

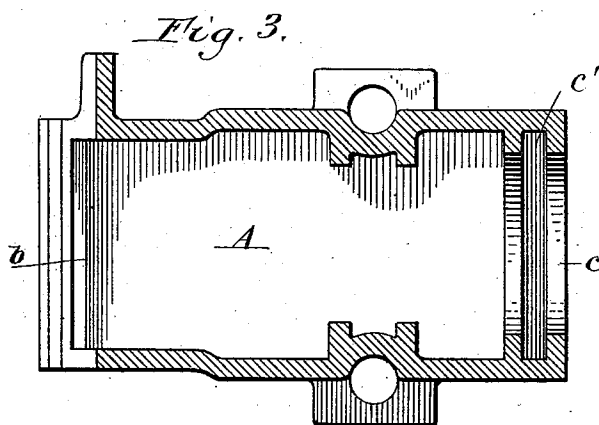
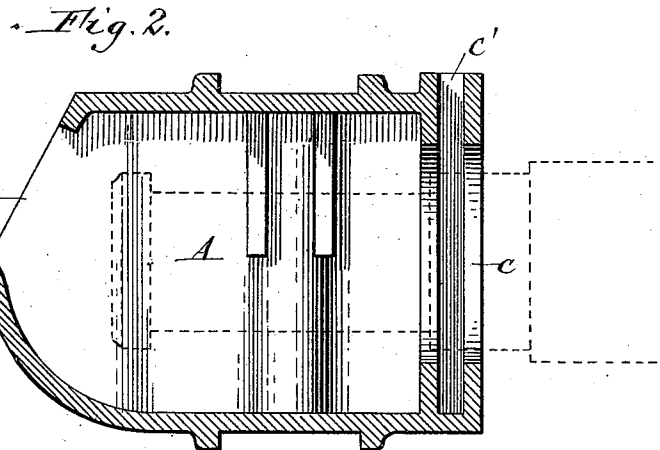
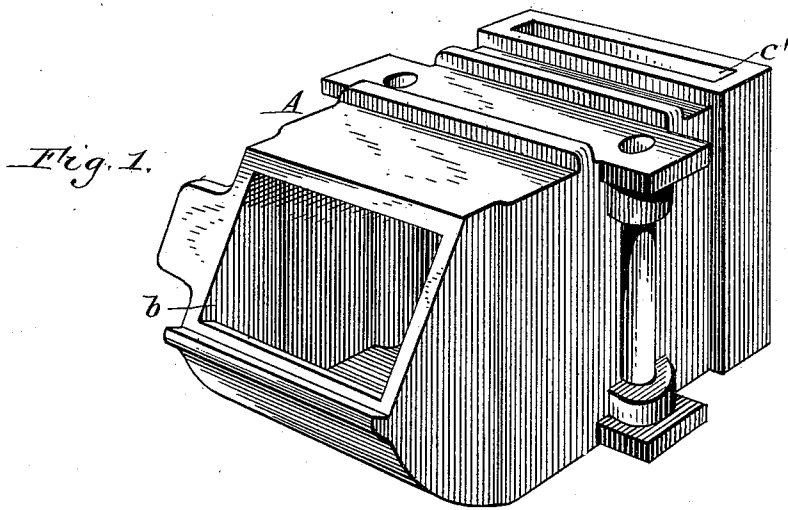
(No Model.)

3 Sheets—Sheet 1.

C. F. BINGHAM.  
GREEN SAND CORE.

No. 507,406.

Patented Oct. 24, 1893.



Witnesses:  
Thos. L. Popp  
Friedrich, Gustav Wilhelm  
Chas. F. Bingham Inventor.  
By Wilhelm Hornet.  
Attorneys.

