G. M. CLARK, Jr.

INGOT CASTING MACHINE.

APPLICATION FILED JUNE 17, 1910.

**992,853.**

Patented May 23, 1911.

3 SHEETS—SHEET 1.

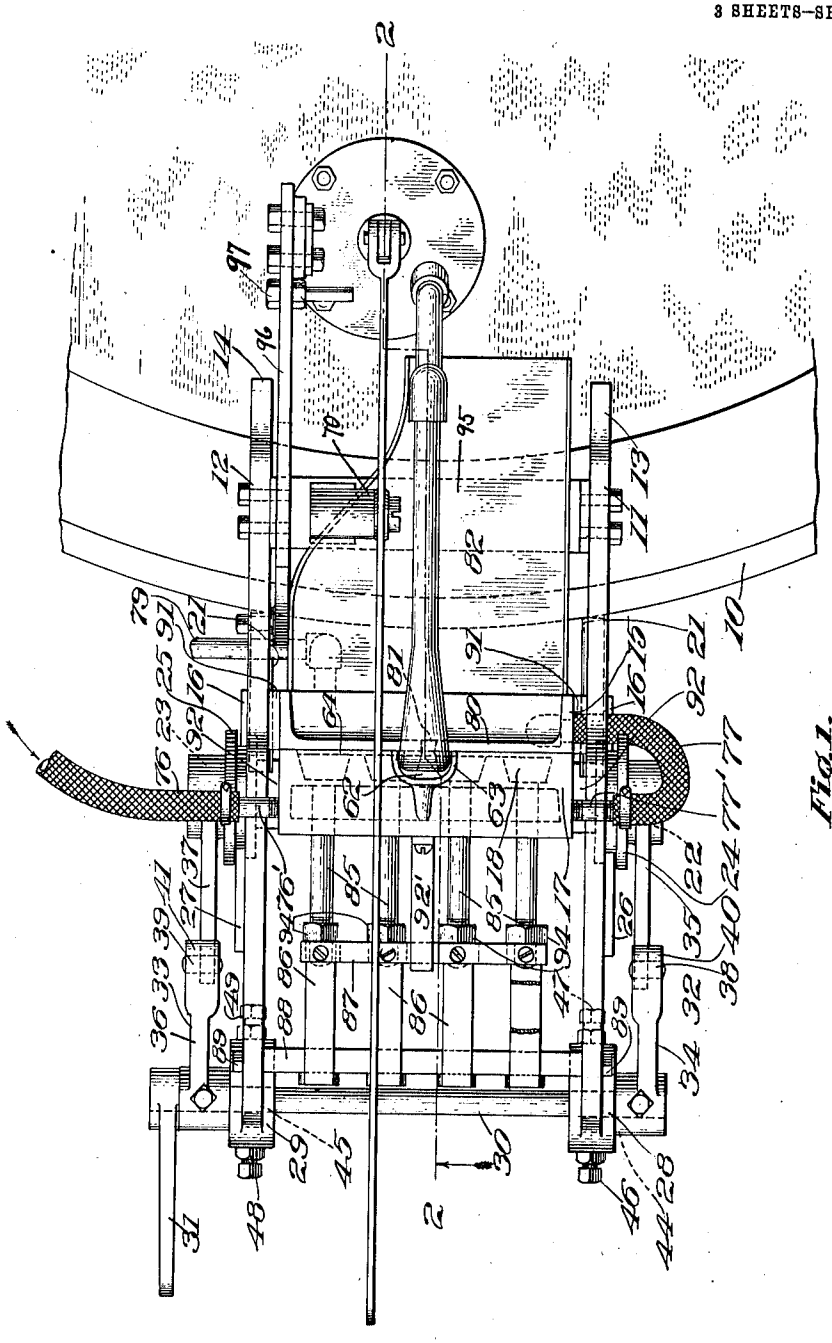

Fig. 1.

