

No. 810,654.

PATENTED JAN. 23, 1906.

J. ILLINGWORTH.
INGOT CASTING MACHINE.

APPLICATION FILED JUNE 17, 1905.

2 SHEETS—SHEET 1.

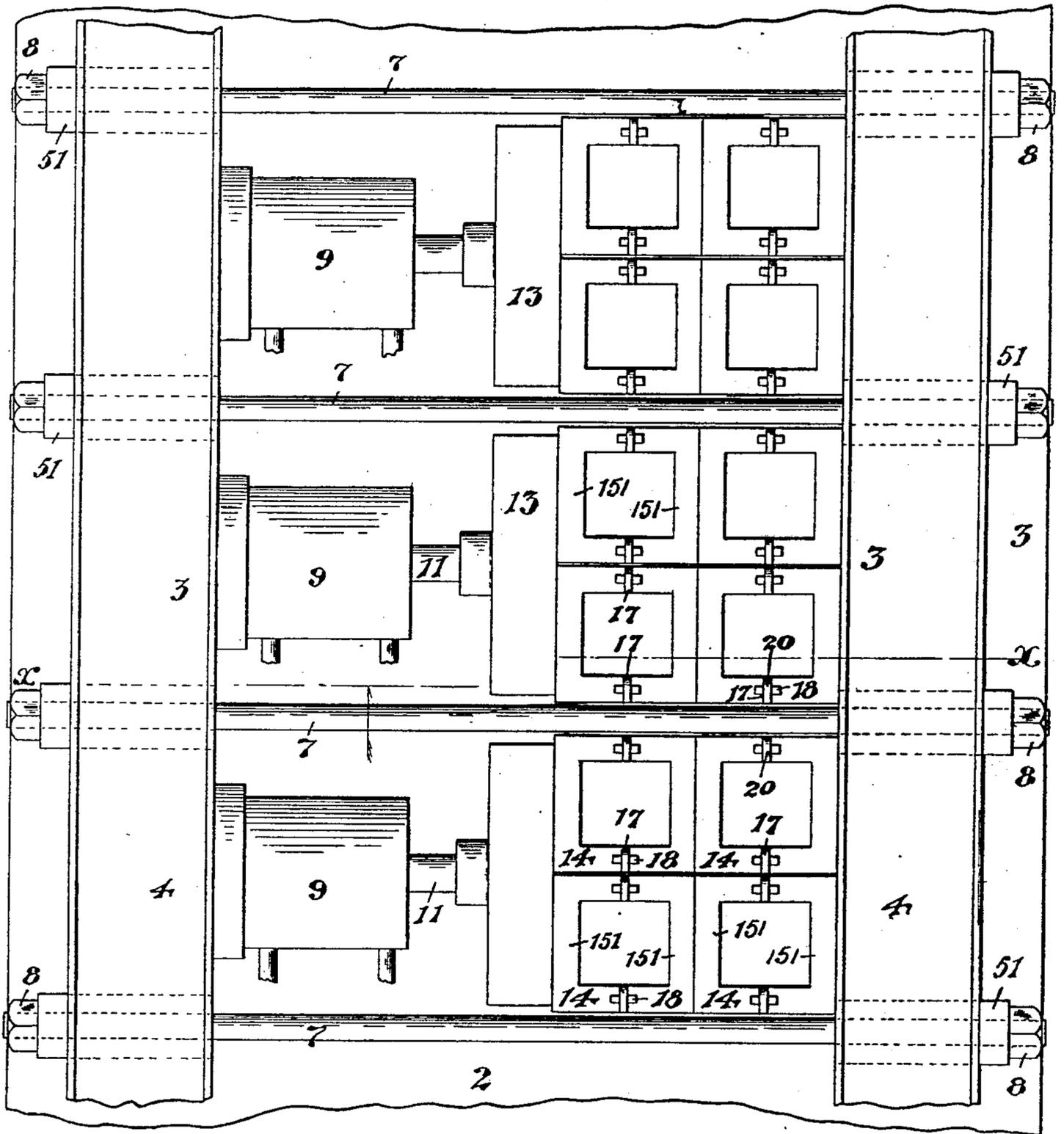


Fig. 1.

