

No. 850,770.

PATENTED APR. 16, 1907.

J. MACPHAIL.  
MOLD FORMING MACHINE.  
APPLICATION FILED DEC. 11, 1905.

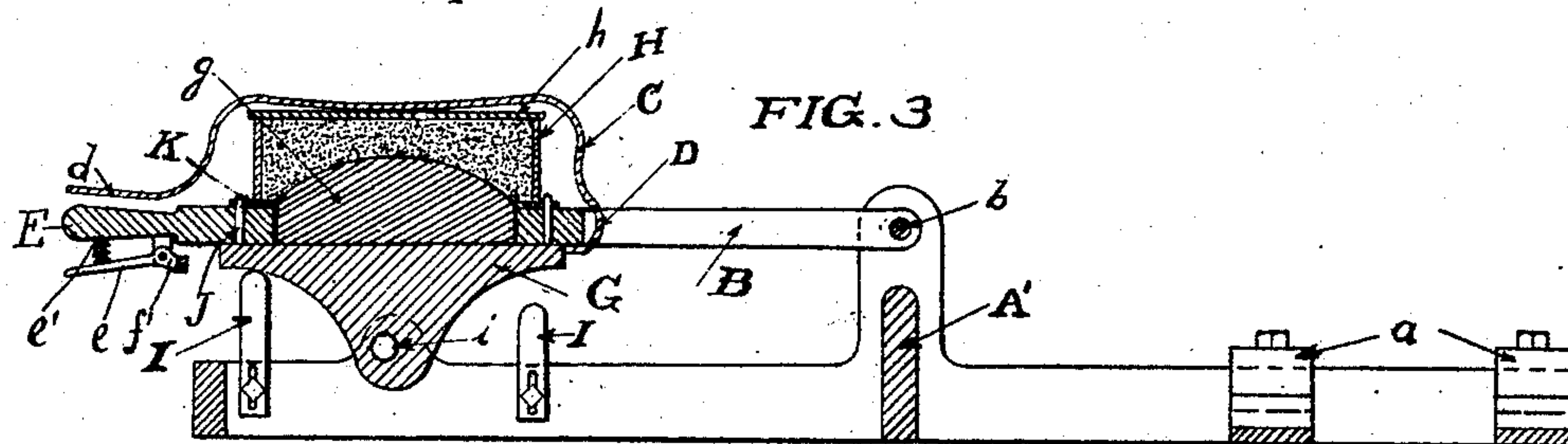
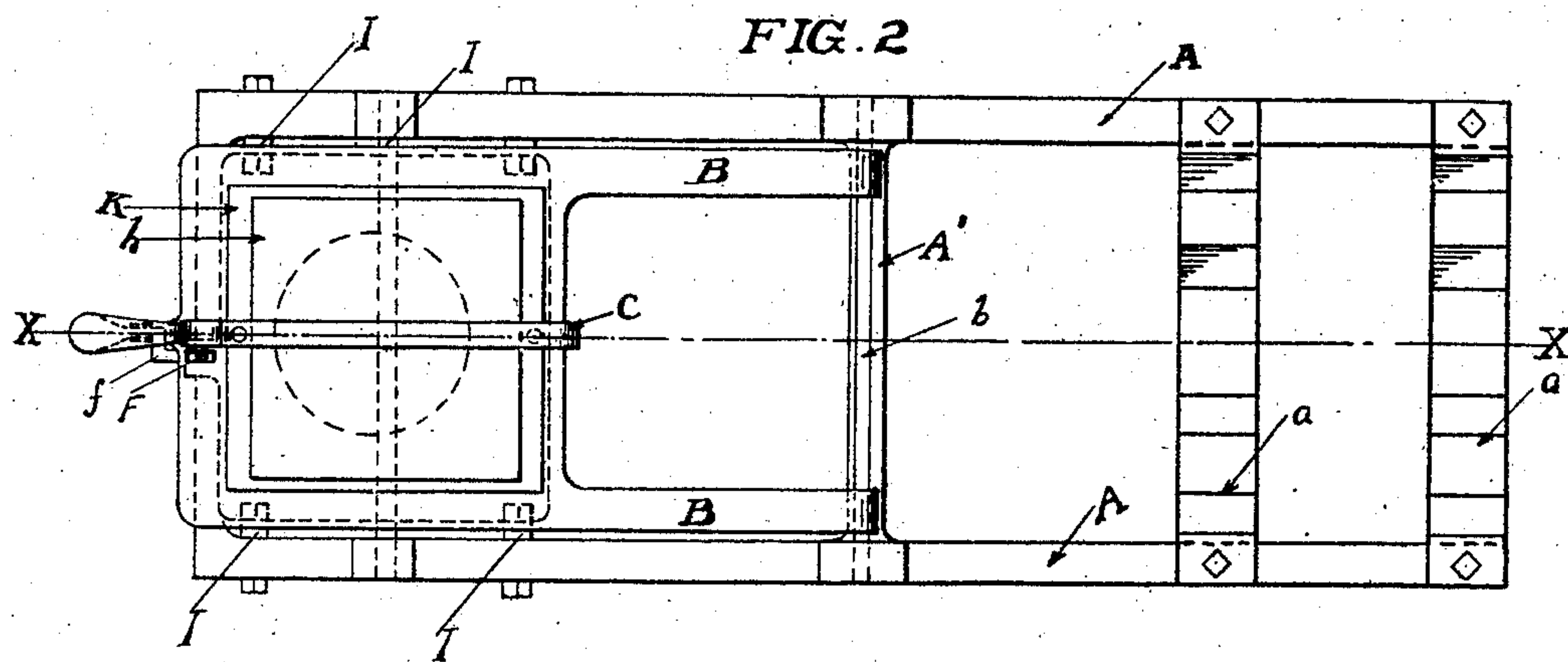
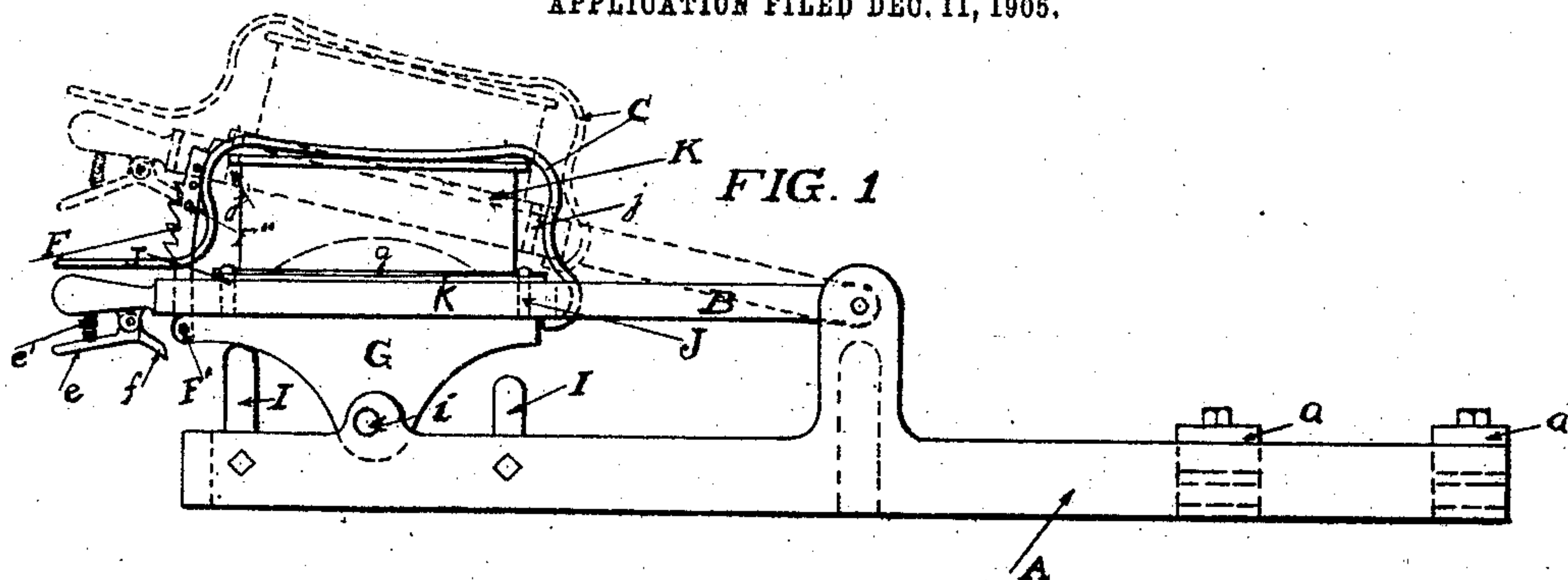