Witnesses
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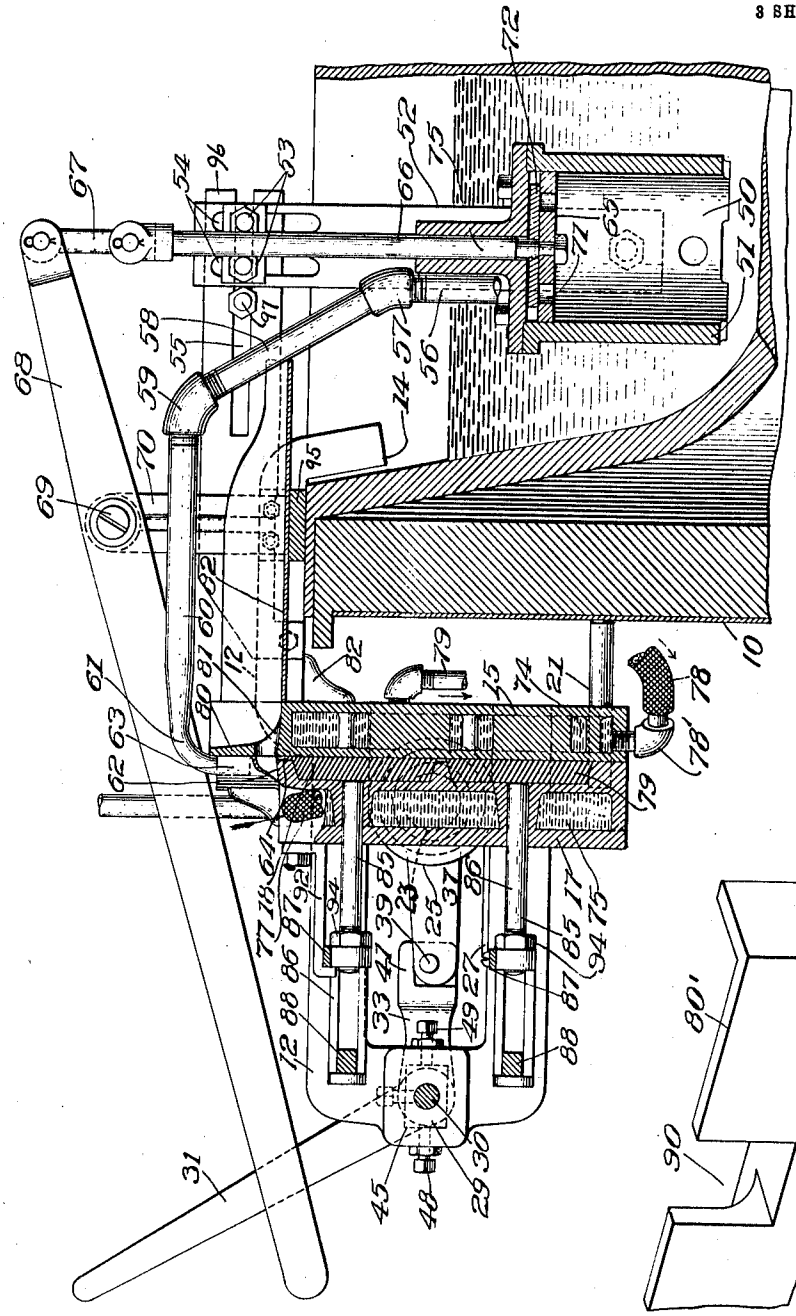

Fig. 2.



Fig. 2a.