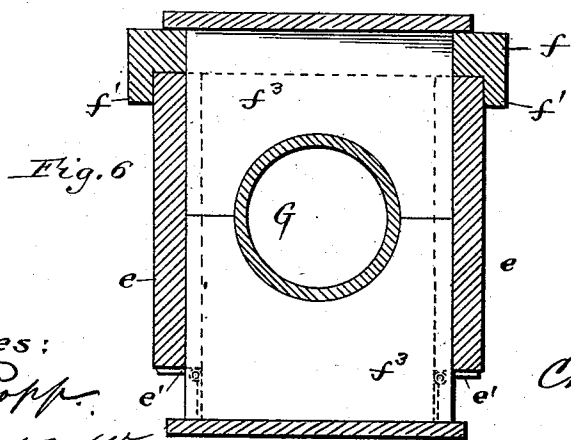
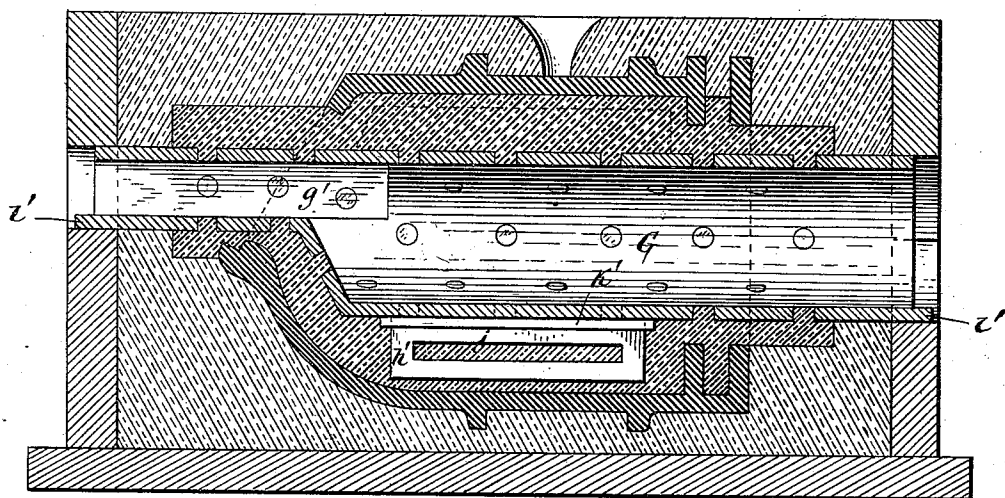
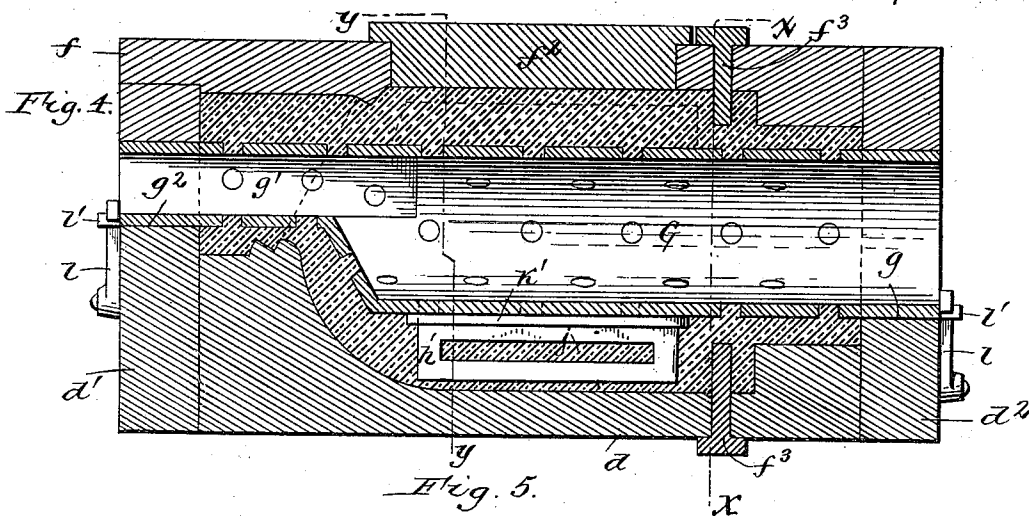
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3 Sheets—Sheet 2.