FIG. 5

WITNESSES:  
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# UNITED STATES PATENT OFFICE.

JAMES MACPHAIL, OF MOLINE, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO KILLING MOLDING MACHINE COMPANY, OF DAVENPORT, IOWA, A CORPORATION.

## MOLD-FORMING MACHINE.

No. 850,770.

Specification of Letters Patent.

Patented April 16, 1907.

Application filed December 11, 1905. Serial No. 291,349.

*To all whom it may concern:*

Be it known that I, JAMES MACPHAIL, a citizen of the United States of America, residing at Moline, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Machines for Forming Molds for Metal Castings, of which the following is a specification.

My invention relates to improvements in machines for forming sand molds for metal castings, and has for its object the quickening of the operation of forming such molds by machines and the construction of a simple practical machine for that purpose.

I illustrate my invention by the accompanying drawings, in which similar letters refer to similar parts in all the figures.

Figure 1 is a side view showing the flask, and in dotted lines the flask drawn from the pattern. Fig. 2 is a top view. Fig. 3 is a vertical longitudinal section on the line X X of Fig. 2. Fig. 4 is a detail view of the stepped braces *a a*. Fig. 5 is a detail view of the forked end of the clamp.

The pattern-plate G, fitted with a pattern *g*, is mounted upon the base-frame A, either rigidly or eccentrically pivoted by a pivot-pin *i*, as shown, depending upon the form of casting to be made. I are slotted adjustable supports for the pattern-plate G, secured to the base-frame. Shallow castings can be made from a rigidly-secured pattern-plate, but deeper castings require a pivoted pattern-plate to give the pattern sufficient play to allow the mold to be drawn without breaking.

A swinging frame B is pivoted in uprights upon the base-frame A by pivot *b*.

A stripping-plate K is adapted to receive the flask H and is secured to the swinging frame B by pins J entering holes *j*.

A removable clamp C is provided to secure the flask H and bottom board *h* in position upon the stripping-plate while the swinging frame is in motion. This clamp C has its inner end D forked and recurved to engage the swinging frame and its outer end *d* formed into a handle adapted to be grasped by the hand of the operator, together with the handle E of the swinging frame B.

A segmental rack F, having a series of pin-holes F'', is secured to the pattern-plate pivotally by a pivot-pin F' and extends

through a slot in the swinging frame, and in this rack works the spring stop or catch *f*, hinged to the handle E of the swinging frame and which holds the swinging frame raised from the pattern-plate when it reaches a certain height until released by the lever *e*. The spring *e'* throws the stop or catch *f* against the rack F when not held compressed by the lever *e*.

Many classes of castings can be removed with the swinging frame raised only sufficiently to allow the flask to clear the pattern; but when desired the swinging frame can be given a half-revolution around its pivot, and when this is done the clamp C falls into the depressions of the stepped braces *a a* and is released by pushing it in the direction of the pivot of the swinging frame, thus throwing the forked end free from the swinging frame and allowing the swinging frame to be returned to its first position, leaving the bottom board and flask with the mold resting upon the braces *a a*.

In making molds the rapid duplication of the mold is an essential object. Heretofore in machines of this class a full half-revolution of the swinging frame has been required. In this machine only such a partial revolution of the swinging frame is necessary as will allow the stripping-plate to clear the pattern. The mold can then be removed and the process repeated.

In operation the pattern is mounted upon the pattern-plate. The swinging frame carrying the stripper-plate is swung down to rest the stripping-plate upon the pattern-plate. The flask is placed upon the stripping-plate, filled and rammed, the bottom board placed upon the flask, and the clamp placed in position to hold the flask and bottom board in position. The swinging frame is then raised until it will clear the pattern and is supported temporarily upon the segment-rack or through a half-revolution, as desired. The flask can be removed as soon as the swinging frame is sufficiently raised or swung through a half-revolution and released by pushing the clamp toward the middle of the base-frame or pivot of the swinging frame. The flask having been removed, the swinging frame is then ready to be swung to its first position and the process repeated with another flask.



The pattern-plate G is preferably pivoted sufficiently off center to cause its weight to tilt it slightly in the direction of the pivot b, thus facilitating the replacement of the swinging frame upon it, as by allowing it or causing it to tilt toward the middle of the machine the entrance of the pins J into the guide j is facilitated.

It is obvious that for many forms of castings no bottom board will be required.

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

1. In a mold-forming machine, the combination of a base, a swinging flask-receiving frame pivoted to said base, and a detachable clamp for holding the flask against said frame; said clamp having an inturned rear end adapted to engage the frame, substantially as set forth.

2. In a mold-forming machine, the combination of a base, a swinging flask-receiving frame pivoted to said base, and a detachable clamp for holding the flask against said frame; said clamp having an inturned forked rear end adapted to engage said frame, substantially as set forth.

3. In a mold-forming machine, the combination of a base, a swinging flask-receiving frame pivoted to said base and provided at its forward end with a handle, and a clamp for holding the flask to said frame; said clamp having a forwardly-turned rear end adapted to engage said frame and being provided with a handle at its forward end, substantially as set forth.

4. In a mold-forming machine, the combination of a base, a pattern-supporting member having pivotal connection with said base, and a swinging flask-receiving frame pivoted to said base and arranged for movement to said pattern-supporting member, substantially as set forth.

