(No Model.) 4 Sheets—Sheet 1.

J. M. HEPBURN.

TYPE FOUNDING MACHINE.

No. 324,111. Patented Aug. 11, 1885.

Fig. 1.

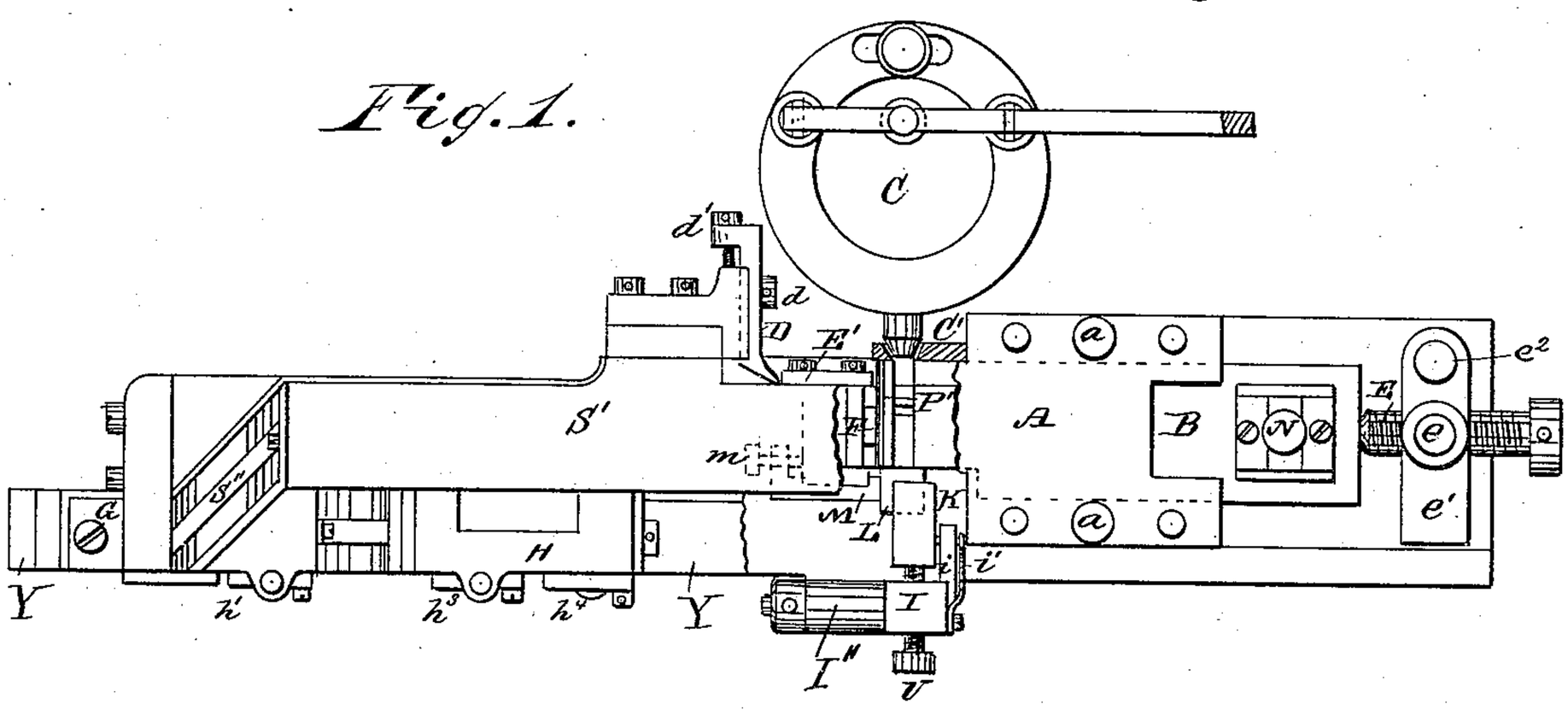


Fig. 2.

