(No Model.) 3 Sheets—Sheet 1.

W. H. WELSH.

TYPE CASTING MACHINE.

No. 524,099. Patented Aug. 7, 1894.

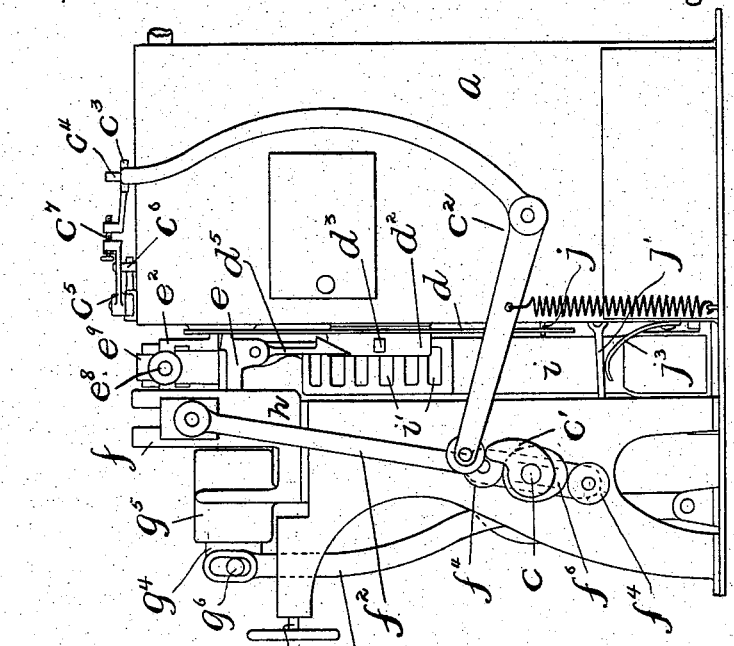

FIG. 2.

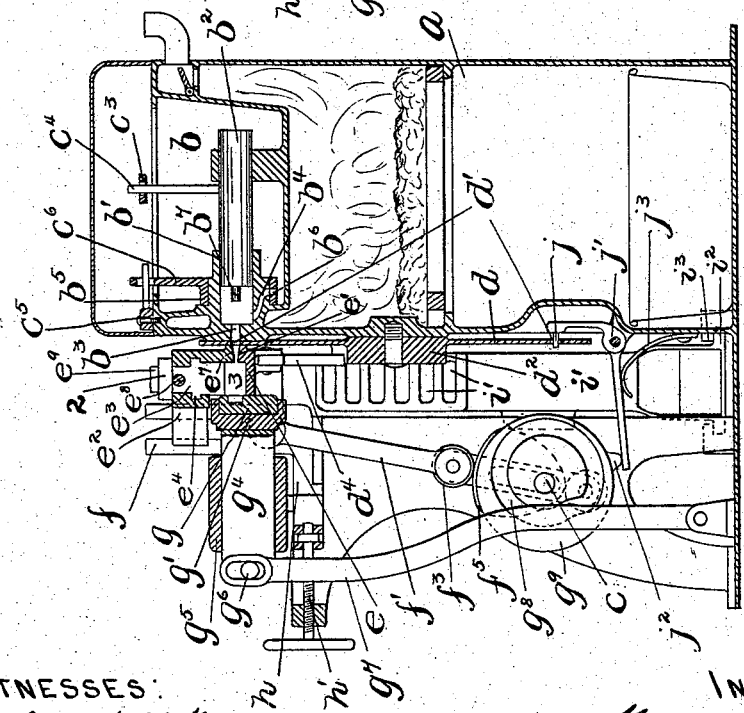

FIG. 1.

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Arthur H. Abell.
Parker Davis

INVENTOR:
W. H. Welsh
by
Wright, Brown & Connally
Attys.

(No Model.) 3 Sheets—Sheet 2.

W. H. WELSH.

TYPE CASTING MACHINE.

No. 524,099. Patented Aug. 7, 1894.