WITNESSES

Ralph Lancaster

Russell M. Everett.

INVENTOR

John Illingworth,

BY

Charles H. Pell,

ATTORNEY.

22-4-11-10
 J. ILLINGWORTH
 PATENT ATTORNEY
 100 N. BROAD ST.
 PHILADELPHIA, PA.
 Compressors

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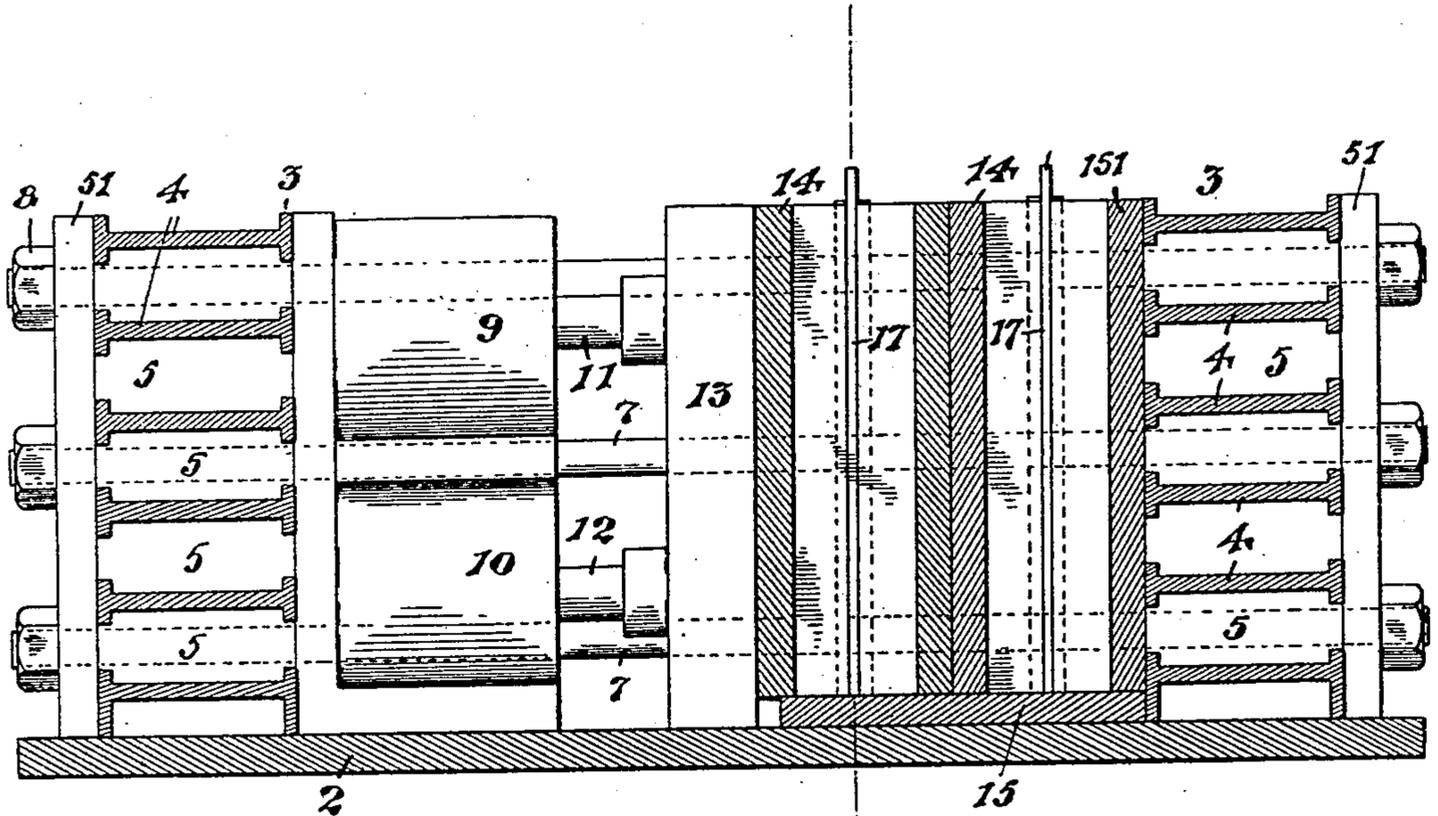


