No. 627,666. Patented June 27, 1899.

F. A. DUNCAN.

MOLD.

(Application filed Aug. 15, 1898.)

(No Model.)

FIG. 1.

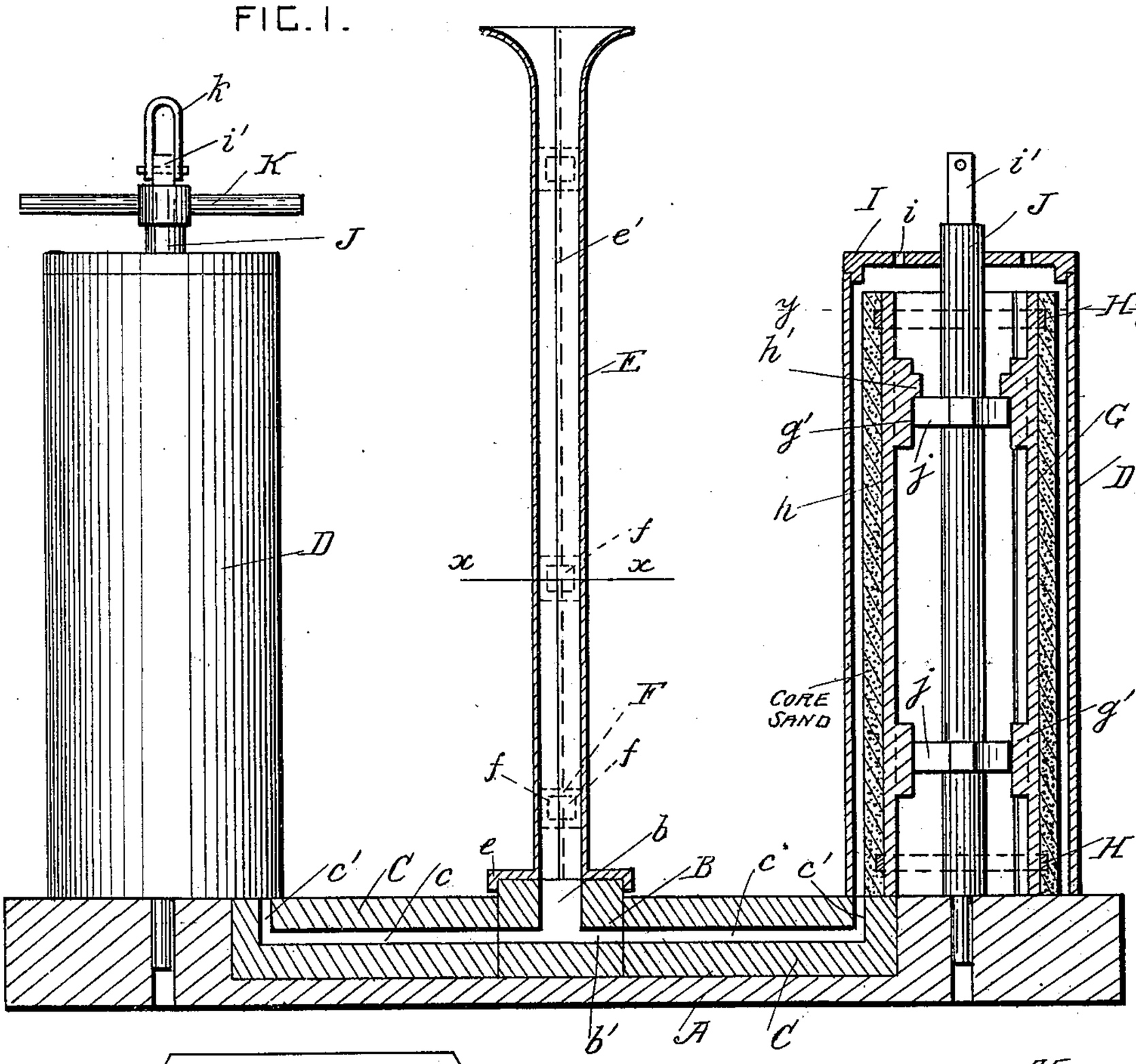


FIG. 2.