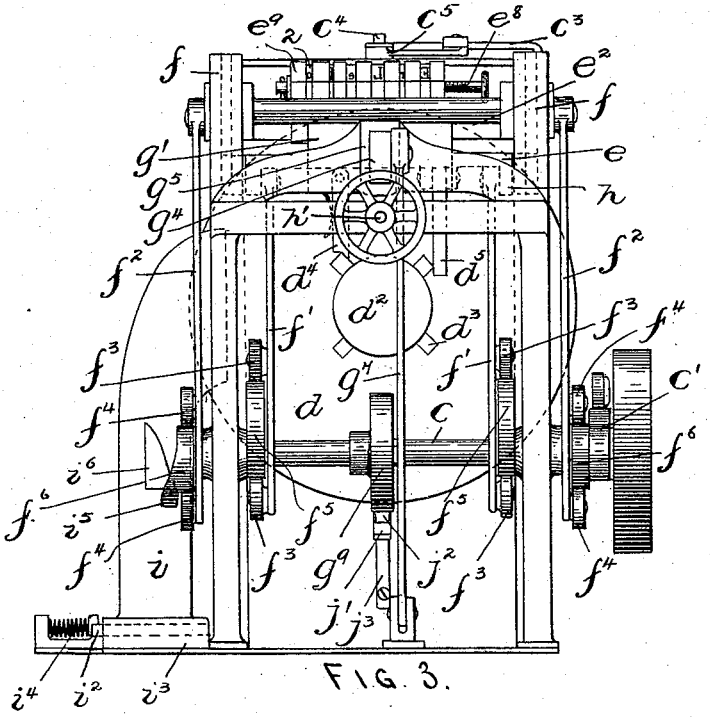

FIG. 3.

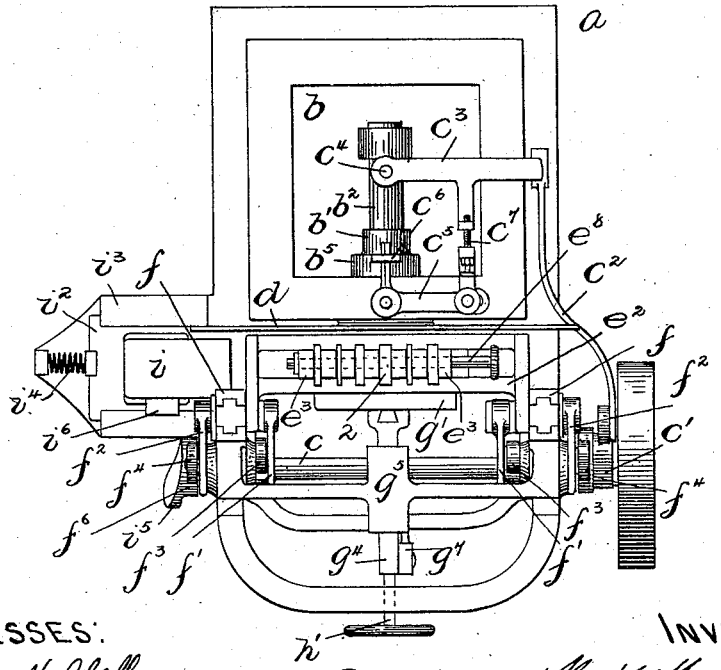

FIG. 4.

WITNESSES:
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(No Model.) 3 Sheets—Sheet 3.

W. H. WELSH.

TYPE CASTING MACHINE.

No. 524,099. Patented Aug. 7, 1894.

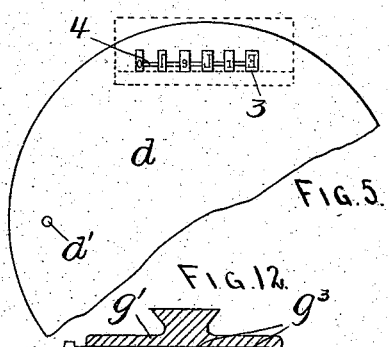


FIG. 5.

