

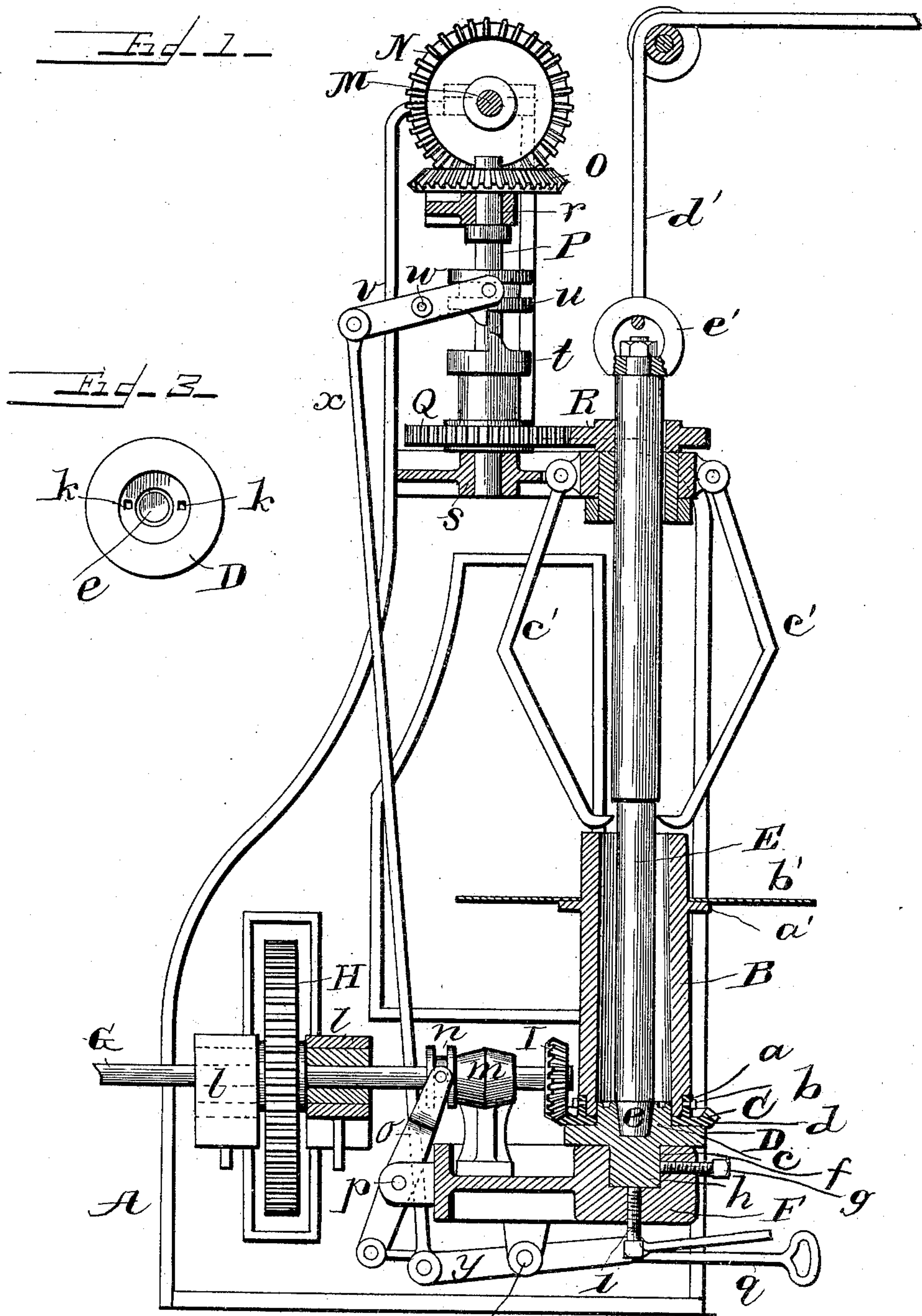
(No Model.)

2 Sheets—Sheet 1.

S. E. LIGHT.  
MACHINE FOR CASTING HOLLOW INGOTS.

No. 467,469.

Patented Jan. 19, 1892.



