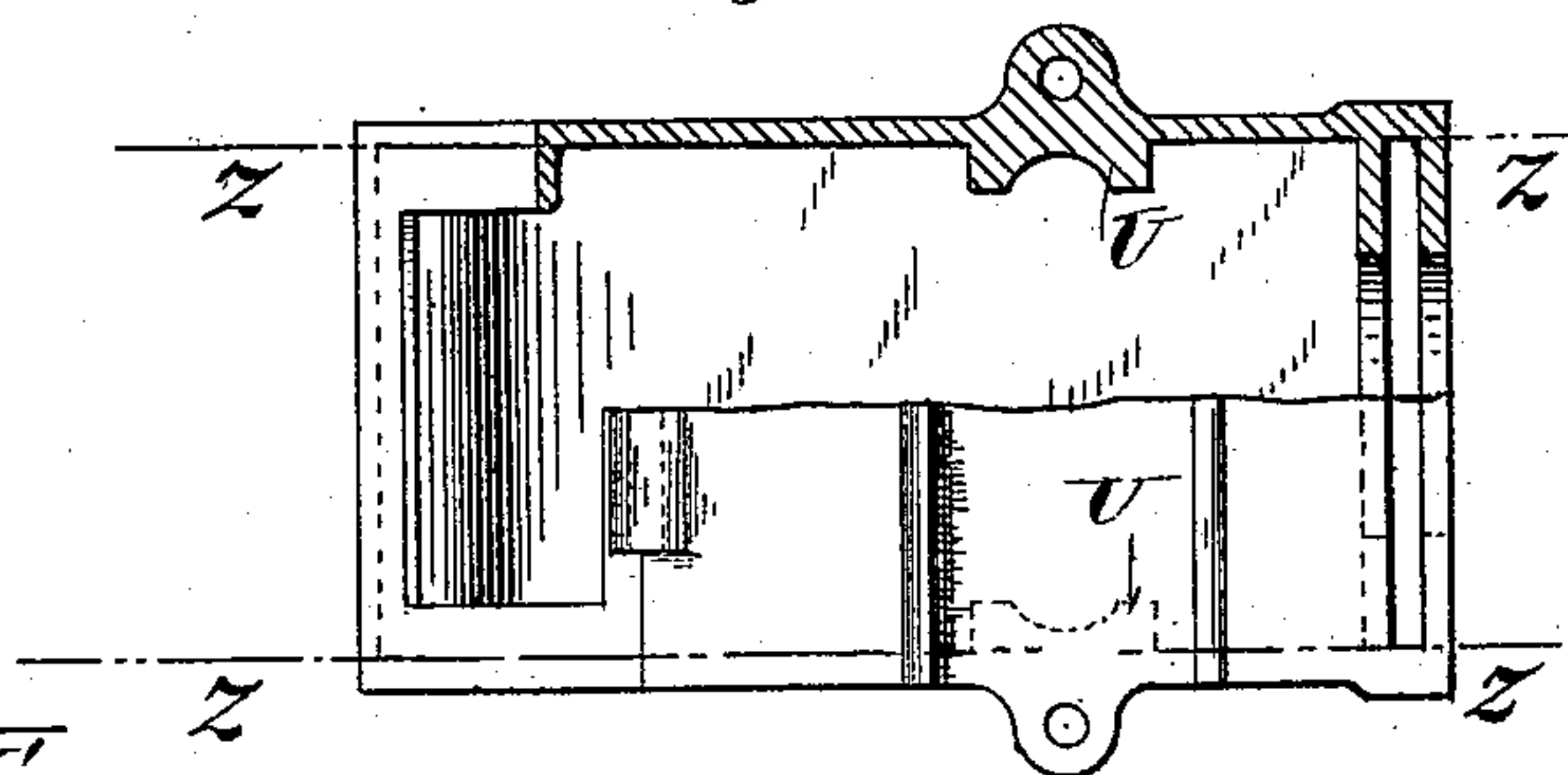


Fig. 7.