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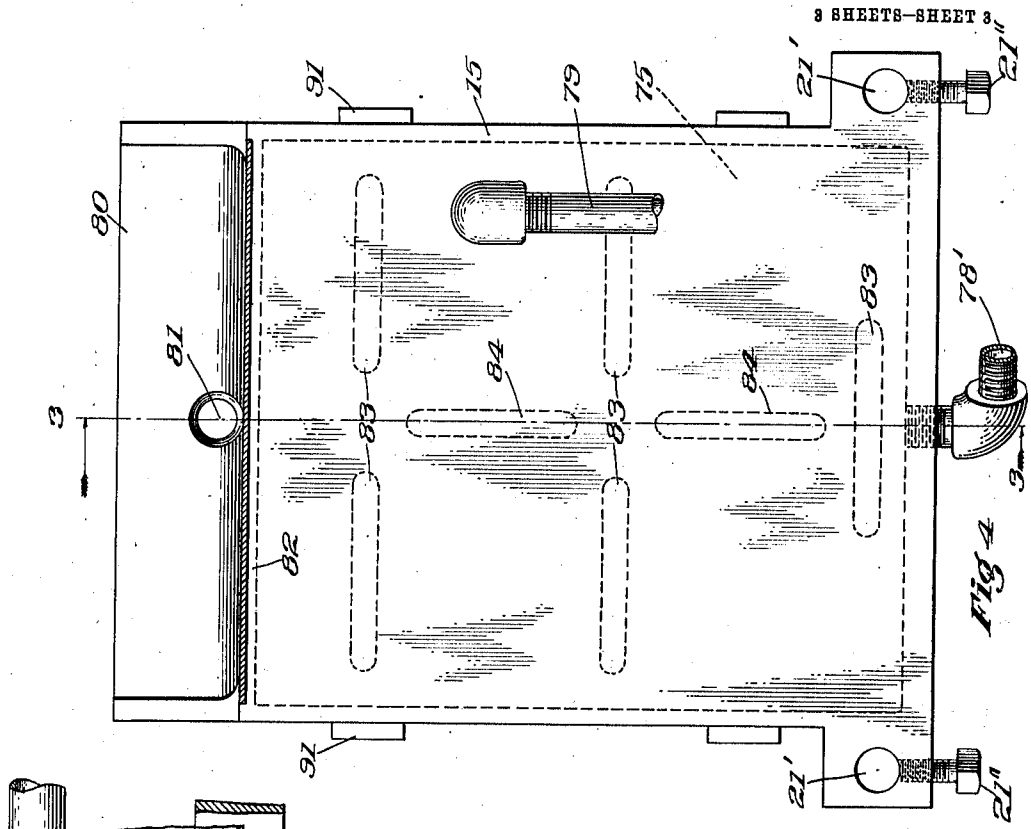


Fig 4

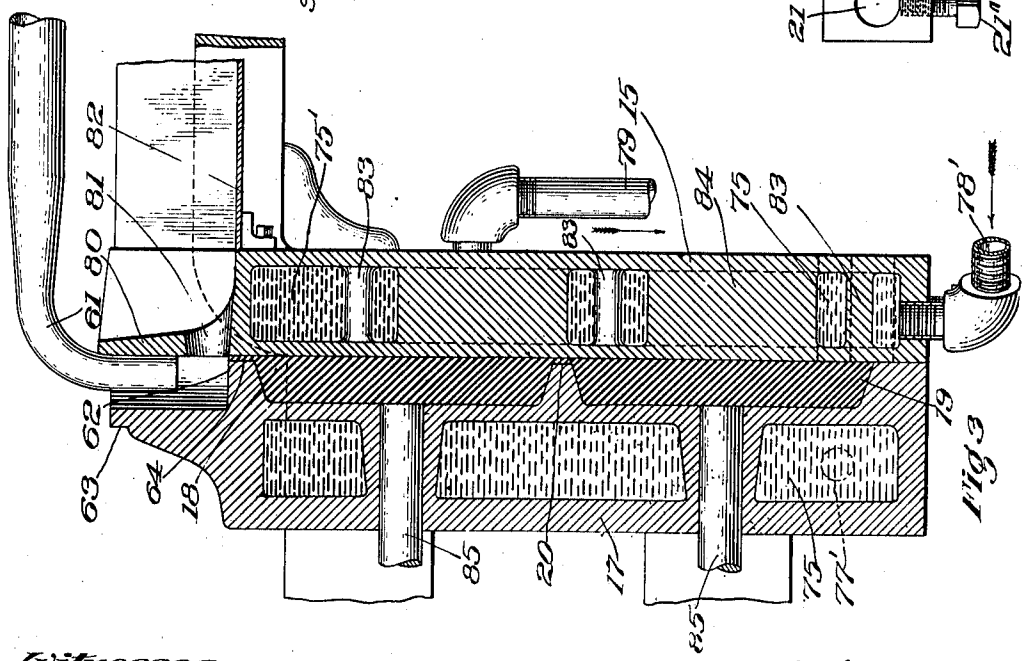


Fig 3

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# UNITED STATES PATENT OFFICE.