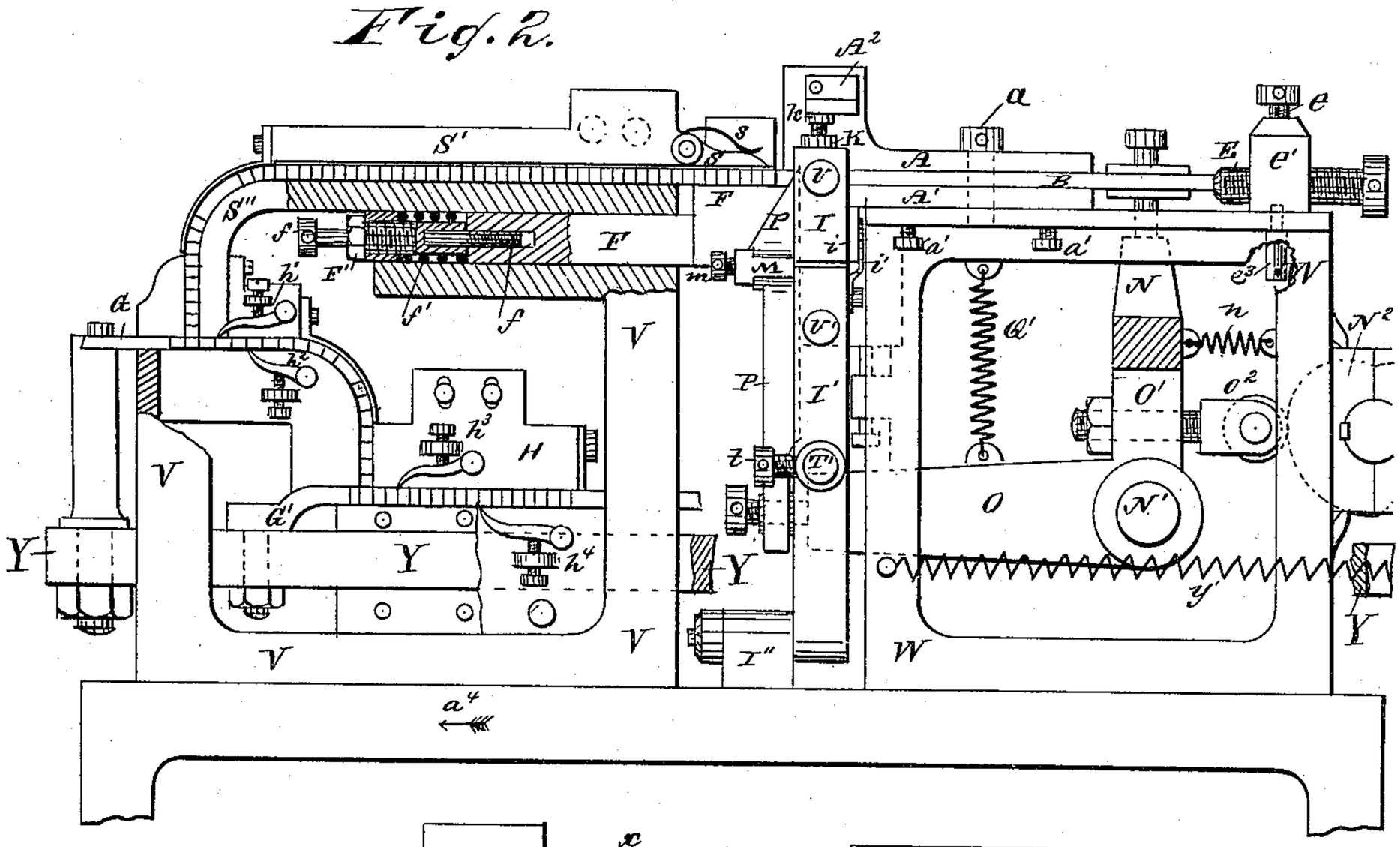


Fig. 3.

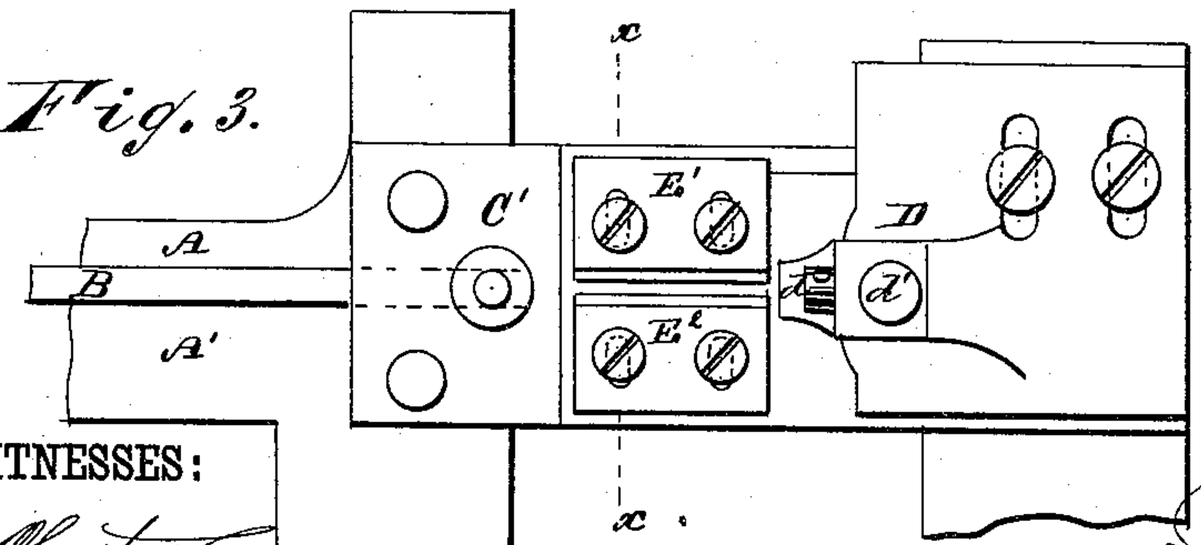
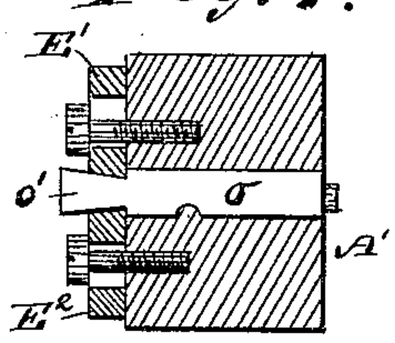


Fig. 4.



