

May 13, 1924.

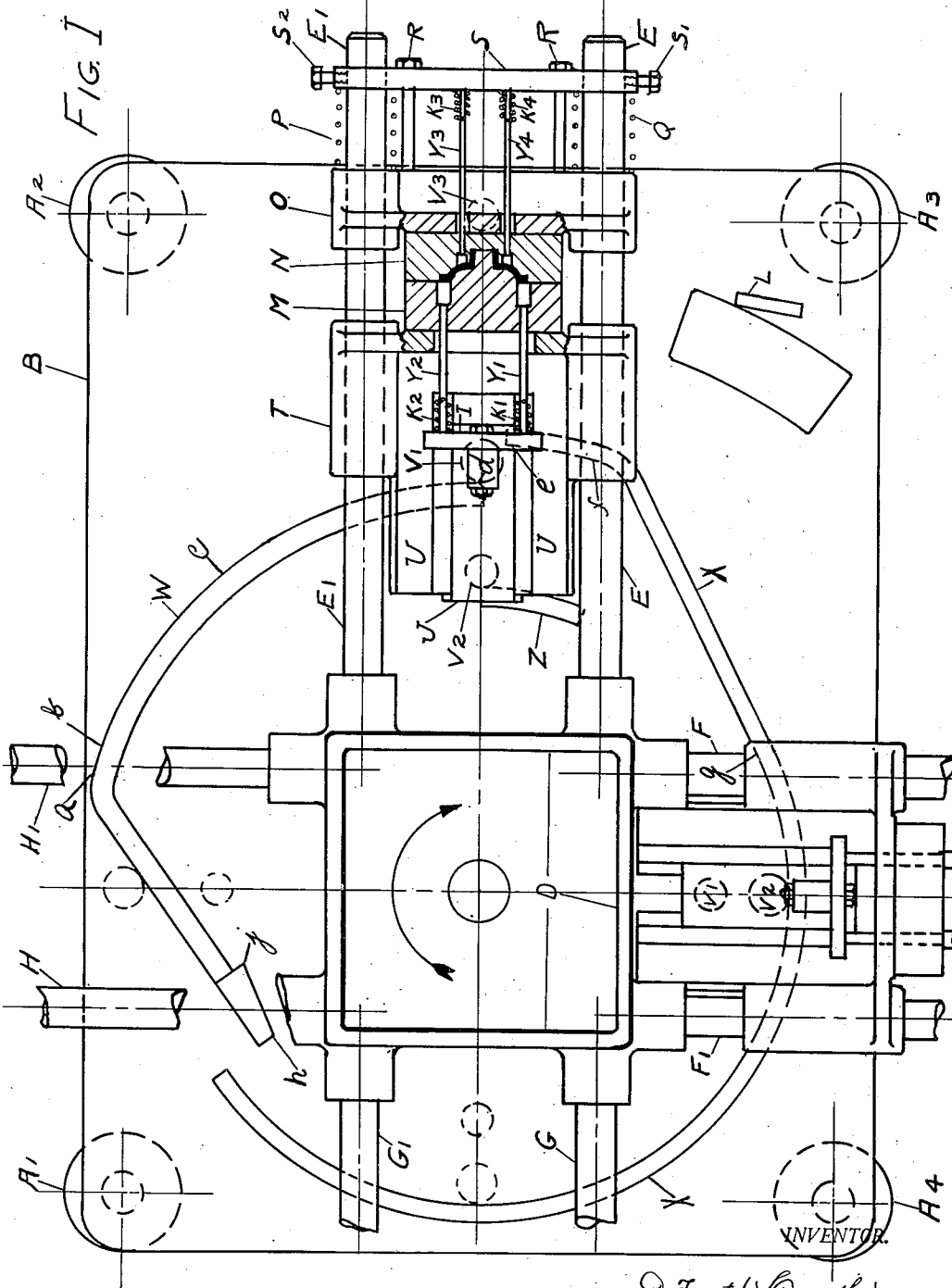
DE FOREST W. CANDLER

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CASTING MACHINE

Filed Oct. 3, 1921

2 Sheets-Sheet 1



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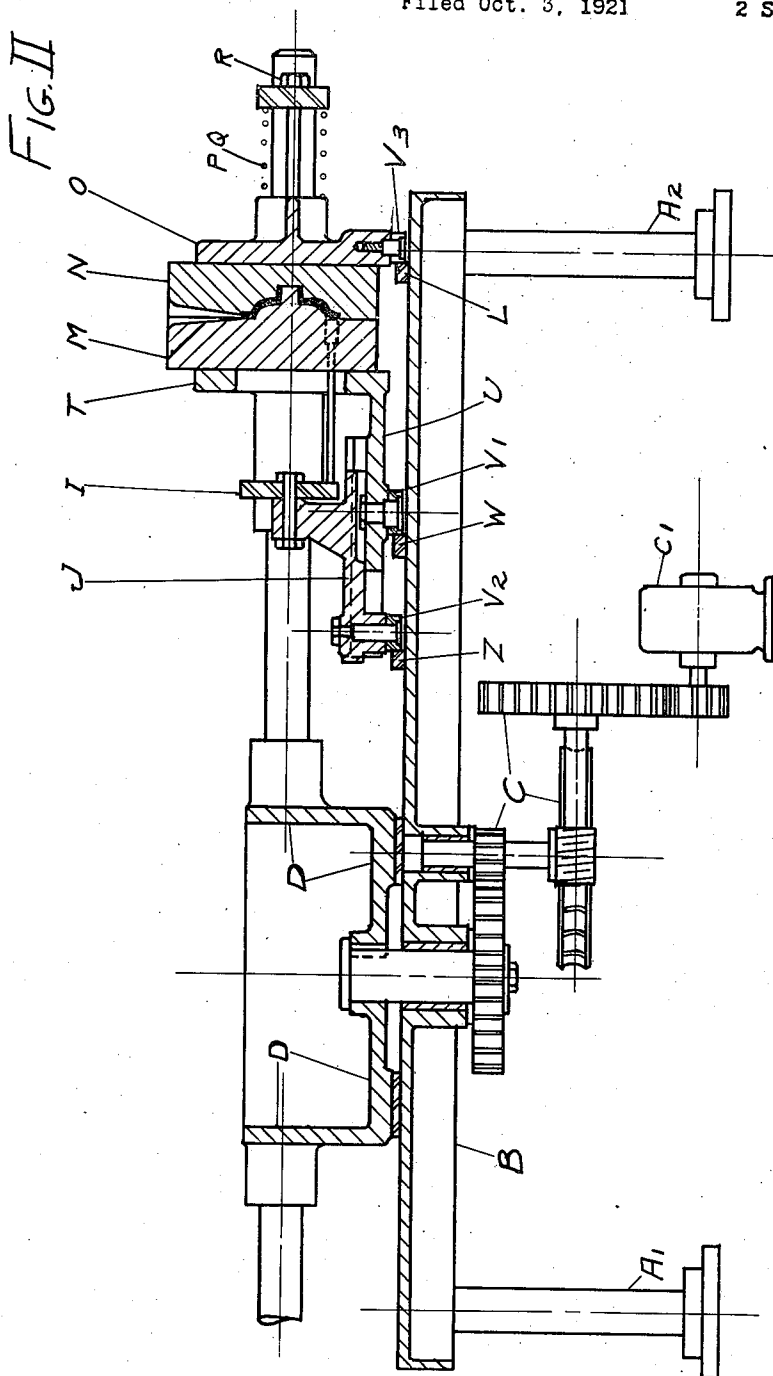
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INVENTOR.

DeForest W. Candler.

UNITED STATES PATENT OFFICE.

DE FOREST W. CANDLER, OF DETROIT, MICHIGAN, ASSIGNOR TO GEORGE M. HOLLEY,
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CASTING MACHINE.

Application filed October 3, 1921. Serial No. 504,988.

To all whom it may concern:

Be it known that I, DE FOREST W. CANDLER, a citizen of the United States, residing at 2932 West Grand Boulevard, city of Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Casting Machines, of which the following is a specification.

The object of this invention is to provide means for making metal castings in permanent moulds so as to obtain a continuous production of castings. The novel features are the automatic means provided whereby the intervals between the pouring, the opening, the releasing, and the ejection of the castings are maintained uniform without being dependent on the skill and attention of the casting machine operator. The apparatus is particularly adapted to the casting of iron in permanent metal moulds.

Figure I shows a plan view.