GEORGE M. CLARK, JR., OF LYNN, MASSACHUSETTS.

## INGOT-CASTING MACHINE.

992,853. Specification of Letters Patent. Patented May 23, 1911.

Application filed June 17, 1910. Serial No. 567,431.

*To all whom it may concern:*

Be it known that I, GEORGE M. CLARK, Jr., a citizen of the United States, and a resident of Lynn, in the county of Essex and State of Massachusetts, have invented a new and useful Improvement in Ingot-Casting Machines, of which the following is a specification.

My invention relates to ingot-casting machines whereby molten metal may be cast into ingots of suitable size for use in the melting pots of linotype and monotype machines.

The object of the present invention is to effect certain improvements over the ingot-casting machine described in my Letters Patent No. 946,721, dated January 18, 1910, whereby several difficulties arising from the practical operation of said machine may be overcome.

One embodiment of my invention is shown in the drawings which accompany and form a part of this specification; although it will be understood that various modifications may be made by those skilled in the art without departing from the spirit of my invention.

In the drawings Figure 1 is a plan view; Fig. 2 is a section taken on the line 2 2 of Fig. 1; Fig. 2ª is a perspective view showing a modification; Fig. 3 is a section taken on the line 3 3 of Fig. 4; and Fig. 4 is a rear elevation, partly in section, of the stationary mold member.

In the particular drawings selected for illustrating my invention, 10 is a melting pot to which my ingot-casting machine is removably secured by a frame comprising two members 11, 12, provided with lugs, 13, 14, extending as shown, into the pot and bearing against the inner edge thereof.

The mold consists of two relatively movable mold members, one of which, shown at 15, is stationary and is secured in the present instance by the screws 16 to the frame members 11, 12. The movable mold member 17 is provided with a series of depressions 18, 19, arranged in pairs connected by a groove 20. Bolts 21 adjustably held in holes 21′ in lugs integral with the stationary mold member 15 by the set screws 21″, or otherwise, bear against the outer edge of the melting pot.

The hubs 22, 23 on the opposite sides of the movable mold member 17 afford journals for the grooved wheels 24, 25, respectively, which run on the rails 26, 27 secured to the frame members 11, 12, respectively. The rock-shaft 30 is mounted in the bearings 28, 29 and is operated by the arm 31. The toggles 32, 33, comprising the arms 34, 35 and 36, 37, respectively, connect the mold member 17 to the rock-shaft 30. The arms 35, 37 are connected to the hubs 22, 23 respectively. The toggles are so arranged that the axes of the pivots 38, 39 are normally located below the plane of the axis of the rock-shaft and the axes of the hubs, said pivots being prevented from passing below the position shown in Fig. 2 by the lugs 40, 41 on the arms 34, 36, respectively, which engage the upper portions of the arms 35, 37, respectively, so that when the movable mold member is pressed into contact with the stationary mold member, the toggles serve to lock the same together. The bearings 28, 29 are adjustably mounted in slots 44, 45, respectively, and their positions are fixed by the set screws 46, 47 and 48, 49.