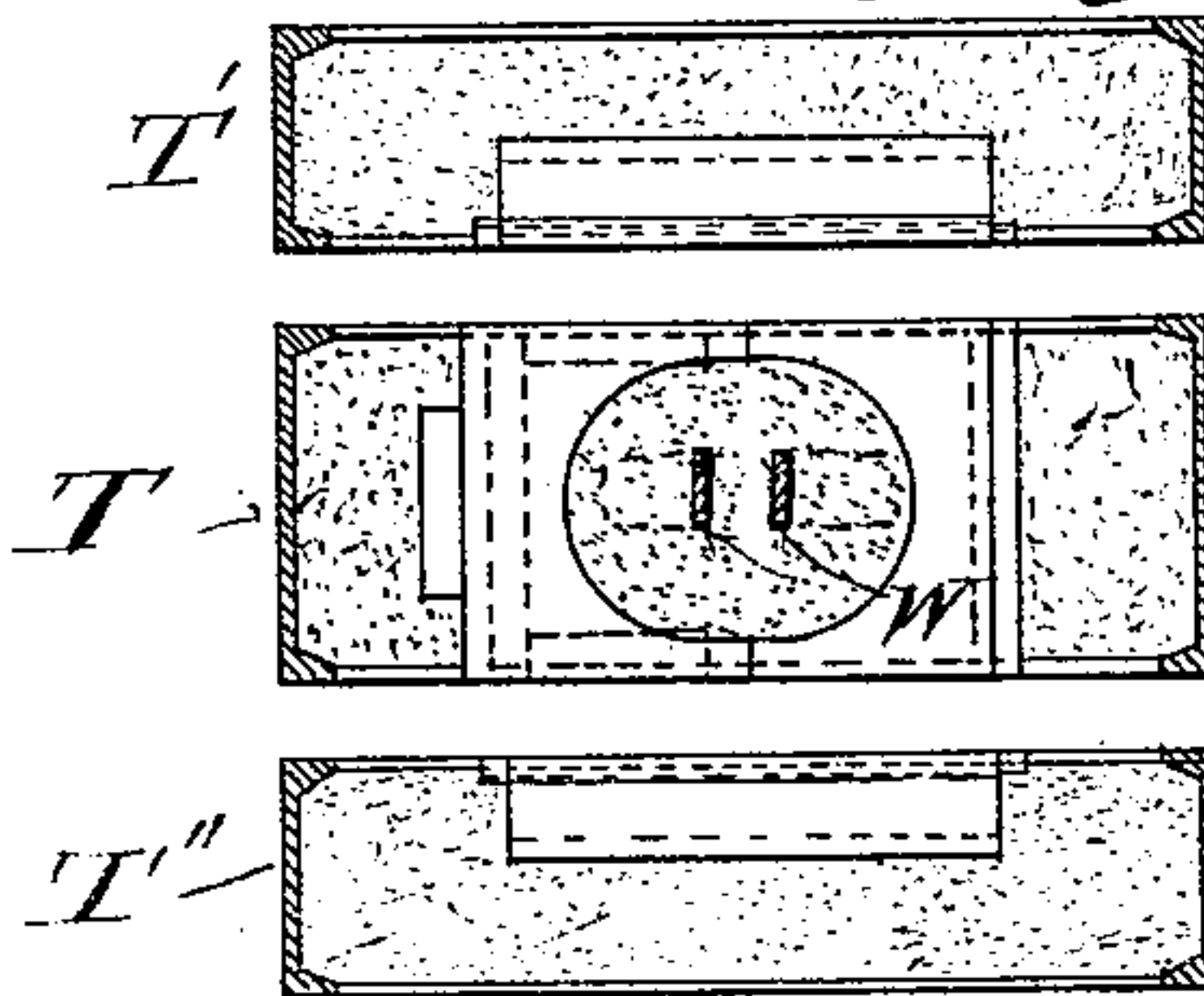