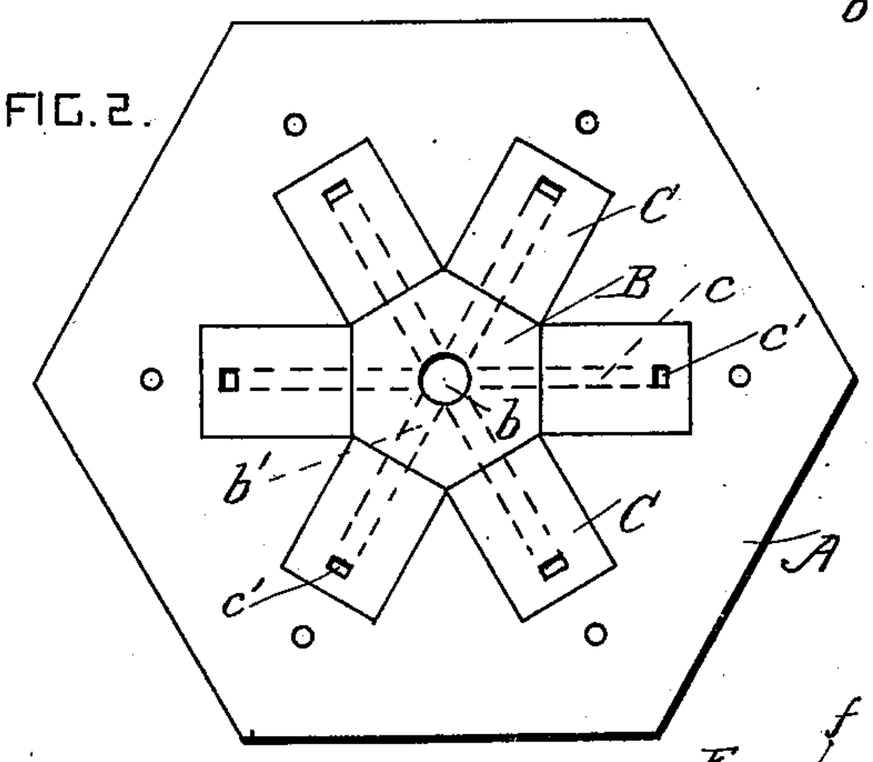


FIG. 4.

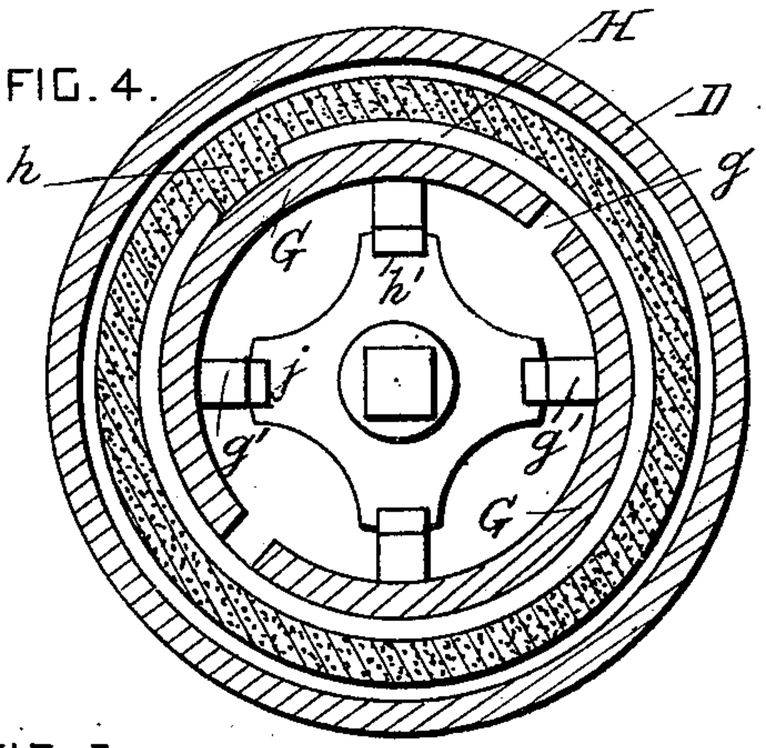
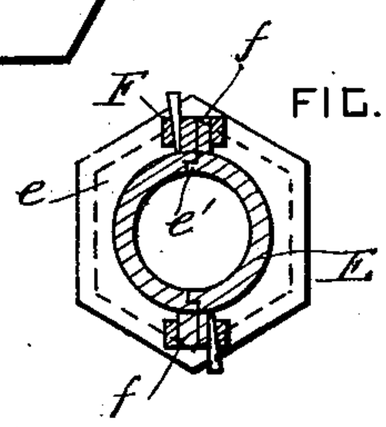


FIG. 3.



WITNESSES

H. Stevens

George H. Blair

INVENTOR

Francis A. Duncan.

by Herbert W. Jenner.

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FRANCIS A. DUNCAN, OF FINDLAY, OHIO.

MOLD.

SPECIFICATION forming part of Letters Patent No. 627,666, dated June 27, 1899.

Application filed August 15, 1898. Serial No. 688,557. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS A. DUNCAN, a citizen of the United States, residing at Findlay, in the county of Hancock and State of Ohio, have invented certain new and useful Improvements in Molds; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to molds for hollow steel ingots; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

In the drawings, Figure 1 is a vertical section through the molds and their base-plate. Fig. 2 is a plan view of the base-plate, drawn to a smaller scale. Fig. 3 is a cross-section through the pouring-gate, taken on the line x x in Fig. 1 and drawn to a larger scale. Fig. 4 is a cross-section through the mold, taken on the line y y in Fig. 1 and drawn to a larger scale.