The pump 50 comprises a cylinder 51 secured to an arm 52 which is fastened to the plate 96 by two bolts 53 extending through vertical slots 54 in said arm and through a horizontal slot 55 in said frame member, the latter slot carrying a stop-bolt 97. A pipe 56 connected to the top of the cylinder is connected in the present instance by an elbow 57 to the pipe 58, which in turn is connected by an elbow 59 to the substantially horizontal pipe 60 terminating in the downwardly extending portion 61. The mold member 17 is provided with an upwardly extending throat portion 63, which as shown, is substantially semi-circular in shape and which, when the mold members are in contact coöperates with the upwardly extending edge 80 of the member 15 to form the throat 62 of the mold. The end portion 61 of the pipe 60 communicates with said throat, and may, as shown, extend part way into the same. The throat of the mold communicates by means of the passage-way 64 with the upper set of molds 18. The upwardly extending edge 80 of the mold member 15 is provided with a passage-way 81 connecting the throat and the passage-way 64 with the overflow apron 82, whereby the surplus molten metal may be conveyed back to the melting pot. The hole 81, preferably is tapered upwardly from the throat to the

apron. It will be obvious that as the mold is filled, the surplus metal will flow through the hole 81 and along the apron back to the melting pot, and that when the mold members are separated and the ingots ejected as hereinafter described, any surplus metal which hardens in the hole 81 will remain therein by virtue of the outward taper of said hole, so that ingots formed in the upper molds 18 will not have a flange or fin connected to them as has been found to be the case with the ingot-casting machine of my prior patent aforesaid.

It is quite important that the ingots should be cast without flanges, fins, or projections, for the reason that when these are present, the operators are liable to be cut by the sharp edges thereof, and for the further reason that the melting pots in which the ingots are used are of relatively small diameter. Furthermore, the use of the vertical throat, apron and passage-way between, eliminates the necessity of providing means such as shown in my prior patent for heating the passage-way communicating between the molten metal inlet pipe and the mold. However it will be understood that various means may be employed for securing ingots without fins, flanges, etc., such for example, as the construction shown in Fig. 2ª, in which the notch 90 is cut in the upwardly extending edge 80′ of the member 15, the forward edges of the throat member 63 bearing against the upper edge 80′, so that said notch becomes as extension of the throat and the portion 61 of the pipe 60 extending as before into said throat. In this case there is no tendency for the metal to harden in the throat, all the surplus metal passing out of the notch 90 to the apron and thence to the melting pot.

The piston 65 provided with the ports 71, is secured to the piston-rod 66 and the latter is connected by the link 67 to the lever 68 pivoted at 69 to the standard 70 secured to the frame-brace 95, which in turn is bolted to the frame members and the plate 96. The circular valve 72 is slidably mounted on the piston-rod 66 and adapted to open and close the ports 71 the extent of movement of said valve vertically being determined by the shoulder 73 on said piston-rod. When the piston descends into the molten metal, the valve 72 will lift and allow a portion of the metal to flow through the ports 71 into the space above the piston, and when the piston rises the valve will close and force the molten metal above the same, through the pipes 56, 58 and 60 to the throat and thence through the passage-way 64 to the molds, the surplus metal as above described flowing back along the apron to the melting pot.

The mold members are provided with water chambers, the water under considerable pressure flowing into the chamber 75 in the member 17, through the flexible pipe 76 and inlet plug 76′ in the upper lefthand corner of said member, and out of said chamber through the outlet plug 77′ and flexible pipe 77. The flexible pipe 77 is connected to the inlet plug 78′, passing into the chamber 75′ in the stationary mold member 15. The water leaves the chamber 75′ by way of the outlet plug 79 which is secured to said member 15 at a point near the upper lefthand corner thereof. It has been found that the water chamber of the stationary mold member frequently bursts because of the pressure to which it was subjected, such pressure being necessary to effect a circulation sufficiently rapid to cool the ingots quickly, and also that there would be portions of the chamber to which the water did not penetrate. In order to overcome these difficulties, I have provided a series of horizontal and vertical webs 83, 84, respectively, cast integral with the mold member 15 and extending from the front to the rear walls thereof, as clearly shown in Figs. 3 and 4. The function of these webs is two-fold, viz., they strengthen the casting sufficiently to permit the use of water under high pressure and they permit of an even distribution of the water throughout the chamber 75′. This latter function is accomplished in part by placing the inlet plug 78′ directly under the lowermost web 83, so that the water entering the chamber 75 is divided into two portions and by the arrangement and location of the other webs which prevent the direct flow of the water from the inlet to the outlet plug.