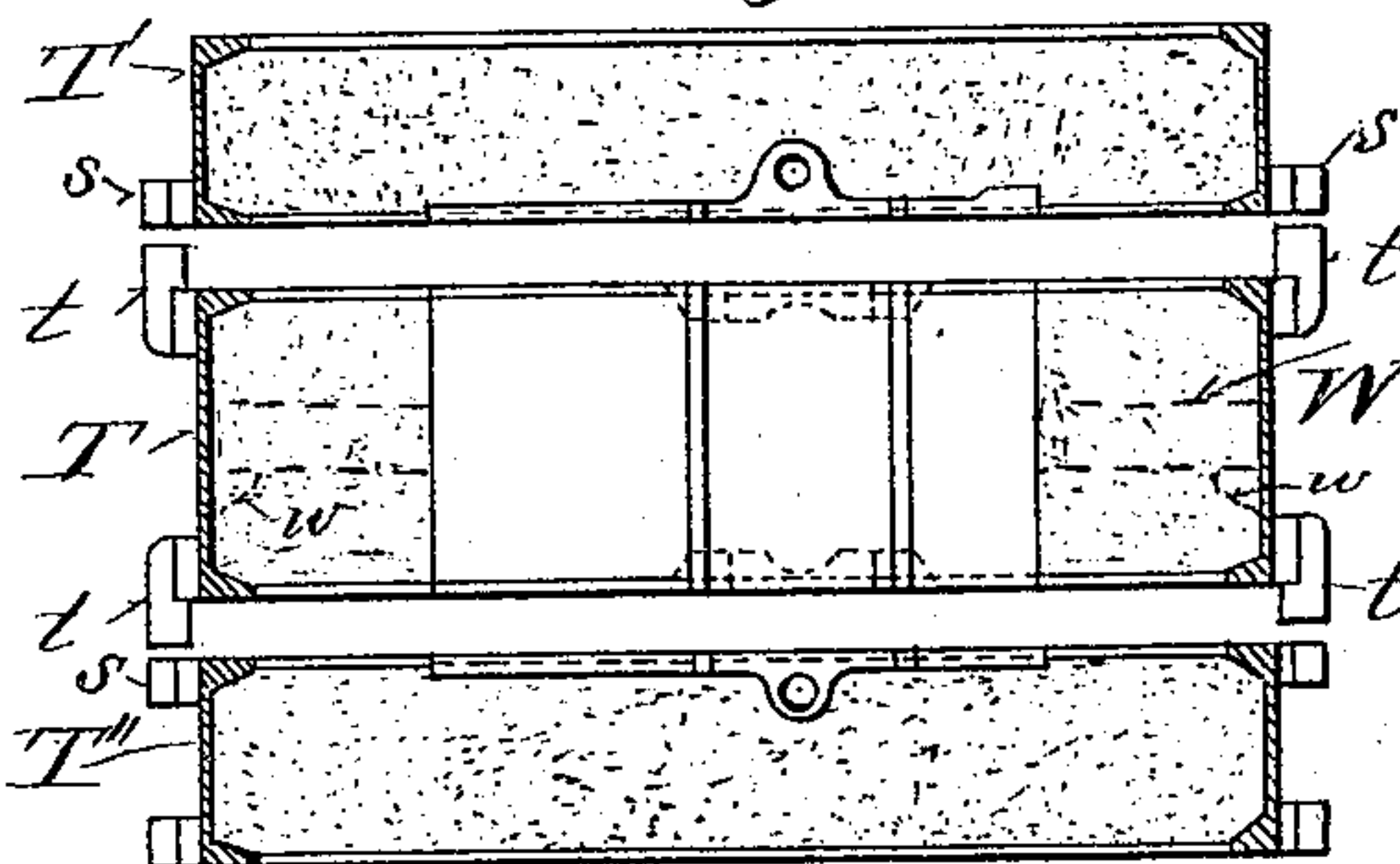