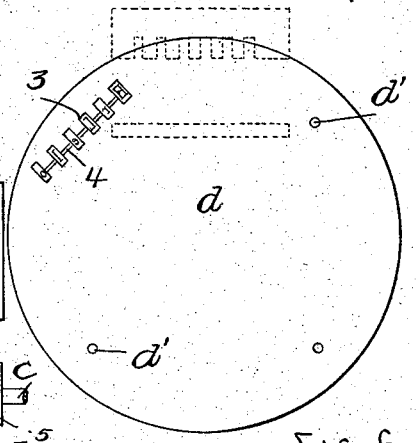


FIG. 6.

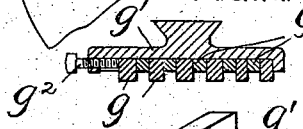


FIG. 12.

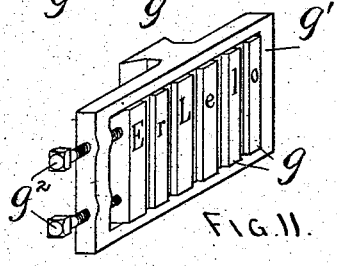
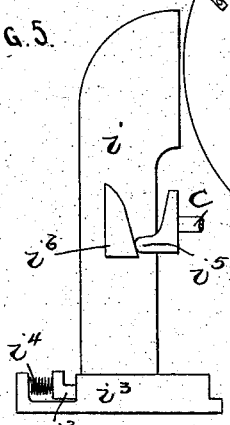


FIG. 11.



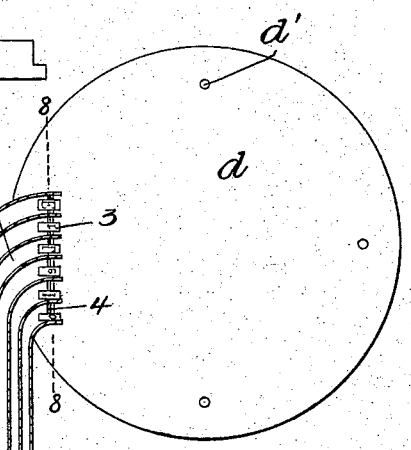


FIG. 7.

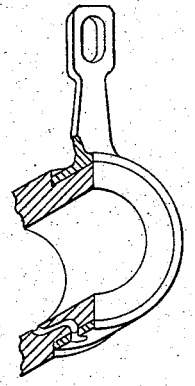


FIG. 9.

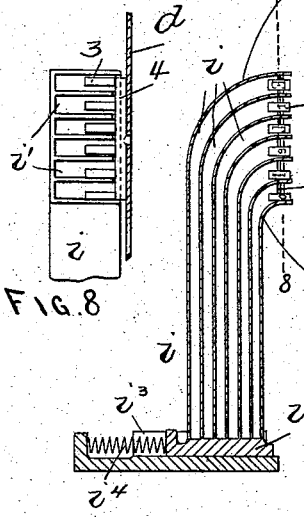


FIG. 8.

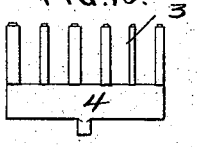


FIG. 13.

FIG. 14.

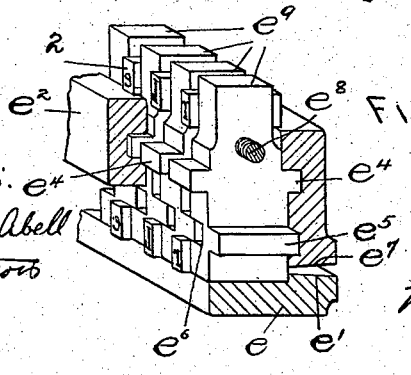


FIG. 10.

WITNESSES:
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INVENTOR:
W. H. Welsh.
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UNITED STATES PATENT OFFICE.

WILLIAM H. WELSH, OF SOMERVILLE, MASSACHUSETTS.

TYPE-CASTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 524,099, dated August 7, 1894.

Application filed August 18, 1893. Serial No. 483,483. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. WELSH, of Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Type-Casting Machines, of which the following is a specification.