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ATTORNEYS.

(No Model.)

4 Sheets—Sheet 2.

J. M. HEPBURN.

TYPE FOUNDING MACHINE.

No. 324,111. Patented Aug. 11, 1885.

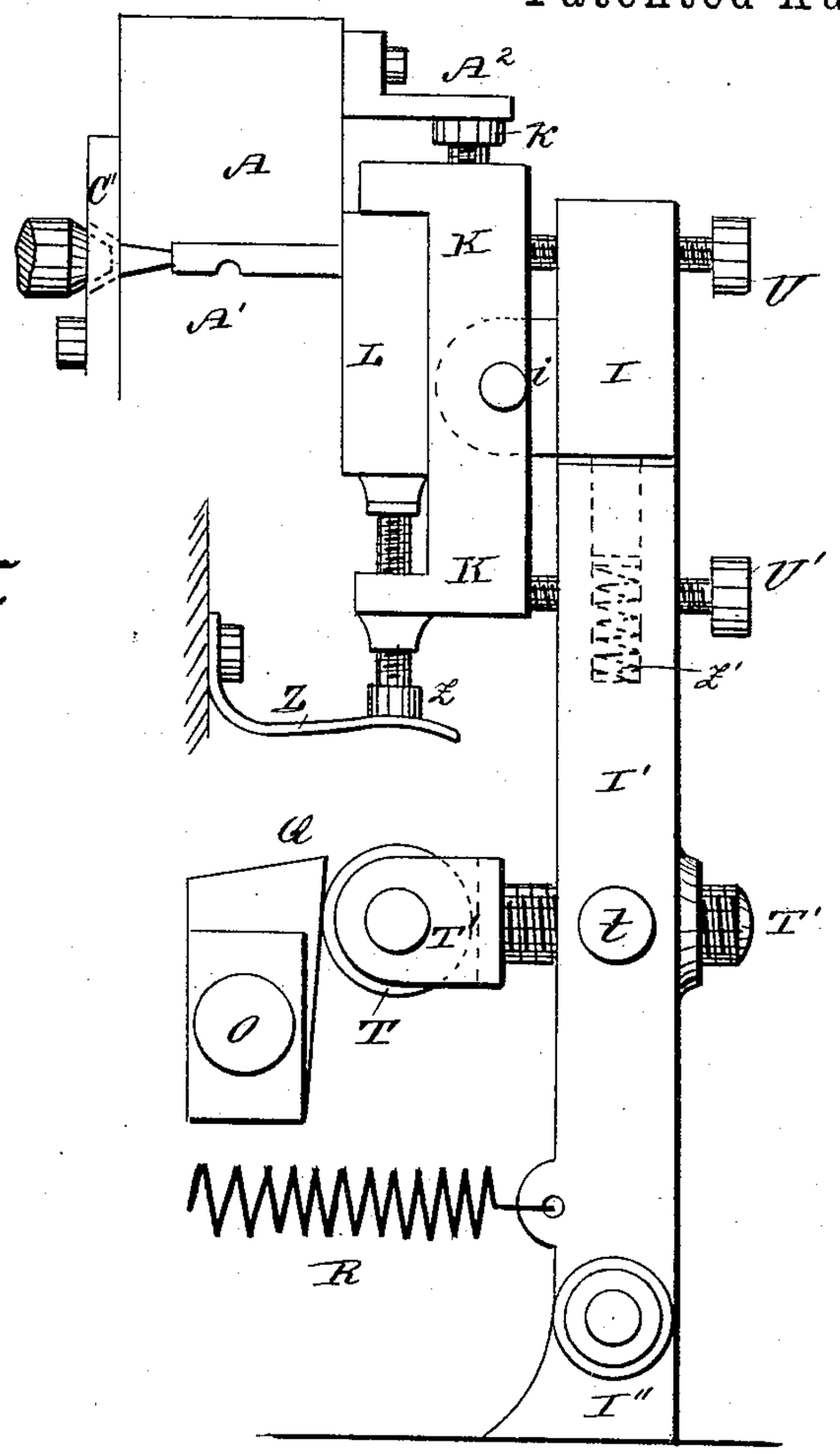


Fig. 5.