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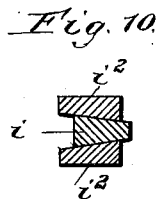
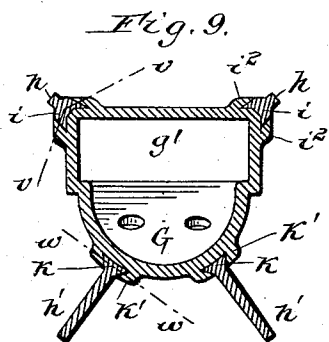
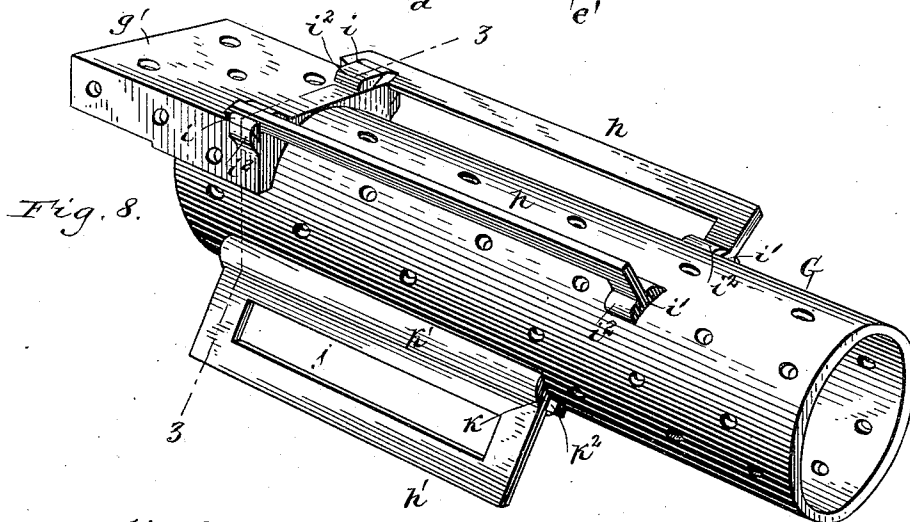
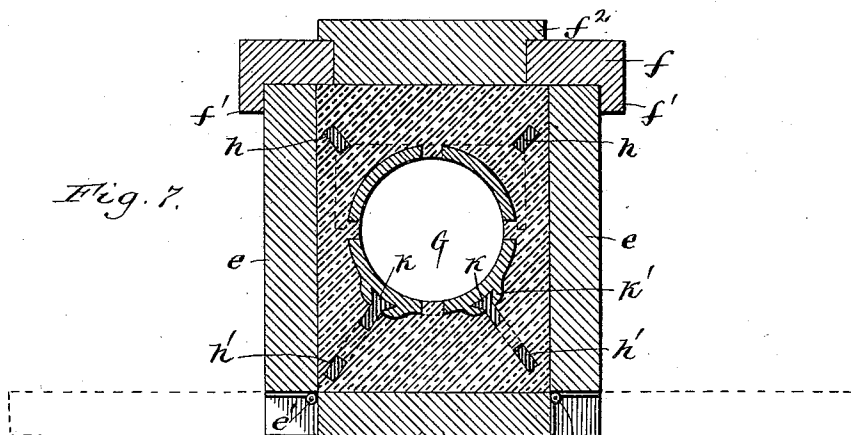
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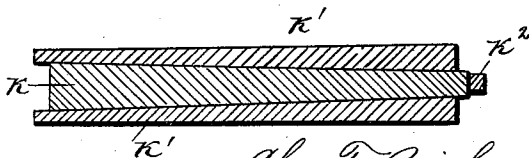
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*Fig. 11.*



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# UNITED STATES PATENT OFFICE.

CHARLES F. BINGHAM, OF BUFFALO, NEW YORK.

## GREEN-SAND CORE.

SPECIFICATION forming part of Letters Patent No. 507,406, dated October 24, 1893.