The chief object of the present invention is to produce a machine in which a plurality of type can be cast simultaneously; it also has in view a more practical construction of type casting machine than now in use.

Reference is to be had to the annexed drawings, and to the letters and figures marked thereon, forming a part of this specification, the same letters designating the same parts or features as the case may be, wherever they occur.

Of the drawings—Figure 1 shows a longitudinal vertical section of a machine embodying the invention. Fig. 2 shows a side elevation. Fig. 3 shows a front elevation. Fig. 4 shows a top plan view. Figs. 5, 6 and 7 show diagrammatic views illustrating different relative positions assumed by the mold-parts, the type-carrying disk, and the breaker. Fig. 8 shows a section on line 8 8 of Fig. 7. Fig. 9 shows a sectional perspective view of the piston-cylinder. Fig. 10 shows a sectional perspective view of the mold. Fig. 11 shows a detail perspective view of the matrix-box. Fig. 12 shows a section of the matrix-box. Figs. 13 and 14 show views of the type as they emerge from the mold.

The fire-box a is of the usual or any suitable construction, and in its top is the pot b for the molten metal. The means by which the metal is injected into the mold consist of a horizontal cylinder b' projecting from the front wall of the pot, and piston or plunger b^2, fitting said cylinder and supported in a bearing rising from the bottom of the pot. The cylinder has a discharging port b^3 in its front end, and a supply port b^4 in the under side, and controlled by a valve in the form of a band b^5 surrounding the cylinder and having a port b^6 to register with the port b^4. In operation the valve turns and closes the port b^4, as the piston b^2 advances so as to prevent the metal from passing back into the pot. The piston is formed with a nub b^7 to enter the port b^3 and clear the same of metal so as to prevent the latter hardening therein.

The piston and the valve are operated from the driving shaft c through the following means: An abrupt cam c' affixed on said shaft engages a roller at the end of one arm of a spring-actuated bell-crank lever c^2, the other arm of which has a laterally extending portion c^3 engaging a pin c^4 projecting from the piston. A bell-crank lever c^5 pivoted on the upper side of the pot b has one arm in engagement with an arm c^6 of the valve b^5, while its other arm is connected with the lateral portion c^3 of the lever c^2 by an adjusting bolt c^7.

A circular disk d is rotatably supported on the front side of the fire-box a and at four equidistant points is provided with holes d' adapted to register with the port b^3. This disk fits closely to the surface of the pot at the port b^3 and besides constituting a carrier for the type, as will hereinafter appear, it also serves as a cut-off or valve to close said port. The disk has a hub d^2 from whose periphery four equidistant lugs d^3 project, and the disk is turned by pawls d^4 and d^5, which depend from the lower half e of the mold, and act on the lugs d^3. The pawl d^4 pushes down on a lug of the disk under a downward movement of the mold-half e, and the pawl d^5 pulls up on another lug of the disk upon the return of the mold-half. The two pawls together impart a quarter of a revolution to the disk. Both the pawls are pivoted and spring-actuated so as to slide over the lugs when retracted.

The mold is in halves movable away from each other rectilinearly, the lower half e moving downward while the top half moves up. The bottom half is simply a bed for the top half to rest upon and has an off-set or shoulder for the base or foot of the type and a tapered surface e' for molding the jet.

The top-half of the mold comprises a casing or frame e^2 having longitudinal grooves in its sides, and blocks e^3 having ears e^4 engaging said grooves, and interlocking ribs and grooves e^5, e^6. The blocks e^3 rest on the bed e when the mold is closed, and a cell in which to cast a type is formed between each two blocks and bounded by the sides of the

blocks and the ribs e^5. The base of the type is formed by the shoulder of the bed e and the rear side of the frame e^2, and the latter has a beveled under face e^7 to co-act with the beveled face e' of the bed in forming the jet.