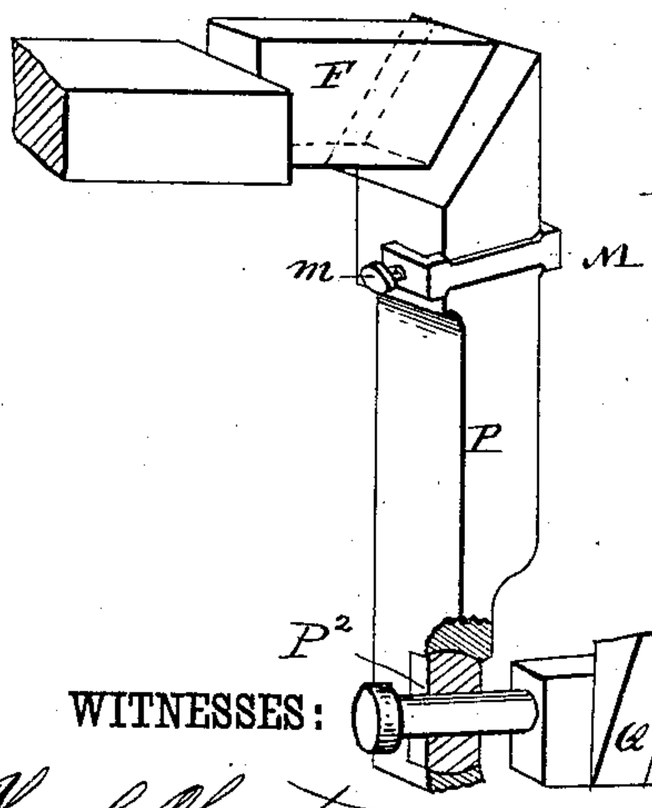
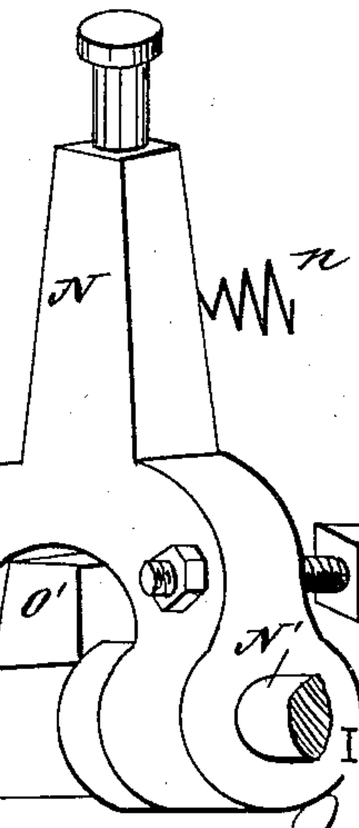


Fig. 6.



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4 Sheets—Sheet 3.

J. M. HEPBURN.

TYPE FOUNDING MACHINE.

No. 324,111. Patented Aug. 11, 1885.

Fig. 7.