Application filed April 4, 1892. Serial No. 427,592. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES F. BINGHAM, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Green-Sand Cores, of which the following is a specification.

This invention relates to the construction of green sand cores for casting journal boxes and similar hollow articles having end openings of smaller diameter than the body of the casting and which require a core of comparatively small diameter at its ends for forming the end openings of the casting and of much larger diameter between its ends for forming the body portion thereof. The use of a green sand core having an ordinary core barrel is impracticable for this purpose, because the portion of the sand core which is to form the body portion of the casting is liable to break upon removing it from the core box. Owing to this difficulty, it has been the custom to cast articles of the foregoing description by means of dry sand cores, and, as is well known, the preparation of a dry sand core requires more time and involves more expense than that of a green sand core.

The object of my invention is to produce a core barrel which will permit the use of a green sand core for forming such castings and thereby effect an important saving in time and expense.

My invention has the further object to provide a box for forming such a core which facilitates the removal of the core from the box.

In the accompanying drawings consisting of three sheets: Figure 1 is a perspective view of a journal box, which may be cast with a green sand core constructed in accordance with my invention. Figs. 2 and 3 are vertical and horizontal sections thereof, respectively. Fig. 4 is a vertical longitudinal section of the core-box with the core-barrel and the core in the same. Fig. 5 is a vertical longitudinal section of a molding flask, showing a journal box cast in the mold with the core in place within the mold. Figs. 6 and 7 are transverse sections in lines  $x-x$  and  $y-y$ , Fig. 4, respectively. Fig. 8 is a perspective view of the core barrel. Fig. 9 is a vertical cross section in line  $z-z$ , Fig. 8. Figs. 10 and 11 are longitudinal sections in lines  $v-v$  and  $w-w$ , Fig. 9.

Like letters of reference refer to like parts in the several figures.

Although my improvements may be used for forming cores for casting all hollow articles having openings in their walls which are smaller than the cavity in the body of the box, I have selected a journal box to illustrate my invention. This journal box consists essentially of a hollow body A, having an oil opening  $b$  in its outer end, an axle opening  $c$  in its inner end, and a vertical pocket or guide-way  $c'$  which receives the usual dust-guard, the oil and axle openings being of smaller dimensions than the interior of the journal box.

$d$  represents the bottom of the core box,  $d'$  the front end wall, and  $d''$  the rear end wall thereof, both of which walls are rigidly secured to the bottom.

$e e$  represent the upright side walls of the core box which are hinged at their lower ends to the longitudinal edges of the bottom  $d$ , as shown at  $e'$ .

$f$  represents the top of the core box which rests upon the upper ends of the side and end walls and which is provided at its longitudinal edges with depending ribs or flanges  $f'$  which engage against the outer sides of the side walls and hold the latter in an upright position in filling the core box with sand. The top is provided with an opening which is closed by a removable cover  $f^2$  and which permits sand to be introduced into the core box after the top is in place.

$f^3$  represents removable pieces arranged in the top and bottom of the core box and extending into the latter for forming part of the guide-ways  $c'$  of the journal box. The inner sides of the top, bottom, side and end walls are shaped to correspond to the interior surface of the journal box or other hollow object which is to be cast.

G represents the core barrel whereby the green sand core is supported in the molding flask. This core barrel rests with its rear end in a seat  $g$  formed in the rear wall of the core box and is provided at its front end with a rectangular portion  $g'$  which rests in a seat  $g^2$  formed in the front wall of the core box. The core barrel is provided with the usual vent openings.