A is a base-plate for supporting all the molds.

B is a block of fire-clay or other equivalent refractory material let into a recess in the base-plate and provided with a single central opening b in its upper side and a series of radial and laterally-projecting passages b'. The passages b' all communicate with the opening b, and a separate passage is provided for each mold.

C are blocks of fire-clay or other equivalent refractory material, each provided with a horizontal and laterally-extending passage c, connected at one end to one of the passages b' and having a vertical upwardly-projecting passage c' at its other end. The blocks C are dropped into the recess in the base-plate, and the molds are stood upon the base-plate over the passages c'.

E is a pouring-gate, which is arranged over the block B and centrally of all the molds. The bottom of the gate E is provided with a socket e, which engages with the upper part of the block B. The gate E is made in two halves or sections which can be separated longitudinally, and e' are lips on one section which fit into grooves in the other section. Each section is provided with lugs f, which are arranged opposite each other in pairs, and F are clamps which are slipped over the adjacent lugs and fastened with wedges, so as to hold together the two halves or sections of the gate. Any other approved clamping device may, however, be used in place of the clamps shown for holding the sections of the pouring-gate together.

D are the molds, which are preferably arranged equidistant from each other around the pouring-gate. Six similar molds are preferably connected to one pouring-gate; but the number of molds may be more or less than six, if desired. Each mold D consists of a metal cylinder which rests by gravity on the base-plate. Each mold is provided with a core which is preferably collapsible. Each core is provided with a support for the core-sand. Each support preferably consists of two ore more core-plates G, and when only two core-plates are used they are substantially semicylindrical. The core-plates have spaces g between their adjacent edges and lugs g' on their inner surfaces.

H are spring-bands, which are divided on one side and which partially encircle the core-plates and hold them in the form of a cylinder and prevent them from moving too far apart when in their expanded position. The core is provided with an outer covering or casing h of core-sand or equivalent material, which adheres to the core-plates and the spring-bands and forms the interior of the mold. The upper lugs g' are provided with projections h' for use in raising and lowering the core.

I is a cover for the mold provided with vent-holes i.

J is the core-spindle, which is journaled in the cover I and in the base-plate A. The upper end i' of the spindle is angular or square, so as to engage with a handle K, and it is provided with a hole for the attachment of the shackle k of a lifting-tackle of any approved construction. The spindle J is provided with projections j, which bear against the lugs g' and hold the core-plates in their expanded position. Any number of lugs and projections may be used, but they must be arranged so that the projections can pass vertically between the lugs on the core-plates.

Certain of the projections *j* come under the projections *h'*, so that the whole core can be lifted by means of its spindle and can be lowered into position in the mold.

The molten steel is poured into the pouring-gate, and it is distributed to the molds through the passages in the fire-clay blocks. The molten steel rises in the molds and forms the ingots. The pouring-gate is made in separate sections, so that the bar of cast-steel which is formed inside it may be liberated. When the steel in the molds has set, the spindle of each core is operated by means of its handle, and it is partially revolved, so that the projections *j* are clear of the lugs *g'*. The spindle can then be removed from the core, and the core-plates collapse as the ingot cools and permit the ingot to contract without gripping the core. The hot ingot can be removed from the mold and core without waiting for it to cool.

What I claim is—

1. The combination, with a base-plate provided with a vertical hole, and a mold resting on the said base-plate around the said hole; of a core provided with collapsible core-plates having lugs *g'* and projections *h'*, said plates also resting on the said base-plate, and a removable core-spindle provided with projections which bear against the said lugs under the projections *h'* and which are free to pass vertically between the said lugs, the lower end portion of the said spindle being journaled in and slidable vertically in the said hole in the base-plate, substantially as set forth.

2. The combination, with collapsible core-plates provided with lugs *g'* and projections *h'*, and a base-plate under the lower ends of the said plates; of a removable spindle provided with projections *j* which bear against the said lugs under the projections *h'* and which support the core before it is lowered onto the base-plate, said projections *j* being free to pass between the projections *h'* when the spindle is partially revolved, substantially as set forth.

3. In a collapsible core-barrel, the combination, with core-plates provided with lugs *g'* and projections *h'*, and contractile bands which encircle the core-plates and normally prevent them from falling apart; of a removable spindle provided with projections *j* which bear against the said lugs under the projections *h'* and which normally support the core while being placed in position and press the core-plates into engagement with the said bands, said projections *j* being free to pass vertically between the projections *h'* when the spindle is partially revolved, substantially as set forth.

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

FRANCIS A. DUNCAN.

Witnesses:
JNO. SHERIDAN,
H. V. WILSON.