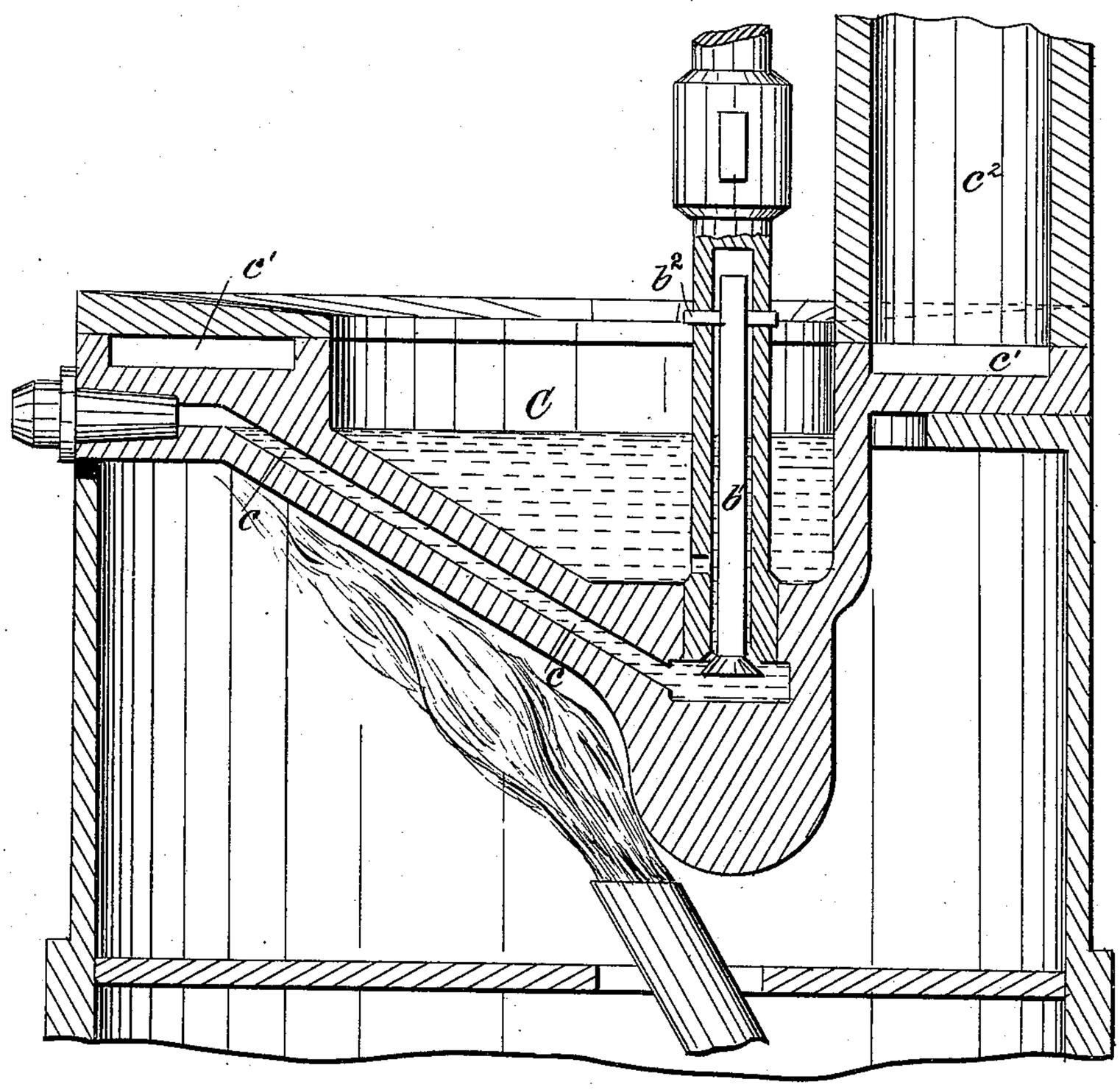


Fig. 8.

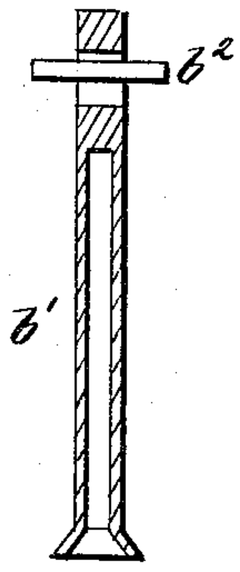
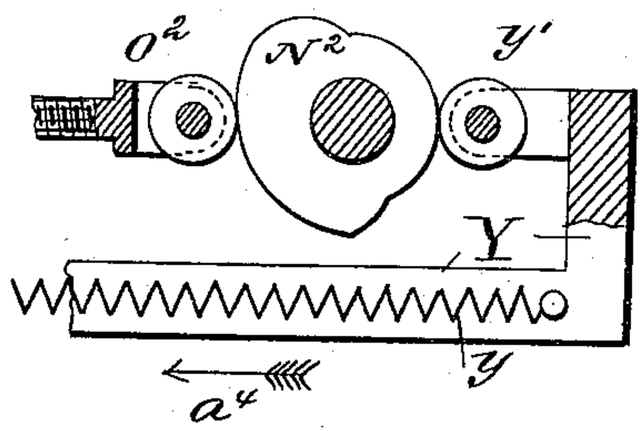


Fig. 9.



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J. M. HEPBURN.

TYPE FOUNDING MACHINE.

No. 324,111. Patented Aug. 11, 1885.

Fig. 10.