Fig. 8.



WITNESSES
H. M. Plaisted
Jas. C. Dawley.

INVENTOR
Henry A. Billings
By H. A. Goulburn
his Attorney.

UNITED STATES PATENT OFFICE.

HENRY A. BILLINGS, OF DAYTON, OHIO.

MOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 488,055, dated December 13, 1892.

Application filed March 24, 1892. Serial No. 426,179. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. BILLINGS, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Molding-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in molding-machines, the peculiarities of which will be hereinafter fully described and claimed.

15 In the accompanying drawings, on which like reference-letters indicate corresponding parts, Figure 1 a side view of my machine; Fig. 1^a, a detail of a guiding-box; Fig. 2, a vertical sectional view of my machine on the line *x x*, Fig. 1; Fig. 2^a, a plan view, on a larger scale, of the pattern which is employed in this machine; Fig. 3, a top view of the machine; Fig. 4, a plan view of the upper ramming-plate; Fig. 5, a plan view of the main flask, the line of division being taken at *y y*, Fig. 1; Fig. 6, a plan of a double flask with boxes therein, showing the side of each as they would appear when the cope is removed; Fig. 7, an end view of the journal-boxes, their matching sides as they would appear when the patterns are mounted in the flask and the flask itself complete, the section being taken on *v' v'*, Fig. 6; Fig. 8, a similar view to Fig. 7, showing the bottom of the box, the section being taken on *w' w'*, Fig. 6; Fig. 9, a plan and partial section of a box, showing parting-lines for pattern; and Fig. 10, a perspective view of the main flask with the pattern withdrawn.

40 I will proceed to describe my invention and illustrate it as applied to molding-machines for journal-boxes to the preparation of sand-cores for which it is especially adapted.

45 The letters A A designate standards or posts, of angular cross-section, firmly secured to a base B and turned forward at their upper ends to constitute supports for a cross-plate C, carrying the guides and cylinder D for the upper ramming mechanism, consisting of a piston E, connected by a rod F with a ramming-plate G, provided with guide extensions H, sliding in ways or guides I, having adjustable plates I', and carried by the

plate C. Steam is admitted above the piston by a pipe J, Fig. 1, and below by a passage J' through the plate C from a steam-chest K, supplied by a pipe L, as usual. The ramming-plate G may thus be operated up and down. A lower ramming mechanism consists of a single-acting piston M, mounted in a cylinder N, supplied from a steam-chest O. A set of rods P, carried by the piston, supports a ramming-head Q, carrying a plate R, constituting the lower ramming-plate. A guiding and measuring frame S, open at top and bottom and preferably rectangular, is carried by the standards A A. Side lugs s receive the guiding-lug *t* of the main portion T of a flask mounted on said frame and also open at top and bottom to allow the action of the upper and lower ramming-plates upon the sand therein. The upper ramming-head is provided with a detachable plate G', having projections and depressions corresponding to the depressions and projections, respectively, for the core W'. The shape of these projections on G' and R varies with the style of box molded, and the plates are therefore made detachable from the ramming-heads. I make the parting-line of the journal-box pattern pass through vertical planes through the inner surface of the sides of the box, as on the lines *z z*, Fig. 9. The portion of the pattern between these two lines is laid on its side on the ramming-plate R, and, being open above and below, the sand may be rammed within the pattern by the upper and lower ramming mechanism above described. The portions of the sides of the box extending within the planes of division *z z* (as the guide-lugs U, between which is to be fitted the journal-brass, and the side edge of the front of the box V) are carried by the detachable ramming-plates before mentioned, which thus make depressions in the sand-core corresponding with their inwardly-projecting position on the sides of the box to be made from this core. The central portion forming the core is supported by an irregular-shaped pronged core-support W, carried by lugs or projections *w*, Fig. 2, on the inside of the main portion of the flask. The ends of the core-support pass out of the front and rear openings in the box-pattern, as seen in Fig. 5. Fig. 2 shows the edge of this core-support

without the inclosing pattern shown in Fig. 5. When the latter pattern is placed on the ramming-plate R and the core-support in position, the sand or loam is thrown loosely into the main flask, the surplus scraped off even with the top of the flask, and the upper ramming-plate brought down to the position shown in Fig. 2. A rectangular frame *a* surrounds the head G and may be pressed upward against the springs *b*, working on the guide-bolts *c*, carried by lugs on the said head. This frame will engage first with the flask as the head is brought down and will hold it steady while the head and plate proceed downward through the space *g*, Fig. 2, approximately one inch, which constitutes the amount of ramming given to the sand above the core-support. At substantially the same time or following directly the lower ramming-plate R is raised through the space *r*, which space, being filled with sand, constitutes the amount of ramming given to the lower portion of the core, being two inches or thereabout. The upper portion of the core is rammed lighter, since the gases formed by casting accumulate in the upper part of the core. I facilitate their exit by providing a number of passages from the core to the outside of the flask through openings *d*. These passages are formed by rods *d'*, which are inserted in said openings and extend within the core, as shown by dotted lines, Fig. 2. On removing said rods communicating passages from the core to the outside are formed. This is a special feature of my device, which secures sound casting by the ready removal of the gases from the molten iron and loam. The rear walls of the journal-box are formed by projections *e* and *e'* from the upper ramming-head, which latter pass upward through slots in the lower ramming-plate R, being mounted on a platen *f*, carried by a U-shaped or forked piece *h*, passing within the lower ramming-head Q and supported by a piston-rod *i*, operated by a piston *j* within a cylinder *k*, supplied from a steam-chest *l*. Fig. 2^a shows this lower ramming-plate, through which project the rear wall-pieces *e'*. The pattern itself is placed in position on the plate which carries the projection from the side wall of the box in the finished casting. In Fig. 10, *e*² shows the mold-cavities formed by the said detachable piece, which passes downward through the upper ramming-plate, as in Fig. 2. The latter piston, being operated, forces the projecting rear walls *e'* of the pattern upward into the compressed core, meeting the matching portion *e*, pressed downward.