Fig. 2

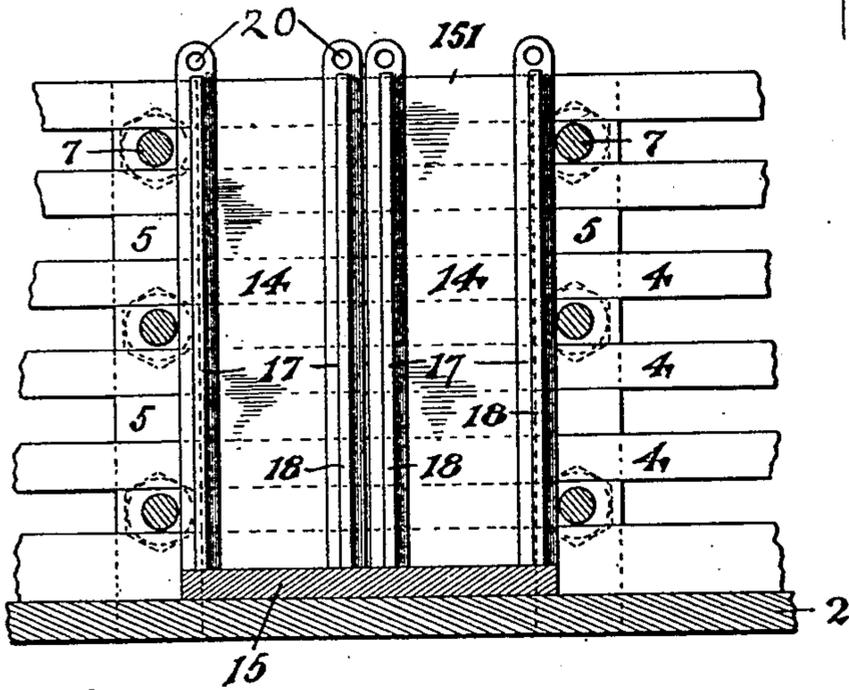


Fig. 3

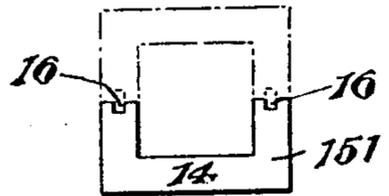


Fig. 4

WITNESSES:

Ralph Lancaster
 Russell M. Everetts.

INVENTOR:

John Illingworth.

BY

Charles H. Pell,

ATTORNEY.

UNITED STATES PATENT OFFICE.

JOHN ILLINGWORTH, OF NEWARK, NEW JERSEY.

INGOT-CASTING MACHINE.

No. 810,654.

Specification of Letters Patent.

Patented Jan. 23, 1906.

Application filed June 17, 1905. Serial No. 265,749.

To all whom it may concern:

Be it known that I, JOHN ILLINGWORTH, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Ingot-Casting Machines; 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, reference being had to the accompanying drawings, and to numerals of reference marked thereon, which form a part of this specification.

This invention relates more particularly to certain improvements in the art of casting ingots disclosed in my prior patent dated March 6, 1900, No. 644,918, the objects of the present improvements being to enable the molding operation to be carried on with greater convenience, facility, and ease, to reduce the cost of the machine, to more effectively prevent "piping," to secure a more perfect ingot, and to obtain other advantages and results, some of which may be hereinafter referred to in connection with the description of the working parts.