Figure II shows a sectional elevation.

In Figures I and II, A¹, A², A³ and A⁴ are the base supports; B is the base; C is suitable gearing mounted on the underside of the base for rotating the turret D; C' is an electric motor for rotating the turret D through the gearing C; EE', FF', GG' and HH' are horizontal rods projecting from the turret D in four directions. Mounted on each pair of rods is a pair of permanent moulds M and N. The mould N is supported by the cross piece O, slidably mounted on the rods EE', the motion of this mould N on the rods EE' being limited by the springs PQ, the bolts R and the cross bar S. The cross bar S is adjusted on the rods EE' and held in position by the set screws S¹ and S². The inner mould M is also slidably mounted on the rods EE' by a cross piece T. Integral with this cross piece T is a bracket U carrying a roller V¹. This roller V¹ engages with stationary cams W and X. Automatic releasing pins Y¹, Y², Y³ and Y⁴ are mounted in the moulds M and N. The pins Y¹ and Y² are operated by a roller V² which engages with the cam Z and with one end of the cam W. The roller V² is mounted on the slide J and carries a face plate I, which strikes the pins Y¹ and Y². The pins Y¹ and Y² are anchored to the plate I by the tension coil springs K¹ and K². The springs K³ and K⁴ anchor the pins Y³ and Y⁴ to the

cross piece S, so as to positively effect the return of the pins into place.