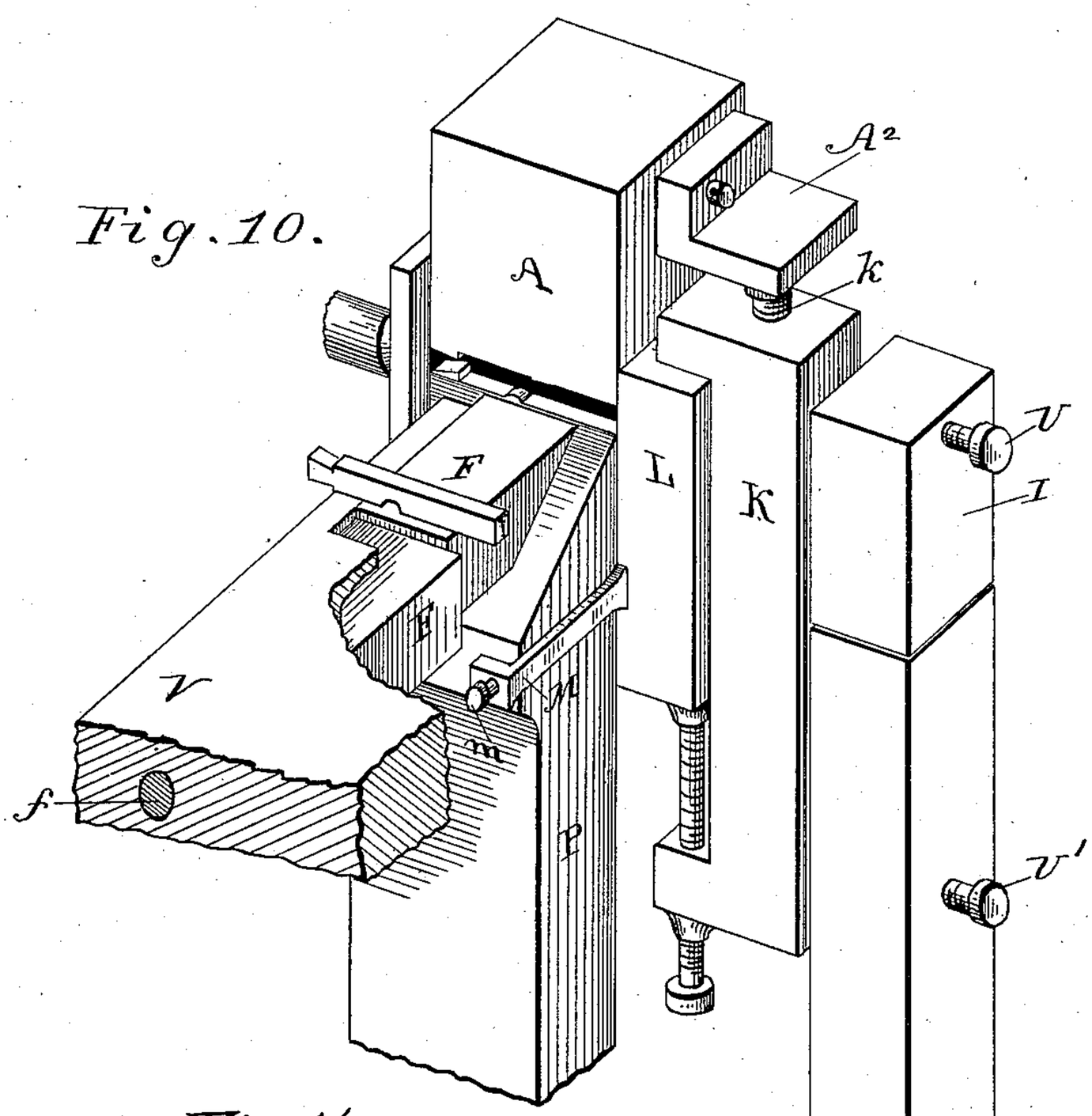
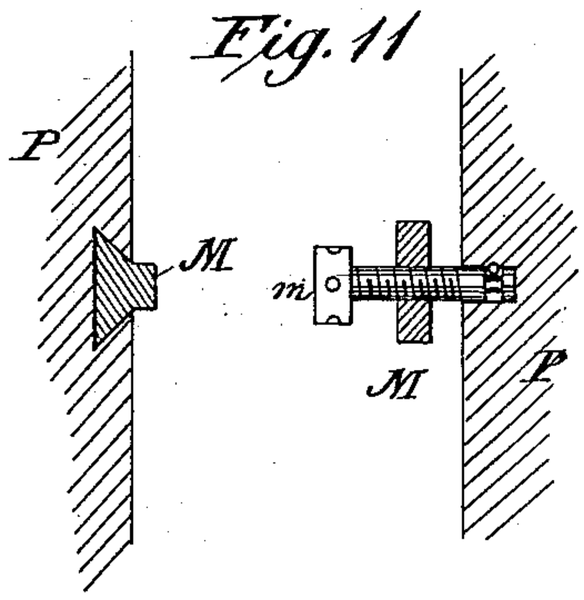


Fig. 11



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UNITED STATES PATENT OFFICE.

JOHN MAIR HEPBURN, OF LONDON, ENGLAND, ASSIGNOR TO THE BAUER'-SCHE GIESSEREI, OF FRANKFORT-ON-THE-MAIN, GERMANY.

TYPE-FOUNDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 324,111, dated August 11, 1885.

Application filed August 17, 1883. (No model.) Patented in Germany February 27, 1883, No. 24,780; in England May 21, 1883, No. 2,531; in Belgium June 30, 1883, No. 61,630; in Austria August 16, 1883, No. 21,167 and No. 35,871; in France September 27, 1883, No. 155,933, and in Italy December 6, 1883, No. 15,762.

To all whom it may concern:

Be it known that I, JOHN MAIR HEPBURN, of London, England, now a resident at Frankfort-on-the-Main, in the Empire of Germany, have invented new and useful Improvements in Type-Founding Machines, of which the following is a specification.

The object of my invention is to provide a new and improved machine for the manufacture of types, spaces, quads, &c., in which machine the type are cast, polished, cut out, and dressed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of my machine, parts being broken out and others shown in section. Fig. 2 is a front elevation of the same, parts being broken out and others shown in section. Fig. 3 shows the guides and the mechanism for cutting off the type. Fig. 4 is a cross-sectional elevation of the same on the line *x x*, Fig. 3. Fig. 5 is a side elevation of a portion of the machine, showing the manner of supporting the matrix-box and means for operating the supporting-lever of said matrix-box. Fig. 6 is a perspective view of the levers and arms for operating the mold-slides. Fig. 7 is a cross-sectional view of the melting-pot. Fig. 8 is a longitudinal sectional elevation of the valve for the metal-pump. Fig. 9 shows the cam for operating the bar Y. Fig. 10 is a detail perspective view. Fig. 11 is a detail view, showing the manner of securing the register and adjusting-screw to the slide.