5. In a mold-forming machine, the combination of a base, a pattern-supporting member having pivotal connection with said base, a swinging flask-receiving member pivoted to said base, and a stripper carried by said swinging frame, substantially as set forth.

6. In a mold-forming machine, the combination of a base, a pattern-supporting member pivoted to said base, a swinging flask-receiving frame pivoted to said base, and guide-pins projecting from said pattern-supporting member and adapted to enter said swinging frame, substantially as set forth.

7. In a mold-forming machine, the combination of a base, a pattern-supporting member supported by said base, a swinging flask-receiving frame pivoted to said base, and means for supporting said frame above said pattern-supporting member to permit the removal of a flask from said frame, substantially as set forth.

8. In a mold-forming machine, the combi-

nation of a base, a pattern-supporting member supported by said base, a swinging flask-receiving frame pivoted to said base, and catch members carried by said pattern-supporting member and said frame and arranged for engagement with each other to support said frame above said pattern-supporting member, substantially as set forth.

9. In a mold-forming machine, the combination of a base, a pattern-supporting member supported by said base, a swinging flask-receiving frame pivoted to said base, a catch member pivoted to said pattern-supporting member, and a catch member carried by said frame arranged for engagement with said pivoted catch member, substantially as set forth.

10. In a mold-forming machine, the combination of a base, a pattern-supporting member supported by said base, a swinging flask-receiving frame pivoted to said base, a rack pivoted to said pattern-supporting member and extending through said frame, and a spring-controlled catch carried by said frame and arranged for engagement with said rack, substantially as set forth.

11. The combination, with a flask and swinging frame, of the clamp having a forked end and adapted to detachably embrace the flask and swinging frame.

12. In a mold-forming machine, the combination with a base-frame, of a swinging frame pivoted therein adapted to receive a flask, a handle on the outer end of the swinging frame, a removable clamp having one end bent to engage the swinging frame, the other end formed into a handle adapted to be grasped by the hand of the operator together with the handle of the swinging frame, and the intermediate portion bent to secure a flask or flask and bottom board in position during the partial revolution of the swinging frame.

13. In a mold-forming machine, the combination with a swinging frame pivoted in a base-frame, of a pattern-plate eccentrically pivoted upon the base-frame.

14. In a mold-forming machine, the combination with a swinging frame pivoted in a base-frame, of a pattern-plate pivoted to the base-frame, a stripping-plate secured to the swinging frame, and guide-pins secured to the pattern-plate entering openings in the swinging frame.

15. In a mold-forming machine, the combination with a swinging frame pivoted in a base-frame, of a pattern-plate secured upon the base-frame, and a segmental rack secured to the pattern-plate, adapted to engage a spring-catch pivoted to the swinging frame.

16. In a mold-forming machine, the combination with a swinging frame pivoted in a base-frame, of a pattern-plate secured upon the base-frame, a stripping-plate secured to the swinging frame, and a segmental rack secured to the pattern-plate adapted to en-



gage a spring-catch pivoted to the swinging frame.

17. In a mold-forming machine, the combination with a base-frame, of a swinging frame pivoted thereon, a pattern-plate pivoted upon the base-frame, guides secured to the pattern-plate adapted to enter holes in the swinging frame, a handle on the outer end of the swinging frame, a removable clamp having one end bent to engage the swinging frame, the other end formed into a handle adapted to be grasped by the hand of the operator together with the handle of the swinging frame, and its intermediate portion bent to secure a flask or bottom board and flask in position upon the swinging frame or a stripping-plate secured thereto during the partial revolution of the swinging frame.

18. In a mold-forming machine, the combination with a swinging frame pivoted in a base-frame, of a pattern-plate pivoted upon the base-frame, a stripping-plate secured to the swinging frame, guide-pins secured to the pattern-plate adapted to enter suitable openings in the swinging frame, a handle formed on the outer portion of the swinging

frame, a segmental rack secured to the pattern-plate, a spring-catch pivoted to the handle of the swinging frame adapted to engage the segmental rack, a separable clamp having one end bent to engage the swinging frame, the other end formed into a handle adapted to be grasped by the hand of the operator together with the handle of the swinging frame and its intermediate portion adapted to secure a flask or bottom board and flask upon the swinging frame or stripping-plate during the partial revolution of the swinging frame, cross-braces secured to the base-frame at the end opposite to the pattern-plate, adapted to receive the bottom board and flask and having a depressed middle portion adapted to allow the clamp to slide therein without disturbing the bottom board or flask when resting upon such braces.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES MACPHAIL.

Witnesses:

JOE SHOREY,  
A. G. BUSH.