The invention consists in the improved ingot-forming machine and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth, and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like numerals of reference indicate corresponding parts in each of the several figures, Figure 1 is a plan of my improved machine. Fig. 2 is a vertical section of the same taken at line *x*. Fig. 3 is a vertical section taken at line *y* of Fig. 2, and Fig. 4 is a detail plan of one of the mold-sections.

In said drawings, 2 indicates the bed-plate or supporting-floor for my improved machine, and at opposite sides of the same are arranged vertical walls, side frames, or bearings 3 3, each of which is preferably composed of a series of horizontal I-beams 4 with filler-blocks 5 between the said beams, the said I-beams being disposed in planes parallel to the floor 2, and therefore adapted to receive edgewise the strain of operation in the machine, as will be hereinafter more fully described. At the outer sides of the two side walls, as described, are arranged vertical cleats or bars 51, and through these cleats from side to side of the machine extend clamping or tying rods 7, threaded at their

extremities to receive nuts 8 outside the cleats 6, and thus serve to unite or bind the two walls together. Obviously any number of such I-beams and blocks can be employed.

In the spaces between the vertical series of rods 7 are arranged against one of the side walls hydraulic cylinders or preferably pairs of hydraulic cylinders 9 10, one vertically above the other in each pair, which cylinders have pistons 11 12, adapted to exert pressure against pressure-plates 13, which are adapted to stand vertically between the tie-rods 7 7. Between each pressure-plate 13 and the side wall or bearing 3 is arranged a series or group of upright molds 14, there preferably being only two or three of such molds in series transversely of the machine or parallel to the rods 7; but any desired number of such series may be arranged longitudinally of the machine, as indicated in Fig. 1. Preferably, however, two series are accommodated between two adjacent rods 7 7 and adapted to be operated by the pressure-plate 13. These molds 14 stand upon a removable plate or plates 15, which is simply laid upon the bed-plate or floor 2.

Each mold 14 in its individual construction comprises a tubular or hollow body portion, preferably square in cross-section and adapted to stand upright, the lower end being closed by the plate 15 and the upper end being opened to receive the metal in pouring. However, the molds may be filled either from the bottom or top. Each of the body portions of the molds is divided longitudinally as upon a median plane parallel to two opposite sides, the edges of the two sections 151 151 thus formed being grooved, as at 16, Fig. 4. Between said grooved edges is a removable filler-piece 17, each being of a thickness adapted to separate the mold-sections slightly, and having at its opposite sides tongues 18, adapted to enter grooves of the section. The top of each of the pieces 17 is provided with a handle or gripping projection 20 of any suitable construction for manipulating the same or permitting said filler-pieces to be raised from between the mold-sections by a hydraulic hoisting-machine, the several filler-pieces all to be removed usually from a group at one time.

In use the molds are arranged as shown in Fig. 1, with the filler-pieces in place and their hydraulic cylinders holding the molds and mold-sections firmly together. The filler-pieces are thus subjected to the pressure of

the rams and are capable of sustaining this pressure without collapsing or crushing, so that the parts thereof could enter the ingot and injure it for commercial or mechanical uses. Being of material capable of sustaining this hydraulic pressure, said filler-pieces are capable of being drawn vertically out from between the mold-sections, and to facilitate this operation said pieces project above the upper ends of the section and are perforated to form an eye which serves as the handle or gripping means above referred to. In this position the molds are filled with molten metal, and this metal is allowed to partially harden or set, and then the pistons of the hydraulic rams are slackened and the filler-pieces removed, after which the pressure of the hydraulic rams is again utilized to close the mold-sections one directly against another into the position indicated in Fig. 4, thus closing up the gaps left by the removal of the filler-pieces and condensing the metal in the molds, so that any central hollowness or piping is pressed out and the ingot is made solid at and near the top thereof.