Referring to the drawings, the upper and lower sides of the mold into which the metal is forced are formed by the top and bottom steel blocks or cheeks, A and A′, which rest upon an angle-piece, and are attached to the frame W, and are regulated or adjusted in position by screws *a* and *a′*. A slide, B, which is also made of hardened steel, fits closely between the cheeks or blocks A A′, and the front end of the slide B forms one side of the mold, and by its movement, which will be described hereinafter, pushes the type, quads, or spaces, when set or hardened, out of the mold to be further acted upon in a manner that will be described. The slide B will be reciprocated horizontally by a lever, N, shown in Figs. 2 and 6, which is drawn back by a spiral spring, *n*, and pushed forward by a suitable cam, N², working against the friction-roller *n′*, which lever N is forked and swings on the transverse shaft N′ in the frame W.

In order to make the type of the desired thickness the slide B is drawn back by the spiral spring *n* until it rests against the screw E, which is passed through a pivoted block, *e′*, provided with a binding-screw, *e*, for locking the regulating-screw E in place. The block *e′* is pivoted, so that in case the slide B is to be removed for cleaning or repairing it, the screw E need not be unscrewed from the said block. The block *e* is pivoted at e^2, and is locked in position by the screw e^3. The mold has its front side formed by a slide, P, which is moved vertically by a lever, O, also pivoted on the shaft N′, which lever is drawn upward by a spring, Q′, secured thereto and to the frame W. To permit the slide P to move vertically as rod O vibrates on its shaft N′, the rod and slide are connected together by a ball-and-socket joint, P², as shown in Fig. 6. The lever O is provided at its pivoted end with an upwardly projecting arm, O′, through which a screw passes carrying a friction-roller, O², against which a suitable revolving cam rests, whereby the cam can force the free end of the lever O downward. When the slide P is at the highest point of its stroke, it is firmly held against the face of the mold and against the back plate, C′, by an inclined plane formed on its upper end and working against a corresponding inclined plane at the end of a platform, F. (Shown in Figs. 2 and 6.) The platform F, which advances up to the face of the mold to receive the letter which has just been cast, and which letter has been pushed out of the mold by the slide B as soon as the slide P has descended, is provided with a square shank and slides in a recess of the frame V. The letter pushed out of the mold rests upon the tip of the platform F until the next one is pushed out, when it will be pushed onto the table V by the second letter, with its ends resting on the table on

opposite sides of the recess in which the platform moves, as shown in Fig. 10. A spiral spring, f', held within a recess in the frame V, pushes the platform F against the slide P. The frame V is provided with a regulating-screw, F', against which the end of the shank of the platform F rests when the slide P is at its highest position. Through the center of the regulating-screw F' a second regulating-screw, f, passes freely, and is screwed into the shank of the platform F and regulated in such a manner that its head strikes on the head of the screw F' before the sharp upper edge of the platform F can come in direct contact with the face of the mold. That side of the mold opposite the one at which the metal is pumped in is closed by a matrix, L, (shown in Figs. 1 and 5) which is held by a screw, z, in the matrix-box K. The vertical position of the matrix-box, and with it the vertical position of the matrix, is regulated by a screw, k, which is in the top of the matrix-box and rests against a lug, A^2, projecting from the upper cheek or block, A. The matrix-box K is provided with a pivot which fits into an arm, i, of a head-piece, I, which head-piece is provided with a shank passing into a socket in the upper end of a vertical lever-bar, I', under which shank a spiral spring, z', is held, which presses on the lower end of the shank. The vertical lever I' is pivoted to a jaw, I^2, on the bed-plate of the machine, and is thrown back by an inclined plane, Q, attached to the lever-arm O, mentioned above. The said inclined plane Q operates against a friction-wheel, T, held on the end of a screw, T', screwed into the lever I', in which lever the screw T' is locked by means of a binding-screw, t. A spiral spring, R, draws the vertical lever I', and with it the head I, the matrix-box K, and the matrix L, firmly up against the mold as the lever O ascends. The screws U and U' are used to adjust the matrix L against the side of the mold.