Operation.—The turret rotating in the direction shown by the arrow on Figure I, at approximately one revolution per minute, or 6° per second, the roller V¹ locks the mould MN when it reaches the point *a* on the cam W. The cast iron is poured in while the mould is traveling from *b* to *c*. While the mould moves from *c* to *d* the iron is allowed to solidify, this occupying a period of approximately 7 to 8 seconds. Immediately after the roller leaves the cam *d* at the end of cam W, the roller V¹ strikes the end *e* of the cam X and while the mould travels from *e* to *f* the mould is slightly opened, this taking a period of 2 or 3 seconds. As the mould travels from *f* to *g* the mould M is positively withdrawn so as to enable the casting to be removed. During this period the roller V² strikes the cam Z and thereby releases the casting from the mould M by means of the pins Y¹ and Y², which are operated by the cam Z and roller V². The pins Y³ and Y⁴ are also used if needed to positively ensure releasing the casting from the mould N.

The springs PQ mounted on the rods EE' and abutting against the cross piece S, which is locked with the rods EE', exerts a pressure on the moulds MN so that they are tightly pressed together. At the same time this spring permits the mould to open slightly and thus take care of the slight expansion that takes place when cast iron freezes. The bolts prevent the mould M moving in too far.

The releasing pins Y¹, Y², Y³ and Y⁴ when used, are operated as follows: When the roller V¹ engages with the cam X, the roller V² engages with the cam Z and the slide J is pushed out, carrying with it the face plate I, which strikes the ejection pins Y¹ and Y² and thereby frees the casting from the mould M. When the roller V¹ strikes the cam W, the roller V² strikes the inside corner *h* of the same cam, as V² travels from *h* to *j* the slide U moves in towards the center of the turret carrying the pins Y¹ and Y² back into place. Meanwhile the roller V³ has engaged with the cam L and carried the mould N away from the center of the turret, the releasing pins Y³ and Y⁴ strike the cross bar S and are thus prevented from moving out, thus

ejecting the casting from the mould N. The springs PQ return the mould N to its original position, and the springs K³ and K⁴ prevent the pins Y³ and Y⁴ being carried in
5 towards the center when the mould N moves.

By these means the process is almost entirely mechanical, and by the addition of a suitable steel belt conveyor protected by sand and flaked mica the red hot castings
10 are removed at the rate of four every minute.

The process of making castings in a rotating series of moulds is not claimed as new.

15 By reason of the fact that most castings are not symmetrical, releasing pins are only required on one face. I therefore find it best to provide releasing pins merely on the inner mould, for example the mould
20 marked M on Figures I and II. Obviously, by eliminating the cam L and the roller V³ and the pins Y³ and Y⁴ the mechanism is simplified and the base B may be made smaller.

25 What I claim is:

1. In a casting machine, a revolvable horizontal turret carrying a plurality of permanent molds, a stationary cam for closing said molds, compression springs for main-
30 taining a predetermined pressure on said molds.

2. In a casting machine, a plurality of permanent molds connected together, means for rotating the molds in a horizontal plane,
35 a stationary cam for closing said molds, compression springs for maintaining a predetermined pressure on said molds.

3. In a casting machine, a plurality of permanent molds connected together, means
40 for rotating the molds in a horizontal plane, ejection pins, a stationary cam operating said ejection pins for the purpose described.

4. In a casting machine, a plurality of molds connected together, means for rotat-
45 ing the molds on a horizontal plane, a stationary cam for closing said molds, ejection pins for said molds, a stationary cam for operating said pins.

5. In a casting machine, a plurality of
50 molds divided on a vertical plane, means for rotating the molds on a horizontal plane, the axis of rotation of which is normal to the vertical dividing planes of the molds, a stationary cam for closing the said molds,
55 compression springs for determining the pressure between the molds when in the closed position, ejection pins for said molds, a stationary cam operating said ejection pins.

6. In a casting machine, a plurality of
60 molds connected together, each mold comprising a two part permanent mold divided on a substantially vertical plane, means for rotating the molds on a horizontal plane,
65 the axis of rotation being normal to the

planes on which the molds are divided, stationary cams for moving the inner portion of the divided mold in a radial direction, compression springs for limiting the pressure between the molds when in the closed position, ejection pins for said molds,
70 a stationary cam for operating said pins.