Witnesses  
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H. B. Reinohl

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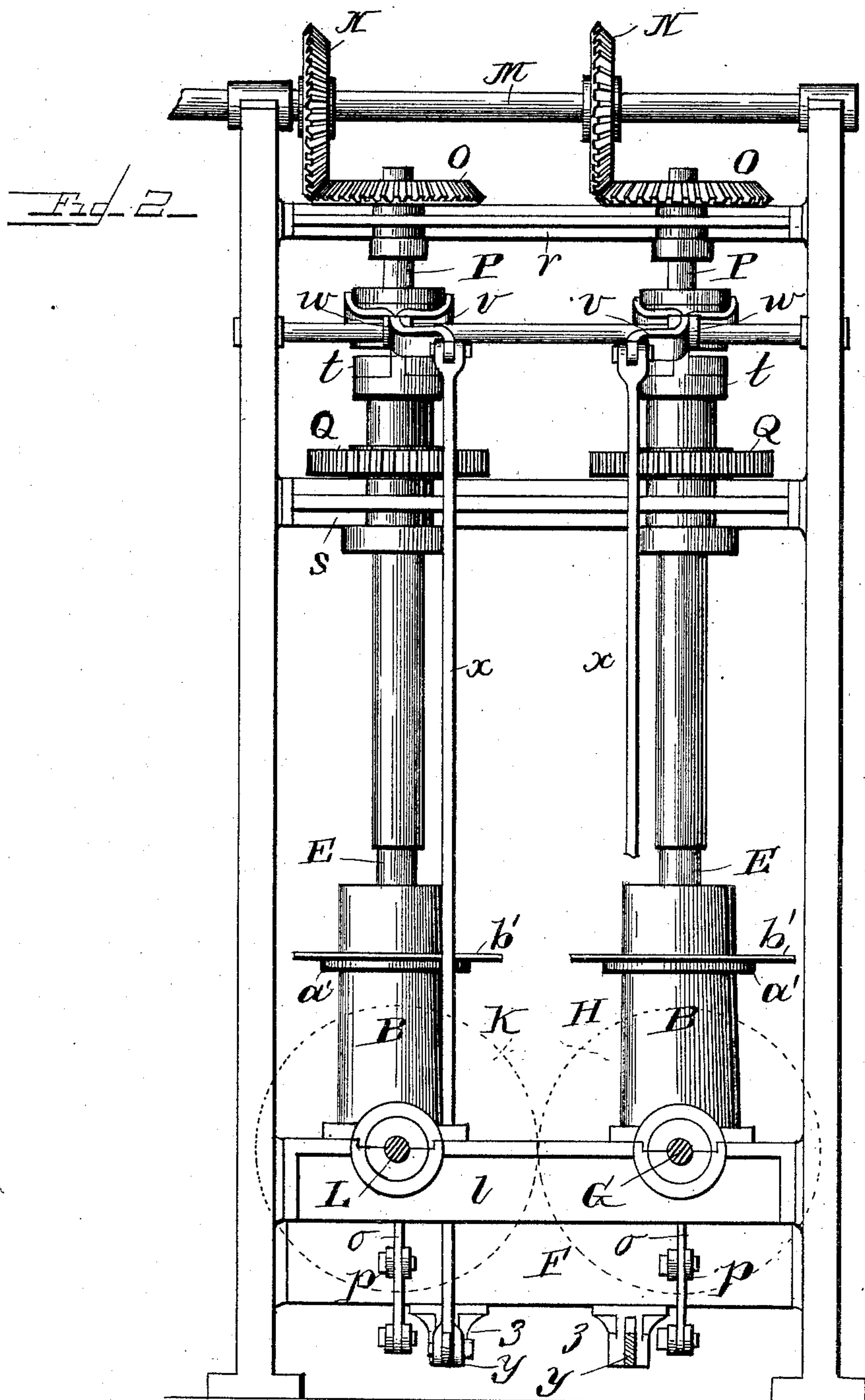
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# UNITED STATES PATENT OFFICE.

SAMUEL E. LIGHT, OF LEBANON, PENNSYLVANIA, ASSIGNOR OF ONE-HALF  
TO ABRAM J. LIGHT, OF SAME PLACE.

## MACHINE FOR CASTING HOLLOW INGOTS.

SPECIFICATION forming part of Letters Patent No. 467,469, dated January 19, 1892.

Application filed July 17, 1891. Serial No. 399,851. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL E. LIGHT, a citizen of the United States, residing at Lebanon, in the county of Lebanon and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Casting Hollow Ingots; 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.

My invention relates to the art of casting ingots, and has for its object an organized machine for casting hollow ingots, which will be hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which form part of this specification, Figure 1 represents a side elevation, partly in section; Fig. 2, a rear elevation, and Fig. 3 a top plan view of the base of the mold detached.

Reference being had to the drawings and the letters thereon, A indicates a frame which may be of any desired length to support a number of molds. For the purpose of illustration two molds are shown; but any desirable number may be operated from a main line of shafting.

B indicates the section of the molds the internal diameter of which is slightly larger at the bottom than at the top to cause the mold to pass up over the ingot without binding. The mold B is provided with a miter gear-wheel C, which has vertical lugs *a a* formed thereon, which engage with the wall of the mold and are secured thereto by set-screws *b b*, to cause the mold to revolve with gear-wheel. The gear-wheel C rests upon a base D, which is provided with a projection *c*, which extends into the lower end of the section B, and is provided with a conical seat *d*, to receive a corresponding projection or extension *e* on the mandrel E, to center the mandrel and secure it centrally in the mold while the mold and the mandrel are being revolved in opposite directions while the molten metal is being poured into the mold and until the ingot has cooled sufficiently to be removed from the mold. The base D rests on a boss F, having a seat *f*, in which it is secured by

a set-screw *g*, engaging with a projection *h* on the lower side of the base, and is removed therefrom by a set-screw *i*, bearing against the lower end of the projection *h*.