Having thus described the invention, what I claim as new is—

1. In an ingot-casting machine, side walls or frames comprising I-beams arranged horizontally one upon another, tie rods or bolts binding the said side walls together, a hydraulic cylinder and a piston, and a mold arranged between the piston and one of the side walls, said mold being in sections disposed perpendicular to the direction of movement of the said piston and having pieces separably inserted between the sections and adapted to be wholly withdrawn from between the molds preliminary to a compression of the partially-cooled ingot.

2. In an ingot-casting machine, the combination of opposite side walls, each comprising a series of I-beams arranged horizontally upon one another, tie rods or bolts holding said side walls together, a series of molds arranged transversely of the machine between two adjacent tie-rods, and a hydraulic cylinder and piston also between said tie-rods in series with said molds, the said molds each being in sections disposed perpendicular to the direction of movement of the said piston and each having pieces also disposed in lines perpendicular to said movement of said piston, said pieces being separable from the sections of the mold and adapted to be wholly withdrawn endwise from between said sections preliminary to the compressing action of the hydraulic piston.

3. In an ingot-casting machine, the combination with a bed-plate, opposite side walls each comprising a vertical series of horizontally-disposed I-beams, transverse tie rods or bolts holding the said side walls together, a transverse series of molds arranged between two adjacent tie-rods, a loose base-plate be-

neath said molds, a pressure-piece against the side of said molds farthest from the side wall, and a hydraulic cylinder and piston between said pressure-piece and the other side wall, the said molds being each in sections having therebetween removable pieces disposed transversely to the direction of movement of the piston and adapted to be withdrawn from between said sections preliminary to the compressing operation of the hydraulic piston.

4. In an ingot-casting machine, a mold comprising a body portion divided longitudinally into sections and having the meeting edges of said sections grooved, tongued metallic filler-pieces adapted to be inserted between said edges and lie in said grooves and means for compressing said molds.

5. In an ingot-casting machine, a series of molds each comprising a tubular body portion divided longitudinally into sections, the opposing edges of said sections being grooved and filler-pieces each adapted to lie between two meeting edges of the mold-sections and having opposite tongues to enter the grooves of said edges, and means for compressing said molds.

6. In an ingot-casting machine, a frame having opposite side walls, a series of molds arranged between said side walls, each mold being divided longitudinally into sections, filler-pieces adapted to be inserted between the edges of said sections and wholly withdrawn from therebetween preliminary to the compressing operation and means for compressing said molds.

7. In an ingot-casting machine, the combination of molds, each comprising longitudinal sections adapted to meet at their edges, and having said edges grooved, filler-pieces each comprising a body portion adapted to lie between the meeting edges of the mold-sections, and projecting upwardly beyond the upper ends of said sections and thereat provided with a handle whereby the filler-piece may be withdrawn longitudinally and wholly from between said sections and having at its opposite sides below said handle ribs or tongues to enter the grooves of said edges.

8. The improved ingot-forming machine herein described, having therein a mold in sections, the contiguous walls of which are grooved and have filler-pieces inserted between said contiguous walls and provided with ribs to enter said grooves, substantially as set forth.

9. The improved ingot-forming machine herein described, comprising two vertical series of beams and means for holding said beams together in series and means for tying one series to the other series, the said series being one at a distance from the other, space being provided between said series to receive a collection of sectional molds and a plurality of hydraulic rams, the said rams bearing

against one wall of the series of beams and
oppositely against certain of the sectional
molds, pieces inserted, perpendicular to the
direction of movement of the hydraulic rams,
5 between the sections of the molds and adapt-
ed to be removed from between said molds,
substantially as set forth.

In testimony that I claim the foregoing I
have hereunto set my hand this 29th day of
May, 1905.

JOHN ILLINGWORTH.

Witnesses:

CHARLES H. PELL,
RUSSELL M. EVERETT. |