$h h'$  represent removable wings or projections attached to the core barrel and which

aid in supporting the green sand core on the barrel. The latter is arranged with its end portions in those portions of the core which form the oil and journal openings at opposite ends of the journal box, and the wings are arranged on the core barrel between its ends, so as to support those portions of the core which form the hollow body of the journal box. These wings extend outwardly from the core barrel beyond the inner edges of the oil and journal openings of the box, so as to reliably support that portion of the core forming the hollow body and prevent the same from breaking by its own weight. The core barrel is preferably provided with two upper wings *h* and two lower wings *h'* arranged equidistant, or nearly so, around the core barrel. The upper wings consist of longitudinal bars separated from the surface of the barrel by an intervening space and having dove-tails *i* *i'* at their front and rear ends. These dove-tails engage with correspondingly shaped ways or grooves *i*<sup>2</sup> formed on the upper sides of the core barrel and its rectangular extension. Each of the lower wings is provided with an opening *j* and the inner longitudinal bars of the wings are provided with dove-tails *k* which engage with similarly shaped ways *k'* formed on the lower side of the core barrel. The dove-tails and their ways are preferably tapered toward the rear end of the core barrel, as represented in Figs. 10 and 11, which enables the wings to be firmly wedged upon the core barrel by moving them rearwardly in their ways. If desired, a stop *k*<sup>2</sup> may be formed on the core barrel at the rear end of the dove-tail ways, as represented in Figs. 8 and 11, whereby the wings are prevented from being wedged too tightly in the guides.

Preparatory to molding the green sand core, the top of the core box is removed, the side walls are swung downwardly, as indicated by dotted lines in Fig. 7, and the core barrel with its wings is placed in the core box. Molding sand is then packed underneath the core barrel until the space below the same is filled, when the side walls are raised and held in an upright position by a clamp of the usual construction. Sand is next rammed between the side walls and the core barrel from above, and the top placed upon the side and end walls, so as to close the upper side of the core box. The cover of the top is then removed and sand is introduced through the cover opening to fill the space between the upper side of the core barrel and the top, after which the cover is replaced. The sand located between the longitudinal bars of the upper wings and the core barrel and in the openings of the lower wings, forms an anchor, whereby those portions of the core forming the cavity of the journal box are sustained and prevented from breaking from the weight of the sand. The sliding pieces arranged in the bottom and top of the core box are next re-

moved and the top is raised, which permits the side walls to swing downwardly. This leaves the finished core exposed on its top and sides and permits the same to be freely raised from the bottom and placed in the previously prepared mold.

In order to prevent any accidental movement or displacement of the core barrel in ramming the sand between the under side of the core barrel and the bottom of the core box, the end walls of the latter are preferably provided with hinged hooks *l* which engage over projecting lugs *l'* formed on the ends of the core barrel and hold the latter securely in the seats *g* *g*<sup>2</sup> in the end walls of the core box. The core barrel is readily released from these hooks by swinging the hooks backwardly when the core is completed and ready to be removed from the core box.

Upon removing the cast journal box from the flask and withdrawing the core barrel through the journal opening of the box, the wings, striking against the rear contracted portion of the journal box, become detached from the core barrel by the outward movement thereof, the wings and the sand core collapsing inside the box as soon as the core barrel is wholly withdrawn, in which condition they can be easily removed.

By constructing the core box as described, the molding of the core is facilitated and the liability of breaking the core in removing the same from the core box is avoided.

I claim as my invention—

1. The combination with the core barrel having longitudinal dove-tail ways, of longitudinal anchoring wings projecting beyond the surface of the barrel and having longitudinal dove-tail tenons which engage with the corresponding ways of the barrel, substantially as set forth.

2. The combination with the core barrel provided with tapering dove-tail ways, of wings provided with tapering dove-tails engaging with said ways, substantially as set forth.

3. The combination with a core barrel having wings or projections between its ends, of a core box having a bottom, end walls secured to the bottom and provided with seats for supporting the ends of the core barrel, movable side walls hinged or pivoted to the bottom, and a removable top or cover, substantially as set forth.

4. A core box for forming sand cores, provided with a bottom and end walls, movable side walls hinged or pivoted to the bottom, and a removable top or cover, substantially as set forth.

Witness my hand this 30th day of March, 1892.

CHARLES F. BINGHAM.

Witnesses:

FRED. C. GEYER,

ALICE G. CONNELLY.