In the upper surface of the projection *c* are pockets *k*, to be filled with metal and form teats or spurs on the ingot to steady it while the mandrel and the mold are being removed, and until the ingot has been properly secured for removal from the base of the mold.

G is the power-shaft driven by any suitable motor, is journaled in suitable bearings or journal-boxes *ll* and *m*, and supports a master gear-wheel H and a bevel or miter pinion I, the former engaging with a similar gear-wheel K on a shaft L, engaging with another mold B, and the shafts, gear-wheels, and molds may be duplicated as often as found advantageous to work. The bevel-pinion I is thrown into and out of engagement with the miter-wheel C by means of a collar *n*, secured to the shaft G, a lever *o* engaging said collar at one end, fulcrumed at *p*, and connected to a hand-bar *q* at its opposite end.

In the upper end of the frame A is supported a shaft M, driven by any suitable connection with the motor, and is supplied with miter or bevel gear-wheels N, the number of which corresponds with the number of molds mounted upon the machine and engage with corresponding miter-wheels O, secured to one end of a vertical shaft P, secured in a bearing *r* near its upper end and in a seat *s* at its lower end. Upon the shaft P is secured a gear-wheel Q, which engages with a gear-wheel R, keyed to the mandrel E to revolve the latter in the mold B. The mandrel is set in motion and stopped by a clutch *t*, fixed to the shaft P, a movable clutch-sleeve *u*, also on the shaft P, a lever *v*, connected to said sleeve, fulcrumed at *w* on the frame A and connected to a rod *x*, engaging with a lever *y*, fulcrumed at *z*.

The mold A is provided with an extension *a'* to support a sheet-metal guard *b'*, to prevent any molten metal falling upon the gear-wheels C and I, and is raised above the ingot when cast by any suitable hoisting device—such as a crane, derrick, or swinging tongs (not shown)—and is supported in its raised po-



sition by hooks  $c' c'$ , pivotally secured to the frame A, and which engage with the under side of the gear-wheel C. The mandrel E has a chain or cable  $d'$  attached to its upper end by a ring  $e'$ , swiveled thereon to allow the mandrel to revolve in the mold.

The mold A and the base D are made separate, for the reason that the former, being subject to the greatest degree of heat and changes in temperature, will wear more rapidly than the base and can be renewed without disturbing the base. For the same reason the gear-wheel C is also made separate from the mold A and need not be renewed as frequently as the mold.

The machine being set in motion, molten metal from a suitable cupola, converter, or crucible is poured from a ladle into the mold or molds, the metal kept in a state of agitation by the motion of the mold, and the mandrel, revolving in opposite directions, dispels the air from the mold and prevents "honeycombs" or air-cells forming in the ingot and the metal adhering to the mandrel.

By the clutches used to put the several molds and mandrels into and out of motion any one or all can be worked at the pleasure of the operators.

Having thus fully described my invention, what I claim is—

1. A mold for hollow ingots, consisting of a vertically-movable and revoluble cylinder having a tapering chamber, a fixed base on which the cylinder revolves, and means for revolving the same, in combination with a vertically-movable mandrel supported in the base of the mold.

2. A mold for hollow ingots, consisting of a revoluble tubular section and a fixed base separable therefrom, in combination with means for revolving the tubular section independent of the base, a mandrel, and means for revolving the mandrel separate from the mold.

3. A mold for hollow ingots, consisting of a tubular section having a gear-wheel secured

thereto, a fixed base separable from the cylinder, and means for revolving the cylinder, in combination with a vertically-movable mandrel.

4. A mold for hollow ingots, consisting of a revoluble tubular section provided with a gear-wheel and a fixed base separable from the tubular section and provided with a central recess or seat, in combination with a vertically-movable mandrel having a projection on its lower end corresponding with the seat in the base, means for revolving the mold, and means for raising the mandrel.

5. In a machine for casting hollow ingots, a plurality of revolubly-supported molds connected with a power-shaft, in combination with a plurality of revolubly-supported mandrels connected with a shaft to be revolved in a direction opposite that of the revolving molds.

6. In a machine for casting hollow ingots, a revoluble and vertically-movable tubular mold-section and means for supporting said section in an elevated position, in combination with a fixed base and a separately-revoluble and vertically-movable mandrel supported in the base of the mold.

7. In a machine for casting hollow ingots, a mold comprising a revoluble section and a fixed base, means for imparting motion to the revoluble section, a mandrel having a gear-wheel attached thereto, and a suitable connection with a power-shaft for revolving the mandrel.

8. A revoluble mold for hollow ingots, in combination with a revoluble mandrel supported in the base of the mold and having a swiveled ring attached to its upper end and means for revolving the mold and the mandrel.

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

SAMUEL E. LIGHT.

Witnesses:

ALLEN D. HOFFER,  
B. F. GINGRILS.