A plurality of plungers 85, one for each of the ingots to be cast, are slidably mounted in the movable mold member, and the outer ends of each are adjustably secured to the yokes 86 and held in adjusted position by the lock-nuts 94, the forward ends of said yokes being connected by the cross-piece 87. The stop-bar passes through the yokes and is arranged, when the mold is closed, to bear against the outer ends thereof, said stop-bar being secured as by the screws 89 to the frame members 11 and 12. The finger 92′ attached to the upper central portion of the mold member 17 is arranged to bear against the cross-piece 74 when the mold is closed and hence lock the plungers against backward motion. When the mold is opened, there is no relative motion between the plungers and the ingots until the rearward ends of the plungers strike the stop-bar 88, whereupon further backward movement of the mold member 17 will cause the ingots to be ejected.

As shown in Figs. 1 and 4, the lugs 91 on the sides of the member 15 are interposed between said member and the frame members 11, 12, so that the clearances 92 are pro-

vided between the movable mold member 17 and said frame members.

I claim:

1. In an ingot-casting machine, a mold comprising two relatively movable mold members, means for conveying molten metal thereto, and an apron secured to one of said mold members for conveying the overflow from said mold back to the melting pot.

2. In an ingot-casting machine, a mold comprising two relatively movable mold members, means for conveying molten metal thereto, and an apron secured to one of said mold members for conveying the overflow from said mold back to the melting pot, the last mentioned mold member being provided with a passage-way for such overflow, said passage-way consisting of a hole tapering outwardly from said mold to said apron.

3. In an ingot-casting machine, a mold comprising two relatively movable mold members, the movable mold member having an upwardly-extending throat member open at the top and front and communicating with the mold, said throat member coöperating, when the mold is closed, with the upwardly-extending edge of the stationary mold member to form the throat of the mold, a molten-metal-conveying pipe terminating in said throat, and an apron secured to the stationary mold member for conveying the overflow from said mold back to the melting pot.

4. In an ingot-casting machine, a mold comprising two relatively movable mold members, the movable mold member having an upwardly-extending throat member open at the top and front and communicating with the mold, said throat member coöperating, when the mold is closed, with the upwardly-extending edge of the stationary mold member to form the throat of the mold, a molten-metal-conveying pipe terminating in said throat and an apron secured to the stationary mold member for conveying the overflow from said mold back to the melting pot, said throat being provided with a passage-way to said apron, said passage-way being tapered outwardly toward said apron.

5. The combination with a melting pot of an organized ingot-casting machine adjustably supported thereon, said machine including a mold, a pump located in said pot and adapted to pump molten metal from said pot into said mold, a lug projecting downwardly in contact with the interior of the pot, and unthreaded members adjustably secured to said machine and engaging the exterior of said pot.

6. In an ingot-casting machine, a mold comprising two relatively movable mold members, one of said mold members being provided with a plurality of compartments, ejectors coöperating with each compartment of said mold, a yoke engaging the outer ends of said ejectors, and a finger secured to the movable mold member and engaging said yoke when the mold is closed.

7. In an ingot-casting machine, a mold comprising two relatively movable mold members, one of said mold members being provided with a plurality of compartments, ejectors coöperating with each compartment of said mold, a yoke engaging the outer ends of said ejectors, and a stop-bar supporting said yoke and serving to limit the outward movement of said ejectors.

8. In an ingot-casting machine, a mold comprising two relatively movable mold members, the stationary mold member having its front edge extending upwardly above the top of the movable mold member and being provided with a passageway for conveying the overflow from said mold back to the melting pot.

In testimony whereof, I have hereunto subscribed my name this 7 day of June 1910.

GEORGE M. CLARK, JR.

Witnesses:

JOSEPH F. SHERMAN,

ELIZABETH L. SHERMAN.