In order to insure bringing the matrix-box, and with it the matrix, well up with the screw k against the lug A^2, attached to the upper cheek or block, A, a spring, Z, is secured to and projects from the frame of the machine, which spring presses against the head of the above-mentioned screw z and presses all the above-mentioned parts upward, and with lug A^2 form guides, between which the matrix-box can be adjusted by the screws k z. The matrix-box, and with it the matrix, is regulated from left to right by a spring, i', Figs. 1 and 2, which presses against the pivot of the matrix-box, and thus forces the matrix against the adjustable register M, attached to the slide P, above mentioned. The register M fits in a dovetail groove of the slide P, and a screw, m, swiveled in the said slide, passes through a screw-threaded aperture in the register, as shown in Fig. 11. By this construction the register will be held to the slide and can be adjusted thereon by turning the screw m to cause it to bear with more or less pressure against the matrix, thus enabling the position of the matrix-box to be regulated very accurately. The downward movement of the lever-arm O draws the slide P downward and removes the matrix from the side of the mold at the same time that the slide B, operated by the lever N, pushes the letter which has just been cast out upon the platform F, this latter having been moved up to the face of the mold, as before described. The object of having the head I of the lever I' only fitted to the latter by a shank, as shown in Fig. 5, is to enable the operator to remove the head I, with the matrix-box K and the matrix L, quickly and easily in order to effect any alteration necessary and to permit the automatic regulation before described. When the letter is pushed out of the mold by the slide B, the break or tail o' of the type o is held by two plates, E' E^2, Figs. 1, 3, and 4, which guide the type pushed by the slide B up to the cutting-knife D, which is provided with a regulating-screw, d', and a set-screw, d. The plates E' E^2 have slotted screw-holes, so that they can be regulated according to the different sizes of type or letters. The body of the letters or types are held down on the end of the top surface of the platform F by a hinged jaw, S, pressed downward by a spring, s. After they have had their breaks cut off, the letters or types pass along under the platform-cover S' and down the right-angle quadrant S^2, and during their passage they turn at ninety degrees, and on arriving at the bottom of the track are moved forward by the arm G, which is attached to a bar, Y. The types are then planed at the top and bottom by two spring-cutters, h' h^2, and after being planed they pass over another quadrant, make another turn at an angle of ninety degrees, and are moved along by an arm, G', which is also attached to the bar Y above named, and are then planed on the opposite sides by the spring-cutters h^3 and h^4. A wooden tray is placed in the machine at H to receive the finished letters or types. A spring, y, is fastened to the frame of the machine and to the bar Y, and draws the bar Y in the direction of the arrow a^4, and a friction-roller, y', being acted on by a suitable revolving cam, N^2, presses the bar Y in the inverse direction of the arrow a^4. When only spaces or quads are being cast, I employ only one set of plates E' E^2 and an extra nicking-cutter, having passed which the spaces or quads are acted upon by the before-mentioned cutting device D, which cuts out and smooths the end, and the quads are then passed along on a galley ready for use.

My improved melting-pot C is constructed as follows: The pot is heated by a Bunsen burner, which is placed in a slanting position, so that the flame plays along under the metal chamber c c up to the nozzle, and then passes around the pot in the flue c' and into the chimney c^2. By this arrangement I can keep the metal contained in the channel c and in the nozzle very hot and fluid, and can introduce it into the mold in a fluid state. The stem of the

pump-valve b' (shown in Fig. 8,) is made hollow in order that it may be light and therefore close more easily. The metal can ascend in the stem of the valve and can balance the valve, whereby an air-chamber is produced, which partly supports the valve in the molten metal, and by expansion assists in closing the valve. The pin b^2 is firmly attached to the stem of the piston—that is, to the top of the plunger—and the pin-hole in the valve is slotted, in order to give the valve sufficient play to close the bottom of the plunger at each downstroke.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a type-casting machine, the combination, with a mold, of the slide B, the adjusting-screw E, the pivoted block e', in which the screw is held, and means for holding the said block in position, substantially as herein shown and described.

2. In a type-casting machine, the combination, with a mold and a cutting-knife, of the slide B and the guide-plates E' E^2, for holding and guiding the type, when pushed out of the mold, to the cutting-knife, substantially as herein shown and described.

3. In a type-casting machine, the combination, with the mold, the slide B, and the slide P, forming one side of the said mold and having beveled upper end, of the sliding platform F, having its forward end beveled, substantially as herein shown and described.

4. In a type-casting machine, the combination, with the sliding platform F, of the regulating-screws F' and f, substantially as herein shown and described, and for the purpose set forth.

5. In a type-casting machine, the combination, with a mold, of the oscillating lever I', the head I, stepped in the oscillating lever, the matrix-box K, pivoted to said head, and its matrix L, substantially as herein shown and described, and for the purpose set forth.

6. In a type-casting machine, the combination, with a mold, of the oscillating lever I', the head I, the matrix-box K, the matrix L, the spring z', the arm i, the screws U U' and k, the spring Z, and the screw z, substantially as herein shown and described, and for the purpose set forth.

7. In a type-casting machine, the combination, with a mold and a pivoted matrix-support, of the slides B P, the pivoted lever N, connected to the slide B, the pivoted lever O, having the arm O' and connected to the slide P, the levers N O being pivoted on the same shaft, and means, substantially as described, for rocking the said levers and the matrix-support on their pivots, substantially as herein shown and described.

8. In a type-casting machine, the combination, with a mold, of the slides B and P, the register M, and the regulating-screw m, substantially as herein shown and described, and for the purpose set forth.

9. In a type-casting machine, the combination, with a mold, of the slides B P, the sliding platform F, and the regulating-screws F' f', substantially as herein shown and described.

10. In a type-casting machine, a melting-pot provided with a piston having an opening communicating with the melting-pot, and containing a tubular valve-stem, b', provided with a slot, through which a pin, b^2, passes, substantially as herein shown and described, and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN MAIR HEPBURN.

Witnesses:
FRANZ HASSLACHER,
JOSEPH PATRICK.