The width of the type cells is regulated as follows: One end-block e^3 is fixed and a screw-threaded rod e^8 engages said blocks and extends loosely through all the other blocks, and has a collar fitting against the other end-block. Each block has an upward-projection e^9, and pattern type 2 are placed between these projections, and the rod e^8 is turned so as to draw the blocks all tight upon the type. This adjustment makes the type casting cells correspond exactly in width with the pattern type, however much the type vary in width. The jet-space between the surfaces e' and e^7 is closed by the disk d, and communication is established between it and the metal-pot through the openings d'. It will be seen that when one of said openings is registering with the port b^3, the piston can charge all of the cells of the mold.

The top and bottom halves of the mold are moved toward and away from each other through the following means: Each is supported in vertical slide-ways f, and a pair of pitmen f' f^2 is pivoted to each mold-half and they carry rollers f^3, f^4 engaging opposite sides of cams f^5 f^6 affixed on the driving shaft. The cams are set oppositely so as to move the mold-halves in opposite directions.

Matrices g for forming the faces of the type are set up in a frame or box g' and abut the front side of the mold. The adjustment of the matrices to accord with the type is effected by means of binding screws g^2 which enter the side of the frame or box and bear against one end matrix and crowd all the other matrices together. Blanks g^3 are put between the matrices to make up the thickness of the mold blocks e^3. The regulation matrix is used and as in matrices used in type casting the distance between the sides of a letter and the side edges of the matrix is the same in one as another, it will be seen that by setting matrices in the box to correspond with the type to be cast, and crowding them all together, they will always have exactly the proper position to co-act with the mold-blocks in forming the type, the blanks between the matrices being all of the same width. The matrix-box moves rectilinearly toward and from the mold; it is fastened on the end of a stem g^4 which fits a slide-way g^5 and carries a pin g^6, which is engaged by the slotted upper end of a lever g^7, pivoted at its lower end to a stationary support and carrying a roller in engagement with a cam-groove g^8 of a disk g^9 affixed to the driving shaft.

The slide-ways f which support the mold and the slide-way g^5 which supports the matrix-box, are both parts of a carriage h fitting ways on the stationary frame of the machine. A screw-threaded rod h' is connected with said carriage and engages a threaded hole in the stationary frame. By turning the rod the mold and matrix-box may be moved back so as to leave the disk d and rear part of the mold accessible for cleaning or other purposes.

A breaker in the form of a stand-pipe i, having a separate passage or chute i' for each type, is located at one side of the disk d and has a laterally curved upper end adapted to be projected over the face of said disk. The arrangement for reciprocating the breaker is as follows: Its base i^2 fits a slide way i^3 and is acted upon by a spring i^4, which tends to project the breaker over the face of the disk. A projection i^5 on one of the cams f^6 acts on a lug i^6 fastened on the side of the breaker and retracts the latter. The jet is detached from the disk d by a push-pin j carried on the end of a bell-crank lever j' and adapted to be projected through the holes d' by reason of a lug j^2 on the periphery of the disk g^9 acting on the lever j'. The lever is retracted by a spring j^3.

The operation may be briefly reviewed as follows: The parts being in the position shown in Fig. 1, the valve b^5 closes, and the piston b^2 drives the metal in the cylinder out through the port b^3 and into the mold. This metal fills all the cells of the mold and the jet space and also the hole d' in the disk d, so that upon hardening a plurality of type is formed corresponding with the number of cells and they are connected by the jet which is common to them all, and moreover are held on the disk d by the sprue in the hole d' and the adhesion of the metal to the disk. The mold opens by the upward movement of the top half and the downward movement of the bottom half, the matrix-box recedes, and the disk d turns carrying the type 3 with it, see Fig. 6. The disk moves through a quarter of a revolution and stops with the type in a vertical line directly in front of the breaker. The latter advances and receives one type in each chute, see Fig. 7, the rear side of the breaker being cut away to allow for the jet 4. In the mean time the mold-parts and matrix-box have returned to receive another charge of metal, and upon opening again, the disk d is turned through another quarter of a revolution and the type 3 being held in the chutes of the breaker are broken from the jet 4 and pass down their respective chutes, the jet being carried on by the disk. At the completion of the second quarter-turn of the disk the push-pin j is projected into the opening d' and detaches the jet and sprue from the disk. At the same time the next following set of type is being taken by the breaker, and another set is being cast, and so the operation continues.