While the operation of the pistons has been described as following each other, there is no delay in their action, as they move practically simultaneously to complete the core by one operation. The upper ramming preferably begins first, in order to prevent lifting the core-support from the projections *w*. The amount of the spaces *g* *r* may be varied by

mounting different thicknesses of plates on the ramming-heads or otherwise. The loam is rammed from above and below to exactly the top and bottom edge of the main flask, so that the latter may be provided with a cope T' and drag T'', as shown in Figs. 7 and 8, to complete the flask and supply the sides of the molded box.

I wish to be understood as laying claim, broadly, to this partition of the pattern and mold along the sides instead of at the center, as is usual; also, to this core-support and its attachment to the main flask, whether such attachment be by resting the support on the projection *w*, as above described, or otherwise.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a molding-machine, the combination, with a flask and an open pattern parted at its upper and lower sides for a hollow casting to be made therein, of ramming mechanism for said flask and a core-support carried by said flask and arranged within said pattern and adapted to receive and hold the green sand packed about it by said ramming mechanism.

2. In a molding-machine, the combination, with a flask and a pattern therefor open on opposite sides and adapted to form hollow-ware castings, of a core-support arranged within said pattern and supported by said flask and oppositely-acting sets of ramming mechanisms operating upon the loam in said flask to pack the same about said core-support and pattern and form a mold for the article and a core therefor at one operation of the machine.

3. In a molding-machine, the combination, with a flask and a pattern for a journal-box, parted at its upper and lower sides, of a core-support mounted in said flask and arranged within the pattern, upper and lower ramming-heads, means to operate them to ram the loam within said flask, and detachable plates for said heads, having projections corresponding with said pattern and the sides thereof, whereby the loam packed within said pattern by said ramming mechanism will be held by said support and impressed by said plates according to the style of pattern molded and the projections on said plates.

4. In a molding-machine, the combination, with a flask, of a core-support mounted within said flask, adapted to receive and hold the loam rammed therein and constitute a green-sand core-support, and removable rods extending from near the upper portion of said core-support to the outside of said flask, whereby vents for gases are formed on the removal of said rods after ramming.

5. In a molding-machine, the combination, with a flask and a pattern for a journal-box, parted at the upper and lower sides, substantially as described, of a core-support for said journal-box, the said core-support being arranged within the pattern which is used within

said flask, upper and lower ramming-plates having projections corresponding to the portions of the sides extending within said box, and auxiliary pieces for the back walls of said oil-box, and means to support and press them into said core within the flask.

6. In a molding-machine, the combination, with a flask and a pattern for a journal-box, said pattern being parted along the inner walls of the upper and lower sides thereof when resting on its side, substantially as shown and described, of a core-support for said box, carried by said flask and arranged within said pattern, ramming-plates having projections, substantially as described, and means to operate said ramming-plates, de-

tachable pieces adapted to form substantially half the rear walls of said box when mounted in the upper ramming-plate, and a secondary plate adapted to carry the other half of said rear walls formed by said detachable pieces, and means to operate one or both of said plates and force the side pieces into said core to shape the mold-cavities for said rear walls, substantially as shown and described.

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

HENRY A. BILLINGS.

Witnesses:

OLIVER H. MILLER,
JAS. C. DAWLEY.