7. In a casting machine, the combination with a movable mold support, of a permanent mold carried thereby and consisting
75 of separable mold sections, means for closing said sections during a portion of the movement of the mold support, compressible means for holding said sections closed, mechanism for automatically separating the
80 sections when a casting has been formed, and means adapted to positively eject a casting when said sections are separated, said ejecting means being operable during the movement of said mold sections.

8. In a casting machine the combination with a movable support, of a plurality of independent permanent molds carried there-
85 by, each of said molds being formed in sections, means for closing said molds during a portion of their movement to receive
90 metal from which castings are formed, means for opening the mold sections when the metal has solidified, and means for positively ejecting a casting from said sections operable when said sections are opened.

9. In a casting machine the combination with a movable support, of a plurality of independent permanent molds carried there-
100 by, each of said molds being formed in sections, means for closing said molds during a portion of their movement to receive metal from which castings are formed, means for opening the mold sections when the metal has solidified, and means for positively eject-
105 ing a casting from said sections operable when said sections are opened, said ejecting means comprising a movable element carried by one of said mold sections, operating mechanism for said element, and means
110 adapted to be engaged by said operating mechanism upon a movement of the mold during a portion of its travel to actuate said movable element.

10. In a casting machine the combination
115 with a rotating support, of a plurality of independent molds carried by said support, each of said molds being composed of separable sections, means for closing said sections for a portion of their travel to re-
120 ceive molten metal to be casted in said molds, yieldable means for holding said sections closed when in a casting position, automatically acting means for separating said sections during the rotation thereof
125 when castings have been formed therein, and ejecting means passing through one of said sections adapted to be operable when said sections are separating to positively eject casting therefrom.

11. In a casting machine the combination with a horizontal rotatable support, of a series of permanent molds mounted thereon and adapted to rotate with said support, each of said molds consisting of a pair of vertical mold sections, means operable during the rotation of said support to successively close and open the mold sections during different portions of their travel, in combination with automatically acting means co-operating with one section of each mold and adapted to positively eject a casting from each mold when the sections thereof are separated.

12. In a casting machine the combination with a horizontal rotatable support, of a series of permanent molds mounted thereon and adapted to rotate with said support, each of said molds consisting of a pair of vertical mold sections, means operable during the rotation of said support to successively close and open the mold sections during different portions of their travel, in combination with automatically acting means co-operating with one section of each mold and adapted to positively eject a casting from each mold when the sections thereof are separated, said means comprising an ejecting pin for each mold, and cam operated mechanism for shifting each pin during a movement of said molds.

13. In a casting machine the combination with a horizontal rotatable support, of a series of permanent molds carried by said support, each mold being composed of separable sections, means on said support for closing said mold sections during a portion of their movement whereby said mold sections are in a casting position, yieldable means for holding said sections in a casting position, and means carried by the support for separating said mold sections after a casting operation to permit a casting to be ejected therefrom.

14. In a casting machine the combination with a horizontal rotatable support, of a series of permanent molds carried by said support, each mold being composed of separable sections, means on said support for closing said mold sections during a portion of their movement whereby said mold sections are in a casting position, yieldable means for holding said sections in a casting position, means carried by the support for separating said mold sections after a

casting operation to permit a casting to be ejected therefrom, ejecting means for positively discharging castings from said molds when the sections thereof are opened, and means carried by said support for actuating said ejecting means.

15. In a casting machine the combination with a rotatable support having a plurality of horizontally disposed mold supporting elements, of a plurality of molds carried by said elements, each mold consisting of a pair of vertical relatively movable mold sections, means for closing said sections during a portion of the cycle of said mold support by sliding one of said sections horizontally relative to the other, and means for separating said sections after a casting operation by sliding one section bodily away from the other to permit a casting to drop from between said opened sections.

16. In a casting machine, a revolvable support having a plurality of horizontal mold supports, of a plurality of molds carried by said supports, each of said molds consisting of sliding sections, means for sliding said sections toward one another during a portion of the cycle of said support to bring the sections to a casting position, means for holding said sections adjacent one another when moving through a casting zone, and automatically acting means for sliding one section away from the other of each mold after a casting operation to permit a casting to drop from between said sections.

17. In a casting machine, a revolvable support having a plurality of horizontal mold supports, of a plurality of molds carried by said supports, each of said molds consisting of sliding sections, means for sliding said sections toward one another during a portion of the cycle of said support to bring the sections to a casting position, means for holding said sections adjacent one another when moving through a casting zone, and automatically acting means for sliding one section away from the other of each mold after a casting operation to permit a casting to drop from between said sections, in combination with means for positively ejecting a casting from said sections when they are opened.

In testimony whereof I affix my signature.

DE FOREST W. CANDLER.