A few of the advantages possessed by a machine constructed in accordance with the invention, are as follows:

The capacity for work is greatly increased by reason of the fact that a plurality of type is cast at the same time.

No grinding to a fit in the pump parts is

necessary and hence they do not need the constant attention required by those now used in machines of this character. No choker or nipple such as employed in the machines now used is necessary.

The movement of the mold parts is rectilinear which insures more perfect action than pivotal movement of these parts.

The regulation matrix can be used; no special construction of matrix is required.

A variety of type can be cast together as indicated in the drawings, and they are distributed by the breaker. In casting type in this way, if all of one character desired has been cast, this can be changed for one of another character without affecting the casting of the other type of a row or line.

It is evident that the invention herein claimed may be embodied in other forms than here shown, and hence it is not limited in this respect.

Having thus explained the nature of the invention and described a way of constructing and using the same, though without attempting to set forth all of the equivalent mechanical forms in which it may be made or all of the modes of its use, it is declared that what is claimed is—

1. A sectional mold for type-casting machines, comprising a plurality of independently-movable mold-blocks forming mold-cavities between them and adapted to receive pattern-type between them for determining the size of the mold-cavities, and means for adjusting the blocks to the pattern-type and holding them at such adjustment.

2. A mold for type-casting machines composed of separable halves, one of which consists of a frame or case, a number of movable blocks therein, forming mold cavities between them and a screw extending through said blocks, substantially as described.

3. A type-casting machine comprising in its construction a sectional mold having a plurality of mold-blocks, adjustable by means of pattern type placed between them, and a matrix-box adapted to hold matrices corresponding with the pattern type.

4. A type-casting machine comprising in its construction a metal pot having an outlet port, and means for discharging the metal therethrough, a mold in front of said port composed of a top and bottom half movable rectilinearly in ways up and down, and means for opening and closing the mold.

5. A type-casting machine comprising in its construction a metal pot having an outlet port and means for discharging the metal therethrough, a mold in front of said port composed of a top and bottom half movable rectilinearly in ways up and down, means for opening and closing the mold, a rotatable carrying disk having a sprue-hole and a hub with lugs on its periphery, and pawls carried by the bottom half of the mold and adapted to engage said lugs and thereby turn the disk.

6. A type-casting machine comprising in its construction a metal pot having a discharge port, and a means for ejecting the metal therethrough, a carrier in the form of a disk on the exterior of the pot fitting at all times closely to the surface thereof where the discharge port issues therefrom and having a sprue-hole, and a mold on the outer side of the said disk.

7. A type-casting machine, comprising in its construction means for casting a line or row of type with a jet common to all of them, a carrier to take the cast from the mold, and a breaker adapted to stand in the path of the type and break them from the jet.

8. A type-casting machine comprising in its construction means for molding a line or row of type with a jet common to all of them, a carrier to take the type from the mold, and a breaker having a channel or chute for each type substantially as described.

9. A type-casting machine comprising in its construction means for molding a line or row of type with a jet common to all the type, a carrier in the form of a rotatable disk having a sprue-hole, and a reciprocating breaker having a chute for each type.

10. A type-casting machine comprising in its construction a metal-pot having an outlet port and means for discharging the metal therethrough, a rotatable disk having a sprue-hole to register with the outlet port, a mold formed of top and bottom halves movable toward and away from each other, the bottom half having means for actuating the rotatable disk, a movable matrix-box, means for opening and closing the mold, and a carriage supporting the mold and matrix-box and movable toward and from the metal-pot, substantially as and for the purpose described.

11. A type-casting machine comprising in its construction a metal-pot having a cylinder on the interior with inlet and outlet ports, an oscillatory valve controlling the inlet-port, a piston in the cylinder, and means for reciprocating the piston and shifting the valve.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 10th day of August, A. D. 1893.

WILLIAM H. WELSH.

Witnesses:
F. PARKER DAVIS,
ARTHUR W. CROSSLEY.